

Mexican Wolf Reintroduction Project

Mexican Wolf Blue Range Reintroduction Project 5-Year Review

*Prepared by the
Mexican Wolf Blue Range
Adaptive Management Oversight
Committee and Interagency
Field Team*



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PREFACE

Mexican wolf reintroduction has been prominent in the American public's eye since long before January 28, 1998, when the first captive-reared wolves were placed in acclimation pens in the Blue Range of east-central Arizona and west-central New Mexico for eventual release to the wild. Nor did controversy end with the first release.

The mass media have been rich with Mexican wolf-related stories for more than 20 years, and references to ongoing controversy run rampant through them. Entire books, and parts of others, have been devoted to the subject; among the more prominent examples are: Brown (1983), Burbank (1990), Grooms (1993), Holaday (2003), Nie (2003), and Robinson (2005). In stark contrast, the definitive book on wolf ecology, L.D Mech's (1970) "The wolf: the ecology, and behavior of an endangered species," includes just a few lines about the Mexican wolf, reflecting a personal communication from B.R. Villa:

In Mexico, the wolf is now restricted to three distinct areas....but the population is still declining and is in danger of extinction (Villa 1968)."

Mech's book makes even less mention of the Mexican wolf's occurrence in the United States, from which it had long since been eradicated as a viable breeding species. But, the final tale is yet to be told, because the journey continues today. Reintroduction is underway, and perhaps recovery might yet be achieved.

Whether reintroduction and recovery should be allowed, and if so where and how, were hotly debated through the 1990s, when reintroduction was formally proposed. They still are. Regardless, the proposal process ended with an affirmative decision pursuant to a Final Environmental Impact Statement (hereafter FEIS; USFWS 1996); a Record of Decision (hereafter ROD; USFWS 1997) pursuant to the National Environmental Policy Act (NEPA) of 1969; and finally a nonessential experimental population rule (hereafter Final Rule; USFWS 1998) approved on January 12, 1998, pursuant to the Endangered Species Act (ESA) of 1973, as amended.

In keeping with the stated experimental nature of the reintroduction effort, and respectful of the doubts expressed by many, the Final Rule required full evaluations after 3 and 5 years to recommend continuation, modification, or termination of the Reintroduction Project. The 3-Year Review, conducted in 2001, concluded that reintroduction should continue, albeit with important modifications (Paquet et al. 2001; Kelly et al. 2001). However, as we discuss elsewhere in this report (e.g. AMOC Responses to Public Comment Component), for many reasons the 3-Year Review recommendations were not implemented, at least not to the extent that interested parties and stakeholders expected or desired. Regardless of cause, the apparent lack of closure was a significant agency and public concern when the time came for the next review.

5-Year Review

By agreement among the primary cooperating agencies, responsibility for the Reintroduction Project's 5-Year Review fell to the Mexican Wolf Blue Range Adaptive Management Oversight

Committee (AMOC) that oversees the Project on behalf of six Lead Agencies and various formal and informal Cooperator agencies. AMOC Lead Agencies include the following: Arizona Game and Fish Department (AGFD), New Mexico Department of Game and Fish (NMDGF), USDA-Forest Service (USFS), USDA-APHIS Wildlife Services (WS), U.S. Fish and Wildlife Service (hereafter USFWS or Service), and White Mountain Apache Tribe (WMAT). Formal Cooperator agencies active in the review include the following: Greenlee County (AZ) and the New Mexico Department of Agriculture (NMDA). The Project's Interagency Field Team (IFT) also contributed significantly to the review, especially the technical aspects.

AMOC and the IFT conducted the 5-Year Review to comply with the Final Rule, but above and beyond that the intent was to identify and implement improvements in the Project. The Review consists of several primary components: Administrative, Technical, Socioeconomic, and Recommendations. Each is detailed in this report.

Regardless of implementation issues, the 3-Year Review's technical component (i.e. Paquet et al. 2001) and stakeholder component (Kelly et al. 2001) were excellent departure points for the 5-Year Review. Both were rich with information. Unfortunately, conflicts within and among their recommendations were never resolved, so this added complexity to the 5-Year Review.

The Draft Administrative and Technical Components of the 5-Year Review primarily addressed the period of January 1998 through December 31, 2003 (available information for 2004-2005 was also incorporated as it became available, and if was useful to include it. The Administrative and Technical Components were released for public comment in December 2004. Contract glitches with the Socioeconomic Component caused its release to be delayed until April 26, 2005.

The public comment period for the 5-Year Review extended from January 2005 through July 31, 2005. More than 10,000 written comments were received on the Draft Review and related documents, including Standard Operating Procedures and a Proposed Moratorium for the Reintroduction Project. Additional comments were heard at 14 public meetings from January through June 2004. All comments received, whether they were written or verbal, were carefully considered in completing the final report.

AMOC conducted the 5-Year Review on behalf of all agencies cooperating in the Reintroduction Project, but responsibility for its rigor and contents resides solely with AMOC. None of the cooperating agencies constrained the review; in fact, all of them were highly supportive of an objective, comprehensive analysis.

The 5-Year Review serves several primary purposes with regard to the Final Rule and previous reviews of the Reintroduction Project, including evaluating:

1. Questions identified in the 1998 Mexican Wolf Interagency Management Plan (Parsons 1998).
2. Recommendations and suggested modifications from the 3-Year Review technical component (Paquet et al. 2001) and stakeholder component (Kelly et al. 2001).

3. Recommendations from the Arizona-New Mexico independent review of the 3-Year Review that was directed by Congress (AGFD and NMDGF 2002).
4. "Commission Directives" to the State Wildlife Agencies of AZ and NM (Attachment 1).
5. All aspects of the Reintroduction Project from 1998 through 2003.
6. All public comment received during AMWG meetings and written comment periods from January through July 2005.

Review and adaptive management of the Reintroduction Project will not stop with this review. Project cooperators will continue to seek internal and public input regarding Mexican wolf reintroduction to help achieve recovery goals and objectives. The public input sought through this 5-Year Review analysis is an important part of that process.

Wrestling with implementation issues will perhaps be even more important. Thus, we look forward to high levels of engagement in public meetings throughout the Blue Range area in 2006 et seq., as we strive to move forward with this Reintroduction Project, and contribute toward recovery and eventual delisting of the Mexican wolf.

Adaptive Management Oversight Committee
December 31, 2005

Mexican Wolf Blue Range Reintroduction Project 5-Year Review:
Administrative Component

by

Adaptive Management Oversight Committee

Arizona Game and Fish Department
New Mexico Department of Game and Fish
U.S.D.A. – APHIS, Wildlife Services
U.S.D.A. Forest Service
U.S. Fish and Wildlife Service
White Mountain Apache Tribe

December 31, 2005

ABBREVIATIONS, ACRONYMS, AND TERMS

The following abbreviations, acronyms, and terms have been used to help make this document readable. We regret any inconvenience this creates for readers who do not like this approach.

| | |
|------------|--|
| AGFD | Arizona Game and Fish Department |
| AMOC | Adaptive Management Oversight Committee |
| AMWG | Adaptive Management Working Group |
| APA | Administrative Procedures Act of 1946 |
| AC | Administrative Component |
| ARC | AMOC Recommendations Component |
| ARPCC | AMOC Responses to Public Comment Component |
| AUM | Animal Unit Month |
| AZ | Arizona |
| BLM | Bureau of Land Management |
| BRWRA | Blue Range Wolf Recovery Area |
| CBD | Center for Biological Diversity |
| CBSG | Conservation Breeding Specialist Group |
| C/R | Comment/Response entries (611 total) |
| CV | Current Value |
| CWD | Chronic Wasting Disease |
| CY | Calendar Year |
| DEA | Draft Economic Analysis |
| Defenders | Defenders of Wildlife |
| DPS | Distinct Population Segment |
| EIS | Environmental Impact Statement |
| ESA | Endangered Species Act of 1973, as amended |
| EQIP | Environmental Quality Incentive Program |
| EPA | Environmental Protection Agency |
| FAIR | Fort Apache Indian Reservation |
| FEIS | Final Environmental Impact Statement of 1996 (for proposed reintroduction of Mexican wolves) |
| Final Rule | Final “nonessential experimental population” or “10(j)” rule of 1998 (for Mexican wolf reintroduction in Arizona and New Mexico) |
| FMD | Foot and Mouth Disease (hoof and mouth disease) |
| FOIA | Freedom of Information Act of 1966 |
| FR | Federal Register |
| FTE | Full Time Employee (or Full Time Equivalent) |
| FY | Fiscal Year |
| GMU | Game Management Unit |
| IFT | Interagency Field Team (for the Reintroduction Project; see below) |
| IMAG | Interagency Management Advisory Group (for the Mexican wolf) |
| IMPLAN | USFS IMPLAN Model |
| MOU | Memorandum of Understanding |
| MWEPA | Mexican Wolf Experimental Population Area |
| NEPA | National Environmental Policy Act of 1969 |

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|------------|--|
| NGO | Non-Governmental Organization |
| NM | New Mexico |
| NMDA | New Mexico Department of Agriculture |
| NMDGF | New Mexico Department of Game and Fish |
| NRCS | Natural Resources Conservation Service |
| PRIA | Public Rangelands Improvement Act of 1978 |
| PVA | Population Viability Analysis |
| ROD | Record of Decision of 1997 for the 1996 FEIS (see above) |
| SCAR | San Carlos Apache Reservation |
| SCAT | San Carlos Apache Tribe |
| SEC | Socioeconomic Component of 5-Year Review |
| SOP | Standard Operating Procedure for the Reintroduction Project |
| SSP | Species Survival Plan |
| SWCD | Soil and Water Conservation District |
| SWDPS | Southwestern (Gray Wolf) Distinct Population Segment (emphasis on <i>Canis lupus baileyi</i> , the Mexican wolf) |
| TC | Technical Component of 5-Year Review |
| TESF | Turner Endangered Species Fund |
| US or USA | United States of America |
| USDA | United States Department of Agriculture |
| USDA-APHIS | USDA-Animal Plant Health Inspection Service |
| USFWS | U.S. Fish and Wildlife Service |
| USFS | USDA Forest Service |
| WMAT | White Mountain Apache Tribe |
| WS | USDA-APHIS Wildlife Services |
| WSMR | White Sands Missile Range |
| WTP | Willingness-to-Pay |
| YNP | Yellowstone National Park (and environs) |

Mexican Wolf Blue Range Reintroduction Project

5-Year Review: Administrative Component

by

Adaptive Management Oversight Committee

INTRODUCTION

The 5-Year Review Administrative Component evaluates the following: (a) Administrative questions identified in the 1998 Mexican Wolf Interagency Management Plan (Parsons 1998); (b) Organizational recommendations from the 3-Year Review technical component (Paquet et al. 2001) and stakeholder component (Kelly et al. 2001); (c) Recommendations from the AZ-NM independent review of the 3-Year Review that was directed by Congress (AGFD and NMDGF 2002); and (d) “Commission Directives” to the State Wildlife Agencies of AZ and NM following discussion of the States’ independent review (see Attachment 1).

Each question, comment, or recommendation below is accompanied by a Status statement indicating that the task it represents is: (a) Completed; (b) Not completed but being implemented and necessary to complete (followed by an assessment of the task and an estimated completion date), or Not completed because it is a continuing need that is being addressed, or Not completed; no action but necessary to complete; or (c) Not considered necessary to complete or to implement (followed by an assessment of why completion/implementation is not necessary). Each entry or item concludes with a 5-Year Review “Finding.”

5-YEAR REVIEW ISSUES, ASSESSMENTS, AND FINDINGS

A. Administrative questions identified in the Mexican Wolf Interagency Management Plan (Parsons 1998).

A-1. Is effective cooperation occurring with other agencies and the public?

Status: Not completed but being implemented and necessary to complete.

Assessment: Kelly et al. (2001) and AGFD and NMDGF (2002) noted that neither agencies nor the public were satisfied with the level of internal or external cooperation in the Reintroduction Project. In September 2002, the Arizona Game and Fish Commission and the New Mexico Game Commission directed their respective wildlife agencies to include improved interagency and public cooperation as a focal point of efforts to restructure and improve the Reintroduction Project. After a year of agency and public discussion, AMOC was created in October 2003 to help achieve that objective.

As noted elsewhere in this document (see the AMOC Responses to Public Comment Component), AMOC believes interagency cooperation has vastly improved since 2001 (although

NM and some AZ counties still do not participate) and cooperation with permittees has also improved (but again there is much room for further improvement).

A draft 2005 statewide public survey in AZ and NM (Responsive Management in prep.; 1514 respondents, sampling error $\pm 2.5\%$) indicated a majority of respondents (67%) had heard about Mexican wolf reintroduction. Of the respondents who had heard about it, 73% were somewhat familiar with it. Among all respondents, 62% favored reintroduction and 13% opposed it. Most respondents (up to 83%) were not sufficiently informed about reintroduction to have an opinion on levels of cooperation. Although most did not know how effective or ineffective cooperation is within the Project or between the Project and the public, respondents were more likely to respond they were effective than ineffective, except cooperation with the public. In the latter area, 19% said it is very or somewhat ineffective and 20% said it is very or somewhat effective.

We also note that 25% of respondents in the above-referenced survey said the responsibilities of the cooperating agencies, programs, and counties are now well, or at least adequately, defined, and 68% of those 25% respondents believe those responsibilities are serving the Project's needs.

An area of special concern to the public, as evidenced in comment at AMWG meetings as well as in written comment on the 5-Year Review, is the relatively large number of apparently unlawful wolf mortalities since 1998. From 1998 through 2005, 25 wild Mexican wolves succumbed to gunshots; two of the incidents were resolved (one through a finding of self defense and the other through successful criminal prosecution, but the other 23 investigations remain open. Discussion of specific aspects of active investigations is precluded, but AMOC has itself expressed concern about the need to ensure that all available enforcement resources within the cooperating agencies are used effectively and efficiently in preventing as well as addressing unlawful take of Mexican wolves.

Finding: Clearly, much work remains to be done in regard to improving cooperation with the public (including defining what such "cooperation" entails). Also, existing levels of interagency cooperation need to be maintained and enhanced (e.g. general cooperation as well as law enforcement issues), and additional effort needs to be put into increasing cooperation with counties other than Greenlee County AZ, which is a full and constructive participant in every aspect of the Project. Toward that end:

1. AMOC will maintain and improve administrative and adaptive management processes for the Reintroduction Project to enhance meaningful opportunities for, and participation by, the full spectrum of stakeholders and interested parties. AMOC efforts will include meeting with the IFT twice each year at the Alpine field office, and offering to meet once each year with the Commission or Board of Supervisors for each County within the Blue Range Wolf Recovery Area (BRWRA).
2. AMOC will direct Reintroduction Project-related outreach efforts in 2006 through the IFT Annual Work Plan to identify and reach specific target audiences, with emphasis on local communities and cooperating agencies within the BRWRA (>75% of outreach activity) and outside the BRWRA (<25% of outreach activity).

3. AMOC will identify no later than June 30, 2006, in a confidential report to USFWS, any law enforcement actions that might help prevent unlawful take of Mexican wolves or help achieve closure on existing active investigations.

A-2. Are combined agency funds and staff adequate to carry out needed management, monitoring, and research?

Status: Not completed but being implemented and necessary to complete.

Assessment: The 3-Year Review identified a lack of resources essential to carrying out needed management, monitoring, and research. For example: management activities were constrained by insufficient staff to carry them out; annual reports, work plans, incident analyses, and operating procedures were not completed due to higher priorities for existing staff; local residents asserted they could not reach an IFT member when assistance was needed; public outreach languished as staff tried to manage the increasing number of released and free-ranging wolves; vehicles were in short supply, and most that existed were high-mileage disposal trucks close to or beyond their useful lifespan when assigned to the Project; some IFT members worked out of their homes due to lack of office space; the trailer housing the Alpine Field Office was questionable in terms of structural stability; monitoring was limited by availability of flights, which reflected limited air support and lack of funds to ensure that flight time could be increased to more fully meet Project needs; and basic questions about wolf movements and behavior, impacts on native and domestic prey, wolf relationships to total predator load, and all aspects of the human dimensions (sociocultural and economic issues), etc. remained unanswered due to lack of funding.

This does not mean, however, that the Project's budget was inconsequential during this period. In fact, the cooperating agencies estimate (Table 1) that from FY1998 through FY 2004 they spent a combined \$7,543,598 on wolf-related activities, including expenses associated with captive breeding and the over-arching rangewide recovery program, as well as the AZ-NM Reintroduction Project.

When the two State Wildlife Agencies conducted an independent review of the 3-Year Review (see AGFD and NMDGF 2002), the lack of essential resources was still obvious. Thus, both State Wildlife Commissions endorsed a recommendation that USFWS "Restructure the Interagency Field Team response protocols, and enhance staff capacity to ensure immediate response capability to, and resolution of, urgent operational issues, such as depredation incidents."

However, the situation did not improve much over the next two years, as the agencies began to restructure the Project. In fact, by late 2003 the pressures of cutbacks in Federal agency budgets began forcing States to either pick up the increasing funding shortfall or allow further decay in the IFT's ability to carry out its responsibilities. The partners had not begun trying to build an overall IFT budget to jointly expand the pool of available resources by December 31, 2003, the end of the period on which the 5-Year Review is primarily focused. Consequently, the available

resources were not always shared effectively, and Project accomplishments and public and agency acceptance and satisfaction were appreciably hampered.

Staff shortfalls in the Project have also been exacerbated by turnover throughout the Project. Given that the agency budgets for this Project are one-year commitments at best, and often are not fully resolved until well into the Fiscal Year, Project personnel have had an understandable degree of uncertainty as to their employment status. This has induced several IFT employees to leave the Project for more stable positions elsewhere, often with wolf management projects in other states or organizations. Disparities in State and Federal salaries for Field Team members have also contributed to dissatisfaction, and eventual vacancies. Government hiring processes tend to extend vacancy periods, imposing even greater workloads on remaining employees who are already stretched to or beyond their limits.

The situation improved in 2004, as AMOC began to work more effectively as a collaborative effort under the October 2003 Project MOU. Initially that year, progress was again impeded by delayed Congressional approval of the Federal budget (i.e. USFWS did not receive its FY2004 allocation until June 2004; FY2004 began in October 2003), and further cutbacks (excluding salaries) in USFWS wolf budgets. However, in February 2004, under the new MOU, the Lead Agencies began building a joint Annual Work Plan and an overall budget for the year in progress. Unfortunately, available funds were not sufficient to cover full-time equivalent (FTE) needs (a total of 14.25 personnel) identified in the Project's (first joint) Annual Work Plan.

Considerable progress was made in 2004 and 2005 as cooperating agencies brought more resources to bear, despite continued delays and cutbacks at the Congressional level. However, disparities in individual agency contributions continued to result in disparities in IFT resources available to address on-the-ground management issues in AZ vs. NM.

The disparities in FTEs and the budget shortfalls had not been fully resolved as this 5-Year Review was completed. Thus, although the IFT and the cooperating agencies are increasingly working as a team, allocating IFT staff resources to a pressing issue of the day still means that other essential priorities, especially long-term issues and public expectations, are deferred beyond the prescribed response deadline or completion date. The same applies to the agency employees providing administrative oversight for the Project, and conducting the adaptive management program and contributing to this review. Other than most of the USFWS employees directly involved, and all the IFT employees except WS personnel, none of the agency staff are assigned only to the Project. Most have at best a small percentage of their work week available to address Project issues, which continues to cause delays in completing Project-related assignments and shortfalls in carrying out needed management, monitoring, and research.

In addition to staffing funding issues, lack of a governmentally funded and administered program to address livestock depredation losses remains a huge impediment to local acceptance of wild Mexican wolves. Such a program would not eliminate opposition, but it would separate those who are adamantly opposed regardless from those who are opposed at least in part because they bear brunt of the real (i.e. documented) and perceived (i.e. undocumented or speculative) economic impacts of reintroduction.

Insufficient resources have been significant problems to date in this Project, but the issue is even more problematic for the future. The reintroduced population is at a point at which exponential population growth might reasonably be expected. As the number of free-ranging wolves increases, and recovery and delisting are approached, management issues will increase proportionately. If those needs go unmet, public dissatisfaction, especially among local residents who are most affected by the Project, will inevitably sky rocket.

Finding: Significant infusion of funding is essential to sustaining progress toward Project objectives, thus to contributing toward wolf recovery. Toward that end:

1. AMOC will develop, no later than June 30, 2006, a report describing a proposed Federally, State, and/or Tribally-funded incentives program to address known and potential economic impacts of wolf nuisance and livestock depredation behavior on private, public, and Tribal Trust lands. AMOC may convene, if necessary, a technical advisory group of individuals with appropriate expertise to assist with this task. The conservation incentives discussion will consider all relevant livestock depredation issues, including: livestock depredation prevention; livestock depredation response; carcass discovery, monitoring, removal, burial, and/or destruction; and possible adjustment of the Federal grazing (AUM) fee (and any Tribal grazing subsidies) within the Mexican Wolf Experimental Population Area (MWEPA) to provide de facto compensation for documented and likely undocumented losses of livestock. The AMOC report shall also include a thorough evaluation of the effectiveness and procedural efficiency of the Defenders of Wildlife wolf depredation compensation fund, and provide recommendations for appropriate improvements.
2. AMOC will advocate creating an IFT position in the Alpine field office to work with cooperators and stakeholders throughout Arizona and New Mexico on proactive measures by which to avoid or minimize wolf nuisance and livestock depredation problems. Note: AMOC as a body will not advocate regulatory changes to address carcass removal or disposal issues.
3. AMOC will collaborate with an appropriate entity to complete an IFT staffing needs assessment no later than June 30, 2007, based on (a) Reintroduction Project experience to date and (b) the Arizona-New Mexico Mexican Wolf Nonessential Experimental Population Rule recommended to USFWS.
4. AMOC will advocate creating sufficient IFT positions in each Lead Agency as appropriate to implement the staffing needs assessment conducted pursuant to Recommendation (30), above. AMOC will also recommend that at least one IFT member from each Lead Agency be stationed in the Alpine field office, to facilitate and enhance interagency communication and cooperation.
5. Concomitant with any recommended MWEPA Rule changes, AMOC recommends that State and Tribal Lead Agencies and non-Federal Cooperators make a contingent-

obligation request for annual Congressional line item allocations sufficient to cover all aspects of AMOC and AMWG participation in NEPA processes and ESA-related rulemaking processes required by such activities, through to the Record of Decision.

6. AMOC recommends that no later than April 30, 2006, AMOC State and Tribal Lead Agencies and non-Federal Cooperators complete and deliver to Congress a funding request that is sufficient to fully staff and equip the Reintroduction Project as of October 1, 2006, at levels commensurate with all on-the-ground responsibilities in all areas of responsibility, including wolf management (including control), enforcement, outreach (including establishing a Mexican wolf education center in Hon-Dah Arizona), citizen participation in adaptive management, Reintroduction Project-related research, and landowner incentives.

- B. Evaluation of the organizational recommendations from the 3-Year Review Paquet Report (Paquet et al. 2001) and Stakeholders Workshop (Kelly et al. 2001).

As noted elsewhere in this report (e.g. AMOC Responses to Public Comment Component), recommendations from the 3-Year Review were not implemented to the extent that many stakeholders desired or expected. This was surprising to some people, because at least some of the recommendations seemed to be potentially valuable tools that, if implemented, might help further Mexican wolf recovery through successful reintroduction. What was not made clear to the public is that although USFWS regularly seeks peer and public review of its work and gives the results serious consideration, implementation is typically discretionary because recommendations must inevitably be balanced by logistical and other considerations, such as workload, staff availability, budget constraints, rulemaking requirements, direct input from key cooperators and local stakeholders, and the need to redefine or strengthen partnerships to support long-term conservation efforts. Moreover, in this case follow-up discussion with the reintroduction effort's primary cooperators was not carried out, thus conflicts among recommendations in the two review components were not resolved. Failure to resolve such conflicts made implementation all the more unlikely, especially for the much more plentiful and sometimes more complex recommendations in the Stakeholder Workshop (Kelly et al. 2001). Even in the 5-Year Review, we were unable to directly address those recommendations (hence they are omitted below) because of the process failures within the 3-Year Review that left Stakeholder consensus on substance, priorities, and completion timeframes unresolved.

3-Year Review Stakeholder Workshop Problem Statements

Participants in the August 2001 Stakeholder Workshop (see Kelly et al. 2001) were divided into six Working Groups, to identify Problem Statements (issues), goals, and actions, and set within-group priorities. The intent was to conclude the Workshop with cross-group vetting and development of overall priorities. However, the Workshop ran so long that most Working Groups did not complete their own work, let alone review the work of other Working Groups. Thus, the Problem Statements provide insight into

discussions within the Stakeholder Workshop, especially regarding the Paquet Report (Paquet et al. 2001) technical component of the 3-Year Review, but they do not represent stakeholder consensus.

Even within the above-described limitations, the Workshop Problem Statements offer useful contrast to the Paquet Report, for two reasons in particular. First, technical shortcomings (e.g. Final Rule issues, science-based concerns about wolf management) in the Reintroduction Project are reaffirmed again and again. The Technical Component of the 5-Year Review will address these issues, so they are not addressed further in the Administrative Component. Second, they resurrect social issues that were lost when the Paquet Report failed to address two of the 3-Year Review issues put forth in the Mexican Wolf Interagency Management Plan (Parsons 1998): (1) Is effective cooperation occurring with other agencies and the public?; and (2) Are combined agency funds and staff adequate to carry out needed management, monitoring, and research? If these two questions had been addressed in the Paquet Report, they might have served well as reminders that feasibility issues must also be addressed when considering management solutions to biologically-based problems, and ultimately on a public lands landscape, feasibility has strong social and economic components.

The Workshop Problem Statements are included below, as excerpts from Kelly et al. (2001), for information purposes. As noted above, technical aspects of the statements are addressed within the Technical Component of this review. Organizational and social aspects of the statements were addressed above, in Section A, covering the two questions from the Mexican Wolf Interagency Management Plan (Parsons 1998), thus they will not be discussed further. The Problem Statements follow, organized by Working Group:

The Wolf Management Working Group identified, in priority order, the following six Problem Statements: (1) Areas for release and establishment of wolves have not always been selected on the basis of biological suitability, cost efficiency, logistical feasibility, wolf management feasibility, and minimized potential for impacts on existing land uses; (2) current post-release wolf management guidelines do not adequately address all relevant issues; (3) effective wolf management is hampered by a lack of information and by questions and concerns about the accuracy of the information on which it is based; (4) no mechanism has been clearly defined by which to monitor, evaluate and modify the Mexican wolf reintroduction program; (5) program staff may lack adequate training to meet the needs of implementing Mexican wolf recovery; and (6) current pre-release management guidelines do not adequately address all relevant issues.

The Data Gathering Working Group crafted seven Problem Statements that were not prioritized. They are listed here in the same order they were listed in the group's report: (1) The Mexican Wolf Recovery Plan lacks current information and needs to be revised; (2) a Population Viability Analysis (PVA) has not been conducted for the wild Mexican Wolf population; (3) the effects of wolf populations on other wild predator and prey species and ecological process are not

understood in the southwestern United States; (4) causes of wolf-human and wolf-livestock conflicts are not sufficiently understood; (5) management actions such as capture and supplemental feeding may negatively effect wolves; (6) current boundaries hinder wolf recovery but may result in more human or wildlife wolf conflicts (7) there is a lack of historical data on wolves.

The Communication and Trust Working Group crafted ten Problem Statements, listed here in priority order: (1) Mechanisms used to communicate are inadequate for stakeholder's satisfaction; (2) information handling and acquisition are not sufficient for good decision making; (3) important decisions are, or appear to be, preordained resulting in stakeholder disenfranchisement; (4) there is a lack of consultation and respect for local expertise which results in missing information, bad decisions, and erosion of local trust and support; (5) there is a lack of specific goals and objectives on how to reach recovery; (6) there is lack of recognition and inclusion of other forms of knowledge in addition to science; (7) changing the rules in the middle of the game, such as direct releases of wolves into the Gila, is premature; (8) anti-government sentiment which has developed from other issues and agencies has contributed to distrust of Wolf Recovery Program; (9) at times, rulemaking does not follow legislation and when it does there is no accountability or consequences; and (10) there is little consistency, permanency, and continuity of agency actors resulting in disrupted trusting relationships and loss of local information. In addition, a plenary presentation by a member of this Working Group focused on the impact of the Mexican wolf recovery and reintroduction on the health of the local communities (see Appendix I of Kelly et al. 2001).

The Human Dimension Working Group crafted five Problem Statements, listed here in priority order: (1) The administrators of the Mexican Gray Wolf Recovery Plan need to be accountable for their actions and the actions of the introduced wolves in order to obtain credibility with the public and other agencies; (2) lack of lines of communication, used in a timely manner, between program staff, agency partners and public needs to be improved; (3) there is a conflict between rural and urban values, perceptions and points of view that stresses the Mexican gray wolf program and local residents in many ways; (4) the Mexican Wolf Program will inherently be a political issue; (5) there is lack of access to the program administrators from the local public that results in decisions that do not fully consider local views.

The Economic Issues Working Group crafted three Problem Statements, but did not assign priorities to them. Thus, the three Problem Statements are listed here in the same order they were listed in the Working Group's report: (1) There are actual losses to the individual and local communities due to the introduction of the Mexican Wolf that are not being adequately addressed and will not be addressed until more permanent solutions are found; (2) the Mexican Wolf Recovery Program needs a better consideration of full costs, including an incentive program, control, accountability, and better use of budget, defining and

accepting the financial and legal liabilities of the USFWS and the State entities involved in the project; and (3) the Mexican Wolf Recovery Program may create potential and actual benefits and losses that have not been evaluated, quantified and considered for the proper balance of the program.

The Livestock/Animal Conflict Working Group crafted six Problem Statements, listed here in priority order: (1) Current management techniques have not been optimally effective in reducing livestock/animal conflicts; (2) Economic impacts of wolf recovery on livestock and animal conflicts are unknown; (3) there is insufficient communication between agencies, livestock producers, and the public; (4) effective husbandry practices to decrease livestock-wolf conflicts have not been fully implemented; (5) existing rules and regulations regarding livestock and animal conflicts do not adequately address concerns of private and public land users and government agencies; and (6) impacts of wolves on the ecosystem are not fully understood.

- B-1. Modify the Recovery Team by inviting an appropriate individual other than the Recovery Coordinator to serve as the team leader

Status: Completed.

Assessment: In August 2003, USFWS convened the Southwestern Gray Wolf Distinct Population Segment (SWDPS) Recovery Team (see below) and appointed Peter Siminski to serve as Team Leader. Mr. Siminski has a long-standing history with the Mexican wolf recovery program, dating back to 1983, shortly after five Mexican wolves had been captured in Mexico and transported to the Arizona-Sonora Desert Museum (ASDM) to establish a captive breeding program. Mr. Siminski, then an ASDM employee, was appointed as the official Mexican wolf studbook keeper and participated in recovery planning coordination of the captive management program.

In 1985, a consortium of holders of captive Mexican wolves (i.e. the Mexican Wolf Captive Management Committee) was established. Through that body, Mr. Siminski has been instrumental in expanding the captive breeding program from the first few initial facilities that held Mexican wolves to currently more than 45 facilities in the United States and Mexico. Mr. Siminski is also credited with establishing management of captive Mexican wolves under the Mexican Wolf Species Survival Plan (SSP), a program of the American Zoo and Aquarium Association. He has served as Mexican Wolf SSP Coordinator since 1993. He also served as a member of the original Mexican Wolf Recovery Team since 1985, and of the second iteration of that Team in the 1990s. In 2003, Mr. Siminski was chosen as Team Leader for the newly convened SWDPS Recovery Team because of his vast knowledge of the program, his fair and unbiased approach toward recovery, and strong leadership abilities that would be needed to lead a diverse team with myriad viewpoints.

Finding: AMOC finds that no further action is required on this topic.

B-2. Instruct the modified Recovery Team to revise by June 2002 the 1982 Recovery Plan.

Status: Not completed but being implemented and necessary to complete.

Assessment: USFWS recognizes the importance of revising the 1982 Recovery Plan (USFWS 1982), given the plan (albeit intentionally) lacks recovery (downlisting or delisting) goals or strategies. When the plan was written, only a handful of Mexican wolves existed in captivity and recovery was virtually inconceivable unless the captive program was successful enough to produce enough wolves for reintroduction purposes. Therefore, the plan contained an overall primary objective to conserve and ensure the survival of *Canis lupus baileyi* by maintaining a captive breeding program and re-establish a viable, self-sustaining population of at least 100 Mexican wolves within their historic range. This was not intended to be a recovery objective for delisting purposes, but rather an interim goal given the uncertain progress of the captive propagation program at the time and recognition that a population of 100 wolves does not constitute recovery of the species.

A second Mexican Wolf Recovery Team was convened in the 1990s, in part to assist in preparing NEPA documents associated with possible Mexican wolf reintroduction in the American Southwest. The Team, assisted by a private contractor, prepared a draft revised Recovery Plan but the document was never completed, nor was it subjected to peer review or shared with the public.

Clearly, the 3-Year Review recommendation to revise the 1982 Recovery Plan was appropriate and valid. Revision was long overdue in 2001. However, the recommended completion date of June 2002 was unrealistic. Recovery planning is a lengthy process, especially with respect to recovering a species as complex and controversial as the wolf. A recovery plan requires a thorough evaluation of all relevant information, often necessitating much more time than the one year afforded by the 3-Year Review recommendation. Moreover, as occurred in this case, litigation sometimes has drastic effects on recovery planning.

The following is an overview of circumstances that led to commencement of recovery planning in 2003 and a hiatus in 2005 that precluded completion of a revised Mexican Wolf Recovery Plan in conjunction with the 5-Year Review. Pursuant to the Final Rule, in 2001 USFWS conducted a 3-Year Review of Mexican wolf reintroduction. One of the Review's primary recommendations, in what is commonly referred to as the "Paquet Report" (Paquet et al. 2001) was to revise the 1982 Mexican Wolf Recovery Plan so it includes downlisting and delisting goals. However, in June 2001 Congress directed USFWS to obtain an independent review of the 3-Year Review. As a result, USFWS chose to delay implementing the 3-Year Review recommendations, including proceeding with recovery planning, until the independent review had been completed. In late August 2002, at USFWS request, AGFD and NMDGF agreed to conduct the independent review. USFWS chose the two State Wildlife Agencies because of their expertise and their participation and long history with the Mexican wolf program.

The States' independent review was completed in September 2002 (AGFD and NMDGF 2002). The results were presented separately to each State's Commission, which resulted in the following direction to the two agencies:

1. The roles and functions of the Primary Cooperators (AGFD, NMDGF, and the Service) must be restructured to ensure State participation, authorities, and responsibilities as reflected in today's [Commission meeting] discussion.
2. The administrative and adaptive management processes must be restructured to ensure opportunities for, and participation by, the full spectrum of stakeholders.
3. The Interagency Field Team response protocols must be restructured, and staff capacity must be enhanced, to ensure immediate response capability to, and resolution of, urgent operational issues, such as depredation incidents.
4. Project outreach must be restructured as necessary to address the Commission, Department, and public concerns expressed today.
5. All actions in the Project must be in strict compliance with any applicable, approved special rules, policies, protocols, management plans, and interagency agreements.
6. The Project's review protocols and procedures must be restructured and improved to ensure that the 5-year review is effective and efficient, and an improvement over the 3-Year Review.

Following the States' review, AGFD initiated discussion with USFWS and NMDGF to address the Commissions' guidance. Despite clear direction and USFWS Region 2 Director concurrence with it, considerable effort was required to overcome staff resistance. However, by February 2003, progress was at last being made and additional potential cooperators were brought into the discussion, including USDA-APHIS WS, USFS, WMAT, NMDA, and various counties in AZ and NM. The lengthy process of restructuring the Blue Range reintroduction effort under State and Tribal leadership was culminated in an October 2003 MOU among AGFD, NMDGF, WS, USFS, USFWS, and WMAT as Lead Agencies and NMDA and Greenlee, Navajo, and Sierra counties as Cooperators. The MOU guides the Reintroduction Project through an adaptive management approach to managing the reintroduced wolf population.

Concurrent with the activities outlined above, at a national level USFWS was in the process of reclassifying the gray wolf to remove it from the list of endangered and threatened wildlife throughout portions of the conterminous United States. This rule, which became effective on April 1, 2003, established three Distinct Population Segments (DPS) for the gray wolf, one of which was the Southwestern Gray Wolf DPS. This action did not change the status of Mexican wolves; wolves in the Southwestern DPS retained their previous experimental population or endangered status. However, establishment of the SWDPS required USFWS to achieve recovery at the DPS level (i.e. the DPS would be delisted when recovery is achieved within the DPS), which had important implications for how recovery is achieved in the Southwest. In recognition of this forthcoming rule, USFWS continued to hold off on recovery planning for the Mexican wolf until gray wolf policy at the national level was determined.

Following the final reclassification rule in April 2003 (which established the SWDPS), and at the direction of the Regional Director, USFWS began to convene a new Recovery Team. The Team,

composed of technical and stakeholder sub-groups to address science and social and economic considerations of wolf recovery, was assembled by August 2003.

The Recovery Team consists of a Technical Sub-Group and a Stakeholder Sub-Group. The Technical Sub-Group is a body of scientists who represented expertise in wolf reintroduction and management, population demographics, general wolf biology and behavior, genetics, captive propagation, and research. The Stakeholder Sub-Group includes a variety of interests from local and private sectors representing the livestock and ranching industry, hunters, hunting guides and outfitters, and environmental and conservation organizations, as well as Federal, State, Tribal, and County governments. The Stakeholder Sub-Group provides the opportunity for those directly or indirectly affected by wolf recovery to voice their concerns, and concerns of the constituents they represent, regarding impacts of wolves on resource management, land use, and socioeconomic factors.

Five Recovery Team meetings were held from October 2003 through October 2004. Progress was at last being made toward a revised Recovery Plan. In January 2005, the 2003 reclassification was vacated (see: Defenders of Wildlife v. Norton, 03-1348-JO; National Wildlife Federation v. Norton, 1:03-CV-340, D. VT. 2005). This caused USFWS to revert to the 1978 gray wolf listing, which listed the species (*Canis lupus*) as a whole but continued to recognize valid biological subspecies (e.g. *Canis lupus baileyi*) for purposes of research and conservation.

In response to these rulings, in 2005 USFWS put the SWDPS Recovery Team “on hold” indefinitely; its charge to develop a recovery plan for the SWDPS was no longer valid, because there no longer was a SWDPS. In December 2005, the Department of Interior announced that it would not be filing appeals for either case (see below). This announcement provides impetus for the Southwest Region to reinstate recovery planning, which USFWS will now proceed with in coordination with other wolf management activities.

Note: On December 19, 2005, AMOC was informed that Craig Manson, Assistant Secretary of the Interior for Fish, Wildlife and Parks, had that day issued a statement on the USFWS decision regarding the U.S. District Court decisions earlier this year striking down the USFWS 2003 reclassification of gray wolf populations. Mr. Manson’s statement was as follows:

The U.S. Fish and Wildlife Service will not appeal U.S. District Court decisions earlier this year striking down the Service’s reclassification of gray wolf populations from endangered to threatened for much of the species’ current range in the United States, although we continue to believe the reclassification was both biologically and legally sound. We are exploring options for managing wolf populations that comply with the Courts’ rulings, while recognizing, as the courts did, that the Yellowstone and Great Lakes wolf populations have reached the recovery goals necessary for delisting.

The Department of the Interior plans to issue separate, proposed rules to delist new distinct population segments of gray wolves in the northern Rocky Mountains and the

Great Lakes as early as possible in 2006. Both proposed rules will have public comment periods lasting 90 days.

In the meantime, gray wolves will continue to be managed as they were prior to the 2003 reclassification. Gray wolves in Minnesota are classified as threatened, as a result of a 1978 reclassification. Gray wolves in the remaining 47 conterminous states and Mexico are endangered, except where they are listed as part of an Experimental Population for reintroduction purposes in the northern Rockies and parts of the Southwest. Citizens with concerns about wolf management should contact the Fish and Wildlife Service or their State wildlife agency for clarification of what actions are currently allowed under the management designation in effect where they live.

In light of Assistant Secretary Manson's statement (above), USFWS Region 2 also affirmed on December 19, 2005 that it would move forward with wolf recovery planning in the Southwest. Meanwhile, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made various recommendations to USFWS and for AMOC action on issues that it considers necessary to address within the context of the 5-Year Review of the Reintroduction Project and the Final Rule under which the Project operates (see the AMOC Recommendations Component).

Finding: AMOC recommends that USFWS complete a Mexican Wolf Recovery Plan no later than June 30, 2007. Note: AMOC appreciates that this recommended deadline is impractical, but offers it, nonetheless, to strongly underscore that (a) revision is long overdue, and (b) lack of a current Recovery Plan (and overall recovery goal) is negatively affecting the Reintroduction Project in several ways, perhaps most importantly that for a reintroduction project population (management) objective to have meaning and credibility, it must be placed in appropriate context by well-defined rangewide downlisting and delisting (recovery) goals.

B-3. Immediately engage the services of the modified Recovery Team.

Status: Not completed but being implemented and necessary to complete.

Assessment: As noted in B-2 (above), the Recovery Team has been on hold due to litigation that vacated the 2003 reclassification rule. Prior to that ruling, however, USFWS was using the full team in this recommended capacity, due to the body of expertise within both sub-groups of the Team. One such example included inviting the Team's Technical and Stakeholder Sub-Group members to review this 5-Year Review, and to provide feedback regarding reintroduction and overall management of wolves in the BRWRA.

Finding: Given the December 19, 2005 Department of Interior announcement (see above) that it will not appeal the court cases that vacated the 2003 rule, USFWS, in coordination with AMOC, will now determine appropriate and necessary activities for the Recovery Team pertinent to the BRWRA. The Team may be able to provide assistance with at least two AMOC 5-Year Review Recommendations, which are as follows (see the AMOC Recommendations Component for these recommendations in full and for related recommendations):

1. AMOC will determine, on biological/ecological grounds, and conclude in a written report to the USFWS Region 2 Director no later than June 30, 2006, whether (and, if so, the extent to which) the current MWEPA outer boundaries should be expanded within Arizona-New Mexico to enable the Arizona-New Mexico Mexican wolf population to exist within a metapopulation context consistent with Leonard et al. 2005 and Carroll et al. in press. AMOC may convene, if necessary, a technical advisory group of individuals with appropriate expertise to assist with this assessment.
 2. AMOC will develop, no later than June 30, 2006, a report describing a proposed Federally, State, and/or Tribally-funded incentives program to address known and potential economic impacts of wolf nuisance and livestock depredation behavior on private, public, and Tribal Trust lands. AMOC may convene, if necessary, a technical advisory group of individuals with appropriate expertise to assist with this task. The conservation incentives discussion will consider all relevant livestock depredation issues, including: livestock depredation prevention; livestock depredation response; carcass discovery, monitoring, removal, burial, and/or destruction; and possible adjustment of the Federal grazing (AUM) fee (and any Tribal grazing subsidies) within the MWEPA to provide de facto compensation for documented and likely undocumented losses of livestock. The AMOC report shall also include a thorough evaluation of the effectiveness and procedural efficiency of the Defenders of Wildlife wolf depredation compensation fund, and provide recommendations for appropriate improvements.
- B-4. Immediately modify the final rule and develop authority to conduct releases into the Gila National Forest.

Status: Not completed; no action but necessary to complete.

Assessment: The existing Final Rule restricts direct releases of Mexican wolves from captivity to the Primary Recovery Zone (PRZ), in the southern portion of the Apache National Forest, entirely within AZ (Greenlee County). Wolves released into the PRZ are allowed to disperse throughout the entire BRWRA, including the Apache National Forest (AZ) and the Gila National Forest (NM). Additionally, wolves that have previously been free-ranging (wild) may be translocated for management purposes anywhere within the Secondary Recovery Zone (SRZ), which includes the remainder of the BRWRA.

AMOC recognizes there are limitations with the existing rule. The Gila National Forest is approximately 75% of the BRWRA and contains much of the best wolf habitat, due to existence of areas with low or no road densities, good populations of large native ungulates (primarily elk), and few to no permitted livestock. Currently, AMOC is limited to releasing (translocating) wolves that have had previous wild experience into New Mexico. This restricts the pool of available release candidates and limits AMOC's ability to release wolves for management purposes, such as replacement of lost mates or genetic augmentation. The ability to augment the wild population with wolves that are genetically underrepresented is important to increasing the overall fitness of the population, thereby aiding recovery of the species.

Additionally, there is public perception that AMOC is concentrating “problem” wolves in New Mexico, because wolves translocated into the Gila are “problem” wolves that have been removed from the wild for livestock depredations or other such nuisance/problem behavior. However, data indicate that translocated “problem” wolves are *more* likely to succeed, not less likely. In other words, this means wolves are less likely to have to be removed because of problem behavior again after being translocated. The data indicate that relocating the offending problem animal(s) to another area can alter their behavior, thereby rendering them no longer “problem” wolves. Nonetheless, AMOC recognizes the value of being able to directly release wolves without any previous history of problem behavior into New Mexico. Aside from the obvious biological considerations, it could help improve relations and build trust with those most affected by wolf reintroduction.

Clearly, a consistent policy needs to be in place that allows wolves with successful experience in surviving on wild prey (even if that includes limited involvement in depredation situations), and wolves that are more naïve but have no experience with livestock to be candidates for release or translocation throughout the BRWRA. In fact, pairings of wolves that are naïve with those having previous wild experience could lead to establishment of pairs or packs with more of the desired attributes for successful establishment in the wild. As stated above, however, the current rules and policies limit the ability to translocate or release wolves with successful experience with wild prey throughout the recovery area, and limit the availability of wolves with no history of depredation for translocations to the SRZ (e.g. New Mexico).

As early as 1999, USFWS began internally discussing the possibility of modifying the Final Rule.¹ In the short time since they had been released, Mexican wolves had colonized the majority of the PRZ, leaving fewer release sites in which to conduct further releases. Additionally, the Project had experienced several conflicts between wolves and human activities in rural areas, wolf/dog conflicts, and several confirmed depredations. Many illegal wolf shootings had also occurred. Thus, USFWS convened a Mexican wolf program review in January 1999, in which experts strongly recommended modifying the rule to gain authority to release wolves in remote areas (i.e. the Gila National Forest) in the NM portion of the BRWRA, to minimize the conflicts. Based on its experience at that time with managing and monitoring the free-ranging population, the IFT also supported this action.

In September 1999, approval was received from the USFWS Southwest Regional Director at the time to proceed with steps that would allow for releases in the Gila National Forest, including focused outreach, relocation/release site clearances, and revision of the Final Rule, the latter of which would require extensive public comment opportunities (e.g. public scoping, review and comment periods, public meetings and/or hearings) under section 10(j) of the Endangered Species Act (ESA), the Administrative Procedures Act (APA), and the National Environmental Policy Act (NEPA).

¹ It should also be noted that a potential rule amendment regarding direct releases into New Mexico was foreseen by USFWS and mentioned as a possibility in the FEIS (public comment and response on pages 5-87 – 5-88).

In October 1999, the Mexican Wolf Recovery Coordinator retired from USFWS, but momentum for proceeding forward with modifying the Final Rule continued. Internal draft Proposed Rule language to allow for direct releases into New Mexico was completed by USFWS in February 2000, and was then to be released to the public through the appropriate NEPA process to solicit public comment. However, it was never released. In April 2000, a new Mexican Wolf Recovery Coordinator was hired and Project priorities were redirected toward improving the IFT's effectiveness and responses to field issues and conflict situations. This shift put rule change momentum on hold, in order to focus on establishing a system of Recovery Protocols to ensure consistency and quality of data collection, consistency in how IFT personnel respond to field situations, safety of Project personnel and wolves, and to provide mechanisms for project peer review and Project and individual accountability.

In 2001, following drafting of various Recovery Protocols, USFWS began the Project's 3-Year Review pursuant to the Final Rule. With USFWS concurrence and support, an independent team of scientists was contracted by the Conservation Breeding Specialist Group (CBSG) to perform the technical portion of the review, which is commonly referred to as the Paquet Report (Paquet et al. 2001). The Paquet Report concluded that the simplest and most important change USFWS could make to enhance recovery would be to modify the Final Rule to allow for initial releases of captive-born (and wild-born if appropriate) Mexican wolves into the Gila National Forest.

Similarly, the "Wolf Management Working Group" of the 3-Year Review's August 2001 Stakeholder Workshop in Show Low, AZ identified (see Kelly et al. 2001) the highest two ranking goals as: (1) to reassess and refine the boundaries for wolf recovery in Arizona and New Mexico; and (2) select better wolf release/management areas within the recovery zones in Arizona and New Mexico. The stakeholders group further indicated that the flexibility to select wolves that have a greater probability of success, and thereby impact landowners and economic interests the least, is in the best interest of the program, both biologically and for those that may be impacted by wolves.

Importantly, both the Paquet Report and the Stakeholders Workshop provided recommendations on strengths and weaknesses of the Reintroduction Project as it was then being implemented. However, some recommendations in the Stakeholders report conflicted with some in the Paquet report or with others in the Stakeholders report. Due to review process design and execution problems, the 3-Review failed to result in an overall set of recommendations from the various components that the primary cooperators (at that time: USFWS, AGFD, NMDGF, and WMAT) agreed to implement. This problem was duly noted in the Stakeholders Workshop Report (Kelly et al. 2001, see minority reports therein) and again in AGFD and NMDGF (2002).

To date, USFWS has not taken action on the Paquet Report recommendation to modify the Final Rule to allow for releases into the Gila National Forest. Shortly after completion of the 3-Year Review, a new Regional Director, H. Dale Hall, was assigned to Region 2. His main priorities for the Mexican wolf recovery program were (1) to restore intended levels of cooperation with State, Tribal, and other interests in reintroduction and recovery planning, and (2) to revise the 1982 Recovery Plan, since the plan does not identify criteria (i.e. how many wolves in how many areas constitutes recovery?) for removing the Mexican wolf from the endangered species list.

Once the 2003 reclassification rule solidified the direction that USFWS would take with respect to wolf recovery (i.e. DPS listings instead of species/subspecies listings), Mr. Hall directed his wolf recovery program staff to revise the Recovery Plan to include downlisting/delisting criteria and describe the larger picture of recovery for the entire SWDPS before considering a rule change for the BRWRA reintroduction effort. Concurrently, he also indicated that in order to revise the rule, USFWS must first have a recommendation from the SWDPS Recovery Team, including both the technical and stakeholder sub-groups, and from AMOC.

However, due to the 2005 court decisions vacating the 2003 reclassification rule, thus putting the SWDPS Recovery Team on hold, Mr. Hall stated in Spring 2005 that in the absence of a functioning Recovery Team, he would look to AMOC and the 5-Year Review for recommendations on changes to the Final Rule. Accordingly, AMOC has made recommendations in the final 5-Year Review for Final Rule changes to address boundary modification concerns (see AMOC Recommendations Component). USFWS will then determine whether and how to proceed with AMOC's recommendations. If and when proposed rule change language regarding authorizing releases into the Gila National Forest is drafted, it will be released to the public pursuant to the APA, ESA, and NEPA to ensure appropriate opportunities for participation and input by the public.

Finding: AMOC proposes combining the current BRWRA Primary and Secondary Recovery Zones, the Fort Apache Indian Reservation (FAIR), and/or any other appropriate contiguous areas of suitable wolf habitat into a single expanded Blue Range Wolf Reintroduction Zone (BRWRZ) and allowing initial releases and translocations throughout the BRWRZ in accordance with appropriately amended AMOC Standard Operating Procedures (SOPs) 5.0: Initial Wolf Releases and 6.0: Wolf Translocations.

B-5. Immediately modify the final rule to allow wolves that are not management problems to establish territories outside the BRWRA.

Status: Not completed; no action but necessary to complete.

Assessment: (Note: Please see B-4 above for additional information regarding rule change modification that is also relevant to this entry). Under the current Final Rule, AMOC is required to capture wolves that establish territories on public land wholly outside the designated wolf recovery areas and return them to the BRWRA or captivity. Additionally, if wolves establish themselves on private or Tribal land outside the BRWRA, AMOC must remove them unless the landowner agrees they may remain.

The 3-Year Review Paquet Report criticizes USFWS for promulgating a rule in which the boundary is so constrained. The report states, "Such regulations are inappropriate for at least 2 reasons: 1) they are nearly impossible to effectively carry out as the wolf population grows because of the difficulties of managing an ever-increasing number of wide-ranging dispersing animals, and 2) they establish a precedent that could be effectively used to argue for the removal of other endangered species inhabiting certain tracts of public or private land (Paquet et al.

2001). They further point out that nowhere else in the United States does USFWS remove wolves simply for being outside a boundary in the absence of a problem.

Although it was the prerogative of the Paquet panel, as an independent reviewer, to make such comments, these opinions are hindsight that was not shaped by the lengthy evaluation and discussions that led to the Final Rule. The criticized constraints were not offered lightly, or without consideration of the problems they might present in the future. USFWS promulgated the Final Rule based on circumstances at the time, including the full range of agency and public comment on the Draft EIS; in the absence of such provisions, USFWS and its primary cooperators believed that reintroduction would likely not have been possible.

The proposed rule change language drafted by USFWS in February 2000 (discussed in B-4, above) did not address allowing wolves that are not a management problem to establish territories outside the BRWRA. At the time the proposed rule change language was drafted, the most important issue viewed as hindering wolf recovery in the Southwest was the inability to release wolves into the Gila National Forest, which makes up of the majority of the BRWRA and contains some of the best wolf habitat. Therefore, the draft primarily addressed modifying the final rule to allow for direct releases of captive-raised wolves into the SRZ (i.e. Gila NF) of the BRWRA. Along with this amendment, USFWS intended to seek suggestions from program cooperators and the public for any other needed rule changes. Because the presence of wolves throughout the entire BRWRA, with all anticipated associated impacts, were analyzed in detail in the FEIS, a rule change considering direct releases into New Mexico would not have required a Supplemental EIS (SEIS). This was because the proposed action of allowing direct releases into the SRZ would not have altered the scope or scale of the impacts, and the actual impacts observed in the BRWRA after two years of wolf releases generally were consistent with what was predicted in the EIS. Therefore, no significant change or new information had been presented that would require a SEIS, and a revision to the rule presumably could have proceeded, in the absence of any new information received during the public comment period.

As the free-ranging wolf population expanded however, a more important issue surfaced that revolved around the BRWRA boundary. As the population grew, dispersing wolves began to travel beyond the BRWRA boundary, sometimes requiring retrieval, as mandated by the Final Rule, even in the absence of problem behavior or conflict situations. As stated in the Paquet Report, this is problematic for several reasons, the most obvious being that it hinders natural dispersal and recolonization of wolves into new areas, thereby slowing recovery. As the number of un-collared wolves increases, it also sets an unrealistic expectation that the IFT will be able to remove wolves that establish outside the BRWRA boundary, when in fact there is no guarantee that even collared wolves can always be captured due to their wide-ranging capabilities. This creates credibility issues with the public, and significant frustration. It also presents serious logistical and staffing concerns, since the IFT must spend considerable time and resources removing otherwise non-problematic wolves, when their time could be spent more productively dealing with more pressing field issues, such as daily monitoring, trapping for un-collared wolves or responding to wolf-livestock conflicts.

To date, as noted in B-4, above, USFWS still has not taken action on the Paquet et al. (2001) recommendation to modify the Final Rule to allow wolves that are not a management problem to establish territories outside the BRWRA. Any proposed rule change language is now separate from the recovery planning process and will come through AMOC as part of this 5-Year Review. Accordingly, AMOC has made recommendations in the final 5-Year Review for Final Rule changes to address boundary modification concerns (see the AMOC Recommendations Component). USFWS will then determine whether and how to proceed with AMOC's recommendations. If and when proposed rule change language regarding authorizing wolves that are not management problems to establish territories outside the BRWRA is drafted, it will be released to the public pursuant to the APA, ESA, FACA, and NEPA to ensure appropriate opportunities for participation and input by the public.

Finding: AMOC will determine, on biological/ecological grounds, and conclude in a written report to the USFWS Region 2 Director no later than June 30, 2006, whether (and, if so, the extent to which) the current MWEPA outer boundaries should be expanded within Arizona-New Mexico to enable the Arizona-New Mexico Mexican wolf population to exist within a metapopulation context consistent with Leonard et al. 2005 and Carroll et al. in press. AMOC may convene, if necessary, a technical advisory group of individuals with appropriate expertise to assist with this assessment. The AMOC assessment will also consider other relevant issues, such as: likelihood of expansion area occupancy by wolves dispersing from northerly states or from Mexico; the merits of extending nonessential experimental population status beyond the current boundaries; and estimated costs associated with managing wolves in an expanded area. The technical advisory group, if convened, shall be chaired by an AMOC representative and shall include no more than 15 other members, each with appropriate scientific expertise. AMOC will advocate that the MWEPA recommendation constructed as a result of its Recommendations allow wolves to disperse from the BRWRZ throughout the MWEPA, subject to management consistent with current Blue Range Reintroduction Project SOPs. Any recommendation to amend the existing Final Rule or to create a new Final Rule would ultimately, if acted on by USFWS, be in full compliance with all applicable APA, ESA, FACA, and NEPA requirements.

B-6. Resist any opportunity to reintroduce Mexican wolves in the White Sands Wolf Recovery Area.

Status: Not completed; being implemented but necessary to complete.

Assessment: As authorized by the Final Rule (USFWS 1998) and Record of Decision (USFWS 1997), USFWS is implementing the "Preferred Alternative" of the FEIS on reintroduction of the Mexican wolf (USFWS 1996). The Preferred Alternative allows wolves to be reintroduced into a portion of the BRWRA, and if feasible and necessary to achieve recovery, White Sands Missile Range (WSMR) would be used as a secondary reintroduction site.

Limiting use of WSMR solely as a secondary site was based on two independent assessments (Bednarz 1989, Green-Hammond 1994) that concluded WSMR by itself could not support a viable population of wolves due to its relatively small size and its isolation from other suitable habitat. This finding was reiterated in the 3-Year Review, noting wolf dispersal would be

hindered by Interstate-25 and poor wolf habitat surrounding WSMR (Paquet et al. 2001). Another more recent habitat modeling analysis (Carroll et. al. in press) came to the same conclusion, stating, “Conversely, an area such as the WSMR, even in the doubtful event that it could support a viable population, would make little contribution to regional recovery goals due to its isolation and small size.” Carroll et al. evaluated WSMR in a regional context, but also summarized habitat quality for WSMR as a stand-alone area for reintroduction. Their results suggest that habitat within WSMR would play little or no role in facilitating reintroduction success.

Finding: AMOC sees no benefit to continuing to hold WSMR up as a possible reintroduction site or primary recovery area. Although wolves might eventually disperse to WSMR, neither the habitat (prey base) nor the management constraints of that site (i.e. national defense and Homeland Security issues) would be conducive to establishing a significant population segment or to contributing toward wolf recovery on a rangewide basis. Thus, AMOC recommends that any amended or new Mexican Wolf Nonessential Experimental Population Rule drafted in conjunction with Recommendations (1) and (2), above, not include WSMR as a Mexican Wolf Recovery Area (i.e. its designation in the current Final Rule) or as a Reintroduction Zone. This would not preclude natural dispersal to WSMR, nor would it require removal of wolves dispersing to WSMR.

B-7. Provide biologists with opportunities to visit other wolf projects to gain training with capturing and handling free-ranging and captive wolves.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: AMOC and the IFT recognize that the highest levels of professionalism, expertise, and ethical standards are required of a workforce in a field as dynamic, broad-based, and closely scrutinized as the Mexican wolf reintroduction effort. AMOC and the IFT include a multitude of agencies that bring to the Project a tremendous diversity in workforce. Each agency represented on the IFT ensures that its own personnel will meet the annual training requirements placed upon them by their own agency, including as a result of consideration of Project needs. The IFT goes even further in ensuring that its members are trained. The IFT currently holds annual training (e.g. immobilization training) that is open to employees of cooperating agencies and held at captive facilities in New Mexico, the Alpine Field Office, and other sites within AZ and NM. Where appropriate, each agency invites other agency personnel to training sessions or to be a trainer at agency meetings. Project staff members have also been detailed to other wolf programs to gain field experience. In addition, and dependent upon funding, AMOC and the IFT will strive to provide additional training opportunities, such as net-gunning wolves in the Rocky Mountains, to increase proficiency and knowledge of IFT members.

Finding: No later than December 15, 2007, AMOC and the IFT will identify training recommendations to build and enhance administrative, project management, supervisory, communication, and technical skills and knowledge as appropriate to each staff member’s job functions within the Reintroduction Project.

- B-8. Station the Field Coordinator in the BRWRA (e.g. in Glenwood or Silver City, New Mexico or Alpine, Arizona) and insist that this person be intimately involved with all aspects of fieldwork (wolf management, public relations, data collection, management, analysis, report preparation, etc.).

Status: Completed.

Assessment: Mexican wolves were first released to the wild in March 1998. At that time, the USFWS Mexican Wolf Field Coordinator position was stationed in the Regional Office in Albuquerque NM. In 1999, USFWS began making plans to station the Field Coordinator in the BRWRA, specifically Glenwood NM. This shift in operations was initiated in order for USFWS to have more presence in local communities affected by wolves. It also gave USFWS the ability to be more responsive to wolf situations in a timely manner as they arose in the field.

From 2000 through May 2001, the Field Coordinator was stationed part-time in Glenwood until her departure from the Mexican wolf recovery program. The Field Coordinator position remained vacant until September 2002, when the current Field Projects Coordinator was hired. The Field Projects Coordinator has been stationed in Alpine AZ, headquarters for the IFT, since being appointed. At this time, USFWS intends to keep the Field Projects Coordinator position stationed in the BRWRA.

As a fully functioning member of the IFT, the Field Projects Coordinator is intimately involved in all aspects of fieldwork, as suggested in the 3-Year Review recommendation. The functions and duties of the Field Coordinator are spelled out in the MOU among the Lead Agencies and other Cooperators as follows:

The Field Coordinator shall:

1. Serve as a member of the IFT and assist the Field Team Leaders in carrying out any field activities necessary to accomplish project goals and objectives.
2. Serve as the communication liaison between the Adaptive Management Oversight Committee and the IFT.
3. Collaborate with the IFT to draft recovery protocols.
4. Assist the Field Team Leaders in drafting Annual Work Plans, Annual Performance Reports, and new or revised project operating procedures.
5. Plan and coordinate, with assistance from the Field Team Leaders, the identification of review of additional release sites for release or translocation of Mexican wolves.

Additional insight on the Field Projects Coordinator can be gleaned from the referenced MOU (see Administrative Component Attachment 2).

Finding: Under current structure, for coordination and communication purposes AMOC believes it is essential for the Field Projects Coordinator to remain stationed in the IFT field office (currently in Alpine AZ). The same logic applies to other agency cooperators, if, as projected,

the IFT expands to meet needs resulting from a growing wolf population. Thus, AMOC recommends that at least one IFT member from each Lead Agency be stationed in the Alpine field office, to facilitate and enhance interagency communication and cooperation.

B-9. Put forth a concerted effort to develop realistic expectations for the Project.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: This recommendation from the Paquet Report identified a need to “constantly remind the public and the media” that “restoration is an imprecise process that is by definition ‘heavy handed.’” It further reflected Paquet et al.’s admonition that USFWS would face (and need to overcome) many “great challenges,” meaning that “intervention will be required, wolves will disappear, and that some animals will die. But just as certainly, meeting the challenges will ensure the restoration of a self-sustaining population of Mexican wolves in the Blue River [sic] Wolf recovery area.”

Clearly, establishing more realistic expectations for the Reintroduction Project was a pressing priority in August 2001, as the 3-Year Review came to a close. The Stakeholders Workshop underscored the Paquet Report admonition about realistic expectations. It seemed evident that to some, the death of any wolf, perhaps even from natural causes, was unacceptable, and especially so for any wolf that died as a direct consequence of human action. Yet, as Paquet et al. (2001) pointed out, mortality was inevitable.

Unrealistic expectations were also evident in regard to human ability to control, or at least modify, wolf behavior. The difficulties of tracking wolves in extremely rugged terrain, from searing summers through snow-bound winters, were too often casually dismissed, as some people questioned why the IFT did not know where every wolf was at every second. And even as these questions were asked, other people or even some of the same people criticized the Project for too much intervention, opining that the wolves should be allowed to adjust to the wild and people would simply need to adjust to them.

Also, IFT response time to “nuisance” and “problem” wolves was often perceived by local residents as inadequate, even as criticisms were constantly lodged about the cost of the Project, which would only be increased if additional resources were allocated to increase responsiveness.

The need for more realistic expectations was reaffirmed a year later, in the State Wildlife Agencies’ September 2002 independent review of the 3-Year Review (AGFD and NMDGF 2002). To better address public expectations for a well-managed reintroduction project that appropriately considered and responded to the public’s expectations, the AZ and NM State Wildlife Commissions requested in September 2002 that USFWS:

1. Restructure the roles and functions of the Primary Cooperators (AGFD, NMDGF, and the Service) to ensure State participation, authorities, and responsibilities.
2. Restructure the administrative and adaptive management processes to ensure opportunities for, and participation by, the full spectrum of stakeholders.

3. Restructure the Interagency Field Team response protocols, and enhance staff capacity, to ensure immediate response capability to, and resolution of, urgent operational issues, such as depredation incidents.
4. Restructure Project outreach as necessary to address Commission, Department, and public concerns.
5. Ensure that all actions in the Project be in strict compliance with any applicable, approved special rules, policies, protocols, management plans, and interagency agreements.
6. Restructure and improve the Project's review protocols and procedures to ensure that the 5-year review is effective and efficient, and an improvement over the 3-Year Review.

The State Wildlife Commissions and their respective agencies were willing to help USFWS restructure the Project from top to bottom, and work toward successful reintroduction and recovery, but first they needed to know that USFWS was receptive to a more collaborative partnership than the States and the public perceived had existed since the initial wolf releases in 1998. Fortunately, the new leadership in USFWS Region 2 was more than receptive to this concept, as Regional Director H. Dale Hall both embraced and helped structure the necessary changes in organizational philosophy, structure, and function.

By November 2002, Directors of the two State Wildlife Agencies and USFWS Region 2 had agreed upon a course of action to address these concerns in such a way that more realistic expectations would be developed on both sides of the equation: the agencies that manage the Project and the public that is interested in and/or affected by it. Identifying themselves as Primary Cooperators, the three agencies agreed (see Attachment 1, dated November 8, 2002):

The Service is responsible for providing guidance and coordinated information to all interested parties relative to recovery of the Mexican wolf. The States and Tribes are responsible for conducting reintroduction efforts in such a manner that they contribute directly to recovery. Other federal, state, local, and private stakeholders have to some extent shared responsibilities, or at least significant stakes, in these areas. The intent of the current Primary Cooperators is to realign the Recovery and Reintroduction components so they are fully integrated, smoothly coordinated, and effective.

This document begins, but does not complete progress toward achieving the direction that was given to the two State Wildlife Agencies by their respective Commissions in September 2002. The Primary Cooperators will, however, complete this effort before March 31, 2003, through appropriate collaboration with Tribal and other interested parties.

From November 2002 through October 2003, the original Primary Cooperators met frequently, and over time with an increasing number of other State agencies, tribes, and local governments, to discuss a new framework for collaboration to ensure that expectations about the Project were more realistic, and more importantly that they were met. Agencies-only meetings were blended with what evolved into quarterly AMWG public meetings for open discussion of virtually all

aspects of the Project. One of the more frequently voiced criticisms reflected a lack of trust in the agencies managing the Project.

The transition from Federal to State and Tribal implementation lead for the Mexican Wolf Blue Range Reintroduction Project was problematic at times for some Project cooperators, as new roles and responsibilities of agencies were defined and implemented. Uncertainty in how the new structure might affect day-to-day operations and decision-making at the field level prevailed.

Many of these issues remained unresolved as staff-level discussions continued; consequently, interagency meetings from February 2003 through October 2003 covered many of the same issues repeatedly, thus delaying addressing fundamental problems such as insufficient funding and staff required to carry out the needed management, monitoring, and research. It was difficult to reach consensus decisions about such issues, as agency representatives at the negotiating table struggled under the new organizational structure they had been directed to implement. Roles, functions, and authorities were debated repeatedly.

Overcoming the trust issues among Project cooperators required time, persistence, and a spirit of cooperation. Nevertheless, by October 2003, the agencies had crafted an MOU (Attachment 2) as a foundation for adaptive management of the Reintroduction Project. Quarterly meetings of AMOC, which guides the Project, and AMWG, which affords a forum for public participation, thus became the primary mechanism for ongoing discussion and re-discussion of what to expect from the Project, and what the Project might expect from the public. Many of the same questions and concerns came up at virtually every meeting in 2003 and 2004, and they were addressed each time. Over-commitment of limited resources in a partnership effort was finally beginning to give way to a more realistic accounting of what could and would be done, and doing it. That seemed to be a significant step forward in a Project as complex and controversial as wolf reintroduction, and it is a credit to all the agencies and public involved.

As of the time at which this 5-Year Review is being completed, the cooperating agencies are continuing to diligently work to develop more realistic expectations for and by the Project in all sectors. It is, however, a never-ending, difficult task. Few individuals inside and especially outside the agencies are sufficiently attuned to the Project to stay fully abreast of its problems, and its progress. Many other issues and activities draw on their time. Thus, the focus is on constant re-education as well as on education. Information is now flowing better about the Project than ever before. The Project has established a toll-free number (1-888-459-WOLF) whereby the public can call during business hours to report sightings or incidents, or to receive information about the project. A 24-hour radio dispatch (1-800-352-0700; the AGFD Operation Game Thief Hot Line) is also operational to report incidents, depredations, or emergencies after hours. SOPs have been completed for all essential areas of IFT activity, and they are continually revised as new experience and knowledge is brought to bear. Lead Agency Directors meet twice each year with AMOC, the IFT, and Cooperators for Project updates on key issues and activities, and to discuss significant issues of concern. The backlog of uncompleted Annual Reports has been eliminated. AMOC and the IFT now engage in joint annual work planning and budgeting, to ensure that staff resource allocations appropriately match product and service expectations and the available resources. Electronic self-subscription update services at <http://azgfd.gov/signup>

complement information posted on the AGFD wolf website, <http://azgfd.gov/wolf>, and the USFWS Mexican wolf website, <http://mexicanwolf.fws.gov>. Enhanced signage in wolf-occupied areas, brochures, public adaptive management discussions, outreach presentations by the IFT, and countless “one-on-one” field staff conversations with local residents are occurring to ensure that people have opportunities to gain more knowledge about the Project, express their opinions, and form more realistic expectations about it. The same mechanisms of interaction serve to inform the agencies about the public’s expectations, and how they can best be met.

Finding: As stated before, the “concerted effort” necessary to “develop realistic expectations” (within and outside the Reintroduction project) is indeed never-ending, thus this Paquet Report recommendation can only be described as “Being Implemented;” it will never be “Completed.”

B-10. Initiate programs to educate people about wolf behavior.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: Education and public outreach is essential and should be a continual, dynamic, and effective part of the Mexican Wolf Recovery Program. Providing sufficient and accurate information on wolves and their behavior is important to all entities involved in this program.

Many strategies have been introduced to provide this information to the public. An interim “Education and Public Outreach Position” was created by USFWS to initially coordinate program goals. It has been superseded by AMOC SOP 3.0: Outreach (available at <http://azgfd.gov/wolf>). AGFD now employs a full-time person on the IFT to meet overall outreach responsibilities for the Project, with emphasis on local education and information (i.e. outreach) efforts. Wolf education boxes have been provided to agencies for public forums; mounts of wolves are on display in various places in the BRWRA, with additional mounts expected in the future. Public outreach presentations have been initiated for schools, communities, and requesting groups. Permanent educational displays are being promoted for various locations. Traveling displays exist but are limited in number at the present; funding is being pursued to develop additional displays. Other educational materials such as brochures and posters have been created and are available from participating agencies. Signs have been developed and posted in wolf areas; additional sign postings are pending. Information has been included in Hunting and Recreation Regulations and made available with permits or hunt tags; presentations have been made at Hunter Safety Courses. Flyers have been made available and passed out to hunters prior to and during hunt seasons. A 24-hour report, information, and emergency phone line and a web-site to sign up for monthly updates are currently in place (see B-9, above). Monthly Project Updates are provided to the public at large via an electronic self-subscription newsletter (*Endangered Species Updates*), at <http://azgfd.gov/signup>, and to certain interested or affected parties who have a specific need for more specific, current information are provided weekly updates after routine monitoring flights, via e-mail, fax, and by local postings. Personal contacts are also made via the phone or by one-on-one discussion with parties reporting wolf sightings or incidents. IFT field activities have been, and will continue to be, conducted to demonstrate wolf monitoring techniques. Wolf issues are discussed and coordinated on a regular basis during AMOC and AMWG meetings, which are held at least quarterly and more often as

necessary. Wolf identification, behavior, and pertinent report information is coordinated for release to local media, including radio stations, television stations, and newspapers, especially prior to hunting seasons. Many Project-related articles have appeared in magazines, as well as professional journals. Partnerships have been established with local businesses and private organizations. Planning and development for educational outreach opportunities are a continuing and expanding part of the recovery program.

The need for public education about measures by which to prevent or at least minimize risks associated with free-ranging animals, whether feral dogs or predatory wildlife, was underscored just as AMOC was completing this 5-Year Review. The event occurred in Canada, and might be highly relevant to the subject of human-wolf interactions in North America. On November 8, the body of 22-year-old Kenton Joel Carnegie, a 3rd-year survey crew intern with an energy exploration company, was found in northern Saskatchewan. Dr. Paul Paquet (personal communication, December 13, 2005) advises AMOC that a final Provincial Coroner's report is expected in January 2006, at which time it also will be made public. However, Dr. Paquet, a wolf expert well known to the Southwest as author of the 3-Year Review "Paquet Report" (Paquet et al. 2001), advises AMOC that preliminary investigation by law enforcement officials, and his own ongoing investigation for the Provincial Coroner, indicate a pack of four wild wolves might have attacked and killed the young man. However, death by wild dogs, with subsequent scavenging by wolves, had not yet been ruled out as this account was being written.

If wolves are proven to have killed Mr. Carnegie, it would be the first documented human death attributed to healthy wild (free ranging) wolves in North America in at least 100 years (see McNay 2002a and 2002b). Canadian experts and officials speculate that several factors might have contributed to the attack. In particular, huge expansion of exploration and mining for oil, gas, precious metals, etc. has resulted in an explosion of "wildcat" dumps (i.e. unregulated dumps), which are well known to attract predators (and wild dogs) and to result in increased risk of negative human-wildlife interactions.

The excerpted article below from the International Wolf Center is the most recent and thorough account available as to what might have occurred. It is included here in the 5-Year Review to ensure that it becomes part of the context for considering the issue of human-wolf interactions.

Regardless of the final outcome of the investigations, the fatal incident and increasing prevalence of habituated wolves and wild dogs in Saskatchewan underscore the need to take precautions in minimizing risks, including: ensuring that garbage dumps (regulated and not) are maintained in such a way that bears, wolves, wild dogs, and mountain lions do not become habituated to them; never feeding free-ranging predators, especially not at arm's-length distances; never providing food to domestic dogs or other domestic animals in such a way that predators might be attracted, and maintaining ready access to deterrent sprays and other protective devices in case of approach closely; etc. AMOC SOP 13.0: Control of Mexican Wolves provides additional information on this subject, as do other public education materials disseminated by the Reintroduction Project.

Finding: Educating people about wolf behavior (and the Reintroduction Project as a whole) is a never-ending process, thus this Paquet Report recommendation can only be described as “Being Implemented;” it will never be “Completed.”

B-11. Require livestock operators on public land to take some responsibility for carcass management/disposal to reduce the likelihood that wolves become habituated to feeding on livestock.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: The 3-Year Review identified an issue concerning livestock carcasses. Simply stated, the concern was that free-ranging Mexican wolves that scavenge on domestic livestock carcasses become habituated, and subsequently deplete domestic livestock. This suspected behavior in turn results in management actions ranging from capture and translocation to permanent removal from the wild, sometimes by lethal control of the offending wolf. Scavenging in this context means that free-ranging wolves encounter a livestock carcass and feed on it. The animal might have died from any of a variety of causes other than attack by wolves.

To put this issue into context, we reviewed the issue as outlined in the 5-Year Review and the findings in both the 3-Year Review Stakeholders Workshop final report and Paquet report.

We conducted a thorough review to evaluate whether a carcass feeding issue does exist, and if so what its magnitude might be. First, we accessed the IFT’s Mexican wolf “Incident Database” for all records of Mexican wolf carcass feeding, depredations, and subsequent management actions. Next, we reviewed information that the Center for Biological Diversity (CBD) had previously received under FOIA, to determine whether the IFT Incident Database contained all relevant information on depredations and carcass feeding. In reviewing the CBD data, we found that all carcass feeding and depredation events noted therein were in fact included in the Incident Database. We also examined land management agency (i.e. USDA Forest Service and USDI Bureau of Land Management) regulations and policies to determine if the agencies have policies or other authorities regarding this issue.

Changes between Draft and Final 5 Year Review: The Draft 5-Year Review noted that 91 percent of the wolves involved with carcasses had also been involved with depredations. This “association” has been widely cited by interested parties during the 5-Year Review public comment period. However, further analysis indicates the 91 percent figure (see old Table 2 in the Draft Technical Component) is misleading, in that it was not based on analysis of the chronology of depredations and carcass feeding incidents.

After preliminary internal review and discussion among AMOC and the IFT, we conducted a further review of depredation and carcass involvement data from the Draft 5-Year Review. Our primary focus was the chronology of the depredations and carcass involvement incidents. Three groupings emerged from this analysis: Group One involves 12 wolves that were clearly involved in a depredation incident prior to being seen feeding on a livestock carcass. Group Two involves six wolves that were seen feeding on a carcass that was the direct result of a depredation. Group

Three involves five wolves that fed on a carcass and later depredated livestock. (Please refer to the following Analysis Section).

Summary of Public Comments to the Draft 5 Year Review: AMOC solicited public comment on the Draft 5-Year Review through a variety of venues. Comments concerning the carcass issue can be summarized as follows: those who felt that the section should be removed from the document because it leads to increased conflict and animosity with the livestock industry; those who felt that carcass removal was not at all practical due to problems finding carcasses and the time and expense involved in disposal; those that felt removing carcasses would lead to further depredations; those that felt using the CBD data biased the results; those that felt the agencies should develop and/or enforce policies for carcass removal; and those that felt incentives for livestock owners should be developed to promote voluntary carcass removal. (Please refer to Response to Comments Section).

3-Year Review: Participants in the Stakeholders Workshop were organized into six working groups. One, the “Wolf-Livestock-Animal Conflict Working Group,” identified finding and disposal of livestock carcasses as an “issue,” and further identified lack of implementation of effective husbandry practices to decrease livestock-wolf conflicts as a “problem.” This Working Group called for livestock producers and land management agencies to work together to develop guidelines for detection and disposal of livestock carcasses to reduce wolf-livestock conflicts.

The 3-Year Review’s Paquet Report addressed the livestock carcass issue in a section titled “Has the Livestock Depredation Control Program been Effective” (pages 52-85). The concluding remarks assert that “Similarly, livestock producers using public lands can make a substantive contribution to reducing conflicts with wolves through improved husbandry and better management of carcasses.” The “Overall Conclusions and Recommendations” (pages 67 to 68) include a recommendation that “livestock operators on public land be required to take some responsibility for carcass management/disposal to reduce the likelihood that wolves become habituated to feeding on livestock.”

5-Year Review: Building on the Paquet Report, with additional information from Project experience since 2001 and from public comment on the 5-Year Review, AMOC now offers an analysis of documented Mexican wolf livestock depredations and incidents of livestock carcass feeding. The information in this section was derived from the IFT’s Incident Database and, for purposes of completeness and accuracy, was checked against information the CBD provided to AMOC that it had obtained via Federal FOIA. Table 2 displays information on wolves involved in known depredation incidents from 1998 through 2004: a total of 46 depredation incidents have been recorded; of those, 23 (50%) involved documented cases of wolves feeding on domestic livestock carcasses.

Because this issue involves a suspected link between wolves scavenging on domestic livestock carcasses and subsequent depredation on domestic livestock, Table 2 presents data on wolf activities such as depredations and scavenging on livestock carcasses as well as management actions associated with each type of incident from capture to translocation. The current fate of each wolf (as of 2005) is also included in Table 2.

Of the 46 wolves involved in known depredation incidents through 2004, 16 (35%) were involved in more than one depredation incident. Of these 46 wolves, 20 (43%) were removed from the wild for depredations; 24 (52%) were translocated into New Mexico; 11 (24%) were permanently removed from the wild population; and 19 (41%) died (Table 2; Note: because some wolves were assigned to multiple activity categories, percentages total more than 100). Of the 46 wolves involved in livestock depredations, 9 (20%) are currently in captivity and 8 (17%) remain in the wild (Table 3).

In the Draft 5-Year Review, we reported that 91 percent of the 22 wolves involved in known livestock depredations had fed on livestock carcasses. Between Draft and Final, we took a further look at the data and separated it by the chronology of depredations versus the chronology of confirmed carcass feeding events. As a result of this analysis, our results have changed and the way we are reporting them has changed. In addition, the sample size increased by 1 from 22 to 23 wolves involved with both carcasses and depredations.

By looking at the chronology of the depredation and carcass feeding incidents, three groupings emerged: Group One involves 12 wolves that were clearly involved in a depredation incident prior to being seen feeding on a livestock carcass. Group Two involves six wolves that were seen feeding on a carcass that was the direct result of a depredation. Group Three involves five wolves that fed on a carcass and later depredated livestock. Table 3 reveals that 5 of the 46 wolves (11%) with records of suspected or confirmed depredations had fed on carcasses prior to their documented depredation incident(s).

The 12 wolves in Group One were involved in depredations prior to any documented carcass feeding event. Six wolves in Group Two were seen feeding on a livestock carcass clearly associated with a depredation incident. Only the five wolves in Group Three were known to have fed on a livestock carcass prior to being involved in a depredation incident; this amounts to 11% of all wolves known to have depredated or suspected of depredations in the BRWRA. Table 4 displays the “locations” of the five wolves identified in Group Three.

Federal Land Management Agency Regulations and Policies Concerning Domestic Livestock Carcass Removal: USDA Forest Service and USDI Bureau of Land Management are the two principal federal land management agencies involved in or affected by Mexican wolf reintroduction and recovery. Neither agency has authority by law, regulation, or policy to require a permittee to remove dead livestock, render dead livestock unpalatable, or bury dead livestock on public lands where domestic livestock grazing is authorized. However, if a permittee voluntarily wanted to commit to such actions, both agencies could write such a commitment into the permittee’s grazing permit. Authority for such mutually agreed-upon actions (essentially, self-imposed commitments) stems from (BLM) 43 CFR Chapter II §4130.3-2 (other terms and conditions) and (Forest Service) 36 CFR 222 and Forest Service Handbook 2209.13 §16.11 (Modification After Issuance). These allow each agency to address the issue of requiring the removal of livestock carcasses, rendering dead livestock unpalatable or burying dead livestock through individual grazing lease/permit authorizations or modifications.

State Statutes Pertaining to Carcass Disposal: The carcass disposal issue is also constrained by AZ and NM State Law. The following Statutes have bearing on whether livestock carcasses can be removed from public lands, to reduce risk of wolves or other predators feeding on them.

Arizona (Note: this information was taken from Arizona's on-line Statutes, which are available at <http://www.azleg.state.az.us/ArizonaRevisedStatutes.asp>)

Chapter 11, Article 4, Section 3-1293. Procedure for owner to authorize another person to deal with animals; violation

- A. A person who desires to authorize another person to gather, drive or otherwise handle animals bearing the recorded brand or mark owned by the person granting the authority, or animals of which he is the lawful owner but which bear other brands or marks, shall furnish the other person an authority in writing which lists the brands or marks authorized to be handled, and authorizes the other person to gather, drive or otherwise handle the animals described.
- B. If a person who gives written authority for the purposes provided in subsection A inserts therein any brand or mark of which he is not the lawful owner and an animal bearing such brand or mark is unlawfully taken, gathered, driven or otherwise unlawfully handled by virtue of the written authority by the person to whom the written authority was given the person giving the written authority shall be deemed a principal to the unlawful taking, gathering, driving or handling of such animals.

Chapter 11, Article 4, Section 3-1302. Taking animal without consent of owner; classification

A person who knowingly takes from a range, ranch, farm, corral, yard or stable any livestock and uses it without the consent of the owner or the person having the animal lawfully in charge is guilty of a class 2 misdemeanor.

Chapter 11, Article 4, 3-1308. Evidence of illegal possession of livestock

Upon trial of a person charged with unlawful possession, handling, driving or killing of livestock, the possession under claim of ownership without a written and acknowledged bill of sale, as provided by section 3-1291, is prima facie evidence against the accused that the possession is illegal.

Chapter 11, Article 4, 3-1303. Driving livestock from range without consent of owner; classification

When livestock of a resident of the state is intentionally driven off its range by any person, without consent of the owner, the person is guilty of a class 5 felony.

Chapter 11, Article 4, 3-1307. Unlawfully killing, selling or purchasing livestock of another; classification; civil penalty; exception

- A. A person who knowingly kills or sells livestock of another, the ownership of which is known or unknown, or who knowingly purchases livestock of another, the ownership of which is known or unknown, from a person not having the lawful right to sell or dispose of such animals, is guilty of a class 5 felony.
- B. A person who knowingly attempts to take or does take all or any part of a carcass of any such animal, pursuant to subsection A, for such person's own use, the use of others or for sale is guilty of a class 5 felony.
- C. In addition to any other penalty imposed by this section, a person depriving the owner of the use of his animal or animals under subsection A or B of this section shall be liable to the owner for damages equal to three times the value of such animal or animals.
- D. This section shall not apply to taking up animals under the estray laws.

New Mexico (Note: this information was taken from New Mexico's on-line Statutes, which are available at <http://www.lawsources.com/also/usa.cgi?nm>)

Article 9. Section 77-9-45. Ownership; possession; transportation; seizure; disposition of livestock; refusal of certificate.

If any duly authorized inspector should find any livestock or carcasses in the possession of any person, firm or corporation for use, sale or transporting by any means, and said person, firm or corporation in charge of said livestock or carcasses is not in possession of a bill of sale, duly acknowledged, or cannot furnish other satisfactory proof of lawful ownership or said inspector has good reason to believe that said livestock or carcasses, are stolen, said inspector shall refuse to issue a certificate authorizing the transportation of said livestock or carcasses, and shall seize and take possession of same.

Livestock Industry Perspective in the Southwest: Both the Arizona and New Mexico Cattle Growers Associations are on public record in Mexican Wolf Adaptive Management Work Group meetings as opposing any mandatory removal of dead livestock from public lands.

Finding: Five (11%) of the 46 wolves known to have been involved in a depredation incident had fed on a livestock carcass prior to committing a depredation. Of these five wolves, two remain in the wild, one is "fate unknown," and two have been permanently removed from the wild. This sample size is too small to support even preliminary, let alone definitive, conclusions as to correlations, trends, or "depredation predisposition" resulting from carcass feeding.

Federal land management agencies do not have the authority to require lease/permit holders to remove livestock carcasses from public land. Permittees can voluntarily commit to such actions, and these commitments could be written into their BLM or USFS grazing permit if the permittee

so desired (i.e. perhaps in exchange for incentive payments of some sort?). The livestock industry in the Southwest opposes mandatory removal of livestock carcasses from Federal lands.

In light of the above:

1. AMOC will develop, no later than June 30, 2006, a report describing a proposed Federally, State, and/or Tribally-funded incentives program to address known and potential economic impacts of wolf nuisance and livestock depredation behavior on private, public, and Tribal Trust lands. AMOC may convene, if necessary, a technical advisory group of individuals with appropriate expertise to assist with this task. The conservation incentives discussion will consider all relevant livestock depredation issues, including: livestock depredation prevention; livestock depredation response; carcass discovery, monitoring, removal, burial, and/or destruction; and possible adjustment of the Federal grazing (AUM) fee (and any Tribal grazing subsidies) within the MWEPA to provide de facto compensation for documented and likely undocumented losses of livestock. The AMOC report shall also include a thorough evaluation of the effectiveness and procedural efficiency of the Defenders of Wildlife wolf depredation compensation fund, and provide recommendations for appropriate improvements. Note: (a) The technical advisory group, if convened, shall be chaired by an AMOC representative and include a maximum of 15 other members, each with appropriate expertise. (b) AMOC as a body will not advocate regulatory changes to address carcass removal or disposal issues.
2. AMOC will convene a stakeholders group to assist AMOC in evaluating, and reporting in writing no later than December 31, 2006, social (human and socioeconomic) implications (including estimated annual livestock depredation losses) for any boundary expansions recommended. Note: The stakeholders advisory group will be Co-Chaired by an AMOC representative and an AMWG Cooperator (County) representative, and include a maximum of 50 other members, representing, insofar as is possible, the full spectrum of stakeholders. This group will comply with FACA, if necessary.
3. No later than March 1, 2006, AMOC will convene a science and research advisory group. The group will review, on a continuing basis, current and proposed management practices and recommend research priorities for AMOC to advocate to external entities and the cooperating agencies on all aspects of the Reintroduction Project. Review tasks will include, but not be limited to: overall Reintroduction Project effectiveness, statistically reliable wolf survey and population monitoring techniques, wolf population dynamics (demographics), prey base dynamics, total predator loads, seasonal wolf livestock depredation rates, annual wolf impacts on native ungulate populations, prey base monitoring techniques appropriate to determining when prescribed unacceptable levels of impact on native wild ungulates have been met or exceeded, wolf-related disease occurrence and prevention, seasonal livestock depredation rates, prevention and/or remediation of wolf nuisance and livestock depredation problems, livestock husbandry, wolf-related tourism, socioeconomics, and human dimensions.

4. AMOC will advocate creating an IFT position in the Alpine field office to work with cooperators and stakeholders throughout Arizona and New Mexico on proactive measures by which to avoid or minimize wolf nuisance and livestock depredation problems. Note: AMOC as a body will not advocate regulatory changes to address carcass removal or disposal issues (but see Recommendation [12], above, regarding a process by which AMOC will explore possible mechanisms to address this issue).

B-12. When writing or lecturing about the project, the Service should emphasize a community approach to understanding the wolf reintroduction project and its effect on other species and ecological processes

Status: Not completed because it is a continuing need that is being addressed.

Assessment: Apparently, Paquet et al. (2001) presumed that only USFWS had a role or stake in guiding and implementing the Reintroduction Project. What caused that presumption is moot. In any event, this recommendation from the Paquet Report and indeed all others apply to all Lead Agencies, not just to USFWS, thus AMOC responds along those broader lines.

This recommendation appears to be based on the Paquet Report's rationale that "Conservation policy is shifting away from the preservation of single species toward preservation and management of interactive networks and large scale ecosystems...." Although the authors did not provide specific references for this statement, their review does discuss changes in entire food webs that can result from disruption of top predator populations (e.g. McLaren and Peterson 1994, Terborgh et al. 1999). The authors also discuss the effects of wolves on prey survival and behavior (e.g. Nelson and Mech 1981, Ballard et al. 1987, Messier 1994), and influences of prey densities on wolf demographics (e.g. Messier 1985, Fuller 1989).

The driving authorities and policy leading to re-establishment of Mexican wolves within the BRWRA were the ESA, the 1982 Mexican Wolf Recovery Plan, and State and Tribal laws and regulations pertaining to wildlife management and conservation. Although the ESA calls for conservation of ecosystems that support listed species, the majority of its protections and regulations are directed at the single-species (as opposed to ecosystem) level. State and Tribal wildlife agency authorities for management and conservation also focus on individual species, rather than habitats. Even public land management agencies, which have mandates to provide for a multitude of land uses, and extensive authority over wildlife habitat, have specific direction regarding individual wildlife species that may be given special status for management or planning purposes. Therefore, while the statement that "conservation policy is shifting...toward preservation and management of interactive networks" may be reflective of the current academic and even public understanding of the importance of landscape-level factors in conservation of wildlife (particularly large carnivores), it has yet to be manifested in significant changes to the State, Federal, and Tribal legal and policy frameworks that guide Mexican wolf reintroduction.

Despite the lack of a clear ecosystem-level mandate related to Mexican wolf reintroduction, community-level changes remain an interest of many of the involved or affected agencies and stakeholders. Possible impacts to game populations are of strong interest to State Wildlife

Agencies, sportsmen, and those involved in or supported by hunting-related industries. Similarly, questions are frequently raised regarding possible impacts of wolves on industries such as ranching, either through direct or indirect impacts that could result from effects to secondary carnivores (e.g. coyotes), ungulate populations, alternate prey populations, or even primary producers (plants). At this time, little information is available to answer these community-level questions regarding Mexican wolf reintroduction.

AMOC has not attempted to quantify a broad array of ecosystem parameters for the explicit purpose of pre- and post-reintroduction comparisons. Also, because the objective for number of wolves to be established within the BRWRA has yet to be reached, community-level influences of wolves may not yet be detectable. Density of wolves within the 17,752 km² BRWRA is estimated at approximately 3 wolves/1,000 km². This density is at the far lower end of wolf densities where authors such as Ballard et al. (1987) (range of ~3 wolves/1,000 km² after wolf control to ~10 wolves/1,000 km² before control), Parker (1973) (range of 2 wolves/1,000 km² to 28-50 wolves/1,000 km² concentrated on prey winter range), and Hayes et al. (2003) (1.7 wolves/1,000 km² after wolf control and 6.0 wolves/1,000 km² before) evaluated interspecific interactions at multiple wolf densities. In comparison, wolves on Isle Royale have represented the high end of wolf densities found in North America, up to 91/1,000 km², (Peterson and Page 1988), and currently exist at about 50 wolves/1,000 km² in Yellowstone's northern range (Smith et al. 2003).

Although it is expected that populations of ungulate prey, alternate prey, competing predators, and the amount of primary production would be decreased in more arid wolf habitats, such as the Southwest, these parameters have not all been quantified within the BRWRA or within other wolf study areas. Therefore, it is difficult for AMOC to provide unequivocal information at this time regarding any landscape-level changes that might occur through Mexican wolf reintroduction. More time is needed for the wolf population to grow, and for effects to be determined through focused research. Paquet et al. (2001) acknowledged this, stating that wolf reintroduction has influenced the carnivore guild (wolves, bears, coyotes, mountain lions) within the northern Rocky Mountains (where wolves had already approached or surpassed recovery levels), but recommending research within the BRWRA regarding interaction of wolves with other carnivores to inform future Mexican wolf reintroduction project evaluations and adjustments.

Finding: Based on the information above, the recommendation from the 3-Year Review that "When writing or lecturing about the project, the Service should emphasize a community approach to understanding the wolf reintroduction project and its effect on other species and ecological processes" (Paquet et al. 2001) is not considered appropriate at this time. Rather, this recommendation is replaced with a related one that:

When writing or speaking about the Mexican wolf reintroduction project, entities cooperating in Mexican wolf reintroduction should accurately reflect the available current information regarding projected and realized community and ecosystem-level functions involving Mexican wolves in all appropriate outreach materials and Project reports or presentations. Wherever

possible, they should also support studies, monitoring, and analyses to evaluate any community-level changes that might result from Mexican wolf reintroduction.

Specifically:

1. No later than March 1, 2006, AMOC will convene a science and research advisory group. The group will review, on a continuing basis, current and proposed management practices and recommend research priorities for AMOC to advocate to external entities and the cooperating agencies on all aspects of the Reintroduction Project. Review tasks will include, but not be limited to: overall Reintroduction Project effectiveness, statistically reliable wolf survey and population monitoring techniques, wolf population dynamics (demographics), prey base dynamics, total predator loads, seasonal wolf livestock depredation rates, annual wolf impacts on native ungulate populations, prey base monitoring techniques appropriate to determining when prescribed unacceptable levels of impact on native wild ungulates have been met or exceeded, wolf-related disease occurrence and prevention, seasonal livestock depredation rates, prevention and/or remediation of wolf nuisance and livestock depredation problems, livestock husbandry, wolf-related tourism, socioeconomics, and human dimensions.
 2. AMOC will ensure that all Reintroduction Project-related outreach activities emphasize wolf conservation and management as an integrated component of the social (human) as well as the ecological landscape, and provide a balanced, objective perspective on positive and negative aspects of wolves as ecosystem components in a multiple-use landscape of intermingled public, private, and Tribal Trust lands.
- C. Evaluation of the recommendations from the Arizona-New Mexico independent review of the 3-Year Review indicating the status of the recommendations as either: a) completed/being implemented; b) not completed/being implemented but necessary (provide justification for why it has not been completed and estimated time-frame for completion); and c) not considered necessary to complete/implement (include justification).

In October 2001, USFWS completed a review of the first three years of the Mexican wolf reintroduction within the BRWRA. This review was required under the Final Rule for Mexican wolf reintroduction (Parsons 1998, USFWS 1998). The language within this rule directed USFWS to conduct “full evaluations after 3 and 5 years that recommend continuation, modification, or termination of the reintroduction effort.” This direction was also included within the final EIS for Mexican wolf reintroduction (USFWS 1996) and the Mexican Wolf Interagency Management Plan (Parsons 1998).

In June 2001, Congress directed USFWS to conduct an independent assessment of the Reintroduction Project’s 3-Year Review (House of Representatives Report 107-103). In August 2002, USFWS asked AGFD and NMDGF if they would conduct the review, which was due for completion by September 30, 2002. AGFD and NMDGF agreed to jointly conduct the independent assessment. The two agencies completed their evaluation and submitted it to

USFWS Region 2 Director H. Dale Hall in September 2002 (see AGFD and NMDGF 2002). Their report contained a series of recommendations regarding the process and outcomes of the 3-Year Review, including six overarching points that both State Game Commissions directed the respective agency to transmit to USFWS.

In developing the process and content for the Mexican wolf Reintroduction Project's mandated 5-Year Review (USFWS 1996, Parsons 1998, USFWS 1998), the Project's cooperating agencies agreed to revisit the recommendations from the States' evaluation of the 3-Year Review. This would include both the six overarching directives, and more detailed recommendations contained within the states' evaluation. The purpose was to determine if the recommendations were still valid, whether they had been implemented, and any rationale for changes in validity or failure to implement the recommendations. Following are AMOC's assessments of the State Game Commission directives regarding the Reintroduction Project and thus the 3-Year Review:

- C-1. The roles and functions of the Primary Cooperators (AGFD, NMDGF, and the Service) must be restructured to ensure State participation, authorities, and responsibilities as reflected in today's discussion.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: Restructuring of roles and functions has been embodied within the MOU among the cooperating agencies in Mexican wolf management. This agreement was completed and received its initial signatures in November 2003. All the Primary Cooperators had signed the agreement by April 2004. One major task in the restructuring of roles and functions is still outstanding. This is Item #8 under the "Lead Agencies agree to:" portion of the MOU, and reads:

Describe the roles, responsibilities, and processes necessary to address involvement, participation, and duties of the Lead Agencies, Project staff, and recognized committees, work groups, or other managing bodies involved with the Project. These descriptions will be completed within six months of the date of the last initial signature on this Agreement.

Finding: AMOC will make this task a priority action item for completion no later than June 30, 2006.

- C-2. The administrative and adaptive management processes must be restructured to ensure opportunities for and participation by the full spectrum of stakeholders.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: An MOU for collaborative Mexican wolf reintroduction was completed among the six Lead agencies and various Cooperators, establishing AMOC to oversee the Project and promote cooperation, coordination, and communication among interested and affected parties. The MOU also establishes an Adaptive Management Work Group (AMWG) to provide opportunities for interested publics to help AMOC identify local issues, review and make recommendations regarding Mexican wolf management activities, and evaluate the effectiveness

of ongoing management and communication processes. AMOC meets in closed session at least quarterly in the BRWRA (more often as necessary, with meetings rotating between northern and southern AZ and NM). AMWG meetings are public sessions; they are held on the same temporary and geographic rotation as AMOC meetings. Both have been occurring since February 2003.

Despite the increased frequency and logistical convenience of AMOC and AMWG meetings, participation by some interests has lagged. State, Federal, and Tribal (WMAT) agencies and Greenlee Co. AZ have been consistent, constructive participants. Two Counties signatory to the MOU (Navajo Co. AZ and Sierra Co. NM) have not attended recent meetings. Catron Co. NM participated in developing the MOU, and many Project SOPs, but with a change in County leadership announced in AMOC and AMWG meetings in 2005 that they would not be participating any further for fear of lending credibility to the effort. Various NGOs, primarily livestock owners and growers, have not attended most working AMWG meetings but have attended sessions to provide comment on proposed actions such as a Moratorium on initial releases, SOP 13.0: Control of Mexican Wolves, and the 5-Year Review. NGOs within the conservation community have attended every AMWG meeting, although only one or two have been represented each time. Private (non-affiliated) individuals attend every AMWG meeting, though again no single individual attends each one.

The reasons most often given for non-participation are variable (see AMOC Responses to Public Comment Component). Logistical issues (e.g. travel time and expense), other more pressing issues, lack of prior notice, “too many meetings,” and lack of engagement in discussion and resolution of priorities are among the more frequent reasons given. Many, perhaps even most, public participants in 2004 and 2005 seemed particularly frustrated by how much time AMOC spent establishing procedures for engagement that, ironically, the Project had previously been criticized for failing to establish. Even so, as SOPs and the 5-Year Review came to closure late in 2005, public comment at AMWG meetings began to acknowledge the progress that had been and was being made, and to acknowledge that more attention was now being focused on what needs to be done as opposed to how to work together to identify and address those needs.

Finding: AMOC Lead Agencies and active Cooperators are in complete agreement that constructive engagement of interested and affected parties is essential to Reintroduction Project success, and ultimately to Mexican wolf recovery. Toward that end:

1. AMOC will convene a stakeholders group to assist AMOC in evaluating, and reporting in writing no later than December 31, 2006, social (human and socioeconomic) implications (including estimated annual livestock depredation losses) for any boundary expansions recommended per Recommendation (5), above. Note: The stakeholders advisory group will be Co-Chaired by an AMOC representative and an AMWG Cooperator (County) representative, and include a maximum of 50 other members, representing, insofar as is possible, the full spectrum of stakeholders. This group will comply with FACA, if necessary.

2. No later than December 15, 2006, AMOC will complete a detailed plan for another Reintroduction Project Review. Note: The Reintroduction Project Review will be conducted in 2009-2010 and completed no later than December 31, 2010.
 3. AMOC will make all Reintroduction Project wolf management, outreach, and budget information (redacted as appropriate to protect confidential personal information) available to the public through Annual Reports for the Reintroduction Project, and other publications and outreach materials as appropriate.
 4. AMOC will recommend, through IFT Annual Reports, or a special report updated each year, wolf-related habitat enhancements that can be accomplished through private property incentives programs and Federal, State, Tribal, and County agency planning processes.
 5. AMOC will advocate creating an IFT position in the Alpine field office to work with cooperators and stakeholders throughout Arizona and New Mexico on proactive measures by which to avoid or minimize wolf nuisance and livestock depredation problems. Note: AMOC as a body will not advocate regulatory changes to address carcass removal or disposal issues.
 6. AMOC will maintain and improve administrative and adaptive management processes for the Reintroduction Project to enhance meaningful opportunities for, and participation by, the full spectrum of stakeholders and interested parties. AMOC efforts will include meeting with the IFT twice each year at the Alpine field office, and offering to meet once each year with the Commission or Board of Supervisors for each County within the BRWRA.
 7. Concomitant with any recommended MWEPA Rule changes, AMOC recommends that State and Tribal Lead Agencies and non-Federal Cooperators make a contingent-obligation request for annual Congressional line item allocations sufficient to cover all aspects of AMOC and AMWG participation in NEPA processes and ESA-related rulemaking processes required by such activities, through to the Record of Decision.
 8. AMOC recommends that no later than April 30, 2006, AMOC State and Tribal Lead Agencies and non-Federal Cooperators complete and deliver to Congress a funding request that is sufficient to fully staff and equip the Reintroduction Project as of October 1, 2006, at levels commensurate with all on-the-ground responsibilities in all areas of responsibility, including wolf management (including control), enforcement, outreach (including establishing a Mexican wolf education center in Hon-Dah Arizona), citizen participation in adaptive management, Reintroduction Project-related research, and landowner incentives.
- C-3. The IFT response protocols must be restructured, and staff capacity enhanced, to ensure immediate response capability to, and resolution of, urgent operational issues, such as depredation incidents.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: SOPs were completed in 2005 for all major IFT activities, through extensive public review during comment periods and discussion in AMWG public meetings. The SOPs are available in downloadable PDF format from <http://azgfd.gov.wolf>. However, existing SOPs will need to be updated as necessary, dysfunctional ones discontinued, and new ones created as the Project evolves.

Overall, capacity for the IFT was not substantially enhanced prior to October 2004. From October 2004 through Spring 2005, enhancement largely consisted of allocating available employees from Lead Agencies to address priority management issues in the field. However, through 2005 IFT staff capacity began to be expanded in more substantial form. Cooperator Public Information Officers began assisting more regularly and more effectively in overall outreach activities. Three FTEs were added to the IFT in 2005, two for AGFD and one for NMDGF. One of the AGFD positions was allocated to IFT outreach responsibilities (see C-4, below); the other two new positions are dedicated to on-the-ground wolf management (the one in NM also will carry IFT Leader responsibilities).

Although much progress has been made, and to a person the IFT is extremely hardworking and productive, through 2005 IFT staff capacity continued to be impacted by within-agency and among-agencies issues, such as:

1. USFWS has consistently fully staffed its committed IFT positions, but, as noted in the Draft 5-Year Review, in 2004 USFWS approved one of its IFT positions to begin graduate studies. Although the thesis project is germane to the Reintroduction Project, graduate study obligations have affected the employee's availability for other Project priorities and the study does rely on IFT resources that might be committed to other priorities if the study were not underway. By and large, though, interns and temporary details of other USFWS (non-Project) staff have probably compensated for any shortfall.
2. Due to base-budget funding constraints, WS is only able to commit 1.25 of a minimum "available" 2.0 FTEs to the Project, when AMOC has assessed the need for WS assistance at 4.0 FTEs dedicated to wolf management purposes, including capture and control as well as depredation investigation.
3. Through 2005, NMDGF allocated 1.0 FTE to all wolf management activities in NM, and IFT staff from other cooperators are frequently required to meet those needs in the periodic absence of the NMDGF employee or to assist the employee in meeting them.
4. USFS has allocated operating expense funds to the IFT, but has not yet responded to an AMOC request for a dedicated USFS communications liaison (minimum 0.5 FTE) within the IFT.

5. As wolf numbers increase on the FAIR, and WMAT is faced with a greater need for information on potential projected wolf impacts on trophy elk hunts, at least another 1.0 FTE and perhaps more will be needed.
6. AGFD has staffed up to meet existing needs in AZ, and to help meet IFT needs throughout the BRWRA, but in the long run will likely not be able to sustain State funding support for these employees.
7. The San Carlos Apache Tribe (SCAT), by Tribal Council choice, is not a Lead Agency or Cooperator in the Reintroduction Project (nor is SCAR included in the BRWRA), but by agreement between SCAT and USFWS Region 2 (Albuquerque NM) IFT resources are used to remove wolves from SCAR as soon as they occur there (regardless of occurrence of depredation issues). These management actions draw on IFT resources (USFWS and WS staff) that would otherwise be available for wolf management on lands that are within the BRWRA.

Finding: SOPs: Although all SOPs identified as essential to the Project were completed in 2005, existing SOPs will need to be updated as necessary, dysfunctional ones discontinued, and new ones created as the Project evolves.

Staff capacity: Given the issues noted above, and the certainty that the BRWRA wolf population will grow with time, IFT staff capacity must be increased in the near term. If the MWEPA were expanded, or dispersal allowed throughout the MWEPA, or initial releases allowed in NM, expansion would be needed even more. Increased effectiveness in planning and evaluation, community outreach, proactive measures to reduce risk of depredation, and response to nuisance and depredation issues are among the more obvious pressing needs.

Therefore:

1. AMOC will maintain all AMOC Reintroduction Project SOPs and continue to require employee compliance with them. Note: herein, “maintain” includes modify, revise, or delete existing SOPs, or add new SOPs, as necessary for purposes of adaptive management.
2. AMOC will advocate creating an IFT position in the Alpine field office to work with cooperators and stakeholders throughout AZ and NM on proactive measures by which to avoid or minimize wolf nuisance and livestock depredation problems. Note: AMOC as a body will not advocate regulatory changes to address carcass removal or disposal issues.
3. AMOC will collaborate with an appropriate entity to complete an IFT staffing needs assessment no later than June 30, 2007, based on (a) Reintroduction Project experience to date and (b) any proposal to amend or replace the current AZ-NM MWEPA.
4. AMOC will advocate creating sufficient IFT positions in each Lead Agency as appropriate to implement the staffing needs assessment conducted pursuant to (2), above.

AMOC will also recommend that at least one IFT member from each Lead Agency be stationed in the Alpine field office, to facilitate and enhance interagency communication and cooperation.

5. Concomitant with any recommended MWEPA Rule changes, AMOC recommends that State and Tribal Lead Agencies and non-Federal Cooperators make a contingent-obligation request for annual Congressional line item allocations sufficient to cover all aspects of AMOC (i.e. including the IFT) and AMWG participation in NEPA processes and ESA-related rulemaking processes required by such activities, through to the Record of Decision.
6. AMOC will recommend that no later than April 30, 2006, AMOC State and Tribal Lead Agencies and non-Federal Cooperators complete and deliver to Congress a funding request that is sufficient to fully staff and equip the Reintroduction Project as of October 1, 2006, at levels commensurate with all on-the-ground responsibilities in all areas of responsibility, including wolf management (including control), enforcement, outreach (including establishing a Mexican wolf education center in Hon-Dah Arizona), citizen participation in adaptive management, Reintroduction Project-related research, and landowner incentives.

C-4. Project outreach must be restructured as necessary to address the Commission, Department, and public concerns expressed here today.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: The approved Project MOU (Attachment 2) establishes and formalizes various means of project-related outreach, including through AMOC and AMWG. The MOU calls for interagency cooperation in developing and reviewing media releases, projects, and other outreach activities. Guidelines for coordinating, developing, and disseminating information for a variety of project-related events have been developed and implemented. An additional outreach component has been the maintenance of a full-time position on the IFT (as an employee of AGFD) that has Project outreach as the primary duties of that position. Moreover, AMOC has approved SOP 3.0: Outreach, to ensure appropriate guidance is given to the IFT and interested parties on performance expectations at the Project and individual employee level. See A-1, A-2, B-4, B-9, B-10, and B-12, above, for additional information regarding outreach.

Finding: Although the basic recommendation for restructuring Project outreach was accomplished in 2004-2005, continual effort will be needed to ensure that progress made to date is sustained, and remaining concerns resolved. Thus:

1. AMOC will direct Reintroduction Project-related outreach efforts in 2006 through the IFT Annual Work Plan to identify and reach specific target audiences, with emphasis on local communities and cooperating agencies within the BRWRA (>75% of outreach activity) and outside the BRWRA (<25% of outreach activity).

2. AMOC will ensure that all Reintroduction Project-related outreach activities emphasize wolf conservation and management as an integrated component of the social (human) as well as the ecological landscape, and provide a balanced, objective perspective on positive and negative aspects of wolves as ecosystem components in a multiple-use landscape of intermingled public, private, and Tribal Trust lands.
 3. AMOC will collaborate with an appropriate entity to complete an IFT staffing needs assessment no later than June 30, 2007, based on (a) Reintroduction Project experience to date and (b) the Arizona-New Mexico Mexican Wolf Nonessential Experimental Population Rule recommended to USFWS.
 4. AMOC will advocate creating sufficient IFT positions in each Lead Agency as appropriate to implement the staffing needs assessment conducted pursuant to (3), above. AMOC will also recommend that at least one IFT member from each Lead Agency be stationed in the Alpine field office, to facilitate and enhance interagency communication and cooperation.
 5. AMOC will maintain and improve administrative and adaptive management processes for the Reintroduction Project to enhance meaningful opportunities for, and participation by, the full spectrum of stakeholders and interested parties. AMOC efforts will include meeting with the IFT twice each year at the Alpine field office, and offering to meet once each year with the Commission or Board of Supervisors for each County within the BRWRA.
 6. AMOC recommends that no later than April 30, 2006, AMOC State and Tribal Lead Agencies and non-Federal Cooperators complete and deliver to Congress a funding request that is sufficient to fully staff and equip the Reintroduction Project as of October 1, 2006, at levels commensurate with all on-the-ground responsibilities in all areas of responsibility, including wolf management (including control), enforcement, outreach (including establishing a Mexican wolf education center in Hon-Dah Arizona), citizen participation in adaptive management, Reintroduction Project-related research, and landowner incentives.
- C-5. All actions in the wolf project must be in strict compliance with any applicable, approved special rules, policies, protocols, management plans, and interagency agreements.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: All cooperating agencies in the Reintroduction Project obtained detailed legal reviews of the draft MOU prior to signing the agreement. A primary purpose of these legal reviews was to ensure compliance with the laws, regulations, and policies of each of the respective cooperating entities. All Project SOPs are also reviewed while being drafted and before approval to ensure compliance with all applicable laws, regulations, and policies. Compliance with applicable rules and mandates is a continuing responsibility of all cooperating agencies in the AMOC. Thus, AMOC will maintain all AMOC Reintroduction Project SOPs and

continue to require employee compliance with them. Note: herein, “maintain” includes modify, revise, or delete existing SOPs, or add new SOPs, as necessary for purposes of adaptive management.

C-6. The Project’s review protocols and procedures must be restructured and improved to ensure that the 5-Year Review is effective and efficient, and an improvement over the 3-Year Review.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: Procedures for conducting the 5-Year Review were developed using input from AMOC Lead Agencies and formal and informal Cooperators. This was a distinct contrast to the 3-Year Review, when the review process was determined by USFWS, although vetted to some extent through the Interagency Management Advisory Group (IMAG). All parties involved in development of the 5-Year Review worked to create a process that would be more effective and efficient than, and an improvement on, the 3-Year Review. A key focus was on providing more opportunities for public comment.

Given that the 5-Year Review will be completed at the end of the eighth year of the Reintroduction Project, albeit due to late formation of AMOC and restructuring of virtually the entire Project, whether it can be considered particularly efficient is moot at best. However, its procedures were agreed upon specifically to improve on aspects of the 3-Year Review, including: (1) assigning AMOC and IFT staff directly involved in administering and implementing the Project to draft the Administrative and Technical components, to make use of their intimate knowledge of Project history and operations and to provide a fresh perspective compared to the 3-Year Review; (2) contracting an independent socioeconomic assessment (a facet absent from the 3-Year Review); and (3) allowing ample time-frames for AMWG discussion and public review of and comments on the draft 5-Year Review report before making findings (recommendations) and finalizing the report.

In particular, AMOC and the IFT allocated considerable time to analyzing and responding to public comment on the draft 5-Year Review, and to editing the document to incorporate suggestions for improvement and to address questions, concerns, and criticisms.

Finding: Strictly from an AMOC perspective, the 5-Year Review has been a substantial improvement over the 3-Year Review from several perspectives: (1) It has been conducted in transparent fashion, in accordance with a reasonably well defined process; (2) AMOC and AMWG meetings throughout the process enabled interested and affected parties who wanted to be well informed about the process to be so informed and ample opportunity to provide comment; (3) Socioeconomic issues were addressed; (4) All recommendations and materials from earlier reviews of the Project and relevant information from all aspects of Project implementation were carefully considered; (5) The 5-Year Review was actually completed, with a thorough discussion among all Lead Agencies and Cooperators, including their Directors, before findings or final recommendations (with completion timeframes as appropriate) were

offered that target specific issues of concern, obstacles to progress, and important areas in which progress to date needs to be sustained.

D. Specific Recommendations from the State Evaluation of the 3-Year Review.

Roles and Functions

D-1. The Mexican Wolf Recovery Program must be restructured to ensure that the two primary components (recovery planning and reintroduction) are managed as collaborative but separate projects.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: The signed MOU describes distinct roles related to recovery and reintroduction for the Lead Agencies. After overcoming various inter-agency issues in 2003 (see B-9, above), increasingly through 2004 and 2005 those distinctions are now being maintained, although constant vigilance is necessary to ensure this. Formation of a new SWDPS Recovery Team in August 2003, with the intent to complete a revised recovery plan by Spring 2006 (see B-2, above), was well coordinated with the overlapping transition to State and Tribal leadership in AMOC for implementing reintroduction activities in AZ and NM. The Recovery Team initially served as a valuable review resource while AMOC and the IFT drafted the 5-Year Review, but this asset was lost when the Team was placed on hiatus in February 2005 (see B-2, above).

Perhaps the key factor in progress on this recommendation was USFWS's hiring of a new Recovery Coordinator in mid-November 2004. The new Coordinator embraced interagency collaboration from the outset, and was consistently able to distinguish between USFWS obligations to leadership of recovery issues and AMOC responsibility for matters pertaining to the Reintroduction Project. This has greatly facilitated efforts to ensure that the two components are managed as collaborative but separate projects.

Finding: The 5-Year Review reaffirms prior conclusions that a Recovery Team, as a means of crafting an updated Recovery Plan and rangewide recovery goals, is essential to articulating and attaining Reintroduction Project population objectives (goals). Nevertheless, AMOC believes it remains important to maintain separation between the two components, to ensure that local interested parties and stakeholders know to whom to look (i.e. AMOC and the IFT) for discussion and resolution of wolf management issues. AMOC is the agreed-upon forum for adaptive management of the Reintroduction Project, and that functionality must be maintained. The Recovery Team needs to be resurrected, to focus on timely completion of an updated Recovery Plan with clear-cut recovery goals that cover but are not restricted to the BRWRA. Both the Technical and Stakeholder Sub-Groups of the Recovery Team could provide valuable support to AMOC in 2006, but the key aspect of AMOC's recommendations in this regard (see the AMOC Recommendations Component) is that the Team would serve in an advisory capacity, not a directive capacity.

D-2. The roles and functions of the Primary Cooperators (AGFD, NMDGF, and the Service) must be restructured to ensure State participation, authorities, and responsibilities as reflected in this report.

Status: Not completed because it is a continuing need that is being addressed.

Assessment and Finding: See C-1 and C-2 under Commission Directives, above.

D-3. The administrative and adaptive management processes for the Reintroduction Project must be restructured to ensure meaningful opportunities for, and participation by, the full spectrum of stakeholders and interested parties (see also “Public Participation and Outreach” below).

Status: Not completed because it is a continuing need that is being addressed.

Assessment and Finding: See C-1 and C-2 under Commission Directives, above.

D-4. The Service should immediately ask the White Mountain Apache Tribe whether it wishes to become a Primary Cooperator in the overall Reintroduction Project component, or retain such status only on its own Tribal lands.

Status: Completed.

Assessment: Through development of the interagency MOU for the Reintroduction Project, WMAT became a Lead Agency and has been an active participant in all AMOC discussions and decisions regarding Mexican wolf reintroduction. Under the MOU, WMAT has the lead for all activities relating to Mexican wolf reintroduction that occur on WMAT Tribal Trust Lands (i.e. FAIR), and plays a support role as appropriate and feasible off the FAIR.

Finding: WMAT has been a valuable cooperator in the Reintroduction Project. The Project would benefit if SCAT were to voluntarily take on a similar role with regard to the SCAR. However, at this time SCAT remains opposed to wolf reintroduction and declines to become a formal participant in the Reintroduction Project or to allow wolves to disperse to and remain on SCAT.

D-5. The Mexican Wolf Recovery Planning component should be staffed by the Service’s Mexican Wolf Recovery Coordinator, and centered in Albuquerque. Other elements of this Federally-staffed component should address the captive breeding program, pre-release acclimation husbandry at Sevilleta and other cooperating facilities, program-level outreach, revision of the 1982 Mexican Wolf Recovery Plan, and coordination of the Mexican wolf recovery planning range-wide, as well as conceptual oversight (not daily supervision) of the reintroduction effort in Arizona and New Mexico.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: USFWS has maintained a Mexican Wolf Recovery Coordinator (or Acting) since 1992. However, this position was vacant from June 2003, when the former Recovery Coordinator left the program, until mid-November 2004. Although USFWS did assign recovery program personnel to perform in the Recovery Coordinator's capacity during that period of vacancy, not all Recovery Coordinator functions were performed during this time.

USFWS Mexican wolf recovery staff members manage facilities and activities involving acclimation pens at Sevilleta National Wildlife Refuge, assist with other cooperating facilities, establish Recovery Protocols for pre-release husbandry at captive facilities and in on-site acclimation pens, and provide guidance to the AZA Mexican Wolf SSP Program. USFWS Region 2 recovery staff, although not dedicated solely to Mexican wolf recovery, also led range-wide recovery planning and initial revision of the 1982 Mexican Wolf Recovery Plan during 2003 and 2004.

USFWS has not hired or maintained staff dedicated to recovery-related outreach functions, due to lack of funding. However, all USFWS personnel assigned to Mexican wolf recovery participate in limited programmatic outreach activities. The only dedicated Mexican wolf outreach staff member is an AGFD IFT employee who performs public outreach for Mexican wolf reintroduction in the BRWRA.

USFWS recovery program staff initially provided limited conceptual oversight of the Reintroduction Project during 2003 and 2004. Conceptual guidance came primarily from the State Wildlife Agencies, though it was vetted with (and approved by) the USFWS Region 2 Director before being implemented through formation of AMOC and AMWG. Since the new USFWS Mexican Wolf Recovery Coordinator was hired in mid-November 2004, however, through him USFWS has increasingly provided the desired blend of conceptual guidance while respecting AMOC and State and Tribal Field Team Leader responsibilities for daily supervision of the IFT and on-the-ground wolf management activities.

Finding: AMOC finds that:

1. USFWS adequately addressed Recovery Program structure issues. As of November 2004, USFWS staff had reinitiated Mexican Wolf recovery planning, and hired a new Recovery Coordinator, who is stationed in Albuquerque.
2. USFWS is adequately addressing captive breeding issues (i.e. facilities and programs), except that Recovery Protocols for pre-release husbandry at captive breeding facilities and in on-site acclimation pens has not been discussed with AMOC. Therefore, no later than June 30, 2006, AMOC will review the USFWS Recovery Protocols for pre-release husbandry at captive breeding facilities and in on-site acclimation pens, and advise USFWS as to whether AMOC believes they are adequate to maximize post-release survival and breeding success.

3. USFWS should allocate sufficient resources to Recovery Program outreach to ensure that the public (particularly interested parties and stakeholders) is adequately aware of progress and impediments thereto.
 4. AMOC recommends completion of a rangewide USFWS Mexican Wolf Recovery Plan no later than June 30, 2007. AMOC notes that this will likely not be possible unless the USFWS budget is sufficient to dedicate sufficient staff and resources to fully support the Recovery Team.
 5. AMOC recommends sustaining the current Recovery Coordinator's approach to providing conceptual oversight (i.e. recovery perspective as opposed to daily supervision) of the reintroduction effort in AZ and NM. It facilitates progress, yet gives appropriate deference to the AMOC and State and Tribally-led adaptive management effort.
- D-6. The Recovery Planning component should be responsible for reviewing and approving adaptive management Project implementation protocols and procedures that are developed by the Reintroduction Project component that is outlined below.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: See Item C-3 under Commission Directives, above. The Reintroduction Project MOU draws appropriate distinction between recovery protocols (rangewide protocols that would apply to processes and activities that support any and all wolf reintroduction efforts within the region) and reintroduction procedures (SOPs that apply specifically to the BRWRA Reintroduction Project). All AMOC SOPs developed thus far have been developed in collaboration with USFWS Mexican Recovery Program staff. However, per the MOU, AMOC is the approving body for all AMOC SOPs, except the SOP that identifies the approval process; that one was approved by the AMOC Lead Agency Directors, including the USFWS Region 2 Director, thus delegating their approval authority to AMOC.

Finding: AMOC's existing SOPs were developed and approved appropriately. AMOC will maintain all AMOC Reintroduction Project SOPs and continue to require employee compliance with them. Note: herein, "maintain" includes modify, revise, or delete existing SOPs, or add new SOPs, as necessary for purposes of adaptive management

- D-7. The Reintroduction Project component (in Arizona and New Mexico) must be centered in Alpine, Arizona, and/or elsewhere in the Recovery Area to ensure adequate field presence and outreach to manage released and wild-born wolves effectively, and to minimize real and perceived public conflicts.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: Project field staff members are appropriately distributed in the BRWRA at this time. Most IFT members are stationed in Alpine AZ, working out of an administrative site constructed by AGFD on USFS property in 2005. AMOC Lead Agencies cooperatively fund operational and

maintenance costs for the facility. This central facility helps maximize interaction within the IFT, facilitating communication and teamwork.

As needed, IFT members are sent to outlying locations for temporary duty assignments, typically in conjunction with livestock depredation issues.

Finding: AMOC believes the Reintroduction Project is appropriately centered in Alpine AZ and that recent AGFD contribution of an administrative site provides adequate office space for the IFT at its present capacity. AMOC also believes that the IFT Leaders appropriately deploy staff members to outlying locations as necessary to provide local presence and to address local management issues. IFT coverage is best in Arizona, and sparsest in New Mexico, due to disparities in State Wildlife Agency IFT staffing. See C-3, above, regarding AMOC recommendations on increasing IFT staff capacity and the need for each Lead Agency to assign one of its IFT members to the Alpine administrative site to enhance intra-IFT communication and coordination.

D-8. The IFT Leader must be a state employee, and all elements of the IFT (including biologists and outreach specialists) must report to that Leader. If IFT presence is needed in New Mexico, it must be funded, staffed, structured, and supervised as agreed by the Primary Cooperators, in keeping with the State-lead recommendation above.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: The approved Reintroduction Project MOU states that Field Team Leaders shall be State and Tribal personnel, and the IFT shall act under guidance of the AGFD Field Team Leader on non-tribal lands in AZ, under guidance of the WMAT Field Team Leader on FAIR, and under guidance of the NMDGF Field Team Leader on non-tribal lands in NM.

Finding: Although compliance with this guidance was uneven in 2003 and 2004, it appears to have improved in 2005. Joint annual work planning, monthly IFT meetings, quarterly AMOC meetings, and twice-yearly AMOC Directors Summits seem to have helped improve IFT coordination and cooperation. This progress needs to be sustained, and improved upon.

D-9. The IFT response protocols must be restructured, and staff capacity must be enhanced (and funded) as necessary to ensure immediate (24-hour or less) response capability for, and resolution of, urgent operational issues, such as depredation incidents. Response capability should be reviewed each calendar year to identify appropriate staffing, budget, and response protocol adjustments as reintroduction continues.

Status: Not completed because it is a continuing need that is being addressed.

Assessment and Finding: See C-3 under Commission Directives, above. See also the AMOC Responses to Public Comment Component for affirmation that IFT response time to depredation incidents is less than 24 hours after the report is received, and improved appreciably from 1998 through 2005.

D-10. All field and other Reintroduction Project protocols, and all management actions in the Project, must always be in strict compliance with any applicable, approved special rules, policies, and protocols, management plans, and interagency agreements.

Status: Not completed because it is a continuing need that is being addressed.

Assessment and Finding: See C-5 under Commission Directives, above.

D-11. The Reintroduction Project must be adaptively managed by collaboration and consensus among all three Primary Cooperators, with appropriate and meaningful opportunities for participation by stakeholder and other interested parties (see below).

Status: Not completed because it is a continuing need that is being addressed.

Assessment: The approved MOU has an explicit objective of implementing interagency coordination and cooperation. This coordination involves an expanded set of six Lead Agencies and additional Cooperators. These entities do adaptively manage the Reintroduction Project, with meaningful opportunities for public participation, through AMOC and AMWG. In cases where consensus cannot be reached, management decisions regarding the reintroduction project ultimately lie with the Lead Agency that has jurisdictional authority for wildlife within the geographic area of the management actions (e.g. AGFD for management actions on non-tribal lands in Arizona, NMDGF for management actions in New Mexico, etc.).

Finding: The operational procedure of “jurisdictional leads” (see above) that AMOC uses should be codified as necessary in AMOC’s SOPs and within the descriptions of roles, responsibilities, and processes as described under paragraph 8 of the MOU’s “Lead Agencies agree to:” section. See also the *Finding* for C-1 under Commission Directives, above

D-12. The Reintroduction Project Coordinator position must be restructured and empowered to coordinate the adaptive management process, including identification, planning, review, and approval of future release sites and release protocols for Arizona and/or New Mexico. The Project Leader shall provide a transition between Recovery (Federal) and Reintroduction (State), by reporting to the Recovery Coordinator (Federal) and supervising the Field Team Leader (State).

Status: Not considered necessary to implement.

Assessment: The AGFD, NMDGF, and USFWS Region 2 Directors agreed in discussion on October 31, 2002 and in a November 8, 2002 written summary of that meeting (see Attachment 1) to implement this recommendation. However, the USFWS Region 2 Director changed his mind in February 2003, due to his agency’s previous commitments to the employee in question (i.e. regarding job responsibilities). The AGFD and NMDGF Directors agreed to defer to the USFWS Region 2 Director on this issue. Thus, the approved MOU contains a different description of roles and responsibilities for the Reintroduction Coordinator (renamed as the Field

Projects Coordinator). The MOU states that the USFWS Field Projects Coordinator will serve as communication liaison between AMOC and the IFT; assist with drafting reintroduction procedures, protocols, annual work plans, and annual reports; and plan and coordinate the identification and review of release and translocation sites. Within the IFT, the Field Projects Coordinator thus provides support to the IFT Leaders.

Finding: The State recommendation was superseded by agreement among the AGFD, NMDGF, and USFWS Region 2 Directors. Thus, the roles and responsibilities of the USFWS Field Projects Coordinator should be as described in the signed Reintroduction Project MOU.

D-13. The adaptive management component of the Reintroduction Project must be restructured in collaboration with stakeholders and other interested parties, in accordance with the primary roles and function identified herein. IMAG should be dissolved or restructured to provide a forum open to any and all interested parties. The States prefer that a State-led Conservation Team approach be used to create this forum.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: IMAG has been dissolved, and has been replaced by AMOC, with AMWG as a forum for public participation in adaptive management of the Reintroduction Project. The revised structure is working increasingly effectively, but further improvements are needed (see AMOC Responses to Public Comment Component).

Finding: AMOC will maintain and improve administrative and adaptive management processes for the Reintroduction Project to enhance meaningful opportunities for, and participation by, the full spectrum of stakeholders and interested parties. AMOC efforts will include meeting with the IFT twice each year at the Alpine field office, and offering to meet once each year with the Commission or Board of Supervisors for each County within the BRWRA.

D-14. With the new adaptive management forum, the Primary Cooperators should use other Cooperators signatory to a Memorandum of Agreement as a sounding board for Project management recommendations that are subsequently approved and implemented by the Primary Cooperators. Consensus should be sought with all formal Cooperators and other interested parties for all decisions, but in the absence of consensus the Primary Cooperators should be jointly responsible and accountable for making the necessary decisions. Signatory cooperator status in this adaptive management forum should be open to any interested governmental and non-governmental agency or organization. Participation by individuals should be without limit, except that voting on recommendations should be restricted to formal Cooperators.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: The recommendation listed above generally describes the means by which Lead Agencies and Cooperators have been operating under the approved MOU. They actually began to function along those lines beginning in February 2003, prior to completion of the MOU. Two

departures from the recommendation as stated above are that (1) in the absence of consensus, Lead Agencies are not jointly (or at least not equally) responsible for management decisions, but primary responsibility rests with the agency that possesses wildlife management authority within the jurisdictional boundaries of that action, and (2) non-governmental entities are not eligible to be signatories to the MOU but can participate in AMWG to assist in adaptively managing Mexican wolf reintroduction. Where the above recommendation differs from the approved MOU, the guidance within the MOU should be followed.

Finding: As noted in D-13, AMOC will maintain and improve administrative and adaptive management processes for the Reintroduction Project to enhance meaningful opportunities for, and participation by, the full spectrum of stakeholders and interested parties. However, AMOC will continue to recognize agency legal authorities and mandates by: (1) in the absence of consensus, deferring final decisions, after consideration of recommendations from all Lead Agencies, to the Lead Agency with primary responsibility (i.e. wildlife management authority) within the jurisdictional boundaries of that action; and (2) ensuring that governmental and non-governmental entities are not signatory to the MOU are afforded ample opportunity through AMWG meetings to contribute to adaptively managing Mexican wolf reintroduction.

Public Participation and Outreach

D-15. The administrative and adaptive management processes for the Reintroduction Project component must be restructured to ensure meaningful opportunities for, and participation by, the full spectrum of stakeholders and interested parties (see above).

Status: Not completed because it is a continuing need that is being addressed.

Assessment and Finding: See D-2 under Commission Directives, above.

D-16. Reintroduction Project outreach must be restructured and funded as necessary to address the Commission, Department, and public concerns expressed in this report.

Status: Not completed because it is a continuing need that is being addressed.

Assessment and Finding: See D-4 under Commission Directives, above.

D-17. An outreach specialist must be added to the IFT, to be supervised by the IFT Leader with funding provided through the AGFD-NMDGF-Service Memorandum of Understanding for this Project, to focus entirely on reintroduction issues as opposed to recovery issues.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: Prior to 2005, an AGFD IFT position served a part-time outreach function (40% outreach; 60% field work). This was clearly insufficient to meet Project needs (see AMOC Responses to Public Comment Component). Thus, the Draft 5-Year Review included a recommendation that USFWS provide an outreach specialist for Mexican wolf reintroduction,

because of a perception that a USFWS employee would have greater ability as a Federal employee to move across State and Tribal boundaries when requested. The recommendation also suggested that if additional Project outreach specialists were deemed necessary by individual Lead Agencies or Cooperators, they should be encouraged to support the USFWS specialist. However, the recommendation noted that funding for additional outreach specialists should not be provided through USFWS funds that would otherwise support implementation of Mexican wolf reintroduction by the Lead Agencies.

In 2004 discussions, AMOC noted that a Project outreach specialist, regardless of agency of employment, should be able to serve all cooperating agencies under the MOU without regard for jurisdictional boundaries, so long as individual agency protocols for press releases and media events were respected and the appropriate Lead Agency has final approval over release of such information. It was also clear by that time that USFWS was not in a position to fund an outreach specialist for the Project. It had also become very clear that public dissatisfaction with the Project outreach effort was growing. Thus, in 2005, AGFD responded to AMOC discussion and priorities by increasing its part-time outreach position to full-time Project outreach throughout the BRWRA. In addition, in 2004 cooperating agency Public Information Officers began increasing their support for the Project, primarily in terms of outreach through broader mass media outlets, especially those in Albuquerque NM, Phoenix AZ, and Pinetop-Lakeside AZ.

Finding: IFT staff outreach capacity has been increased to a level believed sufficient to meet Project needs. Ongoing assessment of performance needs to be maintained, and sufficient funds must be allocated to support the effort. Therefore, AMOC will direct Reintroduction Project-related outreach efforts in 2006 through the IFT Annual Work Plan to identify and reach specific target audiences, with emphasis on local communities and cooperating agencies within the BRWRA (>75% of outreach activity) and outside the BRWRA (<25% of outreach activity).

Technical (Biological) Recommendations in the 3-Year Review

D-18. Given the time constraints of this independent review, the States are unable to provide detailed technical recommendations on biological aspects of the Reintroduction Project. However, we wish to affirm that we find scientific merit in the biological recommendations offered in Paquet et al. (2001), and in some of those offered in the Stakeholders Workshop final report.

Status: Comment only; not considered necessary to complete or implement.

Assessment and Finding: This comment did not require further consideration.

D-19. Not later than January 31, 2003, the Primary Cooperators should jointly decide upon which technical recommendations to take through the newly restructured Reintroduction Project adaptive management process, for discussion, refinement, and implementation, and which ones to assign to the Recovery Program to address at that level. We note again that the Reintroduction Project continues to suffer from the Service's failure to revise the

Mexican Wolf Recovery Plan, to integrate reintroduction population objectives with appropriate recovery objectives.

Status: Completed.

Assessment: This item was initiated but was not completed within the assigned timeframe. Technical recommendations could not be brought to the Reintroduction Project's newly restructured adaptive management process by January 2003, because the MOU codifying that process was not completed until October 2003. However, the Lead Agencies and Cooperators recognized the value in completing this task, thus they used the 5-Year Review process to complete it.

Finding: The 5-Year Review includes recommendations that AMOC will implement through AMWG and others that could most effectively be pursued with assistance from the Recovery Team. However, only the recommendation regarding completion of a Recovery Plan clearly must be assigned to the Recovery Team (see B-2, above, for additional relevant information).

D-20. Not later than March 31, 2003, the Primary Cooperators must discuss their recommendations with other Cooperators in public session, and develop a draft plan for implementing the recommendations selected. This plan must include timelines and measurable objectives for implementation.

Status: Not completed.

Assessment: See D-19 Assessment, above.

Finding: AMOC's 5-Year Review recommendations (see AMOC Recommendations Component) include, as appropriate timeframes and defined objectives. The recommendations and the implementation process will be discussed at length in AMWG meetings, beginning on January 26, 2006 (Safford AZ) and January 27, 2006 (Silver City NM).

D-21. At least annually thereafter, the Primary Cooperators must present to stakeholders and cooperators an annual report and annual work plan for discussion and comment. These documents would collectively serve as the monitoring and evaluation components needed for adaptive management. The agreed-upon annual work plans must be flexible (adaptive), so changing needs can be met, but must also be followed sufficiently closely to allow effective evaluation and monitoring of project actions in a manner that will provide a solid foundation for subsequent decision-making processes and adaptive management.

Status: Not completed because it is a continuing need that is being addressed.

Assessment: Since 2003, considerable progress has been made in "catching up" on production of Annual Reports. All IFT Annual Reports for 1998-2004 are now posted in downloadable PDF format at <http://azgfd.gov/wolf>. Although Annual Work Plans were not completed in timely

fashion in prior years, the 2006 plan was completed before the Calendar Year (2006) began and will be discussed in AMWG sessions in January 2006.

Finding: AMOC will continue to work toward completing IFT Annual Work Plans in October for the coming Calendar Year, and will make all Reintroduction Project wolf management, outreach, and budget information (redacted as appropriate to protect confidential personal information) available to the public through Annual Reports for the Reintroduction Project published in April of each year, and other publications and outreach materials as appropriate.

Five-Year Review

D-22. The Reintroduction Project's review protocols and procedures must be restructured and improved to ensure that the 5-Year Review is (a) effective and efficient, (b) makes full use of all appropriate material from the 3-Year Review, (c) an improvement over the 3-Year Review, and (d) completed by September 30, 2004.

Status: Completed.

Assessment and Finding: See C-6 under Commission Directives, above.

TABLES AND FIGURES

Table 1 (information current as of October 2005). Estimated costs of Mexican wolf conservation by cooperating agencies since initial releases occurred in 1998 in the Arizona-New Mexico Blue Range Reintroduction Project. See footnotes below for information essential to understanding the limitations of the information provided below; the costs reported herein are “best possible” estimates, not exact figures.

| Cost Estimates (= Funds Expended) | | | | | | | | |
|-----------------------------------|-------------------------|---------------------------|--------------------------|----------------------------|----------------------|----------------------|--------------------|------------|
| Fiscal Year | AGFD State ² | AGFD Federal ³ | NMDGF State ⁴ | NMDGF Federal ⁵ | USDA FS ⁶ | USDA WS ⁷ | USFWS ⁸ | Total |
| 98 | 60,632 | 25,797 | 0 | 0 | 3,000 | 0 | 489,700 | 579,227 |
| 99 | 36,094 | 100,100 | 12,250 | 36,750 | 10,000 | 0 | 581,750 | 777,043 |
| 00 | 50,896 | 139,513 | 17,000 | 51,000 | 11,500 | 0 | 744,187 | 1,014,096 |
| 01 | 56,500 | 168,711 | 17,000 | 51,000 | 13,500 | 0 | 936,589 | 1,243,301 |
| 02 | 53,000 | 161,277 | 17,000 | 51,000 | 7,000 | 0 | 781,223 | 1,070,502 |
| 03 | 110,000 | 188,163 | 17,000 | 51,000 | 12,500 | 150,000 | 819,977 | 1,348,643 |
| 04 | 174,357 | 210,135 | 20,000 | 60,000 | 62,500 | 150,000 | 833,790 | 1,510,786 |
| 05 ⁹ | 279,942 | 312,246 | 20,000 | 60,000 | 142,500 | 150,000 | 1,057,000 | 2,021,688 |
| 06 ¹⁰ | 291,750 | 518,250 | 40,000 | 120,000 | 62,500 | 150,000 | 1,265,000 | 2,447,500 |
| Total | 1,113,171 | 1,824,192 | 160,250 | 480,750 | 325,000 | 600,000 | 7,509,216 | 12,012,786 |

² “AGFD State” includes all AGFD funds other than those received from Federal sources.

³ “AGFD Federal” includes all funds expended by AGFD that were of Federal origin via ESA Section 6, Pittman-Robertson, Wildlife Conservation and Restoration Program, State Wildlife Grants, and/or contract with USFWS, USFS, or another Federal agency.

⁴ “NMDGF State” includes all NM funds other than those received from Federal sources.

⁵ “NMDGF Federal” includes all funds expended by NMGFD that were of Federal origin. Prior to FY06, all these were USFWS Mexican Wolf Recovery Program contract funds received by NMDGF. Beginning in FY06 (estimates), 50% are expected to originate from USFWS Mexican Wolf Recovery Program contract funds and 50% from State Wildlife Grant funds.

⁶ “USFS” cost figures through 2002 are estimates generated in April 2003 for the Apache-Sitgreaves National Forests (Alpine and Clifton Ranger Districts) and the Gila Nation Forest (Wilderness Ranger District).

⁷ “USDA WS” cost figures represent directed Congressional allocations specifically for wolf work in AZ-NM.

⁸ “USFWS” cost figures are for the Service’s Mexican Wolf Recovery Program only, and include all funds conveyed by contract to USDA WS and WMAT (White Mountain Apache Tribe) for work on the Mexican wolf reintroduction project. USFWS Mexican Wolf Recovery Program contract funds conveyed to AGFD (all of which are included in the AGFD Federal column in this Table) are as follows: FY98 \$400; FY99 \$88,100; FY00 \$126,513; FY01 \$152,711; FY02 \$146,277; FY03 \$162,623; FY04 \$189,795; FY05 \$0 (zero); and FY06 \$175,000.

⁹ FY05 costs are estimates; the Fiscal Year will not end until June 30 (State) or September 30 (Federal), 2005. The totals will be adjusted when final expenditures for the year have been reported.

¹⁰ FY06 costs are estimates; the Fiscal Year will not end until June 30 (State) or September 30 (Federal), 2006. The totals will be adjusted as changes occur during the year, and again when final expenditures for the year have been reported.

Table 2. Documented depredation incidents and associated wolf activities and management actions (N=46) (Incidents occurred from 1999-2004).

| Wolf # | Pack Name | CD | MD | SD | RFD | Carcass | Translocated | Fate as of end of 2005 |
|--------|-------------------|----|----|----|-----|---------|--------------|------------------------|
| 166 | Campbell Blue | X | | | X | X | | Permanently Removed |
| 168 | Gavilan | X | | | X | | | Permanently Removed |
| 183 | Gavilan | X | | | X | X | | Permanently Removed |
| 190 | Mule | X | | | X | X | | Permanently Removed |
| 191 | Pipestem | X | | | X | X | X | Dead |
| 208 | Pipestem | X | | X | X | X | X | Permanently Removed |
| 507 | Bluestem | X | X | | | X | | In the Wild |
| 509 | Francisco | X | | X | | X | X | Dead |
| 511 | Francisco | X | | X | | X | X | Captivity |
| 521 | Bluestem | X | X | | | X | | In the Wild |
| 555 | Gavilan | X | | | | | | Unknown |
| 562 | Pipestem/Luna | X | | X | X | X | | In the Wild |
| 574 | Saddle | X | X | | X | | | Lethally Controlled |
| 582 | Gavilan | X | X | | | | | Dead |
| 583 | Gavilan/Luna | X | | | X | | X | In the wild |
| 584 | Gavilan/Gapiwi | X | X | | X | X | X | Dead |
| 585 | Gavilan | X | X | | X | | | Dead |
| 586 | Gavilan | X | X | | | | X | Unknown |
| 592 | Campbell B/Sycam | X | X | | X | X | X | Lethally Controlled |
| 623 | Pipestem | X | | X | X | | | Dead |
| 624 | Pipestem/Wild/Gap | X | | X | | X | X | Unknown |
| 625 | Pipestem | X | | X | X | | | Dead |
| 626 | Pipestem | X | | X | X | | | Dead |
| 627 | Pipestem | X | | X | | | X | Unknown |
| 628 | Pipestem | X | | | X | X | X | Permanently Removed |
| 632 | Lupine | | | X | | X | X | Permanently Removed |
| 639 | Bluestem | X | X | | | | X | Dead |
| 644 | Francisco/Cerro | | | X | | | | Dead |
| 646 | Saddle | X | | | | X | | Dead |
| 648 | Saddle/Sycamore | X | | X | X | | X | Captivity |
| 729 | Red Rock | X | | | X | X | | Lethal Control |
| 732 | Red Rock | X | | X | | | X | In the Wild |
| 754 | Bluestem | X | | | | | X | Unknown |
| 756 | Bluestem | X | X | | | | X | Dead |
| 755 | Bluestem | X | X | | | | | Unknown |
| 757 | Bluestem | X | X | | | | | Unknown |
| 758 | Bluestem | X | X | | | | | Unknown |
| 794 | Francisco/Bonito | X | | | | | | Unknown |
| 796 | Cienega/San Mat | X | X | | | X | X | In the wild |
| 797 | Francisco/Saddle | X | X | | X | X | X | In the wild |
| 798 | Francisco | X | | X | | X | X | Dead |
| 799 | Francisco | X | X | | X | X | X | Dead |
| 800 | Francisco | X | | | | | X | Dead |
| 801 | Francisco | X | | | | X | X | Dead |
| 832 | Francisco | X | | X | | X | | Unknown |
| 903 | San Mateo | X | | X | | | | In the Wild |
| 46 | Totals | 44 | 16 | 16 | 20 | 23 | 24 | |
| 100 | Percentage | 96 | 35 | 35 | 43 | 50 | 52 | |

Abbreviations:

- CD = Confirmed depredation
- MD = Multiple depredations
- SD = Suspected depredation
- RFD = Removed for depredation

Note: Carcass = Wolves that have been seen Scavenging on dead livestock

| GROUP | Wolf # | Pack Name | Carcass Feeding Date/s | Depredation Date/s | Carcass-feeding Preceded Depredation (Yes/No) |
|-------------|-----------|------------------------|--------------------------|--|---|
| Group One | 183 | Gavilan | 8/15/99 | 8/11/99, 8/30/99, 9/8/99, 12/26/99, 1/11/00 | N |
| | 509 | Francisco | 3/6/03 | 8/16/02 | N |
| | 511 | Francisco | 3/6/03, 8/19/03 | 8/16/02 | N |
| | 584 | Gavilan/Gapiwi | 2/8/00 | 8/11/99,8/30/99, 9/8/99, 12/26/99, 1/11/00 | N |
| | 592 | Campbell Blue Sycamore | 5/01 | 4/18/01, 6/3/01 | N |
| | 624 | Pipestem/Wild/Gapiwi | 4/10/03 | 7/11/99 | N |
| | 628 | Pipestem | 5/11/01, 4/26/02 | 7/11/99, 6/15/00,5/11/01 | N |
| | 632 | Lupine | 12/27/01, 4/5/02 | 12/27/01 | N |
| | 646 | Saddle | 7/30/99 | 7/11/99 | N |
| | 798 | Francisco | 3/7/03, 8/19/03 | 8/16/02 | N |
| | 799 | Francisco | 3/7/03 | 8/16/02, 3/9/04, 3/18/04 | N |
| | 801 | Francisco | 3/7/03, 8/11/03 | 8/16/02 | N |
| | Group Two | 190 | Mule | 5/11/01,4/26/02 | 5/11/01, 3/23/02, 3/26/02,4/26/02 |
| 191 | | Pipestem | 4/4/99, 6/16/99 | 4/4/99, 6/15/99, 6/22/99, 6/26/99, 7/4/99, 7/11/99 | N |
| 208 | | Pipestem | 4/4/99, 6/16/99 | 4/4/99, 6/15/99, 6/22/99, 6/26/99, 7/4/99, 7/11/99 | |
| 507 | | Bluestem | 8/23/02 | 8/21/02, 9/29/02 | N |
| 521 | | Bluestem | 8/23/02 | 8/21/02, 9/29/02 | N |
| 562 | | Pipestem | 4/4/99, 6/16/99 | 4/4/99, 6/15/99, 6/22/99, 6/26/99, 7/4/99, 7/11/99 | N |
| Group Three | 166 | Campbell Blue | 2/7/01, 3/2/01, 5/01 | 6/3/01 | Y |
| | 729 | Red Rock | 8/7/03, | 3/9/04, 3/18/04 | Y |
| | 796 | Cienega/ San M | 11/17/03 | 5/1/04 | Y |
| | 797 | Francisco | 3/7/03, 8/25/03, 8/26/03 | 3/20/04 | Y |
| | 832 | Francisco | 7/21/03 | 5/1/04 | Y |

| Wolf # | Current "Locations" |
|--------|---------------------|
| 166 | Permanently Removed |
| 729 | Dead-Lethal Control |
| 796 | In the Wild |
| 797 | In the Wild |
| 832 | Unknown |

Appendix 1. Commission Directives to Arizona Game and Fish Department and New Mexico Department of Game and Fish.

Summary of Discussions Among the Arizona Game and Fish Department, New Mexico Department of Game and Fish, and the U.S. Fish and Wildlife Service
Regarding Management of Mexican Wolf Recovery and Reintroduction Efforts

November 8, 2002 (Revised Final)

In separate public sessions during September 2003, the Arizona Game and Fish Commission and the New Mexico State Game Commission passed motions providing guidance to the two agencies on changes they deemed necessary in Mexican wolf Recovery and Reintroduction, as they pertain to the States of Arizona and New Mexico. The direction was as follows:

1. The roles and functions of the Primary Cooperators (AGFD, NMDGF, Service) must be restructured to ensure State participation, authorities, and responsibilities as reflected in today's [Commission meeting] discussion.
2. The administrative and adaptive management processes must be restructured to ensure opportunities for, and participation by, the full spectrum of stakeholders.
3. The Interagency Field Team response protocols must be restructured, and staff capacity must be enhanced, to ensure immediate response capability to, and resolution of, urgent operational issues, such as depredation incidents.
4. Project outreach must be restructured as necessary to address the Commission, Department, and public concerns expressed today.
5. All actions in the Project must be in strict compliance with any applicable, approved special rules, policies, protocols, management plans, and interagency agreements.
6. The Project's review protocols and procedures must be restructured and improved to ensure that the 5-year review is effective and efficient, and an improvement over the 3-Year Review.

The Arizona Commission also:

1. Required its Department to resolve issues 1, 2, and 3 within 60 days of September 30, 2002, at the Primary Cooperator level, and that the changes and the issues they reflect be taken through the restructured Adaptive Management Process for stakeholder discussion and further refinement.
2. Directed its Department to restructure the Mexican Wolf Reintroduction Project within 180 days of September 30, 2002, and report back to the Commission on the results of this effort in April 2003.
3. Reserved the right, if these issues are not resolved within the timeframes outlined in the letter, to take further action on the Department's participation in this Project.

The two State agencies met with the Service on October 31, 2002 to discuss how to comply with the Commissions' guidance. They resolved that the Recovery and Reintroduction components would be separated more clearly in future planning and implementation efforts. To achieve this:

Recovery

1. The Service will disband the current MW Recovery Team and assemble a new one to revise the outdated current plan, using:
 - a. The draft “Thiel plan.”
 - b. New information gained through ongoing wolf recovery efforts.
 - c. Information contained in the Service’s 3-year review of the Mexican wolf conservation program.
 - d. Any other available and relevant information.
2. The Service and the States will ensure that the revised Recovery Plan provides specific, measurable objectives for accomplishing downlisting and delisting the Mexican wolf.
3. The Service, with assistance from the States, will identify prospective Recovery Team members from the appropriate stakeholders range-wide and technical experts, with a clear understanding of the dichotomy between the Team’s role (developing a Recovery Plan) and the separate and distinct State-led Reintroduction effort.
4. The Service will focus its Mexican Wolf Recovery Coordinator (B. Kelly) on guiding and implementing the Recovery Program, thus providing appropriate guidance to the Reintroduction Project (see below).

Reintroduction

1. The Service will focus its Mexican Wolf Reintroduction Coordinator (J. Oakleaf) as the administrative and coordination liaison between the Federal Recovery Coordinator and the State-led Reintroduction Project. The Reintroduction Coordinator will be responsible for:
 - a. Developing and maintaining, in collaboration with the States, protocols and processes by which the Project shall be planned, conducted, and evaluated through the principles of adaptive management. Said protocols and processes must be compatible with any guidance from the Recovery Team as it revises the Recovery Plan (subject to approval by the Service’s Regional Director), and of course must fully comply with applicable Federal and State laws.
 - b. Planning and coordinating identification, review, and approval (subject to State concurrence) of additional release sites in the current Recovery Area.
2. The States shall be responsible for implementing the Reintroduction Project in Arizona and New Mexico, given that:
 - a. Tribal roles and functions in this restructuring have yet to be discussed, let alone resolved, with the Tribes. Tribal authorities will be fully respected by the States in re-defining Reintroduction Project roles and functions of the Primary and any other cooperators.
 - b. The principles of adaptive management shall be used to oversee the Reintroduction Project.
 - i. A representative from each State wildlife agency and the Service’s Reintroduction Coordinator shall be the leads in adaptive management.

- ii. The States, in collaboration with the Reintroduction Coordinator, shall discuss and resolve with current IMAG (Interagency Management Advisory Group) members, and other interested and affected parties, how best to structure and conduct the adaptive management process. The intended objective is to afford any and all responsible interested parties opportunities to constructively and productively participate in the adaptive management process.
 - iii. The Primary Cooperators shall document the revised adaptive management process and construct appropriate guidance documents for it.
 - iv. The Primary Cooperators shall use the Adaptive Management Group as a sounding board for discussions and issues pertaining to the Reintroduction Project, but shall remain responsible for making the necessary decisions for the Project, and/or recommendations to the Recovery Program.
- c. The Reintroduction Project shall be implemented on the ground through a State-led (or Tribal-led, as appropriate to the jurisdictions involved) Field Team approach.
 - i. The Field Team may operate in both States as a single Team, or be split into separate Teams or Sub-Teams as appropriate to ensure the required management and response capability at the local level.
 - ii. The Field Team(s) may operate differently on Tribal lands, subject to pending discussions with Tribal partners.
 - iii. The Field Teams shall be guided by, and report back up through, the Primary Cooperators, represented by their Adaptive Management leads.
 - 1. A State Field Team Leader shall be responsible for directing the daily activities of the Field Team.
 - 2. The Field Team shall draft annual Work Plans, Performance Reports, and new or revised operating protocols/procedures that are subject to Primary Cooperator approval, after the Primary Cooperators complete appropriate discussions with the Adaptive Management Group.

Summary

The Service is responsible for providing guidance and coordinated information to all interested parties relative to recovery of the Mexican wolf. The States and Tribes are responsible for conducting reintroduction efforts in such a manner that they contribute directly to recovery. Other federal, state, local, and private stakeholders have to some extent shared responsibilities, or at least significant stakes, in these areas. The intent of the current Primary Cooperators is to realign the Recovery and Reintroduction components so they are fully integrated, smoothly coordinated, and effective.

This document begins, but does not complete progress toward achieving the direction that was given to the two State wildlife agencies by their respective Commissions in September 2002. The Primary Cooperators will, however, complete this effort before March 31, 2003, through appropriate collaboration with Tribal and other interested parties.

Appendix 2. Memorandum of Understanding (MOU) under which the Mexican Wolf Blue Range Reintroduction Project operates.

Memorandum of Understanding
among the
Arizona Game and Fish Department,
New Mexico Game and Fish Department,
U.S.D.A. Animal and Plant Health Inspection Service/Wildlife Services,
U.S.D.A Forest Service,
U.S. Fish and Wildlife Service,
White Mountain Apache Tribe,
Arizona Counties of Graham, Greenlee, and Navajo,
New Mexico Counties of Catron and Sierra,
and the
New Mexico Department of Agriculture

Final (Agency Approval): October 31, 2003

This Memorandum of Understanding (hereafter Agreement) is made and entered into by and among the:

1. Arizona Game and Fish Department (AGFD), as authorized to enter into agreements as the administrative agent of the Arizona Game and Fish Commission, i.e. A.R.S. Title 17-231.B.7; and consistent with Cooperative Agreement 1416000291201 - A.G. Contract No. KR90-1847-CIV, between AGFD and the Service for recovery of federally listed endangered species;
2. New Mexico Department of Game and Fish (NMDGF), as authorized to enter into agreements by NMAC Section 11-1-1 et seq. and NMSA Section 17-2-42; and consistent with Memorandum of Agreement 1448-00002-95-0800, which delineates a cooperative working relationship for accomplishment of mutual goals in endangered species conservation and recovery; NMDGF's participation in this Agreement is both authorized and limited by New Mexico laws, particularly the New Mexico Wildlife Conservation Act (17-2-37 NMSA through 17-2-46 NMSA 1978); NMDGF can attempt to undertake only those actions within this Agreement that are in compliance with the laws and regulations of the State of New Mexico;
3. U.S.D.A. Animal and Plant Health Inspection Service, Wildlife Services (WS), as authorized to enter into agreements, i.e. Animal Damage Control Act of March 2, 1931, as amended (46 Stat. 1468; 7 USC 426-426b and 426c);
4. U.S.D.A Forest Service Southwestern Region (USFS), as authorized under the Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. 528 (note 528-531)), and the Endangered Species Act of 1973 (16 U.S.C. 1531-1536, 1538-1540);

5. U.S. Fish and Wildlife Service Region 2 (Service), as authorized to enter into agreements, i.e. the Endangered Species Act, 1531 USC et seq.;
6. White Mountain Apache Tribe (WMAT), as authorized to enter into agreements, i.e. Article IV Section 1 of the Tribal Constitution;
7. Graham County (GraCo), Greenlee County (GreCo), and Navajo County (NaCo), as authorized under the State of Arizona, enabling counties to protect the health, safety, and welfare of its citizens, pursuant to Arizona Revised Statutes 11-806(B), as well as County laws, including County land-use plans, water and watershed plans, and environmental and natural resource laws and policies, as well as the Treaty of Guadalupe Hidalgo;
8. Catron County (CaCo) and Sierra County (SiCo), as authorized under the State of New Mexico, granting powers necessary and proper to provide the safety, preserve the health, promote the prosperity, and improve the morals, orders, comfort, and convenience of any County or its inhabitants, pursuant to New Mexico Revised Statute 4-7-31 (NMSA 1978), as well as County laws, including County land-use plans, water and watershed plans, and environmental and natural resource laws and policies, as well as the Treaty of Guadalupe Hidalgo; and
9. New Mexico Department of Agriculture (NMDA), as authorized to enter into agreements in accordance with 76-1-2-F NMSA 1978.

Collectively, all parties to this Agreement are referred to as Signatories.

Collectively, the AGFD, NMDGF, USFS, Service, WMAT, and WS are referred to in this Agreement as Lead Agencies, the agencies with primary regulatory jurisdiction and/or management authority over the Mexican wolf in Arizona and New Mexico. Additional Lead Agencies (i.e. additional Tribal Governments) may be added to this Agreement upon their request, by concurrence from the Signatory Lead Agencies and written amendment to this document.

Collectively, the Counties and NMDA are referred to in this Agreement as Cooperators, which are other State agencies and County governments that have an interest in Mexican wolf management. Additional Cooperators may be added to this Agreement upon their request, by concurrence from the Signatory Lead Agencies and Cooperators and written amendment to this document.

Purpose

The purpose of this Agreement is to establish a framework for adaptively managing the Mexican wolf reintroduction project in and around the BRWRA to contribute toward recovery, including downlisting and delisting.

Objectives

This Agreement is made and entered into by the Signatories to achieve the following objectives:

1. Continue a long-term effort (hereafter referred to as “Project”) to reestablish Mexican wolves in the BRWRA of east-central Arizona and west-central New Mexico, and thus contribute to achieving approved recovery goals.
2. Apply the principles of adaptive management to all aspects of the Project, and provide opportunities for the Signatories and all other interested parties to engage in discussion of (and provide timely, substantive, constructive comment on) Project-related issues and activities.
3. Develop and implement interagency coordination and cooperation protocols, procedures, and schedules for this Agreement.
4. Develop and facilitate implementation of appropriate management, monitoring, evaluation, impact assessment, mitigation, and other Project-related practices.
5. Recognize and respect the separate authorities of the Signatory agencies, and the interests of other governmental entities and other parties.
6. Enhance awareness of the Signatory agencies, other interested (non-signatory) parties (e.g. cities, towns, citizens, and nongovernmental organizations) regarding the Project, and encourage and enhance their participation in the Project.

Witnesseth:

WHEREAS, the Endangered Species Act of 1973 declared the policy of Congress to be that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act;

WHEREAS, the AGFD, a State resource agency, has determined that direct participation in reestablishment of the Mexican wolf would be consistent with its current program to reestablish extirpated nongame and endangered wildlife in Arizona, and is essential to representing the State's interest in, and authority for, management of the wildlife resources that are held as a public trust for the people of Arizona;

WHEREAS, the NMDGF, a State resource agency, has determined that direct participation in reestablishment of the Mexican wolf would be consistent with its mandates under the New Mexico Wildlife Conservation Act, and is essential to representing the State's mandates and authorities for management of all protected wildlife resources that are held as a public trust for the people of New Mexico;

WHEREAS, the AGFD and NMDGF, as State wildlife agencies, have policies that recognize it is essential for the success of wildlife programs to recognize, assess, and protect the customs and cultures of peoples and communities affected by wildlife programs.

WHEREAS, the USFS, a Federal land management agency has the responsibility under the National Forest Management Act, of 1982, to provide for the diversity of plant and animal communities and manage fish and wildlife habitat to maintain viable populations and to further the conservation and recovery of Federally listed species under Section 7(a)(1) of the Endangered Species Act, 1973 as amended on National Forest Lands;

WHEREAS, the Service, a Federal land management and regulatory agency, is responsible for initiating, conducting, and supporting programs for the recovery of listed populations under the authority of the Endangered Species Act of 1973. Such programs include those designated to recover the Mexican wolf;

WHEREAS, the Service is responsible for providing guidance and coordinated information to all interested parties relative to recovery of the Mexican wolf; the States and (if they so choose) Tribes are responsible for conducting reintroduction efforts in such a manner that they contribute directly to recovery; and other Federal, State, local, and private Cooperators have to some extent shared responsibilities, or at least significant stakes, in these areas;

WHEREAS, the Service, AGFD, and NMDGF have been cooperating since 1998 under a Memorandum of Understanding to carry out this Project, and that agreement is scheduled to expire in October 2003;

WHEREAS, the Service conducted a 3-year review of the Mexican Wolf Recovery and Reintroduction Program in 2001 that identified areas of potential improvement;

WHEREAS, at the request of the Service, the AGFD and NMDGF conducted an independent review of the Service 3-year review in 2002, and the Lead Agencies have determined it advisable to redefine their relationships and responsibilities, and their relationships with Cooperators and other interested parties, by:

1. Restructuring the roles and functions of the Lead Agencies to ensure appropriate State and Tribal participation, and recognition of State and Tribal authorities and responsibilities as reflected in discussions among the Lead Agencies during and subsequent to the 2002 independent review.
2. Restructuring the Project's administrative and adaptive management processes to ensure opportunities for, and participation by, the full spectrum of Cooperators and other interested parties.
3. Restructuring the Project's Interagency Field Team response protocols, and enhancing staff capacity, to ensure immediate response capability to, and resolution of, urgent operational issues, such as depredation incidents.
4. Restructuring the Project's outreach efforts as necessary to address the concerns expressed by State Wildlife Commissions, State and Tribal Wildlife Agencies, and the public during the aforementioned reviews.

5. Ensuring that all actions in the Project are in strict compliance with any applicable approved special rules, policies, protocols, management plans, and interagency agreements.
6. Restructuring the Project's review protocols and procedures, and improving them to ensure that the Project's 5-year review is effective and efficient, and an improvement over the 3-Year Review.
7. Realigning Recovery and Reintroduction components so they are fully integrated, smoothly coordinated, and effective, through appropriate collaboration with Tribes and other interested parties.

WHEREAS, the WMAT, a Federally-recognized Indian Tribe, has determined that direct participation in reestablishment of the Mexican wolf would be consistent with its current wildlife and resource management programs and plans, and is important to representing the Tribe's interests in, and authority for, management of wildlife resources on the Fort Apache Indian Reservation;

WHEREAS, the WMAT adopted the WMAT Mexican Wolf Management Plan in 2000, and the WMAT and Service have been cooperating under Cooperative Agreements since 2000 to carry out this Project on the Fort Apache Indian Reservation;

WHEREAS, the WS, a Federal program, is responsible for providing Federal leadership and expertise to resolve conflicts between humans and wildlife, including threatened and endangered species. Conflicts are resolved in cooperation with Federal, State, and Tribal agencies, individuals, and other public and private agencies, organizations, and institutions;

WHEREAS, Arizona and New Mexico Counties are legally responsible for the protection of health, safety, and welfare of individuals and communities that may be affected by reintroduction and recovery of the Mexican wolf;

WHEREAS, the Arizona Counties are participating in the Mexican wolf recovery and delisting program and this Project under the County authorities to protect the health, safety, and welfare of their citizens, and to manage natural resources within the boundaries of the Counties.

WHEREAS, the New Mexico Counties are participating in the Mexican wolf recovery and delisting program and this Project under the County authorities to protect the health, safety, and welfare of their citizens, and to manage natural resources within the boundaries of the Counties.

WHEREAS, "adaptive management" is a foundation for this Agreement, and means "learning by doing" and using objective analysis and informed opinion to determine the need for, and direction of, changes in relevant policies, procedures, plans, and actions," for purposes of this Agreement "adaptive management" includes public participation, and processes for evaluating

and adjusting the Project to better achieve its objectives, as experience and knowledge are gained through implementation, study, scientific research, and discussion.

WHEREAS, in the interest of enhancing communication, Black's Law Dictionary (7th Edition; ISBN 0314241302) and Merriam-Webster's Collegiate Dictionary (11th Edition; ISBN 0877798095) shall be the primary references for words used in this Agreement;

NOW THEREFORE, in consideration of the above premises, the Signatories enter into this Agreement to accomplish its purpose and objectives.

The Lead Agencies agree to:

1. Use the principles of adaptive management to manage this Project, and to cooperate, coordinate, and communicate with each other, all Cooperators, and other interested and affected parties to restructure and document the adaptive management framework for this Project.
2. Assign one employee (and one or more alternates) as Lead Participant in an Adaptive Management Oversight Committee (hereafter Committee; one member per Lead Agency) to guide this Project. The Committee Lead Participant from AGFD, NMDGF, or WMAT shall serve as Committee Chair (2-year term, subject to renewal), to establish a non-Federal lead to ensure compliance with the Federal Advisory Committee Act.
3. Afford any and all interested parties substantive opportunities to constructively and productively participate in the Project, through an Adaptive Management Work Group (hereafter Work Group). The Lead Participant from AGFD, NMDGF, or WMAT shall serve as Work Group Chair (2-year term, subject to renewal), to establish a non-Federal lead to ensure compliance with the Federal Advisory Committee Act. The Work Group shall:
 - a. Meet regularly (at least quarterly – January, April, July, and October) in public session to enhance communication among, and provide for broader participation in the Project by the public, including Lead Agencies and Cooperators (i.e. signatory entities) and other interested parties (i.e. non-signatory participants);
 - b. Review and make recommendations to the Lead Agencies on any management plans (including Annual Work Plans) or operating procedures that pertain specifically to this Project, as opposed to the overall Recovery Program;
 - c. Enhance communication with other interested parties and the public, to keep them informed on the Project;
 - d. Identify (and, as appropriate, address) local issues and concerns;
 - e. Evaluate the effectiveness of management and communication processes each year; and
 - f. Provide a public forum for discussion of issues pertaining to the Project. However, the Lead Agencies shall, by applicable State, Tribal, and Federal law, remain responsible for making necessary decisions for the Project, and any recommendations to the Recovery Coordinator.

4. Provide logistical and other support as necessary for the Committee, Work Group, and Project.
5. Implement, through the Project (subject to guidance by the Service Region 2 Regional Director-approved recovery protocols), the objectives and strategies of the:
 - a. Service Mexican Wolf Recovery Plan;
 - b. Final Environmental Impact Statement on Reintroduction of the Mexican Wolf in the Southwest;
 - c. Mexican Wolf Nonessential Experimental Population Rule (50 CFR 17.84(k));
 - d. AGFD cooperative reintroduction plan for the Mexican wolf in Arizona (NGEWP Technical Report 56);
 - e. 1998 Mexican Wolf Interagency Management Plan (or any subsequent revisions); and
 - f. WMAT Mexican Wolf Management Plan and the Cooperative Agreement between WMAT and the Service for Assistance in Mexican Wolf Monitoring and Management.
6. Maintain one or more State/Tribally-led Interagency Field Teams (hereafter Field Team[s]) to plan, direct, and implement the Project on the ground; and, when appropriate, designate a primary contact (and one or more surrogates) for their agency to interface with the Field Team(s). [Note: Availability of staff is subject to the limitations identified on page 12, Paragraphs 1 and 2].
 - a. Members of the Field Team(s) shall be those agency employees and interns or volunteers who, for the majority of their duties, perform the Project's on-the-ground activities.
 - b. The Field Team(s) shall include the following positions: Field Team Leaders (one per State and Tribal Lead Agency), wildlife biologists/specialists (varying numbers from any Lead Agency or Cooperator), depredation specialists (varying numbers from or certified by Wildlife Services), conservation education/outreach specialists (varying numbers from any State or Tribal Lead Agency); field assistants (varying numbers of seasonal technicians, interns, and volunteers); and such other staff as the Lead Agencies and Cooperators may deem appropriate and necessary.
 - c. The Project-related activities of Field Team members shall be guided and directed by the Field Team Leaders (see next paragraph). However, each employee shall be supervised by their superior in the chain of command within their respective agency.
 - d. Under guidance and direction from the Lead Agencies functioning as the Committee, the Field Team(s):
 - i. Shall be guided by the AGFD Field Team Leader on non-Tribal lands in Arizona, by the WMAT Field Team Leader on WMAT lands in Arizona, and by the NMDGF Field Team Leader in New Mexico.
 - ii. May operate in both States as a single Field Team, or be split into separate Field Teams or Sub-Teams as appropriate to ensure the desired management and response capability at the local level.
 - iii. May operate differently on Tribal lands, subject to direction from the Tribal Field Team Leader(s).

- e. Field Team Leader(s) shall jointly be responsible for:
 - i. Planning, directing, and implementing the daily activities of the Team(s);
 - ii. Drafting Annual Work Plans, Annual Performance Reports, and new or revised Project operating procedures that will be subject to Committee approval (as described in paragraph #8, below), after appropriate discussion with and review by the Work Group. Project procedures must be compatible with any guidance approved by the Service Region 2 Director, and must fully comply with applicable Federal, State, and Tribal laws;
 - iii. Seeking assistance from the Field Projects Coordinator (see below, subsection 3 of "The Service agrees to"), as necessary to conduct its activities;
 - iv. Communicating with the Committee through the Field Projects Coordinator to ensure that issues are brought to the Committee, and reported back to the Field Team(s), in timely fashion; and
 - v. Assisting the Field Projects Coordinator in identifying and reviewing additional areas and sites for release or translocation of Mexican wolves, pursuant to procedures established under paragraph #8, below.
7. Provide facilities, equipment, logistical support, and land access for the Field Team(s) and any other field personnel, under any subsequent and distinct funding documents separate from this Agreement.
8. Describe the roles, responsibilities, and processes necessary to address involvement, participation, and duties of the Lead Agencies, Project staff, and recognized committees, work groups, or other managing bodies involved with the Project. These descriptions will be completed within six months of the date of the last initial signature on this Agreement.
9. Develop and distribute public information and educational materials on the Project.
10. Cooperate in development of all Project-related media releases, media projects, and outreach activities, and ensure that all Lead Agencies have ample opportunity to review and approve such materials before they are released.
11. Cooperate in providing sufficient funding for this Project. The Federal Lead Agencies' intent is to endeavor to use the Congressional budget process to recover and delist the Mexican wolf. The non-Federal Lead Agencies' intent is to seek sufficient Federal funding for Mexican wolf reestablishment and management through direct Congressional allocation, and/or, as appropriate and necessary, other sources that are in addition to Federal funds currently available to AGFD, NMDGF, or WMAT, rather than by reallocation of existing funds. Examples of new sources of funding may include, but are not limited to: Landowner Incentives Program, Partners for Fish and Wildlife, State Wildlife Grants, and any other appropriate sources.

Note: Funds raised by non-Federal parties shall be separate and distinct from the Federal partners. This shall not preclude non-Federal partners from using Federally-originated funds to contribute to their operating budgets. It is understood by all parties that Federal

funds cannot be used to match Federal funds (as in cost-share agreements), unless Congress has specifically authorized an exception.

The Service agrees to:

5. Provide guidance to this Project by:
 - a. Developing appropriate guidance for the Project through a Recovery Plan, recovery protocols, and other recovery guidelines approved by the Regional Director, Region 2.
 - b. Ensuring that the revised Recovery Plan provides specific, measurable objectives for accomplishing downlisting and delisting the gray wolf in the southwestern gray wolf distinct population segment.
 - c. Completing a final draft revision of the Mexican Wolf Recovery Plan by 2004, and striving to secure approval (i.e. Directors' signature) by 2005.
 - d. Ensuring that any Service Region 2 Regional Director-approved guidelines or protocols pertaining to Mexican wolf recovery are communicated in timely fashion to the Committee to use in providing direction to the Field Team.
6. Continue designating wolves released to repopulate the BRWRA, and their descendants, as a nonessential experimental population, in accordance with Section 10(j) of the Endangered Species Act of 1973, as amended.
7. Provide a Mexican Wolf Field Projects Coordinator, who shall:
 - a. Serve as a member of the Field Team(s), and assist the Field Team Leader(s) in carrying out any field activities necessary to accomplish Project goals and objectives.
 - b. Serve as the communication liaison between the Committee and the Field Team(s).
 - c. Collaborate with the Field Team to draft recovery protocols.
 - d. Assist the Field Team Leader(s) as requested in drafting Annual Work Plans, Annual Performance Reports, and new or revised Project operating procedures that will be subject to Committee approval (pursuant to procedures developed under paragraph #8 under "The Lead Agencies agree to"), after appropriate discussion with and review by the Work Group. Project procedures must be compatible with any guidance approved by the Service Region 2 Regional Director, and must fully comply with applicable Federal, State, and Tribal laws.
 - e. Plan and coordinate, with assistance from the Field Team Leader(s), the identification and review of additional areas and sites for release or translocation of Mexican wolves, pursuant to procedures established under paragraph #8 of "The Lead Agencies agree to".
8. Assess Project priorities annually with the Lead Agencies, and, subject to availability, provide supplemental funding to the States, Tribe(s), and WS to support the Project. Funds for WMAT shall require no Tribal match. Funds for States shall be matched by AGFD and/or NMDGF, generally on a ratio of 3:1 (Federal:Non-Federal) or greater,

meaning that the Service shall not require the State (Non-Federal) contribution to exceed 25 percent of total cost, although the States/Cooperators may voluntarily do so.

9. Provide all necessary Service authorizations and permits to all Signatories on a timely basis, as sanctioned under applicable laws.

The AGFD agrees to:

3. Be responsible for implementing the Project in Arizona on non-Tribal lands, and for providing assistance as available (a) on Tribal lands as requested by the appropriate Tribe, and (b) in New Mexico on non-Tribal lands as requested by NMDGF.
4. Maintain on staff: (a) one Field Team Leader(s); (b) one or more conservation-education specialists to assist in Project outreach activities; and (c) additional staff as deemed necessary, pursuant to paragraphs #8 and #11 under “The Lead Agencies agree to”.
5. Provide administrative and other support for the Project.
6. Provide all necessary AGFD authorizations and permits to all Signatories on a timely basis, as sanctioned under applicable laws.

The NMDGF agrees to:

1. Be responsible for implementing the Project in New Mexico on non-Tribal lands, and for providing assistance as available (a) on Tribal lands as requested by the appropriate Tribe, and (b) in Arizona on non-Tribal lands as requested by AGFD.
2. Maintain on staff: (a) one Field Team Leader(s); (b) one or more conservation-education specialists to assist in Project outreach activities; and (c) additional staff as deemed necessary, pursuant to paragraphs # 8 and #11 under “The Lead Agencies agree to”.
3. Provide administrative support for the Project.
4. Facilitate issuance of necessary NMDGF authorizations and permits to all Signatories on a timely basis, as sanctioned under applicable laws.

The USFS agrees to:

1. Assist the Field Team as necessary to ensure timely, effective, and well-coordinated implementation of the Project’s Annual Work Plan.
2. Strive to provide all necessary USFS authorizations and permits to all Signatories on a timely basis, as sanctioned under applicable laws.

The WS agrees to:

1. Provide Federal leadership and expertise to resolve conflicts between humans and wildlife in regard to this Project, in cooperation with Federal, State, and Tribal agencies, individuals, and other public and private agencies, organizations, and institutions.
2. Maintain on staff one or more wildlife depredation specialists to assist in Mexican wolf damage management, primarily livestock depredations.

The WMAT agrees to:

1. Be responsible for, and retain lead authority for, implementing the Project on the Fort Apache Indian Reservation.
2. Maintain on staff: (a) a Field Team Leader; (b) one or more conservation education specialists to assist in outreach activities regarding the Project; and (c) additional field staff as deemed necessary.
3. Provide administrative and other support for this Project.
4. Strive to provide all necessary Tribal authorizations and permits to all Signatories on a timely basis, as sanctioned under applicable laws.

The Arizona and New Mexico Counties agree to:

1. Assign an Elected or Appointed Official, or a designee thereof, to participate in the Project's Adaptive Management Work Group.
2. Cooperate, coordinate, and communicate with other interested and affected parties to participate in the Project's Work Group.
3. Enhance communication with other interested parties and the public to keep them informed on the Project and the Recovery Program.
4. Provide logistical and other support as necessary for the Work Group.
5. Coordinate impact assessments and mitigation measures that may occur from reintroduction and recovery of the Mexican wolf, on health, safety, and welfare of the Counties and their residents.

The New Mexico Department of Agriculture agrees to:

1. Assign an Elected or Appointed Official, or a designee thereof, to participate in the Project's Adaptive Management Work Group.

2. Cooperate, coordinate, and communicate with other interested and affected parties to participate in the Project's Work Group.
3. Enhance communication with other interested parties and the public to keep them informed on the Project and the Recovery Program.
4. Provide logistical and other support as necessary for the Work Group.

It is Mutually Agreed and Understood by and among the Lead Agencies and Cooperators (i.e. the Signatories to this Agreement) that:

1. Sufficiency of Resources. The terms of this Agreement are contingent upon sufficient resources being available to the Signatories for the performance of this Agreement. The Lead Agencies will agree to a work plan each year, develop budgets, and, as funding is available from all sources, assess priorities and apply the available funding to those priorities. The decision as to whether sufficient resources are available to each Signatory shall be determined by each Signatory, shall be accepted by all other Signatories, and shall be final. [Note: For NMDGF, "sufficient resources" means appropriated dollars, and NMDGF is not obligated by this Agreement to seek funds from the Legislature.]
2. Non-Fund Obligor Document. Nothing in this Agreement shall obligate the Signatories to obligate or transfer any funds, expend appropriations, or to enter into any contract or other obligations. Specific work projects or activities that involve transfer of funds, Services, or property among the Signatories may require execution of separate agreements or contracts and be contingent upon the availability of appropriated or other funds. Appropriate statutory authority must independently authorize such activities; this Agreement does not provide such authority. Negotiation, execution, and administration of each such agreement must comply with all applicable statutes and regulations.
3. Establishment of Responsibility. This Agreement is non-binding and establishes no duty or obligation on any party; this Agreement is not intended to, and does not create or establish, any substantive or procedural right, benefit, trust responsibility, claim, cause of action enforceable at law, or equity in any administrative or judicial proceeding by a party or non-party against any party or against any employee, officer, agent, or representative of any party.
4. Responsibilities of Parties. The Signatories to this Agreement and their respective agencies and offices will handle their own activities and use their own resources, including the expenditure of their own funds, in pursuing the objectives of this Agreement. Each party will carry out its separate activities in a coordinated and mutually beneficial manner. Employee assignment to the Project is subject to approval by the employing agency.
5. Freedom of Information Act (FOIA). Any information provided to the Federal Agencies under this instrument may be subject to release under the Freedom of Information Act (5

U.S.C. 552). However, nothing in this Agreement shall be construed to affect the applicability of the exemptions set forth in 5 U.S.C. Section 552 (b).”

6. Participation in Similar Activities. This instrument in no way restricts the Signatories from participating in similar activities with other public or private agencies, organizations, and individuals. This Agreement does not modify or supersede other existing agreements between or among any of the Signatories.
7. Commencement/Expiration/Withdrawal. This Agreement takes effect upon the date of the last signature of approval and shall remain in effect for no more than five years from the date of execution, unless renewed, extended, or canceled. This Agreement may be renewed, extended, or amended upon written request by any Signatory, and subsequent written concurrence of the other Signatories. All such actions shall be discussed in a public meeting of the Work Group. Any Signatory may withdraw from this Agreement with a 60-day written notice to the other Signatories, through the Work Group Chair. Withdrawal by one party shall not affect the continued cooperation of the remaining parties under this Agreement. Further:
 - a. In accordance with the laws of the State of Arizona, all parties are hereby put on notice that State of Arizona participation this Agreement is subject to cancellation pursuant to A.R.S. § 38-511.
 - b. In accordance with the laws of the State of New Mexico, this Agreement is subject to approval by the Department of Finance and Administration. If any money has been contributed by the parties to this Agreement, after completion of the Agreement’s purposes any surplus money on hand shall be returned in proportion to the contributions made. No property shall be acquired as the result of the joint exercise of powers under this Agreement.
8. Additional Signatories. This Agreement may be amended at any time to include additional Signatories. An entity requesting inclusion as a Signatory shall submit its request to the Work Group Chair in the form of a document defining its proposed responsibilities pursuant to this Agreement.
 - a. Inclusion of additional Lead Agencies shall be approved by majority voice concurrence of the current Lead Agency signatories present in a Work Group meeting.
 - b. Inclusion of additional Signatories shall be approved by majority voice concurrence of the current Lead Agency and Cooperator signatories present in a Work Group meeting.
 - c. On approval, the new Cooperator must comply with all aspects of the Agreement as it was structured at the time of approval of its request for Cooperator status.
9. Conflict Resolution. Conflicts between or among the Signatories concerning this Agreement that cannot be resolved at the lowest possible level shall be referred to the next higher level, et seq., as necessary, for resolution.

10. Principal Contacts. Appendix A lists the principal implementation and contract administration contacts for this Agreement. Agencies may change their contact(s) by written notification to the Work Group Chair, who shall distribute an updated Appendix A to all Signatories. Principal Contact changes by one Signatory shall not require concurrence by other parties to this Agreement.

IN WITNESS WHEREOF:

The Signatories hereto have executed the Agreement as of the last written date below.

Duane L. Shroufe, Director
Arizona Game and Fish Department

Date

Bruce C. Thompson, Director
New Mexico Department of Game and Fish

Date

H. Dale Hall, Director, Region 2
U.S. Fish and Wildlife Service

Date

Harv Forsgren, Regional Forester
USDA Forest Service Southwestern Region

Date

Michael V. Worthen, Regional Director, Western Region
USDA APHIS/Wildlife Services

Date

Dallas Massey, Sr., Chairman
White Mountain Apache Tribe

Date

Name and Title of Elected Official
Catron County, New Mexico

Date

Name and Title of Elected Official
County of Sierra, New Mexico

Date

Name and Title of Elected Official
Graham County, Arizona

Date

Name and Title of Elected Official
Greenlee County, Arizona

Date

Name and Title of Elected Official
Navajo County, Arizona

Date

I. Miley Gonzalez, Ph.D., Director/Secretary
New Mexico Department of Agriculture

Date

[Other Lead Agencies and Cooperators yet to be inserted]

Appendix A: Primary Contacts for Agreement

Project Contacts are the individuals who represent their agencies in implementing this Agreement. Contract Administration Contacts are the individuals whom Project Contacts consult regarding administrative (contractual) issues related to this Agreement. Project Contacts and Contract Administration Contacts may or may not be the same individual.

| Project Contacts: | Phone, FAX, E-Mail: |
|--------------------------------|--|
| AGFD Terry B. Johnson | 602.789.3507; 602.789.3926; teebeej@gf.state.az.us |
| NMDGF Chuck Hayes | 505.476.8102; 505.476.8128; clhayes@state.nm.us |
| USDA APHIS WS David L. Bergman | 602.870.2081; 602.870.2951; david.l.bergman@aphis.usda.gov |
| USDA FS Wally J. Murphy | 505.842.3195; 505.842.3800; wmurphy@fs.fed.us |
| USFWS Colleen Buchanan | 505.761.4782; 505.346.2542; colleen_buchanan@Service.gov |
| WMAT John Caid | 928.338.4385; 928.338.1712; jcaid@wmat.nsn.us |
| County Catron | |
| County Greenlee Hector Ruedas | 928.865.2072; 928.865.4417; kgale@co.greenlee.az.us |
| County Sierra Adam Polley | 505.894.6215; 505.894.9548; adam@riolink.com |
| NMDA Bud Starnes | 505.646.8005; 505.646.1540; bstarnes@nmda.nmsu.edu |
| | |

| Contract Administration Contacts: | Phone, FAX, E-Mail: |
|-----------------------------------|--|
| AGFD Terry B. Johnson | 602.789.3507; 602.789.3926; teebeej@gf.state.az.us |
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| USDA FS Susan McDonnell | 505.842.3345; 505.842.3152; smcdonnell@fs.fed.us |
| USFWS Susan MacMullin | 505.248.6671; 505.248.6692; susan_macmullin@Service.gov |
| WMAT John Caid | 928.338.4385; 928.338.1712; jcaid@wmat.nsn.us |
| County Catron | |
| County Greenlee Kay Gale | 928.865.2072; 928.865.4417; kgale@co.greenlee.az.us |
| County Sierra | 505.894.6215; 505.894.9548; adam@riolink.com |
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| | |

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Mexican Wolf Blue Range Reintroduction Project 5-Year Review:
Technical Component

by

Interagency Field Team

Arizona Game and Fish Department
New Mexico Department of Game and Fish
U.S.D.A. – APHIS, Wildlife Services
U.S.D.A. Forest Service
U.S. Fish and Wildlife Service
White Mountain Apache Tribe

December 31, 2005

Mexican Wolf Blue Range Reintroduction Project

5-Year Review: Technical Component

by

Interagency Field Team

Note: see the Administrative Component for a list of abbreviations, acronyms, and terms.

INTRODUCTION

The Mexican wolf (*Canis lupus baileyi*) was relentlessly pursued in the wild and eventually extirpated from the southwestern United States, in large part because of conflicts with livestock (Bailey 1907, Young and Goldman 1944, Brown 1983, Robinson 2005). Many techniques were used to eradicate them, including trapping, shooting, and poisoning with strychnine, arsenic, or sodium cyanide (Young and Goldman 1944, Parsons 1996, Brown 1983, Robinson 2005). Federal government trappers reported taking more than 900 wolves in Arizona and New Mexico from 1915 to 1925 (Brown 1983). How many more were killed there but not reported is unknown. Wolf removal efforts in Mexico in the early to mid-1900s were not completely successful, in that some wolves survived at least until the 1980s (McBride 1980).

Little is known about the Mexican wolf's natural history prior to reintroduction to the Blue Range Wolf Recovery Area (BRWRA) in Arizona and New Mexico in 1998. The Mexican wolf is the most genetically distinct (Garcia-Moreno et al. 1996) and southern-most occurring gray wolf subspecies in North America (Nowak 1995 and 2003). One obvious difference between Mexican wolves and other gray wolves is their smaller size. Historic weights of wild Mexican wolves ranged from 25-49 kg (54-99 lbs) (Young and Goldman 1944, Leopold 1959, McBride 1980), versus 36-55 kg (80-120 lbs) in more northern animals (Mech 1970).

Prior to reintroduction of Mexican wolves, biologists suggested their primary prey had been white-tailed deer (*Odocoileus virginianus*) and mule deer (*O. hemionus*) (Brown 1983, Parsons 1998); however, data collected on Mexican wolves since their reintroduction indicates their current wildlife prey are primarily elk (*Cervus elaphus*) (Reed 2004¹). The dichotomy between the two perspectives is at least partially attributable to nonparallel frames of reference: historically-based perspectives (e.g. Brown 1983 and Parsons 1998) reflect the fact that deer were the prevalent wild ungulates in Mexican wolf range as it was known prior to the late 1990s (southern AZ and NM south into Mexico, where elk were virtually absent); in contrast, elk are common to locally abundant (sometimes even more so than mule or white-tailed deer) in the BRWRA, where Mexican wolf reintroduction is occurring.

¹ In Reed (2004), opportunistic scat collection occurred in BRWRA from 1998-2001, where radio-collared wolves were present. Scats were actively collected from June-August 2000 and March-October 2001 within BRWRA. Relative abundance of wild ungulate prey and livestock in areas of wolf occurrence and scat deposition was not determined. Seasonal and area differences (e.g. winter-summer and AZ-NM) and conservative identification of scats as wolf (i.e. scats >28 mm) may have biased the results toward larger ungulates commonly found in larger scats. Also, note that wolf scats collected by a permittee reporting livestock depredations in the study area during this time were not made available to Reed.

Historically, Mexican wolves were distributed across a significant portion of the southwestern United States and northern and central Mexico. This range included eastern and central Arizona, southern New Mexico, and west Texas (Brown 1983, Parsons 1996). In addition, recent genetics work that looked at historic wolf specimens collected in 1916 and earlier (Leonard et al. 2004) suggests that Mexican wolves intergraded with more northern races well into Colorado. Mexican wolves were extirpated in New Mexico around 1942 (Bednarz 1988). Fewer than 50 Mexican wolves still existed in Chihuahua and Durango, Mexico by 1980 (McBride 1980). Subsequent surveys in Mexico have not confirmed presence of wolves in the wild (Carrera 1994), and it is unlikely that a viable population exists (Parsons 1996).

Five wolves (4 males and 1 pregnant female) were live-trapped in Mexico between 1977 and 1980 to establish a captive population known as the “Certified” (Parsons 1998) or “McBride” lineage. Two other lineages, both from captive facilities in the United States and Mexico, were also certified for the captive breeding population in 1995 (Hedrick et al. 1997). The latter wolves were referred to as the “Aragon” and “Ghost Ranch” lineages. There were a total of seven founders of the Mexican wolf Certified captive population: three from McBride, two from Aragon, and two from Ghost Ranch.

The Mexican wolf was listed as endangered under provisions of the Endangered Species Act (ESA) in 1976 (Parsons 1998). The Mexican Wolf Recovery Team was formed in 1979 and the Mexican Wolf Recovery Plan was approved and signed by the United States and Mexico in September of 1982 (U.S. Fish and Wildlife Service [USFWS] 1982). The main objectives of the Recovery Plan were to maintain a captive population and to re-establish a viable, self-sustaining wild population of Mexican wolves. Following approval of a Final Environmental Impact Statement (FEIS; USFWS 1996), the Secretary of the Interior approved the reintroduction of Mexican wolves to establish a population of at least 100 wolves in the BRWRA of Arizona and New Mexico in March 1997 (USFWS 1998). The USFWS classified wolves reestablished in this area as a “nonessential experimental population” under section 10(j) of the ESA (USFWS 1998). In 2003, the USFWS reclassified the gray wolf in North America creating three Distinct Population Segments (USFWS 2003). Under this reclassification wolves occupying the Southwestern Distinct Population Segment (SWDPS) including the current BRWRA population, were listed as endangered and a recovery team was convened to develop a new recovery plan for the SWDPS. Recovery planning for the Mexican wolf was put on hold, however, in January 2005 when an Oregon U.S. District Court judge enjoined and vacated the 2003 gray wolf reclassification rule (USFWS 2003), which also abolished the SWDPS. In December 2005, the USFWS decided not to appeal the Oregon Court ruling. This decision re-opened the door for the USFWS, Region 2 to once again move forward with Mexican wolf recovery planning in the Southwest. Target deadlines for Recovery Plan development and completion will be identified once the Recovery Team resumes meeting. In the meantime, the Mexican wolf in the BRWRA will continue to be managed as part of a Nonessential Experimental Population for reintroduction purposes.

Mexican wolves were first reintroduced to the BRWRA in March 1998 when 11 animals were initial-released into the primary recovery zone (Parson 1998). Additional individuals and family groups of Mexican wolves have been released or translocated into various parts of the BRWRA

each year through 2003. Interagency Field Team (IFT) members have monitored the reintroduced population for reproduction, food habits including livestock depredation, and other biological traits of Mexican wolves. Predictions in the FEIS estimated that by the sixth year of the reintroduction, the number of wolves in the wild would be about 55 (USFWS 1996). In 2003, the IFT estimated the Mexican wolf population in the BRWRA to be approximately 50 to 60 wolves, indicating population numbers were on track with FEIS (1996) predictions (Arizona Game and Fish Department [AGFD] 2004) in regards to this population parameter.

Herein, we: (1) provide a 5-Year Review of the Mexican wolf reintroduction pursuant to the Mexican wolf Final Rule (USFWS 1998), and (2) highlight additional analyses that provide valuable information to the current reintroduction effort. In addition, we identify home range and dispersal patterns; analyze release success; document reproduction, population growth, causes of mortality, survival and removal rates; assess prey numbers; investigate livestock depredation patterns, and classify human/wolf encounters in the BRWRA.

STUDY AREA / REINTRODUCTION AREA

The BRWRA includes all of the Apache and Gila National Forests (NF) in east-central Arizona and west-central New Mexico, encompassing 17,775 km² (6,845 mi²) (USFWS 1996). In addition, the White Mountain Apache Tribe (WMAT) has developed a management plan for wolves that adds 6,475 km² (2,500 mi²) for wolves to recolonize. Elevations ranged from <1,220 m (4,000 ft) in the semi-desert lowlands along the San Francisco River to 3,353 m (11,000 ft) on Mount Baldy, Escudilla Mountain, and the Mogollon Mountains (USFWS 1996). The BRWRA has four distinct seasons including autumn (Sep-Nov), winter (Dec-Feb), spring (Mar-May), and summer (Jun-Aug). The BRWRA has relatively mild weather with cool summers and moderate to cold winters over most of the higher elevations, and warm year-round temperatures in the lower elevations (USFWS 1996). Average temperatures ranged from 43 to 65 °F in the higher elevations and lower elevations, respectively (USFWS 1996). Yearly precipitation ranged from 30.5 cm (12 in) in the southern woodlands to 94.0 cm (37 in) in the mixed conifer forests (USFWS 1996). Snow typically occurred at higher elevations from December to March, however snow is also possible in the BRWRA as early as October and as late as June. Mixed conifer forests in the higher elevations and semi-desert grasslands in the lower elevations characterized the area, with ponderosa pine (*Pinus ponderosa*) forests dominating the area in between (USFWS 1996). Potential native prey of Mexican wolves included elk, white-tailed and mule deer, and to a lesser extent, pronghorn (*Antilocapra americana*), javelina (*Tayassu tajacu*), and Rocky Mountain bighorn sheep (*Ovis canadensis*) (Parsons 1996). Elk populations were estimated in the FEIS at 15,800 (3.7/km²) (USFWS 1996). Both species of deer were estimated at 57,170 total (average density 13.36/ km²) (USFWS 1996). Approximately 82,600 cattle and 7,000 sheep were permitted to graze roughly 69% of the BRWRA, and 50% of the allotments were grazed year-round when the Reintroduction Project began (USFWS 1996). The actual numbers of cattle and sheep varied each year relative to environmental factors, and were generally lower because of drought conditions (see also Section 3.2 of the Socioeconomic Component of the 5-Year Review). Other domestic animals in the BRWRA that wolves might encounter include cats, dogs, poultry, goats, horses, and mules. Other large predators in the

BRWRA included coyotes (*Canis latrans*), cougars (*Puma concolor*), and black bears (*Ursus americanus*) (USFWS 1996).

METHODS

All adult wolves released from captivity or trapped in the wild were radiocollared (models 400 and 500, Telonics, Inc., Mesa, Arizona). Wolves were radiotracked periodically from the ground (i.e. triangulation) and a minimum of once a week from the air (White and Garrot 1990). Location data (i.e. date, UTM location, wolf identification number, sex, age, number of wolves, behavior, and weather) were entered into the Reintroduction Project's database, along with reports for specific incidents (e.g. depredations, wolf/human conflicts, aversive conditioning, captures, mortalities, translocations, initial releases, predation). The cut-off date for data analysis for the Technical Component of the 5-Year Review was December 31, 2003. However, data from subsequent years (i.e. 2004 and 2005) were used when available and appropriate.

Home Ranges

Aerial locations of wolves were used to estimate home ranges (White and Garrott 1990). Annual home range polygons were based on locations from January through December each year that were evenly distributed across summer and winter seasons for wolves from a given pack (Mladenoff et al. 1995, Wydeven et al. 1995). Some packs maintained home ranges for several years; thus, we used each pack year as an independent home range sample. In order to maximize sample independence, only individual locations of radiomarked wolves that were spatially or temporally separated from other radiomarked pack members were used. This approach minimizes pseudoreplication (Garton et al. 2001) among locations.

Wolf home range size in some areas reaches an asymptote at around 30 locations. In such cases increasing the number of locations beyond this level has little effect in increasing estimated home range size (Carbyn 1983, Fuller and Snow 1988). Thus, we elected to use ≥ 30 locations per year as a threshold for analyzing home ranges. Alternatively, some authors have suggested that in recolonizing wolf populations, a larger number of locations (≥ 80) may be required for home range size to reach its asymptote (Fritts and Mech 1981). To account for this potential sampling bias, we used the fixed kernel (FK) method to estimate wolf home ranges due to its low bias when sample sizes are small (Kernohan et al. 2001). In contrast, previous wolf home range analyses have relied largely on the less stable and less accurate minimum convex polygon (MCP) method (e.g. Carbyn 1983, Fuller and Snow 1988, Burch 2001). Fixed kernel home ranges derived from smaller samples typically yield more accurate home range size estimates than estimates more dependent on increased sample size to develop accurate home ranges (Seaman et al. 1999, Powell 2000, Kernohan et al. 2001). Thus, we used a 95% FK approach to describe home range sizes due to its improved performance relative to other home range estimators.

Polygons were generated using the FK method (Worton 1989) at the 95% (home range use) and 50% probability levels (core use areas) (White and Garrott 1990), with least-squares cross-validation as the smoothing option in the animal movement extension in the program Arcview (Hooge et al. 1999; Environmental Systems Research Institute 2000). Home range polygons

were only created for wolves that localized and established an exclusive use area. Home range sizes were compared with each other and with those in the literature (e.g. Fuller and Murray 1998, Fuller et al. 2003).

Releases and Translocations

We defined “initial releases” as wolves released directly from captivity, with no previous free-ranging experience, into the Primary Recovery Zone (Fig. 1). “Translocations” were defined as free-ranging wolves (either captive reared or wild born) captured in the wild and moved from one area to another. This included wolves temporarily (<24 hrs to 24 months) placed in captivity after being free-ranging. Candidate release wolves were acclimated prior to release in USFWS approved facilities, where contact between wolves and humans was minimized and carcasses of road-killed deer and elk supplemented their routine diet of processed canine food. Information on captive facilities, genetic lineages of Mexican wolves, and individual wolves chosen for release is discussed elsewhere by García-Moreno et al. (1996), Parsons (1996, 1998), Hedrick et al. (1997), and Brown and Parsons (2001).

Three initial release or translocation methodologies were employed: (1) hard releases in which a wolf or wolves were released directly from a crate to the wild (Fritts et al. 2001), (2) soft releases in which a wolf or wolves were held in a chain link enclosure for one to six months until acclimated to the area (Fritts et al. 2001), and (3) modified soft releases in which a wolf or wolves were held in a mesh enclosure until they self-released by tearing through the mesh after ≤ 1 day to 2 weeks of acclimation. We considered a successful initial release or translocation to be any wolf that ultimately bred and produced pups in the wild (breeding season data from 2004 for wolves released in 2003 was included in the analysis). We excluded wolves whose fate was unknown (e.g. uncollared released pups, or missing collared animals) from this analysis. We considered each time an animal was released to be an independent sample. The number of successful and unsuccessful-released wolves was compared using a chi-square analysis to limit the number of variables subsequently used in a logistic regression analysis (Hosmer and Lemeshow 2000). We used likelihood-based methods (i.e. ΔAIC_c and w_i) as a means to quantify the strength of models explaining release success patterns (Burnham and Anderson 1998). The dependent variable was a binomial (whether a release was successful or not), while independent variables included: (1) year of release, (2) type of release (i.e. initial release or translocation), (3) method of release, (4) season of release (autumn, winter, spring, and summer), (5) number of adults in the group, (6) if the group was released with pups or not, (7) status of the wolf (i.e. breeder, subadult, or pup), (8) sex, (9) age, (10) time spent in captivity, (11) time spent in wild, (12) proportion of wolf's life spent in the wild, (13) time spent in the acclimation pen, and (14) State (i.e. New Mexico or Arizona). Logistic regression provides poor confidence intervals when there are empty cells. Thus, models with overdispersed data were removed from further consideration (Hosmer and Lemeshow 2000).

Reproduction and Population Growth

Population estimates were determined through the use of howling surveys (Harrington and Mech 1982, Fuller and Sampson 1988), tracks, and visual observations during aerial and ground

radiotelemetry (White and Garrot 1990). A “breeding pair” was defined as an adult male and adult female wolf that produced at least two pups during the previous breeding season that survived until December 31 of the year of their birth (USFWS 1998). “Pack” was defined as two or more wolves traveling together. Thus, minimum population estimates incorporated the total number of collared wolves, uncollared wolves, and pups, documented as close to December of the year of interest as possible. We attempted to maintain at least two radiocollared wolves in each pack within the BRWRA and investigated (i.e. looked for sign, howling surveys) reports in areas where packs were not known to exist.

Pups were born from early April to May within the wild population and were counted post-emergence from the den whenever opportunity allowed. Counts of pups, failed radiocollars, and uncollared wolves were based on the latest date in the year in which verification was available. This period for pups was prior to October because they become less distinguishable from uncollared subadult and adult wolves after that. The period following 28 weeks of age in a pup cycle is generally referred to as the slow growth rate (Mech 1970, Kreeger 2003). Although wolves continue to grow until 12 to 14 months of age, relatively little mass is gained by either sex from 28 to 51 weeks of age (Kreeger 2003). Further, pups tended to be closely associated with collared animals prior to October, at den or rendezvous sites. After October, pups occasionally disperse or travel separately from the breeding pair, either alone or with other uncollared members of the pack.

Finally, average pack size for free-ranging Mexican wolves, and average litter size for reproducing packs were calculated and compared with other gray wolf populations. In this case, litter size represented the earliest documented count of the pups in a given pack. These observations do not represent the number born in a given year as some mortality likely occurs before initial counts.

Mortality

Wolf mortalities were identified via telemetry and reports received from the public. We investigated mortality signals within 12 hours of detection to determine the status of the wolf. Carcasses were investigated by law enforcement agents and later necropsied to determine proximate cause of death. We summarized causes for all known deaths. For radiocollared wolves, we calculated mortality, missing, and removal rates using methods presented in Heisey and Fuller (1985).

We calculated overall cause-specific mortality rates (i.e. human-caused versus natural mortality), however, similar to other studies (e.g. Fritts and Mech 1981, Fuller 1989, Pletscher et al. 1997, Bangs et al. 1998), mortality was primarily human-caused. Thus, there was not enough consistent variability in cause of death to justify additional breakdown of mortality rates, or to warrant calculation of yearly cause-specific mortality rates. However, management removals may have an equivalent effect as mortality on the free-ranging population of Mexican wolves (see Paquet et al. 2001). Thus, we also calculated yearly cause-specific removal rates for radiocollared wolves because sufficient sample sizes existed for these classifications. Later in recovery, these removals may actually be deaths, as wolves will be increasingly removed

through lethal control (Bangs et al. 1998). Wolves were removed from the population for four primary causes: (1) dispersal outside the BRWRA, (2) cattle depredations, (3) nuisance to humans, and (4) other (principally to pair with other wolves, or move to a better area without any of the other causes occurring first). Each time a wolf was moved to a new location was considered a removal, regardless of animal status later in the year (e.g. if the wolf was translocated or held in captivity). We calculated an overall failure rate of wolves in the wild by combining mortality, missing, and removal rates to represent the overall yearly rate of wolves that were affected (i.e. managed, dead, or missing) in a given year. Mortality, missing, and removal rates were then compared with predictions in the FEIS (USFWS 1996) and in other wolf populations (Fuller et al. 2003).

In addition, we developed single variable models using Cox's proportional hazards model (Cox and Oakes 1984) to identify possible important covariates that influenced wolf survival. We developed one model for mortality and one model for removals. The dependent variable was hazard rate (i.e. the mortality or removal rate), while independent variables included: (1) year, (2) status of the wolf (i.e. breeder, subadult, or pup), (3) sex, (4) age, (5) time spent in captivity, (6) time spent in the wild, (7) proportion of the wolf's life spent in the wild, and (8) state (i.e. New Mexico or Arizona).

We generated rates inside of 1:24,000 quadrangle maps to determine how mortality, missing, and removal rates varied across the landscape. Spatially explicit survival models needed for each quadrangle were based on: (1) aerial locations, (2) mortalities, (3) missing animals, and (4) removals. Time between aerial locations averaged 6.25 ± 5.75 (SD) days ($n = 4,909$). Thus, we calculated the number of radio days by multiplying the number of locations in a given quadrangle by 6.25 days. Quadrangles that contained <5 aerial locations or <30 radio days were areas where data were insufficient for full evaluation. We calculated monthly mortality, missing, and removal rates within a cell and considered monthly failure rates (see above) >3% (34% yearly) as a sink area. In this case, a sink area would be considered any quadrangle where mortality, missing, and removal create an area in which the growth rate of Mexican wolves is <1.0. We identified 34% yearly failure rate as the equivalent to a 1.0 growth rate in a regression equation developed from other wolf populations (Fuller 2003). Further, we identified quadrangles with monthly failure rates between 4 and 6% as weak sinks. We also identified the last location of wolves that disappeared, to examine the possibility that these wolves were killed in that area. In the scope of these analyses, we attempted to answer the following questions: (1) is wolf mortality substantially higher than projected in the FEIS, (2) have any sinks been identified, and (3) are any sources of mortality significantly higher than expected?

Dispersal

To evaluate the self-sustaining potential of the Mexican wolf population, we investigated dispersal and movement patterns of individual wolves on the landscape. Wolf dispersal was defined as the time when a wolf permanently left its' natal home range (Boyd and Pletscher 1999). To account for wolves that functioned as individual animals following release or translocation, we defined these as movements rather than classic dispersals. Distance and direction of travel, age and sex of the wolf, and result of the movement (i.e. the ultimate fate of

the animal) were recorded for each event. We calculated travel distance and direction using Arcview (Environmental Systems Research Institute 2000), either between the central point of successive home ranges, or the distance and direction from the original home range or release site, to the point where individual wolves died or were captured. Movements were considered successful if the animal ultimately produced pups. The purpose of this analysis was to evaluate the effects of dispersal and movements on population growth within the BRWRA.

Predation

We opportunistically searched for wolf-killed and scavenged native ungulate carcasses throughout the year. After wolves abandoned a carcass, IFT members attempted to determine the proximate cause of death (Roy and Dorrance 1976, Fritts and Mech 1981, Mech et al. 1998, Mech et al. 2001). Kills were classified as confirmed, probable, or possible based upon standardized criteria (Roy and Dorrance 1976) and the preponderance of evidence. Only confirmed or probable kills were used for analysis purposes. Data on species, age (calf/fawn, or adult), sex, and amount consumed were recorded for each carcass. In addition, bone marrow and mandibles were collected as an indicator of overall health (i.e. percent fat) and for aging, respectively.

We also recorded the location of each kill relative to a specific state game management unit. Each kill was referenced to population estimates of deer and elk within each management unit and year in which the kill occurred. This represented prey availability. For Arizona, data on population estimates for individual management units were based upon deer and elk management summaries for 2003 (AGFD unpublished data). In New Mexico, we used the most recent aerial population survey relative to when the predation event occurred (New Mexico Department of Game and Fish [NMDGF] unpublished data). Thus, each kill had a specific reference to the population of elk and deer, and the male: female, and female: calf or fawn ratios. Ungulate estimates were then averaged across all years and game management units to represent available prey. We then compared documented wolf kills to the available prey estimate (AGFD unpublished data, and NMDGF unpublished data) and ratios using chi-square analysis (Sokal and Rohlf 1981). The available ungulate estimates differed between states (i.e. methods and accuracy). However, we believe the data were sufficient to give relative proportions of deer versus elk, male: female, and female: calf or fawn ratios for comparisons with wolf kills. We did not extend the data to suggest what the estimated numbers of elk or deer were within the BRWRA.

We located select packs from fixed-wing aircraft daily during a one month period (March 2003) to determine the feasibility of a winter study to document kill rates (Peterson 1977; Ballard et al. 1987, 1997; Mech et al. 2001; Smith et al. 2004). Ground tracking was done on days we were unable to fly. Kills discovered during this study were included in analyses. Except for this pilot study, we expected data collected on ungulate kills would be biased toward larger ungulates (e.g. large elk are more likely to be discovered than elk calves or deer). Thus, selection patterns were only valid if selection occurred for smaller animals, or alternatively against larger animals.

Prey density estimates were not available for the entire BRWRA; therefore, we were unable to use this parameter to estimate the number of wolves the BRWRA could support (Keith 1983, Fuller 1989). However, we compared the mass change during repetitive examinations of captive adult (≥ 2 years) Mexican wolves with the mass gain or loss in repetitive captures of wild adult Mexican wolves to evaluate the ability of wild wolves to find or kill enough food to maintain their mass. The hypothesis that mass gain or loss was equivalent between wild and captive wolves was tested with a two-sample t-test. Starvation in adults is indicative of food limitation (e.g. prey availability or inability of a wolf to capture adequate prey such as might occur when a “naive” wolf is initially-released) in wild wolf populations (Fritts and Mech 1981, Ballard et al. 1997). Thus, any significant deviation from 0 weight loss between captures would indicate food limitation.

Depredations

Personnel from the U.S.D.A.-APHIS Wildlife Services (WS), or other members of the IFT if WS personnel were unavailable, examined dead or injured cattle, sheep, horses, and dogs to determine cause of death. Domestic animal depredations were classified as confirmed, probable, or possible wolf kills, non-wolf, or unknown, in adherence with standardized criteria (Roy and Dorrance 1976, Fritts 1982). We compared depredations with projections in the FEIS and other population of wolves (Bangs et al. 1998, USFWS et al. 2003). These comparisons were normalized to represent the number of wolf-caused mortalities relative to 100 wolves within the population.

The effectiveness of the wolf depredation investigation program (i.e. livestock and other domestic animals) was evaluated based on: (1) response time from reported to arrival of personnel, (2) number of documented confirmed or probable livestock kills compared with that predicted in the FEIS (USFWS 1996), (3) trend in confirmed depredations per 100 wolves, (4) number of wolves removed per livestock depredation, and (5) recurrence of depredations by wolves translocated due to previous depredations. We considered a response time of <24 hours, documented confirmed or probable kills less than or equal to estimates identified in the FEIS (1996), and a decreased or stable trend per 100 wolves as a sign of an effective depredation program. Although, we recognize that not all livestock kills from wolves or other causes are documented (Fritts 1982, Bangs et al. 1998, Oakleaf et al. 2003), the most valid analysis must be based on the best available data, which currently are depredation investigations, versus unknown livestock loss figures. However, Project personnel and ranchers spent a considerable amount of time monitoring wolves and/or livestock, looking for possible depredations. Further, biases (i.e. not all livestock kills are found) should be similar to other areas in the United States, making comparisons between Mexican wolves and other wolf populations reasonable.

Human/Wolf Interactions

We summarized human-wolf encounters based on categories described by McNay (2002). Three categories applied to Mexican wolves: investigative search, investigative approach, and aggressive charge. We considered wolf behavior an investigative search when the wolf ignored humans or human activity. An investigative approach described wolves that moved toward

people in an inquisitive, non-threatening manner. In an aggressive charge, wolves moved toward people rapidly. Because every documented aggressive charge by a Mexican wolf occurred when a dog was present, we did not feel that any of the other terms used by McNay (2002) were appropriate (e.g. agonism, predation, prey testing, self-defense, and rabies). Encounters triggered by a dog were considered provoked, while other cases were considered non-provoked (McNay 2002). We also identified whether the interaction was related to food conditioning (i.e. associating food with people). Further, we identified wolves that appeared habituated (i.e. close proximity to humans and habitations with an apparent lack of fear or concern for human presence) to people (Appendix I).

We also identified cases where aversive conditioning (e.g. hazing with cracker shells or rubber bullets, translocations) was applied. We determined what proportion of the wolves was removed for nuisance behavior and the general trend of wolf/human interactions.

Genetics

All animals released to the wild in the BRWRA were genetically redundant to the captive Mexican wolf population. Data from microsatellite analysis show that all three lineages (i.e. McBride, Ghost Ranch, and Aragon) can definitively be differentiated from northern gray wolves, coyotes, and dogs (Hedrick et al. 1997). Prior to releasing Mexican wolves from captivity, we pulled blood from each animal for genetic analysis and storage at the National Forensics Laboratory in Ashland, Oregon. In addition, we pulled blood from every wild wolf captured to determine if it was a pure Mexican wolf. This allowed us to determine the parentage and pack affiliation of each animal. This also allowed us to monitor for possible introgression of coyote, dog, or wolf-dog hybrid genes into the Mexican wolf population. Finally, blood was also collected and banked from any non-target canids (i.e. feral dogs, coyotes, wolf-dog hybrids) that were captured in order to monitor for possible introgression of Mexican wolf genes into coyote or dog populations.

RESULTS

Home Ranges

Home ranges (95% FK probability contour) were determined for 19 packs totaling 39 pack years (Fig. 2) and averaged $462 \pm 63 \text{ km}^2$ (SE) ($182 \pm 24 \text{ mi}^2$). Core use areas (50% FK probability contour) averaged $59 \pm 9 \text{ km}^2$ ($23 \pm 4 \text{ mi}^2$). During a pack's first year of home range establishment, their home range (log transformed to normalize) was smaller than packs which had been in the wild greater than one year or for packs that formed naturally in the wild ($t = 3.310$, $P = 0.002$, $n = 39$; and $t = 2.610$, $P = 0.013$, $n = 39$ for home ranges and core use areas, respectively). Home ranges were primarily contained within the BRWRA (partly as a function of the Final Rule (Fig. 1). However, 28% ($n = 11$ out of 39) of pack annual home ranges had at least small portions (approximately 20%) outside of the reintroduction boundary (Fig. 2). The total area occupied by established wolf packs has continued to increase during each successive year of the Project, primarily due to an increase in the number of colonizing packs (Table 1).

Releases

Ninety wolves were released 130 separate times including 51 translocations ($n = 11$ translocated wolves were wild born), and 79 initial releases from captivity. Overall, wolves were successful (i.e. produced pups in the wild) 26% of known fate releases (i.e. dead, produced pups in the wild, or removed). Success was 18% for known-fate animals initial-released from captivity ($n = 60$), while known-fate translocated wolves ($n = 46$) were twice as successful (37%; $\chi^2 = 4.646$, $P = 0.031$, $df = 1$). Wolves released in New Mexico (translocations; 47% success) were more successful than those released in Arizona (initial releases and translocations; 22%; $n = 106$, $\chi^2 = 5.229$, $P = 0.022$, $df = 1$). Not surprisingly, adult wolves were more successful (38% success), than subadults (16%) or pups (10%; $n = 106$, $\chi^2 = 7.767$, $P = 0.021$, $df = 2$).

Temporal effects also influenced release success, with 2002 (67% success) the best year for releases, followed by 2000, 2003, 1998, 1999, and 2001 (32, 29, 13, 12.5, and 11%, respectively [$n = 106$, $\chi^2 = 15.486$, $P = 0.008$, $df = 5$]). Fall (75% success) and summer (35% success) were more successful periods for release than winter (22%) or spring (18%; $n = 106$, $\chi^2 = 8.221$, $P = 0.042$, $df = 3$). Further, successful releases consisted of wolves that spent a greater proportion of their lives in the wild prior to release (0.236 ± 0.323 [SD]; unsuccessful released wolves 0.117 ± 0.214 ; $n = 106$, $t = -2.186$, $P = 0.031$), and a greater number of months in the wild (6.679 ± 8.474 [SD] months; and unsuccessful released wolves 3.088 ± 6.2225 ; $n = 106$, $t = -2.369$, $P = 0.020$). Successful wolves were older at the time of release (3.111 ± 1.765 years) than unsuccessful animals (2.217 ± 1.739 , $n = 106$, $t = -2.35$, $P = 0.022$). Similarly, successful wolves spent more time in captivity (2.731 ± 1.660 years) relative to unsuccessful (1.991 ± 1.706 , $n = 106$, $t = -2.35$, $P = 0.022$). However, the last result is likely because years in captivity and age were highly correlated ($r = 0.956$) and age was believed to be an overriding influence. All other significant variables were not highly correlated ($r < 0.70$), and thus only years in captivity was removed from the model-building process. All other variables had no significant effect on the successful release of Mexican wolves and were excluded from the model-building process (all $P > 0.10$).

Logistic regression analysis determined the top candidate model included status of the wolf, the proportion of the released wolf's life spent in the wild, and year of release as dependent variables (Table 2). There was also support for models with state, season of release, and age dependent variables (Table 2). The top candidate model described the data ($R^2 = 0.223$), and predicted unsuccessful released animals well (specificity = 0.804). However, the model did not predict successfully released animals as well (sensitivity = 0.454).

Reproduction and Population Growth

We estimated the Mexican wolf population within the BRWRA grew from 4 in 1998 to 55 in 2003 (Table 3). Initially (1998-2001), this growth came primarily through reintroductions. From 2002-2003, reproduction has been the primary factor influencing growth (Table 3). At the end of 2003, 25 radiocollared wolves were free-ranging within the BRWRA. There were also approximately 12 uncollared subadult wolves and ≥ 20 pups documented by the end of September (Table 3). During 2003, the population consisted of 13 packs (i.e. two or more wolves

traveling together), and five lone collared wolves. In 2003, seven packs (i.e. Hawks Nest, Cienega, Saddle, Bluestem, Bonito Creek, Gapiwi, and Luna) produced wild conceived and wild born litters. The number of uncollared subadults observed during a given year generally tracked the number of pups observed the previous year (e.g. the total number of pups in the wild prior to 2003 was 37, while the sum of subadults observed was 22 [Table 3]). This trend indicated that a large proportion of pups that survived until late October were likely to survive late into the following year.

The number of breeding pairs (e.g. $n = 4$ versus 10 in 2003) and pups produced (e.g. $n = 20$ versus 40 in 2003) were below the level predicted in the FEIS (Figs. 3a-3b; USFWS 1996), while the number of released, removed, and population estimates were generally at or above predicted levels (Figs. 3c-3e; USFWS 1996).

Compared with other reintroduced or recolonizing wolf populations in the United States, the rate of Mexican wolf population growth was intermediate (Fig. 4a). Similarly, the number of Mexican wolf breeding pairs lay between other expanding wolf populations (Fig. 4b). Average litter size for wild conceived and wild born pups was 2.1 pups/litter ($n = 16$, range 1-5); far less than the average litter size of 4.2 -6.9 observed elsewhere (Fuller et al. 2003). The average number of wolves per pack (packs that had been in the wild for at least one year) was 4.8 ($n = 16$, range 2-11) based on autumn estimates.

Mortality

Causes of death for Mexican wolves in the wild from 1998-2003 were largely human-related (i.e. vehicle collision [8], illegal gunshot [19], self defense [1], lethal control [1], and capture complications [1]). Other causes of death included (one each) death by dehydration, brain tumor, infection, cougar attack, and unknown. Three of the preceding deaths were documented from uncollared wolves. An adult male from the Lupine Pack was bitten by a rattlesnake. As a consequence of the bite, his neck became swollen, which likely led to asphyxiation from the radiocollar. Canine bite marks on his head were likely caused by other pack members reacting to his aberrant behavior. In addition, 5 pups died (i.e. three parvovirus, two distemper) in a captive facility following capture and removal from the wild. Out of 31 radiocollared wolves that were classified as mortalities from 1998-2003 (Table 4), 26 were human-caused, four were natural mortalities, and one was unknown cause of death. This resulted in an overall mortality rate of 0.21 (Table 4) and rates of 0.18 and 0.03 for human-caused and natural mortalities, respectively.

Loss rates (i.e. mortality and missing wolves) were predicted at 25% in the FEIS (USFWS 1996). We added mortality and missing rates to compare with this prediction, resulting in a 25% overall loss rate (Table 4). Loss rates were below the 25% level during three years (i.e. 1999, 2000, and 2002). Although loss rates were similar to the 25% loss rate predicted within the FEIS, removal rates were higher than the 10% removal rate predicted within the FEIS (Table 4; USFWS 1996). Thus, the overall mortality/removal rate was also much higher than that predicted in the FEIS (Table 4; USFWS 1996). However, the FEIS also anticipated that 5 of the 15 wolves released each year (1998-2002) were expected to die or be removed relatively quickly and did not incorporate these removals/deaths into the overall estimate. By including these 5 removals in the

overall removal rate (as we did in Fig. 3d), the overall annual removal rate was 22%. Thus, for comparison with our data (we included data on removal and survival regardless of the timing of the event relative to releases), the removal/mortality level predicted in the FEIS was 47% (USFWS 1996). The removal/mortality level observed in the wolf population was higher (64%) than that predicted by the FEIS (Table 4; USFWS 1996).

The greatest single cause of removal was wolves moving outside the recovery area (Fig. 1, Table 5). Further, this is the only removal cause that did not decrease over time (Table 5). Predictably, nuisance and other removals (e.g. generally to pair with a new mate) decreased over time (Table 5).

Cox's proportional hazard models (Cox and Oakes 1984) ($n = 185$ observations, 33 failures, and 33,415 radio days) identified three variables that may be important in predicting which wolves become mortalities: year, months in the wild, and proportion of the wolf's life spent in the wild. Year differences were a result of high mortality during 1998. All other years appeared similar and reduced the hazard rate relative to 1998 (1999: 0.237, -1.71, 0.087, 0.046-1.230 [hazard ratio, z , P , 95% confidence ratio]; 2000: 0.268, -1.95, 0.051, 0.071-1.005; 2001: 0.285, -2.11, 0.035, 0.089-0.914; 2002: 0.116, -2.89, 0.004, 0.027-0.500; 2003: 0.352, -1.86, 0.062, 0.118-1.05). The greater amount of time spent in the wild (0.964, -1.76, 0.078, 0.926-1.004 [hazard ratio, z , P , 95% confidence ratio]) and the greater proportion of a wolf's life spent in the wild (0.301, -1.87, 0.061, 0.086-1.057) also reduced the hazard rate in univariate model building analysis. All other variables did not affect the hazard rate (all $P > 0.15$).

Similarly, Cox's proportional hazard models (Cox and Oakes 1984) ($n = 185$ observations, 58 failures, and 33,415 radio days) identified the same three variables that may be important in predicting which wolves succumb to removal. Year differences were a result of high removal during 1998, 1999, and 2000. Thus, the hazard rates relative to 1998 were: (1) 1999: 0.714, -0.58, 0.561, 0.230-2.222 [hazard ratio, z , P , 95% confidence ratio]; (2) 2000: 1.197, 0.38, 0.702, 0.477-3.004; (3) 2001: 0.398, -1.73, 0.084, 0.140-1.131; (4) 2002: 0.307, -2.11, 0.035, 0.102-0.919; (5) 2003: 0.409, -1.74, 0.081, 0.150-1.117). The greater amount of time in the wild (0.962, -2.41, 0.016, 0.933-0.993 [hazard ratio, z , P , 95% confidence ratio]) and the greater proportion of a wolf's life spent in the wild (0.478, -1.70, 0.089, 0.205-1.118) also reduced the hazard rate in univariate model building analysis. All other variables did not affect the hazard rate (All $P > 0.24$).

Depicting survival rates across the landscape ultimately produced a checkered pattern of source-sink areas within and outside the reintroduction boundary (Fig. 5). A total of 218 1:24,000 quadrangles (quads) contained a minimum of one aerial location from 1998-2003. The majority (77%, $n = 168$) of these quads were sources, however, 65% ($n = 109$) of these source quads were based on data insufficient for full evaluation (radio days <30). The remainder of quads ($n = 50$) were considered sinks due to various causes (Fig. 5). However, a proportion of sink quads were also based on data insufficient for full evaluation ($n = 22$).

Dispersal

Collared wolves ($n = 45$) functioned in the wild as individual wolves either immediately following release ($n = 32$) or through natural dispersal ($n = 13$). Only 8 (5 following release and 3 natural dispersal) of these animals were ultimately successful (i.e. bred and produced pups in the wild). The majority of single wolves (60%) died ($n = 12$), or were removed for being outside the boundary ($n = 15$). Other fates of single wolves included removal for nuisance ($n = 5$) and cattle depredations ($n = 1$), wolves still alive but had not bred ($n = 2$), and missing wolves ($n = 2$). Three of the successful dispersing animals were ultimately removed. The majority of single wolves (68%) were outside the boundary for at least one location ($n = 31$ out of 45), even if they were not necessarily removed for this cause. Movement distances were similar between natural dispersal and movements following release ($t = 1.211$, $P = 0.233$), thus these two groups were pooled to analyze movements. Movement distances for lone wolves averaged 87 ± 10 km (54 ± 6 mi). Movement distances were similar between male and female wolves ($t = -0.951$, $P = 0.347$, $n = 44$). Neither sex was more prone to display lone movements relative to the released population ($\chi^2 = 0.207$, $P = 0.649$, $df = 1$). Wolves primarily dispersed in a northwest or southeast direction (51%), which was the same direction as the mountain ranges in the BRWRA (Fig. 6). Not surprisingly, yearlings were more prone to disperse than adults relative to the released population ($\chi^2 = 8.391$, $P = 0.004$, $df = 1$).

Predation

From 1998-2003, the IFT documented 72 confirmed or probable native ungulate kills made by wolves. In addition, wolves were documented to feed or scavenge on 28 native ungulates killed by other predators, hunters, vehicles, or natural causes. Of the 72 confirmed or probable kills, 90% ($n = 65$) were elk, indicating a strong preference for elk relative to ungulate species available (32% elk, and 68% deer [$\chi^2 = 116.192$, $P < 0.001$, $df = 1$]). Mexican wolves also killed mule deer ($n = 4$), white-tailed deer ($n = 1$), and bighorn sheep ($n = 2$). However, it was unknown if this preference for elk was simply a function of prey size (e.g. larger elk being easier for the IFT to find than deer due to consumption rates), or alternatively a 'true' selection. Further, areas used by wolves appeared to be in high-density elk areas on a state game management unit scale. Prey availabilities on a local scale were not available.

Wolves selected for calf elk within the population (39% and 23% of kills and population, respectively), and selected against cow elk (47% and 60% of kills and population, respectively), while bulls were selected similar to availability (14% and 17% of kills and population, respectively; $\chi^2 = 5.098$, $P = 0.078$, $df = 2$). This trend would likely be more significant if systematic locations of ungulate kills were more prevalent during the study because wolves appear to be selecting for smaller prey (e.g. calves that are presumably harder to locate) and against larger prey (e.g. cow elk). The preference for elk relative to deer was supported by a recent scat study (Reed 2004).

Adult wolves lost mass between subsequent captures in the wild ($\bar{x} = -1.025$ kg [-2.260 lbs], $n = 40$). This pattern was significantly different from the pattern observed in captivity where wolves gained weight ($\bar{x} = 0.519$ kg [1.146 lbs], $t = -2.647$, $P = 0.009$, $n = 139$). However, weight loss between captures of wild wolves was not significantly different from 0 ($t = -1.705$, $P = 0.096$, $n = 40$). Both of these results were influenced by two wolves (M190, F189) from the same pack

that lost 15.9 kg (35 lbs) and 8.39 kg (18.5 lbs) soon after release. After removal of these outliers, the difference between wild and captive wolves weight change was not significant ($t = -1.599$, $P = 0.112$, $n = 129$). Further, when these two wolves were removed from the sample the difference from 0 for weight loss of wild wolves was further obscured ($t = -0.994$, $P = 0.327$, $n = 38$).

Depredations

There were 89 reported incidents within the WS database between 1998 and 2003. Average response time to investigate complaints was 23 hours (12 hrs min, 120 hrs max). Cattle killed (i.e. confirmed, probable, possible) by wolves from 1998-2003, consisted of one bull, 12 cows, and 24 calves (Table 6). Also, 6 dogs, 4 horses, and 5 cattle were confirmed injured by wolves, and 3 additional cattle possibly injured by wolves. Twenty two wolves were removed or translocated as a result of livestock depredations. Thus, 1 wolf was removed for every 1.18 confirmed depredations.

WS personnel also investigated livestock kills not related to wolf depredation. These included nine accidents, six feral dogs, three black bears, five coyotes, one domestic hybrid wolf, two cougars, and one unknown causes not related to wolves. Depredation rates (per 100 wolves) on cattle varied from year to year, but were always within the 1-34 range predicted in the FEIS (Table 7; USFWS 1996). There was no clear trend in the data, but 2003 had one of the lowest depredation rates observed during the six years (Table 7). Five of 18 wolves translocated following depredations (not necessarily removed for depredations, but had previously depredated) ultimately depredated again before the end of 2003. In contrast, 39 of 83 (47%; released and radiocollared in the wild and never translocated) wolves caused at least one confirmed depredation (injury or kill). Further, 9 of 17 known-fate wolves (53%) translocated following depredations ultimately bred and reproduced in the wild. This rate exceeded the overall release success of 26%, as well as translocation success rate (37%).

Human/Wolf Interactions

We documented wolves displaying limited fear of humans on 33 occasions. The majority of these were considered investigative searches (64%) in which wolves did not approach people, but simply ignored their presence (Appendix I). Most other cases were considered investigative approaches (27%) where the wolf approached a human in a non-threatening manner. Three charge incidents (9%) occurred where wolves were more aggressive. In all of the charge incidents and most of the investigative approaches (5 out of 9), dogs were involved, and these cases were considered provoked. Similarly, most of the investigative search cases involved dogs (12 of 21) and were considered provoked. Of the 12 non-provoked incidents where wolves displayed a lack of fear of humans, six involved wolves or a wolf considered habituated (Appendix I). One involved a carcass hanging in a deer camp that the wolves fed on, and another was an unknown large canid (a wolf or large dog). Two other incidents involved people encountering wolves while riding horses, followed by a brief interaction.

Overall, nine wolves were removed due to human nuisance behavior on 11 occasions. Human-nuisance removal rates declined after 2000 (Table 5). Further, 23 of the 33 known wolf incidents occurred within three months of initial release or translocation of the animal, including all of the aggressive charges, and all of the non-provoked cases. Of the remaining nine cases, seven involved domestic dogs, one was unknown if dogs were present, and two were the result of unverified wolf reports.

In 20 of the 33 cases, aversive conditioning and/or removal was applied in an attempt to prevent recurrence of the behavior. On several occasions ($n = 6$) aversive conditioning may have contributed to the ultimate success of the wolves with minimal future problems (See Appendix I).

Genetics

Two Mexican wolf hybrid litters totaling 13 pups ($n = 7$ and $n = 6$) have been confirmed since the onset of reintroduction. Both litters resulted from a female Mexican wolf breeding with a male dog. The first wolf (628) was born in the wild and the second (613) was born in captivity. The first incident occurred in 2002 and involved 628 which had been traveling with a male wolf. The second incident occurred in 2005 (although this incident occurred outside the scope of the 5-Year Review, it is included because of its relevance to the discussion) and involved lone 613 which bred with a feral dog. Both hybrid litters were promptly discovered while the pups were still den-bound and were humanely euthanized. Genetic testing verified hybridization had occurred in both litters.

DISCUSSION

Home Ranges

Wolf home range size differences across their geographic range appear to be principally related to prey abundance or biomass (Keith 1983, Fuller 1989, Fuller et al. 1992, Fuller et al. 2003). Specifically, home range size and area/wolf likely relate to the amount of vulnerable prey biomass available to wolves, and thus are also possibly related to prey species (Fuller et al. 2003). Eighteen Mexican wolf packs established territories between 1998 and 2003, totaling 39 pack years, and averaging $462 \pm 63 \text{ km}^2$ (SE), or $182 \pm 24 \text{ mi}^2$. The average home range size of Mexican wolves most closely resembled moose (*Alces alces*) dependent gray wolf packs studied in the north (see table 6.3 in Fuller et al. 2003, and table 1 in Fuller and Murray 1998). However, home range size was smaller than that of other reintroduced populations that principally preyed on elk in central Idaho, and the Greater Yellowstone Area (Oakleaf 2002). The large territories in these areas and in the Mexican wolf population may reflect wolf populations that are not subject to density-dependent constraints, or alternatively a general pattern for wolf packs relying primarily on elk (Oakleaf 2002). Further, the spatial distribution of elk may require wolves to maintain a larger home range to encompass sufficient summer and winter ranges of elk. More importantly, however, Mexican wolves have successfully established and maintained home ranges, regardless of size, within the BRWRA.

Releases

Release success was limited with our population (26% success), particularly for wolves released directly from captivity (18%). These success rates were similar for red wolves (*Canis rufus*) (21%; Phillips et al. 2003), but less than those for gray wolves in Idaho (68%) and Yellowstone (77%; Fritts et al. 2001). Similar to Fritts et al. (2001) and Phillips et al. (2003), release success did not depend on the type of release (i.e. hard release, soft release, or modified soft release). However, similar to other studies, hard releases tended to produce more movement and less pack cohesiveness relative to soft release strategies (Bangs et al. 1998, Fritts et al. 2001).

Our model-building efforts identified 3 primary variables that predicted successful and unsuccessful release efforts: (1) status of the animal (breeder, subadult, or pup), (2) proportion of the released wolf's life spent in the wild, and (3) year of the release). Red wolves also had reduced success among pups released (Phillips et al. 2003).

Perhaps most importantly, the proportion of the wolf's life spent in the wild influenced success, with wolves with a greater proportion of time in the wild being more likely to survive and reproduce. Again, this result was similar to that observed in red wolves (Phillips et al. 2003). This result likely also influenced the increased success of translocated wolves relative to initial released wolves, and the increased success of wolves released in New Mexico (only translocated animals) relative to Arizona (translocated and initial released wolves). This variable might also relate to the increased success of released wolves in Yellowstone and Idaho relative to red wolves and Mexican wolves. Other variables not modeled that might relate to the increased success of wolves in Yellowstone and Idaho include differences in cattle numbers and grazing patterns, road density, and the lack of a boundary rule. Because all wolves released in Yellowstone and Idaho were captured in the wild in Canada (Bangs and Fritts 1996, Bangs et al. 1998, Fritts et al. 2001), it was likely that these latter wolves were more adept initially to adaptation in the wild. Brown (1983) suggested use of captive stock is the biggest impediment to successful Mexican wolf reintroduction, and that wild wolves from Yellowstone or Canada would be more successful in Arizona and New Mexico. However, we agree with Phillips et al. (2003) that captive wolves can contribute to establishment of a viable wild population, and as such are an appropriate source stock to reestablish wolf populations. In regard to the Mexican wolf, there is no other option; all known extant animals are of captive origin.

Reproduction and Population Growth

Population growth within the BRWRA more closely resembled patterns observed in northwestern Montana and Wisconsin than those observed in the released population in Idaho and Yellowstone. Mexican wolf pack sizes averaged 4.8 wolves, which was less than populations in other areas of North America that principally preyed on deer (5.6 wolves/pack), elk (10.2 wolves/pack), moose (6.5 wolves/pack), and caribou (*Rangifer tarandus*) (9.05 wolves/pack [see table 6.1 in Fuller et al. 2003]). Similarly, litter size was small for Mexican wolves, averaging 2.1 pups/litter, relative to other populations of gray wolves (see table 6.4 in Fuller et al. 2003). However, litter size was similar to the 2.8 pups/litter observed in red wolf populations (Phillips et al. 2003, calculated from Table 11.4).

Several competing hypotheses can be developed from these data. First, there is a strong correlation between litter size and ungulate biomass available for wolves (Fuller et al. 2003). Thus, one hypothesis is that wolves in the BRWRA may be limited by the amount of vulnerable prey. Generally, winter snow is ephemeral in the BRWRA, and elk can escape snow pack by changing elevations (USFWS 1996). Other areas where wolves have been studied are much further north where snow is more consistent and deeper across the range, and thus may have more profound effects on prey vulnerability to wolf predation (Nelson and Mech 1986, Mech and Peterson 2003, Smith et al. 2004). Thus, one would predict less vulnerable prey in winter for wolves simply as a result of weather differences between the BRWRA and other areas in North America where wolves have been studied. However, based on ungulate biomass indexes, Paquet et al. (2001) found that the BRWRA could support about 213 wolves, based solely on elk populations, and in theory up to 468 wolves, based on all ungulates. Thus, it would appear there are enough ungulates available to support more wolves than currently exist. However, it is not just prey numbers that wolves respond to, but rather vulnerable prey biomass (Packard and Mech 1980, Fuller et al. 2003).

A second hypothesis is that pack size and pup production are a result of historical adaptation within the environment. For example, Bednarz (1988) suggested Mexican wolves historically occurred in small family groups of 2-8 individuals. However, McBride (1980) reported mean litter size of 4.5 pups and a mean litter size before parturition of 6.8 pups. Further, the captive population of Mexican wolves has a mean litter size of 4.6 pups (Siminski 2003). Also, female Mexican wolves captured in the wild and returned to captivity while pregnant or shortly after whelping had a mean litter size of 4.6 ($n = 6$). Thus, it is likely that more pups are born than are observed in the wild.

The final hypothesis is that wolves released from captivity may be initially less capable of exploiting vulnerable prey, and thus have fewer surviving pups when counts are conducted. This is illustrated by the fact that Mexican wolf and red wolf populations (Phillips et al. 2003) appear to have relatively low litter sizes in the wild. In theory, we would expect to be able to test this hypothesis in the future as more wild born wolves pair and produce pups. Further, frequent management (see below) of these populations may influence the ability of these wolves to fully exploit their home range. Indeed, the two Mexican wolf packs that produced the greatest number of pups in the wild ($n = 5$) were within their respective territories for approximately 3 years prior to achieving this litter size. Data should be collected to evaluate all three hypotheses, especially the first, because of lack of information addressing these issues.

These competing hypotheses, however, do not change the overriding fact that Mexican wolves have successfully reproduced in the wild within the BRWRA. Further, the wild population of Mexican wolves has continued to increase as a result of releases, translocations, and, more recently, natural reproduction in a fashion consistent with predictions in the FEIS (USFWS 1996).

Mortality

Mortality rates of Mexican wolves were among the lowest observed relative to other wolf populations across North America (Fuller et al. 2003). However, the level of mortality that eventually leads to a declining population is likely related to the level of reproduction in the population, and whether breeding wolves are killed (Fuller 1989; Ballard et al. 1987 and 1997; Fuller et al. 2003). We found low levels of reproduction, and no differential mortality rates among age or status classes. In other words, the Mexican wolf population may still decline at lower mortality rates relative to other, more fecund, wolf populations. Further, this population is essentially a closed population with presumably no opportunity for recovery via immigration except for additional releases from captivity. Nevertheless, loss rates observed in the wild were similar to levels identified in the FEIS (USFWS 1996), and the population is increasing.

The absolute number of removals and removal rates were above levels identified in the FEIS (USFWS 1996). Further, removal rates were consistently higher than mortality rates. Thus, the dominant factor influencing an individual wolf's persistence on the landscape was not mortality, but rather removal. Some forms of removal (e.g. those caused by livestock depredations) will likely remain near current levels or vary yearly with environmental factors (Bangs et al. 1998, Mech et al. 1988), as they are a necessary part of any successful wolf-recovery program. Nuisance-related removals are declining, and likely will continue to decline as initial releases from captivity are reduced in the BRWRA (see below). Similarly, other removals (e.g. removals to pair animals, or move wolves to better locations) have dropped since the first few years of the Project, with no such removals in the last two years. Despite some removal rates dropping following the recommendations of the 3-Year Review (Paquet et al. 2001), the elevated trend in boundary-related removals (36% of all removals) remains a concern.

We agree with Paquet et al. (2001) and Phillips et al. (2003) that removal of wolves for no other cause than being outside the BRWRA: 1) increases the cost of the overall recovery program and requires that field personnel be increasingly allocated to trap individual wide-ranging wolves, 2) fosters the erroneous perception that all wolves can be contained within artificial boundaries, 3) is in direct conflict with management philosophies employed by the USFWS on other projects (USFWS 1994a, 1995), 4) excludes habitat that could enhance recovery efforts, and 5) artificially restricts natural dispersal. Dispersal behavior is vital to establishing long-term population viability through colonization of new areas (Boyd and Pletscher 1999, see below).

Cox-proportional-hazard models (Cox and Oakes 1984) identified three covariates (year, proportion of the individual wolf's life spent in the wild and absolute number of months spent in the wild) that were potentially important in reducing wolf mortality and removal rates. Two covariates (i.e. year and proportion of the individual wolf's life spent in the wild) were also retained in the release success model discussed above.

Source and sink habitat was distributed inside and outside the BRWRA. Many cases of suspect data occurred within individual 1:24,000 quadrangle areas due to the random distribution of wolf locations and therefore the number of radio days per cell was similarly uncertain. The number of suspect data cells may suggest that either: 1) we analyze the data using a larger grid size (e.g.

1:100,000 quadrangles), or 2) we interpret the current data and continue to track the changes as data accumulate within individual cells. We chose the latter option, as this is a long-term study with consistent data collection through time. Overall, there appear to be two primary sink areas; the northwest corner of the BRWRA, and the northeastern side of the BRWRA (Fig. 5). The overall pattern of source-sink dynamics within the BRWRA suggest that a large area may be required to maintain a viable population of wolves within the southwestern United States (e.g. the more sink areas identified, the larger the area needed to maintain a viable population).

Dispersal

Movement distances for lone wolves averaged 87 ± 10 km (54 ± 6 mi [SE]), with a maximum distance of 271 km (168 miles), and two other lone wolves moving >200 km across the landscape. This mean movement distance was similar to other studies conducted on colonizing wolves (see Table 6 in Boyd and Pletscher 1999). These long distance dispersers crossed interstate highways and the non-essential experimental population boundary, and persisted in various habitat types ranging from the New Mexico-Mexico border (e.g. desert habitat) to north of Flagstaff, Arizona (Fig. 6). The number of dispersals appear to be increasing (Fig. 6).

Under the Final Rule (which requires that all wolves remain within the BRWRA), few “legal” dispersals could occur. For example, if a wolf moved the average lone-movement distance (i.e. 87 km) from the geographic center of the BRWRA and the FAIR in a random direction, it would end outside the BRWRA 66% of the time. Thus, the average dispersing wolf in the ideal spot (i.e. the geographic center of the area that wolves can occupy) would still use areas outside the BRWRA 66% of the time. Indeed, single wolf movements resulted in the majority spending some time outside the BRWRA (68%).

Currently, we are documenting more dispersal by wild born wolves, as would be expected with increased pup production in recent years. Generally, wolves disperse between 1-2 years of age (Fuller 1989, Fritts and Mech 1981), although there is some variation depending on prey abundance and wolf densities (see Ballard et al. 1987 and 1997; pages 116-119 in Mech et al.; and Table 6 in Boyd and Pletscher 1999). However, as wild born wolves (i.e. the segment of the population with a decreased chance of mortality and removal) approach dispersal age, it is increasingly likely that many will ultimately disperse outside the BRWRA and will need to be removed if current rules and regulations remain unchanged.

Predation

Without human management and mortality, wolf population densities are principally related to vulnerable prey densities (Keith 1983, Fuller 1989, Ballard et al. 1997, Fuller et al. 2003). Wolves tend to kill less fit prey that is predisposed to predation in some form (Mech and Peterson 2003). Documented kills by Mexican wolves were principally elk, with calf elk preferred prey. Mexican wolf selection for calf elk was similar to other studied wolf populations (Smith et al. 2004, Husseman 2002). Selection for elk may be related to prey distribution, such that deer are more scattered across the landscape, relative to the more predictable and larger elk herds (Huggard 1993, Mech and Peterson 2003). Current research investigating winter (through

daily aerial flights, and GPS collars), and summer (through GPS collars) kill rates should allow a better evaluation of predation patterns in the future and help elucidate the overall impact of wolves on ungulates. To date, however, no detectable changes have occurred to big game populations as a result of wolf reintroduction.

Although the number of pups produced per litter is of concern (see discussion above), the majority of adult wolves maintained their weight in the wild, with two notable exceptions. There were no wolf mortalities from intraspecific strife, and we found no Mexican wolves dead from starvation. High levels of intraspecific strife or any indication of starvation would be indicative of a food-stressed environment (Fritts and Mech 1981, Ballard et al. 1997). The lack of evidence that these indicators occurred combined with a suggested wolf population level that ungulates in the area could support (Paquet et al. 2001), leads to the conclusion that there was ample vulnerable prey in the area to support wolves.

Depredations

Healthy populations of native ungulates throughout the United States have allowed wolf recovery to occur. As a consequence, the proportion of livestock lost to wolves is generally low in most areas where wolves and livestock coexist in North America, (Bjorge and Gunson 1985, Fritts et al. 1992, Bangs et al. 1998, Fritts et al. 2003, Oakleaf et al. 2003).

Fritts et al. (2003) noted that most livestock losses in previously studied areas were killed during the summer grazing season. At this time of year, wolves and livestock were often located in remote forest grazing areas (Oakleaf et al. 2003). The pattern was markedly different in the BRWRA, with many of the remote areas year-round forest grazing operations (i.e. cattle calved, raised their young, and were present in remote areas year-round), compared with summer operations in northern areas. Newborn livestock and younger calves in remote locations may be the most vulnerable segment of the cattle population (Oakleaf et al. 2003).

One hypothesis regarding the question of why wolves do not kill more livestock given the availability of relatively vulnerable animals has been that wolves react differently to livestock than to wild prey due to limited exposure of wolves to livestock (e.g. livestock are only present during a portion of the year in more northerly latitudes [Fritts et al. 2003]). If this hypothesis were correct, one would expect that where wolves and livestock coexist year-round, depredations would be greater and the number of vulnerable livestock in the area would be greater. However, confirmed depredations are currently occurring at only a slightly higher rate in the BRWRA, despite 3-4 times greater time for cattle and wolves to interact (Table 8). Thus, confirmed depredations by wolves have remained within levels identified within the FEIS (USFWS 1996).

Another pattern that is markedly different than that observed in other wolf recovery areas (see Bangs et al. 1998) is the relative success of translocating previously depredating wolves. We found that these wolves contributed to recovery and caused fewer depredations than average for the entire population. Fritts et al. (2003) suggested that typically when wolves depredate on cattle, they do not depredate again for several weeks, if at all. Even in the northern Rockies recovery area, the pattern of wolves translocated for depredations and ultimately depredating

again, was generally only observed in northwestern Montana (Bangs et al. 1998), with translocated wolves in Idaho showing far fewer repeat depredations. This pattern may relate to the ability, both in Idaho and the BRWRA, to translocate wolves into unoccupied wolf habitat free of livestock.

Human/Wolf Interactions

Overall, Mexican wolves were involved in 30 incidents of apparently fearless behavior. However, the majority of these incidents (79%) involved wolves that had recently been released and had spent limited time in the wild, with the remainder of the cases involving dogs. Similar to other areas where wolves and humans interact, aggressive behavior by wolves in the Southwest toward humans with dogs were the most frequent occurrence (McNay 2002, Fritts et al. 2003). Wolves have been documented to kill domestic dogs virtually everywhere the two coexist (Bangs et al. 1998, Fritts et al. 2003), including the BRWRA. Wolf attacks on dogs may sometimes result in a temporary loss of flight response to humans (McNay 2002, Fritts et al. 2003). In the three cases that a Mexican wolf or wolves appeared aggressive and charged toward humans, dogs were in the area and the aggression appeared to be focused on the dogs rather than the people.

As of December 2005, this Reintroduction Project has not documented, nor have there been reported, any instances in which wolves have come into physical contact with humans. However, wolves released from captivity may be more prone to initial fearless behavior toward humans, despite minimizing human contact in captivity and developing appropriate standards for selecting individual wolves to release (see Parsons 1998, Brown and Parsons 2001). Aversive conditioning and/or removal resolved all problems reasonably quickly. The paucity of documented wolf attacks in North America suggests that wolves rarely attack people there (McNay 2002). However, as the Adaptive Management Oversight Committee (AMOC) was completing the 5-Year Review, an event occurred in Canada that might be relevant to the subject of human-wolf interactions in North America. On November 8, 2005, a pack of wolves or wild dogs may have attacked and killed a man. These animals may have become habituated to humans due to a proliferation of garbage dumps associated with mines and mining exploration activities. This incident is currently under investigation and an official coroner's report is expected in January 2006. However, wolves in protected populations generally are less fearful of humans than those in exploited populations (McNay 2002). Thus, managers should continue to closely monitor initial released wolves and initiate aggressive aversive conditioning, or removal if appropriate, when wolves are near humans.

Genetics

There is no genetic evidence to date that suggests introgression with dogs or any other canids is occurring in the free-ranging Mexican wolf population. While there have been two documented hybrid incidents in the BRWRA, each litter was detected and removed from the wild before any of the offspring could potentially reproduce in the wild. Where hybridization has been known to occur (i.e. Europe), hybrid survival was typically poor and had no detectable impacts on wolf population viability or genetics (Mengel 1971, Vila and Wayne 1999). Differences in seasonality

of female estrus and male fertility between wild and domestic species may also shed light on the apparent lack of effect of isolated hybrid events. While domestic dogs of both sexes are known to breed year-round, wolf-dog hybrids retain the annual breeding cycle of their wild wolf parent; however, the timing is shifted so that the wolf-dog hybrid breeds approximately three months earlier (Mengel 1971). Mengel (1971) concluded that the phase shift in the breeding season of wolf-dog hybrids served as an effective block to introgression of dog genes into wolf populations. Therefore, even had the two litters not been detected, there likely would have been no negative impacts to the free-ranging Mexican wolf population.

We promptly discovered both hybrid litters as a result of ongoing management and monitoring. In the first incident, an entire wolf pack was in the process of being removed from the wild for depredating on cattle. Upon locating the den and removing the pups, we noticed that one pup had markings (i.e. whitish with spots) that were inconsistent with typical Mexican wolf pups, which immediately prompted genetic testing of the entire litter. When the tests determined the litter was a wolf-dog mix, the pups were humanely euthanized. In the second incident, female 613 was translocated as a single wolf near another pack's home range in January 2005, just prior to the breeding season. The pack's breeding female had previously been killed. The intent of this translocation was to create a new pair by augmenting the population with 613, a genetically important female. Although 613 was located within 3 miles of the breeding male, the two wolves were never documented together. Subsequently, 613 was seen on several occasions in an area with numerous feral dogs. When she exhibited localized denning behavior in the spring, the IFT closely monitored the den and discovered the pups had obvious dog markings. The litter was humanely euthanized.

The Final Rule identified the potential for hybridization between Mexican wolves and dogs. We will continue to monitor the genetic purity of the Mexican wolf population by genetically testing all captured wild wolves, dogs, and coyotes. In this way, we will continue to investigate genetic data and determine if introgression of either domestic dog or coyote genes has occurred in the Mexican wolf population or vice versa.

MANAGEMENT IMPLICATIONS

Many of the goals and projections described in the FEIS (USFWS 1996) have been met or exceeded. Most notably, population counts are at projected levels, with mortality lower than estimated in the FEIS (USFWS 1996). Thus, the overall Reintroduction Project is functioning at least as well as projected and should continue with some modifications. This is consistent with Recommendation 3 in the Recommendations Component of the 5-Year Review.

First, both the number of released, and the number of removed wolves have exceeded levels projected within the FEIS (USFWS 1996). These higher levels are largely a result of guidelines in the Final Rule for the BRWRA that require wolves to be removed if they establish a home range wholly outside the recovery area, or at the request of private landowners for wolves on their lands outside the recovery area (USFWS 1996). These policies conflict with normal wolf movements (see Table 6 in Boyd and Pletscher 1999), and differ from management of wolves elsewhere in the United States (USFWS 1994a, 1995). Accordingly, we recommend the USFWS

modify the Final Rule to allow wolves to expand into adjacent areas of the Mexican Wolf Experimental Population Area (Fig. 1). This step alone would greatly reduce the number of removals due to boundary violations and bring removal rates more in line with predictions in the FEIS (USFWS 1996). This is consistent with Recommendations 5, 7, and 9 in the Recommendations Component of the 5-Year Review.

Data suggest that animals living in the wild for a greater proportion of their life are more likely to be successful, and are less likely to succumb to mortality or removal. Thus, our second recommendation is that wolves with wild experience continue to be translocated after their first removal event, except in extreme situations (i.e. lethal control or permanent removal from the wild following three depredations in a one year period). This is consistent with Recommendation 9 in the Recommendations Component of the 5-Year Review.

Our third recommendation is that greater effort be placed on appropriate centralized databases. There is a need to continue improving the efficiency, reliability, and accessibility of the Project's databases. This is consistent with Recommendation 15 in the Recommendations Component of the 5-Year Review.

Finally, the Blue Range Wolf Reintroduction Project differs socially, biologically, and environmentally from other wolf recovery programs. Ample research opportunities exist to collect and compare data with more northerly and better-studied wolf populations. As such, we recommend that more research opportunities be explored and funded to provide insight into overall Mexican wolf biology and Reintroduction Project effectiveness. This is consistent with Recommendation 16 in the Recommendations Component of the 5-Year Review.

Table 1. Average 95% fixed kernel home range and 50% core use areas documented for Mexican wolves in the Blue Range Wolf Reintroduction Area, Arizona and New Mexico, 1998-2003.

| Year | No. packs | \bar{x} home range size (km ²) ^a | \bar{x} core use size (km ²) ^b | Total area occupied by packs (km ²) |
|------|-----------|---|---|---|
| 1998 | 2 | 150 | 19 | 301 |
| 1999 | 5 | 118 | 21 | 590 |
| 2000 | 5 | 575 | 71 | 2,872 |
| 2001 | 6 | 479 | 52 | 2,876 |
| 2002 | 9 | 299 | 37 | 2,691 |
| 2003 | 12 | 725 | 92 | 8,700 |

^a \bar{x} home range size was based on 95% fixed kernel estimators.

^b \bar{x} core use size was based on 50% fixed kernel estimators.

Table 2. Models supported within the analysis for successful Mexican wolf releases in the Blue Range Wolf Recovery Area, Arizona and New Mexico, 1998-2003. The dependent variable was based on 28 successes (i.e. wolves that bred and produced pups in the wild) and 78 failures (i.e. wolves that did not successfully breed and produce pups in the wild).

| Model | AIC _c | ΔAIC | w _i |
|---|------------------|------|----------------|
| Status ^a + Wild/Life ^b + Year | 113.71 | 0.00 | 0.334 |
| Status + Wild/Life | 114.64 | 0.93 | 0.210 |
| Status + Season ^c + State ^d | 115.67 | 1.96 | 0.125 |
| Age + Wild/Life + Year | 116.69 | 2.98 | 0.075 |
| Year + Status | 116.84 | 3.13 | 0.242 |
| Age + Wild/Life | 117.02 | 3.31 | 0.064 |
| Status + Season | 117.49 | 3.78 | 0.050 |
| Translocation ^e + Status | 119.25 | 5.54 | 0.021 |
| Status + Months in the Wild | 119.98 | 6.27 | 0.015 |
| Age + Season | 119.99 | 6.28 | 0.014 |
| Season + State | 120.49 | 6.78 | 0.011 |
| Year | 120.73 | 7.02 | 0.010 |

^a Status of the wolf (breeder, subadult, or pup).

^b The proportion of the wolf's life spent in the wild at the time of the release.

^c Season of release for the wolf (autumn, winter, spring, or summer).

^d State of release of the wolf (New Mexico or Arizona).

^e Either translocation or initial release.

Table 3. Minimum population estimates of Mexican wolves in the Blue Range Wolf Recovery Area, Arizona and New Mexico, 1998-2003, based on visual counts, removals, and releases.

| Year | Released ^a | Removed ^b | Mortalities | Pups ^c | Collared | Uncollared ^d | Estimate ^e |
|-------|-----------------------|----------------------|-------------|-------------------|----------|-------------------------|-----------------------|
| 1998 | 16 | 6 | 5 | 0 | 4 | 0 | 4 |
| 1999 | 23 | 12 | 2 | 8 ^f | 7 | 0 | 15 |
| 2000 | 31 | 23 | 4 | 5 | 15 | 2 ^f | 22 |
| 2001 | 21 | 10 | 9 | 3 | 18 | 5 | 26 |
| 2002 | 16 | 7 | 3 | 21 | 25 | 3 | 42 |
| 2003 | 23 | 14 | 13 | 20 | 23 | 12 | 55 |
| Total | 130 | 58 | 36 | 57 | | 22 | |

^a Based on the number of initial releases and translocations of Mexican wolves. Any animal that was captured and moved was considered a new translocation. Thus, a single wolf may have been released several times in a given year.

^b Wolves captured and moved. We considered it removal regardless of whether the animal was re-released or not. These estimates include wolves that were removed and died in captivity (not included in mortalities), animals that were lethally removed (1 in 2003, included in mortalities), and animals that died during capture (1 in 2002, included in mortalities).

^c Based on the number of pups observed in the wild as close as possible to the end of the year. Radiocollared pups (n= 7) were also included in the collared end-of-year count for 2002.

^d Uncollared subadult wolves (not pups of the year) documented by this Project as close to the end of the year as possible. These numbers do not include missing wolves.

^e Minimum population estimate for the end of the year. These numbers represented the cumulative of pups, collared, and uncollared animals observed near the end of the year for any given year.

^f Six of these pups were removed in 2000 and not counted as subadults in 2000.

Table 4. Mortality, removal, and missing rates of collared Mexican wolves in the Blue Range Wolf Recovery Area, Arizona and New Mexico, 1998-2003. The table also includes failure rate (i.e. dead, removed or missing) of wolves in the wild. All rates were calculated using the program Micromort (Heisey and Fuller 1985). The numbers in parentheses represent the number of radiocollared wolves that were removed, missing, or died during a given time frame by cause.

| Year | N ^a | Removal Rate | Mortality Rate | Missing Rate | Failure Rate |
|--------------------|----------------|------------------------|----------------|--------------|--------------|
| 1998 | 13 | 0.46 (6) | 0.39 (5) | 0.08 (1) | 0.93 (12) |
| 1999 | 14 | 0.49 (6) | 0.16 (2) | 0 (0) | 0.65 (8) |
| 2000 | 30 | 0.65 (19) | 0.14 (4) | 0.07 (2) | 0.86 (25) |
| 2001 | 31 | 0.28 (9) ^b | 0.22 (7) | 0.06 (2) | 0.56 (18) |
| 2002 | 34 | 0.26 (7) | 0.11 (3) | 0.04 (1) | 0.41 (11) |
| 2003 | 37 | 0.30 (11) ^b | 0.27 (10) | 0 (0) | 0.58 (21) |
| Total ^c | 75 | 0.39 (58) ^b | 0.21 (31) | 0.04 (6) | 0.64 (95) |

^a N represents the total number of collared wolves in the population during the full year. Some wolves had more radio days than other wolves.

^b Includes one wolf that died while being removed outside the BRWRA (2001), and one wolf that was lethally removed for cattle depredations (2003). These wolves were exclusively classified as a removal rather than both a removal and mortality. This treatment of animals is consistent with Heisey and Fuller (1985), in that individuals can only be uniquely classified as to one fate.

^c Total represents the summation of all mortality or removal events divided by the radio days and raised to the 365 power, to describe the average yearly mortality, removal, and failure rates.

Table 5. Removal rates (Heisey and Fuller 1985) of Mexican wolves within the Blue Range Wolf Recovery Area, Arizona and New Mexico, 1998-2003, by cause. Values in parentheses represent the number of radiocollared wolves that were removed during a given time frame by cause. Some wolves were translocated immediately following removal, while others were placed in captivity, or translocated at a later date.

| Year | N ^a | Removal Rate | Boundary ^b | Nuisance ^c | Cattle ^d | Other ^e |
|-------|----------------|--------------|-----------------------|-----------------------|---------------------|--------------------|
| 1998 | 13 | 0.46 (6) | 0.08 (1) | 0.15 (2) | 0 (0) | 0.23 (3) |
| 1999 | 14 | 0.49 (6) | 0 (0) | 0 (0) | 0.245 (3) | 0.245 (3) |
| 2000 | 31 | 0.65 (19) | 0.17 (5) | 0.17 (5) | 0.14 (4) | 0.17 (5) |
| 2001 | 30 | 0.28 (9) | 0.13 (4) | 0.06 (2) | 0.06 (2) | 0.03 (1) |
| 2002 | 34 | 0.26 (7) | 0.15 (4) | 0.04 (1) | 0.07 (2) | 0 (0) |
| 2003 | 37 | 0.30 (11) | 0.19 (7) | 0.03 (1) | 0.08 (3) | 0 (0) |
| Total | 75 | 0.39 (58) | 0.14 (21) | 0.07 (11) | 0.10 (14) | 0.08 (12) |

^a N represents the total number of collared wolves in the population during the full year. Some wolves had more radio days than other wolves.

^b The removal rate of wolves that moved outside of the Blue Range Wolf Recovery Area (see Fig. 1).

^c The removal rate of wolves that displayed poor behavioral characteristics and were located close to humans.

^d The removal rate of wolves that depredated repeatedly on livestock

^e Wolves removed to pair with other wolves or to relocate to a better area prior to other causes of removals being initiated.

Table 6. Number of livestock and dogs confirmed (Conf.), probable (Prob.), or possible (Poss.) killed by Mexican wolves in the Blue Range Wolf Recovery Area, Arizona and New Mexico, 1998-2003. Information from the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services database.

| Year | Cattle | | | Dog | Sheep | Horse |
|-------|--------|-------|-------|-------|-------|-------|
| | Conf. | Prob. | Poss. | Conf. | Conf. | Poss. |
| 1998 | 0 | 0 | 0 | 1 | 0 | 0 |
| 1999 | 5 | 0 | 4 | 0 | 0 | 0 |
| 2000 | 1 | 0 | 2 | 0 | 1 | 0 |
| 2001 | 5 | 0 | 3 | 0 | 0 | 0 |
| 2002 | 9 | 0 | 0 | 1 | 0 | 0 |
| 2003 | 3 | 4 | 1 | 0 | 1 | 1 |
| Total | 23 | 4 | 10 | 2 | 2 | 1 |

Table 7. Number of cattle confirmed killed by wolves, wolf population estimates, and number of cattle killed per 100 wolves in 5 states. Data represent the years 2000-2002 for all states except Arizona/New Mexico, which includes 1998-2003. We used USDA-APHIS, Wildlife Services annual reports from each state to determine the number of cattle killed by wolves. Kills were verified by specialists trained in field necropsies to determine cause of death and do not reflect those animals that were determined to be probable or possible kills.

| State/year | Cattle killed | Wolf population | Cattle killed/wolf population x 100 |
|--------------|---------------|-----------------|-------------------------------------|
| Montana 2000 | 14 | 97 | 14 |
| Montana 2001 | 12 | 123 | 10 |
| Montana 2002 | 20 | 183 | 11 |
| Montana Mean | 15.33 | 134.33 | 11 |
| Wyoming 2000 | 3 | 159 | 2 |
| Wyoming 2001 | 18 | 189 | 10 |
| Wyoming 2002 | 23 | 217 | 11 |
| Wyoming Mean | 14.67 | 188.33 | 8 |
| Idaho 2000 | 15 | 187 | 8 |
| Idaho 2001 | 10 | 251 | 4 |
| Idaho 2002 | 9 | 263 | 3 |
| Idaho Mean | 11.33 | 233.67 | 5 |
| AZ/NM 1998 | 0 | 4 | 0 |
| AZ/NM 1999 | 5 | 15 | 33 |
| AZ/NM 2000 | 1 | 22 | 5 |
| AZ/NM 2001 | 5 | 26 | 19 |
| AZ/NM 2002 | 9 | 42 | 21 |
| AZ/NM 2003 | 3 | 55 | 5 |
| AZ/NM Mean | 3.83 | 27.33 | 13.83 |

Figure 1. The Mexican wolf Blue Range Wolf Recovery Area (comprised of the primary and secondary recovery zones) and non-essential experimental population area, Arizona and New Mexico.



Figure 1. The Mexican Wolf Blue Range Wolf Recovery Area in Arizona and New Mexico.

Figure 2. Mexican wolf home ranges established from 1998-2003 in Arizona and New Mexico. Numbers represent individual packs (≥ 2 wolves traveling together) that had enough locations (>30) and movement characteristics consistent with a home range (See text on following page for description of the packs).

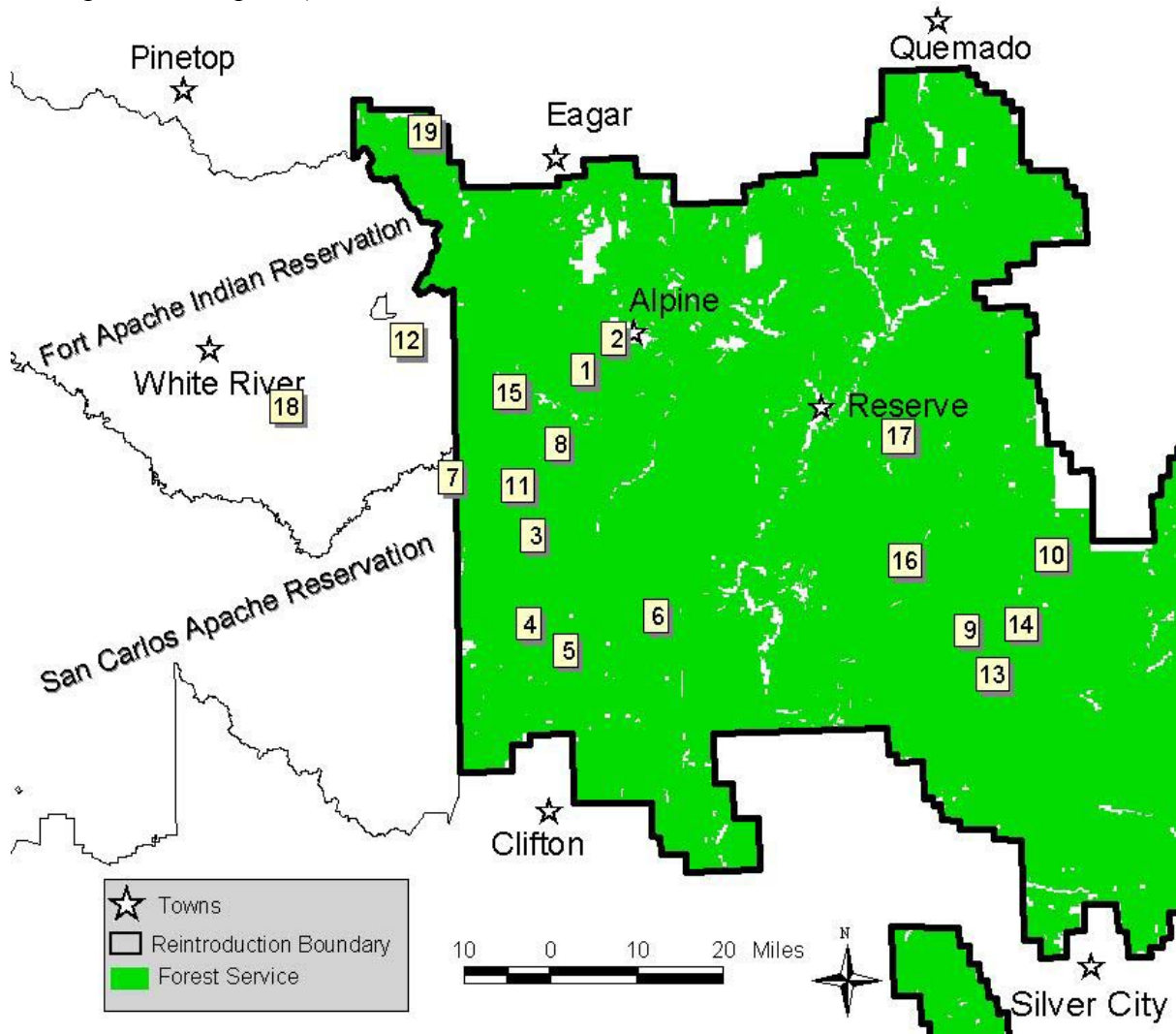


Figure 2, Continued.

| No. | Pack name | Release year(s) ^a year(s) | Home range year(s) ^b | Breeding pair in 2003 | No. wolves map |
|-----|------------------|---|------------------------------------|--------------------------|------------------|
| 1 | Hawks Nest | 1998 IR, 1998 TR | 1998-2003 | 1999, 2002-2003 | 4 |
| 2 | Campbell Blue | 1998 IR | 1998 | N/A | 0 |
| 3 | Campbell Blue II | 1998 TR, 2000 TR | 1999-2000 | N/A | 0 |
| 4 | Mule | 1999 IR | 1999 | 1999 | 0 |
| 5 | Pipestem | 1999 IR | 1999 | N/A | 0 |
| 6 | Gavilan | 1999 IR | 1999 | 1999 | 0 |
| 7 | Francisco | 2000 IR | 2000-2003A | 2000-2002 | 0 |
| 8 | Cienega | 2000 IR | 2000-2003 | 2002 | 5 |
| 9 | Mule II | 2000 TR | 2000 | N/A | 0 |
| 10 | Pipestem II | 2000 TR | 2001-2002 | N/A | 0 |
| 11 | Saddle | 2001 IR | 2001-2003 | 2003 | 8 |
| 12 | Bonito Creek | 2001 NP | 2001-2003 | 2003 | N/A ^c |
| 13 | Luna | 2002 TR | 2002-2003 | 2002 | 4 |
| 14 | Gapiwi | 2002 TR | 2002-2003 | N/A | 4 |
| 15 | Bluestem | 2002 IR | 2002-2003 | 2002-2003 | 7 |
| 16 | 729 and 799 | 2003 NP | 2003 | N/A | 2 |
| 17 | Francisco II | 2003 TR | 2003 | N/A | 1 |
| 18 | Hon-Dah | 2003 TR | 2003 | N/A | N/A ^c |
| 19 | Cerro | 2003 NP | 2003 | N/A | 0 |

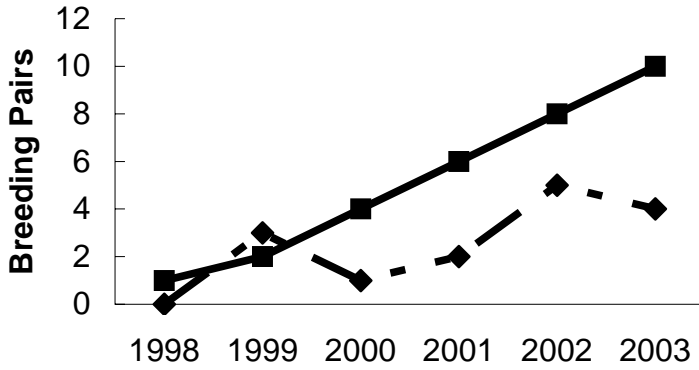
^a Represents the year that the pack was initially released from captivity (IR), translocated (TR), or naturally paired in the wild (NP).

^b Represents individual years that a pack had an adult female, an adult male and at least two pups that survived until December 31 of the year.

^c Numbers of wolves on Fort Apache Indian Reservation are not provided, at the request of the White Mountain Apache Tribe.

Figure 3. Observed (dashed line) and predicted (USFWS 1996; solid lines) Mexican wolf population trends in the FEIS (USFWS 1996).

A:



B:

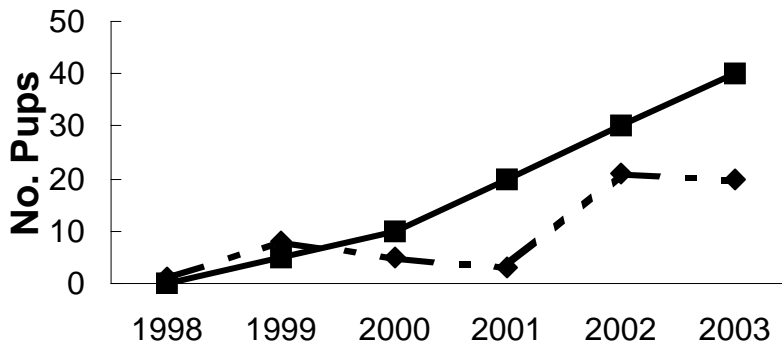
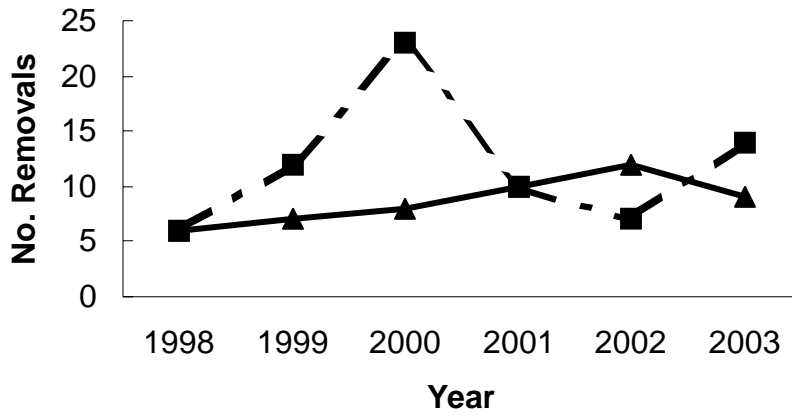


Figure 3, Continued.

C:



D:

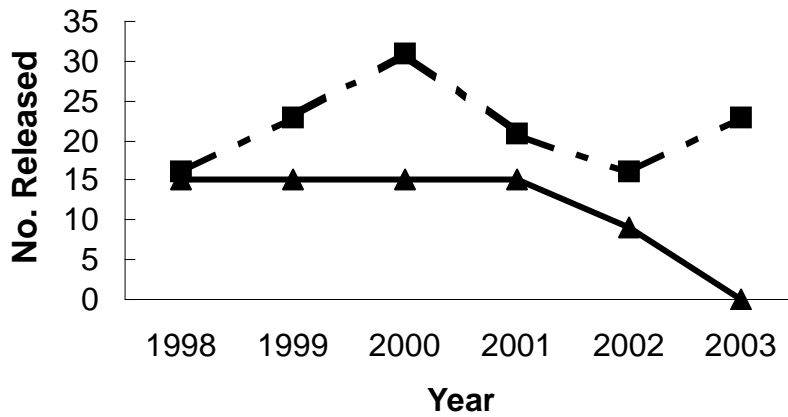


Figure 3, Continued.

E:

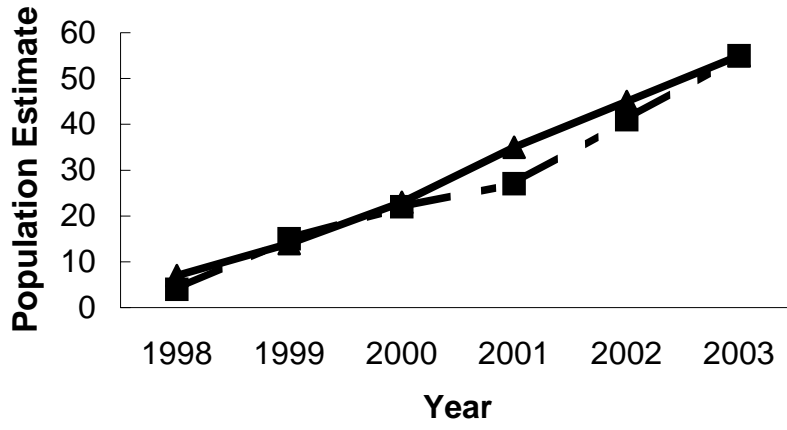
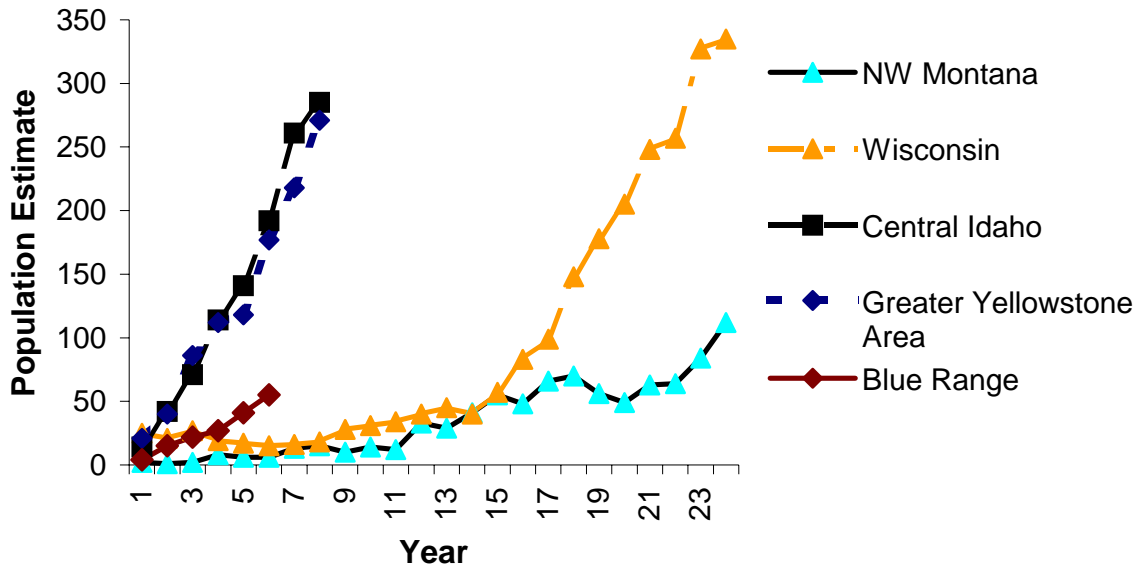


Figure 4. Population trends observed with Mexican wolf and other reintroduced or recolonizing gray wolf populations in the United States.

A:



B:

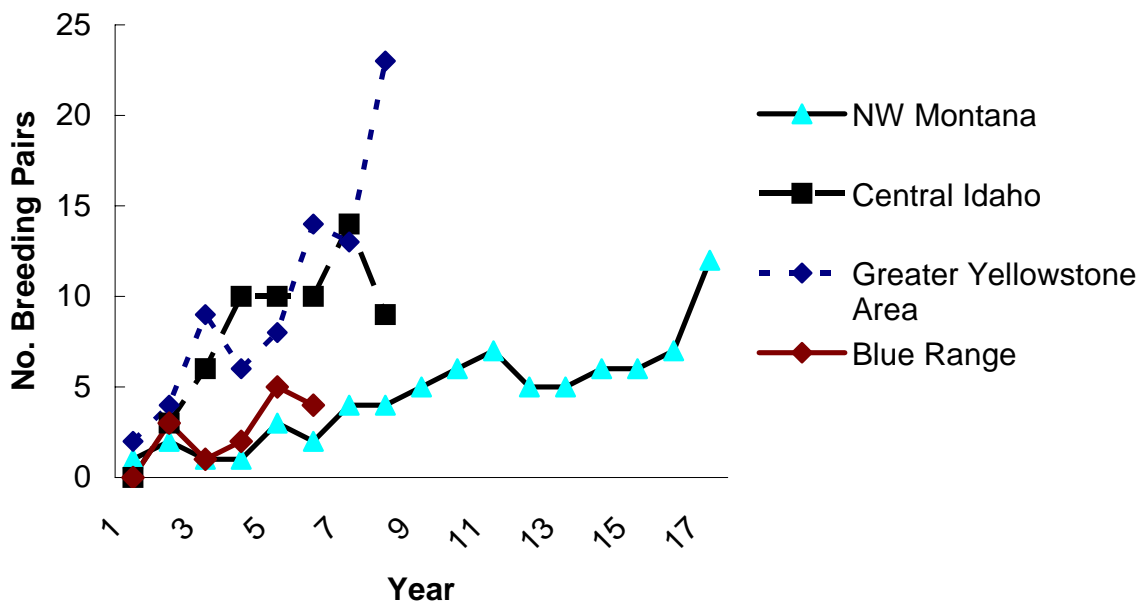


Figure 5. Source-sink dynamics of Mexican wolves in the Blue Range Wolf Recovery Area, Arizona and New Mexico, 1998-2003. Inset figures identify areas with multiple causes for sinks (see the legend in the bottom left corner).

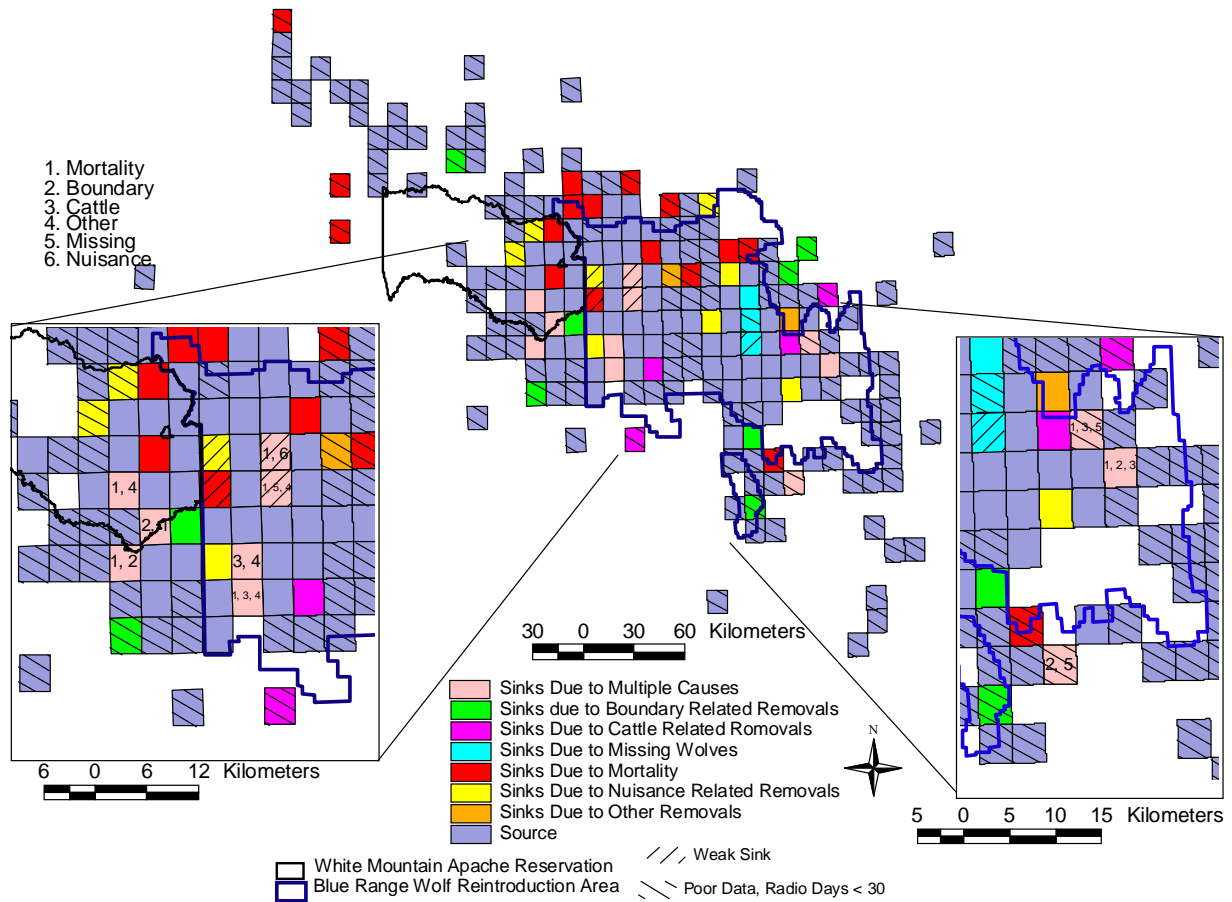
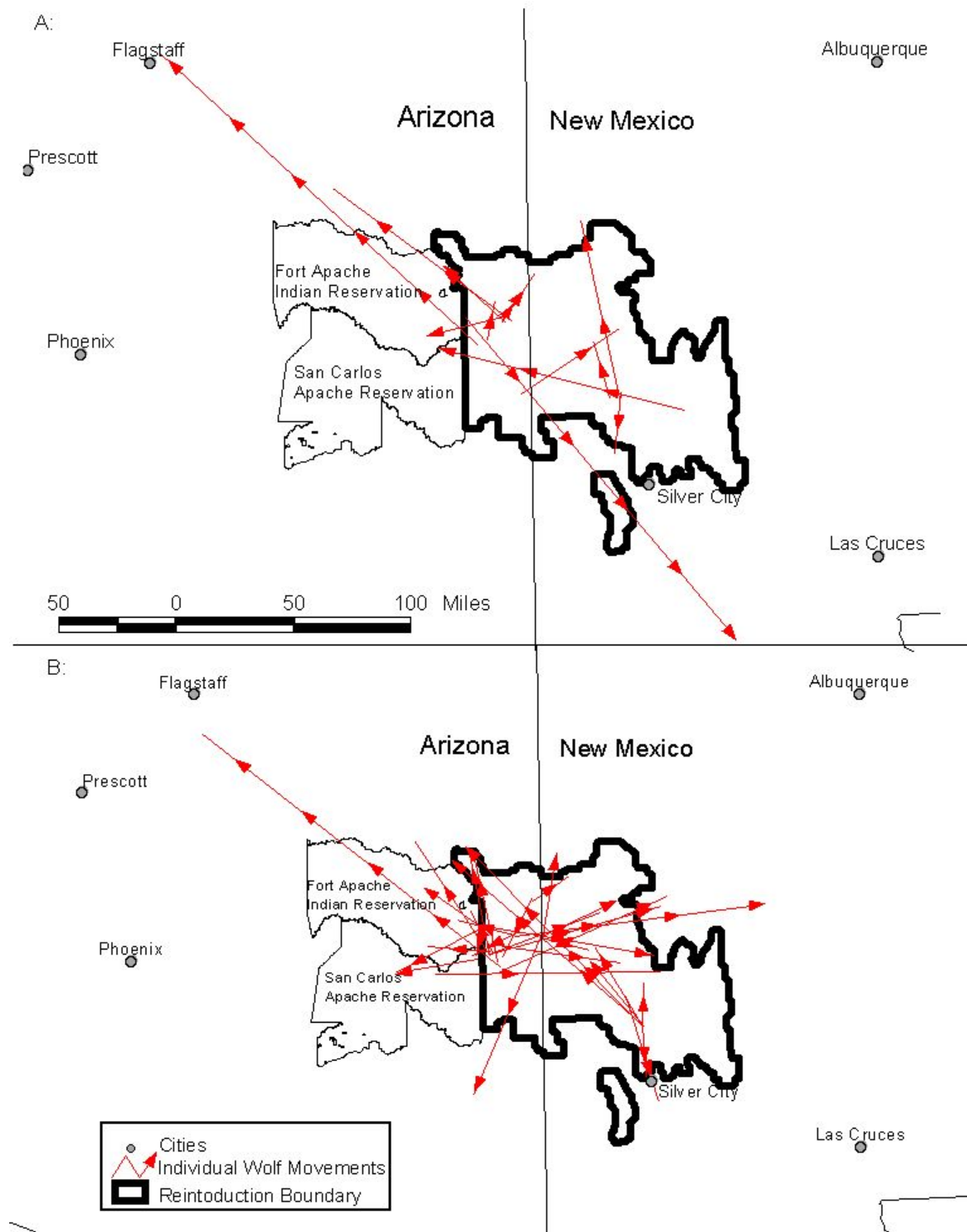


Figure 6. Movement patterns of individual Mexican wolves in the Blue Range Wolf Recovery Area from 1998-2000 (A), and 2001-2003 (B). Each line represents one dispersal/movement of a lone wolf.



APPENDIX I—Wolf/Human Interactions in the Blue Range Wolf Recovery Area, Arizona and New Mexico, 1998-2003

| Event | Date | Wolves involved | Dog presence (provoked) | Classification (bolded items indicate IFT actions) | Memo |
|-------|-------------------------|-----------------|-------------------------|---|---|
| 1 | April 28, 1998 | 156 | Yes | Charge/ Investigative approach, Dead | Wolf 156 was shot by a camper who feared for his family's safety when the wolf was in the area of their camp and attacked their dog |
| 2 | May 8, 1998 | 494 | | Investigative search, Aversive conditioning Habituated, Removed | Wolf 494 became a nuisance by frequenting the town of Alpine, Arizona, from May 8 to 28, 1998 and was permanently removed from the wild. |
| 3 | May 1999 to August 1999 | 191, 208, 562, | Yes | Investigative approach, Aversive conditioning Removed for livestock depredation | 191 (alpha female), 208, and 562 (all recently released) approached ranch house with loose dogs, dogs chased wolves, wolves chased dogs, dog was bitten. Owner ran wolves off, one wolf M208 followed owner back toward house. F191 subsequently denned and several more encounters with dogs ensued near the house. Attempts at aversive conditioning were mostly unsuccessful. All wolves removed in August due to livestock depredation. |
| 4 | January 6, 1999 | 166, 482 | | Investigative search, Food conditioning | Campbell Blue pair pulled down a deer carcass hanging in a hunter's camp |
| 5 | January 5, 2000 | 522 | Yes | Investigative search, Removed | Female 522 hung around hunter's camp and interacted with dogs. Trapped and put in acclimation pen to hold through hunting season. |
| 6 | February 6, 2000 | 522 | Yes | Investigative search, Removed | Interacted with dogs at a ranch house immediately post-release. |

| Event | Date | Wolves involved | Dog presence (provoked) | Classification (bolded items indicate IFT actions) | Memo |
|-------|-----------------|--------------------|-------------------------|---|---|
| 7 | April 14, 2000 | 166, 518 | Yes | Charge, Removed | Permittee reported an aggressive encounter with Campbell Blue pair when the female (518) bumped his horse and passed under it. Wolves also attacked one of his dogs. They followed him to a cabin and he stayed in it until the wolves left. |
| 8 | May 16, 2000 | 191, 208, | Yes | Investigative approach, Removed for livestock depredation | A female was jogging with 2 dogs when 2 wolves approached. According to the jogger, the wolves were clearly interested in her dogs and she was able to scare them away. |
| 9 | June 1, 2000 | 624 | | Investigative search. Removed | Frequented a ranch house |
| 10 | July 16, 2000 | 624 | Yes | Investigative search. Removed | Frequented a ranch and exhibited playful behavior with a dog. |
| 11 | August 20, 2000 | 509, 511, 587, 590 | Yes | Aggressive charge, Habituated, Aversive conditioning | Camper and his cocker spaniel were in the middle of a meadow behind his trailer when 4 wolves (most likely Francisco) came running out of the woods toward them. Camper fired one shot in front of the wolves but they kept coming. He fired a second shot as they got closer and they turned away. He was upset at the situation and felt that the wolves were a danger to people and animals/pets. Later that week, people camped nearby observed several wolves and pups resting in the shade under and around the camper's trailer. At the time he was inside with his dog, unaware wolves were outside. He was upset when he learned of the incident, stating that this was not the behavior of wild animals and was concerned about what would have happened had he or his dog come out of the trailer. |

| Event | Date | Wolves involved | Dog presence (provoked) | Classification (bolded items indicate IFT actions) | Memo |
|-------|-----------------|--------------------|-------------------------|---|--|
| 12 | August 24, 2000 | 511, 509, 587, 590 | | Investigative approach, Habituated, Aversive conditioning | Camper observed Francisco and Cienega packs on multiple occasions camping at Double Cienega. Sometimes they came through camp, <5 ft of him taking pictures, although the pups seemed more skittish. He saw them other times farther away within the campground or out in the meadow. |
| 13 | Sept. 25, 2000 | 590 | | Investigative search, Habituated, Aversive conditioning | Yearling male 590 frequented Double Cienega Campground most of one day. |
| 14 | Sept. 29, 2000 | 509, 511, 587, 590 | | Investigative approach Food conditioning, Habituated, Aversive conditioning | 5-6 people camped in Double Cienega from about August 21 to 30, 2000. They had interactions with Francisco Pack throughout the week. On multiple occasions campers howled them in, chased them on ATVs, left food out, and shot blunt arrows at them. The wolves also chased their horses, mules, and people on ATVs. The IFT informed them this behavior was not acceptable, and explained that what they were doing could have negative effects on the wolves' behavior. On August 30, 2100, while speaking with the hunters, an IFT member observed the wolves chasing the mules. He then hazed the wolves by running at them and throwing rocks. The wolves did not respond. We first spoke with the group on about August 23, 2000. IFT personnel informed them about the Mexican Wolf Reintroduction Project, the presence of wolves in the area, and proper behavior with respect to wolves (e.g. do not leave food out; keep an eye on mules/horses; if you see wolves, yell and throw rocks at them). We also asked them to let us know if they had any interactions with the wolves. |

| Event | Date | Wolves involved | Dog presence (provoked) | Classification (bolded items indicate IFT actions) | Memo |
|-------|-----------------|-----------------|-------------------------|--|---|
| 15 | October 1, 2000 | Unknown | | Investigative search, Food conditioning | At about 0440 hrs, the homeowner went out the front door on the porch and observed an animal in the driveway. At first he thought it was a German shepherd, then by the color and size he realized it was a wolf. He scared it away and it headed west down the road. He tried to follow it in his truck but lost track of it. When he got back to the house it was by the back door eating out of the dog dish. He scared it away again and it ran behind the house between the animal pens and the barn. He checked the dog dish and it was empty. He was not sure if there had been food in it or not. IFT personnel responded to the call made by the landowner's sister. The IFT observed large canid tracks in the driveway and yard. (track size = 5 x 3 1/2", in the sand and gravel). No other tracks were found in area. IFT personnel returned on October 2, 2000 at about 0500 hrs. |
| 16 | November 2001 | M580; Wildcat | Yes | Investigative search, Removed | Point of Pines, San Carlos Apache Reservation. Wolf frequented a residential area. There were many domestic and feral dogs in the area. The wolf was captured by helicopter. |
| 17 | Summer 2002 | Bluestem | | Investigative search, Habituated | Vicinity of PS Knoll, Apache National Forest, Arizona. Permittee was on horseback and encountered a wolf while monitoring cattle. The permittee shouted at the wolf, however the animal made no response. The wolf eventually left the area. The wolf did not approach the permittee, therefore, most likely was displaying curious behavior. Unknown if a dog was with permittee or not. |

| Event | Date | Wolves involved | Dog presence (provoked) | Classification (bolded items indicate IFT actions) | Memo |
|-------|-------------|-----------------|-------------------------|--|---|
| 18 | Summer 2002 | Bluestem | Yes | Investigative search, Habituated | Vicinity of PS Knoll, Apache National Forest, Arizona. Permittee on horseback encountered a wolf while monitoring cattle; dog present. Shouted at wolf; wolf vacated area. Wolf most likely displaying curious behavior, possibly due to the presence of the dog. |
| 19 | Summer 2002 | 637; Bluestem | | Investigative search, Habituated, Aversive conditioning | U.S. Forest Service reported a wolf walking down the Big Lake campground road, in Apache National Forest, Arizona. Project personnel located wolf f637 150 yards south of active campsites. Project personnel responded that same day and fired/hit the wolf with a rubber bullet. Wolf vacated area. |
| 20 | Summer 2002 | 637; Bluestem | Yes | Investigative search, Habituated, Removed | White River, Fort Apache Indian Reservation, Arizona. Project personnel located f637 around White River for several days. The wolf was seen traveling adjacent to residential area. Project personnel attempted to haze the wolf from these areas. Many domestic and feral dogs in area. Wolf observed interacting with resident's dog about 8 miles to the north of White River in the yard of a private residence. Wolf was captured and returned to captivity. |
| 21 | Summer 2002 | Bluestem | Yes | Investigative search, Aversive conditioning | Sprucedale Ranch, Apache National Forest, Arizona. No direct interaction between wolves and humans, but wolves were observed from the ranch headquarters. A female domestic dog with pups was present which was killed by the wolves after she attempt to chase them away from area. Project personnel intensively monitored wolves, and aversively conditioned them when located in area. Wolves eventually stayed away from ranch. |

| Event | Date | Wolves involved | Dog presence (provoked) | Classification (bolded items indicate IFT actions) | Memo |
|-------|-----------------|-----------------|-------------------------|--|--|
| 22 | Summer 2002 | Bluestem | Yes | Investigative search, Habituated, Aversive conditioning | Beaver Creek Ranch, Apache National Forest, Arizona. On several occasions the wolves were in the vicinity of the ranch headquarters and cabins. No direct interaction between wolves and humans. Several dogs and horses at residence. The IFT intensively monitored and aversively conditioned wolves when located in area. Wolves eventually stayed away from ranch. |
| 23 | August 23, 2002 | Francisco | Yes | Investigative search | Four Drag allotment, Apache National Forest. Permittee was checking cattle along Malay pasture fence line with his working dogs. Permittee encountered WS and was told he could ride into the area with the dogs based on a wolf radio signal in a different direction. The dogs were released and began barking while working cattle. When a dog squealed, the permittee saw a wolf holding it by the back of the neck and shaking. The rancher yelled and the wolf let go. The rancher left with his dogs. |
| 24 | Summer 2002 | Francisco | Yes | Investigative search | Four Drag Cattle allotment, Apache National Forest hunter encountered wolves while hunting cougar in a remote area. Hunter was on horseback with a pack of hounds. The dogs got in a fight with the wolves; one of the dogs suffered extensive injuries. Hunter heard the fight, rode his horse toward the wolves, and fired a shot in the air. However, one wolf would not let go of the one hound. The other three wolves were about 50 yards away when he approached. He fired two more shots and scared the wolf away at about 10 yards. Hunter reported being in fear for the dogs but did not feel threatened himself. The wolves had a kill nearby and may have had pups in the area. |

| Event | Date | Wolves involved | Dog presence (provoked) | Classification (bolded items indicate IFT action) | Memo |
|-------|------------------|--------------------|-------------------------|--|--|
| 25 | October 19, 2002 | 584, 624; Gapiwi | Yes | Investigative approach | Chicken Coop Canyon, Gila Wilderness, New Mexico. Hunters saw two wolves near camp. Later wolves followed outfitter (on horseback) and her dogs. Hound ran at wolves, brief fight, hound came back and wolves left. |
| 26 | October 21, 2002 | 584, 624; Gapiwi | Yes | Investigative approach | On October 21, 2002, two wolves came by outfitter's camp. Meat from three elk was near camp. There were also dogs in the camp. Hunters ran out to take pictures and the wolves left. Adult pair of wolves had a rendezvous site nearby with one pup. |
| 27 | May 1, 2003 | 648 (?); Sycamore | | Investigative approach, Aversive conditioning | Near Little Turkey Creek, Gila Wilderness, New Mexico. Hunter saw a wolf on trail during middle of the day. Wolf moved toward hunter, and he threw a rock at the wolf, causing it to leave. |
| 28 | May 2003 | 592, 648; Sycamore | | Investigative search, Removed | Seventy-Four Draw, Gila National Forest, New Mexico. Young female on horseback encountered 2 wolves. Closest wolf was approximately 10 yards away, second wolf was further off and moving away from. Gun fired to scare wolf off. Wolf showed limited fear of person and gunshot, but eventually moved away. Incident lasted approximately 10 minutes. |

| Event | Date | Wolves involved | Dog presence (provoked) | Classification (bolded items indicate IFT action) | Memo |
|-------|-------------|----------------------------------|-------------------------|---|---|
| 29 | May 2003 | 592, 648; Sycamore | | Investigative search, Removed | Seventy-Four Draw, Gila National Forest, New Mexico. Wolves followed armed rancher six miles. He was on foot driving cattle down a canyon toward home. The wolves had been observed trying to kill calves in that group and the rancher chose to move them onto private land. He drove the herd of cows and was followed by the wolves for an hour. Rancher stated, "The wolves followed right behind me and kept getting closer and closer, I yelled at them and threw rocks at them, and it didn't work. When they got within 40 feet of me at that point I thought wild animals don't act like this, and because I felt threatened, I fired one round from my 30-30 over them. Their reaction was to skulk off the road and go around me and get in front of the cows again, they still showed no signs of leaving. They seemed to try and hold the cows up, just like when we originally saw them. From that point on I had trouble driving the cows and had to throw rocks over the cows trying to scare the wolves off, this continued until the vehicle the IFT member was driving came into earshot then the wolves moved up on the side of the canyon wall but still didn't leave. The IFT person was informed the wolves were right there with me and he confirmed that." |
| 30 | Spring 2003 | Unknown; Cienega Pack home range | Yes | Investigative approach | Foote Creek trail area, Apache National Forest, Arizona. Cougar hunters had wolf a follow them for approximately one mile. The hunters had several hounds with them. The wolf never approached the hunters or dogs and eventually left the area. |

| Event | Date | Wolves involved | Dog presence (provoked) | Classification (bolded items indicate IFT action) | Memo |
|-------|-----------------------------|-----------------|-------------------------|---|--|
| 31 | July 1, 2003 -July 31, 2003 | 613; Red Rock | | Investigative search, Aversive conditioning Habituated, Removed | Occurred around Aragon and Cruzville, New Mexico. Wolf near residences at Cruzville, hit with one rubber bullet, and moved to Aragon area. Sighted repeatedly near residences, no direct threats; F613 would leave area or hide when observed. Caught near residence east of Aragon after killing a turkey. Wolf caught and returned to captivity. |
| 32 | Fall 2003 | 729; Red Rock | Yes | Investigative search | Sheep Basin, Gila National Forest, New Mexico. Hunters pulled into camp at night and saw M729 confronting their two dogs, that were tied to a tree. Hunters got out of vehicle and yelled at the wolf. The wolf stared at the hunters and eventually fled from the area. No threat to human safety. Wolf was drawn into area by presence of dogs. |
| 33 | Fall 2003 | Unknown | | Investigative approach, Aversive conditioning | Dry Prong, San Carlos Apache Reservation. Based on a second hand report from a San Carlos Apache Tribe representative. A wolf approached a tribal hunting camp within 50 yards and was hanging around near the camp and was unafraid of people. The hunters tried to scare the wolf away by yelling and throwing things in the direction of the wolf, but it wouldn't leave. The hunters did not feel safe and moved their camp. |

APPENDIX II—Assessment of Blue Range Wolf Recovery Area Project Evaluation Questions Identified in the 1998 Mexican Wolf Interagency Management Plan (Parsons 1998)

The 1998 Mexican Wolf Interagency Management Plan identified nine questions to serve as the foundation for the 3-Year and 5-Year Reviews. Each question was analyzed in a scientific manner and discussed in the body of the Technical Component of the 5-Year Review. However, for ease in evaluating the nine questions, they are also addressed separately, below. Note that two of the questions (i.e. Is effective cooperation with other agencies occurring? Are combined agency funds adequate?) are addressed in the Administrative Component of the 5-Year Review. Two additional questions (i.e. Have sinks been identified? Have any sources of mortality been higher than expected?) identified by an AMOC cooperator have been added to this section.

1. Have wolves successfully established home ranges within the designated wolf reintroduction area?

Response: The data show that many home ranges have been established and maintained within the designated reintroduction area. Overall, 19 packs established home ranges in 39 cumulative pack years (see Table 1, and Fig. 2). However, many of these packs had a small portion of their individual home ranges outside the current reintroduction boundary.

2. Have reintroduced wolves reproduced successfully in the wild?

Response: Reintroduced wolves have successfully produced pups in the wild. Most of the successful reproduction from 1998-2003 was documented in 2002 and 2003. Overall, 16 packs produced wild-conceived and wild-born pups. Average litter size, however, was below that observed in other wolf populations in the United States and the projections in the FEIS (USFWS 1996) (Fig. 3).

3. Is wolf mortality substantially higher than projected in the FEIS?

Response: Wolf loss rates (i.e. mortality plus missing rates) were similar to estimates identified in the FEIS (USFWS 2003). However, removal rates were higher than mortality rates and were the dominating processes influencing the population (see Tables 4 and 5). Combining removal, missing, and mortality rates to form a failure rate (e.g. wolves that did not persist on the landscape) indicated that overall levels were higher than predicted in the FEIS (see Tables 4 and 5).

4. Is population growth substantially lower than projected in the FEIS?

Response: Projected population growth and current population are very similar (Fig. 3). However, releases are also higher than projected in the FEIS (USFWS 1996) (Fig. 3), thus the population is likely artificially high.

5. Are numbers and vulnerability of prey adequate to support wolves?

Response: This is a difficult question to analyze because of the difficulties in quantifying levels of vulnerable prey within the overall prey populations. Different measurements produce different results. For instance, the small number of pups per litter suggest that prey might be limiting within the population (see the Reproduction and Population Growth section of the Discussion). Other matrices indicate the level of available and vulnerable prey is adequate (e.g. number of wolves predicted by Ungulate Biomass Index, weight loss indexes, and the level of intraspecific strife). Overall, it appears there is an adequate natural prey base for Mexican wolves within the BRWRA.

6. Is the livestock depredation control program adequate? (include evaluation of the number of depredations vs. number projected vs. other wolf programs vs. the first 3 years of reintroduction).

Response: Each of the five measures used to define a successful depredation control program indicate current methods are adequate. The number of confirmed wolf-killed cattle was within projections in the FEIS (USFWS 1996), although higher than that observed in other populations of gray wolves. This higher number of killed cattle within the BRWRA relative to other wolf populations likely relates to differing grazing regimens between areas (i.e. the BRWRA has year-round grazing, whereas other wolf occupied areas in the United States do not).

7. Have documented cases of threats to human safety occurred?

Response: No cases of physical contact between a Mexican wolf and a human have occurred during the six years of data analyzed. On three occasions, wolves behaved aggressively toward humans or the dogs that accompanied them (see Appendix I). In all three cases, wolves were within three months of initial release and dogs were present.

8. Have any sinks been identified?

Response: Sinks were scattered inside and outside the BRWRA (see Fig. 5). Two clusters of sinks occurred within the BRWRA, one each in the northwestern and northeastern corners of the BRWRA.

9. Have any sources of mortality been significantly higher than expected?

Response: Sources of mortalities are consistent with other studied populations, and were principally human-caused (e.g. illegal shootings or vehicle collisions). See also Question 3, above.

APPENDIX III—Evaluation of the Biological and Technical Recommendations Identified in the 3-Year Review Paquet Report (Paquet et al. 2001)

The following is an evaluation of the biological and technical recommendations from the 3-Year Review Paquet Report (Paquet et al. 2001), indicating the status of each recommendation as either completed, not completed, or not considered necessary to complete, and the appropriate assessments and findings.

1. Continue to develop appropriate opportunities to release (and re-release) wolves for at least 2 years to ensure the restoration of a self-sustaining population

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Releases and translocations continue to be used as management actions to ensure the restoration of a self-sustaining wolf population. Adaptive management will facilitate the continuation of these management practices as needed in the future.

Finding: This is consistent with Recommendation 3 in the Recommendations Component of the 5-Year Review.

2. Begin developing population estimation techniques that are not based exclusively on telemetric monitoring.

Status (Time Frame): Not completed (initial stages; time frame for completion unspecified)

Assessment: Staff and funding have not been available to fully implement this Recommendation. Currently, the IFT uses howling surveys, track counts, and observational data, in association with trapping/collaring, and telemetric monitoring, to obtain population estimates. A standardized system for determining population estimates still needs to be developed, and additional techniques need to be implemented or refined.

Finding: This is consistent with Recommendation 17 in the Recommendations Component of the 5-Year Review.

3. Develop data collection forms and data collection and management procedures similar to those used by the red wolf restoration program in North Carolina.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: New forms and procedures have been incorporated into Project Standard Operating Procedures (SOPs) and other procedural documents, based in part on examples from wolf projects in Minnesota, North Carolina, and the Northern Rockies.

Finding: Continues to be adaptively implemented as needs for new forms and procedures are identified.

4. Require biologists to promptly and carefully enter field data into a computer program for storage, proofing, and analysis.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: The IFT has developed, enhanced, and maintained Project databases for all essential field data, including but not limited to wolf locations, mortalities, survivorship, incident reports, depredation investigations, releases, and predation/carcass analysis. In addition, a comprehensive database documenting the chronological history for all wolves past and present, both in the wild and in acclimation facilities, has been created, and is regularly maintained for accuracy and completeness.

Finding: This is consistent with Recommendation 15 in the Recommendations Component of the 5-Year Review.

5. Make all data available for research and peer review.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Project data for research and peer review are available to individuals and entities with appropriate research proposals. Data have been made available to a graduate-level scat study, the 3-Year Review, a depredation study, an undergraduate summer intern study, and an ongoing graduate-level study on Mexican wolf predation patterns.

Finding: This is consistent with Recommendation 16 in the Recommendations Component of the 5-Year Review.

6. Carefully consider using a modified #3 soft-catch trap for capturing Mexican wolves rather than the McBride #7

Status (Time Frame): Being implemented

Assessment: The IFT considered, but decided against, using modified #3 soft-catch traps because the amount of injuries caused using McBride #7 traps was minimal, and the concern that too many wolves would be able to pull out of the #3 traps. The IFT documented wolves pulling out of McBride #7 and Newhouse #4 traps.

Finding: The question of efficacy of #3 soft-catch traps for capturing Mexican wolves has not been satisfactorily answered and will be pursued further. This is consistent with Recommendation 21 in the Recommendations Component of the 5-Year Review.

7. Encourage research that will help inform future program evaluations and adjustments.

Status (Time Frame): Completed/being implemented (initial stages; ongoing)

Assessment: The Reintroduction Project is implementing a cattle depredation study and a preliminary winter predation study in the BRWRA. In addition, a graduate-level study on wolf predation patterns was initiated in fall 2004.

Finding: This is consistent with Recommendation 16 in the Recommendations Component of the 5-Year Review.

8. Develop a contemporary definition of a biologically successful wolf reintroduction and the criteria needed to measure success.

Status (Time Frame): Not completed

Assessment: Recovery planning for the Mexican wolf was put on hold in February 2005, after an Oregon U.S. District Court judge enjoined and vacated the 2003 gray wolf reclassification rule (USFWS 2003). In December 2005, USFWS decided not to appeal the Oregon ruling. This decision re-opened the door for USFWS Region 2 to once again move forward with Mexican wolf recovery planning in the Southwest. Target deadlines for Recovery Plan development and completion will be identified once the Recovery Team resumes meeting. Criteria to measure reintroduction and recovery success will be developed in the Recovery Plan. After recovery goals have been established, the BRWRA can be evaluated relative to those goals.

Finding: This is consistent with Recommendation 33 in the Recommendations Component of the 5-Year Review.

APPENDIX IV—Evaluation of the Recommendations from the Six Working Groups of the 3-Year Review Stakeholder Workshop

The following is an evaluation of recommendations generated by the six Working Groups of the 3-Year Review Stakeholders Workshop (Kelly et al. 2001), indicating the status as either completed, not completed, or not considered necessary to complete, and the appropriate assessments and findings.

1. Create maps and reports that reflect population levels of prey base, their spatial and temporal distribution, and current and projected management objectives and direction for New Mexico, Arizona, and Mexico.

Status (Time Frame): Not completed (time frame for completion unspecified)

Assessment: Detailed information on spatial, temporal, and density distribution of prey species would be helpful, but funding and personnel restraints in all three AMOC-member Game and Fish agencies (i.e. AGFD, NMDGF, WMAT) preclude such detailed surveys. Current management objectives for ungulates within the BRWRA can be obtained from the appropriate management agency (AGFD, NMDGF, or White Mountain Apache Outdoor and Recreation Department). Projected game management objectives cannot be described at this time, because of the many variables that affect future management strategies. In Mexico, wildlife management is much more complex and less structured, due to the large amount of private land and limited financial ability of government agencies to carry out these activities. Also, neither the Recovery Program nor the Reintroduction Project has authority or jurisdiction in Mexico.

Finding: AMOC and the IFT will continue to seek innovative approaches to support and encourage the referenced State and Tribal wildlife agencies in improving the quality of prey base surveys. In addition, they will continue to use existing data sets to adaptively describe prey bases across the BRWRA in a manner that is consistent with data quality.

2. Identify wild ungulate prey base habitat enhancements to be accomplished through private property incentives programs and federal, state, tribal, and county, land management agency planning processes.

Status (Time Frame): Not completed (time frame for completion unspecified)

Assessment: This activity has not been pursued due to other higher priority management activities and a lack of planning, funding, and personnel to address this issue.

Finding: Developing a list of prey base habitat enhancements that can be employed at some time in the future, when planning, funding, and personnel permit, is consistent with Recommendation 26 in the Recommendations Component of the 5-Year Review.

3. Predation losses to be determined by cooperators and stakeholders on game species and develop definitive statements on anticipated allocations of wild ungulates to wolves and hunters.

Status (Time Frame): Not completed (partially implemented; time frame for completion unspecified)

Assessment: Intensive winter monitoring has provided minimum food consumption rates and characteristics of prey being fed on by wolves. Supporting information is gathered through the analysis of other wolf kills found opportunistically throughout the year. An ongoing graduate study on Mexican wolf predation patterns should provide further insight toward food habits of wolves. However, losses to predation will be localized and difficult to determine, without additional research focused on ungulate population dynamics. Allocating wild ungulates to predators is not currently, or planned as, a management strategy in Arizona, New Mexico, or on FAIR.

Finding: This is consistent with Recommendation 11.c. in the Recommendations Component of the 5-Year Review.

4. When livestock depredation is suspected, utilize partnerships between stakeholders to assist with increased monitoring of vulnerable livestock and local populations of wolves in order to determine if and when depredation occurs.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: When wolves are in close proximity to livestock, the IFT informs ranchers and other livestock owners of the wolf locations. In addition, when wolf territories overlap with active livestock pastures, and depredations are confirmed or suspected, livestock managers may be provided telemetry equipment to assist with monitoring of vulnerable livestock. Under these circumstances, the IFT intensifies monitoring efforts.

Finding: Additional assistance (i.e. riders, ranch-hands, monetary compensation etc.) can be acquired through Defenders proactive carnivore conservation fund.

5. Notify livestock operators when wolves are likely to den in livestock pastures and consider modifying livestock grazing use to minimize opportunities for depredation.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: This Recommendation has been implemented, with successful results, through partnerships between the IFT, livestock permittees, U.S. Forest Service, and Defenders.

Finding: The IFT, AMOC lead agencies, and cooperating organizations continue to seek innovative approaches to notifying affected livestock owners and to minimize wolf-livestock conflicts.

6. Inform livestock operators of procedures to preserve evidence of depredation and contact points to have kills confirmed.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: This information is provided to livestock operators that have wolf/livestock conflicts through personal communication.

Finding: A flyer has been developed with this information and has been distributed. The flyer needs to be revised to incorporate information contained in recently completed SOP 10.0: Incident Reporting by Other Agencies and SOP 11.0: Depredation on Domestic Livestock and Pets.

7. When wolves are confirmed to be involved in livestock depredation, apply direct control measures in an attempt to curtail depredation and monitor effects to determine if depredation reoccurs

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Intensive monitoring and direct control measures are implemented after depredations are confirmed or suspected, in accordance with protocols.

Finding: Direct control measures and circumstances for their use are described in the recently completed SOP 13.0: Control of Mexican Wolves.

8. If wolves are observed chasing/harassing livestock, utilize aggressive aversive conditioning in an effort to curtail the behavior and if these attempts fail take direct control actions to curtail the behavior or remove the offending animal or animals.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Aggressive aversive conditioning may be successful in temporarily deterring wolves from livestock in some cases. Direct control measures may be needed but other less drastic options need to be implemented before direct control (removal) of the wolves will occur.

Finding: These management responses are conducted in accordance with SOP 13: Control of Mexican Wolves. This is consistent with Recommendation 10 in the Recommendations Component of the 5-Year Review.

9. Review and refine the criteria for release site selection and timing, including: potential conflicts with previously released wolves, potential conflicts with land uses; potential conflicts with humans; potential conflicts with management priorities for other species of wildlife; desired impacts on other species (i.e. reducing populations of other predators), den-

site potential; wild ungulate prey base abundance and availability; post-release movements and dispersal potential; any other relevant biological factors; logistical feasibility; cost of field monitoring; and field project staffing needs.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: A comprehensive analysis of release site areas should increase chances of wolf survival and reproduction, and lessen impacts to current land uses and local residents.

Finding: Through adaptive management and information gained from previous releases, the release site selection process has become more refined and is likely to have increased success in the future. In addition, SOPs 5.0: Initial Wolf Releases and 6.0: Wolf Translocations address these.

10. Create a review team that includes stakeholders to identify and prioritize potential release sites within the reintroduction area (includes timing, prey base, land ownership).

Status (Time Frame): Not completed/being implemented (initial stages; time frame for completion unspecified)

Assessment: AMOC did this for the spring 2004 release proposal, through AMWG and Greenlee County AZ. This Recommendation was considered not completed because a new review team was not created to accomplish this task. In Arizona, this was done initially to identify the eight original release sites within the primary recovery area, and also on FAIR through the White WMAT planning process. Similarly, New Mexico completed this task for four initial sites selected within the Gila wilderness.

Finding: The IFT, on an ongoing basis, will continue to evaluate and propose potential release sites as identified in SOP 5.0: Initial Wolf Releases and SOP 6: Wolf Translocations.

11. Develop criteria for class of wolves to be released (individual vs. pack; male vs. female; pregnant female; old vs. young; etc.).

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Analysis of previously released wolves to determine the most successful characteristics has helped make subsequent releases more successful. However, adherence to strict criteria may not be possible, given the relatively small number of genetically surplus wolves that can be released, and other field considerations.

Finding: The IFT will use criteria developed in SOP 5.0: Initial Wolf Releases and SOP 6.0: Wolf Translocations.

12. Develop a formal supplemental feeding protocol.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Supplemental feeding is dictated by factors such as: 1) use of food caches 2) wild experience of released wolves 3) release site fidelity 4) natural prey use, etc. Flexibility must be maintained to allow for adaptive management under dynamic situations.

Finding: The IFT will follow the supplemental feeding protocol in SOP 8.0: Supplemental Feeding.

13. Review and refine all depredation management procedures and guidelines on public and on private lands.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Depredation management procedures and guidelines were reviewed and refined.

Finding: Three SOPs related to this Recommendation were approved in 2005: SOP 13.0: Control of Mexican Wolves, SOP 11.0: Depredation on Domestic Livestock and Pets, and SOP 10.0: Incident Reporting by Other Agencies.

14. Review and refine all procedures and guidelines for detecting and monitoring released wolves, radiotracking and recapture practices in proximity to livestock and elsewhere.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Procedures and guidelines for detecting, monitoring, and capturing wolves were reviewed and refined.

Finding: Nine SOPs related to this Recommendation were approved in 2005: SOP 11.0: Depredation on Domestic Livestock and Pets, SOP 13.0: Control of Mexican Wolves, SOP 15.0: Helicopter Capture and Aerial Gunning, SOP 16.0: Howling Surveys, SOP 17.0: Ground Telemetry, SOP 18.0: Aerial Telemetry, SOP 21.0: Handling, Immobilization, and Processing Live Mexican Wolves, SOP 22.0: Chemical Darting, and SOP 23.0: Blood Collection, Handling and Storage.

15. Review and refine all procedures and guidelines for translocation.

Status (Time Frame): Completed/being implemented.

Assessment: Translocation procedures and guidelines were reviewed and refined.

Finding: SOP 5.0: Initial Wolf Releases and SOP 6.0: Wolf Translocations were reviewed, revised, and approved in 2005.

16. Review and refine all criteria, procedures, and guidelines for temporary and/or permanent removal from the wild of released wolves.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Criteria, procedures, and guidelines for removal of wolves were reviewed and refined.

Finding: SOP 11.0: Depredation on Domestic Livestock and Pets and SOP 13.0: Control of Mexican Wolves were approved in 2005. Relocating wolves previously removed from the wild is recommended by the IFT, and approved by the respective agency where the release site is located. Relocating wolves is based on cause of removal, genetic profile of population, population density, and amount of breeding pairs in the wild.

17. Review and refine all procedures and guidelines for preventing, managing, or monitoring dispersal.

Status (Time Frame): Not completed (time frame for completion unspecified)

Assessment: Analysis of previously released wolves to determine the age class of most common dispersers, pack size with highest dispersal rates, and other circumstances of dispersal has allowed the IFT to better prevent, manage, and monitor dispersal. Routine aerial and ground telemetry monitoring has allowed the IFT to track dispersing wolves.

Finding: Formal procedures or guidelines have not been developed specifically for dispersal, but portions of this Recommendation are covered in various other Project documents such as: the FEIS, the nonessential experimental rule, and various SOPs (i.e. SOP 5.0: Initial Wolf Releases, SOP 6.0: Wolf Translocations, and SOP 13.0: Control of Mexican wolves). However, dispersal is a natural and desirable behavior of wolves, which facilitates natural pair formation, reproduction, and recolonization. Therefore, it is impossible to prevent and is extremely time consuming to manage dispersal behavior.

18. Review and refine all procedures and guidelines for detecting or monitoring prey use.

Status (Time Frame): Completed

Assessment: Various IFT activities are designed to document prey use (i.e. winter study, depredation study, and ongoing graduate research). In addition, wolves are intensively monitored after direct releases from captivity or when in close proximity to cattle, to determine prey use.

Finding: SOP 19.0: Intensive Winter Monitoring and Ungulate Mortality Collection outlines specific guidelines for detecting and monitoring prey use, through intensive aerial and ground monitoring.

19. Review and refine all procedures and guidelines for detecting and monitoring selection and use of den sites.

Status (Time Frame): Not completed (not considered necessary)

Assessment: Routine monitoring has detected the selection and use of most den sites; therefore, formal procedures or guidelines have not been deemed necessary by the IFT. Some den sites have been analyzed for their physical and biological characteristics.

Finding: Current procedures appear adequate for detecting and monitoring den sites and additional formal guidelines are not deemed necessary at this time.

20. Review and refine all procedures and guidelines for detecting and monitoring reproduction.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: The IFT initially documents reproduction through monitoring, observational data, localized movements during denning season, and later determines successful reproduction through den site analysis, howling for pups, and observations. The current field practices of the IFT have been very successful at determining reproduction.

Finding: Current procedures appear adequate for detecting and monitoring reproduction, but the IFT continues to look for opportunities to adaptively improve methodology.

21. Review and refine all procedures and guidelines for detecting and monitoring pup recruitment (survival past one year).

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: The IFT documents recruitment through collaring pups and tracking survival. Supplemental information is obtained by acquiring pack size and pup counts through observational reports, howling surveys, and track counts. Collaring or ear tagging pups with remote transmitters is the best way to accurately determine pup recruitment (survival past one year).

Finding: Monitoring pup recruitment is difficult, but current procedures appear adequate at this time. The IFT continues to assess and evaluate opportunities to adaptively improve methodology, however.

22. Review and refine all procedures and guidelines for detecting and monitoring availability and use of water.

Status (Time Frame): Not considered necessary to complete/implement

Assessment: Implementing this Recommendation would require intensive monitoring and research efforts beyond the current scope of the IFT. Prior to releasing wolves, the IFT considers the proximity of a release site to perennial water sources, as part of the release site selection criteria.

Finding: Creating procedures and guidelines for detecting and monitoring water availability and use has no application for the Reintroduction Project, and therefore, is deemed unnecessary.

23. Review and refine all procedures and guidelines for identifying and addressing conflicts with land uses and land users.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Conflicts with land uses and users are identified and addressed through AMOC and AMWG.

Finding: SOP 13.0: Control of Mexican Wolves was approved in 2005 and addresses approaches to mediating conflicts with land uses and users.

24. Develop procedures and guidelines for minimizing undesired and maximizing desired impacts on other species of wildlife.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Concerns over minimizing undesired and maximizing desired impacts of wolves are addressed through AMOC and AMWG.

Finding: Provisions to address this topic were incorporated into the FEIS, Final Rule, and SOP 13.0: Control of Mexican Wolves. Additional procedures and guidelines will be developed when issues arise.

25. Review the protocol for husbandry of captive pre-release wolves in on-site acclimation pens to ensure it is adequate to maximize post-release survival and breeding success.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: A husbandry protocol for captive wolves in on-site acclimation pens was developed in 1998, prior to the first release of Mexican wolves. Since the inaugural release of Mexican wolves in 1998, Project personnel have been refining methodologies used for releases to maximize post-release survival and breeding success.

Finding: This is consistent with Recommendation 27 in the Recommendations Component of the 5-Year Review.

26. Develop guidelines to ensure that Project staff solicit and consider information from all available knowledge bases (including published and unpublished sources, locally knowledgeable individuals, natural historians, academicians, agency staff, and historical as well as recent information) during Project planning and implementation.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: During development of SOPs and other Project guidelines, IFT members solicited and considered information from professionals and specialists within the field of wolf research/management, review published and unpublished documents, and research archived data within each of the respective agencies. AMOC and AMWG provide opportunities to use all available knowledge bases in other planning and implementation stages, including public/stakeholder input.

Finding: This Recommendation is consistent with Recommendations 13 and 16 in the Recommendations Component of the 5-Year Review.

27. Compile data to ensure availability of data

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Data are collected and compiled on all facets of the Reintroduction Project, including but not limited to: wolf locations, mortalities, incident reports, observation reports, depredation investigations, predation/carcass analysis, releases/translocations, acclimation facilities, and the captive breeding program. Project personnel assimilate archived data to disseminate internally among the cooperating agencies, the public, and academic entities. Information dissemination occurs through status reports, monthly updates, briefings, recommendations, proposals, and technical, professional, and general presentations. In addition, data were made available for the 3-Year Review and are gradually being released to academia for research purposes.

Finding: This is consistent with Recommendation 15 in the Recommendations Component of the 5-Year Review.

28. Develop the 5-Year Review criteria

Status (Time Frame): Completed

Assessment: Criteria were developed by AMOC.

Finding: 5-Year Review criteria are completed as supported in this document.

29. Develop the 5-Year Review process

Status (Time Frame): Completed

Assessment: The 5-Year Review process was developed by AMOC.

Finding: Development of the 5-Year Review process is completed as supported in this document.

30. Provide technical training opportunities for field staff in the broader recovery zone and other wolf projects (including Mexico) in order to standardize methods and provide quality control.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Several Reintroduction Project employees previously participated in the red wolf recovery program, the northern Rockies wolf recovery project, and the northeastern wolf recovery project. Frequent discussions with other projects and familiarity with the literature has helped ensure standardized methods and quality control. Continuing education for staff will help staff retention and make the Project more effective and efficient. Mexican interns have worked on the Mexican wolf Reintroduction Project, acquiring technical skills and exposure to policies and procedures, and developing a partnership with their United States counterpart.

Finding: This is consistent with Recommendation 28 in the Recommendations Component of the 5-Year Review.

31. Ensure that Project staff have competency in data gathering, storage, retrieval, and analysis.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Appropriate Project staff are trained and evaluated in data gathering, storage, retrieval, and analysis. On-the-job training and fulfillment of employee professional development plans provides Project personnel with opportunities to enhance and refine their ability to accomplish the aforementioned objectives. However, agencies need to provide their staff with more opportunities to acquire skills and appropriate knowledge required to perform these tasks using current scientific methodologies. Agencies should identify deficiencies through regular job performance appraisals.

Finding: This is consistent with Recommendation 28 in the Recommendations Component of the 5-Year Review.

32. Ensure that Project staff have competency in verbal and written communication skills

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Training and evaluation of all appropriate staff in verbal and written communication skills is an ongoing process.

Finding: This is consistent with Recommendation 28 in the Recommendations Component of the 5-Year Review.

33. Agency personnel should attend at least two communication training sessions annually.

Status (Time Frame): Not considered necessary to complete/implement

Assessment: Project personnel attend regular training as part of their respective professional development plans, and are also continually involved with on the job training opportunities.

Finding: Given time and funding constraints, it is considered excessive for staff to attend two communication-training sessions annually. Opportunities for in-house and on-line training will be explored.

34. Develop mechanisms to communicate and inform stakeholders, especially for local communities

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: AMOC and AMWG provide opportunities for local communities and other stakeholders to communicate directly with Project managers quarterly, within or near the BRWRA. In addition, monthly updates are posted on Project websites and disseminated throughout local communities within the BRWRA. Furthermore, livestock producers and affected members of the public are informed about wolf presence, depredations, and nuisance animals found in the vicinity of their livestock or residence.

Finding: This is consistent with Recommendations 23 and 24 in the Recommendations Component of the 5-Year Review.

35. Provide accurate bi-monthly information on FWS website by the USFWS

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: In 2003, the IFT converted bi-monthly updates into monthly updates to increase the amount of detail and depth of these reports. These reports are also accessible via the AGFD and USFWS websites. Individuals requiring immediate information on wolf locations (i.e. livestock producers and affected citizens), due to depredation or nuisance behavior, are provided appropriate information by the IFT.

Finding: This is consistent with Recommendations 23 and 24 in the Recommendations Component of the 5-Year Review.

36. Identify resources, individuals, or groups that can aid outreach activities.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: This Recommendation was implemented through development and coordination of teacher wolf workshops, in cooperation with the Information and Education Branch of the AGFD, and other organizations. Partnerships between the IFT and volunteer groups are also occurring to aid in development and dissemination of outreach materials.

Finding: This is consistent with Recommendations 23 and 24 in the Recommendations Component of the 5-Year Review.

37. Information provided in outreach programs should be balanced and objective and not designed to persuade attitudes and opinions.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: All information provided during outreach programs is evaluated for its balance and objectivity as outlined in SOP 3.0: Outreach. Recommended changes can be made through IFT staff and supervisors, public comment, AMOC, and AMWG.

Finding: This is consistent with Recommendations 23 and 24 in the Recommendations Component of the 5-Year Review.

38. Increase the sensitivity of program staff and partners to cultural differences in attitudes and values specific to the program.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Project personnel are cognizant there is a diverse array of cultural attitudes and values specific to the wolf reintroduction. Information is presented to the public in a non-biased manner and Project personnel are receptive to all questions and concerns. Understanding different cultural attitudes and values toward the Project enables the IFT and agency administrators to appropriately represent the full spectrum of public interests. AMOC and AMWG provide forums for the public and public representatives to address issues of this nature.

Finding: This is consistent with Recommendations 23 and 24 in the Recommendations Component of the 5-Year Review.

39. Scientists and administrators involved in the program need to have a high level of sensitivity to the political factors, operating at various levels, that seek to influence the program and resist purely politically motivated solutions to problems.

Status (Time Frame): Completed/being implemented

Assessment: The IFT generally attempts to resolve issues by specifically addressing solutions based on the scientific literature and overall working knowledge of specific problems. Political realities should always be a part of the IFT and AMOC decision-making process, however.

Finding: The IFT's primary role is to present the best science-based recommendations (while keeping in mind political and other considerations). AMOC's responsibility is to evaluate the recommendations and consider the socio-political context.

40. Incorporate local citizen views into the Mexican gray wolf recovery program.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: AMOC and AMWG provide opportunities for local citizen views to be incorporated into the Reintroduction Project. In addition, the Mexican Wolf Recovery Team Stakeholder Sub-Group is composed of representatives from local communities and organizations involved in development of a new Mexican Wolf Recovery Plan.

Finding: This is consistent with Recommendation 34 in the Recommendations Component of the 5-Year Review.

41. Cooperators and stakeholders develop and define measurable techniques for reducing livestock and animal conflict by the end of the 5-Year Review.

Status (Time Frame): Not completed/being implemented (time frame for completion unspecified)

Assessment: Techniques to reduce livestock and animal conflicts are described in SOP 13.0: Control of Mexican Wolves. Defenders of Wildlife coordinated discussions with Project cooperators, stakeholders, and interested parties, trying to develop an insurance compensation program for livestock depredations, which doesn't require depredations to be confirmed in order to receive monetary compensation. However, this compensation system is only a concept at present, in preliminary discussion phase. Project personnel also acquire input from stakeholders through day-to-day interactions.

Finding: This is consistent with Recommendation 12 in the Recommendations Component of the 5-Year Review.

42. Develop information dissemination network to provide current and timely information to pet owners, sporting dog owners, recreationists within occupied wolf areas.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Project briefings and signs are posted throughout the BRWRA, special notices are posted at trailheads or campgrounds, and personal contacts are made with campers, hunters, and residents when wolves are in their area.

Finding: IFT and AMOC will continue to seek innovative solutions to provide current and timely information to all users of the land within occupied wolf areas.

43. Minimize management action (e.g., capture/recapture, supplemental feeding, and removal of wolves).

Status (Time Frame): Completed/being implemented

Assessment: Management actions have been minimized through application of hazing techniques, release of family groups with pups, reductions in the number of wolves directly released from captivity, and less supplemental feeding of wolves. However, management actions will always be needed to address various reintroduction concerns.

Finding: Toward this end, a set of Reintroduction Project SOPs has been developed to guide when and how various management actions will be applied.

44. Monitor long-term disease and health trends to include a health assessment and vaccinations into wolf handling protocols to limit health and disease concerns.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Long-term disease and health trends have been and are being monitored through regular testing of wolves and blood samples.

Finding: Health assessments, vaccination tracking, and blood collection have been incorporated into SOP 21.0: Handling, Immobilization, and Processing Live Mexican Wolves.

45. Identify local misconceptions, with help of local sources of the Mexican wolf, and address them as part of the outreach plan.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Many local misconceptions were identified through the 3-Year Review public open house and workshop process. All these misconceptions were considered during development of SOP 3.0: Outreach, which is carried out by Project personnel during formal presentations and informal communication with the public.

Finding: AMOC is preparing a “myth busters” document to address the more common misconceptions dealing with Mexican wolf reintroduction. The document will be downloadable from <http://azgfd.gov/wolf> when it is completed.

46. There is a need to address the issue of livestock carcass detection and disposal to reduce wolf and livestock conflicts.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Carcasses of livestock are, when feasible and acceptable to the livestock owner(s), made unavailable to wolves by removal, rendering inedible, or on-site disposal by the IFT (however, see C/R 257 in the AMOC Responses to Public Comment Component). Carcasses on public lands that are seen during aerial telemetry flights, or discovered through regular field monitoring, are routinely disposed of or rendered inedible by the IFT, when feasible and acceptable to the permittee. Similar actions are taken by the IFT on private lands, when given permission.

Finding: This is consistent with Recommendations 12.b and 29 in the Recommendations Component of the 5-Year Review.

47. Compile and review all monitoring and recapture information collected to date on dispersing wolves to evaluate effectiveness, program costs, and impacts to landowners and other stakeholders due to current boundaries.

Status (Time Frame): Not completed (time frame for completion unspecified)

Assessment: It would be difficult, if not impossible, to split off time and expense figures for monitoring dispersing wolves. In addition, the effectiveness of the activities would be difficult to define and the impacts to landowners might be extremely difficult to quantify. However, managing wolves that establish territories wholly outside the BRWRA requires an extensive amount of resources, and limits the ability of IFT staff to pursue other field responsibilities.

Finding: This is consistent with Recommendation 13 in the Recommendations Component of the 5-Year Review.

48. Conduct a staffing need assessment based on Project experience to date.

Status (Time Frame): Completed/being implemented (2005)

Assessment: AGFD conducted a staffing needs assessment, and initiated an expansion and reorganization of the AGFD portion of the IFT to reflect roles and responsibilities, as described in the MOU. Thus, as of 2005, AGFD has 5 full-time employees assigned to the IFT. WMAT recruited a technician in 2003 to complement the existing wolf biologist position. USFWS stationed the Mexican Wolf Field Projects Coordinator in Alpine AZ, to facilitate communication between cooperating agencies and become a functional member of the IFT. NMDGF has hired an additional person for the IFT who will report for duty in early 2006. WS has assigned 2 employees to part-time duty (total 1.25 FTEs) on the IFT.

Finding: This is consistent with Recommendations 29, 30, and 31 in the Recommendations Component of the 5-Year Review.

49. Compile, review, and publish an assessment of all release program impacts reported to date on existing land uses, local customs, cultures, and economies in Arizona and New Mexico, including a determination of appropriate measures.

Status (Time Frame): Completed

Assessment: This Recommendation is addressed in the Socioeconomic Component of the 5-Year Review.

Finding: See the Socioeconomic Component of the 5-Year Review for information compiled to date on this Recommendation. This is also consistent with Recommendation 13 in the Recommendations Component of the 5-Year Review.

50. Compile and analyze all incidents involving livestock, other domestic animals, or humans to identify preventative measures and to assess the effectiveness of current management options.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: All reported incidents of wolf-livestock or wolf-human interactions during the initial stages of the Project are discussed in the Technical Component of the 5-Year Review.

Finding: Compilation and analysis of all incidents involving livestock, other domestic animals, and humans is completed as supported in this document.

51. Assess the impact of wolves on other species of wildlife.

Status (Time Frame): Not completed (time frame for completion unspecified)

Assessment: To produce valid information a study would have to extend over several years, for each species studied, requiring significant funding which has not been available. With approximately 50 wolves spread out over 2500 mi² it would be very difficult to assess with any accuracy the wolves' impact on other species of wildlife, in any specific area. Another impediment to completing this Recommendation is the lack of any defensible density data for any of the various prey species in the area.

Finding: This is consistent with Recommendation 25 in the Recommendations Component of the 5-Year Review.

52. Survey the public, academicians, and agencies to identify areas in which they believe they can appreciably contribute knowledge that is not currently reflected in the program.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: This was done through the 3-Year Review process, and continues through the activities of AMOC and AMWG, as well as, the 5-Year Review. The Recovery Team is comprised of a diverse group of people from the public, academia, and government agencies; it contributes knowledge and information that otherwise might not be as well represented in the Reintroduction Project.

Finding: This is consistent with Recommendation 34 in the Recommendations Component of the 5-Year Review.

53. Survey the public and program staff to identify information gaps, weaknesses, perceived misleading information that affect their understanding of the need for and/or quality of the program.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: This is already being done on an informal basis but could be better structured to provide more complete information to the public.

Finding: This was done through the 3-Year Review process and continues through the activities of AMOC and AMWG, as well as the 5-Year Review.

54. Collect data on aversive conditioning to identify management actions.

Status (Time Frame): Completed/being implemented

Assessment: Hazing of wolves through intensive short-term harassment usually causes wolves to move from an area temporarily or sometimes permanently. Management actions conducted by the Project revealed that aversive conditioning has greater success in smaller defined areas.

Finding: The IFT will continue to gather literature on aversive conditioning and document all pertinent data (e.g. method employed, wolf response, follow-up) when aversive conditioning is applied. These data will be used through adaptive management to evaluate, modify, and improve the efficacy of aversive conditioning actions applied to Mexican wolves.

55. Collect data on Mexican wolf food habits to quantify actual diet composition.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: A graduate student completed a Master's Thesis (Reed 2004), analyzing wolf scats to determine food habits of Mexican wolves. Intensive winter monitoring and opportunistic collection and analysis of wolf kills have also provided characteristics of prey

used by Mexican wolves. In addition, a graduate level study on wolf predation patterns is underway to further address this issue.

Finding: Innovative approaches to refine, expand, and fund Mexican wolf food habit studies will continue to be sought out.

56. Conduct a population/habitat viability analysis of the wild population in the BRWRA using modern, scientifically accepted methods, to be completed by FWS contracted experts by February 2002.

Status (Time Frame): Not completed

Assessment: A population/habitat viability analysis has not been completed for three reasons: (a) AMOC believes there is not yet sufficient demographic and other required information to conduct a robust PVA; (b) expert opinion is mixed at best on the utility of population/habitat viability analyses in “real world” management; and (c) population/habitat viability analyses are significant time and money sinks, and until both (a) and (b) have been satisfactorily resolved, AMOC will place higher priority on other facets of the Reintroduction Project, such as on-the-ground wolf management and community outreach. However, in anticipation of these problems being overcome, AMOC will collaborate with an independent entity to identify all information needs (e.g. data types and sample sizes) for a statistically valid habitat/population viability analysis for the BRWRZ wolf population to be conducted and completed in Calendar Year 2010.

Finding: This is consistent with Recommendation 32 in the Recommendations Component of the 5-Year Review.

57. Establish baseline numbers and distribution data for selected (examples) wild organisms and ecological processes by August 2002, and implement ongoing monitoring of change.

Status (Time Frame): Not completed (not considered necessary)

Assessment: This is beyond the scope of the BRWRA Reintroduction Project, and would require resources and research assets not currently available. However, AMOC encourages independent research on this and other aspects of the wolf reintroduction.

Finding: This is consistent with Recommendation 16 in the Recommendations Component of the 5-Year Review.

58. Analyze the short and long term effects of management actions on wolf behavior, social structure, and evolution.

Status (Time Frame): Not completed

Assessment: Analysis of management actions on wolves is an ongoing activity.

Finding: Data related to this Recommendation are routinely collected during ongoing IFT management activities. An objective assessment of this Recommendation will require dedicated research. This Recommendation is consistent with Recommendation 16 of the Recommendations Component of the 5-Year Review.

59. Collect and analyze all available historical information on past wolf numbers and distribution.

Status (Time Frame): Completed

Assessment: This information can be found in the FEIS (USFWS 1996) for reintroduction of Mexican wolves.

Finding: See the FEIS (USFWS 1996), Parsons (1996), and Brown (1983) for scholarly discussions of the history of Mexican wolves, including past numbers and distribution.

60. Develop a better understanding of ethical considerations related to Mexican gray wolf recovery, including the reintroduction of captive-raised predators into the wild, allowing extinction of this sub-species, and the conflicting attitudes and resulting stresses among residents of the area directly affected by wolf recovery.

Status (Time Frame): Completed/being implemented (ongoing)

Assessment: Prior to inception of the reintroduction effort, extensive deliberation occurred on whether or not Mexican wolves should be reintroduced, analyzing the ethical, biological, and socio-political implications and ramifications. Conclusions from this analysis were incorporated into the policies, rules, and regulations that govern the Reintroduction Project.

Finding: Ethical considerations are discussed and analyzed through AMOC and AMWG. Information on conflicting attitudes and resulting stresses is provided in the Socioeconomic Component of the 5-Year Review.

61. Contract an independent comprehensive economic (costs - benefits) analysis that evaluates and quantifies the potential and actual benefits and losses of the Wolf Reintroduction in the activities of the local communities. The results have to be immediately incorporated to the adaptive management in the program, the 5-Year Review and any subsequent reviews in order to maximize the benefits and minimize the costs.

Status (Time Frame): Completed

Assessment: A Socioeconomic study was conducted as part of the 5-Year Review.

Finding: See the Socioeconomic Component of the 5-Year Review for a synopsis of the best information gathered to date on cost/benefit analysis of Mexican wolf reintroduction.

62. Evaluate effectiveness of current compensation fund and implement monetary reimbursement.

Status (Time Frame): Not completed (time frame for completion unspecified)

Assessment: A sub-group from AMOC has been created to handle this issue.

Finding: This is consistent with Recommendation 12 in the Recommendations Component of the 5-Year Review.

63. Analyze behavior of wolves released to date to determine what the recovery zone boundaries should be from a biological perspective (i.e. considering denning and foraging behavior, and seasonal or other movements).

Status (Time Frame): Completed

Assessment: Data discussed in the Technical Component of the 5-Year Review reveal that present recovery zone boundaries are inadequate. Wolves are natural dispersers, traveling extensive distances in search of available home range, mates, and appropriate habitat. Since inception of the Reintroduction Project, several wolves have dispersed outside the BRWRA, and even outside the experimental population area, before localizing and establishing a home range. A few denning packs have also established territories wholly outside the BRWRA. All the aforementioned wolves were subsequently removed and relocated due to violation of the boundary rule. Further analysis is being conducted through the 5-Year Review to determine whether or not recovery zone boundaries should exist, and if so what they should be from a biological perspective. The New Mexico Game Commission has also directed NMDGF to analyze this Recommendation.

Finding: This is consistent with Recommendation 5 in the Recommendations Component of the 5-Year Review.



**MEXICAN WOLF BLUE RANGE
REINTRODUCTION PROJECT
5-YEAR REVIEW:
SOCIOECONOMIC COMPONENT**

Final Report | 31 December 2005

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EXECUTIVE SUMMARY

The 1998 Mexican Wolf Final Rule states that the U.S. Fish and Wildlife Service (USFWS) will evaluate Mexican wolf reintroduction progress and prepare full evaluations of the program after three and five years.¹ These evaluations will include recommendations of whether to continue, modify, or terminate reintroduction. The purpose of this analysis is to estimate the social and economic impacts of the Mexican wolf reintroduction effort since its inception in 1998 as part of the five-year review assessment of the program being conducted by the USFWS and cooperating agencies. This information is intended to assist the USFWS, cooperating agencies, and stakeholders in their evaluation of the reintroduction effort.

The time frame for this evaluation is the initial five-year period for Mexican wolf reintroduction, from March 1998 to December 31, 2003. However, where more recent data are available, it is included in the analysis. The study area is defined as the five counties that include lands within the Blue Range Wolf Recovery Area (BRWRA), including Catron, Sierra, and Grant Counties, New Mexico, and Apache and Greenlee Counties, Arizona. Key findings are summarized below.

Economic Impacts

The economic impacts portion of the analysis attempts to identify changes in economic activities that have occurred since Mexican wolf reintroduction began, and to quantify these changes where possible. To accomplish this, the analysis focuses on comparing the level of economic activity in various sectors after wolf reintroduction to activity levels prior to the reintroduction. The analysis then compares current estimates to estimates presented in the *Reintroduction of the Mexican Wolf Within its Historic Range in the Southwestern United States: Final Environmental Impact Statement* (FEIS).²

The FEIS estimated potential economic impacts that would occur once the Mexican wolf population reached 100. Under Alternative A, the Preferred Alternative, the FEIS estimated that impacts associated with livestock losses, reduced hunting value and associated regional expenditures, and land use restrictions near dens, pens, and rendezvous sites (minor impacts)

¹ Establishment of a Nonessential Experimental Population of the Mexican Gray Wolf in Arizona and New Mexico, 63 Federal Register 1763-1772; 50 CFR Section 17.84(k).

² U.S. Fish and Wildlife Service. 1996. *Reintroduction of the Mexican Wolf Within Its Historic Range in the Southwestern United States: Final Environmental Impact Statement*.

could occur.³ Economic benefits were estimated to include increased recreational use and associated expenditures. Impacts related to ranching and hunting activities were quantified.

This analysis finds that from 1998 to 2003, the economic impacts described in the FEIS were not realized, except for some impacts on ranching and, to a lesser extent, recreational use. The lack of observable impacts is likely to result, in part, from the relatively small wolf population within the BRWRA during this time period compared to the 100-wolf projections of the FEIS. The low estimate of impacts on ranching, represented by agency logs of confirmed wolf depredations, roughly corresponds to FEIS estimates (adjusted to the smaller wolf population). The analysis also presents estimates of unrecorded depredations based on the number of confirmed kills and rancher estimates of depredations, which are higher than the FEIS estimates.⁴ In addition to impacts on ranching, impacts on recreational use were also observed. Anecdotal evidence suggests that some individuals participated in recreational activities related to the Mexican wolf. This analysis finds that impacts to hunting participation did not occur during the study period. Hunting success rates did decline, likely due to a combination of management, weather patterns (drought), and biology-related factors. Key findings are summarized below:

Demographics: Overall, the BRWRA study area contains a high percentage of Federal lands and is sparsely populated, with a five-county study area population of 122,000 and an average population density of 4.5 people per square mile. On average, population growth in affected communities has been slower over the past decade than in Arizona and New Mexico as a whole. The majority of communities within and in proximity to the BRWRA exhibited below average median household incomes and had a larger share of their populations living in poverty than was typical for Arizona and New Mexico both in 1990 and 2000. The five counties containing portions of the BRWRA also demonstrated higher rates of unemployment than surrounding counties during both census years. However, many communities experienced an increase in median household income, a decrease in poverty rates, and a decrease in unemployment between 1990 and 2000. Effects of Mexican wolf reintroduction on demographic trends are not perceptible over the study period, as the lower population growth rates and median income, as well as the higher poverty and unemployment rates, for the most part pre-dated wolf reintroduction. Thus, these conditions are likely to be evidence of continuing long-term trends, including aging rural populations, rather than impacts of wolf reintroduction.

The FEIS was accurate when predicting that the areas in proximity to the BRWRA would not experience the same population growth from 1990 to 2000 as elsewhere in Arizona and New Mexico.

Rancher Impacts: The economies of ranching communities that utilize the BRWRA are affected by decisions that alter the uses of Federal lands. Wolves may also venture outside of the BRWRA onto private ranch lands that border the BRWRA and affect both deeded and public

³ The FEIS considered four alternative wolf reintroduction scenarios and determined that Alternative A, which includes the BRWRA, was the Preferred Alternative.

⁴ The FEIS estimates that a population of 100 wolves would be confirmed to kill between one and 34 cattle each year, but notes that additional undocumented and/or unconfirmed depredations would occur.

land ranches. Ranchers have identified a number of consequences that may result from wolf reintroduction:

- *Physical effects:* Ranch animal depredation, including cattle, sheep, horses, and dog deaths and injuries from wolf attacks; non-lethal physiological impacts on livestock, such as weight loss, stress, and lower birth rates.
- *Additional costs of livestock management:* Need to alter forage use, provide additional labor, and increase expenditures on supplies to prevent depredation.
- *Property value impacts:* Ranchers have expressed concern that disproportionately affected ranches may go out of business due to wolf depredation impacts. Additionally, ranch market value may be reduced due to wolf impacts.
- *Positive impacts:* Positive impacts could be associated with increased predation on coyotes or improved forage conditions due to less competition with elk.

To date, the primary impacts on ranching activities have been associated with depredation of ranch animals. Exhibit ES-1 presents a range of estimates of wolf depredation from 1998 to 2004.⁵ The low estimate represents the average of the agency records of confirmed kills (including records from the USFWS, USDA Wildlife Services, and the Defenders of Wildlife compensation program). The medium estimate incorporates a multiplier from published literature that estimates unconfirmed kills in addition to confirmed kills. The high estimate reflects estimates of losses due to wolf depredation provided by ranchers. These estimates range from an average of five to 33 cattle killed each year by wolves, which is less than one percent of the 34,800 cattle grazed in the BRWRA annually. The average death loss rate for cattle operations in Arizona and New Mexico from all factors was four percent in 1997, including predation by other animals, digestive, respiratory, and calving problems, disease, weather conditions, poison, theft, and unknown causes.⁶ Applying these percentages to the estimated number of livestock in the BRWRA, approximately 1,310 cattle and calves and six sheep died from causes other than slaughter in the BRWRA in 2002 (the year of highest recorded depredations), compared to 5 to 33 cattle killed by wolves. Thus, wolf predation comprises a small percent (between 0.3 and 2.5 percent) of typical cattle losses experienced annually in the BRWRA. However, some individual ranchers may be disproportionately affected.

⁵ Although the scope of this analysis is 1998 to 2003, this analysis includes readily available information for 2004.

⁶ U.S. Department of Agriculture National Agricultural Statistics Service (1999), Meat Animals Production, Disposition, and Income: Final Estimates 1993-1997. Statistical Bulletin Number 959a.

| Exhibit ES-1 | | | | | |
|--|------------------------|---------------|--------------|---------------|-------------|
| TOTAL NUMBER OF WOLF DEPREDATIONS, 1998 to 2004^a | | | | | |
| | | Cattle | Sheep | Horses | Dogs |
| Number of Kills^b | Low Estimate | 32.3 | 2.3 | 0.3 | 2.0 |
| | Medium Estimate | 181.1 | 5.4 | 3.0 | 3.0 |
| | High Estimate | 233.0 | 5.4 | 4.0 | 3.0 |
| Number of Injuries^c | | 5.0 | 0.0 | 2.0 | 1.0 |
| <p>Notes:</p> <p>^a While the scope of the five year review is from 1998 through 2003, data for 2004 are included to incorporate the most recent records of depredation.</p> <p>^b The low estimate represents the average of the Agency records of confirmed kills. The medium estimate includes a multiplier from published literature that estimates unconfirmed kills in addition to confirmed kills. The high estimate presents the estimates provided by ranchers of losses due to wolf depredation. Section 3 describes the methods used to develop these estimates in detail. Note that the medium estimate does not represent an “average” or “best” estimate; it represents one method for estimating the number of kills.</p> <p>^c The costs associated with injury estimates are applied to the low, medium, and high estimates of kills when calculating the total economic impacts to ranchers.</p> | | | | | |

Exhibit ES-2 presents a summary of the economic impacts to ranching that have occurred to date. Adjusted FEIS estimates are roughly consistent with agency logs of confirmed wolf depredations over the past five years (low estimate in this analysis). The analysis also presents estimates of unrecorded depredations based on the number of confirmed kills (medium estimate) and rancher estimates of depredations (high estimate), which are higher than confirmed agency estimates. The value of wolf-related losses is estimated at \$39,000 to \$206,000, including time to prepare claims.⁷ Of these estimated costs, \$34,000 in compensation has been paid to ranchers since 1998. The annual regional economic impact associated with uncompensated costs to ranchers is estimated to range from \$3,000 to \$99,000 (see Exhibit ES-3).⁸ This impact represents less than one percent of the \$83.9 million (2004\$) in livestock cash receipts in 2002.⁹

⁷ These estimates include data for 2004. Loss estimates for 1998 to 2003, the defined time period of the five-year review, range from \$32,000 to \$173,000.

⁸ The decreased direct regional economic output includes the direct and induced effects of lost cattle minus any compensation that ranchers received for these cattle. Production losses do not include the value of lost dogs and horses or the value of time spent by ranchers preparing compensation claims since these losses do not affect output (i.e., revenue from cattle and sheep sales). To the extent that ranchers forego investing in livestock herds because they instead spent money replacing dogs and horses or paying for additional labor, this analysis may understate actual production losses. Section 3 discusses these estimates in greater detail. Impacts are measured in terms of decreased economic output in 2002, the year in which ranchers sustained the most livestock losses.

⁹ This estimate compares the regional impacts in 2002 (the year of highest recorded depredations) with the livestock receipts in that year.

| Exhibit ES-2 | |
|--|-----------|
| TOTAL ECONOMIC IMPACTS TO RANCHERS, 1998 to 2004^a | |
| (2004\$) | |
| Low Estimate^b | \$38,650 |
| Medium Estimate^b | \$163,270 |
| High Estimate^b | \$206,290 |
| <p>Notes:</p> <p>^a While the scope of the five year review is from 1998 through 2003, data for 2004 is included to include the most recent records of depredation. Impacts include the market value of livestock and domestic animals killed by wolves, the cost of injuries resulting from wolf attacks, and the value of the time spent by ranchers to prepare claims for compensation. These values do not include (i.e., subtract out) compensation received by ranchers for these losses.</p> <p>^b The low estimate represents the average of the agency records of confirmed kills. The medium estimate incorporates a multiplier from the published literature that estimates unconfirmed kills in addition to confirmed kills. The high estimate is based on estimates provided by ranchers of losses due to wolf depredation.</p> | |

| Exhibit ES-3 | | | | | |
|---|---------------------|-------------------------------|---------------------------------|--------------------------------|--|
| ESTIMATED ANNUAL REGIONAL ECONOMIC IMPACT OF REDUCTIONS | | | | | |
| IN LIVESTOCK PRODUCTION USING 2002 DATA (2004\$)^a | | | | | |
| Livestock Loss Estimate^b | Type of Loss | Direct Effect (Output) | Indirect Effect (Output) | Induced Effect (Output) | Total Impact (Output)^c |
| Low Estimate | Output | \$1,840 | \$350 | \$390 | \$2,590 |
| | Employment | 0.0 | 0.0 | 0.0 | 0.0 |
| Medium Estimate | Output | \$34,700 | \$6,630 | \$7,440 | \$48,770 |
| | Employment | 0.7 | 0.1 | 0.1 | 0.9 |
| High Estimate | Output | \$70,530 | \$13,470 | \$15,130 | \$99,130 |
| | Employment | 1.4 | 0.2 | 0.2 | 1.9 |
| <p>Notes:</p> <p>^a Regional economic impact measures represent a one-time change in economic activity; thus, they are not additive to other estimates. These estimates represent the estimated regional economic impact from livestock losses in 2002. As 2002 was the year with the highest depredation rate, the regional impact analysis represents the upper bound of annual direct, indirect, and induced effects from 1998 to 2004.</p> <p>^b Livestock loss estimates include the uncompensated value of cattle killed by wolves in 2002. No reported cattle injuries or sheep depredations occurred in this year.</p> <p>^c Note that estimates may not sum due to rounding.</p> | | | | | |

Regarding property values, public land ranches in all areas of New Mexico experienced a reduced rate of ranch appreciation when compared to deeded land ranches between 1998 and 2003. This slowed appreciation has been attributed to uncertainty about future grazing access on public lands and the many controversies associated with public land grazing, including issues such as grazing fees, NEPA compliance, and Endangered Species Act (ESA) compliance. Thus, wolf reintroduction activities may have been one of many factors, along with conservation activities for other endangered species, as well as other controversies and uncertainties, that

contributed to a difference in appreciation rates for deeded land versus public land ranches in the BRWRA.

Hunters/Outfitters/Guide Impacts: Because the hunting outfitter and guide industry operating within the BRWRA relies on state and Federal permits and access to Federal lands, as well as a healthy population of wild prey, it may be subject to policy changes concerning the use of resources on Federal lands. The FEIS estimated that a harvest reduction of 120 to 200 elk would occur once the wolf population reached 100. This harvest reduction would have represented two to six percent of annual elk harvest in the BRWRA between 1998 to 2003. Reductions in hunting days equal to the FEIS estimates would have represented one to two percent of total elk hunting days in New Mexico and Arizona in 2001, or four to seven percent of elk hunting days in the BRWRA. However, over the past five years, wolf populations have not reached 100. Due to the small wolf population and more dominant overall trends that are unrelated to wolves, impacts on hunters and hunting effort in this region have not been observable to date. Specifically:

- *Effects on big game population from depredation:* The current BRWRA elk population is larger than the population projected by the FEIS to exist after the wolf population reaches 100. Nonetheless, both elk and deer populations in the BRWRA declined since 1998. However, other factors, such as game manager decision-making strategies as well as an ongoing drought complicate the assessment of whether wolf predation has affected elk populations to date. State wildlife agencies attribute the decline in deer population, which has been ongoing for at least a decade, to a combination of factors, including drought, forest succession, lack of natural fires, and resulting lack of available forage for deer.
- *Effects on hunter visitation to the region:* The number of elk permits sold in the BRWRA increased from 1998 to 2004, as did the number of hunters and hunter days. Thus, this analysis finds no evidence that wolf reintroduction has affected the hunter visitation in the BRWRA area. Correspondingly, this analysis also finds no evidence that either New Mexico or Arizona has experienced reductions in elk permit revenue since wolf reintroduction. While wolves have killed elk over this time period, a change in hunter visitation due to deer and elk population reductions by wolves is not detectable. The number of deer licenses issued in New Mexico declined by 13 to 18 percent in recent years. The number of deer permits issued in Arizona declined from 2,100 in 1998 to 850 in 2003 (a decline of 36 percent). As stated above, the decline in deer population has been caused by multiple factors other than wolves, and is the most likely cause for the reduction in permits granted.
- *Reduced hunting success:* Overall, elk hunting success rates in the New Mexico portion of the BRWRA show a decrease over the study period, from 39 percent in 1998 to 34 percent in 2003 (on average across game management units). Success rates in the Arizona portion of the BRWRA show a decrease from 48.5 percent to 42 percent over this time period. Despite small increases in the number of elk hunters in recent years, elk harvests have

remained relatively constant, resulting in a slight decrease in the elk hunting success rate. This decrease is likely due to the combination of a larger group of elk hunters pursuing a smaller amount of prey. Because of the relatively small number of wolves compared to the overall elk population, any incremental impact of wolf reintroduction is not detectable at this time. The success rate for deer permits did decline over this time period, however the change corresponds to the decline in deer population, and is the most likely reason for this decline. In addition, ongoing research suggests that deer comprise a small fraction of the Mexican wolf diet.¹⁰ Any incremental decrease in success rates for deer harvest due to wolves is not detectable.

- *Lost income to outfitter/guides:* The outfitter/guide industry is an important contributor to local economies and likely brings \$13 to \$17 million in gross revenues annually. However, revenue impacts are not estimated because no reduction in hunter participation was observed during the study period.
- *Regional Economic Effects:* Regional economic impacts are not estimated because no reduction in hunter participation was observed.

San Carlos Apache and White Mountain Apache Tribes Impacts: Although the BRWRA does not include any Tribal lands, the lands of the San Carlos Apache and the White Mountain Apache (Fort Apache Reservation) lie adjacent to the BRWRA. Because of their rural nature, high unemployment, and dependence on natural resources on Reservation lands, both Tribes are in a relatively weak economic position to absorb incremental cost increases that could result from Mexican wolf reintroduction. While each Tribe initially objected to the introduction of wolves onto their lands, the White Mountain Apache now have an agreement with the USFWS to allow wolf reintroductions. The San Carlos Apache continue to object to the reintroductions, and report that wolf depredation on livestock has occurred on their lands. The Point of Pines Cattle Association on the Reservation reports that "at one branding site there were only two branded calves compared to the past when an Apache reported that three hundred used to be branded at that site. This decline in branding numbers happened after the wolves were reintroduced. Point of Pines was never compensated for those losses."¹¹ These calves had an economic value of over \$100,000 to the Tribe, which may be attributable to wolf reintroduction. However, further investigation of the cause of the livestock losses would be necessary to accurately evaluate impacts to date. Both Tribes also expend considerable effort in attending meetings to discuss management of the Mexican wolf. Both USFWS and DoW contributed funds to support Tribal efforts for wolves during the study period. Other economic impacts on the Tribes, such as impacts on available hunting permits, have not been observable to date.

The FEIS estimated that if the lands of the San Carlos Apache become fully occupied by wolves, impacts of wolf reintroduction could be \$4,900 to \$21,100 annually. The San Carlos discussion about livestock losses due to wolf depredation would suggest that the FEIS could

¹⁰ Personal communication with Mexican Wolf Recovery Coordinator, December 16, 2005.

¹¹ Letter from Steve Titla, Titla and Parsi, General Counsel for the San Carlos Apache Tribe, Re: Economic impact of wolf depredation to Point of Pines on San Carlos, November 18, 2004.

have underestimated impacts on livestock. However, as stated above, further investigation of the cause of these livestock losses would be necessary to accurately evaluate impacts to date.

Tourism/Conservation Impacts: The primary categories of economic benefits of the reintroduction effort include:

- *Increased recreation visits.* Greater National Forest visitation could lead to increased regional tourism and recreation-related expenditures in local economies.
- *Existence value.* The public holds a non-use value for the Mexican wolf that could be enhanced by actions to reintroduce the species to the study area.
- *Agency spending in local areas.* Federal and state agency spending on the reintroduction effort may contribute to local economies.
- *Overall ecosystem health.* The restoration of wolves as the top carnivore could restore ecosystem function to the BRWRA area.

Approximately 3.2 million National Forest visits, or 14 percent of National Forest visits to Arizona and New Mexico, occur annually in the BRWRA area. Lack of data makes assessment of recent changes to visitation difficult, though measurable increases in visitation for wolf-related recreation appears unlikely given the small number of wolves and the lack of a current mechanism for issuing guiding permits. The FEIS states that increased recreational value and expenditures may occur in the BRWRA after Mexican wolf reintroduction. Some anecdotal evidence demonstrates that increases in recreation have occurred since wolf reintroduction, including reports that at least 15 wolf-related tours have visited the BRWRA since the program began. In addition, at least one workshop was held that discussed potential tourism opportunities.

A large number of public and agency meetings (estimated at 277) have been held since Mexican wolf reintroductions began. Federal and State agency funding for the Mexican wolf program totaled \$7.8 million from 1998 to 2004, or between \$0.67 to \$1.4 million annually.¹² Regional impacts of agency expenditures were approximately \$1.5 million in regional output annually, with a benefit to employment of 31 jobs, assuming that all funds were spent in the BRWRA area.¹³ In addition to agency expenditures, some non-profit groups have invested resources into the Mexican wolf program. For example, DoW reports spending \$59,000 on equipment and an additional \$78,000 on staff and staff housing for the wolf project. Actual agency expenditures are somewhat higher than those estimated in the FEIS, which estimated expenditures at approximately \$5 million from 1998 to 2004. Regional economic impact estimates were not included in the FEIS.

The public holds a non-use value for the Mexican wolf that could be enhanced by actions to reintroduce the species to the study area. However, no studies exist that estimate the existence

¹² From 1998 to 2003, Federal and state agency funding totaled \$6.3 million (2004\$).

¹³ This estimate is based on 2002 expenditures.

value for Mexican wolves. While a few studies in the literature have attempted to estimate existence value for other wolf populations, these studies were not conducted in the Southwest. Because the context of the other study areas was unique to those areas (Yellowstone National Park and North Carolina), a transfer of estimated benefits is not conducted.

Social Impacts

With the exception of the social impacts on two groups, nearby Tribes and a subset of ranchers, the analysis concludes that social impacts of the reintroduction effort between 1998 and 2003 have been minimal. Three factors provide the foundation for this conclusion. First, wolf populations would have to be much larger to generate impacts on most groups in the BRWRA. Second, certain segments of local society are unlikely to see widespread impacts, positive or negative, even if wolves appear in larger numbers. The general population is aware of the presence of wolves, but that fact has little bearing on their day to day social (and economic) lives. Third, social impacts from wolf reintroduction are likely to take a much longer period of time to develop than the five-year study period. For example, if wolf populations grow slowly and after ten years have a negative impact on elk herds, then the number of outfitters might decline as business is slowly reduced.

With these issues in mind, the general conclusions of our social impact assessment are:

- The distribution of social impacts is such that a majority of them fall on a subset of local ranchers, including Tribal operations. These operators have had to repeatedly alter their social lives to accommodate wolves.
- The cultural impacts of wolf recovery on the two Tribes adjacent to the BRWRA are complex. While the impacts are not direct, the Tribes view these impacts to be significant. Though the two Tribes currently view the reintroduction effort differently, ranching and outfitting are important components in their social and economic structures. The relationship between the Tribes and the Federal agencies resulted in social impacts during the study period, and remains a complex source of possible future impacts.
- Outfitters remain nervous about economic impacts, but social impacts to hunting and outfitting have not emerged to date.
- The information concerning changes to the tourism industry, including hotel operators, tour operators and restaurants, supports a finding of limited social impacts on this group from wolf recovery.
- Local conservationists' social impacts from wolf recovery are positive, heterogeneous and difficult to aggregate due to the wide ranging social, economic and demographic groups they represent. There is little data to support a finding of widespread social impacts.

Comparison of FEIS to Current Assessment

Exhibit ES-4 presents a comparison of the impacts contained in the FEIS to the findings of this report.

| Exhibit ES-4 | | | |
|--|---|---|---|
| COMPARISON OF SOCIAL AND ECONOMIC IMPACTS OF MEXICAN WOLF REINTRODUCTION IN THE BRWRA TO FEIS ESTIMATES, 1998 TO 2004 | | | |
| Category | Description of Impact | FEIS Estimate^a | Observed Wolf Impacts (1998 to 2004) |
| Biological effects | Wolf population in BRWRA | 100 | 2004 population: 44 |
| | Elk population in BRWRA | 9,300 to 18,000 | ~20,000; 6,000 in AZ; 14,000 in NM (2002) |
| | Deer population in BRWRA | 35,500 to 64,100 | ~10,000 in AZ (2002); Unknown in NM. |
| | Deer population reduction | 4,800 to 10,000 | Deer population declining in both states. |
| | Elk population reduction | 1,200 to 1,900 | Elk population declining in both states. |
| Hunting ^b | Reduction in deer harvest | 300 to 560 annually | Not observable to date. Success rates have declined somewhat. |
| | Reduction in elk harvest/success | 120 to 200 annually | Elk harvest has remained constant, while deer harvest declined along with population. Success rates have declined for both elk and deer. Wolf impact not observable. |
| | Lost hunting value | \$877,900 to \$1.6 million annually | Not observable to date. Number of hunters and hunter days increased. |
| | Lost hunter expenditures | \$707,400 to \$1.3 million annually | Not observable to date. Number of hunters and hunter days increased. |
| | Lost revenue to AZ/NM from reduced permit sales (2004\$) | \$83,100 to \$151,700 annually | Not observable to date. |
| Ranching | Number of livestock losses | 1 to 34 confirmed annually | 32 to 233 cattle, 2 to 5 sheep, 0 to 4 horses, and 2 to 3 dogs (1998-2004); or 5 to 33 cattle, 0 to 1 sheep and horses, and less than 1 dog annually. |
| | Lost livestock value to ranchers | \$840 to \$28,560 annually ^c | \$38,600 to \$206,000 (1998-2004), or \$5,500 to \$29,500 annually. Regional impacts \$3,000 to \$99,000 annually. |
| | Property value | Not addressed. | Public land ranches showed slow appreciation. |
| Tribal Activities | Potential reduction in non-member elk hunting permits to San Carlos Apache ^d | \$4,900 to \$21,100 annually | Not observable to date. |
| | Livestock depredation | Not quantified | Reported losses of 300 calves in one year. |
| Benefits | Increased recreational use | Not quantified | Incidental reports of at least 15 trips made to area. |
| | Increased tourism/expenditures | Not quantified | Incidental reports of at least 15 trips made to area. |
| | Enhanced existence value | Not quantified | Not quantified. |
| Other | Conflicts with local ordinances | Not quantified | Discussed in social impacts section. |
| | Minor access restrictions near pens, dens, and rendezvous sites | Not quantified | Not observed to date. |
| | Agency Expenditures | \$5.0 million (1998 - 2004); annual average \$713,500 | \$7.8 million (1998-2004), or between \$0.67 to \$1.4 million annually, in direct expenditures. Approx. \$1.5 million additional regional output annually, with a benefit to employment of 31 jobs. |

Notes:

^aThe FEIS estimates compare a point in time five years after the wolf population goal for the area is achieved to what the prey populations were projected to be without wolves. EIS estimates are inflated to 2004 dollars.

^bThe FEIS states that the estimated hunting losses may overstate actual losses, as hunter may pursue substitute sites or to substitute species for hunting. In addition, because hunting in New Mexico and Arizona is dominated by resident hunters, money not spent in the BRWRA is likely to be spent elsewhere in these states.

^cValue of cattle losses calculated by multiplying estimated number of lost cattle by the average value of cattle sold across all size and weight classes in Arizona and New Mexico in 2004, as reported by U.S. Department of Agriculture (1998 – 2004), Meat Animals Production, Disposition, and Income: Summary, National Agricultural Statistics Service, Mt An 1-1.

^dValues of lost deer and elk are estimated assuming that 30 wolves utilize the Reservation. Cost estimates do not include lost hunting value or regional expenditures (FEIS 4-35).

Source: U.S. Fish and Wildlife Service. 1996. *Reintroduction of the Mexican Wolf Within Its Historic Range in the Southwestern United States: Final Environmental Impact Statement.*

INTRODUCTION**SECTION 1****1.1 Framework for Analysis**

The Mexican wolf Final Rule states that the U.S. Fish and Wildlife Service will evaluate Mexican wolf reintroduction progress and prepare full evaluations after three and five years.¹⁴ These evaluations will include recommendations of whether to continue, modify, or terminate the reintroduction effort. The purpose of this analysis is to estimate the social and economic impacts of the Mexican wolf reintroduction effort since its inception in 1998 as part of the five-year review assessment of the program being conducted by the USFWS and cooperating agencies. This information is intended to assist the USFWS, cooperating agencies, and stakeholders in their evaluation of the reintroduction effort.

1.2 Mexican Wolf Reintroduction Project Background

In 1998, the USFWS, in cooperation with the Arizona Game and Fish Department, the New Mexico Department of Game and Fish, USDA Wildlife Services, and USDA Forest Service, began a program to release a "nonessential experimental" population of Mexican wolves into a portion of its native territory in Arizona and New Mexico. The area where the wolves are allowed to disperse into and colonize, known as the "Blue Range Wolf Recovery Area," encompasses approximately 7,200 square miles of the Apache National Forest in southeastern Arizona and the Gila National Forest in southwestern New Mexico. Wolves may only be released into the primary recovery zone, an area within the BRWRA in eastern Arizona. The rule allows the wolf population to disperse into the remaining portion of the BRWRA, but does not allow wolves to establish territories on lands outside of the BRWRA (except on Tribal or private lands when landowners consent). The primary goal of the Reintroduction Project is to restore a "self-sustaining population of about 100 wild Mexican wolves distributed over 5,000 square miles of the BRWRA."¹⁵ Under the rule, promulgated under section 10(j) of the ESA, private citizens may kill or injure wolves in defense of human life or when wolves are in the act of attacking livestock (with some restrictions).

Regulatory History Timeline:

- **Pre-1970:** Last confirmed sighting of wild Mexican wolf in Southwestern United States.
- **1976:** Mexican wolf listed as endangered subspecies under the ESA.

¹⁴ Establishment of a Nonessential Experimental Population of the Mexican Gray Wolf in Arizona and New Mexico, 63 Federal Register 1763-1772; 50 CFR Section 17.84(k).

¹⁵ Paquet, Paul C. et al. "Mexican wolf recovery: Three year program review and assessment." Prepared by the Conservation Breeding Group for the Service. June, 2001.

- **1978:** Entire gray wolf species in North America south of Canada listed as endangered under the ESA (listed as threatened in Minnesota).
- **1982:** Mexican wolf recovery plan published.
- **November 1996:** Service releases the FEIS.
- **January 1998:** Service publishes final rule to establish a nonessential experimental population of the Mexican gray wolf in Arizona and New Mexico within the Blue Range Wolf Recovery Area (under section 10(j) of the ESA).
- **March 1998:** Service commences reintroduction of Mexican wolf.
- **June 2001:** Three-year review of the Mexican wolf reintroduction program completed.
- **2004-2005:** Release of administrative, technical and socioeconomic components of 5-Year Review of Mexican Wolf Reintroduction Project to the public.

1.3 Analytic Approach

The goal of this socioeconomic analysis is to evaluate the local and regional social and economic impacts of the Mexican Wolf Reintroduction Project that occurred between March 1998 and December 2003, and to compare those impacts to impacts estimated in the 1996 Final Environmental Impact Statement. This analysis is intended to allow resource managers and the public to evaluate the social and economic implications of altering the Reintroduction Project. The analysis presents two analyses: 1) an assessment of economic impacts and comparison to the FEIS; 2) an assessment of social impacts. The scope of the analysis is as follows:

This analysis focuses on regional social and economic impacts. As part of this effort, the analysis characterizes the regional economy, population characteristics and community and institutional structures for the study area.

The analysis is retrospective, identifying potential social and economic impacts for the five-year review period (1998 to 2003). However, where more recent data is available, it is included in the analysis.

This analysis focuses on impacts in the five counties that contain lands within the BRWRA: Catron, Grant, and Sierra Counties, New Mexico; Greenlee and Apache Counties, Arizona, as well as adjacent Tribal lands of the White Mountain Apache (Fort Apache) and the San Carlos Apache. The five counties included in the Study Area for the economic analysis each include some portions of the BRWRA, and thus are most likely to experience the largest impacts of wolf reintroduction. Thus, the analysis focuses on these counties when trying to understand potential impacts related to wolf reintroduction. Section 6 of the analysis also discusses broader non-use, or existence values, for Mexican wolves.

This analysis also evaluates the relevance and quality of available research studies related to the attitudes, as well as social and economic impacts of wolves or wolf reintroduction from other areas.

1.4 Data Sources

FEIS estimates are used to provide a basis against which recent activities occurring in the BRWRA study area since Mexican wolf reintroduction are compared. This analysis reviewed a variety of data sources to understand recent and historical activities, including:

- In-person discussions with numerous individuals at Service open house meetings in January and February 2005 as well as personal communication with more than 60 local stakeholders, including private, municipal, state, and Federal sources;
- Published data sources;
- Administrative records from the FEIS and from recent litigation regarding the Mexican wolf recovery and reintroduction;
- Relevant research and policy literature, with a focus on those projects that directly address the social and economic issues arising from wolf reintroduction in the BRWRA in particular and North America in general;
- Available secondary economic and social data on the BRWRA region describing the county and community level social, demographic, and economic conditions; and
- Public comments on the draft socioeconomic analysis.

1.5 Economic Impact Assessment

The economic impacts portion of the analysis attempts to identify changes in economic activities that have occurred since Mexican wolf reintroduction began, and to quantify these changes where possible. To accomplish this, the analysis focuses on comparing the level of economic activity in various sectors after wolf reintroduction to activity levels prior to the reintroduction. The analysis then compares current estimates to estimates presented in the FEIS. Specifically, this analysis:

- 1) Characterizes changes to the regional economy since 1996;
- 2) Describes the issues raised by stakeholders in economic sectors affected by the reintroduction of the Mexican wolf;

- 3) Discusses whether existing data indicate that the reintroduction of the Mexican wolf has played a role in changes to the affected economic sectors and whether these changes have had an effect on the regional or local economy; and
- 4) Quantifies such impacts to the extent possible.

Note that, in addition to potential impacts from wolf reintroduction, drought and other factors contributed to changes in the regional economy over the study period, and assigning the cause of change is difficult. Ongoing trends are often well established and overwhelm any observations of incremental effects caused by Mexican wolf reintroduction.

1.6 Social Impact Assessment

This portion of this analysis addresses possible social impacts from Mexican wolf reintroduction in the study area during the initial five year recovery period of 1998 to 2003. Social impacts are defined as "...the consequences to human populations of any public or private actions that alter the ways in which people live, work, play, relate to one another, organize to meet their needs and generally cope as members of society. The term also includes cultural impacts involving changes to the norms, values, and beliefs that guide and rationalize their cognition of themselves and their society."¹⁶ In the context of this analysis, such impacts are hypothesized to derive from the reintroduction and management policies for Mexican wolves during the initial five years of that program (1998-2003).

Social impacts are generally assumed to occur in standard categories consisting of population changes, community and institutional structures, political and social resources, individual and family changes, and community resources. These categories are defined as follows:

- **Population Characteristics:** Ongoing and expected population changes (growth or decline), ethnic and racial makeup, and net migration, temporary residents, seasonal or leisure residents, and age distributions;
- **Community and Institutional Structures:** changes to group and individual relationships with federal and state agencies; changes to the basis of community economic and social stability;
- **Political and Social Resources:** The size, structure, and organization of local government; its relationship with state and federal governments; historical and current patterns of employment and industrial diversification; activities of voluntary associations, religious organizations, interests groups; relationships between social and political institutions;

¹⁶ Interorganizational Committee, 2003: 231.

- **Individual and Family Changes:** Influences on the daily life of the individuals and families, including attitudes, perceptions, family characteristics, and local social networks; can include changing attitudes toward the policy, an alteration in family and friendship networks, perceptions of risk, health, and safety; fears and aspirations;
- **Community Resources:** Patterns of natural resource and land use; past and current housing and community services (health, police, fire, sanitation); continuity and survival of historical and cultural resources; changes for indigenous people and religious sub-cultures.

Impacts are placed into each category if the analysis establishes that such an impact is related directly to wolf reintroduction or is clearly an indirect impact of wolf reintroduction.

Time and resource limitations allow us to draw general conclusions only as to possible social impacts on most groups and communities. Significant field research is required to adequately address specific direct, indirect, and cumulative impacts of wolf recovery. Hence, this analysis will focus on direct impacts suggested by the limited information gathered for this study.

Impacts on groups can be broken into two general categories: active impacts and passive impacts. Active impacts are social impacts derived from direct interactions with wolves. Ranchers, outfitters and people living in areas where wolves are common are more likely to have active encounters with wolves. Thus, social impacts derived from those encounters are more readily identified. Active impacts appear to be relatively rare for the general public. Passive impacts occur when people in the study area hold strong opinions about wolves and their reintroduction but have few, if any, direct encounters with wolves. Social impacts on such groups are much harder to establish beyond those associated with opinions held about the positive existence value of the wolves.

It must be made clear that social impacts are *prima fascia* neither positive nor negative. Those who feel that their social lives have been significantly altered do typically make a distinction between positive and negative impacts. However, people from different social groups frequently assess the same impact differently. For example, ranchers may label the anxiety they feel when they see wolves in close proximity to their livestock as a negative impact while their neighbors might find the sighting of the very same wolves to have a positive impact on their social lives. We generally speak of impacts as negative or positive if they were described as such by those that were interviewed.

1.7 Socio-Economic Estimates Presented in the Final Environmental Impact Statement

This section presents a brief summary of the estimates presented for the BRWRA as part of Alternative A in the FEIS.¹⁷ These estimates are the basis of comparison for this analysis.

¹⁷ U.S. Fish and Wildlife Service. 1996. *Reintroduction of the Mexican Wolf Within Its Historic Range in the Southwestern United States: Final Environmental Impact Statement*.

Exhibit 1-1 presents a summary of the impacts that would result from reintroduction of wolves to the BRWRA area, as estimated in the 1996 FEIS. Note that these estimated impacts are projected for "a point in time five years after the wolf population goal for the area of 100 wolves is achieved."¹⁸ Thus, impacts presented in this Exhibit are unlikely to have been realized to date, since the population of wolves has not yet reached 100. As shown, impacts were anticipated to include reductions in prey populations, reductions in hunting and livestock values (both Tribal and non-Tribal), increases in tourism and recreation, and other minor restrictions. The majority of quantified impacts were projected to involve lost hunting value and reductions in hunter expenditures.

1.8 Structure of Report

This remainder of this report is organized as follows:

- Section 2: Demographic Trends In The Blue Range Wolf Recovery Area
- Section 3: Economic Impacts of Mexican Wolf Reintroduction On Ranching Activities
- Section 4: Economic Impacts of Mexican Wolf Reintroduction On Hunting Activities
- Section 5: Economic Impacts of Mexican Wolf Reintroduction On Tribes
- Section 6: Economic Impacts of Mexican Wolf Reintroduction on Tourism and Conservation
- Section 7: Social Impacts of Mexican Wolf Reintroduction

¹⁸ U.S. Fish and Wildlife Service. 1996. *Reintroduction of the Mexican Wolf Within Its Historic Range in the Southwestern United States: Final Environmental Impact Statement.*

| Exhibit 1-1 | | |
|---|--|---|
| SUMMARY OF FEIS ESTIMATES OF SOCIAL AND ECONOMIC IMPACTS OF WOLF REINTRODUCTION IN THE BRWRA | | |
| Category | Description of Impact | Value |
| Biological effects ^a | Wolf population | 100 |
| | Deer population reductions | 4,800 to 10,000 |
| | Elk population reductions | 1,200 to 1,900 |
| Hunting ^b | Reduction in deer harvest | 300 to 560 |
| | Reduction in elk harvest | 120 to 200 |
| | Lost hunting value (2004\$) | \$877,900 to \$1.6 million annually |
| | Lost hunter expenditures (2004\$) | \$707,400 to \$1.3 million annually |
| | Lost revenue to AZ/NM from reduced permit sales (2004\$) | \$83,100 to \$151,700 annually |
| Ranching | Confirmed cattle losses | 1 to 34 |
| | Lost value to ranchers (2004\$) ^c | \$840 to \$28,560 annually |
| Tribal Activities | Potential reduction in non-member elk hunting permits to San Carlos Apache (2004\$) ^d | \$4,900 to \$21,100 annually |
| | Livestock depredation | |
| Benefits | Increased recreational use | Not quantified |
| | Increased tourism | Not quantified |
| | Enhanced existence value | Not quantified |
| Other | Conflicts with local ordinances | Not quantified |
| | Minor access restrictions near pens, dens, and rendezvous sites | Not quantified |
| | Agency Expenditures (2004\$) | \$5.0 million (1998 - 2004); annual average \$713,500 |

Notes:

^aPrey population estimates compare a point in time five years after the wolf population goal for the area is achieved to what the prey populations were projected to be without wolves.

^bEstimated hunting losses may overstate actual losses, as hunters may pursue substitute sites or substitute species. In addition, because hunting in New Mexico and Arizona is dominated by resident hunters, money not spent in the BRWRA is likely to be spent elsewhere in these states.

^cValue of cattle losses calculated by multiplying estimated number of lost cattle by the average value of cattle sold across all size and weight classes in Arizona and New Mexico in 2004, as reported by U.S. Department of Agriculture (1998 – 2004), Meat Animals Production, Disposition, and Income: Summary, National Agricultural Statistics Service, Mt An 1-1.

^dValues of lost deer and elk are estimated assuming that 30 wolves utilize the reservation. Cost estimates do not include lost hunting value or regional expenditures (FEIS 4-35).

Source: U.S. Fish and Wildlife Service. 1996. *Reintroduction of the Mexican Wolf Within Its Historic Range in the Southwestern United States: Final Environmental Impact Statement.*

**DEMOGRAPHIC TRENDS
IN THE BLUE RANGE WOLF RECOVERY AREA****SECTION 2**

2.1 Introduction

This section describes the general climatic conditions, population trends, and economic activity within and in proximity to the BRWRA both prior to and since the reintroduction of Mexican wolves. The purpose of this section is to provide background on the five counties and communities containing portions of the BRWRA in order to present a context for subsequent sections of this analysis; the purpose is not to suggest that population and economic indicators are the result of the Reintroduction Project. We begin with an overview of the land use, population, and history of the counties that contain portions of the BRWRA and the communities in proximity to the BRWRA. Subsequent segments present more detailed demographic and socioeconomic information. Throughout this section, we compare population and economic indicators to information and predictions presented in the FEIS.¹⁹

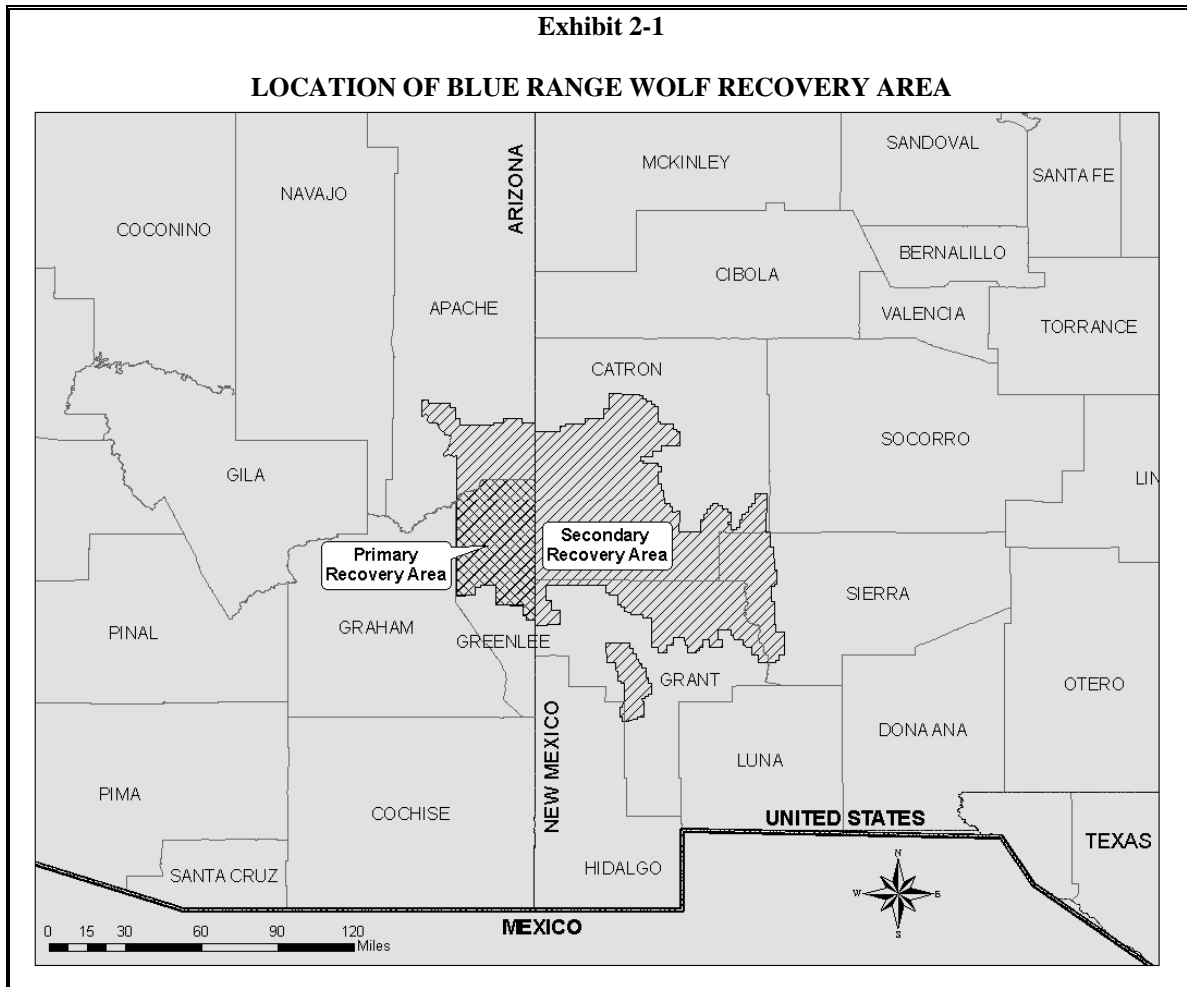
The BRWRA encompasses approximately 7,200 square miles and straddles the border between Arizona and New Mexico (see Exhibit 2-1). Portions of the BRWRA fall within five counties: Apache and Greenlee counties in Arizona; and Catron, Grant, and Sierra counties in New Mexico. The USFWS initially released wolves within the Primary Recovery Area, which constitutes approximately 1,200 square miles of the BRWRA and falls within Greenlee County, Arizona.

2.2 Overview of Study Area

The five counties in Arizona and New Mexico that contain portions of the BRWRA can be generally characterized as mountainous and sparsely populated. Within the BRWRA,

¹⁹ U.S. Fish and Wildlife Service (1996), *Reintroduction of the Mexican Wolf Within Its Historic Range in the Southwestern United States: Final Environmental Impact Statement*. When comparing data describing the BRWRA in this analysis and the FEIS, note that the two analyses have separate definitions of the study area. The FEIS relies on statistics from the 1990 Census tracts that are within the BRWRA (Apache County 3901; Greenlee County 9704; all of Catron County; Grant County 9841, 9842, and 9849; and Sierra County 7824). Since the location of tracts is not consistent between Censuses, however, this analysis defines the study area as the five counties that contain portions of the BRWRA in order to compare statistics between 1990 and 2000.

elevations range from under 4,000 feet in the semi-desert lowlands to 11,000 feet in the mountains.²⁰ The population density across the five counties is approximately 4.5 people per square mile; in contrast, the average population density throughout the U.S. is 79.6 people per square mile.²¹



The majority of land in Apache, Greenlee, Catron, Grant, and Sierra counties is publicly owned. In Apache County, Arizona, 21 percent of the land is publicly owned, 14 percent is privately owned, and 66 percent is within the Apache and Navajo reservations. In Greenlee County, Arizona, 94 percent of the land is publicly owned and only seven percent is privately owned. In Catron, Grant, and Sierra counties, New Mexico, the percentages of land that are held publicly total 75, 64, and 82 percent, respectively, and private land comprises 25, 35, and 18 percent of these counties. In addition, tribal lands account for one percent of Grant County.

²⁰ 5-Year Review Technical Component.

²¹ U.S. Census Bureau (2000), Census 2000.

According to the Bureau of Economic Analysis, government jobs (including Federal, state, local, and military employment) represent the most common sector of employment in four of the five counties containing portions of the BRWRA; in Sierra County, the services sector employs the largest portion of the population. In Apache County, almost 52 percent of employees are employed by government entities, while the percentage of government employment ranges from 10 to 30 percent in the remaining counties. In Apache, Catron, Grant, and Sierra counties, many employees work for various service industries, including professional, technical, administrative, educational, waste, accommodation, food, and other services. The portion of employees in the service industry in these four counties ranges from 11 percent in Catron County to 23 percent in Sierra County. Wholesale and retail trade also represents a major industry in the five counties, employing between six percent (in Greenlee and Catron counties) and 13 percent (in Grant County) of full- and part-time employees. Furthermore, construction employs between five and seven percent of workers in the five counties. Finally, a portion of the population in each of the counties in the study area is employed on farms and ranches. Two percent of full- and part-time employees work on farms in Apache County, three percent work on farms in Grant County, five percent work on farms in Greenlee County, eight percent work on farms in Sierra County, and 20 percent work on farms in Catron County.²² Raising beef cattle and calves constitutes the primary activity on the farms and ranches in the study area.

As discussed in the FEIS, the majority of the communities in proximity to the BRWRA are small, with only Deming and Silver City, New Mexico, having populations greater than 10,000. Many of these cities and towns were established as mining towns at the turn of the century. Following countywide patterns, primary economic activities in these communities at present are services, retail trade, and some construction. The FEIS noted that tourism and the movement of retirees into these communities represented the primary drivers of these industries; this pattern has continued since 1998. In addition, many residents work for the Federal, state, and local government, and agriculture continues to play an important role, particularly in the smaller communities.

Industries other than retail, services, and the government do employ a substantial number of residents in certain communities. Clifton, Arizona, contains a copper mine that employs 70 percent of the town's residents. Mining activities contribute to the relatively high median income and employment rates in this community (see Exhibits 2-9 and 2-12 later in this section). Furthermore, workers from other communities commute to work at this mine.²³ The primary economic activity in Eagar and Springerville, Arizona, is power generation at two plants. In addition to work at these utilities, many residents commute to work in other communities such as St. Johns, which is located farther from the BRWRA. Similar to the county employment trends, however, many residents of Eagar and Springerville work for the government, as well as in

²² These percentages do not include employment in the forestry, fishing, hunting, and agriculture support sector, which accounts for less than one percent of employment in all counties except for Catron, where approximately six percent of employees work in this sector. Source: U.S. Department of Commerce Bureau of Economic Analysis (2005), Regional Economic Accounts, CA25N: Total full-time and part-time employment by industry in 2002, accessed March 23, 2005, at <<http://www.bea.doc.gov/bea/regional/reis/default.cfm>>.

²³ Arizona Department of Commerce (2005), Arizona Community Economic Base Studies, accessed March 23, 2005, at <<http://www.commerce.state.az.us/prop/eir/azcommunitybasestudy.asp>>.

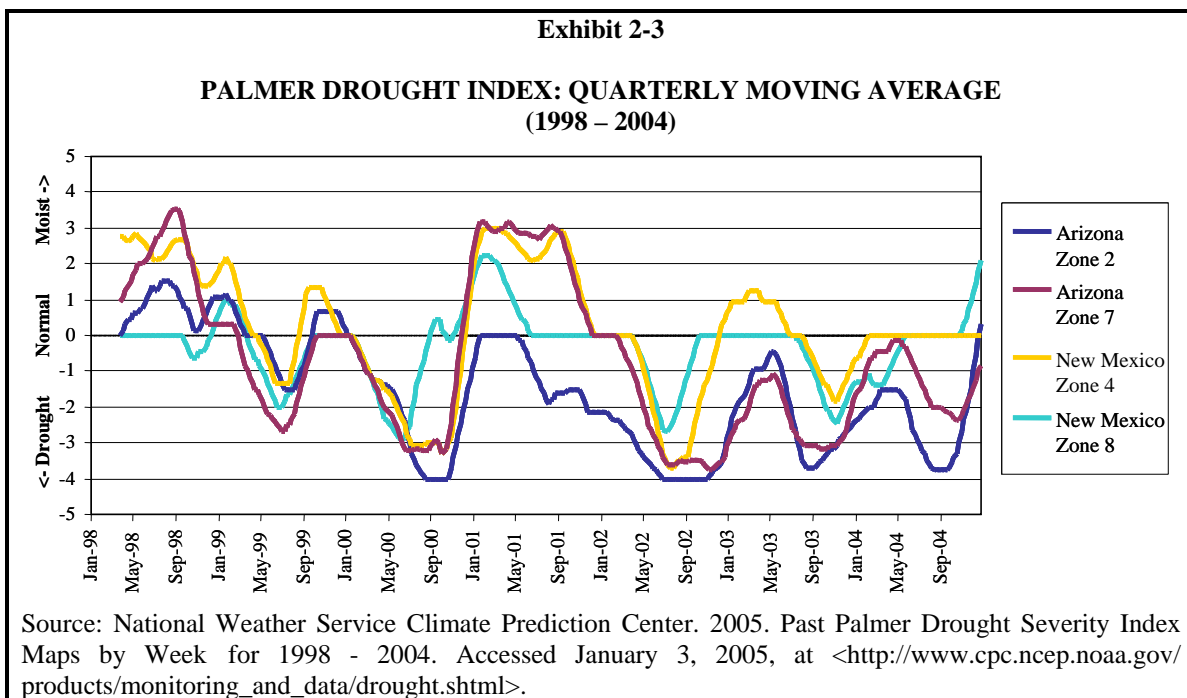
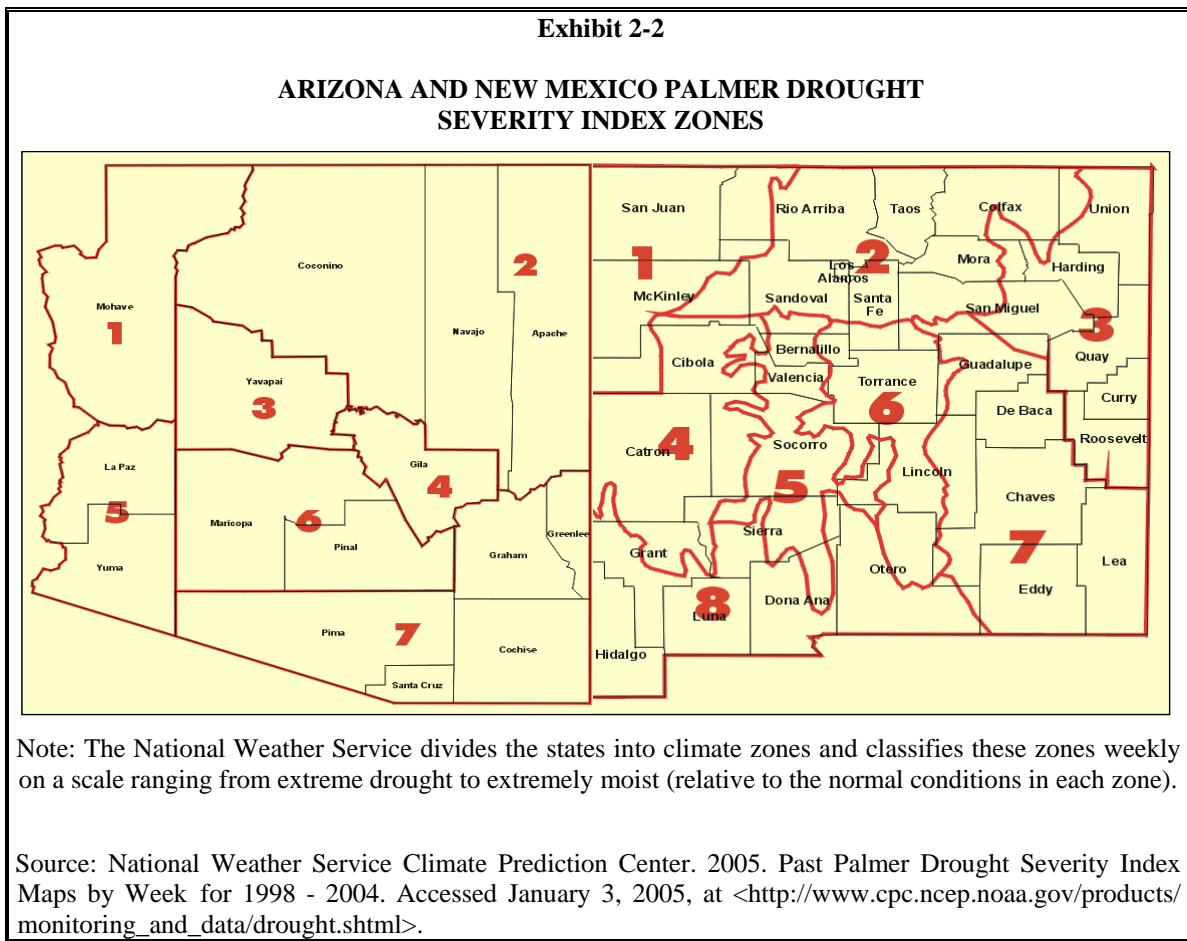
manufacturing, accommodation, and the food services sectors.²⁴ The remainder of this section provides more detailed information on climatic conditions, demographic trends, and economic indicators in the counties and communities in proximity to the BRWRA.

2.3 Climatic Conditions

Seasonal and long-term weather patterns affect water availability and plant growth. In the BRWRA, these conditions can directly influence economic activities such as ranching, which relies on available forage for livestock; hunting, which relies on the availability of wild game; and tourism, which is influenced by the weather. Under typical conditions, the amount of rainfall varies substantially throughout the study area. The average annual precipitation is only approximately 12 inches in the lowlands, but annual precipitation levels reach 37 inches in the mixed conifer forests.²⁵ The Palmer Drought Severity Index (PDSI), prepared by the National Weather Service, represents an index of relative dryness or wetness. The National Weather Service divides states into climate zones and classifies these divisions weekly on a scale ranging from extreme drought to extremely moist. Exhibit 2-2 illustrates the National Weather Service climate divisions for Arizona and New Mexico; Exhibit 2-3 presents the PDSI from 1998 to 2004 in Arizona Zones 2 and 7 and New Mexico Zones 4 and 8, the four climate divisions that overlap with the BRWRA. As Exhibit 2-3 demonstrates, these areas experienced moist conditions in 1998 and the beginning of 2001, but they also underwent prolonged drought periods in 1999 and 2002 through 2004. As discussed in the hunting and grazing sections of this analysis, the recent drought has affected forage availability for cattle and wild game, leading to a reduction in herd numbers due to the decreased carrying capacity of the land.

²⁴ Arizona Department of Commerce (2005), Arizona Community Economic Base Studies, accessed March 23, 2005, at <<http://www.commerce.state.az.us/prop/eir/azcommunitybasestudy.asp>>.

²⁵ 5-Year Review Technical Component.



2.4 **Population Trends**

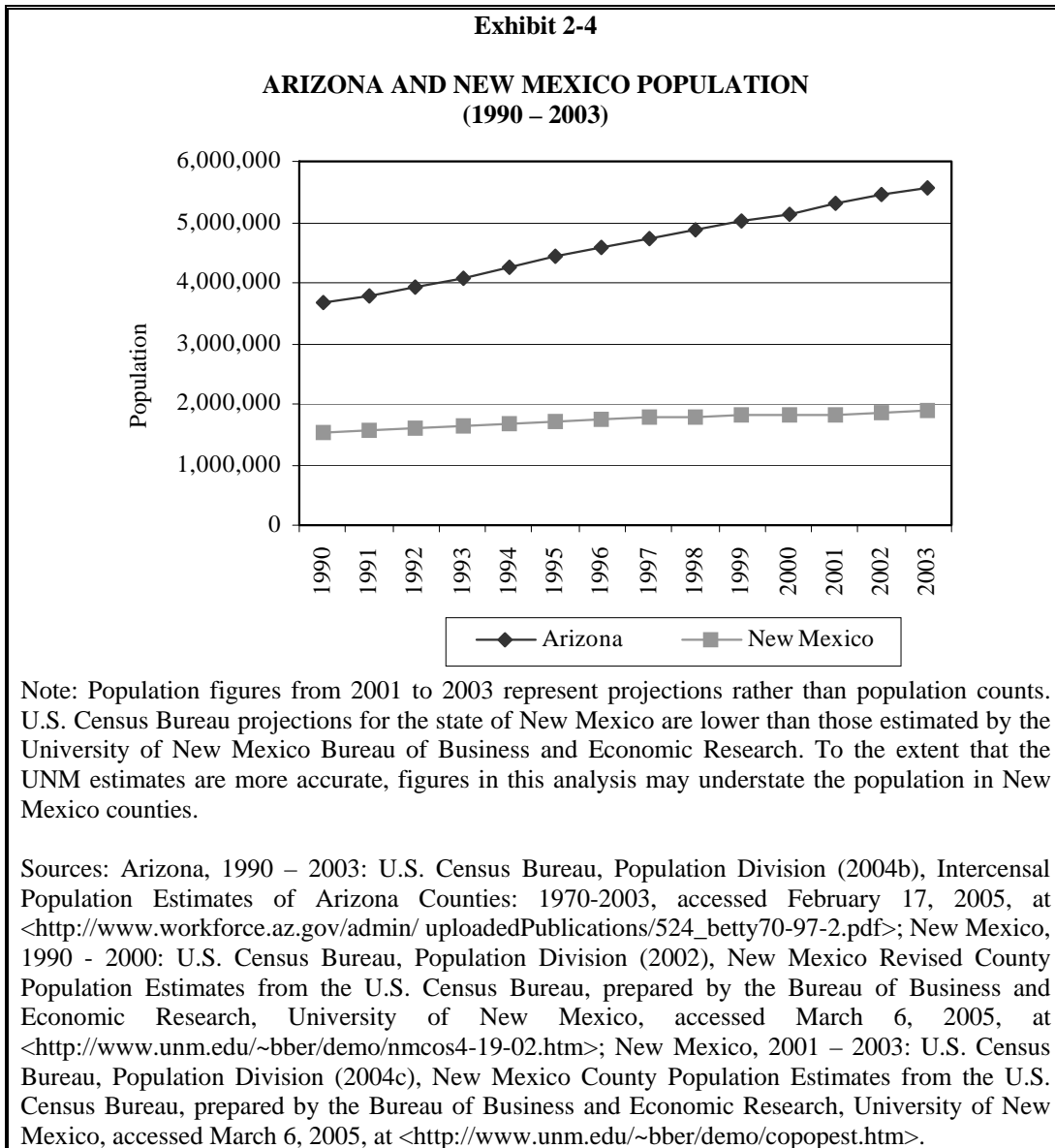
This section discusses population trends and age distributions in counties and communities in proximity to the BRWRA. We also compare these data to statewide and U.S. trends in order to better understand how demographics in the study area differ from state and national averages.

2.4.1 **Total Population**

From 1990 to 2003, the U.S. population grew from 248.7 million to 290.8 million, an increase of 17 percent. During this same period, Arizona experienced rapid growth; the number of people living in the state increased from less than 3.7 million in 1990 to an estimated 5.8 million in 2003. This growth represents a 53 percent increase. New Mexico's growth, while more moderate than that of Arizona, also exceeded the national average; it increased 24 percent from 1.5 million to 1.9 million.^{26, 27} Exhibit 2-4 depicts these population changes.

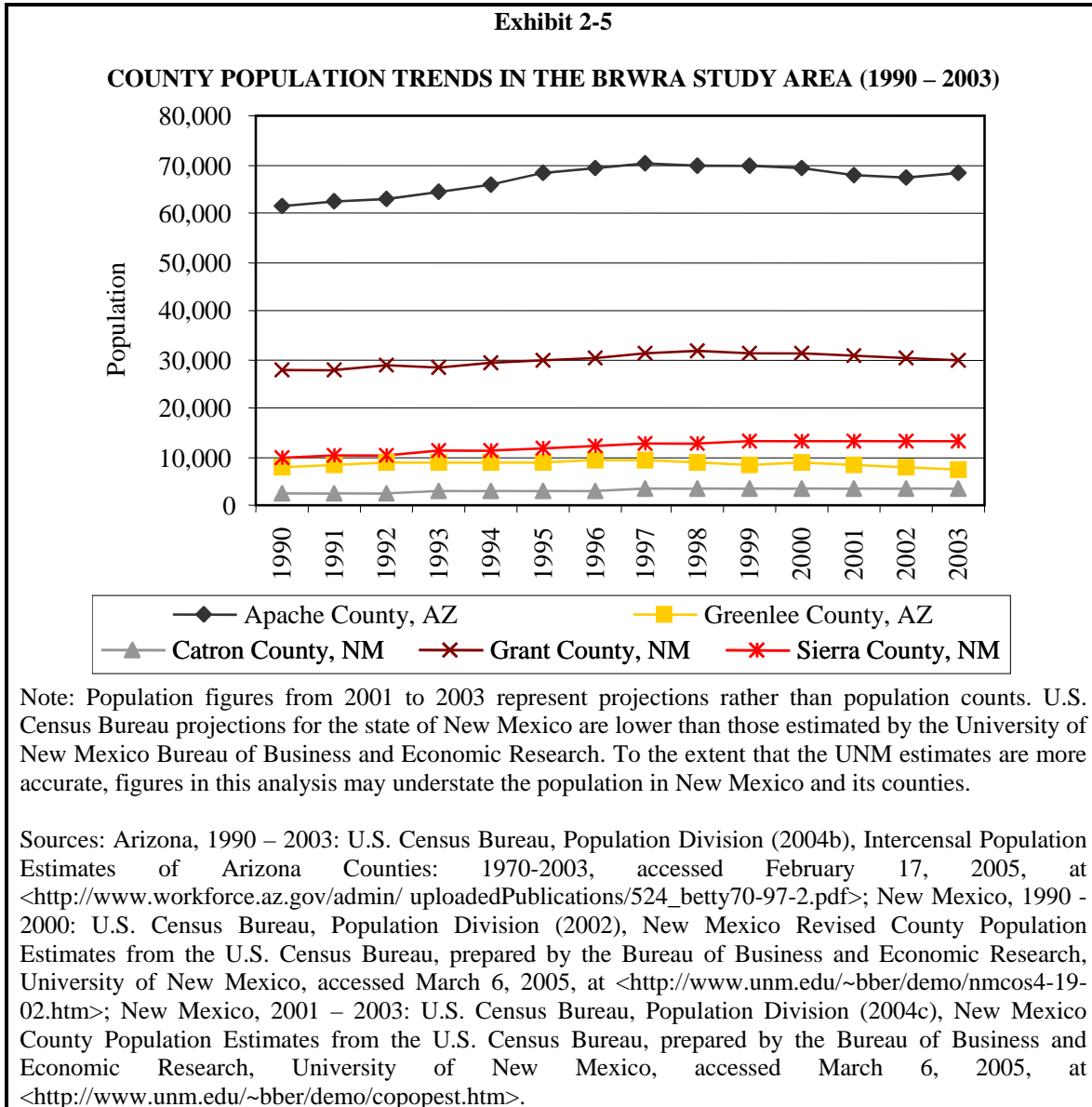
²⁶ U.S. Census Bureau (1990), Census 1990; U.S. Census Bureau, Population Division (2004a), U.S. and State Population Estimates from the U.S. Bureau of the Census: U.S. and State Population Estimates, 2000 to 2004, prepared by the Bureau of Business and Economic Research, University of New Mexico, accessed March 6, 2005, at <<http://www.unm.edu/~bber/demo/usto2000s.htm>>.

²⁷ U.S. Census Bureau projections for the state of New Mexico are lower than those estimated by the University of New Mexico Bureau of Business and Economic Research. To the extent that the UNM estimates are more accurate, figures in this analysis may understate the population in New Mexico and its counties.



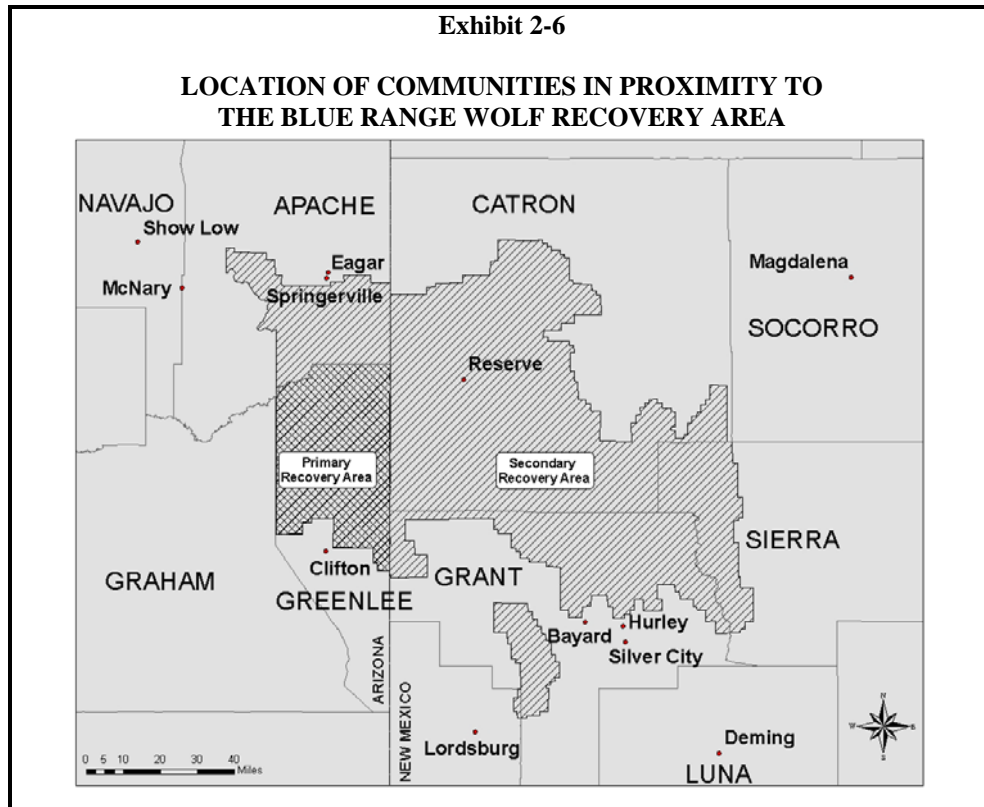
The population of the five counties containing portions of the BRWRA totaled approximately 122,000 people in 2003; these counties account for less than two percent of the population in Arizona and New Mexico. While Arizona and New Mexico experienced population growth of roughly 44 percent from 1990 to 2003, Exhibit 2-5 demonstrates that, as projected in the FEIS, population growth was less pronounced in the counties in the BRWRA. From 1990 to 2003, the population increased by 11 percent in the study area. Greenlee County, Arizona, is the only county that experienced a net decrease from 1990 to 2003; its population dropped six percent from 8,000 in 1990 to 7,500 in 2003. Apache County, Arizona, increased 11 percent over the same period, from 61,600 to 68,100. Grant County, New Mexico, experienced a moderate growth rate of eight percent, increasing from 27,700 in 1990 to 29,800 in 2003. Catron and Sierra counties in New Mexico underwent the largest growth rates of 33 and 32 percent,

respectively. Catron County grew from 2,600 to 3,400, while Sierra County increased from 9,900 to 13,100.²⁸ The relatively large population growth in Catron County from 1990 to 2000 represents the only population change not predicted by the FEIS; the FEIS projected stable to negative population growth in Catron County, as opposed to an increase of over 30 percent.



²⁸ U.S. Census Bureau (2002), New Mexico Revised County Population Estimates from the U.S. Census Bureau, prepared by the Bureau of Business and Economic Research, University of New Mexico, accessed March 6, 2005, at <<http://www.unm.edu/~bber/demo/nmcos4-19-02.htm>>; U.S. Census Bureau, Population Division (2004b), Intercensal Population Estimates of Arizona Counties: 1970-2003, accessed February 17, 2005, at <http://www.workforce.az.gov/admin/uploadedPublications/524_betty70-97-2.pdf>; U.S. Census Bureau, Population Division (2004c), New Mexico County Population Estimates from the U.S. Census Bureau, prepared by the Bureau of Business and Economic Research, University of New Mexico, accessed March 6, 2005, at <<http://www.unm.edu/~bber/demo/copoest.htm>>.

This section also includes population information for selected cities and towns within or in proximity to the BRWRA. Exhibit 2-6 shows the locations of these communities, and Exhibit 2-7 displays their population in 1990 and 2000. On average, the communities' population growth rate was slower than that in Arizona and New Mexico as a whole. Exhibit 2-7 further demonstrates that the majority of the communities lagged behind the average growth rate in their states; only three communities (Show Low, Arizona, and Deming and Reserve, New Mexico) approached or exceeded the Arizona and New Mexico growth rates of 52 and 24 percent, respectively.



| Exhibit 2-7 | | | | | |
|--|----------------------------|----------------------------|--------------------|--|---------------------------------------|
| COMMUNITY POPULATION TRENDS IN THE BRWRA STUDY AREA | | | | | |
| (1990 and 2000) | | | | | |
| Community | 1990 Population | 2000 Population | Growth Rate | Average Growth Rate (State) | Average Growth Rate (U.S.) |
| Clifton, AZ | 2,840 | 2,600 | -8.6% | 52.3% | 16.9% |
| Eagar, AZ | 4,030 | 4,030 | 0.2% | 52.3% | 16.9% |
| McNary, AZ | 360 | 350 | -1.7% | 52.3% | 16.9% |
| Show Low, AZ | 5,020 | 7,700 | 53.3% | 52.3% | 16.9% |
| Springerville, AZ | 1,800 | 1,970 | 9.4% | 52.3% | 16.9% |
| Bayard, NM | 2,600 | 2,530 | -2.5% | 23.7% | 16.9% |
| Deming, NM | 10,970 | 14,120 | 28.7% | 23.7% | 16.9% |
| Hurley, NM | 1,530 | 1,460 | -4.6% | 23.7% | 16.9% |
| Lordsburg, NM | 2,950 | 3,380 | 14.5% | 23.7% | 16.9% |
| Magdalena, NM | 860 | 910 | 6.0% | 23.7% | 16.9% |
| Reserve, NM | 320 | 390 | 21.3% | 23.7% | 16.9% |
| Silver City, NM | 10,680 | 10,550 | -1.3% | 23.7% | 16.9% |

Note: The percentage change between the 1990 and 2000 population figures may not equal the growth rate due to rounding.

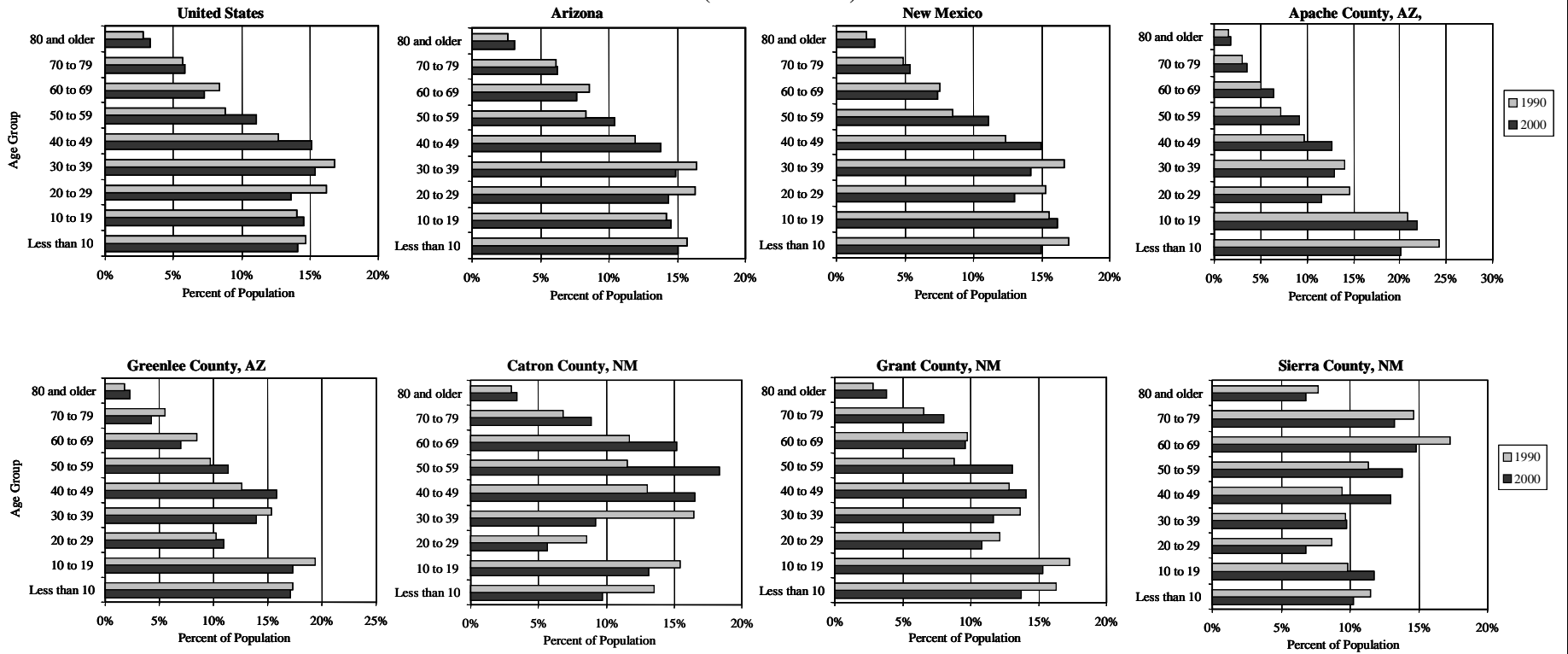
Sources: U.S. Census Bureau (1990), Census 1990; U.S. Census Bureau (2000), Census 2000.

2.4.2 Population Age Structure

Exhibit 2-8 compares the age distribution of the population within the U.S., Arizona, New Mexico, and the five counties containing portions of the BRWRA. Apache and Greenlee counties in Arizona have younger populations than the U.S. and Arizona averages. The counties within New Mexico (Catron, Grant, and Sierra) have disproportionately older populations and lower percentages of people below the age of 30 than the rest of the country and New Mexico. Catron and Grant counties in particular have aging populations, which could likely indicate the movement of retirees into these areas. Such movement could have impacts on median income levels and local industries, as discussed in subsequent sections.

Exhibit 2-8

POPULATION AGE STRUCTURE
(1990 and 2000)



Sources: U.S. Census Bureau (1990), Census 1990; U.S. Census Bureau (2000), Census 2000.

2.5 Economic Indicators

This section describes the economic conditions in the counties and communities in proximity to the BRWRA. Similar to the previous section, the discussion compares economic conditions in Apache, Greenlee, Catron, Grant, and Sierra counties as well as selected communities in the study area to state and national averages. Economic indicators include median household income, poverty rates, trends in employment and the portion of employment in the agriculture, forestry, fishing, and hunting sector, and unemployment rates.

2.5.1 Median Household Income

According to the 1990 U.S. Census, the median household income in Arizona was \$42,000 (2004\$), which was moderately below the national average of \$45,800 (2004\$).²⁹ According to the 2000 U.S. Census, the median income in Arizona was \$46,000, compared to the national average of \$47,600. The median household income in New Mexico during the same years was further below the national average; it equaled \$36,700 and \$38,700 in 1990 and 2000, respectively. As Exhibit 2-9 demonstrates, the median household income in the majority of counties in the study area was below the national and state averages. The average median household income in the five counties, weighted by population, was \$26,100 in 1990 and \$29,400 in 2000. Only Greenlee County approached average income levels; in 1990, the median household income in Greenlee County was \$41,900, while in 2000 the county's median household income equaled \$44,700. Of the counties in the study area, Apache County, Arizona, demonstrated the lowest median income; it was \$21,500 in 1990 and \$26,500 in 2000.³⁰ These figures are below the median income of \$32,900 (\$21,600 in nominal dollars) reported by the FEIS for the BRWRA in 1990.³¹ Income levels may be less than state averages due to the aging populations and number of retirees moving into the counties containing portions of the BRWRA because retired individuals living on fixed incomes typically have lower incomes than other segments of the population. Furthermore, residents of Apache County may demonstrate particularly low income levels because of the large portion of the land that is within Apache and Navajo reservations, areas that typically have lower income and higher poverty rates.

The majority of the communities within and in proximity to the BRWRA also exhibit below average median household incomes. In 1990, only Clifton and Eagar, Arizona, demonstrated income levels similar to state and national averages. The median household income was \$41,400 in Clifton and \$47,000 in Eagar. These higher incomes could be due to the presence of industry, including mining activity in Clifton and power generation in Eagar. The communities in the study area with the lowest median household incomes in 1990 were McNary, Arizona (\$16,800), and Deming, (\$23,700), Lordsburg, (\$24,500), and Bayard, New Mexico

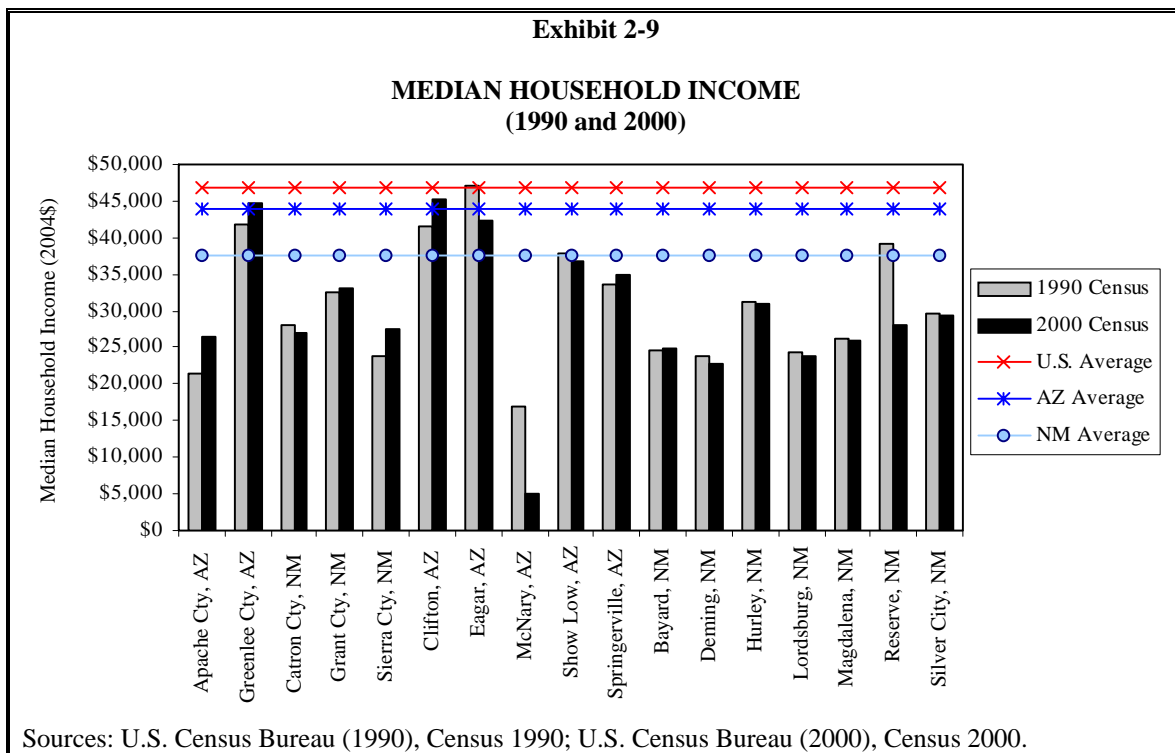
²⁹ All dollar values from this point forward are presented in 2004\$, adjusted based on the consumer price index for all commodities.

³⁰ U.S. Census Bureau (1990), Census 1990; U.S. Census Bureau (2000), Census 2000.

³¹ While the FEIS also relied on 1990 Census data for income figures, it only considered income levels in tracts within the BRWRA (Apache County 3901; Greenlee County 9704; all of Catron County; Grant County 9841, 9842, and 9849; and Sierra County 7824), while this analysis averages income levels throughout the counties containing portions of the BRWRA.

(\$24,600).³² Again in 2000, only Clifton (\$45,100) and Eagar (\$42,400) had median household incomes that approached state and national levels. McNary (\$5,000) and Deming (\$22,800) continued to demonstrate the lowest median household incomes among communities in the study area. In Arizona, New Mexico, the U.S., and the majority of counties and communities in the study area, median income levels increased moderately or remained relatively stable from 1990 to 2000. In Eagar and McNary, Arizona, and Reserve, New Mexico, however, income levels decreased by 10, 70, and 28 percent, respectively.³³

While the median household income in the majority of counties within and in proximity to the BRWRA is below national and state averages, several communities experienced a rise in median household income between 1990 and 2000. For example, Apache City, Greenlee City, Clifton, and Springerville, Arizona as well as Grant City, Sierra City, and Bayard, New Mexico all had a higher median household income in 2000 than in 1990. Exhibit 2-9 depicts the median household income levels in the study area communities according to the 1990 and 2000 U.S. Census.



³² Unlike the other communities in the study area, McNary is a Census Designated Place (CDP) rather than an incorporated municipality. This difference may partially account for its low income and high unemployment and poverty rates.

³³ U.S. Census Bureau (1990), Census 1990; U.S. Census Bureau (2000), Census 2000.

2.5.2 Poverty Rate

Just as median household incomes are disproportionately low in the study area, a greater portion of the population in proximity to the BRWRA lives below the poverty line. The 1990 Census reported that approximately 13 percent of the U.S. population lived in poverty, and the 2000 Census reported that approximately 12 percent lived in poverty. Both Arizona and New Mexico have higher poverty rates. In Arizona, 16 percent of the population lived below the poverty line in 1990 and 14 percent lived below the poverty line in 2000; in New Mexico, these percentages increase to 21 percent and 18 percent in 1990 and 2000, respectively.³⁴

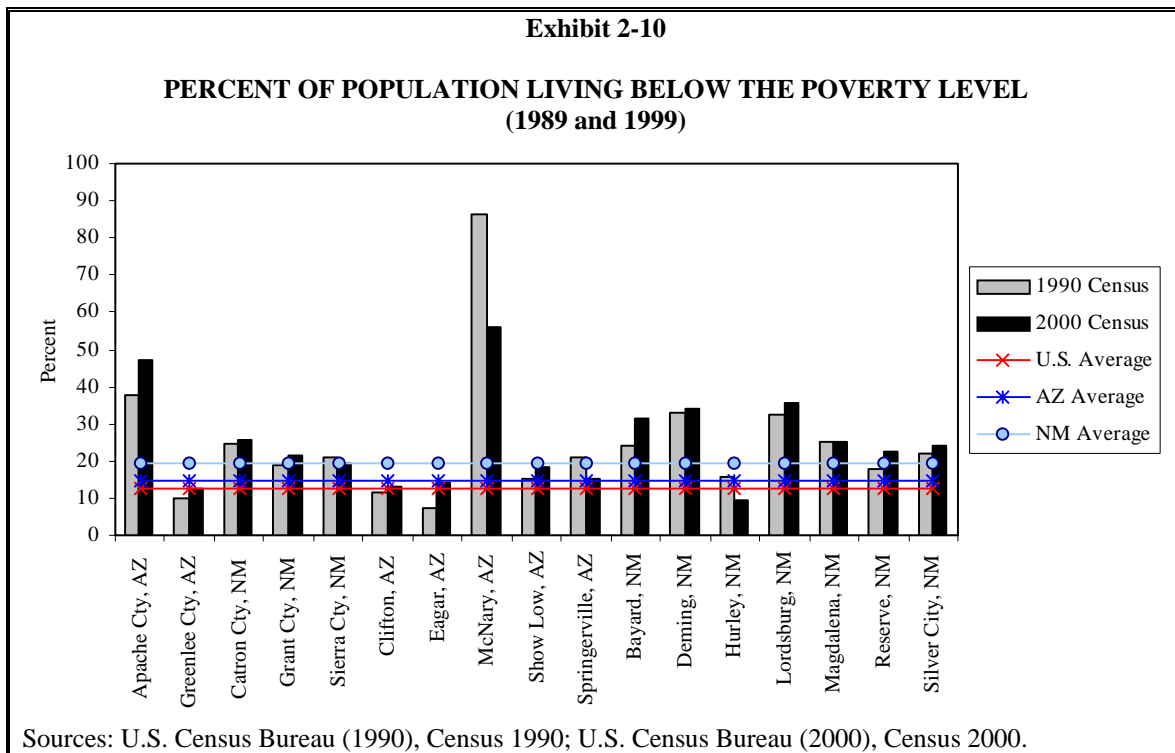
Once again, the majority of the counties containing portions of the BRWRA demonstrate poverty levels above the national average; the average poverty rate in the study area was 35 percent in 1990 and 29 percent in 2000. Only Greenlee County had equal or lower poverty rates (13 percent and 10 percent according to the 1990 and 2000 U.S. Census, respectively). While the poverty levels in Grant County (21 percent in 1990; 19 percent in 2000) and Sierra County (20 percent in 1990; 21 percent in 2000) exceed national levels, they were indicative of poverty rates throughout New Mexico. Apache County, Arizona, had the highest poverty rates of the five counties in both 1990 (47 percent) and 2000 (38 percent). Clifton and Eagar, Arizona, and Hurley, New Mexico, represent the only communities whose poverty rates approximately equal national levels. For the remaining communities, a disproportionate portion of the population lives below the poverty line compared to the remainder of the country. Show Low and Springerville, Arizona, as well as Reserve, New Mexico, have poverty rates similar to statewide averages. McNary demonstrated the highest poverty rate among the communities in the study area; according to the 1990 and 2000 Census, rates equaled approximately 56 and 86 percent, respectively. Bayard, Deming, and Lordsburg, New Mexico, also had higher poverty rates than the surrounding areas.³⁵

Several communities within and in proximity to the BRWRA did experience a reduction in poverty rates between 1990 and 2000. For example, the poverty rates dropped in McNary and Springerville, Arizona and Sierra City and Hurley, New Mexico. Exhibit 2-10 presents poverty status data for the areas in and surrounding the study area.

In contrast to the findings presented in this analysis, the FEIS reported that approximately 18 percent of the population in the BRWRA lived below the poverty level in 1990. This rate is closer to state and national averages. The difference in poverty rates between the FEIS and this analysis likely results from the difference in study areas; this analysis reports a weighted average for all counties containing portions of the BRWRA, while the FEIS only includes the 1990 Census tracts within the BRWRA (Apache County 3901; Greenlee County 9704; all of Catron County; Grant County 9841, 9842, and 9849; and Sierra County 7824).

³⁴ U.S. Census Bureau (1990), Census 1990; U.S. Census Bureau (2000), Census 2000.

³⁵ U.S. Census Bureau (1990), Census 1990; U.S. Census Bureau (2000), Census 2000.



2.5.3 Employment

Exhibit 2-11 presents the number of employees by industry in the study area in 2003. As discussed in the overview section, the majority of full- and part-time workers in the study area are employed by the government, trade, and service sectors. As discussed in the FEIS, increasing tourist activity and the movement of retirees into the counties likely drives the trade and service sectors. The same trends are also likely to contribute to employment in the construction and real estate markets in these communities. The government, trade, and service sectors are not as likely to experience extensive positive or negative impacts due to the presence of Mexican wolves. The Reintroduction Project could increase the workload of some government employees. For instance, the U.S. Fish and Wildlife Service would likely require additional staff to administer the program, and state and local officials may spend time attending meetings related to the Mexican wolf. Overall, however, the government sector should not change greatly due to Mexican wolves. The presence of wolves could also affect tourism activities, but no single sector accounts for all such activities. Instead, tourism is only one driver of several sectors such as retail trade, accommodation and food services, arts, entertainment, and recreation, and real estate.

Exhibit 2-11

EMPLOYMENT ACROSS SECTORS, 2003^a

| Industry | Arizona | New Mexico | Apache, AZ | Greenlee, AZ | Catron, NM | Grant, NM | Sierra, NM |
|---|------------------|------------------|---------------|--------------|--------------|---------------|--------------|
| Farm | 22,523 | 23,950 | 459 | 216 | 308 | 442 | 357 |
| Agricultural Services, Forestry, Hunting, and Fishing | 22,835 | 7,387 | (D) | (D) | 91 | (D) | (D) |
| Mining | 10,707 | 17,556 | (D) | (D) | (L) | 609 | (D) |
| Utilities | 11,548 | 4,057 | (D) | 47 | (D) | (D) | (D) |
| Construction | 217,526 | 63,008 | 1,181 | 264 | 103 | 987 | 300 |
| Manufacturing | 187,381 | 42,245 | (D) | (D) | 28 | 226 | 53 |
| Wholesale Trade | 102,715 | 26,404 | 303 | (D) | (D) | 198 | (D) |
| Retail Trade | 340,332 | 113,289 | 2,124 | 247 | 87 | 1,575 | 504 |
| Transportation and Warehousing | 81,482 | 24,093 | (D) | (D) | 57 | (D) | 75 |
| Information | 56,069 | 17,733 | 145 | (D) | (D) | 179 | 32 |
| Finance and Insurance | 159,189 | 31,680 | (D) | (D) | 13 | 310 | 100 |
| Real Estate | 141,671 | 30,922 | (D) | (D) | 84 | 414 | 223 |
| Services ^b | 815,708 | 263,506 | 3,907 | (D) | 162 | 2,502 | 1,040 |
| Government | 417,726 | 213,002 | 13,285 | 532 | 364 | 3,618 | 946 |
| Other ^b | 339,055 | 127,531 | 1,712 | 0 | 31 | 210 | 112 |
| Total^c | 2,926,467 | 1,006,363 | 25,362 | 4,295 | 1,531 | 13,329 | 4,514 |

Notes:

^a The estimates of employment are based on the 2002 North American Industry Classification System (NAICS). (D) signifies that actual employment figures are not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals. (L) signifies that there are less than 10 jobs in a sector, but the estimates for this item are included in the totals.

^b Numbers for the "Services" and "Other" sectors may underestimate employment as certain subsectors within these categories do not list employment data for proprietary reasons given the small number establishments within these subsectors.

^c Employment across sectors may not sum to total because certain sectors do not report employment figures for proprietary reasons given the small number of establishments within these sectors.

Source: U.S. Department of Commerce Bureau of Economic Analysis (2005), Regional Economic Accounts, CA25: Total full-time and part-time employment by industry, accessed May 11, 2005, at <<http://www.bea.doc.gov/bea/regional/reis/default.cfm>>.

The sectors that most likely experienced the greatest changes due to the Mexican wolf Reintroduction Project are farming and the services associated with agriculture, hunting, and the fishing sectors; Exhibit 2-12 presents changes in these sectors as well as changes in total employment between 1990 and 2003. In Arizona, New Mexico, and Apache, Greenlee, and Grant counties, agriculture represents five percent or less of total employment in both 1990 and 2003.³⁶ In Sierra County, agriculture and related services accounted for 11 and eight percent of

³⁶ For the remainder of this section, employment in "agriculture" refers to full- and part-time employment within the agricultural services, forestry, fishing, and hunting sector (SIC 100 in 1990; NAICS two-digit sector "11" in 2003) and employment on farms and ranches. Employment numbers for "agriculture" may underestimate actual employment as certain subsectors within these categories do not list employment data for proprietary reasons given the small number establishments within these subsectors.

employment in 1990 and 2003, respectively. Agriculture and related services employ the largest portion of the population in Catron County; in 1990 and 2003, these sectors accounted for 23 and 26 percent of the population, respectively.³⁷

| Exhibit 2-12 | | | | |
|---|--------------------------------|-------------|-------------|-----------------------|
| TOTAL EMPLOYMENT VERSUS EMPLOYMENT IN THE AGRICULTURE, FISHING, AND HUNTING SECTOR | | | | |
| (1990 – 2003) | | | | |
| | Year | 1990 | 2003 | Percent Change |
| Arizona | Total^a | 1,909,879 | 2,926,467 | 53.23% |
| | Agriculture^b | 47,114 | 45,358 | -3.73% |
| | Percent | 2.47% | 1.55% | N.A. |
| New Mexico | Total^a | 767,139 | 1,006,363 | 31.18% |
| | Agriculture^b | 28,180 | 31,337 | 11.20% |
| | Percent | 3.67% | 3.11% | N.A. |
| Apache County, AZ | Total^a | 17,876 | 25,362 | 41.88% |
| | Agriculture^b | 483 | 459 | -4.97% |
| | Percent | 2.70% | 1.81% | N.A. |
| Greenlee County, AZ | Total^a | 3,607 | 4,295 | 19.07% |
| | Agriculture^b | 187 | 216 | 15.51% |
| | Percent | 5.18% | 5.03% | N.A. |
| Catron County, NM | Total^a | 1,246 | 1,531 | 22.87% |
| | Agriculture^b | 282 | 399 | 41.49% |
| | Percent | 22.63% | 26.06% | N.A. |
| Grant County, NM | Total^a | 12,046 | 13,329 | 10.65% |
| | Agriculture^b | 436 | 442 | 1.38% |
| | Percent | 3.62% | 3.32% | N.A. |
| Sierra County, NM | Total^a | 3,334 | 4,514 | 35.39% |
| | Agriculture^b | 352 | 357 | 1.42% |
| | Percent | 10.56% | 7.91% | N.A. |
| <p>Note:</p> <p>^a "Total" represents total full and part-time employment, including employees, sole proprietors, and active partners but not unpaid family workers or volunteers.</p> <p>^b "Agriculture" represents employment within the agricultural services, hunting, forestry, and fishing sector (SIC 100 in 1990; NAICS two-digit sector "11" in 2003) and employment on farms and ranches. Employment numbers for "Agriculture" may underestimate actual employment as certain subsectors within these categories do not list employment data for proprietary reasons given the small number establishments within these subsectors..</p> <p>Source: U.S. Department of Commerce Bureau of Economic Analysis (2005), Regional Economic Accounts, CA25: Total full-time and part-time employment by industry, accessed May 11, 2005, at <http://www.bea.doc.gov/bea/regional/reis/default.cfm>.</p> | | | | |

From 1990 to 2003, total employment across all sectors in Arizona and New Mexico increased by 53 and 31 percent, respectively. This increase in employment resembled changes in

³⁷ U.S. Department of Commerce Bureau of Economic Analysis (2005), Regional Economic Accounts, CA25: Total full-time and part-time employment by industry, accessed May 11, 2005, at <<http://www.bea.doc.gov/bea/regional/reis/default.cfm>>.

population, which increased by 53 percent and 24 percent from 1990 to 2000 in Arizona and New Mexico, respectively. Employment growth did outpace population growth in the study area, however; employment increased by 32 percent from 1990 to 2003, while population increased by 11 percent during the same period. Employment increases in the majority of the five counties containing portions of the BRWRA did not match state rates; only Sierra County sustained employment increases that exceeded the state average (35 percent increase, compared to 31 percent throughout New Mexico).

In the majority of the counties containing portions of the BRWRA, employment in the agriculture sectors did not demonstrate the same growth as total employment. In Arizona, employment in the agriculture sectors decreased by almost four percent. Consequently, the percent of employment within the agriculture sector decreased from 1990 to 2003. In New Mexico, both total and agricultural employment increased, but since increases in the agriculture sectors were less substantial, the percent of employment in agriculture declined slightly. The percent of employment attributable to agriculture decreased in Apache County as total employment increased by 42 percent but agricultural employment decreased by five percent. Catron County represents the only county where the percentage of the workforce within the agriculture sectors increased; Bureau of Economic Analysis data suggest that agricultural employment increased by 41 percent from 1990 to 2003 while total employment grew by only 23 percent. In the remaining counties, both agricultural and total employment increased during this period, resulting in little change in the percent of employment attributable to agriculture.³⁸ The FEIS predicted that farm and ranch employment would decrease by approximately eight percent from 1988 to 2000. While agriculture did not grow as strongly as other sectors in the study area, it did perform better than FEIS predictions.

Growth in employment in the agriculture sectors exceeded population increases in Greenlee and Catron counties between 1990 and 2003. In Greenlee County, population decreased by six percent while employment in the agriculture sectors increased by almost 16 percent. In Catron County, employment in the agriculture sectors increased by 41 percent, compared to a 33 percent increase in population. In the remaining counties in the study area, however, population growth exceeded changes in employment in the agriculture sectors. In Apache County, employment in the agriculture sector decreased by five percent while population increased by 11 percent. In Grant and Sierra counties, employment in the agriculture sectors increased by one percent while population increased by eight and 32 percent, respectively.

2.5.4 Unemployment

In 1990, the unemployment rate was six percent nationwide, seven percent in Arizona, and eight percent in New Mexico.³⁹ Unemployment was higher in the study area, averaging 17 percent. Of the five counties, Apache County, Arizona, demonstrated the highest unemployment

³⁸ U.S. Department of Commerce Bureau of Economic Analysis (2005), Regional Economic Accounts, CA25: Total full-time and part-time employment by industry, accessed May 11, 2005, at <<http://www.bea.doc.gov/bea/regional/reis/default.cfm>>.

³⁹ The unemployment rate equals the number of unemployed in the civilian labor force divided by the total civilian labor force.

rate (24 percent); this rate could in part be the result of the high percentage of the population living on the Apache and Navajo reservations, as reservations typically demonstrate above-average unemployment rates. Catron and Grant counties, New Mexico, also had rates higher than 10 percent in 1990; unemployment totaled almost 13 percent in Catron County and over 10 percent in Grant County. Unemployment in Greenlee and Sierra counties was closer to the state and national averages. Of the communities, McNary, Arizona, demonstrated the highest unemployment rate, topping 50 percent. Several other communities in the study area also had unemployment rates greater than 10 percent, including Springerville, Arizona (13 percent), and Bayard (13 percent), Deming (17 percent), Hurley (11 percent), Lordsburg (12 percent), and Silver City, New Mexico (11 percent).⁴⁰

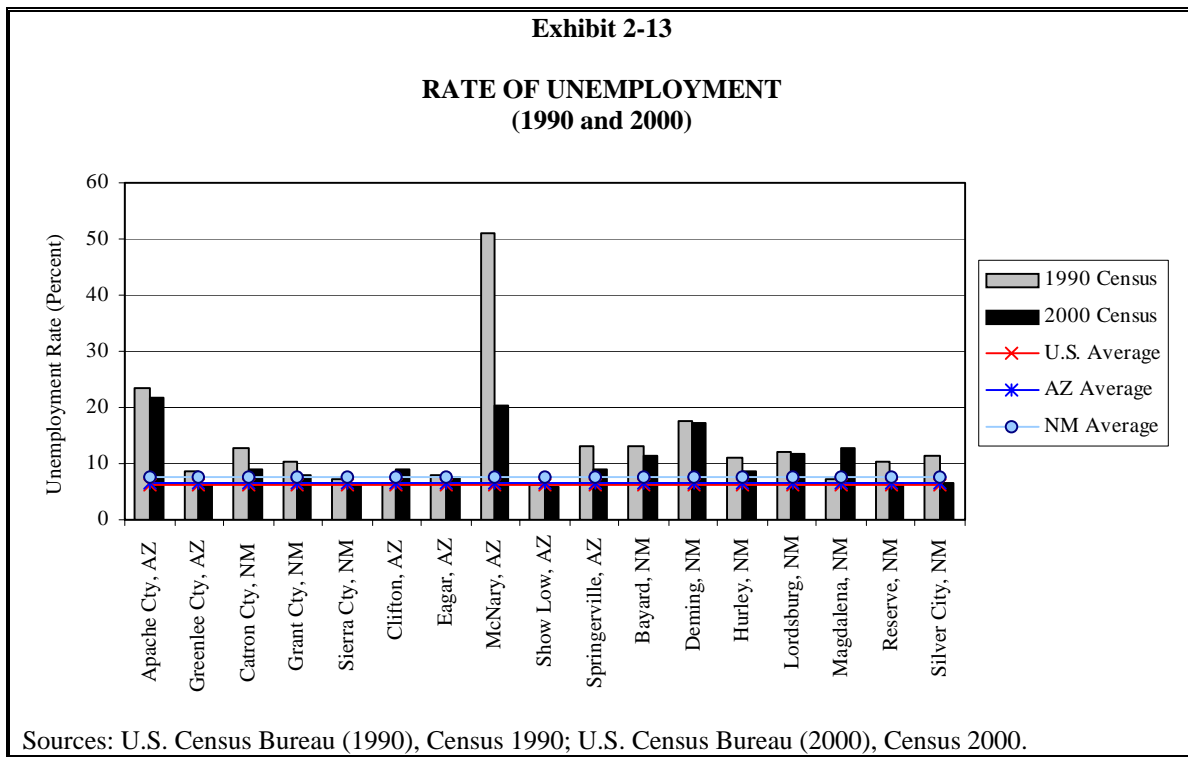
The national unemployment rate continued to equal approximately six percent in 2000. Similarly, it equaled six percent in Arizona and seven percent in New Mexico. As in 1990, unemployment throughout the study area was higher, averaging 15 percent in 2000. Apache County continued to have the highest unemployment rate of the five counties; unemployment totaled approximately 22 percent in 2000. The remaining counties experienced moderately high unemployment rates during this time period compared to national and state averages. McNary, Arizona, continued to have the highest unemployment rate among the communities in the study area (21 percent). Fewer cities and towns in the study area demonstrated rates exceeding 10 percent in 2000; only the New Mexico communities of Bayard (11 percent), Deming (17 percent), Lordsburg (12 percent), and Magdalena (13 percent) had double-digit unemployment rates. While unemployment in the U.S., Arizona, New Mexico, and the majority of counties and communities decreased from 1990 to 2000, it increased in Clifton, Arizona (seven percent to nine percent), and Magdalena, New Mexico (seven to 13 percent).⁴¹

While unemployment rates were higher than the state and national averages, many of the communities studied exhibited a reduction in unemployment between 1990 and 2000. With exception of Clifton, AZ and Magdalena, NM, all communities exhibited at least a slight decline in unemployment rates. Exhibit 12-13 presents unemployment rate data for these areas.

Note that unemployment rates reported in this analysis are more than twice as high as unemployment rates presented in the FEIS. For example, this analysis states that the average unemployment rate in the study area was 17 percent in 1990, while the FEIS reports an unemployment rate of 8.3 percent. As noted above, this difference most likely occurs because this analysis calculates unemployment rates across the five counties containing portions of the BRWRA, while the FEIS averages unemployment rates across the 1990 Census tracts that are within the BRWRA.

⁴⁰ U.S. Census Bureau (1990), Census 1990; U.S. Census Bureau (2000), Census 2000.

⁴¹ U.S. Census Bureau (1990), Census 1990; U.S. Census Bureau (2000), Census 2000.



2.6 Conclusions

The majority of counties and communities in proximity to the BRWRA exhibit weaker demographic and economic indicators than Arizona and New Mexico as a whole. The poverty and unemployment rates are, in general, higher than elsewhere in the states and nationwide. Likewise, communities in proximity to the BRWRA have lower median household incomes. Employment in the agriculture, fishing, and hunting sector remains a small percentage of total employment with no clear increasing or decreasing trend.

Certain portions of the study area demonstrated particularly lower household income and higher poverty and unemployment rates. Apache County may have weaker economic indicators (i.e., lower median incomes and higher poverty and unemployment rates) in part due to the large portion of Native American-owned land in the northern part of the county (66 percent). McNary, Arizona, may demonstrate lower income and higher poverty and unemployment rates than other communities in the study area because it is a Census Designated Place (CDP) rather than an incorporated municipality. While the majority of the communities have weaker economic indicators than the state averages, Clifton’s higher than average income and employment rate and a lower poverty rate may result from local mining activities. As discussed above, a nearby mine employs citizens from Clifton as well as residents in the surrounding areas, bringing economic activity to the area.

As discussed, there has been some improvement in the economic indicators for the studied communities between 1990 and 2000. Many communities have experienced an increase

in median household income, a decrease in poverty rates, and a decrease in unemployment rates during this time period.

The FEIS was accurate when predicting that the areas in proximity to the BRWRA would not experience the same population growth from 1990 to 2000 as elsewhere in Arizona and New Mexico. Similarly, the FEIS also noted that median income levels in the BRWRA were below state and national averages in 1990 (the FEIS did not project future income trends). As both the FEIS and this analysis note, lower income levels could be the result of aging populations and the movement of retirees into the study area.

While some FEIS projections are similar to trends reported in this analysis, other economic indicators vary between the two studies. Most notably, 1990 poverty and unemployment rates reported in the FEIS are lower than in this analysis. This difference most likely occurs because the FEIS relies on statistics from the 1990 Census tracts that are within the BRWRA (Apache County 3901; Greenlee County 9704; all of Catron County; Grant County 9841, 9842, and 9849; and Sierra County 7824). Since the location of tracts is not consistent between Censuses, however, this analysis defines the study area as the five counties that contain portions of the BRWRA in order to compare statistics between 1990 and 2000.

**ECONOMIC IMPACTS OF MEXICAN WOLF
REINTRODUCTION ON RANCHING ACTIVITIES****SECTION 3**

This section of the analysis discusses the economic impacts of Mexican wolf reintroduction in the BRWRA on ranching activities from 1998 to 2004.⁴² The section first highlights categories of economic impacts on ranching activities that ranchers have identified. Estimates are then presented of the number of livestock depredations by wolves and the associated costs of these losses to ranchers, including the regional impact of decreased cattle production in the BRWRA. The analysis also compares the total economic impacts experienced by ranchers since the Reintroduction Project began with the monetary compensation that ranchers have received for livestock losses. Finally, depredation estimates are compared to projected losses reported in the FEIS.⁴³

3.1 Economic Concerns of the Ranching Industry Utilizing the BRWRA

Ranchers and researchers have identified a number of consequences that may result from the reintroduction of wolves in proximity to ranch operations. These impacts are summarized in the following categories:

Physical Effects:

- 1) **Depredation of ranch animals:** Includes cattle, sheep, horse, and dog deaths and injuries resulting from wolf attacks; and
- 2) **Non-lethal physiological impacts on ranch animals:** Includes weight loss, stress, and lower birth rates.

⁴² This analysis evaluates the economic impacts associated with the wolf Reintroduction Project from 1998 to 2003. However, data for 2004 is included where available. Throughout this analysis, the “impacts” refer to both (positive) benefits and (negative) costs that could result from the Mexican wolf Reintroduction Project.

⁴³ U.S. Fish and Wildlife Service (1996), *Reintroduction of the Mexican Wolf Within Its Historic Range in the Southwestern United States: Final Environmental Impact Statement*.

Effects on Livestock Management:

- 3) **Change in forage use:** Ranchers may have to move cattle more often, or be forced to move them to alternative grazing sites to avoid depredation;
- 4) **Need for additional labor:** Ranchers must invest time to report depredation losses, and may increase herd supervision;
- 5) **Increased expenditures on supplies:** Includes purchasing replacement cattle and additional herding dogs, as well as increased wear on vehicles; and
- 6) **Positive impacts:** Includes increased predation on coyotes and/or improved forage conditions due to less competition with elk.

Property Value Impacts:

- 7) Ranchers have expressed concern that disproportionately affected ranches may go out of business due to wolf depredation impacts.
- 8) Ranchers have expressed concern that the market value of their ranches may be reduced due to wolf impacts.

This analysis estimates the economic costs of wolf reintroduction to ranching activities due to wolf predation on ranch animals, as well as the value of time spent by ranchers to apply for compensation. We also consider compensation received by ranchers for animal losses and estimate the annual regional economic effects of decreased livestock production. The economic impact of non-lethal physiological impacts on cattle, increased expenditures on ranch supplies, and potential impacts are also discussed in more detail but are not quantified in this analysis. To identify impacts, we interviewed cattle and sheep ranchers in the BRWRA and in Idaho, reviewed public comments submitted to the USFWS, collected data from relevant Federal and state agencies, and reviewed literature on wolf reintroductions in the U.S.

3.2 Brief Overview of Ranching Activities in the BRWRA

According to the USDA 2002 Census of Agriculture, there are 122,500 cattle, at least 300 sheep and lambs, and 9,000 horses and ponies in Apache and Greenlee counties, Arizona, and Catron, Grant, and Sierra counties, New Mexico.⁴⁴ Based on acreage, this analysis estimates that 34,800 cattle, (6,900 in Arizona and 27,800 in New Mexico), at least 120 sheep (80 in Arizona and 40 in New Mexico), and 1,600 horses (800 in Arizona and 800 in New Mexico) grazed in the

⁴⁴ Sheep and lamb data underestimate total numbers because Apache and Catron counties do not report sheep inventories in order to protect the proprietary information of the few establishments that raise sheep. U.S. Department of Agriculture National Agricultural Statistics Service (2002), 2002 Census of Agriculture, accessed March 9, 2005, at <<http://www.nass.usda.gov/census/>>.

BRWRA in 2002 (the year of highest recorded depredations).⁴⁵ While these estimates are less than half of the 82,600 cattle estimated in the FEIS to graze in the BRWRA, they are consistent with the number of cattle that are authorized to graze in the Gila and Apache National Forests.⁴⁶ The difference in estimates between this analysis and the FEIS could be explained by 1) the recent decrease in the number of authorized head in the National Forests, in part due to a multi-year drought; and/or 2) the FEIS figures may have been based on permitted head, which represents the maximum number of cattle that may potentially graze in an allotment.⁴⁷

Exhibit 3-1 presents the number of authorized animal unit months (AUMs) from 1986 to 2002 for cattle in the Gila National Forest, the portion of the BRWRA within New Mexico.⁴⁸ As the Exhibit indicates, the number of authorized AUMs declined over the past two decades. This trend is likely to result from multiple factors, including declining forage conditions due to drought and competition for forage by other ungulates, changes in the market conditions for livestock, as well as attempts by USFS range managers to improve riparian habitat and to comply with other endangered species requirements.

Death losses include deaths caused by predators (such as coyotes, dogs, mountain lions, and bobcats); digestive, respiratory, and calving problems; weather conditions; poison; theft; and unknown causes. The average death loss rate for cattle and calves in Arizona and New Mexico was four percent in 1997 (the year prior to the Mexican Wolf Reintroduction Project); the average death loss rate for sheep in the two states was five percent in 1997.⁴⁹ Applying these percentages to the estimated number of livestock in the BRWRA, approximately 1,310 cattle and calves and six sheep are likely to have died from causes other than slaughter in the BRWRA in 2002 (the year of highest recorded depredations).

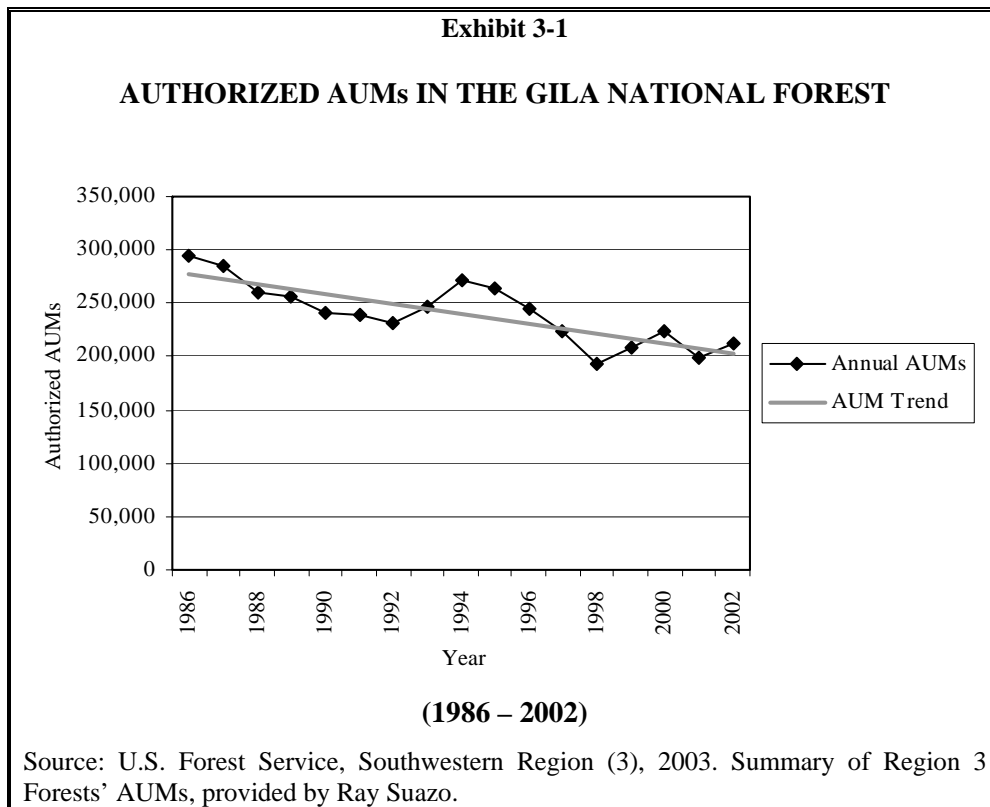
⁴⁵ In order to estimate the number of livestock in the BRWRA, this analysis multiplies the total county livestock figures by the percentage of the county that falls within the BRWRA.

⁴⁶ The methodology employed in this analysis estimates that 27,800 cattle grazed in the Gila National Forest in 2002. According to the U.S. Forest Service, up to 30,100 cattle are permitted to graze in the forest, while in 2004 only 18,800 cattle were actually authorized to do so.

⁴⁷ This analysis of the number of cattle grazed in the BRWRA (based on acreage) yields number of estimated head that is consistent with the known number of authorized head in 2004. However, this analysis estimates that almost 900 horses and 100 sheep existed in the Gila National Forest in 2002, while the U.S. Forest Service reports that only approximately 300 horses and no sheep were authorized to graze in the forest in 2004. This is likely to be the result of assuming that livestock are grazed evenly throughout the BRWRA area, and indicates that this analysis may overestimate the number of sheep and horses in the BRWRA. The source of the 2002 authorization numbers is: U.S. Forest Service (2005), 2004 Livestock Head Estimates, received from Russell Ward, Gila National Forest, March 9, 2005.

⁴⁸ Data describing AUMs in the Apache-Sitgreaves National Forest, which contains the Arizona portion of the BRWRA, are not readily available for the same time period.

⁴⁹ U.S. Department of Agriculture National Agricultural Statistics Service (1999), Meat Animals Production, Disposition, and Income: Final Estimates 1993-1997. Statistical Bulletin Number 959a.



According to the USDA’s 2002 Census of Agriculture, there are almost 9,700 cattle and calf ranches in New Mexico and Arizona; approximately eight percent of these ranches are within the five counties containing portions of the BRWRA.⁵⁰ Exhibit 3-2 demonstrates that within the study area, the majority of cattle and calf ranches (60 percent) are Very Small, consisting of fewer than 50 head. Fourteen percent of ranches are classified as small (50 to 99 head); 20 percent are medium (100 to 499 head); and six percent are large (at least 500 head). In 2005, nearly all ranches in the study area were classified as small entities.⁵¹ The USDA also reports that livestock cash receipts in 2002 (including, but not limited to, cattle and calf establishments) in the five counties totaled \$83.9 million (2004\$).⁵² Based on acreage, this analysis estimates that approximately \$17.4 million (21 percent) of this revenue is attributable to activities within the BRWRA.

⁵⁰ In contrast, Section 3 of this analysis notes that the five counties contain less than two percent of Arizona and New Mexico’s population.

⁵¹ Dialog search of File 516, Dun and Bradstreet, “Duns Market Identifiers.” Nov. 21, 2005.

⁵² U.S. Department of Agriculture National Agricultural Statistics Service (2002), 2002 Census of Agriculture, accessed March 9, 2005, at <<http://www.nass.usda.gov/census/>>.

| Exhibit 3-2 | | | | | | |
|--|---|------------------|--------------|--------------|--------------|------------|
| CATTLE AND CALVES: NUMBER OF OPERATIONS BY SIZE GROUP, 2002 | | | | | | |
| | Area | Total Operations | Extra Small | Small | Medium | Large |
| | | | < 50 Head | 50-99 Head | 100-499 Head | > 500 Head |
| States | Arizona | 2,838 | 1905 | 278 | 443 | 212 |
| | New Mexico | 6,845 | 3,983 | 810 | 1388 | 664 |
| | Total | 9,683 | 5,888 | 1,088 | 1,831 | 876 |
| | Percent | 100% | 61% | 11% | 19% | 9% |
| Counties | Apache, AZ | 227 | 155 | 38 | 26 | 8 |
| | Greenlee, AZ | 79 | 59 | 7 | 10 | 3 |
| | Catron, NM | 154 | 83 | 17 | 38 | 16 |
| | Grant, NM | 192 | 103 | 32 | 44 | 13 |
| | Sierra, NM | 107 | 54 | 13 | 31 | 9 |
| | Total | 759 | 454 | 107 | 149 | 49 |
| | Percent | 100% | 60% | 14% | 20% | 6% |
| | Source: U.S. Department of Agriculture National Agricultural Statistics Service (2002), 2002 Census of Agriculture, accessed March 9, 2005, at < http://www.nass.usda.gov/census/ >. | | | | | |

3.3 Economic Impacts of Wolf Depredation of Ranch Animals

The biggest concern of the livestock industry related to wolf reintroduction is the loss of ranch animals to wolf predation. Indeed, across the U.S, wolves have attacked cattle, sheep, horses, and dogs following their reintroduction. Depredation estimates are described below and are detailed in Exhibits 3-2 through 3-8.

According to ranchers’ experience, depredation rates vary based on the size of wolf packs and livestock’s proximity to wolf home ranges and rendezvous sites. In addition, wolves tend to return to sites where they have successfully killed prey before.⁵³ It is therefore not surprising that in the BRWRA, certain ranchers have suffered repeated wolf attacks on livestock while neighboring ranchers have experienced few problems.⁵⁴ By rancher estimates, of 25 ranches that reported cattle losses since 1998, nearly all reported more than one depredation event. In one example, one rancher noted that wolves no longer attacked her cattle when she moved the cattle to another pasture. However, the move caused her neighbor to experience more wolf attacks as the wolves began to prey on the neighbor’s herd instead.⁵⁵

Sources indicate that calves are most commonly killed because they are more vulnerable than adult cattle, even when cows attempt to protect them. Bjorge and Gunson (1983) report that

⁵³ R. Loucks, Wolf Coordinator for Lemhi County, Idaho, personal communication, March 3, 2005.

⁵⁴ Repeated attacks could also be the result of other factors such as management and husbandry practices.

⁵⁵ D. Ely, Arizona rancher, personal communication, March 4 and 24, 2005. One public commenter pointed out that ranchers, who are restricted by their permits and allotment grazing plans, may not have the option of moving cattle to another pasture when faced with depredation threats (see C/R #556).

of 377 cattle killed by wolves in Alberta, Canada, 62 percent were calves, 23 percent were cows, 15 percent were yearlings, and 0.2 percent were bulls.⁵⁶ Oakleaf et al. (2003) found that wolves tend to kill younger calves more frequently than calves born earlier in the spring.⁵⁷ Some ranchers indicate that yearlings are also commonly killed because they are more likely to approach wolves.⁵⁸ While depredation estimates are often not reported by age of animal, Defenders of Wildlife (DoW) and rancher records suggest that wolves in the BRWRA kill more calves than adult cattle.⁵⁹ For example, rancher estimates of cattle depredation in the BRWRA suggest that nearly ninety percent of cattle lost to wolf predation were calves.⁶⁰ Because of the lack of consistent data describing age of lost livestock, this analysis does not subdivide loss estimates by age.⁶¹

In the BRWRA, the DoW Bailey Wildlife Wolf Compensation Trust compensates ranchers who have lost ranch animals to Mexican wolves. The program pays ranchers for 100 percent of the market value of a confirmed kill, 50 percent of the value of a probable kill, and 100 percent of the veterinary services to treat an injured animal or the decreased market value of the animal. A state or Federal wildlife agent (most commonly, Wildlife Services within the U.S. Department of Agriculture's Animal and Plant Health Inspection Service) must determine whether the kill is confirmed or probable upon inspecting the carcass; if no body is recovered, DoW will not compensate ranchers.⁶² Ranchers are frequently unable to locate carcasses or notify wildlife agents soon enough to receive a confirmed or probable designation because of the rugged and vast terrains where livestock graze, consumption by predators and scavengers, and carcass decomposition.⁶³ Ranchers report that when wolves kill calves, very little carcass typically remains for purposes of confirming the kill with DoW.⁶⁴ Some ranchers who cannot

⁵⁶ R.R. Bjorge and J.R. Gunson (1983), Wolf predation of cattle on the Simonette River pastures in northwestern Alberta, 1983, pp. 106-111 in Ludwig N. Carbyn, ed, in *Wolves in Canada and Alaska, Proceedings of the Wolf Symposium, Edmonton, Alberta, 1983*, Canadian Wildlife Services Report Series, Ottawa, Canada.

⁵⁷ John K. Oakleaf et al. (2003), Effects of wolves on livestock calf survival and movements in central Idaho, *Journal of Wildlife Management* 67(2): 299-306.

⁵⁸ D. Ely, Arizona rancher, personal communication, March 4 and 24, 2005; Robert Loucks, Wolf Coordinator for Lemhi County, Idaho, personal communication, March 3, 2005.

⁵⁹ D. Ely, Arizona rancher, personal communication, March 4 and 24, 2005; Laura Schneberger, New Mexico rancher, personal communication, March 26, 2005; Defenders of Wildlife, The Bailey Wildlife Foundation Wolf Compensation Trust: Payments to Ranchers for Livestock Losses Caused by Wolves, accessed January 24, 2005, at <<http://www.defenders.org/wildlife/wolf/wolfcomp.pdf>>.

⁶⁰ L. Schneberger, New Mexico rancher, personal communication, March 26, 2005.

⁶¹ As described later in this section, calves carry a lower market value than adult cows. Thus, the analysis would overstate the value of the cattle killed if they were, in fact, all calves;

⁶² C. Miller, Defenders of Wildlife, personal communication, March 20, 2005.

⁶³ John K. Oakleaf et al. (2003), Effects of wolves on livestock calf survival and movements in central Idaho, *Journal of Wildlife Management* 67(2): 299-306. Personal communication with Jim Blair, New Mexico rancher, November 15, 2005. Personal communication with B. Wilson, New Mexico rancher, November 16, 2005. Personal communication with S. Luce, Arizona rancher, November 16, 2005. Personal communication with F. Galley, New Mexico rancher, November 16, 2005. Personal communication with L. Schneberger, New Mexico rancher, November 17, 2005.

⁶⁴ Personal communication with F. Galley, New Mexico rancher, November 16, 2005.

locate carcasses may not bother to report their losses. Consequently, it is likely that more ranch animal depredation has occurred than has been recorded by wildlife agencies and DoW.

3.3.1 Estimating the Number of Livestock Losses

Sufficient evidence exists to indicate that ranch animal depredations have occurred as the result of Mexican wolves in the BRWRA. However, estimating the exact number of livestock that have been killed by wolves remains controversial due to difficulties associated with locating carcasses and determining cause of death. Thus, this analysis presents three estimates of the number and type of ranch animals killed by wolves since the Reintroduction Project began:⁶⁵

- **Low Estimate:** For cattle, sheep, horse, and dog kills, the low estimate equals the average number of kills confirmed by the USFWS, the U.S. Department of Agriculture (USDA), and DoW. Probable kills are not included in this estimate.
- **Medium Estimate:**⁶⁶ For cattle and sheep kills, the medium estimate represents the average number of confirmed kills (i.e., the low estimate) multiplied by a factor from published literature that estimates the ratio of total kills to confirmed kills. For horse and dog kills, the medium estimate includes probable deaths reported by USFWS, USDA, and DoW in addition to confirmed kills.
- **High Estimate:** The high estimates of cattle and horse kills are based upon estimates of total livestock losses to wolf depredation by ranchers within the BRWRA.⁶⁷ These estimates are detailed in Appendix A. Ranchers in the BRWRA did not provide estimates of total sheep and dog kills in the BRWRA from 1998 to 2004. Thus, the high estimate of these kills is assumed to equal the medium estimate.

Exhibits 3-3 through 3-8 presents the low, medium, and high estimates of the number of livestock killed by Mexican wolves in the BRWRA from 1998 to 2004. We also present one estimate for ranch animal injuries that have resulted from wolf attacks (Exhibit 3-8). To be clear, assumptions for each animal are described separately below:

- **Cattle:** The low estimate is the average number of confirmed agency-recorded kills. To derive the medium estimates for cattle kills, the analysis multiplies the average

⁶⁵ For all estimates in this analysis, the number of cattle, sheep, horse, and dog killed by wolves is separate from and does not include the number of livestock lost for other reasons such as depredations by other carnivores, consuming poisonous plants, disease, weather conditions, or other causes.

⁶⁶ Medium estimate represents neither an average nor a “best” estimate of depredations. Rather, low, medium, and high estimates represent three separate methods for estimating livestock losses resulting from reintroduction of Mexican wolf.

⁶⁷ Laura Schneberger, a New Mexico rancher, compiled estimates from ranchers throughout the BRWRA of losses that they believe are attributable to Mexican wolves.

number of agency-confirmed kills by the estimated ratio of total livestock losses to confirmed livestock losses (5.6:1 cattle losses to agency-confirmed kills). The high estimate represents rancher estimates of losses.

- **Sheep:** The low estimate is the average number of confirmed agency-recorded kills. To derive the medium estimates for cattle kills, the analysis multiplies the average number of agency-confirmed kills by the estimated ratio of total livestock losses to confirmed livestock losses (2.3:1 sheep losses to agency-confirmed kills). Because no sheep losses were recorded in rancher estimates, the high estimate is assumed to be equal to the medium estimate.
- **Horses:** The low estimate is the average number of confirmed agency-recorded kills. No data was available to establish a likely ratio of total kills to agency-recorded confirmed kills for horses. Therefore, the medium estimates of horse kills equal the agency-confirmed kills plus the agency-recorded "probable" kills. The high estimate represents rancher estimates of losses.⁶⁸
- **Dogs:** The low estimate is the average number of confirmed kills. No data was available to establish a likely ratio of total kills to agency-recorded confirmed kills for dogs. Therefore, the medium estimates of dog kills equal the agency-confirmed kills plus the agency-recorded "probable" kills. When sources provide conflicting estimates in a given year, we assume the larger of the estimates equals the number of kills. While some ranchers do mention that they have lost herding dogs to wolves and were unable to locate the dogs' remains, no estimates exist approximating the ratio of estimated total dog losses to confirmed dog predations by wolves. Thus, the high estimate is assumed to be equal to the medium estimate.

This analysis only presents one estimate of injuries based upon DoW records. Although rancher estimates of livestock injuries also exist, the value of these injuries is not readily available. Given that the number of injuries does not vary greatly (DoW reports eight injuries; ranchers estimate 11 injuries), this analysis relies on DoW data for the number and value of livestock injuries. Exhibit 3-8 presents a summary of the low, medium, and high estimates of the number of livestock deaths and injuries caused by wolf attacks in the BRWRA since the wolf Reintroduction Project began in 1998. In a given year, these mortalities and injuries represent less than one percent of the roughly 34,800 cattle, 120 sheep, and 1,600 horses and ponies that graze in the BRWRA annually.

Based on the number of wolves in the BRWRA from 1998 to 2004, Mexican wolves killed between 0.1 cattle per wolf per year under the low depredation estimate to 1.1 cattle per wolf per year under the high depredation estimate.⁶⁹ The remaining annual ranch animal mortalities and injuries (including cattle injuries) averaged zero per wolf from 1998 to 2004.

⁶⁸ Interviews with ranchers suggest that horses killed by wolves are generally recoverable, i.e., horses killed by wolves can usually be located and identified.

⁶⁹ From 1998 to 2003, the actual years included under the five-year review, Mexican wolves also killed between 0.1 and 1.1 cattle per wolf.

| Exhibit 3-3 | | | | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------------------|--------------|
| NUMBER OF CATTLE KILLS IN THE BRWRA | | | | | | | | |
| (1998 – 2004) | | | | | | | | |
| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004^a | Total |
| <i>Wolf Population in BRWRA</i> | 4 | 15 | 22 | 26 | 42 | 55 | 44 | NA |
| Low Estimate: Agency-Recorded Kills | | | | | | | | |
| USDA | 0 | 5 | 1 | 3 | 9 | 3 | NR | 21 |
| USFWS | 0 | 5 | 1 | 6 | 11 | 3 | NR | 26 |
| DoW | 0 | 5 | 2 | 6 | 6 | 10 | 7 | 36 |
| <i>Average</i> | 0 | 5 | 1.3 | 5 | 8.7 | 5.3 | 7 | 32.3 |
| Medium Estimate: Ratio | | | | | | | | |
| Agency kills*Ratio (5.6:1) ^b | 0 | 8 | 2.7 | 13 | 10 | 10.7 | 10 | 54.3 |
| High Estimate: Rancher Reported Kills | | | | | | | | |
| BRWRA Rancher Estimates ^c | 0 | 44.5 | 8.5 | 12 | 92 | 38 | 38 ^d | 233 |
| <p>Notes:</p> <p>The “Impacts on Tribes” section of this analysis discusses estimates of losses among cattle owned by Tribes.</p> <p>^a “NR” indicates that no records were available.</p> <p>^b The medium estimate is derived from assuming a ratio of agency-recorded confirmed kills to actual kills, as described in Exhibit 3-4.</p> <p>^c Some rancher estimates did not distinguish whether losses occurred in 1999 or 2000. Where this occurred, this analysis divides the livestock losses between the two years, resulting in some “partial” loss estimates.</p> <p>^d Rancher estimates of cattle depredations in 2004 are not readily available; consequently, this analysis assumes that cattle losses were equal in 2003 and 2004. These estimates only include losses that ranchers believe are attributable to wolves.</p> <p>Sources:</p> <p>Wolf population (1998 to 2003), USDA, and USFWS estimates: 5-Year Review Technical Component; 2004 wolf population from Arizona Game and Fish Department et al. (2005), Mexican Wolf Blue Range Reintroduction Project Interagency Team Annual Report. DoW data: Defenders of Wildlife (2005), The Bailey Wildlife Foundation Wolf Compensation Trust: Payments to Ranchers for Livestock Losses Caused by Wolves, accessed January 24, 2005, at http://www.defenders.org/wildlife/wolf/wolfcomp.pdf; BRWRA rancher estimates: compiled by L. Schneberger, New Mexico rancher, personal communication, March 26, 2005.</p> | | | | | | | | |

| Exhibit 3-4 | |
|---|--------------------|
| DEVELOPMENT OF MEDIUM ESTIMATE: RATIOS OF ESTIMATED TOTAL LIVESTOCK LOSSES TO CONFIRMED KILLS | |
| Source | Ratio |
| Cattle^a | |
| Naughton-Treves et al. (2003) ^d | 2:1 |
| Bjorge and Gunson (1985) ^e | 6.7:1 |
| Oakleaf et al. (2003) ^f | 8:1 ^b |
| <i>Average Cattle Ratio</i> | <i>5.6:1</i> |
| Sheep | |
| Hinson (2005) ^g | 2.3:1 ^c |
| <i>Average Sheep Ratio</i> | <i>2.3:1</i> |
| <p>Notes:</p> <p>^a The ratios of estimated total cattle losses to confirmed kills are based upon published estimates, although some ranchers also estimate these ratios. According to one rancher in the study area, all yearling and cow losses have been confirmed but few calf kills have been confirmed as resulting from wolf attacks. Comparing one estimate of the number of cow, yearling, and calf losses with the number of confirmed kills, the ratio equals approximately 29:1. Source: D. Ely, Arizona rancher, personal communication, March 4 and 24, 2005.</p> <p>^b Oakleaf et al. (2003) may overestimate the ratio of estimated total losses to confirmed kills because their study focused on calves, which are often particularly difficult to recover because they are consumed more rapidly.</p> <p>^c Because no published sources exist that estimate the ratio of total sheep losses to confirmed kills, we rely on ranchers' estimates. One rancher in Idaho received 100 percent compensation for confirmed sheep kills and 50 percent compensation for probable kills from the Defenders of Wildlife. She also received additional compensation from the Idaho Office of Species Conservation. The ratio compares the total number of sheep that the rancher believes she lost to wolves to the number of sheep kills she was compensated for.</p> <p>Sources:</p> <p>^d Lisa Naughton-Treves et al. (2003), Paying for tolerance: rural citizens' attitudes toward wolf depredation and compensation, <i>Conservation Biology</i> 17(6) 1500-1511.</p> <p>^e As cited in Idaho Office of Species Conservation (2004), Idaho Wolf Depredation Compensation Plan, accessed March 7, 2005, at http://www.accessidaho.org/species/wolf_plan_GS_feb_05.pdf.</p> <p>^f John K. Oakleaf et al. (2003), Effects of wolves on livestock calf survival and movements in central Idaho, <i>Journal of Wildlife Management</i> 67(2): 299-306.</p> <p>^g M. Hinson, Idaho rancher, personal communication, March 7, 2005.</p> | |

| Exhibit 3-5 | | | | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------------------|
| NUMBER OF SHEEP KILLS IN THE BRWRA | | | | | | | | |
| (1998 – 2004) | | | | | | | | |
| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | Total^a |
| <i>Wolf Population in BRWRA</i> | 4 | 15 | 22 | 26 | 42 | 55 | 44 | NA |
| Low Estimate: Agency-Recorded Kills | | | | | | | | |
| USDA | 0 | 0 | 1 | 0 | 0 | 1 | NR | 2 |
| USFWS | 0 | 0 | 1 | 0 | 0 | 1 | NR | 2 |
| DoW | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| <i>Average</i> | 0 | 0 | 0.7 | 0 | 0 | 0.7 | 1 | 2.3 |
| Medium/High Estimate: Ratio | | | | | | | | |
| Agency kills*Ratio (2.3:1) ^b | 0 | 0 | 1.5 | 0 | 0 | 1.5 | 2.3 | 5.4 |
| <p>Notes:</p> <p>^a For the USDA and the USFWS estimates, totals equal the sum of depredations from 1998 to 2003, while totals presented for Defenders of Wildlife estimates represent totals from 1998 to 2004. No rancher estimates of sheep killed by wolves are readily available.</p> <p>^b The medium estimate is derived from assuming a ratio of agency-recorded confirmed kills to actual kills, as described in Exhibit 3-4.</p> <p>Sources:</p> <p>Wolf population (1998 to 2003), USDA, and USFWS estimates: 5-Year Review Technical Component; 2004 wolf population from Arizona Game and Fish Department et al. (2005), Mexican Wolf Blue Range Reintroduction Project Interagency Team Annual Report. DoW data: Defenders of Wildlife (2005), The Bailey Wildlife Foundation Wolf Compensation Trust: Payments to Ranchers for Livestock Losses Caused by Wolves, accessed January 24, 2005, at <http://www.defenders.org/wildlife/wolf/wolfcomp.pdf>.</p> | | | | | | | | |

| Exhibit 3-6 | | | | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------------------|
| NUMBER OF HORSE KILLS IN THE BRWRA | | | | | | | | |
| (1998 – 2004) | | | | | | | | |
| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | Total^a |
| Wolf Population in BRWRA | 4 | 15 | 22 | 26 | 42 | 55 | 44 | NA |
| Low Estimate: Agency-Recorded Kills | | | | | | | | |
| USDA | 0 | 0 | 0 | 0 | 0 | 0 | NR | 0 |
| USFWS | 0 | 0 | 0 | 1 | 0 | 0 | NR | 1 |
| DoW | 0 | 0 | 0 | 0 | 0 | 0 | NR | 0 |
| <i>Average</i> | <i>0</i> | <i>0</i> | <i>0</i> | <i>0.3</i> | <i>0</i> | <i>0</i> | <i>0</i> | <i>0.3</i> |
| Medium Estimate: Agency Confirmed Plus Probable | | | | | | | | |
| USDA | 0 | 0 | 0 | 0 | 1 | 0 | NR | 1 |
| USFWS | 0 | 0 | 0 | 1 | 0 | 1 | NR | 2 |
| DoW | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| <i>Average</i> | <i>0</i> | <i>0</i> | <i>0</i> | <i>0.3</i> | <i>0.3</i> | <i>0.7</i> | <i>0</i> | <i>1.3</i> |
| High Estimate: Rancher Reported Kills | | | | | | | | |
| BRWRA Rancher Estimates ^b | 0 | 0.5 | 0.5 | 0 | 3 | 0 | 0 | 4 |
| <p>Notes:</p> <p>^aFor the USDA and the USFWS estimates, totals equal the sum of depredations from 1998 to 2003, while totals presented for Defenders of Wildlife estimates represent totals from 1998 to 2004.</p> <p>^bSome rancher estimates did not distinguish whether losses occurred in 1999 or 2000. Where this occurred, this analysis divides the livestock losses between the two years, resulting in some “half” losses. Rancher estimates of horse depredations in 2004 are not readily available; consequently, this analysis assumes that horse losses were equal in 2003 and 2004. These estimates only include losses that ranchers believe are attributable to wolves. Additional detail for these estimates is provided in Appendix A.</p> <p>Sources:</p> <p>Wolf population (1998 to 2003), USDA, and USFWS estimates: 5-Year Review Technical Component; 2004 wolf population from Arizona Game and Fish Department et al. (2005), Mexican Wolf Blue Range Reintroduction Project Interagency Team Annual Report. DoW data: Defenders of Wildlife (2005), The Bailey Wildlife Foundation Wolf Compensation Trust: Payments to Ranchers for Livestock Losses Caused by Wolves, accessed January 24, 2005, at <http://www.defenders.org/wildlife/wolf/wolfcomp.pdf>; BRWRA rancher estimates: compiled by L. Schneberger, New Mexico rancher, personal communication, March 26, 2005.</p> | | | | | | | | |

| Exhibit 3-7 | | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------------------|
| NUMBER OF DOG KILLS IN THE BRWRA^a | | | | | | | | |
| (1998 – 2004) | | | | | | | | |
| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | Total^b |
| Wolf Population in BRWRA | 4 | 15 | 22 | 26 | 42 | 55 | 44 | NA |
| Agency-Recorded Kills | | | | | | | | |
| USDA | 1 | 0 | 0 | 0 | 1 | 0 | NR | 2 |
| USFWS | 1 | 0 | 0 | 0 | 1 | 0 | NR | 2 |
| DoW | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| Average | 1 | 0 | 0 | 0 | 0.7 | 0.3 | 0 | 2 |
| Medium/High Estimate: Agency-Confirmed Plus Probable | | | | | | | | |
| Confirmed Plus Probable | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 3 |
| <p>Notes:</p> <p>^a All dogs killed are assumed to be herding or guarding dogs. However, some of the reported dog kills may have been hunting dogs. To the extent that this is true, the analysis may overestimate losses and economic impacts to ranchers because hunting dogs are not associated with ranching operations.</p> <p>^b For the USDA and the USFWS estimates, totals equal the sum of depredations from 1998 to 2003, while totals presented for Defenders of Wildlife estimates represent totals from 1998 to 2004.</p> <p>Sources:</p> <p>Wolf population (1998 to 2003), USDA, and USFWS estimates: 5-Year Review Technical Component; 2004 wolf population from Arizona Game and Fish Department et al. (2005), Mexican Wolf Blue Range Reintroduction Project Interagency Team Annual Report; DoW data: Defenders of Wildlife (2005), The Bailey Wildlife Foundation Wolf Compensation Trust: Payments to Ranchers for Livestock Losses Caused by Wolves, accessed January 24, 2005, at <http://www.defenders.org/wildlife/wolf/wolfcomp.pdf>.</p> | | | | | | | | |

| Exhibit 3-8 | | | | | | | | | |
|---|------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| SUMMARY OF WOLF DEPREDATION ESTIMATES IN THE BRWRA | | | | | | | | | |
| (1998 – 2004) | | | | | | | | | |
| | | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | Total |
| Wolf Population in BRWRA^a | | 4 | 15 | 22 | 26 | 42 | 55 | 44 | NA |
| Kills: Low Estimate^b | Cattle | 0 | 5 | 1.3 | 5 | 8.7 | 5.3 | 7 | 32.3 |
| | Sheep | 0 | 0 | 0.7 | 0 | 0 | 0.7 | 1 | 2.3 |
| | Horse | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0.3 |
| | Dog ^f | 1 | 0 | 0 | 0 | 0.7 | 0.3 | 0 | 2 |
| Kills: Medium Estimate^c | Cattle | 0 | 28 | 7.5 | 28 | 48.5 | 29.9 | 39.2 | 181.1 |
| | Sheep | 0 | 0 | 1.5 | 0 | 0 | 1.5 | 2.3 | 5.4 |
| | Horse | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 3 |
| | Dog ^f | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 3 |
| Kills: High Estimate^d | Cattle | 0 | 44.5 | 8.5 | 12 | 92 | 38 | 38 | 233 |
| | Sheep | 0 | 0 | 1.5 | 0 | 0 | 1.5 | 2.3 | 5.4 |
| | Horse | 0 | 0.5 | 0.5 | 0 | 3 | 0 | 0 | 4 |
| | Dog ^f | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 3 |
| Injuries^e | Cattle | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 5 |
| | Horse | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| | Dog ^f | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |

Notes and Sources:
^a 1998 through 2003: 5-Year Review Technical Component: Arizona Game and Fish Department et al. (2005), Mexican Wolf Blue Range Reintroduction Project Interagency Team Annual Report;
^b “Low” estimates represent the average of confirmed kills as reported by the U.S. Department of Agriculture and U.S. Fish and Wildlife Service from 5-Year Review Technical Component and Defenders of Wildlife (2005), The Bailey Wildlife Foundation Wolf Compensation Trust: Payments to Ranchers for Livestock Losses Caused by Wolves, accessed January 24, 2005, at <<http://www.defenders.org/wildlife/wolf/wolfcomp.pdf>>.
^c For cattle and sheep, “medium” estimates derived by multiplying average number of confirmed kills by average ratios of total estimated losses to confirmed losses, as presented in Exhibit 3-7. For horses and dogs, medium estimates represent sum of confirmed and probable kills as reported by the U.S. Department of Agriculture, the U.S. Fish and Wildlife Service, and Defenders of Wildlife. Where estimates differ among sources for a particular year, the higher estimate is used. U.S. Department of Agriculture and U.S. Fish and Wildlife Service from 5-Year review Technical Component and Defenders of Wildlife (2005), The Bailey Wildlife Foundation Wolf Compensation Trust: Payments to Ranchers for Livestock Losses Caused by Wolves, accessed January 24, 2005, at <<http://www.defenders.org/wildlife/wolf/wolfcomp.pdf>>.
^d For cattle and horses, “high” estimates based upon ranchers’ estimates of total losses to wolves as provided by L. Schneberger, New Mexico rancher, personal communication, March 26, 2005. For sheep and dogs, high estimates equal medium figures because no rancher estimates of sheep and dog kills are readily available.
^e This analysis only presents one estimate of injuries based upon DoW records. Given that the number of injuries does not vary greatly between available estimates (DoW reports eight injuries; ranchers estimate 11 injuries), this analysis relies on DoW data for the number and value of livestock injuries. Economic impacts associated with injuries are added to the low, medium, and high estimates of impacts associated with ranch animal kills. Defenders of Wildlife (2005), The Bailey Wildlife Foundation Wolf Compensation Trust: Payments to Ranchers for Livestock Losses Caused by Wolves, accessed January 24, 2005, at <<http://www.defenders.org/wildlife/wolf/wolfcomp.pdf>>.
^f Some of the dogs reported as being killed or injured by wolves in this analysis may be hunting dogs rather than herding or guard dogs. To the extent that this is true, the analysis may overestimate losses and economic impacts to ranchers because hunting dogs are not associated with ranching operations.

3.3.2 Value of Ranch Animals

This section calculates the value of ranch animals lost to Mexican wolf predation in the BRWRA. The values used to estimate losses to ranch animals are the following:

- **Cattle:** For cattle and calves killed by wolves, the analysis applies the average value per head in Arizona and New Mexico in the year that a loss occurred (ranging from \$740 to \$840 in 2004\$) to estimated losses in order to calculate the value of animals killed by wolves. Economic logic says that the price of a cow today reflects the discounted net present value of its future earning potential. The market price of a cow today, therefore, should reflect its earning potential, discounted to present dollars. Although it would be best to use the price and value per head according to the livestock class killed, data on size-class and weight were not generally available in depredation records. Anecdotal evidence suggests that wolves prefer calves, which carry a lower market value than adult cows. Thus, the analysis would overstate the value of the cattle killed if they were, in fact, all calves;⁷⁰
- **Sheep:** For sheep killed by wolves, the analysis applies the average value per head in Arizona and New Mexico in the year that a loss occurred (ranging from \$90 to \$120 in 2004\$) to estimated losses in order to calculate the value of animals killed by wolves;⁷¹
- **Horses:** For horses killed by wolves, the analysis assumes that a DoW compensation value of \$1,500 has remained nominally constant from 1998 through 2004. Converting this figure to 2004\$, the value ranges from \$1,500 to \$1,740. This figure is similar to values cited by New Mexico State University and University of Arizona cost and return estimates; the NMSU study valued ranch horses at \$1,050 in 1997, and the Arizona study's values for ranch horses ranged from \$1,500 to \$2,500 in 2000;⁷²
- **Dogs:** The value of a dog is based on compensation payments by DoW and conversations with ranchers indicating that the nominal value of a dog equaled

⁷⁰ Rancher estimates of cattle depredation suggest that nearly ninety percent of cattle lost to wolf predation were calves. L. Schneberger, New Mexico rancher, personal communication, March 26, 2005. Livestock values represent values reported by: U.S. Department of Agriculture (1998 – 2004), Meat Animals Production, Disposition, and Income: Summary, National Agricultural Statistics Service, Mt An 1-1. This value represents the average value of livestock sold across all size and weight classes for each state.

⁷¹ Livestock values represent values reported by: U.S. Department of Agriculture (1998 – 2004), Meat Animals Production, Disposition, and Income: Summary, National Agricultural Statistics Service, Mt An 1-1. This value represents the average value of livestock sold across all size and weight classes for each state.

⁷² Defenders of Wildlife (2005), The Bailey Wildlife Foundation Wolf Compensation Trust: Payments to Ranchers for Livestock Losses Caused by Wolves, accessed January 24, 2005, at <<http://www.defenders.org/wildlife/wolf/wolfcomp.pdf>>; L. Allen Torell et al. (2000), Range Livestock Cost and Return Estimates for New Mexico, 1997, New Mexico State University Agricultural Experiment Station, College of Agriculture and Home Economics, Research Report 738; Trent Teegerstrom and Russell Tronstad (2000), Cost and Return Estimates for Cow/Calf Ranches in Five Regions of Arizona, University of Arizona Department of Agricultural and Resource Economics, Cooperative Extension, Publication AZ1193.

\$500 in multiple years during this time period;⁷³ these figures are then converted to real 2004\$ ranging from \$500 to \$580; and

- **Injuries to Ranch Animals:** DoW compensates ranchers for their veterinary expenses or for the decreased market value of the animal that resulted from the injury. The analysis uses DoW's compensation amounts for injuries to value the cost of non-lethal wolf attacks on livestock.⁷⁴

Exhibits 3-9 through 3-11 present the value of livestock losses attributable to Mexican wolves in the BRWRA. As shown, Mexican wolf kills have resulted in costs ranging from \$27,890 (2004\$) to \$195,530 since their reintroduction into the BRWRA in 1998. Using the medium estimate, \$145,580 (95 percent) of these losses are attributable to lethal attacks on cattle. Horse mortalities represent \$4,700 (three percent), dog mortalities cost ranchers approximately \$1,620 (one percent), and sheep mortalities account for \$590 (less than one percent). Exhibits 3-9 through 3-11 also demonstrate that losses from lethal wolf attacks were most severe in 2002 (\$42,100), followed by 2004 (\$33,200). Not surprisingly, the lowest value of losses occurred in 1998 (\$580), when the fewest wolves existed in the BRWRA.

From 1998 to 2004, the economic impact of injuries caused by Mexican wolves totaled \$4,520 (2004\$) (see Exhibit 3-12). The majority of this value (\$4,050) occurred in 2001, when wolves injured two calves and one horse. DoW recorded less costly injuries in 1998 and 1999 and no injuries in 2000 and 2002 through 2004.

⁷³ Defenders of Wildlife (2005), The Bailey Wildlife Foundation Wolf Compensation Trust: Payments to Ranchers for Livestock Losses Caused by Wolves, accessed January 24, 2005, at <<http://www.defenders.org/wildlife/wolf/wolfcomp.pdf>>

⁷⁴ This analysis only presents one estimate of injuries based upon DoW records. Rancher estimates of livestock injuries also exist, however the value of these injuries is not readily available. Given that the number of injuries does not vary greatly (DoW reports eight injuries; ranchers estimate 11 injuries), this analysis relies on DoW data for the number and value of livestock injuries. Defenders of Wildlife (2005), The Bailey Wildlife Foundation Wolf Compensation Trust: Payments to Ranchers for Livestock Losses Caused by Wolves, accessed January 24, 2005, at <<http://www.defenders.org/wildlife/wolf/wolfcomp.pdf>>; C. Miller, Defenders of Wildlife, personal communication, March 20, 2005.

| Exhibit 3-9 | | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| VALUE OF RANCH ANIMAL LOSSES TO WOLF DEPREDATION IN THE BRWRA – LOW ESTIMATE (1998 – 2004) | | | | | | | | |
| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | Total |
| Cattle | | | | | | | | |
| Estimated Kills ^a | 0 | 5 | 1.3 | 5 | 8.7 | 5.3 | 7 | 32.3 |
| Value per Head (2004\$) ^b | \$760 | \$740 | \$780 | \$810 | \$820 | \$790 | \$840 | NA |
| Total Value (2004\$) | \$0 | \$3,690 | \$1,050 | \$4,030 | \$7,140 | \$4,220 | \$5,880 | \$26,000 |
| Sheep | | | | | | | | |
| Estimated Kills ^a | 0 | 0 | 0.7 | 0 | 0 | 0.7 | 1 | 2.3 |
| Value per Head (2004\$) ^b | \$120 | \$90 | \$100 | \$100 | \$90 | \$110 | \$120 | NA |
| Total Value (2004\$) | \$0 | \$0 | \$70 | \$0 | \$0 | \$70 | \$120 | \$260 |
| Horses | | | | | | | | |
| Estimated Kills ^a | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0.3 |
| Value per Head (2004\$) ^c | \$1,740 | \$1,700 | \$1,650 | \$1,600 | \$1,580 | \$1,540 | \$1,500 | NA |
| Total Value (2004\$) | \$0 | \$0 | \$0 | \$530 | \$0 | \$0 | \$0 | \$530 |
| Dogs | | | | | | | | |
| Estimated Kills ^a | 1 | 0 | 0 | 0 | 0.7 | 0.3 | 0 | 2 |
| Value per Head (2004\$) ^d | \$580 | \$570 | \$550 | \$530 | \$530 | \$510 | \$500 | NA |
| Total Value (2004\$) | \$580 | \$0 | \$0 | \$0 | \$350 | \$170 | \$0 | \$1,100 |
| Total Value All Kills (2004\$) | \$580 | \$3,690 | \$1,110 | \$4,560 | \$7,490 | \$4,460 | \$6,000 | \$27,890 |
| Notes: | | | | | | | | |
| <p>^a “Low” estimates of total kills represent the average of confirmed kills as reported by the USDA and USFWS from 5-Year Review Technical Component and Defenders of Wildlife (2005), The Bailey Wildlife Foundation Wolf Compensation Trust: Payments to Ranchers for Livestock Losses Caused by Wolves, accessed January 24, 2005, at <http://www.defenders.org/wildlife/wolf/wolfcomp.pdf>. Although it would be best to use the price and value per head according to the livestock class killed, data on size-class and weight were not generally available in depredation records. Anecdotal evidence suggests that wolves prefer calves, which carry a lower market value than adult cows. For example, rancher estimates of cattle depredation from Mexican wolves suggest that nearly ninety percent of cattle lost to wolf predation were calves. Thus, the analysis may overstate the value of the cattle killed if they are, in fact, mainly calves. L. Schneberger, New Mexico rancher, personal communication, March 26, 2005.</p> <p>^b Cattle and sheep values represent the average value of livestock sold across all size and weight classes in Arizona and New Mexico. Livestock values represent values reported by: U.S. Department of Agriculture (1998 – 2004), Meat Animals Production, Disposition, and Income: Summary, National Agricultural Statistics Service, Mt An 1-1.</p> <p>^c This analysis relies on a 2003 compensation value determined by DoW. The compensation value is similar to values cited by New Mexico State University and University of Arizona cost and return estimates. The NMSU study valued ranch horses at \$1,050 in 1997, and the Arizona study’s values for ranch horses ranged from \$1,500 to \$2,500 in 2000. Sources: L. Allen Torell et al. (2000), Range Livestock Cost and Return Estimates for New Mexico, 1997, New Mexico State University Agricultural Experiment Station, College of Agriculture and Home Economics, Research Report 738; Trent Teegerstrom and Russell Tronstad (2000), Cost and Return Estimates for Cow/Calf Ranches in Five Regions of Arizona, University of Arizona Department of Agricultural and Resource Economics, Cooperative Extension, Publication AZ1193.</p> <p>^d The value of a dog is based on compensation payments by DoW and conversations with ranchers indicating that the nominal value of a dog equaled \$500 in multiple years during this time period; we convert these figures to real 2004\$. Some of the dogs reported as being killed or injured by wolves in this analysis may be hunting dogs rather than herding or guard dogs. To the extent that this is true, the analysis may overestimate losses and economic impacts to ranchers because hunting dogs are not associated with ranching operations.</p> | | | | | | | | |

| Exhibit 3-10 | | | | | | | | |
|---|--------------|-----------------|----------------|-----------------|-----------------|-----------------|-----------------|------------------|
| VALUE OF RANCH ANIMAL LOSSES TO WOLF DEPREDATION IN THE BRWRA – MEDIUM ESTIMATE | | | | | | | | |
| (1998 – 2004) | | | | | | | | |
| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | Total |
| Cattle | | | | | | | | |
| Estimated Kills ^a | 0.0 | 28.0 | 7.5 | 28.0 | 48.5 | 29.9 | 39.2 | 181.1 |
| Value per Head (2004\$) ^b | \$760 | \$740 | \$780 | \$810 | \$820 | \$790 | \$840 | NA |
| Total Value (2004\$) | \$0 | \$20,640 | \$5,860 | \$22,550 | \$40,000 | \$23,610 | \$32,930 | \$145,580 |
| Sheep | | | | | | | | |
| Estimated Kills ^a | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 1.5 | 2.3 | 5.4 |
| Value per Head (2004\$) ^b | \$120 | \$90 | \$100 | \$100 | \$90 | \$110 | \$120 | NA |
| Total Value (2004\$) | \$0 | \$0 | \$160 | \$0 | \$0 | \$170 | \$270 | \$590 |
| Horses | | | | | | | | |
| Estimated Kills ^c | 0.0 | 0.0 | 0.0 | 1.0 | 1.0 | 1.0 | 0.0 | 3.0 |
| Value per Head (2004\$) ^d | \$1,740 | \$1,700 | \$1,650 | \$1,600 | \$1,580 | \$1,540 | \$1,500 | NA |
| Total Value (2004\$) | \$0 | \$0 | \$0 | \$1,600 | \$1,580 | \$1,540 | \$0 | \$4,710 |
| Dogs | | | | | | | | |
| Estimated Kills ^c | 1.0 | 0.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 | 3.0 |
| Value per Head (2004\$) ^e | \$580 | \$570 | \$550 | \$530 | \$530 | \$510 | \$500 | NA |
| Total Value (2004\$) | \$580 | \$0 | \$0 | \$0 | \$530 | \$510 | \$0 | \$1,620 |
| Total Value All Kills (2004\$) | \$580 | \$20,640 | \$6,010 | \$24,150 | \$42,100 | \$25,830 | \$33,200 | \$152,510 |
| Notes: | | | | | | | | |
| ^a “Medium” estimates of total cattle and sheep kills derived by multiplying average number of confirmed kills by average ratios of estimated total losses to confirmed losses, as presented in Exhibit 3-7. | | | | | | | | |
| ^b Cattle and sheep values represent the average value of livestock sold across all size and weight classes in Arizona and New Mexico. Livestock values represent values reported by: U.S. Department of Agriculture (1998 – 2004), Meat Animals Production, Disposition, and Income: Summary, National Agricultural Statistics Service, Mt An 1-1. | | | | | | | | |
| ^c “Medium” estimates of horse and dog kills represent sum of confirmed and probable kills as reported by the USDA, the USFWS, and DoW. Where estimates differ among sources for a particular year, the higher estimate is use. USDA and USFWS from 5-Year Review Technical Component and Defenders of Wildlife (2005), The Bailey Wildlife Foundation Wolf Compensation Trust: Payments to Ranchers for Livestock Losses Caused by Wolves, accessed January 24, 2005, at < http://www.defenders.org/wildlife/wolf/wolfcomp.pdf >. | | | | | | | | |
| ^d This analysis relies on a 2003 compensation value determined by DoW. The compensation value is similar to values cited by New Mexico State University and University of Arizona cost and return estimates. The NMSU study valued ranch horses at \$1,050 in 1997, and the Arizona study’s values for ranch horses ranged from \$1,500 to \$2,500 in 2000. Sources: L. Allen Torell et al. (2000), Range Livestock Cost and Return Estimates for New Mexico, 1997, New Mexico State University Agricultural Experiment Station, College of Agriculture and Home Economics, Research Report 738; Trent Teegerstrom and Russell Tronstad (2000), Cost and Return Estimates for Cow/Calf Ranches in Five Regions of Arizona, University of Arizona Department of Agricultural and Resource Economics, Cooperative Extension, Publication AZ1193. | | | | | | | | |
| ^e The value of a dog is based on compensation payments by DoW and conversations with ranchers indicating that the nominal value of a dog equaled \$500 in multiple years during this time period; we convert these figures to real 2004\$. Some of the dogs reported as being killed or injured by wolves in this analysis may be hunting dogs rather than herding or guard dogs. To the extent that this is true, the analysis may overestimate losses and economic impacts to ranchers because hunting dogs are not associated with ranching operations. | | | | | | | | |

| Exhibit 3-11 | | | | | | | | |
|---|--------------|-----------------|----------------|----------------|-----------------|-----------------|-----------------|------------------|
| VALUE OF RANCH ANIMAL LOSSES TO WOLF DEPREDATION – HIGH ESTIMATE (1998 – 2004) | | | | | | | | |
| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | Total |
| Cattle | | | | | | | | |
| Estimated Kills ^a | 0.0 | 44.5 | 8.5 | 12.0 | 92.0 | 38.0 | 38.0 | 233.0 |
| Value per Head (2004\$) ^b | \$760 | \$740 | \$780 | \$810 | \$820 | \$790 | \$840 | NA |
| Total Value (2004\$) | \$0 | \$32,800 | \$6,670 | \$9,660 | \$75,830 | \$30,040 | \$31,920 | \$186,920 |
| Sheep^c | | | | | | | | |
| Estimated Kills | 0.0 | 0.0 | 1.5 | 0.0 | 0.0 | 1.5 | 2.3 | 5.4 |
| Value per Head (2004\$) ^b | \$120 | \$90 | \$100 | \$100 | \$90 | \$110 | \$120 | NA |
| Total Value (2004\$) | \$0 | \$0 | \$160 | \$0 | \$0 | \$170 | \$270 | \$590 |
| Horses | | | | | | | | |
| Estimated Kills ^a | 0.0 | 0.5 | 0.5 | 0.0 | 3.0 | 0.0 | 0.0 | 4.0 |
| Value per Head (2004\$) ^d | \$1,740 | \$1,700 | \$1,650 | \$1,600 | \$1,580 | \$1,540 | \$1,500 | NA |
| Total Value (2004\$) | \$0 | \$850 | \$820 | \$0 | \$4,730 | \$0 | \$0 | \$6,400 |
| Dogs | | | | | | | | |
| Estimated Kills ^e | 1.0 | 0.0 | 0.0 | 0.0 | 1.0 | 1.0 | 0.0 | 3.0 |
| Value per Head (2004\$) ^f | \$580 | \$570 | \$550 | \$530 | \$530 | \$510 | \$500 | NA |
| Total Value (2004\$) | \$580 | \$0 | \$0 | \$0 | \$530 | \$510 | \$0 | \$1,620 |
| Total Value All Kills (2004\$) | \$580 | \$33,650 | \$7,650 | \$9,660 | \$81,080 | \$30,720 | \$32,190 | \$195,530 |
| Notes: | | | | | | | | |
| ^a “High” estimates of cattle and horse kills based upon ranchers’ estimates of total losses to wolves as provided by L. Schneberger, New Mexico rancher, personal communication, March 26, 2005. These estimates are detailed in Appendix A. | | | | | | | | |
| ^b Cattle and sheep values represent the average value of livestock sold across all size and weight classes in Arizona and New Mexico. Livestock values represent values reported by: U.S. Department of Agriculture (1998 – 2004), Meat Animals Production, Disposition, and Income: Summary, National Agricultural Statistics Service, Mt An 1-1. | | | | | | | | |
| ^c “High” estimates of sheep kills derived by multiplying average number of confirmed kills by average ratios of total losses to confirmed losses, as presented in Exhibit 3-7. | | | | | | | | |
| ^d This analysis relies on a 2003 compensation value determined by DoW. The compensation value is similar to values cited by New Mexico State University and University of Arizona cost and return estimates. The NMSU study valued ranch horses at \$1,050 in 1997, and the Arizona study’s values for ranch horses ranged from \$1,500 to \$2,500 in 2000. Sources: L. Allen Torell et al. (2000), Range Livestock Cost and Return Estimates for New Mexico, 1997, New Mexico State University Agricultural Experiment Station, College of Agriculture and Home Economics, Research Report 738; Trent Teegerstrom and Russell Tronstad (2000), Cost and Return Estimates for Cow/Calf Ranches in Five Regions of Arizona, University of Arizona Department of Agricultural and Resource Economics, Cooperative Extension, Publication AZ1193. | | | | | | | | |
| ^e “High” estimates of dog kills represent sum of confirmed and probable kills as reported by USDA, USFWS, and DoW. Where estimates differ among sources for a particular year, the higher estimate is use. USDA and USFWS from 5-Year Review Technical Component and Defenders of Wildlife (2005), The Bailey Wildlife Foundation Wolf Compensation Trust: Payments to Ranchers for Livestock Losses Caused by Wolves, accessed January 24, 2005, at < http://www.defenders.org/wildlife/wolf/wolfcomp.pdf >. | | | | | | | | |
| ^f The value of a dog is based on compensation payments by DoW and conversations with ranchers indicating that the nominal value of a dog equaled \$500 in multiple years during this time period; we convert these figures to real 2004\$. Some of the dogs reported as being killed or injured by wolves in this analysis may be hunting dogs rather than herding or guard dogs. To the extent that this is true, the analysis may overestimate losses and economic impacts to ranchers because hunting dogs are not associated with ranching operations. | | | | | | | | |

| Exhibit 3-12 | | | | | | | | |
|---|--------------|--------------|-------------|----------------|-------------|-------------|-------------|----------------|
| VALUE OF RANCH ANIMAL INJURIES IN THE BRWRA^a | | | | | | | | |
| (1998 – 2004) | | | | | | | | |
| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | Total |
| Cattle Injured | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 5 |
| Total Value (2004\$) | \$0 | \$30 | \$0 | \$1,280 | \$0 | \$0 | \$0 | \$1,310 |
| Horses Injured | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| Total Value (2004\$) | \$370 | \$0 | \$0 | \$2,770 | \$0 | \$0 | \$0 | \$3,130 |
| Dogs Injured ^b | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total Value (2004\$) | \$0 | \$80 | \$0 | \$0 | \$0 | \$0 | \$0 | \$80 |
| Total Value All Injuries (2004\$) | \$370 | \$100 | \$0 | \$4,050 | \$0 | \$0 | \$0 | \$4,520 |
| Sources and Notes: | | | | | | | | |
| No sheep injuries were recorded in available estimates. | | | | | | | | |
| ^a The number and value of injuries based on DoW data from Defenders of Wildlife (2005), The Bailey Wildlife Foundation Wolf Compensation Trust: Payments to Ranchers for Livestock Losses Caused by Wolves, accessed January 24, 2005, at < http://www.defenders.org/wildlife/wolf/wolfcomp.pdf >; C. Miller, Defenders of Wildlife, personal communication, March 20, 2005. Alternate rancher estimates suggest that 11 livestock were injured from 1998 to 2004. The analysis does not use these data because information on the value of the alternate injuries estimate is not readily available. Rancher estimates from L. Schneberger, New Mexico rancher, personal communication, March 26, 2005. | | | | | | | | |
| ^b Some of the dogs reported as being injured by wolves in this analysis may be hunting dogs rather than herding or guard dogs. To the extent that this is true, the analysis may overestimate losses and economic impacts to ranchers because hunting dogs are not associated with ranching operations. | | | | | | | | |

3.4 Physiological Impacts on Livestock

In addition to depredation, the presence of wolves in proximity to livestock may induce behavioral changes in livestock that result in physical effects. For example, livestock may lose weight because wolves force them off of suitable grazing habitat or away from water sources. In addition, the presence of wolves may agitate livestock, causing them to expend more energy.⁷⁵ Decreased feeding, drinking, and increased agitation rates may also lower birthrates by reducing conception levels and causing miscarriages. While both ranchers and research concur that such outcomes are possible, no evidence exists that these behavioral changes have occurred in response to Mexican wolves.⁷⁶

Observations suggest that wolves may have less impact on livestock behavior than they do on wild ungulate behavior, such as elk. Furthermore, many variables could result in weight loss and decreased birthing rates, such as poor forage or weather conditions. Given the lack of evidence and uncertainty associated with verifying that wolves are causing detrimental physical

⁷⁵ J. Blair, a New Mexico rancher, reports that wolves scare his cattle into moving throughout the range more than he would like his cattle to move. Personal communication, November 15, 2005.

⁷⁶ John K. Oakleaf et al. (2003), Effects of wolves on livestock calf survival and movements in central Idaho, *Journal of Wildlife Management* 67(2): 299-306. Oakleaf’s study observed no evidence, however, that the presence of wolves affected cattle movement or herd size.

effects on livestock, this analysis does not attempt to quantify the economic impacts of such outcomes.

3.5 Change in Forage Use

Anecdotal evidence suggests that the number of depredations is dependent on the proximity of livestock to wolf rendezvous sites. For this, or other reasons, ranchers may feel compelled to modify grazing practices in an attempt to avoid wolves. Rancher responses could include herding or hauling livestock to different portions of their grazing allotment or bringing livestock off the range. One public commenter pointed out that ranchers, who are restricted by their permits and allotment grazing plans, may not have the option of moving cattle to another pasture when faced with depredation threats. Indeed, multiple ranchers report that they have little flexibility regarding alternative grazing sites; they do not own sufficient pasture or possess sufficient Federal grazing allotments.⁷⁷ In addition, changing grazing areas could result in penalties from land management agencies.⁷⁸ One Arizona rancher reported purchasing additional land in order to have more flexibility to avoid wolves.⁷⁹ As wolf populations grow and their presence becomes more common, however, avoiding them is likely to become increasingly difficult.

While ranchers have described instances in which they have hauled livestock to different grazing areas or purchased additional land, estimates do not exist regarding the frequency or nature of these actions across the BRWRA. Therefore, this analysis does not attempt to quantify the economic impacts of modifying grazing activities in response to the reintroduction of Mexican wolves into the BRWRA.

3.6 Need for Additional Ranch Labor

Changes in ranch management techniques in order to avoid livestock depredation by wolves may require additional time on behalf of ranchers and their employees.⁸⁰ Many ranchers report increasing herd supervision when wolves are in the area.⁸¹ In addition, they have spent

⁷⁷ For example, one New Mexico rancher says he is reluctant to move his cattle to his summer pastures where wolves are known to roam, causing him to graze his winter pastures longer than is advisable. Personal communication with J. Blair on November 15, 2005.

⁷⁸ Idaho Office of Species Conservation (2004), Idaho Wolf Depredation Compensation Plan, accessed March 7, 2005, at <http://www.accessidaho.org/species/wolf_plan_GS_feb_05.pdf>.

⁷⁹ D. Ely, Arizona rancher, personal communication, March 4 and 24, 2005.

⁸⁰ For example, one New Mexico rancher spent \$5,500 hiring additional riders to move his herd away from a wolf pack. Personal communication with F. Galley, November 16, 2005.

⁸¹ M. Hinson, Idaho rancher, personal communication, March 7, 2005. William Marks, an Arizona rancher, incurred the expense of hiring additional labor to move 150 cattle out of an area where a female wolf was giving birth to pups. Personal communication with S. Luce, W. Marks' neighbor, November 16, 2005.

time treating injured cattle, moving cattle to new grazing areas, checking cows for pregnancy that may have aborted due to wolves, and implementing new management techniques to avoid the predators. For example, one rancher volunteered to tag her cattle with radio transmitters in order to better track her livestock and depredation incidents as part of an independent study. While the USFWS compensated her for the material, the agency did not reimburse her for the time that she spent tagging the animals.⁸²

Ranchers also report spending time when they apply for wolf compensation. Thompson estimates that each compensation requires approximately ten hours for the rancher to locate the livestock carcass, wait for a wildlife agent to inspect the kill, complete the necessary paperwork, and conduct any further correspondences or negotiations to ensure that payment is received.⁸³ The DoW, however, compensates ranchers only for the value of the lost livestock; payments do not reimburse ranchers for the time spent to receive compensation.

Due to the additional time that ranchers and employees must spend on various activities when wolves are in proximity to cattle, they may have to reduce time spent on other activities such as ranch maintenance and improvement. For example, ranchers are concerned that they may not have time to repair fences, and cattle may escape. In some cases, ranchers have hired additional employees specifically for the purpose of supervising livestock when wolves are in the area.⁸⁴ DoW does offer some compensation for ranchers who change their management practices in order to avoid conflicts with wolves through the Bailey Wildlife Foundation Proactive Conservation Fund. DoW estimates that they have provided \$59,000 in equipment-related assistance to people affected by Mexican wolves since 1998. This estimate includes several grants to ranchers in 2005, including one fencing project, as well as \$12,000 to assist the White Mountain Apache to support a "tribal herdsman/wolf monitor" as part of a broader grazing program supported by NRCS.⁸⁵

This analysis recognizes that the reintroduction of Mexican wolves into the BRWRA has increased the amount of time that ranchers must spend managing their livestock. Sufficient evidence does not exist, however, to quantify the economic impacts of additional hired labor or labor input from ranchers and family members or decreased time for other activities throughout the study area. Consequently, the analysis only calculates the economic impact of the estimated time that ranchers spend on the compensation process for depredation losses.

3.6.1 Rancher Time Spent Applying for Compensation

For each confirmed and probable kill, ranchers need approximately ten hours to identify the carcass, coordinate the inspection with wildlife agents, complete necessary paperwork, and

⁸² D. Ely, Arizona rancher, personal communication, March 4 and 24, 2005.

⁸³ James G. Thompson (1993), Addressing the human dimensions of wolf reintroduction: an example using estimates of livestock depredation and costs of compensation, *Society and Natural Resources* 6: 165-179.

⁸⁴ D. Ely, Arizona rancher, personal communication, March 4 and 24, 2005.

⁸⁵ Written communication with Timm Kroeger, Defenders of Wildlife, Natural Resources Economist, Conservation Economics Program, December 5, 2005.

correspond and negotiate with authorities until payment is received.⁸⁶ This section estimates the time spent on confirmed and probable kills and injuries for cattle, sheep, horses, and dogs. While more losses may occur, this analysis assumes that these carcasses are never identified and, therefore, ranchers do not spend time applying for compensation claims. To the extent that ranchers do spend time on claims that are not identified as confirmed or probable, this analysis may understate the economic impact of the time associated with seeking compensation. The analysis values an hour of time between \$7.59 and \$8.71 (2004\$), based on U.S. Department of Agriculture hourly wage rates for livestock workers in Arizona and New Mexico.⁸⁷ Exhibit 3-13 shows that ranchers spent 750 hours, valued at \$6,240, preparing compensation claims from 1998 to 2004; on average, all ranchers in the BRWRA spent almost 110 hours, valued at \$890 on average, each year.⁸⁸

| Exhibit 3-13 | | | | | | | | |
|---|--------|--------|--------|---------|--------|---------|--------|---------|
| ECONOMIC COSTS OF COMPENSATION CLAIM PREPARATION | | | | | | | | |
| (1998 – 2004) | | | | | | | | |
| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | Total |
| Confirmed and Probable Losses ^a | 2 | 7 | 2 | 27 | 9 | 17 | 11 | 75 |
| Preparation Hours ^b | 20 | 70 | 20 | 270 | 90 | 170 | 110 | 750 |
| Hourly Rate ^c | \$7.59 | \$8.14 | \$7.75 | \$8.21 | \$8.71 | \$8.68 | \$8.09 | NA |
| Economic Impact | \$150 | \$570 | \$160 | \$2,220 | \$780 | \$1,480 | \$890 | \$6,240 |
| Sources: | | | | | | | | |
| ^a DoW data from Defenders of Wildlife (2005), The Bailey Wildlife Foundation Wolf Compensation Trust: Payments to Ranchers for Livestock Losses Caused by Wolves, accessed January 24, 2005, at < http://www.defenders.org/wildlife/wolf/wolfcomp.pdf >. | | | | | | | | |
| ^b James G. Thompson (1993), Addressing the human dimensions of wolf reintroduction: an example using estimates of livestock depredation and costs of compensation, <i>Society and Natural Resources</i> 6: 165-179. | | | | | | | | |
| ^c U.S. Department of Agriculture National Agricultural Statistics Service (2005), Farm Labor: 1998 – 2004, accessed March 11, 2005, at < http://usda.mannlib.cornell.edu/reports/nassr/other/pfl-bb/ >. | | | | | | | | |

3.7 Additional Expenditures on Ranch Supplies

The presence of wolves may cause ranchers to purchase additional provisions and animals in order to protect livestock and maintain herd size. Some ranchers report purchasing more dogs in order to increase the number guarding herds. Furthermore, the presence of wolves may decrease the useful life of dogs from nine or ten years to five or six years because of the additional stress caused by the presence of wolves; thus, ranchers might need to replace the dogs

⁸⁶ James G. Thompson (1993), Addressing the human dimensions of wolf reintroduction: an example using estimates of livestock depredation and costs of compensation, *Society and Natural Resources* 6: 165-179.

⁸⁷ U.S. Department of Agriculture National Agricultural Statistics Service (2005), Farm Labor: 1998 – 2004, accessed March 11, 2005, at <<http://usda.mannlib.cornell.edu/reports/nassr/other/pfl-bb/>>. This value represents the wage rate for ranch labor. To the extent that compensation claims are prepared by ranch management who are more highly compensated, this value may understate the economic impact of ranchers' time.

⁸⁸ Note that some public commenters stated that this estimate may overstate the level of effort involved in compensation. Public comments of Michael Robinson, Center for Biological Diversity, July 29, 2005.

more rapidly.⁸⁹ Ranchers may also replace calves and yearlings when large numbers are depredated in a particular year in order to maintain herd size and ensure future calf crops. As mentioned in the section on grazing modifications, some ranchers have reported purchasing additional land or allotments in order to increase alternative grazing sites for the purpose of avoiding wolf ranges. Another material expense occurs if ranchers increase the frequency of visits to range areas in order to inspect livestock when wolves are in the area or if they haul livestock to different grazing areas. Either of these activities would require fuel and increase the wear on ranch vehicles. Finally, some ranchers have mentioned purchasing camping equipment for herdsman so that they may sleep out on the range with the livestock in order to protect the animals from depredation. In these cases, DoW has provided compensation to the ranchers for the material because they were able to demonstrate that the purchases were for the purpose of protecting livestock from wolf depredations.⁹⁰ As described above, DoW estimates that they have provided \$59,000 in equipment-related assistance to people affected by Mexican wolves since 1998.⁹¹

This analysis recognizes that ranchers have spent money on goods in order to better manage their operations in the presence of wolves.⁹² No estimates exist, however, describing the frequency and scale of the costs spent on these materials throughout the BRWRA. Therefore, the analysis does not attempt to calculate the economic impact of material acquisitions.

3.8 Property Value Impacts

Several public comments related to the five-year program review stated that the greatest economic impact of the wolf reintroduction is that ranch property values may be affected by wolf depredation. Comments state that these disproportionately affected ranches will "reach a threshold and go out of business. Additionally, commenters anticipate "a decreased value of the ranch itself due to the depredation of a predator." Thus, the public commenters make two general points: 1) conducting ranching operations on affected ranches could make ranching uneconomical; 2) property values of ranches could be reduced due to a change in the public perception of that property and its desirability.

Numerous published studies have documented that livestock production frequently does not provide enough income to enter the ranching business, or even to continue operating a family ranch. Depending on ranch size, nominal rates of return from livestock are typically reported to

⁸⁹ M. Hinson, Idaho rancher, personal communication, March 7, 2005. L. Schneberger, a New Mexico rancher, emphasizes the threat wolves pose to dogs, which can perform the work of a \$25,000 a year ranch hand. Personal communication, November 17, 2005.

⁹⁰ D. Ely, Arizona rancher, personal communication, March 4 and 24, 2005; M. Hinson, Idaho rancher, personal communication, March 7, 2005.

⁹¹ Written communication with Timm Kroeger, Defenders of Wildlife, Natural Resources Economist, Conservation Economics Program, December 5, 2005.

⁹² S. Luce, an Arizona rancher, spent \$50,000 on fine woven wire fencing in order to prevent wolves from attacking his herd. Personal communication, November 16, 2005.

be from negative amounts to about three percent.⁹³ Torell et al. state that “given the stated and observed desire to remain in ranching, perhaps the most reasonable assumption for policy analysis is that western ranchers will continue in business until forced to leave.”⁹⁴ In another example, Rowe et al. state that “ranchers are highly motivated to ranch, and are willing to absorb a considerable share of the costs of investment in amenities like open space, wildlife habitat, watershed, and viewshed...”⁹⁵ Given observed rancher behavior, it is unclear that the presence of wolves would necessarily lead to ranchers leaving the industry. Indeed, evidence was not presented in conversations with stakeholders or public comments that ranches closed or property values were reduced due to wolf reintroduction since 1998.

Changes to private property values associated with public attitudes about the limits and costs of implementing the Reintroduction Project would be known as "stigma" impacts. If stigma impacts occurred between 1998 and 2003, we would expect to observe a decline in ranch property values near the BRWRA. Ranch value research in New Mexico suggests that over the 1996 to 2002 period the market value of scenic deeded land ranches in the New Mexico mountains, with wildlife income, appreciated in value by eight to nine percent per annum on a nominal price basis and by four to five percent on a real price basis. By comparison public land ranches in all areas of New Mexico, including those grazing the Gila National Forest, increased at a nearly constant real value with an estimated appreciation rate of about 0.5 percent per year.⁹⁶ Arizona appraisers described the 2004-05 ranch real estate market for ranches using the Apache-Sitgreaves National Forest as steady and with a steady upward trend in price.⁹⁷

In all areas of New Mexico, the reduced rate of ranch appreciation for public land ranches when compared to deeded land has been attributed to uncertainty about future grazing access on public lands and the many controversies associated with public land grazing, including issues such as grazing fees, NEPA compliance, and ESA compliance.⁹⁸ Thus, wolf reintroduction activities may have been one of many factors, along with conservation activities for other endangered species, as well as other controversies and uncertainties, that contributed to a difference in appreciation rates for private versus public land ranches in the BRWRA.

⁹³ Torell, L. Allen et al., “The Lack of Profit Motive for Ranching: Implications for Policy Analysis,” *Current Issues in Rangeland Economics, Proceedings of a Symposium Sponsored by Western Coordinating Committee 55* (WCC-55), February 2001.

⁹⁴ *Ibid.*

⁹⁵ Sulak, Adriana et al. 2004. "Western Ranching: Loving it or Leaving It," *Current Issues in Rangeland Resource Economics*, Utah State Univ. Research Report 190.

⁹⁶ Torell, L.A., O.A. Ramirez, Neil R. Rimbey, and Daniel W. McCollum. 2005. Income Earning Potential versus Consumptive Amenities in Determining Ranchland Values. *J. Agr. Resource Econ.* 30(3):537-560; Torell, L.A. N. R. Rimbey, O.A. Ramirez, and D.W. McCollum. 2004. New Faces and the Changing Value of Rangeland. pp. 57-86. In: L.A. Torell, N.R. Rimbey, and L. Harris (eds), *Current Issues in Rangeland Resource Economics*, Utah State Univ. Research Report 190.

⁹⁷ *Ibid* ; Rolston, T. and C. Benton. 2005. Proceedings of Spring Ag Outlook Forum, February 25, 2005, Arizona Chapter, American Society of Farm Managers and Rural Appraisers, Phoenix, AZ.

⁹⁸ Torell, L.A. and J.P. Doll. 1991. Public land policy and the value of grazing permits. *West. J. Agr. Econ.* 16(1):174-184.

3.9 Positive Impacts

The majority of potential economic impacts resulting from wolf reintroduction programs represent costs to ranchers. The possibility does exist, however, that the establishment of wolves in their former habitat could restore ecosystems and increase vegetation. If so, such a change would benefit ranch operations because it would increase the quality of forage available for grazing. For example, wolves reintroduced to Yellowstone National Park controlled elk populations and ended their overgrazing of local vegetation, thus improving grass conditions and allowing trees to repopulate the area. In Yellowstone National Park, wolves appear to have influenced elk populations, resulting in improvements in riparian vegetation, thus improving grass conditions and allowing trees to repopulate the area.⁹⁹ The increase in vegetation has benefited other species, including birds (Berger 2001).¹⁰⁰ It is unlikely, however, that the presence of wolves to date has reduced elk competition sufficiently to improve forage in the BRWRA to date. Consequently, the analysis does not attempt to estimate the economic impacts of forage improvements resulting from the reintroduction of Mexican wolves.

Wolves could also compete with and reduce the number of other predators that kill ranch animals in the BRWRA, such as coyotes.¹⁰¹ For example, wolves have reduced coyote populations in Yellowstone dramatically, causing a 50 percent decline in coyote density and reducing the coyote population in Lamar Valley from 80 to 36 animals between 1995 and 1998. According to NASS, coyotes were responsible for \$1.9 million (2004\$) in confirmed cattle and calf losses in Arizona and New Mexico in 2000.¹⁰² These losses represented 50 percent and 80 percent of confirmed calf losses to predators in Arizona and New Mexico, respectively, and 28.6 percent of confirmed cow losses in New Mexico. In the BRWRA, however, no evidence exists that suggests wolves have reduced populations of other carnivores to date. Consequently, this analysis also does not attempt to estimate the economic impacts of reduced death loss rates from predators other than wolves.

3.10 Total Economic Impacts

Exhibit 3-14 summarizes the economic impacts to ranchers associated with Mexican wolf reintroduction in the BRWRA. The table presents low, medium, and high estimates based on the sum of the values of livestock kills, injuries, and time spent by ranchers to prepare compensation

⁹⁹ Ripple, William J. and Robert L. Beschta. 2003. Wolf reintroduction, predation risk, and cottonwood recovery in Yellowstone National Park. *Forest Ecology and Management*. 184: 299-313.

¹⁰⁰ Berger Joel, et al. 2001. A mammalian predator-prey imbalance: Grizzly bear and wolf extinction affect avian neotropical migrants. *Ecological Applications*. 11(4): 947-960.; Jim Robbins (2004), Lessons from the wolf, *Scientific American*, June: 76-81.

¹⁰¹ D.W. Smith, et al. 2003. Yellowstone After Wolves. *BioScience*. 53 (4): 330-340.

¹⁰² Coyotes killed 4000 calves in New Mexico in 2000 and 1600 calves in Arizona in 2000. The value per head of calves killed estimated by NASS is \$303 in New Mexico and \$306 in Arizona (2001\$). Coyotes also killed 200 cattle in New Mexico that were valued at \$629 per head (2001\$). National Agricultural Statistics Service (NASS), Agricultural Statistics Board, U.S. Department of Agriculture. Released May 2001. "Cattle Predator Loss Estimates."

claims. As the exhibit indicates, impacts from 1998 to 2004 range from \$38,650 to \$206,290 (2004\$). The average annual impacts range from \$5,520 to \$29,470 (2004\$).

| Exhibit 3-14 | | | | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| ECONOMIC IMPACT OF LIVESTOCK LOSSES IN THE BRWRA, 1998 – 2004 | | | | | | | | |
| (2004\$) | | | | | | | | |
| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | Total |
| Livestock Kills [A] | | | | | | | | |
| Low Estimate | \$580 | \$3,690 | \$1,110 | \$4,560 | \$7,490 | \$4,460 | \$6,000 | \$27,890 |
| Medium Estimate | \$580 | \$20,640 | \$6,010 | \$24,150 | \$42,100 | \$25,830 | \$33,200 | \$152,510 |
| High Estimate | \$580 | \$33,650 | \$7,650 | \$9,660 | \$81,080 | \$30,720 | \$32,190 | \$195,530 |
| Livestock Injured [B] | | | | | | | | |
| Value | \$370 | \$100 | \$0 | \$4,050 | \$0 | \$0 | \$0 | \$4,520 |
| Compensation Claim Preparation [C] | | | | | | | | |
| Value | \$150 | \$570 | \$160 | \$2,220 | \$780 | \$1,480 | \$890 | \$6,240 |
| Total Value of Impacts to Ranchers [A+B+C] | | | | | | | | |
| Low Estimate | \$1,100 | \$4,360 | \$1,270 | \$10,820 | \$8,280 | \$5,940 | \$6,890 | \$38,650 |
| Medium Estimate | \$1,100 | \$21,310 | \$6,170 | \$30,410 | \$42,890 | \$27,310 | \$34,090 | \$163,270 |
| High Estimate | \$1,100 | \$34,320 | \$7,810 | \$15,920 | \$81,860 | \$32,200 | \$33,080 | \$206,290 |

3.10.1 Uncompensated Ranch Losses

While ranchers who did not or could not report livestock losses lost the production value associated with their lost livestock over the study period, some ranchers who did report wolf depredation received compensation from DoW. In theory, if the value of livestock to the ranchers was compensated at a fair market value for the lost production value of the livestock, as well as the time and materials invested in reporting the claim, then the ranchers should have been “made whole” through these payments. At present, DoW is the only source of compensation available to ranchers for livestock losses.¹⁰³ This section of the analysis compares the impacts to ranchers provided in Exhibit 3-14 (including the value of kills, injuries, and ranchers’ time) to the amount of compensation paid out by DoW during this time period. As shown in Exhibit 3-15, “uncompensated” economic impacts to ranchers range from \$5,020 to \$172,660 from 1998 to 2004.¹⁰⁴

¹⁰³ See the Social Impacts Section for a discussion of rancher sentiments about the current compensation program.

¹⁰⁴ Note that this estimate does not take into account the donations of equipment that DoW also made to ranchers in the BRWRA area during this time period.

| Exhibit 3-15 | | | | | | | | | |
|--|------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------------|
| UNCOMPENSATED LOSSES TO RANCHERS IN THE BRWRA FROM 1998 - 2004 | | | | | | | | | |
| (2004\$) | | | | | | | | | |
| | | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | Total |
| Value of Livestock Killed (A) | Low Estimate ^a | \$1,100 | \$4,360 | \$1,270 | \$10,820 | \$8,280 | \$5,940 | \$6,890 | \$38,650 |
| | Medium Estimate ^a | \$1,100 | \$21,310 | \$6,170 | \$30,410 | \$42,890 | \$27,310 | \$34,090 | \$163,270 |
| | High Estimate ^a | \$1,100 | \$34,320 | \$7,810 | \$15,920 | \$81,860 | \$32,200 | \$33,080 | \$206,290 |
| Compensation paid by DoW ^b (B) | | \$540 | \$2,440 | \$1,540 | \$10,230 | \$5,300 | \$8,500 | \$5,090 | \$33,630 |
| Uncompensated Losses (A-B) | Low Estimate ^c | \$560 | \$1,920 | -\$270 | \$590 | \$2,970 | -\$2,560 | \$1,800 | \$5,020 |
| | Medium Estimate ^b | \$560 | \$18,870 | \$4,630 | \$20,180 | \$37,590 | \$18,810 | \$29,000 | \$129,640 |
| | High Estimate ^b | \$560 | \$31,880 | \$6,270 | \$5,690 | \$76,560 | \$23,700 | \$27,990 | \$172,660 |
| Notes and Sources: | | | | | | | | | |
| ^a Economic impacts equal the value of livestock killed by wolves, the veterinary expenses for livestock injured by wolves, and the time spent by ranchers preparing compensation claims; these economic impacts are summarized in Exhibit 3-14. | | | | | | | | | |
| ^b DoW compensation data from Defenders of Wildlife (2005), The Bailey Wildlife Foundation Wolf Compensation Trust: Payments to Ranchers for Livestock Losses Caused by Wolves, accessed January 24, 2005, at < http://www.defenders.org/wildlife/wolf/wolfcomp.pdf >. | | | | | | | | | |
| ^c Uncompensated losses represent the difference between economic impacts and compensation values. | | | | | | | | | |

3.10.2 Regional Economic Impacts of Decreased Livestock Production

This analysis models the regional impacts of reduced production in the livestock industry in the five-county study area during the study period. Reduced production is assumed to equal the value of cattle and sheep killed by wolves in the BRWRA, minus any compensation that ranchers received for these losses.¹⁰⁵ Cattle and sheep losses will primarily affect the livestock-related sectors of the economy. Decreased operations in these industries would also result in secondary effects on related sectors in the study area. Some of these related sectors may be closely associated with livestock, such as feed grains and hay and pasture, while others may be less closely associated with the industry, such as the insurance sector. In order to model the economic impacts of these initial and secondary effects, the analysis utilizes a software package called IMPLAN to estimate the total economic effects of the reduction in economic activity in the livestock-related industries in the study area.¹⁰⁶ IMPLAN is commonly used by State and Federal agencies for policy planning and evaluation purposes. The model draws upon data from several Federal and State agencies, including the Bureau of Economic Analysis and the Bureau of Labor Statistics. IMPLAN translates initial changes in expenditures into changes from demand for inputs to affected industries. These effects can be described as direct, indirect, or induced, depending on the nature of the change:

¹⁰⁵ Production losses do not include the value of lost dogs and horses or the value of time spent by ranchers preparing compensation claims since these losses do not affect output (i.e., revenue from cattle and sheep sales). To the extent that ranchers forego investing in livestock herds because they instead spent money replacing dogs and horses or paying for additional labor, this analysis may understate actual production losses.

¹⁰⁶ For the IMPLAN analysis, the study area represents the five counties containing portions of the BRWRA: Apache and Greenlee counties in Arizona, and Catron, Grant, and Sierra counties in New Mexico.

- **Direct effects:** Changes in output attributable to a change in demand or a supply shock. These are specified initially by the modeler (e.g., the change in recreation expenditures on goods and services, by sector);
- **Indirect effects:** Changes in output industries that supply goods and services to those directly affected by the initial change in expenditures; and
- **Induced effects:** Changes in household consumption, arising from changes in employment (which in turn are the result of direct and indirect effects). For example, changes in employment in a region may affect the consumption of certain goods and services.

These categories are calculated for all industries to determine the regional economic impact of livestock losses resulting from wolf attacks in the BRWRA.¹⁰⁷

Because the model estimates impacts on an annual basis, this analysis calculates the regional impact of productivity losses using data from the year with the most depredations: 2002. In this year, wolves killed between 9 and 92 cattle, though no sheep kills or livestock injuries were reported. The analysis subtracts any compensation that ranchers received from DoW for these depredations from the value of the lost cattle. Consequently, the analysis measures the regional impact of uncompensated decreases in cattle production in 2002. This is an attempt to best measure the likely regional annual losses due to wolf depredation on livestock.

Exhibit 3-16 presents the results of the IMPLAN analysis. According to the model analysis, the reduction in livestock production as a result of predation by wolves caused a total economic loss in regional output of \$2,590 under the low estimate, \$48,770 under the medium estimate, and \$99,130 under the high estimate (2004\$). In addition, the livestock losses resulted in the loss of approximately zero jobs (under the low estimate), one job (under the medium estimate), or two jobs (under the high estimate) across all sectors of the regional economy in 2002.¹⁰⁸

¹⁰⁷ There are two important caveats relevant to the interpretation of IMPLAN model estimates, generally, and within the context of this analysis. The first is that the model is static in nature and measures only those effects resulting from a specific policy change (or the functional equivalent specified by the modeler) at a single point in time. Thus, IMPLAN does not account for posterior adjustments that may occur, such as the subsequent re-employment of workers displaced by the original policy change. In the present analysis, this caveat suggests that the long-run net output and employment effects resulting from the Mexican wolf reintroduction are likely to be smaller than those estimated in the model, which implies an upward bias in the estimates. A second caveat to the IMPLAN analysis is related to the model data. The IMPLAN analysis relies upon input/output relationships derived from 1998 data. Thus, this analysis assumes that this historical characterization of the affected counties' economies are a reasonable approximation of current conditions. If changes have occurred since 1998 in the structure of the economies of the counties in the study area, the results may be sensitive to this assumption. The magnitude and direction of any such bias are unknown.

¹⁰⁸ These data are from IMPLAN for the Range-Fed, Ranch-Fed and Cattle Feedlots livestock sectors.

| Exhibit 3-16 | | | | | |
|---|---------------------|-------------------------------|---------------------------------|--------------------------------|------------------------------|
| ESTIMATED ANNUAL REGIONAL ECONOMIC IMPACT OF REDUCTIONS IN LIVESTOCK PRODUCTION USING 2002 DATA (2004\$)^a | | | | | |
| Livestock Loss Estimate^b | Type of Loss | Direct Effect (Output) | Indirect Effect (Output) | Induced Effect (Output) | Total Impact (Output) |
| Low Estimate | Output | \$1,840 | \$350 | \$390 | \$2,590 |
| | Employment | 0.0 | 0.0 | 0.0 | 0.0 |
| Medium Estimate | Output | \$34,700 | \$6,630 | \$7,440 | \$48,770 |
| | Employment | 0.7 | 0.1 | 0.1 | 0.9 |
| High Estimate | Output | \$70,530 | \$13,470 | \$15,130 | \$99,130 |
| | Employment | 1.4 | 0.2 | 0.2 | 1.9 |

Notes:
^a Regional economic impact measures represent a one-time change in economic activity; thus, they are not additive to other estimates. These estimates represent the estimated regional economic impact from livestock losses in 2002. As 2002 was the year with the highest depredation rate, the regional impact analysis represents the upper bound of annual direct, indirect, and induced effects from 1998 to 2004.
^b Livestock loss estimates include the uncompensated value of cattle killed by wolves in 2002. No reported cattle injuries or sheep depredations occurred in this year.

3.11 Conclusions and Comparison to FEIS

This analysis quantifies the economic impacts to ranchers of livestock kills, injuries, and time spent preparing compensation claims that have resulted from the reintroduction of the Mexican wolf into the BRWRA. This analysis estimates that from 1998 to 2004, Mexican wolves killed between 32 and 233 cattle, between two and five sheep, between zero and four horses, and between two and three dogs. In addition, wolves injured five cattle, two horses, and one dog over the same period. The economic impacts to ranchers of these kills, injuries, and lost time totals between \$38,650 and \$206,290 (2004\$). While other management changes in response to the presence of wolves (such as increased labor time and purchasing additional dogs to guard livestock and breeding animals to replace those lost) have also cost ranchers time and money, sufficient evidence does not exist to value these ranch modifications. Therefore, to the extent that ranchers incur costs due to wolves that are in addition to depredation losses and time applying for compensation, this analysis understates the losses and economic impacts to livestock operations. From 1998 to 2004, DoW paid \$33,630 ranchers as compensation for lost livestock. Thus, uncompensated losses range from \$5,020 to \$172,660, depending on the depredation estimate used.¹⁰⁹

The FEIS estimates that a population of 100 wolves would be confirmed to kill between one and 34 cattle each year. While the FEIS notes that additional undocumented and/or unconfirmed depredations would occur, the FEIS does not estimate the number or value of

¹⁰⁹ From 1998 to 2003 (i.e., the years included in the five-year review), wolves killed between 25 and 195 cattle, between one and three sheep, between zero and four horses, and between two and three dogs. Wolves still injured five cattle, two horses, and one dog. The total impacts of these losses ranged from \$31,770 to \$173,210. During this period, DoW provided ranchers with \$28,550 in compensation, and uncompensated losses ranged from \$3,210 to \$144,660.

additional ranch animals that would be killed or injured by wolves. The FEIS also mentions that ranchers may expend additional time and resources to avoid wolves, but the 1996 analysis did not quantify these impacts.

To compare the FEIS projections to impacts that occurred during the study period, this analysis adjusts the FEIS estimates downward based on the number of wolves in the BRWRA during the study period. The adjusted FEIS estimates project that Mexican wolves would have killed 36 cattle from 1998 to 2004.¹¹⁰ As stated above, the FEIS did not quantify estimates of sheep, horse, or dog depredation. Our current analysis suggests that, on average, the wolves killed a total of 32 to 233 cattle, or between 4.6 and 33.3 cattle per year from 1998 to 2004. Thus, while the FEIS aligns well with the number of confirmed kills presented as low end of the estimates in this analysis, medium and high estimates of depredations, which include unconfirmed kills, are higher than estimates included in the FEIS.

As stated above, there are 122,500 cattle, at least 300 sheep and lambs, and 9,000 horses and ponies in Apache and Greenlee counties, Arizona, and Catron, Grant, and Sierra counties, New Mexico.¹¹¹ This analysis assumes that 34,800 of these cattle, 120 of these sheep, and 1,600 of these horses and ponies are within the BRWRA. Thus, the livestock depredation estimates presented in this analysis all represent less than one percent of the cattle, sheep, and horses in the BRWRA. In comparison, the average death loss rate for cattle in Arizona and New Mexico was four percent in 1997 (the year prior to the Mexican wolf Reintroduction Project); the average death loss rate for sheep in the two states was five percent in 1997.¹¹² Applying these percentages to the estimated number of livestock in the BRWRA, approximately 1,310 cattle and calves and six sheep died from causes other than slaughter in the BRWRA in 2002, compared to 5 to 33 cattle killed by wolves. Thus, wolf predation comprises a small percent (between 0.3 percent and 2.5 percent) of typical cattle losses experienced annually in the BRWRA. The FEIS also projected that depredations would total less than one percent of livestock grazing activities in the BRWRA.

The U.S. Department of Agriculture reports that livestock cash receipts from Apache, Greenlee, Catron, Grant, and Sierra counties totaled \$83.9 million in 2002 (2004\$). Based on the percentage of these counties' land that is in the BRWRA, this analysis estimates that \$17.4 million (21 percent) of the cash receipts are attributable to livestock activities in the BRWRA. This analysis estimates that the losses attributable to Mexican wolves in 2002 (the year with the most depredations) ranged from \$8,300 to \$81,900 and the uncompensated losses ranged from \$3,000 to \$77,000, depending on the depredation estimate used. Thus, the total direct economic impacts represented between 0.05 percent and 0.47 percent of total cash receipts, and the

¹¹⁰ U.S. Fish and Wildlife Service (1996); 5-Year Review Technical Component; Arizona Game and Fish Department et al. (2005), Mexican Wolf Blue Range Reintroduction Project Interagency Team Annual Report.

¹¹¹ U.S. Department of Agriculture National Agricultural Statistics Service (2002), 2002 Census of Agriculture, accessed March 9, 2005, at <<http://www.nass.usda.gov/census/>>.

¹¹² Death losses include deaths caused by predators (such as coyotes, dogs, mountain lions, and bobcats); digestive, respiratory, and calving problems; weather conditions; poison; theft; and unknown causes. U.S. Department of Agriculture National Agricultural Statistics Service (1999), Meat Animals Production, Disposition, and Income: Final Estimates 1993-1997. Statistical Bulletin Number 959a.

uncompensated losses represent between less than 0.02 percent and 0.44 percent of total cash receipts in the BRWRA. As this was the year with the most recorded deprecations, this represents the upper bound estimate of annual impacts on livestock receipts to date.

The estimated annual economic impact on regional outputs due to the decreased cattle production (estimated for 2002, the year with the most cattle losses) totaled between \$2,590 and \$99,130. These regional impacts represent less than one percent of the \$83.9 million in livestock cash receipts in that year. As above, because 2002 was the year with the most recorded deprecations, this represents the upper bound estimate of annual impacts on livestock receipts to date. While these losses and impacts may not be significant on a regional level, wolf deprecations have not affected ranchers uniformly throughout the BRWRA. Therefore, certain establishments grazing livestock in proximity to Mexican wolf ranges have experienced a disproportionate portion of the impacts. For example, by rancher estimates, of 25 ranches that reported cattle losses since 1998, nearly all reported more than one deprecation event.¹¹³ In 2002, two ranches together reported 89 percent of rancher-reported cattle deprecations. In 2003, a third ranch reported 25 of the 38 rancher-reported cattle deprecations, or 66 percent.¹¹⁴

¹¹³ L. Schneberger, New Mexico rancher, personal communication, March 26, 2005.

¹¹⁴ *Ibid.*

**ECONOMIC IMPACTS OF MEXICAN WOLF
REINTRODUCTION ON HUNTING ACTIVITIES****SECTION 4**

This section of the analysis evaluates the changes to hunting activities associated with the wolf Reintroduction Project from 1998 to 2003. Data for 2004 is also presented where available.

4.1 FEIS Estimates of Impacts on Hunting Activities

Because wolves prey on ungulates, there has been concern from hunters and the outfitting and guide industries that utilize the BRWRA that wolf reintroduction may have economic impacts on the hunting industry. Indeed, the largest economic impacts quantified in the FEIS are potential impacts on big game hunting. The FEIS estimated that when the population of wolves reaches 100 in the BRWRA, hunting days could be reduced by 9,800 to 18,200 hunting days for deer, and 2,800 to 4,600 hunting days for elk annually. This reduction would result in reduced recreational expenditures of \$0.7 to \$1.3 million annually in New Mexico and Arizona (2004\$). In addition, the social cost of the lost enjoyment of elk and deer hunting in the BRWRA would be reduced by \$0.9 to \$1.6 million annually (2004\$). Finally, hunting permit revenues to the states of Arizona and New Mexico would be reduced by \$83,000 to \$152,000 annually (2004\$). This section of the analysis discusses the experiences of the outfitter and guide industry since wolf reintroduction, and presents data to assist with evaluation of impacts of wolf reintroduction on this industry since the program began. Exhibit 4-1 summarizes the estimates presented in the FEIS as well as the assumptions that were used to derive the estimates.

| Exhibit 4-1 | | | | |
|--|-------------|--------------|---------------------|--------------|
| FEIS ASSUMPTIONS AND ESTIMATES OF ECONOMIC IMPACTS ON HUNTING (DEER AND ELK), 2004\$ | | | | |
| Assumptions | | | | |
| | <i>Deer</i> | | <i>Elk</i> | |
| Number of Wolves = 100 | | | | |
| Hunting Success Rate | 23.9% | 23.9% | 33.7% | 33.7% |
| Average Days Per Big Game Hunter | 7.79 | 7.79 | 7.79 | 7.79 |
| Willingness to Pay per Hunting Day (2004\$) | \$ 69.83 | \$ 69.83 | \$ 69.83 | \$ 69.83 |
| Hunting expenditures per day (2004\$) | \$ 55.74 | \$ 55.74 | \$ 58.15 | \$ 58.15 |
| Estimates | | | | |
| | <i>Deer</i> | | <i>Elk</i> | |
| | Low | High | Low | High |
| Harvest reduction | 300 | 560 | 120 | 200 |
| Number of Reduced Hunting Days | 9,795 | 18,284 | 2,776 | 4,627 |
| Value of Lost Hunting Days | \$ 684,000 | \$ 1,276,800 | \$ 193,900 | \$ 323,100 |
| Value of Reduction in Hunter Expenditures | \$ 546,000 | \$ 1,019,200 | \$ 161,400 | \$ 269,100 |
| | | | <i>Deer and Elk</i> | |
| Total Value Lost Hunting Days (Deer and Elk) | | | \$ 877,900 | \$ 1,599,900 |
| Total Value Reduction in Hunter Expenditures (Deer and Elk) | | | \$ 707,400 | \$ 1,288,300 |
| Value of Lost Permit Revenue (Deer and Elk) | | | \$ 83,100 | \$ 151,700 |
| Source: U.S. Fish and Wildlife Service. 1996. Reintroduction of the Mexican Wolf Within Its Historic Range in the Southwestern United States: Final Environmental Impact Statement. Costs adjusted to 2004\$ using the Consumer Price Index, accessed at http://data.bls.gov/cgi-bin/dsrv . | | | | |

4.2 Economic Concerns of Outfitters, Guides, and Hunters Who Utilize the BRWRA

The BRWRA is a prime hunting area, particularly for elk. Some of the largest bull elk on record have been hunted in this area. There were 249 outfitters listed as registered as Active New Mexico Outfitters in 2004. In addition, about 100 additional outfitters hold inactive licenses in New Mexico.¹¹⁵ Many of these outfitters operate within the BRWRA. Typically, 75 to 80 outfitters hold active permits to hunt in the Gila National Forest each year, or about 32 percent of active outfitters in New Mexico.¹¹⁶ Approximately 30 outfitters operate in Apache National Forest.¹¹⁷ Most outfitters operating in the BRWRA get the majority of their income from elk

¹¹⁵ Personal communication with New Mexico Council of Outfitters and Guides, March 8, 2005.

¹¹⁶ Based on the number of outfitter/guide permits issued annually in the Gila National Forest. Email communication with Paula Barnhill, Gila National Forest, March 18, 2005.

¹¹⁷ Personal communication with M. Frances, Apache National Forest, Springerville District, March 10, 2005. The number of outfitter/guide permits for Clifton and Alpine Ranger Districts were assumed to be similar to the number issued in Springerville.

hunting.¹¹⁸ New Mexico Department of Game and Fish (NMDGF) reports that approximately 12 percent of non-resident elk hunters utilize the services of the guide/outfitter industry each year.¹¹⁹

The outfitting and guiding industry in the BRWRA area is reliant on state and Federal permits to operate, usually requires Federal lands access, and depends on a healthy population of wild prey. The primary concerns of hunters and the hunting industry regarding economic impacts fall into five major categories:

- 1) **Big Game Population Effects:** Elk and other big game species populations may be reduced by wolves to the point that permit numbers are decreased and/or the overall quality of hunt is decreased.
- 2) **Effects of Hunter Visitation to the Region:** The reputation of the area could be tarnished, resulting in fewer hunters visiting the area. Outfitters have reported that some hunters at trade shows have responded negatively to hearing that wolves are present, and may have chosen other places to visit.
- 3) **Hunting Success Effects:** Hunting efforts in the area could become more arduous and ultimately less successful as game are chased and dispersed into hard to reach areas. Outfitters report that some elk herds in the BRWRA have been displaced from meadows, and are now found in more heavily wooded areas.
- 4) **Lost Income/Costs to Outfitters:** Hunting income to outfitters and guides would be reduced if hunter visitation declines. In addition, hunting dogs could be lost to wolf predation, which is not currently compensated for by DoW.
- 5) **Regional Economic Effects:** Hunting effort reductions would lead to reduced direct expenditures by hunters in local businesses, leading to reductions in total regional spending, reduced employment and reduced taxes collected.

The following discussion provides data that offers insight into what hunters and the hunting industry have experienced since Mexican wolf introduction.

4.3 Big Game Population Effects

Outfitters and hunters are concerned that Mexican wolf reintroduction may affect the population of game available for hunting.¹²⁰ Indeed, the FEIS estimated that the population of

¹¹⁸ Personal communication with San Francisco River Outfitters, March 8, 2005.

¹¹⁹ Kohlmann, Stephan. "Elk Management in New Mexico: An Introduction." NMGFD, Elk Program, Undated. Received March 3, 2005.

¹²⁰ Concern about wolf impacts on the elk population was raised during personal communication with several New Mexico outfitters. Personal communication with R. Campbell, November 14, 2005; Personal communication with

deer and elk could be reduced once the wolf population reached 100. Thus, this section investigates whether game populations may have declined in recent years due to wolf reintroduction.

It has been hypothesized by rancher and sportsmen's associations that reintroduction in Montana, Wyoming, and Idaho would cause calf-to-cow ratios to plummet and therefore game populations would be decimated. However, elk populations at the time of reintroduction were frequently "over objective" (i.e., larger than game managers considered to be desirable) in reintroduced areas, and measures such as winter cow-elk hunts were being used to bring down populations. The elk population has declined recently in Yellowstone, but there is disagreement about the cause--wolves, hunters, grizzlies, and climate are all considered to be potentially responsible.¹²¹ In 2005, the number of elk-hunting permits granted was reduced in North Yellowstone, potentially offering insights into whether hunting may be reducing populations.¹²² One newspaper article suggests that in Yellowstone, wolves initially feasted on cows and calves, but more recently have attacked bull elk. This change was posited to result from a combination of factors, including weakening of the elk males through six years of drought.¹²³ In Idaho, calf-to-cow populations have increased to 36 per 100 in wolf territory since wolf reintroduction.¹²⁴ One ongoing research effort in Montana has found that "hunter harvest has focused on adult cow elk, as season regulations dictate, but has not yet led to a detectable decrease in the population size of the wintering elk herd in the study area" despite an increase in hunter harvest.¹²⁵ The study also notes that "thus far, elk distribution appears to be more dynamic in areas used frequently by wolves, perhaps altering elk grazing patterns."¹²⁶

The State Game and Fish Agencies in New Mexico and Arizona are responsible for managing game resources within the states, on both public and private land. The majority of lands within the BRWRA are divided into five Game Management Units. Apache National Forest is divided into Arizona Game Management Units 1 and 27. The majority of lands in the Gila National Forest are made up of GMUs 15, 16, and 23. These units are primarily hunted for elk, mule deer, white-tailed deer, and wild turkey. Secondary game species include antelope, javelina, and Rocky Mountain bighorn sheep. Exhibit 4-2 presents the GMUs in the BRWRA.

W. Lee, November 16, 2005; Personal communication with J. Lipsey, manager of an Arizona dude ranch, November 18, 2005.

¹²¹ Barber, Shannon M. et al. 2005 "Bears Remain Top Summer Predators." *Yellowstone Science*, Summer 2005, Vol 13 (3); Vucetich, J.A., et al. 2005. "Influence of harvest, climate, and wolf predation on Yellowstone elk, 1961-2004." *Oikos*: 111: 259-270.

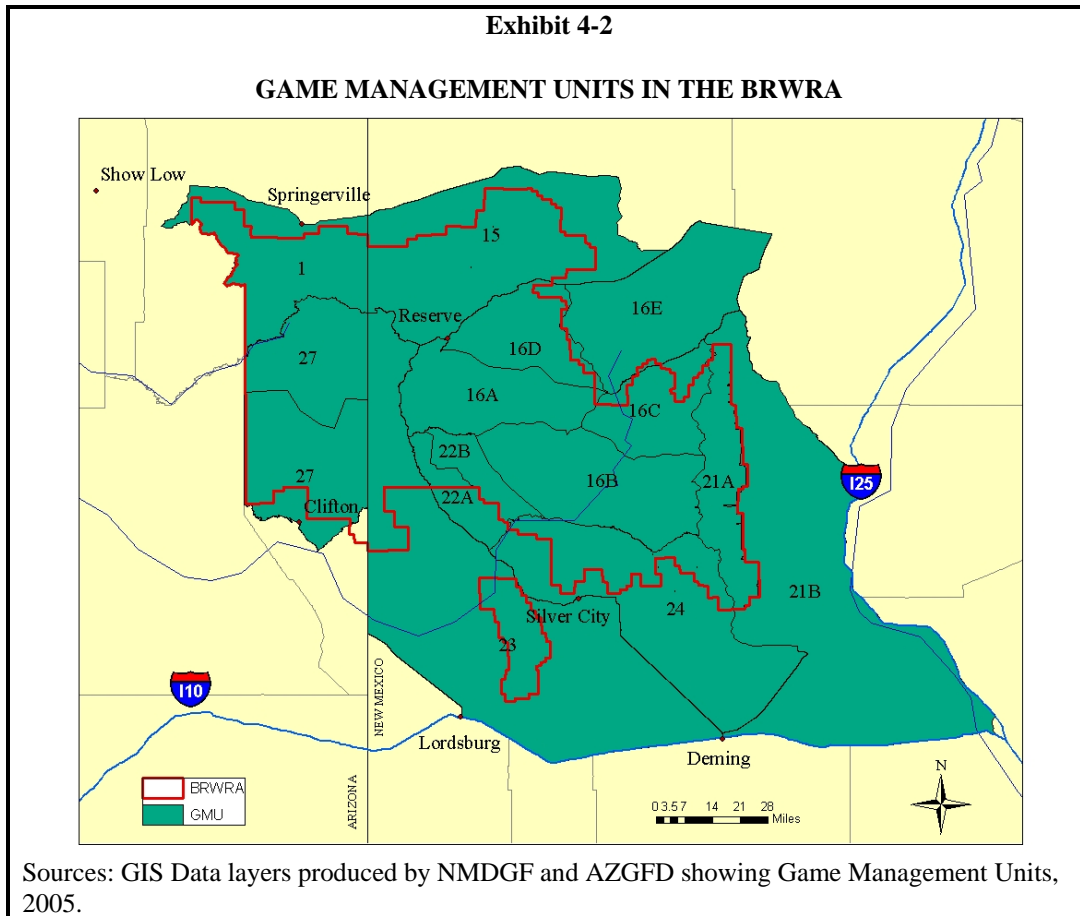
¹²² Vergano, Dan. "What's killing the elk in Yellowstone?", *USA Today*, November 11, 2005. Accessed at http://www.usatoday.com/tech/science/discoveries/2005-11-21-elk-yellowstone-mystery_x.htm.

¹²³ Stark, Mike. "Park's wolves eating more bull elk," *Billings Gazette*, April 7, 2004.

¹²⁴ Thomas McIntyre, "Return of the Wolf: Will the Alpha Predator Change Your Hunting?" *Field & Stream*, Feb. 1, 2004.

¹²⁵ Gude, Justin and Bob Garrott. "[2002-2003 Annual Report: The Lower Madison Valley Wolf-Ungulate Ecological Research Project](#)" Montana State University, 2004.

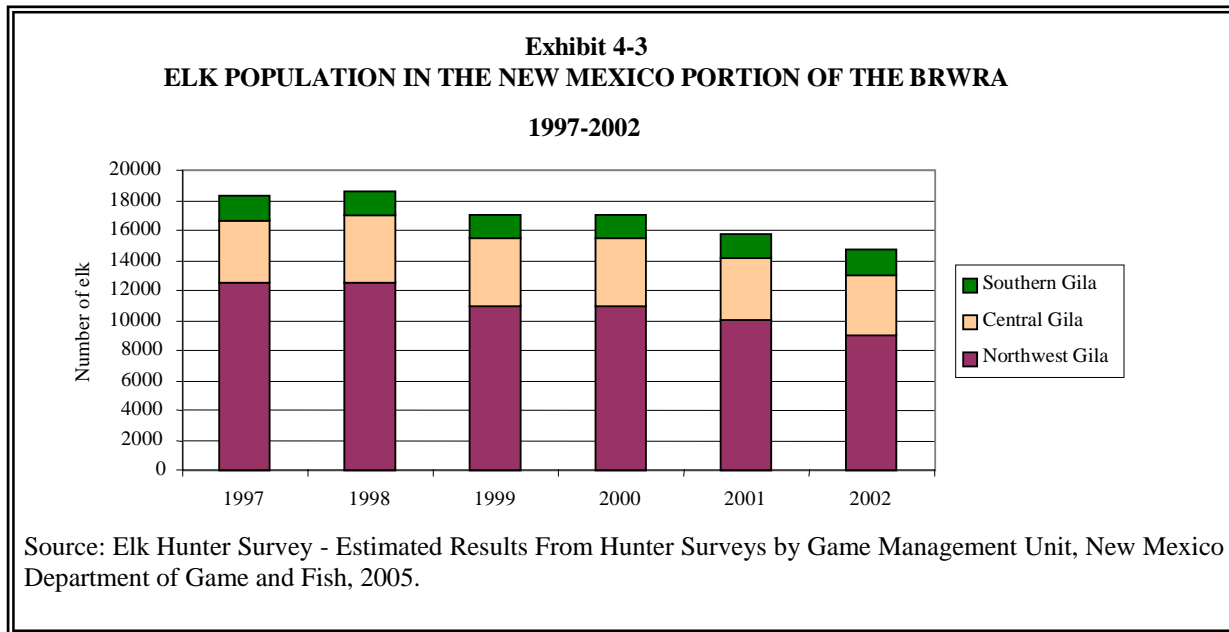
¹²⁶ *Ibid.*



The State of New Mexico is currently home to approximately 70,000 elk, of which approximately 15,000 (21 percent) reside in the BRWRA in Gila National Forest.¹²⁷ The population of elk in Apache National Forest was approximately 5,000 in 2004. Exhibits 4-3 and 4-4 present estimated elk populations within the BRWRA during recent years. The New Mexico elk population has declined since 1998 from approximately 18,500 in 1998 to approximately 15,000 in 2002 (a decrease of 19 percent). In Arizona, the estimated elk population has declined steadily, declining from 8,500 to 6,000 between 1998 and 2002 (a decrease of 29 percent). NMDGF and AZGFD, as well as outfitters, report that these populations are closely managed and that these units were purposely reduced in size by regulating the number of hunting permits for these areas. These statements are supported by the reported number of elk permits sold in these units, which has increased in these units during this time period.

¹²⁷ Kohlmann, Stephan G. "Elk Management in New Mexico: An Introduction." New Mexico Department of Game and Fish. Received March 3, 2005.

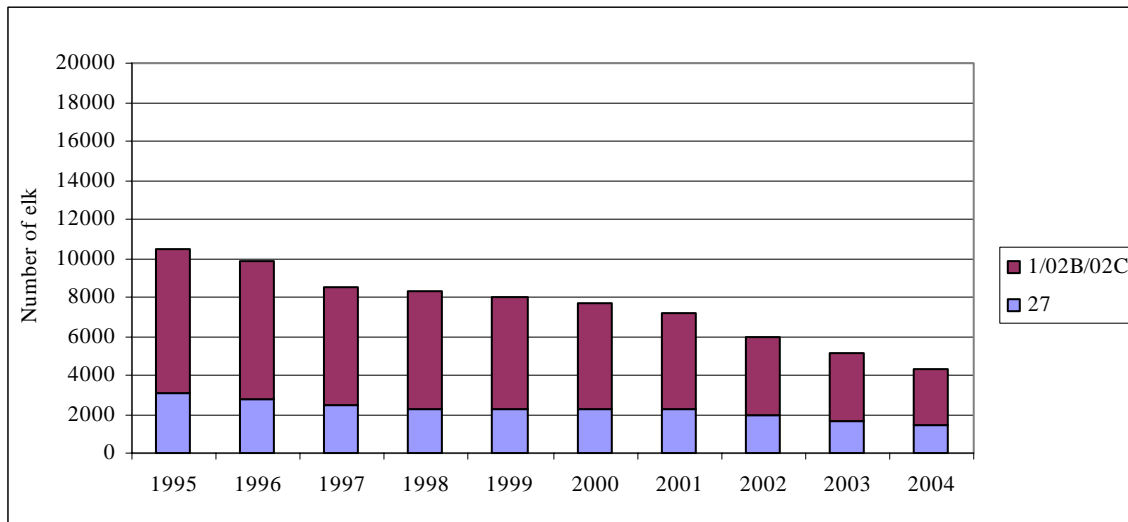
The FEIS based its elk population estimates on a study by Green Hammond,¹²⁸ which estimated that the elk population in the BRWRA was 15,900 in 1996 (NM population: 10,200; AZ population: 5,700).¹²⁹ The FEIS projected that five years after the population of wolves reached 100, elk populations would range from 9,300 to 18,000. The actual elk population in the BRWRA in 2002 (the latest date for which data was available for both states) is estimated to range from 16,500 to 20,600. Since the wolf population has not yet reached 100, determining whether the projected effects on elk populations will occur is not yet possible. However, the current BRWRA population is larger than the projected population after the wolf population reaches 100. Other factors, such as game manager decision-making strategies as well as climate further complicate the assessment of whether wolf predation has affected elk populations to date.



¹²⁸ Green Hammond, Katherine. "Assessment of Impacts to Populations and Human Harvest of Deer and Elk Caused by the Reintroduction of Mexican Wolves." Prepared for U.S. Fish and Wildlife Service, Order No. 20181-4-0201, April 11, 1994.

¹²⁹ Data for New Mexico was not available for a direct comparison of this FEIS estimate to current data sources, but Arizona estimates are roughly consistent with this estimate, ranging from 2,000 to 9,000. This range of estimates and those presented in Exhibits 4-3, include estimates for GMUs 2B and 2C in Arizona, though these units are not in the BRWRA. Data provided by AZGFD did not allow disaggregation of this data from Unit 1. As a result, estimates of population in the Arizona portion of the BRWRA are presented as a range.

Exhibit 4-4
ELK POPULATIONS IN THE ARIZONA PORTION OF THE BRWRA
(UNITS 1 AND 27), 1995-2004



Source: Elk Management Summaries for 2003/2004, Arizona Game and Fish Department records, February 2005. Population estimates for GMUs 2B and 2C are included, though these units are not in the BRWRA. Data provided by AZGFD did not allow disaggregation of these data from Unit 1 data.

Deer populations have been declining for the past decade in the BRWRA area.¹³⁰ In the Arizona portion of the BRWRA, mule deer populations declined from a population of approximately 12,000 in 1998 to a population of approximately 8,000 in 2002, as presented in Exhibit 4-5. State wildlife agencies attribute this decline to a combination of factors, including drought, overall forest succession, lack of natural fires, and resulting lack of available forage for deer.¹³¹ The whitetailed deer population in Arizona was approximately 2,300 in 2003 (trend data was not available to estimate changes in population of white-tailed deer over time, but game managers report trends similar to mule deer). While official deer population estimates were not available for the BRWRA in New Mexico, state deer managers and outfitters report that similar declines in mule deer and white-tailed deer have been observed in the Gila National Forest.¹³²

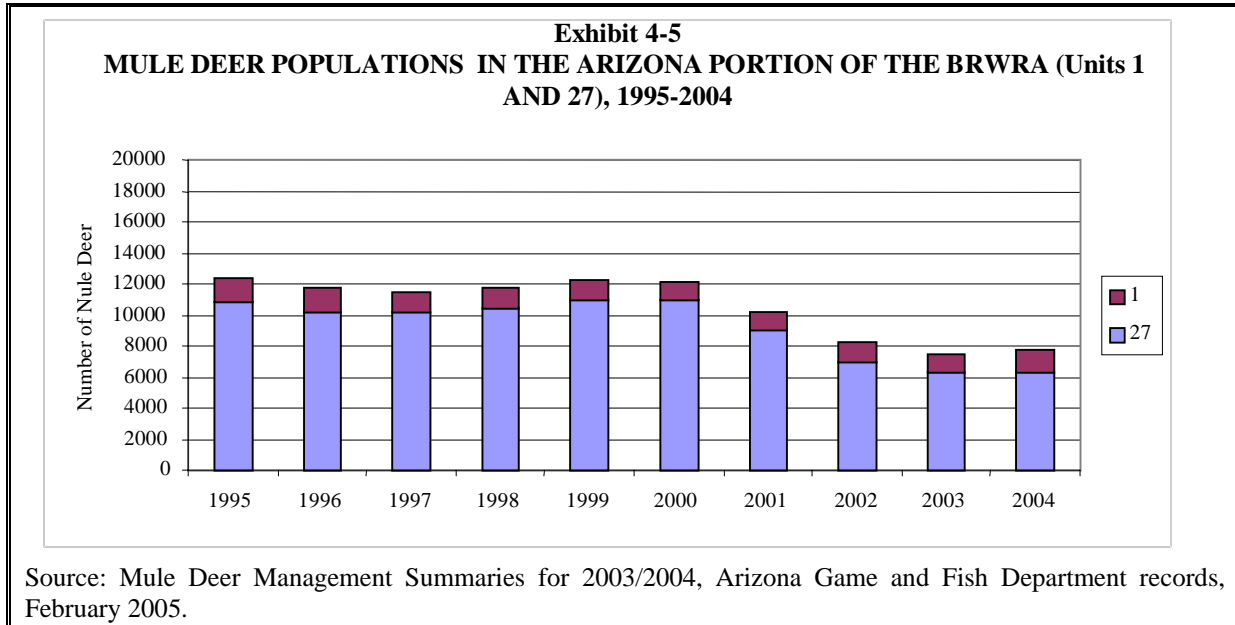
The FEIS estimates that deer populations in the BRWRA will range from 35,500 to 64,100 five years after the wolf population reaches 100. Given the apparent continued decline in population, these projected population estimates may be high. However, because population

¹³⁰ Personal communication with B. Hale, Deer Program Manager, New Mexico Department of Game and Fish, December 28, 2004. Personal communication, NM Council of Outfitters and Guides, March 8, 2005.

¹³¹ Personal communication with S. Kohlmann, Elk Program Manager, NMGFD, March 3, 2005.

¹³² Deer population in the Gila National Forest are surveyed periodically, but total population is not estimated. Personal communication with P. Mathis, Regional Game Manager, Southwest Region, NMGFD, March 7, 2005; Barry Hale, Deer Program Manager, New Mexico Department of Game and Fish, December 28, 2004.

estimates were not available to estimate deer populations in the BRWRA, direct comparisons are not possible. Even if populations were known, estimating deer population reductions that result from wolf predation would be complicated by other factors, such as changes to climate and forage conditions, that have lead to ongoing downward trends in deer populations.



4.4 Effects on Hunter Visitation to the Region

4.4.1 Number of Permits Sold

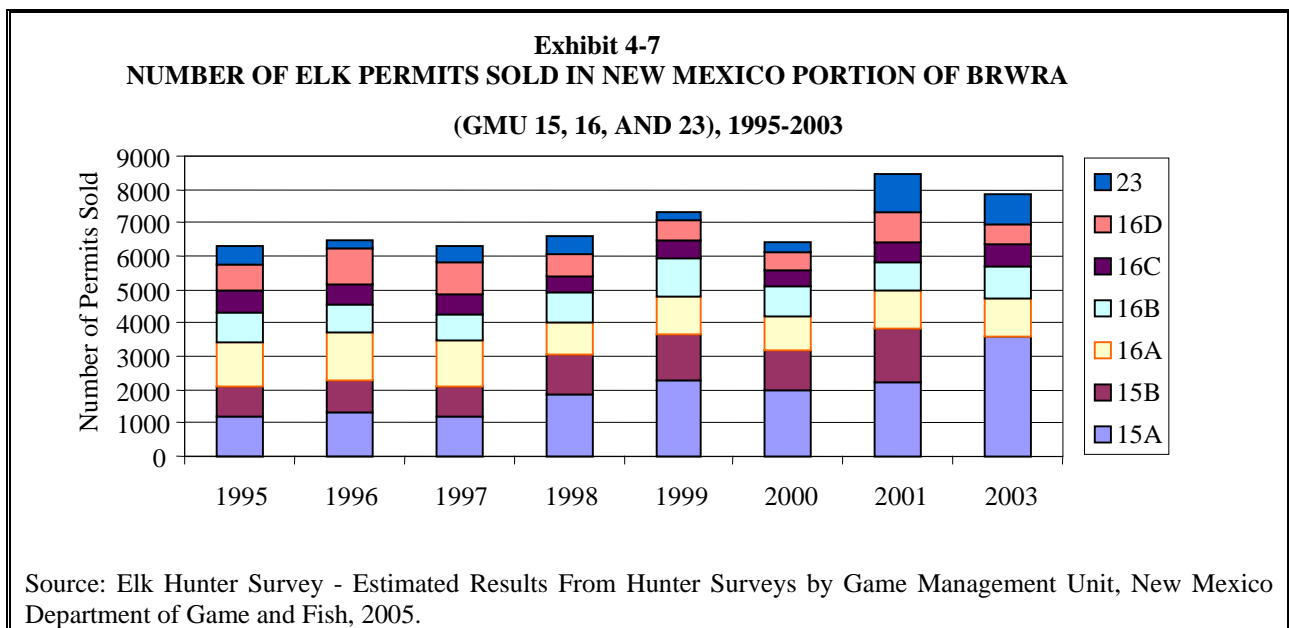
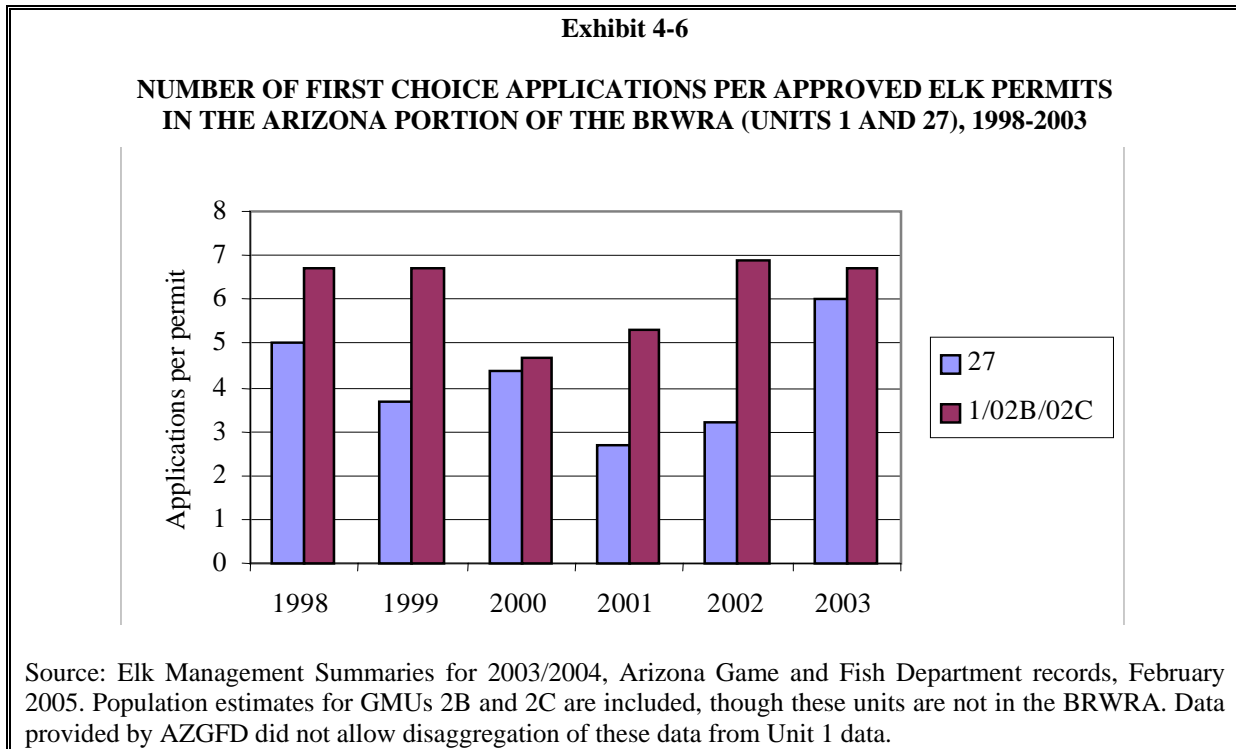
The FEIS estimated that the number of elk and deer hunting permits sold by the states of New Mexico and Arizona in the BRWRA could decline after the wolf population reached 100, leading to a reduction in fees collected by the states (as shown in Exhibit 4-1).¹³³ This section examines whether a downward trend in permit sales can be identified in the BRWRA since reintroduction.

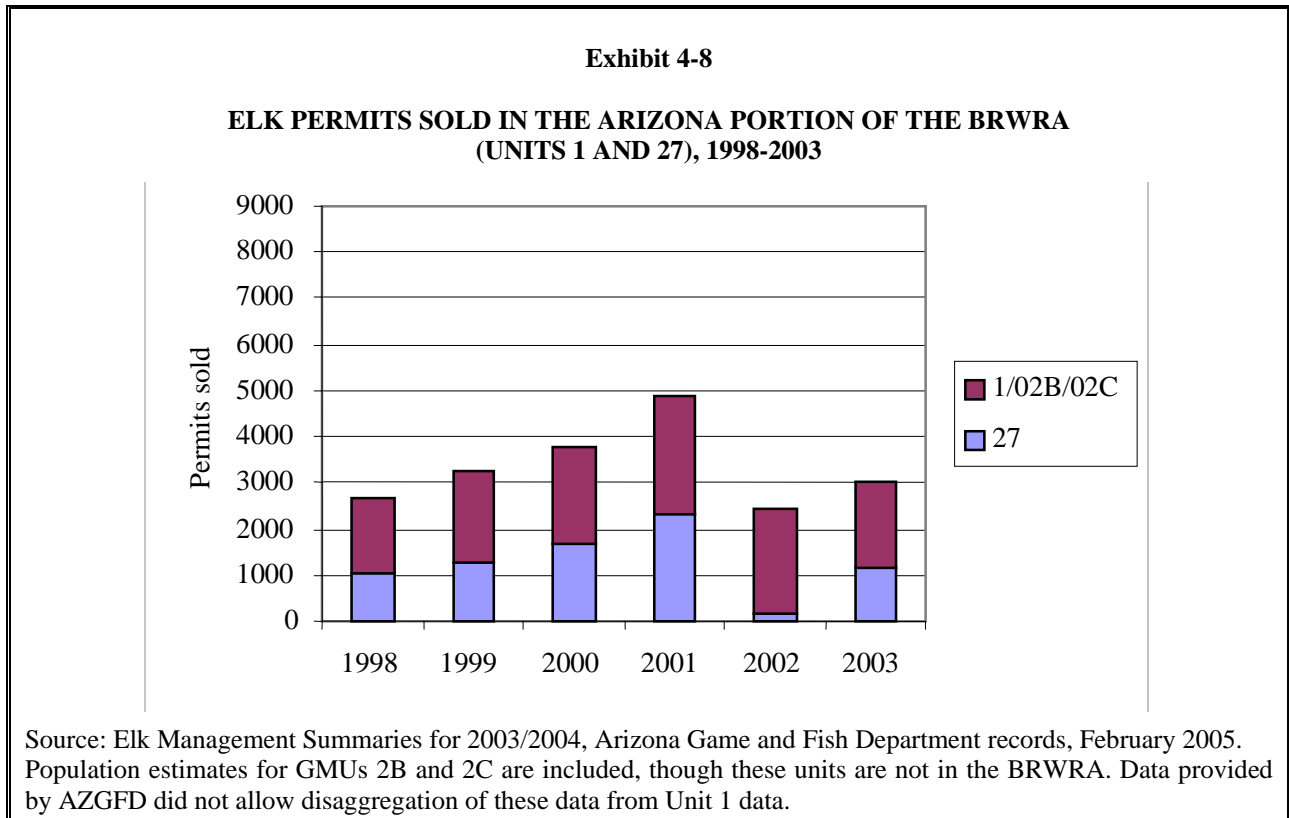
In New Mexico and Arizona, elk hunting is permitted through an annual lottery system. In both Arizona and New Mexico, the demand for elk permits exceeds the number of permits issued. In Arizona’s Region 1 there are, on average, four first choice elk permits for every permit issued. AZGFD reports that hunter demand is greatest for the early bull rifle permits, with 80 to 150 applicants for every permit issued.¹³⁴ The number of first choice applications per approved

¹³³ The FEIS states that the estimated hunting losses may overstate actual losses, as hunter may pursue substitute sites or to substitute species for hunting. In addition, because hunting in New Mexico and Arizona is dominated by resident hunters, money not spent in the BRWRA is likely to be spent elsewhere in these states.

¹³⁴ AZGFD, “Regional Elk Management Operational Plans,” March 25, 2004.

elk permit from 1998 to 2003 in the Arizona portion of the BRWRA is presented in Exhibit 4-6. Because of the high demand for these permits, the number of permits sold is usually determined by state quotas, which are chosen with the goal of maximizing the sustainable population of elk, while also maximizing the hunting experience of hunters and minimizing conflicts with other land uses. Exhibits 4-7 and 4-8 present the trend in elk permits sold in the BRWRA since wolf reintroduction.





In New Mexico, most permits for deer hunting licenses on public lands have traditionally been purchased “over the counter,” with no draw system for most hunts. In order to improve the deer hunting experience in NM, NMDGF has begun using a lottery system in 2005, which is likely to result in fewer deer licenses issued overall.¹³⁵

The price of a deer or elk permit or license depends on whether it is over-the-counter or acquired through a draw, whether the hunter is a resident, non-resident, junior, or senior, and, in New Mexico, whether the hunt is a standard hunt, quality hunt, or high-demand hunt.¹³⁶ For all permit types, non-residents pay significantly more than residents for hunting permits in both New Mexico and Arizona. In these states, current resident elk permit fees range from \$46 to \$76, while non-resident elk permit fees range from \$291 to \$766 for non-residents (ranging from 5 to 17 times greater for non-residents).¹³⁷ NMDGF reports that license fees from elk licenses typically amount to \$7 million annually. Draw permit-tags for deer range from \$22 in Arizona to

¹³⁵ Barry Hale, Deer Program Manager, New Mexico Department of Game and Fish, December 28, 2004.

¹³⁶ A “quality” hunt is determined by the State Game Commission (NM), and is designed to provide an increased opportunity for a successful harvest; a “high demand” hunt is a hunt that had at least 20 percent nonresident applicants for the previous two license years. New Mexico Big Game and Furbearer Rules and Information: 2005-2006 License Year, NM Game and Fish, 2005.

¹³⁷ Fees presented are for adult licenses and permits. Sources: New Mexico Game and Fish Department. “New Mexico Big Game and Furbearer Rules and Information, 2005-2006 License Year, 2005; 2004-2005 Arizona Hunting and Trapping Regulations, Arizona Fish and Game Department, 2004.

\$32 in New Mexico for residents, and \$113 to \$196 for non-residents. Statewide revenues from Arizona for all licenses, including fishing licenses, was \$10.6 million in 2001.

Outfitters and guides must be authorized for an annual or priority use special use permit to conduct commercial activities on USFS lands. An outfitter can be (but is not limited to): a hunting guide, fishing guide, backpacking guide and horse packer. In 2002, over 1,050 outfitter guide permits were authorized across USFS Region 3 (Arizona and New Mexico). Outfitter permits in the BRWRA represent approximately 10 percent of all outfitter permits granted by the USFS across Region 3.¹³⁸

The FEIS estimates that elk hunting effort will be reduced by 2,700 to 4,600 hunting days and deer hunting will be reduced by 9,700 to 18,400 hunting days after the population of Mexican wolves reaches 100. As a result of this reduction, a corresponding decrease in state permit revenues of \$68,700 to \$125,500 annually is projected. However, the number of elk permits sold in the BRWRA has increased since wolf reintroduction. In the New Mexico portion of the BRWRA, the number of elk permits sold increased by 20 percent between 1998 and 2003. The trend in the Arizona portion of the BRWRA is less clear, but also shows an increase of 15 percent from 1998 to 2003. Since the reintroduction of wolves began, the number of applications per elk permit has remained relatively stable at between three and seven applications per permit from 1998 to 2003 in the BRWRA. Thus, this analysis finds no evidence that wolf reintroduction has affected the number of elk permits granted by the states for hunting in the BRWRA area. Correspondingly, this analysis also finds no evidence states of New Mexico or Arizona have experienced reductions in elk permit revenue since wolf reintroduction.

The number of deer licenses issued in New Mexico declined by 13 to 18 percent in recent years.¹³⁹ The number of deer permits issued in Arizona declined from 2,100 in 1998 to 850 in 2003 in Arizona (a decline of 36 percent). This change corresponds to the decline in deer population, and is the most likely reason for this decline.

4.4.2 Hunting Effort (Number of Hunters and Hunter Days)

The FEIS estimated that the number of hunter days in the BRWRA would decline after the wolf population reached 100. This section examines whether a downward trend in hunters or hunter days was observable in the BRWRA since reintroduction.

Non-resident hunters comprise approximately ten percent of annual hunting efforts in New Mexico and Arizona, which is consistent with hunting patterns nationally on a statewide basis. Big game hunters make up 86 percent of hunters in New Mexico, which is consistent with

¹³⁸ U.S. Forest Service, Region 3. Draft Biological Assessment for 11 Land and Resource Management Plans, November 2003.

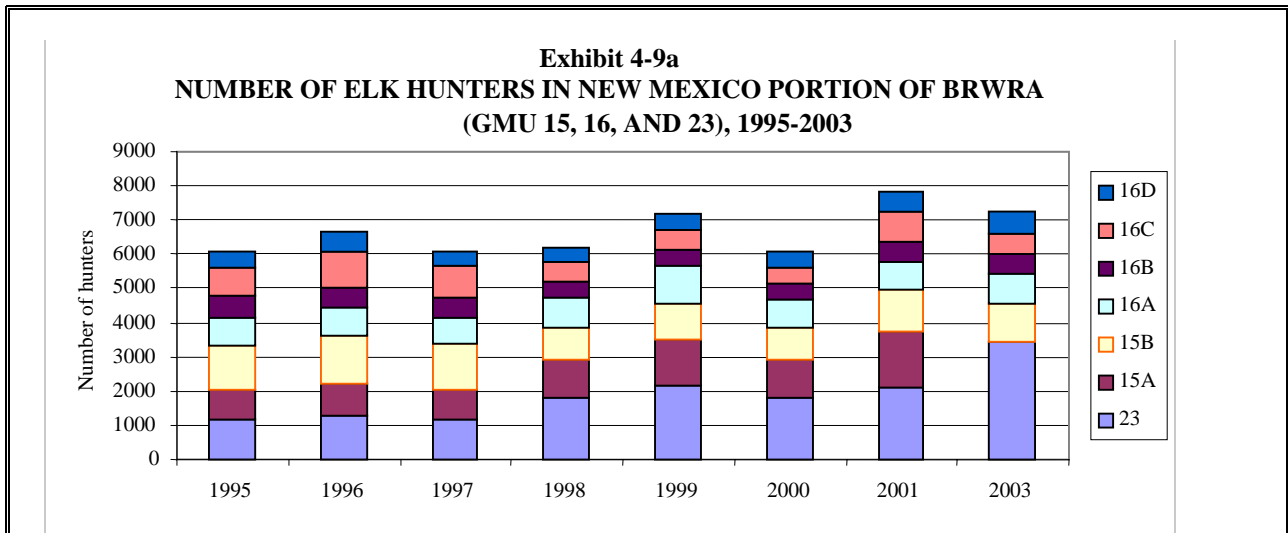
¹³⁹ Personal communication with Pat Mathis, Southwest Regional Game Manager, New Mexico Department of Game and Fish, March 7, 2005.

national trends (84 percent). By contrast, only 36 percent of hunters in Arizona hunted big game in 2001.¹⁴⁰

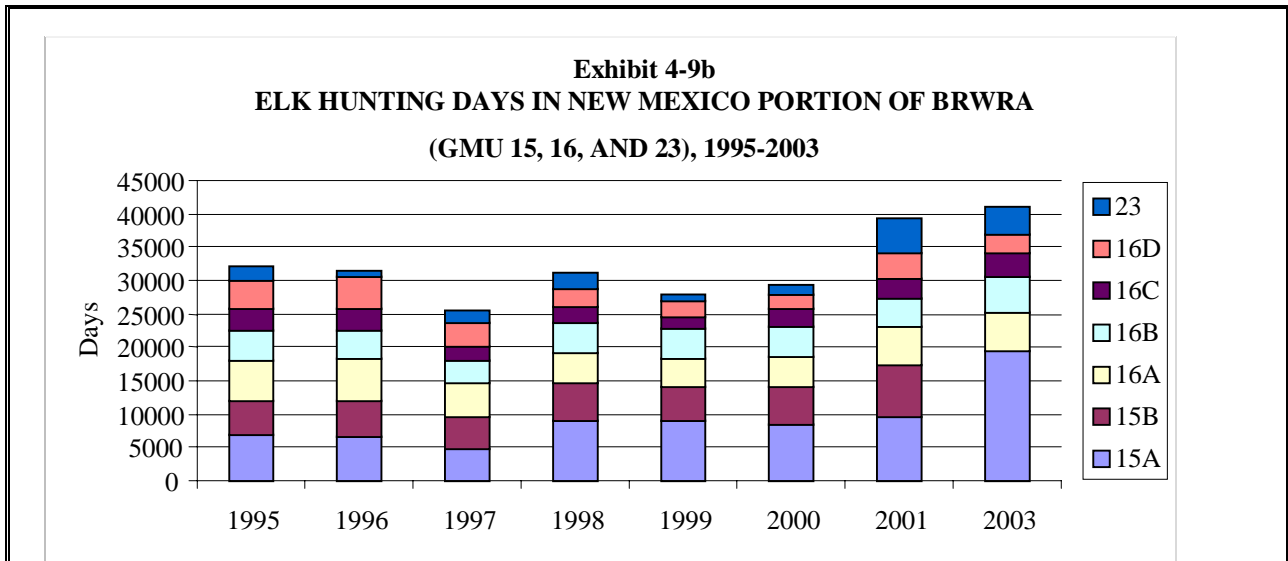
Approximately one third of elk hunting activities (number of hunters and hunting days) in New Mexico occurred in the BRWRA in the 2003-2004 season. The number of elk hunters and hunting days are estimated annually by the state game agencies using a sample of returned hunter surveys. Exhibits 4-9 and 4-10 present the estimated number of hunters and the number of hunters days in the BRWRA since wolf reintroduction.¹⁴¹

¹⁴⁰ U.S. Fish and Wildlife Service, 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, Revised March 2003; New Mexico Silberman, John. "The Economic Importance of Fishing and Hunting", Arizona State University West, 2002.

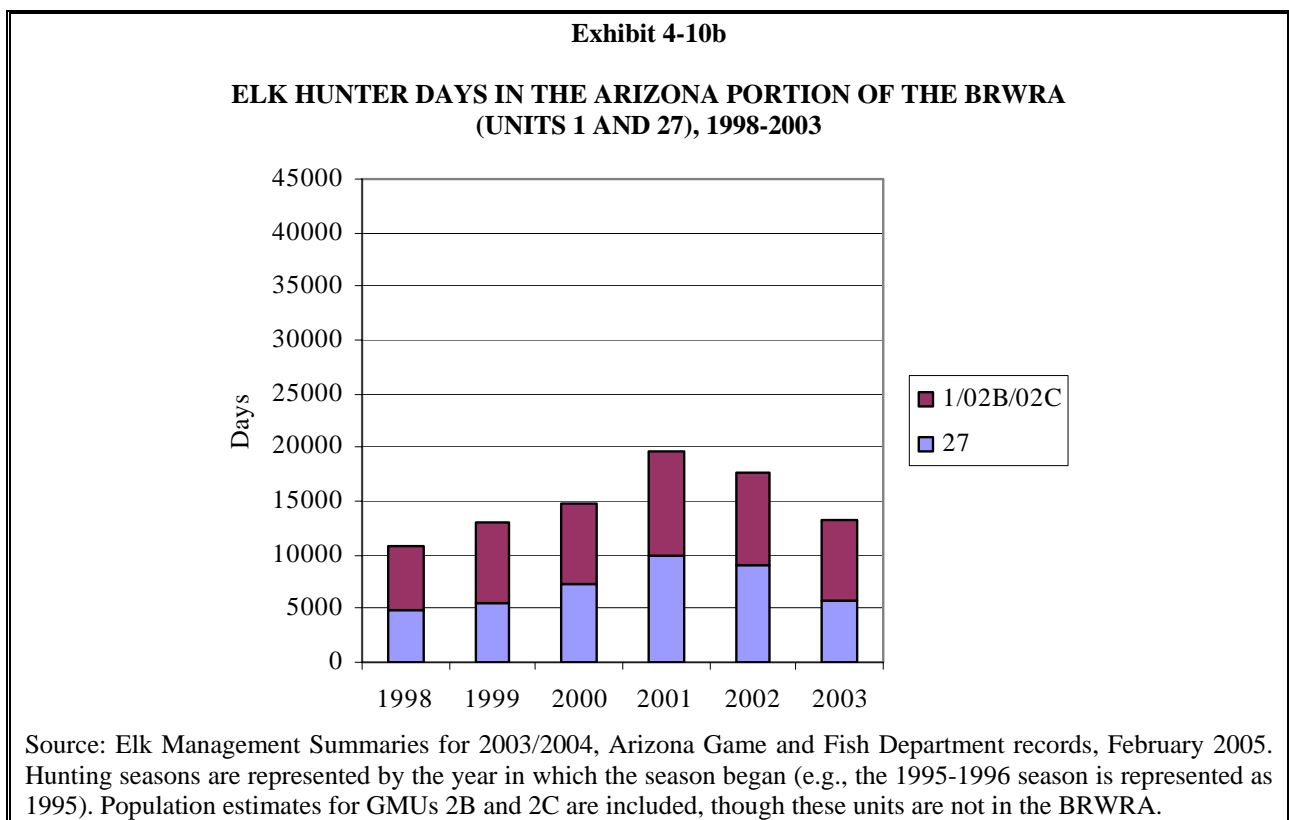
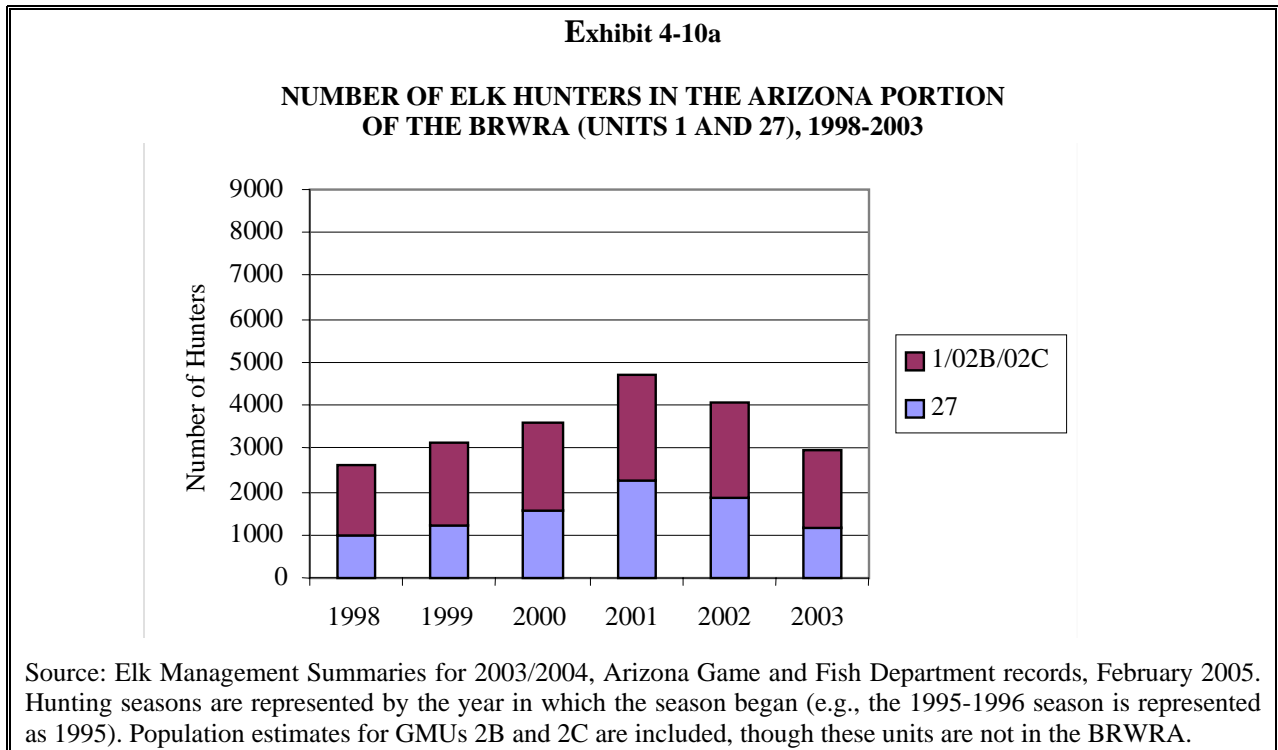
¹⁴¹ Note that hunting days are reported by season (e.g., 1995-1996 hunting season). In the exhibits, hunting seasons are represented by the year in which the season began (e.g., the 1995-1996 season is represented as 1995).



Source: Elk Hunter Survey - Estimated Results From Hunter Surveys by Game Management Unit, New Mexico Department of Game and Fish, 2005. Hunting seasons are represented by the year in which the season began (e.g., the 1995-1996 season is represented as 1995). Data for the 2002-2003 season was not available.



Source: Elk Hunter Survey - Estimated Results From Hunter Surveys by Game Management Unit, New Mexico Department of Game and Fish, 2005. Hunting seasons are represented by the year in which the season began (e.g., the 1995-1996 season is represented as 1995). Data for the 2002-2003 season was not available.

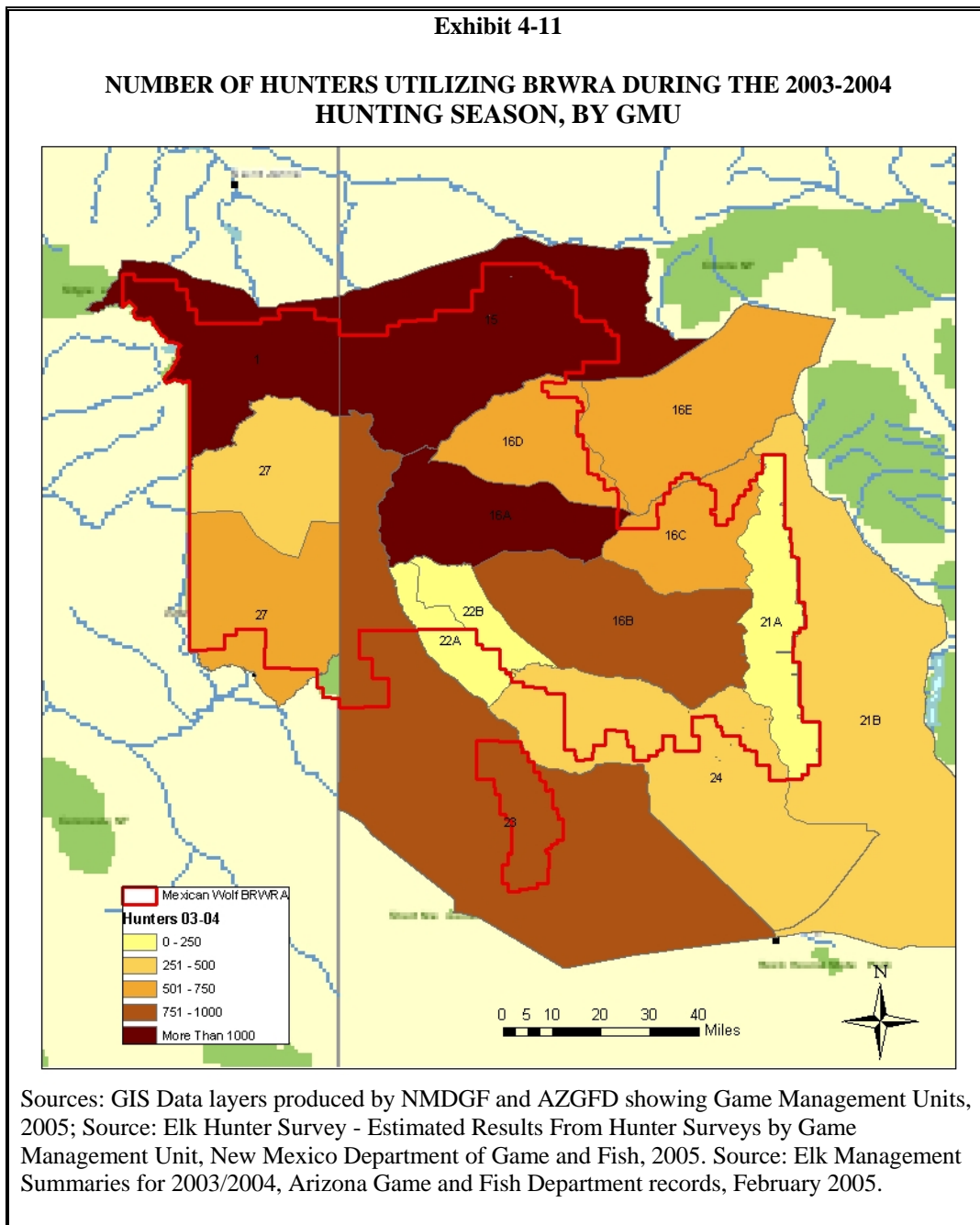


In 2001, five percent of total hunting days statewide occurred in Apache and Greenlee Counties (28,000 and 34,000 days, respectively), though 10 percent of all big game hunting days occurred in those counties.¹⁴² Despite the relatively small contribution to total hunting effort in the state, these counties primarily attract big game hunters, who contributed 52 percent and 82 percent of hunting days in Apache and Greenlee Counties, respectively.¹⁴³ Exhibit 4-11 presents the distribution of hunters across the GMUs in the BRWRA in the 2003-2004 season. As shown, Units 15 and 16A in New Mexico and Unit 1 in Arizona had the most licensed hunter visits during this season.

As stated above, the FEIS estimates that elk hunting effort would be reduced by 2,700 to 4,630 hunting days and deer hunting would be reduced by 9,700 to 18,400 hunting days after the population of Mexican wolves reaches 100. While the wolf population did not reach 100, some decline in hunter effort could have been observed to date given the current wolf population. However, the level of hunting activity did not decline since wolf reintroduction. Thus, the number of elk hunters and hunter days does not appear to have been affected by the reintroduction of Mexican wolves to date.

¹⁴² Silberman, John. "The Economic Importance of Fishing and Hunting", Arizona State University West, 2002.

¹⁴³ *Ibid.*



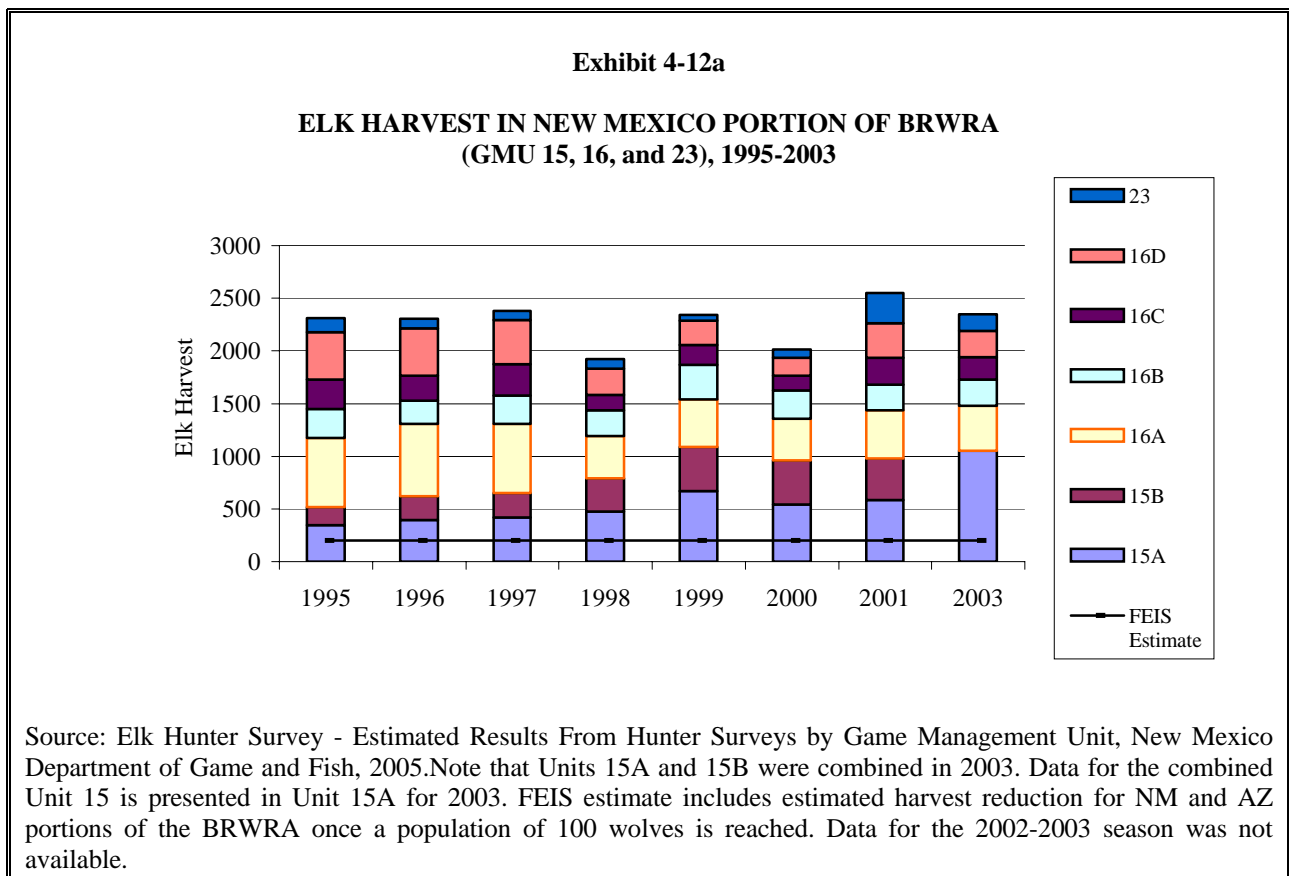
4.5 Effects on Hunting Success

4.5.1 Deer and Elk Harvest

Hunters and outfitters have expressed concerns that wolf presence could result in reduced hunting success, either from reduced prey populations or through behavioral changes to the prey populations that render them more difficult to hunt, e.g., herds become more dispersed. The FEIS

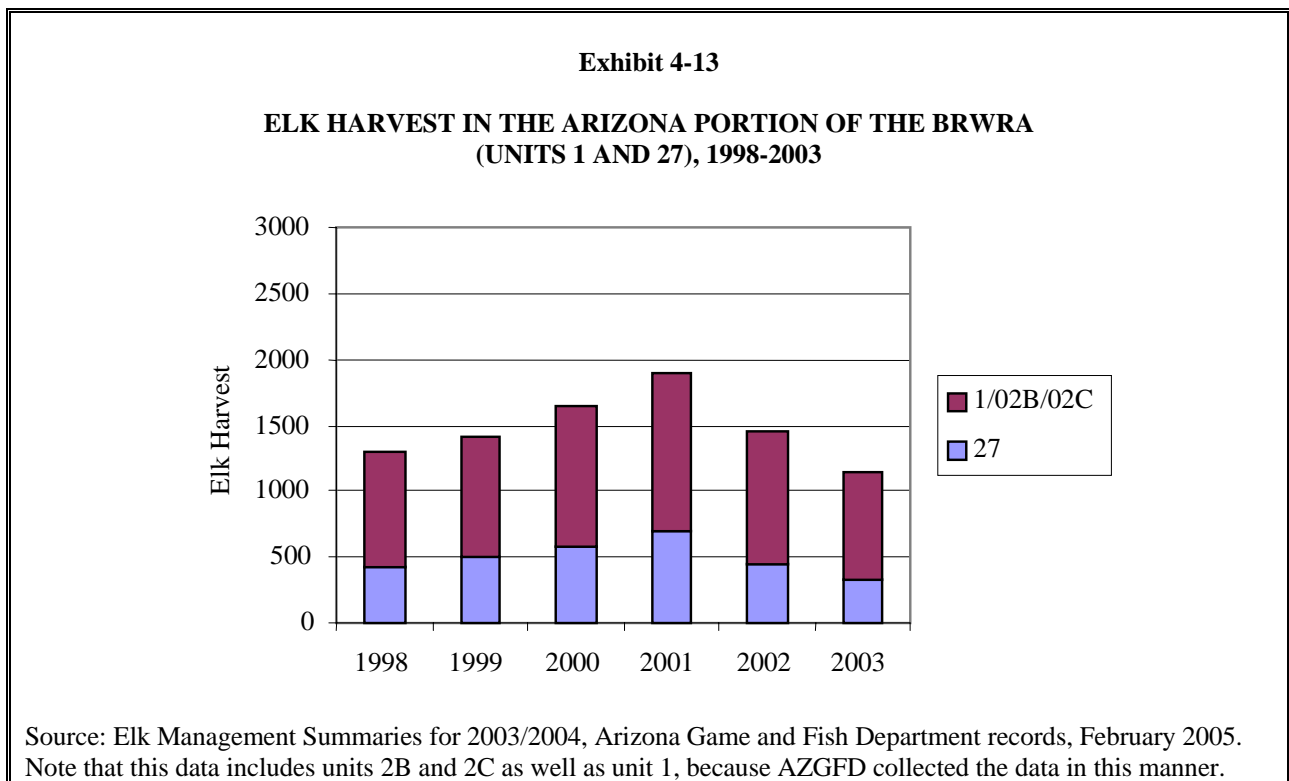
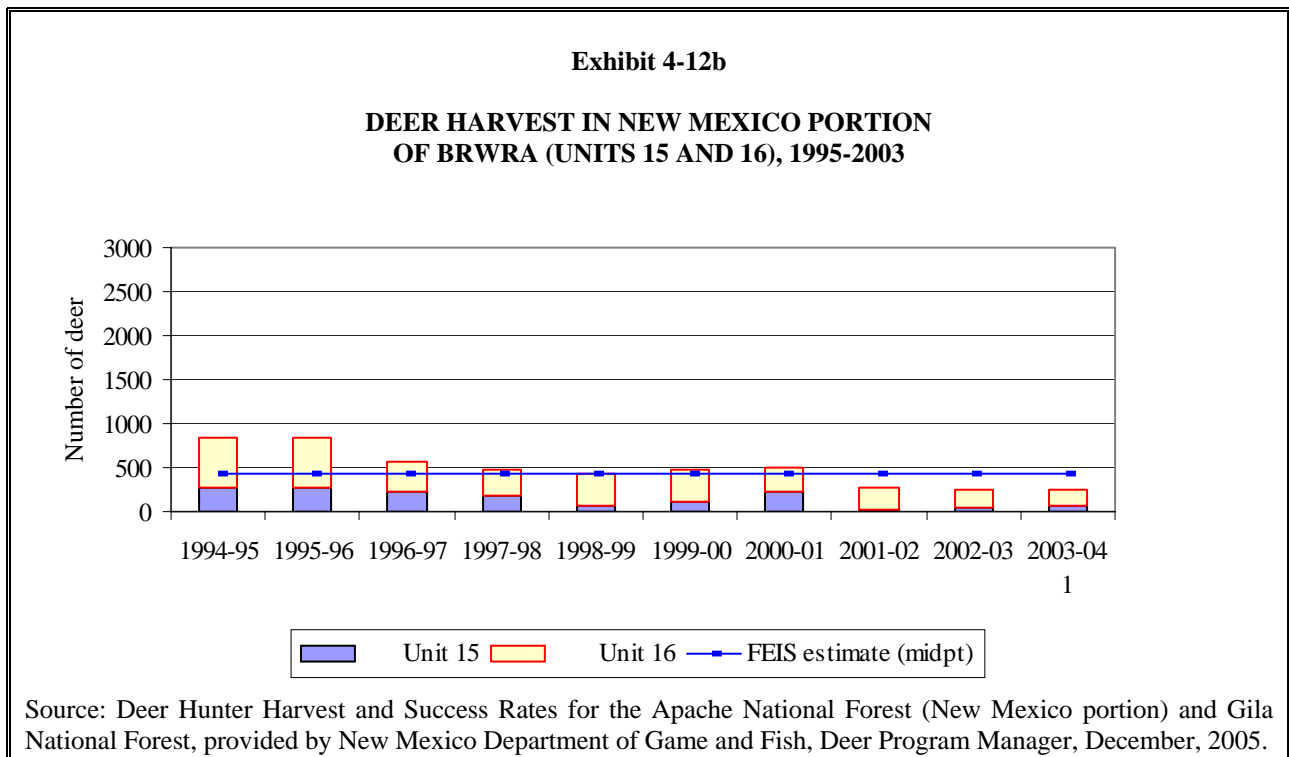
estimated that once the wolf population reached 100, a reduction in harvest of 120 to 200 elk and 300 to 560 deer would be expected annually. This estimate is based on assumptions about the deer and elk population reduction, the rate of hunter success, and the number of days typically hunted in the BRWRA. This section examines whether there was an observable downward trend in elk harvest or success rate since wolf reintroduction.

NMDGF estimates that total elk harvest in New Mexico is typically close to 15,000 annually.¹⁴⁴ In Arizona, the statewide elk harvest is roughly 10,000 annually.¹⁴⁵ Exhibits 4-12 and 4-13 present data on estimated annual elk harvest in the BRWRA since wolf reintroduction. Elk harvest in the BRWRA comprised between 12 and 19 percent of statewide harvest in Arizona between 1998 and 2003, assuming that annual state-wide harvests were constant over this period. In New Mexico, BRWRA harvest comprised 13 to 17 percent of statewide elk harvest.

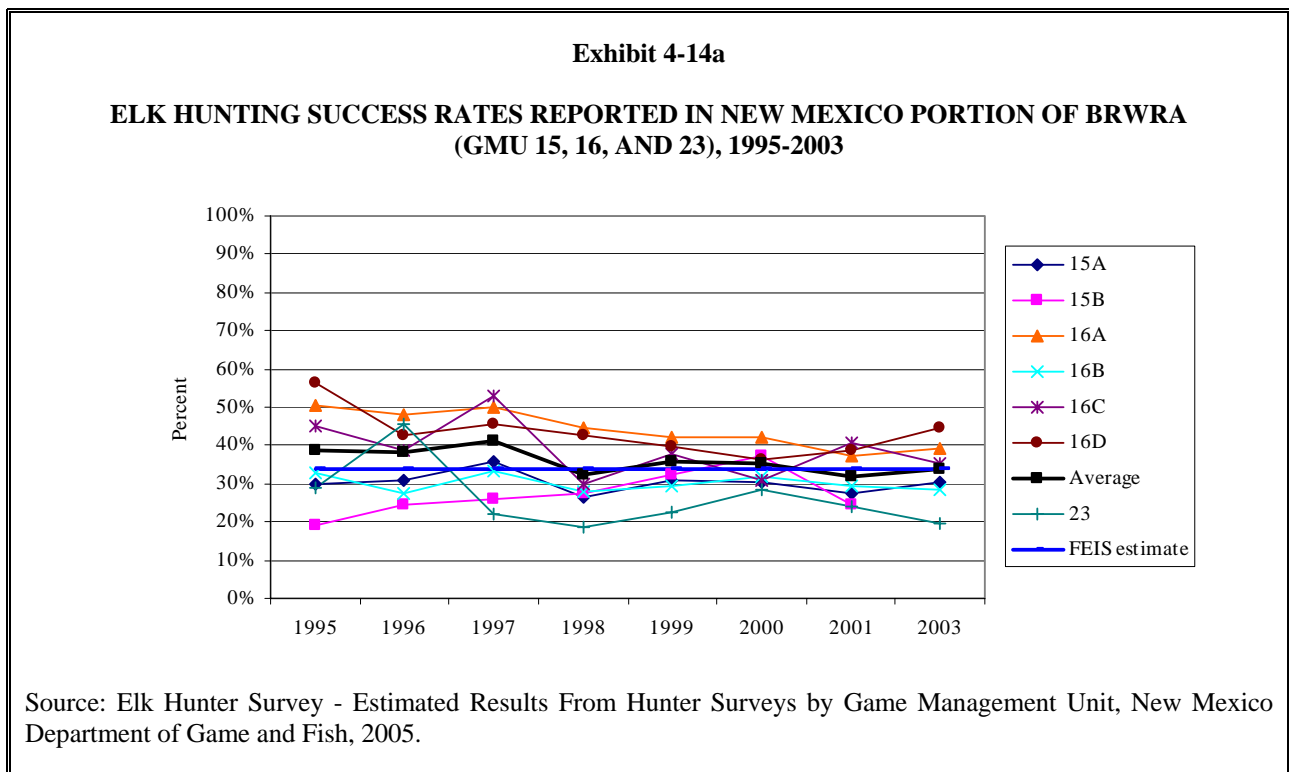


¹⁴⁴ Personal communication with S. Kohlmann, Elk Program Manager, NMGFD, March 3, 2005.

¹⁴⁵ "Elk", Arizona Game and Fish website. Accessed at <http://www.gf.state.az.us/h_f/game_elk.shtml> on December 15, 2004.



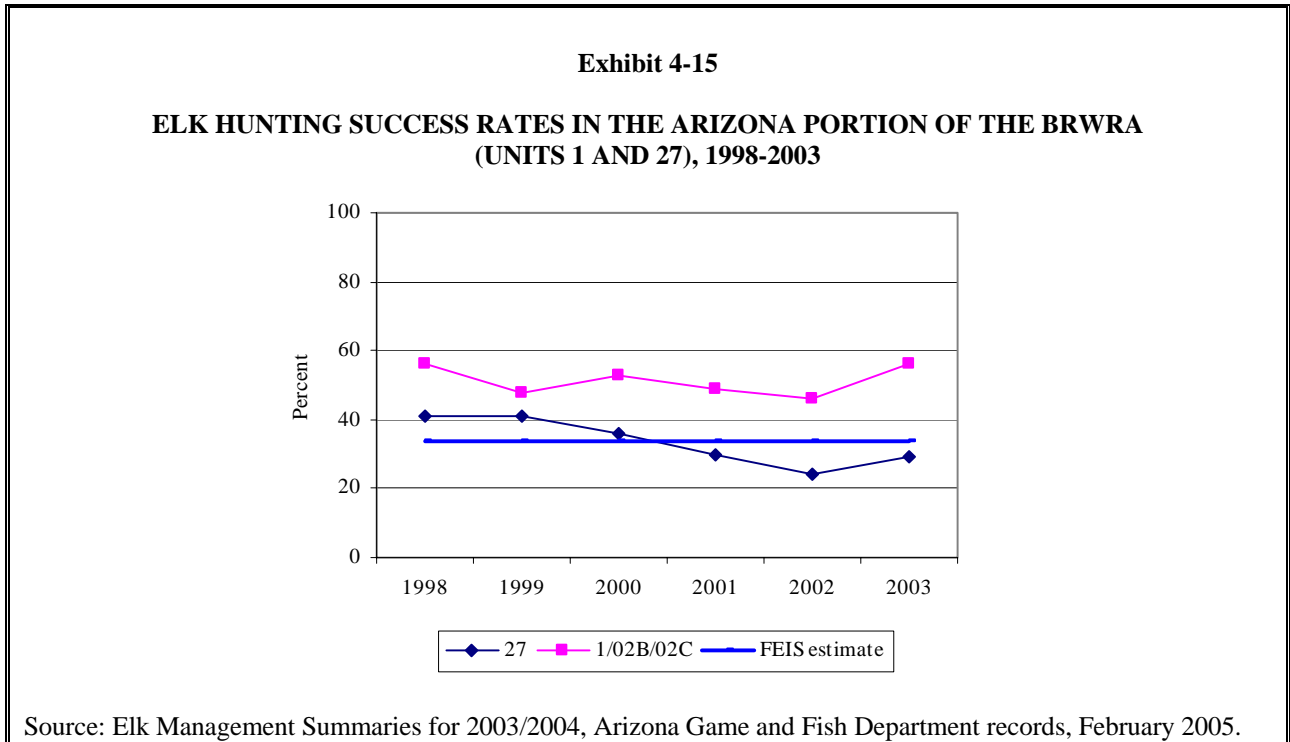
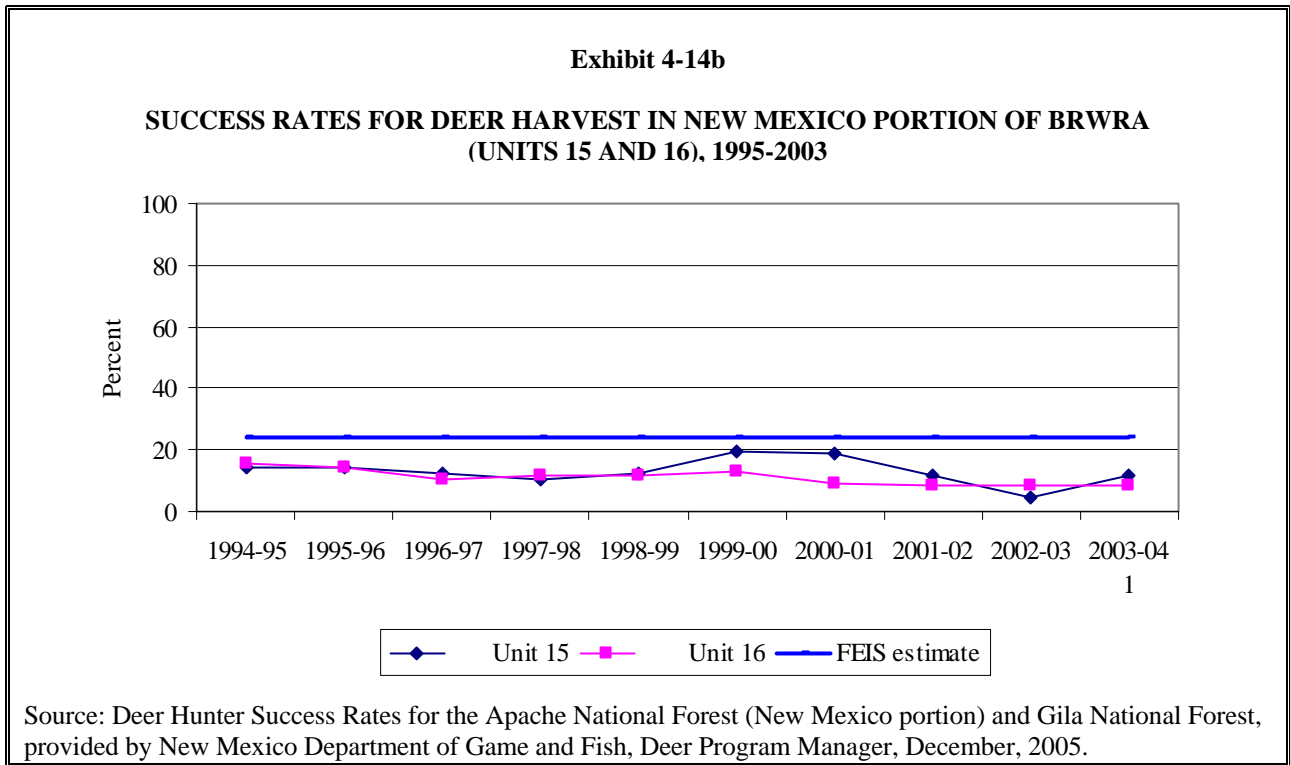
The FEIS assumed that hunting success rates for deer and elk hunting would be approximately 24 and 33 percent, respectively. As shown in 4-14 and 4-15, the reported success rate in the BRWRA from 1998 to 2003 was lower for deer hunting (14 percent weighted average) and higher for elk hunting (37.5 percent weighted average), than assumed in the FEIS.¹⁴⁶ Thus, if recent success rates are indicative of future success rates, then FEIS projections of deer hunter days lost may have been somewhat high, while projections for elk hunter days lost may have been somewhat low.¹⁴⁷ Note that elk harvest and success rate records are estimated by the state game agencies based on a limited sample of hunter surveys as well as the number of permits sold. NMDGF game managers caution that success rates may be somewhat inflated due to the natural human tendency to “brag.”¹⁴⁸



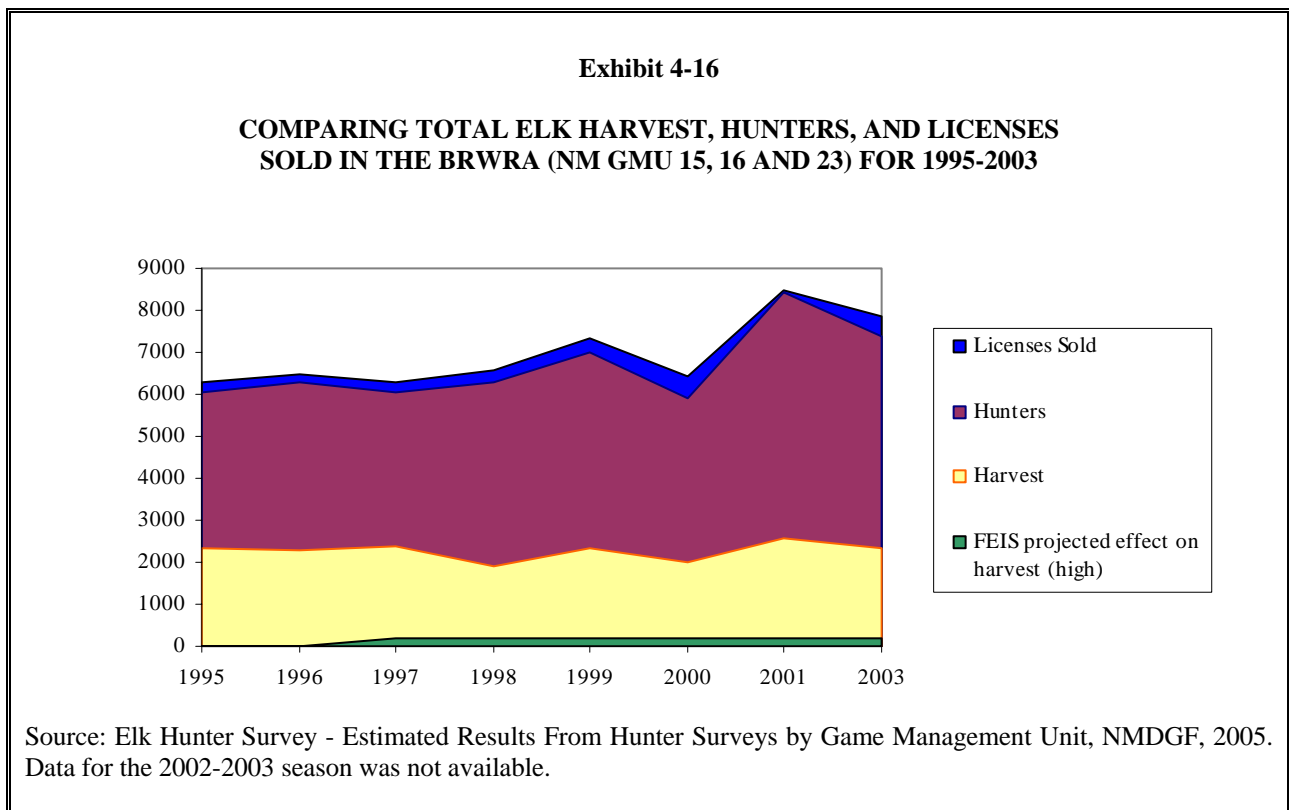
¹⁴⁶ Success rate is defined as number of kills (harvest) divided by the number of hunters. Rates are presented as a weighted average across Arizona and New Mexico.

¹⁴⁷ This is because the FEIS estimates lost hunter days by dividing reduced harvest estimates by the hunting success rate, then multiplying by the average days hunting per big game hunter.

¹⁴⁸ Email communication with Steve Kohlmann, Elk Program Manager, NMGFD, January 3, 2005.



Overall, elk hunting success rates in the New Mexico portion of the BRWRA decreased over the study period, from 39 percent in 1998 to 34 percent in 2003 (on average across GMUs). Success rates in the Arizona portion of the BRWRA decreased from 48.5 percent to 42 percent over this time period. Exhibit 4-16 compares the number of elk licenses, number of elk hunters, and elk harvest over time in the New Mexico portion of the BRWRA. This comparison shows that despite small increases in the number of elk hunters in recent years, elk harvests have remained relatively constant, resulting in a slight decrease in the elk hunting success rate. This decrease is likely due to the combination of a larger group of elk hunters (as shown in Exhibits 4-8 and 4-9) pursuing a smaller amount of prey (as shown in Exhibits 4-2, 4-3 and 4-4), but could also be caused, in part, by wolf predation, or any number of things. However, because of the relatively small number of wolves compared to the overall elk population, any incremental impact of wolf reintroduction is not detectable at this time. The success rate for deer permits did decline over this time period, however the change corresponds to the decline in deer population, and is the most likely reason for this decline.¹⁴⁹ In addition, ongoing research suggests multiple factors that deer are comprise a small fraction of the Mexican wolf diet.¹⁵⁰ Any incremental decrease in success rates for deer harvest due to wolves is not detectable.



¹⁴⁹ State wildlife agencies attribute the decline in deer population, which has been ongoing for at least a decade, to a combination of factors, including drought, forest succession, lack of natural fires, and resulting lack of available forage for deer.

¹⁵⁰ Personal communication with Mexican Wolf Recovery Coordinator, December 16, 2005.

4.6 Lost Income/Costs to Outfitters

Outfitters and guides have raised concerns that their incomes may be affected if Mexican wolves either reduce the hunter success in the area or drive hunters away due to poor perceptions of the area. As stated above, 75 to 80 outfitters typically hold active permits to hunt in the Gila National Forest each year, or about 32 percent of active outfitters in New Mexico.¹⁵¹ Approximately 30 outfitters operate in Apache National Forest.¹⁵² Most outfitters operating in the BRWRA get the majority of their income from elk hunting.¹⁵³ According to Dun and Bradstreet data, 84 hunting establishments operate within the five-county study area (see Exhibit 4-17). Dun and Bradstreet data suggest that all of these establishments are small entities.

| Exhibit 4-17 | | | | |
|--|--|-------------------------------|-----------------------------------|---------------------------------------|
| NUMBER OF HUNTING-RELATED BUSINESSES IN THE BRWRA AREA (2005) | | | | |
| Type of Business (NAICS code) | Hunting Guide Services (713990) | Hunting Camps (721214) | Hunting Preserves (114210) | Sporting Goods Stores (451110) |
| Apache County | 6 | 6 | 0 | 8 |
| Greenlee County | 2 | 0 | 0 | 1 |
| Catron County | 4 | 2 | 2 | 1 |
| Grant County | 7 | 11 | 3 | 9 |
| Sierra County | 2 | 11 | 0 | 8 |
| Total | 21 | 30 | 5 | 28 |

Source: Dialog search of File 516, Dun and Bradstreet, "Duns Market Identifiers, " Sept 2005 data, accessed on Nov 21, 2005. All of these businesses are identified as meeting the criteria to be considered small entities by the Small Business Administration.

Advertised guided elk hunts in the Gila National Forest average \$3,000 to \$4,500 for a typical five-day guided hunt. Most, if not all of professional outfitters are small businesses that rely on a healthy elk population for their business. If the number of licenses issued or the number of hunters visiting is reduced in the BRWRA, these outfitters will be affected. Here is an estimate of the annual revenues of outfitters that utilize the BRWRA:

- 110 outfitters in the BRWRA (80 in NM, 30 in AZ)
- 20-40 hunters per outfitter per season
- \$4,000 average cost of five day elk hunting trip in BRWRA area
- \$120,000 to \$160,000 in annual gross income to outfitter

¹⁵¹ Based on the number of outfitter/guide permits issued annually in the Gila National Forest. Email communication with Paula Barnhill, Gila National Forest, March 18, 2005.

¹⁵² Personal communication with M. Frances, Apache National Forest, Springerville District, March 10, 2005. The number of outfitter/guide permits for Clifton and Alpine Ranger Districts were assumed to be similar to the number issued in Springerville.

¹⁵³ Personal communication with San Francisco River Outfitters, March 8, 2005.

- \$13.2 to \$17.6 million in gross revenues for outfitters in BRWRA

Hunters have also expressed concerns that wolves may prey on hunting dogs, which are currently not compensated for by DoW. The number of dogs reported killed to USFWS or Wildlife Services to date has been small (see Section 3). However, these kills may not be reported due to the current policy on compensation for them. While data does not exist to quantify total costs that may have resulted from dog kills to date, breeders report that dogs are valuable. Puppies can be sold for \$600-\$2,000, and adult dogs are reported to easily exceed \$5,000.¹⁵⁴ Breeders point out that the loss of a dog used for breeding can result in loss of potential valuable offspring. Good adult hunting dogs are the result of years of training, which is also lost if a dog is taken by a wolf.

However, as stated above, there is little evidence to suggest that the number of hunters visiting the area was reduced by the reintroduction of Mexican wolves between 1998 and 2003. In fact, the number of elk permits sold in the BRWRA has increased since wolf reintroduction, as stated above. The number of deer permits/licenses issued in Arizona and New Mexico did decline over this time period, however the change corresponds to the decline in deer population, and is the most likely reason for this decline.

4.7 Regional Economic Impacts

The International Association of Fish and Wildlife Agencies report on the Economic Importance of Hunting in America estimates that hunters spent \$196 million in New Mexico and \$298.4 million in Arizona in 2001.¹⁵⁵ Distributing these direct expenditures across 3.36 million hunter days spent in these states that year, direct expenditures per hunter per day are estimated at \$118 (NM) and \$106 (AZ).¹⁵⁶ Regional economic impacts of these expenditures (which include equipment and travel expenditures) are estimated at \$561.9 million in output for Arizona and \$342 million in total output for New Mexico, in addition to impacts on employment and jobs.

Using the per day total expenditures estimates, direct expenditures associated with elk and deer hunting days in the BRWRA (71,000 in 2001) are estimated to have been \$7.5 million. Regional economic impacts would be associated with these expenditures. This information is provided for context, however, as no reductions in hunter visitation have been observed since Mexican wolf reintroduction began in the BRWRA.

¹⁵⁴ Email communication with NAV office, hunting hound breeder, Illinois on February 28, 2005.

¹⁵⁵ International Association of Fish and Wildlife Agencies, Economic Importance of Hunting in America, 2002. This estimate is an adjusted estimate of the Service's National Survey of Fishing, Hunting and Wildlife-Associated Recreation, 2001 Survey.

¹⁵⁶ *Ibid.*

4.8 Conclusions and Comparison to FEIS

The estimated harvest reduction of 120 to 200 elk would have represented 2 to 6 percent of annual elk harvest in the BRWRA between 1995 to 2003. Reductions equal to the FEIS estimates would have represented one to two percent of total elk hunting days in New Mexico and Arizona in 2001, or four to seven percent of elk hunting days in the BRWRA. However, over the past five years, wolf populations have not reached 100. For this or other reasons, impacts on hunters and hunting effort in this region appears to have been minimal to date. Exhibit 4-18 presents a comparison of current estimates to FEIS estimates.

- *Effects on big game population from depredation:* The current BRWRA elk population is larger than the population projected by the FEIS to exist after the wolf population reaches 100. Nonetheless, both elk and deer populations in the BRWRA declined since 1998. However, other factors, such as game manager decision-making strategies as well as an ongoing drought complicate the assessment of whether wolf predation has affected elk populations to date. State wildlife agencies attribute the decline in deer population, which has been ongoing for at least a decade, to a combination of factors, including drought, forest succession, lack of natural fires, and resulting lack of available forage for deer.
- *Effects on hunter visitation to the region:* The number of elk permits sold in the BRWRA increased from 1998 to 2004, as did the number of hunters and hunter days. Thus, this analysis finds no evidence that wolf reintroduction has affected the hunter visitation in the BRWRA area. Correspondingly, this analysis also finds no evidence that either New Mexico or Arizona has experienced reductions in elk permit revenue since wolf reintroduction. While wolves have killed elk over this time period, a change in hunter visitation due to deer and elk population reductions by wolves is not detectable. The number of deer licenses issued in New Mexico declined by 13 to 18 percent in recent years. The number of deer permits issued in Arizona declined from 2,100 in 1998 to 850 in 2003 (a decline of 36 percent). As stated above, the decline in deer population has been caused by multiple factors other than wolves, and is the most likely cause for the reduction in permits granted.
- *Reduced hunting success:* Overall, elk hunting success rates in the New Mexico portion of the BRWRA show a decrease over the study period, from 39 percent in 1998 to 34 percent in 2003 (on average across game management units). Success rates in the Arizona portion of the BRWRA show a decrease from 48.5 percent to 42 percent over this time period. Despite small increases in the number of elk hunters in recent years, elk harvests have remained relatively constant, resulting in a slight decrease in the elk hunting success rate. This decrease is likely due to the combination of a larger group of elk hunters pursuing a smaller amount of prey. Because of the relatively small number of wolves compared to the overall elk population, any incremental impact of wolf reintroduction is not detectable at this time. The success rate for deer permits did decline over this time period, however the change corresponds to the decline in deer population, and is the most likely reason for this decline. In addition, ongoing research suggests that deer comprise a

small fraction of the Mexican wolf diet.¹⁵⁷ Any incremental decrease in success rates for deer harvest due to wolves is not detectable.

- *Lost income to outfitter/guides:* The outfitter/guide industry is an important contributor to local economies and likely brings \$13 to \$17 million in gross revenues annually. However, revenue impacts are not estimated because no reduction in hunter participation was observed during the study period.
- *Regional Economic Effects:* Regional economic impacts are not estimated because no reduction in hunter participation was observed.

| Exhibit 4-18 | | | |
|--|--|--|---|
| SUMMARY OF FEIS ESTIMATES AND OBSERVATIONS OF IMPACTS OF WOLVES ON HUNTING ACTIVITY IN THE BRWRA, 1998-2004 | | | |
| Concerns | FEIS Estimates | Observations (1998-2004) | Conclusions |
| Prey Population Effects | Elk and deer population reduction expected. | Elk and deer populations have declined in the BRWRA. | Population declines likely due to forage factors and management decisions. Not likely due to wolf. |
| Hunter Visitation | Reduced hunting days expected. | Increase in hunter days and hunters. | Not observable to date. |
| Hunting Success | Harvest reduction expected. Constant success rate. | No observable change in elk harvest. Decreased success rate for deer and elk. | Increased hunting pressure combined with decreased prey base lead to decreased success rate. Wolf effect is not detectable. |
| Lost Income to Outfitter/Guides | Not quantified. | No observable change. | Not observable to date. |
| Regional Economic Impacts | Not quantified. | No observable change. | Not observable to date. |

¹⁵⁷ Personal communication with Mexican Wolf Recovery Coordinator, December 16, 2005.

**ECONOMIC IMPACTS OF MEXICAN WOLF
REINTRODUCTION ON TRIBES****SECTION 5**

This section of the analysis evaluates the socioeconomic impacts to tribes associated with the wolf Reintroduction Project from 1998 to 2003. Data for 2004 is also presented where available.

Although the BRWRA does not include any Tribal lands, the lands of the San Carlos Apache and the White Mountain Apache (Fort Apache Reservation) lie adjacent to the BRWRA, and have had experiences with wolves. The FEIS discussed potential effects that wolf reintroduction could have on Tribal activities if Tribal lands become "fully occupied," with an estimated wolf population of 20 to 30 wolves. This discussion uses several economic indicators to present the overall susceptibility of the Tribes to impacts from Mexican wolf introduction, as well as summarizing known economic impacts on the Tribes from reintroduction to date. Because of their rural nature, high unemployment, and dependence on natural resources on Reservation lands, both Tribes are in a relatively weak economic position to absorb incremental cost increases that could result from Mexican wolf reintroduction. The San Carlos also report that depredation of their cattle has occurred. Both Tribes also expend considerable effort in attending meetings to discuss management of the Mexican wolf. USFWS and DoW both contributed funds to support Tribal efforts for wolves during the study period.

5.1 San Carlos Apache Tribe

The FEIS identifies several potential impacts of Mexican wolf reintroduction on the San Carlos Apache Tribe if the Reservation becomes fully occupied by wolves. The potential effects include impacts on big game hunting activities if elk populations are reduced, especially if wolves take large trophy bull elk. The FEIS also discusses the potential for livestock depredation, which is deemed "likely." The FEIS states that costs of lost deer, elk, and cattle could range from \$4,100 to \$17,500 annually, but does not include estimates of lost hunting value to hunters or reduced regional expenditures. Other negative impacts are identified, such as conflicts with the existing Tribal resolution opposing wolf recovery and conflicts with Tribal sovereignty rights. Positive impacts mentioned include increased tourism, existence value, and long-term ecological balance.

The San Carlos Apache have historically been opposed to Mexican wolf reintroduction. Under a standing Tribal Council Resolution, wolf migration through the area is not permitted, and no releases of wolves onto the reservation are currently planned.¹⁵⁸ Under an existing cooperative agreement with the USFWS, the San Carlos accept funds from USFWS to train Tribal personnel to monitor movement, locations, and activities of Mexican wolves on the Reservation, as well as to assess depredations. USFWS has provided approximately \$40,000 per year to the Tribe for these purposes since the agreement was signed.¹⁵⁹

5.5.1 Population Trends and Population Density

Based on U.S. Census data, the San Carlos Apache Reservation population has shown some growth in recent years, increasing from an estimated 7,294 in 1990 to 9,385 in 2000. The State of Arizona estimated that population on the reservation was 9,791 in 2003, and the Tribe estimates that current population is more than 12,000.¹⁶⁰ Population is nonetheless sparse overall when compared to Arizona as a whole. While the San Carlos Apache Reservation encompasses over 1.8 million acres, population density on the Reservation is approximately 3.2 people per square mile, compared to an overall population density in Arizona of 32.1. Because the population is rural, fewer employment opportunities exist to substitute for losses in income, should that occur as a result of wolf reintroduction.

5.1.2 Unemployment and Per Capita Income

Based on the 2000 Census, the unemployment rate on the San Carlos Apache reservation was 35.4 percent. A recent study by the Tribe found that the unemployment rate is much higher, at 76 percent, indicating that at least seven out of ten people in the Tribe's labor force are unemployed.¹⁶¹ Using either measure, the employment rate on the San Carlos Reservation is far higher than surrounding counties (Apache County, which has the highest unemployment rate in the study area, had an unemployment rate of 24 percent in 2000) or Arizona as a whole (7 percent).

Tribal per capita income was \$5,200 in 2000, or about one-fifth of the Arizona average. In addition, the poverty rate on the San Carlos Apache Reservation is 48 percent. Again, this rate is far higher than surrounding counties or Arizona as a whole.

¹⁵⁸ Mark MacAllister. "The Mexican Wolf Recovery Area." [Field Trip Earth](#). Accessed Dec. 7, 2005.

¹⁵⁹ Personal communication with USFWS Wolf Coordinator, December 16, 2005.

¹⁶⁰ Letter from Susan B. Montgomery, Sparks, Tehan & Ryley, P.C. re: Comments to Draft Economic Analysis Regarding Possible Designation of Critical Habitat for the Southwestern Willow Flycatcher on the San Carlos Apache Reservation, dated October 6, 2004.

¹⁶¹ Letter from Steve Titla, Titla and Parsi, General Counsel for the San Carlos Apache Tribe, Re: Economic impact of wolf depredation to Point of Pines on San Carlos, November 18, 2005; Letter from Joe Sparks, Sparks, Tehan & Ryley, P.C. re: Request for Information Regarding Possible Designation of Critical Habitat for the Southwestern Willow Flycatcher, dated September 7, 2004.

5.1.3 Dependence on Hunting Revenues and Livestock Grazing

The San Carlos Apache Tribe's economy includes cattle operations, forestry, a small service sector, and tourism and recreation. The Tribe has five cattle associations and operates two Tribal ranches. Livestock grazing is an important source of income for the San Carlos Apache Tribe. Typically, herds roam free and unattended, and are rounded up periodically for branding. However, many cattle remain unbranded, and determining ownership in the case of depredation could be difficult. In addition, there is no established calving season, and thus cattle breed and give birth throughout the year. This management regime complicates the protection of cattle, and calves in particular, from wolf depredation.¹⁶²

Tribal representatives have expressed concerns that the cattle herd on the Reservation has been affected by wolf depredation. The Point of Pines Cattle Association on the Reservation reports that "at one branding site there were only two branded calves compared to the past when an Apache reported that three hundred used to be branded at that site. This decline in branding numbers happened after the wolves were reintroduced. Point of Pines was never compensated for those losses."¹⁶³ The Tribe calculates that this may have resulted in annual cattle losses of \$119,000 since 1998.

The San Carlos Apache derive significant revenues from big game hunting permits, particularly elk permits. In 1999, the elk herd was estimated to be 1,200 animals. As in the surrounding areas, these elk can be quite large, and have been recorded as "world class" in the Boone and Crockett Club records. In 1999, trophy elk permits had a basic cost of \$20,000, which could be increased with the size of the animal to as much as \$60,000. Annual revenue from elk hunting was estimated at \$500,000 in 1999.

5.2 White Mountain Apache Tribe

The FEIS states that, if fully occupied, hunting and livestock activities on Fort Apache Reservation could be affected, but that the more important land use activities on the Reservation are timber and recreation, which would only be affected through minor land use restrictions, if any. Effects on the Tribe's ski area were not anticipated.

A resolution by the Tribe in 1995 stated that "the Mexican wolf reintroduction and subsequent migration onto Fort Apache Indian Reservation lands may cause adverse effects with game populations as well as livestock." The resolution further stated that this "could cause additional economic stresses to tribal enterprises as well as possible conflicts with policy

¹⁶² Pavlik, Steve. "San Carlos and White Mountain Apache Attitudes toward the Reintroduction of the Mexican Wolf to its Historic Range in the American Southwest." Wicazo SA Review, Spring 1999.

¹⁶³ Letter from Steve Titla, Titla and Parsi, General Counsel for the San Carlos Apache Tribe, Re: Economic impact of wolf depredation to Point of Pines on San Carlos, November 18, 2005.

issues.”¹⁶⁴ However, in 1998, the Tribal council reversed its position and passed a resolution to allow wolves that migrated onto the Reservation to remain there. In 2000, the Tribe entered into a long-term cooperative agreement with the USFWS to implement the White Mountain Apache Tribe Wolf Management Plan which includes allowing releases of wolves on Fort Apache Indian Reservation. The initial goal of the Management Plan is "to return the Mexican wolf to the Reservation, adding biological diversity and returning a historical and culturally significant species to the landscape. A long-term objective is to develop educational, employment, and tourism benefits from the Mexican wolf program." Since the agreement was signed, two releases of Mexican wolves have occurred on the reservation: the Hon-Dah Pack on June 23, 2005 and F613 on January 22, 2005.¹⁶⁵

USFWS reports that has granted approximately \$135,000 annually to the White Mountain Apache Tribe since the Cooperative Agreement was signed.

DoW estimates that they provided \$12,000 in 2004 to assist the White Mountain Apache to support a "tribal herdsman/wolf monitor" as part of a broader grazing program supported by NRCS. In addition, DoW reports providing the White Mountain with \$20,000 in equipment between 1998 and 2003 to assist with wolf monitoring and management. Field equipment provided included a digital camera, spotting scope, laptop computer, radio telemetry receivers/antennas, GPS units, chemical immobilization/field handling kit, tranquilizer darts, a Honda "Rancher" ATV, tent, sleeping bags, and educational materials.¹⁶⁶

5.2.1 Population Trends and Population Density

The population of White Mountain Apache at Fort Apache is somewhat larger than the population of the San Carlos Apache. Population has also shown some increases in recent years, from 10,394 in 1990 to 12,429 in 2000. The State of Arizona estimated the population at 13,235 in 2003. With a reservation of 1.6 million acres, the population density was 4.2 people per square mile in the 1990 census.

5.2.2 Unemployment and Per Capita Income

Like the San Carlos, the unemployment rate on the Fort Apache reservation was 20.7 percent in the 2000 census, far higher than in surrounding counties or Arizona as a whole. Average income per capita was \$6,358 in 2000, far lower than surrounding counties or Arizona

¹⁶⁴ White Mountain Apache Tribal Council Resolution No. 12-95-371, December 6, 1995, as quoted by Pavlik, Steve. "San Carlos and White Mountain Apache Attitudes toward the Reintroduction of the Mexican Wolf to its Historic Range in the American Southwest." *Wicazo SA Review*, Spring 1999.

¹⁶⁵ Brian T. Kelly and Cynthia Westfall. "White Mountain Apache Tribe Welcomed as Partner in Wolf Recovery." *Fish and Wildlife News*. June 2001; Laura Tanglely. "Restoring a Lost Heritage." *National Wildlife Magazine*. Dec/Jan 2003, Vol. 41, no. 1; Mark MacAllister. "The Mexican Wolf Recovery Area." *Field Trip Earth*. Accessed Dec. 7, 2005.

¹⁶⁶ Written communication with Timm Kroeger, Defenders of Wildlife, Natural Resources Economist, Conservation Economics Program, December 5, 2005.

has a whole. Poverty rates among the White Mountain Apache are also high, at 49 percent of the population in 2000.¹⁶⁷

5.2.3 Dependence on Hunting Revenues and Livestock Grazing

A 1993 study indicated that Tribal enterprises of the White Mountain Apache, including the Tribal Herd, which owns and manages cattle, and the Agricultural Enterprise, which grows and sells livestock feed, were among 10 primary enterprises that are major contributors for Tribal members and residents of surrounding communities.¹⁶⁸

The White Mountain Apache Tribe also derive significant revenues from big game hunting permits, particularly from elk. In 1999, the elk herd population on the Fort Apache Reservation was estimated at 12,000 animals (ten times larger than on San Carlos lands). A website states that over 100 Rocky Mountain elk in the All-Time Boone and Crockett Record Book were taken on Fort Apache lands.¹⁶⁹ The basic cost of an elk permit for Fort Apache is \$16,000, plus an additional \$3,000 for a Record Book bull. Both the 1998 and 2001 hunting seasons were very good hunting seasons, with eight to ten clients harvesting elk that qualified for the Record Book. The Tribe also offers one bighorn sheep permit at \$40,000, 40 turkey permits at \$1,500, as well as bear and mountain lion permits annually.¹⁷⁰ Annual Tribal revenues from elk hunting was estimated at \$1 million in 1999.¹⁷¹

¹⁶⁷ U.S. Census Bureau (2000), Census 2000 American Indian and Alaska Native Summary File, accessed March 2005 at <<http://www.factfinder.census.gov>>.

¹⁶⁸ Kalt, Joseph P., "Economic Analysis of Proposed Designation of Critical Habitat for *Salix arizonica* (Arizona Willow) on the Fort Apache Indian Reservation," submitted to White Mountain Apache Tribe, Fort Apache Indian Reservation, Harvard University and the Economics Resource Group, 1993.

¹⁶⁹ Accessed at <<http://162.42.237.6/wmatod/lk.shtml>> on March 3, 2005.

¹⁷⁰ Accessed at <<http://162.42.237.6/wmatod/elk.shtml>> on March 3, 2005.

¹⁷¹ Pavlik, Steve. "San Carlos and White Mountain Apache Attitudes toward the Reintroduction of the Mexican Wolf to its Historic Range in the American Southwest." Wicazo SA Review, Spring 1999.

| Exhibit 5-1 | | | | |
|---|-------------------|--------------------------|--------------------------|---------------------------------|
| COMPARISON OF 2000 SOCIOECONOMIC INFORMATION OF AFFECTED TRIBES TO STATE AND NATIONAL AVERAGES | | | | |
| Area/Tribal Lands | Population | Unemployment Rate | Per Capita Income | Poverty Rate^a |
| <i>National Level Information</i> | | | | |
| USA | 281,421,906 | 4.2% | \$21,587 | 12.4% |
| <i>State Level Information</i> | | | | |
| Arizona | 5,130,632 | 5.6% | \$20,275 | 13.9% |
| California | 33,871,648 | 7.0% | \$22,711 | 14.2% |
| New Mexico | 1,819,046 | 7.3% | \$17,261 | 18.4% |
| <i>Tribal Level Information</i> | | | | |
| Fort Apache | 12,429 | 20.7% | \$6,358 | 48.8% |
| San Carlos Apache | 9,385 | 35.4% ^b | \$5,200 | 48.2% |
| Notes: ^a Poverty rate represents the percent of individuals below the applicable poverty threshold level. Poverty thresholds are the same for all parts of the country, but vary depending on the applicable family size, age of householder, and number of related children under 18. Poverty thresholds are shown at http://www.Census.gov/hhes/poverty/threshld/thresh99.html . ^b A recent study by the San Carlos Apache Tribe found that the unemployment rate is 76 percent. Letter from Joe Sparks, Sparks, Tehan & Ryley, P.C. re: Request for Information Regarding Possible Designation of Critical Habitat for the Southwestern Willow Flycatcher, dated September 7, 2004. Letter from Steve Titla, Titla and Parsi, General Counsel for the San Carlos Apache Tribe, Re: Economic impact of wolf depredation to Point of Pines on San Carlos, November 18, 2005. | | | | |
| Source: U.S. Census Bureau, Census 2000, accessed at < http://censtats.census.gov/pub/Profiles.shtml >. | | | | |

5.3 Conclusions and Comparison to FEIS

As the socioeconomic statistics provided in this section demonstrate, the Tribes adjacent to the BRWRA are in more susceptible economic positions than their surrounding communities or states. Unemployment on these Tribal lands is higher than in surrounding areas; any lost income or employment on these Reservations would likely not be replaced by employment opportunities in other sectors.

While few specific economic impacts of wolf reintroduction have been quantified to date, continued growth in the wolf population on the BRWRA could affect the Tribes in the future. While increases in tourism could benefit the Tribes, the Tribes also have economic interests in livestock and hunting activities that could be negatively affected.

The FEIS estimated that if the lands of the San Carlos Apache become fully occupied by wolves, impacts of wolf reintroduction could be \$4,100 to \$17,500 annually. The San Carlos comments about livestock losses due to wolf depredation would suggest that the FEIS could have underestimated impacts on livestock.-check with ES Further investigation of the cause of the livestock losses would be necessary to accurately evaluate impacts to date.

**ECONOMIC IMPACTS OF MEXICAN WOLF
REINTRODUCTION ON TOURISM AND CONSERVATION****SECTION 6**

This section of the analysis evaluates the tourism and conservation-related impacts associated with the wolf Reintroduction Project from 1998 to 2004.¹⁷²

6.1 Potential Economic Benefits of Mexican Wolf Reintroduction

The published economics literature has documented that real social welfare benefits can result from the conservation and recovery of endangered and threatened species.¹⁷³ Such benefits have also been ascribed to preservation of open space and biodiversity, both of which are associated with species conservation.¹⁷⁴ Likewise, regional economies and communities can benefit from the preservation of healthy populations of endangered and threatened species, and from the habitat on which these species depend.

The primary goal of the ESA is to enhance the potential for species recovery. Thus, the benefits of actions taken under the ESA are primarily measured in terms of the value the public places on species preservation (e.g., avoidance of extinction, and/or an increase in a species'

¹⁷² Impacts can be either positive (i.e., benefits of increased tourism or conservation) or negative (i.e., costs incurred by industry or citizens). The majority of the impacts discussed in this section are positive.

¹⁷³ Bishop R.C. 1978. Endangered species and uncertainty: the economics of a safe minimum standard. *American Journal of Agricultural Economics*, 60:10-18; Bishop R.C. 1980. "Endangered Species: An Economics Perspective." *Transactions of the 45th North American Wildlife and Natural Resources Conference*. Published by the Wildlife Management Institute, Washington D.C. Brookshire, D.S., L.S. Eubanks, and A. Randall. 1983. Estimating option prices and existence values for wildlife resources. *Land Economics*, 59:1-15; Hageman, R.K. 1985. Valuing marine mammal populations: benefit valuation in a multi-species ecosystem. Administrative report No. LJ-85-22, National Marine Fisheries Service, Southwest Fisheries Center, La Jolla, CA. 88p; Samples, K., J. Dixon, and M. Gowen. 1986. Information disclosure and endangered species valuation. *Land Economics* 62:306-312. Stoll, J.R. and L.A. Johnson. 1984. Concepts of value, nonmarket valuation, and the case of the whooping crane. Texas Agricultural Experiment Station Article No. 19360. Natural Resource Workshop, Department of Agricultural Economics, Texas A&M University. 30p.

¹⁷⁴ Pearce, D. and D. Moran. 1994. *The Economic Value of Biodiversity*. The World Conservation Union. London: Earthscan. Fausold, C.J. and R.L. Lillieholm. 1999. The economic value of open space: A review and synthesis. *Environmental Management* 23(3):307-320.

population). Such social welfare values may reflect both use and non-use (i.e., existence) values. For example, use values might include the potential for recreational use of a species, should recovery be achieved. The FEIS states that increased recreational value and expenditures may occur in the BRWRA after Mexican wolf reintroduction. Non-use values are not derived from direct use of the species, but instead reflect the utility the public derives from knowledge that a species continues to exist.

In addition, as a result of actions taken to preserve endangered and threatened species, various other collateral benefits may accrue to the public, such as preserving habitat for other species and enhancing nearby residential property values (e.g., preservation of open space).

This chapter describes the categories of benefits identified by stakeholder groups as potentially occurring as a result of Mexican wolf reintroduction. It then discusses the extent to which existing information supports the occurrence of these benefits during the study period, as well as existing data and valuation studies that can be used to monetize these benefits. In particular, it considers the economic literature regarding the public's willingness to pay to preserve red and gray wolves. The primary categories of economic benefits of wolf reintroduction that have been identified by stakeholders include:

- 1. Increased Recreation Visits and Expenditures:** Increases in regional tourism will result as people interested in seeing, hearing, or tracking wolves visit the area. Increases in consumer surplus will accompany increases in recreation use. Furthermore, increased expenditures in local economies will result from increased tourism. The FEIS reports that increased tourism may result from wolf reintroduction.
- 2. Existence Value (Intrinsic Value):** The public holds a non-use value for the Mexican wolf that could be enhanced by actions to reintroduce the species to the study area.¹⁷⁵
- 3. Agency Spending:** Increased expenditures in local economies will result from meetings, staffing, and other spending by cooperating agencies. These expenditures would represent a redistribution of resources to the BRWRA area rather than an overall increase in social welfare.
- 4. Overall Ecosystem Health:** The restoration of wolves as the top carnivore could restore ecosystem function to the BRWRA area.
- 5. Other Positive Impacts:** Other positive impacts could result from the reintroduction of Mexican wolves into the BRWRA, such as (but not limited to) increased educational opportunities.

As discussed below, it is not feasible to fully describe and accurately monetize the benefits of this designation in the context of this economic analysis.¹⁷⁶ The discussion presented

¹⁷⁵ See, for example, Letter from Tim Kroeger, Defenders of Wildlife, "Issues pertaining to the Economic portion of the Mexican wolf Socio-Economic Analysis" to Industrial Economics, October 21, 2004.

in this report provides insight into the benefits of the program *to date* based on information obtained in the course of developing the economic analysis. It is not intended to provide a complete analysis of the economic benefits that may result from this program in the future, or to fully quantify the biological benefits of the program.

6.2 Increased Recreation Visits

6.2.1 National Forest Visitation Trends

A direct measure of whether Mexican wolf reintroduction has affected tourism in the BRWRA would be to observe whether visitation to the National Forests within the study area has increased either at the site, district, or Forest level. Unfortunately, neither Apache nor Gila National Forests keep annual estimates of visitation at the forest or district level. Only partial estimates are available for some recreation sites within the forests because many sites are unmanned and forests rely on “self-pay” stations to collect fees. Thus, these estimates do not provide an overall picture of trends in visitation to the forests since Mexican wolf reintroduction.

The USFS reports that approximately 23 million National Forest visits annually occur in USFS Region 3 (New Mexico and Arizona).¹⁷⁷ Of these, approximately 3.2 million (14 percent) occur in the BRWRA area (Gila and Apache-Sitgreaves National Forests). A National Visitor Use Monitoring Program (NVUM) was established by the USFS in 1998 to create a standardized recreation sampling system in order to provide more comprehensive data on National Forest visitation. The first NVUM surveys for Apache-Sitgreaves and Gila National Forests were conducted in 2002, and report 2001 visitation data.

The NVUM Survey of Apache-Sitgreaves National Forest estimated that 1.9 million forest visits occurred in 2001.¹⁷⁸ As shown in Exhibit 6-1, the most common primary activity named at this forest was “General/other—relaxing, hanging out, escaping noise and heat, etc.” (43 percent of visitors), followed by fishing (20 percent), hiking (nine percent), and camping in developed sites (seven percent). One percent of visitors stated that “viewing wildlife, birds, fish, etc. on National Forest system lands” was their primary activity, though 73 percent of visitors stated that it was an activity they participated in.¹⁷⁹

¹⁷⁶ In its guidance for implementing Executive Order 12866, OMB acknowledges that it may not be feasible to monetize, or even quantify, the benefits of environmental regulations due to either an absence of defensible, relevant studies or a lack of resources on the implementing agency’s part to conduct new research. U.S. Office of Management and Budget, “Circular A-4,” September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

¹⁷⁷ Draft Biological Assessment for 11 Land & Resource Management Plans USDA Forest Service Southwestern Region, November 2003.

¹⁷⁸ The study defines a “National Forest visit” as the entry of one person upon a National Forest to participate in recreation activities for an unspecified period of time. Error rate 14 percent.

¹⁷⁹ Kocis, Susan M. et al. “National Visitor Use Monitoring Results: Apache-Sitgreaves National Forest.” USDA Forest Service Region 3, National Visitor Use Monitoring Project, August 2002.

| Exhibit 6-1 | | |
|--|------------------------------|---|
| APACHE-SITGREAVES NATIONAL FOREST ACTIVITY PARTICIPATION AND PRIMARY ACTIVITY | | |
| Activity | Percent participation | Percent who said it was their primary activity |
| General/other- relaxing, hanging out, escaping noise and heat, etc. | 84.2 | 41.3 |
| Fishing- all types | 50.5 | 19.6 |
| Hiking or walking | 62.2 | 8.7 |
| Camping in developed sites (family or group) | 35.7 | 7.2 |
| Off-highway vehicle travel (4-wheelers, dirt bikes, etc.) | 11.3 | 4 |
| Viewing natural features such as scenery, flowers, etc., on National Forest system lands | 79.3 | 3.5 |
| Primitive camping | 19.4 | 3.3 |
| Driving for pleasure on roads | 53.3 | 3.2 |
| Picnicking and family day gatherings in developed sites (family or group) | 47.8 | 1.5 |
| Hunting- all types | 3 | 1.3 |
| Viewing wildlife, birds, fish, etc., on National Forest system lands | 73.5 | 1 |
| Other non-motorized activities (swimming, games and sports) | 6.9 | 0.9 |
| Visiting a nature center, nature trail or visitor information services | 18.3 | 0.5 |
| Horseback riding | 3.4 | 0.4 |
| Bicycling, including mountain bikes | 11.5 | 0.3 |
| Motorized water travel (boats, ski sleds, etc.) | 6.8 | 0.2 |
| Gathering mushrooms, berries, firewood, or other natural products | 27.6 | 0.2 |
| Backpacking, camping in unroaded areas | 4 | 0.1 |
| Visiting historic and prehistoric sites/area | 11 | 0.1 |
| Resorts, cabins and other accommodations on Forest Service managed lands (private or Forest Service run) | 13.7 | 0 |
| Nature study | 4.8 | 0 |
| Snowmobile travel | 0 | 0 |
| Other motorized land/air activities (plane, other) | 1.1 | 0 |
| Non-motorized water travel (canoe, raft, etc.) | 6.4 | 0 |
| Downhill skiing or snowboarding | 0.1 | 0 |
| Source: Kocis, Susan M. et al. "National Visitor Use Monitoring Results: Apache-Sitgreaves National Forest." USDA Forest Service Region 3, National Visitor Use Monitoring Project, August 2002. | | |

The NVUM Study for Gila National Forest estimated that 1.3 million National Forest visits occurred in 2001. In contrast to Apache-Sitgreaves, the most common primary activity by visitors to Gila National forest was picnicking and family day gatherings in developed sites (21 percent), followed by hiking or walking (19 percent), and hunting (14 percent), as shown in Exhibit 6-2. In this survey, five percent of those surveyed stated that wildlife viewing was their primary activity, while 35 percent stated that it was an activity that they participated in.¹⁸⁰

¹⁸⁰ Kocis, Susan M. et al. "National Visitor Use Monitoring Results: Gila National Forest." USDA Forest Service Region 3, National Visitor Use Monitoring Project, August 2002.

| Exhibit 6-2 | | |
|--|------------------------------|---|
| GILA NATIONAL FOREST ACTIVITY PARTICIPATION AND PRIMARY ACTIVITY | | |
| Activity | Percent participation | Percent who said it was their primary activity |
| Picnicking and family day gatherings in developed sites (family or group) | 37.4 | 20.5 |
| Hiking or walking | 53.6 | 18.8 |
| Hunting- all types | 14.3 | 14.2 |
| General/other- relaxing, hanging out, escaping noise and heat, etc. | 56.1 | 6.5 |
| Viewing natural features such as scenery, flowers, etc., on National Forest system lands | 55.8 | 6.3 |
| Backpacking, camping in unroaded areas | 9.6 | 5.5 |
| Viewing wildlife, birds, fish, etc on National Forest system lands | 34.9 | 5.2 |
| Camping in developed sites (family or group) | 17.8 | 4.9 |
| Visiting historic and prehistoric sites/area | 20.9 | 4 |
| Fishing- all types | 8.6 | 2.8 |
| Gathering mushrooms, berries, firewood, or other natural products | 9.6 | 2.4 |
| Driving for pleasure on roads | 19.9 | 1.9 |
| Horseback riding | 3.6 | 1.5 |
| Off-highway vehicle travel (4-wheelers, dirt bikes, etc.) | 2.7 | 1.4 |
| Primitive camping | 10.4 | 1.1 |
| Visiting a nature center, nature trail or visitor information services | 9.9 | 1 |
| Nature study | 20.3 | 0.8 |
| Resorts, cabins and other accommodations on Forest Service managed lands (private or Forest Service run) | 0.9 | 0.7 |
| Non-motorized water travel (canoe, raft, etc.) | 0.9 | 0.6 |
| Bicycling, including mountain bikes | 1.8 | 0.1 |
| Other non-motorized activities (swimming, games and sports) | 2.2 | 0 |

Source: Kocis, Susan M. et al. "National Visitor Use Monitoring Results: Gila National Forest." USDA Forest Service Region 3, National Visitor Use Monitoring Project, August 2002.

The paucity of visitation data makes evaluation of trends in forest visitation since wolf reintroduction difficult. Ideally, visitation information would be obtained through a series of surveys and interviews with recreational users at the project site. Given resource and time constraints, however, designing a study to collect primary data from recreation sites is beyond the scope of this analysis. To get a sense of the potential magnitude of impacts, USFS recreation staff at Apache and Gila National Forests were interviewed to discuss their observations of tourism trends since Mexican wolf reintroduction. Staff were not able to identify any changes in observed visitation that they could attribute to wolf reintroduction, citing the small numbers of wolves in the forest as the likely reason. Staff noted that assessment of visitation data is complicated by the recent drought and incidence of several large forest fires that have closed some areas to visitation in recent years.¹⁸¹

¹⁸¹ Personal communication with A. Telles, Gila National Forest, March 9, 2005; Personal communication with Michelle Duvalos, Apache-Sitgreaves National Forest, December 15, 2005.

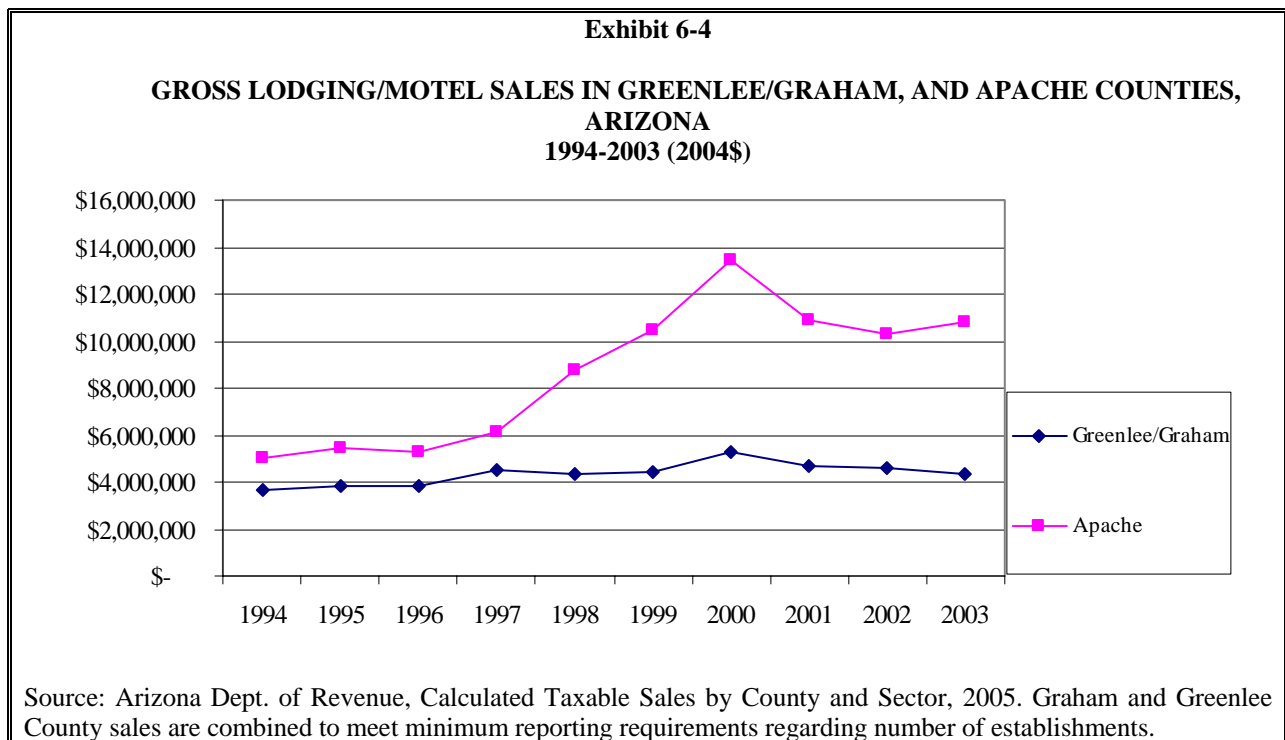
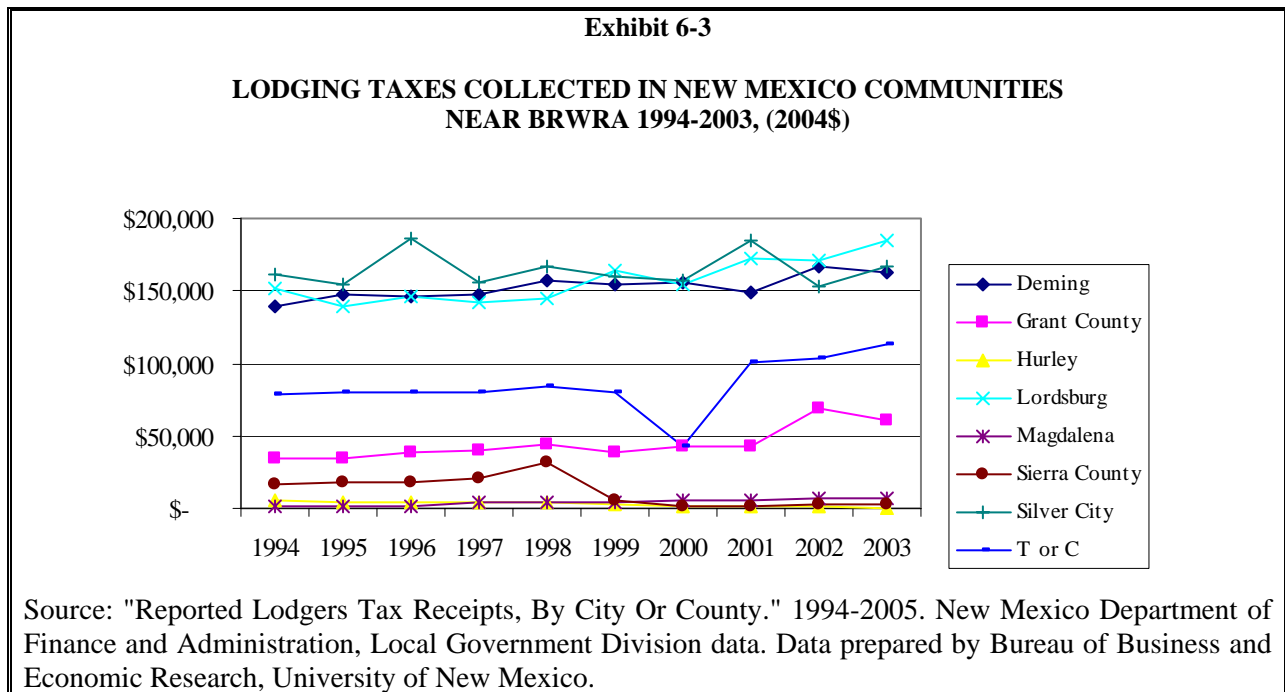
6.2.2 Lodging Trends

Another mechanism for understanding whether tourism has increased in the BRWRA since wolf reintroduction is to examine the number of overnight visits at hotels in gateway communities to the BRWRA. Taxes collected present a fairly accurate measure of the number of overnight visitors to an area over time, because taxes are collected on a per-room basis. Exhibit 6-3 presents the tax revenues for New Mexico towns near the BRWRA between 1994 and 2003. This data shows that tax revenues increased fairly steadily between 1994 and 2004 in towns near the BRWRA, with an average annual increase of two percent. However, tax payments in near-wolf towns remained small during this time period relative to total lodging taxes collected in New Mexico, declining slightly from 2.78 percent in 1998 to 2.10 percent in 2004.¹⁸² Thus, while visitation to hotels near the BRWRA increased at a steady pace during the reintroduction period, it did not increase relative to other areas in New Mexico. No trend is discernable specific to post-wolf reintroduction in the tax data.

In Arizona, gross lodging and motel sales have increased in affected counties since 1998, as shown in Exhibit 6-4. In Apache County, where the active reintroductions occur, lodging sales did increase relative to Greenlee County after wolf reintroduction. However, little evidence exists to determine whether this increase in sales relates to the reintroduction of the Mexican wolf. As discussed below, discussions with business owners in BRWRA areas suggest that wolf reintroduction has yet to produce a perceptible change in tourist visitation, probably because of the low number of wolves in the area.¹⁸³

¹⁸² "Reported Lodgers Tax Receipts, By City Or County." 1994-2005. New Mexico Department of Finance and Administration, Local Government Division data. Data prepared by Bureau of Business and Economic Research, University of New Mexico.

¹⁸³ Personal communication with M. Sauber, New Mexico resident and business owner, March 25, 2005. Personal communication with management of Sportsman's Lodge, Alpine, Arizona, November 21, 2005. Personal communication with management of Alpine Inn, Alpine, Arizona, November 21, 2005. Personal communication with management of Hannagan Meadow Lodge, Alpine, Arizona, November 21, 2005.



6.2.3 Establishment of "Wolf Tours"

Although not observable in published data, anecdotal evidence suggests that some tourist visitation has been sparked by wolf reintroduction. For example, the Sportsman's Lodge in Alpine, Arizona has a photograph of a Mexican wolf in their lobby and often receives inquiries from guests about where they can see or hear wolves. The Lodge directs these inquiring guests to a nearby rest area on Highway 180 where wolves can often be heard at sundown. Similarly, the Hannagan Meadow Lodge in Alpine, Arizona reports that guests have shown interest in trying to see or hear wolves once they learn that wolves have been reintroduced to the area.¹⁸⁴ Management at the Sportsman's Lodge believes it could probably tap into this interest and attract additional guests by using the Mexican wolf for marketing purposes, such as including photos of the wolf in their brochures.¹⁸⁵ These lodge owners report that a few travelers may have visited the area in order to see wolves.

Clear evidence of wolf tourism would be the establishment of wolf tours. For example, in Yellowstone, approximately 40,000 visitors participated in "wolf walks" over the course of a summer.¹⁸⁶ Other groups in the Yellowstone area have also begun offering wolf-focused tours to wolf reintroduction areas. For example, the International Wolf Center offers five day wolf tours to the Yellowstone area. These trips range in price from \$595 and \$1,295 per person depending on the food and lodgings provided. Other tour groups such as Travel Wild and Natural Habitat Adventures have offered similar trips for various prices in the Yellowstone area.

Several private citizens report leading hiking trips in the BRWRA for people interested in seeing wolves.¹⁸⁷ Additionally, the Phoenix based Grand Canyon Chapter of the Sierra Club has organized eight trips to the area to assist with wolf recovery. Participants in these trips have stayed at the Hannagan Meadow Lodge, the Alpine Inn, and the Sportman's Lodge, all located in the vicinity of Alpine, Arizona.¹⁸⁸ The Arizona Heritage Alliance has also organized three wolf related trips to the BRWRA during which participants stayed at the Hannagan Meadow Lodge and the Holder's ranch.¹⁸⁹ Moreover, the Alpine Inn and the Sportsman's Lodge each report having received in the last year one group of European tourists specifically visiting to see and

¹⁸⁴ Personal communication with management of Hannagan Meadow Lodge, Alpine, Arizona, November 21, 2005.

¹⁸⁵ Personal communication with management of Sportsman's Lodge, Alpine, Arizona, November 21, 2005.

¹⁸⁶ James Brooke, "Yellowstone Wolves Get An Ally in Tourist Trade," New York Times, Feb. 11, 1996.

¹⁸⁷ Personal Communication with Jean Ossorio, New Mexico resident, October 27, 2004; Personal communication with Dutch Salmon, New Mexico resident, March 25, 2005; Written comments from Nancy Kaminski, New Mexico resident, received on November 24, 2005; Public comments of Jean Ossorio, "Re: Comments on Evaluation of Socioeconomic impacts associated with the reintroduction of the Mexican wolf, a Component of the Five-Year Review," July 28, 2005.

¹⁸⁸ Written comments of Sandy Bahr, Conservation Outreach Director of the Grand Canyon Chapter of the Sierra Club. Received August 1, 2005.

¹⁸⁹ *Ibid.*

hear wolves.¹⁹⁰ These trips represent increased economic activity as a result of the wolf reintroduction.

In May 2003 the Southwest Environmental Center held a workshop attended by 40 people to discuss “potential tourism ideas related to reintroduced Mexican wolves.” Participants discussed the likelihood that a formal review process by USFS, and perhaps a NEPA assessment, would be required before wolf tourism permits in the National Forests were issued. There is no evidence that this review process has been initiated. The provision of permits would also depend on whether wolf guiding constitutes harassment of wolves. As of March 2005 USFS at Apache-Sitgreaves and Gila National Forest had not received any applications from outfitters/guides proposing trips to track or otherwise observe wolves. However, anecdotal evidence suggests that at least one outfitter has added wolves to his marketing brochure in a list of wildlife to be observed in the Gila.¹⁹¹

6.3 Regional Tourism Expenditures

If Mexican wolf reintroduction results in increased forest visits, these visits will in turn generate increased visitation and visitor expenditures in the local areas outside of the forests. In addition to souvenir shops, gas stations, restaurants, and other retailers are expected to benefit. Mexican wolf supporters hope that tourism gains can be reaped through marketing efforts that capitalize on the Mexican wolf as a charismatic symbol of the region's wilderness.¹⁹² In Yellowstone, wolf reintroduction has provided economic benefits to areas in proximity to wolf reintroduction areas. For example, the presence of wolves in Yellowstone has stimulated visitation to areas within the park where wolves can be viewed (e.g., Lamar Valley). In nearby communities, souvenirs and other items featuring wolves (such as books and tee-shirts) have shown a spike in sales.¹⁹³ This increase in wolf tourism has benefited towns nearby Yellowstone. For example, the number of people entering the park through Cooke City, Montana, during peak wolf viewing season increased 21 percent between 1994 and 1995 while Yellowstone's overall attendance only increased 2.6 percent for the same period.¹⁹⁴ Wolf-related tourism in Yellowstone has generated an estimated \$23 million regionally.¹⁹⁵

It should be noted that most of the tourism-related businesses such as hotels, gas stations, and restaurants in the BRWRA study area qualify as small entities under the Small Business

¹⁹⁰ Personal communication with management of Alpine Inn, Alpine, Arizona, November 21, 2005. Personal communication with management of Sportsman's Lodge, Alpine, Arizona, November 21, 2005.

¹⁹¹ Public comments of Jean Ossorio, "Re: Comments on Evaluation of Socioeconomic impacts associated with the reintroduction of the Mexican wolf, a Component of the Five-Year Review," July 28, 2005.

¹⁹² Bobbie Holaday, an Arizona resident, maintains that much can be done to extract tourism benefits from the wolf reintroduction. Personal communication with Bobbie Holaday, November 14, 2005, and written public comments of July 5, 2005.

¹⁹³ Michael Milstein (2005), Call of the wild a boon to tiny town, Billings Gazette, SD 1, July 23, 2005.

¹⁹⁴ *Ibid.*

¹⁹⁵ Rupert Isaacson, "Chances with Wolves," Geographical, July 1999 v71 i7.

Administration's size standards. As shown in Exhibit 6-5, more than 70 percent of restaurants and more than 80 percent of hotels in the five counties area are considered small businesses while more than 90 percent of gasoline stations and food and beverage stores are considered small. Thus, these small businesses may benefit from increased wolf tourism, if it occurs in the future. However, as stated above, increased visitation has been limited to date.

| Exhibit 6-5 | | | | | |
|--|--------------------------------------|----------------------|--------------------------|--------------------------------|---|
| NUMBER OF TOURISM-RELATED BUSINESSES IN THE BRWRA AREA (2005) | | | | | |
| County | Type of business (NAICS code) | Hotels (7211) | Restaurants (722) | Gasoline Stations (477) | Food & beverage stores (445) |
| Apache County | # of Businesses | 40 | 57 | 9 | 41 |
| | % Small | 92.5% | 68.4% | 77.8% | 97.6% |
| Greenlee County | # of Businesses | 5 | 9 | 3 | 11 |
| | % Small | 100% | 88.9% | 100% | 100% |
| Catron County | # of Businesses | 7 | 14 | 5 | 2 |
| | % Small | 100% | 57.1% | 100% | 100% |
| Grant County | # of Businesses | 23 | 86 | 15 | 30 |
| | % Small | 73.9% | 75.6% | 100% | 96.7% |
| Sierra County | # of Businesses | 23 | 33 | 7 | 16 |
| | % Small | 78.3% | 75.8% | 100% | 93.8% |
| Total | # of Businesses | 98 | 199 | 39 | 100 |
| | % Small | 85.7% | 72.9% | 94.9% | 97.0% |

Source: Dialog Search of File 516, Dun and Bradstreet, "Duns Market Identifiers." Sept 2005, and it was accessed on Nov 21, 2005

6.3.1 National Forest Recreation Expenditures

The economic impact of visits to National Forests can be monetized by considering the expenditures of visitors at these forests and their consumer surplus.¹⁹⁶ The National Forest Visitor Use Monitoring (NVUM) Study collected information on the number of trips to forests as well as expenditures associated with these trips. Exhibit 6-6 presents the NVUM estimates of current consumer expenditures within the National Forests that comprise the BRWRA.¹⁹⁷ However, these data represent expenditures for all recreation to these Forests, rather than recreation that resulted directly from wolf reintroduction. If additional recreational activities

¹⁹⁶ Consumer expenditures represent the amount that individuals pay to participate in a particular industry or sector, such as recreation. Expenditures provide one measure of the economic benefit that different industries or sectors can provide to a local or regional economy. Consumer surplus is a value that measures what individuals are *willing to pay* for something above and beyond what they are required to spend. That is, consumer surplus measures the difference between what a person is willing to pay and the amount he/she actually is required to pay (i.e., expenditures).

¹⁹⁷ Note that a portion of the Apache-Sitgreaves National Forest is outside the BRWRA, but all of the Gila National Forest is within the recovery area.

were to occur due to wolf reintroduction, the value of these trips could also be measured in terms of consumer expenditures and consumer surplus. Because data on recreation related to wolf reintroduction is not available, data are not presented that describe the consumer surplus associated with National Forest visitation to this area due to wolves.

| Exhibit 6-6 | | | | | | | | |
|--|-----------|--------------|--------------|-------------|-------------|--------------|-------------|--------------|
| 2002 VISITOR SPENDING TO THE BRWRA AREA USING NATIONAL FOREST USING NVUM DATA (2002\$) | | | | | | | | |
| Apache-Sitgreaves National Forest | | | | | | | | |
| | Non-local | | | Local | | | Non-Primary | Total |
| | Day Trip | OVN-NF | OVN | Day Trip | OVN-NF | OVN | | |
| Rec. visits | | | | | | | | 1,976,149 |
| Segment shares | 3% | 42% | 34% | 9% | 4% | 6% | 2% | 100% |
| Visits | 40,118 | 561,645 | 454,665 | 120,353 | 53,490 | 80,235 | 26,745 | 1,337,250 |
| Avg. Party size | 2.7 | 2.9 | 2.8 | 2.2 | 2.7 | 2.7 | 2.7 | 2.7 |
| Trip Exp. per Party | \$66.44 | \$207.57 | \$281.34 | \$32.63 | \$119.16 | \$138.13 | \$227.39 | |
| Trip Exp. Total | \$987,000 | \$40,200,000 | \$45,684,000 | \$1,785,000 | \$2,361,000 | \$4,105,000 | \$2,252,000 | \$97,374,000 |
| Percent of Total Expenditures | 1% | 41% | 47% | 2% | 2% | 4% | 2% | 100% |
| Gila National Forest | | | | | | | | |
| Rec. visits | | | | | | | | 1,337,250 |
| Segment shares | 1% | 11% | 22% | 23% | 5% | 16% | 22% | 100% |
| Visits | 13,373 | 147,098 | 294,195 | 307,568 | 66,863 | 213,960 | 294,195 | 1,337,250 |
| Avg. Party size | 2.1 | 2.1 | 2.4 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| Trip Exp. per Party | \$50.25 | \$155.22 | \$224.38 | \$30.09 | \$110.72 | \$99.26 | \$30.09 | |
| Trip Exp. Total | \$320,000 | \$10,873,000 | \$27,505,000 | \$4,407,000 | \$3,525,000 | \$10,113,000 | \$4,215,000 | \$60,958,000 |
| Percent of Total Expenditures | 0% | 18% | 45% | 7% | 6% | 17% | 7% | 100% |
| Notes: | | | | | | | | |
| OVN: Overnight Trips spent outside the Forest. OVN-NF: Overnight trips spent in the Forest. Non-Primary: Forest visitation for which the forest was not the primary destination. Forest-wide expenditures are distributed by the percent of trips by each segment of visitors visiting the forest multiplied by the average expenditures by that segment type. Note that a portion of the Apache-Sitgreaves National Forest is outside the BRWRA, but all of the Gila National Forest is within the recovery area. | | | | | | | | |
| Source: | | | | | | | | |
| Kocis, Susan M. et al. "National Visitor Use Monitoring Results: Gila National Forest." USDA Forest Service Region 3, National Visitor Use Monitoring Project, August 2002; Kocis, Susan M. et al. "National Visitor Use Monitoring Results: Apache-Sitgreaves National Forest." USDA Forest Service Region 3, National Visitor Use Monitoring Project, August 2002. | | | | | | | | |

Direct trip expenditures of \$97.3 million at Apache-Sitgreaves and \$60.9 million at Gila National Forest (2002\$) also result in regional effects on these economies (the multiplier effect). While these values represent the direct spending associated with all recreation trips to these forests in 2001, rather than wolf-related expenditures, they highlight several interesting features of these forests: 1) In Apache-Sitgreaves, non-local visitors comprised 79 percent of visitors,

non-local visitors comprised only 34 percent of visitors to the Gila; 2) local day trippers comprise 23 percent of visitors, but only 6 percent of expenditures in the Gila National Forests; 3) non-local overnight visitors comprise the largest segment of trip expenditures for both forests (47 percent (Apache-Sitgreaves) and 45 percent, (Gila)). However, because data on wolf-related visitation was unavailable, quantification of the value of wolf-related recreation over the study period is not possible.

6.4 Agency Expenditures

Expenditures by managing agencies, including the USFWS, Arizona Game and Fish Department, New Mexico Game and Fish Department, USDA Wildlife Services, and USFS, to run the Mexican wolf program have not been insignificant. While many of these expenditures would have been spent by the agencies in some other capacity if the Mexican wolf program did not exist, they do represent a redistribution of resources and are a regional contribution to the BRWRA study area in many cases. Since the 1970's, the agencies estimate that they have expended \$12.0 million on the program (2004\$). For the period of the five-year review, the agencies have spent approximately \$7.6 million (2004\$). Exhibit 6-7 presents the total agency expenditures each year that data were available.

| Exhibit 6-7 FEDERAL AND STATE AGENCY EXPENDITURES ON THE MEXICAN WOLF PROGRAM, 1977-2005 (2004\$) | | | | | | | |
|--|-------------|---------------------|---------------------|--------------------|-------------------|---------------------|--------------------------|
| | Year | AGFD State | AGFD Federal | NMDGF State | USFS | USFWS | Total^a |
| Pre-Wolf Reintr. | 1977-1990 | \$ 37,300 | \$ 20,400 | \$ - | \$ - | \$ 79,500 | \$ 137,200 |
| | 1991 | \$ 22,000 | \$ 37,000 | \$ - | \$ - | \$ 2,800 | \$ 61,900 |
| | 1992 | \$ 18,900 | \$ 33,700 | \$ - | \$ - | \$ 134,600 | \$ 187,400 |
| | 1993 | \$ 22,400 | \$ 33,500 | \$ - | \$ 1,300 | \$ 163,400 | \$ 220,700 |
| | 1994 | \$ 28,400 | \$ 56,400 | \$ - | \$ 3,800 | \$ 191,200 | \$ 279,900 |
| | 1995 | \$ 78,900 | \$ 44,200 | \$ - | \$ 3,700 | \$ 539,200 | \$ 666,100 |
| | 1996 | \$ 15,600 | \$ 26,600 | \$ - | \$ 4,200 | \$ 576,700 | \$ 623,200 |
| | 1997 | \$ 5,600 | \$ 900 | \$ - | \$ 4,100 | \$ 509,600 | \$ 520,300 |
| Post-Wolf Reintr. | 1998 | \$ 70,300 | \$ 29,400 | \$ - | \$ 3,500 | \$ 568,000 | \$ 671,300 |
| | 1999 | \$ 40,900 | \$ 13,600 | \$ 13,900 | \$ 11,300 | \$ 801,200 | \$ 881,100 |
| | 2000 | \$ 55,900 | \$ 14,300 | \$ 8,600 | \$ 12,600 | \$ 1,011,100 | \$ 1,112,400 |
| | 2001 | \$ 60,300 | \$ 17,100 | \$ 18,100 | \$ 14,400 | \$ 1,216,300 | \$ 1,326,100 |
| | 2002 | \$ 55,700 | \$ 15,800 | \$ 17,900 | \$ 7,400 | \$ 1,027,500 | \$ 1,124,100 |
| | 2003 | \$ 112,900 | \$ 26,700 | \$ 17,500 | \$ 12,800 | \$ 1,061,100 | \$ 1,231,000 |
| | 2004 | \$ 267,000 | \$ 26,000 | \$ 20,000 | \$ 12,500 | \$ 1,083,600 | \$ 1,409,100 |
| | 2005 | \$ 144,800 | \$ 316,300 | \$ 78,500 | \$ 61,300 | \$ 912,100 | \$ 1,513,000 |
| Grand Total | | \$ 1,036,900 | \$ 711,900 | \$ 184,500 | \$ 152,900 | \$ 9,877,900 | \$ 11,964,800 |
| Total 1998-2004 | | \$ 663,000 | \$ 142,900 | \$ 106,000 | \$ 74,500 | \$ 6,768,800 | \$ 7,755,100 |

Source: AZGFD, Estimated Costs of Mexican Wolf Conservation, Revised September 1, 2004. Costs adjusted to 2004\$ using the Consumer Price Index, accessed at <http://data.bls.gov/cgi-bin/dsrv>. Notes:
^a Total figures proved by AZGFD. Due to rounding, rows may not sum to the total provided.

As stated above, agencies would have spent many of these government expenditures in some other capacity if the Mexican wolf program did not exist. Nonetheless, because they do represent a redistribution of expenditures, they are likely to result in some regional economic effects, to the extent that expenditures actually occur in the BRWRA area. Using IMPLAN (see Section 3 for a more detailed discussion of this model), this analysis finds that in 2002, the increased government expenditures are likely to have resulted in local economic output of \$1.5 million, and employment of 31 people.¹⁹⁸ Exhibit 6-8 presents the estimated annual regional economic effects of the wolf program expenditures.

| Exhibit 6-8 | | | | |
|---|---------------|-----------------|----------------|---------------|
| IMPLAN DATA RESULTS FOR ANNUAL GOVERNMENT EXPENDITURES ON WOLVES IN 2002 (2004\$) | | | | |
| | Direct | Indirect | Induced | Total |
| Output | \$1.1 million | \$0 | \$406,300 | \$1.5 million |
| Employment | 24 | 0 | 7 | 31 |
| Notes and Sources: IMPLAN model results, 1998 data presented in 2004 dollars. Annual regional impacts are calculated for 2002 to demonstrate "average" impacts. Section 3 also calculates regional impacts for 2002. | | | | |

In addition to agency expenditures, several non-governmental organizations have invested staff time and materials to the wolf Reintroduction Project. DoW reports that it has made a substantial investment, both in meetings and in staff placement, to the BRWRA area. DoW reports that it has had a total of 15 people working in the BRWRA area for varying lengths of time, and has expended \$59,000 on equipment and an additional \$78,000 on staff and staff housing for the Mexican wolf project. Measures supported by these expenditures include the deployment of a range rider and the development of community herding projects. In addition to agency-sponsored meetings, several non-governmental organizations hold regular meetings to discuss wolf issues. Many members of the public have spent considerable time at meetings and presentations relating to this program.¹⁹⁹

It is likely that some of these public attendees would have preferred to spend their time elsewhere on other activities, were the wolf program not to exist. These attendees would have an opportunity cost associated with their attendance (i.e., they participated in lieu of other activities of value). In contrast, some attendees at these meetings consider the time spent on wolf-related issues to be a benefit to them. Because the ratio of those bearing opportunity costs to those who feel they benefit from meetings is unknown, this analysis does not include time, or expenditures associated with this time, to be a benefit or cost of the program. For context purposes, this analysis presents an estimate of the number of meetings with public attendees since

¹⁹⁸ Estimates are presented using 2002 data, which is used as a proxy for an "average" year of expenditures since reintroduction.

¹⁹⁹ Public comments of Timm Kroeger, Defenders of Wildlife, "re: Mexican Wolf Project 5-year Review," July 27, 2005; Written communication with Timm Kroeger, Defenders of Wildlife, December 5, 2005.

reintroduction in Exhibit 6-9. Wolf Team members estimate that between 1998 and 2005, the average attendance at public meetings was 40 people, and that most attendees were from local areas, though some individuals attended from other states.²⁰⁰ The exhibit does not include school presentations, since attendance by children is assumed not to affect local expenditures or, alternatively, to result in an opportunity cost.

Note that some attendees traveled to the BRWRA region from other areas for these meetings, and expended funds in the local communities as a result. Thus, the BRWRA communities may have experienced some localized benefits from funds that would have been spent elsewhere.

| Exhibit 6-9 | |
|--|---------------------------|
| TOTAL NUMBER OF MEETINGS PUBLIC PARTICIPANTS, 1998-2003 | |
| Year | Number of Meetings |
| 1998 | 47 |
| 1999 | 38 |
| 2000 | 33 |
| 2001 | 39 |
| 2002 | 60 |
| 2003 | 60 |
| Total | 277 |

Notes: Where identified in the progress reports, meetings with school groups are excluded. Educational impacts for school-age children are discussed in Section 6.6. Estimates of number of meetings held was not included in the 2003 progress report. Thus, this analysis assumes that effort was equal to 2002. These estimates do not include approximately 110 meetings held between 1987-1997 that occurred during the program's conceptual stage, including development of the FEIS, and Record of Decision.
 Source: Mexican Wolf Program Annual Progress Reports: 1991-2003, USFWS; Written communication with T. Johnson, AZGFD, December 7, 2005.

6.5 Existence Value (Intrinsic Value)

A number of published studies have demonstrated that the public holds values for endangered and threatened species separate and distinct from any expected direct use of these species (i.e., willingness to pay to simply ensure that a species will continue to exist).²⁰¹ Since species conservation values are not generally observed in market transactions, economists rely on estimates of the public’s willingness to pay that are developed using stated preference tools (e.g., contingent valuation surveys). While the public may hold measurable existence, or non-

²⁰⁰ Written communication with T. Johnson, AZGFD, December 7, 2005.

²⁰¹ For examples, see Boyle, K.J. and R.C. Bishop. 1986. “The Economic Valuation of Endangered Species in Wildlife.” *Transactions of the Fifty-First North American Wildlife and Natural Resources Conference*. Published by the Wildlife Management Institute, Washington D.C; Loomis, J.B. and D White. 1996. Economic benefits of rare and endangered species: Summary and meta analysis. *Ecological Economics* 18:197-206; Kotchen, M.J. and S.D. Reiling. 1998. Estimating and questioning economic values for endangered species: an application and discussion. *Endangered Species Update* 15(5):77-83.

use, values for Mexican wolves, the calculation of existence values for Mexican wolves is beyond the scope of this analysis. A benefits transfer is not attempted here, as existing wolf valuation studies are considered to be unique to the areas where the studies were conducted. However, for context, a brief discussion of existing studies is presented here. EPA guidelines for conducting a benefits transfer are described in the text box below.

A few willingness-to-pay studies reported in the economics literature attempt to estimate the non-use value the public holds for recovery of wolves. While these studies do not estimate the willingness to pay that individuals would have for the reintroduction of the Mexican wolf, they support the notion that conservation of wolves may generate social welfare benefits to the public. The studies describe the public values associated with wolf reintroduction, recovery, and maintaining and sustaining wolf populations. These studies include contingent valuation studies by Duffield (1996), Chambers and Whitehead (2003), Mangun et al. (1996), and Rosen (1997), a meta-analysis study by Loomis and White (1996), and a case study of marketing "wolf-friendly" beef by Aquino and Falk (2001). The results of these studies are presented in Exhibit 6-10, and are discussed individually below.

What Is Benefits Transfer?

Benefits transfer uses existing resource valuation estimates to calculate the value associated with environmental change. That is, to estimate the value of a change in human use of the environment (e.g., increased recreational trips due to wolf reintroduction), benefits transfer applies a value of that effect derived from existing empirical studies. Best practice for conducting benefits transfer generally includes the following five steps (U.S. Environmental Protection Agency guidelines for preparing economic analyses describe these steps in more detail):

- **Describe the conditions to be valued:** Identify and describe in detail the affected activity and population within the assessment area (e.g., users of a particular recreation site).
- **Identify relevant research:** Conduct a literature search to identify relevant studies (i.e., studies of a similar activity, population, and assessment area).
- **Review research for quality and applicability:** Assess the quality of available studies and their applicability to the affected activity.
- **Transfer of economic values:** Apply the valuation information to the conditions being valued using the appropriate methodology (four different types of benefits transfers are available: point estimate, benefit function, meta-analysis, and Bayesian techniques).
- **Address uncertainty:** Clearly caveat assumptions and the direction of potential bias introduced by each assumption, and any uncertainty.

Source: U.S. Environmental Protection Agency. Guidelines for Preparing Economic Analyses, EPA-240-R-00-003, September 2000.

| Exhibit 6-10 | | | | | | |
|---|---|---|---|---|--|---|
| KEY CHARACTERISTICS OF WOLF VALUATION STUDIES | | | | | | |
| Study Characteristic | Duffield and Neher (1996) | Chambers and Whitehead (2003) | Loomis and White (1996) | Mangun et al (1997) | Rosen (1997) | Aquino and Falk (2001) |
| Location | Yellowstone National Park and contiguous National Forests | MN | Various | Eastern NC | Northeastern NC and Great Smokey Mountains National Park | NM |
| Population sampled | National, and Residents of ID, MT, and WY | Residents of Ely and St. Cloud, MN | Various | Residents of NC counties in the vicinity of Alligator River NWR | Residents of AL, GA, KY, NC, OH, SC, TN, and VA | n/a |
| Valuation methodology | Contingent valuation | Contingent valuation | Benefits transfer/summary of literature | Contingent valuation | Contingent valuation | Market study |
| Survey mode | Telephone | Mail | n/a | In person interview | Telephone | Intercept survey of a sample of convenience |
| Resource valued | Recovery of gray wolves, or their absence | Wolf management plan and a wolf damage plan | Gray wolf reintroduction | Red wolf reintroduction | Sustain and maintain red wolf recovery | "Wolf-friendly" beef |
| Year of survey | 1993 | 2001 | Various from 1991 to 1993 | 1996 | 1995 | n/a |
| Number of respondents | 648 | 353 | n/a | 50 | 507 | 98 |
| Response Rate | Regional- 70 percent National- 48 percent | 56.1 percent | Various from 31 to 86 percent | 73.5 percent | 33 percent | n/a |
| Value | -\$12.14 to \$24.68 per person (2004\$) | \$5.00 to \$22.52 per household (2003\$) | \$16 to \$118 per household (1996\$) | \$7.52 (1996\$) annually per household | \$30.35 to \$68.59 (1997\$) annually per household | n/a |
| <p>Sources: Duffield, John and C. Neher. "Economics of Wolf Recovery in Yellowstone National Park", Trans 61st North American Wildlife and Natural Resources Conference, 1996. Chambers, Catherine and John Whitehead. 2003. A Contingent Valuation Estimate of the Benefits of Wolves in Minnesota. <i>Environmental and Resource Economics</i> 26:249-267. Loomis, John and Douglas White. 1996. Economic Benefits of Rare and Endangered Species: Summary and Meta-Analysis. <i>Ecological Economics</i> 18: 197-206. Mangun, William, John Lucas, John Whitehead, and Jean Mangun. 1996. Valuing Red Wolf Recovery Efforts at Alligator River NWR: Measuring Citizen Support. <i>Wolves of America Conference Proceedings</i>. Rosen, William. 1997. Red Wolf Recovery In Northeastern North Carolina and the Great Smoky Mountains National Park: Public Attitudes and Economic Impacts. <i>Report submitted to U.S. Fish and Wildlife Service</i>. Aquino, Helen and Constance Falk. 2001. A Case Study in the Marketing of "Wolf-Friendly" Beef. <i>Review of Agricultural Economics</i> 23(2):524-537.</p> <p>Note: These studies generally treat non-respondents like respondents. That is, non-respondents are not assumed to hold zero willingness to pay values for wolves.</p> | | | | | | |

In Duffield (1996), respondents were asked whether or not they would be willing to buy a lifetime membership in a trust fund established to support or oppose efforts to reintroduce gray wolves into Yellowstone National Park. Respondents were presented with varying dollar costs for trust fund membership. They received 335 completed surveys from a regional subsample, and 313 completed surveys from a national sample. Overall, the study found that nationally, supporters of wolf reintroduction outnumbered opponents by two to one. However, in the affected states, opposition and support were nearly evenly divided (49 percent favored, 43 percent opposed, eight percent undecided). Values for both supporters and opponents were higher locally than nationally, with local supporters offering \$24.68 (2004\$) to fund reintroduction, while opponents offered \$10.74 (2004\$) to prevent reintroduction. Nationally, values for supporters averaged \$12.14 (2004\$), while opponents averaged \$1.83 (2004\$).²⁰² These values are presented in Exhibit 6-11. A meta-analysis by Loomis and White (1996), includes a summary of five other contingent valuation estimates by Duffield of the economic value of gray wolf reintroduction. The willingness to pay values estimated in these studies reportedly range from \$27.11 for households in the region of reintroduction to between \$69 and \$118 for local or U.S.-local visitors (1993\$).²⁰³

| Exhibit 6-11 | | |
|---|--------------|-----------------|
| ESTIMATED MEAN VALUES OF WOLF REINTRODUCTION IN THE YELLOWSTONE AREA, PER PERSON (2004\$) | | |
| | Local | National |
| Support | \$24.68 | \$10.74 |
| Oppose | \$12.14 | \$1.83 |
| Source: Duffield, John and C. Neher. "Economics of Wolf Recovery in Yellowstone National Park", Trans 61st North American Wildlife and Natural Resources Conference, 1996. Costs adjusted to 2004\$ using the Consumer Price Index, accessed at http://data.bls.gov/cgi-bin/dsrv . | | |

Chambers and Whitehead (2003) provide an estimate of the willingness to pay both for gray wolf management and for a reimbursement fund for those who suffer wolf-related damages in Minnesota. Respondents were asked if they would be willing to pay a one-time tax increase to fund the Wolf Management Plan (WMP). The WMP would include population and health monitoring, as well as preserving wolf and prey habitat. Respondents were told that if the plan passed, a stable population of 1,600 wolves would result and wolves would not be returned to the threatened and endangered species list in the near future. Next, respondents were asked if they would pay a one-time tax increase to fund the Wolf Damage Plan (Damage Plan). The Damage Plan would increase compensation for lost livestock and initiate compensation for lost pets and veterinary costs associated with injured animals. The authors randomly selected 800 individuals from Ely (in the center of wolf habitat) and St. Cloud (outside the area designated as primary wolf habitat), Minnesota. Of these 173 completed surveys were received from Ely, and 180

²⁰² Duffield, John and C. Neher. "Economics of Wolf Recovery in Yellowstone National Park", Trans 61st North American Wildlife and Natural Resources Conference, 1996.

²⁰³ Loomis, John and Douglas White. 1996. Economic Benefits of Rare and Endangered Species: Summary and Meta-Analysis. *Ecological Economics* 18: 197-206.

completed survey were received from St. Cloud. The results for the two samples were found to differ. A majority of Ely respondents said they would not be willing to pay the tax amount to fund either the WMP (67 percent) or the Damage Plan (56 percent), whereas 44 percent of the St. Cloud respondents said they would not pay the increased taxes for the WMP and 40 percent for the Damage Plan. The willingness to pay for the WMP of the Ely sample was found to be \$4.77, and \$21.49 for the St. Cloud Sample (2001\$) per household. The willingness to pay for the Damage Plan of the Ely sample was \$4.43, and \$20.16 for the St. Cloud sample.

Mangun et al. (1996) conducted a small-scale pilot survey to evaluate general knowledge and support levels for red wolf among the local population surrounding the Alligator River National Wildlife Refuge (NWR) in North Carolina, and to estimate an economic value of red wolves.²⁰⁴ The pilot survey employed the contingent valuation method to estimate willingness to pay for red wolf reintroduction in eastern North Carolina. Respondents were asked if their household would be willing to donate every year to a "Red Wolf Recovery Trust Fund" set up by the U.S. Fish and Wildlife Service, where the money would be used by wildlife managers to pay for the reintroduction of the red wolf into the Alligator River NWR. The authors randomly selected 68 residents of eastern North Carolina counties in the vicinity of Alligator River NWR; from this sample 50 completed surveys were collected. Preliminary results of this pilot study indicate the mean willingness to pay for red wolf reintroduction of local North Carolina residents to be \$7.52 annually per household (1996\$).²⁰⁵

Rosen (1997) conducted a survey to explore three broad topics: 1) public opinions, attitudes, and knowledge about red wolves and recovery; 2) the effect of red wolf recovery on household tourism decisions; and 3) the social benefits of red wolf recovery.²⁰⁶ A total of 507 surveys were completed, a response rate of 33 percent. A majority of respondents were in favor of red wolf recovery in northeastern North Carolina (75 percent) and Great Smoky Mountains National Park (79 percent). Respondents were asked to assume that all government financing and support for recovered red wolves was to end, a private red wolf trust fund organization would assume management of recovery, and without private trust fund financing all red wolves would be removed from the wild. Then each respondent was randomly assigned one of three possible scenarios, as described in Exhibit 6-12. As shown in Exhibit 6-12 the willingness to pay for the scenario that protects both red wolf populations is \$35 to \$68, less than the scenario that protects the Great Smokey Mountains National Park population \$39 to \$69, and greater than the scenario that protects the northeastern North Carolina population \$30 to \$67. These estimates likely overstate household willingness to pay for red wolf recovery, as most respondents viewed their contribution as a contribution for all endangered species and not just the red wolf.

²⁰⁴ Mangun, William, John Lucas, John Whitehead, and Jean Mangun. 1996. Valuing Red Wolf Recovery Efforts at Alligator River NWR: Measuring Citizen Support. *Wolves of America Conference Proceedings*.

²⁰⁵ Individual respondents willingness to pay had a range of \$1 to \$50.

²⁰⁶ Rosen, William. 1997. Red Wolf Recovery In Northeastern North Carolina and the Great Smoky Mountains National Park: Public Attitudes and Economic Impacts. *Report submitted to U.S. Fish and Wildlife Service*.

| Exhibit 6-12 | |
|---|-----------------------------------|
| ESTIMATED MEAN ANNUAL VALUES OF RED WOLF RECOVERY IN NORTHEASTERN NORTH CAROLINA AND GREAT SMOKEY MOUNTAINS NATIONAL PARK, PER HOUSEHOLD (1996\$) | |
| Scenario | Annual Household WTP Value |
| Willingness to pay to support and maintain the reintroduction of 50 wolves in northeastern North Carolina, the 18 wolves in the Great Smoky Mountains National Park will be removed. | \$30.35 - \$66.74 |
| Willingness to pay to support and maintain 18 wolves in the Great Smoky Mountains National Park, sufficient funding is available to maintain wolf recovery in northeastern North Carolina. | \$38.61 - \$68.59 |
| Willingness to pay to support and maintain 18 wolves in Great Smoky Mountains National Park and 50 wolves in northeastern North Carolina, without sufficient funds all wolves will be removed. | \$35.43 - \$68.46 |
| Source: Rosen, William. 1997. Red Wolf Recovery In Northeastern North Carolina and the Great Smoky Mountains National Park: Public Attitudes and Economic Impacts. <i>Report submitted to U.S. Fish and Wildlife Service.</i> | |

The only known valuation study of Mexican wolves did not quantify a value of wolves or wolf recovery. Aquino and Falk (2001) conducted a case study of an effort in New Mexico to market "wolf-friendly" beef. As part of this effort, a survey was conducted in 1998 at the Albuquerque Zoo to determine participants' views on consumer willingness to pay for beef products with environmental attributes, ranch management, and public land use. A total of 98 surveys were completed at the zoo. In addition to demographic and group affiliation questions, respondents were asked if they agreed/disagreed with seven ranch management practice and beef attribute questions. A majority of respondents agreed with a statement that they would support predator protection in ranch management (94.6 percent), the purchase of beef that protects predators (94.4 percent), and a premium for riparian/predator protection (87.5 percent). However, no explicit willingness to pay estimate was developed.

It should be noted that while contingent valuation provides a useful method for estimating a full range of values (i.e., use value, non-use value, existence value, etc.), the reliability and validity of this method has been the subject of much controversy.²⁰⁷ Some economists express particular concern about the ability of the method to provide meaningful estimates of non-use values for public goods. The debate primarily focuses on whether respondents can provide reliable estimates of the value of these types of goods, given that the public has little or no experience with purchasing such goods. Critics note that for a variety of reasons, respondents' stated intentions may not equal true willingness to pay. Observers have noted that respondents may not carefully consider personal budget constraints when stating willingness to pay. Likewise, individuals' bids may be affected by the "warm glow" of giving.

²⁰⁷ For example, see Diamond, P. and J. Hausman. 1993. *Contingent Valuation: A Critical Assessment*. North Holland Press; Clark, J, R.G. Ethier, G.L. Poe, and W.D. Schulze. 2000. A comparison of hypothetical phone and mail contingent valuation responses for green pricing electricity programs. *Land Economics* 76(1):54-67.

That is, bids may reflect individuals' interest in contributing to a worthy cause rather than their true value for the resource in question.

In addition to concerns regarding the contingent valuation method, transfer of existing value of wolf reintroduction in the context of Yellowstone National Park, Minnesota, and North Carolina to the Southwest would require consideration of all of the key elements for a successful transfer (e.g., adjustment for biases, treatments of outliers and protest bids, internal consistency, etc.), including whether populations sampled, reintroduction programs, and reintroduction areas are similar enough to conduct a reliable transfer.

This analysis does not attempt a benefits transfer using the results of these analyses because the resources being valued are not considered to be comparable. As noted in Chambers and Whitehead (2003) "the Yellowstone situation is not directly comparable to that in Minnesota due to the nature and history of the Minnesota wolf populations." Similarly, we conclude the situations in Yellowstone, Minnesota, and North Carolina are unique and not comparable. This is based on the exceptional character of Yellowstone as a highly prized national tourist attraction, differences in public expectations of National Parks (Yellowstone, Great Smoky) versus National Forests, distinct histories of the reintroduction efforts, and economic differences between the BRWRA and local populations (particularly North Carolina and Minnesota). Indeed, some authors have stated that it is not appropriate to transfer studies to the Southwest from other areas where wolves have been reintroduced because different social conditions and primary economic activities can strongly affect the public's opinion of reintroduction and the potential for economic benefits.²⁰⁸ Comparisons between the red wolf and Mexican wolf are also not appropriate because, as pointed out by DoW, species characteristics and valuation context are different for the red wolf and Mexican wolf both because the red wolf is slightly smaller than the Mexican wolf and may be considered less of a threat to livestock populations, and because red wolves are endemic to the eastern United States.²⁰⁹

6.6 Overall Ecosystem Health

Several stakeholders have commented that wolves represent an integral part of the ecosystem in which they live because, as a top predator, they keep other animal populations in check and consequently provide ecological balance. For example, wolves could decrease overgrazing by controlling ungulate populations. In Yellowstone National Park, wolves appear to have influenced elk populations, resulting in improvements in riparian vegetation, thus improving grass conditions and allowing trees to repopulate the area.²¹⁰ The increase in

²⁰⁸ Michael Milstein (2005), Call of the wild a boon to tiny town, Billings Gazette, SD p1, July 23.

²⁰⁹ Comment letter submitted by Timm Kroeger, on behalf of Defenders of Wildlife. Issues pertaining to the Economic portion of the Mexican Wolf Socio-Economic Analysis (5-year review). October 21, 2004.

²¹⁰ Ripple, William J. and Robert L. Beschta. 2003. Wolf reintroduction, predation risk, and cottonwood recovery in Yellowstone National Park. *Forest Ecology and Management*. 184: 299-313.

vegetation has benefited other species, including birds (Berger 2001).²¹¹ Although the BRWRA represents a different habitat than Yellowstone, protecting the Mexican wolf may benefit other organisms that cohabit these areas and ecosystem health overall.

In addition, as described in Section 3, wolves could also compete with and reduce the number of other predators in the BRWRA, such as coyotes.²¹² For example, wolves have reduced coyote populations in Yellowstone dramatically, causing a 50 percent decline in coyote density and reducing the coyote population in Lamar Valley from 80 to 36 animals between 1995 and 1998. According to NASS, coyotes were responsible for \$1.9 million (2004\$) in confirmed cattle and calf losses in Arizona and New Mexico in 2000.²¹³ In the BRWRA, however, no evidence exists that suggests wolves have reduced populations of other carnivores to date.

No data reviewed during the course of this study suggest that Mexican wolves have altered or improved ecosystem health in the BRWRA. Ecosystem changes take time, however, and some residents claim that Mexican wolves have not been established in the area long enough to alter the ecosystem. The lack of change since the Reintroduction Project began could also be because not enough wolves currently inhabit the area.²¹⁴ To the extent that either of these reasons are true, the reintroduction of Mexican wolves may have positive impacts on the BRWRA in the future although benefits cannot be quantified at present.

6.7 Other Positive Impacts

The reintroduction of Mexican wolves could result in other positive impacts for the BRWRA, such as the movement of people to the area and increased educational opportunities. For instance, to the extent that the presence of wolves enhances the “wilderness” experience, they may attract new residents to the area. Specifically, many retirees move to communities surrounding the BRWRA in order to escape the city. One public commenter stated that wolves influenced their decision to move to the Silver City area, though other residents did not know of individuals who had moved to the area specifically because of the Mexican wolf Reintroduction Project.²¹⁵

²¹¹ Berger Joel, et al. 2001. A mammalian predator-prey imbalance: Grizzly bear and wolf extinction affect avian neotropical migrants. *Ecological Applications*. 11(4): 947-960; Jim Robbins (2004), Lessons from the wolf, *Scientific American*, June: 76-81.

²¹² D.W. Smith, et al. 2003. Yellowstone After Wolves. *BioScience*. 53 (4): 330-340.

²¹³ Coyotes killed 4000 calves in New Mexico in 2000 and 1600 calves in Arizona in 2000. The value per head of calves killed estimated by NASS is \$303 in New Mexico and \$306 in Arizona (2001\$). Coyotes also killed 200 cattle in New Mexico that were valued at \$629 per head (2001\$). National Agricultural Statistics Service (NASS), Agricultural Statistics Board, U.S. Department of Agriculture. Released May 2001. "Cattle Predator Loss Estimates."

²¹⁴ Personal communication with D. Stevens, New Mexico resident, March 25, 2005; Personal communication with D. Dolan, New Mexico resident, March 25, 2005; Personal communication with G. and J. Martin, New Mexico residents, March 25, 2005.

²¹⁵ For example, personal communication with D. Dolan, New Mexico resident, March 25, 2005

The presence of wolves could also offer educational opportunities by stimulating interest in the natural environment. In the communities surrounding the BRWRA, there has been some talk of opening a museum on the local ecology, and the wolves would feature prominently in potential exhibits.²¹⁶ Another resident mentioned a new charter school that would use the outdoors as a laboratory to study ecology. Many lessons could focus on the effects of the wolf reintroduction.²¹⁷ Finally, a local bookstore owner reports that two books have sold particularly well since the wolf reintroduction began due to renewed interest in Mexican wolves; one book was brought back into print after the program was proposed. Gross revenues from these book sales are estimated at \$27,500 since 1998.²¹⁸

6.8 Conclusions and Comparison to FEIS

The FEIS states that increased recreational value and expenditures may occur in the BRWRA after Mexican wolf reintroduction. However, to date, little evidence exists that increased recreation has occurred since wolf reintroduction.

The public holds a non-use value for the Mexican wolf that could be enhanced by actions to reintroduce the species to the study area. While a few studies in the literature have attempted to estimate existence value for Mexican wolves, these studies were not conducted in the Southwest. Because the contextual issues in the other study areas were distinct, a benefits transfer was not conducted.

Federal and state agency funding has not been insignificant, totaling \$7.6 million from 1998 to 2004. Estimated annual regional impacts of these expenditures, assuming that they are spent locally, totaled \$1.5 million in regional output in 2002, with a benefit to employment of 31 jobs.

²¹⁶ Personal communication with S. Morgan, New Mexico resident, March 29, 2005.

²¹⁷ Personal communication with J. Gilchrist, New Mexico resident, March 29, 2005.

²¹⁸ Personal communication with D. Salmon, New Mexico resident, March 25, 2005.

SOCIAL IMPACTS WITHIN BRWRA**SECTION 7**

This section of the analysis evaluates the social impacts associated with the Mexican wolf reintroduction in the BRWRA from 1998 to 2003. Social impacts are defined as "...the consequences to human populations of any public or private actions that alter the ways in which people live, work, play, relate to one another, organize to meet their needs and generally cope as members of society. The term also includes cultural impacts involving changes to the norms, values, and beliefs that guide and rationalize their cognition of themselves and their society."²¹⁹ This section first provides a brief description of the types of social impacts examined in this analysis. It then discusses the methods and data sources used to identify existing social impacts. Finally, this section presents the social impacts to ranchers, outfitters, guides, and hunters, Tribes, and tourism and conservationists.

7.1 Introduction

Social impacts are generally assumed to occur in standard categories consisting of population changes, community and institutional structures, political and social resources, individual and family changes, and community resources. These categories are defined as follows:

- **Population Characteristics:** Ongoing and expected population changes (growth or decline); ethnic and racial makeup; net migration, temporary residents, seasonal or leisure residents, and age distributions;
- **Community and Institutional Structures:** Changes to group and individual relationships with Federal and state agencies; changes to the basis of community economic and social stability;
- **Political and Social Resources:** The size, structure, and organization of local government; its relationship with state and Federal governments; historic and current patterns of employment and industrial diversification; activities of voluntary associations, religious organizations, interests groups; relationships between social and political institutions;

²¹⁹ Interorganizational Committee, 2003: 231.

- **Individual and Family Changes:** Influences on the daily life of the individuals and families, including attitudes, perceptions, family characteristics, and local social networks; can include changing attitudes toward the policy, an alteration in family and friendship networks, perceptions of risk, health, and safety; fears and aspirations;
- **Community Resources:** Patterns of natural resource and land use; past and current housing and community services (health, police, fire, sanitation); continuity and survival of historical and cultural resources; changes for indigenous people and religious sub-cultures.

If the analysis establishes that an impact is related directly to wolf reintroduction or is an indirect impact of wolf reintroduction, it is described in the relevant category.

Impacts on social groups can be broken into two general categories: active impacts and passive impacts. Active impacts are social impacts that are derived from direct interactions with wolves. These impacts appear to be relatively rare for the general public. Ranchers, outfitters and people living in areas where wolves are common are more likely to have active encounters with wolves. Thus, social impacts derived from those encounters are more readily identified. Passive impacts occur when people in the study area hold strong opinions about wolves and their reintroduction but have few (if any) direct encounters with wolves. Social impacts on such groups are much harder to establish beyond those associated with the existence value of the wolves.

7.2 Methodology and Data Sources

Unstructured, personal interviews with individuals living in BRWRA communities form the basis of this analysis. A snowball sample was used to identify interview subjects; this approach is used when a random or probability sample is not a viable option and evaluating small groups or social networks is required.²²⁰ Interviewees were asked to offer referrals to other individuals living in the BRWRA. The goal of this approach is to understand the dynamics of small groups and social networks.

Two starting points were used to generate the snowball sample. First, public open houses in the reintroduction area concerning wolf recovery were conducted in February 2005 that yielded numerous contacts. Individuals interviewed at these meetings were asked to suggest additional contacts. These names were added to those offered by agency personnel and people formally active in the Reintroduction Project. From this group, about a dozen unstructured interviews were conducted. Second, local individuals approached in gas stations, grocery stores, restaurants, bars, hotels and parks in BRWRA communities were asked to discuss the wolf and their communities. These individuals were also asked to suggest additional local contacts. This method generated more than forty unstructured interviews within the area. In total, roughly 60

²²⁰ Salganik, M.J. and D.D. Heckathorn. 2004. Sampling and Estimation in Hidden Populations Using Respondent-Driven Sampling. *Sociological Methodology* 34:193-239.

percent of interviews were conducted in New Mexico and 40 percent in Arizona. Public comments received on the draft analysis are also incorporated into this draft.

The goal of these interviews was to understand how the respondents perceived the role of the wolf in their social lives. First, some personal history was established, along with general perceptions of the social conditions in their community. Then the relationship between social conditions and natural resource programs, Federal landowners, and others was discussed. After these issues had been explored, the issue of wolves was examined.

In addition, this analysis uses the information provided in the FEIS as a baseline. The administrative records from the FEIS and recent litigation regarding Mexican wolf recovery and reintroduction, research, and policy literature were also used, with a focus on those projects that directly address the social and economic issues arising from wolf reintroduction in the BRWRA in particular, and North America in general. The interviews drive the majority of the social impact information and conclusions, while the additional sources are used to supplement and reinforce conclusions.

It must be made clear that social impacts are *prima fascia* neither positive nor negative. Those who feel that their social lives have been significantly altered typically make a distinction between positive and negative. However, people from different social groups frequently assess the same impact differently. For example, ranchers may label the anxiety they feel when they see wolves in close proximity to their livestock as a negative impact while their neighbors might find the sighting of the very same wolves to have a positive impact on their social lives. We generally speak of impacts as negative or positive if they were described to us as such.

7.3 Overview

Many ongoing social forces affect the communities in the BRWRA. For example, some communities are experiencing growth, while others face population decline. Other factors such as significant and persistent poverty and demographic shifts (e.g., an aging population) have social impacts (see Section 2 for more information on population and economic trends in the study area). For example, Exhibit 2-8 indicates that Catron County experienced a decline in child rearing age classes (age 20 to 39 years) between 1990 and 2000. At the same time, the post-child age classes (age 40+ years) increased significantly. This demographic shift reduced school enrollments. Although different arguments exist as to why this change occurred, a common theme is that the loss of the timber industry changed the employment mix of Catron County. Young families found it difficult to make a living and chose to leave. At the same time, retirees and others without children have moved into the county. The cumulative impact over time is declining school enrollments. Further, numerous public land policies changed in the years leading up to and since the reintroduction of the wolves in the BRWRA. Thus, significant social change within the BRWRA is occurring independent of wolf recovery efforts. General social forces such as these can overwhelm social impacts from a specific policy such as wolf reintroduction. It is therefore difficult to separate the direct social effects exclusively caused by the wolf program from broader social trends. Through interviews and a review of relevant

literature, this analysis does attempt to identify social impacts associated with the wolf reintroduction, where possible.

Social impacts from wolf recovery appear to consist of diffused social benefits and concentrated social costs.²²¹ Positive social impacts to larger communities were difficult to identify. There were numerous indications that supporting wolf recovery is a position some people hold publicly and many hold privately in response to significant social pressure. Positive impacts appear to be diffused across the area. Positive social impacts appear to be related mostly to individuals (and families) of wolf supporters and their social networks. It appears plausible from the information at hand that some dense local networks of people with a common set of values who support wolf recovery exist. People involved in such networks may spend time and effort to see and experience wolves, as well as derive general personal benefits from the return of wolves to the local ecosystem.²²²

To a great extent, negative impacts are experienced at the individual and family levels and are difficult to see in the larger context of the community or at an institutional level. Such impacts are diffused across the study area. Many people who are opposed to wolves never interact with them and never risk any of their own financial or social capital due to wolves. The exception is a subset of ranchers who have experienced livestock impacts from wolves, including Tribal cattle operations. Social impacts from these encounters appear uniformly negative and concentrated on individual ranch families, Tribal cattle associations, and related communities.

7.4 Social Impacts: Ranching Activities

Potential impacts to ranchers are more readily identifiable since ranchers are a well-defined group engaged in a well defined economic and social activity. Some ranchers experience direct social impacts of wolf recovery as well as some indirect effects because wolves can affect the social and material well being of ranchers. Because wolves are responsible for predation on livestock, almost all of the direct impacts fall on those ranchers who experience wolf impacts repeatedly over time. Ranchers who experience wolf conflicts sporadically are less likely to feel the same enduring social impacts, though they feel some negative impact associated with the wolf conflicts.

The primary social impacts of wolves on ranchers include, but are not limited to, uncertainty about herd losses and accompanying economic losses, trade-offs of time required to

²²¹ Naughton-Treves, Lisa, Rebecca Grossberg and Adrian Treves. 2003. Paying for tolerance: Rural citizens' attitudes toward wolf depredation and compensation. *Conservation Biology* 17(6): 1500-1511.

²²² For example, Defenders of Wildlife public comment that more than 100 meetings have taken place to date on Mexican wolf reintroduction. Several private citizens report leading hiking trips in the BRWRA for people interested in seeing wolves. Personal communication with Jean Ossorio, New Mexico resident, October 27, 2004; Personal communication with Dutch Salmon, New Mexico resident, March 25, 2005; Written comments from Nancy Kaminski, New Mexico resident, received on November 24, 2005; Public comments of Jean Ossorio, "Re: Comments on Evaluation of Socioeconomic impacts associated with the reintroduction of the Mexican wolf, a Component of the Five-Year Review," July 28, 2005; Public comments of Timm Kroeger, Defenders of Wildlife, P.C. re: Mexican Wolf Project 5-year Review, dated July 27, 2005.

manage for wolves rather than work on other ranch needs, feelings of diminution and anger over the management of compensation programs, and, for Tribes, loss of culturally important calves and the experience of associated cultural impacts. In addition, the presence of wolves influences the management logistics of the ranch and the allocation of family and hired labor. Ranchers also pointed to the personal and family stress involved with trying to run a ranch with wolves present. Finally, the available compensation program for economic losses appears to add to the social impacts due to the rules in place and the manner in which those rules are implemented. Ranchers feel that the compensation programs insufficiently mitigate the social impacts of wolf reintroduction on ranchers because they only pay for a portion of actual losses (see Section 3 for a more complete description of compensation programs).

A possible positive impact of these disturbances is increased social cohesion within rancher networks and within those local networks that sympathize and support them. However, when social cohesion increases across a narrow section of the community, it can become a negative social impact on the community by creating additional fractures between groups in the local social structure.

Social impacts are divided into the following categories:

- **Population Characteristics:** One person interviewed indicated that a rancher may have sold a ranch during the study period in response to difficulties in managing the ranch with wolves present. Other changes in ranch and herd numbers related to drought and economics rather than wolf recovery are demonstrable. Thus, without surveying ranchers who have left the business in the study area since 1998, we cannot draw a conclusion as to the social impacts in this category.
- **Community and Institutional Structures:** Some people in the study area are sympathetic to ranchers and see social impacts from wolves as an erosion of the cultural and economic stability of local communities. Others do not share that sympathy and see wolves' effects on ranchers as having little negative social impact, and even a positive impact. Given the available data, social impacts on community structures from wolf recovery remain vague. If there is a single shared social impact across groups and communities, it appears to be a general exasperation with the recovery agencies, and with implementation of the program on the ground. Ranchers voiced concern that public involvement has declined to a point that only a limited group of salaried representatives attend meetings. They attribute this to exhaustion and frustration with the process, and point to this as evidence of the erosion of trust between themselves and USFWS.
- **Political and Social Resources:** Most political and social resource impacts are related to changes in local economic and social structures that are not due to wolf recovery. Thus, no changes could be identified.
- **Individual and Family Changes:** This category is the primary area of social impact on ranchers. The most likely social impacts due to individual changes

are from personal stress due to managing livestock when wolves are nearby and/or preying on livestock and other domestic animals. This comports with the findings of Naughton-Treves, et al.²²³ Ranchers report sleep deprivation and exhaustion when faced with wolves nearby. Similar stresses may have caused family changes resulting in social impacts. More time dealing with wolves changes the allocation of family labor and responsibility. Ranchers provided detailed logs of changes they had to make when wolves were near their herds. The logs described additional time checking and moving herds, feelings of anxiety over finding evidence of wolves, and added efforts to find and confirm predation. Perceptions of risk include concerns about risks to personal safety (particularly, of wolf attacks), fears of going out of business, concerns that trying to manage for wolves would conflict with U.S. Forest Service grazing allotment management plans. Ranchers also perceived that there was a risk that cooperating agencies would seek to remove ranchers from public land.

Reported impacts at the individual and family level may also have indirect impacts on extended family and community social networks. One example was offered where four ranches shipped cattle together to fill trailers and get the best shipping rates. This cooperation also allowed them to fill trailers with calves of similar weights and sex, helping to increase prices when sold. One rancher in the group had numerous losses to wolves. He sold his calves early at low weights to avoid further losses. This reduced the number of calves available to ship with the other ranchers, thereby negating the benefits of shipping calves together. Indirect impacts such as these cannot be further analyzed without significant additional field work.

Another social impact on ranchers relates to the structure and implementation of the compensation program for lost livestock. Less than timely response from state and Federal agencies, unrealistic evidentiary requirements, agency unwillingness to accept rancher data or information, and the response from agencies that they lack the resources to be more diligent were cited generally as negative aspects of the program. Ranchers expressed frustration that, over the initial five years of the program, no significant improvements to the structure and implementation of the compensation program were achieved, despite the feedback they have provided. These issues were reported to produce feelings of powerlessness and frustration that grew over the study period. Montag et al. (2003) also documented many of these concerns.²²⁴

²²³ Naughton-Treves, Lisa, Rebecca Grossberg and Adrian Treves. 2003. Paying for tolerance: Rural citizens' attitudes toward wolf depredation and compensation. *Conservation Biology* 17(6): 1500-1511.

²²⁴ Jessica M. Montag et al. (2003), Political and Social Viability of Predator Compensation Programs in the West: Final Project Report, Wildlife Biology Program, School of Forestry, University of Montana, Missoula, MT.

- **Community Resources:** Impacts on ranchers possibly include the erosion of the perception of ranching as an important public land use and as a cultural resource. Finally, some locals fear that wolves will add to the long-term, negative cumulative social impacts on communities of public land management policies.

7.5 Social Impacts: Outfitters, Guides, and Hunters

The possible social impacts to outfitters, guides and hunters in the study area are less demonstrable than those to ranchers in the same area. If changes in the amount of harvest and number of hunting days had occurred at the level predicted in the FEIS, some social impacts related to hunting impacts could accrue to local communities. Social impacts would be possible if outfitters were going out of business or hunter success dropped dramatically. However, changes of that magnitude were not observed. Thus, social impacts on outfitters, guides, and hunters are described as follows:

- **Population Characteristics:** If big game numbers change sufficiently, some outfitters may leave the area and some hunters may hunt elsewhere. It is difficult to say if wolf population changes would cause these changes without interviewing outfitters who left the industry and hunters who move to other areas.
- **Community and Institutional Structures:** Outfitters and hunting in general appear integral to local communities. Loss of outfitting opportunities would have a social impact due to their role in both the local economy and the community social structure. Reductions in outfitting and hunting would affect other economic activities as well as the social networks within which outfitters and hunters are embedded. However, no data is available to evaluate this possible impact.
- **Political and Social Resources:** No data is available to evaluate social impacts on outfitters and hunters in this category.
- **Individual and Family Changes:** Outfitters are nervous about the long-term changes that wolf reintroduction might bring to their personal lives and industry. Their major worry is that the economic viability (and associated value) of their operations may change as the wolf population grows. Although this anxiety was expressed throughout the study period, there is no data to support a conclusion that such changes have occurred. Most social impacts in this category remain in the realm of perceived risk.
- **Community Resources:** Reductions in outfitting and hunting represent potential changes to communities within the BRWRA. Some changes did occur during the study period, as discussed in Section 4. However, no data is available to examine the possible cultural and social impacts from those changes.

7.6 Social Impacts: Tribes

Possible social impacts to the two Tribes with lands adjacent to the BRWRA, the San Carlos Apache and the White Mountain Apache, stem from their economic and cultural activities as well as their intergovernmental relationship with the wolf reintroduction agencies.²²⁵ The full spectrum of potential impacts is difficult to assess without significant additional fieldwork. Social impacts on the Tribes are difficult to evaluate due to the complex social structures on the reservations. Nonetheless, the intricate ties between indigenous culture, ranching, and outfitting activities indicate that Tribes are more likely to experience social impacts than other groups or communities. The social impacts to Tribes include:

- **Population Characteristics:** No data is available to evaluate social impacts in this category due to wolf reintroduction.
- **Community and Institutional Structures:** As stated in Section 5, the Tribes are in a relatively weaker economic position than other communities in the area. The Tribal cattle associations and outfitting programs are important economic and social foundations for them. As the wolf population grows and wolf interactions with livestock operations and outfitters become more frequent, the likelihood of social impacts increases.
- **Political and Social Resources:** Wolf issues directly affect tribal relationships with the USFWS. Initially, both Tribes declined to cooperate in the wolf Reintroduction Project.²²⁶ The San Carlos Tribe passed a Tribal resolution against the program that is still in force. The White Mountain Tribe has decided to cooperate with USFWS and now employs some Tribal members in the wolf program. These are issues of both intergovernmental relations and political sovereignty, which are difficult to evaluate without additional information.
- **Individual and Family Changes:** The impact of the program on Tribal sovereignty over their cattle operations is a major source of concern, particularly for the San Carlos Tribe. The impact of wolf predation on Tribal herds for individuals, families and Tribal groups is seen as being significant, though its magnitude is unclear.
- **Community Resources:** The role of ranching and outfitting in Tribal cultures appears to be an important cultural and social resource that is related directly to the wolf Reintroduction Project. The cultural and social ties between these activities and wolf populations were evident during the study period,

²²⁵ Steve Pavlik (1999), "San Carlos and White Mountain Apache Attitudes toward the Reintroduction of the Mexican Wolf to its Historic Range in the American Southwest." *Wicazo Sa Review* 14 Spring:129-145.

²²⁶ Steve Pavlik (1999), "San Carlos and White Mountain Apache Attitudes toward the Reintroduction of the Mexican Wolf to its Historic Range in the American Southwest." *Wicazo Sa Review* 14 Spring:129-145.

particularly regarding conflicts over livestock. Social impacts appear more likely to occur as the wolf population increases.

7.7 Social Impacts: Tourism and Conservation

The social impacts to those involved in tourism and conservation in the study area for the five-year period of reintroduction are difficult to demonstrate. Individuals involved with these activities are heterogeneous and lack readily identifiable social or economic activities or structures. Tourism drives many sectors, including retail trade, accommodations, real estate, and food services.²²⁷ Local people involved in tourism may well benefit from increases in visitors related to wolf recovery, as discussed in Section 6. Significant discussion about the potential for increased tourism occurred prior to and during the Reintroduction Project. No overall increases in wolf-related recreation could be identified to date, however. Thus, social impacts on the tourism industry are not evaluated.

Conservationists are not always members of organized groups. This analysis included many local people who were not involved in any organized group yet expressed attitudes and opinions consistent with wolf supporters and conservationists in general. Most social impacts accruing to local conservationists are to individuals, though a strengthening of local networks could occur due to social conflict over wolves. The social impacts include:

- **Population Characteristics:** Some citizens argue that people are moving into the BRWRA because of wolf reintroduction. A significant population change due directly to wolf-driven migration does not appear to have occurred during the study period, however. Others claim that people seeking to interact with wolves have visited the BRWRA. Some respondents stated that people already drawn to the area are seeking to recreate near wolves for personal enjoyment.
- **Community and Institutional Structures:** Changes to the tourism industry and conservation communities due to wolf reintroduction do not appear to have altered the social and economic structures of communities during the study period. Tourism continues to play an important role in the local economy. Community change appears to be happening independent of wolves. No significant impacts related to wolf reintroduction could be identified.
- **Political and Social Resources:** Relationships between wolf supporters and local government appear to be virtually non-existent. Supporters appear to know each other and retain a social network accordingly. Social impacts on the tourism industry might have occurred if wolf reintroduction had produced an increase in tourism activities. Local tourism businesses such as hotels, resorts, restaurants, grocery stores and gas stations appear in favor of almost any activity that increases business, whether it is related to wolves or any

²²⁷ Tourism is not the only activity influencing these sectors, however.

other factors. Anecdotal information about tourism during the study period was provided. However, impacts on political and social resources stemming from those visits were not identifiable given the available data.

- **Individual and Family Changes:** The presence of wolves presents a positive change in the lives of wolf supporters and an opportunity to seek enjoyment from having wolves as neighbors. These impacts are difficult to aggregate, but appear generally positive. Tourism sectors, such as hotels, resorts, restaurants, grocery stores and gas stations, do not report large increases in visitation due to wolf reintroduction over the study period. Social impacts are, however, difficult to evaluate because the groups are so diverse. For example, gas station sales may capture an increase in people driving to the BRWRA to camp near wolves, but that increase might not translate into sales at the grocery store. Thus, potential positive changes are disaggregated and no data exists to evaluate them as a whole.
- **Community Resources:** No data is available to evaluate social impacts in this category.

7.8 Conclusions: Attitudes Toward Mexican Wolf Reintroduction

The vast majority of social science analysis concerning wolf recovery in North America involves attitude research using general survey techniques. Attitude data can assist resource managers in deciding what types of education or public outreach efforts they might focus on by outlining the public's perceptions and what the public might want from a policy or program. General conclusions drawn from numerous studies of attitudes towards wolves provide a useful context for understanding the social conflicts and attitudes encountered in the BRWRA. These general conclusions provide a social context for understanding why people in the BRWRA see social impacts as significant, insignificant, positive, or negative. It is important to note, however, that previous attitude research is of little direct utility to an analysis of specific social impacts from wolf recovery in the BRWRA. As Naughton-Treves et al. note, "[t]he impact of direct experience with wolf depredation on individual attitudes has seldom been examined."²²⁸

Browne-Núñez and Taylor (2002) review 50 studies of attitudes toward wolves in North America conducted between 1974 and 2000.²²⁹ These surveys conclude that although the general public usually holds very positive attitudes toward wolves and their reintroduction, respondents living in rural areas are often split or generally opposed to both the wolf and its return. The studies generally find that people living in rural areas that are likely to encounter the wolf (i.e., farmers and ranchers) and older people oppose reintroduction. In contrast, the studies find that younger people, people living in urban areas, and people with higher levels of education are typically more likely to support wolf recovery. Based on Browne-Núñez and Taylor's literature

²²⁸ Lisa Naughton-Treves et al. (2003), Paying for tolerance: Rural citizens' attitudes toward wolf depredation and compensation, *Conservation Biology* 17(6): 1500-1511.

²²⁹ C. Brown-Núñez and J. G. Taylor (2002), Americans' attitudes toward wolves and wolf reintroduction: An annotated bibliography, *Information and Technology Report*, USGS/BRD/ITR-2002-0002, U.S. Government Printing Office, Denver, CO, 15p.

review, the most common conclusion appears to be a call for more education about wolves and recovery efforts, though some research reported that increased knowledge about wolves and recovery efforts did not affect attitudes.²³⁰

Few studies are specific to the BRWRA. The Browne-Nuñez and Taylor review identified four studies conducted on the Mexican wolf specifically.²³¹ These studies generally comport with other North American studies in that it is reasonable to conclude that rural respondents in the recovery area are less supportive of reintroduction than their urban counterparts.²³² The studies note concern for livestock losses and general support for compensation to ranchers should such losses occur.

The League of Women Voters conducted a survey in 1995 that assessed New Mexico residents' opinions of Mexican wolf reintroduction to New Mexico and Arizona. The survey was administered to two samples within New Mexico: a regional sample and a statewide sample. Statewide, 62 percent of respondents supported reintroduction while 22 percent opposed. Specifically, 38 percent strongly supported, 23 percent moderately supported, 13 percent neither supported nor opposed, 5 percent moderately opposed, 17 percent strongly opposed, and 4 percent did not know. Regionally, 50 percent of respondents supported reintroduction and 30 percent opposed reintroduction. Statewide, residents in cities were less likely than statewide residents in rural areas to strongly oppose wolf reintroduction. Respondents were also asked about five potential concerns related to Mexican wolf reintroduction. The five concerns were human safety, pet safety, livestock safety, land-use restrictions, and impacts on game populations. Of the highest concern to respondents was livestock safety: 36 percent stated that it was a major concern, 35 percent said it was a minor concern, 28 percent said it was not a concern, and one percent did not know. A majority of state residents also were concerned about wolf reintroduction because there may be restrictions placed on property.²³³

²³⁰ J.W. Enck and T.L. Brown (2002), New Yorkers' attitudes toward restoring wolves to the Adirondack Park, *Wildlife Society Bulletin* 30:16-28.

²³¹ James R. Biggs (1988), Reintroduction of the Mexican Wolf into New Mexico: An Attitude Survey, M.S. thesis, New Mexico State Univ.; 66p. 1988.; T.B. Johnson (1990) Preliminary results of a public opinion survey of Arizona residents and interest groups about the Mexican wolf, Arizona Department of Fish and Game, Phoenix, AZ; Responsive Management (1995), New Mexico residents' opinions toward Mexican wolf reintroduction, Harrisonburg, VA; K.A. Schoenecker, and W.W. Shaw (1997), Attitudes toward a proposed reintroduction of Mexican gray wolves in Arizona, *Human Dimensions of Wildlife* 2:42-55.

²³² For example, see Duffield, John and C. Neher. "Economics of Wolf Recovery in Yellowstone National Park", Trans 61st North American Wildlife and Natural Resources Conference, 1996; Chambers, Catherine and John Whitehead. 2003. A Contingent Valuation Estimate of the Benefits of Wolves in Minnesota. *Environmental and Resource Economics* 26:249-267; Rosen, William. 1997. Red Wolf Recovery In Northeastern North Carolina and the Great Smoky Mountains National Park: Public Attitudes and Economic Impacts. *Report submitted to U.S. Fish and Wildlife Service*. These studies are detailed in Section 6.5. Also, see Quintal, Paula Kim Miller, "Public Attitudes and Beliefs about the Red Wolf and its Recovery in North Carolina." Master of Science thesis submitted to Forestry Department, North Carolina State University, 1995.

²³³ Duda, M. D. and K. C. Young. 1995. New Mexico residents' opinions toward Mexican wolf reintroduction. Contract Report for League of Women Voters of New Mexico. Responsive Management, Harrisonburg, Virginia.

Additional social research studies attitudes of various groups towards compensating people for ranch animal losses and the programs set up to accomplish this mitigation.²³⁴ Research into ongoing compensation programs by Montag et al. indicates that social support for such programs stems mainly from the desire to equitably distribute the costs of large carnivore restoration.²³⁵ They also found that program attributes such as methods of verification and funding sources were important in identifying supporters and non-supporters of compensation programs. Naughton-Treves et al. conclude that compensation programs do little to change attitudes toward wolves.²³⁶ Montag et al. support this conclusion, noting that many compensated ranchers criticize the programs for not solving the actual problem of wolves killing cattle. Even with compensation, many ranchers still approved of lethal control of predatory wolves.

This evidence seems to indicate strongly held attitudes toward wolves in the BRWRA. Groups that both support and oppose wolf reintroduction are readily identifiable. Weisiger (2004) remarks on the vehemence with which groups held their position on the wolf and the anger they held for the opposition.²³⁷ These groups appear to represent a significant population with a variety of strong opinions about wolves, but with little direct involvement in the reintroduction.

²³⁴ M. Musiani and P. C. Paquet (2004), The Practices of Wolf Persecution, Protection, and Restoration in Canada and the United States, *BioScience* 54(1):50-60; Lisa Naughton-Treves et al. (2003), Paying for tolerance: Rural citizens' attitudes toward wolf depredation and compensation, *Conservation Biology* 17(6): 1500-1511; Kimberly K. Wagner et al. (1997), Compensation programs for wildlife damage in North America, *Wildlife Society Bulletin* 25(2): 312-319; Marsha L. Weisiger (2004), The Debate over El Lobo: Can Historians Make a Difference? *The Public Historian* 26(1): 123-44.

²³⁵ Jessica M. Montag et al. (2003) Political and Social Viability of Predator Compensation Programs in the West: Final Project Report, Wildlife Biology Program, School of Forestry, University of Montana, Missoula, MT.

²³⁶ Lisa Naughton-Treves et al. (2003), Paying for tolerance: Rural citizens' attitudes toward wolf depredation and compensation, *Conservation Biology* 17(6): 1500-1511.

²³⁷ Marsha L. Weisiger (2004), The Debate over El Lobo: Can Historians Make a Difference? *The Public Historian* 26(1): 123-44.

APPENDIX A

RANCHER-ESTIMATED MEXICAN WOLF DEPREDATIONS IN ARIZONA AND NEW MEXICO BY RANCH, 1999 TO 2003

Exhibit 1

RANCHER-ESTIMATED MEXICAN WOLF DEPREDACTIONS IN ARIZONA AND NEW MEXICO BY RANCH, 1999 TO 2003¹

| Livestock Owner | 1999 | | | | | 2000 | | | | | 2001 | | | | | 2002 | | | | | 2003 | | | | | |
|----------------------|------------|----------|-----------|------------|----------|------------|----------|----------|------------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|----------|----------|----------|----------|-----------|----------|----------|--|
| | Bull | Cow | Calf | Horse | Injury | Bull | Cow | Calf | Horse | Injury | Bull | Cow | Calf | Horse | Injury | Bull | Cow | Calf | Horse | Injury | Bull | Cow | Calf | Horse | Injury | |
| Ranch A | | | | | | | | | | | | | | | | | 6 | 58 | 1 | | | | | 1 | | |
| Ranch B ² | | | | | | | | | | | | 3 | 1 | | | | | 18 | | | | | | | | |
| Ranch C | | | | | | | | | | 4 | | | | | | | 1 | 4 | | | | | | | | |
| Ranch D | | | | | | | | | | 1 | | | | | | | | | | | | | | | | |
| Ranch E | | 3 | 3 | | | | | | | | | | | | | | | | | | | | | | | |
| Ranch F ³ | 0.5 | 0.5 | 0.5 | | | 0.5 | 0.5 | 0.5 | | | | | | | | | | | | | | | | | | |
| Ranch G | | | 20 | | | | | | | | | | | | | | | | | | | | | | | |
| Ranch H | | | | | | | | | | | | | | | | | 1 | | | 1 | | | | | | |
| Ranch I ³ | | 1.5 | 0.5 | 0.5 | | | 1.5 | 0.5 | 0.5 | | | | | | | | | | | | | | | | | |
| Ranch J | | | | | | | | | | | | | | | | | | | 2 | | | | | | | |
| Ranch K | | | | | | | | 3 | | | | | | | | | | | | | | 1 | 25 | | | |
| Ranch L | | | 6 | | | | | | | | | | | | | | | | | | | | | | | |
| Ranch M | | | | | | | | | | | | | | | | | 1 | 1 | | | | | | | | |
| Ranch N | | | | | | | | | | | | | | | | | | | | | | | | 2 | | |
| Ranch O | | | 6 | | | | | | | | | | | | | | | | | | | | | | | |
| Ranch P | | 1 | 2 | | 1 | | | | | | | | | | | | | | | | | | | | | |
| Ranch Q ⁴ | | | | | | | | | | | | | 8 | | | | | | | | | | | | | |
| Ranch R | | | | | | | | | | | | | | | | | | | | | | | | 3 | | |
| Ranch S | | | | | | | | | | | | | | | | | | | | | | | | 5 | | |
| Ranch T | | | | | | | | | | | | | | | | | 1 | | | | | | | | | |
| Ranch U | | | | | | | | 2 | | | | | | | | | | | | | | | | | | |
| Ranch V | | | | | | | | | | | | | | | | | | 1 | | 1 | | | | 1 | | |
| TOTALS | 0.5 | 6 | 38 | 0.5 | 1 | 0.5 | 2 | 6 | 0.5 | 5 | 0 | 3 | 9 | 0 | 0 | 0 | 10 | 82 | 3 | 2 | 0 | 1 | 37 | 0 | 0 | |

Source: This data was gathered in an informal phone survey of area ranchers. Compiled by Laura Schneberger, New Mexico rancher. Received March 26, 2005. Specific ranch names were not included in this exhibit due to privacy concerns.

Notes:

¹ Chart does not include Tribal cattle loss estimates.

² This ranch manager states that up to 20 calves were missing in late May and early June of 2001.

³ Original information was given as a combined total of winter 1999 and winter 2000 depredations. For this exhibit, the figure was split between the two years, resulting in some estimates that are presented as decimals in a given year (e.g. 0.5).

⁴ 2001 figures for this ranch are ambiguous but appear to fall between 7 and 9 calves killed.

REFERENCES

- Arizona Department of Commerce. 2005. Arizona community economic base studies. Accessed March 23, 2005, at <<http://www.commerce.state.az.us/prop/eir/azcommunitybasestudy.asp>>.
- _____. 2005. Community profiles. Accessed March 23, 2005, at <http://www.commerce.state.az.us/communities/community_profile_index.asp>.
- Arizona Department of Revenue. 2005. Calculated taxable sales by county and sector, data provided by Northern Arizona University, February.
- Arizona Game and Fish Department. 2004. Regional elk management operational plans, March 25. Arizona Game and Fish Department, Phoenix, Arizona.
- _____. 2004. 2004-2005 Arizona hunting and trapping regulations. Arizona Game and Fish Department, Phoenix, Arizona.
- _____. 2004. Estimated costs of Mexican wolf conservation, revised September 1, 2004. Arizona Game and Fish Department, Phoenix, Arizona.
- _____. Website "Elk". Accessed at <http://www.gf.state.az.us/h_f/game_elk.shtml> on December 15, 2004.
- _____. 2005a. Elk management summaries for 2003/2004, February. Arizona Game and Fish Department, Phoenix, Arizona.
- _____. 2005b. Mule deer management summaries for 2003/2004, February. Arizona Game and Fish Department, Phoenix, Arizona.
- _____. 2005c. GIS Data layers of Game Management Units. Arizona Game and Fish Department, Phoenix, Arizona.
- _____, New Mexico Department of Game and Fish, U.S. Fish and Wildlife Service, U.S. Department of Agriculture-Wildlife Services, and the White Mountain Apache Tribe. 2005. Mexican wolf Blue Range reintroduction project interagency field team annual report, reporting period: January 1- December 31, 2004.
- Barber, Shannon M. et al. 2005 Bears remain top summer predators. *Yellowstone Science*, Summer 2005, Volume 13 (3).

- Berger Joel, et al. 2001. A mammalian predator-prey imbalance: Grizzly bear and wolf extinction affect avian neotropical migrants. *Ecological Applications*. 11(4): 947-960.
- Biggs, J.R. 1988. Reintroduction of the Mexican wolf into New Mexico – an attitude survey. M.S. thesis, New Mexico State University, Las Cruces, New Mexico. 66 pages.
- Bishop R.C. 1978. Endangered species and uncertainty: the economics of a safe minimum standard. *American Journal of Agricultural Economics*, 60:10-18.
- _____. 1980. "Endangered species: an economics perspective." *Transactions of the 45th North American Wildlife and Natural Resources Conference*. Published by the Wildlife Management Institute, Washington D.C.
- Bjorge, R.R. and J.R. Gunson. 1983. Wolf predation of cattle on the Simonette River pastures in northwestern Alberta, 1983. In Ludwig N. Carbyn, ed, in *Wolves in Canada and Alaska, Proceedings of the Wolf Symposium, Edmonton, Alberta, 1983*. Ottawa, Canada: Canadian Wildlife Services Report Series. Pages 106-111.
- Boyle, K.J. and R.C. Bishop. 1986. The economic valuation of endangered species in wildlife. *Transactions of the Fifty-First North American Wildlife and Natural Resources Conference*. Published by the Wildlife Management Institute, Washington D.C.
- Brook, A., M. Zint, and R. De Young. 2003. Landowners' responses to an Endangered Species Act listing and implications for encouraging conservation. *Conservation Biology* 17(6): 1638-3649.
- Brooke, J. 1996. Yellowstone wolves get an ally in tourist trade," New York Times, February 11, 1996.
- Brookshire, D.S., L.S. Eubanks, and A. Randall. 1983. Estimating option prices and existence values for wildlife resources. *Land Economics*, 59:1-15.
- Brown-Nuñez, C. and J.G. Taylor. 2002. Americans' attitudes toward wolves and wolf reintroduction: An annotated bibliography. Information and Technology Report USGS/BRD/ITR-2002-0002. U.S. Government Printing Office, Denver, CO, 15 pages.
- Carson, J.M. 1998. Reintroducing the Mexican wolf: will the public share the costs, or will the burden be borne by a few? *Natural Resources Journal* 38(2): 297-325.
- Census 2000 American Indian and Alaska Native summary file. Accessed March 2005, at <http://www.factfinder.census.gov>.
- Chambers, C. and J. Whitehead. 2003. A contingent valuation estimate of the benefits of wolves in Minnesota. *Environmental and Resource Economics* 26:249-267

Clark, J.R.G. Ethier, G.L. Poe, and W.D. Schulze. 2000. A comparison of hypothetical phone and mail contingent valuation responses for green pricing electricity programs. *Land Economics* 76(1): 54-67.

Comment letter submitted by Timm Kroeger, on behalf of Defenders of Wildlife. Issues pertaining to the economic portion of the Mexican wolf socio-economic analysis (5-year review). October 21, 2004.

Defenders of Wildlife. 2005. The Bailey Wildlife Foundation Wolf Compensation Trust: payments to ranchers for livestock losses caused by wolves. Accessed January 24, 2005, at <<http://www.defenders.org/wildlife/wolf/wolfcomp.pdf>>.

Dialog search of File 516, Dun and Bradstreet, "Duns Market Identifiers." Nov. 21, 2005.

Diamond, P. and J. Hausman. 1993. *Contingent Valuation: A Critical Assessment*. North Holland Press.

Duda, M.D. and K.C. Young. 1995. New Mexico residents' opinions toward Mexican wolf reintroduction. Contract Report for League of Women Voters of New Mexico. Responsive Management, Harrisonburg, Virginia. 75 pages.

Duffield, J. and C. Neher. 1996. Economics of wolf recovery in Yellowstone National Park. Trans 61st North American Wildlife and Natural Resources Conference.

Email communication with P. Barnhill, Gila National Forest, March 18, 2005.

Email communication with N. Kaminski, New Mexico resident, November 24, 2005.

Email communication with NAV office, hunting hound breeder, Illinois on February 28, 2005.

Enck, J.W. and T.L. Brown. 2000. Preliminary assessment of the social feasibility for reintroducing gray wolves to the Adirondack Park in northern New York. Human Dimensions Research Unit Publication 00-3, Department of Natural Resources, Cornell University, Ithaca, New York.

Fausold, C.J. and R.L. Lillholm. 1999. The economic value of open space: A review and synthesis. *Environmental Management* 23(3):307-320.

Hageman, R.K. 1985. Valuing marine mammal populations: benefit valuation in a multi-species ecosystem. Administrative report No. LJ-85-22, National Marine Fisheries Service, Southwest Fisheries Center, La Jolla, CA. 88p.

Idaho Office of Species Conservation. 2004. Idaho wolf depredation compensation plan. Accessed March 7, 2005, at <http://www.accessidaho.org/species/wolf_plan_GS_feb_05.pdf>.

- International Association of Fish and Wildlife Agencies. 2002. Economic importance of hunting in America. Washington, D.C.
- Interorganizational Committee on Guidelines and Principles of Social Impact Assessment. 2003. Principles and guidelines for social impact assessment in the United States. *Impact Assessment and Project Appraisal*. 21(3): 231-250.
- Johnson, T.B. 1990. Preliminary results of a public opinion survey of Arizona residents and interest groups about the Mexican wolf. Nongame and Endangered Wildlife Program Technical Report. Arizona Game and Fish Department, Phoenix, Arizona.
- Kalt, J.P. 1993. Economic analysis of proposed designation of critical habitat for *Salix arizonica* (Arizona willow) on the Fort Apache Indian Reservation. Submitted to White Mountain Apache Tribe, Fort Apache Indian Reservation, Harvard University and the Economics Resource Group.
- Kelly, B.T. and C. Westfall. 2001 White Mountain Apache Tribe welcomed as partner in wolf recovery. Fish and Wildlife News, June.
- Kocis, S.M. et al. 2002. National visitor use monitoring results: Apache-Sitgreaves National Forest. USDA Forest Service Region 3, National Visitor Use Monitoring Project, August.
- Kocis, S.M. et al. 2002. National visitor use monitoring results: Gila National Forest. USDA Forest Service Region 3, National Visitor Use Monitoring Project, August.
- Kohlmann, S. Elk management in New Mexico: an introduction. New Mexico Department of Game and Fish, Elk Program, Undated. Received March 3, 2005.
- Kotchen, M.J. and S.D. Reiling. 1998. Estimating and questioning economic values for endangered species: an application and discussion. *Endangered Species Update* 15(5): 77-83.
- Letter from Joe Sparks, Sparks, Tehan & Ryley, P.C. re: Request for Information Regarding Possible Designation of Critical Habitat for the Southwestern Willow Flycatcher, dated September 7, 2004.
- Letter from Sandy Bahr, Grand Canyon Chapter of the Sierra Club, dated July 29, 2005.
- Letter from Steve Titla, Titla and Parsi, General Counsel for the San Carlos Apache Tribe, Re: Economic impact of wolf depredation to Point of Pines on San Carlos, November 18, 2005.

Letter from Susan B. Montgomery, Sparks, Tehan & Ryley, P.C. re: Comments to Draft Economic Analysis Regarding Possible Designation of Critical Habitat for the Southwestern Willow Flycatcher on the San Carlos Apache Reservation, dated October 6, 2004.

Letter from Tim Kroeger, Defenders of Wildlife, "Issues pertaining to the Economic portion of the Mexican wolf Socio-Economic Analysis" to Industrial Economics, October 21, 2004.

Loomis, J.B. and D. White. 1996. Economic benefits of rare and endangered species: summary and meta analysis. *Ecological Economics* 18: 197-206.

Loomis, J. and E. Ekstrand. 1997. Economic benefits of critical habitat for the Mexican spotted owl: a scope test using a multiple-bounded contingent valuation survey. *Journal of Agricultural and Resource Economics* 22(2). December.

MacAllister, M. Accessed Dec. 2005. The Mexican wolf recovery area. Field Trip Earth.

Mangun, W., J. Lucas, J. Whitehead, and J. Mangun. 1996. Valuing red wolf recovery efforts at Alligator River NWR: measuring citizen support. *Wolves of America Conference Proceedings*.

McIntyre, T. 2004. Return of the wolf: will the alpha predator change your hunting? Field & Stream, Feb. 1, 2004.

Milstein, M.. 2005. Call of the wild a boon to tiny town. *Billings Gazette*. SD 1. July 23, 2005.

Montag, J.M., M.E. Patterson, and B. Sutton. 2003. Political and social viability of predator compensation programs in the West: Final Project Report. Wildlife Biology Program School of Forestry University of Montana Missoula, MT.

Musiani, M. and P.C. Paquet. 2004. The practices of wolf persecution, protection, and restoration in Canada and the United States. *BioScience* 54(1): 50-60.

National Weather Service Climate Prediction Center. 2005. Past Palmer drought severity index maps by week for 1998 - 2004. Accessed January 3, 2005, at <http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/drought.shtml>.

Naughton-Treves, L., R. Grossberg, and A. Treves. 2003. Paying for tolerance: rural citizens' attitudes toward wolf depredation and compensation. *Conservation Biology* 17(6): 1500-1511.

New Mexico Department of Finance and Administration, Local Government Division. 2005. Lodging Tax Data.

New Mexico Department of Game and Fish. 2005. GIS Data layers of Game Management Units.

_____. 2005. Elk hunter survey - estimated results from hunter surveys by Game Management Unit.

_____. 2005. New Mexico big game and furbearer rules and information, 2005-2006 license year.

_____. 2005. Deer hunter harvest and success rates for the Apache National Forest (New Mexico portion) and Gila National Forest. Deer Program Manager, December.

Oakleaf, J.K., C. Mack, and D.L. Murray. 2003. Effects of wolves on livestock calf survival and movements in central Idaho. *Journal of Wildlife Management* 67(2): 299-306.

Pavlik, Steven. 1999. San Carlos and White Mountain Apache attitudes toward the reintroduction of the Mexican Wolf to its historic range in the American Southwest. *Wicazo SA Review* 14(1): 129-145.

_____. 2000. Will big trotter reclaim his place? The role of the wolf in Navajo tradition. *American Indian Culture and Research Journal* 24(4): 107-25.

Pearce, D. and D. Moran. 1994. *The Economic Value of Biodiversity*. The World Conservation Union. London: Earthscan.

Personal communication with management of Alpine Inn, Alpine, AZ, November 21, 2005.

Personal communication with J. Blair, New Mexico rancher, November 15, 2005.

Personal communication with B. Campbell, New Mexico outfitter, November 14, 2005.

Personal communication with D. Dolan, New Mexico resident, March 25, 2005.

Personal communication with D. Ely, Arizona Rancher, March 4 and 24, 2005.

Personal communication with M. Frances, Apache National Forest, Springerville District, March 10, 2005.

Personal communication with F. Galley, New Mexico rancher, November 16, 2005.

Personal communication with J. Gilchrist, New Mexico resident, March 29, 2005.

Personal communication with B. Hale, Deer Program Manager, New Mexico Department of Game and Fish, December 28, 2004.

Personal communication with management of Hannagan Meadow Lodge, Alpine, AZ, November 21, 2005.

Personal communication with M. Hinson, Idaho rancher, March 7, 2005.

Personal communication with B. Holaday, Arizona resident, November 14, 2005. Written comments also received, July 8, 2005.

Personal communication with Steve Kohlmann, Elk Program Manager, NMGFD, January 3 and March 3, 2005.

Personal communication with J. Lipsey, manager of Arizona dude ranch, November 18, 2005.

Personal communication with R. Loucks, Wolf Coordinator for Lemhi County, March 3, 2005.

Personal communication with S. Luce, Arizona rancher, November 16, 2005.

Personal communication with G. and J. Martin, New Mexico residents, March 25, 2005.

Personal communication with P. Mathis, Regional Game Manager, Southwest Region, New Mexico Department of Game and Fish, March 7, 2005.

Personal communication with C. Miller, Defenders of Wildlife, March 20, 2005.

Personal communication with S. Morgan, New Mexico resident, March 29, 2005.

Personal communication with W. Lee, New Mexico outfitter, November 16, 2005.

Personal communication with New Mexico Council of Outfitters and Guides, March 8, 2005.

Personal communication with J. Ossorio, New Mexico resident, October 27, 2004.

Personal communication with D. Salmon, New Mexico resident, March 25, 2005.

Personal communication with San Francisco River Outfitters, March 8, 2005.

Personal communication with M. Sauber, New Mexico resident and business owner, March 25, 2005.

Personal communication with L. Schneberger, New Mexico rancher, March 26, 2005 and November 17, 2005.

Personal communication with management of Sportsman's Lodge, Alpine, AZ, November 21, 2005.

Personal communication with D. Stevens, New Mexico resident, March 25, 2005.

Personal communication with B. Wilson, New Mexico rancher, November 16, 2005.

Public comments of Sandy Bahr, Conservation Outreach Director of the Grand Canyon Chapter of the Sierra Club. Received August 1, 2005.

- Public comments of Jean Ossorio, "Re: Comments on Evaluation of Socioeconomic impacts associated with the reintroduction of the Mexican wolf, a Component of the Five-Year Review," July 28, 2005.
- Public comments of Michael Robinson, Center for Biological Diversity, July 29, 2005.
- Public comments of Timm Kroeger, Defenders of Wildlife, P.C. re: Mexican Wolf Project 5-year Review, dated July 27, 2005.
- Quintal, P.K.M. 1995. Public attitudes and beliefs about the red wolf and its recovery in North Carolina. M.S. Thesis submitted to Forestry Department, North Carolina State University, 1995.
- Responsive Management. 1995. New Mexico residents' opinions toward Mexican wolf reintroduction. Responsive Management, Harrisonburg, Virginia.
- Ripple, W.J. and R.L. Beschta. 2003. Wolf reintroduction, predation risk, and cottonwood recovery in Yellowstone National Park. *Forest Ecology and Management*. 184: 299-313.
- Robbins, Jim. 2004. Lessons from the wolf. *Scientific American*. June: 76-81.
- Rolston, T. and C. Benton. 2005. Proceedings of spring ag outlook forum, February 25, 2005, Arizona Chapter, American Society of Farm Managers and Rural Appraisers, Phoenix, Arizona.
- Rosen, W. 1997. Red wolf recovery in northeastern North Carolina and the Great Smoky Mountains National Park: Public Attitudes and Economic Impacts. *Report submitted to U.S. Fish and Wildlife Service*.
- Samples, K., J. Dixon, and M. Gowen. 1986. Information disclosure and endangered species valuation. *Land Economics* 62:306-312.
- Schoenecker, K.A., and W.W. Shaw. 1997. Attitudes toward a proposed reintroduction of Mexican gray wolves in Arizona. *Human Dimensions of Wildlife* 2(3): 42-55.
- Silberman, J. 2002. The economic importance of fishing and hunting, Arizona State University West.
- Smith, D.W., R.O. Peterson, and D.B. Houston. 2003. Yellowstone after wolves. *Journal of BioScience* 53 (4): 330-340.
- Stark, M.. 2004. Park's wolves eating more bull elk. *Billings Gazette*, April 7, 2004.
- Stoll, J.R. and L.A. Johnson. 1984. Concepts of value, nonmarket valuation, and the case of the whooping crane. Texas Agricultural Experiment Station Article No. 19360. Natural Resource Workshop, Department of Agricultural Economics, Texas A&M University. 30p.

- Sulak, Adriana et al. 2004. Western ranching: loving it or leaving it. *Current Issues in Rangeland Resource Economics*, Utah State Univ. Research Report 190.
- Tangley, L. 2003. Restoring a lost heritage. *National Wildlife Magazine*. Dec/Jan, Vol. 41, No. 1.
- Teegerstrom, T. and R. Tronstad. 2000. Cost and return estimates for cow/calf ranches in five regions of Arizona. University of Arizona Department of Agricultural and Resource Economics, Cooperative Extension. Publication AZ1193.
- Thompson, B.C., J.S. Prior-Magee, M. Munson-Magee, W. Brown, D. Parsons, and L. Moore. 2000. Beyond release: incorporating diverse publics in setting research priorities for the Mexican wolf recovery program. *Transactions of the North American Wildlife and Natural Resources Conference* 65: 278-291.
- Thompson, J.G. 1993. Addressing the human dimensions of wolf reintroduction: an example using estimates of livestock depredation and costs of compensation. *Society and Natural Resources* 6: 165-179.
- Torell, L.A., J.M. Hawkes, and S.A. Bailey. 2000. Range livestock cost and return estimates for New Mexico, 1997. New Mexico State University Agricultural Experiment Station, College of Agriculture and Home Economics. Research Report 738.
- _____ and J.P. Doll. 1991. Public land policy and the value of grazing permits. *West. J. Agr. Econ.* 16(1):174-184.
- _____ et al. 2001. The lack of profit motive for ranching: implications for policy analysis. *Current Issues in Rangeland Economics, Proceedings of a Symposium Sponsored by Western Coordinating Committee 55 (WCC-55)*, February 2001.
- _____, N.R. Rimbey, O.A. Ramirez, and D.W. McCollum. 2004. New Faces and the Changing Value of Rangeland. Pages 57-86 in L.A. Torell, N.R. Rimbey, and L. Harris (eds), *Current Issues in Rangeland Resource Economics*, Utah State Univ. Research Report 190.
- _____, O.A. Ramirez, N.R. Rimbey, and D.W. McCollum. 2005. Income earning potential versus consumptive amenities in determining ranchland values. *J. Agr. Resource Econ.* 30(3):537-560
- Treves, A. and K. Ullas Karanth. 2003. Human-carnivore conflict and perspectives on carnivore management worldwide. *Conservation Biology* 17(6): 1491-1499.
- _____, R.R. Jurewicz, L. Naughton-Treves, R.A. Rose, R.C. Willging, and A.P. Wydeven. 2003. Wolf depredation on domestic animals in Wisconsin, 1976–2000. *Wildlife Society Bulletin* 2002 30(1): 231–241.

U.S. Bureau of Labor Statistics. 2005. Quarterly Census of Employment and Wages: 1990 - 2003. Accessed March 2, 2005, at <<ftp://ftp.bls.gov/pub/special.requests/cew/>>.

U.S. Census Bureau. 1990. Census 1990.

_____. 2000. Census 2000. Accessed at <<http://censtats.census.gov/pub/Profiles.html>>.

U.S. Census Bureau Population Division. 2002. New Mexico revised county population estimates from the U.S. Census Bureau. Prepared by the Bureau of Business and Economic Research, University of New Mexico. Accessed March 6, 2005, at <<http://www.unm.edu/~bber/demo/nmcos4-19-02.htm>>.

_____. 2004a. U.S. and state population estimates from the U.S. Bureau of the Census: U.S. and State population estimates, 2000 to 2004. Prepared by the Bureau of Business and Economic Research, University of New Mexico. Accessed March 6, 2005, at <<http://www.unm.edu/~bber/demo/usto2000s.htm>>.

_____. 2004b. Intercensal population estimates of Arizona counties: 1970-2003. Accessed February 17, 2005, at <http://www.workforce.az.gov/admin/uploadedPublications/524_betty70-97-2.pdf>.

_____. 2004c. New Mexico county population estimates from the U.S. Census Bureau. Prepared by the Bureau of Business and Economic Research, University of New Mexico. Accessed March 6, 2005, at <<http://www.unm.edu/~bber/demo/copopest.htm>>.

U.S. Department of Agriculture, Forest Service Southwestern Region. 2003. Draft biological assessment for 11 land & resource management plans, November.

U.S. Department of Agriculture National Agricultural Statistics Service. 1999. Meat animals production, disposition, and income: final estimates 1993-1997. Statistical Bulletin Number 959a.

_____. 2005a. Farm labor: 1998 – 2004. Accessed March 11, 2005, at <<http://usda.mannlib.cornell.edu/reports/nassr/other/pfl-bb/>>.

_____. 2005b. State office websites. Accessed March 11, 2005, at <<http://www.usda.gov/nass/sso-rpts.htm>>.

U.S. Department of Agriculture. 1998 - 2004. Meat Animals Production, Disposition, and Income: Summary. National Agricultural Statistics Service. Mt An 1-1.

U.S. Department of Commerce Bureau of Economic Analysis. Regional Economic Accounts. CA25N: Total full-time and part-time employment by industry in 2002. Accessed March 23, 2005, at <<http://www.bea.doc.gov/bea/regional/reis/default.cfm#a>>.

U.S. Fish and Wildlife Service. 1996. Final environmental impact statement: reintroduction of the Mexican wolf within its historic range in the southwestern United States. U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

_____. 2001. National survey of fishing, hunting, and wildlife-associated recreation. Revised March 2003.

_____. Mexican wolf program annual progress reports: 1991-2003.

U.S. Forest Service, Region 3. 2003a. Summary of Region 3 forests' AUMs. December.

_____. 2003b. Draft Biological Assessment for 11 Land and Resource Management Plans, November.

_____. 2005. 2004 Livestock head estimates. Received from Russell Ward, Gila National Forest, March 9, 2005.

U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at <<http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>>.

Vanclay, F. 2003. Social impact assessment: international principles. International Association for Impact Assessment, Fargo, North Dakota. [Available at: <http://www.iaia.org/publications.htm>].

Vergano, D. 2005. What's killing the elk in Yellowstone? USA Today, November 11, 2005. Accessed at http://www.usatoday.com/tech/science/discoveries/2005-11-21-elk-yellowstone-mystery_x.htm.

Vucetich, J.A., et al. 2005. Influence of harvest, climate, and wolf predation on Yellowstone elk, 1961-2004. *Oikos*: 111: 259-270.

Wagner, K.K., R.H. Schmidt, and M.R. Conover. 1997. Compensation programs for wildlife damage in North America. *Wildlife Society Bulletin* 25(2): 312-319.

Weisiger, M.L. 2004. The debate over el lobo: can historians make a difference? *The Public Historian* 26(1): 123-44.

White Mountain Apache Tribal Council Resolution No. 12-95-371, December 6, 1995, as quoted by Pavlik, Steve *in* San Carlos and White Mountain Apache attitudes toward the reintroduction of the Mexican wolf to its historic range in the American Southwest. *Wicazo SA Review*, Spring 1999.

Williams, C.K., G. Ericsson, and T.A. Heberlein. 2002. A quantitative summary of attitudes toward wolves and their reintroduction (1972-2000). *Wildlife Society Bulletin* 30(2): 575-584.

Written comments from Nancy Kaminski, New Mexico resident, received on November 24, 2005.

Written communication with Timm Kroeger, Defenders of Wildlife, Natural Resources Economist, Conservation Economics Program, December 5, 2005.

Written communication with T. Johnson, AGFD, December 7, 2005.

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**Mexican Wolf Blue Range Reintroduction Project 5-Year Review:
AMOC Recommendations Component**

by

Adaptive Management Oversight Committee

Arizona Game and Fish Department
New Mexico Department of Game and Fish
U.S.D.A. – APHIS, Wildlife Services
U.S.D.A. Forest Service
U.S. Fish and Wildlife Service
White Mountain Apache Tribe

December 31, 2005

Mexican Wolf Blue Range Reintroduction Project

5-Year Review: Recommendations Component

by

Adaptive Management Oversight Committee

Mexican wolf reintroduction in Arizona and New Mexico is conducted under authority of a 1998 Final Rule (USFWS 1998; 63 Fed. Reg. 1752-1772, January 12, 1998) that defines a Mexican Wolf [nonessential] Experimental Population Area (MWEPA). Within the MWEPA, the Reintroduction Project is focused in the Blue Range Wolf Recovery Area (BRWRA) of eastern Arizona and western New Mexico. The Final Rule requires a 5-Year Review to determine whether and how to modify the Reintroduction Project.

Below, the Adaptive Management Oversight Committee (AMOC) presents Recommendations from its 5-Year Review of the Blue Range Reintroduction Project. Recommendations (1) through (14) are offered to the U.S. Fish and Wildlife Service (USFWS) Region 2 Director, for consideration, and to elicit USFWS guidance to AMOC on whether and how to pursue them. Recommendations (15) through (37) are essentially findings that are within AMOC's purview to pursue (though see below, regarding process issues). These Recommendations are guidance and not rules or regulations. They are not legally binding.

Consistent with the existing Final Rule, all these Recommendations identify changes that are intended to (a) facilitate progress toward establishing a viable Mexican wolf population in Arizona-New Mexico, (b) contribute toward rangewide recovery, and (c) accomplish both within the framework of a landscape mosaic of multiple-use public, Tribal Trust, and private lands.

Although AMOC will diligently pursue timely action on these Recommendations, the time-frame and/or content of one or more might need to be adjusted, or AMOC might need to add or delete Recommendations, as necessary to respond to changes in law, regulation, policy, management issues, budget allocations, workloads, acts of nature, etc.

In short, these Recommendations should not be considered etched in stone. AMOC will change them as necessary to adaptively manage the Reintroduction Project, consistent with the Final Rule and a Memorandum of Understanding under which AMOC operates. Any changes, however, would be discussed within AMOC's Adaptive Management Work Group, and vetted through appropriate processes, before they are implemented. Further, all actions undertaken pursuant to these Recommendations and the Standard Operating Procedures (SOPs) referenced therein shall be in full compliance with applicable State, Tribal, and Federal laws, including but not limited to the Endangered Species Act of 1973, as amended.

Also, interested parties should realize that these AMOC Recommendations do not constrain any of the individual AMOC Lead Agencies or Cooperators from advocating agency-specific

positions on each of the relevant issues as AMOC begins moving forward to act on these Recommendations in 2006. If formal agency positions are needed, or desired, they will be developed through the appropriate internal or public processes for each agency, whether that includes Board of Supervisor meetings, Commission meetings, Tribal Council discussions, etc.

Finally, the appropriate Federal, State, and/or Tribal regulatory processes will be used to propose, vet, and reach final decisions on any of the following Recommendations that trigger a requirement for procedural compliance, including review and rulemaking pursuant to the Administrative Procedures Act (APA), Endangered Species Act (ESA), Federal Advisory Committee Act (FACA), National Environmental Policy Act (NEPA), and other applicable State, Tribal, and Federal laws.

Other Abbreviations, Acronyms, and Terms Used Below

AUM: Animal Unit Month – the tenure of one animal unit (AU) for a one-month period (M), or the amount of forage required by one animal unit for one month. Example: an AUM for cattle is typically defined as one mature (1000 lb) cow and her suckling calf grazing for one month. AUMs for other livestock species, such as sheep, are typically calculated via conversion factors as ratios of the cattle AUM. For sheep in Arizona, the conversion factor currently is 5. See the Society for Range Management Glossary for further information.

BRWRA: The existing Blue Range Wolf Recovery Area as designated by the current Final Rule, consisting of the Primary and Secondary Recovery Zones in Arizona and New Mexico and (per a Memorandum of Understanding between the U.S. Fish and Wildlife Service and the White Mountain Apache Tribe) the Fort Apache Indian Reservation in Arizona.

BRWRZ: The future Blue Range Wolf Reintroduction Zone, as it would be defined by proposed changes in the current Final Rule.

Fair Market Value: The price that a seller is willing to accept and a buyer is willing to pay on the open market in an arms-length transaction, meaning the point at which supply and demand intersect (i.e. agreement is reached that results in sale). Methods and resources used to determine fair market value (i.e. compensation value) of animals killed or injured by wolves might include, for example, auction market operators and/or county animal damage committees. In the case of purebred breeding stock, breeders seeking compensation might be required to furnish purchase receipts for the animals damaged, or if raised on a farm or ranch, sale receipts for animals of similar age, weight, and breeding value. Factors to consider when determining fair market value include: a) class and weight of animals; b) stage of production for breeding animals; and c) age.

MWEPA: Mexican Wolf Experimental Population Area.

Stakeholders: People and organizations that have a vested or other interest in an issue.

Tribal Trust Lands: lands set aside by Congress as reserved for governance by a Native American Tribe (i.e. Congressionally allocated reservation lands, as opposed to Tribal lands acquired by fee-simple, purchase, easement, lease, etc.).

Recommendations

1. No later than March 31, 2007, AMOC will use the results of Recommendations (3) through (14), below, to draft a recommended Mexican Wolf Nonessential Experimental Population Rule by which to redefine the MWEPA, including appropriate external and internal (i.e. BRWRZ) boundaries.
2. No later than April 30, 2007, AMOC will submit its recommended Mexican Wolf Nonessential Experimental Population Rule to the USFWS Region 2 Director.

Note: Recommendations (3) through (14), below address actions undertaken in the course of recommending a new or amend final rule. While that process is underway, all components and requirements of the current Final Rule continue to apply, and the Reintroduction Project shall be conducted in strict accordance with them.

3. AMOC recommends continuing the Reintroduction Project with modifications as outlined below. In other words, AMOC does not recommend terminating the Reintroduction Project.
4. AMOC recommends that any amended or new Mexican Wolf Nonessential Experimental Population Rule drafted in conjunction with Recommendations (1) and (2), above, not include White Sands Missile Range as a Mexican Wolf Recovery Area (i.e. its designation in the current Final Rule) or as a Reintroduction Zone.
5. AMOC will determine, on biological/ecological grounds, and conclude in a written report to the USFWS Region 2 Director no later than June 30, 2006, whether (and, if so, the extent to which) the current MWEPA outer boundaries should be expanded within Arizona-New Mexico to enable the Arizona-New Mexico Mexican wolf population to exist within a metapopulation context consistent with Leonard et al. 2005 and Carroll et al. *in press*. AMOC may convene, if necessary, a technical advisory group of individuals with appropriate expertise to assist with this assessment.

Note:

- a. The AMOC assessment will also consider other relevant issues, such as: likelihood of expansion area occupancy by wolves dispersing from northerly states or from Mexico; the merits of extending nonessential experimental population status beyond the current boundaries; and estimated costs associated with managing wolves in an expanded area.

- b. The technical advisory group, if convened, shall be chaired by an AMOC representative and shall include no more than 15 other members, each with appropriate scientific expertise.
 - c. AMOC will advocate that the MWEPA recommendation constructed under Recommendations (1) and (2), above, allow wolves to disperse from the BRWRZ (see Recommendation [7], below) throughout the MWEPA, subject to management consistent with current Blue Range Reintroduction Project SOPs.
 - d. Any recommendation to amend the existing Final Rule or to create a new Final Rule would ultimately, if acted on by USFWS, be in full compliance with all applicable APA, ESA, FACA, and NEPA requirements.
6. AMOC will propose, within the context of Recommendation (5), above, that the MWEPA population (management) objective be to establish and maintain a total of at least 100 wolves.

Note: The Reintroduction Project's population (management) objective is not a recovery goal for delisting the Mexican wolf from the list of threatened and endangered species; an updated recovery goal covering the Blue Range has not yet been determined by a Recovery Team. A population (management) objective of at least 100 wolves is, however, consistent with the Mexican Wolf Recovery Plan (USFWS 1982), Final Environmental Impact Statement (USFWS 1996), and Record of Decision for Mexican wolf reintroduction within the BRWRA of the MWEPA (USFWS 1997).

7. AMOC will propose, within the context of Recommendation (5), above, combining the current BRWRA Primary and Secondary Recovery Zones, the Fort Apache Indian Reservation, and/or any other appropriate contiguous areas of suitable wolf habitat into a single expanded Blue Range Wolf Reintroduction Zone (BRWRZ) and allowing initial releases and translocations throughout the BRWRZ in accordance with appropriately amended AMOC SOPs 5.0: Initial Wolf Releases and 6.0: Wolf Translocations.
8. AMOC will propose, within the context of Recommendation (5), above, prohibiting initial releases outside the new BRWRZ, except as necessary to allow latitude for any new Tribal "Statement of Relationship" based agreements with USFWS within the MWEPA that might allow initial releases on Tribal Trust Lands.
9. AMOC will propose, within the context of Recommendation (5), above, that wolves occurring within the MWEPA (but outside the re-defined BRWRZ) that must be relocated to address nuisance or livestock depredation issues (per AMOC SOP 13.0: Control of Mexican Wolves), may be translocated anywhere within the MWEPA except into the BRWRZ. Conversely, AMOC will also propose, within the context of Recommendation (5), above, that wolves occurring within the BRWRZ that must be relocated to address nuisance or livestock depredation issues (per SOP 13.0) may only be translocated to other areas within the BRWRZ. Regardless, all translocations must be carried out in accordance with AMOC SOP 6.0: Wolf Translocations.

10. AMOC will propose, within the context of Recommendations (5) and (6), above, that States and Tribes be authorized to issue permits, in accordance with an appropriately revised AMOC SOP 13.0: Control of Mexican Wolves, to private individuals and/or their delegated representative(s) to use authorized non-lethal means (e.g. cracker shells, rubber bullets) to harass wolves engaged in nuisance behavior or livestock depredation, or which are attacking domestic pets on private, public, or Tribal Trust lands, and to take (i.e. permanent removal by authorized lethal means) wolves in the act of attacking domestic dogs on private or Tribal Trust lands.
11. AMOC will propose, within the context of Recommendations (5) and (6), above, that, when the MWEPA population (management) objective estimate on December 31 for two sequential years is 125 wolves or more, in each immediately subsequent year the States of Arizona and New Mexico and any Tribal AMOC Cooperators may:
 - a. Take (i.e. permanently remove by any authorized means) as many wolves as necessary, above a MWEPA baseline of 125 wolves, to resolve documented wolf nuisance and livestock depredation incidents, consistent with AMOC SOP 13.0: Control of Mexican Wolves;
 - b. Issue State or Tribal permits to private individuals to take (i.e. permanently remove by any authorized means) as many wolves as necessary, above a MWEPA minimum baseline of 125 wolves, to resolve documented wolf nuisance and livestock depredation incidents, consistent with AMOC SOP 13.0: Control of Mexican Wolves;
 - c. Take (i.e. permanently remove by any authorized means) as many wolves as necessary, above a minimum baseline of 125 wolves, to resolve local unacceptable impacts on native ungulate populations.

Note: Unacceptable impacts” will be defined in AMOC’s recommended Mexican Wolf Nonessential Experimental Population Rule (see Recommendations [1] and [2], above).

12. AMOC will develop, no later than June 30, 2006, a report describing a proposed Federally, State, and/or Tribally-funded incentives program to address known and potential economic impacts of wolf nuisance and livestock depredation behavior on private, public, and Tribal Trust lands. AMOC may convene, if necessary, a technical advisory group of individuals with appropriate expertise to assist with this task. The conservation incentives discussion will consider all relevant livestock depredation issues, including: livestock depredation prevention; livestock depredation response; carcass discovery, monitoring, removal, burial, and/or destruction; and possible adjustment of the Federal grazing (AUM) fee (and any Tribal grazing subsidies) within the MWEPA to provide de facto compensation for documented and likely undocumented losses of livestock. The AMOC report shall also include a thorough evaluation of the effectiveness and procedural efficiency of the Defenders of Wildlife wolf depredation compensation fund, and provide recommendations for appropriate improvements.

Note:

- a. The technical advisory group, if convened, shall be chaired by an AMOC representative and include a maximum of 15 other members, each with appropriate expertise.
- b. AMOC as a body will not advocate regulatory changes to address carcass removal or disposal issues (but see Recommendation [12], above, regarding a process by which AMOC will explore possible mechanisms to address this issue).

13. AMOC will convene a stakeholders group to assist AMOC in evaluating, and reporting in writing no later than December 31, 2006, social (human and socioeconomic) implications (including estimated annual livestock depredation losses) for any boundary expansions recommended per Recommendation (5), above.

Note: The stakeholders advisory group will be Co-Chaired by an AMOC representative and an AMWG Cooperator (County) representative, and include a maximum of 50 other members, representing, insofar as is possible, the full spectrum of stakeholders. This group will comply with FACA, if necessary.

14. No later than December 15, 2006, AMOC will complete a detailed plan for another Reintroduction Project Review.

Note: The Reintroduction Project Review will be conducted in 2009-2010 and completed no later than December 31, 2010.

15. AMOC will collaborate on a systems evaluation of all Reintroduction Project databases, to identify in a written report no later than December 31, 2006, recommendations for improving efficiency, reliability, and access relative to Reintroduction Project management information systems.
16. No later than March 1, 2006, AMOC will convene a science and research advisory group. The group will review, on a continuing basis, current and proposed management practices and recommend research priorities for AMOC to advocate to external entities and the cooperating agencies on all aspects of the Reintroduction Project. Review tasks will include, but not be limited to: overall Reintroduction Project effectiveness, statistically reliable wolf survey and population monitoring techniques, wolf population dynamics (demographics), prey base dynamics, total predator loads, seasonal wolf livestock depredation rates, annual wolf impacts on native ungulate populations, prey base monitoring techniques appropriate to determining when prescribed unacceptable levels of impact on native wild ungulates have been met or exceeded, wolf-related disease occurrence and prevention, seasonal livestock depredation rates, prevention and/or remediation of wolf nuisance and livestock depredation problems, livestock husbandry, wolf-related tourism, socioeconomics, and human dimensions.
17. AMOC will refine its annual population (management) objective estimates, including (if possible) developing a statistically valid confidence interval and making use of techniques in

addition to telemetric monitoring, and promptly implement any constructive changes in its population estimation methods.

18. AMOC will use its IFT Annual Work Plan process to determine the need for initial releases of wolf packs in Calendar Year 2007 and beyond. Note: Releases of individual wolves as appropriate for management purposes (e.g. enhancing genetic diversity within the wild population) are not affected by this Recommendation.
19. AMOC will maintain all AMOC Reintroduction Project SOPs and continue to require employee compliance with them. Note: herein, "maintain" includes modify, revise, or delete existing SOPs, or add new SOPs, as necessary for purposes of adaptive management.
20. AMOC will make all Reintroduction Project wolf management, outreach, and budget information (redacted as appropriate to protect confidential personal information) available to the public through Annual Reports for the Reintroduction Project, and other publications and outreach materials as appropriate.
21. AMOC will collaborate with the USDA National Wildlife Research Center to complete and report no later than December 31, 2006, an independent evaluation of modified #3 soft-catch traps, McBride #7 traps, and any other live traps considered appropriate or potentially appropriate for capturing Mexican wolves.
22. AMOC will identify no later than June 30, 2006, in a confidential report to USFWS, any law enforcement actions that might help prevent unlawful take of Mexican wolves or help achieve closure on existing active investigations.
23. AMOC will direct Reintroduction Project-related outreach efforts in 2006 through the IFT Annual Work Plan to identify and reach specific target audiences, with emphasis on local communities and cooperating agencies within the BRWRA (>75% of outreach activity) and outside the BRWRA (<25% of outreach activity).
24. AMOC will ensure that all Reintroduction Project-related outreach activities emphasize wolf conservation and management as an integrated component of the social (human) as well as the ecological landscape, and provide a balanced, objective perspective on positive and negative aspects of wolves as ecosystem components in a multiple-use landscape of intermingled public, private, and Tribal Trust lands.
25. AMOC will collaborate with State and Tribal wildlife agencies to obtain updated abundance and distribution information for deer and elk populations every two years for each Game Management Unit in the BRWRA, and for as much of the rest of the wolf-occupied MWEPA as feasible.

26. AMOC will recommend, through IFT Annual Reports, or a special report updated each year, wolf-related habitat enhancements that can be accomplished through private property incentives programs and Federal, State, Tribal, and County agency planning processes.
27. No later than June 30, 2006, AMOC will review the USFWS Recovery Protocols for pre-release husbandry in captive-breeding facilities and on-site acclimation pens, and advise USFWS as to whether AMOC believes they are adequate to maximize post-release survival and breeding success.
28. No later than December 15, 2007, AMOC and the IFT will identify training recommendations to build and enhance administrative, project management, supervisory, communication, and technical skills and knowledge as appropriate to each staff member's job functions within the Reintroduction Project.
29. AMOC will advocate creating an IFT position in the Alpine field office to work with cooperators and stakeholders throughout Arizona and New Mexico on proactive measures by which to avoid or minimize wolf nuisance and livestock depredation problems. Note: AMOC as a body will not advocate regulatory changes to address carcass removal or disposal issues (but see Recommendation [12], above, regarding a process by which AMOC will explore possible mechanisms to address this issue).
30. AMOC will collaborate with an appropriate entity to complete an IFT staffing needs assessment no later than June 30, 2007, based on (a) Reintroduction Project experience to date and (b) the Arizona-New Mexico Mexican Wolf Nonessential Experimental Population Rule recommended to USFWS per Recommendations (1) and (2), above.
31. AMOC will advocate creating sufficient IFT positions in each Lead Agency as appropriate to implement the staffing needs assessment conducted pursuant to Recommendation (30), above. AMOC will also recommend that at least one IFT member from each Lead Agency be stationed in the Alpine field office, to facilitate and enhance interagency communication and cooperation.
32. AMOC will collaborate with an independent entity to identify all information needs (e.g. data types and sample sizes) for a statistically valid habitat/population viability analysis for the BRWRZ wolf population to be conducted and completed in Calendar Year 2010.
33. AMOC will recommend to USFWS completion of a Mexican Wolf Recovery Plan no later than June 30, 2007.
34. AMOC will maintain and improve administrative and adaptive management processes for the Reintroduction Project to enhance meaningful opportunities for, and participation by, the full spectrum of stakeholders and interested parties. AMOC efforts will include meeting with the IFT twice each year at the Alpine field office, and offering to meet once each year with the Commission or Board of Supervisors for each County within the BRWRA.

35. AMOC will continue to advocate a clear and appropriate distinction between the AMOC-managed Blue Range Reintroduction Project and the USFWS-managed Mexican Wolf Recovery Program.
36. Concomitant with any recommended MWEPA Rule changes pursuant to Recommendations (1) and (2), above, AMOC recommends that State and Tribal Lead Agencies and non-Federal Cooperators make a contingent-obligation request for annual Congressional line item allocations sufficient to cover all aspects of AMOC and AMWG participation in NEPA processes and ESA-related rulemaking processes required by such activities, through to the Record of Decision.
37. AMOC recommends that no later than April 30, 2006, AMOC State and Tribal Lead Agencies and non-Federal Cooperators complete and deliver to Congress a funding request that is sufficient to fully staff and equip the Reintroduction Project as of October 1, 2006, at levels commensurate with all on-the-ground responsibilities in all areas of responsibility, including wolf management (including control), enforcement, outreach (including establishing a Mexican wolf education center in Hon-Dah Arizona), citizen participation in adaptive management, Reintroduction Project-related research, and landowner incentives.

Literature Cited

- Carroll, C., M.K. Phillips, C.A. Lopez Gonzalez, and N.A. Schumaker. *In press*. Defining recovery goals and strategies for endangered species: the wolf as a case study. *BioScience* 56(1):1-13.
- U.S. Fish and Wildlife Service. 1982. Mexican wolf recovery plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 115 pages.
- _____. 1996. Final environmental impact statement: reintroduction of the Mexican wolf within its historic range in the southwestern United States. U.S. Fish and Wildlife Service, Albuquerque, New Mexico.
- _____. 1997. Notice of record of decision and statement of findings on the environmental impact statement on reintroduction of the Mexican gray wolf to its historic range in the southwestern United States. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 21 pages.
- _____. 1998. Establishment of a nonessential experimental population of the Mexican gray wolf in Arizona and New Mexico. *Federal Register* 63: 1752-1772.

**Mexican Wolf Blue Range Reintroduction Project 5-Year Review:
AMOC Responses to Public Comment Component**

by

Adaptive Management Oversight Committee

Arizona Game and Fish Department
New Mexico Department of Game and Fish
U.S.D.A. – APHIS, Wildlife Services
U.S.D.A. Forest Service
U.S. Fish and Wildlife Service
White Mountain Apache Tribe

December 31, 2005

Mexican Wolf Blue Range Reintroduction Project

5-Year Review: AMOC Responses to Public Comment Component

by

Adaptive Management Oversight Committee

Note: see the Administrative Component for a list of abbreviations, acronyms, and terms.

RESPONSES TO 5-YEAR REVIEW PUBLIC COMMENT IN JANUARY-JULY 2005

This document, part of the 5-Year Review, includes AMOC responses to: (1) written public comment on the 5-Year Review received January through July 2005; (b) oral public comment on the 5-Year Review at eight AMWG public meetings in June 2005; and (3) AMOC responses to public comment on a proposed Moratorium, and several Project SOPs addressing issues ranging from control of Mexican wolves to Project outreach activities. The responses also reflect AMOC consideration of oral public comment at 10-12 other AMWG public meetings in AZ and NM during the 5-Year Review period.

The Reintroduction Project operates under authority of a nonessential experimental population Final Rule (USFWS 1998), pursuant to Section 10(j) of the ESA¹ (see the Administrative Component for a list of abbreviations, acronyms, and terms used throughout the 5-Year Review). The Final Rule was approved by the Secretary of the Interior in 1998, after a 1996 Final Environmental Impact Statement (FEIS; USFWS 1996) was completed pursuant to the National Environmental Policy Act (NEPA), with a Record of Decision (ROD) in 1997 (USFWS 1997).

The Final Rule requires 3-Year and 5-Year Reviews of the Reintroduction Project to determine if changes are needed in any aspect of the reintroduction effort. The 3-Year Review was conducted in 2001; see Kelly et al. (2001) and Paquet et al. (2001) for the primary information on that review. The 5-Year Review was conducted in 2005, and the results are detailed in this document and several others referenced herein.

Reference is frequently made in the entries below to requested or possible actions and AMOC recommendations, including changes in the Final Rule. Please note that this is not a decision document, nor is any other part of the 5-Year Review a decision document, except in terms of clarifying the primary areas in which AMOC will be considering changes over the coming years. After initial discussion and vetting within AMOC and through AMWG, any changes in the Final Rule or in any other law, rule, regulation, or policy would need to be proposed and approved through the appropriate State, Tribal, and/or Federal administrative and/or regulatory processes. Thus, the need for compliance with APA, ESA, NEPA, and other State, Tribal, and Federal laws is implicit, and not overtly stated and re-stated with each response below. However, given that

¹ See the Administrative Component for a list of abbreviations, acronyms, and terms used throughout the 5-Year Review.

some entities are prone to imply such compliance does not occur, we do occasionally reference such compliance requirements as a reminder that we are well aware of them. Indeed, every action AMOC (including the IFT) takes in any aspect of the Reintroduction Project is in full compliance with the agencies' interpretations of applicable laws, rules, regulations, and policies.

Public comment below is divided into various sections. Each section represents comment that was received and considered at various stages of the 5-Year Review. Thus, the AMOC responses to a given issue may vary slightly from one section to another. Such changes reflect evolution in AMOC's perspective on a given issue as the 5-Year Review proceeded. However, the first section provides the most detailed AMCO responses and reflects final AMOC consideration of all relevant information. Many comments in that section are redundant to comments in subsequent sections. No effort was made to eliminate redundant comment because of the complexities of numbering and cross-referencing entries within each section.

Written Public Comment and AMOC Responses

Below is a summary of written public comment that AMOC received on the 5-Year Review from January through July 2005. Each **Comment** is accompanied by an AMOC **Response**. The notation C/R is used to flag other Comment/Response entries that seem relevant to the topic.

A. General

1. **Comment:** The word "persecute" with respect to treatment of wolves is not appropriate. **Response:** The document will be reworded, so choice of modifiers does not distract from more substantive issues.
2. **Comment:** It has been made clear that dissenting viewpoints in the current status and management of the program were not welcome and would not be applied to the 5-Year Review. People were told the termination option would not be available for comment. In all program reviews there are three options: continue, continue with modifications, and termination. It is premature and self serving to ignore a legal and obligatory option, simply because the agency wishes to succeed at reintroduction and eventual recovery. **Response:** USFWS stated in a cover letter released with the draft 5-Year Review that the Mexican Wolf Blue Range Reintroduction Project is a matter of law, the courts have repeatedly affirmed the legality of the Project, and the focus of the 5-Year Review would be on objectively identifying specifics about what has worked and what has not worked thus far in the Reintroduction Project. The cover letter also stated that comments providing position statements (e.g. like/dislike; agree/disagree with reintroduction) would not be considered relevant to the Review. These statements did not mean that dissenting viewpoints and the termination option would not be considered. Rather, they were intended to mean that opinions (organizational or personal preferences) on whether or not wolves should be in the wild are moot, because wolves are already on the landscape pursuant to the ESA and relevant court decisions. The purpose of the public comment period was to solicit meaningful input regarding how Mexican wolves are managed on the ground and how the Project could be improved. Therefore, what was sought through

public comment was substantive input (reflecting on-the-ground experiences, facts, and perceived or real flaws in current management, as opposed to simply opinions) explaining why the Project should continue, how it might be modified, or why it should be terminated.

3. **Comment:** In the interest of fairness to all parties, the USFWS should make every effort not only to avoid taking politically motivated solutions to problems but also should avoid the appearance of favoritism and insist that all meetings with “members of the public” be announced in advance and open to the public without restriction. (This comment was made in reference to 2 Congressman Pearce meetings). **Response:** The referenced meetings were not AMOC or USFWS meetings. Neither AMOC nor USFWS requested the meetings, nor did they have any role in planning or conducting them. The meetings were convened and attended by staff of Congressman Pearce (NM) and local (NM) livestock and landowner interests. They were held in Glenwood and Socorro NM, on February 12, 2005. The Congressman asked that USFWS officials attend to listen and respond to comments on the Mexican Wolf Recovery Program and the BRWRA Reintroduction Project. USFWS asked the Congressman’s staff if AMOC could be extended an invitation, which was granted a few days before the meetings. AMOC, as a body, declined the invitation, in part because the meetings were not open to the public. However, when a standing member of Congress asks a Federal agency such as USFWS to attend a meeting, that agency generally does not decline the invitation. Regardless, neither AMOC nor its individual agency members can dictate with whom a Congressman and/or his staff meet. Any group or individual can request a meeting with a Congressman by contacting him or his staff directly.
4. **Comment:** The ground rules for public participation in the review process have been circumvented with the 2 extra meetings in February at the request of reintroduction opponents who could not seem to convey their complaints adequately at the 4 scheduled open houses. **Response:** See C/R 3.
5. **Comment:** The program sides with environmental extremists. Key employees’ attitudes may be jaded for love of the wolf over other wildlife. It is common knowledge that one or more key players on the USFWS wolf Recovery Team are on record of wanting to stop multiple-use and in particular, grazing on Federally managed lands. That makes it hard for your team to be objective and obvious that the program has always been about more than just reintroducing wolves. **Response:** Agency employees in the Reintroduction Project do not have anti-grazing or anti-multiple-use agendas. As government employees and public servants, our job is to implement the Project consistent with all applicable Federal, State, and Tribal laws, and help recover the Mexican wolf, not make judgments regarding the appropriateness of grazing or other multiple-use activities on public lands. Grazing of public lands is a lawful activity, subject to regulations that AMOC does not establish or administer. It is, however, just one of the multiple-uses of public lands that we must consider in adaptively managing the Reintroduction Project.

6. **Comment:** Will there be a highly influential scientific assessment of all science and data obtained on the Mexican wolf Reintroduction Project? All information must be complete and peer reviewed in accordance with the Office of Management and Budget, Final Information Quality Bulletin for Peer Review published in December 2004. If the information is peer reviewed, will it be transparent and the written charge to the peer reviewers be made available to the public? Will the peer reviewer's names and expertise be made available to the public? Will the peer reviewer's reports and the agency's response to the peer reviewer's reports be made available to the public? **Response:** With regard to scientific assessment, the 5-Year Review's Administrative and Technical components were provided to the SWDPS Recovery Team's Technical Sub-Group in October 2004 for informal "peer" review. AMOC did that not because of a legal or procedural requirement, but because the Sub-Group had expertise directly relevant to the 5-Year Review. The Technical Sub-Group was asked to provide comment as individuals. Some did, and the documents were revised extensively to address the comment. AMOC also provided the public comment drafts of both components to the Recovery Team's Stakeholder Sub-Group as well as the Technical Sub-Group in December 2004. Again, each member was asked to provide comment individually, during the ensuing public comment period. Some did, and some provided comment through organizations or agencies with which they were affiliated. All comment received is integrated into this document, and will be reflected in appropriate final revisions of the draft 5-Year review. The Recovery Team was not asked to review the Socioeconomic Component of the 5-Year Review because the Team had become inactive (see C/R 64) when that document became available for public comment in April 2005. Regarding the Office of Management and Budget (OMB) Final Information Quality Bulletin for Peer Review (OMB 2005): that Bulletin does not apply to information disseminated on or before June 16, 2005. The Bulletin also does not apply to information for which an agency has already provided a draft report and an associated charge to peer reviewers. OMB's intent, as expressed in the Bulletin, is for agencies to have appropriate and scientifically rigorous peer review on all significant regulatory information the agencies intend to disseminate. The Administrative and Technical components of the 5-Year Review were disseminated to the public in December 2004 and January 2005, and the Socioeconomic Component was disseminated in April 2005. Since both releases preceded June 16, 2005, and the 5-Year Review is not regulatory in nature; formal peer review per the OMB Bulletin is not required. The OMB Bulletin is also supplemental guidance to existing agency peer review requirements. USFWS policy (see USFWS 1994b and 1994c) is to solicit independent peer review on listing recommendations and draft recovery plans to ensure the best biological and commercial information is used in the decision-making process, as well as to ensure that reviews by recognized experts are incorporated into the review process of rulemakings and recovery plans developed in accordance with requirements of the ESA. Thus, as with the OMB Bulletin, the USFWS policy on peer review does not apply to the 5-Year Review.
7. **Comment:** Will USFWS address any peer reviewer's potential conflicts of interest (including those stemming from ties to other stakeholders or others involved in the

- issue)? **Response:** All comments were taken at face value, without consideration for possible conflict of interest. See C/R 6.
8. **Comment:** This report needs to be subjected to a peer review by a disinterested entity. **Response:** See C/R 6 and 7.
 9. **Comment:** Will the selection process for peer reviewers be done by using the policies employed by the National Academy of Science? **Response:** See C/R 6 and 7.
 10. **Comment:** If the peer reviewers are government employees will they be subject to Federal ethics requirements? **Response:** See C/R 6 and 7.
 11. **Comment:** Page 34, Paragraph 1 (Technical): The statement “Some forms of removal (those caused by livestock depredations) will likely remain near current levels...as they are a necessary part of any successful wolf Recovery Program” is not based on science or fact. All wolf Recovery Programs to date in the USA have included removing wolves for livestock depredations so there has been no attempt to institute a wolf Recovery Program that does not do so. Therefore this statement is not based on empirical comparison but rather on a preconceived notion. The notion that removals for depredations are an unalterable part of the management landscape but will not impact success does not have a relation to the experience of this program. The opinion quoted by agency personnel that the numbers of wolves removed due to depredations will not substantially change reflects a prejudice in favor of the current failing management paradigm, and not a considered evaluation of the facts on the ground, the Paquet analysis, nor the experience of other wolf programs. This statement should be deleted and a more reasoned evaluation of the prospects of lowering this removal rate should be substituted. Furthermore, the entire section devoted to Reproduction and Population Growth should include a PVA that incorporates all the factors effecting population and its prospects including its genetic composition. **Response:** The referenced comments are from the discussion section of the Technical Component of the 5-Year Review, and it appears the commenter overlooked use of the qualifier “likely.” Wolves that present a chronic threat to livestock are removed to address negative impacts and to promote tolerance for other wolves on the landscape. The Blue Range Reintroduction Project and wolf recovery efforts elsewhere in the USA remove wolves with chronic livestock depredations to reduce conflicts and to manage wolves within the framework of practices that were in place prior to reintroduction or expansion of wolves. Management must also be consistent with the legal designation of wolves in the particular area. Removal of problem wolves in the BRWRA is not evidence of a failing management paradigm, but a reasoned response to wolf/human conflicts that arise. SOP 13.0: Control of Mexican Wolves is a detailed management approach aimed at lowering removal rate from the wild through application of a stepwise series of responses to nuisance and problem wolf issues. Finally, development and inclusion of a PVA is not a purpose of, and is beyond the scope of, the 5-Year Review. However, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding a PVA that reflects our concerns about

data sufficiency for such an analysis (see the AMOC Recommendations Component; see also Fritts and Carbyn 1995, White 2000, Boitani 2003).

12. **Comment:** The paucity and quality of data have created an inadequate, flawed, biased review. This and the Paquet report should have been conducted by reviewers completely divorced from the program and wolf advocacy and with thorough knowledge and sensitivity to those impacted by their findings. **Response:** AMOC believes this Comment inaccurately portrays the integrity and quality of the 5-Year Review process. We readily acknowledge that data are lacking in some areas or are insufficient for thorough statistical analysis, although this is less a problem now than it was during the 3-Year Review (including the Paquet report). Some data insufficiencies are explainable, given the relatively brief tenure of the Reintroduction Project. Other data problems reflect reluctance by affected publics to report depredation incidents, human-wolf interactions, and documented economic impacts (positive or negative). Regardless, the 5-Year Review is being carried out as a component of an overall adaptive management program, and the persons assigned to carry it out have a thorough knowledge of the relevant issues and an objective viewpoint as to the need for and nature of constructive change.
13. **Comment:** I would like to register a complaint that comments on the review be restricted to and limited by the review itself as that avoids expressing the essence of the reality. **Response:** The purpose of the 5-Year Review was to evaluate the effectiveness of the Mexican wolf Reintroduction Project in the BRWRA. As such, public comments were solicited specific to that topic. Regardless of the 5-Year Review, members of the public may write or call agency cooperators at any time to make inquiries, express opinions, and voice concerns or issues about any aspect of the Reintroduction Project or wolf recovery efforts. See C/R 2.
14. **Comment:** NMDA suggests a total overhaul if the program is to continue, beginning with a request to Congress for proper funding levels. This funding should include fencing of a sanctuary large enough to support the contemplated recovery population. Private entities should also be contacted for additional monies. **Response:** Larger, dedicated budgets and more personnel would not, by themselves, lead to earlier recovery of the Mexican wolf. Greater support in those areas would help, but much more than that is needed. The Reintroduction Project reflects a legal mandate under the ESA and a judicial mandate from a pivotal court settlement and subsequent court decisions. A total Project overhaul would require changes to relevant laws, regulations, or a court decision related to the Final Rule (USFWS 1998) authorizing the reintroduction. In addition, recovery of a listed species under the ESA generally connotes healthy populations of wild, naturally interacting and dispersing, free-ranging animals that are no longer in danger of elimination throughout all or a significant portion of their range. Consequently, artificial containment of Mexican wolves to a fenced “sanctuary” would not meet the legal standard of recovery of the species under the ESA. For example, wolves maintained at pre-release facilities, such as Sevilleta and Ladder Ranch, do not count toward recovery while in captivity.

15. **Comment:** Failure to implement the recommendations of the Paquet report has cost the project dearly in work hours, funds, morale and has contributed to the downward population trend in the wild. It would be best to recover the Mexican wolf so that it could then be managed as a recovered population with the concomitant benefits to the taxpayer, ranchers, outfitter, business people, tourists, politicians and the American public. **Response:** Wolf recovery and subsequent management at State or Tribal levels would likely provide benefits to many interested and affected parties. However, the Paquet et al. 2001 report, which addressed technical issues, was only one component of the 3-Year Review. The August 2001 Stakeholders Workshop (Kelly et al. 2001) also generated many recommendations. Under a principle of “equality of implementation,” perhaps both sets of recommendations would have been implemented. This would have been impractical, since some recommendations in the Stakeholders report conflicted with some in the Paquet report or others in the Stakeholders report. A fundamental failure of the 3-Review was absence of an overall set of recommendations from the various components that the cooperators agreed to implement. However, failure to implement recommendations from the Technical Component (i.e. Paquet report) of the 3-Year Review has not resulted in a failure to attain “recovered” status at this point, nor has it caused a downward population trend in the wild. Despite fluctuations in population parameters due to mortality, weather, disease, reproduction, removals, and many other causes, the number of breeding pairs in the wild and total wolf numbers in the wild are increasing. In 1998, 1999, 2000, 2001, 2002, 2003, and 2004 there were 0, 0, 1, 3, 5, 3, and 6 breeding pairs (5-Year Review Technical Component). The IFT projects that the number of breeding pairs on December 31, 2005 will be 5-8. Similar trends have been observed for the minimum population count, with counts of 4, 15, 22, 26, 42, 55, and 44-48 for 1998, 1999, 2000, 2001, 2002, 2003, and 2004, respectively (5-Year Review Technical Component). The mid-year informal (tentative) count for 2005 indicates a minimum of 51-63 wolves. However, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible changes in the Final Rule or creation of a new Final Rule, and other essential actions that would enhance efforts to attain Reintroduction Project objectives (see the AMOC Recommendations Component).
16. **Comment:** Page 1, first paragraph, Technical: Wolves still inhabited Mexico through the 1980s, not because removal efforts there were not as effective, but because organized efforts were begun later in 1950 and because these efforts were sporadic and not as consistent as they had been in the US. **Response:** Other possible explanations for longer persistence in Mexico include more wolves to begin with, less effective eradication techniques and fewer dedicated control agents, and/or more remote areas with less access. Any explanation at this juncture would be conjectural, however, so it might be best to simply state (as we will) that “wolf removal efforts in Mexico in the early to mid-1900s were not completely successful, in that some wolves survived.”
17. **Comment:** The Catron County Commission is concerned about the introduction of Mexican wolves to the county and formally requests that the NMFG Commission institute an assessment of the existing and potential impacts that may occur to the wildlife

of NM. We also request they determine the wolf impacts on the other specifics of NM wildlife to include effects on elk population, on the declining mule deer population, on threatened and endangered species of the State, and the nation. Furthermore we request that the Game and Fish Commission utilize the services of NM State University's Wildlife Department, who has expertise regarding predator/prey ecology and wildlife management. **Response:** This request is outside the scope of the 5-Year Review. However, the following discussion addresses, in part, issues raised by the Commenter. Using the best available information: The FEIS estimates 4800-10,000 fewer deer and 1200-1900 fewer elk over the entire BRWRA at a point in time five years after the initial wolf population goal of 100 wolves is achieved. Data gathered on free-ranging wolves since their release in 1998 suggest a heavier reliance on elk, and less use of deer, than was estimated in the FEIS. NMDGF has more recently modeled elk populations and wolf mortality within the NM portion of the BRWRA. Their results indicated that human-caused mortality (i.e. hunting) of elk is the primary mortality factor regulating elk populations, and that elk hunting designed to meet (human) objectives for elk populations in this unit and wolf predation can be sustained with the current BRWRA wolf reintroduction goal. To date, no detectable changes to big game populations as a result of wolf reintroduction have occurred in AZ or NM. No changes in the number of permits issued for big game hunts have been made as a result of wolf presence, either. The Socioeconomic Component of the 5-Year Review indicates the level of hunting activity across the BRWRA has not declined since the Reintroduction Project began. Elk permits and hunter days have both increased during the Reintroduction Project (1998-2004). Although there is no data at this time specific to the BRWRA, primarily due to the small population size and lack of detailed studies prior to reintroduction of Mexican wolves in the BRWRA, the effects of reintroducing a "top carnivore" on other associated species can be postulated from research conducted in Yellowstone. That data shows a positive response from willows, aspen, and cottonwoods trees in areas frequented by wolves (Ripple and Beschta 2003, 2004), suggesting wolf reintroduction has likely had a positive influence on watershed conditions by redistributing ungulate (primarily elk) grazing. Wolves in Yellowstone have contributed to a more stable and healthy elk population (Smith et al. 2003). Also, wolves have reduced coyote populations and wolf kills provide a meat source for bears, eagles, and other scavengers (Smith et al. 2003). The Yellowstone studies have thus shown the wolf can play an important role in contributing toward balanced ecosystem function (see also Terborgh et al. 1999 regarding ecosystem roles of "top carnivores"). There is no evidence that Mexican wolves pose threats to, or have adverse impacts on, any other species of wildlife (including other imperiled, at-risk, threatened, or endangered species) in terms of diminished prey population status.

18. **Comment:** Within this program, the public funds allocated have been exceeded. Positive results have not been seen and the subsidies are not working. Good management of this program is highly overrated for conservation purposes. **Response:** As the Project has moved toward a true partnership among the Lead Agencies participating in AMOC, the shortfall in annual Congressional appropriations to USFWS for this project has been partially offset by increased contributions from other partners. The other agencies see this as a reflection of their legal obligations under the ESA and essential to meeting

obligations created when wolf reintroduction was approved. As the partnership funding has increased over the past two years, under auspices of AMOC, we have been able to increase on-the-ground wolf management efforts through an expanded IFT. Much of this growth has occurred over the past 12-18 months, thus it is not reflected in the draft 5-Year Review documents. Nevertheless, the partner agencies believe the investment is worthwhile, and wolf management is improving as a result.

19. **Comment:** WS used to provide hazing, pre-inspection of localized wolves, and outreach services which are no longer available the last two years because of cost-cutting. No effort has been made to replace this loss as the population increases. Because of no collaring wolves the last two years, management for WS is impossible and ranchers to adjust to grazing areas. **Response:** WS responds to potential Mexican wolf depredations reported by livestock owners, the public and the IFT (of which WS staff are members). Since FY 2003, appropriated funds have been insufficient for WS to contribute to all wolf work needed in the BRWRA. AMOC needs four FTEs from WS for wolf management in AZ and NM, but WS funding is sufficient for only 1.25 FTEs. Consequently, WS has been forced to redirect its IFT resources to focus primarily on timely depredation response. More wolves have been captured in 2005 than in any previous year on the Project. However, even more wolves must be collared to improve all aspects of wolf management. Finally, AMOC is constantly seeking additional sources of funding, personnel, and equipment to further assist cooperative efforts in managing wolves throughout the BRWRA.
20. **Comment:** Catron County NM requests the USFWS schedule another public meeting regarding the introduction of the wolf. **Response:** AMOC is the appropriate entity to convene public meetings regarding the Blue Range Reintroduction Project. AMOC is comprised of six lead agencies (AGFD, NMDGF, WS, USFS, USFWS, and WMAT) that share primary regulatory jurisdiction and/or management authority over the Mexican wolf in AZ and NM. These agencies have delegated oversight and direction of the Blue Range Reintroduction Project to AMOC. Other State agencies and county governments that have an interest in Mexican wolf management can also participate, as formal or informal Cooperators. NMDA and Greenlee County AZ are examples of formal Cooperators. AMOC holds quarterly public AMWG meetings in the BRWRA to provide ample opportunity for stakeholder participation in the Reintroduction Project. Since this Comment was submitted (July 2005), AMOC has held two additional public meetings regarding the Reintroduction Project, one each in Glenwood NM and Morenci AZ (both in October 2005), and two more will be held in January 2006, in Safford AZ and Silver City NM. Other public meetings will held as necessary to further opportunities for public participation. Requests for public meetings should be directed to the AMOC Chair, Mr. Terry B. Johnson, AGFD.
21. **Comment:** The open house sessions held by the USFWS put on a one-sided show – all pro-wolf and shows none of the damages wolves cause. **Response:** See C/R 20. USFWS is just one of six AMOC Lead Agencies. AMOC conducted several open houses and other public meetings in 2004 and 2005, as components of the 5-Year Review. All six

Lead Agencies participated in structuring and carrying out the meetings. The meetings reflected previous public comment about format, including conflicting desires for more structured and for less structured meetings. In each meeting, AMOC's discussion of the issues inherent to wolf reintroduction (e.g. livestock depredation, nuisance wolf problems) was forthright and balanced – all aspects were covered, wolf damage was not downplayed. However, perhaps the “one-sided show” Comment is in reference to possible under-representation of depredation scenes in graphics (e.g. posters) posted at these meetings. Thus, AMOC is developing material to provide better graphic image balance in the future, and would appreciate contributions of appropriate images from any source.

22. **Comment:** Project personnel are not honest or truthful about the wolves and their history. **Response:** Inaccurate information is never intentionally provided by Reintroduction Project personnel or by any agency participant in the Project. Anyone who has evidence to the contrary should submit it to AMOC, or directly to the appropriate agency, with sufficient detail to enable appropriate investigation. All information provided about individual wolves and their history is factual, and is based on the best available information. The Project maintains various databases that track each individual wolf in the wild. Additionally, a hard-copy file maintained for each wolf contains information on the wolf's history. However, wolf behavior and new circumstances inevitably result in changes in knowledge about individual wolves and packs of wolves. AMOC is well aware that when agency employees provide new information that conflicts with previous information, accusations of dishonesty and lying may result. This does not stop us from presenting new facts or theories, when appropriate to do so.
23. **Comment:** The relationship between the IFT and locals needs to be improved. Local input on prey base should be considered along with greater input on wolf saturation level should be used unless greater funds become available to supply greater staff to a large rugged area. **Response:** There is always room for improvement in this area, and the IFT is working with local landowners on a daily basis to make the Project more efficient and effective for all stakeholders. The IFT invites local residents and other members of the public to participate in wolf management activities as available and as appropriate to the specific activity. AMOC and the IFT will consider any specific suggestions in regard to improving relationships with local residents and/or other interested parties and stakeholders. With regard to prey base issues, the IFT uses the best available information from the State and Tribal wildlife agencies, but insights from local residents can be very helpful (e.g. to help identify the best suitable areas for release or translocation of wolves).
24. **Comment:** The Administrative Introduction section fails to mention the turnover in the Mexican wolf project leader position and the long lapses of time during which the position remained vacant. **Response:** The USFWS Mexican Wolf Recovery Coordinator position was vacant from October 1999 through April 2000, and again from July 2003 through November 2004. During both periods, USFWS continued to fulfill Recovery

Coordinator responsibilities through use of existing Mexican wolf Recovery Program staff or by appointing an Acting Mexican Wolf Recovery Coordinator.

25. **Comment:** Why has the Defenders fund which offers assistance to ranchers for additional riders, ranch hands, fences, etc. been so under-utilized? **Response:** Defenders has not provided any data to AMOC that would enable us to determine if its incentives fund has been under- or over-used. However, use of this fund is not within AMOC's scope of authority. The fund is private, and its use is a function of cooperation between individual ranchers and Defenders. We can only provide information to the public that the fund is available, and contact information for Defenders.
26. **Comment:** Page 1, first paragraph (Technical): The Predatory Animal and Rodent Control Service was not actually a Service and did not exist in the period 1915 – 1925. The agency that should be referenced is the US Biological Survey which in 1940 became the USFWS. **Response:** The Federal government's direct predator control work began in 1914, within the Bureau of Biological Survey (see Robinson 2005 for relevant background). In 1924, the Bureau became the Division of Predatory Animal and Rodent Control (PARC). At least two more name changes occurred before 1939, when the Division of Predator and Rodent Control was transferred from USDA to the Department of the Interior, Fish and Wildlife Service. More name changes occurred, before the predator control program was returned to USDA, where it eventually became known as USDA-APHIS Wildlife Services. The 5-Year Review's Technical Component will be modified to reflect this history.
27. **Comment:** Supporters of the Mexican wolf program far outnumber its opponents. **Response:** The few public surveys and opinion polls conducted on this subject affirm that a majority of respondents (including those residing within the BRWRA) support Mexican wolf recovery (e.g. Biggs 1988, Duda et al. 1998, Johnson 1990, Manfredo et al. 1994).
28. **Comment:** Obviously the USFWS is spread so thin that they cannot cover the entire BRWRA and have not the personnel to do so. The agency admits to being chronically short staffed. **Response:** The IFT has not been fully staffed or funded since reintroduction began in 1998. Recent cutbacks in WS budget have exacerbated problems in management responses (see C/R 19). However (see C/R 18), in 2004 and 2005 AMOC was able to compensate for Congressionally-imposed cutbacks in USFWS funding by infusing more State and USFS funding. At the Reintroduction Project's public meetings in 2005, various individuals commented that some aspects of the field effort had improved as a result of infusion of additional resources into the IFT.
29. **Comment:** The USFWS annual budget for FY 2005 (October 1, 2004 to September 30, 2005) had to be enhanced by a \$350,000 line item. **Response:** USFWS does not receive a specific line item for Mexican wolf from Congress. The Recovery Program has received varying sums of money directly from USFWS's Washington Office (versus the more conventional budget allocation process within USFWS, Region 2, Albuquerque) the last couple of years. In FY 2005 this sum was \$350,000. Depending on the amount allocated

by Washington each year, Region 2 has made up at least part, if not all, of the shortfall in program funds by reallocating funds within the Region. In FY 2006 (October 1, 2005 to September 30, 2006), the USFWS Mexican Wolf Recovery Program is not scheduled to receive funding directly from the Washington Office. Whether USFWS Region 2 will make sufficient regional funds available to cover any wolf program shortfall in FY 2006 (i.e. between the proposed budget and the allocated funds) remains to be seen. However, USFWS will continue to seek the amount of funding needed for the program.

30. **Comment:** The agencies budget for FY 2006 is a half million dollars less than FY 2003 and there are more and more wolves on the ground to manage. **Response:** The initial FY 2006 budget figures for the USFWS portion of the Project budget are down from last year. However, USFWS is only one of six agencies that fund AMOC and IFT activities. Total budget projections (i.e. among all Lead Agencies) for the Project in FY 2006 are close to last year's actual allocations.
31. **Comment:** The USFWS annual budget for FY 2006 (October 1, 2005 to September 30, 2006) will not be enhanced by a line item. **Response:** See C/R 29 and 30.
32. **Comment:** Tax money shouldn't be spent on recovering wolves and putting us out of business. **Response:** Funds spent on Mexican wolf recovery are a lawful, legitimate, and court-mandated use of Federal tax monies. No State or Tribal tax funds are used for the Reintroduction Project. The Socioeconomic Component of the 5-Year Review, conducted by an independent contractor, failed to identify any instances whereby Mexican wolf reintroduction efforts have put anyone out of business. If anyone has documentation to the contrary, please provide it to AMOC.
33. **Comment:** I would like to know the cost of recapturing a wolf. I would think it considerable with all the manpower, vehicles, and aircraft involved. **Response:** AMOC cannot break out each individual activity for a cost analysis; agency cost accounting systems do not enable us to do so. See C/R 30 and 36.
34. **Comment:** There are no measurable meaningful milestones of costs or time to consider if the program is on track. The costs of the program must be available to the public at any and all times. There should be a budget, time table and a plan the public can see the progress of and if results are forthcoming cost effectiveness. **Response:** The AMOC Lead Agencies have made concerted efforts to account for all monies spent on reintroduction and recovery of the Mexican wolf. Current Mexican wolf recovery/reintroduction budget information is presented to the public twice each year, during AMWG meetings (see C/R 242-251 regarding adaptive management). The Socioeconomic Component of the 5-Year Review also addresses Project costs. The 3 and 5-Year Reviews and Reintroduction Project Annual Reports are also benchmarks designed to report and help evaluate progress.
35. **Comment:** The IFT must have state of the art equipment and research tools to better monitor and record data relating to Mexican wolves. Increased funding for research will

increase the type and volume of data collected for improved management. **Response:** The IFT has all the equipment and tools appropriate and necessary to perform its functions. However, the IFT is a management entity, not a research entity. The IFT uses proven techniques that have been developed and/or refined by countless wildlife researchers. The IFT also explores additional methods by which it can improve these techniques for Mexican wolf monitoring and management. Project-related research is largely conducted by parties other than the IFT, to ensure that it doesn't detract from IFT management priorities.

36. **Comment:** What is the cost per wolf of the program? **Response:** Cost per wolf is a highly misleading measure of program effectiveness, because so many factors come into play. As of June 30, 2005, there were approximately 51-63 Mexican wolves in the wild (see C/R 15) and more than 200 in captivity. AMOC estimates that for the period 1977-2005 expenditures on Mexican wolf recovery and reintroduction by all cooperating agencies were approximately \$14,177,094. This does not include expenditures by captive-rearing facilities, which are often subsidized by private donations. Costs for facilities, equipment, and other "long-lived" items must be amortized, not just across wolves produced in captivity or the wild to date, but across those that will be produced within the useful lifespan of such facilities and equipment. Finally, a "cost per wolf" index would fail to attribute costs to such AMOC actions as increasing the quantity, quality, and geographic coverage of public participation components of wolf recovery/reintroduction, which are considerable. See C/R 30 and 33.
37. **Comment:** There needs to be accountability and responsibility for all adverse results associated with this program (public health, personal losses, and revenue loss). **Response:** AMOC and its signatory Cooperators recognize (as stated in the October 2003 MOU convening the group) that negative impacts of wolf reintroduction must be satisfactorily addressed in order to maximize likelihood of success. The question becomes, however, what is the actual extent of impact in each area, and how might these impacts best be remedied? Hard data are needed to refine the extent of impact; thus far such data have proven elusive at best. In the absence of hard data, anecdotal information and more subjective personal observation come into play. The complexity of interpreting cause and effect (thus remedies) is exacerbated, because other factors mask impacts from wolves in many areas of concern. Moreover, despite widespread attention given to documented, undocumented, or perceived impacts, no elected officials have stepped forward to provide a reliable, stable, sufficient source of funding for management incentives or compensation for any aspect of private or local government impact, including livestock depredation. After considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible voluntary incentives programs to address livestock depredation issues and associated economic issues (see the AMOC Recommendations Component).
38. **Comment:** Those that live in the recovery area want the wolves out. The only private sector opinions that should be considered are from those people living inside the recovery area. Those that want the wolves that live in cities don't have to deal with a dangerous

- animal in their midst or threats to their livelihoods. **Response:** AMOC is committed to ensuring that the voices of those most directly affected by wolf reintroduction are heard and heeded as decisions are shaped and implemented, but all other opinions and voices must also be heard.
39. **Comment:** Inherent in the Mexican wolf program is the “opinion” that the various rural cultures are not valuable. This is our home and our world and it is being attacked by outsiders in a very sophisticated but insensitive and war-like manner by these transient outsiders from their transient homes, worlds, and careers. The Mexican wolf program if persisted in, will inevitably lead to cultural and material disasters --the rural cultures are threatened by wolf recovery and cannot survive it. **Response:** AMOC believes that a commitment to wolf recovery is unrelated to any “opinions” about whether or not rural cultures are valuable. However, the AMOC Lead Agencies wish to make clear that by law, policy, regulation, ethics, and action, they do and always will value rural cultures. The fact is, wolf reintroduction and recovery are infinitely more compatible with rural than with urban culture. Thus, finding meaningful ways to sustain, even enhance, rural culture is essential to successful pursuit of wolf reintroduction and recovery goals.
40. **Comment:** The USFWS admitted to feeding wolves in captivity diets consisting of beef. Thus if the environmentalists assumption (that wolves that scavenge on livestock carcasses will eventually kill livestock) is correct, then no wolves ever fed from these sources in captivity should be released to the wild. **Response:** Mexican wolves in SSP captive breeding facilities in the USA that are not candidates for eventual release can be fed beef. Many facilities, however, choose not to exercise this option and continue to feed their wolves native prey, or a zoo based canine diet that includes a high protein, nutrient-dense, poultry and pork-based kibble, and a high protein meat “log” made of horse meat and horse meat by-products. Wolves housed at USFWS approved pre-release facilities (i.e. Ladder Ranch Wolf Management Facility, Sevilleta Wolf Management Facility, and Wolf Haven International) are fed a varying diet that does not include beef. Pre-release wolves are primarily fed native prey animals such as mule deer, white-tailed deer, and elk. Most of the native prey food is obtained via road kill salvage. When native prey is not available, pre-release wolves are fed kibble or carnivore logs (but never beef in any form).
41. **Comment:** Any road kill fed to wolves should be disease free to mitigate potential spread of CWD. (#22 Technical). **Response:** Road-killed ungulate carcasses fed to Mexican wolves in captivity or the wild should be disease free. Appropriate, conservative measures are being taken in AZ and NM to avoid potential for spread of CWD (see SOP 9.0: Road Kill Salvage). Understanding of CWD is constantly expanding; as new information becomes available, SOP 9.0 will be amended appropriately.
42. **Comment:** You admit to having continual funding problems to fund the program and now you suggest “financial incentive programs for landowners/permittees in exchange for an increased level of tolerance.” When will you stop finding new ways to spend money and accept there are numerous problems with this Recovery Program and

- financing is certainly not the least of it? **Response:** AMOC has consistently stated that funding for the Reintroduction Project, including funds for field staff, currently fall below the level necessary to meet all public desires for information and management actions relating to Mexican wolves. More funding and more funding stability are needed to perform all wolf-related activities at the levels requested by interested publics. These activities include monitoring for wolf locations, determining population size, monitoring reproduction and number of breeding pairs, information dissemination, management and control actions, improving counts of livestock losses to wolves, monitoring for changes in social/cultural aspects of local communities, studies of prey population changes and potential ecosystem effects. Funding for financial incentives described within the 5-Year Review would have to originate from different sources of funds than those already available for the Reintroduction Project, to prevent a reduction of ongoing services the Project currently provides.
43. **Comment:** The main objective of this project is to put ranchers out of business and should be addressed in the 5-Year Review. **Response:** Consistent with the MOU under which the Reintroduction Project operates, the Project's objective is to help recover the Mexican wolf pursuant to the ESA and relevant court rulings, while minimizing negative impacts within the BRWRA. See also C/R 5.
44. **Comment:** The 1996 FEIS on the reintroduction of the Mexican wolf did not demonstrate the real socioeconomic inputs to communities and individuals, did not properly consider local experts observations and opinion, and did not truthfully report the past or reality. This is a gross injustice. **Response:** Socioeconomic aspects of the FEIS were based on the best information available at the time. The FEIS projected future environmental consequences of a range of alternatives as objectively, accurately, and completely as possible. However, this Comment is outside the scope of the 5-Year Review.
45. **Comment:** A large stakeholders group was put together by the Wolf Recovery Coordinator at the time, for the purpose of making recommendations for changes in the program in a way that would forward the program, yet eliminate or mitigate the problems and make things work for the majority of the stakeholders. What has happened to those recommendations? **Response:** The 3-Year Review, which included the referenced Stakeholders Workshop, was conducted in 2001. However, it did not culminate with the desired primary cooperator (USFWS, AGFD, NMDGF, and WMAT) discussion of the recommendations, thus final actions were not taken in a formal or organized, collaborative sense. Several things occurred that contributed to the lack of closure: (1) in July 2001, Congressman Skeen (NM) inserted language in the USFWS 2002 budget allocation directing USFWS to conduct an independent review of the 3-Year Review before taking action on its recommendations; (2) the USFWS Region 2 Director position (covering AZ and NM as well as Oklahoma and Texas) was vacated in 2001, and Acting Directors were hesitant to make decisions in the absence of a new Director; and (3) lack of cooperator and public consensus about the fairness and validity of the overall 3-Year Review process. As a result of these factors, in August 2002 USFWS asked the State

wildlife agencies in AZ and NM to conduct the independent review Congressman Skeen had requested, which was due in September 2002. The states conducted the review, and in September 2002 provided a suite of recommendations to the new USFWS Region 2 Director. From September 2002 through October 2003, the states, USFWS, and eventually other State, Federal, Tribal, and local government cooperators, developed a cooperative adaptive management program to provide fresh guidance for the Reintroduction Project, and restore and enhance opportunities for public involvement in the effort. Fundamental to this renewed commitment to collaboration was conducting a thorough 5-Year Review of the Reintroduction Project, with substantial public involvement, during which the Paquet Report, the Stakeholders Workshop, and all other aspects of the 3-Year Review would be re-considered. The Paquet Report is often referenced as “pure science,” but much of it has administrative, legal, and social contexts, especially some of the key recommendations that were not subjected to final primary cooperator review. The Stakeholders Workshop also generated recommendations, some of which conflicted with other recommendations from the same workshop, and some of which conflicted with recommendations from the Paquet report. These conflicts were never explored or resolved in 2001, for reasons discussed above. Now they have been vetted and addressed during the 5-Year Review. See also C/R 15.

46. **Comment:** USFWS has stopped trapping in winter months unless forced to do so by a major depredation problem and official pressure. **Response:** The IFT traps wolves year-round as necessary for depredation management (see SOP 13.0: Control of Mexican Wolves). However, the IFT does not trap for routine monitoring when temperatures are too cold, because of increased risk of foot injuries (i.e. all management actions have inherent risks) and the labor-intensive monitoring (i.e. hourly trap checks throughout the night) needed for devices that indicate when a wolf has been caught. These devices also require trapping within a localized area, thus limiting success because, in winter, wolves typically only localize in areas near recent kills.
47. **Comment:** Consider termination of the program for various reasons including: budget constraints, ineffective management, failure to implement the Final Rule, failure to deal with public safety issues, wolf reintroduction has changed the socioeconomic, culture and customs of the recovery area. **Response:** Under applicable Federal law, and relevant court decisions, wolf reintroduction will be pursued until recovery has been achieved, thus setting the stage for Federal downlisting, and delisting, and a “return” to State and Tribal management outside the ESA. See also C/R 14.
48. **Comment:** WS should have the lead for the program. **Response:** Each of the six AMOC Lead Agencies brings unique authorities and responsibilities to Mexican wolf management. The ESA of 1973, as amended, commits all Federal departments and agencies (and States participating in ESA Section 6 agreements, such as AZ and NM) to conserving endangered and threatened species, and using their authorities in furtherance of the purposes of the ESA. Under Federal law of March 2, 1931, WS, a Federal agency, is also responsible for providing Federal leadership and expertise to resolve conflicts between humans and wildlife, including threatened and endangered species. Conflicts are

resolved in cooperation with Federal, State, and Tribal agencies, private individuals, and other public and private agencies, organizations, and institutions. USFWS is the lead Federal agency in matters pertaining to the ESA. In addition, each State or Tribal wildlife agency is responsible for managing wildlife within its boundaries as a public or Tribal trust. Thus, responsibility for the Reintroduction Project is appropriately shared among the six AMOC Lead Agencies.

49. **Comment:** Remove cooperator status of NGOs that influence the program through financial contributions. **Response:** Per the MOU under which the Reintroduction Project operates, NGOs do not have Cooperator status in AMOC or in AMWG. No NGO has influenced or will be allowed to influence (i.e. directly or indirectly) the Reintroduction Project via financial contributions, although AMOC continues to welcome financial contributions from any organization or individual for purposes that are consistent with Project objectives and management approaches. See also C/R 245 and 247.

B. Legal Issues

50. **Comment:** The 5-Year Review should contain some discussion and recommendations concerning law enforcement in wolf mortalities. **Response:** Law enforcement is a small but crucial portion of reintroduction/recovery efforts for species like the Mexican wolf. The 5-Year Review will be revised to address general enforcement issues better, but discussion of individual active investigations is precluded to protect the integrity of the investigations and potential prosecutions. Also, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made a recommendation regarding law enforcement activities, including investigative issues (see the AMOC Recommendations Component).
51. **Comment:** Prior to a rule change or recommending any changes to livestock operations in the BRWRA, a takings implication assessment should occur. A real one – not the shallow inadequate attempt implemented by the prior FEIS related to the current rule. There have been several cases since the FEIS relating to property on Federal lands, surface easements, and water rights that need to be completely considered before implementing any new changes that detrimentally affect livestock operators. **Response:** The Reintroduction Project is authorized under the Final Rule, which reflects a commitment to integrate wolf reintroduction and recovery into multiple-uses of public lands and to minimize conflicts on private lands. The Final Rule is not structured, nor is the Reintroduction Project empowered or administered, to force changes in public or private grazing practices to accommodate presence of wolves. Thus, the 5-Year Review and ongoing adaptive management of the Project will continue to focus on finding and implementing incentives for voluntary actions by ranchers and other stakeholders that would help accommodate presence of wolves by reducing conflicts such as livestock depredation. After considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made a recommendation regarding possible voluntary incentives programs to address issues reflected in this Comment (see the AMOC Recommendations Component). However, concerns about “takings” implications

for livestock operations should be addressed through agency appeals processes and/or legal action, as they largely represent constitutional and legal issues about which there is significant disagreement between and among the interested and affected parties (i.e. they are beyond the scope of the 5-Year Review).

52. **Comment:** You have no flexible legal protection like a large control zone with complete protection (the containment area) surrounded by a zone in which wolves can be taken under permit or for depredation control or for reduction of wolf numbers. **Response:** Cooperating agencies within AMOC are committed by law, rule, and policy to manage wolves within a multiple-use context on public lands. There is no place in that scenario for a large control zone in which wolves are completely protected (e.g. where wolves would never be controlled, regardless of depredation behavior). Management (including prescribed take) of wolves within the Reintroduction Project is essential to comply with applicable laws (e.g. ESA), regulations (e.g. Final Rule), and policies (e.g. AMOC SOPs) and to appropriately balance wolf conservation (and progress toward recovery) with pre-existing multiple-uses of public lands and private property rights.
53. **Comment:** Page 22, Paragraph 2 (Technical): The word “illegal” should be added before “vehicle collision” to those that were not reported as required by the Final Rule because it is illegal to kill a Mexican wolf by vehicle and then not report it. Similarly, “lethal control” should be changed to “government gunshot” and “capture complications” should be changed to “stress from government aerial pursuit.” **Response:** The referenced paragraph of the 5-Year Review summarizes the types of wolf mortalities that have occurred in the BRWRA. The collision itself is not illegal; failure to report the collision to the appropriate authorities is the illegal action. As for the other suggestion, lethal control and capture complications more accurately describe the occurrences.
54. **Comment:** The right for individuals to protect themselves and their property from a wolf attack must be a part of any and all rules pertaining to the Mexican wolf. **Response:** The rights of individuals to protect themselves (and their property in certain circumstances) are affirmed in the Final Rule.
55. **Comment:** USFWS had prior knowledge of the likelihood of livestock predation and knew that take of private property would occur yet no funds have been appropriated to pay for the take of US citizens’ property. This is a violation of the Constitution. If tax payers want wolves, then taxpayers should pay for all costs of the program including private property damages. **Response:** See C/R 223-251 regarding compensation.
56. **Comment:** Livestock owners should be allowed to protect their property regardless of where the livestock or the wolves are. The US Constitution outlines the rights of all citizens regardless of whether they are on private, State or Federal lands and the USFWS has made an unprecedented statement (law) which gives different rights depending on where someone is located. **Response:** On private lands and Tribal Trust Lands anywhere within the MWEPA, the Final Rule states “livestock owners or their agents may take (including kill or injure) any wolf actually ‘engaged in the act of killing, wounding, or

biting livestock;’ provided that evidence of livestock freshly wounded or killed by wolves is present; and further provided that the take is reported to the Service’s Mexican Wolf Recovery Coordinator or a designated representative of the Service within 24 hours.” The Final Rule also includes a provision that livestock owners or their agents may be issued a permit on public lands, under the ESA, to take wolves actually engaged in the act of killing, wounding, or biting livestock. Before such a permit is issued, several conditions must be met, including: a) livestock must be legally present on the grazing allotment; b) six or more breeding pairs of Mexican wolves must be present in the BRWRA; c) previous loss or injury of livestock on the grazing allotment, caused by wolves, must be documented by USFWS or authorized agent; and d) agency efforts to resolve the problem must be completed. At this time (September 2005), all four of these conditions have not been met in any one incident, thus no landowner permits have been issued.

57. **Comment:** Losses of livestock to other predators must also be considered a take of property by the program as severe restrictions have been placed on the use of M44s, leg hold traps, and aerial gunning of coyotes. **Response:** The Final Rule states that “the WS division will discontinue use of M-44s and choking-type snares in “occupied Mexican wolf range” (see definition in section 17.84(k)(15)).” A USFWS Biological Opinion issued to WS allows for M-44 use in the recovery area outside “occupied habitat.” However, WS has chosen to be even more restrictive to ensure protection of wolves. The Final Rule does allow “selective lethal control of coyotes by traps, calling and shooting, and aerial shooting, as well as a variety of non-lethal techniques.” No restrictions were placed on management of bears and mountain lions. Furthermore, in NM, the NMDA restricts use of M-44s by private applicators in areas of Mexican wolf habitat.
58. **Comment:** How long can the American citizen expect to suffer under the mandates of a failed program and the dictates of the ESA? As a result of the ESA, citizens all across America have suffered as a result of a veritable cornucopia of nonessential species listings. I demand the ESA be repealed, terminated or major modifications enforced. **Response:** The Reintroduction Project has not failed. Reauthorization of the ESA is an issue to be addressed in Congress and is beyond the scope of the 5-Year Review.
59. **Comment:** How long do the agencies plan on continuing this failed program? **Response:** See C/R 47 and 58.
60. **Comment:** How long will funding continue to be allocated in support of this failed program? **Response:** See C/R 47 and 58.
61. **Comment:** There is no public mandate to recover Mexican wolves. **Response:** See C/R 47 and 58.
62. **Comment:** All of this is being done for a statute that expired many years ago (ESA) and would not be in place except for the appropriations committee not fighting for proper rules and procedures. It is hoped expired statutes would not be funded as a rule. **Response:** The ESA was due for reauthorization in 1993. Although it has not been

reauthorized, the USFWS Endangered Species program has continued to receive annual appropriations while Congress considers reauthorization. This allows conservation actions for threatened and endangered species to continue. The annual appropriations also serve to extend the ESA, as currently amended, one year at a time.

63. **Comment:** A congressional investigation should be made to investigate the USFWS and the field team. **Response:** AMOC does not intend to request a Congressional or GAO investigation of the USFWS, the IFT, or any other element of the Reintroduction Project; nor does AMOC believe an investigation is warranted or that it would be fruitful.
64. **Comment:** The Mexican wolf recovery plan says there is “no possibility for complete delisting of the Mexican wolf.” Mexican wolves will never be delisted so the statements you make to us about delisting them once 100 wolves are in the wild is a lie. **Response:** AMOC believes that no agency or employee representing the Reintroduction Project has ever said, nor could they say at this time, that achieving the Reintroduction Project’s population objective of at least 100 wolves in the BRWRA would ensure delisting the Mexican wolf. There is no such guarantee of delisting, and never has been. In addition, we note that the 1982 Mexican Wolf Recovery Plan (USFWS 1982) referenced in this Comment is 20 years out of date. The Plan itself notes that both the Plan and the quantified objective are “subject to amendment as more data on the Mexican wolf are acquired.” New recovery guidance, based on what has been learned over the past 20 years, will be determined when the Recovery Plan is revised and approved, a process that was well underway in 2004. Given the recent U.S. District Court decisions (Defenders of Wildlife et al. v. Secretary, U.S. Department of Interior; et al. 03-1348-JO; and National Wildlife Federation et al. v. Secretary, United States Department of Interior. 1:03-CV-340) to vacate the USFWS (2003) gray wolf reclassification, USFWS Region 2 put the SWDPS Recovery Team on hold in February 2005 pending a formal response to the court rulings. This means the Recovery Team cannot complete a revised Recovery Plan that covers the Reintroduction Project and the BRWRA until after this 5-Year Review has been completed. Whether or not achieving the BRWRA population objective is alone sufficient for recovery (thus delisting), or merely a step toward recovery, will not be clear until the Recovery Plan is completed and approved. See C/R 359 regarding the BRWRA population objective.

Note: On December 19, 2005, AMOC was informed that Craig Manson, Assistant Secretary of the Interior for Fish, Wildlife and Parks, had that day issued a statement on the USFWS decision regarding the U.S. District Court decisions earlier this year striking down USFWS’s reclassification of gray wolf populations. Mr. Manson’s statement was as follows:

The U.S. Fish and Wildlife Service will not appeal U.S. District Court decisions earlier this year striking down the Service’s reclassification of gray wolf populations from endangered to threatened for much of the species’ current range in the United States, although we continue to believe the reclassification was both biologically and legally sound. We are exploring options for managing wolf

populations that comply with the Courts' rulings, while recognizing, as the courts did, that the Yellowstone and Great Lakes wolf populations have reached the recovery goals necessary for delisting.

The Department of the Interior plans to issue separate, proposed rules to delist new distinct population segments of gray wolves in the northern Rocky Mountains and the Great Lakes as early as possible in 2006. Both proposed rules will have public comment periods lasting 90 days.

In the meantime, gray wolves will continue to be managed as they were prior to the 2003 reclassification. Gray wolves in Minnesota are classified as threatened, as a result of a 1978 reclassification. Gray wolves in the remaining 47 conterminous states and Mexico are endangered, except where they are listed as part of an Experimental Population for reintroduction purposes in the northern Rockies and parts of the Southwest. Citizens with concerns about wolf management should contact the Fish and Wildlife Service or their State wildlife agency for clarification of what actions are currently allowed under the management designation in effect where they live.

In light of Assistant Secretary Manson's statement (above), USFWS Region 2 also affirmed on December 19, 2005 that it would move forward with wolf recovery planning in the Southwest. Meanwhile, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made various recommendations to USFWS and for AMOC action on issues that it considers necessary to address within the context of the 5-Year Review of the Reintroduction Project and the Final Rule under which the Project operates (see the AMOC Recommendations Component).

65. **Comment:** Permit and urge WS officers to fulfill their obligations to the public in the area of predator control in spite of any objections to the contrary by USFWS. This is provided for under Title 7, U.S. Code for the Department of Agriculture, APHIS. **Response:** Title 7 of the U.S. Code Section 426 states "The Secretary of Agriculture may conduct a program of WS with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the WS authorities in effect on the day before October 28, 2000." Activities conducted by the WS Program are dependent on available funding and direction from Congress, the President, and the Secretary of Agriculture. See also C/R 48 regarding the WS mission.
66. **Comment:** Once wolves are at the 100 level, total management should be turned over to the States to be managed in conjunction with all other wildlife. **Response:** The long-term prognosis for management of wolves in AZ and NM cannot be determined until a Recovery Plan covering this area has been completed and approved (see C/R 64). If and when delisting occurs, wolf management will become a State and Tribal wildlife management responsibility, in accordance with USFWS approved State- and Tribe-specific management plans. However, if recovery proceeds to the point at which the

Mexican wolf is downlisted to “threatened” status, management could also become a State and Tribal responsibility pursuant to a special rule issued under Section 4(d) of the ESA. Meanwhile, with the Mexican wolf listed as an “endangered” species, management remains a Federal responsibility, in cooperation with the States, Tribes, and other partners as described in the Final Rule and various AMOC and other relevant documents.

67. **Comment:** Hunting should be stopped in wolf country. **Response:** Wolf recovery, including reintroduction, is compatible with hunting, as has been amply demonstrated for many years in the Great Lakes region and Northern Rockies. There is no evidence indicating hunting or hunters limit wolf reintroduction or recovery. To the contrary, hunter license fees are the foundation of wildlife management programs that manage the wild ungulates that are the primary prey base of wolves. See also C/R 17.
68. **Comment:** Any public land permittee (i.e. rancher) who kills a wolf for any reason other than to protect human life should be required to forfeit all grazing leases in perpetuity. Likewise, any hunter who kills a wolf would lose his/her right to hunt on public lands in perpetuity. **Response:** Appropriate penalties for unlawful actions are defined in law and rule. The courts are the forum in which to advocate this belief, not the 5-Year Review.
69. **Comment:** The program is a failure and should be abandoned immediately. **Response:** See C/R 47 and 58.
70. **Comment:** Discontinue the project – if the wolves survive independently, so be it; if they become extinct, so be it. **Response:** See C/R 47 and 58.
71. **Comment:** Is this program one of perpetuity or is there an established schedule and perceived milestone date? **Response:** There is no final milestone date for determining whether success has been achieved or the effort should be discontinued. See C/R 66.
72. **Comment:** The program should be stopped before a human life is lost. **Response:** Although attacks by wolves on humans do occur, they are considered extremely rare in North America (see also C/R 175, 328, 330, 332, and 415 on the well documented low probability of human injury or death from wolves). Loss of a human life for any reason would be tragic, but the Reintroduction Project will continue until the ESA, a Final Rule revision, and/or a court decision dictates otherwise, or recovery is achieved and reintroduction transitions to State and Tribal population management and maintenance.
73. **Comment:** The program should be stopped until USFWS: 1) can verify that every wolf is free of hybridization, 2) can identify with certainty how each wolf is obtaining its food supply and 3) can keep wolves from coming into contact with the public in a threatening manner. **Response:** USFWS has a legal mandate under the ESA to conserve and recover listed species, including the Mexican wolf. The other cooperating agencies in AMOC share that responsibility. The genetic pedigree of every wolf in captivity is known; all are pure Mexican wolves. It is impossible and unrealistic for anyone to verify every wolf in the wild is free of hybridization, because not all Mexican wolves in the wild have been

(or can be) captured and genetically assessed. However, aside from two wild-born litters that were discovered (and subsequently euthanized), there is no evidence to date (as determined by ongoing genetic testing of all captured wolves) to suggest hybridization with dogs or other canids is occurring in the free-ranging wolf population. It is equally unrealistic to expect the Reintroduction Project to determine how each wolf is obtaining its food supply, or to keep wolves away from people, as wolves are curious animals and will sometimes come into proximity of people. Agencies cannot prevent free-ranging wildlife from interacting with humans, or vice versa.

74. **Comment:** Considering the financial circumstances of the program and the fact that there is likely to be even less funding in the future, termination or no further expansion of the program is a valid recommendation. **Response:** After considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made a recommendation against terminating the Reintroduction Project (see the AMOC Recommendations Component). See also C/R 47 and 58.
75. **Comment:** Immediately relinquish control of the program from the USFWS to county or State government agencies. **Response:** Dissatisfaction reflected or expressed during and after the 3-Year Review strongly indicated the need to move the reintroduction effort from control of a single agency (USFWS) to oversight and management by a broader partnership. The States of AZ and NM strongly advocated in September 2002 that cooperation of at least the two State Wildlife Agencies and USFWS was essential to addressing wolf issues and to effectively representing State and local interests. The States also advocated stronger, more meaningful participation by local governments. The desired partnership State-Federal-Tribal partnership is being achieved through AMOC, although the redefined effort is little more than 2 years old. Counties within the BRWRA were aggressively solicited to participate, but only one – Greenlee County AZ – has taken full advantage of the opportunity. Two other Counties are signatory to the AMOC MOU, but are not active participants. Three other Counties initially attended meetings and participated in shaping the AMOC MOU, but have since dropped out, in one case (Catron County NM) asserting in public meetings that its participation would just lend credence to the adaptive management effort, when the only acceptable outcome for them is removal of all wolves from wild and abandonment of recovery efforts. See C/R 66.
76. **Comment:** We believe the Mexican wolf project has failed in many ways. The first major injustice came when you failed to consider the effect it would have on the Blue community, the livelihoods of livestock producers, the lifestyles of everyone who lives here from the ranchers to the retired people who have a pet dog, cat, or chicken, the hunter who have dogs, mules, and horses they use for their business, the school children who have had to learn to be watchful on the playground and the teacher who is responsible for their well-being. We think it is time you gave a long hard look at the program. The funds spent, the failure incurred, and the many hungry children and needy elderly people we could be helping with that 10 million. Where are your priorities and values? **Response:** The USA is a patchwork quilt of public and private priorities and values; rarely can one be set aside entirely in favor of another. Finding a balance between

opposing values is the essence of governing a democracy, and managing natural and other resources. Wolf reintroduction, public lands, private property rights, human hunger, and rural lifestyles are not either/or values. They must be weighed against each other, and compromises must be made that enable stakeholders favoring each to have meaningful returns on their societal investment. Give and take is vitally important. In any event, the potential effects of wolf reintroduction on communities within the BRWRA were considered through NEPA process before reintroduction was approved in 1998. AMOC remains committed to such values. However, that does not mean decisions will never be made that favor other values. See also C/R 47 and 58.

77. **Comment:** Stop all Federal funding of the Mexican wolf program with all funding being reallocated for watershed improvements in the Gila wilderness and surrounding areas. **Response:** The Mexican Wolf Recovery Program and the Blue Range Reintroduction Project are conducted under auspices of the ESA. Most of the funding for the Mexican Wolf Recovery Program is appropriated by Congress to the USFWS. Funding for watershed improvements in the Gila Wilderness Area would be allocated to USFS, therefore it is not possible to directly divert funds. Furthermore, the Gila National Forest has been using fire as a management tool in the Gila Wilderness. These management activities are expected to result in long term benefits to watershed condition and ecosystem health. Other than fire, direct habitat manipulations are not allowed in Wilderness Areas.
78. **Comment:** We oppose further funding or exploring this program. There are so many factors that have not proven successful and too much has been spent already. There are many disaster victims who we consider more important than the Mexican wolf reintroduction. **Response:** See C/R 47 and 58.
79. **Comment:** My suggestion for the Mexican wolf program is to take six sections of the National Forest southeast of Reserve NM and fence it 9 feet high with chain link and lay 2 foot wire on the inside ground so wolves can't dig out and put the wolves in this area which should be adequate space for them to roam and breed. Question #1 is food source. One that comes to mind besides road kill would be a contract with the dairies by Anthony NM for old cows that are inadequate for further production to be used as wolf food. If you wanted this to pay its own way, you could put a visitor center and lodging place in the center of the area so people could visit and see them and hear them howl. I think it would bring in a lot of tourists to Catron County which we all know needs the revenue. **Response:** See C/R 14 regarding why a fenced enclosure would not contribute toward recovery.
80. **Comment:** USFWS inflexibility in changing the MOU is what is keeping most of the other affected counties from signing it. **Response:** All affected Counties participating in developing the MOU, whether or not they ultimately signed the MOU, contributed to crafting the final language that was endorsed by all signatories. Every County issue was addressed through revisions that were accepted by all participants, as evidenced by discussion at the "negotiating table." Unfortunately, most of the affected Counties have

opted not to participate actively, even in non-public meetings, thus preventing AMOC from determining what “changes” they might have in mind now.

81. **Comment:** Sierra County has not signed the MOU as reported on Page 7 (Administrative). **Response:** AMOC has a signed copy of the October 23, 2003 final (approval) draft of the MOU on file.
82. **Comment:** Page 4, paragraph 3 (Technical): The reclassification of wolves was overturned thus the wolf is not the DPS as a listed entity. Note also that the 1978 FR Gray Wolf Reclassification Rule that is now current states that recovery will move forward according to biological subspecies. **Response:** The final 5-Year Review will appropriately reference the listed status of the wolf and the SWDPS as they stand when the Review is completed. See C/R 64 regarding the USFWS decision on appeal of U.S. District Court decisions regarding reclassification.
83. **Comment:** Page 34, Paragraph 2 (Technical): The reference to the “recent reclassification rule for gray wolves” should be removed due to recent litigation. Furthermore it was not part of the Paquet Report nor the Philips et al. article cited and is not germane to the reasons why the boundary rule is inappropriate. **Response:** The final 5-Year Review will appropriately reference the listed status of the wolf and the SWDPS as they stand when the Review is completed. See C/R 64 regarding the USFWS decision on appeal of U.S. District Court decisions regarding reclassification.
84. **Comment:** Page 42, Paragraph 2 (Technical): Since there is no longer a SWDPS, wolves should be allowed to roam free regardless of political or regulatory designations so long as they are not creating a tangible problem. **Response:** The final 5-Year Review will appropriately reference the listed status of the wolf and the SWDPS as they stand when the Review is completed. See C/R 52 regarding management “zones,” and see C/R 64 regarding the USFWS decision on appeal of U.S. District Court decisions regarding reclassification.
85. **Comment:** Page 85, Item 8 (Technical): The SWDPS no longer exists and progress on developing a revised plan has been stopped by the USFWS Regional Director. **Response:** The final 5-Year Review will appropriately reference the listed status of the wolf and the SWDPS as they stand when the Review is completed. See C/R 64 regarding the USFWS decision on appeal of U.S. District Court decisions regarding reclassification.
86. **Comment:** The nullification of the 2003 gray wolf listing rule does not obviate the USFWS mandate under the ESA to continue to recover the Mexican wolf. Rather, the mandate reverts to the 1978 listing under which Mexican wolf recovery was conceived and implemented. USFWS has no legitimate excuse or reason to continue to delay actions necessary for Mexican wolf recovery. **Response:** The final 5-Year Review will appropriately reference the listed status of the wolf and the SWDPS as they stand when the Review is completed. See C/R 64 regarding the USFWS decision on appeal of U.S. District Court decisions regarding reclassification. As for delays in recovery actions,

- USFWS and cooperating agencies have implemented or are implementing the majority of the recovery actions in the 1982 Mexican Wolf Recovery Plan Implementation Schedule (see Page 59 of the Recovery Plan, USFWS 1982) (e.g. 111-1, 111-2, 112-1, 112-21, 112-22, 12, 131, 132, 133, 211, 212-1, 212-2, 221-1 (or as per SOP 13), 221-2, 221-3, 222-1, 222-21, 222-22, 222-23, 222-3, 23, 241, 242, 243, 244, 245, 246, 247, 261-1, 261-2, 261-3, 262, 311-3, 311-2, 311-3, 312-1, 312-2, 313, 314, 315, 316, 321, 322-324, 33, 34, 5). See also C/R 64, 82-85.
87. **Comment:** Due to the recent litigation that vacated the Gray Wolf Final Rule, the status of the SWDPS Recovery Team needs to be discussed and clarified in the 5-Year Review. **Response:** The discussion requested in this Comment is outside the scope of the 5-Year Review. See C/R 64 regarding the USFWS decision on appeal of U.S. District Court decisions regarding reclassification. See also C/R 82-86 and the Administrative Component of the 5-Year Review.
88. **Comment:** Given the recent court decision on the DPS, the USFWS should reconsider the SWDPS to more properly coincide with the historic range of the Mexican wolf. This would limit the primary reintroduction effort to Mexico and a narrow area along the Mexican border in Texas, NM, and AZ. **Response:** See C/R 64 regarding the USFWS decision on appeal of U.S. District Court decisions regarding reclassification and reinitiating wolf recovery planning in the Southwest. See also C/R 82-87. Although the limited area referenced in this Comment once comprised the northerly portion of known historical range of the Mexican wolf (e.g. when the FEIS was completed; see also Garcia-Moreno et al. 1996), recent genetic research (Leonard et al. 2005) strongly suggests a wider mandate for reintroduction of the Mexican wolf may be justified due to evidence of extensive historic gene flow between Mexican wolves and northern wolves across the previously recognized boundaries of the various subspecies.
89. **Comment:** Currently there is a study in effect to increase the wolf range to include the entire States of NM, AZ, and parts of Utah, Colorado, Oklahoma, Texas, and Mexico. This activity needs to be terminated. Agencies have failed to maintain control and implement goals within the current experimental area. Attempts to broaden the areas of introduction will further devastate the local economies and the welfare of its citizens. **Response:** This Comment is in reference to the SWDPS Recovery Team and apparently an imminent publication by Carroll et al. (*in press*). Neither is within the scope of the 5-Year Review. Moreover, AMOC has no authority over, or influence on, independent scientific research. See also C/R 64 and 82-88.
90. **Comment:** Other areas including but not limited to the Sky Islands ecosystem, Southern Rockies in southern Colorado and northern NM and the Grand Canyon ecosystem need to be evaluated for reintroduction of Mexican wolves. **Response:** This Comment is outside the scope of the 5-Year Review. See also C/R 88-89.
91. **Comment:** Page 14 Administrative Component. WSMR should still be considered. All models and assessments predicting failures if wolves are released there are based on the

discredited notion of confining wolves to a specific area. WSMR is supposed to be used if the BRWRA ends up insufficient to get to 100 wolves. There is now abundant evidence that under the current management that goal may not be reached. WSMR should be opened up for releases and should be authorized in this review. Failure to do so along with failure to change management to allow the BRWRA to reach 100 wolves may constitute a NEPA violation. **Response:** Five independent evaluations (Bednarz 1989, USFWS 1996 [the FEIS], Green-Hammond 1994, Paquet et al. 2001, and Carroll et al. *in press*) have all concluded that WSMR is an inferior area for Mexican wolves because of its small size, isolation from other suitable habitat, and poor surrounding wolf habitat which would hinder dispersal to and from other areas. After considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made a recommendation to eliminate WSMR as a Mexican wolf recovery area or reintroduction zone (see the AMOC Recommendations Component). See also C/R 95, 100, 103, and 117 regarding rulemaking and NEPA.

92. **Comment:** The SWDPS exceeds the historic range of the Mexican wolf and should be modified to reflect that the range does not extend beyond an 80 mile distance north of the Mexican border in AZ and NM. **Response:** See C/R 64 regarding status of the SWDPS and C/R 82 and 89 regarding the evolving understanding of Mexican wolf historical distribution.
93. **Comment:** We question the appropriateness and scientific validity of imposing secondary boundaries on this small population of endangered wolves and we see no reason why highly endangered Mexican wolves should receive lower standards of protection and tolerance than more abundant wolves elsewhere in the USA. **Response:** The Mexican wolf is protected under ESA consistent with the law itself and the Final Rule under which reintroduction is occurring. The Final Rule, issued under Section 10(j) of the ESA, designates the AZ-NM population as “experimental nonessential,” meaning that wolves released to the wild within the 10(j) boundary are not essential to recovery. That is, even if all wild Mexican wolves in the BRWRA died, elimination would not occur because there are now sufficient Mexican wolves in captivity. Secondary boundaries, such as were established in the Final Rule, are implemented when they will help achieve the desired results for reintroduction, and thus contribute toward recovery. The need for secondary boundaries seemed clear in the FEIS. The 5-Year Review was intended, in part, to revisit that need in terms of the on-the-ground experience that has been gained since 1998 through reintroduction and management. Consequently, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made a recommendation regarding possible secondary boundary adjustments to facilitate initial wolf releases and translocations and to enable broader dispersal throughout the MWEPA (see the AMOC Recommendations Component).

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94. **Comment:** The Mexican wolf program does not have a clearly defined goal stating exactly what the criteria and numbers will be for delisting the Mexican wolf as an

endangered species. Clearly defined, attainable, and realistic goals must be included as part of the 5-Year Review. **Response:** The 5-Year Review is not the appropriate legal tool to define recovery downlisting and delisting criteria for the Mexican wolf program. That is a Recovery Team and Recovery Plan function. See C/R 64 and 93.

95. **Comment:** We recommend USFWS move forward with the draft rule change language by sharing it with the public. **Response:** After considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible changes in the Final Rule or creation of a new Final Rule (see the AMOC Recommendations Component). The USFWS will determine whether and how to proceed with AMOC's recommendations. If and when proposed rule change language is drafted, it will be released to the public pursuant to the ESA, APA, and NEPA to ensure appropriate opportunities for participation and input by the public. See also C/R 64 and 93.
96. **Comment:** A unified, consensus recommendation from the SWDPS Recovery Team in order to change the Final Rule is unrealistic. The management of the Mexican wolf is the responsibility of the Secretary of the Interior (entrusted to USFWS and the Recovery Team works at the pleasure of the Secretary. USFWS has an affirmative responsibility and a mandate under the ESA to recover endangered species and that responsibility cannot be trusted to a non-government entity like the Recovery Team. A rule change should be advanced independently of the Recovery Team process. **Response:** As noted in C/R 64, the SWDPS Recovery Team is inactive at this time. Any questions or concerns regarding the Team and its activities or responsibilities are outside the scope of this 5-Year Review and should be posed to the USFWS Southwest Regional Director. See C/R 93, 95, and 99 regarding AMOC's recommendations for changes in the Final Rule.
97. **Comment:** We note this is the third technical review of this project since 1999 – all of which have recommended that the existing rule be revised. USFWS has delayed this important decision for 5.5 years. Further delay cannot be justified. **Response:** There have been three technical reviews of the Mexican wolf program. The first review was held in January 1999, after the majority of the wolves released the first year in 1998 were illegally shot and killed. That review indicated the need to revise the Final Rule to allow for release of wolves in more isolated, remote, areas to reduce the likelihood of illegal shootings and wolf/livestock conflict. Please see the Administrative Component of the 5-Year Review for explanation of why a Final Rule amendment was not completed subsequent to the 1998 review. The second technical review, commonly referred to as the Paquet report, was performed in 2001 as part of the 3-Year Review. The known factors contributing to failure to complete and implement the 3-Year Review are discussed in C/R 15 and 45. The third review is this 5-Year Review. Thus, all three reviews have concluded that the Final Rule should be revised to enhance progress toward the reintroduction population objective and recovery. See C/R 93 and 96. See also Parsons and Nicholopoulos 1998.

98. **Comment:** The short-comings of the program stem directly from politically motivated project components incorporated into the initial project design and Final Rule. We strongly recommend a science-based revision of the current rule and science-based implementation of the project from this point on. **Response:** The Mexican Wolf Blue Range Reintroduction Project was authorized for and is carried out on lands that are largely public, and subject to multiple-use. Biological science is not the only driver for recovery efforts, and determining how much of a landscape can or should be dedicated to recovery efforts is not a simple or an easy matter (e.g. see Carroll et al. *in press*, Reading et al. 1997, and Vucetich et al. *in review*). Although all recovery and reintroduction efforts should, if not must, reflect the best available science, other factors, such as valualational and organizational considerations (i.e. social tolerance and human dimensions), legitimately come into play; in fact, they might be crucial to determining success or lack thereof (e.g. Reading et al. 1997, Breitenmoser et al. 2001). Thus, the 5-Year Review and its recommendations (see the AMOC Recommendations Component) are consistent with science, but were also shaped by consideration of other relevant information, including social values and concerns as well as biological needs and constraints.
99. **Comment:** Absent continued releases of wolves into the BRWRA in perpetuity, it is difficult to see how the population can grow and sustain itself under the restraints of the boundary rule. **Response:** After careful consideration of public comment on the 5-Year Review and its own evaluations of wolf management activities and problems in the BRWRA, AMOC has reached the same conclusion. Accordingly, AMOC has made recommendations regarding possible changes in the Final Rule or creation of a new Final Rule to adjust at least the secondary boundaries and to enable dispersal throughout the MWEPA (see the AMOC Recommendations Component). See also C/R 93 and 95-98.
100. **Comment:** The existing FEIS already analyzed an alternative without boundaries. Any additional NEPA required for a revised rule should not require multiple years to complete. **Response:** The FEIS did analyze an alternative without boundaries; Alternatives A, B, and C included reintroduction of wolves into (only) the Primary Recovery Zone of the BRWRA. The alternatives differed in their approach to dispersal, with Alternative A allowing wolves to disperse (or be translocated) into the Secondary Recovery Zone only, Alternative B allowing no dispersal outside the primary recovery zone, and Alternative C designating reintroduced wolves as endangered and allowing wolves to disperse with no boundary (Alternative D was the No Action alternative). However, because the FEIS analyzed the presence of wolves throughout the entire BRWRA, the 5-Year Review states that revision of the Final Rule would not require preparation of a supplemental EIS if the only revision were to allow direct releases into the Secondary Recovery Zone in addition to the Primary Recovery Zone (see B.5 in the Administrative Component of the 5-Year Review). However, the 5-Year Review goes on to explain that wolf dispersal beyond the BRWRA has become a significant management and recovery issue, and it recommends revision of the nonessential population boundary rule to address this problem (see Management Implications, Technical Component). The effects of allowing wolves to disperse to SCAR, FAIR, the Sitgreaves National Forest,

and the San Mateo Mountains were analyzed under Alternative C within the FEIS. However, these effects were analyzed with Mexican wolves classified as endangered rather than nonessential experimental. Further, the current revision may or may not include a greater area than described under Alternative C, therefore a supplemental EIS would likely be required during the process of rule revision. A rule revision of that magnitude (which could include additional possible revisions beyond those mentioned here) would require significant technical, social, and economic review and considerable public scoping; the process could, therefore, realistically take more than a year to complete.

101. **Comment:** Modify the Final Rule to allow direct releases of wolves into the Gila National Forest. **Response:** See C/R 93 and 95-99.

102. **Comment:** Translocation of free-ranging wolves for management purposes was not presented to the public and affected interests at the time the proposed rule was promulgated nor was it given proper evaluation in the EIS. The decision to take this management direction was the result of a liberal and deceptive interpretation of the rule. **Response:** Translocation of Mexican wolves as a management action was done with full public participation and disclosure. The FEIS and ROD for reintroduction of Mexican wolves analyzed in detail the presence of wolves and the associated effects for the entire BRWRA, which includes both the primary and secondary zones. Many key changes or clarifications regarding the proposed rule were incorporated into the Final Rule, based on public and primary cooperator comments received on, or related to, the proposed rule. One of those key changes was that the definition of “secondary recovery zone” was modified to clarify that, following initial release of wolves in the primary recovery zone; wolves may be translocated and released into the secondary recovery zone for authorized management purposes. Following publication of the Final Rule on January 12, 1998, additional public comment was accepted for a 14-day period. Because of the high public interest regarding translocation of wolves into NM, especially those that previously depredated livestock, on January 14, 2000, USFWS announced its intent to prepare an Environmental Assessment (EA) entitled “The Environmental Assessment for the Translocation of Mexican Wolves Throughout the BRWRA in Arizona and New Mexico.” Translocation of wolves is a management action discussed in general terms in the FEIS and associated ROD. The intent of the EA was to provide a specific connection between the general terms used in the FEIS and ROD to the specific language in the Final Rule that authorizes translocations. A scoping letter was sent to more than 1000 interested members of the public. Additionally, news releases requesting input on wolf translocation were distributed, and agency personnel contacted local ranchers, land owners, outfitters/guides, and special interest groups. Scoping comments were accepted through February 4, 2000. Many of the issues raised in more than 700 responses received through the public scoping process were outside the scope of the analysis, or no new information or circumstances were presented over what had previously been addressed in the FEIS. However, three issues (native prey base for wolves, livestock depredation, impacts on local government policies and plans) required further analysis and disclosure through an EA. The EA, which was tiered to the FEIS, was prepared and distributed on

February 10, 2000, to more than 700 individuals and organizations. A 30-day public comment period extended through March 15, 2000. It included two public hearings, one each in Catron (Reserve) and Grant (Silver City) counties NM. More than 9000 public comments were received and carefully considered. On March 17, 2000, a Finding of No Significant Impact (FONSI) was signed, in regard to translocating wolves into the secondary zone of the BRWRA. The Reintroduction Project's current approach to wolf translocation is entirely consistent with that administrative record, although it is still constrained (geographically) by the current Final Rule.

103. **Comment:** Before modifying the rule can be considered or signed a Decision Notice by the Regional Director of the USFWS is required to conduct the proper NEPA process, analysis and full disclosure of the potential impacts. The USFWS should mitigate the significant adverse effects of the current wolf introduction program before these modifications are considered. **Response:** After considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible changes in the Final Rule or creation of a new Final Rule (see the AMOC Recommendations Component). If USFWS determines the Final Rule should be changed in response to recommendations in the final 5-Year Review and further AMOC actions, or for some other reason, it will develop a formal proposal to do so, and subject that proposal to appropriate rulemaking procedures, including applicable NEPA review.
104. **Comment:** Expanding the recovery area and increasing the number of wolves beyond 100 is unacceptable. **Response:** See C/R 93, 95-99, 101, and 103 regarding AMOC recommendations for changes in the Final Rule.
105. **Comment:** I felt a promise was given to those opposing reintroduction that the area the wolves were allowed would not be expanded. That promise should not be broken. The only way to expand the range would be to obtain consensus approval of those who received the promise. **Response:** AMOC finds no evidence of a promise by any of the agencies cooperating in the Reintroduction Project that the area within which wolves are allowed would never be expanded (or diminished, for that matter). To the contrary, the commitment to reassess all elements of the Reintroduction Project, including current boundaries, in 3-Year and 5-Year Reviews is evident in the administrative record and the FEIS. See also C/R 93 and 95-103 regarding AMOC recommendations for changes in the Final Rule.
106. **Comment:** Change the current rule that requires killing difficult to trap wolves. This is critically endangering genetic diversity of the wolves and having a significant negative impact on their numbers. **Response:** The Final Rule stipulates that, in accordance with the ESA, wolves released to the wild are considered expendable to the Recovery Program. The Final Rule also states that a person may take (kill) a Mexican wolf in self-defense or in the defense of other humans. The Final Rule is not structured, nor is the Reintroduction Project empowered or administered, to force changes in public or private grazing practices to accommodate presence of wolves. Changing the status of wolves in

the BRWRA from “nonessential experimental” to fully endangered would restrict management flexibility. None of the AMOC Lead Agencies support such an action. As for the assertion that the current rule “requires” killing difficult to trap wolves, it does not. The Final Rule and the Reintroduction Project’s SOPs provide flexibility that enables live capture and permanent removal of “problem” wolves. AMOC has determined that active management (including killing and/or other permanent removal of problem wolves) has not endangered genetic diversity of the wild population, nor has it had a significant long-term (lasting) impact on the number of wolves in the wild.

107. **Comment:** Part B, #5 (Administrative): The review does not provide any evidence or rationale for not proceeding with a rule change. **Response:** Using information from the 5-Year Review and comments submitted on the draft review, AMOC has assessed whether the project is operating sufficiently effectively to drive progress toward the Reintroduction Project’s population objective (at least 100 wolves in the BRWRA) under its current regulatory structure. After considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible changes in the Final Rule or creation of a new Final Rule (see the AMOC Recommendations Component). USFWS will determine whether and how to proceed with AMOC’s recommendations regarding the Final Rule. If and when proposed rule change language is drafted, it will be released to the public pursuant to the ESA, APA, and NEPA to ensure appropriate opportunities for participation and input by the public. See also C/R 64 and 93-103 regarding possible changes in the Final Rule.
108. **Comment:** Wolves should not be allowed to expand outside the BRWRA; all wolves outside the Recovery Area should be removed. **Response:** See C/R 64 and 93-103. After considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible changes in the Final Rule or creation of a new Final Rule (see the AMOC Recommendations Component). AMOC has determined that the Final Rule should be modified to address several issues, including providing for population dispersal outside the current boundaries of the BRWRA (i.e. Apache and Gila National Forests in AZ and NM). Allowing wolves to more freely disperse across the landscape into suitable habitat throughout the MWEPA would speed progress toward the reintroduction goal. Expansion of the MWEPA 10(j) area to the southern borders of NM and AZ could also ensure management flexibility if wolves were to come northward from Mexico, where reintroduction is now underway. However, expansion beyond the current MWEPA would also entail various new costs, both within the Reintroduction Project and to various stakeholders. AMOC will need to address these issues fully during any informal or formal rulemaking processes subsequent to USFWS consideration of the AMOC recommendations.
109. **Comment:** Because *Defenders; et al. v. Secretary, U.S. Department of Interior et al.* 03-1348-JO enjoined and vacated the proposed reclassification rule, there is ongoing uncertainty over the fate of the SWDPS recovery planning process. Therefore, it is imperative the USFWS act now to revise the BRWRA dispersal rule rather than waiting for revisions of national management policy for the wolf. **Response:** H. Dale Hall, the

previous USFWS Region 2 Director, stated in Spring 2005 that in the absence of a Recovery Team, he (and presumably his successor) would look to AMOC and the 5-Year Review for recommendations on any changes to the Final Rule. Accordingly, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible changes in the Final Rule or creation of a new Final Rule (see the AMOC Recommendations Component). USFWS will determine whether and how to proceed with AMOC's recommendations. If and when proposed rule change language is drafted, it will be released to the public pursuant to the ESA, APA, and NEPA to ensure appropriate opportunities for participation and input by the public. See also C/R 64, 93, 103, and 107 regarding Final Rule changes.

110. **Comment:** We recommend that expansion of the Primary Recovery Area be considered in light of the biological needs of the wolf population. This issue must be analyzed in more depth and should be undertaken by the newly modified Recovery Team. **Response:** See C/R 85, 88, 93, 103, and 107-109.
111. **Comment:** We recommend adjustments to the regulations regarding wolves that stray from the recovery area to allow more flexibility for dispersing wolves. This will be critical to the recovery of the Mexican wolf. If wolves are successfully hunting, breeding, and avoiding humans, they should be allowed to remain outside the recovery area. **Response:** Greater freedom to disperse should lessen management-induced disruption of social bonds to packs and promote territory establishment and stability within and between packs, which in turn could lessen the number of human/wolf conflicts. Allowing wolves to freely disperse across the landscape into suitable habitat, versus attempting to artificially confine their movements to a recovery area with regulatory (versus biological) boundaries, could speed progress toward Reintroduction Project's population goal. As noted earlier, expansion of the current MWEPA 10(j) area would require amendment of the Final Rule. Thus, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible changes in the Final Rule or creation of a new Final Rule (see the AMOC Recommendations Component). The USFWS will determine whether and how to proceed with AMOC's recommendations. If and when proposed rule change language is drafted, it will be released to the public pursuant to the ESA, APA, and NEPA to ensure appropriate opportunities for participation and input by the public. See also C/R 64, 85, 88, 93, and 107-109.
112. **Comment:** Recommendations for boundary changes and direct releases into NM are irrelevant to the report without the final Recovery Team's recommendation. These recommendations should not have been included in the review questions. **Response:** See C/R 109 regarding the SWDPS Recovery Team's role vs. AMOC's role in recommending boundary changes to the USFWS Region 2 Director.
113. **Comment:** Delay in modifying the no-dispersal rule will impose increasing burdens on project staff by involving them in counter productive management actions toward non-

depredating dispersing wolves; the wolves that would normally form the most valuable component of population recovery. **Response:** See C/R 107-109, and 111. Allowing wolves not causing a management problem outside the current BRWRA to remain there would allow the IFT to concentrate on other management issues (e.g. outreach, nuisance and problem animals, tracking and monitoring, research and investigations). However, the geographic scope of participating agency responsibilities would have to be expanded to address management issues that develop in the outlying areas, and this factor also must be considered in assessing the merits of secondary boundary expansion. In any event, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible changes in the Final Rule or creation of a new Final Rule (see the AMOC Recommendations Component).

114. **Comment:** We believe the current level of take of wolves authorized and accomplished through the existing rule is unsustainable and violates the provision of Section 10(j)(2)(A) of the ESA requiring that releases of listed species under 10(j) provisions must “further the conservation” of the species. If other recommendations (change rule to allow releases into NM; allow dispersal of wolves outside the BRWRA, decreased removals in response to livestock depredation, co-equal status of wolves and livestock, etc.) cannot be accomplished under a revised nonessential experimental population classification, the rule should be rescinded and Mexican wolves recognized as either “essential experimental” or fully endangered. **Response:** The Final Rule provides for limited allowable legal take of wolves in the wild within the MWEPA. It states that no person, agency, or organization may “take” any wolf in the wild within the MWEPA, except as provided in the rule. Stripping the nonessential experimental status from wolves in the BRWRA would, AMOC believes, severely restrict management options and impede progress toward establishing a viable, self-sustaining population of free-ranging wolves. None of the AMOC Lead Agencies support such an action. See also C/R 106 regarding lack of AMOC agency support for rescinding nonessential, experimental population designation.
115. **Comment:** The nonessential, experimental classification is wrong. They are highly endangered wildlife and deserve the full protection of the ESA. **Response:** AMOC Lead Agencies and Cooperators unanimously believe Mexican wolf reintroduction in AZ and NM is best pursued via nonessential experimental population status (i.e. 10[j] rule), as has been conferred via the existing Final Rule for this Project. Nonessential experimental population rules provide for management flexibility essential to a reintroduction effort such as this one. See also C/R106 and 114, regarding lack of AMOC agency support for rescinding the nonessential experimental population designation.
116. **Comment:** Reintroduce wolves in the sky islands ecosystem and the Grand Canyon ecosystem to increase the population and to restore vital ecological processes. **Response:** See C/R 85-88, 103, and 106-109 regarding AMOC recommendations for possible boundary changes.

117. **Comment:** Expanding the program's recovery zones will have a deleterious effect on livestock producers and may have serious repercussions for human safety. Any expansion should consider the economic impacts and the threats to livestock as well as human safety. **Response:** Expansion of the current MWEPA 10(j) area and/or the current BRWRA boundaries would require amendment of the Final Rule and would include an analysis of economic impacts, in compliance with NEPA. See also C/R 95, 100, and 103 regarding rulemaking and NEPA.
118. **Comment:** Inclusion of WSMR as part of a future recovery area targeted for wolf releases is short sighted and may have a negative impact on the future mission of WSMR and could potentially affect the Base Realignment and Closure process negatively, thus losing billions of dollars that WSMR provides to NM's economy. **Response:** See C/R 91.
119. **Comment:** The draft 5-Year Review does not reveal the reasons why the boundaries have not been lifted. Where is the story that conveys this information? **Response:** The 5-Year Review discusses in detail why a rule change to address the boundary issues has not yet been accomplished. Please refer to sections 2.4 and 2.5 of the Administrative Component of the 5-Year Review. See also C/R 15 and 45.
120. **Comment:** USFWS should adopt the 5-Year Review's recommendations for improving the Mexican wolf program by modifying the current nonessential experimental population rule to allow wolves to colonize suitable habitats throughout the SWDPS. **Response:** See C/R 107-109.
121. **Comment:** The experimental population rule should be revised to allow initial releases of wolves anywhere in the BRWRA, FAIR, and any other Native American or private lands within Mexican wolf historic range where owners have entered into agreements to support wolf recovery. **Response:** WMAT is one of six lead agencies that participate in AMOC. WMAT also has an MOU with the USFWS that allows for management of Mexican wolves on FAIR. Given the unique government to government relationship the Federal government has with Indian tribes, WMAT has certain sovereign rights, and has final jurisdiction on the number and what kind of wolf releases will be allowed on FAIR. In regard to initial releases of wolves on private lands, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible changes in the Final Rule or creation of a new Final Rule (see the AMOC Recommendations Component). The processes by which those issues are considered will enable AMOC to address the possibility of initial releases of wolves on private lands.
122. **Comment:** Pages 8 – 14, 4 and 5, Administrative: These 2 areas depend too heavily on the results of the SWDPS Recovery Team. This team is trying to encompass a larger area than the BRWRA. The BRWRA had recommendations for change that needs to be addressed now for the benefit of the daily program that is already on the ground. **Response:** See C/R 103 and 107-109.

123. **Comment:** The 1996 FEIS only considered the effects of 100 wolves in the wild. The implication was that this was the target number when all parties knew that there was no way this would be considered a sustainable breeding population. By adopting the 10(j) rule, USFWS sought to eliminate the need to evaluate the future known impacts of having 1,500 or more wolves in their historic range. **Response:** The adequacy of the FEIS has been reaffirmed in various court decisions since it was released.
124. **Comment:** According to USFWS own numbers, there are at least 20 fewer known wolves in the wild than predicted and only because of a policy change allowing multiple re-releases of problem animals. **Response:** Wolf counts in the BRWRA are minimum population counts that represent the number of collared and uncollared wolves observed in the wild. The actual population is probably higher because some individual wolves and packs are not detected, including dispersing wolves without collars. At the end of 2003, the BRWRA minimum population estimate of 50-60 was similar to the FEIS prediction for the sixth year of the Reintroduction Project (55). The final end-of-year minimum population count for 2005 will not be made until December 31, 2005.
125. **Comment:** From 2004 to mid 2005 more wolves have been released and removed due to livestock depredation and other nuisance behaviors than at any other time in the programs history. Hopefully this data will not be ignored simply because it is more beneficial for the program if the 5-Year Review is read in a vacuum. However, as of the end of June, 2005 the collared population consisted of 22 wolves, in nine packs, and five lone wolves. **Response:** Some Mexican wolves will likely be removed for livestock depredations every year. The 5-Year Review covers the period 1998-2003. However, for 1998-2005, the highest rate of collared wolves being removed for livestock depredations occurred in 1999, and the highest rate of collared wolves being removed for nuisance situations occurred in 2000. The 5-Year Review suggests that as fewer wolves are released from captivity to the wild, there may be fewer removals for nuisance issues (current patterns of nuisance removal are consistent with this speculation). Most nuisance issues occur with wolves that are released directly from captivity. See also C/R 124 regarding minimum population counts.
126. **Comment:** According to predictions in the EIS for preferred alternative A, releases of Mexican wolves should have ended in 2002, four years after the program began. They have not ended, but have increased using problem animals. This is indicative that the population cannot hold its own, on its own, in the BRWRA. **Response:** The FEIS predicted it would take five years of initial releases (beginning in 1997), to achieve the reintroduction goal of 100 or more wolves in the wild by 2005. This timeline was largely based on untested assumptions, since there were no Mexican wolves in the wild from which to learn. It serves as a reference point for evaluating progress toward population objectives, but the fact that actual results vary from the predictions is not an indication that the BRWRA population “cannot hold its own, on its own.”
127. **Comment:** Page 41, Paragraph 3 (Technical): The recommendation to create a large experience center is poorly described and most likely unnecessary. If that means placing

wolves somewhere where once again there will be a boundary on their roaming it is inappropriate for all the reasons discussed in the 3 year review and in paragraph 2 of Page 41. The process of removing wolves from the wild is physically and socially dangerous to the wolves. 12 wolves have died as a direct result of capture (either in captivity or during capture): 3 Pipestem pups, 2 other wild-conceived pups infected with Parvovirus by the Pipestem pups, 5 Francisco pups, one wolf run down by aircraft, and F511. Additionally many previously cohesive packs have split upon re-release and later dying or being removed. These incidental effects of an attempt to translocate wolves should be taken into account in both the notion of setting up an experience center and in the notion that translocations are a net benefit to wolves. **Response:** An experience center concept was offered in the draft 5-Year Review as food for thought. Upon further reflection, AMOC has determined that it will be removed from the final 5-Year Review for lack of merit.

128. **Comment:** Trapping for what have been routine activities such as wellness checks or collar refreshment should be minimized or eliminated. The program is attempting to develop a self sustaining wild wolf population – leave these animals alone as much as possible and let them be wild. **Response:** Mexican wolves are not captured in the wild for “wellness” checks. They are captured in the wild to place or replace radio-collars, or for other management purposes. Radio collars allow the IFT to accurately document home ranges, minimum population estimates, dispersals, survival, reproduction, pack formation and a variety of other biological factors. Radio-collars also assist in management (e.g. responses to depredation incidents) and help the IFT identify appropriate individuals for translocation or permanent removal. Without radio-collars, much of the information in the 5-Year Review would not exist, thus constraining efforts to improve management practices and progress toward population objectives. Thus, IFT will continue to trap and collar wolves as necessary for management and monitoring purposes.
129. **Comment:** Allowing a pair of wolves to be released with pups to force them to stay in an area that instinct tells them to leave is one of the biggest mistakes the agency keeps making. It is stressful to the parents, the pups seldom have good survival rates and it is contributing to livestock depredation in an effort to feed young. Allowing natural adaptation and development of territory is preferable prior to allowing breeding. **Response:** Release sites are chosen based on criteria that represent the biological needs of the wolves, but which also consider the potential for conflict with other factors (e.g. human activities). Wolves are more successful at establishing a territory and raising pups when they are released with pups in an area of good prey density. In some situations, wolves have quickly adapted to the wild and have killed native prey. AMOC has limited information on pup survival because pups are generally too small to collar. In addition, AMOC has no information indicating pups influence adults to depredate on livestock, or that a release or translocation is more or less stressful on the parents depending on the timing of release. Further, to maximize chances for successful transition to the wild, supplemental feeding is employed until the wolves are known to kill prey, or the wolves leave the area following a release or translocation (SOP 6.0: Wolf Translocations).

130. **Comment:** The wolves are being micro-managed and overly handled. **Response:** Intensive management of Mexican wolves is an inevitable consequence of the reintroduction process on the BRWRA, and is unlikely to abate in the near term.
131. **Comment:** The report fails to acknowledge the risks of death, injury, and pack disruption due to translocations. Sound scientific evidence strongly contradicts the idea that translocated wolves are more likely to reproduce/be more successful. **Response:** AMOC is unaware of the sound scientific evidence that supposedly contradicts this finding. Please provide appropriate references if you have them. Removal events have rarely resulted in death or injury to animals, although some level of injury or loss is inevitable. Further, in the 5-Year Review draft analysis, each wolf was considered a separate animal that could succeed, fail, or end up missing. Ultimately, young wolves generally must disperse from the pack and find a mate to be successful. Whether translocation events cause higher dispersal rates (e.g. pack disruption) relative to natural processes is unknown. AMOC considered translocation events and removal events separately. Removal, death, or disappearance of a wolf was the end of the previous translocation/initial release that put that animal into the wild. If the wolf had produced pups in the wild (e.g. contributed to recovery) prior to its removal or death, then the preceding translocation or initial release was considered successful. Wolves that were fate unknown or alive at the end of the study period, but which had not bred in the wild were excluded from analysis. Through these methods, the data presented in the 5-Year Review indicate translocated wolves are more successful per wolf relative to initial release of captive wolves. As suggested in the 5-Year Review, captive wolves remain a viable option to start a population. However, wolves with previous wild experience (e.g. translocations) generally have more success, so the transition to reliance on translocations and natural (wild) population growth should occur as soon as feasible.
132. **Comment:** No more releases should be done until better population estimate techniques are developed and you have an accurate population estimate. (#1) Technical Recondition **Response:** Several methods exist for determining population indices and estimates of the number of wolves in the wild. Each method has its own strengths and weaknesses. The method used in the BRWRA Reintroduction Project to develop minimum population counts is territory mapping (Kunkel et al. 2005). The primary drawback to this method is that it is costly and requires intensive trapping and radio monitoring of individual animals. However, in the short term, information gained using this method is important because of the small number of wolves and the need for accurate estimates of population decline or increase (Kunkel et al. 2005). This data is also considered the baseline from which other population estimates are derived and compared. AMOC and the IFT are constantly looking for ways to refine and improve the efficiency and effectiveness of population surveys. For example, use of a helicopter and spotter plane with the current method might allow for more accurate counts of pack numbers and composition, and would also allow the Project to more efficiently capture and collar wolves. One other recently developed method suggests that DNA analysis of scat could be used for mark-recapture methodology of population estimates and/or minimum count estimates (Kohn et al. 1999). However, this method requires equal defecation rates among sex and age

classes, an assumption that may not be true for wolves (Lucchini et al. 2002), and expensive lab analyses. Nevertheless, DNA analysis of scats for population estimates is being discussed and considered for the Blue Range Reintroduction Project and might ultimately (long-term) provide accurate population estimates with small confidence intervals (Kohn et al. 1999).

133. **Comment:** On Page 42, management implications – technical: “Further, before initial release, wolves would likely benefit from a large experience in the wild, protected area similar to those used for real wolves.” How and where would this “large experience in the wild” be accomplished? Suggest more detail. **Response:** See C/R 127.
134. **Comment:** USFWS should adopt the 5-Year Review’s recommendations for improving the Mexican wolf program by translocating wolves with “wild experience” after their first removal. **Response:** SOP 6.0: Wolf Translocations and SOP 13.0: Control of Mexican Wolves already allow this to occur.
135. **Comment:** Just because there was agreement by the counties to reassess and refine the boundaries did not mean we were in agreement with initial releases into the Gila. Similarly, the selection of better release/management areas within the recovery zone in AZ and NM does not mean we support initial releases into NM. On the contrary, we are adamantly opposed. Following the logic of this review, wolves released directly will result in higher depredations. **Response:** AMOC knows that counties within the NM portion of the BRWRA do not support direct releases into the Gila National Forest.
136. **Comment:** Conduct more frequent releases to increase the wild population of genetically under-represented lines. A genetically diverse wild population is critical to the long term survival of this species. **Response:** AMOC is aware of the issues and concerns, be they real or perceived, regarding genetic health of the free-ranging Mexican wolf population. Sampling based on the collared free-ranging Mexican wolf population suggests the current known representations in the wild for the under-represented Ghost Ranch and Aragon lineages (see also C/R 174 and 185) are 9.55% and 10.00%, respectively. The reality, however, is that we do not know the full genetic composition of the wild population. Releases and subsequent wild pairings and re-pairings have resulted in un-collared wolves breeding and producing offspring for which genetic testing to verify lineage representation has not been accomplished. Genetic experts have indicated that, ideally, the genetic composition of the wild population should mimic that of the captive population, which currently for the Ghost Ranch and Aragon lineages is 14.63% and 12.43%, respectively. AMOC can help facilitate this by carefully considering which wolves to release in the future. For example, most, if not all, the releases and translocations accomplished in recent years have been done to infuse the wild population with Ghost Ranch and Aragon lineage wolves, which we believe are underrepresented in the free-ranging population. However, it is important to note that even if release of wolves from the Ghost Ranch and Aragon lineages continued, the reality is that much of the genetic interplay is beyond the control of the agencies managing this effort, and will

depend more on which wolves survive in the wild to successfully breed and in turn, what successive generations do.

137. **Comment:** Re-released wolves are said to be adopting better to their new circumstances yet it is well known that agency personnel are concentrated in AZ and wolves in NM are seldom monitored much after translocation. **Response:** Wolves that are translocated to large areas of designated wilderness and outside of active livestock allotments may require less intensive monitoring than wolves in other locations. IFT members can cross State boundaries as necessary to best implement wolf monitoring and management across the BRWRA, per the interagency MOU for the Reintroduction Project. AMOC knows there have not been enough field staff in NM to meet all the public desires regarding wolf reintroduction there. To address this, NMDGF is adding to its field staff by hiring a second, full-time position dedicated to wolf reintroduction matters. The new NMDGF employee will report for duty early in 2006. Also, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible further expansion of the IFT on an agency-specific basis (see the AMOC Recommendations Component).
138. **Comment:** The fact that mortality numbers are lower than predicted in the FEIS should be no great source of comfort. The failure rate of 62% is higher than the sustainable rate of mortality in all studies cited in Fuller et al. (2003) except one. In that one instance, the ability of the population to sustain itself is attributed to the existence of source populations in surrounding areas. **Response:** As the Reintroduction Project moves forward, we expect removal rates for causes other than boundaries to stabilize or decrease. Until and unless a Final Rule change occurs, we will (and legally must) continue to remove wolves that cross the BRWRA boundary. In any event, the “Fuller exception” is similar to the BRWRA situation; i.e. the BRWRA “source population” is the captive population (which can be maintained indefinitely).
139. **Comment:** The Mexican wolf should be delisted from the ESA at a population of 100 animals or less in the wild. **Response:** Delisting (recovery) thresholds are not within the scope of the 5-Year Review.
140. **Comment:** Pages 19-20, 54, and elsewhere (Technical): The method for estimating release success is flawed and thus comes to the mistaken conclusion that translocations (and by implication, the capture of wild animals) offer a better chance for success than first time releases. Such a conclusion in turn becomes a justification to capture wolves from the wild because the implication is that such captures coupled with subsequent releases actually boost the chances of these animals becoming successful. This is not the case. Success would be better measured by number of pups successfully raised and would properly account for the Pipestem and Francisco pups largely destroyed as a result of being captured and thus count these packs as less successful as a result. Proximity to established packs should be an analysis factor because of its clear causative relation to the fatal intraspecific strife that led to the demise of the Lupine Pack. The existing analysis tallies these 9 unsuccessful animals as falling within the released from captivity category

thus skewing the analysis due to a factor that is only incidentally (because animals released from captivity must be released in AZ according to the rule) germane to the circumstances of their unhappy fates. The fact that most were pups would skew the analysis to over-count age of animals as a factor in their loss. Because 9 animals is relatively large in the small sample size available, such misunderstandings of cause and effect contribute to a significant misreading of what factors are actually affecting release success. **Response:** Periodic capture and translocation of “experienced,” but otherwise problem-free, wolves (see definition of “nuisance” and “problem” wolves in SOP 13.0: Control of Mexican Wolves) is not considered a viable management approach at this stage of the Reintroduction Project, but that is subject to constant re-evaluation. That said, translocations of experienced wolves, in general, have been more successful than initial releases. In terms of the referenced litters, both the Francisco (unknown cause) and Pipestem pups (parvovirus) died in captivity. It is unknown if these litters would have lived or died if they had remained in or been returned to the wild. In regard to the Lupine Pack, the alpha male died from asphyxiation due to a snake bite and subsequent neck swelling around the radiocollar (this animal was also bitten in the head, presumably by other members of the pack, however, this was not the cause of death). The four yearlings in this pack had begun dispersing prior to death of the alpha male and interaction with other wolves. One yearling was removed outside the boundary, two died from gunshot, and one was hit by a car. The alpha female remained localized in the area of the release late in the summer of 2001 and ultimately was killed by gunshot. The bottom line is that loss of the Lupine Pack was not caused by proximity to other wolves. See also C/R 131 on translocations.

141. **Comment:** Page 30-31 (Technical): This discussion should be modified to take into account the other variables we requested be analyzed. The review concludes that the greater success of wolf reintroduction in Yellowstone and Idaho may be related to those wolves’ wild provenance but the low density of livestock and lack of a boundary rule would also account for this difference which is another reason these factors should be analyzed in the final version of the review. **Response:** The referenced parts of the 5-Year Review Technical Component will be reassessed in light of this Comment, and appropriate changes will be made.
142. **Comment:** Page 5, Paragraph 2 (Technical): It does not suffice to state that the population is on track with FEIS predictions simply because population numbers were on track by the fifth year. These numbers reflect continued releases after such releases were predicted to no longer be necessary and releases of greater numbers of wolves than predicted. The more germane benchmark is the number of breeding pairs predicted to be ten, because that number reflects the progress toward a self-sustaining population. Please state in this section how many breeding pairs were actually present. **Response:** The referenced section of the Technical Component of the 5-Year Review reflects the current literature regarding Mexican wolves. The subject sentence has been changed to read: “In 2003, the IFT estimated the number of Mexican wolves in the BRWRA to be approximately 50 to 60 animals, indicating population numbers were on track with FEIS predictions in regard to this population parameter.” Breeding pairs, and the fact they lag

behind FEIS projections, are discussed within the Results section of the Technical Component of the 5-Year Review (see Figure 3a). Breeding pairs are a strictly defined term of an adult male and an adult female that have produced two pups that survived until December 31 of the year their birth. Thus, number of breeding pairs is not a more germane benchmark than population counts, as population counts inherently include more factors such as reproduction, releases, translocations, mortality, recruitment, removals, and missing wolves.

143. **Comment:** Page 40, Paragraph 3 (Technical): The goals and projections described in the EIS have been selectively described here, and improperly omit the key projection of number of breeding pairs. **Response:** See C/R 142.
144. **Comment:** According to the projections for the first five years there should have been documented 45 wolves born in the fifth year. No one knows how many were born in the fifth or previous years. **Response:** The IFT conducts annual population counts, including the number of pups born to known (e.g. radio-collared) packs. Similar to our minimum population estimate, these numbers are also considered minimums. Wildlife population estimates, by definition, do not produce the exact number of animals on the ground. They are merely estimates, and for wolves, pups are among the individuals most likely to be missed, especially pups that do not survive to emerge from the den. See C/R 132.
145. **Comment:** Capturing and collaring wild-born wolves has not been very successful. How many pups have actually been collared? Why isn't WS used for this? **Response:** Capture and collaring wild-born wolves has been very successful, however, success is proportional to the amount of time and effort that can be expended, and is also a function of the number of wild-born wolves within the population. A total of 16 subadult (less than two years old) wild-born wolves were captured and collared from 2000-2004 (pups younger than 4-5 months old are too small to be fitted with a collar). WS has the primary lead in wolf control responses (SOP 13.0: Control of Mexican Wolves). However, WS participates in other forms of capture on an as needed and available basis such as detailed in SOP 15.0: Helicopter Capture and Aerial Gunning, and in SOP 21.0: Handling, Immobilizing, and Processing Live Mexican Wolves. See also C/R 19, 170, and 282 regarding funding and staffing levels for WS.
146. **Comment:** The Lupine alpha male did not just die from snakebite but from a combination of snakebite, intraspecific strife, and asphyxiation by radio collar; it is not accurate to depict the only cause of death that was not management caused and omit the others. Similarly, it should be explicitly noted that the necropsy report of the wild pups that succumbed to disease after their capture indicated the role of capture in their deaths. Please discuss the role that being captured played in those pup deaths. **Response:** The Lupine male was bitten by a rattlesnake. As a consequence of the bite, his neck became swollen, which likely led to asphyxiation from the radiocollar. Canine bite marks on his head were likely caused by other pack members responding to his aberrant behavior. This description of the chain events leading to the Lupine male's death will be reflected in the 5-Year Review. The necropsy reports for the Pipestem and Gavilan pups did not indicate

- capture having a role in their deaths. A project veterinarian speculated the Pipestem pups may have been recovering from parvovirus when captured, and recrudescence may have occurred from the stress of trapping. Evidence for this was inconclusive, however. See C/R 140.
147. **Comment:** The data showing translocated wolves are more successful need to be reworked to include the Francisco pups that died in captivity. **Response:** See C/R 131 and 140.
148. **Comment:** The absence of any potential source population compounds the lower pup productivity. **Response:** Some areas within the BRWRA act as sources while others act as sinks, as is presented in the Technical Component of the 5-Year Review. The captive population is our primary source population. See C/R 138 regarding source populations.
149. **Comment:** Delaying a rule change any longer is a serious threat to the genetic diversity of the wild population and to the ultimate success of recovery due to the lack of Ghost Ranch and Aragon wolves in the population and the inability to do initial releases into NM. This is compounded more since much of the area in AZ where releases can occur is already occupied and no more releases can occur there to bolster the genetic diversity. **Response:** See C/R 136.
150. **Comment:** Page 9, Paragraph 3 (Technical): The method for estimating success of wolf releases is flawed in that it takes a very small sample size, posits success as an either/or variable based on subsequent reproduction, and excludes some factors that are far more important than the ones chosen. Rather success should be measured by the total number of successfully raised pups which would indicate more than just mere parturition but also the crucial factor of the pups' ultimate survival as well as how many litters were produced. **Response:** See C/R 131 and 140.
151. **Comment:** For the past two years, there has been very little effort to follow the Final Rule with respect to upholding their obligations to stakeholders and keeping a handle on the spread of their wolves. **Response:** In 2003, the six Lead Agencies and various Cooperators developed and signed an MOU creating AMOC and AMWG, in response to a variety of agency and public concerns about the Blue Range Reintroduction Project. During the past two years, AMOC has held a wide variety of public meetings on Project management practices, economic impacts, SOPs, a moratorium on initial wolf releases, and the 5-Year Review. The Project has continually been adjusted over that period to address management concerns, whether the concerns originated from the public or AMOC agencies. See C/R 290 regarding AMOC and IFT efforts to "keep a handle on the spread of their wolves."
152. **Comment:** Policy changes allowing captive born wolves to be released into NM would be in direct conflict with the Final Rule. **Response:** No policy changes have been made that are in conflict with the Final Rule. The USFWS Region 2 Director interpreted the Final Rule to mean that pups conceived in the wild and born in captivity are wild by

definition, thus eligible for release to the wild in the primary and secondary recovery zones. Conversely, pups conceived and born in captivity are captive-reared and ineligible for release in the secondary recovery zone.

D. 3-Year Review

153. **Comment:** Recommendations made in the 3-Year Review should be implemented. **Response:** See C/R 15 and 45.
154. **Comment:** No data were made available to the scientific team for the 3 year review. This resulted in a 3-man scientific team making recommendations of a political nature. **Response:** All available data were provided to the team that performed the technical component of the 3-Year Review for USFWS. As for opinions that recommendations in the team's report (i.e. the Paquet report) are or are not political, the report speaks for itself. See C/R 12.
155. **Comment:** The dissenting opinion of the only livestock owner in the "Livestock-Animal Conflict Working Group" of the 3 year review workshop was ignored. This is indicative of the USFWS bias against livestock interests. **Response:** See C/R 15 and 45. Lead Agencies and Cooperators in the Mexican wolf Reintroduction Project are not biased against livestock interests. Multiple use of public land, including ranching and livestock grazing, is a legal and legitimate activity on Federally managed USFS lands that make up the BRWRA. AMOC's role is to manage the Mexican wolf project to help further recovery of the Mexican wolf, and not to make judgments regarding the appropriateness of grazing or other multiple-use activities on public lands. The Reintroduction Project is authorized under a Final Rule that reflects a commitment to integrate wolf reintroduction and recovery into multiple-uses of public lands and to minimize conflicts on private lands. The Final Rule is not structured, nor is the Reintroduction Project empowered or administered, to force changes in public or private grazing practices to accommodate presence of wolves. Thus, the 5-Year Review and ongoing adaptive management of the Project will continue to focus on finding and implementing incentives for voluntary actions by ranchers and other stakeholders that would help accommodate presence of wolves by reducing conflicts such as livestock depredation.
156. **Comment:** The stakeholder recommendations concerning the 3-Year Review have been ignored. **Response:** See C/R 15 and 45.
157. **Comment:** Direct WS to immediately implement stakeholder recommendations from the 3-Year Review, not just those made by the agency groups. **Response:** After considering all public and cooperator comment during the 5-Year Review, the 3-Year Review and its recommendations, and its own evaluations, AMOC has made recommendations regarding possible changes in the Final Rule or creation of a new Final Rule (see the AMOC Recommendations Component). See also C/R 15 and 45.

E. 5-Year Review

158. **Comment:** From the 3-Year Review to the 5-Year Review, radio-collared wolves have decreased from 27 to only 22. This shows the lack of progress in the reintroduction and recovery of Mexican wolves and thus the need for changes. **Response:** Even though there were fewer collars at the end of the 5-Year Review (2003), there were more wolves free-ranging in the BRWRA. In the first few years of the reintroduction effort, many of the wolves were collared because they were all released with radio-collars. The IFT strives to maintain one or more collars in each pack to monitor overall trends in the population. However, as pups are born in the wild, and as collars fail, the percentage of collared wolves in the wild population should be expected to decrease. Thus, we will likely never have as high a percentage of collared wolves in the BRWRA population as there was at the end of the 3-Year Review. Regardless, collared animals alone are not as good an indicator of progress of a reintroduction effort as total numbers. See SOP 21.0: Handling, Immobilizing, and Processing Live Mexican Wolves for additional information on collaring wolves.
159. **Comment:** Have all the proper EIS and other requirements been done previously and for the new 5 year program in current planning stage? **Response:** All NEPA- and ESA-based requirements for proposing Mexican wolf reintroduction in the BRWRA were completed before reintroduction began in late January 1998. They are on file with the USFWS. All Reintroduction Project activities since then that have required NEPA compliance have been appropriately documented, and the documentation is on file with the appropriate Federal, State, or Tribal agency (e.g. see C/R 102). The 5-Year Review itself does not require NEPA documentation, but recommendations from the Review might trigger NEPA process before final decisions could be made. If NEPA obligations do arise, AMOC will comply with them to the letter and spirit of the law and any applicable rules and regulations (see also C/R 95, 100, 103, and 117-188).
160. **Comment:** Since the 5-Year Review lacks its Socioeconomic Component, it was premature to submit the draft report for comment. We request you publish an updated 5-Year Review draft for public comment that includes a comprehensive Socioeconomic Component. **Response:** The Socioeconomic aspects of the 5-Year Review were available during the latter portion of the extended 5-Year Review period (i.e. April 26 through July 31, 2005).
161. **Comment:** With the lack of adequate monitoring personnel, we question whether issues 3, 4, 6, 8, or 9 of the Technical Evaluation can be adequately addressed. Especially disconcerting are the admitted lapses in information surrounding wolf reproduction and the number and locations of packs without collars. **Response:** The questions the Comment refers to are: (3) Is wolf mortality substantially higher than projected in the FEIS?; (4) Is population growth substantially lower than projected in the FEIS?; (6) Is the livestock depredation control program adequate?; (8) Have any sinks been identified?; and (9) Have any sources of mortality been higher than expected? AMOC believes the methods and data within the Technical Component of the 5-Year Review are sufficient to answer these questions.

162. **Comment:** NMDA requests the recovery goals be restated to include a clearly defined number of reproducing packs based on actual habitat-carrying capacity and suggests recovery area maps be redrawn to include only areas of suitable habitat having both adequate prey and minimal impact to livestock and human populations. **Response:** Comments pertaining to the Recovery Team and development of recovery goals are beyond the scope of the 5-Year Review. See C/R 64 regarding status of the Team. Regarding the suggestion about recovery area (i.e. BRWRA) mapping, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible changes in the Final Rule or creation of a new Final Rule (see the AMOC Recommendations Component).
163. **Comment:** NMDA views the Administrative Component of the review as currently written as unbalanced and not representative of stakeholder concerns regarding the possibilities for resolution of the issues. **Response:** AMOC is unable to respond to this Comment, because NMDA did not identify why it perceives the Administrative Component to be “unbalanced and not representative of stakeholder concerns regarding the possibilities for resolution of the issues.” We wish these concerns had emerged while AMOC was drafting the 5-Year Review.
164. **Comment:** Page 1, Paragraph 3, first and second sentence (Technical): This abbreviated statement of range does not suffice because it misidentifies the range of *Canis lupus baileyi* as including that of *C. l. mogollensis* and *C. l. monstrabilis* – implying that these are one and the same subspecies despite the fact they had been conflated just for the purpose of providing additional areas for potential reintroduction. (The Commenter goes on to provide a detailed historic range description). **Response:** When the FEIS for what has become the Blue Range Reintroduction Project was written, the Mexican wolf subspecies was thought (based on the best available science at that time) to have historically occurred in southern NM, southern AZ, western Texas, and northern Mexico (see Bogan and Mehlhop 1983, Brown 1983, Nowak 1995). However, a recent study of the molecular genetics of wolves (Leonard et al. 2005), based on new techniques that were just emerging in the mid 1990s, supports a larger historical distribution of Mexican wolves (or zone of intergradation with other wolf subspecies) than was described in the FEIS or the draft 5-Year Review. *Canis lupus mogollensis* and *C. l. monstrabilis* have not generally been recognized as valid gray wolf subspecies since prior to 1983, but rather have been grouped with *C. l. baileyi* or *C. l. nubilus* (see Nowak 1983, Bogan and Mehlhop 1983, Brewster and Fritts 1995, Nowak 1995, Garcia-Moreno et al. 1996, Nowak 2003). Regardless, the evolving description of historical distribution does not reflect conflation “just for the purpose of providing additional areas for potential reintroduction.” Rather, it reflects changes in the best available science over time, changes that continually force reconsideration of approaches to recovery and reintroduction.
165. **Comment:** Ethically the program and its review are weak. To improve its ethical foundations, the program should: 1) minimize the use of lethal control and intensive

intervention; 2) maximize the use of proactive nonlethal measures of conflict management; 3) support the “living with predators” program of wildlife and animal protection non-profits; and 4) add an ethics component to compliment the technical, administrative, and socioeconomic reports. **Response:** AMOC does not consider the Reintroduction Project or the 5-Year Review to be “ethically weak.” AMOC has assiduously pursued objective, balanced review of the relevant issues. If shortfalls in results have occurred, and this Comment provided no evidence they have, they are not due to lack of ethics. In any case, emphasizing one management construct over another should be a result of assessing the strengths (benefits) and weaknesses (costs) of each and determining which best meets the given situation (need). Lethal and nonlethal mechanisms of wolf control are advocated and applied on that basis, i.e. appropriateness and effectiveness, not because one is arbitrarily deemed morally superior to the other. “Living with predators” is a concept that should indeed be considered by all humans occupying landscapes on which predators occur, but ascribing some sort of moral high ground to it would be inappropriate for a government entity such as AMOC.

166. **Comment:** Page 100, Item 60 (Technical): Note that much documentation is missing. **Response:** All livestock depredation investigations that were reported to the IFT and which resulted in a finding of confirmed, probable, or possible livestock depredation were included in the 5-Year Review analysis. No such depredations were excluded from the analysis, and no data were withheld.
167. **Comment:** The recovery range as defined in the FEIS is misidentified as adequate habitat for 100 wolves, in reality it contains areas that are populated by landowners, in-holders and small businesses and has only about 1/3 the land habitat as is shown in the EIS. **Response:** The Blue Range was chosen for wolf reintroduction because it contains habitat suitable for establishing a population of at least 100 Mexican wolves (see Johnson et al. 1992, USFWS 1993, USFWS 1996, and C/R 359). The BRWRA consists of 96% public land (USFS), approximately 4% private land, and small amounts of State and National Park Service land (USFWS 1996). However, most of the areas surrounding the BRWRA consist of a mixture of private land, State land, BLM land, and 2 Native American Reservations.
168. **Comment:** 5-Year Review report indicates only 21 wolf mortalities since inception of reintroduction. This is misleading, add to that the number of pups that died of parvovirus in 1999 in the wild, pups that had to be recaptured but died in captivity anyway, and pup mortality from other causes, the number is much higher. The FEIS records that the program began in 1997, however, releases began in 1998 so the equivalent prediction for the 5-Year Review was 9 expected mortalities by the 5 year end. While 21 is much more than 9, USFWS has ignored known pup mortality to keep their numbers in line with the FEIS predictions. **Response:** The FEIS predicted that in 2003 alone, 9 wolves would be removed for control and that 21 would die, disappear, leave, or be removed for reasons other than control. However, the cumulative number of removals for control and death predicted through 2003 in the FEIS are 27 and 67 wolves, respectively. The 5-Year Review describes the mortalities that were documented in the wild. Thus, similar to other

numbers (e.g. cattle depredation, population estimates, and pup production), mortalities represent a minimum estimate of what actually occurred. Survival rates are best assessed based on information from individually radiocollared wolves. Regardless, known pup mortality has not been ignored for any reason; all known mortalities were incorporated into the data analyzed for the 5-Year Review.

169. **Comment:** The report is only supposed to cover through 2003 but the report refers to incidents, studies, etc. occurring in 2004 and “currently.” **Response:** The 5-Year Review analysis covered all data for 1998 through 2003. In addition, as appropriate and possible, the document incorporated additional information into discussion passages in order to be as forthcoming as possible, without constantly reanalyzing the entire data set as new information became available. AMOC regrets if this has caused any inconvenience or confusion among the readers.
170. **Comment:** Page 2, A.2, Administrative: Agency funds do not include WS costs for the program over the seven year period listed in the table. Their cost is important to the overall review. **Response:** The funding table will be corrected in the final 5-Year Review. Up to FY 2004, all funding that was provided to WS is included as part of the USFWS funding. FY 2003 was the last year the USFWS provided funding to WS. Since FY 2003, Congress has provided annual funding of \$150,000 to WS for wolf depredation work in AZ and NM. See also C/R 19 and 282 regarding WS funding.
171. **Comment:** The draft 5-Year Review went out to several environmental NGOs before being made available to the public. **Response:** The draft 5-Year Review was submitted for release via AGFD and USFWS website distribution in December 2004. At the same time, electronic copies were provided to all members of the SWDPS Recovery Team, which included Stakeholders from various interest groups, including conservation, environmental, guide and outfitter, livestock industry, and other organizations, as well as Federal, State, and Tribal government agencies. While the documents were being loaded on the AGFD and USFWS websites, individual hard copies were provided to any member of the public who requested one via email, postal mail, telephone, and/or fax. Hard copies were also provided to the public at AMWG public meetings throughout the January-July 2005 comment period. All sectors of the public thus had equal access to the document, at the same time. No advance copies were provided to any entity, except the Technical Sub-Group of the Recovery Team for informal peer review (see C/R 6).

F. Wolf Biology

172. **Comment:** Pen-raised wolves will have fewer pups not because of inadequate prey species but rather their inability to hunt until they learn. **Response:** AMOC knows of no scientific data supporting this contention. However, this issue is discussed within the 5-Year Review.
173. **Comment:** Page 17, Technical: To compare this rugged area to other wolf areas in the USA does not make sense. Is there documentation determining cause of death in animals

less than 11% like it is here? **Response:** Other areas where wolves occur (e.g. the Northern Rockies, in particular Idaho) are at least as rugged and perhaps more remote than the BRWRA. WS told the Commenter in the late 1990s that they could determine cause of death for livestock (i.e. carcasses, missing animals) in her area (eastern AZ) less than 11% of the time. The data on which that estimate was based, and the derivation of the estimate itself, are unknown. However, as of December 12, 2005, WS had investigated 183 reported incidents involving livestock and dogs in and around the BRWRA. Of these, WS verified 86 (47%) as confirmed or probable wolf depredations. An additional 33 (18%) were classified as possible wolf depredations, and 38 (21%) were attributed to other causes of death (e.g. predators other than wolves, accidents, plant poisoning). Only 26 (14%) of the 183 documented WS depredation incident investigations have been classified as unknown. Similarly, Idaho WS reports that about 40 to 50% of the livestock carcasses reported to them as possible depredations are found, through WS investigation, to be confirmed or probable wolf depredations (M. Collinge, personal communication, December 12, 2005).

174. **Comment:** Mexican wolves are not endangered species. They were trapped in Canada and hauled here and are being called Mexican wolves. **Response:** The Mexican wolf was listed as an endangered subspecies in 1976 (41 FR 17736). In 1978, the wolf species in North America south of Canada was listed as endangered, except in Minnesota where it was listed as threatened (43 FR 9607). This listing of the species as a whole continued to recognize valid biological subspecies for the purposes of research and conservation (43 FR 9610). Further, no wolves have been trapped in Canada, or elsewhere north of AZ-NM, and released in or translocated to the BRWRA. The entire BRWRA wild population is purely of Mexican wolf origin.
175. **Comment:** Captive raised Mexican wolves are more accustomed to humans and less apt to avoid human smells and sounds and are more likely to attack people. **Response:** Captive propagation and management of Mexican wolves genetically, physically, and behaviorally suitable for release to the wild is essential to successful reintroduction. One of the primary characteristics for selecting Mexican wolves for release is avoidance and fear of humans. Potential release wolves must not be socialized or habituated to humans, so they are not likely to be attracted to people or human establishments once released. Therefore, the Mexican wolves selected for reintroduction are managed with minimal exposure to humans, in an environment that fosters and maintains natural wolf behaviors. Although wolf attacks on humans have occurred in North America, they are extremely rare (see McNay 2002a and 2002b for a comprehensive summary; see Linnell et al. 2002 for comparative information world-wide). Wolves, like other animals, occasionally develop some level of habituation to humans and human activity, but observation of wolves in proximity to humans does not mean that wolves are likely to attack. The vast majority of wolf attacks in North America have resulted from situations involving rabid wolves, wolves habituated to humans (such as being fed by humans at campgrounds or near settlements), or provoked wolves (e.g. wolves that were being attacked themselves), and the attacks on humans were incidental to the wolves' attempts to escape (see McNay

2002a and 2002b). However, there are no documented accounts in North America of free-ranging wolves taking human lives (McNay 2002a and 2002b).

176. **Comment:** What scientific evidence exists in support of the USFWS claim that there are no wild Mexican wolves existing or traveling through the BRWRA or other parts of AZ and NM? **Response:** In the late 1980s and through the 1990s, prior to the March 1998 release of Mexican wolves in the BRWRA, surveys were conducted to find wild wolves. Sightings were also investigated, where details warranted follow up. However, no Mexican wolves were detected in the wild anywhere in AZ, NM, or in Mexico in the USA-Mexico borderlands. Perhaps the best evidence that wolves were not in the wild here prior to reintroduction is the fact that genetic analysis has confirmed that every wolf captured in the BRWRA since releases began in 1998 is a reintroduced wolf or progeny thereof.
177. **Comment:** Conclusive proven scientific evidence that the Mexican wolf ever existed as a native species in NM beyond a line farther than Hatch NM. It migrated northward as a result of introduced livestock as a prey source. **Response:** See C/R 164.
178. **Comment:** Pup production in the wild is less than half that predicted in the EIS. **Response:** The 5-Year Review discussion of small litter sizes includes three different hypotheses for observed small litter size: 1) There is a strong correlation between ungulate biomass available for wolves (Fuller et al. 2003); 2) pack size and pup production are the result of historical adaptation to the environment; and 3) wolves released from captivity may be initially less capable of exploiting available prey and thus likely to have fewer pups when counts are conducted. The 5-Year Review reported the average litter size for Mexican wolves in the wild is 2.1, but also recognizes that more pups may be born than are observed. Female wolves captured in the wild and returned to captivity while pregnant or shortly after whelping had a mean litter size of 4.6 (n = 6), supporting the notion that more pups are born than are observed in the wild. Thus far, the captive community has not observed any negative effects on litter size due to inbreeding depression, and the same is assumed for the wild population.
179. **Comment:** The number of un-collared, unknown wolves indicates successful breeding in the wild but no one knows if these animals documented as unknown are Mexican wolves. **Response:** By definition, the genetic history of an unknown wolf cannot be known. The potential for hybridization of wolves with dogs has always been recognized, as described in the Final Rule. However, blood is drawn from every wild wolf captured, to determine its heritage. Every wild wolf captured thus far has been determined to be a pure Mexican wolf (see also C/R 176), except two litters of pups that were born to female Mexican wolves that bred with male dogs. Both hybrid litters were humanely euthanized before any of the offspring could reproduce in the wild and possibly impact the free-ranging population's genetics. Both hybrid litter cases involved a female Mexican wolf in the wild breeding with a male dog. The first female was wild born and the second female was captive born. The first incident involved a female that had been traveling with a male wolf. The male might have functioned as a surrogate father to the female prior to her

- sexual maturity. There is some speculation that the nature of their relationship may have prevented a reproductive pair bond. The second incident involved a lone female that bred with a feral dog. Aside from these two hybrid litters, there is no evidence to date that suggest hybridization with dogs or any other canids is occurring in the free-ranging Mexican wolf population. See also C/R 73, 179, 187-189, 192-193, and 197.
180. **Comment:** Please provide an accurate account as to the exact number of wolves currently in the wild. **Response:** The minimum number of wolves documented in the wild at the end of 2004 was 44 (see C/R 132). Consistent with the Final Rule, a definitive updated count will not be made until December 31, 2005.
181. **Comment:** I object to the justification of the program as one of a geographically distinct population. Wolves of the Southwest historically were not separate from those of the Rocky Mountain States as there is no barrier to their mingling. **Response:** The Mexican wolf reintroduction effort has been tested in court, and all court decisions thus far have reaffirmed its validity in terms of compliance with applicable laws and administrative procedures. The biological concept of species embraces genetic exchange between and among subspecies when geographic isolation does not preclude it. Although the population of Mexican wolves in the BRWRA is now geographically separated from all other extant wolf populations, historically mixing with other populations certainly occurred. Even so, Mexican wolves are genetically distinct (overall) from other subspecies of wolves, i.e. unique alleles (genes) occur within the current population of Mexican wolves, just as there are shared alleles showing common historical ancestry with other populations or subspecies (Leonard et al. 2005). The Reintroduction Project is not linked to the validity of the USFWS policy on DPSs. See also C/R 64 on the SWDPS and 164 on the evolving understanding of Mexican wolf historical distribution.
182. **Comment:** Just as the USDA predator project and others have demonstrated, the haphazard removal of coyotes (Andelt 1985; Lindsey 1987) results in increased sightings and depredations as the population again tries to settle. Allowing wolves that do no harm to range outside the boundaries will help both the human and animal components of this recovery effort as stable, established wolf territories result in a stable, more easily managed population. **Response:** Studies conducted on coyotes are not necessarily applicable to wolves. See C/R 110 and 112.
183. **Comment:** Most dens identified as existing by the IFT were evaluated and pups never captured and identified before dispersal. Many potential litters were never sought by the IFT. **Response:** The IFT does not enter active wolf dens because doing so would be unnecessarily disruptive and likely reduce whelping success. Pups are not physically capable of wearing a radio collar until September. See C/R 144 and 145.
184. **Comment:** Releasing wolf pairs during the spring when the female is pregnant has led to abandonment and deaths of the litter. These deaths are also not counted in either category. Hence the unknown number of pup mortalities has had a striking influence on the lack of natural increases (USFWS has compensated by re-releasing problem animals).

Response: Translocation of pairs during spring has occurred while the female is pregnant. In most cases, this has resulted in successful translocation, with the wolves localizing in a desired area and successfully raising pups. However, a few cases have resulted in no pup production or abandonment. The total number of mortalities includes only documented losses. See C/R 129.

185. **Comment:** USFWS, most likely due to inbreeding problems, entered two new lineages (Ghost Ranch and Aragon) to the program even though Roy McBride stated they were not pure Mexican wolves and exhibited dog-like characteristics. There is not one person alive who knows more about Mexican wolves than he yet USFWS ignored his plea not to reintroduce them because the genetics had been fouled and the likelihood of problems such as livestock predation would likely be substantial. Could this be why you have experienced higher than expected livestock depredations and multiple hybrid litters? This whole issue needs to be reevaluated with sound science by independent scientists. **Response:** There is one certified pool, containing three pure lineages of Mexican wolf: McBride, Ghost Ranch, and Aragon (see Hedrick et al. 1997). All three lineages consist of pure-bred Mexican wolves; none appear to have ancestry from dogs or coyotes. Hedrick et al. (1997) recommended that all three lineages be combined in captivity to increase the number of founders and to postpone any inbreeding depression. Due to the increased chance of mortality, animals released to the wild must be genetically surplus to the captive population. When the reintroduction effort began in 1998, only wolves from the McBride lineage were released because of their genetic surplus status. Since the Ghost Ranch and Aragon lineages were integrated into the captive population, animals from these lineages have been incorporated into the release effort. There is no evidence to suggest that a wolf's lineage (McBride, Ghost Ranch, or Aragon) has any impact on its likelihood to depredate, hybridize, or survive in the wild.
186. **Comment:** Consider an experiment with pup cross fostering. **Response:** Cross fostering pups, or placing captive born pups into the dens of females in the wild, has been used in the Red Wolf Recovery Program. The Blue Range reintroduction effort might be able to use this approach to integrate valuable genetics into the wild population. However, it is highly invasive and AMOC has not attempted it to date.
187. **Comment:** We have been told Mexican wolves are a separate species and cannot interbreed but this has proven false with the hybrid litters. **Response:** Nuances of the evolving biological definition of what constitutes a "species" might have been missing from whatever conversation took place that stimulated this Comment. Regardless, gray wolves and dogs can interbreed; they just don't do so typically. The possibility of hybridization between Mexican wolves and dogs, while minimal, has always been acknowledged within the reintroduction effort, as published in the Final Rule. See also C/R 73, 179, and 185 on hybridization.
188. **Comment:** How is it that male dogs are getting past the alpha male wolves and breeding with the female wolves? **Response:** See C/R 73, 179, 185, and 187.

189. **Comment:** The question, “Have Mexican wolves crossbred with coyotes or other canids” should be evaluated in the 5-Year Review. It appears some has occurred and this taints the viability of the project. **Response:** It was not addressed in the draft 5-Year Review, but it will be addressed in the final document in a newly created genetics section. See also C/R 73, 179, 185, and 187.
190. **Comment:** The USFWS and IFT must conduct more frequent releases to increase the wild population of genetically under-represented lines. A genetically diverse population is critical to the long-term survival of this species. **Response:** See C/R 136, 174, and 185.
191. **Comment:** Page 31 -31 (Technical): The discussion of small litter sizes omits the possibility of in-breeding depression. The review is deficient in not addressing the genetic issues involving this problem. The review should incorporate Dr. Hedrick’s analysis of management-induced genetic pauperization of the population and his recommendation of introduction of Ghost Ranch and Aragon animals. **Response:** See C/R 73, 136, 174, 178-179, 185, and 187.
192. **Comment:** In a letter to the USFWS, Roy McBride says that the animals from the Ghost Ranch lineage are wolf-dog hybrids. Have animals from the Ghost Ranch lineage been introduced to the wild or bred to any of the animals released into AZ and NM? Was the euthanization of the Norma Ames and other facilities Ghost Ranch lineage animals not substantial evidence that these animals are wolf-dog hybrids? Would you please publish the genetic lineage and/or studbook relating to all “wolves” released into the BRWRA? Also please provide the basis on which all animals used within the breeding program have been certified as pure “Mexican wolves?” **Response:** Mexican wolves from the Ghost Ranch lineage have been bred to Aragon and McBride lineage animals, and have been released to the wild in the BRWRA. The first release of Ghost Ranch wolves to the BRWRA occurred in November 1999. Some Ghost Ranch wolves were euthanized and/or neutered in the late 1970s and/or early 1980s because of the mistaken belief they were wolf-dog hybrids. This is not evidence that Ghost Ranch lineage animals are wolf-dog hybrids. Rather, it reflects a reaction to uncertainty at the time, due to a lack of absolute evidence they were not hybrids. Recent advances in genetic testing have confirmed the Ghost Ranch lineage as pure Mexican wolf (Hedrick et al. 1997). Hence, they are now included in the captive breeding program and the reintroduction effort. All animals in the captive breeding program are certified pure Mexican wolves, through molecular genetic analysis, particularly from microsatellite loci. Definitive data from microsatellite analyses show that all three Mexican wolf lineages are substantially different from northern gray wolves, coyotes, and dogs. Further, the results are consistent with no past introgression from dogs and coyotes (Hedrick et al. 1997). The studbook for Mexican wolves (those in captivity as well as those released into the BRWRA) is maintained by and available from the American Zoo and Aquarium Association's Mexican Wolf SSP Program. See C/R 73, 136, 178-179, 185, 187-189, and 192.
193. **Comment:** How many wolf-dog hybrid appearing pups have been euthanized by this program? Please provide full specifics for each. Did these hybrids result from the pairing

of a released “wolf” and a dog after the “wolf” was released or did these hybrids result from the mating of captive animals before or after they were released into the wild? What assurances are there that all wolf-dog hybrids have been eliminated from the released population or that such hybridization will not happen again and dilute the purity of the species? **Response:** The only two litters found, totaling 13 wolf-dog hybrid pups (7 from one and 6 from the other), have been euthanized. No other hybrid litters have been found or reported, and every Mexican wolf released to the wild has been of certified pure genetic lineage (i.e. not a hybrid). We will continue to investigate genetic data and determine if introgression of either domestic dog or coyote genes has occurred within the Mexican wolf population. See C/R 73, 136, 178-179, 185, 187-189, and 192.

194. **Comment:** Wolf-dog hybrids are not protected by the ESA. Why hasn't the USFWS as yet published and distributed common ways to identify these animals and promote their destruction? **Response:** Wolf-dog hybrids, as noted in the Comment, are not protected by the ESA (see also C/R 193). AMOC has published ways to distinguish Mexican wolves from other canids (which include wolf-dog hybrids), although such distinctions often require close observation of, and familiarity with, physical details. Mexican wolves can also be readily distinguished from dogs or wolf-dog hybrids through genetic evaluation at the molecular level (Hedrick et al. 1997). Although Reintroduction Project staff address wolf-dog hybrids issues as they are encountered in the field (again, see C/R 193), agencies participating in the Reintroduction Project do not promote broad-scale destruction of such animals, which are considered under jurisdiction of County Rabies Animal Control agencies rather than State Wildlife Agencies or USFWS.
195. **Comment:** If Mexican wolves are genetically pure and show no signs of inbreeding depression, then why did the Pipestem Pack produce a dog-spotted pup in 2002? **Response:** In 2002, the Pipestem Pack alpha female bred with a domestic dog and produced a hybrid litter of seven pups. The female and her litter of pups were captured and removed from the wild. When the results of genetic testing showed that the litter was a dog-wolf mix, the pups were humanely euthanized. Despite these two known instances of hybrid litters, wolf-dog hybridization is a rare event in nature (e.g. see Nowak 2003). See also C/R 193.
196. **Comment:** There is no scientific study that supports the USFWS contention that either genetic integrity or reproductive viability can be maintained over time in a captive wolf population limited to one founding female and two founding males, such as is precisely the case for the McBride lineage of captive wolves. Moreover, both the Ghost Ranch and Aragon lineages are compromised by hybridization with dogs. What is the actual truth here? **Response:** See C/R 185 and 191-192 regarding the number of founders and certified lineages. Two males and one pregnant female captured in the wild in Mexico from 1977 to 1980 and the uncaptured mate of the pregnant female founded the certified captive population of Mexican wolves. In 1995, the Mexican Wolf Recovery Team approved addition of two other captive Mexican wolf lineages, representing four additional founders, into the certified population, based on state-of-the-art genetic analysis. One is known as the Ghost Ranch lineage, some of which were kept and bred at

the Ghost Ranch Living Museum in northern NM; the other is the Aragon lineage, based at the Aragon Zoo in Mexico City. Thus, the Mexican wolf population (captive and wild) now includes three certified lineages (of pure Mexican wolves) that together reflect seven founders. The finite number of founders for short-term viability in a sexual-reproducing species such as the wolf is two. However, to capture a representative amount of variability of a wild population, 20 to 30 unrelated founders is preferred for captive breeding (Ballou and Foose 1996; E. Spevak, personal communication, September 23, 2005). For some species, this has not been possible, because conservation efforts for these species were started after the extant population had already been reduced to fewer individuals than theorists would prefer (e.g. Mexican wolf [7], Przewalski's horse [13-14], Pere David deer [3], black footed ferret [7], Mauritius pink pigeon [13], Guam rail [10], Mhorr gazelle [11], Attwater's prairie chicken [19], red wolf [12], and Arabian oryx [(13)). In such instances, it is especially important to manage for as much genetic variation as possible. The Mexican Wolf SSP provides that service for the captive population, and guidance for releasing animals into the wild population (see C/R 192).

197. **Comment:** Two hybrid litters have been found and destroyed; the potential exists for a significant number of unknown hybrid wolves in the wild. **Response:** See C/R 169, 179, 193, and 195.
198. **Comment:** There has been much question about the viability of keeping Mexican wolves pure as there may already have been crossbreeding with dogs. An answer that is not forthcoming from USFWS. Any cross-pups should be euthanized. **Response:** All known cross-bred pups have been euthanized. See C/R 169, 179, 193, and 195.
199. **Comment:** Mexican wolves were at best rare in the area and the 100 population goal is way over estimated. The population goal needs to be reconsidered and genetic viability needs should be ignored and solved using other methods if the population is too small to self-sustain. It is a moot point to be worried about genetics when the entire population started with only one female and two males anyway. **Response:** See C/R 185, 192, and 196 regarding the number of founders in the certified Mexican wolf population. See C/R 64 on the origin of the Reintroduction Project's population objective.
200. **Comment:** How can 7 original founders beget a genetically sound population? **Response:** See C/R 185, 192, and 196.
201. **Comment:** Livestock production in the upper Eagle Creek watershed has decreased due to drought, regulation increases, and the Mexican wolf. The costs to make the adjustment to meet larger scale management requirements of the various regulatory programs, especially the wolf reintroduction program, have drastically and disproportionately increased the financial burden on the local ranchers. The AGFD has made it clear they do not want to manage for elk in our watershed. Since elk is a major component of the prey base for the wolves, it is our recommendation that the upper Eagle Creek watershed be removed from the recovery area. **Response:** Economic issues are addressed in the Socioeconomic Component of the 5-Year Review. However, the premise that presence or

absence of elk alone makes an area wolf habitat or not wolf habitat is fundamentally unsound. Regardless, AGFD does not have a policy of not managing elk below the Rim. AGFD simply does not want to have year-round elk populations in marginal habitats, such as pinyon-juniper; and hunt and habitat recommendations are structured to achieve the desired result. Moreover, the purpose of the Mexican wolf reintroduction effort is to attain a self-sustainable population distributed throughout the BRWRA, including available habitat below the Rim. Thus, setting ecological in-holdings such as the upper Eagle Creek watershed aside from contiguous suitable wolf habitat in the recovery area would create unmanageable situations from a wildlife management perspective.

202. **Comment:** Wolves in the Gila are having a big effect on the elk's behavioral patterns. They are being pushed into higher heavier timber and don't use the wet meadows and open ridges anymore. If wolves continue to reproduce as they are, they will have a definite impact on elk herd sizes and State Game and Fish Departments will reduce licenses and hurt outfitter and other businesses. **Response:** See C/R 17 regarding wolf impacts on ecosystems by "moving" prey through hunting pressure. Unquestionably, wolves will eventually redistribute prey within the BRWRA through predation pressure and mere presence. State and Tribal wildlife agency monitoring of elk numbers and distribution will help determine when (and the extent to which) this occurs, but no detectable changes to big game populations as a result of wolf reintroduction in the BRWRA have occurred to date. No changes in the number of permits issued for big game hunts have been made as a result of wolf presence, either, as a result of wolf presence. If unacceptable negative impacts on prey base are ever identified, the State and Tribal wildlife agencies have the authority to implement remedial wolf management actions. Unacceptable impacts to game populations are defined within the experimental population rule as "2 consecutive years with a cumulative 35% decrease in population or hunter harvest estimates for a particular species of ungulate in a GMU or distinct herd segment compared to the pre-wolf 5-year average." The Final Rule also encourages wildlife management agencies to develop their own definitions of unacceptable impacts for approval by USFWS. Thus, both AGFD and WMAT have set that standard at 25% reduction attributable to wolf depredation.
203. **Comment:** Another socioeconomic study needs to be re-done in 3 years when the real harm by wolves starts to take effect by killing off the elk herds and bringing the cow/calf ratios for 30 – 40 calves per hundred cows down to 2 – 5 calves per hundred. **Response:** A better picture of wolf reintroduction impacts on prey populations, if any, would be achieved after the reintroduction population objective has been met, not at a point when the wolf population is still growing. Whether or not a subsequent socioeconomic study will be conducted depends upon funding available to the Reintroduction Project, and other project priorities expressed by the participating agencies and the public. Regardless, State and Tribal wildlife agencies will continue to monitor elk numbers and assess population trends and causes thereof.
204. **Comment:** More wolves are needed in order to affect elk in such a way that elk no longer hang in the creek bottoms eating what few willows are left or hammering the

winter browse which is critical to deer. If we could substantially reduce the non-native Roosevelt elk, then habitat conditions for deer may improve and their populations could help support wolves too. **Response:** See C/R 17 and 202.

205. **Comment:** Predator reintroduction programs are vital for population control of prey species. Deer overpopulation due to a lack of predators is a serious problem due to overcrowding, lack of food, and disease. **Response:** Although reduction or elimination of predation pressure can contribute to growth and overpopulation of deer herds, leading to undesirable impacts to habitat (e.g. Kaibab deer irruption of the early 20th century), there are no indications that deer are overpopulated within the BRWRA or suffering from overcrowding, starvation, or density-dependent disease mortality.
206. **Comment:** Page 1, second paragraph, last sentence, Technical: The switch in prey to elk following reintroduction reflects the new range of Mexican wolves; their evolutionary range in the Sky Islands and Mexico had few, if any, elk. **Response:** Elk (*Cervus elaphus*), as a species, are native to the southwestern USA (see C/R 204). Elk were among the natural prey of wolves that historically occurred in central and northern AZ and NM. Mexican wolves are thought to have preyed more heavily on deer toward the southern end of their range (i.e. Mexico), and perhaps the Sky Islands where elk did not occur or were only found in low numbers (see C/R 207). However, in what is now thought to be the northerly historical distribution for the Mexican wolf, elk would likely have been common prey before populations decreased in the late 1800s and early 1900s due to unregulated subsistence and market hunting (see Leonard et al. 2005 and C/R 164 and 207 regarding Mexican wolf historical range).
207. **Comment:** The agency severely overestimated the number of mule deer and Coues deer in the BRWRA, so much so that Mexican wolves are being forced to rely on Rocky Mountain Elk for a main prey species. Rocky mountain elk are not the historic prey of Mexican wolves and it takes a large pack to bring one down. **Response:** The FEIS identified deer as the preferred natural prey base of Mexican wolves. This was based on publications that considered central AZ and NM as the northerly limit of Mexican wolf historical distribution and which recognized that deer, not elk, were historically the common large wild native ungulates over that area (e.g. Brown 1983, Bednarz 1988, Johnson et al. 1992; also see Hesselton and Hesselton 1982). However, the FEIS identified elk as the likely primary prey base for reintroduced wolves over much of the BRWRA, because elk have become abundant there since they were reintroduced in the 1900s (e.g. see Bailey 1931, Findlay et al. 1975, Mackie et al. 1982, Peek 1982, Hoffmeister 1986). Ungulate estimates in the FEIS were based on the best information available from State and Tribal wildlife agencies in AZ and NM. These agencies conduct big game surveys with the objective of obtaining accurate population information to support sound management of wildlife resources, including predator populations. Any evidence of over or underestimation should be brought to the attention of the game management divisions of the respective wildlife agencies. Prior to the time wolves were extirpated from the Southwest, distribution and abundance of prey species such as elk and deer might have been quite different from what they are now. For example, elk were

eliminated from AZ and NM by the time wolf eradication efforts crested in the early 1900s. Today, elk are common within BRWRA, and this likely influences the relative frequency of elk to deer in the diets of Mexican wolves. The first Mexican wolves were released into the BRWRA in 1998, and they successfully preyed on elk within six weeks of release. Released and wild-born Mexican wolves continue to prey on elk and other wild ungulates, as individuals and as packs. See also C/R 206.

208. **Comment:** Page 31, Reproduction and Population Growth, Technical: You compared litter sizes and ungulate biomass available for wolves, and even that “wolves in the BRWRA may be limited by the amount of vulnerable prey.” It would appear that different locations are going to necessitate different prey base and sustain different wolf numbers; because it worked in Idaho, Montana, or other states doesn’t mean it will have the same outcome here. **Response:** Wolf populations are limited by the amount of vulnerable prey (Fuller et al. 2003) and/or human tolerance.
209. **Comment:** The 5-Year Review is not clear or concise and methods are confusing and may be meaningless to the lay reader. For example, Page 25 states “... indicating a strong preference for elk relative to the ungulate species available (32% elk and 78% deer).” This statement only considers wild ungulates as opposed to wild versus domestic ungulates. There were 89 reported incidents under depredations and 72 confirmed or probable kills of which 90% were elk. According to these numbers, preference seems to be cattle. What proportion of wolf diet and scat analysis indicate domestic ungulates, what percent were wild ungulates? And where did the 32% elk and 78% deer numbers come from? **Response:** Results of wolf predation on native ungulate species and wolf depredation on domestic livestock were not compared directly in the Technical Component of the 5-Year Review because data collection procedures were inconsistent or biased for predation relative to depredation incidents (e.g. varying levels of search effort for domestic livestock vs. native ungulates, incomplete information on number of cattle permitted vs. actual number grazed, and easier detection of domestic vs. native ungulate carcasses). In general, livestock kills are disproportionately investigated and documented relative to native ungulate kills; hence the incorrect perception that wolves prefer domestic livestock over native prey. The only completed scat study from within the BRWRA was conducted in AZ during the summer-fall, in areas where cattle were not present and calving year-round. This study reported wolves consumed 74% elk, 11% unknown native ungulates (deer or elk), 5% deer, 5% small mammals, and 4% livestock (Reed 2004²). Finally, the 32% elk and 78% deer figures referenced in the Comment are a typographical error and should actually be 32% elk and 68% deer. These values

² In Reed (2004), opportunistic scat collection occurred in BRWRA from 1998-2001, where radio-collared wolves were present. Scats were actively collected from June-August 2000 and March-October 2001 within BRWRA. Relative abundance of wild ungulate prey and livestock in areas of wolf occurrence and scat deposition was not determined. Seasonal and area differences (e.g. winter-summer and AZ-NM) and conservative identification of scats as wolf (i.e. scats >28 mm) may have biased the results toward larger ungulates commonly found in larger scats. Also, note that wolf scats collected by a permittee reporting livestock depredations in the study area during this time were not made available to Reed.

represent the proportion (based on State wildlife agency game surveys) of native ungulates available within a specific GMU.

210. **Comment:** Proper management practices between predators and prey should be a priority. Wolves are devastating wildlife (deer) populations. **Response:** No detectable changes to big game populations as a result of wolf reintroduction have occurred to date, either in AZ or NM. No changes in the number of permits issued for big game hunts have been made as a result of wolf presence, either. See C/R 17, 23, 202-203, 206-207, 213, 396, 413, 468, and 476 on estimates of prey populations and changes in big game populations and/or hunt permits and hunter days.
211. **Comment:** Wolves will enhance hunting opportunities because they weed out the sick and old, thereby strengthening the health of prey populations. **Response:** Wolves disproportionately select for vulnerable prey. In Yellowstone, wolves contribute to a more stable and healthy elk population (Smith et al. 2003).
212. **Comment:** There is not enough prey base for the wolves. **Response:** See C/R 17, 23, 202-203, 207, 213, 396, 413, 468, and 476 on prey base issues.
213. **Comment:** The game depredation assumptions are subjective. To say deer aren't found simply because of size and consumption rate is only a best guess. There are very few deer in the BRWRA for wolves to consider them a primary food source. Only known elk calf kills are being counted so the actual losses based on wolf numbers are not accurate. Only a small percentage of elk calves taken are documented simply due to the size of the animal and the inability to locate the carcasses. The agency is obligated to make realistic determination as to the effect wolves will eventually have on elk herds and associated hunting activities. **Response:** Wolf predation estimates are based on wolf scat analyses, aerial winter predation studies, and identification of wolf kills on the ground. All these studies indicate that elk are the predominant source of prey for wolves. These results suggest that elk are a more significant portion of the wolf diet, and deer a smaller proportion, than was originally projected in the FEIS for Mexican wolf reintroduction. To date, no detectable changes to big game populations as a result of wolf reintroduction have occurred. No changes in the number of permits issued for big game hunts have been made as a result of wolf presence, either. See C/R 206 and 207.
214. **Comment:** By USFWS own evaluation, the main prey item historically for Mexican wolves was the white-tailed deer. USFWS is expecting Mexican wolves to prey on Rocky Mountain elk which are not native to the recovery area and were thus not a historic prey item for them. Mexican wolves expected to prey on elk even though it was not a historic prey species may be part of the reason we have seen such high predation on livestock and needs to be reevaluated since this oversight has been a major factor in the dismal success of the project. **Response:** See C/R 164, 206, and 207 on expected and actual prey base. Depredation rates in the BRWRA differ from the Northern Rockies, perhaps largely because of differences in grazing techniques and livestock husbandry practices. For instance, depredation rates (number of cattle confirmed kill/year/100 wolves) for

Montana, Wyoming, Idaho and AZ/NM were 11, 8, 5, and 16, respectively (see Table 7 of the Technical Component). Thus, the AZ/NM population has a slightly higher rate than other areas. However, wolves in AZ/NM can have up to four times greater interaction time with cattle on National Forest lands due to differing grazing schemes in this area. See also C/R 206 and 207.

215. **Comment:** Regardless of whether wolves need water, their prey does. To release wolves at locations that has no water for prey will cause wolves to leave the area when allegedly that place was chosen for its high concentration of prey. **Response:** Areas with adequate prey densities are undeniably required for successful release of wolves. Adequate water for prey species is one of the factors taken into consideration for determining a release area, whether it is an initial release or a translocation (see SOP 5.0: Initial Wolf Releases, and SOP 6.0: Wolf Translocations). Wolves are only released into areas of the BRWRA where there is adequate water to hold wolves and their native ungulate prey species.
216. **Comment:** Depredation rates are higher with Mexican wolves simply because they are mostly pen-raised and don't know how to hunt wild prey. **Response:** Mexican wolves know how to hunt wild prey, and wild-born wolves are more effective than captive-reared. See C/R 214 for a discussion of depredation rates.
217. **Comment:** How is it the prey density estimates were not adequate (Page 16, Predation, Technical) but the livestock depredations in other areas in the USA was sufficient to consider valid (Page 17)? **Response:** Prey estimates for the BRWRA are trend data (e.g. whether a population is increasing or decreasing), not true population estimates or densities for a particular GMU. Thus, these data were not used to predict the number of wolves the area could support based on a regression equation (Fuller 1989) that relates prey densities to the number of wolves. Data were available for livestock depredations in other areas in the USA, thus, we used these data to add to the overall understanding of the Blue Range Reintroduction Project.
218. **Comment:** There has been no trapping, collaring or vaccinations of wild born pups. **Response:** See C/R 145, 183, and 253.
219. **Comment:** No investigations of uncollared wolves in NM have taken place. **Response:** The IFT has spent significant time and effort investigating reports and searching for wolves without collars in NM. Many reports lack detail sufficient for follow-up. Therefore, reports must be prioritized based on their details, consistency, and overall patterns of reports for uncollared wolves. NMDGF is adding an additional employee to the IFT (see C/R 137), and should have additional ability to detect uncollared wolves. AMOC encourages anyone who believes they may have observed wolves (collared or uncollared) in NM and throughout the BRWRA to continue to report details of these observations to the IFT.
220. **Comment:** There have been no attempts to find missing wolves in NM, either when wolf sightings have reported or when depredations have occurred. **Response:** AMOC is not

aware of any instances where the IFT has failed to respond to any potentially verifiable incidents of livestock depredation by wolves. Depredation response time is the time between receiving a report and arriving at the scene to investigate it. Response times can be significantly affected by weather, as well as by topography and logistical issue, but all reports are investigated. For March 1998 through December 2003 (i.e. the 5-Year Review period), the average IFT depredation response time was 23 hours (range = 12 to 120 hours). For January 1, 2004 through October 10, 2005, the average IFT depredation response time was 18 hours (range = 12 to 48 hours). The IFT is available 7-day per week for depredation incident investigations, via a toll free number, 1-888-459-9653. If there is no answer, leave a message; your call will be returned as quickly as possible. If the IFT does not answer its toll free number, depredation or public safety issues can also be reported to AGFD at a 24-hr/day toll free hotline, 1-800-352-0700. See also SOP 10.0: Incident Reporting by Other Agencies and SOP 11.0: Depredation on Domestic Livestock and Pets. NMDGF also operates a 24-hr/day toll free number for reporting violations of wildlife laws, 1-800-432-GAME, that can be used in an emergency to report a possible wolf depredation.

221. **Comment:** Majority of wild born pups are no longer collared and vaccinated. **Response:** See C/R 145, 183, and 253.
222. **Comment:** USFWS will not trap for single wolves. **Response:** The IFT generally does not pursue single wolves for capture, because single wolves generally do not have a consistent pattern of use and/or use a vast area. Trapping is most effective when there is a good probability that a wolf will use the area near the trap. These limitations were recognized in the Final Rule, by the following statement, “(10) If Mexican wolves of the experimental population occur on public lands outside the designated wolf recovery area(s), but within the Mexican Wolf Experimental Population Area, the Service or an authorized agency will attempt to capture any radio-collared lone wolf and any lone wolf or member of an established pack causing livestock “depredations” [see definition in paragraph (k)(15) of this section]. The agencies will not routinely capture and return pack members that make occasional forays onto public land outside the designated wolf recovery area(s) and uncollared lone wolves on public land. However, the Service will capture and return to a recovery area or to captivity packs from the nonessential experimental population that establish territories on public land wholly outside the designated wolf recovery area(s).” Single wolves are, however, trapped per SOP 13.0: Control of Mexican Wolves, when they are involved in nuisance depredation incidents.

G. Compensation

223. **Comment:** Livestock permittees should not expect the public to protect their private property from the natural consequences of their neglectful husbandry practices. **Response:** It is inaccurate at best to ascribe all livestock depredation to “neglectful [livestock] husbandry practices.” AMOC believes, as do the agencies it represents, that for wolf recovery to succeed, a better mechanism must be found by which to address wolf

impacts on livestock lawfully present on public or private lands. It appears that legislation at the State or Federal level would be necessary to provide such a mechanism.

224. **Comment:** Innovative solutions, such as fladry, fencing, and herding projects as supported by Defenders through the Proactive Carnivore Conservation Fund that are fair to all interests and promote wolf recovery need to be explored. **Response:** Federal listing of wolves brought about development and use of non-lethal tools and techniques to manage wolves (see Smith et al. 2000a and 2000b for a comprehensive review). These included scare devices (Breck et al. 2002; Schultz et al. 2005; Shivik and Martin 2001; Shivik et al. 2003), dogs (Coppinger and Coppinger 1995), barriers (Musiani and Visalberghi 2001; Musiani et al. 2003), improved livestock husbandry (Fritts et al. 1992; Mech et al. 2000), and translocation of problem wolves (Bradley et al. 2005; Fritts 1982 and 1985; Linnell et al. 1997). Additional research will be conducted based on project needs, funding, and innovative ideas.
225. **Comment:** Locals in the recovery area have to spend time and cost of fuel to attend wolf meetings and supply data to program of incidents and sightings. **Response:** AMOC by choice, since 2003, has elected to hold the majority of its public meetings in the core of the BRWRA. One reason is to encourage participation by local residents, who are unquestionably the stakeholders most likely to feel any direct impacts from wolf reintroduction. This also minimizes outlays of time and money for local residents, but has the opposite effect on stakeholders from distant locales. Urbanites from Phoenix, Tucson, Albuquerque, etc, have sometimes chastised AMOC for this deference. Thus, periodically meetings are held in outlying locations as well. Regardless, it does cost time and money to attend AMOC meetings. The alternative is not to attend, or to not hold meetings, and either of those choices would result in reduced opportunities for public participation in helping shape AMOC's adaptive management practices. With regard to locals spending time and money to provide information on incidents and sightings, that contribution is much appreciated and helps AMOC provide better management responses to address issues as they occur. Thus, locals benefit directly by providing such information.
226. **Comment:** Compensation for livestock losses should be from the USFWS wolf reintroduction funds to eliminate any real or appearances of conflict of interest. Consider not using Defenders compensation fund. **Response:** The USFWS does not compensate ranchers for livestock injured or killed by Mexican wolves and has no legal authority to do so. At this time, Defenders' Bailey Wildlife Foundation Wolf Compensation Trust is the only established compensation mechanism for wolf depredations. Defenders stated goal is to shift economic responsibility for wolf recovery away from individual ranchers and toward those individuals who want to see wolf populations restored.
227. **Comment:** It appears that compensation has done nothing to lessen rancher opposition so perhaps buying out the ranchers and allowing the public's wildlife to roam freely on the public's land is a better alternative. **Response:** A "buyout program" on public lands would have to be approved by Congress and signed into law by the President, as there is currently no law, regulation or policy that would allow for the buyout and retirement of

Federal livestock grazing permits. Under the multiple-use mandate of the USFS, livestock grazing on national forest system lands is authorized and regulated by a number of laws including the Multiple Use-Sustained Yield Act of 1960, Federal Land Policy and Management Act of 1976, [Section 402(a)], Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976, NEPA of 1969, and the Rescission Act of 1995. Livestock grazing is considered a traditional use of the national forest and, again, part of a multiple-use mandate.

228. **Comment:** Dogs used for livestock operations and hunting should be compensated for if killed or injured by wolves. **Response:** Federal, State and Tribal agencies do not compensate for dogs injured or killed by Mexican wolves and they have no legal authority to do so. The Defenders' Bailey Wildlife Foundation Wolf Compensation Trust is the only mechanism available to compensate for wolf-related loss of sheep, cattle, horses, mules, goats, llamas, donkeys, pigs, chickens, geese, turkeys, herding dogs and livestock guarding dogs. The Trust does not compensate for depredation of hunting dogs.
229. **Comment:** USFWS needs to allocate funds to reimburse livestock owners for kills both currently occurring and retroactive to wolf releases. **Response:** See C/R 228.
230. **Comment:** Livestock owners should be compensated for suspected and undocumented losses if there is any chance wolves killed it even if the evidence has been destroyed or lost to other carnivores or scavengers. **Response:** See C/R 228.
231. **Comment:** A formula should be devised to incorporate the extra expenses ranchers incur into the compensation they receive when they suffer a loss. **Response:** After considering all public and cooperators' comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding voluntary incentives and compensation issues (see the AMOC Recommendations Component).
232. **Comment:** Regarding requests by ranchers for compensation due to decreased weight gain of cattle "run" by wolves: please take into consideration the portion of grazing that occurs on public lands which is in itself a form of subsidy to the cattle industry. **Response:** Multiple use of public land, including ranching and livestock grazing, is a legal activity on Federally managed USFS lands that make up the BRWRA. Grazing fees are set by Federal law and are beyond the purview of AMOC. The present formula for calculating the grazing fees on Federal lands in the West was set forth in the Public Rangelands Improvement Act (PRIA) of 1978. On February 14, 1986, after the expiration of the PRIA formula, President Ronald Reagan issued Executive Order 12548 directing the Secretaries of the Interior and Agriculture to continue to use the PRIA fee formula to calculate annual grazing fees. The order established a minimum fee of \$1.35. It also directed that for any given year the annual change in the fee shall not be greater than plus or minus 25% of the previous' years fee. In 1988, the fee formula from Executive Order 12548/PRIA was incorporated into 36 CFR 222 Subpart C. See C/R 37, 226, and 227.

233. **Comment:** There should be Federal compensation to livestock producers for all losses that are above pre-wolf introduction averages. Compensation should also include stock dogs, hunting dogs, and any purebred breeding animal normally classified as a pet. **Response:** AMOC established a compensation subcommittee to evaluate compensation programs such as the one described in the Comment. Updates on progress have been reported during quarterly AMOC meetings. Ultimately, a governmental compensation program would require legislative action. If such a program were enacted, it would have to address the availability and quality of allotment specific baseline data for pre-wolf reintroduction predator impacts on livestock herds. See C/R 37, 226-227, and 232.
234. **Comment:** Many ranchers are losing cattle without being compensated. A fair and equitable compensation program needs to be put in place which does not rely on outside interest groups for compensation. It must include not only livestock found, but must compensate for the increase in mortality rates since most livestock is never found and therefore no compensation is given. **Response:** See C/R 233.
235. **Comment:** The Coalition of Counties has only encountered extreme resistance to the concept of financial incentives and compensation in exchange for boundary expansion or dissolution. **Response:** AMOC's efforts to advocate such concepts have also met resistance in some quarters. In spite of this resistance, AMOC believes there is a workable solution to this conundrum. Some existing programs could provide financial incentives to persons who are providing wolf habitat, including the NRCS EQIP (which provides payments in other states for land enhancements that might reduce wolf depredation), and State Landowner Incentive Programs. These voluntary incentive programs are contingent upon willingness of interested landowners to participate.
236. **Comment:** Explore incentives that financially award private or Tribal landowners that "host" stable wolf packs or denning activity on their property. **Response:** See C/R 235.
237. **Comment:** Innovative approaches that minimize opportunities for interaction should be sought after and encouraged. Ranchers need to be taught how to minimize conflicts with livestock and wolves and funded to implement such measures rather than be assured that any wolf that takes livestock will be removed. **Response:** In some situations, new or additional husbandry practices might reduce conflicts with wolves. However, no participating agency has the authority to require such measures, and it is unreasonable to expect livestock operators to bear additional costs for livestock management without some means to offset these costs. Programs such as the Defenders proactive conservation fund could be used to pay for such measures, and it has been used to pay for herders on some allotments within the BRWRA (e.g. see Defenders of Wildlife 2005). Unquestionably, though, increased rancher use of preventative measures and greater public financial support for covering the costs of those measures would benefit wolf reintroduction. See C/R 224 and 235.
238. **Comment:** Possible actions to address wolf-livestock conflicts could include providing financial incentives for livestock management practices that minimize conflict, providing

payment to any permittee whose allotment or deeded land supports a successful wolf den in a given year, and voluntary retirement of certain grazing allotments with appropriate compensations. **Response:** See C/R 231 and 237.

239. **Comment:** Any proposed financial incentives to livestock producers should be conservatively and realistically selected to maximize the success of the reintroduction program. Describing the desired return on incentives as “an increased level of tolerance” is unacceptably vague. Given that years of political compromise and taxpayer funded subsidies to the livestock industry have produced continued intolerance, legislative sabotage, lawsuits against USFWS to terminate the reintroduction, and illegal wolf killings, what is the realistic hope for adequate return on further incentives? **Response:** AMOC believes that financial incentives can contribute to wolf recovery in the Southwest. A compensation subcommittee of AMOC has been established to evaluate alternative incentive and compensation programs. Updates on progress have been reported during quarterly AMOC meetings. Ultimately, authorization for a compensation program would require legislative action. See C/R 231, 233, 235, and 237-238.
240. **Comment:** Landowners and permittees should be provided payment incentives in exchange for increased tolerance of wolves. **Response:** See C/R 235 and 238.
241. **Comment:** We are in favor of a financial incentive program for landowners and permittees however given the current financial difficulties of the program we believe that such a financial incentive program would undermine the prudent use of already limited program funds. **Response:** The funding for incentives described within the 5-Year Review would have to originate from a different source of funds than those already available for the Reintroduction Project, in order to prevent a reduction of ongoing services that the project currently provides. Perhaps such compensation could be linked to standards (criteria) for husbandry practices that are appropriate to the topographic, weather, and other conditions with which ranchers must cope in the arid, mountainous Southwest.

H. Adaptive Management Oversight Committee/Interagency Field Team

242. **Comment:** Page 88, Items 19 and 20 (Technical): The bureaucratic interagency process set up to run the Mexican wolf project has been successfully used by anti-wolf recovery local government representatives to prevent releases of wolves into areas that may have biological potential. As a result, within the 3.3 million acre expanse of the Gila NF, the only places approved for releases so far are the 4 Gila Wilderness sites approved in 2000. Despite the meetings, money spent and other accoutrements of bureaucracy progress on Item 20 is stalled. **Response:** See C/R 102 regarding the four sites within the Gila National Forest approved in 2000 for translocations. The IFT is scheduled to prepare additional release and/or translocation site proposals for AMOC approval in 2006. SOP 5.0: Initial Wolf Releases and SOP 6.0: Wolf Translocations describe the relevant proposal and approval processes

243. **Comment:** Giving receivers to ranchers is preferential treatment of some members of the public and is wrong. If I cannot have a receiver (I'm a landowner in the same area as them) then they should not either. Providing certain people receivers is disparate treatment. **Response:** AMOC's decision to provide telemetry receivers to ranchers with demonstrated need for immediate information on presence of collared wolves is a deliberate, appropriate effort to reduce the impacts of "living with wolves." If a landowner who does not have livestock in the BRWRA demonstrated equal need, their request for a receiver would be considered in accordance with its priority relative to other such requests and on the basis of receiver availability.
244. **Comment:** Wolf team full cooperators do not include local organizations or local government; instead, TESH and Defenders enjoy full cooperator status. **Response:** Lead agencies that are full cooperators in the Mexican wolf Reintroduction Project include the USFWS, AGFD, NMDGF, USFS, WS, and the WMAT. While TESH and Defenders support the Reintroduction Project, they are not signatories to the MOU (see also C/R 245). However, USFWS and TESH do have a Cooperative Agreement in regard to management and maintenance of the Ladder Ranch captive wolf facility. NGOs are eligible to participate in the public AMWG meetings, and several do, but they do not participate as Cooperators in AMOC and they play no role in making AMOC decisions, other than to provide comment and recommendations, as can any other organization or member of the public. Per the MOU regarding Mexican wolf reintroduction, "Cooperator" status is restricted to governmental agencies at or above the county level. NGOs and private individuals participate in AMWG meetings to the extent they desire, but they do not attend AMOC meetings.
245. **Comment:** AMOC is made up of Federal and State wildlife agencies and NGOs. **Response:** See C/R 244. As stated in the MOU:

Collectively, the AGFD, NMDGF, USFS, USFWS, WMAT, and WS are referred to in this Agreement as Lead Agencies, the agencies with primary regulatory jurisdiction and/or management authority over the Mexican wolf in AZ and NM. Additional Lead Agencies (i.e. additional Tribal Governments) may be added to this Agreement upon their request, by concurrence from the Signatory Lead Agencies and written amendment to this document.

Collectively, the Counties and NMDA are referred to in this Agreement as Cooperators, which are other State agencies and county governments that have an interest in Mexican wolf management. Additional Cooperators may be added to this Agreement upon their request, by concurrence from Signatory Lead Agencies and Cooperators and written amendment from this document.

The MOU does not allow for private organizations, NGO or otherwise, to participate in AMOC as formal "Cooperators" and AMOC conducts itself accordingly.

246. **Comment:** Meeting and advertising cost for public input are born by counties where the input is sought. **Response:** AMOC covers costs for notification of public meetings and meetings facilities (when required) associated with public input processes. Counties may elect to distribute additional meeting announcements, advertisements, etc., and/or provide meeting facilities at their choosing. Greenlee, Sierra, and Catron counties have all provided public meeting rooms at their own cost. AMOC appreciates such cooperation, whether or not the agency is signatory to the MOU under which AMOC operates.
247. **Comment:** Public involvement was effectively eliminated unless you had access to internal information supplied by the NGOs with cooperator status in AMOC. **Response:** Every individual and organization had equal access to the 5-Year Review process, and equal opportunity to participate. Admittedly, residents of the BRWRA had the benefit of public meetings being skewed in terms of location for their convenience. However, that was intentional on AMOC's part. Also, NGOs do not have cooperator status within AMOC or AMWG (see C/R 244 and 245). Finally, the public does not need to wait for public meetings to provide input or request information.
248. **Comment:** Public input has been exorcised from the program. **Response:** See C/R 20, 34, 151, 171, 247, 251,301, 427, 428, and 431 regarding opportunities for public participation. Public input is an active and important part of the adaptive management process. AMOC is committed to holding quarterly, open public meetings within the reintroduction area to obtain continuous feedback on Mexican wolf conservation and management activities. Some additional public input processes may also occur for specific to individual activities, such as the 5-Year Review, development of Reintroduction Project SOPs, etc. Any time proposed actions or draft documents are brought to the public for comment, they are considered to be open questions. Many decisions within the Reintroduction Project are now guided by recently-approved SOPs, which were made available as drafts for public comment. Occasionally, the management agencies may also make decisions regarding management actions that are not addressed by the SOPs, in a time frame that does not allow for public input specific to that management action. In these rare instances, information is reported to the public as decisions and actions that have already occurred, not as a proposal open for comment. Any proposal that includes an opportunity for public comment could ultimately be implemented as presented, implemented as modified after considering public comments, or not implemented at all, based on public input that is received.
249. **Comment:** The project refuses to keep track of the spread of wolves. **Response:** Changes in distribution of wolves and occupied range of wolves are calculated each year (see Table 1 in the Technical Component). Reported sightings by the public are investigated if: (1) there is a pattern of more than one report in an area, (2) the reports appear credible, and (3) locations of radio-collared wolves do not correlate with the reports. In response to increasing numbers of free-ranging wolves, the IFT has accelerated trapping and collaring of uncollared animals. See C/R 250 on information flow and frequency of wolf location updates.

250. **Comment:** The wolf project refuses to inform ranchers of wolf presence in a timely manner. **Response:** AMOC began addressing this problem in 2003, as a first priority. The situation improved in 2004 and even more so in 2005, based on local resident comment at public meetings. Through November 15, 2005, the IFT has called residents or permittees 61 times by the day after the flight, and emailed residents or permittees 506 times on the day of or day after the flight. In addition, they responded to all calls from local residents requesting information. These emails and calls consisted of locations relative to geographic areas on the landscape. The locations were intentionally vague during the denning season of wolves, and generally only described the distance from one map point instead of two. The IFT is available for follow up calls or any phone call from the public regarding locations at 1-888-459-9653. Individuals have in some instances suggested that the location information should be given in more timely fashion, or was not accurate. AMOC does not always agree with that perspective, but in all such cases the IFT now works with the individuals to ensure that communication is improved. The IFT does not contact individuals who do not have wolves on or near their allotment or private land (e.g. individual locations may not be on an allotment but there is reason to believe from past movements/incidents that the wolves may end up on a particular allotment in the future). Further, the IFT does not routinely give locations to individuals who do not request the information from the IFT. Permittees or private residents that request the information and have a demonstrable need for the information are routinely contacted. The IFT is consistently searching for improvements in methodology and carefully considers all requests.
251. **Comment:** Immediately implement proper public input procedures and a balanced public advisory committee. **Response:** The public input procedures used in AMOC's 5-Year Review were/are proper, and as effective as the input received allows them to be. Public meetings and opportunities for written and verbal comment have been more than ample. Extensions for comment have been provided where circumstances seemed to indicate they would be valuable. AMOC itself represents all the State, Federal, and Tribal agencies with primary jurisdiction over wolf issues (except SCAT, which thus far has chosen not to participate formally). Persistent effort has been put forth to afford county governments opportunities to participate as formal Cooperators, though few have opted to sign on and only one (Greenlee County AZ) has been a consistent, constructive participant effectively representing their constituencies. Regardless of the agencies represented in AMOC and AMWG discussions, however, those participating have on every occasion carefully considered the values and interests of the entire spectrum of publics interested in or affected by wolf reintroduction in AZ and NM. Some key stakeholders have opted not to participate fully in AMWG meetings, but AMOC will continue to provide appropriate opportunities and, in the absence of participation, try to represent absentee interests to the best of its ability.

I. Standard Operating Procedures

252. **Comment:** Flight times should be changed to late afternoon/evenings to get better scientific location points. **Response:** Weather, as it relates to human safety and visibility,

is a key consideration in timing of flights. Most flights are flown in the morning hours to avoid afternoon build-up of winds and storms. Angle of the sun in the early morning hours also generally provides the best sighting conditions for wolves and ungulate carcasses.

253. **Comment:** The agency has ignored county recommendations regarding release site selection criteria and timing. (#19 Technical) Much needed active management (hazing, trapping, counting, vaccinating and DNA testing of wolves) all of which were assured in the original EIS are not being done. **Response:** AMOC has never ignored, nor has the IFT ignored, any county or other recommendations regarding release site selection criteria and timing. All recommendations and relevant information are carefully considered, regardless of origin. Ultimately, release site decisions reflect situation-specific determinations that the overall potential benefits of one alternative are greater than for others, and the downsides (“costs”) of that alternative are either less than for any others or acceptable considering the benefits. As for active management practices, it appeared to AMOC that in some cases from 1998 through 2004 hazing and trapping were not initiated in a consistent manner. Thus, those components of wolf management were carefully described in AMOC SOPs (e.g. SOP 13.0: Control of Mexican Wolves), with specific triggers (criteria) for when and how they would be implemented in nuisance or problem wolf situations. As for vaccinating and DNA testing of released and captured (wild born) or recaptured wolves, all wolves handled are vaccinated and DNA tested as prescribed in SOP 21.0: Handling, Immobilizing, and Processing Live Mexican Wolf (Note: in accordance with Project veterinary guidance, SOP 21.0 does define specific circumstance in which the health, safety, and/or size/age of a given wolf dictate that it will not be vaccinated).
254. **Comment:** Insufficient field personnel have resulted in the inability of the IFT to respond to nuisance situations to haze wolves from problem situations. This needs to be addressed in the 5-Year Review. **Response:** AMOC came to this same conclusion soon after it began functioning under the MOU created in October 2003. Since then, AMOC efforts to increase agency commitments of resources to the IFT have added three FTEs, provided expanded emergency assistance from a variety of non-IFT agency employees during management actions, and generally greatly enhanced the IFT’s response capability for nuisance and problem situations. Development of appropriate SOPs for the IFT has also enhanced management responses, and provided local residents with more certainty as to how and when the IFT will respond to such situations. In short, the performance bar has been greatly elevated, and the public now has a bar against which that performance can be objectively measured. Other improvements are expected to result from the outcomes of the 5-Year Review. As the wolf population grows, or spreads, IFT capacity must continually grow to ensure that performance drop-offs do not occur.

J. Livestock Depredation

255. **Comment:** Page 17, Paragraph 2 (Technical): How many depredations were located by government personnel (or researchers working in concert with such personnel) versus

how many were located by ranchers, versus how many were located by other individuals should be included in describing the effectiveness of the depredation program. Such information would provide insight into how onerous it is for ranchers to locate livestock carcasses killed by wolves thus providing a quantitative measure to the validity of one of the livestock industry's most oft-repeated claims. **Response:** Per SOP 11.0: Depredation on Domestic Livestock and Pets, the IFT investigates and documents all dead livestock located by or reported to the IFT that have potential for wolf involvement. All such records become part of an IFT database. From 1998 through 2005, 163 cattle/sheep/or goats were found dead or injured (i.e. total, from all causes), according to depredation reports available from the IFT (1-888-459-9653). The IFT found and reported 41% (n = 66) of these animals; permittees and others reported 59% (n = 97). However, comparisons between the number of known (tagged) livestock missing for an individual permittee and the number of dead (all causes) known (tagged) livestock found would be required to assess the difficulty of finding dead livestock. Research is underway within BRWRA to determine detection rates of livestock death (due to all causes; see C/R 301), but we do not yet know whether the results will be applicable across the Southwest. Situation-specific differences in topography, animal husbandry (livestock herding practices), and other factors might limit application.

256. **Comment:** Page 42, Paragraph 2 (Technical): A database and associated records need to be maintained on wolves scavenging on livestock that they did not kill. **Response:** See C/R 255. The referenced IFT incident record includes relevant information (if any) on scavenging. All such records become part of an IFT database. Therefore, records are maintained that document all known scavenging events, including those that were determined not to be wolf depredations.
257. **Comment:** Page 98, Item 53 (Technical): Captures and recaptures of wolves have not been minimized. Such control actions could be minimized by requiring removal of livestock carcasses before wolves scavenge on them and become habituated to livestock. **Response:** The carcass issue was first raised during the 3-Year Review by a panel of independent scientists (i.e. the "Paquet Report"). It was carried forward in the 5-Year Review so AMOC could address an important issue that was not highlighted in the 3-Year Review: there is no Federal or State law under which livestock owners or permittees (on public or private lands) could be required to remove, destroy, bury, or otherwise render inedible a livestock carcass. State laws in both AZ and NM affirm the livestock permittee is the only person who can lawfully decide whether to destroy, remove, or render inedible carcasses of livestock they own. After considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible voluntary incentives for private individuals to address livestock carcass issues (see the AMOC Recommendations Component). However, per those recommendations, AMOC will not advocate regulatory changes to address carcass removal or disposal issues. See also C/R 52 and 287 on capture, etc. as essential components of wolf management.

258. **Comment:** The livestock carcass issue needs to be a non-issue. The idea that carcasses are everywhere needs to be stopped – there are just as many wild prey carcasses that the wolves could eat but they do not. **Response:** See C/R 257 and 259. No data exist by which to elucidate whether livestock or wildlife carcasses are more abundant within the BRWRA, all or in part. Nor do data exist by which to determine whether wild Mexican wolves prefer other foods to either kind of carcass.
259. **Comment:** USFWS should adopt the 5-Year Review’s recommendations for improving the Mexican wolf program by requiring the removal or treatment of livestock carcasses to make them unpalatable to wolves. Livestock die for dozens of reasons unrelated to predators, but when left on public lands the carcasses have been found to attract wolves, which ultimately encourages livestock depredation and wolf control. **Response:** The 5-Year Review carried the carcass removal recommendation forward from the 3-Year Review, for discussion and clarification purposes. See C/R 257.
260. **Comment:** In rough, rugged country, finding livestock carcasses is essentially impossible. Also, if you destroy carcasses, you will leave the wolves hungry causing them to kill possibly another livestock cow. Best to leave it up to the discretion of each rancher. **Response:** Per C/R 257, the livestock permittee is the only person who can lawfully decide whether to destroy, remove, or render inedible carcasses of livestock that he or she owns. See also C/R 258 regarding wolf preferences for carcasses and live prey.
261. **Comment:** The livestock carcass removal issue alone is enough to recommend permanent termination of the program. It is apparent by the unnecessary focus on this issue that far more is at stake for our members (i.e. various livestock organizations) than wolves and their survival. Use of this so-called carcass issue shows that there has been no good faith effort to work with ranchers on realistic problems they face. **Response:** See C/R 257, 258, and 260.
262. **Comment:** Fire to burn livestock carcasses is unacceptable due to drought conditions. Liming pollutes the watershed. Removing carcasses is as realistic as collaring every wolf. Livestock carcasses should not be removed if a lion or bear killed it because they will return up to 7 days later for their kill and they will re-kill if their food is taken and this would be a change in the ecosystem because of wolf reintroduction. **Response:** See C/R 257, 258, and 260.
263. **Comment:** The report fails to discuss the “attractant” aspect of livestock carcasses and the role carcasses may play in bringing wolves into close proximity of living livestock. **Response:** Section B-11 of the 5-Year Review addresses the attractant issue, which was raised in the 3-Year Review and thus carried forward in the 5-Year Review for discussion and an AMOC decision on whether to take or recommend relevant action. See also C/R 257, 258, 260, 267, and 268.

264. **Comment:** Requiring livestock operators to remove carcasses should be removed as a recommendation. This is reflective of an anti-grazing attitude that is so prevalent in the program. **Response:** See C/R 257, 258, 260, 267, and 268.
265. **Comment:** Innovative solutions to the carcass removal issue should be investigated. A partnership among ranchers, the agencies and conservation organizations is a possible solution. Perhaps a paid employee funded by the USFS, BLM or even the States to deal with carcasses on public lands should be investigated. A volunteer program similar to “Wolf Guardians” started by Defenders in the Rockies to minimize wolf/livestock conflicts could potentially be adapted to deal with carcasses. Or simply an educational program such as a brochure on how to make carcasses inedible, distributed by Federal or State agencies that come into contact with ranchers such as SWCD or NRCS. **Response:** After considering all public and cooperators comment during the 5-Year Review, and its own evaluations, AMOC has made a recommendation to develop voluntary incentives for private entities to address livestock carcass removal and disposal issues (see the AMOC Recommendations Component). See also C/R 257-264.
266. **Comment:** Regarding the livestock carcass removal issue, explore increasing grazing fees for operators who don’t manage their allotments properly and decrease grazing fees for operators who do. **Response:** The Federal grazing fee is established by Presidential Executive Order (see C/R 232). The formula (thus the fee) can only be modified or extended by the President. Grazing allotments are managed through a grazing permit, allotment management plan, and annual operating instructions from the appropriate land management agency (e.g. BLM or USFS). Permittees and the agencies use these documents to achieve desired vegetation condition as well as other management objectives. However, per C/R 257, there is no law, regulation, or policy that would allow USFS or BLM to require or enforce carcass removal.
267. **Comment:** The issue of livestock carcasses as attractants to wolves and possible catalysts for the onset of livestock depredation should be addressed through revisions of the rule. USFWS needs to increase law enforcement to monitor these and other activities relating to livestock operations. **Response:** Public lands grazing permits are administered by land management agencies (e.g. BLM and USFS). USFWS has no law enforcement jurisdiction over Federal grazing permittees.
268. **Comment:** Provide compensation to ranchers for livestock killed by wolves, but in return, require said ranchers to remove carcasses promptly. **Response:** See C/R 37 and 226-241 on compensation and C/R 257 on carcass removal and incentives recommendations.
269. **Comment:** We disagree that translocated wolves caused fewer depredations. Response time has been notoriously slow. The areas in NM where translocations occur are extremely remote; therefore, investigation of a depredation is not likely to occur even when a carcass is located. **Response:** Data collected for the 5-Year Review indicate five of the 18 wolves (27%) translocated after depredations ultimately depredated again.

Thus, most wolves involved in depredation incidents did not depredate again when translocated to another area. Re: depredation incident responses: per SOP 11.0: Depredation on Domestic Livestock and Pets, the IFT investigates depredation incidents as soon as a report is received. Depredation response time is the time between receiving a report and arriving at the scene to investigate it. Response times can be significantly affected by weather, as well as by topography and logistical issue, but all reports are investigated. For March 1998 through December 2003 (i.e. the 5-Year Review period), the average IFT depredation response time was 23 hours (range = 12 to 120 hours). For January 1, 2004 through October 10, 2005, average IFT depredation response time was 18 hours (range = 12 to 48 hours). The IFT is available 7-days per week for depredation incident investigations, via a toll free number, 1-888-459-9653. If there is no answer, leave a message; calls will be returned as quickly as possible. If the IFT does not answer its toll free number, depredation or public safety issues can also be reported to AGFD at a 24-hr/day toll free hotline, 1-800-352-0700. See also SOP 10.0: Incident Reporting by Other Agencies and SOP 11.0: Depredation on Domestic Livestock and Pets.

270. **Comment:** USFS should draw up and enforce livestock carcass removal rules. Penalties for not complying with this rule should include fines for first and second offenses with loss of grazing permit following the third non-compliance. This parallels the three times and out policy enacted for depredating wolves. Wolves drawn in to depredate livestock following feeding of abandoned carcasses which have not been removed by the permittee may be removed but should not be subject to lethal take. **Response:** See C/R 257.
271. **Comment:** The conclusion that carcass habituation is a valid issue, based on “observed” numbers that are unverifiable, is not defensible. NMDA would like this section rewritten or eliminated and notes that this section may increase the animosity between the livestock industry and the USFWS. **Response:** See C/R 257 re: the origin of the carcass removal issue. Depredation and carcass feeding incidents referenced in the 5-Year Review came from the WS Incident Investigation Database. They are based on documented depredation investigations that are verifiable, in accordance with SOP11.0: Depredation on Domestic Livestock and Pets.
272. **Comment:** New allotments should require responsible removal of carcasses by the allotment holder. Marginal operations could have their allotments bought out. Defenders could offer an incentive plan for ranchers who remove carcasses regardless of how the animal died. Make it worth their while to assist in this preventative management tool. **Response:** New allotments are not being created within the BRWRA. Allotments change hands through the sale of property, livestock, or both. See C/R 257 on carcass removal and AMOC’s intent to develop voluntary incentives to induce livestock operators to address the carcass issue.
273. **Comment:** Appendix II, #56 (Technical): The review notes that IFT disposes of carcasses when feasible. Producers themselves must take that responsibility. An appropriate role of the IFT would include providing livestock producers with the information on the means of disposing promptly carcasses in a manner that minimizes

scavenging by wolves. **Response:** The IFT does dispose of carcasses when the opportunity arises and they have permission from the livestock owner to do so. This is consistent with the AMOC agencies' commitment to cooperative solutions, which help build acceptance. Some ranchers remove and/or treat livestock carcasses themselves when possible, but this is voluntary and cannot be required under current law, regulation, or policy. The IFT also provides information to livestock owners on husbandry practices that can reduce the likelihood of wolf depredation. See also C/R 257 on carcass removal.

274. **Comment:** Since WS has the only certified wolf depredation investigators, they should be allowed to determine policy for verifying a wolf kill. It is a conflict of interest to force a different agency to comply with USFWS wolf kill standards when USFWS employees are not experts in depredations and do not investigate kills themselves. WS needs to determine their own standards and train their employees accordingly. **Response:** AMOC set the "wolf/no wolf" kill standard for the Blue Range Reintroduction Project in SOP 11.0: Depredation on Domestic Livestock and Pets. All cooperating agencies agreed to that standard. Per SOP 11.0, a WS IFT member has the primary lead on initiating depredation incidents investigations within 24 hours of receiving a report (see C/R 220 and 269 on compliance rates), and on determining cause of death. The method used in SOP 11.0 to determine if a wolf caused a depredation is based on criteria developed by Roy and Dorrance (1976), as well as classroom and on-the-job training with experienced WS professionals and other experts in the field. But, there is not a "certification" program for wolf depredation investigators.
275. **Comment:** The reality is if you have a depredation in AZ or NM, you might get some help. You may or may not get an email from the IFT telling you wolf locations. It matters very little when there is not a current count of wolves and distribution is not being documented since USFWS has the excuse that a collared wolf isn't in the area where a depredation occurs. (#14) Technical. **Response:** See C/R 220 and 274 re: depredation investigations. All incidents reported are investigated in accordance with SOP 11.0: Depredation on Domestic Livestock and Pets, and all nuisance and depredation incidents are handled in accordance with SOP 13.0: Control of Mexican Wolves. Whether a collared wolf is actually in the incident area has no impact on initiating an investigation. Per program guidelines for dissemination of location information (see SOP 3.0: Outreach), certain individuals receive, at a minimum, weekly flight location emails that are distributed within 24 hours of the telemetry flight. Typically, the email is sent the same day as the flight. These are people who have previously incurred livestock depredations or who previously have had "problem wolf" situations, and who have requested detailed location information updates. If such individuals lack access to email, they receive a phone call in the same time frame. However, as noted in the Comment, it is true that radio-collared wolves make up only a portion of the free-ranging population, and any wolf can move a long way very quickly. Therefore, we urge livestock owners, other residents, and anyone else using the BRWRA to act as if wolves could be present anywhere in the area at anytime.

276. **Comment:** With wolf mortality considered low and removal rates higher than predicted, that finding leads one to believe that more wolves are problem animals than the agency will admit to. **Response:** See Figure 3d and Table 5 of the Technical Component for information on removal rates and the absolute number of wolves removed. No relevant information about problem wolves or anything else has been withheld. See also C/R 11, 46, 253, and 275 regarding nuisance and problem wolves.
277. **Comment:** Livestock losses have increased since wolf introduction. **Response:** See C/R 214 and 216.
278. **Comment:** Page 23, Technical: Removals are confusing and deceptive. Although the Francisco Pack was removed for being outside the boundary, they were involved in numerous documented and unverified livestock killings and attacks, plus attacks on dogs. Many people have grown tired of reporting nuisances when wolves are in an area where cattle are disappearing but no carcasses are found – there is a definite “why bother nothing can or will be done” attitude. **Response:** All nuisance and problem (depredation) information for 1998-2003 was incorporated into the 5-Year Review. Wolves were assigned to removal categories in the 5-Year Review based on the major reason they were removed. Assigning multiple causes would have resulted in inflated counts of removals (e.g. one removal event would be counted multiple times). The Francisco Pack was removed mainly because it was outside the boundary, on SCAR, and SCAT requested removal per a standing Tribal Council resolution. Whether or not the pack depredated was irrelevant to SCAT. It is true that various members of the Francisco Pack were confirmed to have been involved in livestock depredations; two uncollared subadults were targeted for lethal removal, which was unsuccessful. However, the remaining pack members were not under a livestock-related removal order when the pack (2 alphas and 4 pups) was captured on and removed from SCAR, thus assigning the entire pack to a depredation category would have been doubly inaccurate. Regarding knowledgeable individuals choosing to withhold information on depredation incidents, this is a self-defeating action. Since IFT response modes and resource allocations (i.e. budgets) are based largely on accumulated incident records, failure to report actual cattle depredations, suspected depredations, missing livestock, or nuisances because an individual believes nothing can or will be done only penalizes the community most affected by wolf reintroduction. A complete and accurate compilation of wolf depredation reports is essential to making appropriate management decisions regarding Mexican wolves.
279. **Comment:** Page 21, Table 1, Administrative: 40 wolves have depredated cattle. This table can also represent that the BRWRA doesn't have an adequate prey base or it can represent wolves prefer livestock as an easier source of diet. **Response:** Depredation on livestock does not of itself indicate an insufficiency of native ungulate prey (see C/R 23, 202, and 207 on prey base sufficiency). As discussed in the Technical Component, many factors contribute to livestock depredation. Ease of access to livestock and native prey availability are just two among many. Sufficient data do not yet exist for the BRWRA to elucidate clear correlations for each factor, let alone identify causative effects, for this area (see C/R 301 on a relevant ongoing study in BRWRA). However, as noted in C/R

- 258, when given the choice between livestock and abundant native ungulates, wolves in other areas have been shown to prefer the latter (Salvador and Abad 1987, Meriggi et al. 1991, Smietana and Klimek 1993).
280. **Comment:** Successful litters have been raised on livestock operations utilizing cattle as a prey source. **Response:** Livestock depredation has been documented within the BRWRA, but no litters of wolf pups have been raised solely on a livestock prey base. Adults as well as pups have been removed from the wild to address chronic livestock depredation issues. Wolves that establish a habit of killing livestock are now removed in accordance with SOP 13.0: Control of Mexican Wolves, regardless of breeding status or pack structure.
281. **Comment:** Mexican wolves released into the Gila Wilderness have not established permanent home ranges and instead moved consistently to adjacent livestock operations. **Response:** Mexican wolf home ranges are sufficiently large that is unlikely any pack would ever be confined entirely to an area as small as the Gila Wilderness (see also C/R 468). Note: portions of the Gila Wilderness are lawfully grazed by livestock, thus it is not necessary for Mexican wolves to leave the area to encounter livestock.
282. **Comment:** The USFWS should not use WS employees to monitor the wolves because their time needs to be spent controlling more traditional predators, especially coyotes. **Response:** See C/R 19 and 170 regarding WS funding. Congress provides annual funding and direction for WS to work on wolf management in AZ and NM. Decreases in annual appropriations have reduced the primary focus to livestock depredation response. Per SOP 11.0: Depredation on Domestic Livestock and Pets, WS IFT members are lead respondents on potential Mexican wolf depredation investigations. Routine monitoring is handled by IFT members from agencies other than WS.
283. **Comment:** If a wolf is in the area, WS leaves the area immediately. They are scared to do their job for fear of harming a wolf. **Response:** WS does not leave an area because they are afraid to do their job for fear of harming a wolf. However, WS sometimes does change its wildlife damage management methods when a wolf moves into an area in which WS is currently working. These changes enable WS to meet the needs of the cooperator, while still (a) meeting its own obligations under the ESA, (b) abiding by the Final Rule, (c) abiding by EPA Section 3 labels, and (d) abiding by a USFWS Biological Opinion on the WS depredation management program.
284. **Comment:** As ranchers below the Mogollon Rim, we feel the wolves have been allowed to roam into territory restricted to them. AGFD has informed us they don't manage for elk below Rose Peak. If elk are to be the prey of wolves, then wolves need to be kept above Rose Peak. This will ensure that the wolf program maintains a wild prey base to reduce conflicts with the growing number of livestock below Rose Peak. We propose the area between the Mogollon Rim and Rose Peak be used as a buffer zone to move in and out of. Any wolves below Rose Peak should be relocated to their designated territory. Wolves should be handled as any other predator when livestock or other domestic animal depredation occurs. **Response:** Wolves are allowed to roam throughout the BRWRA, in

accordance with the Final Rule under which reintroduction is authorized. Wolves that travel outside the boundaries set by that rule must be captured, removed, and translocated in accordance with the same rule. Regardless, the premise that presence or absence of elk alone makes an area wolf habitat or not wolf habitat is, from a wildlife management perspective, fundamentally unsound. Moreover, the purpose of the Mexican wolf reintroduction effort is to attain a self-sustainable population distributed throughout the BRWRA, including any available habitat below the Rim. Thus, setting ecological appropriate in-holdings aside from contiguous suitable wolf habitat in the BRWRA would impede progress toward wolf management objectives. The preceding notwithstanding, AMOC agrees that the desired future condition is recovery of the wolf, Federal delisting, and returning management responsibility to the States and Tribes, a scenario in which depredating wolves present in healthy, self-sustaining populations could be managed like any other predator.

285. **Comment:** The increase in the coyote population due to the lack of trapping and predator control has caused the deer population to decline. Unless the competition from coyotes is taken care of, the wolves will continue to rely on livestock as a main food source. **Response:** We have no information indicating that the BRWRA coyote population has expanded, the BRWRA deer population has declined due to coyote depredation, wolves in the BRWRA rely on livestock as a main food source, or wolves in the BRWRA will [continue to] rely on livestock as a main food source unless competition from coyotes is diminished.
286. **Comment:** Page 98, Item 56 (Technical): There are no effective regulatory methods in place to prevent wolves from scavenging on livestock. And contrary to the statement to this item, both wolf 166 and 592 were allowed to scavenge on dead cattle despite requests by agency personnel that they be allowed to remove these carcasses. Most dead livestock that are found are located after wolves have begun scavenging, which greatly reduces the chances the wolves will not become habituated. This review should identify what level of predator control that is ultimately caused by such scavenging this population can sustain in perpetuity and what level is actually occurring, as a baseline for determining whether this situation is being adequately addressed. **Response:** That statement will be changed to read “Carcasses of livestock are, when feasible and acceptable to the livestock owner(s), made unavailable to wolves by removal, rendering inedible, or on-site disposal by the IFT [however, see C/R 257]. Carcasses on public lands that are seen on aerial telemetry flights, or discovered through regular field monitoring, are routinely disposed of or rendered inedible by the IFT, when feasible and acceptable to the permittee. Similar actions are taken by the IFT on private lands, when given permission.” As was also noted in C/R 257, the IFT works with willing permittees to remove livestock carcasses or render them inedible in accordance with permittee wishes. During certain times of the year (e.g. calving season for cattle or denning season for wolves), it may be especially beneficial to livestock operators to remove or render inedible carcasses, to discourage wolves from localizing near the carcasses. However, the converse might also be true, i.e. Chavez and Gese (2005) suggested hyper-abundance of secondary prey items and domestic livestock carrion dampened the need for wolves to switch to cattle. In the case

of wolves 166 and 592, the livestock permittee would not allow agency personnel to remove or render the livestock carcasses inedible because of the belief that the wolves would then go on to depredate on other cattle that much sooner.

287. **Comment:** Rates of wolf removal exceed mortality rates and the combination of these rates (62%) is not sustainable. The FEIS predicted releases wouldn't be needed past 2002 but they have continued through 2004. This is not a "recovery" scenario. Removals of wolves for livestock depredations are not likely to decline given the near-ubiquitous distribution of livestock in the BRWRA. This is a serious impediment to wolf recovery. **Response:** AMOC believes the BRWRA population is approaching the point at which releases are not necessary to sustain growth that will result in achieving the current population objective of at least 100 wolves (see C/R 505 regarding the 2006 Moratorium). Although discussion of recovery is beyond the scope of the 5-Year Review (see C/R 64, 66, 85-87, 96, 357-375, 457, and 463), achieving a BRWRA population of at least 100 wolves would constitute an important step toward rangewide recovery. As stated in C/R 85-88, 103, 104, 106-109, 357, and 368, AMOC has determined that the Final Rule should be changed to facilitate progress toward that objective. Thus, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible changes in the Final Rule or creation of a new Final Rule (see the AMOC Recommendations Component). However, as stated in C/R 52 and 257 and as reflected in SOP 13.0: Control of Mexican Wolves, AMOC also believes that livestock-related wolf removal practices are an essential component of wolf management, to strike the proper balance between addressing various impact concerns and maintaining a viable, self-sustaining population of wolves in the BRWRA. See also C/R 99 and 138 on sustainability.
288. **Comment:** Do not relocate "bad" wolves, properly eliminate them. **Response:** AMOC believes that SOP 13.0: Control of Mexican Wolves now provides appropriate guidance for the stepwise progression of control actions.
289. **Comment:** Response times to depredations are frequently longer than one day. **Response:** Depredation response time is the time between receiving a report and arriving at the scene to investigate it. For March 1998 through December 2003 (i.e. the 5-Year Review period), the average IFT depredation response time was 23 hours (range = 12 to 120 hours). For January 1, 2004 through October 10, 2005, the average IFT depredation response time was 18 hours (range = 12 to 48 hours). See also C/R 220.
290. **Comment:** A lack of field personnel has forced livestock operators and homeowners to perform depredation and impact monitoring functions (having to check livestock more often for fear of depredations, costing ranchers more time and money), which has passed an unfunded mandate to local government and private citizens. This mandate has been disruptive to the daily activities of local citizens and has created an adverse fiscal impact for local governments, livestock operators, and homeowners that the 5-Year Review fails to address. **Response:** Some livestock operators and other residents of the BRWRA have significantly contributed to wolf management since 1998 through their own "monitoring"

efforts (see also C/R 151). AMOC greatly appreciates these efforts, and encourages all parties to help ensure that relevant information flows quickly and accurately in both directions. AMOC also believes that inadequate funding and staffing for the IFT, and perhaps inefficient deployment of available IFT staff, have at times placed undue hardship on local residents, especially in the Reintroduction Project's early years. Since being formed in 2003, AMOC has responded to these problems by: securing additional funding; expanding the IFT (3 new positions added in 2005); developing SOPs to increase management efficiency, effectiveness, and consistency in IFT response; and increasing opportunities for interested and affected parties to apprise the cooperating agencies of their concerns, so appropriate adaptive management responses can be formulated and implemented. According to comment from ranchers and other affected parties in AMWG meetings during 2005, improvements have been noted in management response within the IFT. However, AMOC believes that more improvement is needed, thus, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding IFT expansion on an agency-specific basis (see the AMOC Recommendations Component). With regard to any financial impacts of the Reintroduction Project, whether positive or negative they are addressed in the Socioeconomic Component and C/R 518-611.

291. **Comment:** Page 60, Table 8, Technical: Why does it only show cattle killed? Figures are misleading. We realize that it is difficult to come up with realistic figures but when a permittee has the loss figures from the years before and after the wolves move into their area to compare that is important, substantive data. It should be more meaningful than similar data from a state 1000 miles away. Why were probable kills left out? Were all cattle depredation investigation in other states handled or described the same way? **Response:** Only confirmed kill data were used in that Table (i.e. probable kills were omitted) because that was the only information available for the other states, and our intent was to contrast livestock losses among various wolf management/reintroduction projects. BRWRA depredation investigations are conducted by trained personnel and described as confirmed, probable, or possible (per SOP 11.0: Depredation on Domestic Livestock and Pets). Depredation investigations in other states are handled much the same as they are in the BRWRA. Although the BRWRA Reintroduction Project appears to spend more time looking for dead cattle than other wolf management projects do, the actual number of livestock killed within any project is impossible to determine because not all livestock carcasses are found and/or reported and because sometimes sufficient evidence does not exist to determine the cause of death. The best available information for numbers of cattle killed by Mexican wolves in 1998-2003 was reported in the Technical Component, i.e. 23 confirmed livestock kills, four probable kills, and 10 possible kills. We recognize there is a large discrepancy between the number of livestock kills reported (documented) by the Reintroduction Project and the number reported missing by livestock producers. However, we rely on reports verified by WS when determining actual wolf depredation numbers (a similar standard exists for the other wolf projects). Even so, to address this discrepancy, the Socioeconomic Component (see also C/R 518-611) presents a range of estimates of wolf depredations for 1998 through 2004. The low estimate represents the average of the agency records of confirmed kills

(including all records from the IFT and the Defenders compensation program [see Defenders of Wildlife 2005]). The medium estimate incorporates a multiplier from published literature that estimates unconfirmed kills in addition to confirmed kills. The high estimate reflects estimates of losses based on information provided by ranchers. According to these estimates, wolves have killed an average of five to 33 cattle each year, or less than 1% of the estimated 34,800 cattle grazed in the BRWRA annually.

292. **Comment:** The project needs to provide trained depredation personnel and realistic and flexible investigation procedures. (#16) Technical. **Response:** WS IFT members are professional wildlife damage management experts who are well trained in the field of predator depredation. IFT members and other personnel from the other cooperating agencies, who assist WS as necessary in depredation investigations, sometimes also have significant expertise involving depredation by protected wildlife. Any staff members who do not have the necessary experience are provided appropriate training, usually by WS, before they participate in investigations. See also SOP 11.0: Depredation on Domestic Livestock and Pets, for investigation criteria.
293. **Comment:** When wolves have been confirmed to depredate livestock, lethal take permits should be approved immediately for the affected party, as with any other livestock depredating predator. (#17) Technical. **Response:** Because Mexican wolves are Federally listed under the ESA as an endangered species, they cannot be managed like “any other livestock depredating predator.” All Mexican wolf management must comply with the Final Rule.
294. **Comment:** There is nothing to substantiate rancher claims of wolf losses. It seems most wolf losses are due to poor animal husbandry practices. **Response:** The 5-Year Review reflects all available information livestock losses (see C/R 291). The IFT investigates every reported livestock loss, but it appears that an unknown number of losses are not reported to the IFT (see C/R 278 and 346 on unreported losses). In addition to unreported but “known” losses, some carcasses or losses to Mexican wolves will inevitably go unreported since (due to topography, vegetation cover, decay and consumption rates, etc.) they will never be found. Nevertheless, AMOC cannot and will not speculate as to whether “most” depredation losses are due to “poor animal husbandry practices,” or whether all ranchers could improve their herd husbandry practices. See C/R 214, 223, 224, 235, 237, and 273 on animal husbandry practices.
295. **Comment:** Assess effects of ADC, specifically coyote trapping. **Response:** ADC became WS in 1997, thus WS is used throughout the 5-Year Review. The IFT considered all relevant wildlife management programs in the Technical Component. AMOC concludes WS is a significant asset to wolf conservation, and Section 7 consultations between WS and USFWS are the appropriate mechanism for assessing specific effects of WS programs such as coyote trapping. Any further assessment is beyond the scope of the 5-Year Review.

296. **Comment:** We disagree with the agency's methods, including bringing in a scientific team to make recommendations that are actually political recommendations and only afterward asking a working group to enhance the 3 year review. Even then the USFWS did not find the time or money to incorporate those recommendations, with the exception of one working group. This group concurred with the most burdensome claim made by the scientific team which was to regulate ranchers over livestock carcasses. The agency has spent tremendous time and effort on this single issue to the exclusion of all others. USFWS included subjective and biased incidental data from an extremist environmental organization to bolster their need to place the burden for increased wolf livestock kills on the rancher. We strongly disagree with this claim and adamantly refute all evidence USFWS used to back up the opinion that wolves kill more livestock when they find a livestock carcass. **Response:** This Comment is largely beyond the scope of the 5-Year Review. See C/R 45 on 3-Year Review issues. See also C/R 257 on the carcass issue, which as noted was first raised during the 3 Year Review and which was carried forward in the 5-Year Review to provide closure that should have been forthcoming in 2001. As noted in C/R 257, there is no legal foundation in existing laws, regulations, or policies for requiring removal of livestock carcasses from public land grazing allotments or from private lands. As for the portion of the Comment about including "subjective and biased incidental data from an extremist environmental organization," AMOC presumes the organization in question is the CBD. The CBD obtained those data from an AMOC agency, via FOIA. The CBD's FOIA records were consulted only to ensure that the information the IFT considered in the 5-Year Review was complete (the information actually came directly from an IFT database).
297. **Comment:** There have been many instances where confirmed wolf kills have been changed to possible or probable kills. WS and the project won't admit when wolves have actually killed livestock. **Response:** In the preliminary phase of an investigation pursuant to SOP 11.0: Depredation on Domestic Livestock and Pets, participants often speculate as to cause. The affected rancher is often on site at that time, as are IFT members from non-WS cooperating agencies. If a participant is not present all the way through the final WS determination, they might well come to an erroneous conclusion as to why the final cause differs from that which was first speculated (if it does differ). Again, the final call on cause of death in a depredation investigation is made by WS after careful review of all available evidence (in accordance with SOP 11.0). The final call may or may not be the same as the initial conjecture. Thus, interested parties should refer only to a final printed IFT report for a determination regarding a depredation investigation.
298. **Comment:** Agency personnel have avoided using their own best available science in determining actual livestock losses. It is obviously not a primary focus of data collection since agency policy is to use what suits the program best and refuse any information from the livestock experts. **Response:** See C/R 292 and 297.
299. **Comment:** The burden of proof on all livestock kills should be placed on the USFWS to prove that is absolutely was not a wolf kill instead of on the ranchers to prove it was a wolf kill. **Response:** See C/R 220, 274-275, 291-292, and 297 regarding outcomes of

depredation investigations. The burden of proof is not on ranchers, nor should it rest with them or with USFWS. The burden of proof is on the IFT investigator(s) (per SOP 11.0: Depredation on Domestic Livestock and Pets) to provide fair and unbiased reports on all depredation incidents. As of September 2005, 96 of the 162 potential Mexican wolf depredation reports in the IFT files attributed cause of death or injury to possible, probable, or confirmed Mexican wolf depredation. Other known, possible, or probable causes reflected in these reports included accidental injury, lightning, noxious weeds, coyotes, black bears, mountain lions, feral dogs, hybrid animals (not Mexican wolf hybrids), birthing, and unknown causes.

300. **Comment:** Entire wolf packs should not be destroyed following livestock depredation. Proper aversive conditioning and livestock carcass disposal should be exercised first. **Response:** Management of wolves causing livestock depredations focuses on individual animals as outlined in SOP 13.0: Control of Mexican Wolves. The first depredation response relies on non-lethal management to change the behavior of the depredator(s). With each successive depredation, the level of management intensity increases. The absolute last action would be removal of the entire pack if removal of selective depredators and/or other pack members did not stop the depredations.
301. **Comment:** Page 84, Item 7 (Technical): The cattle depredation study has been an on-and-off endeavor that has been handicapped by secrecy about where it has taken place and even who the peer reviewers for this research are. This secrecy undermines the validity of the study's methodology and has led to suspicion that the study was terminated or suspended because it did not demonstrate the high level of depredations that is adherents expected. The current status of the project should be clearly stated in the review and its procedures opened up to public scrutiny. **Response:** WS National Wildlife Research Center is conducting the referenced study, with support from some AMOC agencies. The study began in late 2003, at the end of the period the 5-Year Review covers (1998-2003), and its findings will not be available until 2007, after the Review is completed. Therefore, the study is not covered in the final Review, other than to acknowledge its existence. However, AMOC wants to make clear herein that: (a) the principal investigator discussed the general purpose and approach of the study in several AMWG public meetings during 2003-2004; (b) the final draft proposal for the study was vetted with the SWDPS Recovery Team Technical Sub-Group; (c) neither the methods of the study nor the study itself have been modified or terminated, nor will they be modified or terminated, because of any concerns about the possible final results (i.e. there is no "predetermined" outcome); (d) the draft final report will be subjected to rigorous peer review before and during the publication process; and (e) to help ensure that the study is not disrupted, further information about it (e.g. location, interim findings) will not be shared publicly until the final report has been completed.
302. **Comment:** Pages 20-24 (Administrative): It is irresponsible to find that 91% of wolves that are known to scavenge on livestock are also associated with depredations and not to recommend any regulatory changes. Such changes should be identified and implemented. It is also unfortunate that the statistics probably underestimate the incidents of scavenging

- since poor records of such are kept. Also note that the limited wolf monitoring (1 -2 per week) almost certainly missed other scavenging incidents. Whatever best estimate figure this review ultimately comes up with of how many wolves have become habituated to stock as a result of carcasses, it should be analyzed as part of a population viability analysis for what effect it has on this population's viability. **Response:** Sections of the 5-Year Review pertaining to correlations between scavenging and depredation have been reanalyzed and revised to clarify this issue. AMOC will not recommend regulatory changes to require carcass removal (see C/R 257 and the AMOC Recommendations Component). Doing so would conflict with the agencies' commitment to integrate Mexican wolf reintroduction into existing multiple-uses of public lands, with respect for private property rights. However, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible incentives-based voluntary practices that could address carcass-related issues (see the AMOC Recommendations Component). With regard to a PVA, AMOC has made a recommendation regarding a habitat /population viability analysis that reflects concerns about data sufficiency for such an analysis (see the AMOC Recommendations Component; see also Fritts and Carbyn 1995, White 2000, Boitani 2003).
303. **Comment:** Mexican wolves are being forced to rely on elk gut piles left by hunters, elk calving season and livestock for their main source of manageable prey, while they have killed some grown elk almost equal to the number of USFWS verified livestock depredations, the majority are not subsisting on elk and are migrating from wilderness areas to livestock operations for an easier prey source. **Response:** See C/R 209, 281, 287, and 468.
304. **Comment:** Excessive livestock depredation has been prevalent in the past 3 years and has led to high removal rates of Mexican wolves from the wild. **Response:** See C/R 287.
305. **Comment:** Excessive livestock depredation has also led to the sale of several ranches in the BRWRA. **Response:** The 5-Year Review, including Socioeconomics investigators' discussions with rancher stakeholders and local communities, did not reveal any data that would confirm this Comment. Any information supporting this allegation should be submitted to AMOC as soon as possible.
306. **Comment:** Livestock depredation control program is incapable of keeping up with the livestock depredators that the USFWS is determined to re-release in the BRWRA. **Response:** See C/R 254 and 290 regarding problems stemming from insufficient IFT staff early in the Reintroduction Project. However, to date the IFT has addressed every known depredation issue in the BRWRA that has been brought to our attention. See C/R 220, 269, and 289 on response times, which decreased from less than 24 hours for 1998-2003 to less than 18 hours for 2004-2005.
307. **Comment:** Control actions are not being done in a reasonably timely manner. **Response:** See C/R 220 and 269 on response times. Please note that some control actions are more difficult (and take longer) than others, due to terrain, weather, and wolf behavior.

308. **Comment:** USFWS are seldom available to answer the calls when depredations are occurring. **Response:** See C/R 220 and 269 regarding IFT availability, their toll free phone number (1-888-459-9653), and alternative 24 hr/day toll free numbers to use if the IFT is not immediately available. SOP 0.C provides additional pertinent individual contact information for IFT and other Project-related staff. Also see C/R 269 regarding average IFT response times for investigating depredation incident reports.
309. **Comment:** There is a large discrepancy between the agency identified confirmed depredation losses versus rancher estimated losses of livestock. Clearly timely determinations of mortality could help to offset speculation of the cause of mortality be it wolf, bear, lion, or other agent. **Response:** See C/R 291 regarding the referenced discrepancy. Also see SOP 11:0: Depredation on Domestic Livestock and Pets, which establishes current timeframes for final determinations on livestock investigations. Those timeframes were established in part because prior to 2005 determinations were sometimes delayed unacceptably.
310. **Comment:** Implement a “one strike you’re out” policy on all depredating wolves with the definition of depredation being any attack or attempted attack on humans or domestic property, pet or livestock. **Response:** The Reintroduction Project is obligated by law and policy to address (provide relief for) depredation issues, but it is also legally compelled to help pursue recovery, which requires growth in the wild wolf population. Thus, a “one strike and you’re out” policy would be inappropriate. Conflicts between wild wolves and livestock are inevitable, but most should be addressed through management of the overall situation, not just management of the offending wolf. More than half the Mexican wolves that have been translocated after depredations subsequently produced pups in the wild. As noted in the Technical Component, the success rate for wolves translocated after being involved in depredation was twice the success rate for wolves released directly from captivity. This indicates that depredating wolves (and perhaps some non-depredating wolves) relocated to a different setting may significantly contribute to achieving the Reintroduction Project’s population objective. Interventions such as hazing, fladry, movement of wolves or livestock, and removal of individual pack members can also be employed to increase the likelihood of successful translocation of wolves that were previously involved in a depredation situation. See also SOP 13.0: Control of Mexican Wolves.
311. **Comment:** No funding for training of WS in livestock depredation investigation procedures. **Response:** See C/R 19, 170, 274, 292, 399, and 406 regarding budget and training. Although its annual Congressional appropriations continue to decrease, WS has been able to reallocate other appropriated funds in order to sustain essential depredation investigation training for other cooperating agencies as well as for its own employees.
312. **Comment:** No investigation or confirmation of hundreds of missing calves or cattle have taken place. **Response:** The 5-Year Review includes all depredation information reported to the IFT, except as noted in C/R 399-406 and 408 regarding SCAR. AMOC has no

information supporting a claim that hundreds of missing calves or cattle in the BRWRA have not been investigated. See also C/R 166, 275, 291, 432, and 449.

313. **Comment:** AMOC determines SOPs for investigations and should recuse themselves from investigating livestock kills and dog attacks. **Response:** AMOC sets policy for the IFT and oversees IFT activities, but typically is not directly involved in operational IFT activities. Thus, AMOC approved SOP 11.0: Depredation on Domestic Livestock and Pets consistent with the Final Rule's guidance on livestock and dog depredation, but the IFT carries out the investigations. In accordance with SOP 11.0, WS IFT members have the lead on conducting wolf depredation investigations. Other IFT members are available to help WS conduct effective, timely investigations. See also C/R 432 and 449.
314. **Comment:** AMOC forces WS to use AMOC procedures for livestock depredation investigations. **Response:** See C/R 313, 432, and 449.
315. **Comment:** WS are not allowed to trap problem or depredating wolves and USFWS refuses to allow WS to trap for problem wolves but makes WS responsible for confirming depredations as per AMOC and USFWS procedure for investigations. **Response:** See 11, 46, 253, and 275 on nuisance and problem wolves. See C/R 220, 274-275, 291-292, 297, and 299 on depredation investigations. See also SOP 13: Control of Mexican Wolves, which delineates AMOC's step-wise progression in procedures for controlling nuisance and problem wolves. WS IFT members have the lead in addressing problem wolf issues in the field. Other IFT members assist them, as necessary and available.
316. **Comment:** Livestock depredation removals are seldom done any longer, instead when there is a major livestock conflict USFWS removes the wolves for management purposes allowing them more flexibility to re-release problem animals. **Response:** See C/R 315 et seq. Permanent and other wolf removals will continue to occur in accordance with SOP 13.0: Control of Mexican Wolves.

K. Human/Wolf Interactions

Note: As AMOC was completing the 5-Year Review, an event occurred in Canada that might be highly relevant to the subject of human-wolf interactions in North America. On November 8, the body of 22-year-old Kenton Joel Carnegie, a 3rd-year survey crew intern with an energy exploration company, was found in northern Saskatchewan. Dr. Paul Paquet (personal communication, December 13, 2005) advises AMOC that a final Provincial Coroner's report is expected in January 2006, at which time it also will be made public. However, Dr. Paquet, a wolf expert well known to the Southwest as author of the 3-Year Review "Paquet Report" (Paquet et al. 2001), advises AMOC that preliminary investigation by law enforcement officials, and his own ongoing investigation for the Provincial Coroner, indicate a pack of four wild wolves might have attacked and killed the young man. However, death by wild dogs, with subsequent scavenging by wolves, had not yet been ruled out as this account was being written.

If wolves are proven to have killed Mr. Carnegie, it would be the first documented human death attributed to healthy wild (free ranging) wolves in North America in at least 100 years (see McNay 2002a and 2002b). Canadian experts and officials speculate that several factors might have contributed to the attack. In particular, huge expansion of exploration and mining for oil, gas, precious metals, etc. has resulted in an explosion of “wildcat” dumps (i.e. unregulated dumps), which are well known to attract predators (and wild dogs) and to result in increased risk of negative human-wildlife interactions.

The excerpted article below from the International Wolf Center is the most recent and thorough account available as to what might have occurred. It is included here in the 5-Year Review to ensure that it becomes part of the context for considering the issue of human-wolf interactions.

Regardless of the final outcome of the investigations, the fatal incident and increasing prevalence of habituated wolves and wild dogs in Saskatchewan underscore the need to take precautions in minimizing risks, including: ensuring that garbage dumps (regulated and not) are maintained in such a way that bears, wolves, wild dogs, and mountain lions do not become habituated to them; never feeding free-ranging predators, especially not at arm’s-length distances; never providing food to domestic dogs or other domestic animals in such a way that predators might be attracted, and maintaining ready access to deterrent sprays and other protective devices in case of approach closely; etc. See Fritts et al. (2003) for broader discussion of topics related to dynamics between wolves and humans.

Four Wolves Suspected in Man’s Death in Remote Area of Canada

By Jess Edberg, Information Specialist -- International Wolf Center, 12/12/2005

An apparent wolf attack has been determined as the cause of death for 22-year-old Kenton Joel Carnegie, whose body was found on Tuesday, November 8, at Points North Landing near Wollaston Lake in the Canadian province of Saskatchewan, about 450 kilometers northeast of La Ronge.

The main theory in this case is that Carnegie was attacked by a pack of four wolves seen in the area for some time that were showing signs of losing their natural fear of humans (an indication of habituation to humans), according to Saskatchewan Environment and Resource Management (SERM) wolf biologist Tim Trottier, who is investigating the case. There is also evidence that Carnegie and others had recently been interacting with the wolves at close range.

Canadian wolf biologist Dr. Paul Paquet has also been investigating the incident and says that evidence points to approximately four wolves, based on blood and tracks present in the area. Investigating conservation officers, given permission to kill any wolves suspected in the incident, have killed two wolves from the area. Dr. Paquet’s examination

of the animals showed cloth, hair and flesh in the large intestine that resembled human remains and are being tested for human origin.

Paquet said that the wolves suspected of attacking Carnegie probably had prior human contact and that the attack was likely spurred by the animals' interest in discarded food or garbage.

"I suspect that ultimately we will find that these are garbage-habituated wolves that are either being inadvertently fed or intentionally fed in the area," he said. "That is the common thread to most wolf attacks that I've investigated."

If wolves are proven to have killed Carnegie, it will be the first documented case of healthy, wild wolves killing a human in North America.

Does this mean that all wolves should be considered a serious threat to humans living in or visiting wolf country? Not necessarily. Wolves and other wild animals have always been unpredictable. Bears, mountain lions, bison, moose and even domestic pets have been known to present a serious threat to people under certain circumstances. The danger may lie more in how we as humans behave in the presence of a wild animal and not the other way around. Tens of millions of human visitor days have been logged in wolf country without wolf attacks.

Like other wild and domestic animals, wolves are responsive to the actions of humans. Humans have a remarkable ability to influence and shape animal behavior, whether that involves a black bear harassing campers for food after being fed by an eager photographer, a raccoon rummaging through your trash can when the lid is not secured, or a chickadee feeding contently at a backyard feeder while you watch through your kitchen window.

Our actions have the potential to cause immediate and sometimes dangerous behavioral changes in wildlife. Wolves are probably no different from a chickadee in how susceptible they are to habituation. By avoiding contact with wildlife or providing negative stimulus in the presence of a bold animal (yelling, banging pots and pans, throwing sticks), also known as aversive conditioning, we may be able to avoid habituating animals to us.

Could this regrettable event have been prevented with appropriate waste disposal and aversive conditioning by those encountering wolves? We cannot know; we can simply be aware of the potential danger of habituating wild animals to us and take action against it in the future.

317. **Comment:** The issue of teaching wolf aversion to humans needs to be addressed in the 5-Year Review. **Response:** SOP 13.0: Control of Mexican Wolves provides guidelines that could help avoid or reduce nuisance behavior of wolves and some wolf/human conflicts.

SOP 3.0: Outreach addresses the need and various mechanisms (e.g. presentations, brochures, posters, website postings) by which to provide such information to the public, especially those who live or recreate in the BRWRA. This was not adequately highlighted in the draft 5-Year Review, but will be emphasized in the final document (see also the Note, immediately above).

318. **Comment:** Wolves should be removed from residents who fear and don't like wolves. **Response:** Fear or dislike of wolves is not sufficient cause for wolves to be removed. The Final Rule states that a person may take (kill) a Mexican wolf in self defense or in the defense of others. In addition, if the USFWS, or an authorized agency, determines that a wolf presents a threat to human life or safety, USFWS or the authorized agency may kill it, capture and euthanize it, or place it in captivity. SOP 13.0: Control of Mexican Wolves provides guidance on managing "nuisance" wolves. It calls for escalating response levels until the nuisance activities have ceased. See also C/R 11, 253, 275, and 278 on nuisance and problem wolves.
319. **Comment:** Work with State and Federal veterinary offices to guarantee that livestock operators will be financially protected should wolves carry and transmit FMD and anthrax to the U.S as it has become fact in Russia/Eurasia. **Response:** The last documented occurrence of FMD in the USA was in 1929 (see C/R 320-321, 324-325, and 421). To date, AMOC is not aware of any credible publication or other report that identifies wolves as a vector of FMD or anthrax. We are aware, however, that a Russian linguist, Mr. Will Graves, is translating Russian literature on wolves in Russia for a book that may be relevant to this Comment. We will review the book when it has been published. Regardless, responsibility for compensation due to FMD or anthrax related livestock losses would be at the discretion of Congress, and likely be administered through WS Veterinary Services. Further information on Veterinary Services can be found at <http://www.aphis.usda.gov/vs>. Additionally, for informational purposes only, AMOC notes that:
- a. FMD is a highly contagious but usually nonlethal disease of ruminants, camels, and swine that is characterized by vesiculation of the oral mucosa of the skin and of the feet (Thomson et al. 2001). In Africa, African buffalo (*Syncerus caffer*) play a pivotal role in FMD as a sylvatic maintenance host (Bengis et al. 2002). Outside of Africa, FMD is primarily maintained in domestic ruminants, particularly cattle, but wildlife occasionally are infected incidentally by spill over (Bengis et al. 2002). In the carnivore family, only two species of bears (grizzly bear [Grosso 1957] and Asiatic black bear [Neugebauer 1976 as cited in Hedger 1981]) have been identified as contracting FMD (Hedger 1981).
 - b. Anthrax is an infectious and often fatal disease of domestic and wild animals and humans that is caused by the endospore-forming bacterium *Bacillus anthracis* (Gates et al. 2001). Anthrax is global in distribution and is endemic to North America. In the USA, there are two endemic areas: western Texas and adjacent Mexico, where outbreaks are reported sporadically in sheep and white-tailed deer; and northwestern Mississippi and adjacent southeastern Arkansas, where outbreaks occur primarily in cattle. In general, herbivores (e.g. cattle) are much

more susceptible to anthrax than are carnivores. Carnivores are more likely to develop chronic anthrax, which is rarely fatal. During an epidemic, carnivores may eat large quantities of contaminated meat without developing anthrax. In a table of species susceptible to anthrax (Gates et al. 2001), several species of African canids were listed but no North American canid has been identified as being susceptible to anthrax. Gates et al. (2001) also included the following statement: “In an epidemic among bison in northern Canada, workers observed numerous apparently healthy wolves *Canis lupus* scavenging on carcasses, even though they had consumed so much contaminated meat that their abdomens were distended almost to the ground and they could barely run. No dead wolves have ever been found during anthrax epidemics in northern Canada.”

320. **Comment:** Dr. Lawhorn of the Dept. of Homeland Security has said that the damage caused by FMD if introduced into the American cattle industry would be unquantifiable. Will the USFWS review all the Russian scientific literature dealing with this information? (comment predicated on a draft book regarding the truth about Russian/Eurasian wolves in which the author indicates wolves are the stimulators in carrying and mechanically transmitting highly contagious and infectious diseases such as foot and mouth and anthrax and questions whether due diligence been done in the lower 48 America by the USDA). **Response:** AMOC and the IFT make every reasonable effort to review the best available science and information pertaining to wolves, and incorporate it into the Reintroduction Project as necessary and appropriate. See also C/R 319.
321. **Comment:** Will the Governors of NM and AZ, the State legislators and appropriate agency personnel be provided all the scientific peer reviewed research performed by State and Federal veterinary authorities on the possibility of FMD outbreak and wolves being the carriers of the disease? **Response:** The Governors of AZ and NM receive briefings from their respective Department of Agriculture on diseases issues such as FMD. State legislatures are similarly advised on such issues, as necessary. AMOC operates the Reintroduction Project under direct and indirect guidance from various Federal, State, and private veterinarians, including any advice from the two State Departments of Agriculture. All reasonable disease concerns have been and will continue to be considered in developing and revising SOPs for the Project. However, thus far the possibility of wolves as carriers of FMD has not been sufficient to warrant modifying any SOPs for this Project. See also C/R 319 and 320.
322. **Comment:** Wolves as carriers of rabies needs to be addressed since most wolves in the wild are not vaccinated and the vaccine used on the collared wolves has been determined by the USDA to not be effective on wolves. This will greatly increase as wolves are allowed to range near Mexico where rabies is common. **Response:** The rabies virus is in the genus *Lyssavirus*, which has a near global distribution (World Health Organization 1994). Lyssaviruses are well adapted to particular mammalian species. Striped skunks, gray foxes, and bats are considered the primary rabies vectors (reservoir species) in the Southwest. All of these species are infinitely more abundant in the Southwest than are wolves. Moreover, mammalian species other than skunks, foxes, raccoons, bats, and

coyotes in North America are normally considered dead end hosts that do not serve as vectors. In other words, wolves are dead-end hosts for rabies and unlikely to transmit the disease to any other animal, including humans. Rabies is more likely to impact wolf ecology by decimating packs (Ballard and Krausman 1997; Chapman 1978; Theberge et al. 1994), due to their social habits and den use (Weiler et al. 1995). Rabies vaccines approved for use in domestic dogs have been used in captive wolves for many years, and more recently in the red wolf and Yellowstone gray wolf efforts (Federoff 1999). Regardless, the Blue Range Reintroduction Project vaccinates all captive wolves prior to release to the wild, and all those captured in the wild, for canine distemper, adenovirus, coronavirus, parainfluenza, parvovirus, and rabies. All these vaccines are approved for domestic dogs and can legitimately be used off-label for wildlife under veterinary direction. These vaccines are effective in preventing diseases in wolves, but wolves have not been clinically challenged by the diseases following vaccination. Although WS has not approved rabies and canine distemper vaccines for on-label use for wolves (Kreeger 2003), captive and free ranging wolves develop rabies antibodies when given inactivated canine rabies vaccine (Federoff 1999). The bottom line is that wolves have nowhere been shown to be significant disease vectors (for rabies or other diseases) in comparison to other wild or in comparison to domestic mammals typically present in a wolf-management area.

323. **Comment:** Significant issues concerning public health must be addressed and demands placed upon the agencies as to response to an impending threat to public health. Wolves are being introduced into a rabies endemic area. It is a proven fact that wolves can travel 140 linear miles and this places the Mexican border well within their range. Mexican feral dogs and coyotes are currently rabies epizootic and manifest exposure to Mexican wolves. There is no scientific evidence to prove efficacy of wolf vaccination; however, there is evidence of vaccination failure in wolves. Only a portion of reintroduced wolves have been rabies vaccinated. There is no known vaccine approved or recommended by WS or the American Veterinary Medical Association. Additionally, the AVMA also concluded that translocation of known terrestrial rabies reservoir species should be prohibited. The Mexican wolf is such a species. There are no known measures to control rabies zoonotic outbreaks. A single rabid wolf would result in a rabies disaster. The program should be terminated prior to a real imminent hazard of wolf rabies infections of humans directly or via domestic animal intermediaries. **Response:** See C/R 322.
324. **Comment:** Will WS/USFWS do the studies and take appropriate action to guarantee that an outbreak of FMD will not take place in the United States as it has recently occurred in Russia? **Response:** See C/R 319, 320, and 321. Addressing FMD is not within the scope of the 5-Year Review or AMOC's authorities or management obligations. Preventing foreign animal diseases in livestock at the Federal level is the responsibility of WS Veterinary Services. Further information on Veterinary Services and FMD can be found at <http://www.aphis.usda.gov/vs>.
325. **Comment:** Are the State and Federal game and fish personnel aware that if an FMD outbreak occurs, the quarantined area or "hot spot" will be locked down for 30 mile

- radiuses indefinitely by the Department of Homeland Security/USDA? **Response:** See C/R 319-321 and 324.
326. **Comment:** When problems come up both wolves and humans should be discouraged from the behavior which led to the problem. It does no good to kill “problem” wolves when “problem” people continue to act irresponsibly. **Response:** See C/R 11, 253, 275, 278, and 318 on nuisance and problem wolves.
327. **Comment:** The report does not address the enormous amount of fear, terror, and stress wolves engender. **Response:** See C/R 593. AMOC cooperators do not have the specialized expertise necessary to assess psychological/social impacts relating to human fear and stress that might be attributed to presence of wolves or much more common predators that exist throughout the BRWRA, including black bears and mountain lions. However, AMOC can (and will) continue to consider and provide the most accurate, complete information available regarding real or perceived stress-related impacts of Mexican wolves, and any means by which to help alleviate such impacts. As noted elsewhere (see C/R 72, 175, 318, 328, 330, 332, 344, and 415), the “best scientific” information available strongly indicates that fear such as is noted in this Comment is not warranted. Wolves simply do not constitute an appreciable (statistically significant) threat to human safety or health. Ultimately, though, AMOC realizes that fear is not necessarily a fact, data, or logic-based emotion, and absence of a factual or logical foundation for fear does make the personal impact any less “real.” Fear is a very personal thing: some people will fear wolves no matter what the “facts” are; others will not fear wolves no matter what the “facts” are.
328. **Comment:** Wolves are a threat to our and our children’s safety needs to be evaluated in the 5-Year Review. **Response:** As of September 30, 2005, there were no documented accounts of free-ranging (wild) wolves killing people (adults or children) in North America (see McNay 2002a and 2002b; L.D. Mech, personal communication, October 5, 2005). Although attacks by wild wolves on humans do occur, a wolf attack of any kind is an extremely rare event in North America. Most attacks in North America have involved rabid wolves, wolves habituated to humans (e.g. being fed by humans at campgrounds or near settlements), or wolves that were being beaten or which someone was trying to kill (and the “attacks” were thought to be the wolves’ attempts to get away). See also C/R 175, 318, 327, 332, 415, and 593.
329. **Comment:** Human safety is the main reason this program should be terminated. USFWS has recorded two pages of human encounters in the 5-Year Review and left out at least another page worth that they seem to have forgotten about or were not reported. **Response:** See C/R 72 regarding possible causes for terminating the Reintroduction Project and C/R 327 and 328 regarding concerns about human safety. With regard to the number of human encounters during the 5-Year Review period (1998-2003), all 11 incidents of wolves “approaching” humans in the BRWRA that were reported to the IFT were incorporated into a Project database and reflected in the Review. No documented reports were withheld or have been “forgotten.” AMOC is aware that other people claim

to have had such encounters, but, for various reasons (e.g. see C/R 278 and 346) have apparently declined to submit reports. We again encourage all persons to report wolf-human interactions within the BRWRA, so incidents can be investigated when appropriate to do so. Absent such information, AMOC is unable to fully consider the scale and significance of this issue in adaptively managing the Project.

330. **Comment:** Mothers in the Catron County area have seen wolves in their yards and keep their children in their homes when they should be allowed to at least roam their yards or stand at bus stops. **Response:** Observations of wolves in proximity to areas or structures occupied by humans do not of themselves mean the wolves might attack humans or domestic animals. Although some situations in the BRWRA have caused concern among local residents, no incidents of Mexican wolves attacking children have been documented anywhere in AZ or NM. Even so, humans living or recreating in areas occupied by predatory species of wildlife (especially bears and lions, which have occasionally attacked children in the Southwest) should take appropriate precautions, and be thoroughly educated about prevention measures such as those described in SOP 13: Control of Mexican Wolves and outreach materials available from the IFT. See C/R 332.
331. **Comment:** USFWS now tells local inhabitants not to allow their children to have a dog to protect them from coyotes, lions and bears because the dog will attract wolves. **Response:** AMOC does not tell anyone not to own a dog or another pet, but does provide information about relevant risk-reduction measures. In some circumstances, the presence of dogs can increase the chance of a close encounter with wolves. See also C/R 330.
332. **Comment:** The USFWS has admitted that children's voices attract the Mexican wolf. **Response:** McNay (2002a and 2002b) referenced six wolf/human-child interactions in Alaska and Canada (but none in the USA), none of which indicated that a child's screams or voices might have elicited the interaction. When AMOC asked about this Comment, L.D. Mech (personal communication, October 5, 2005), one of the world's most respected wolf experts, replied that he was not aware of any specific instances in which the voices of children could be specifically tied to a wolf attack on a child. However, he also stated, "if small children are in an area where large predators occur, be they bears, mountain lions, bobcats, coyotes, domestic dogs, or wolves, it is only prudent, no matter how unlikely an attack, that adults maintain an extra level of vigilance." See also C/R 330 and 331.
333. **Comment:** USFWS has gone so far as to try to build an 8 foot fence for a woman with 4 small children because of Mexican wolf encounters. **Response:** The Comment is not accurate. The referenced situation is this: Defenders is providing materials to a rural family to construct a 6-ft high fence to protect various animals (e.g. chickens, horses) from possible depredation by wolves. Defenders has specifically advised the family, which is contributing labor to the project, that allocation of proactive conservation funds to this project does not mean Defenders believes any humans, adult or otherwise, are at risk due to presence of wolves.

334. **Comment:** USFWS said in the EIS that Mexican wolves were shy and would avoid people, they now say that Mexican wolves are curious and intelligent and will follow people. **Response:** See C/R 175, 318, 327-328, 330, 331-332, 415, and 593.
335. **Comment:** Who is accountable if a Mexican wolf attacks and kills or injures a person? Current rules hold no associated agency responsible. These agencies have forced free roaming predators upon the populace with zero burden of responsibility. **Response:** A liability claim against a cooperating agency would likely be pursued through the appropriate State or Federal legal process. Federal claims would initially be considered within the Federal Torts Claim Act (FTCA), which provides a limited waiver of the Federal government's sovereign immunity when its employees are negligent within the scope of their employment. Under the FTCA, the Federal government can only be sued 'under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred.' 28 U.S.C. S 1346(b). Thus, the FTCA does not apply to conduct that is uniquely governmental, that is, incapable of performance by a private individual.
336. **Comment:** Mexican wolves kill and maim for pleasure and this is documented in the historic book "Slash Ranch Hounds." For people to think otherwise is utterly unfathomable. **Response:** Human emotions and feelings are often used in describing wolf behavior, especially in popular publications such as the G.W. "Dub" Evans hound book referenced in this Comment. "Slash Ranch Hounds" (1951; reprinted by High Lonesome Books in 2003) is an enthralling personal perspective by someone who experienced Mexican wolves first-hand as they were vanishing from the landscape. It includes a brief chapter entitled "Wolf Cunning." Much of the chapter describes interactions of wolves and ranch or hunting dogs. It is not, nor does it pretend to be, a scientific analysis or description of wolf behavior. Neither the Evans perspective (i.e. wolves are evil and should be exterminated) nor the diametrically opposed perspective evident in the popular literature (i.e. wolves are heroic and should be saved at all costs) advances adaptive management, which must be based on a more diverse reality, without judgment about perceived morality or lack thereof. Simply put, wolves are not humans; attributing human values and emotions to them fails to recognize their distinctness as a species and creates a shaky foundation for management.
337. **Comment:** Page 70, Technical: The description of "Event 1" is not entirely accurate. The dog was not "in camp" when it was attacked by the wolf and the wolf was not "in camp" when it was shot. These events took place some distance away from the actual camp site. **Response:** The text has been changed to read "Wolf 156 was shot by a camper who feared for his family's safety when the wolf was in the area of their camp and attacked their dog."
338. **Comment:** Appendix I, Wolf/Human Interactions, Technical: Incidents are missing and there are discrepancies. For example, #23 – is this August 23, 2002 incident with permittee or the incident later on with Wildlife Service personnel? Also, on August 15, 2002 there was a human interaction when a permittee witnessed a wolf eating livestock

alive. **Response:** Incident 23 refers to the incident involving WS personnel. Based on discussion with the permittee, a wolf/human interaction event was added to reflect the incident (see Event 23 in the Wolf/Human Interaction Table). Also, based on the discussion with the permittee, we concluded that the August 15 incident was not a wolf/human interaction because it did not involve wolves interacting with the permittee. It was a depredation incident, in which the permittee observed wolves attacking and eating a live Hereford cow. The wolves were chased away and WS personnel initiated a livestock depredation investigation.

339. **Comment:** The human encounter section is incomplete and is missing some of the more interesting incidents. Event 27 is incomplete. The encounter the young woman experienced lasted 10 minutes. That same evening both wolves followed my husband who was on foot driving cattle down a road. He was stuck between the cows and the wolves for an hour. An IFT employee also suffered somewhat threatening behavior by the same wolves the same night and that should be included too. **Response:** The IFT report on Event 27 did not include a timeframe nor did it indicate the wolves were following the rancher. Based on discussion with the Commenter, we made several changes in the text. We inserted a timeframe in the memo for this event (now Event 28) to reflect that it occurred for 10 minutes. The IFT report indicated the rancher had driven up on the herd of cows and observed two wolves attempting to get at some of the calves. As the cattle were herded toward the rancher's private land, the wolves followed the herd down the road. This information is now presented as Event 29 in the Wolf/Human Interaction Table. The IFT member who responded to the incident did not feel threatened by the wolves. The only wolf behavior the IFT biologist observed was directed toward the cattle in the area. The biologist shot rubber slugs and cracker shells at the wolves when they approached the cattle. The wolves left the immediate area, and were heard howling shortly afterward.
340. **Comment:** I have had dozens of close encounters I could write about between myself and my employees and the wolves (numerous accounts detailed). These wolves have no fear of humans and are handled and followed too much. **Response:** The person who submitted this Comment included two detailed incidents of Wolf/Human interactions that occurred after the data cutoff (i.e. 1998-2003) for the 5-Year Review analysis had passed. The IFT is trying to contact the individual to get more information about these events, and any other events the person might have experienced during the 5-Year Review timeframe. When the information is obtained, the IFT will review it and the database will be updated appropriately. AMOC encourages all persons to report incidents of wolf-human interactions in the BRWRA to the IFT, so they can investigate when appropriate and maintain an accurate incident database. Mexican wolves are now managed at all stages of the reintroduction process to minimize contact and habituation with humans. This includes stringent limitations on personnel that wolves contact within remote captive facilities, and field procedures that minimize direct contact between wolves and IFT staff. Aversive conditioning is also used, when appropriate (see SOP 11.0: Depredation on Domestic Livestock and Pets, and SOP 13.0: Control of Mexican Wolves).

341. **Comment:** Page 23, Table 2, Administrative: There have been 2 lethal controls, not 1. **Response:** The draft 5-Year Review presented information for 1998 through 2003, during which time only one lethal control occurred (in 2003). Now there have been three lethal control actions: one each in 2003, 2004, and 2005.
342. **Comment:** USFWS should adopt the 5-Year Review's recommendations for improving the Mexican wolf program by changing the practice of eliminating wolves from "areas where they conflict with livestock or humans," to placing greater emphasis on innovative approaches to minimizing opportunities for such conflicts. **Response:** See C/R 224, 237, 257, and 265.
343. **Comment:** Wolf/Human interactions (Page 18): We believe people have the right to go into the forest with or without their dog present and work their cattle if that is their business or go for a pleasure ride or legal hunt. We also believe they should be able to take food for themselves if they camp out and it should not be their fault if a wolf comes into their camp attempting to get the food. They should not have to wait until their lives are in complete jeopardy to legally do something about it. **Response:** The Reintroduction Project does not regulate whether people take dogs afield while working, recreating, or hunting. However, as noted in our outreach efforts, the presence of dogs does increase the likelihood of a close, but not necessarily a threatening, encounter with wolves. AMOC and the IFT also acknowledge that in most wolf-dog encounters, the dog will likely get the short end of the stick. However, we note that presence of many other species of wildlife (e.g. lions, bears, rattlesnakes, scorpions) also constitutes a danger to dogs, especially free-ranging dogs. We also note that dogs set loose to pursue lions or bears probably have a greater risk of encountering a wolf than do unleashed dogs. But, these collective risks do not deprive humans of the opportunity to make their living within or enjoy a recreational visit to the BRWRA, with or without the company of their dogs. Each person must assess any risk associated with a dog's presence in an area occupied by wolves, just as they must choose to address or not address any risks associated with bears, mountain lions, coyotes, lightning, hypothermia, etc. Accordingly, AMOC will continue to provide educational information to livestock owners, hunters, and various other publics about living and/or recreating in "wolf country." For areas consistently used by wolves, this often includes posting appropriate cautionary signs and providing information in hunting and recreation regulations and with permits or hunt tags. It also includes IFT outreach presentations in Hunter Safety Courses, to civic and other groups, and in campgrounds and day-use recreation areas throughout the BRWRA.
344. **Comment:** If a wolf comes to the home place of a dog and the dog acts as a watch dog growling and barking at the intruder, this should not be considered "provoked by the dog." Instead, it should be classified as the wolf being the intruder and provoking the altercation. **Response:** Human/wolf interactions were classified in the draft 5-year Review according to a publication summarizing reported wolf attacks in North America (McNay 2002a and 2002b). Because of the close relationship between wolves and dogs, wolves tend to treat dogs as competitors and potential intruders in their territory. A dog is also likely to defend its territory when a wolf approaches. Thus, if a wolf conflict occurs

in the presence of a dog, McNay (2002a and 2002b) typically considered it “provoked by the dog.” Such encounters are dangerous for the dog, and precautions should be taken to protect pets in occupied wolf areas. See also C/R 343.

345. **Comment:** Page 70, Technical: There are 2 incidents not mentioned in the Wolf/Human Interaction section. May 5, 1998 when a permittee saw wolves circling and lunging toward his cattle he was checking on. When he approached the cattle he hollered to scare the wolves off. The larger wolf came angling toward him. He shouted, walking toward them but they kept coming, leaving slowly only after he fired shots in the air. May 8, 1998 the Campbell Blue male killed a female cow dog among 3 houses behind what was thought to be a secure fence while residents were there. **Response:** The IFT has no record of the May 5, 1998 incident. The IFT database does not indicate the May 8, 1998 incident involved a Wolf/Human interaction, so it was not presented in the 5-Year Review. However, a female cow dog killed on May 8, 1998 was investigated and confirmed by WS. The IFT is still trying to contact this individual to get more information about these events, and will update the IFT database appropriately when it is obtained.
346. **Comment:** Recreational campers are refusing to inform or report interactions they are having with wolves for fear of being on the suspect list if a wolf showed up dead. How should these incidents be handled? Most of this is happening in the Buffalo Crossing area and also Beaver Creek and Hannagan vicinities. More and more people are coming to us local ranchers every year with these stories but they will not tell the authorities so no report, no wolf/human incident. Also, usually no dogs are involved. **Response:** When a wolf is found dead, the subsequent investigation (see SOP 12.0: Mortality and Injury Response) focuses where the evidence leads. Someone who has previously reported a wolf in that area might be contacted for further information, but that does not mean they would be a suspect in the death. Withholding such information has no up-side. Accurate, timely information on wolf-human incidents is essential to designing appropriate management responses, and to ensuring sufficient resources are available to provide appropriate response(s). See also C/R 278 and 329 on non-reporting.
347. **Comment:** While we strongly agree that there should be no restrictions to wolf movements throughout the geographic scope of the SWDPS, we strongly disagree with the part of recommendation number 1 (Technical) that would exclude areas from wolf occupation where wolves “conflict with livestock and humans.” Most of the SWDPS comprises areas where wolves and livestock could conflict. We request the language be revised to indicate that while conflicts with livestock and humans must be addressed and resolved, they will not automatically preclude wolf recovery in a given area. **Response:** The 5-Year Review and ongoing adaptive management of the Reintroduction Project will continue to focus on finding and implementing incentives for voluntary actions by local stakeholders that would help accommodate presence of wolves by reducing conflicts such as livestock depredation. Potential conflicts with humans and/or livestock will continue to be considered in evaluating releases and translocations. Significant conflicts may be decisive in avoiding a particular area, but lesser conflicts may be unavoidable, given that humans and livestock are so widely distributed within the BRWRA.

348. **Comment:** Farmers, ranchers, and outdoorsmen should adjust to allow for the presence of wolves. **Response:** Decades of agricultural and recreational experience in areas of Minnesota and the Northern Rockies that are occupied by humans and wolves affirm that farmers, ranchers, outdoor recreationists, and indeed the full spectrum of humanity can adjust to allow for presence of wolves, if they choose to adjust. This does not, however, change AMOC's obligation to manage Mexican wolves as necessary to integrate their presence into the Southwest's existing mosaic of public, private, and Tribal lands.
349. **Comment:** Livestock owners, hunters, and others who have traditionally taken their dogs with them to either make their living or just enjoy a recreational visit to areas in the wolf recovery areas are now deprived of that right without putting their dogs in danger. **Response:** See C/R 343.
350. **Comment:** A new rule provision is needed that all dogs in the BRWRA whether resident or owned by visitors must be controlled by physical restraint at all times. Dogs used in livestock operations are the exception. **Response:** AMOC will not recommend dog-control rules, regulations, policies, or ordinances beyond those already implemented by the appropriate County, Tribal, and/or local government, or beyond the local closures occasionally (and temporarily) implemented through the USFS for den sites and/or rendezvous sites. Leashing dogs in wolf country is often advisable for several reasons, but AMOC cannot require it and will not recommend regulations to require it for all circumstances. See also C/R 343.
351. **Comment:** The project has released wolves near outfitting businesses but provides no plans to mitigate attacks on hunting hounds. **Response:** See C/R 37, 55, and 223-241 on compensation (mitigation). Most wolf releases have been in relatively remote areas, away from human residents. However, outfitters also often use these areas. Wolves, outfitters, and hunters are part of the multiple-use National Forest landscape. The Final Rule does not consider wolves that attack hunting/ranching dogs on public land to be problem animals, but does consider wolves that attack dogs on private land twice within a year to be problem animals. Defenders may compensate for loss of a ranching dog, but does not compensate for loss of a hunting dog.
352. **Comment:** Release locations are far too close to communities and to calving cattle. **Response:** Releases and translocations are carried out in the most remote areas available, but other factors must also be considered. SOP 5.0: Initial Wolf Releases and SOP 6.0: Wolf Translocations call for release/translocation sites to be: (1) five or more miles from a town, (2) three or more miles from a dwelling occupied year-round, (3) evaluated relative to presence of livestock within five miles of the release/translocation sites, and (4) as far away as possible from active livestock calving pastures. Wolves can travel great distances relatively quickly, and cattle calf year-round in much of the BRWRA. Thus, wolves can travel to areas occupied by humans or calving cattle from anywhere in the BRWRA. Although most wolves tend to shy away from human habitations, not all do.

Undesirable contacts are thus inevitable, and will likely increase as more humans move to the BRWRA.

353. **Comment:** USFWS and cooperators refusal to listen to recommendations of affected public over questionable release areas have led to wolf/human conflicts. **Response:** See C/R 352. AMOC developed SOP 5.0: Initial Wolf Releases and SOP 6.0: Wolf Translocations specifically to establish consistent processes by which to ensure that all public comment is carefully considered in reaching decisions on new release and translocation areas. Although some release and translocation sites that AMOC approves might ultimately prove to be less than entirely successful, as some already have from any of several perspectives, they will always represent the best overall choice based on the selection criteria, all the comment received, and all the relevant available information.
354. **Comment:** Re-release of problem wolves is now an SOP. **Response:** Translocation of nuisance and problem wolves has occurred in the past and will occur in the future, per guidelines within SOP 6.0: Wolf Translocations and SOP 13: Control of Mexican Wolves. Many translocations have resulted in pairs that subsequently contributed to population growth through reproduction. As discussed in the 5-Year Review, animals with a depredation history seem to be less prone to depredate after translocation (see C/R 131, 147, and 269). Furthermore, most documented nuisance situations are caused by wolves with limited time in the wild. This behavior generally ceases after about three months in the wild.
355. **Comment:** Problem animals are seldom removed unless there is intervention by higher authority. **Response:** See C/R 11, 46, 253, 275, 278, and 318 on nuisance and problem wolves. AMOC believes that sometimes the cooperating agencies have not responded appropriately to problem situations. Some responses lacked timeliness, or were not sufficiently rigorous. The Aspen Pack situation in the Blue (late 2004) probably brought such concerns to a head within AMOC. As a result, problem animals are now removed in accordance with SOP 13.0: Control of Mexican Wolves.
356. **Comment:** NGO cooperators are allowed to participate in decisions to expunge the record of a problem animal for re-release of problem wolves. **Response:** See C/R 49, 244, 245, 247, 455, and 456: NGOs do not have cooperator status within AMOC, and do not participate in making decisions about possible re-release of a nuisance or problem animal. Wolves are managed according to SOPs; criteria for re-release of wolves are set forth in SOP 6.0: Wolf Translocations and SOP 13.0: Control of Mexican Wolves. According to SOP 13.0, if an animal has been involved in three depredation incidents, it must be permanently removed from the wild in AZ and NM. However, if a wolf has been involved in fewer than three depredation incidents, it might, if more than 365 days have passed since the last incident, be considered a “new” wolf. Ultimately, however, the record of a wolf follows the animal throughout its life, and at no point in time is any information “expunged” from its record.

L. Recovery Planning

357. **Comment:** The 1982 Recovery Plan needs to be updated now to address ongoing management and future reintroduction (not recommended as the rule stands now). The BRWRA will not meet the 100 goal as the way the program stands now. **Response:** The structure, function, and activities of the SWDPS (Gray Wolf or Mexican Wolf) Recovery Team are outside the scope of the 5-Year Review. Concerns regarding the Recovery Team should be addressed separately and directly to the USFWS, which convenes the Team, defines its purpose, and enables its work on recovery issues. See also C/R 64, 85-87, 96, 457, and 463 on SWDPS Recovery Team issues. However, given that the goal of achieving at least 100 wolves in the BRWRA is a Reintroduction Project goal, not a recovery goal, but still must be placed in a recovery context, AMOC has made a recommendation regarding convening a Recovery Team to complete a Recovery Plan (see the AMOC Recommendations Component). See also C/R 85-88, 103, 106-109, and 368 on possible boundary changes.
358. **Comment:** The 1982 Recovery Plan needs to be revised to include downlisting and delisting criteria. **Response:** See C/R 357.
359. **Comment:** How was the 100 wolves as a reintroduction goal established? This information is not provided in the report. **Response:** See C/R 64, 85-87, 96, 357, 457, and 463 regarding issues pertaining to the SWDPS Recovery Team, Recovery Plan, and recovery or reintroduction population goal/objective. AMOC has noted considerable misunderstanding about “100 wolves” as a population or recovery goal. The 1982 Mexican Wolf Recovery Plan (USFWS 1982) identified the following as a “prime objective,” not as a recovery criterion or even as a downlisting threshold: a “self-sustaining population of at least 100 wolves in the middle to high elevations of a 5,000 square mile area within the Mexican wolf’s historic range.” The desired wild population, in conjunction with establishment of a captive breeding program, was intended to conserve and establish the survival of *Canis lupis baileyi*. The 1982 Recovery Plan “prime objective” was carried forward through the 1996 FEIS and the 1998 Final Rule. Thus, it became the current BRWRA reintroduction population goal or objective. In other words, it is not and never has been a final recovery goal (see also B.2 in the Administrative Component). Updated recovery criteria for southwestern wolves (i.e. the Mexican wolf) have yet to be recommended by a Recovery Team. However, AMOC remains accountable for determining through the 5-Year Review whether adjustments in the current nonessential experimental population goal and BRWRA boundaries are warranted. Thus, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible changes in the Final Rule or creation of a new Final Rule, as well as convening a Recovery Team to address Recovery Plan issues (see the AMOC Recommendations Component; see also C/R 99). The USFWS Region 2 Director will then be responsible for acting on AMOC’s recommendations.

360. **Comment:** It should be abundantly clear to the USFWS and the Recovery Team that successful recovery of wolves in the SWDPS depends upon and is advanced by successful recovery of the BRWRA population. **Response:** See C/R 357.
361. **Comment:** Page 101, Comment #66; Technical: The primary author of this review comment is a member of the SWDPS Recovery Team and has no knowledge of a “population habitat viability analysis of the wild population in the BRWRA” being conducted by the Recovery Team. Even if this statement by the USFWS was true at the time this document was written, this action cannot now be categorized as “being implemented” because the SWDPS Recovery Team is now on hold due to recent litigation nullifying the 2003 rule which established the SWDPS. **Response:** The response to Comment #66 has been modified from the draft 5-Year Review to reflect the current status of the Recovery Team. See also C/R 64 and 357.
362. **Comment:** It is inappropriate and an abrogation of ESA responsibility for the USFWS to postpone currently authorized recovery actions as provided by the 1982 Recovery Plan for the Mexican wolf pending some uncertain future decision or plan rendered by the now inactive SWDPS Recovery Team. **Response:** See C/R 86 and 109 regarding recovery actions and C/R 357 regarding the Recovery Team.
363. **Comment:** Page 5, Paragraph 1 (Technical): The Recovery Team has been suspended and is unlikely the plan will be completed in 2006. Also the Team did not review the 5-Year Review as stated on an unnumbered page preceding the Technical Component. **Response:** See C/R 85-87, 109, 110, 122, 357, and 359, as well as the Administrative Component (B.2) of the 5-Year Review for background on and current status of the recovery planning effort. See C/R 6 regarding Recovery Team review of the draft 5-Year Review.
364. **Comment:** Page 101, Item 66 (Technical): Because the Recovery Team has been suspended, this review should include such a population and habitat viability analysis. **Response:** See C/R 71 and 361.
365. **Comment:** All references (Administrative) to decisions, analysis, and products stemming from the SWDPS Recovery Team’s work must now be amended to reflect that team’s suspension. **Response:** We amended the 5-Year Review accordingly.
366. **Comment:** The USFWS should move forward in finalizing the draft SWDPS Recovery Plan no later than the August 2005 expected release date. **Response:** See C/R 357 and 363. See also B.2 in the Administrative Component.
367. **Comment:** USFWS should re-evaluate the northern limit of the recovery area. The Mexican wolf is the best source for establishing wolves in the Southern Rockies Ecosystem. The northern boundary of the recovery area should be expanded north to include additional suitable habitat for Mexican wolf reintroduction. **Response:** The

Southern Rockies Ecosystem referenced in this Comment is outside the scope of the 5-Year Review.

368. **Comment:** The expansion of the recovery zone was anticipated by the Coalition of Counties and livestock producers when the original rule was proposed. The USFWS and environmental organizations that support their agenda have been notorious in their lack of integrity concerning making agreements and sticking to them. The FEIS should have accurately disclosed the ultimate goal of reintroduction. That is, reintroducing Mexican wolves from the Mexican border to southern Utah and Colorado should have been analyzed in the FEIS as a predictable outcome of incremental actions leading to a final action. **Response:** The original (current) Final Rule and BRWRA boundaries were based on a different understanding of Mexican wolf historical distribution than exists today, due to recent advances in science (see C/R 82, 88, 164, and 181). Moreover, the first few years of the Reintroduction Project were expected to provide new insights about how well BRWRA boundaries provide for progress toward the Project's population goal. This was reflected in the Final Rule's requirement for evaluating the reintroduction effort through 3-Year and 5-Year reviews. Whether boundary changes such as those referenced in this Comment should have been addressed in the FEIS is now moot. More importantly, any changes proposed through 5-Year Review recommendations (see the AMOC Recommendations Component) will be vetted through the appropriate administrative and regulatory processes.
369. **Comment:** Wolves moving outside the recovery area is indicative of a habitat choice that was a political decision and not necessarily within a Mexican wolf's instinctive comfort zone. Normally these were desert animals and the early arguments that lead to the BRWRA being defined as the Primary Recovery Zone are now being shown by the wolves themselves to be incorrect. **Response:** The 5-Year Review indicates that 68% of single wolves (those dispersing or that left the pack following release) were reported outside the BRWRA boundary at least once. However, only 11 of the 39 yearly home ranges of wolf packs delineated extended beyond the BRWRA. Thus, Mexican wolves primarily occupy the BRWRA, which habitat modeling is now affirming is one of the most suitable areas in the Southwest for wolves to occupy (Carroll et al. *in press*). One reason that wolves sometimes occur outside the boundary is simple: wolves disperse great distances and the current BRWRA is not very big relative to wolf movements. For instance, one Mexican wolf moved from outside the boundary on the west in AZ to near the northeastern boundary in NM in a relatively short period of time.
370. **Comment:** The goal of 100 wolves for the BRWRA is way overestimated and needs to be reconsidered as the number of wolves now occurring are leaving the recovery area and are slaughtering much more livestock than projected in the FEIS. **Response:** See C/R 99, 103, 104, 108, 189, 199, 202, 287, 357, and 359 regarding the population goal. See C/R 216 and 291 regarding livestock depredation.
371. **Comment:** Mexican wolf recovery efforts should be focused in Mexico, not here. **Response:** The ESA mandates that recovery efforts in the USA be undertaken by Federal

agencies and, more obliquely, cooperating State and Tribal agencies (see C/R 48). These agencies cannot legally abdicate that responsibility to foreign countries.

372. **Comment:** The new, Mexican Wolf Recovery Team is made up of people who are USFWS employees, State agency employees or board members and advisors of the Southern Rockies Wolf restoration group. Individuals not associated with government agencies or preservationist organization pay their own way to participate in the Mexican Wolf Recovery Team. **Response:** See C/R 357.
373. **Comment:** Allowing the NGOs to serve as experts on the Recovery Team has given them unique power over the landowners in the areas affected by endangered species. **Response:** See C/R 357.
374. **Comment:** Remove the Mexican wolf from the endangered species list. **Response:** The Mexican wolf will not be removed from the endangered species list until or unless one of the following occurs: (a) it is recovered; (b) it becomes extinct (i.e. it does not exist in captivity or the wild); (c) a court decision results in removal; or (d) the ESA itself is changed by Congress in such a way that listing is no longer appropriate.
375. **Comment:** Terminate the current Recovery Team and reassign a new team whose primary objective is reasonable recovery rather than social engineering. This team should sign a term of reference that includes consideration of human social impact and historical science. **Response:** See C/R 357.

M. Livestock Grazing on Public Lands

376. **Comment:** Establish a rule that wildlife has precedence over livestock on public land. **Response:** Livestock grazing on National Forest lands is a traditional lawful use and part of the USFS multiple-use mandate. Livestock grazing is authorized and regulated by the Multiple Use Sustained Yield Act of 1960, the Federal Land Policy and Management Act of 1976 [Section 402(a)], Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976, NEPA of 1969, and the Rescission Act of 1995. See also C/R 227, 378, 380, and 472.
377. **Comment:** Page 9, Paragraph 3 (Technical): Several factors to be assessed as causes are minimally germane to the success and should be removed or conflated with others: 1) the year of release does not convey any biological information; 2) time spent in acclimation pen if functionally synonymous with method of release and thus one of these should be dropped from the analysis; 3) state (NM or AZ) partly overlaps the question of type of release (i.e. translocation or initial release) and does not in and of itself represent a biological factor -- information that might stem from using this factor could better be analyzed by substituting "distance from other wolf pack home ranges," which better distinguished the situation in NM from that in AZ during the period under review; 4) what may be the most important factor in success of wolf release is the animal unit months of livestock grazed or actual (if actual use figures are not available) within a

given distance from the release site. **Response:** Year and State of release are used in this analysis as a blocking variable relative to other biological variables, principally weather patterns and environmental differences, in a given year. Data that overlaps years can mask or accentuate differences in other variables that more closely relate to yearly differences. Other variables were not prevented from entering into the model before year or State if they were more significant in describing the patterns observed. Analysis of the data indicates that method of release and time spent in an acclimation pen are not functionally synonymous; method of release had a significant effect on success, while time spent in an acclimation pen did not. Regardless, each variable analyzed had the potential to be in the model prior to other variables if it was more significantly related to success of individual releases. Cattle densities and distance to other wolves were discussed as possible analysis factors. However, releases and translocation sites were chosen to avoid other wolves and cattle to the greatest degree possible within the area available for releases. Thus, these factors were controlled for in release area selection. Further, no wolf deaths were caused by other wolves during the 5-Year Review time frame of 1998-2003 (see C/R 140 and 146 on the Lupine Pack for further information), thus other wolves had little influence on success of any releases. A wide variety of habitat features could be included in the release success model (e.g. 2-wheel drive and 4-wheel drive road densities, ungulate densities, livestock densities, wolf densities, vegetation characteristics [e.g. the openness of the habitat], water, and slope). However, searching for a specific link between environmental variables and release success was outside the scope of this analysis, because of time and resource constraints (such an analysis would take years of dedicated research). Rather, we looked at more basic factors associated with the wolves that might affect survival (e.g. age, sex); habitat variables might be investigated in future detailed analysis. There are two different underlying questions in assessing release success, (1) which animals and methodologies are likely to be successful, and (2) what areas promote successful releases. The first question could be assessed with existing data, but the latter question would require extensive GIS analysis and computations that could not be accomplished within the available time. Further, questions arise with regard to the timing of any cattle density comparison. Is it the number of cattle present at the time of release, or the animal unit months on the allotment throughout the year? What if the wolves do not use (remain in) the allotment in which the release occurred? Further, wolves within a given pack were subject to differing conditions relative to cattle presence, due to their post-release behavior (e.g. some dispersed, some stayed near the release site). Similarly, “distance to other wolves” had significant issues in terms of methodologies (e.g. Is it measured at the time of release – as in a point location to a point location, or via the preceding year’s home ranges, or via the home ranges that were eventually established by released wolves within the year. Overall, these analyses will require more time for careful consideration of the methodologies and a greater number of variables collected from GIS data to determine which areas promote successful releases.

378. **Comment:** The revised rule should prohibit the removal or lethal take of wolves for engaging in livestock depredation within the currently defined BRWRA. Wolf recovery should be established at least a co-equal (to livestock grazing) priority. Until wolf

recovery is stable and the population within the BRWRA is considered a “source” population, the USFWS should give deference to wolves when conflicts occur between wolves and livestock. We recognize this is potentially a very controversial recommendation and we are not recommending forced elimination of grazing privileges in the BRWRS, but rather innovative solutions that promote wolf recovery such as voluntary grazing allotment retirement programs or implementing new livestock husbandry and management practices that minimize conflicts. **Response:** Under the Final Rule, wolves released to the wild are considered expendable to the Recovery Program. The Final Rule reflects a commitment to integrate wolf reintroduction into multiple-uses of public lands and to minimize conflicts on private lands. The Final Rule is not structured, nor is the Reintroduction Project empowered or administered, to force changes in public or private grazing practices to accommodate presence of wolves. See also C/R 51, 106, 155, 227, 376, 380, and 472.

379. **Comment:** Cattle should be removed from all public land. **Response:** See C/R 376.
380. **Comment:** This kind of recommendation (notify livestock operators when wolves are likely to den in livestock pastures and consider modifying grazing use to minimize opportunities for depredation) is indicative of our claim that the Mexican wolf is being used as a means to control and limit the ability of livestock allotment users to access their Federal grazing allotments. There has been no cooperation with ranchers in developing implementation of this suggestion even though it says livestock permittees have been contacted. It is beyond my capacity to understand why Defenders is a partner in this recommendation. Livestock grazing is a legitimate, legal, and approved application of the Multiple Use Sustained Yield Act and should not be inhibited by this program. It is enough of a strain on ranchers to have to tolerate the excess predation without having to worry about the availability of pasture. (#15) Technical. **Response:** See C/R 227, 376, and 472. USFS is mandated by section 7(a)(1) of the ESA to contribute to conservation of the Mexican wolf. Therefore, USFS has been an active participant in reintroduction and recovery efforts for the species. USFS is not; however, removing ranching from National Forest system lands as a result of the Mexican wolf. USFS operates under a multiple-use mandate in which both uses have value. It is prudent for the IFT to advise ranchers when situations arise that could lead to livestock depredation. Defenders becomes involved in such situations only to offer assistance to permittees who desire such assistance. Ranchers have the opportunity to provide input and comments to AMOC on the 5-Year Review and any Federal rules that USFWS prepares in response to AMOC recommendations in the Review. Members of the ranching community have been involved in the Recovery Plan revision effort (but see C/R 357). Furthermore, the public is invited to attend AMWG meetings and provide input to AMOC. These public meetings are held quarterly at logistically convenient locations in AZ and NM.
381. **Comment:** USFS and BLM have a responsibility to be proactive in Mexican wolf recovery as outlined in Section 7(a) 1 of the ESA. They should modify grazing leases to require leaseholders to monitor and properly dispose of livestock carcasses to decrease wolf-livestock conflicts. **Response:** See C/R 380; Section 7(a) 1 of the ESA does apply to

BLM as well as to USFS. The types of requirements proposed in this Comment can be written into grazing permits, but only when mutually agreed upon by the permittee and USFS (see also C/R 257 regarding carcass removal).

N. Law Enforcement

382. **Comment:** Investigative actions need to be stepped up to try and apprehend people responsible for shooting Mexican wolves and penalties for killing wolves needs to be increased. **Response:** All wolf mortalities are fully investigated with every available resource. The USFWS Office of Law Enforcement conducts extensive proactive patrol activities in high risk areas to deter illegal take of Mexican wolves. Additional USFWS agents are routinely brought in to supplemental local staff in such actions. State and Tribal wildlife agencies, including IFT members and commissioned personnel, also assist in preventative enforcement contact efforts, and in investigations as requested by USFWS. Federal penalties for illegal take of a Mexican wolf are set in the ESA and could only be increased if the ESA were amended. State penalties are set by the respective State legislatures, and could only be changed by legislative action. WMAT Tribal civil penalties are under control of the Tribal Council.
383. **Comment:** Request additional law enforcement personnel and resources. Vigorously investigate not only shootings but also vehicular collision and human interference with wild wolves short of actual killing. Concentrate law enforcement efforts on identified sink areas and geographical clusters of mortalities and missing wolves. **Response:** See C/R 382. The USFWS Office of Law Enforcement investigates all wolf mortalities that occur in the wild, no matter the cause, and every suspect wolf-human interaction that might have resulted in illegal take of a Mexican wolf.

O. Other Translocation Projects

384. **Comment:** We request better coordination with respect to wolf releases into areas where other wildlife translocations are being conducted to ensure the wolf program doesn't hinder other active wildlife management activities. **Response:** This concern about the importance of coordination with other ongoing wildlife management activities was reflected in development and review processes for Project work plans, various SOPs, and management approaches in 2005, and will continue to be considered in future years. All wolf management actions (e.g. releases, translocations, and control efforts) are fully coordinated with wildlife management (including game management) programs within the State and Tribal agencies that are cooperating or are otherwise involved in the Project.
385. **Comment:** Wolves and lion hunting with hounds are not compatible and this can have grave consequences on future sheep transplants into the Bear Mountain area. **Response:** The conflict addressed in this Comment is largely unavoidable, especially considering projected increases in numbers of uncollared wolves. However, timely information on known or likely presence of collared wolves can better enable a houndsman to determine

whether or not to let hounds loose in a given area. This underscores the importance of ensuring that wolf management is effectively coordinated with other ongoing wildlife management activities. Consequently, Project work plans, SOPs, and management approaches have all been modified since 2004 to ensure appropriate coordination and flow of information (see C/R 384). Ultimately, though, loss of free-ranging dogs and running hounds to wolves (rarely does the opposite occur) is inevitable, just as hounds and other dogs are inevitably lost through encounters with mountain lions, bears, or other wild animals (e.g. rattlesnakes).

P. Scientific Procedures

386. **Comment:** Conducting studies, monitoring, and analyses to evaluate any community-level changes that may result from Mexican wolf reintroduction should be a main priority of the project. **Response:** AMOC believes that monitoring changes in the ecological community is very important. However, AMOC does not believe that day-to-day management needs for Mexican wolf reintroduction can be sacrificed in favor of, or while awaiting funding for, long-term ecological monitoring. Community-wide studies are often labor-intensive and costly, and thus far the budget for Mexican wolf reintroduction has not been sufficient to allow for both studies and management to occur. Consequently, AMOC and the IFT have used information on community-level changes from wolf studies in other areas (where applicable) as a basis for BRWRA management. If additional funds become available in the future, community-level monitoring may be implemented. See also C/R 35, 42, 132, 224, 301, 392, 431, and 492 regarding research.
387. **Comment:** On Page 7, study area/reintroduction area Technical report: break out the permitted number of cattle from the actual number of cattle. These 2 numbers are significantly different, especially since the onset of the drought. **Response:** This section of the 5-Year Review was changed to read: “Approximately 82,600 cattle and 7,000 sheep were permitted to graze roughly 69% of the BRWRA and 50% of the allotments were grazed year-round when Reintroduction Project began (USFWS 1996). The actual numbers of cattle and sheep varied each year relative to environmental factors, and were generally lower because of drought conditions.”
388. **Comment:** There was an admitted inconsistent data collection and recording methodology by independent observers and between government agencies over the years, yet the data from those years were combined with that of the more reliable years of statistical analysis. Some observers were volunteers and the triangulations put wolves in the Mohave Desert. **Response:** The triangulations and locations in the Mohave Desert during the referenced test were the result of human error: people analyzing the data used locations in different UTM zones on the same map. The data were accurate, but were incorrectly displayed and interpreted within the 3-Year Review. This error was corrected by zone transformations in the 5-Year Review.
389. **Comment:** The statistics used in this study are useful only if they are collected in a consistent, reproducible, comprehensive, and uniform fashion. Much of the data in this

report are none of those and the limitations are repeatedly admitted, yet these data are wrongly used for statistical analysis, and for actionable conclusions. This objection applies to all field observations, including estimates of wolves in the wild, dispersion, mortality, reproduction, predation, and depredation. All of these issues are ultimately based on human observation with: 1) consistent documentation using standardized methods by trained observers over the life of the study; 2) use of documented representative sampling methods; and 3) standardized data bases. Yet in the document are statements that evidence that these minimal standards were not used (Pages 37, 42, 83, 91-92, 100). **Response:** We believe the information gathering and analysis approaches in the 5-Year Review were accurate and appropriate. If you have specific examples to the contrary, please provide them. Record keeping and methods were consistent for locations (based on location database at Alpine Field office), mortalities (event database at Albuquerque NM, with paper records kept with USFWS Special Agents), dispersal (based on location database), predation (based on predation database at Alpine AZ), depredations (based on paper WS reports associated with each investigation, housed at Albuquerque NM [events database]; Alpine AZ; and Phoenix AZ [depredation database]) during the review process. Visual estimates of the number of wolves and pups associated with each collared pack in the wild were composed yearly. The sum of the number of wolves and pups associated with each collared pack represented our minimum annual population and pup estimate per year. All observers were trained by qualified personnel. Sampling is generally required for large populations. The first requirement is to determine the sample unit. In the case of population estimates and reproduction, the sample unit is individual packs. During the course of this study, we attempted to place radio collars within every pack, and investigated credible reports of uncollared wolves, that were indicative of a pack being present. We used this “sample” (e.g. every pack with credible evidence of existence) as the basis for minimum reproduction and population estimates. Sampling methods for dispersal and mortality relied on individual collared wolves as an indication of the population. The sample in this case is whatever animals are captured and big enough to wear a collar. Predation and depredations were not designed to be sample, but rather summarizing the data that was collected from all kills that were found. Within scientific documents it is important to note the limitations of the data, and areas where additional or ongoing research may help to elucidate some of the hypothesis or questions. Many of the specific examples above relate to areas in the document where we note the limitations of the data or discuss specific research projects that have been initiated. Specific research will be analyzed and reported within a specific research period, and may eventually effect data collection methods, but does not represent a shift in the record keeping or methods currently. Further it is appropriate within scientific documents to discuss the limitation of specific data. The section on Page 42 refers to the differences between two databases housed in different offices relative to depredations. We have reconciled those two databases by referencing each individual paper record of depredations housed in the different offices. That reconciled version of depredations will be presented in the final 5-Year Review (see also C/R 132 and 161).

390. **Comment:** Require 5 years of livestock carcass removal and compare results to previous 5 years of not removing carcasses. **Response:** As of 2005, no research projects are

designed or planned to study the difference between carcass removal and no removal. Furthermore, as noted elsewhere (see C/R 227, 257, 266, and 267), there is currently no law, regulation or policy that would allow such a research project without individual livestock grazing permit owners volunteering to participate.

391. **Comment:** As the authors of the Technical Component indicate, the appropriate figures to examine when assessing the sustainability of the reintroduced population are the reproductive rate and the failure rate (mortality rate and removal rate). For all intents and purposes, a removed wolf in the population is equivalent to a dead wolf in a population not subject to removals for boundary infractions and depredations. Individuals in wild wolf populations in studies cited by Fuller et al. (2003) were undoubtedly subject to lethal control when they ran afoul of livestock, but those numbers were included in the mortality rates found in the studies, and were not additive to those figures. **Response:** Essentially, lethal removals from other populations were included in mortality rates because those wolves were killed. In the BRWRA population, many of those wolves were removed but not killed. To clarify, consider 2 wolves in each population. In the other wolf populations, these two wolves were killed, 1 by automobile and one by lethal control. In the BRWRA population, one of these wolves was killed by automobile and the other was considered removed. Also assume there are 60 radio days. The daily survival rate in the other area is $(1 - (2[\text{number of deaths}]/60[\text{radio days}]))$ equals 0.967. In our study, the daily survival rate would be $(1 - ((1[\text{deaths}]/60) + (1[\text{removals}]/60)))$ equals 0.967. Thus, by adding the removal rate to the mortality rate you end up with the same answer as if you simply added the removals and deaths together and called them mortalities.
392. **Comment:** More research should be funded. **Response:** AMOC believes that research regarding wolves and wolf habitat is important. So is social research (i.e. human dimensions and socioeconomics). However, as noted above (see C/R 35 and 386), research is often costly, and the budget for Mexican wolf reintroduction is not sufficient to support both essential daily management and long-term research. Thus, AMOC and the IFT have used and will continue to use information from wolf research in other areas (where applicable). If additional funds become available to the Reintroduction Project, through agency budget increases or voluntary external contributions, specific wolf-related research projects might be implemented (see C/R 132, 224, 301, 386, 431, and 492), primarily by entities other than the IFT (see C/R 35).
393. **Comment:** Project databases/data collection should be improved. **Response:** Project databases and data collection methods have been improved several times already, but specific recommendations for further improvement would always be appreciated. Examples of improvements to date include: Data collection methods have been improved through development of SOPs that ensure more consistency and accuracy in recording, analyzing, storing, and retrieving information of all kinds. Depredations are tracked more closely now, and data from all sources are integrated more quickly into a common database. Individuals contacted after monitoring flights, to provide current location information, are now recorded and tracked centrally. Pack numbers are now tracked via

specific forms that provide summarized information to date. Hunter contact numbers are tracked through daily data sheets. Flight locations have been corrected within the database to ensure they are in the proper UTM zone. Also, flight locations are now reviewed monthly (per a base map) to ensure accuracy. However, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding evaluation and enhancement of Project management information systems to ensure they are effective and efficient (see the AMOC Recommendations Component).

394. **Comment:** Data collection needs to be applied evenly rather than simply collecting data that benefits the program needs and expectations. (#3) Technical **Response:** Data are collected as necessary to achieve Reintroduction Project objectives. Results are reported without bias, and not skewed to be favorable to the Project. We are not aware of any area in which the methods or data collection were biased for or against program needs.
395. **Comment:** Has any of the research performed on the project been used to change data collection procedures? So far there seems to be nothing available to the public on these studies. Why are they being encouraged but not used? (#7) Technical. **Response:** Data collection procedures are incorporated into the current SOPs. They reflect considerable experience and knowledge gained since 1998. Project SOPs will continue to be revised as new information becomes available.
396. **Comment:** The program has not taken the obligation to create maps and reports that reflect population levels of prey base, their spatial and temporal distribution, and current and projected management and direction for NM, AZ, and Mexico seriously. (#11) Technical. **Response:** AMCO relies on the State and Tribal wildlife agencies to provide information on prey base abundance, distribution, trend, and management within the BRWRA. AMOC does not see the need to duplicate their efforts, nor do we have the staff or funding resources in the Project to do so. Also, AMOC has no authority over management issues or activities in Mexico.
397. **Comment:** So far there is nothing out there to show that identifying wild ungulate prey base habitat enhancements through private property incentive programs is being done. (#12) Technical. **Response:** Thus far, no measurable reduction in prey has been identified as resulting from reintroduction of Mexican wolves, therefore AMOC has not seen the need to pursue or advocate such enhancements to counteract presence of wolves. Also, as noted in C/R 396, management of game populations, including relevant private property incentive programs, is within the purview of the individual State and Tribal wildlife agencies.

Q. Tribal

398. **Comment:** There are questions about the validity of the livestock loss information acquired from the SCAT. The SCAT does a poor job of managing their cattle and is close to no management at all and the losses could easily be the result of their inadequate

management. **Response:** In accordance with a standing SCAT Council resolution, the only wolf management allowed on SCAR is depredation investigation and immediate wolf removal. Thus, per the Final Rule, SCAR is not included in the BRWRA. SCAT is not a formal Cooperator in the Reintroduction Project, preferring to handle depredation and removal issues directly with USFWS via a Statement of Relationship and with WS via a separate agreement. Questions or concerns about SCAT management practices are therefore outside the scope of the 5-Year Review, and should be addressed directly to SCAT.

399. **Comment:** The discovery or attempt to discover wolf depredations on SCAR has been inadequate and unfunded. This breaches the trust responsibility the US government has with Tribes. The SCAT desires adequate funding to hire personnel, get training, obtain wolf expertise to properly monitor the wolves on the Reservation and address the depredation issue. **Response:** See C/R 398. USFWS and WS respond independently of AMOC to SCAT requests for assistance with wolf issues. When SCAT reports a possible wolf depredation incident, WS conducts a formal investigation. USFWS also funds SCAT wolf management activities (i.e. detection and removal) and provides necessary equipment to the extent possible, via Recovery Program funds. In 2005, USFWS secured funding under the Tribal Wildlife Grants Program to provide additional assistance to SCAT. This will include (in cooperation with WS) training Tribal game officers in investigative procedures, to enable SCAT to take on more responsibility for conducting depredation investigations in the future. In 2005, USFWS also hired a Tribal member, permanently stationed in San Carlos, who divides his time between Mexican wolf and fisheries issues. As noted, WS also provides assistance with wolf control on SCAR, including training for SCAT employees, but is limited by available, budgeted funds. SCAT has declined to accept AGFD wolf assistance offered under an existing MOU between SCAT and AGFD. Thus, other IFT resources, such as AGFD employees and equipment, cannot be deployed to SCAR. AMOC will continue to cooperate with SCAT to the extent possible, but additional AMOC and IFT resources cannot be allocated to work on SCAR unless SCAT becomes a formal Cooperator or comes to some other mutually acceptable agreement with AMOC Lead Agencies other than USFWS and WS.
400. **Comment:** The USFWS currently decides whether a wolf depredation has occurred on livestock on the San Carlos Reservation. There may be a conflict of interest in that process because on one hand they endeavor to implement the program successfully and on the other hand decide whether a depredation has occurred. These policies conflict with each other. **Response:** See C/R 398 and 399. WS has the lead on conducting wolf depredation investigations on SCAR and determines whether a wolf depredation has occurred. USFWS employees assist WS in conducting timely investigations, and in removing wolves at SCAT request. These activities are conducted in accordance with SCAT guidance, and are beyond the scope of the 5-Year Review, given that SCAR is outside the BRWRA and SCAT is not a formal Cooperator in the Reintroduction Project.
401. **Comment:** Apaches on SCAR no longer camp and hunt in their traditional hunting camps because of interactions they've had with wolves showing no fear of humans.

- These impacts were not adequately noted in the report. **Response:** The 5-Year Review reflects all information available to AMOC. Many wolf reports from SCAR that were passed on to the IFT were hearsay, often having passed through several people before reaching the IFT. Given the typical lag time involved between incident and reporting, and frequent inability to locate a specific source, USFWS, WS, and SCAT biologists were generally unable to get confirming details during follow-up efforts. This accounts for the gap between the number of incidents that SCAT officials have heard about, and the absence of documented reports in the 5-Year Review. USFWS is now working with SCAT to ensure reporting procedures are tightened up, so each incident is documented to the extent possible. Based on information discussed with SCAT on December 23, 2005, Event 33 was added to the Human/Wolf Interaction Table. Any further information obtained regarding specific events will also be used to update the IFT database.
402. **Comment:** SCAT's position is that any wolves found on SCAR should be removed by USFWS immediately before they depredate. **Response:** See C/R 398-401. AMOC is aware of SCAT's formal position, and accordingly defers to USFWS and WS to handle SCAT requests for assistance independent of the IFT. USFWS and WS response times are limited by available resources, and responsibilities within the BRWRA. As noted in C/R 399, additional IFT resources cannot be used for wolf management on SCAR because SCAT has declined to become a formal Cooperator in the Reintroduction Project or to come to some other enabling agreement with AMOC Lead Agencies other than USFWS and WS.
403. **Comment:** The boundaries should not include SCAR. There are not adequate funds to address the wolf problem on SCAR and it is not rational to discuss expansion of wolf release areas/boundaries which may impact Apaches even more. **Response:** As noted above (see C/R 398-402), SCAR is not within the BRWRA, and per a SCAT Council resolution all wolves must immediately be removed from SCAR. After considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible changes in the Final Rule or creation of a new Final Rule (see the AMOC Recommendations Component). Within the processes by which those recommendations are explored, SCAT will again have ample opportunities to decide whether to allow wolf presence on SCAR. SCAT is not a formal Cooperator in the Reintroduction Project, thus requests for funding for wolf management on SCAR should be addressed to USFWS.
404. **Comment:** USFWS should have anticipated the problems wolves would cause on SCAR because of the livestock present on SCAR. **Response:** The FEIS and Final Rule recognized wolves would inevitably travel beyond the MWEPA and BRWRA boundaries, and provided direction on removing such wolves. SCAT was represented on the Interagency Team that drafted the FEIS. USFWS also met with SCAT representatives privately several times during the EIS process, and following completion of the EIS and publication of the Final Rule. However, as noted above (see C/R 398-403), SCAT is not a formal Cooperator in the Reintroduction Project. Unless it becomes one, consultation

issues with USFWS should be addressed directly to USFWS, as they are beyond the scope of the 5-Year Review and AMOC operations.

405. **Comment:** SCAT should have been consulted about the wolf reintroduction but we were not. **Response:** See C/R 404.
406. **Comment:** USFWS should develop Tribal procedures and provide training to the tribe. **Response:** See C/R 399 and 400. USFWS and WS are providing training to SCAT employees on wolf depredation investigation procedures. AMOC remains available to assist SCAT in adapting AMOC SOPs for use on SCAR.
407. **Comment:** Adequate studies have not been done to assess whether wolves that feed on livestock will then kill livestock. That is the reason the SCAR proposed a comprehensive study of wolf/cattle mortality on SCAR. A partial study was done, then abandoned by USFWS. In the absence of a scientific study on SCAR pointing to that conclusion, this issue is unsupported and opposed. **Response:** See C/R 399.
408. **Comment:** Any evidence put forth to conclude that there were only a certain number of wolf depredations on the SCAR is unreliable and suspect. The Tribe does not accept these conclusions and studies, since there are inadequate resources and personnel to assess the situation. **Response:** See C/R 399-406.
409. **Comment:** USFWS should develop a communication system that is effective and efficient with respect to communicating with a sovereign tribe (SCAR). **Response:** See C/R 398-403 and 406.
410. **Comment:** The methods used by the Tribes is not known, nor is their data. So the number estimates are suspect. **Response:** See C/R 398-406.
411. **Comment:** Page 61, Map, Technical: Why is SCAR not shown or referred to? **Response:** See C/R 398-406. SCAR is not within the BRWRA and a standing SCAT Council resolution affirms SCAT's desire not to have wolves on SCAR. Since the referenced map depicts only areas that wolves are allowed to occupy, SCAR is not shown or referenced.

R. Outreach/Education

412. **Comment:** Page 30, #4, Administrative: The outreach coordinator was recommended to be a USFWS employee – AGFD should not shoulder the cost of this position. **Response:** In 2004 and 2005, AMOC secured increased commitment for outreach support (i.e. staff time) from the USFWS Region 2 (Albuquerque) Public Affairs Office, as well as comparable staff in other cooperating agencies. However, this support primarily applies to outreach (communication) through the mass media, from agency offices distant from the IFT's primary arena of activity, the BRWRA. Thus, reacting to AMOC's priorities for additional field staff, AGFD funded a new IFT position for outreach specifically in the BRWRA. As one of the six Lead Agencies, AGFD is amenable to using its resources this

way as an interim measure, on the assumption that other Project cooperators will handle other shared issues to the maximum extent of their ability. In summary, AMOC believes that Project outreach to local residents and communities within BRWRA has not been sufficient in the past. AMOC modified SOP 3.0: Outreach to address this, and the 2006 IFT Annual Work Plan will reflect the higher priority set by AMOC for local outreach. Further, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding IFT expansion on an agency-specific basis, and outreach focus in 2006, that would address concerns inferred from this Comment (see the AMOC Recommendations Component).

413. **Comment:** Further assess prey base and educate the public regarding wolf depredation in order to dispel possible myths of stated “competition” with hunters, and with respect to hunting as having positive economic impact to Catron County. **Response:** After considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made a recommendation regarding further study of prey base within the BRWRA and MWEPA (see the AMOC Recommendations Component). Such studies would help update or supplement prey base population information provided by State and Tribal wildlife agency cooperators in the Reintroduction Project. Prey base information will also continue to be incorporated into outreach materials to address relationships between prey base trends and hunting permit trends. The “myth” of wolf competition with hunters is addressed in the Socioeconomic Component. As noted in the 5-Year Review, information from all available sources indicates that hunting (especially big game hunting) has an important beneficial impact on all Counties and Reservations within the BRWRA.
414. **Comment:** Continue to emphasize public education and outreach. **Response:** See C/R 412.
415. **Comment:** More accurate and realistic information about wolf behavior needs to be disseminated. No more false information such as wolves are afraid of humans and will run, they have never attacked a human in North America, etc. (#9) Technical **Response:** See C/R 175, 327-337, and 593 regarding fear of wolves and/or wolf attacks. The draft Technical Component stated that: “The paucity of documented wolf attacks in North America suggests that wolves rarely attack people there (McNay 2002a and 2002b). However, wolves in protected populations generally are less fearful of humans than those in exploited populations (McNay 2002a and 2002b). Thus, managers should continue to closely monitor initially released wolves and initiate aggressive aversive conditioning, or removal if appropriate, when wolves are near humans.” McNay (2002a and 2002b) also concluded that no documentation exists confirming that a wild healthy wolf has killed a human since at least 1900. Wolves do tend to shy away from (i.e. avoid) humans, or move quietly away from humans. Some people interpret that as fear of humans. Others see it as a sign of intelligence. Regardless, these are just behavioral tendencies, not certainties. Thus, it is also true that some wolves are more tolerant of (or even seem “curious” about) humans, and don’t shy away from humans. Some even approach humans rather closely, perhaps due to habituation or some innate behavioral trait

(curiosity?). Humans can easily perceive such wolves as actual or potential threats, due to proximity alone. The fact that wolves display such behavioral variety can lead to “fact combat,” with one person arguing their experience or knowledge base is “the truth” while another argues the same from a different, perhaps even opposing, experience or knowledge base. Most likely, neither perspective is entirely right; neither is entirely wrong. Both might reflect different parts of the continuum of “normal” wolf behavior. Regardless, AMOC is committed to providing balanced, accurate information on all aspects of wolf behavior and wolf reintroduction (e.g. see SOP 3.0: Outreach).

416. **Comment:** Those directly affected by the wolves should have the opportunity to help develop the educational processes so they are more realistic. (#10) **Technical Response:** In April 2005, AMOC reviewed its public outreach efforts, including SOP 3.0: Outreach and the standard IFT outreach presentation. With assistance from Greenlee County AZ, both were modified to help ensure Project outreach efforts are accurate and appropriately balanced. This issue was discussed again in several subsequent AMWG public meetings. SOP 3.0 now provides better guidance for public outreach, including direction to ensure that such efforts are realistic and well-rounded. AMOC welcomes additional input and assistance from entities that wish to provide help with and input to Mexican wolf outreach efforts. AMOC is already working with livestock industry representatives from the Southwest to exchange graphics and other information, so both can integrate new material into their existing presentations to provide a more objective look at the full spectrum of relevant issues.
417. **Comment:** The Apache-Sitgreaves Forest highly encourages USFWS to work with the public to convey information on the role of wolves within the existing ecosystem. It is in the interest of all agencies to work closely with affected permittees to keep them informed and part of the process. **Response:** See C/R 412, 413, 415, and 416. AMOC and the IFT are committed to providing such information to the public, especially affected permittees, to keep them well informed and part of the adaptive management process. AMOC developed and implemented SOP 3.0: Outreach in 2005 to make clear our commitment to effective public outreach, and to communicating and coordinating effectively with land management and other agencies with an interest in Mexican wolf reintroduction. Effective and timely communication is essential to increasing social capital with regard to local acceptance of wolves. AMOC and IFT presentations must always provide a balanced perspective on wolf reintroduction, including factual information on the role wolves play in the ecosystem and their impacts on livestock operations. AMOC will continue to make every reasonable effort to work with permittees to improve communication and understanding. We hope more permittees will make the complementary effort that others are already making.
418. **Comment:** Public outreach education efforts regarding wolf behavior in the Blue Range Wolf Recovery Area and surrounding areas need to be enhanced for the purpose of improving the level of coexistence between livestock owners, residents, visitors and wolves. **Response:** See C/R 417. AMOC is striving to increase funding levels toward that end, has modified Project priorities and procedures (e.g. SOP 3.0: Outreach) to provide

for this, and is monitoring Project performance to ensure the desired results are achieved. Any help external parties can provide would be greatly appreciated.

419. **Comment:** Appendix II, #9, 52, and 55 (Technical): It would be valuable for the IFT to indicate to the public and to outside human dimensions experts the contexts in which the IFT has provided information regarding wolf behavior and means of preventing depredations as well as the content of the educational programs provided. In particular the frequency and locations of presentations as well as the means of advertising demonstrations, and public participation in presentations would demonstrate whether public education efforts are reaching the audiences that most need them. In addition it is important to indicate whether presentations include demonstrations in the field of methods that can be used to protect livestock. **Response:** IFT outreach presentations are documented in the Reintroduction Project's monthly updates (sign up for these at <http://azgfd.gov/signup>). Roll-up numbers for 1998-2003 will be incorporated into the final 5-Year Review. AMOC SOP 3.0: Outreach affirms the Project's commitment to effective outreach, identifies various outreach mechanisms, and standardizes outreach activities to help ensure timely, accurate, effective communication. An integral component of AMOC and IFT outreach activities is close communication with livestock permittees. All AMWG public meetings are posted on the AGFD and USFWS websites (<http://azgfd.gov/wolf> and <http://mexicanwolf.fws.gov>), and noticed through a self-subscription newsletter available at the AGFD website address listed above. Structured demonstrations of livestock protection methods have, to date, not been a component of IFT outreach presentations. However, the Project frequently provides information to livestock owners on proactive protection measures, on an event-driven, one-on-one basis. Ultimately, though, individual livestock owners will decide whether proactive measures are appropriate for them. See also C/R 415 and 416.
420. **Comment:** Part B, #10 (Administrative): It would appear that the most critical demonstrations at this point would be demonstrations to livestock producers and others such as pet owners, regarding non-lethal means by which to prevent wolf-human conflicts, especially livestock depredations. **Response:** See C/R 418 and 419. AMOC believes it is important to educate the public on all aspects of Mexican wolf ecology and behavior, including methods to reduce human-wildlife conflicts. AMOC and the IFT have provided a variety of demonstrations and materials to producers, such as the publication "Lines of Defense: Coping with Predators in the Rocky Mountains" (Gese et al. 2004). We will continue to work with permittees and other resource managers to provide the latest information on innovative approaches to reducing human-wildlife conflicts.
421. **Comment:** All information utilized by USFWS for public relations such as presentations in schools must be in compliance with the Data Quality Act. Will all the information be accurate, clear, complete (such as information on how the wolves eat live animals and could be carriers of FMD) and unbiased? **Response:** See C/R 415 and 416 on outreach. See C/R 319-321 and 324-325 on FMD. AMOC again notes that within the carnivores, only two species of bears (grizzly bear [Grosso 1957] and Asiatic black bear

[Neugebauer 1976 as cited in Hedger 1981]) have been identified as contracting FMD (Hedger 1981). Further, no FMD has been noted in the USA since 1929, thus the likelihood of wolves in the BRWRA carrying it seems sufficiently remote not to warrant special attention.

422. **Comment:** Both the good and bad sides of having wolves reintroduced need to be portrayed in public outreach efforts. **Response:** See C/R 412-421.
423. **Comment:** Ensure widespread postings on laws related to Mexican wolf reintroduction, punishment of offenders and reward offerings. **Response:** As discussed in AMWG meetings and the 5-Year Review, AMOC cooperators have posted such information widely within BRWRA and will continue to do so. Information on legal issues related to Mexican wolf reintroduction (e.g. illegal activities, reward offerings) is disseminated to the public in a variety of ways. For example, laws related to the killing, injuring, or harassing of Mexican wolves are published in the annual hunting regulations produced by AGFD, NMDGF, and WMAT. The BRWRA is liberally posted with signs and informational kiosks alerting the public that they are in wolf country, providing information on legal and illegal activities relative to Mexican wolves, and hot line numbers to call to report a violation of wildlife law. Similar signs are posted in USFS offices and other public places in and around the BRWRA. AMOC member agencies have also prepared and disseminated a variety of brochures relevant to these issues. USFWS and AGFD also post information on their respective websites. Finally, rewards are offered by USFWS, AGFD, and NMDGF for information leading to apprehension of individuals who illegally take protected wildlife, including Mexican wolves. Various NGOs have offered an additional \$35,000 for information regarding illegal killing of Mexican wolves. Reward information can be found in the Mexican wolf monthly updates (available through <http://azgfd.gov/signup>), or at <http://mexicanwolf.fws.gov/>.
424. **Comment:** More education is needed so people have less fear of wolves. **Response:** See C/R 412-423.
425. **Comment:** Page 85, Outreach, Technical: Program outreach needs to be more balanced and tell the real effects of wolves on ranchers, residents, hunters, campers, etc. **Response:** See C/R 413-423.
426. **Comment:** The impact following the Yellowstone wolf reintroduction was and continues to be enormous. The entire Nation should be aware of the significance of this program. The local education has been important but greater effort should be made at educating the rest of North America. Positive economic impact will follow. **Response:** To the extent that budgets and staffing allow, BRWRA Reintroduction Project personnel regularly participate in national-level conferences and workshops to disseminate information regarding Mexican wolf reintroduction and to gain insights from areas in which wolf reintroduction and management are issues. This information has been integrated into the 5-Year Review (e.g. Socioeconomic Component), and is reflected in ongoing management of the Project. Nevertheless, AMOC notes that Yellowstone differs

significantly from the BRWRA, including differences in the number and kinds of recreational opportunities available, visitor attractions beyond presence of wolves, pre-existing tourism focus, etc. The extent to which local economies in the BRWRA might benefit, or want to benefit, from tourism associated with presence of wolves remains largely conjectural at this time.

427. **Comment:** To access AMWG, affected persons have to leave work, drive long distances, perhaps rent a room and give their version of events. This is not a reasonable approach if the agency really wishes to ensure opportunity to the full spectrum of stakeholders. The restructuring has resulted in a tremendous burden to affected stakeholders and allowed the USFWS to further ignore their input. Restructuring IMAG was the worst thing that has happened to affected stakeholders since the program's implementation. **Response:** Agency and public criticisms of IMAG and Reintroduction Project adaptive management approaches prior to 2003 (e.g. Parsons 1998) were significant, and well reflected in the 3-Year Review comment (e.g. Stakeholders Workshop Final Report) and subsequent evaluation in September 2002 by the State Wildlife Commissions of AZ and NM. Still, AMOC understands that some interested or affected parties, perhaps for different reasons, might prefer the IMAG approach. Moreover, the AMOC approach of rotating regularly-held quarterly AMWG meetings between northern and southern towns within the BRWRA, and between AZ and NM, inevitably means local residents and distant parties both must travel farther to some meetings than to others. The IMAG alternatives seemed to be (depending on the year) fewer meetings, no meetings, or fewer locations for meetings. Each of these results in unequal participation opportunities and logistical hardship. Time and travel are hardships for anyone, but AMOC believes the current approach is fairer than any other that has been tried to date. Also, AMOC notes that the 5-Year Review did not surface any recommended alternatives to the current approach. If restructuring has been "the worst thing to happen to affected stakeholders since the program's implementation," it would help to have specifics on why and how, so AMOC might consider appropriate remedies.
428. **Comment:** Organizations that represent the livestock and outfitting industries are not being allowed to effectively participate in the program. We are seeing drafts of documents that NGOs have access to participate in developing and we are not. All we are allowed to do is comment on a near final product with no value to our industries in it. Any person or entity that cannot sign a multiple-use as-is support document should not be allowed participation. Multiple use of Federal lands is the law and allowing those who would violate the law into the process is appalling and creates more problems than it rectifies. **Response:** See C/R 49, 244, 245, 247, and 356 on NGO status. NGOs have the same access to AMOC documents as any other organization or member of the public. NGO personnel assisting in IFT wolf management and outreach activities on the ground are not allowed to participate in reviewing AMOC documents or discussions leading to AMOC decisions. AMOC documents are provided to all segments of the public at the same time, and in the same way, with one exception: a small supply (typically 35 to 50 copies) of each draft AMOC document pertaining to the 5-Year Review and a few other significant issues (e.g. draft SOPs) were provided to six individuals in rural areas of AZ

and NM to ensure that local “backcountry” residents had timely access to them. Also, AMOC often uses all public comment from quarterly AMWG meetings to develop initial drafts of Project documents. Interested parties who show up only at the final public discussion of such drafts, or who do not attend AMWG meetings, thus miss valuable opportunities to help shape them. Although AMOC and the agencies it represents fully support multiple-use laws, rules, and policies regarding public lands, AMOC cannot require that private citizens be allowed to participate in adaptive management only if they have the same values. Freedom of speech rights alone guarantee equal access to engage in public process.

429. **Comment:** Local residents, ranchers, county and local officials feel their requests for information goes unheeded. Ranchers in particular feel as if they are not given enough advanced warning about wolf locations in time to protect their livestock. County officials have expressed concerns that the economic impacts are being ignored, and the program is harmful to the economy. Communication between the USFWS and effected parties must improve and be on a timelier basis. **Response:** See also C/R 447 and 496. Concerns about timely information flow were significant elements of agency and public comment during the 3-Year Review. In 2004, AMOC still had the same concerns. Project SOPs were changed accordingly in 2005, outreach capacity in the IFT has been enhanced, and every IFT member has been directed to improve communication with the affected public. As of September 30, 2005, AMOC continues to believe that broad disclosure of location specifics would not be appropriate. The central problem is how to ensure that people who truly need to know details can be handled efficiently and effectively, without precipitating an unintended legal obligation to provide the same detail to everyone. AMOC (with significant assistance from Greenlee County) is continuing to explore alternative approaches, and has already adjusted its procedures pertaining to flow and detail of wolf location information to address this issue. With regard to economic impacts, those are addressed in the Socioeconomic Component (see also C/R 518-611).
430. **Comment:** The interface between Service personnel and ranchers should be increased. Work with ranchers to increase protection of livestock in wolf country. **Response:** The IFT works directly with permittees to protect livestock from wolf depredation. The IFT provides information on the Defenders program to assist ranchers by hiring additional riders, buying feed, or other alternative “proactive” approaches. The IFT also provides telemetry receivers to ranchers in areas of depredation concern, to help them prevent and find wolf depredations. Further, during its fieldwork, the IFT often locates dead livestock (including wolf depredations), and reports all such discoveries to the appropriate rancher(s) (see C/R 137). Additionally, the IFT has provided materials and labor to help ranchers erect chain link livestock pens, and provides weekly wolf locations to permittees to enable them to monitor areas with high wolf activity (see C/R 250). Overall, the IFT interacts with ranchers on a consistent basis regarding a variety of topics. However, AMOC and the IFT recognize that communication can always be improved, and will continue to strive to improve relationships with the ranching community.

431. **Comment:** On Page 42, management implications – technical: “As such we recommend that more research opportunities be explored and funded to provide insight to the overall Mexican wolf program.” Including some confirmation or analysis of social issues would be relevant to this review. There is a strong need to communicate with and respond to locals in a quicker and more consistent manner than accomplished to date. Consider an additional full time equivalent position located in Alpine. **Response:** See C/R 429 and 430, and the Socioeconomic Component. As suggested, AMOC will consider expansion of social research to provide further insight into Mexican wolf reintroduction in the context of local custom and culture (see the AMOC Recommendations Component). Although public comment at recent AMWG public meetings suggests progress was made in 2004 and 2005 regarding IFT management responses and communication with locals, AMOC will continue to pursue greater improvement in timeliness, consistency, and outcomes. Three new IFT positions were created and funded in 2005 (two AGFD positions were filled in 2005 and a NMDGF position will be filled early in 2006), and the need for more will be assessed on an ongoing basis (again, see the AMOC Recommendations Component).
432. **Comment:** USFWS is still not fully coordinating with the public and WS is trying every way they can to minimize the reported livestock losses in order to keep the wolf program up and running. **Response:** See C/R 216, 255, 278, 291, 292, 294, 297, 299, 513, 545, and 550-551.
433. **Comment:** Livestock operators are often snubbed and under-informed of planning and participation opportunities in favor of NGOs that can financially benefit the program and use it to further their own agenda. This is by far the worst program problem that needs to be rectified. **Response:** See C/R 428-430. NGOs, regardless of their agenda or funding, do not have greater planning and participation opportunities in this Project than local livestock operators do. They might take greater advantage of available opportunities by participating more actively (organizationally) in public meetings or in providing comment, but they do not have greater access to AMOC and certainly not to the IFT. Conservation and environmentally oriented NGOs argue that the opposite is true. They believe they have less access, based partly on daily IFT-rancher interactions and partly on livestock operator private meetings with congressional staff and USFWS in February 2005, during (but not as a part of) the 5-Year Review.
434. **Comment:** Public opinions have not been used in making management decisions on the recovery of wolves. Past management seems to listen to opinions of special interest groups and government personnel involved in the project. If there is to be recovery, there needs to be a change in the future decision making, a collaborative effort that will address the issues of the community before implementing any decisions. If the community has ownership in this program, it would benefit the recovery of the Mexican wolf. We as ranchers would like to be part of the solution and not part of the problem. **Response:** AMOC makes use of all relevant information, regardless of source, to shape and implement its decisions. Information, including public comment, is heeded to the extent that its substance and credibility merit such. Addressing the needs of local communities

necessarily occurs within the context of a previously-approved (via the FEIS), ongoing wolf reintroduction effort that is guided by a nonessential experimental population rule that AMOC did not enact, and by Federal, State, and Tribal laws with which AMOC, the IFT, and the Project as a whole must comply. AMOC cannot wait until all possible issues and alternatives and viewpoints have been discussed and addressed to act. Wolves are on the ground, more are coming (whether through release or natural recruitment), and appropriate management actions must be carried out now. Nevertheless, failure to develop local community support during the crucial early years of 1998-2002, or to remedy this problem since then, is a significant obstacle to success. Equally, local community ownership of wolf reintroduction is essential to long-term success, thus progress must surely begin with enhanced, constructive participation by local communities and local governments. Greenlee County is modeling that approach, but others must emulate it and AMOC must demonstrate responsiveness to it. So must all other interested and affected parties involved in this complex issue. AMOC would appreciate any assistance that any party would care to make toward that end.

435. **Comment:** Significant turnover at the field level has frustrated the development of constructive working relationships with citizens living in wolf-occupied areas. Acceptance of wolves by the local community is dependant upon trust and good working relationships with the agency and field team, both of which suffer from frequent turnover. USFWS and its cooperators should make every effort to minimize turnover. **Response:** Staff turnover can impede progress, for many reasons. Some factors in staff turnover are at least partially within control of AMOC cooperators, while others are not. AMOC is well aware of this issue and is striving to increase staff retention and to improve working relationships and trust with local communities throughout the BRWRA.
436. **Comment:** Pursue interagency communication and projects with regard to habitat enhancement through land restoration efforts (i.e. watershed restoration, juniper removal, native plant restoration, grassland enhancement). **Response:** State and Tribal agencies are responsible for prey base management in the BRWRA, and thus provide appropriate habitat recommendations to land management agencies and private landowners. However, there is no indication that habitat or prey base is limiting wolf population growth in the BRWRA. Thus, although the projects advocated in this Comment are commendable, they are beyond the scope of the 5-Year Review and AMOC.
437. **Comment:** We recommend increased education and outreach. USFS personnel are available to partner in outreach in the surrounding communities. **Response:** See C/R 413-425. Also, AMOC will direct the IFT to pursue greater USFS participation in local outreach and education efforts.
438. **Comment:** Use ranchers who have learned to live with wolves in your outreach efforts. **Response:** Such ranchers have been brought to AZ-NM in past years, from Northern Rockies States, to provide relevant personal insights to agency staff and the public. However, this has not occurred since 2001, or with specific outcomes in mind. Thus, after considering all public and cooperator comment during the 5-Year Review, and its own

evaluations, AMOC has made recommendations regarding outreach and IFT expansion on an agency-specific basis that could incorporate the suggestion in this Comment (see the AMOC Recommendations Component).

439. **Comment:** There should be discussions with ranchers who have learned to live with and tolerate predators. **Response:** See also C/R 438. AMOC notes that this has occurred in the AZ-NM reintroduction effort, with limited success. Some ranchers from local communities who have contributed to public discussions in this way have subsequently expressed concerns about being ostracized in their local communities, because of their beliefs about the need for and possibilities of co-existence (i.e. between wolves and ranchers, and between wolf advocates and ranchers). AMOC will strive to provide more opportunities for such discussions to occur, but tolerance within and among the peer groups will be essential to substantive exchange of ideas.
440. **Comment:** Monitoring and removal considerations should be appropriate to the level of interaction and consistent with the Recovery Plan. The mere presence of wolves in the vicinity of livestock is unavoidable if wolves are to be recovered in the Blue Range Wolf Recovery Area. Provision of telemetry equipment to non-IFT members may create more apprehension than help, and has created a sense of disparity or preferential treatment with other public land users. **Response:** AMOC established SOP 13.0: Control of Mexican Wolves in 2005 to address the first concern, ensuring that monitoring and removal considerations are appropriate to the level of interaction. All management actions in the Reintroduction Project, including those, are consistent with the existing 1982 Recovery Plan (USFWS 1982). As for the concern that providing telemetry equipment (receivers) might create more apprehension than help, AMOC will defer to individual ranchers to resolve that for themselves; those who believe benefits are worth the risks will be loaned available equipment. However, AMOC notes that most ranchers who have been loaned such equipment thus far have expressed gratitude for its availability, rather than complaints about additional stress. As noted in C/R 243, some individuals have complained about this “preferential treatment” for ranchers. AMOC believes this disparity appropriately reflects disparate impacts of wolves, but is prepared to consider loaning the same equipment (subject to availability) to any resident in the BRWRA who demonstrates a substantive need.
441. **Comment:** We recommend that efforts be taken to secure additional funding from all agencies involved and be open to discussion on shared work. **Response:** Per the MOU that now drives the Reintroduction Project, AMOC is making such efforts and will continue to do so. We have already been successful in securing funds by which to increase IFT staff by three FTEs. We have also established a process by which to ensure that responsibilities and resources within the Project are appropriately shared, so each agency’s contribution of funding, staff, and other resources is more effectively integrated into the overall cooperative effort. AMOC believes significant progress has been made in this area since 2003. However, we also note that failure to establish a sufficiently funded government program by which to address livestock depredation issues (i.e. through incentives for prevention as well as mitigation of losses) has been and will continue to be

a major obstacle to success. After considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made various recommendations regarding addressing funding issues for all agencies involved in the Project (see the AMOC Recommendations Component).

442. **Comment:** The agencies or the IFT as appropriate must develop an identifiable human resource that can independently monitor the affects of wolf recovery on the local population and economy and interact with the same. Intermittent “town hall meetings” are not sufficient to evaluate and accommodate the local reaction to wolf recovery efforts. Wolf recovery impacts on a local community are not just based on cattle depredations but involve perceptions and fear that are based sometimes on fact and sometimes on misperceptions of fact. This issue can not be evaluated without a direct and continued effort to understand and capture data more frequently. For example, ranchers have reported non-lethal physiological impacts on livestock such as weight loss, stress and lower birth rates and increased costs due to alteration of land use for forage and additional labor and other expenditures to prevent depredation. If true, this impacts the value of the operation in addition to depredations. Utilizing WS personnel for this matter is not sufficient. A generalist or a team should be hired to help better understand and manage the social nature of this issue on the ground. All interested parties will benefit whether they are in favor of Mexican wolf recovery or not. Better collection of data surrounding the social/economic issue could help develop solutions so factions become cooperators and thus contributors over the longer period of time required to recover the species. **Response:** After considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding IFT expansion that would address the concerns inferred from this Comment (see the AMOC Recommendations Component).
443. **Comment:** NMDA believes the program would benefit from the development of a landowner agreement process with the purpose of signing up willing landowner participants for the recovery program. **Response:** After considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made a recommendation regarding IFT expansion that would incorporate the suggestion in this Comment (see the AMOC Recommendations Component). AMOC looks forward to NMDA assistance in developing, funding, and administering such a program.
444. **Comment:** NMDA recommends a grant program administered by the counties for hazing and shepherding to aid the producers. The Defenders hazing program is incorrectly designed. The counties should run the process expending funds through local sources to haze wolves from livestock, to help protect health and property in the affected area, and to respond to problem areas with non-lethal solutions to wolf interactions. If run properly, this could discourage wolves from approaching livestock or homesteads. **Response:** See C/R 441 and 444. After considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made a recommendation regarding voluntary incentives-based programs that would incorporate the suggestion in this

Comment (see the AMOC Recommendations Component). AMOC looks forward to NMDA assistance in developing and administering such a program.

445. **Comment:** Apply the science now and let others help you deal with vocal opponents through creative ideas and means. The objective and requirement under the ESA is the expedited and economical recovery of the Mexican wolf – not the appeasement of every opposing voice out there. **Response:** AMOC believes science should inform conservation and adaptive management practices, but multiple-use. Tribal sovereignty, and private property rights must also be considered. The ESA commits Federal agencies, and (via Section 6 Agreements or Statements of Relationship and other agreements) State and Tribal cooperators to furthering recovery, but also prescribes approaches by which to ensure that other values (and opinions) are appropriately considered.
446. **Comment:** The recovery effort is a patchwork of concerned parties – take that recovery effort to all your publics. Do not ignore the vocal, local minority but also do not simply react to their most recent concerns. Focus on outreach efforts that bring home how coexistence is possible for livestock owners, residents, vacationers, visitors and wolves. Make the recovery effort a part of the community and it will do much to make recovery sensible, possible and workable. **Response:** See C/R 417, 430, 434, 435, 442, and 479.
447. **Comment:** Local county governments need to be made full partners in the wolf program. **Response:** See C/R 429 and 496. AMOC has made repeated overtures for more participation by County governments. The MOU under which AMOC operates provides for such partnership. Limitations in the MOU on County roles were requested by Counties participating in structuring the MOU. Only Greenlee County AZ has remained a constructive, persistent partner since AMOC began work. The door remains open to all Counties in the impact area, but the Counties must begin participating within the existing framework or let AMOC know what they would want changed to enable them to participate. Meanwhile, AMOC will continue to hold public and non-public meetings in locations that facilitate County participation.
448. **Comment:** The USFWS does not cooperate with, report to, or coordinate with the USFS unless a closure notice is needed. **Response:** USFS is an active, constructive member of AMOC. In 2005, AMOC finalized a series of SOPs that detail how the reintroduction effort is managed. Five of these SOPs describe how coordination with USFS Ranger Districts is handled during: (SOP 5.0) Initial Wolf Releases, (SOP 6.0) Wolf Translocations, (SOP 7.0) Temporary Closures, (SOP 15.0) Helicopter Capture and Aerial Gunning (SOP 18.0) Aerial Telemetry. In addition, individual Ranger Districts in and around the BRWRA receive weekly wolf updates from the IFT, and can receive automated monthly Project reports from AGFD (<http://azgfd.gov/signup>). Members of the IFT also stop by Ranger Districts whenever possible to meet with USFS staff and update them on the Project. Also, USFS is evaluating hiring a communication liaison for the IFT, to further improve and strengthen communication between the Project and individual Ranger Districts. The lines of communication haven't always been perfect, but

AMOC and IFT pledge to continue to seek ways to improve on the timeliness and quality of information exchange with our internal cooperators as well as with the public.

449. **Comment:** We are concerned about the close ties of the USFWS and Defenders who pay for cattle losses. This partnership gives Defenders clout in determining the cause of death in a reported wolf depredation and this is highly unprofessional in a government program that should be fair to all. This partnership could terminate at any time leaving the rancher at a total loss of property **Response:** Virtually since reintroduction began in 1998, Defenders has voluntarily provided invaluable assistance to the field effort (to the benefit of the ranching community) by funding interns and (through USFWS) a student-trainee exchange program with Mexico. Although these individuals have mostly been temporary (seasonal) employees, they operate under direct daily supervision by IFT (agency) staff. As IFT assistants, these individuals sometimes are present during depredation investigations, but they do not participate in recommending or making final decisions about such investigations. They have no influence on investigation outcomes. In accordance with SOP 11.0: Depredation on Domestic Livestock and Pets, WS IFT members have the lead on conducting wolf depredation investigations. All other IFT staff are available to assist WS to ensure timely investigations. With regard to compensation issues, the Defenders program has never been presented as a panacea for all depredation issues, but it is an important asset. See also C/R 428-430.
450. **Comment:** The livestock industry has been given a disproportionate amount of control concerning the reintroduction project and the related political pressures are preventing a successful program. **Response:** The Reintroduction Project is conducted in full compliance with a Final Rule, including efforts to address livestock depredation and nuisance problems. The Final Rule and the associated EIS were outcomes of several years of public process subsequent to a court settlement between USFWS and various environmental groups. The Project thus reflects both a legal mandate under the ESA and a judicial mandate from the court. Participation by the livestock industry has helped ensure that local perspectives and concerns are represented as adaptive management decisions are shaped and implemented. Their participation has not, however, resulted in disproportionate control, even when political pressure has been high. The USA operates under a framework of participatory government, and those who do not participate have little ability to help shape decisions that affect their lives.
451. **Comment:** Given the current staffing and funding crisis, I suggest involving the public as much as possible as cheaply as possible. Use volunteers both for technical and outreach functions; engage public interest and harness enthusiasm by emphasizing the role of ecological and intrinsic valuation of the subspecies in your agency team's public approach; look at allowing the team to officially but not financially publicly support any external efforts to foster consensus-driven discussion between various stakeholders and the public in addition to the internal efforts the agency team is already in charge of; make full use of allies wherever you can find them and try to more overtly recognize those parts of the public and stakeholder constituency who may be more able to consider themselves less overtly financially tied to the absence of the subspecies on the landscape.

- Response:** After considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible IFT expansion that would facilitate integrating some of the suggestions in this Comment (see the AMOC Recommendations Component).
452. **Comment:** Even though the USFS is not considered a primary cooperator, it is evident from talking with locals that a consistent USFS presence with the program would ensure more timely and appropriate communication. **Response:** See C/R 448.
453. **Comment:** We are concerned about the lack of legitimate input from the livestock community. They have the most to lose with this recovery plan yet are the least sought out for input during the review. **Response:** See C/R 427, 428, 447, 450, 455, and 496.
454. **Comment:** Local residents input regarding potential release sites needs to be taken more seriously. **Response:** The USA is a patchwork quilt of public and private priorities, values, and opinions; rarely can one be set aside entirely in favor of another. Finding a balance between opposing values is the essence of democratic process, and managing natural resources. While pursuing wolf reintroduction as a means of contributing to recovery, AMOC must therefore consider public lands, private property rights, and disparate opinions and preferences of the full spectrum of interested and affected parties. Each of these must be weighed against all others, and the best possible decision must be made. Sometimes such decisions are “win-win,” enabling stakeholders favoring different approaches to see that their input was considered and actually used in shaping the decision. Other times, a situation requires a decision that is antithetical to the wishes of one or more groups, the proverbial “win-lose” or “lose-lose.” Many people don’t like decisions that don’t go their way, but give and take (lose today, win tomorrow) over the long haul is vitally important to democratic process. In any event, AMOC always seriously considers the potential effects of wolf reintroduction (e.g. release site selection) on local residents, and relevant input from such individuals, before making decisions. SOPs 5.0: Initial Wolf Releases and 6.0: Wolf Translocations both commit the IFT to holding local meetings as necessary to discuss potential releases and translocations. See also C/R 102 regarding USFS NEPA compliance in 1997-2000 on release and translocation site selection and approval.
455. **Comment:** AMOC is loaded with Feds and NGOs and hardly any stakeholder involvement. AMWG is supposed to be the forum for stakeholder input but the way it is run, little if any real action is taken on input given there. The whole team consists of pro-wolf, anti-rancher, and anti-anybody who stands in the way of wolf recovery. **Response:** AMOC is composed entirely of State, Tribal, and Federal agencies. The MOU under which AMOC operates also provides for formal Cooperator status for any County or other State agency that chooses to sign on. AMOC also encourages active “informal cooperator” participation by any County or State agency unwilling to sign the MOU. Moreover, AMWG is open to participation by anybody, affiliated or not. If the public AMWG meetings are dominated by entities the Commenter does not consider

stakeholders, perhaps it is because those persons and organizations show up and the “true” stakeholders do not. You can lead a horse to water, but you can’t make it drink.

456. **Comment:** The NGOs, specifically CBD and TESH need to be taken out of full-cooperator status since they are anti-multiple-use and anti-rancher. **Response:** See C/R 49, 244, 245, 247, 356, and 455: no NGO has Cooperator status with AMOC. NGOs are eligible to participate in the public AMWG meetings, and several do. NGOs and other entities are also encouraged to contribute resources to the IFT to assist with wolf management on the ground, and some do, primarily Defenders and TESH. TESH also cooperates with USFWS in the Mexican wolf captive breeding program. But, no NGO is a Cooperator in AMOC, nor do any participate in making AMOC decisions, other than by providing comment and recommendations through AMWG, as can any other organization or member of the public.
457. **Comment:** The technical sub-group of the Recovery Team should have been multidiscipline. The failure to include the social and other physical sciences outside wolf biology and behavior has resulted in the inability to properly evaluate potential environmental impacts. The Counties and other State agencies were regulated to “stakeholders.” The lack of a multidiscipline scientific evaluation and defective participation of elected representatives of the affected citizens has seriously eroded the credibility of any information being developed by the Recovery Team and the USFWS. **Response:** The structure, function, and activities of the SWDPS (Gray Wolf or Mexican Wolf) Recovery Team are outside the scope of the 5-Year Review. Concerns regarding the Recovery Team should be addressed separately and directly to USFWS, which convenes the Team, defines its purpose, and enables its work on recovery issues. See C/R 64, 96, 109, 357-358, and 368.
458. **Comment:** The technical sub-group of the Recovery Team was made of entirely life-long wolf promoters and several non-government organization activists doubling as biologists. Not one person with livestock expertise was allowed to participate. It also seems as if the technical end of the planning was completed prior to the onset of the team. **Response:** See C/R 64, 96, 109, 357-358, 368, and 457.
459. **Comment:** USFWS should adopt the 5-Year Review’s recommendations for improving the Mexican wolf program by creating more field opportunities for biologists from Mexico to gain valuable wolf management experience, which will aid wolf recovery in other regions. **Response:** The Reintroduction Project has used funding from Defenders and a USFWS intern program to enable several biologists and officials from Mexico to visit and actively participate (for up to six months) in the BRWRA field effort since 2000. At annual meetings of the Trilateral Committee (USA, Canada, and Mexico), AMOC also continues to advocate closer linkages between wolf reintroduction efforts in Mexico and those underway in the AZ-NM.
460. **Comment:** The independent review of the 3 year review performed by AZ and NM could hardly be considered an independent review. Both State agencies are highly dependent on

USFWS for funding to run the program. Instead, the review was conducted with a built in bias for wolf reintroduction by individuals fiscally dependent on the program. The fact that the review promoted the position that the State's role needed to be increased was predictable. Contrary to enhancing public trust, the outcome resulted in increased cynicism. There has not been any increase in meaningful response to the Coalition's member counties and their roles as elected representatives of their citizens has been diluted to participation as mere "stakeholder and interested parties." **Response:** Consistent with guidance from Congress (see C/R 45), USFWS asked the two States to conduct an independent review in 2002, not to conduct an "objective" review. Neither State has ever pretended that the review was "objective;" It was intended to be "independent" of the 2001 review, i.e. unfiltered by USFWS. This objective was indeed accomplished. Funding issues had no impact on the State review, as should be evident from the sharp criticisms in the review. The State review's recommendation for increased State presence was predictable, given that this position had been advocated since the State role was known to be eroding in October 1997, even before wolves were first released to the wild. As for dilution of the Coalition's member counties role to participation as "mere 'stakeholders,'" that is a reflection of decisions made by some Coalition members. The door was opened in February 2003 for the Counties to help shape a new adaptive management program, and AMOC has held it wide open since October 2003 for Counties to sign the MOU (which several Coalition members helped shape), and thus be granted full Cooperator status per the MOU.

461. **Comment:** There is no cooperation between the wolf program and the public. I have been lied to by everyone I have had contact with since the program started and have also been called a liar by wolf program staff. **Response:** AMOC believes there is always room for improvement in cooperation. However, ample evidence exists that cooperation is occurring, and this is reflected in the 5-Year Review. Regardless, AMOC does not condone lying or calling anyone a liar. If this has happened, we sincerely regret it, but, absent specifics, there is nothing we can do to remedy the situation. If the Commenter wishes to pursue this further, please contact any member of AMOC.
462. **Comment:** The rule interpretation and translocation of "problem" wolves have not produced the effect of improving relations and building trust with those affected by wolves on the ground (Administrative, Page 9). **Response:** AMOC is obligated to manage Mexican wolves as necessary to comply with the Final Rule and thus to make progress toward the BRWRA population objective. We hope more timely, effective, and consistent management efforts will eventually improve relations and build trust with affected parties. We believe there is movement in that direction over the two years that AMOC has been operating, and we hope to see more progress in the next few years.
463. **Comment:** USFWS has lied all along about the 100 wolves as a population goal and about keeping the boundaries – you knew all along you would change both to unlimited number of wolves and no boundaries. **Response:** See C/R 64, 96, 99, and 359 and B.2 in the Administrative Component regarding the BRWRA population goal. The Final Rule required 3-Year and 5-Year Reviews of the Reintroduction Project to ensure that the need

- to modify the population goal and the MWEPA and BRWRA boundaries was reassessed while considering new information gained through reintroduction and research. Thus, after considering all public and cooperators comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible changes in the Final Rule or creation of a new Final Rule to address boundary issues (see the AMOC Recommendations Component) (see also C/R 99 and 359). The USFWS Region 2 Director will be responsible for acting on AMOC's recommendations in this area.
464. **Comment:** The USFWS, AGFD, and NMDGF should cease bending over backward to accommodate the selfish, short-sighted, and vocal minority (i.e. ranchers) that oppose wolves. **Response:** This Comment does not accurately portray ranchers as a whole, or AMOC's efforts to pursue wolf reintroduction on a public lands, multiple-use landscape with significant private in-holdings.
465. **Comment:** There is a conflict of interest for the Recovery Team to ignore data that would threaten their livelihoods such as achieving population goals. **Response:** See C/R 64, 96, and 99.
466. **Comment:** Page 103, #73, Technical: The public has been falsely misled to believe the wolves would stay put. **Response:** Since reintroduction was first discussed with the public in the late 1980s, agency representatives have spoken consistently and forthrightly about the likelihood that if Mexican wolves were reintroduced, some might localize and others might travel hundreds of miles. This was all based on conjecture, since no wild wolves existed to inform us. Experience has now proven that Mexican wolf packs range over large areas, and individual wolves sometimes disperse hundreds of miles. As predicted, some wolves have established home ranges in areas in which they were released, while others have moved to other areas to establish a home range. This was repeatedly acknowledged prior to reintroduction of Mexican wolves in the BRWRA, and remains true today. Wolves can exist anywhere within the BRWRA, and are fully expected to move outside it to some extent. AMOC is, however, generally required to remove packs that establish territories wholly outside the BRWRA, per guidelines in the Final Rule. The fact that this requirement exists in the Final Rule suggests that the public and cooperating agencies were both keenly aware that wolves cover large areas.
467. **Comment:** You failed to report you have also received extensive public resistance to modifying the rule to allow for direct releases into NM. **Response:** AMOC has modified the 5-Year Review to clarify that public comment was received in opposition to, as well as in support of, modifying the Final Rule to allow direct releases into NM. See also C/R 107.
468. **Comment:** The description of the Gila NF (Administrative, Page 18) is deceptive. The wilderness areas do not have adequate populations of native ungulates and do contain permitted livestock. **Response:** State and Tribal wildlife agencies provide information to AMOC on native ungulate (prey) populations (see C/R 23, 202-203, 207, 396, and 413). NMDGF asserts through such information that native ungulate populations in the Gila

NF, including the Wilderness Areas, are sufficient to sustain wolves and current and projected hunter use. See also C/R 281.

469. **Comment:** The authors of the 5-Year Review are biased against the livestock industry and rural lifestyles and their desire to portray their actions in a positive light prevent an accurate disclosure. This review should have been done by those completely divorced from the program and wolf advocacy. **Response:** See C/R 460. AMOC is responsible for conducting the 5-Year Review on behalf of all cooperators in the Reintroduction Project. Neither AMOC nor the IFT is biased against the livestock industry or rural lifestyles. To the contrary (see C/R 247 and others), AMOC has skewed its public participation processes to ensure that local interests have disproportionate opportunities to contribute to adaptive management of this Project, within the framework set forth in the MOU under which AMOC operates. Moreover, AMOC is committed to ensuring that wolf management actions are described on the basis of accurate information, regardless of whether this results in showing AMOC or the IFT in a positive or a negative light. Although AMOC is committed by law and ethics to contributing to Mexican wolf recovery through the Reintroduction Project, our actions are not based on the blind advocacy that we infer the Commenter means. Finally, AMOC and the IFT were the most appropriate parties to conduct this Review; we have the experience, information, and resources to do it in timely and objective fashion.
470. **Comment:** Limited monitoring has led to problems not being investigated in a timely basis. We call your attention to (Page 2, Item 2, Justification, Administrative): “Monitoring was limited by availability of flights which reflected limited air support and lack of funds to ensure that flight time could be increased to more fully meet project needs; and basic questions about wolf movements and behavior, impacts on native and domestic prey, wolf relationship to total predator load and all aspects of the human dimension (social, cultural and economic issues) etc. remained unanswered due to lack of funds.” This statement is totally devoid of credibility. **Response:** Since AMOC began functioning under its MOU of October 2003, its efforts to increase agency commitments of resources to the IFT have added three full time employees, provided expanded emergency assistance from a variety of non-IFT agency employees during management actions, and generally greatly enhanced IFT response capability for nuisance and problem situations. Development of appropriate SOPs has also enhanced management responses, and provided local residents with more certainty as to how and when the IFT will respond to specific situations. In short, the Project’s performance bar has been greatly elevated since 2003, and the public now can more objectively assess whether operates up to that standard. Other improvements are expected to result from outcomes of the 5-Year Review. However, as the wolf population grows, or spreads out, IFT capacity must continually grow to ensure that performance drop-offs do not occur.
471. **Comment:** A program should be developed for issuing guiding permits and market a program targeting wolf enthusiasts and conservationists who wish to see Mexican wolves in the wild in order to promote an additional economic benefit to the residents of the recovery area. **Response:** Although AMOC advocates pursuit of wolf tourism activities

to enhance public appreciation for and understanding of Mexican wolves, and contribute to local economies, administrative responsibility for such a program lies with USFS, not AMOC. Wolf tourism is a private enterprise, beyond the scope of AMOC authorities. Even so, AMOC believes wolf-related tourism could provide economic benefits within the BRWRA. In the socioeconomic analysis portion of the 5-Year Review, several interviewees provided anecdotal accounts on this topic. A conference in Alpine AZ, in 2003, hosted by an NGO, focused on "potential [tourism] ideas related to reintroduced wolves." More recently, locals have discussed developing a museum on local ecology that could feature wolves, and a charter school that could use wolves to study ecology. Although wolf-related tourism in BRWRA is already occurring, it has not resulted in economic benefits that could be detected by socioeconomic analysis in the 5-Year Review.

472. **Comment:** Wolves should not be secondary to livestock on public lands in the BRWRA. We recognize that grazing has a long tradition in the west and giving priority to wolves would be controversial. Mexican wolves are part of the nation's wildlife heritage and creative ideas should be used to solve this issue. Voluntary buy-outs of grazing leases to minimize conflicts between wildlife and grazing should be explored. **Response:** Under the Multiple Use Mandate of the USFS, wolves and grazing are both recognized as having value on National Forest system lands. Conservation of the Mexican wolf is a USFS obligation under section 7(a)(1) of the ESA. Livestock grazing is a traditional use of the National Forest and part of the USFS multiple-use mandate as authorized and regulated through the Multiple Use-Sustained Yield Act of 1960, among other applicable laws. With regard to permittee buy-outs, there is no law, regulation, or policy that would allow for a Federal buy-out program (see C/R 227). A Federal buy-out program would have to be approved by Congress and signed into law by the President. Meanwhile, through AMWG, AMOC and various public interest groups are working to develop creative ideas to minimize conflicts between wildlife and the ranching industry.
473. **Comment:** Conflicts with management and recovery of other Federally-listed species have occurred. Restrictions of closure areas have affected landscape management decisions regarding grazing and fire in the Blue Range Wolf Recovery Area. **Response:** Use of fire as a management tool, like other land management activities, is carefully coordinated within USFS (in consultation with USFWS) to prevent or reduce conflicts with a wide variety of multiple-uses on National Forests. USFS is mandated by section 7(a)(1) of the ESA to contribute to conservation of the Mexican wolf (see also C/R 472). Therefore, USFS has been an active participant in reintroduction and recovery efforts for the species. AMOC is, however, aware of two instances in which temporary wolf closures (e.g. for den sites) have conflicted with initial plans to conduct control burns on National Forest lands. These issues were resolved to provide benefits for both interests. We are not aware of any other conflicts with management and recovery of Federally-listed species. Some BRWRA livestock operators have, however, adjusted operations to reduce livestock-wolf interactions.

474. **Comment:** Mexican wolf recovery should formally enjoy at least an equal priority to livestock grazing on public lands. **Response:** See C/R 472 and 473.
475. **Comment:** Livestock depredation should not be considered just cause for removal of wolves. Livestock operators who lease public lands for personal profit must accept livestock depredation as a cost of doing business on public lands. **Response:** See C/R 348, 472, and 473.
476. **Comment:** The wolf program is starting to cost the NMGF as they cut 100 elk bull tags in the Wilderness this past year. The loss of tags means less hunting dollars into the general economy. **Response:** The number and type of elk permits issued in NM are based on unit management objectives and current population numbers, composition, and trends relative to those objectives. Within some portions of the Gila NF Wilderness Areas, the number and type of elk permits issued have recently been modified in an attempt to prevent populations from falling below these objectives. Decisions to modify permit numbers were, however, in no way influenced by presence of Mexican wolves. Information within the Socioeconomic Component indicates that hunter days within the NM portion of the BRWRA have increased during the period covered by the 5-Year Review.
477. **Comment:** The wolf program is costing us ranching jobs as cattle permits are cancelled to give the wolf room and ranching families must move. **Response:** No allotment permits have been canceled to provide “room” for Mexican wolves.
478. **Comment:** Because the majority of conflicts the wolves have had with humans were the result of wolves attacking dogs, the USFS should require people visiting forests to leave their dogs at home. In addition to provoking wolf attacks, dogs are a serious nuisance to other forest visitors and wildlife. **Response:** See C/R 349 and 350. AMOC will not recommend dog-control rules, regulations, policies, or ordinances beyond those already implemented by the appropriate County, Tribal, and/or local governments, or beyond the local closures occasionally (and temporarily) implemented through the USFS for den sites and/or rendezvous sites. Leashing dogs in wolf country is often advisable for several reasons, but AMOC cannot require it and will not recommend regulations to require it for all circumstances.
479. **Comment:** People who live in urban areas should have no “say so” for anything regarding the wolf program since it is the rural people who are affected. **Response:** See C/R 417, 430, 434, 435, 442, and 446. Wolf reintroduction in AZ-NM is occurring across a mosaic of private, public, and Tribal lands. The stakeholders in wolf decisions thus include the full spectrum of Americans. In a participatory democracy, such as we have enjoyed in this country for more than 200 years, that means all opinions count and all voices must be heard. AMOC is committed to ensuring that the voices of those most directly affected by wolf reintroduction are heard and heeded as decisions are shaped, made, and implemented, but other voices should also be heard.

480. **Comment:** The almost certain curtailment of hunting will effect a huge segment of our society. The wolf stands to affect a great many lives and lifestyles in a very harmful way not addressed in the social report. **Response:** See C/R 468. To date, no detectable changes have occurred to big game populations as a result of wolf reintroduction. No changes in the number of permits issued for big game hunts have been made as a result of wolf presence, either. Although no impacts to prey populations from wolves have been observed to date, wildlife management agencies do have the authority to implement wolf management actions if mortality by wolves results in unacceptable impacts to game populations. Unacceptable impacts to game populations are defined within the Final Rule as “2 consecutive years with a cumulative 35 percent decrease in population or hunter harvest estimates for a particular species of ungulate in a game management unit or distinct herd segment compared to the pre-wolf 5-year average,” The Final Rule also encourages wildlife management agencies to develop their own definitions of unacceptable impacts for approval by the USFWS. WMAT and AGFD have both adopted 25% as their thresholds for unacceptable impacts.
481. **Comment:** Catron County Commission requests the IFT always notify the County sheriff at the earliest possible time when there is a livestock incident potentially involving wolves. **Response:** The private individual (e.g. livestock operator) involved in such a situation has the right to decide whether to contact the County Sheriff. As AMOC discussed with Catron County in February 2005, the IFT cannot and will not violate that individual prerogative. However, if a livestock operator wants to contact the local Sheriff regarding a livestock incident that might involve Mexican wolves, WS IFT staff will work with the operator as necessary to help make that contact.
482. **Comment:** The difficulties of reconciling the depredation and other data between agencies is an indication that there is no desire to have accurate information on the program. **Response:** The draft 5-Year Review showed the referenced differences in data simply to ensure the public was aware of the discrepancies. The final 5-Year Review will provide reconciled numbers for depredations.
483. **Comment:** For USFWS to allow CBD incidental and non-scientific data collection into this document is biased and smacks of corruption. Whenever a county or a rancher or livestock organization provides data, it is apparently run through a shredder in Service offices. AMOC should have worked with the livestock industry prior to placing this pseudo-science into the document and until they do, this “data” should be removed from the 5 year review. **Response:** See C/R 257, 296, 460, and 469 regarding carcass and depredation information, which seems to be at the heart of this Comment. As noted in C/R 257, the carcass issue was first raised during the 3-Year Review by a panel of independent scientists. Currently, there are no laws, regulations, or policies that could require removal of livestock carcasses from public land grazing allotments or private lands. This is a matter of law, not policy or preference. Because the issue was raised during the 3-Year Review, and not clarified (due to lack of follow-through on that review), it was carried forward in the 5-Year Review. However, AMOC did not include subjective data on that issue from an environmental group. The CBD provided data that it

had obtained from WS through FOIA. AMOC only used that information to ensure that the 5-Year Review reflected all the available records. Each depredation incident and each carcass feeding incident included in the 5-Year Review was derived from a WS database, independent of the CBD's information.

484. **Comment:** The IFT and the Forest Districts coordinate wolf releases and grazing management when possible and will continue to do so. The Districts will continue to work to minimize wolf/livestock interactions where possible. The USFS requests that the details of releases, translocations and confirmed predations be shared with the Forest in a timely manner so that we may be included in discussions to identify appropriate locations and actions. **Response:** Per SOP 5.0: Initial Wolf Releases and SOP 6.0: Wolf Translocations, the IFT is required to submit draft proposals to AMOC for Lead Agency review, including discussion in an AMOC meeting. As an AMOC member, USFS is always represented in AMOC meetings. Therefore, USFS input on translocations and releases occurs early in the decision-making process. Additionally, as proposals are further developed, the IFT is required by SOPs 5.0 and 6.0 to seek input from individual District Rangers and USFS staff, to determine site selection and suitability and to ensure compliance with NEPA and any applicable site-permitting processes.
485. **Comment:** The data collecting and studies need to be easily accessible to the public. They should be listed and links provided online. Current wolf locations should be included in each monthly report. It is difficult for the public to know how to know where wolves are which can influence where they camp, hunt, etc. **Response:** Dissemination of data, in the form of Annual Reports as well as the 3-Year and 5-Year Reviews, is achieved in part through online postings (<http://azgfd.gov/wolf> and <http://mexicanwolf.fws.gov>). Persons without Internet access may request single hard copies from any AMOC Cooperator. Published studies are available in the scientific literature at various libraries. Multiple studies are in progress in the BRWRA and their final reports will be accessible to the public when they are completed. AMOC is also discussing interim wolf location dissemination guidelines that delineate response time, recipients, and perhaps more specificity for individual wolf locations. A final decision on these draft guidelines is expected by December 2005. Meanwhile, general inquiries regarding wolf locations that might affect hunting or camping decisions should be directed to the IFT via its toll-free number 1-888-459-9653. However, it is important to note much of the available location information is for radio-collared wolves, which make up only a portion of the free-ranging population and which sometimes move quickly over large distances. Therefore, AMOC urges residents and livestock owners, as well as anyone using the BRWRA, to consider that wolves may be present anywhere at anytime. See C/R 429 on draft information guidelines.
486. **Comment:** The database should be centralized to ensure consistency. **Response:** The suggested action is recommended in the management implications section of the Technical Component, and the IFT is already implementing it.

487. **Comment:** It is unrealistic to expect a rancher or any other working person to call every day to find out where the wolves are. It is much more efficient to provide personnel to contact the ranchers and other people potentially affected by the movements of wolves and have this person located in Alpine with the rest of the IFT. **Response:** See C/R 250, 412, 429, 485, 488, and 498.
488. **Comment:** Page 87, Item 14 (Technical): Note that only ranchers and people who oppose wolf recovery are now informed of wolves locations in proximity to livestock, wolves scavenging on dead livestock and wolves depredating. People who support wolves have been cut out of the loop to receive such wolf location information. All citizens should be treated equally and if they are not then the policy that elevates the rights of certain stakeholders over others should be explicitly articulated in the review. **Response:** AMOC is now considering guidelines that would better address this issue (see also C/R 250, 412, 429, 485, and 498).
489. **Comment:** Appendix II, #2 (Technical Report): Population estimation techniques (track station surveys or genetic sampling of hair or feces) need to be developed now to ensure they are in place as the population grows beyond the point where current techniques are useful so that the new population estimation techniques can be validated early on before the IFT begins to rely more on non-telemetric methods. **Response:** The IFT uses standard population estimation techniques, such as observational data, howling surveys, and track counts based on telemetric monitoring (see C/R 132 for discussion of these methodologies). However, we are also pursuing new methods, such as genetic sampling of feces, and funding to integrate such methodologies as they become available.
490. **Comment:** Why aren't the missing Fate Unknown wolves listed in the mortalities category? **Response:** See C/R 493. Fate Unknown wolves are wolves that we no longer know to be alive, e.g. perhaps due to radiocollar failure. These wolves could still be alive (i.e. some Fate Unknown wolves have been recaptured and recollared after months of "absence"), thus they should not be listed as mortalities.
491. **Comment:** The Lupine male did not die from snakebite as listed but from combination of snakebite, management—induced intraspecific strife and asphyxiation by radio collar. It is not accurate to report the only cause that was not anthropogenic and omit the two others. It should also be noted the necropsy of the Pipestem pups succumbed to disease after their capture indicated the pivotal role of the capture in their deaths. **Response:** See C/R 140 and 146.
492. **Comment:** Non-standardized and severely limited methods were used in data collection for the report therefore the statistics are not useful since the data was not collected in a consistent, reproducible, comprehensive and uniform fashion. This applies to all field observations, population estimates, dispersal, mortality, reproduction, predations, and depredation. In the document are statements that evidence that these minimal standards were not used (Pages 37, 42, 83, 91-91, 100). **Response:** Record keeping and methods were consistent for locations (based on location database at the Alpine Field Office),

mortalities (event database at Albuquerque NM, with paper records kept with USFWS Special Agents), dispersal (based on location database), predation (based on predation database at Alpine AZ), depredations (based on paper WS reports associated with each investigation, housed at Albuquerque NM [events database]; Alpine AZ; and Phoenix AZ [depredation database]) during the review process. Visual estimates of the number of wolves and pups associated with each collared pack in the wild were composed yearly. The sum of the number of wolves and pups associated with each collared pack represented our minimum annual population and pup estimate per year. All observers were trained by qualified personnel. Sampling is generally required for large populations. The first requirement is to determine the sample unit. In the case of population estimates and reproduction, the sample unit is individual packs. During the course of this study, we attempted to place radio collars within every pack, and investigated credible reports of uncollared wolves, that were indicative of a pack being present. We used this “sample” (e.g. every pack with credible evidence of existence) as the basis for minimum reproduction and population estimates. Sampling methods for dispersal and mortality relied on individual collared wolves as an indication of the population. The sample in this case is whatever animals are captured and big enough to wear a collar. Predation and depredations were not designed to be sample, but rather summarizing the data that was collected from all kills that were found. Within scientific documents it is important to note the limitations of the data, and areas where additional or ongoing research may help to elucidate some of the hypothesis or questions. Many of the specific examples above relate to areas in the document where we note the limitations of the data or discuss specific research projects that have been initiated. Specific research will be analyzed and reported within a specific research period, and may eventually effect data collection methods, but does not represent a shift in the record keeping or methods currently. Further it is appropriate within scientific documents to discuss the limitation of specific data. The section on Page 42 (in the Draft 5-Year Review) referred to the differences between two databases housed in different offices relative to depredations. We have reconciled those two databases through referencing each individual paper record of depredations housed in different offices. That reconciled version of depredations will be presented in the final version of the 5-Year Review. See also C/R 132 and 161.

493. **Comment:** Loss of wolves to “other” causes was projected in the FEIS to be 25%. Other Losses estimated in the FEIS for 2002 was 21. When you count the 16 Fate Unknown from 2002, add to that Fate Unknown from 2003 and 2004 and uncounted for or missing pups from all 5 years, the Other Losses number is much higher. **Response:** The 25% “Other Loss” figure presented in the FEIS (Table 2-2, Page 2-8) is an annual loss estimate and adding the figures together as suggested would not be an accurate representation of this value. Furthermore, all Fate Unknown and uncollared “missing” wolves are not mortalities. Some wolves (adults and pups) have “disappeared” for months (sometimes longer than the 3-month threshold for declaring them “Fate Unknown”) only to resurface alive. Other Fate Unknown wolves have eventually been confirmed as mortalities. Regardless, the FEIS definition of Other Losses was inadequate, and for purposes of clarity and full disclosure, we have elected to present these data in the 5-Year Review on the basis of “real world” evidence and experience, without

consideration for whether interpretation might increase or decrease mortality rates. Strict comparison with the FEIS would create the erroneous perception that all Fate Unknown animals were mortalities. Accuracy and understanding may be enhanced by subdividing Fate Unknown into sub-categories (i.e. Fate Unknown – likely alive, Fate Unknown – likely dead, and Fate Unknown – no information) and analyzing them individually. One weakness with this approach is wild-born pups that lack stud book numbers; they lack such numbers because they are not collared and cannot be identified, thus their fates cannot be individually determined. Another way to address this issue may be to use the collared population as a sample of the entire population versus absolute numbers. For example, “Mortality” and “Missing” rates could be combined and compared with the FEIS estimate of 25%. This issue is readdressed in the Technical Component.

494. **Comment:** Since the 5 year review deadline, several other mortalities of adult animals have occurred. **Response:** Four wolves died in 2004 and four have died thus far in 2005 (as of October 27, 2005). However, the 5-Year Review covers only 1998-2003.
495. **Comment:** There is a significant difference between the number of wolves in the wild and the number of Mexican wolves reported in the 5-Year Review but no one knows what is out there and what exactly it is. **Response:** See C/R 132.
496. **Comment:** Catron County elected officials are getting no information on the program even when requested. **Response:** See also C/R 447. Since February 2003, AMOC has diligently tried to ensure that Catron County has appropriate access to information about AMOC activities, AMWG meetings, and adaptive management of the Reintroduction Project. We have provided many opportunities for, and have repeatedly asked, Catron County to participate as a formal or informal Cooperator. Catron County officials and/or their designated representative from Western New Mexico University attended many AMOC and AMWG meetings from February 2003 through February 2005, and both attended a few subsequent AMWG meetings in 2005. The County’s representative and a now-deceased Commissioner contributed significantly to developing the MOU under which AMOC operates, and to drafts of many SOPs that AMOC has now approved. Although Catron County has declined to become a formal Cooperator in the Project, AMOC continues to provide electronic (email) notice to several Catron County officials regarding relevant AMOC and AMWG activities, just as we do for the Lead Agencies and formal Cooperators in this Project. AMOC has held its own business meetings and AMWG public meetings in Catron County several times to facilitate participation by the County. We have also offered to meet with the County in other settings (e.g. County Commission meetings) to provide information on the Project. Nevertheless, AMOC will respond to this Comment by contacting Catron County again to ask it to specify what information it desires that it is not getting. If AMOC can legally provide the desired information, and has not already provided it, we will provide it to the extent that is available.
497. **Comment:** The AZ/NM Coalition of Counties had to include in a lawsuit a complaint over the lack of response to a Freedom of Information Act request (winning that portion

- of the suit). **Response:** The case in question involved USFWS withholding certain documents requested under FOIA, based on USFWS concerns about the Privacy Act. Parties to the lawsuit (Coalition of Arizona/New Mexico Counties v. United States Fish and Wildlife Service et al., CV-03-0508-MCA/LCS) negotiated a Modified Scheduling Order that allowed USFWS to summarize and release the information on WS Mexican wolf complaint investigation forms, without violating the Privacy Act. USFWS released the information to the Court and Plaintiffs in the case in April 2004.
498. **Comment:** Local residents get limited or no information needed to assist them to keep up with livestock protection when wolves are in the area, costing them valuable resources, time, and cattle. On the other hand, the Forest Guardians, CBD and Defenders get information on a regular basis and have even teamed up with USFWS to defend against legal action. **Response:** See C/R 250, 412, 480, 485, 487-488, and 498.
499. **Comment:** All available data on scat analysis should be made available to the public on a regular basis. Information should include collection sites and contents of all wolf scat. **Response:** The IFT does not routinely collect scat for analysis, but all available scat information is or will be summarized in IFT annual reports. If someone needs more detail than is included in such reports, please contact the IFT at 1-888-459-9653.
500. **Comment:** All information obtained in necropsy reports on Mexican wolves should be made available to the public. **Response:** Necropsy reports that are not part of an active law enforcement investigation are available to the public upon request. Please contact the IFT at 1-888-459-9653.
501. **Comment:** Why are not all wolves collared as was promised? **Response:** The agencies involved in the Reintroduction Project cannot commit to collaring all wolves released to or born in the BRWRA. From the outset of discussions regarding reintroduction, in the 1980s, we have tried make clear that it was not likely all wild wolves could be captured and collared, and that collar failure on released wolves was inevitable. Wolf pups, whether born in captivity or the wild, are too small to collar. Our standard is to collar every adult wolf that is released or re-released to the wild, all non-adult released or re-released wolves that are large enough to collar, and to have at least one wolf in each wild pack collared at all times (e.g. some packs have as many as five collars). If their size permits, all wild wolves that are captured (e.g. wild-born wolves) or recaptured (e.g. wolves with failed collars) are collared or re-collared, in accordance with SOP 21.0: Handling, Immobilizing, and Processing Live Mexican Wolves.
502. **Comment:** Regarding the technical report, current information regarding the wolf program has been gathered under artificial conditions in a highly altered and managed environment and with interactions that would not likely occur under natural conditions. Applying borrowed theorems from other wolf research (even when it may be the only choice) puts in question the accuracy and relevance when applied to Mexican wolves. The biggest problem is no habitat models exist for the Mexican wolf. No work was done on prey evaluation, impacts, or any of a host of questions before the assumptions in the

document were made. Without knowing about habitat parameters, prey utilization, and the relationship to wolf behavior, it is impossible to make valid recommendations to expand the project or to evaluate the success of the existing program. **Response:** The purpose of the 5-Year Review is to evaluate the existing Reintroduction Project, and implement or recommend modifications where appropriate. Both the evaluation and the modifications will by necessity be based on the best available information. Where information (e.g. data) is lacking, informed opinion must be relied upon. Relevant experience and knowledge from other areas and projects, especially including other wolf projects, is vitally important. We recognize, however, that any inferences drawn are conjectural, and that all hypotheses applied may well be proven “wrong” (all or in part) when tested in the real world. There is little to no certainty in most if not all aspects of wildlife management; abundant probabilities and possibilities, but virtually no certainty. Regardless, management of wolves is a necessary part of reintroduction, to ensure that wolves adequately transition from captivity to the wild and to limit impacts on livestock owners and rural residents. The Technical Component is a summary of the information gathered from 1998-2003. Evaluation of prey impacts is based on the best information available from State and Tribal wildlife agencies (see C/R 23, 202-203, 207, 396, 413, and 468). Although a peer-reviewed GIS-based wolf habitat model is just now being published (Carroll et al. *in press*), the fundamentals of wolf habitat use are well known, largely intuitive, and have been applied to this Project since the earliest stages of development. Wolves occupy the landscape at an ecological scale that is not as fine-grained as many species. Mexican wolves are wide-ranging predators that tend to occur in oak and oak-pine forest and woodland (and adjacent grasslands), at 4000 to 7000 feet (although they range higher and lower), where deer and elk provide the primary prey base. Many details and location-specific refinements can be made, but those generalities are sufficient to drive most wolf management. They are also the same criteria that were used in winnowing 15 possible reintroduction sites down to the Blue Range. Thus, we believe the 5-Year Review, and the Reintroduction Project itself in daily operations, have consistently demonstrated use of the best available methodologies and information, and that where experience or new information from other sources has suggested possible improvements, such improvements have been or are being made (see also C/R 161).

503. **Comment:** NMDA does not agree with the assumptions made in the technical report quantifying or drawing conclusions about wolf behavior in relation to distribution, ranges, feeding, dispersal, and relations with humans or livestock because the current science is insufficient to support these conclusions. It would be more appropriate to state that it is too early to evaluate success or failure since some major components of research and data are not currently available. **Response:** See C/R 161, 389, and 502. AMOC believes that it is too soon to draw definitive conclusions about long-term success or failure of the Reintroduction Project. The scientific process is one in which hypotheses are posited and tested, and recommendations are made based on the data available at the time. As new information becomes available, existing assumptions and practices are retested or revisited. It is an iterative process, and we agree that this Project is still in the early stages of that process. We believe, however, that the data currently available in most areas is adequate for evaluating progress to date, and for elucidating important

recommendations for change and improvement. We also believe that any known limitations of the data are appropriately acknowledged in the 5-Year Review.

504. **Comment:** Appendix II, #6 (Technical Report): The review indicates the IFT has considered the use of modified #3 soft-catch traps rather than the McBride #7 but has determined that McBride #7 traps caused minimal injuries and the IFT was concerned about pull-outs if switching to #3 traps. However, the report provides no data on trap injuries or the incidence of pull-outs. The IFT must provide the public with the data that were used to make this decision so scrutiny by outside experts may help determine potential impact to the long-term viability of the population. **Response:** The IFT has evaluated the effectiveness of modified soft-catch #3s and McBride #7s. Our experience indicates the McBride #7 is best suited to our Project because they cause fewer injuries and because wolves have more difficulty escaping from them, in comparison to modified soft-catch #3s. However, we do modify all McBride #7s to improve their ability to catch and hold wolves and to protect animals while they are in the trap. In any event, per an AMOC recommendation (see AMOC Recommendations Component), the WS National Wildlife Research Center is already re-evaluating these traps and others to provide recommendations to AMOC on possible further improvements in IFT capture techniques.
505. **Comment:** Appendix II, #49 (Technical): With respect to resisting purely politically motivated solutions to problems, we note that the moratorium on new releases, the restrictions on translocations, and SOP 13.0 appear to be politically motivated and do not have a solid foundation in scientific data or in the recovery and conservation of the Mexican wolf. The IFT must provide a clear explanation of the factors – political, scientific and other that led to the proposed moratorium, restrictions on translocations and SOP 13.0. **Response:** First and foremost, the obligation to explain the rationale for adaptive management decisions in the Blue Range Reintroduction Project belongs to AMOC, not the IFT. “Political motivation” seems to refer to meetings that local livestock and landowner interests in NM had with Congressman Pearce’s (NM) staff, in Glenwood and Socorro NM, on February 12, 2005 (see C/R 3). The Congressman requested that officials from USFWS attend to listen and respond to comments on the wolf program. USFWS did not request the meeting, and had no role or involvement in planning or conducting it. USFWS’s request to the Congressman’s staff that AMOC be extended an invitation to attend was granted a few days before the meetings. AMOC declined the invitation, in part because the meeting was not open to the public. However, when a standing member of Congress requests that a Federal agency, such as USFWS, attend a meeting, that agency generally does not decline the opportunity. AMOC and its Federal, State, and Tribal member agencies cannot dictate with whom a Congressman and/or his staff meet, nor does AMOC arrange or schedule private meetings between Congressional leaders and select groups of their constituents. Anyone can request a meeting with a Congressman by contacting him or his staff directly. As for the moratorium, AMOC does not believe that a 1-Year Moratorium on initial release of captive-reared wolves will appreciably slow the recovery process. The 1-Year Moratorium for 2006 will not prevent free-roaming wolves from breeding and dispersing within the BRWRA. In any wildlife reintroduction, the desire is to reach a point at which the wild population no longer needs

enhancement by release of captive individuals. Captive releases are costly in terms of time, money, and other resources. Moreover, wild-born/reared individuals are generally superior to captive-born/reared animals in several ways. The point at which a transition could or should be made to reliance on growth in the wild Blue Range Mexican wolf population has been a discussion topic for several years, dating back to development of the EIS addressing the proposed reintroduction effort. Initial AMOC discussion in 2003 revolved around biological aspects of the question. However, other factors also needed to be considered, because reintroduction is occurring across a mosaic of public and Tribal land ownership and management, with private in-holdings. Guidance offered by the Final Rule under which reintroduction is authorized must also be considered. Events early in 2005 brought these issues to the forefront. In response to the February 2005 “Pearce” meetings, the USFWS crafted a proposed moratorium for AMOC consideration. AMOC received the rough draft proposal on April 20, and discussed it at a previously-scheduled meeting on April 21. Cooperator consensus indicated the proposal, with modifications, had sufficient merit from an administrative and managerial perspective to be brought forth for public comment, discussion, and final AMOC action (i.e. approval or rejection). AMOC made various modifications, and brought the Draft Proposed Moratorium to the public for initial discussion in a previously-scheduled public meeting on April 22 (San Carlos AZ). From April 22 through July 31, 2005, the Draft Proposed Moratorium was available to the public for comment. It was also discussed in eight AMOC public meetings in June 2005, four each in AZ and NM. All comment received, whether verbal or written, was evaluated and carefully considered in reaching a final decision on this matter. The moratorium is being enacted because AMOC believes the administrative and social contexts of this reintroduction effort warrant it, and because a hiatus on new pack releases for one calendar year will not substantially impede progress toward population objectives. The moratorium covers CY2006 only, and provision is made for replacing individual wolves lost to unnatural or other causes. Further, AMOC wishes to emphasize that the Moratorium is contingent upon achieving at least six breeding pairs of Mexican wolves in the BRWRA in the 2005 end-of-year count. If that number is not achieved, or sustained into 2006, the Moratorium may be rescinded. Regardless, AMOC acknowledges that, in hindsight, the question of whether to enact a moratorium, and the justification for and composition of a moratorium, should have been melded into the pre-existing 5-Year Review, review of relevant SOPs, and development of the Project’s Annual Work Plan for 2006. Thus, the need for, and elements of, any future guidelines for new releases will be discussed as AMOC and the IFT construct Annual Work Plans for each year beyond 2006. These documents will be discussed at AMOC’s quarterly public meetings in AZ and NM, with ample opportunity for public comment to ensure full consideration of relevant concerns before decisions are made.

506. **Comment:** Page 12, Paragraph 3 (Technical): It is at least as important to calculate causes of mortality when mortality is caused by humans because that may be the factor most amenable to change. Such a calculation should be included. **Response:** We will calculate human caused and natural mortality rates to be included in the final 5-Year Review.

507. **Comment:** Page 13, Paragraph 1 (Technical): The “slight corrections...needed in the formula” should be made and the results incorporated into the final version of the review. **Response:** We used the Heisey and Fuller (1985) method that included corrections for multiple causes. However, the wording in this section of the Technical Component has been revised for clarity. See also C/R 508.
508. **Comment:** Page 13, Paragraph 2 (Technical): It is unclear why the model to identify factors in allowing wolves to survive only measures survival as opposed to reintroduction, while the previous model to measure release success measures reproduction. Release success must be presumed to influence a shorter period of time than survival success, and thus it would be more appropriate to correlate release success with the absence of mortality or removal, and survival success with breeding success. Even if the benchmark for survival success is held to be appropriate, the independent variables miss the four most pertinent factors effecting survival: 1) Animal unit months of livestock grazed or authorized within home ranges or region in which wolf travels, 2) road density within home ranger or region wolf travels, 3) land classification (i.e. within BRWRA and FAIR or outside of these jurisdictions), and 4) whether the wolf encounters livestock carcasses or not. As in the release success model, two factors of slight or no pertinence have been improperly included: year and State. **Response:** Survival models use survival rates, or “hazard rates” in the Cox proportional hazard model (Cox and Oakes 1984), as the dependent variable. Thus, rates are an appropriate dependent variable in this case, rather than a binomial variable, such as “produced in the wild” or “not.” A wide variety of habitat features could also be included in the survival model (e.g. 2-wheel drive and 4-wheel drive road densities, ungulate densities, livestock densities, vegetation characteristics [e.g. openness of the habitat], water, slope, etc.). However, a specific link between environmental variables and survival was outside the scope of this analysis because it would take an extensive period of time and effort (see discussion below). Rather, we were looking at more basic factors associated with the animal that may affect survival (e.g. age, sex). Habitat variables may be investigated in future detailed analysis. There are two different underlying questions, (1) which animals are likely to survive, and (2) what areas promote conditions for wolf survival. The first question could be addressed with existing data, but the latter question would require extensive GIS analysis and computations beyond the scope of our current databases. Both State and year were used as blocking variables to allow comparisons between animals subject to similar mortality risks. This methodology is consistent with the published literature regarding survival analysis (see Heisey and Fuller 1985).
509. **Comment:** Page 21, Paragraph s 1 and 2 (Technical): The number of breeding pairs in 2003 should be included and compared to the 10 breeding pairs that were predicted in the EIS rather than simply stating it was below the EIS prediction. **Response:** The specified paragraphs reference Figure 3a, which compares the actual breeding pairs relative to EIS predictions for 1998 through 2003. However, to ensure clarity, the text in the 5-Year Review will be revised to provide the appropriate numbers.

510. **Comment:** Page 36, Paragraph 2 (Technical): It is incorrect that there were no mortalities from intraspecific strife (Lupine Pack M480 and subsequent demise of rest of pack)
Response: See C/R 140 and 146.
511. **Comment:** Page 93, Item 37 (Technical): Data is not being collected and compiled on all facets of the project (i.e. carcass scavenging and captive wolf deaths). Data is being lost by USFWS. **Response:** Information for livestock carcasses investigated by WS is written into a depredation report for each incident. All wolves that die in the Sevilleta or Ladder wolf facilities are shipped to the National Wildlife Health Center (Madison, Wisconsin) to determine the cause of death. These captive deaths are recorded in USFWS files. No data have been lost, and all relevant information regarding the wild population is being incorporated into a central IFT database.
512. **Comment:** Better record keeping through more accurate, scientific methods used to track the number of incidents in which wolves scavenge on livestock carcasses is needed. **Response:** The IFT collects information on scavenging of livestock carcasses that is useful for wolf management purposes. Neither the IFT nor ranchers can detect all livestock carcasses, whether or not they result from predation, including animals scavenged or killed by Mexican wolves. All livestock carcasses detected by the IFT in the BRWRA, or reported by ranchers, are investigated by WS for evidence of depredation (see C/R 220, 255, 274-275, 278, 291-292, and 297, and SOP 11.0: Depredation on Domestic Livestock and Pets). With permission of the livestock owner, the carcass is removed from the area (or rendered inedible) to encourage wolves to find an alternative natural prey item (see also C/R 286). See also C/R 257 and 483 regarding livestock carcass removal.
513. **Comment:** There appears to be faulty information or biased collection practices. For instance, wolf distribution assessments are not done regularly, leaving a huge gap between wolves actually on the ground and what USFWS finds and reports back to the public. The livestock depredation data is subjective and collection is biased in favor of agency needs, leading to incorrect numbers of actual losses. Agency personnel have even avoided using their own best available science in determining actual livestock losses. It is obviously not a primary focus of data collection since agency policy is to use what suits the program best and refuse any information from livestock experts. **Response:** See C/R 132, 255, 278, and 299 regarding depredation data and reports. Monthly project updates have been disseminated regularly for more than a year, consistent with SOP 3.0: Outreach. These updates include general wolf location information. If you are not receiving these via the electronic self-subscription service, and you do have Internet connectivity, please sign up for them at <http://azgfd.gov/signup>. More detailed information on wolf distribution (i.e. current known locations) is provided to affected stakeholders within 24 hours of each weekly telemetry flight (see C/R 275, 429, and 485). Livestock depredation data stems from depredation reports that are investigated by the IFT consistent with SOP 11.0: Depredation on Domestic Livestock and Pets. These reports yield a minimum estimate of the actual number of cattle lost to wolves. The reports are factual and reflect the best available science and professional training and

ethics. In other words, neither they nor IFT analyses of depredation data reflect a bias in favor of or against agency needs, or anything else. AMOC does not refuse information from livestock experts. Any such input is carefully considered, as appropriate the situation and in the context of all other available information.

514. **Comment:** On Page 28, Results, Depredation – Technical: “There is no clear trend in the data, but 2003 had one of the lowest depredation rates observed during the six years (Table 8).” The year 2003 was the worst drought year over the previous periods, which resulted in a decrease in the number of cattle on the forests. A relief in drought conditions will result in numbers building back up to permitted numbers; wolf/livestock conflicts could likely rise as well. **Response:** The quoted excerpt is from the Results section of the Technical Component. The referenced data reflect what has occurred, not what might occur in the future. The referenced passage from the Discussion section addresses the possibility that depredation removal rates might remain constant, or fluctuate with yearly environmental conditions. Drought probably did contribute indirectly to lower depredation rates in 2003, as postulated, but other factors might also have come into play. We do not have enough information yet to say whether or not drought plays a significant role in the number of cattle killed by Mexican wolves.
515. **Comment:** Page 6, Study Area, Technical Component: Needs to be corrected to acknowledge it can/has snowed in October and into May and even June. **Response:** The passage in the 5-Year Review will be revised to read, “Snow typically occurs....”
516. **Comment:** Page 6, Study Area, Technical Component: Fails to list domestic animals (cats, dogs, chickens, sheep, goats, horses, mules, cattle) as potential prey. **Response:** The 5-Year Review will be modified to ensure that appropriate distinction is made between natural prey (i.e. native species of wildlife) and domestic animals on which wolves might prey, and within those categories which species are known or likely to be primary prey items.
517. **Comment:** The descriptions of elk, deer, and cattle numbers should be corrected or updated (Page 7, Technical). To say that elk numbers have increased recently we find it difficult to consider 9 years as “recent.” As we’ve stated numerous times, deer numbers have declined sharply and to lump the much larger area that is in NM into AZ was erroneous and irresponsible. **Response:** See C/R 413, 468, and 480. In summary, to date, no detectable changes have occurred to big game populations as a result of wolf reintroduction. The number of permits issued for big game hunts have not decreased as a result of wolf presence, either.

S. Socioeconomic

518. **Comment:** Statements like “the economic impacts described in the FEIS were not realized with the exception of impacts to ranchers and the ranching community,” (Page ES02) are not substantiated and are inappropriate. The document compounds the use of this anecdotal information. **Response:** As stated in Section 1.4 of the socioeconomic

analysis, in-person discussions with numerous individuals were conducted as part of this analysis. These included discussions at an initial meeting in October 2004 to which there were approximately 65 invitees, Service open house meetings in January and February 2005, phone interviews with more than 60 local stakeholders, including private parties, as well as municipal, State, and Federal agency staff. It was not possible to interview every person in the BRWRA study area, nor was it the goal of this analysis. Page ES-2 of the socioeconomic analysis now states that "This analysis finds that from 1998 to 2003, the economic impacts described in the FEIS related to livestock losses to ranchers and the ranching community were not realized, except for some impacts on ranching and, to a lesser extent, recreational use. The lack of observable impacts is likely to result, in part, from the relatively small wolf population within the BRWRA during this time period compared to the 100-wolf projections of the FEIS....In addition to impacts on ranching, impacts on recreational use were also observed. Anecdotal evidence suggests that some individuals participated in recreational activities related to the Mexican wolf. This analysis finds that impacts to hunting participation did not occur during the study period." This is a statement of findings of this analysis, based on the research conducted. The Commenters did not provide evidence that contradicts this finding. Nevertheless, after considering all public and cooperator comment during the 5-Year Review, and its own evaluations, AMOC has made recommendations regarding possible changes in the Final Rule or creation of a new Final Rule and additional assessment of social issues pertaining to such modifications (see the AMOC Recommendations Component).

519. **Comment:** There were no valuable conclusions reached in the socioeconomic report. No substantive proof was ever offered that the economic impacts of the FEIS were never reached. Most conclusions were drawn following profiles from comparatively few interviewees and the writers depended almost entirely on the IMPLAN model for the statistics they incorporated into the charts and bar graphs. The literally hundreds of campers, hikers and others who visited the area to see or hear wolves were not interviewed. **Response:** See C/R 518.
520. **Comment:** The socioeconomic report is difficult to review and analyze as it provides so little solid information and data on the actual impacts. Overall it appears that the potential negative impacts have been overstated and the potential positive impacts have been understated. There is significant focus on depredation of livestock and is clearly overstated (see Section 3, Pages 3-1 to 3-29). Even if the worst case estimates were correct the overall impact is still less than 1%. **Response:** The purpose of the socioeconomic analysis is to estimate the social and economic impacts of the Mexican wolf reintroduction effort since its inception in 1998, as part of the 5-Year Review. This information is intended to assist USFWS, cooperating agencies, and stakeholders in their evaluation of the reintroduction effort. The analysis presents the assumptions and data used to develop impact estimates. It is intended to discuss impacts to all affected economic sectors, including ranchers, hunting guides and outfitters, and Tribal entities, as well as recreation and tourism. Thus, the analysis presents a chapter on each of the above topics. The benefits of reintroduction are included in the analysis and are discussed,

though not quantified, in Chapter 6. This section has been expanded in the revised analysis.

521. **Comment:** The socioeconomic impact component is a non-conclusive, predetermined analysis with misdirected assumptions and diverted cause and effect. The analysis is confusing and difficult to follow or understand. It contains conflicting and inaccurate statements. The stated purpose of the report was not accomplished. **Response:** See C/R 520 regarding the purpose of the socioeconomic analysis.
522. **Comment:** The socioeconomic report does not help quantify the decisions on proposed changes to the 10(j) rule. Nowhere does the report address the economic impacts that would be caused by the proposed rule changes stated in the Administrative Component. It is difficult to understand how the Recovery Team and the stakeholders could make a recommendation to the Regional Director without a comprehensive economic impact report. **Response:** See C/R 520 regarding the purpose of the socioeconomic analysis. This analysis was not intended to estimate future impacts of the reintroduction effort, although in several instances, potential future effects are discussed in general terms. Thus, it does not consider future changes to the rule that may be considered.
523. **Comment:** The socioeconomic review is deficient in not noting or even attempting to assess the impacts on local residents of the failure of the FWS to implement the 3 year review recommendations on boundaries, direct releases into NM and livestock carcasses, and how the subsequent low numbers of breeding pairs of wolves diminished the advantages local residents and others would have had in greater success of the program. **Response:** See C/R 520 regarding the purpose of the socioeconomic analysis.
524. **Comment:** Exhibit ES 1 and ES 2 give a range of 32.2 – 233 depredations and \$38,650 to \$206,290 in economic impact to ranchers. This huge deviation is beyond any acceptable standard deviation for statistical validity. **Response:** The actual number of livestock killed by Mexican wolves is not possible to determine since not all livestock carcasses are found and/or reported, and because sometimes sufficient evidence such as the livestock carcass no longer exists to determine the cause of death. Thus, the economic analysis presents a range of estimates of wolf depredation. The low estimate represents the average of the Agency records of confirmed kills (including records from USFWS, WS, and the Defenders compensation program). The medium estimate incorporates a multiplier from published literature that estimates unconfirmed kills in addition to confirmed kills. The high estimate reflects estimates of losses due to wolf depredation provided by ranchers. Due to the uncertainty in depredation numbers, the cost estimates are also uncertain. The range in both depredation and cost estimates reflect this uncertainty.
525. **Comment:** In Section 3.10 of the socioeconomic report where the writers attempt to draw conclusions and compare their findings to the FEIS, adjusting the FEIS estimates, the wolves would have killed 36 cattle from 1998 to 2004. The writers' analysis list figures from 32 to 233. Obviously the FEIS aligns well with the low-end number of kills.

- As for the high end of 233, there is not substantive proof of this outrageously high number of alleged wolf kills. That the uncompensated losses range from \$5,020 to \$172,480 depending on the estimate used is again inconclusive. The charts produced from unproven statistics being fed into the model produced charts that are meaningless when attempting to reach realistic conclusions on economic impacts. **Response:** See C/R 524.
526. **Comment:** The livestock depredation data are subjective and collection is biased in favor of agency needs. **Response:** See C/R 524.
527. **Comment:** The geographic scope of the analysis guarantees a skewed result. Neither costs nor benefits of Mexican wolf recovery are limited to the BRWRA. Costs are shared more broadly through Federal and State taxes supporting the program. While it is true that local people may feel more directly the impact of the program, it is inherently dishonest to imply that all costs are borne locally. **Response:** The five counties included in the Study Area for the economic analysis each include some portions of the BRWRA, and thus are most likely to experience the largest impacts of wolf reintroduction. Thus, the socioeconomic analysis focuses on the demographic and social characteristics of these counties when trying to understand potential impacts related to wolf reintroduction. Section 6 of the analysis discusses the potential for the broader public to hold non-use, or existence values, for Mexican wolves.
528. **Comment:** The socioeconomic analysis should not be limited to the effects of the reintroduction program on the 5 counties of the recovery area. Neither benefits nor costs of wolf reintroduction are limited to the recovery area itself. Taxpayers on both State and national levels bear some portion of the costs, while all citizens of the nation reap potential benefits of reintroduction including fully functioning ecosystems. By limiting the “tentative categories of social and economic impact” to livestock grazing, outfitters and guides, local government, tourism/conservation, and tribes, the proposed outline ignores potential beneficiaries including educational and scientific institutions, many of which while not located in the 5 county area, conduct activities in the area. Broaden the scope to consider both costs and benefits to the region, State and nation, and attempt to capture intangible or difficult to quantify impacts on ecosystem services, spiritual values, and scientific knowledge. Consider also the impacts of projected levels of development and economic activity on the wolf reintroduction as well as the impact of wolf reintroduction on the economy. **Response:** See C/R 527.
529. **Comment:** It is appropriate to assess the benefits on a broader, national basis since most wolf recovery takes place on public lands which are owned equally by all citizens of the USA. Narrowing the scope of the analysis gives unwitting credence to the specious argument that local people should have more influence on the program because they are disproportionately impacted. This is tantamount to suggesting that because decisions by the Kansas City Board of Education more directly impacted my livelihood than those of my non-teacher neighbors, I should have had more votes for School Board members than they. **Response:** The socioeconomic analysis (Sections 3 and 6, in particular) draws on

rancher interviews, livestock depredation estimates, available published literature on existence values, and overall ecosystem health estimates from outside of the BRWRA, including data sources in Idaho and Yellowstone. To the extent that additional relevant information has become available from other areas where wolf reintroductions are occurring, this information is discussed in the final socioeconomic analysis.

530. **Comment:** Wolf presence in other areas report huge economic benefits. To assume that people are different in the Southwest just because the topography is different is to take a jaundiced perspective of the southwestern population. Survey after survey taken in the SW report overwhelmingly that a large majority of citizens favor the return of the Mexican wolf. **Response:** See C/R 521 and 529.
531. **Comment:** The NMDA believes the socioeconomic report grossly underestimates the total impacts to communities, counties, and the agriculture industry because the impacts can be very localized while the report has spread its assumptions over the entire five counties. The effect may be a 1% loss to a five-county industry, but that could be devastating if that entire loss is to one or two producers. **Response:** Section 3 of the socioeconomic analysis recognizes that "while [estimated] losses and impacts may not be significant on a regional level, wolf depredations do not affect ranchers uniformly throughout the BRWRA. Therefore, certain establishments grazing livestock in proximity to Mexican wolf ranges have experienced a disproportionate portion of the impacts. For example, by rancher estimates, of 25 ranches that reported cattle losses since 1998, nearly all reported more than one depredation event. In 2002, two ranches together reported 89% of rancher-reported cattle depredations. In 2003, a third ranch reported 25 of the 38 rancher-reported cattle depredations, or 66%". The revised analysis presents additional detail, where it is known, about the number of ranches that experienced repeated wolf depredations during the study period.
532. **Comment:** There was a severe drought during the study period and the impact it had on local livestock mortality was not fully explored in the socioeconomic report. **Response:** Sections 2 and 3 discuss the potential impacts of drought on economic activities in the BRWRA area. As stated in Section 2, "the recent drought has affect forage availability for cattle and wild game, leading to a reduction in herd numbers due to the decreased carrying capacity of the land." Section 3 observes that the recent trend in reduced AUMs on USFS lands "is likely to result from multiple factors, including declining forage conditions due to drought and competition for forage by other ungulates...." A full analysis of the interaction between increasing drought conditions and hunting, ranching, recreation, tourism or other activities within the BRWRA was not possible during the time-frame for this analysis.
533. **Comment:** The people in Catron County, the most impacted, were not surveyed for economic or social impacts. **Response:** As stated in Section 1.4 of the socioeconomic analysis, in-person discussions with many individuals were conducted as part of this analysis. These included discussions at an initial meeting in October 2004 to which there were approximately 65 invitees, Service open house meetings in January and February

2005, phone interviews with more than 60 local stakeholders, including private parties, as well as municipal, State, and Federal Agency staff. It was not possible to interview every person in the BRWRA study area, nor was it the goal of this analysis. A representative of Catron County participated in the kickoff meeting for this analysis in October 2004. This representative represented Catron County in adaptive management discussions for the Reintroduction Project from February 2003 to 2005. He also played a key role in helping AMOC design the 5-Year Review's Socioeconomic Component. Some members of the Catron County Board of Supervisors met with analysts during the course of this analysis. Several additional residents of Catron County were contacted during revisions to the draft socioeconomic analysis. Their comments have been incorporated into the final analysis.

534. **Comment:** You should figure out what the future holds for small businesses, outfitters, hunters, and ranches who stand to lose the most in just a few short years if wolves keep multiplying as fast as they are now and apply corrective measures to ensure these citizens they will still be in business down the road. **Response:** See C/R 520 and 538.
535. **Comment:** The socioeconomic evaluation should address the potential effects/conflicts of wolf recovery on the existing/future socioeconomic landscape of the region and the potential effect/conflicts of the existing/future socioeconomic landscape of the region on the success of wolf recovery efforts. Even though the USFWS goal is to overlay wolf recovery onto existing land use practices, this analysis needs to remain open to the possibility that land use priorities on public lands may need to change to accommodate wolf recovery on a meaningful level. **Response:** See C/R 520 and 522.
536. **Comment:** Each loss of a viable business is meaningful. Most public lands grazing permits are held in rural areas, so any action affecting livestock operation is likely to disproportionately affect rural areas. Adverse changes to livestock grazing negatively affect the economy and social structure of poor rural areas to a greater degree than wealthy urban areas. **Response:** See C/R 522 and 538.
537. **Comment:** The selected contractor, Industrial Economics, Inc. has demonstrated a serious lack of knowledge of western ranching practices, rural economies, and social structures on previous socioeconomic impact analyses completed for the FWS in the past. This leads us to conclude there will be serious deficiencies in the product. **Response:** The socioeconomic analysis was developed by a team that consisted of: (1) researchers at Industrial Economics, Incorporated, with experience in southwestern land use issues; (2) Dr. Aaron Harp, rural sociologist and former Director of the Policy Analysis Center for Western Public Lands at the University of Idaho, and (3) three technical advisors. The technical advisors, who are experts in agricultural and resource economics as well as rural sociology, are Dr. Allen Torell, Professor of Agricultural Economics, NM State University; Dr. Larry Van Tassell, Dept. of Agricultural Economics and Rural Sociology, University of Idaho; and Dr. David Brookshire, Professor of Economics, University of NM.

538. **Comment:** The social assessment methodology does not address either distributional effects or cumulative effects. Why is the socioeconomic impact assessment void of any analysis of the actual or potential distributional effects analyses, given Federal agency requirement to conduct basic distributional effect analysis, environmental justice and civil rights impact analysis? The ESIMW emphasis is on attitudes rather than assessing distributional effects. **Response:** Sections 3 and 6 of the socioeconomic analysis address distributional effects. Specifically, Section 3.9.2 provides an assessment of the distributional (regional) impacts of decreased livestock production on local economies in the BRWRA study area, and Section 6.3 presents estimates of distributional impacts created by increased wolf-specific Agency expenditures. In addition, Section 5 presents estimated economic impacts of Mexican wolf reintroduction on SCAT and WMAT. A small business analysis is not conducted as part of this effort. A small business analysis pursuant to the Regulatory Flexibility Act as amended by the Small Business Regulatory Enforcement Fairness Act is only required for rulemakings; therefore, such an analysis is not required for the 5-Year Review. Nonetheless, the suggestion to provide additional information regarding the numbers of small entities that may have been affected by the wolf reintroduction effort is useful. The revised socioeconomic analysis provides additional information on small entities in the BRWRA study area.
539. **Comment:** Until 1998, non-wolf losses were an accepted and budgeted-for part of doing business. The wolf is an uninvited, additional business cost, systematically imposed upon these economic entities. Additionally, the report further implies that wolves have less of an impact upon the livestock industry than other predators, diseases, nature, etc. No support for this implication has been supplied. **Response:** Section 3 of the socioeconomic analysis states that "the average death loss rate for cattle and calves in Arizona and New Mexico was 4% in 1997 (the year prior to the Mexican wolf reintroduction effort); the average death loss rate for sheep in the two states was five 5% in 1997. Death losses include deaths caused by predators (such as coyotes, dogs, mountain lions, and bobcats); digestive, respiratory, and calving problems; weather conditions; poison; theft; and unknown causes (USDA 1999). Applying these percentages to the estimated number of livestock in the BRWRA, approximately 1310 cattle and calves and six sheep died from causes other than slaughter or predation by wolves in the BRWRA in 2002, compared to 5 to 33 cattle killed by wolves. Thus, wolf predation comprises a small percentage (between 0.3 and 2.5%) of typical cattle losses experienced annually in the BRWRA.
540. **Comment:** The socioeconomic evaluation should place livestock depredation by wolves in proper perspective by comparing this source of livestock mortality to all other sources of livestock mortality. **Response:** See C/R 539.
541. **Comment:** A better analysis would look at the wolf-populated areas versus the areas that are unpopulated by wolves and seeing if the ranchers in those areas having fewer depredations overall. Are they fairing better economically than ranchers in the BRWRA? How do you know that a wolf depredation on livestock is not displacing some other possible depredation by other predators or death by starvation? **Response:** See C/R 539.

542. **Comment:** It is inappropriate to include the high estimates of depredations because the information is purely anecdotal. If included, it should be noted as anecdotal. If used, the numbers should be labeled “alleged depredations” and the numbers that are real labeled as “actual confirmed depredations.” **Response:** As discussed in C/R 524, data collected by ranchers comprises the high estimate of wolf depredations. The rancher-collected data includes descriptions of livestock impacts that occurred on 25 ranches between 1999 and 2003. Due to the uncertainty in depredation numbers, the cost estimates are also uncertain. This uncertainty is reflected in the ranges in both depredation and cost estimates.
543. **Comment:** The report explains that ranchers “estimated” that their actual losses of livestock to wolves were much higher than the documented losses but there is no explanation of how the ranchers calculated these higher estimates or of how the reviewers collected them. It is irresponsible to include the higher estimates in the review without documenting how they were obtained. **Response:** See C/R 542.
544. **Comment:** Pages 3-21 – 3-22 (Socioeconomic): The review should count how many depredations were found by ranchers and how many by agency people to more accurately assess this. **Response:** See C/R 524 and 542.
545. **Comment:** The complaints against Defenders in the socioeconomic report (Section 3.3) are unfounded. How can WS determine cause of death if no carcass is produced? When no carcass is available the kill may have been from anything. Ranchers should check their private property (livestock) on public land often enough to know when depredation has occurred and not wait until weeks later then blame missing livestock losses on wolves. **Response:** Section 3.3 of the socioeconomic analysis states that "a State or Federal wildlife agent...must determine whether the kill is confirmed or probable upon inspecting the carcass; if no body is recovered, Defenders will not compensate ranchers (C. Miller, personal communication, March 20, 2005). Ranchers are frequently unable to locate carcasses or notify wildlife agents soon enough to receive a confirmed or probable designation because of the rugged and vast terrains where livestock graze, consumption by predators and scavengers, and carcass decomposition (Oakleaf et al. 2003). In addition, some ranchers who cannot locate carcasses may not bother to report their losses. Consequently, it is likely that more ranch animal depredation has occurred than has been recorded by wildlife agencies and Defenders."
546. **Comment:** The reference in the socioeconomic report to the “positive impacts” the wolf program might have on increased vegetation suggests that livestock producers are overusing the resources in the area. **Response:** The majority of quantified economic impacts resulting from the wolf Reintroduction Project are costs to ranchers. Section 3 of the socioeconomic analysis states that "the possibility does exist, however, that the establishment of wolves in their former habitat could restore ecosystems and increase vegetation. If so, such a change would benefit ranch operations because it would increase the quality of forage available for grazing. For example, wolves reintroduced to Yellowstone influenced elk, resulting in improvements in riparian vegetation, thus

improving grass conditions and allowing trees to repopulate the area (Ripple and Beschta 2003, 2004). The increase in vegetation has benefited other species, including birds (Berger et al. 2001). It is unlikely, however, that the presence of wolves to date has reduced elk competition sufficiently to improve forage in the BRWRA due to their low numbers. Consequently, the analysis does not attempt to estimate the economic impacts of forage improvements resulting from the reintroduction of Mexican wolves." Thus, the analysis does not comment on whether livestock grazers are "overusing" resources in their area. Instead, it discusses the potential impacts that competition with elk may have on forage availability.

547. **Comment:** Grazing numbers have decreased due to wolf reintroduction causing an economic effect along with local custom and culture changes. **Response:** Sections 3 and 7 of the socioeconomic analysis discuss economic impacts and social impacts that have resulted from Mexican wolf reintroduction.
548. **Comment:** The value assumed for livestock in the socioeconomic report may be accurate for calves but is way too low for the replacement of cows. The projected revenues for a cows future possible productivity should be considered as well since it can take months or years for a cow to acclimate to a new environment and be as productive as the native cows. **Response:** As stated in Section 3.3.2 of the socioeconomic analysis, the analysis uses the WS average value per head of livestock sold across all size and weight classes for AZ and NM during the years of 1998 to 2004. These values vary from \$740 to \$840 (2004 dollar values) per head. Economic logic says that the price of a cow today reflects the discounted present value of its future earning potential. The market price of a cow, therefore, should reflect its earning potential, discounted to present dollars. Although it would be best to use the price and value per head according to the livestock class killed, data on size-class and weight was available in depredation records. Anecdotal evidence suggests that wolves prefer calves, which carry a lower market value than adult cows. Thus, the analysis would overstate the value of the cattle killed if they were all calves.
549. **Comment:** The socioeconomic report should not attribute all declines in revenue to ranchers to wolves. It has no mechanisms to factor in taxpayer contributions such as the many subsidies received by ranchers such as below market land leases. **Response:** The socioeconomic analysis develops estimates of rancher losses based on the production value of the livestock lost, as well as costs to establish compensation claims. Because estimates are not reliant on estimates of rancher profits, they are independent of income sources for ranchers.
550. **Comment:** In the socioeconomic report there is little discussion regarding the purpose of the payments made by DOW. If payments are a reimbursement for medical expenses, should they be left out? **Response:** Section 3.3 of the socioeconomic analysis states that the Defenders Bailey Wildlife Compensation Trust compensates ranchers who have lost ranch animals to Mexican wolves. The program pays 50% of the value of a probable kill, and 100% of the veterinary services to treat an injured animal or the decreased market value of the animal. Both the total economic impact of livestock losses in the BRWRA

and the net "uncompensated" losses to ranchers in the BRWRA are presented in Section 3.10 of the socioeconomic analysis. Because these payments made by Defenders to ranchers as compensation for livestock losses are not reductions in local economic activity, they are not included in the regional impacts assessment in Section 3.10.

551. **Comment:** Several questions have remained unanswered in the socioeconomic report including the effects the program will have on the sheep and dairy industries inside the recovery area. **Response:** Section 3 of the socioeconomic analysis estimates that since 1998, losses of approximately 34 to 233 cattle and 2 to 5 sheep occurred. Estimated livestock losses include all cattle, including dairy cattle, though dairy cows are not typically grazed on Federal lands of the BRWRA. As discussed in C/R 548, cattle are valued using the WS average value per head of livestock sold across all size and weight classes for AZ and NM during the years of 1998 to 2004. These values vary from \$740 to \$840 (2004\$) per head. Sheep losses are valued at \$260 to \$590. Based on BRWRA acreage relative to county acreage, the analysis estimates that approximately 120 sheep and 34,800 cattle grazed in the BRWRA in 2002. Thus, impacts on the sheep and cattle industries represent less than 1% of grazed sheep and cattle in the BRWRA study area.
552. **Comment:** Page 3-2 (Socioeconomic): The value of time spent in applying for compensation is greatly overstated since the procedures consist only of mailing off a form provided by the government. Likewise, since most depredations are located not by ranchers but by government personnel, the time described to find these has been greatly overstated. **Response:** In Section 3, the economic analysis states that a rancher may need approximately 10 hours to identify a carcass, coordinate an inspection with wildlife agents, complete the necessary paperwork, and correspond and negotiate with authorities until payment is received. This time estimate was developed by Thompson (1993).
553. **Comment:** The complaints by ranchers in Section 3.6 of the socioeconomic report are unfounded. Tagging calves is a rancher's responsibility as is the time spent applying for wolf compensation. As an American citizen, I am not compensated by the Federal government for the time I have to spend filling out my tax return. **Response:** See C/R 552.
554. **Comment:** Page 303 (Draft Socioeconomic Component): Note that footnote 45 [= 47 in Final Socioeconomic Component] appears to be documentation of trespass grazing and this should be incorporated into the effects on ranchers. Note that in the case of the Gavilan Pack on the Wild Bunch Allotment (Apache NF) and wolf M166, trespass grazing was involved in habituating wolves to livestock. These and any other instances should be enumerated and analyzed fully in the context of the socioeconomic effect of wolves. **Response:** In the paragraph and associated footnotes, the socioeconomic analysis points out that 1) the number of permitted head is likely to be larger than the number of authorized head in any given year; 2) the FEIS estimates of grazed cattle in the BRWRA may have been based on permitted head estimates; 3) the estimates in this analysis of the number of horses and sheep (based on acreage) yields a larger number of these animals than was authorized by USFS in 2002. Thus, the paragraph does not provide evidence of

trespass livestock. These points have been clarified in the final analysis. As stated in C/R 520, the purpose of the socioeconomic analysis is to estimate the social and economic impacts of the Mexican wolf reintroduction effort since its inception in 1998, not to assess whether impacts could have been avoided.

555. **Comment:** Need to check figures for cattle grazed in the BRWRA. Cattle numbers in the report are higher than they really are. Allotments have been reduced and people are going out of business due to forced reductions, predators, and drought – many of those since wolf reintroduction began. **Response:** According to the WS 2002 Census of Agriculture, there are 122,500 cattle, at least 300 sheep and lambs, and 9,000 horses and ponies in Apache and Greenlee counties AZ, and Catron, Grant, and Sierra counties NM. Sheep and lamb data underestimate total numbers because Apache and Catron counties do not report sheep inventories in order to protect the proprietary information of the few establishments that raise sheep (USDA 2002). Section 3 of the socioeconomic analysis estimates, based on acreage, that 34,800 cattle, (6900 in AZ and 27,800 in NM), at least 120 sheep (80 in AZ and 40 in NM), and 1600 horses (800 in AZ and 800 in NM) grazed in the BRWRA in 2002. In order to estimate the number of livestock in the BRWRA, this analysis multiplies the total county livestock figures by the percentage of the county that falls within the BRWRA. Because this estimate is based on relative acreage, it could overestimate or underestimate the actual number of cattle grazed in the BRWRA. The analysis also presents data suggesting that the overall number of authorized AUMs in Gila National Forest has declined fairly steadily since 1986.
556. **Comment:** If the analysts had truly looked at the makeup of the livestock industry within the BRWRA they would have realized that cattle grazing on USFS lands is restricted by permits and allotment grazing plans. Moving livestock to an area out of reach of wolves is not an option. **Response:** The estimate of economic impacts on ranchers in the socioeconomic analysis does not assume livestock were moved, or could be moved, to decrease depredation. Section 3.3 offers a description of how depredation rates may vary based on livestock's proximity to wolf home ranges. The draft report then offers anecdotal evidence that one rancher's depredation rate decreased when she moved cattle to another pasture.
557. **Comment:** The study "Paying for tolerance: rural citizen's attitudes toward wolf depredation and compensation" was performed in Wisconsin and its applicability to the Mexican wolf program is slight. The ratio of average cattle killed, as used in the development of the medium estimate is low and biased against livestock owners. **Response:** The Naughton-Treves et al. (2003) study referenced in the Comment was used in the socioeconomic analysis in conjunction with two other studies to develop one estimate of the number of depredations that may have occurred in the BRWRA area during the study period. This estimate was then placed in context with two other estimates of the number of depredations: the low estimate was developed from Agency records of depredations; the high estimate was developed from rancher-reported losses collected by the local ranching community.

558. **Comment:** The analysis repeatedly states that there are impacts to ranchers, but dismisses the impacts without any further analysis. With the numerous impacts that have been identified but not quantified, it is reasonable to believe that these impacts could be significant. **Response:** Where possible, the socioeconomic analysis attempted to quantify total impacts to ranchers. Section 3 quantifies impacts resulting from depredation to livestock and rancher time spent applying for compensation. Other impacts that are identified include physiological impacts on livestock, a need to alter use of forage, a need for additional ranch labor (such as to provide increased herd supervision), and additional expenditures on items such as guard dogs, fuel, and wear on ranch vehicles. However, for these activities, estimates were not available that describe the frequency and scale of these impacts.
559. **Comment:** The analysis should have estimated the total impacts to ranches that were compensated for livestock losses. The greatest economic impact of the wolf reintroduction is that these disproportionately affected ranches will reach a threshold and go out of business. Additionally common sense would indicate a decreased value of the ranch itself due to the depredation of a predator. **Response:** Evidence was not presented in conversations with stakeholders or public comments that ranches closed or property values were reduced due to wolf reintroduction since 1998. Research suggests that the market value of ranches in NM has increased in real dollars between 1996 and 2002, though the value of permit ranches remained relatively stable over that time period (Torell et al. 2005; Torell et al. 2004). This slowed appreciation has been attributed to uncertainty about future grazing access on public lands and the many controversies associated with public land grazing, including issues such as grazing fees, NEPA compliance, and ESA compliance. Wolf reintroduction under the ESA might have been one of many factors, along with conservation activities for other endangered species, as well as other controversies and uncertainties, that contributed to the difference in appreciation rates for deeded land versus public land ranches in the BRWRA. See C/R 558.
560. **Comment:** There is an inherent bias in selecting information for inclusion into the socioeconomic report. The “costs” extend some 94 pages while the benefits are glossed over in 15 pages mostly spent justifying why the benefits could not be enumerated. **Response:** The socioeconomic analysis is intended to discuss impacts to all affected economic sectors, including impacts on ranching, hunting guides and outfitters, Tribal entities, as well as recreation and tourism. The statement of work for the socioeconomic analysis states that “to the extent that they are readily identifiable and measurable, non-market effects should also be considered in this analysis.” Thus, the analysis presents a chapter on each of the above topics. To the extent possible, the benefits of reintroduction are included in the analysis.
561. **Comment:** The DEA features only a very superficial discussion of the benefits of reintroduction. In many cases, this lack of quantitative assessment of benefits is unjustified. As a result of this mismatch, the study is seriously biased toward

- emphasizing the negative impacts of reintroduction at the expense of the positive impacts. **Response:** See C/R 560.
562. **Comment:** The DEA mentions that reintroduction of Mexican wolves "could result in... increased educational opportunities." (Page 6-14 in the Draft Socioeconomic Component) This statement suggests that such impacts are hypothetical while a number of educational activities have focused on Mexican wolves. Examples: June 2002--Tempe high school field ecology conducted an interpretive program in Middle Mountain area, July 2004--field program organized for Tempe high school field biology class, July 2003--Mexican Wolf Workshop for educators at Sipe Wildlife Area, as well as 160 community outreach activities conducted by the Mexican Wolf Reintroduction Program. **Response:** Section 6 of the socioeconomic analysis presents available anecdotal information on attempts to establish for-profit wolf tourism, movement of people into the local area due to wolf presence, and increased educational opportunities that have resulted from Mexican wolf reintroduction. However, it was not possible to interview every person who may have visited the area on behalf of Mexican wolves, nor was it the goal of this analysis. Instead, a sample was interviewed. Additional information provided during the comment period was incorporated into the final socioeconomic analysis.
563. **Comment:** The DEA fails to mention several media productions that have featured the Mexican Wolf Recovery Program and the Reintroduction Project, including Bluestem Pack (BBC 2003), Jeff Corwin Experience (2003; Animal Planet), Wildlife Survivors: El Lobo: The Song of the Wolf (March 2004). **Response:** See C/R 562.
564. **Comment:** The DEA fails to mention the sales of some reintroduction-related products, such as Wolf-friendly beef products. This constitutes an economic benefit attributable to reintroduction. **Response:** See C/R 562.
565. **Comment:** On Page 6-9, the socioeconomic report indicates that there was one private citizen that reported leading two hikes for people who wanted to see wolves and goes on to say this appears to be the only case of wolf-related tourism occurring to date in the BRWRA. This is incorrect. The Arizona Heritage Alliance has had several wolf related trips including two where visitors stayed at the Hannagan Meadow Lodge and another where visitors stayed at the Holder Ranch. In addition to that, the Sierra Club has led at least 8 trips to the area where members stayed, dined, bought supplies, etc. at local businesses. There are likely many more examples of this. **Response:** See C/R 562.
566. **Comment:** The statement "USFS at Apache-Sitgreaves and Gila NF could not locate any applications to date for outfitter/guides proposing to run trips to track or otherwise observe wolves as of March 2005. One private citizen reports she led 2 hiking trips for several people who wished to see wolves. However this appears to be the only case of wolf-related tourism occurring to date in the BRWRA" is misleading. At least one outfitter/guide in the Gila NF acknowledges the fact that wolves are an attraction for some clients by including them in his advertising. One difficulty they have encountered is a resistance on the part of USFS officials to any mention of wolves in their permit

- applications and possibly their advertising. Second, I was the private citizen referred to in the quote and did indeed lead two all-women camping trips in AZ for a total contribution of at least 40 tourist business days and many enterprises benefited from business they otherwise would not have enjoyed. In addition, my husband and I have made a total of at least 30 trips to the recovery entirely due to the presence of wolves. I maintain a list of at least 20 businesses that benefited. I strongly doubt we are the only individuals making visits to the BRWRA primarily due to the presence of wolves. **Response:** See C/R 562.
567. **Comment:** Pages 6-9 and 7-9 (Socioeconomic): Wolf tourism is far greater than noted. I have run across several groups of people who traveled to this area for the purpose of seeing or hearing wolves. **Response:** See C/R 562.
568. **Comment:** Data sources were inadequate for the socioeconomic review. Pro-wolf people in the recovery region were only contacted very late in the review process and their opinions and impacts not fully incorporated into the results. This lateness resulted in several pro-wolf people who could not be reached at a first phone call but who called back later, not being contacted at all. **Response:** See C/R 562.
569. **Comment:** The socioeconomic analysis only looked at the ranching interest. What about local businesses that benefit from tourism resulting from people that come here to look for wolves to enrich their recreational experience? This is occurring – just check with Alpine businesses. **Response:** See C/R 562.
570. **Comment:** Wolves as an asset to the economy as a draw for tourism needs to be evaluated. **Response:** See C/R 562.
571. **Comment:** If anecdotal information is used for livestock depredations then why not use it relative to people's increased visits to the area and tourism? For example some of us visit Alpine once a month specifically for wolf related reasons. While this is anecdotal, it could be documented with credit card or other such receipts. **Response:** See C/R 562.
572. **Comment:** Section 6 of the socioeconomic report regarding tourism is very understated and to report that few people specifically make wolf-related trips to the area is untrue. It is also a poor assumption that many of the people who attend wolf meetings and spend money locally would have preferred to spend their time elsewhere – the vast majority are pro-wolf and travel voluntarily to attend meetings on wolf-related issues. **Response:** Section 6 of the socioeconomic analysis discusses tourism trends in the BRWRA area during the study period. Regarding expenditures related to wolf meetings, the analysis states that "because the ratio of those bearing opportunity costs to those who feel they benefit from meetings is unknown, this analysis does not include time, or expenditures associated with this time, to be a benefit or cost of the program."
573. **Comment:** On Page 6-14 the report indicates there is no evidence to suggest the Mexican wolves have altered or improved the ecosystem health of the BRWRA. We question whether that is something that was really documented in this analysis. **Response:** This

statement has been rephrased in the final socioeconomic analysis to state: "No data reviewed during the course of this study suggest that Mexican wolves have altered or improved ecosystem health in the BRWRA to date."

574. **Comment:** If hard data do not exist regarding the benefits of wolves to the recovery area and the nation as a whole they might at least examine more carefully the question of whether information on such benefits as wolf tourism dollars in the Yellowstone area and in North Carolina and Minnesota may not have some application in the Southwest. **Response:** See C/R 530.
575. **Comment:** Because the wolf program is new, there is no historic data to reflect the future economic potential for wolf-related tourism. Data from areas where wolf reintroduction has been in existence longer should be considered and analyzed. **Response:** See C/R 530.
576. **Comment:** Section ES-7 (Tourism/Conservation), the BRWRA is too isolated to receive the eco-tourism benefits that Yellowstone receives and almost assuredly will never equal our present elk hunting industry revenues. **Response:** See C/R 530.
577. **Comment:** Section 7 of the socioeconomic report is based on a biased profile of people and does not present a true picture. **Response:** As stated in Section 1.4 of the socioeconomic analysis, in-person discussions with numerous individuals were conducted as part of this analysis. These included discussions at an initial meeting in October 2004 to which there were approximately 65 invitees, Service open house meetings in January and February 2005, phone interviews with more than 60 local stakeholders, including private parties, as well as municipal, State, and Federal Agency staff. It was not possible to interview every person in the BRWRA study area, nor was it the goal of this analysis.
578. **Comment:** Pages 1-3 and 6-13 and 7-10-7-11 (Socioeconomic): The 1995 League of Women Voters poll on attitudes toward wolf recovery (52% support, 37% opposition in rural southwestern NM) should be incorporated into this analysis. **Response:** The revised socioeconomic analysis presents a discussion of this study.
579. **Comment:** In the Socioeconomic Component, it is not clear that "general public attitudes and perceptions regarding wolf reintroduction" encompasses people's WTP for wolf reintroduction, the measure commonly used to quantify the monetary value of non-market benefits. The IEc document is silent on whether or not non-market benefits will be included in the economic analysis even though the FWS document "Mexican Wolf Reintroduction Project 5-Year Review" states that they will be. The socioeconomic analysis fails to clearly commit to the inclusion of non-market benefits in the economic analysis. **Response:** The socioeconomic analysis (Sections 3 and 6, in particular) draws on rancher interviews, livestock depredation estimates, overall ecosystem health estimates, and available published literature on existence value from outside of the BRWRA, including data sources in Idaho and Yellowstone. It also summarizes published literature that estimate non-use values for wolves, primarily using contingent valuation

techniques (this section has been expanded in the revised socioeconomic analysis). It should be noted that while contingent valuation provides a useful method for estimating a full range of values (i.e. use value, non-use value, existence value, etc.), the reliability and validity of this method has been the subject of much controversy. In addition to concerns regarding the contingent valuation method, transfer of existing estimated values of wolf reintroduction to the Southwest would require consideration of all of the key elements for a successful transfer (e.g. adjustment for biases, treatments of outliers and protest bids, internal consistency, etc.), including whether populations sampled, reintroduction programs, and reintroduction areas are similar enough to conduct a reliable transfer. Because of the unique character of studied sites, this analysis does not attempt a benefits transfer using results of this analysis.

580. **Comment:** Non-market benefits, including positive impacts on the ecosystem, educational, and scientific opportunities should be included. **Response:** See C/R 579.
581. **Comment:** The DEA cites studies that question the validity of the CV method, but does not cite studies that show that appropriately designed CV studies can, and have been shown to, generate valid estimates of individuals' WTP. **Response:** See C/R 579.
582. **Comment:** The DEA states that the published economics literature shows that non-use values generate measurable welfare benefits (Pages 6-12). It would be more pertinent to state that studies have shown that non-use benefits are particularly important with respect to wolves. **Response:** See C/R 579.
583. **Comment:** The authors ignore all but one of the studies that examine WTP for wolf conservation. Furthermore, they argue that the study is not suitable for benefit transfer without conducting a substantive test of that argument on the basis of quantifiable criteria. The DEA only considers one of the two geographic regions for which the one study they cite generated WTP estimates while ignoring the central Idaho region. **Response:** See C/R 579.
584. **Comment:** The Socioeconomic Component states that non-market efforts will be considered in the analysis but only where these are “readily identifiable and measurable.” How are these to be defined? In the 1994 EIS of reintroducing wolves to Yellowstone and Central Idaho, non-market benefits were “identified” and “measured” (or rather, estimated). However if the level of effort required to develop those benefit estimates is beyond that which will be investigated in the Mexican wolf 5-Year Review, and if the USFWS/Industrial Economics, Inc. decides not to employ the economic methodologies available (i.e. benefits transfer) that would allow utilizing appropriately adjusted Yellowstone and Idaho benefit estimates in the Mexican wolf socioeconomic analysis, then non-market benefits may be termed not “readily identifiable and measurable” and could end up being excluded from the analysis. This is a real concern. Given that several existing studies have demonstrated the very real and substantial non-market benefits associated with reintroducing wolves, omission on these benefits from the analysis is

likely to substantially underestimated total benefits of Mexican wolf reintroduction. **Response:** See C/R 579.

585. **Comment:** In Exhibit 6-9, the "Net" row in the table is incorrect because it does not weight WTP for supporters and opponents by their respective shares of total respondents. If this had been done, the "net" mean WTP would increase. **Response:** The Commenter correctly points out that the draft socioeconomic analysis did not explain that the net value should be weighted. To provide a more clear discussion, the "net" row has been removed in the final socioeconomic analysis.
586. **Comment:** The DEA does not include the expenditures of NGOs and private individuals associated with the more than 100 meetings that have taken place to date on Mexican wolf reintroduction. It does not include the expenditures of non-Agency personnel stationed in the area for projects related to Mexican wolf reintroduction. Defenders had a total of 15 people located in the area working on wolf reintroduction. It does not include the expenditures associated with pro-active measures taken by DOW. These measures amount to a total of about \$18,100 between April 2002 and June 2005. **Response:** Section 6.3 of the socioeconomic analysis details known expenditures by Agencies involved in Mexican wolf reintroduction, and presents a regional impact analysis that describes the impacts of these expenditures on the local BRWRA economies. In addition, the analysis presents an estimate of the number of meetings held with people not employed by government agencies. The section focused on Agency expenditures because these figures are expected to comprise the bulk of expenditures for the area. The information provided in the Comment will be taken into account in the final report.
587. **Comment:** The cow/calf ratio is not addressed and the report does not assess the damage to elk and deer numbers that affect hunter opportunity. **Response:** Section 4 of the socioeconomic analysis presents available data on the estimated number of elk and deer in the BRWRA, as well as the number of hunters, hunter permit days, and the number of permits granted in the BRWRA area during the study period. The cow/calf ratio is one of the variables used to predict future population growth potential of a population. Though the analysis does not explicitly discuss the cow-calf ratio, it is incorporated into the agency estimates of population size during this time period.
588. **Comment:** Small businesses (gas stations, grocery stores, gun shops, cafes, motels, etc.) should be included as a category in the Socioeconomic Component as they stand to lose big time if elk hunting is substantially curtailed due to future wolf predation. **Response:** Section 3.9.2 of the socioeconomic analysis provides an assessment of the distributional (regional) impacts of decreased livestock production on local economies in the BRWRA study area. In addition, Section 6.3 presents estimates of distributional impacts created by increased Agency expenditures. Finally, Section 5 presents estimated economic impacts of Mexican wolf reintroduction on FAIR and SCAR. A small business analysis pursuant to the Regulatory Flexibility Act as amended by the Small Business Regulatory Enforcement Fairness Act is only required for rulemakings; therefore, such an analysis is not required for this 5-Year Review. Nonetheless, the suggestion to provide some

additional information regarding the numbers of small entities that may have been affected by this rulemaking is useful. The revised socioeconomic analysis provides some additional information on small entities in the BRWRA study area.

589. **Comment:** The socioeconomic study should compare the BRWRA to what is happening in Idaho, Montana, and Wyoming where wolves are numbering over 800 now and wiping out elk herds and taking the hunting industry along with it. **Response:** See C/R 530.
590. **Comment:** Why is there no discussion of the wildlife and outfitter impacts in Wyoming and Montana and the possible impacts within the BRWRA? **Response:** See C/R 589.
591. **Comment:** The socioeconomic report is severely faulty by not including the segment of the population most impacted by the wolves – the non-ranching residents of the Blue River – our feelings of safety of ourselves and our animals, our changed lifestyles and our diminished property values. **Response:** Section 7 of the socioeconomic analysis evaluates the social impacts associated with the Mexican wolf reintroduction in the BRWRA from 1998 to 2003. Social impacts are defined as “the consequences to human populations of any public or private actions that alter the ways in which people live, work, play, relate to one another, organize to meet their needs and generally cope as members of society. The term also includes cultural impacts involving changes to the norms, values, and beliefs that guide and rationalize their cognition of themselves and their society” (Interorganizational Committee 2003: 231). The analysis states that significant social change within the BRWRA is occurring independent of wolf recovery efforts, and that general social forces such as these can overwhelm social impacts from a specific policy such as wolf reintroduction. It is therefore difficult to separate the direct social effects exclusively caused by the wolf program from broader social trends. The analysis acknowledges that individuals may be impacted by wolf reintroduction. However, the analysis observes that negative impacts experienced at the individual and family levels have been difficult to see in the larger context of the community or at an institutional level.
592. **Comment:** Section ES-2 (Demographics) of the socioeconomic report does not fully recognize the real problem for the lower population growth rates, lower median incomes, higher poverty rates and unemployment. The main reason for this is a direct result of government and radical environmental groups foisting the endangered species programs on the rural residents. The socioeconomic report should not deny this and should admit that the Mexican wolf program is designed to get rid of the consumptive user on Federally managed lands. **Response:** See C/R 591.
593. **Comment:** The socioeconomic report seems to gloss over the mental stress to family stability due to losing their livestock to wolves. It also does not address the concerns by families in their reports of wolf attacks within their own private property nor their fears, concerns, and behavior changes such as constantly watching their children due to the proximity of wolves to their homes and children. **Response:** Section 7 of the socioeconomic analysis presents impacts associated with risk, health, and safety as well

as fears and aspirations resulting from Mexican wolf reintroduction that were identified to date. The identified primary social impacts of wolves on ranchers include, but are not limited to, uncertainty about herd losses and accompanying economic losses, trade-offs of time required to manage for wolves rather than work on other ranch needs, feelings of diminution and anger over the management of compensation programs, and, for Tribes, loss of culturally important calves and the associated cultural impacts. In addition, the presence of wolves influences the management logistics of the ranch and the allocation of family and hired labor. Ranchers also pointed to the personal and family stress involved with trying to run a ranch with wolves present. Finally, the available compensation program for economic losses appears to add to the social impacts due to the rules in place and the manner in which those rules are implemented. Ranchers feel that the compensation programs insufficiently mitigate the social impacts of wolf reintroduction on ranchers because they only pay for a portion of actual losses (see Section 3 for a more complete description of compensation programs).

594. **Comment:** Regarding the socioeconomic study, nowhere is the impact on non-ranching property owners who are greatly impacted by the wolves. An example is loss in property value. Many potential buyers would be discouraged by the threats to their family and domestic animals. We were told that wolf tourism would improve our property values yet there is no such tourism. **Response:** See C/R 593.
595. **Comment:** The loss of ranches, as small businesses, resulting in the loss of the investment-backed expectation, and the total loss of cattle, would result in irreversible and irreparable damage to their business, family, and communities. There would also be significant adverse effects to their lifestyles and social position. **Response:** See C/R 593.
596. **Comment:** The Mexican wolf reintroduction program has been ineffective in protecting native wolf species and the consequences to Catron County have been devastating. **Response:** The purpose of the socioeconomic analysis is to estimate the social and economic impacts of the Mexican wolf reintroduction effort since its inception in 1998 as part of the 5-Year Review. Impacts to Catron County are discussed in relevant sections regarding ranching, hunting, tourism/conservation, and social impacts.
597. **Comment:** It is stated that "with only Deming and Silver City, New Mexico, having populations greater than 10,000" (Pages 2-3), however, Deming is not within the 5 county analysis. **Response:** In the report, Deming is referred to as a community "in proximity to the BRWRA" and not as lying within the five county study area. Information on Deming was included to provide additional context for the analysis.
598. **Comment:** Exhibit 2-9 includes Deming, Lordsburg, and Magdalena NM although these towns are not within the study area. **Response:** In order to provide context for some of the demographic findings, the report also contains information about communities such as Deming, Lordsburg, and Magdalena that are in proximity to the BRWRA.

599. **Comment:** There are inaccuracies in the reported median household incomes of the counties. US Census data indicate Apache County did not have the lowest median income of the included counties. **Response:** The report uses median household income data drawn from the 1990 and the 2000 US Census reports while the numbers provided in the Comment are model-based estimates from the Small Area Income and Poverty Estimates. When the 90% confidence interval for the estimates is taken into consideration, Apache County and Catron County exhibit no statistically significant difference in income.
600. **Comment:** The demographic section does not adequately display the depth and scope of poverty, ethnic breakdown, overall minority population, and woman-owned business. **Response:** Section 2 of the socioeconomic analysis presents general demographic data on the five counties in the BRWRA study area. Section 5 of the analysis presents demographic information specific to WMAT and SCAT, where available. As shown, unemployment and poverty rates on Tribal Reservations exceed those of surrounding counties. In addition, Tribes have a unique relationship with the Federal government, and, though they are sovereign nations, often are more entangled with Federal processes than non-Federal entities. Nonetheless, rural residents and Tribal residents share a burden of a lack of diversity of alternative employment possibilities, which is discussed in Section 7 of the analysis.
601. **Comment:** A statement that "fewer employment opportunities exist to substitute for losses in income" for Tribal members (Page 5-2) does not indicate what major differences exist between rural Tribal areas and other rural areas that leads to fewer employment opportunities on one and not the other. **Response:** See C/R 600.
602. **Comment:** The report states that "higher poverty and unemployment rates, are most likely not related to wolf reintroduction." How can the FWS make this pre-determined conclusion without conducting a proper cumulative effects analysis? **Response:** As stated in Section 7 of the socioeconomic analysis, many ongoing social forces affect the communities in the BRWRA. For example, some communities are experiencing growth, while others face population contraction. Other factors such as significant and persistent poverty and demographic shifts (e.g. an aging population) have social impacts (see Section 2 for more information on population and economic trends in the study area). For example, Exhibit 2-8 indicates that Catron County experienced a decline in child rearing age classes (age 20 to 39 years) between 1990 and 2000. At the same time, the post-child age classes (age 40+ years) increased significantly. This demographic shift reduced school enrollments. Although different arguments exist as to why this change occurred, a common theme is that the loss of the timber industry changed the employment mix of Catron County. Young families found it difficult to make a living and chose to leave. At the same time, retirees and others without children have moved into the county. The cumulative impact over time is declining school enrollments. Further, numerous public land policies changed in the years leading up to and since the reintroduction of the wolves in the BRWRA. Thus, significant social change within the BRWRA is occurring independent of wolf recovery efforts. General social forces such as these can overwhelm social impacts from a specific policy such as wolf reintroduction. Thus, the analysis

concludes that it is therefore difficult to separate the direct social effects exclusively caused by the wolf program from broader social trends.

603. **Comment:** The NMDA's understanding was that the economic contractor was to review the wolf program, rather than justifying its existence through comparisons of government expenditures by the program and potential impacts from ecotourism. How much did each individual agency spend on the program in the counties discussed, and what sector did expenditures occur? **Response:** The purpose of the socioeconomic analysis is described in response to C/R 520. Agency expenditures are not typically tracked on a county basis. The revised socioeconomic analysis provides data by agency to better understand expenditures by type.
604. **Comment:** Regarding agency spending in local areas, once the wolf Recovery Program is completed, these short-term economic benefits will cease. These dollars are primarily tax dollars and are not new dollars or natural resource dollars which have a much bigger effect on the economy. **Response:** As stated in C/R 520, the purpose of the socioeconomic analysis is to estimate the social and economic impacts of the Mexican wolf reintroduction effort since its inception in 1998, as part of the 5-Year Review. The economic analysis quantifies only those expenditures that occurred during the study period. The analysis does not forecast economic impacts and does not speculate on future wolf recovery expenditures.
605. **Comment:** Pages 6-2 and 6-10 (Socioeconomic): Many agency expenditures would never have been made in the absence of wolves. **Response:** See C/R 604.
606. **Comment:** An accurate disclosure of wolf associated costs to stakeholders – costs to livestock grazers and permit holders from wolf depredation, cost to guides and outfitters, costs to recreation activities and cost to hunting/fishing activities. **Response:** Section 3 of the socioeconomic analysis presents estimates of economic impacts resulting from wolf depredation to livestock since the wolf program began. Sections 4 and 5 of the analysis present an analysis of economic impacts that occurred to the outfitting/guide industry and to recreational visitation to the BRWRA area.
607. **Comment:** An accurate accounting of wolf base prey and forecast of recovery. Relate this to the economic cost of wolf recovery versus loss or revenue from livestock sales and outdoor sports related activities. **Response:** As stated above, the socioeconomic analysis was not intended to estimate future impacts of the wolf reintroduction effort, although in several instances, potential future effects are discussed in general terms. Section 3 places the estimated economic impacts on the ranching industry in context. An analysis of that scale is beyond the scope of the 5-Year Review.
608. **Comment:** The socioeconomic report should have discussed the effect that the presence of abandoned carcasses left for wolves to feed on has on the number of wolf depredations. **Response:** Wolf depredations on livestock as a function of carcasses left out on the range is discussed in the Administrative Component. See also C/R 257.

609. **Comment:** How will the socioeconomics report assess aspects of non-residents for which the presence of wolves in the wild is part of their enjoyment of the forest resource when they come to visit? Will just the public input from the 4 public meetings be used for this? Can my views and others who don't live here be made part of this analysis? How can we participate? **Response:** The Socioeconomic Component presents available information regarding local versus non-local visitation to Apache-Sitgreaves and Gila National Forests. However, there is a paucity of visitation data to the area that would allow meaningful evaluation of trends in forest visitation since wolves were reintroduced. Ideally, visitation information would be obtained through a series of surveys and interviews with recreational users at the project site. Given resource and time constraints, however, designing and conducting a study to collect primary data from the project site was beyond the scope of the socioeconomic analysis.
610. **Comment:** "Mexican wolves killed between 0.1 cattle per wolf per year under the low depredation estimate to 1.1 cattle per wolf per year under the high depredation estimate" (Pages 3-13) These figures refer to a theoretical wolf and not to actual wolves in the wild. Since wolves are removed from the wild for having killed more than 1.1 cattle per wolf and since few wolves hunt alone, the figures are patently meaningless. **Response:** The estimates cited by the Commenter refer to wolves on the ground and simply represent the average number of livestock killed/year/wolf under the low and high depredation scenarios presented in the Socioeconomic Component.
611. **Comment:** Regarding Section 3.5 of the Socioeconomic report on the need to alter forage, ranchers should explore alternative grazing schemes such as calving once a year to allow for protecting calves of a vulnerable size, preventing grazing near wolf rendezvous sites, and developing more pastures with more fencing to provide for more frequent rotation of pastures. These are more work for the rancher but progressive ranchers that apply such methods reap greater revenue than those that allow for calf birthing year round and only move livestock on a seasonal basis. **Response:** As stated in C/R 520, the purpose of the socioeconomic analysis was not to analyze potential changes that could be made to improve wolf-human interactions. Instead, the socioeconomic analysis estimates the social and economic impacts of the Mexican wolf reintroduction effort since its inception in 1998. It is worth noting, however, that a number of ranchers in the BRWRA employ some of these tools in their grazing operations. However, not all ranch operations are equally suited for implementing these kinds of actions, either logistically or economically. Specifically, ranching on public lands in the BRWRA is a USFS permitted activity. The USFS permit specifies authorized activities (e.g. number of AUMs, pasture rotation schedule, improvement maintenance responsibility), but also provides a certain amount of flexibility in how the operation is run to allow for maximum efficiency and to respond to unforeseen events. Suffice to say that no two public land ranches (which generally include a variable mix of public and private base property) are identical. Decisions on day-to-day ranch management on public lands are primarily the prerogative of the individual rancher (within the constraints of his or her permit).

Oral Public Comment and AMOC Responses

AMOC held a series of eight public meetings in AZ and NM in June 2005, to provide a forum for the public to ask questions and/or provide oral comment on AMOC's draft 5-Year Review, a proposed 1-Year Moratorium on wolf releases, and five other draft SOPs. Speakers were encouraged to provide comment specific to these three subjects, but were allowed to address any aspect of wolf recovery or the Reintroduction Project during the time allotted to each speaker. Attendees were reminded many times that only written comment would be considered on the three subjects, but that oral comment had value in terms of helping AMOC understand and interpret the range of issues. Copious notes on all oral comment were taken, and AMOC subsequently decided, in the interest of improving communication and dialogue. Below, we summarize the comment at the eight meetings, and respond to each question or concern.

Important Note: These Responses were written in September-October 2005, before AMOC finished developing responses to written comment on the 5-Year Review (see previous section), in November-December. New information and fresh perspectives gained during the 5-Year Review process might have resulted in disparities between these Responses and those in the previous section. If such disparities exist, please defer to the information in the previous section.

A. General

1. **Comment:** What is the purpose of the eight public meetings? **Response:** The primary purpose is to provide opportunities for the public to learn about and comment on the draft 5-Year Review of the Blue Range Mexican Wolf Reintroduction Project, draft SOPs that guide the Project, and a Proposed 1-Year Moratorium on New Releases of Captive Wolves. AMOC members will consider the oral comment from these meetings, but formal public comment had to be submitted in writing, as indicated before and during the meetings (i.e. oral testimony at the meetings was not formally recorded).
2. **Comment:** Information being put out by the Mexican wolf reintroduction program is flawed because it doesn't show the negative side. **Response:** Information about the Reintroduction Project is disseminated through monthly updates, educational presentations, annual reports, multiple agency websites, and 3- and 5-Year Reviews of the Project. The Project endeavors to present a balanced picture regarding Mexican wolf reintroduction. In particular, the Project's outreach slide show has been significantly modified in response to comment about its substance and tone.
3. **Comment:** Why were the closed-door meetings with Congressman Pearce allowed to be held? **Response:** The referenced meetings were not AMOC or USFWS meetings. Neither AMOC nor USFWS requested the meetings, nor did they have any role in planning or conducting them. The meetings were convened and attended by staff of Congressman Pearce (NM) and local (NM) livestock and landowner interests. They were held in Glenwood and Socorro NM, on February 12, 2005. The Congressman asked that USFWS officials attend to listen and respond to comments on the Mexican Wolf Recovery Program and the BRWRA Reintroduction Project. USFWS asked the Congressman's

staff if AMOC could be extended an invitation, which was granted a few days before the meetings. AMOC, as a body, declined the invitation, in part because the meetings were not open to the public. However, when a standing member of Congress asks a Federal agency such as USFWS to attend a meeting, that agency generally does not decline the invitation.

4. **Comment:** When can environmentalists have their own private meeting with Congressman Pearce? **Response:** Neither AMOC nor its individual agency members can dictate with whom a Congressman and/or his staff meet. Any group or individual can request a meeting with a Congressman by contacting him or his staff directly.
5. **Comment:** Why didn't the high level USFWS officials that attended the Congressman Pearce sponsored meetings attend these meetings? **Response:** USFWS and AMOC received such a request from several environmental organizations shortly before the eight public meetings held in AZ and NM in June 2005. However, the focus of those meetings (i.e. soliciting comments on the draft 5-Year Review, the proposed 1-Year Moratorium, and five draft SOPs) had been established months in advance by AMOC. Although individuals providing oral comment were allowed to make any statement they desired in the time allotted to them, the emphasis and intent of the meetings was to gather input for AMOC on the three stated topics of discussion, and not a general question/answer session between higher level USFWS employees and the public on the pros and cons of wolf reintroduction/recovery. Therefore, it was predetermined that AMOC was the appropriate level of officials to be in attendance at the meetings.
6. **Comment:** Why weren't Pearce's staffers at the June AMOC meetings? **Response:** AMOC has no control over what meetings Congressman Pearce's staff members choose to attend. However, one of his staff members did attend the Truth or Consequences meeting (June 17, 2005).
7. **Comment:** Should ranchers and landholders have more say in what happens on the land than people not resident to the area? **Response:** Approximately 96% of the BRWRA is public land, including the Gila National Forest in NM and the Apache National Forest in AZ. National Forests are managed by USFS under tenets of the Multiple Use-Sustained Yield Act of 1960 and the National Forest Management Act of 1976. Overlaying these basic statutory regulations are other laws, including the Clean Water Act, Clean Air Act, Wilderness Act, and the ESA; these statutes are further interpreted by litigation and case law, which in turn refine and define how public lands are managed. Livestock grazing is a recognized, legitimate use of much of the public lands in the BRWRA as per the Federal Land Policy and Management Act of 1976 [Section 402(a)], the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976, the NEPA of 1969, and the Rescission Act of 1995 (see also the Responses to Comments 0.2 and 0.4). In addition to livestock grazing on the BRWRA, in-holdings of private ownership are scattered throughout the area. Some of these private in-holdings are considered base property by USFS in terms of issuing grazing permits and have been owned by the same ranching families for generations.

Other in-holdings have been sold and/or subdivided and have changed hands multiple times over the years. Regardless of the history of ownership, however, private lands carry inherent property rights that must be considered whenever a management decision is proposed and implemented. Ranchers and property owners in and adjacent to the BRWRA are arguably the most immediately and directly affected when a nuisance or problem wolf issue arises. The Final Rule recognizes that the concerns of ranchers, landholders, and Tribes must be considered in order to effect reintroduction and eventual recovery of the Mexican wolf.

8. **Comment:** It is not wolves that are interlopers in the wild, it is ranchers. **Response:** Livestock grazing on National Forest lands is authorized and regulated through a series of Federal statutes (see Response to Comment A.7). Livestock grazing is a traditional use of the National Forest and part of the USFS's multiple-use mandates. It is also a traditional and culturally important use of Tribal lands.
9. **Comment:** Are the views of pro-wolf advocates heard at the same level as minority ranchers? **Response:** Views of all constituents are heard and considered by AMOC. Comment that helps the managing agencies implement a successful wolf program that coexists with other land uses has more weight, regardless of its origin. The views of various constituents are not weighted by counting votes or by the strength with which the views are expressed. Therefore, views of pro-wolf, anti-wolf, and neutral parties have equal potential to influence the Reintroduction Project if they provide constructive input that leads to a more successful wolf project.
10. **Comment:** Reintroduction of wolves can be an economic boon to an area and ranchers could charge for eco-tourism. **Response:** We agree that wolf-related eco-tourism has the potential to provide economic benefit to the area. At this time, there is no way to predict to what extent such businesses will develop or how much revenue would be generated.
11. **Comment:** How much time has been lost on the ground (in terms of proactively moving forward with reintroduction and eventual recovery) in terms of what's been going on (in terms of all the meetings, litigation, political delays), and can we really afford to immerse ourselves in the process? **Response:** The Project is about two years behind schedule in terms of on-the-ground accomplishment, due to reasons stated by the commenter and various other issues (e.g. especially the 13 unlawful wolf kills in 2003). Despite lack of closure on several key recommendations, and unresolved discussion points in the 3-Year Review of 2001, adaptive management activities were restored in 2003 and have been well underway in 2004 and 2005. The Reintroduction Project has continued to move forward despite these setbacks.
12. **Comment:** Were there any special invitations to the Alpine Meeting? **Response:** No. The meeting announcement was disseminated via the Reintroduction Project's standard outlet, a self-subscription electronic newsletter, entitled *Endangered Species Updates*, available at <http://azgfd.gov/signup>. This newsletter reaches more than 5,000 individuals, agencies, and organizations that have an interest and/or stake in Mexican wolf

reintroduction. In addition to the newsletter, information on the meetings was provided to all newspapers and other media outlets in AZ and NM.

13. **Comment:** Why wasn't the Alpine meeting posted earlier? **Response:** The reference is to AMOC's failure to post a copy of the meeting announcement in one or more locations in the Alpine area. The failure was due to human error. It was an oversight, not an intentional act. AMOC and the IFT will do everything possible to ensure this does not happen again.
14. **Comment:** The \$12,000,000 spent to date on wolf recovery does not fully represent the cost of the wolf program. **Response:** State, Tribal and Federal agencies involved in wolf recovery/reintroduction have made concerted efforts to account for all of the monies spent on reintroduction and recovery of the Mexican wolf. The \$12,000,000 figure includes estimated expenditures on Mexican wolf recovery/reintroduction by all the cooperating agencies from 1977-2005. With the exception of depredation claims, cost to the ranching community is difficult to assess. However, the Socioeconomic Component attempts to further identify and characterize those costs.
15. **Comment:** Economic impacts have occurred to local communities due to the cumulative impacts of restrictions on use of natural resources (e.g. logging, grazing). Federal money would be better spent attempting to offset the loss of teachers and school facilities due to declining enrollment, instead of putting money into wolf reintroduction. **Response:** The purpose of the ESA is to conserve Federally-listed species; USFWS is the agency charged with administering this law. USFWS is not able to "choose" whether Federal money allocated by Congress for species conservation is spent on recovering the Mexican wolf versus funding education or other endeavors that local communities might believe are more important than wolf recovery. Securing funds for loss of teachers and school facilities is primarily the responsibility of the states, counties, and local school districts. More Federal money could be spent on education if the President's Budget Request and the Congressional Budget Resolution had those provisions. This comment is best addressed by how Congress develops tax and spending legislation. The Federal budget process is guided by a set of specific procedures laid out in the Congressional Budget Act of 1974. The centerpiece of the Budget Act is the requirement that Congress develop an annual "budget resolution" setting overarching limits on spending and on tax cuts. These limits apply to legislation developed by individual congressional committees as well as to any amendments offered to such legislation on the House or Senate floor. The budget process involves the President's Budget Request, it lays out the President's relative priorities for Federal programs — how much he believes should be spent on defense, agriculture, education, health, etc. The President's budget is very specific, and lists a recommended funding level for individual Federal programs or small groups of programs called "budget accounts." The budget typically sketches out fiscal policy and budget priorities not only for the coming year but for the next five years or more; it is accompanied by historical tables that set out past budget figures. The President's Budget Request tells Congress what the President believes overall Federal fiscal policy should be, as established by three main components: (1) how much money the Federal

government should devote to public purposes; (2) how much it should take in as tax revenues; and (3) how much of a deficit (or surplus) the Federal government should run. All Federal agencies submit their budget request through the President's Budget Request.

B. Legal Issues

1. **Comment:** How can the wolf program be done away with entirely? **Response:** The Reintroduction Project is conducted under a nonessential experimental population rule (i.e. the Final Rule) pursuant to the ESA. The Final Rule and the associated FEIS were outcomes of several years of public process subsequent to a court settlement between USFWS and various environmental groups. The Project thus reflects a legal mandate under the ESA and a judicial mandate from the court settlement. In order to eliminate the wolf program, changes to the relevant laws, regulations, or a court decision related to the Final Rule would be required. It would also be possible to modify the program by amending the rule authorizing the reintroduction. Also, if sufficient progress is not made under the nonessential experimental population designation, the courts might be asked to force USFWS to conduct the reintroduction under the full protection of the ESA, which would result in far less flexibility for management of wolves on the ground.
2. **Comment:** What (ESA, courts, etc.) is driving wolf recovery? **Response:** The purpose of the ESA is to conserve threatened and endangered species and their ecosystems. Specifically, it requires development of recovery plans for all listed species, except in the rare case that such a plan would not further conservation of the species. These plans guide efforts to alleviate threats to the species such that they can be removed from the list of threatened and endangered species. A recovery plan for the Mexican wolf was approved in 1982; this document, in addition to the Final Rule, recommendations from the 3-Year Review, various court settlements, interagency processes, and public input has provided the framework for recovery efforts in the Southwest. A revised recovery planning process was initiated in 2003, but is currently on hold due to litigation. Ultimately, a new recovery plan will provide direction for wolf recovery in the Southwest. See also Response to Comment B.1.
3. **Comment:** There should be an independent General Accountability Office (GAO) investigation of the Mexican wolf recovery program. **Response:** The GAO's Office of Special Investigations (OSI) is responsible for conducting congressional oversight investigations of alleged violations of Federal criminal law and for integrating such oversight within GAO's audits and evaluations. GAO investigations are generally initiated at the request of Congress. OSI's powers and authorities derive from those vested in the Office of the Comptroller General, as codified in Title 31, U.S. Code, namely: 1) Investigate all matters related to the receipt, disbursement, and use of public money; 2) make an investigation ordered by either house of the Congress or a congressional committee with jurisdiction over revenue, appropriations, or expenditures; 3) give a congressional committee with jurisdiction over revenue, appropriations, or expenditures the help and information it requests.

4. **Comment:** What happens to the Mexican wolf after they're determined to be recovered? **Response:** Once wolves in AZ and NM are recovered, as indicated by delisting under the ESA, they will be managed by the appropriate State and Tribal wildlife agencies. Depending upon State and Tribal laws and regulations, wolves could be managed similarly to bears, mountain lions, bobcats, foxes, or any other animal. In order to achieve delisting, it is likely that the States and Tribes will have to first develop wolf management plans to provide guidance and assurances that state management will be able to maintain "recovered" wolf populations, and not to reduce populations to the extent that protection under the ESA would once again be necessary. Within the frameworks of the management plans, states would have the ability to offer the appropriate protections for Mexican wolves, and to determine if and under what circumstances take of Mexican wolves could occur.
5. **Comment:** Removal of livestock or their remains from private or public lands, except by the lawful owner, is illegal. **Response:** Arizona Revised Statute 3-1302 is entitled "[T]aking animal without consent of owner; classification," and states "[A] person who knowingly takes from a range, ranch, farm, corral, yard or stable any livestock and uses it without the consent of the owner or the person having the animal lawfully in charge is guilty of a class 2 misdemeanor." The comparable NM statute is not as explicit as the Arizona Revised Statute; however, it does address some of the same issues. New Mexico Statute 77-9-45 is entitled "[O]wnership; possession; transportation; seizure; disposition of livestock; refusal of certificate," and states "[I]f any duly authorized inspector should find any livestock or carcasses in the possession of any person, firm or corporation for use, sale or transporting by any means, and said person, firm or corporation in charge of said livestock or carcasses is not in possession of a bill of sale, duly acknowledged, or cannot furnish other satisfactory proof of lawful ownership or said inspector has good reason to believe that said livestock or carcasses, are stolen, said inspector shall refuse to issue a certificate authorizing the transportation of said livestock, or carcasses, and shall seize and take possession of same."

C. 10(j) Final Rule

1. **Comment:** Can wolves be designated "fair game" when they wander out of the BRWRA? **Response:** No. The gray wolf species (which includes the Mexican wolf subspecies) in North America south of Canada was listed as endangered on March 9, 1978, except in Minnesota where it was listed as threatened (43 FR 9607). On January 12, 1998, a Final Rule under Section 10(j) of the ESA of 1973, as amended, was published in the Federal Register (63 FR 1752). The Final Rule was entitled "Establishment of a Nonessential Experimental Population of the Mexican Gray Wolf in Arizona and New Mexico." It established the boundaries of the MWEPA (MWEPA) as the portion of AZ lying north of Interstate highway 10 and south of Interstate highway 40; the portion of NM lying north of Interstate highway 10 in the west, north of the NM-Texas boundary in the east, and south of Interstate Highway 40; and the portion of Texas lying north of United States Highway 62/180 and south of the Texas-NM boundary. The BRWRA is contained entirely within the MWEPA, and includes the entire Apache

National Forest in east-central AZ, and the entire Gila National Forest in west-central NM. The final rule also sets forth management directions and provides for limited allowable legal take of wolves in the wild within the MWEPA, such as in defense of human life. If a Mexican wolf wanders outside the BRWRA, but remains within the MWEPA, then the rule states that no person, agency, or organization may “take” any wolf in the wild within the MWEPA, except as provided in the rule. “Take” as defined by the ESA and the Final Rule means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

2. **Comment:** The reintroduction program should buy a ranch and fence it in and use that as wolf recovery. **Response:** Under the ESA of 1973, as amended, the term “endangered species” means any species which is in danger of extinction throughout all or a significant portion of its range. The gray wolf (*Canis lupus*) is native to most of North America north of Mexico City, with the exception of the southeastern United States, which was historically occupied by the red wolf (*Canis rufus*). The Mexican (gray) wolf subspecies historically occurred over much of NM, AZ, Texas, and northern Mexico. Recent literature on the genetics of gray wolves (e.g. Leonard et al. 2005) supports a larger geographic distribution of Mexican wolves (or zone of intergradation with other gray wolf subspecies) than previously described (USFWS 1996). Recovery of a listed species under the ESA generally connotes healthy populations of wild, naturally-interacting and dispersing, free-ranging animals that are no longer in danger of extinction throughout all or a significant portion of their range. Furthermore, the average home range size of Mexican wolf packs is 182 ± 24 mi² (see Technical Component). Consequently, artificial containment of Mexican wolves to a fenced ranch, no matter how large, is not feasible and would not meet the legal standard of recovery of the species under the ESA. For example, wolves maintained at pre-release facilities such as Sevilleta and Ladder Ranch do not count toward recovery while in captivity.
3. **Comment:** Wolves need to be released outside their current boundaries. **Response:** A revision to the Final Rule would be required to allow the release of Mexican wolves outside their current boundaries. The need to amend the final rule will be assessed in the 5-Year Review. Furthermore, Mexico has an ongoing recovery program in which the future release of Mexican wolves into the wild may play a part.
4. **Comment:** Only the Mexican Wolf Recovery Team can ask for a rule change, and now the Recovery Team has been disbanded. **Response:** This is incorrect. Ultimate responsibility for pursuing a rule change lies with the USFWS Southwest Regional Director. Also, see Responses to Comments C.3 and M.1.
5. **Comment:** Wolves need to be kept in an enclosed area within the wilderness. **Response:** See responses to C.2 and F.24.
6. **Comment:** Wolves need to be reintroduced into large roadless areas such as the Gila Wilderness Area. **Response:** The Gila Wilderness Area is part of the “secondary recovery zone” of the BRWRA. The Final Rule defines “secondary recovery zone” as an

area adjacent to a primary recovery zone (i.e. a portion of the Apache National Forest that lies in Greenlee County, Arizona) in which USFWS allows released wolves to disperse, where wolves captured in the wild for authorized management purposes may be translocated and released, and where managers will actively support recovery of the reintroduced population. While wolves have been translocated into the Gila Wilderness Area on several occasions, captive-reared Mexican wolves (i.e. without wild experience) may not be directly reintroduced into the Gila Wilderness Area as per the final rule. The release of captive-reared wolves into the Gila Wilderness Area would require a revision to the final rule and will be explored in the 5-Year Review. Under the existing rule, captive-reared and “experienced” wolves can be released into wilderness areas in AZ, such as the Blue Range Wilderness.

7. **Comment:** Why were Mexican wolves reintroduced into an area with so many ranchers when there are better places in NM for reintroduction than the BRWRA? **Response:** Most of the public lands in NM administered by the USFS and BLM contain grazing allotments. Identification of potential areas for releasing Mexican wolves began in 1986 when the USFWS, pursuant to the 1982 Mexican Wolf Recovery Plan, solicited candidate areas from the wildlife management agencies of NM, AZ, and Texas. Four areas in AZ and one area in NM were settled on as likely candidates. USFWS and states compared and ranked the five candidates based on the following attributes: area of vegetation associated with typical Mexican wolf habitat, wild ungulate density, water availability, livestock density, potential effects on other threatened or endangered species, human population density, and road density (USFWS 1993). Overall, WSMR ranked highest, followed closely by the BRWRA. Further analysis of WSMR, however, suggested that it lacked enough suitable area to sustain an independent, viable population of Mexican wolves. Based on this analysis, USFWS determined reintroduction in the BRWRA was biologically and environmentally preferable and had the greatest potential for successfully achieving the current recovery objective for Mexican wolves.
8. **Comment:** Why aren't wolves allowed to establish territories outside the Blue Range Wolf Recovery Area? **Response:** See Response to Comment C.3.
9. **Comment:** Why aren't direct releases of wolves into the Gila National Forest allowed? **Response:** The Final Rule only authorizes direct release of captive-reared, “naive” wolves in the primary recovery zone of the BRWRA. Wolves that are either born or have gained experience in the wild can be translocated into the Gila National Forest. Also, see response to C.6.
10. **Comment:** Can the experimental/nonessential designation for Mexican wolves in the BRWRA be changed to endangered? **Response:** Yes, at least in theory. The ESA allows such changes. The process would involve a formal rule change and a corresponding NEPA analysis (in terms of preparing an EA, a supplemental EIS, or a new EIS). The process would take several years to accomplish. Project cooperators, however, believe that changing the status of wolves in the BRWRA from “nonessential experimental” to

fully endangered would severely restrict management flexibility. Thus, none of the AMOC Lead Agencies support such an action; some would aggressively oppose it.

11. **Comment:** Can ranchers be issued non-lethal ammunition such as rubber bullets like they do in the northern Rockies? **Response:** Some ranchers and local landowners, upon their request, have been provided cracker shells for hazing wolves around livestock or occupied dwellings. In terms of use of non-lethal ammunition such as rubber bullets, the final rule states that throughout the MWEPA (see also Response to Comment C1), which includes the BRWRA, you may harass wolves that are within 500 yards of people, buildings, facilities, pets, livestock, or other domestic animals in an opportunistic, noninjurious manner at any time – provided that wolves cannot be purposely attracted, tracked, searched out, or chased and then harassed. The Final Rule defines “harass” as an intentional or negligent act or omission which creates the likelihood of injury to the wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to breeding, feeding, or sheltering. The only type of harassment permitted as per the Final Rule is that of “opportunistic, noninjurious harassment.” Opportunistic, noninjurious harassment is defined as when the wolf presents itself (for example, the wolf travels onto and is observed on private land or near livestock). Any harassment must not cause bodily injury or death to the wolf. The basic intent of harassment permitted by the Final Rule is to scare wolves away from the immediate area. It is limited to approaching wolves and discharging firearms or other projectile launching devices in proximity to but not in the direction of wolves, throwing objects in the general direction of but not at wolves, or making any loud noise in proximity to wolves.
12. **Comment:** Why are wolves being shot by ranchers? **Response:** To date, not one rancher has been identified as legally or illegally having shot (or otherwise killed) a Mexican wolf. Twenty-five wolves have been illegally shot since inception of the Reintroduction Project. Most of these incidents remain under investigation. The Final Rule provides a provision that states livestock owners or their agents may be issued a permit on public lands, under the ESA, to take wolves actually engaged in the act of killing, wounding, or biting livestock. Before such a permit is issued, several conditions must be met, including: a) livestock must be legally present on the grazing allotment; b) six or more breeding pairs of Mexican wolves must be present in the BRWRA; c) previous loss or injury of livestock on the grazing allotment, caused by wolves, must be documented by USFWS or its authorized agent; and d) agency efforts to resolve the problem must be completed. At this time (September 2005), all four of these conditions have not been met in any one incident, and no permits have been issued. Furthermore, on private and Tribal Trust Lands anywhere within the MWEPA, the Final Rule states “livestock owners or their agents may take (including kill or injure) any wolf actually ‘engaged in the act of killing, wounding, or biting livestock;’ provided that evidence of livestock freshly wounded or killed by wolves is present; and further provided that the take is reported to the Service’s Mexican Wolf Recovery Coordinator or a designated representative of the Service within 24 hours.”

13. **Comment:** Are there any plans to use M-44s in wolf country? **Response:** No. Use of M-44s has been discontinued in occupied Mexican wolf range, as set forth by the Final Rule.
14. **Comment:** What happens if a hunting dog tangles with a wolf (in terms of defending the animal, compensation)? **Response:** There are no provisions under the Final Rule for defense of a hunting dog that results in “take” (see the definition of take in comment C.1) of a Mexican wolf. The hunting dog owner is limited to “opportunistic, noninjurious harassment” in defense of the dog (see also Response to Comment C.11). In regard to compensation, the Defenders program does not compensate for the loss or injury of hunting dogs to wolves.
15. **Comment:** What are the pros and cons of expanding the 10(j) area? **Response:** Expansion of the current MWEPA 10(j) area would require amendment of the Final Rule. If this were to occur, Mexican wolves could more freely disperse outside the current boundaries of the BRWRA (i.e. Apache and Gila National Forests in AZ and NM). This would relax or eliminate the requirement to remove wolves not causing a management problem outside the BRWRA and return them to the recovery area or captivity. This would allow the IFT to concentrate on more immediate management issues (e.g. outreach, nuisance and problem animals, tracking and monitoring, research and investigations) versus expending valuable resources (i.e. time, capital, manpower) on wolves that have established themselves outside the current recovery area boundary, but are not otherwise causing problems. This should lessen, but not eliminate some of the conflicts with livestock owners and landholders. Although the average number of conflicts/livestock owner or landholder should lessen, total conflicts may increase by spreading wolf reintroduction over a larger area. Removing or expanding the 10(j) boundary restriction would likely facilitate achieving the six or more breeding pairs benchmark more quickly, which in turn could liberalize management actions that could be taken in controlling livestock depredations, such as issuing take permits to landowners. Greater freedom to disperse should lessen management-induced disruption of social bonds to packs and promote territory establishment and stability within and between packs, which in turn should lessen the number of human/wolf conflicts. Allowing wolves to more freely disperse across the landscape into suitable habitat, versus attempting to artificially confine their movements to a recovery area with regulatory (versus biological) boundaries, should speed the goals of reintroduction and ultimately delisting, which will then allow management of the Mexican wolf to be turned over to the states. Expansion of the MWEPA to the southern borders of NM and AZ would also ensure management flexibility if wolves were to come northward from Mexico, where reintroduction is now underway. However, expansion of the MWEPA would also require greater management effort overall, which would only be possible with an expanded IFT, which would require additional funding.
16. **Comment:** Will the 10(j) area be expanded? **Response:** See Response to Comment C.3.
17. **Comment:** Why are wolves allowed to roam outside the wilderness where they can get in conflict with humans and domestic animals? **Response:** The BRWRA is much larger

than the Gila Wilderness Area, and includes all the Apache National Forest in AZ and NM, and the Gila National Forest in NM. See also the responses to comments C.1 and C.7.

D. 3-Year Review

1. **Comment:** Why haven't the recommendations in the Paquet report (i.e. 3-Year Review) been followed? **Response:** The 3-Year Review, including the Paquet Report, was conducted in 2001. However, the review did not culminate with the desired cooperator (USFWS, AGFD, NMDGF, and WMAT) discussion of the recommendations, thus final actions were not taken in a formal or organized, collaborative sense. Several things occurred that contributed to the lack of closure: (1) in July 2001, Congressman Skeen (NM), via language in the next-year's budget allocation, directed USFWS to conduct an independent review of the 3-Year Review before taking action on its recommendations; (2) the USFWS Region 2 Director position (covering AZ-NM as well as OK and TX) was vacated in 2001, and Acting Directors were hesitant to make decisions in the absence of a new Director; and (3) lack of cooperator and public consensus about the fairness and validity of the overall 3-Year Review process was evident. As a result of these issues, in August 2002 USFWS asked the State Wildlife Agencies in AZ and NM to conduct the independent review Congressman Skeen requested, and which was due in September 2002. The states conducted the review, and in September 2002 provided a suite of recommendations to the new USFWS Region 2 Director. From September 2002 through October 2003, the states, Service, and eventually other State, Federal, Tribal, and local government cooperators developed a cooperative adaptive management program to provide guidance to the Reintroduction Project, and restore and enhance opportunities for public involvement in the effort. A commitment to conduct a 5-Year Review of the Project, with substantial public involvement, during which the Paquet Report and all other aspects of the 3-Year Review would be considered, was fundamental to this renewed commitment to collaboration. Although the Paquet Report is often referenced as "pure science," there are administrative, legal, and social contexts for much of it, especially some of the key recommendations. Those are the aspects that were perhaps most clearly not fully vetted and resolved in 2001, and that must be done before final recommendations can be offered and decisions made. This vetting will be accomplished through the 5-Year Review.

E. 5-Year Review

Socioeconomic Section

1. **Comment:** How were people contacted to be interviewed for the Socioeconomic portion of the 5-Year Review? **Response:** As stated in Section 1.4 of the Socioeconomic analysis, in-person discussions with many individuals were conducted by Industrial Economics, Incorporated as part of this analysis. These included discussions at an initial meeting in October 2004 to which there were approximately 65 invitees, USFWS open house meetings in January and February 2005, as well as phone interviews with more

than 60 local stakeholders, including private parties and non-government organizations, as well as municipal, state, and Federal agency staff. The unstructured, personal interviews with individuals living in BRWRA communities form the basis of the Socioeconomic analysis. A "snowball sample" was used to identify interview subjects (Salganik and Heckathorn 2004). This approach is used when a random or probability sample is not a viable option and evaluating small groups or social networks is required. Interviewees were asked to offer referrals to other individuals living in the BRWRA, who were then contacted. Attendees of the initial meeting and public open houses as well as stakeholders identified by agency personnel as being active in support of or in opposition to the reintroduction program were contacted first. Some individuals were also approached in public areas in BRWRA communities to discuss impacts of the wolf and their communities, and asked to suggest additional local contacts. Data collection efforts also resulted in discussions with personnel at numerous local and state agencies. Approximately 60% of interviews were conducted in NM and 40% in AZ.

2. **Comment:** The Company (Industrial Economics) writing the Socioeconomic section of the 5-Year Review of the Mexican Wolf Reintroduction is from back East and doesn't know how things are done in the West. **Response:** The Socioeconomic analysis was developed by a team consisting of: (1) researchers at Industrial Economics, Incorporated, with experience in Southwestern land use issues; (2) Dr. Aaron Harp, rural sociologist and former Director of the Policy Analysis Center for Western Public Lands at the University of Idaho; and (3) three technical advisors. The technical advisors, who are experts in agricultural and resource economics as well as rural sociology, are Dr. Allen Torell, Professor of Agricultural Economics, New Mexico State University; Dr. Larry Van Tassell, Professor of Agricultural Economics and Rural Sociology, University of Idaho; and Dr. David Brookshire, Professor of Economics, University of New Mexico.
3. **Comment:** The Company contracted to do the Socioeconomic Review (Industrial Economics) did the reviews for the Mexican spotted owl and the Southwestern willow flycatcher and they were flawed. **Response:** As stated in Response E.2, the Socioeconomic analysis was developed by a team that included Industrial Economics, Dr. Aaron Harp, Dr. Allen Torell, Dr. Larry Van Tassell, and Dr. David Brookshire. Both the Mexican spotted owl and southwestern willow flycatcher analyses were written by Industrial Economics, and were also peer reviewed by relevant southwestern experts in their fields.
4. **Comment:** The draft Socioeconomic Review places the cost of a cow at \$640.00; cows are worth more than this. **Response:** As stated on page 3-15 of the draft Socioeconomic analysis, "[F]or cattle and calves killed by wolves, the analysis applies the average value per head in AZ and NM in the year that a loss occurred (ranging from \$740.00 to \$840.00 in 2004 dollars) to estimated losses in order to calculate the value of animals killed by wolves." Livestock values represent values reported in the USDA Meat Animals Production, Disposition, and Income: Summary, National Agricultural Statistics Service (1998-2004). This value represents the average value of livestock sold across all size and weight classes for each state.

5. **Comment:** Why doesn't the 5-Year Review discuss the impacts on human health from wolves? **Response:** Section 7 of the Socioeconomic analysis presents impacts associated with risk, health, and safety, as well as fears and aspirations resulting from Mexican wolf reintroduction to date. No attacks or injuries on humans have been recorded, nor have there been any disease transmission or other public health issues attributed to Mexican wolves. The 5-Year Review does discuss human-wolf interactions within the reintroduction area.
6. **Comment:** The contractors for the Socioeconomic Review did not talk to a representative sample of ranchers or the chambers of commerce from the affected counties. **Response:** See response to E.1.
7. **Comment:** Can counties provide local information on the Socioeconomic Review for local verification of facts and figures used? **Response:** Yes. The draft Socioeconomic analysis will be revised to reflect new data provided by affected Counties and other comments on the analysis.
8. **Comment:** Can the extreme stress-related illnesses suffered by residents along the Blue as a consequence of the Aspen Pack be addressed in the 5-Year Review? **Response:** As stated in the Response to Comment E.5, Section 7 of the Socioeconomic analysis presents impacts associated with risk, health, and safety as well as fears and aspirations resulting from Mexican wolf reintroduction identified to date. Revisions will be made to the analysis to incorporate data submitted during the comment period.
9. **Comment:** Are local communities in and adjacent to the BRWRA interested in looking into wolf reintroduction from an ecotourism view? **Response:** The Socioeconomic Component focuses on impacts that have occurred since the Project's inception in 1998. During the development of the Socioeconomic analysis, several interviewees provided anecdotal accounts related to eco-tourism interest, including a conference in 2003, hosted by the Southwest Environmental Center in Alpine, AZ, on "potential ideas related to reintroduced wolves" that reported 40 attendees, a discussion of a potential future museum on local ecology that would feature wolves, and a new charter school that would use wolves to study ecology. Wolf-related eco-tourism in the BRWRA may have occurred, but did not result in economic benefits of a magnitude that could be detected through the Socioeconomic analysis.
10. **Comment:** Are the negative effects to future generations of livestock producers being accounted for in the recovery program? **Response:** The purpose of the Socioeconomic analysis is to estimate the social and economic impacts of the Mexican wolf reintroduction program since its inception in 1998, as part of the 5-Year Review. This analysis was not intended to estimate future impacts of wolf reintroduction, although in several instances potential future effects are discussed in general terms. The analysis provides a range of estimates of past depredation of livestock, estimates a value of the losses, and presents regional economic impacts induced by uncompensated losses. The

information in this analysis is intended to assist cooperating agencies and stakeholders in their evaluation of the Reintroduction Project.

11. **Comment:** Thousands of jobs are being outsourced or eliminated annually, why can't ranchers adapt? **Response:** Multiple use of public land, including ranching and livestock grazing, is a legal and legitimate activity on Federally managed USFS lands that make up the BRWRA. The role of the USFWS and other cooperating agencies, and the Reintroduction Project is to uphold and administer the ESA by working to recover the Mexican wolf, not to make judgments regarding the appropriateness of grazing or other multiple-use activities on public lands.
12. **Comment:** Why aren't ranchers and other affected parties part of the subcommittee for the 5-Year Review, especially the Socioeconomic assessment? **Response:** No subcommittee groups of any kind were formed as part of the 5-Year Review. The Socioeconomic Review was performed by an independent contractor, Industrial Economics (and their local subcontractors), which in turn interviewed numerous stakeholders and affected parties as part of the review process. However, ranchers and other affected parties were represented by the AMOC and AMWG cooperating agencies that participated in (or had the opportunity to participate in) structuring and implementing the review. Unfortunately, most local governments opted not to take full, if any, advantage of those direct participation opportunities.
13. **Comment:** How is the 5-Year Review addressing the economic impacts of recovery on rural communities? **Response:** The study area for the Socioeconomic analysis is defined as the five counties that include lands within the BRWRA, including Catron, Sierra, and Grant counties NM and Apache and Greenlee counties AZ. The analysis attempts to identify all social and economic impacts in those counties that have occurred since the Project's inception in 1998.

Technical Section

14. **Comment:** Why were only confirmed livestock depredations, and not probable kills, used in the analysis in the 5-Year Review? **Response:** Tables 6 and 7 of the Technical Component show depredation figures for confirmed, probable and possible depredations and injuries of domestic livestock and dogs. Confirmed kills were used for comparison with both the FEIS (USFWS 1996) and other wolf populations. The FEIS (USFWS 1996) defined depredations as, "The confirmed killing or maiming of lawfully present livestock on Federal, State, Tribal, or other public lands, or private lands by one or more wolves. The Fish and Wildlife Service (FWS), Animal Damage Control (ADC), or FWS-authorized State or Tribal agencies will confirm killing or maiming of domestic livestock." The FEIS further stated, "No accepted method exists to project unconfirmed predation losses." Thus, the IFT compared confirmed depredations with the FEIS predictions because that was the information the EIS was predicting. Data from other wolf populations were based on confirmed kills, thus using probable and possible depredations with the Mexican wolf population would make comparisons invalid.

15. **Comment:** Is the issue of Mexican wolves hybridizing with dogs and coyotes addressed in the 5-Year Review? **Response:** It was not addressed in the draft version; however, it will be addressed in the final document. In addition, during the time frame associated with the 5-Year Review (1998-2003), there was only one instance of hybridizing with a dog by Mexican wolves and no instances of hybridization with a coyote. The pups of the one hybrid litter were euthanized. Thus, during the time frame of the 5-Year Review there was one hybridization event that had no effect on the population, thus no analysis of the data was possible or relevant. However, the lack of ability to analyze or describe an effect does not diminish the fact that genetic analysis of all captured animals is an important component of Mexican wolf reintroduction. We will continue to investigate genetic data and determine if introgression of either domestic dog or coyote genes has occurred within the Mexican wolf population. In 2005, a second hybrid litter was found and humanely euthanized. Again, these animals were captured prior to any introgression into the wolf population and thus had no influence on the overall population of wolves in the wild.
16. **Comment:** Why aren't the real livestock losses and wolf/human interactions accurately reported in the 5-Year Review? **Response:** All wolf/human interactions and livestock losses that were reported and available to the IFT were included in the 5-Year Review.

F. Wolf Biology

1. **Comment:** Historically, the Mexican wolf never ate elk; the only elk they eat now are cripples and carrion. **Response:** Prior to when wolves were extirpated from the southwestern United States, distribution and abundance of prey species such as elk and deer may have been different from what they are today. Observations of wolves in the Southwest indicated that deer were the most important prey source (Bailey 1931, Bednarz 1988). This assumption was based largely on the fact that deer outnumbered all other large game, including elk, within the areas occupied by wolves. Today, elk are common within the reintroduction area, and this likely influences the relative frequency of elk to deer in the diets of Mexican wolves. At times, wolves may disproportionately use vulnerable prey. However, monitoring by the IFT and specific research studies (Reed 2004) indicate that wolves prey upon all sex and age classes of elk, and therefore are fully capable of killing live elk when necessary.
2. **Comment:** At the beginning of the program, people were guaranteed that wolves would not cross with dogs or coyotes. **Response:** Hybridization of wolves with dogs has always been recognized as a potential occurrence within the program as published in the Final Rule (63 FR 1752-1772). As discussed in the Final Rule, litters suspected to be wolf-dog hybrids have been captured, held in captivity, genetically tested for purity, and when necessary, euthanized to maintain the subspecies genetic integrity. A larger wolf population on the landscape would probably lower, but not completely eliminate the possibility of hybridization. The rationale behind this statement is simple: the more

wolves on the landscape, the more opportunities for single wolves to encounter and pair with other wolves. See also responses to E.15 and F.6.

3. **Comment:** Wolves won't stay in the Gila Wilderness Area because of a lack of prey (deer and elk). **Response:** Both wolves and prey populations may show seasonal movement across the boundaries of the Gila Wilderness. Some of the reintroduced wolf packs have established territories largely within the Gila Wilderness, and have spent extended periods of time inside the Wilderness. Although prey densities within the Wilderness appear to be adequate, at least seasonally, it is unreasonable to expect that any wolf packs will remain within the Wilderness 100% of the time.
4. **Comment:** Have wolves eliminated the prey base that coyotes and mountain lions depend on? **Response:** There is no evidence from game surveys and local observations that indicate elimination of coyote and mountain lion prey base. If the prey base had been eliminated, these predators would be absent from the landscape or there would be an increase in depredation incidences because these species would be preying on livestock and pets. These other predators have not been eliminated, and there is no evidence of an increase in coyote and mountain lion depredations since wolves were reintroduced.
5. **Comment:** As time goes by and there are more wolves, will they start running in large packs? **Response:** As the total number of wolves within the reintroduction area increases, wolves have the ability to congregate in larger groups. However, pre-reintroduction observations of Mexican wolves indicated relatively small pack sizes (Bednarz 1988). Resources (prey populations, water sources, large expanses of wilderness and other inaccessible areas) in the southwestern United States tend to occur at lower densities than in wolf habitats in places such as the northern Rocky Mountains. It is unlikely that large pack sizes (up to 37 animals; Smith et al. 2003) observed with reintroduced wolves in the Greater Yellowstone Ecosystem will occur in the Southwest. The average Mexican wolf pack size is 4.8 wolves. The largest pack observed to date was the Francisco pack in 2002 which consisted of 11 animals (six adults/subadults and five pups).
6. **Comment:** Hybridization is occurring between uncollared wolves and dogs; how is this being addressed? **Response:** There have been two documented incidents of free-ranging Mexican wolves breeding with dogs. Both cases involved a female Mexican wolf breeding with a male dog and resulted in hybrid litters. Both hybrid litters were humanely euthanized before any of the offspring had the opportunity to reproduce in the wild and impact the free-ranging population's genetics. Prior to releasing any Mexican wolf to the wild, blood is taken and banked at the University of New Mexico and the USFWS Ashland, Oregon Forensics Laboratory. Additionally, blood is taken and analyzed by the Forensics Laboratory from all canids (Mexican wolves, coyotes, feral dogs, wolf-dog crosses) that are captured or handled in the wild, for the purpose of monitoring genetic health of the free-ranging population and to assess any possible introgression of dog genes into the population. The Reintroduction Project cannot assure the public that no additional hybridization has occurred, since not every wolf born in the wild has been (or can be) captured and genetically assessed. However, aside from the two hybrid litters that

have been discovered, there is no evidence to date to suggest hybridization with dogs or other canids is occurring in the free-ranging Mexican wolf population. See also responses to comments E.15 and F.2.

7. **Comment:** How many litters are euthanized because they appear dog-like? **Response:** As noted in comment F.6, two Mexican wolf-dog hybrid litters have been humanely euthanized after genetic testing verified they were Mexican wolf-dog crosses. See also responses to comments E.15 and F.2.
8. **Comment:** The Mexican wolf is not a true wolf and can't bring down an elk. **Response:** The Mexican wolf is recognized by the scientific community and USFWS as a subspecies of the gray wolf. This recognition is based on scientific evidence, including morphological measurements (Bogan and Mehlhop 1983) and genetic analysis (Hedrick et al. 1997). The first Mexican wolves were released in 1998 and successfully preyed upon elk within six weeks of release. Released and wild-born wolves continue to prey on elk and other prey species.
9. **Comment:** Elk are not a native species and NMDGF should be focusing on controlling elk and bringing back the deer population. **Response:** Elk (*Cervus elaphus*) as a species are, in fact, native to the southwestern US. However, Merriam's elk (*C. e. merriami*), the subspecies that occurred in the Southwest at the turn of the 20th century, was eliminated by unregulated hunting. Elk were restored to AZ and NM in the early 1900s, when ranchers and kindred spirits brought in loads of Rocky Mountain elk (*C. e. nelsoni*), which have subsequently prospered. Regardless, elk were among the natural prey of wolves that historically occurred in central and northern AZ and NM. Mexican wolves are thought to have preyed more heavily on deer, however, especially toward the southern end of their range (i.e. in Mexico) where elk did not occur. Elk and deer populations in the Southwest have varied markedly over time. In recent decades, elk seem to have flourished in many areas, while deer herds appear to have declined. . Drought and habitat fragmentation are among the primary factors thought to lie behind deer herd declines. Both deer and elk are managed by State and Tribal wildlife agencies to meet population objectives that reflect trade-offs among many public and Tribal interests. Elk and livestock both graze, and competition between the two for forage allocations on public lands can be strong. In any event, it is unlikely that direct manipulation of elk numbers would result in substantial increases to deer populations, or vice versa. Deer browse, rather than graze, and forage use between the two is not as strongly overlapping as it is between cattle and elk. Moreover, changes in habitat quality and quantity would likely be the only effective way to increase numbers of either deer or elk. Some habitat manipulation could be accomplished by humans, but to some extent positive change is also dependent on weather cycles (rainy years are good for deer).
10. **Comment:** The Mexican wolf is capable of killing anything it wants. **Response:** The wolf is capable of preying upon a wide variety of prey items, including something as large as a cow or elk and as small as a mouse or insect.

11. **Comment:** Genetic viability of Mexican wolves is based on seven founders; what is the finite number for the genetic viability of a species in the wild? **Response:** The finite number for short-term viability in a sexual-reproducing species such as the wolf is two. However, to capture a representative amount of variability of a wild population, 20 to 30 unrelated founders is preferred (Ballou and Foose 1996; Ed Spevak, Cincinnati Zoo, personal communication). For some species this is no longer a luxury (e.g. Mexican wolf (7), Przewalski's horse (13-14), Pere David deer (3), black footed ferret (7), Mauritius Pink Pigeon (13), Guam rail (10), Mhorr gazelle (11), Attwater's Prairie chicken (19), red wolf (12), and Arabian oryx (13)). Conservation programs for these species were all started with the last known members of their species. In these instances, it is important to manage for as much genetic variability as possible.
12. **Comment:** Two of the Mexican wolf lineages have not been adequately incorporated in the wild population. This is easier to do while the population is small. This practice will help retain genetic variation and alleviate genetic depression. **Response:** The agencies involved in managing the reintroduced population are keenly aware of the issues and concerns, be they real or perceived, regarding the genetic health of the free-ranging Mexican wolf population. Sampling based on the collared free-ranging Mexican wolf population suggests the current *known* representation for the Ghost Ranch and Aragon lineages in the wild is 9.55% and 10.00%, respectively. The reality, however, is we do not know the full genetic composition of the wild population since releases and subsequent wild pairings and re-pairings have resulted in un-collared wolves breeding and producing offspring in which genetic testing to verify lineage representation has not been accomplished. Despite our best efforts to capture and test all wolves, the number of uncollared (thus genetically unknown) wolves will only increase as the population continues to grow. Genetic experts have indicated that ideally, the genetic composition of the wild population should mimic that of the captive population, which currently for the Ghost Ranch and Aragon lineages is 14.63% and 12.43%, respectively. As program managers, we can help facilitate this by carefully considering which wolves to release in the future. For example, most, if not all, of the releases and translocations accomplished in recent years have been done in order to infuse the wild population with Ghost Ranch and Aragon lineage wolves which we believe are underrepresented in the free-ranging population. This is because in the early years of reintroduction, the only wolves in captivity that were genetically redundant (and therefore available for release) were those of the McBride lineage. We also know that despite our efforts to augment the wild population with Ghost Ranch and Aragon wolves, many of them have been killed, removed from the wild, or otherwise have not successfully bred and reared offspring. However, it is important to note that even if release of wolves from the Ghost Ranch and Aragon lineages continues, the reality is that much of the genetic interplay is beyond the control of the agencies managing this program and in fact will depend more on which wolves survive in the wild to successfully interbreed and in turn, what successive generations do.
13. **Comment:** The reintroduction of wolves in the Blue Range Wolf Recovery Area (BRWRA) is jeopardizing other wildlife and watersheds. **Response:** Although we have

no data at this time specific to the BRWRA, primarily due to the small population size and lack of detailed studies prior to the reintroduction of Mexican wolves in the BRWRA, we can postulate on the effects of reintroducing a top level carnivore into an ecosystem from information gained in Yellowstone National Park. Scientifically obtained data shows a positive response from willows, aspen, and cottonwoods trees in areas frequented by wolves (Ripple and Beschta, 2003, 2004); suggesting wolf reintroduction has likely had a positive influence over watershed conditions. Wolves in Yellowstone have contributed to a more stable and healthy elk population (Smith et al. 2003). It has also been shown that wolves have reduced coyote populations and that wolf kills provide a meat source for bears, eagles and other scavengers (Smith et al. 2003; Robbins 2005). The Yellowstone studies have shown that the wolf plays an important role in contributing toward balanced ecosystem function. It is speculated that reintroduction of wolves will result in increased numbers of many species, and increased health of vegetation communities. There is no evidence whatsoever that Mexican wolves pose a threat to any other species of wildlife, in terms of population status.

14. **Comment:** Given that there are already bears and mountain lions in the Blue Range Wolf Recovery Area (BRWRA), the wolf is limited on where it can go and what it can do. There needs to be a study to look at the relationship between wolves and other top predators (i.e. lions and bears). **Response:** Wolves coexist with bears and mountain lions throughout much of their range. Specific interactions between wolves, bears, mountain lions, and other top predators have not been studied within the BRWRA. Resources within the Reintroduction Project have focused on day-to-day monitoring, management, and information dissemination relating to Mexican wolves. If additional funding were available, specific research projects such as those evaluating interactions among top predators might be able to be funded. These studies could also be pursued by independent researchers. AMOC has advocated that cooperating agencies and other interested parties undertake such research.
15. **Comment:** Doesn't the forest need a keystone predator like the wolf? **Response:** Keystone predators can improve the ecological health of natural communities. Although we have no data at this time specific to the ecological response of the reintroduction of wolves in the Blue Range Wolf Recovery Area (BRWRA), primarily due to the small population size and lack of detailed studies prior to the reintroduction of Mexican wolves in the BRWRA, we can postulate on the effects of reintroducing wolves from information gained in Yellowstone National Park. The importance of wolves in the ecosystem has also been shown on Isle Royal in Michigan (Peterson 1977). See also responses to comments F.13 and F.25.
16. **Comment:** What are the impacts of Mexican wolves on bighorn sheep populations? **Response:** To date, the impact of Mexican wolves on bighorn sheep has been insignificant. Wolves were possibly involved in the killing of two bighorn sheep since reintroduction began in 1998. In addition, wolves were documented feeding on the remains of a third bighorn sheep that was possibly killed by a mountain lion. It appears that mountain lions have a greater impact on bighorns than Mexican wolves.

17. **Comment:** How do we measure the pressure wolves put on other predators (e.g. bears, lions, coyotes) through competition? **Response:** Wolves most likely directly interact with other top predators at scavenging or kill sites. Wolves, especially when in packs, could displace individual predators from carcasses, resulting in a shortened time that an individual large carcass could feed a top predator. On the other hand, wolf kills could result in an increased number of carcasses being available for scavenging by other animals. Wolves may directly compete with coyotes, and reduce coyote populations (Smith et al. 2003). Quantification of the overall effects of wolf reintroduction on predator populations should be investigated through an intensive research project, which is currently beyond the financial capabilities of the Reintroduction Project.
18. **Comment:** Are wolves that feed on livestock carcasses more prone to attack livestock? **Response:** The 5-Year Review Administrative component states that 50% (22 out of 44) of the wolves involved in depredation incidents had fed on livestock killed by other causes. Conversely, 50% of the wolves that had depredation incidents had not been documented to have scavenged upon dead livestock. This data does not demonstrate a clear trend. However, 91% (20 out of 22) of wolves involved in scavenging incidents later killed livestock. The data is further confounded by the ability to find livestock carcasses caused by wolves or other causes. The possibility always exists that wolves have scavenged or killed livestock prior to the first documented instance of scavenging or killing. The IFT works with permittees to remove livestock carcasses or render them inedible according to permittee wishes. During certain times of the year (e.g. calving season for cattle or denning season for the wolves), it may benefit livestock operators to remove or render inedible carcasses whenever possible to limit localization behavior of wolves associated with carcasses in the area. However, Chavez and Gese (2005) suggested that hyper-abundance of secondary prey items and domestic livestock carrion dampened the need for wolves to switch to cattle. When given the choice between livestock carcasses and abundant native ungulates, wolves prefer ungulates (Salvador and Abad 1987, Meriggi et al. 1991, Smietana and Klimek 1993).
19. **Comment:** Is it true that when mountain lions make a kill, wolves will steal their kill, which in turn forces lions to kill more often than they would normally do? **Response:** Interspecific competition between wolves and lions has been documented throughout the West, including the Mexican wolf reintroduction effort. For example, mountain lions have been documented to kill wolves in the northern Rockies, and vice versa (Smith et al. 2003). However, neither is thought to be a significant mortality factor on the other (Ballard et al. 2003). The degree of interaction likely varies depending on the time of year and spatial use (Ballard et al. 2003). Wolves are more likely to interact with mountain lions in the winter, when prey, mountain lions, and wolves use valley bottoms because of high snow depth in the surrounding mountains. This may not hold true for the Blue Range Wolf Recovery Area, however, because snow is more ephemeral and prey species aren't as concentrated in valley bottoms. However, to the degree that the two carnivores interact, observations suggest that mountain lions generally avoid wolves, are at risk of predation from wolves, and are subordinate at kill sites (Smith et al. 2003). On

the Blue Range Wolf Recovery Area, wolves have been documented feeding on seven ungulates that were either confirmed, probable, or possibly killed by a mountain lion. It is unknown whether wolves usurped these kills from the mountain lions, or if the lions had simply abandoned the carcasses. In one instance, there was a dead wolf (killed by a mountain lion) at a mountain lion kill, and two other wolves feeding on the ungulate remains.

20. **Comment:** How many wolves involved in the captive breeding program have had litters of less than 100% pure Mexican wolves? **Response:** None. Only 100% pure Mexican wolves are part of the captive breeding program, and the breeding of Mexican wolves in the captive community is closely monitored and overseen by the Mexican Wolf SSP. The Mexican Wolf SSP program, administered by the American Zoo and Aquarium Association, manages Mexican wolf breeding to maintain a healthy and self-sustaining population that is both genetically diverse and demographically stable. Beyond this, the SSP participates in a variety of other cooperative conservation activities, such as research, public education, reintroduction, and field projects. The mission of the Mexican Wolf SSP is to help ensure survival of the Mexican wolf.
21. **Comment:** Why are documented hybrids allowed to run in the wild? **Response:** The Mexican Wolf Experimental Population Final Rule states that “the Service or any agent so authorized by the Service may capture, kill, subject to genetic testing, place in captivity, euthanize, or return to the wild (if found to be a pure Mexican wolf) any feral wolf-like animal, feral wolf hybrid, or feral dog found within the Mexican Wolf Experimental Population Area that shows physical or behavioral evidence of hybridization with other canids, such as domestic dogs or coyotes.” There have been two known occurrences of Mexican wolves breeding with dogs that resulted in hybrid litters; both of these litters were humanely euthanized. In addition to these, four possible domesticated hybrids (most likely family pets at one time, not Mexican wolf hybrids) have been discovered within the Blue Range Wolf Recovery Area. None of the cooperating agencies can control or regulate hybrids from the domestic pet trade, except that if they are captured, they are removed from the wild as per the Final Rule. See also responses to F.6 and F.7.
22. **Comment:** What happens to hybrid wolf litters? **Response:** Hybrid Mexican wolf litters are humanely euthanized. See also response to F6.
23. **Comment:** What can be done about the depleted gene pool? **Response:** The captive managed population is descended from seven founders, none of which are still alive. New founders could only be added if wild wolves were discovered in Mexico (an unlikely, but possible, event) and brought into the bi-national captive breeding program. The current gene diversity in the captive population is 82.41%, lower than the average for other mammals in the Mexican Wolf SSP (93%). When gene diversity falls below 90% of that in the founding population, reproduction may be compromised by such things as lower birth weights, smaller litter sizes, and greater neonatal mortality (Siminski and Spevak 2004). At present, the captive population of Mexican wolves could maintain only 75%

gene diversity for 38 years and would be expected to maintain 64.58% after 100 years. Loss of gene diversity could be slowed by increasing annual population growth rates and increasing the effective breeding population (number of animals capable of breeding). However, both are affected by the social structure of the species and the carrying capacity of the captive facilities (literally, the number of pens available for captive wolves), the latter of which would also need to be increased. Increasing the representation of under-represented founders will also slow the loss of gene diversity.

24. **Comment:** Why isn't there an active program of habitat enhancement in the wilderness to provide more prey for wolves and lessen the impacts on domestic livestock? **Response:** The Wilderness Act of September 3, 1984 and USFS policy prevent any direct habitat improvement in Congressionally designated wilderness. Passive improvement such as natural fire management is allowed which, under desirable conditions, creates a mosaic of early successional stage vegetation across the landscape that should favor ungulate populations. However, there is no indication at this time that prey abundance and availability are limiting for Mexican wolves anywhere in the BRWRA.
25. **Comment:** What is the value of a top predator like the wolf? **Response:** Although we have no data at this time specific to the BRWRA, primarily due to the small population size and lack of detailed studies prior to reintroduction of Mexican wolves, we can postulate on the effects of reintroducing a top level carnivore into an ecosystem from information gained in Yellowstone National Park. Scientifically obtained data shows a positive response from willows, aspen, and cottonwoods in areas frequented by wolves (Ripple and Beschta, 2003, 2004) in Yellowstone, suggesting wolf reintroduction has had a positive influence over watershed conditions. Wolves in Yellowstone have contributed to a more stable elk population (Smith et al. 2003). It has also been shown that wolves have reduced coyote populations and that wolf kills provide a meat source for bears, eagles and other scavengers (Smith et al. 2003, Robbins, 2005). The Yellowstone studies have shown that the wolf plays an important role in contributing toward balanced ecosystem function.
26. **Comment:** The program has spent \$12,000,000 to date on wolf reintroduction, or \$200,000/wolf. At this rate, it will take another \$25,000,000 to achieve recovery. Is it worth it? **Response:** Conservation of the Mexican wolf is required under the ESA. Top carnivores, such as the Mexican wolf, are known to make significant contributions toward ecosystem health and functionality. It is not possible to assign a monetary value to the role of wolves as top predators in the wild, and whether or not the program is worth a given amount of money is a question of values that must be answered individually. However, recovery of the Mexican wolf also addresses State and Tribal obligations to manage wildlife. Moreover, the total costs cover more than just the Reintroduction Project; recovery costs are also a significant component of the total cost. The costs of ensuring significant opportunities for public involvement in the program are also substantial. Moreover, the \$12,000,000 referenced includes funds spent over a 20-year period before reintroduction began.

27. **Comment:** What is the probability that wolves will transmit infectious diseases? **Response:** Wolves can host a variety of diseases and generally are susceptible to diseases that affect dog or coyote populations, such as canine distemper or canine parvovirus (Kreeger 2003, Hedrick et al. 2003). Many diseases may be passed from domestic dogs, coyotes, or foxes to wolves and back to these species. Wolves also can have diseases that are present in ungulates (such as leptospirosis, or brucellosis), or through intermediate host such as ticks spreading Lyme disease from deer or mice to wolves (Kreeger 2003). Wolves may acquire rabies by a bite or receiving a wound from an infected animal, or by ingesting an infected animal. Striped skunks, gray foxes, and bats are considered the primary vectors of rabies in the Southwest. The Mexican wolf project vaccinates all wolves in captivity prior to their release to the wild and those captured in the wild for canine distemper, adenovirus, coronavirus, parainfluenza, parvovirus, and rabies. All of these vaccines are approved for domestic dogs. The vaccines are effective in preventing diseases in wolves, but wolves have not been clinically challenged by the diseases following vaccination and thus USDA has not approved some vaccines (e.g. rabies and canine distemper) for wolves (Kreeger 2003). Transmission of rabies and other diseases to humans is very remote unless people are either bitten by a wolf (rabies) or smell the scat (e.g. *Echinococcus* spp.) of wolves. *Echinococcus* spp. are not known to exist in the Southwest, and to date no Mexican wolves in the wild have come into physical contact with people during the Reintroduction Project. The bottom line is that wolves have nowhere been shown to be significant disease vectors in comparison to the individual or aggregate number of other wild and domestic mammals present in an area.
28. **Comment:** What is the lower limit (minimum viable population) for wolves? **Response:** Minimum viable population size (MVP) for wolf populations in the Southwest has not been defined. Defining MVP requires the identification of an acceptable level of certainty of population persistence over a given period of time, given the parameters of the population, and the characteristics of the environment (e.g. likelihood of stochastic, or chance, events). MVP sizes may be considered during recovery planning as a component of the scientific standard for recovery. The 1982 Mexican wolf recovery plan (USFWS 1982) did not define a recovery goal, but rather stated “the Mexican Wolf Recovery Team sees no possibility for complete delisting of the Mexican wolf.” The 1982 plan went on to state its prime objective as: “To conserve and ensure the survival of *Canis lupus baileyi* by maintaining a captive breeding program and re-establishing a viable self-sustaining population of at least 100 Mexican wolves in the middle to high elevations of a 5,000-square mile area within the Mexican wolf’s historic range.” (USFW 1982). At the time, the Mexican wolf’s historic range was thought to extend to the north into southern AZ and NM, as well as southeastern Texas (USFWS 1982). Recent evidence indicates that Mexican wolves occurred as far north as southern Colorado (Leonard et al. 2005), suggesting a far greater area could be considered for recovery of the Mexican wolf. The Southwestern Distinct Population Segment Gray Wolf Recovery Team was formed in 2003 to draft a recovery plan for the Southwest. However, the team is currently on hold due to litigation (see Response to Comment M.1). This recovery team (when reactivated) will assess the best available science, including consideration of population viability, to develop recovery criteria that indicate threats to the species have been alleviated. Despite

the current lack of defined recovery goals in the Southwest, some information on a recovered wolf population can be drawn from other recovery plans for gray wolves. The Northern Rocky Mountain Wolf Recovery Plan identified a recovery goal of 10 breeding pairs of wolves for three consecutive years in three recovery areas (USFWS 1987). These sub-populations would be connected through dispersal and function as a meta-population of approximately 300 wolves. The Eastern Gray Wolf Recovery Plan identified the need for 1,251 to 1,400 wolves in Minnesota and one other viable population of wolves (200 wolves if the population was more than 100 miles from the Minnesota population, or 100 wolves if closer than 100 miles for five years) (USFWS 1992). We do not know yet what recovery of the wolf in the Southwest will entail when the Recovery Plan has been revised, but will be determined through the recovery process rather than the 5-Year Review process.

G. Compensation

1. **Comment:** People are not turning in pet and livestock depredation reports because they know they won't be compensated for them. **Response:** The compensation program is administered by Defenders. There are specific criteria that must be met to qualify for compensation (see Response to Comment G.4); however, if reports are not turned in, then obviously compensation can't be considered or dispersed. Choosing not to submit a claim because "you know" that it will not be honored, is a self-defeating and self-fulfilling prophecy. Whether or not compensation is desired from Defenders, having a complete and accurate compilation of wolf depredation reports will assist the cooperating agencies in making appropriate management decisions regarding Mexican wolves. Many ranchers report possible coyote, mountain lion, and bear depredation for management purposes, despite no compensation for these predator losses. In areas where known wolf packs are present, the IFT works with ranchers to ensure that depredations discovered by ranchers are investigated. In addition, the IFT occasionally finds cattle carcasses while monitoring wolf activities. These carcasses are documented and investigated.
2. **Comment:** Does anyone pay compensation for chickens that are depredated on by wolves? **Response:** The Bailey Wildlife Foundation Wolf Compensation Trust, administered by Defenders, will compensate for wolf-related loss of sheep, cattle, horses, mules, goats, llamas, donkeys, pigs, chickens, geese, turkeys, herding dogs and livestock guarding dogs.
3. **Comment:** There needs to be a serious effort by the government to fairly compensate ranchers for their losses, including the added burden on finite resources of dealing with wolves (e.g. broken fences, bookkeeping, labor). **Response:** Federal, State, and Tribal governments do not compensate ranchers for livestock injured or killed by Mexican wolves and have no legal authority to do so. Suspected wolf depredations on livestock are investigated by the IFT. Copies of investigation reports are sent to the resource owners to determine if they are willing to share the information with Defenders for consideration of payment. The property owner bears the responsibility for contacting Defenders. Defenders will pay full market value for confirmed livestock killed by wolves up to

\$2,000.00/animal. They pay 50% of market value (up to \$1,000.00/animal) for probable losses when evidence is strong, but not conclusive that wolves have killed the livestock. If Defenders and the rancher do not agree on the value of the livestock, the local County extension agent determines the price. The fund does not compensate for livestock covered by an insurance program or an existing State program. Establishment of a Federal, State, or Tribal compensation program would require legislative action. xxx

4. **Comment:** An insurance program (vs. compensation) for livestock depredations by wolves should be evaluated. **Response:** AMOC has established a compensation subcommittee to evaluate alternative compensation programs such as the one described in the comment. Updates on progress have been reported during quarterly AMOC meetings.
5. **Comment:** Has there been any compensation to County governments for tax revenues lost because of wolf depredations on domestic livestock? **Response:** No. County governments are not compensated for loss of tax revenues associated with wolf depredations on domestic livestock.
6. **Comment:** Ranchers should be compensated for livestock losses due to wolves, and by the same token, ranchers are obligated to improve their management practices such that wolf depredations are minimized. **Response:** The issue of compensation is currently outside the purview of any Federal, State, or Tribal agency since no existing law, regulation or policy authorizes Federal, State, or Tribal agencies to compensate livestock owners for verified depredations from any types of predators (e.g. mountain lion, bear, wolf, coyote). See also Response to Comment G.3. Livestock grazing on national forest lands is administered through a grazing permit, annual operating instructions, and an allotment management plan. Livestock husbandry practices can be incorporated into any or all of these documents by agreement of both the agency and the permittee.
7. **Comment:** As compensation for rancher losses to wolf depredations, they could sell canned hunts for hunters to kill wildlife in fenced areas. **Response:** Both AZ and NM have laws governing establishment of game farms on private lands. The promotion of canned hunts for wildlife is beyond the purview of the Mexican wolf Reintroduction Project.
8. **Comment:** Compensation for livestock depredations by wolves should be government sponsored and not a Defenders program. **Response:** Federal, State, and Tribal agencies have no legal authority to compensate ranchers for livestock depredations attributed to Mexican wolves. At this time, the Bailey Wildlife Foundation Wolf Compensation Trust, administered by Defenders, is the only established mechanism to compensate for wolf depredations. Defenders' goal is to shift economic responsibility for wolf recovery away from individual ranchers and toward individuals who want to see wolf populations restored. See also Response to Comment G.6.
9. **Comment:** AZ only produces 2% of the beef in the nation, and there are only 1,600 public land ranchers in the State, 1/3 of which would accept a \$175/AUM buyout.

Response: If a rancher had a 300 head year-round permit on national forest land, a buyout would cost \$630,000 (3,600 AUMs X \$175). A “buyout program” would have to be approved by Congress and signed into law by the President. There is currently no proposed legislation, law, regulation or policy that would allow for the buyout and retirement of livestock grazing permits or the expenditure of Federal funds for such a program. Furthermore, the National Cattlemen’s Beef Association and its State affiliates and their membership oppose buyouts.

10. **Comment:** The current compensation program is inadequate to compensate for actual losses. **Response:** The number of confirmed depredations by Mexican wolves on domestic livestock in the Blue Range Wolf Recovery Area is a minimum value (see Exhibits 3-3, 3-7, and 3-8 in the Socioeconomic Component). Some livestock carcasses are never found, due to the large size and rugged nature of many allotment pastures. Other livestock carcasses may eventually be located, but not until weather, scavengers, and decomposition obscures cause of death. Finally, calves may be entirely consumed in a very short period. As stated in the Response to Comment G.3, the government does not compensate ranchers for livestock injured or killed by Mexican wolves and has no legal authority to do so. Defenders’ privately funded and administered livestock compensation fund is an attempt to shift some of the economic burden of wolf recovery from livestock producers to those who support wolf reintroduction. Pay-outs from the fund for confirmed and probable wolf depredations on livestock are market-based and Defenders goes to great lengths to work directly with affected livestock owners to ensure a fair and equitable valuation. AMOC continues to work toward addressing the bigger issues of how to fairly assess actual losses, develop additional sources of funding, and administer the program in a fashion acceptable to all involved parties.
11. **Comment:** Has Congress appropriated any money for wolf depredation compensation? **Response:** No. See response to G.3.
12. **Comment:** Ranchers should be fairly compensated for wolf losses and other wolf-related expenses, and there should be lower standards in terms of what constitutes proof of livestock depredation before a rancher can get paid. **Response:** Federal, State, and Tribal agencies currently do not have authority or funding to provide for a compensation program to offset wolf depredations and other wolf-related expenses. Such authorities would require legislative change. The only compensation program is a private program run by Defenders. Defenders’ website describes the program as follows: “In 1987, Defenders of Wildlife created a \$100,000 fund to compensate ranchers in the U.S. Northern Rockies for all verified livestock losses to wolves. Anticipating the reintroduction of the Mexican wolf, the fund was expanded in 1995 to cover potential losses in the southwestern United States and the States bordering the northern Rockies in 1999. In 1997, the compensation fund officially became the Defenders of Wildlife Wolf Compensation Trust. The trust expanded to \$200,000 in 1999. In the fall of 2000, The Bailey Wildlife Foundation made a generous contribution to Defenders wolf and grizzly bear compensation fund and the trusts were renamed to acknowledge the significance of the contribution. In total, Defenders has paid more than \$210,000 to more than 180

ranchers since the program's inception in 1987." (Defenders of Wildlife 2005). This includes \$35,023.00 in compensation claims in the BRWRA. In reference to lowering standards of proof, the IFT will maintain high standards to ensure that Mexican wolves are only accountable for their depredations. Reducing payment standards for the Bailey Wildlife Foundation Wolf Compensation Trust would need to be addressed by Defenders and those seeking compensation.

13. **Comment:** Grazing is already subsidized with low grazing fees, why should ranchers be further compensated? **Response:** Grazing fees are set by Federal law and are beyond the purview of AMOC. The present formula for calculating the grazing fees on Federal lands in the West was set forth in the PRIA of 1978. On February 14, 1986, after the expiration of the PRIA formula, President Ronald Reagan issued Executive Order 12548 directing the Secretaries of the Interior and Agriculture to continue to use the PRIA fee formula to calculate annual grazing fees. The order established a minimum fee of \$1.35. It also directed that for any given year the annual change in the fee shall not be greater than plus or minus 25 percent of the previous' years fee. In 1988, the fee formula from Executive Order 12548/PRIA was incorporated into 36 CFR 222 Subpart C.
14. **Comment:** What can be done to improve the compensation program to include probable wolf kills if the physical evidence points to wolves? **Response:** The Defenders compensation program pays 50% of market value (up to \$1,000.00/animal) for probable losses when evidence is strong, but not conclusive that wolves have killed the livestock. Reducing the standards for the Bailey Wildlife Foundation Wolf Compensation Trust would be between the Defenders and those seeking compensation. See also response to G.3, G.10, and G.12.
15. **Comment:** The Defenders compensation program does not adequately compensate for the loss of an animal. **Response:** See responses to G.3, G.10, G.12, G.14, and G.16.
16. **Comment:** The Defenders compensation program should pay for the lifetime value of cow production lost. **Response:** The Defenders wolf compensation fund is a private program funded by private donations. Their policy is to provide full market-based compensation (up to \$2,000.00/animal) for confirmed wolf depredations on livestock. In addition, they pay 50% of market value (up to \$1,000/animal) for probable wolf depredations on livestock. The average lifetime value of a cow (in terms of calf production and sales), given all the variables and hazards (both known and unknown) of an open-range existence would be extremely difficult to determine, and somewhat speculative in any event. Although AMOC can make suggestions, any changes to the existing compensation program is ultimately under the purview of Defenders. See also Response to Comment E.4.
17. **Comment:** Has the San Carlos Apache Tribe been compensated for cattle losses, and who compensates the Tribe? **Response:** SCAT has received compensation from Defenders for wolf-related livestock loss. Compensation claims are processed identically to those submitted by private ranchers/livestock owners.

18. **Comment:** Can additional funding be provided to the San Carlos Apache Tribe for range riders? **Response:** USFWS provides funding annually to the SCAT wildlife department in support of wolf management efforts. There is a great deal of flexibility in how this money can be used, depending on identified needs of the Tribe. In addition, the Defenders Proactive Carnivore Conservation Fund was established to reduce conflicts between predators (such as wolves) and humans before such problems arise. Tribal proposals to reduce conflicts between Mexican wolves and livestock on SCAR through use of range riders and/or other methods can be submitted to Defenders for funding consideration. Finally, USFWS is constantly seeking additional sources of funding, personnel, and equipment to assist cooperative efforts in managing wolves both on and off Tribal lands.

H. AMOC/IFT

1. **Comment:** Does AGFD purposely overestimate the number of deer in the Blue, not to put wolves on the land, but to keep hunter numbers (and license revenues) up? **Response:** AGFD does not overestimate the number of deer in the BRWRA for any reason. Hunt recommendations are made annually, based on surveys conducted by Wildlife Managers assigned to that GMU and in full compliance with agency-wide guidelines discussed with and approved by the AGFC Commission in public session. Each recommendation is discussed with AGFD's Executive Staff before final permit recommendations are made to and approved by the Commission. Any evidence of intentional over or underestimation should be brought to the attention of AGFD's Director.
2. **Comment:** Has AGFD decreased the number of elk permits because of wolves? **Response:** No. See also C/R 1, above.
3. **Comment:** Why were elk permits cut for the vicinity of East Fork NM? **Response:** The number and type of elk permits issued in NM are based on unit management objectives and current population numbers, composition, and trends relative to those objectives. Within some portions of the Gila National Forest, the number and type of elk permits issued have recently been modified in an attempt to prevent populations from falling below these objectives. Decisions to modify permit numbers were in no way influenced by the presence of Mexican wolves.
4. **Comment:** Why doesn't USFWS leave WS alone, so they can more effectively conduct capture and lethal of problem wolves? **Response:** In accordance with SOP 13.0: Control of Mexican Wolves, WS has the lead on control of wolves involved in livestock depredations. All other employees, including USFWS are there to assist WS to effectively implement control actions. The bottom line is that the six cooperating agencies, including WS, have signed an MOU to work together as full partners in the Mexican Wolf Reintroduction Project.

5. **Comment:** Are the agencies involved in wolf reintroduction shooting elk to feed wolves? **Response:** No. None of the management agencies shoot elk, deer or any other prey to feed wolves. Dead elk and deer are sometimes salvaged to provide supplemental food for captive or recently-released Mexican wolves. These carcasses are usually the result of automobile collisions, but sometimes become available from depredation control or other management actions if other needs for the carcasses have not been identified. All salvage and transport of carcasses is conducted in compliance with Reintroduction Project SOPs 8.0 and 9.0, and State and Tribal wildlife agency policies to prevent the spread of CWD.
6. **Comment:** Some County Commissioners say (including today in this public meeting) they will no longer attend AMOC meetings because it gives credence to wolf recovery. **Response:** It is unfortunate that some elected officials have opted not to take advantage of the opportunity to represent their constituents' interests through direct participation in the AMOC meetings. Past participation by such officials has been invaluable in ensuring that local perspectives and concerns are represented and considered as decisions are being made. AMOC is deeply appreciative of the continued effective, constructive, and persistent participation by Greenlee County, and encourages others to consider a similar approach. The United States operates under a framework of participatory government, and those who do not participate have little ability to help shape the decisions that affect their lives. Whether the non-participating counties' decision not to participate appropriately reflects the will of their constituents is not for AMOC to decide. Nevertheless, we believe the program and the outcomes would benefit from stronger participation by all interested parties, including county governments, and we invite them to do so. Although the purpose of the reintroduction program is to ultimately recover the Mexican wolf, pursuant to the ESA, participation by the Counties in the adaptive management process does not require their endorsement or support of reintroduction.
7. **Comment:** The AGFD radio room 1-800-352-0700 number has problems. **Response:** Absent specifics, it is impossible to address this concern. We do not know whether the alleged problems were of a technical nature, or something else. However, the AGFD Radio Room operates 24 hrs/day, every day of the year (i.e. no days off), Its operating procedures are highly standardized and rigidly enforced. Routine performance audits include supervisory personnel listening to the audio tapes (every call is recorded) to ensure that the highest possible standards of customer service are met. So, until and unless some specific details are provided, this allegation will not be considered further.
8. **Comment:** What is the purpose of WS helping USFWS in the recovery of Mexican wolves? **Response:** The ESA of 1973 commits all Federal departments and agencies to conserve endangered and threatened species, and to use their authorities in furtherance of the purposes of the ESA. WS, a Federal program, is responsible for providing Federal leadership and expertise to resolve conflicts between humans and wildlife, including threatened and endangered species under Federal legislation of March 2, 1931. Conflicts are resolved in cooperation with Federal, State, and Tribal agencies, individuals, and other public and private agencies, organizations, and institutions.

9. **Comment:** Ranchers can deal with predators, but with wolves, they have to come to the government agencies responsible for wolf reintroduction, and they do little to control the wolves. **Response:** The harassment provision of the Final Rule allows anyone to harass Mexican wolves to scare them away from people, buildings, facilities, livestock, other domestic animals, and pets anywhere in the MWEPA. A person may kill or injure a Mexican wolf in defense of human life or when wolves are in the act of attacking their livestock on their private land. In addition, under the Final Rule (p. 1764) the take of Mexican wolves by livestock guarding dogs when used in the traditional manner to protect livestock on public, Tribal, and private lands, is permitted. Livestock producers/owners can also call upon the IFT (which includes WS) for assistance (see also Response to Comment H.39). WS was created within USDA in 1885 to provide Federal leadership in resolving predator conflicts. In 1931, Congress formally granted authority to WS to manage predators where they came into conflict with humans. Congress has provided limited funding to WS for assistance in livestock depredations by wolves in AZ and NM. Additional options for livestock operators to address wolf conflicts could become available at the point where wolves were sufficiently recovered to be delisted under the ESA.
10. **Comment:** Hunting needs to be curbed because it takes away the wolf's choice. **Response:** All modeling and data analyses that have been conducted for the Blue Range Wolf Recovery Area indicate that prey availability is sufficient to support Mexican wolves. The participating management agencies believe that existing hunting regulations do not need to be modified in order to support sufficient numbers of prey for wolf reintroduction.
11. **Comment:** The red wolf reintroduction program back East is doing well relative to the Mexican wolf program. What is the red wolf program doing right and how can it be incorporated into the Mexican wolf program? **Response:** The red wolf program initiated wild releases in 1987. Thus, this program was initiated 11 years prior to the Mexican wolf program. By comparing the first seven years of the red wolf program (1987-1994) to the first seven years of the Mexican wolf program (1998-2005), the population parameters are actually quite similar. For instance, the red wolf program had 2, 0, 1, 4, 2, 5, 9 litters born in 1988, 1989, 1990, 1991, 1992, 1993, and 1994, respectively, consisting of 2, 0, 3, 14, 4, 18, and 25 pups, respectively (Phillips et al. 2003). The Mexican wolf program had 0, 8, 5, 3, 21, 20, and 22 pups born in 1998, 1999, 2000, 2001, 2002, 2003, and 2004, respectively, resulting in 0, 0, 1, 3, 5, 3, and 6 breeding pairs (a male and female and at least 2 pups that survive until December 31 of the year of their birth), respectively (Technical Component; see also AGFD et al. 2005). Other similarities exist between the two programs in release success (21% and 26% for the red and Mexican wolf program, respectively (Technical Component; see also Phillips et al. 2003)). Overall, the Mexican wolf program is making progress similar or slightly better than the red wolf program at a comparable stage in the reintroduction process.
12. **Comment:** Why was a recreation area at Snow Lake closed because of wolves? **Response:** At the request of the IFT, with concurrence from USFS, the recreation closure

at Snow Lake was put in place to prevent harassment and potential displacement of wolves that had denned within a mile of the trailhead during the reproductive period. This practice is put in place only in areas where substantial possibility exists of human/wolf conflict to prevent disturbance to wolves when they are birthing and caring for pups.

13. **Comment:** Why are so few illegal wolf shooting cases resolved? **Response:** Most crimes are solved by gathering information from witnesses present at the scene. This allows investigators to accumulate information and build a case. Also, witnesses are rarely in the area for wildlife related crimes. Furthermore, people often falsely assume that wildlife crimes are not a serious violation (similar to speeding), and thus do not report these crimes. Despite these hindrances, special agents within USFWS investigate all wolf mortalities and make cases on wolf shootings wherever wolves occur in the USA.
14. **Comment:** Could a reward system be implemented to assist in the apprehension of criminals that illegally shoot wolves? **Response:** Rewards are offered by USFWS, AGFD, and NMDGF for information that leads to apprehension of individuals who illegally take protected wildlife, including Mexican wolves. An additional \$35,000 is being offered by a variety of public interest groups for information regarding illegal take of Mexican wolves. Information on these rewards can be found within the Mexican wolf monthly updates, or at <http://mexicanwolf.fws.gov/notes.cfm>.
15. **Comment:** People are afraid to report observations of wolves because if the wolves are found dead at a later date, they might be blamed. **Response:** This fear is unfounded. When a wolf is found dead, the subsequent investigation focuses on where the evidence leads. Someone who has previously reported a wolf in that area might be contacted for further information, but that does not mean they are a suspect in the death.
16. **Comment:** The San Carlos Apache Reservation does not support wolf reintroduction on their Tribal lands because of consequences to their cattle operations. **Response:** The Final Rule (63 FR 1752-1772; USFWS 1998) allows Tribes to choose whether wolves are present on their land, similar to the guidelines for private landowners. SCAT currently does not support wolf restoration on SCAR. A standing Tribal resolution requests removal of all wolves from SCAR. A primary reason for the resolution is concern over cattle depredation; other stated concerns include a lack of adequate funding for wildlife management, and wolf impacts on the Reservation's trophy elk hunt.
17. **Comment:** Can the IFT/Reintroduction Project identify potential problem areas before incidents occur such that proactive measures, including communication with affected ranchers/landholders, can be initiated before an incident occurs? **Response:** Yes, and AMOC and the IFT will focus on doing this from now on. A full-time outreach position was added to the IFT in 2005, and identification of problem areas will be among the primary priorities for that position. We will also identify additional proactive measures that can be implemented in the program and will accept specific suggestions anyone would care to provide to help us achieve this objective.

18. **Comment:** The educational component of reintroducing wolves is missing from eastern AZ. What can be done to get this information out there? **Response:** Much of the IFT outreach activity in previous years has been in response to presentation requests from interested parties. Thus, many of those presentations have been to civic groups, schools, and other (primarily urban) groups. With addition of a full-time outreach position on the IFT, this is changing. Emphasis will increasingly be on outreach to landowners and agencies in the reintroduction area to ensure that information about the Project, and life in wolf country, flows freely and objectively, with all aspects fully disclosed. We will use presentations as a primary mechanism, but we also intend to expand mass media outreach efforts, including local newspapers, radio stations, and other appropriate venues.
19. **Comment:** How many wolves and breeding pairs are there in the wild, and what is the trend in wolf numbers? **Response:** The number of breeding pairs in the wild and wolf numbers are increasing. However, like all wildlife populations, there are fluctuations in the number of breeding pairs and the population due to mortality, weather, disease, reproduction, removals, and numerous other causes. In 1998, 1999, 2000, 2001, 2002, 2003, and 2004 there were 0, 0, 1, 3, 5, 3, and 6 breeding pairs (Technical Component; see also AGFD et al. 2005). The number of breeding pairs for 2005 cannot be counted until December 31, but currently it appears that 5-8 will be counted. Similarly, trends for the minimum population count have been observed with counts of 4, 15, 22, 26, 42, 55, and 44-48 for 1998, 1999, 2000, 2001, 2002, 2003, and 2004, respectively (Technical Component; see also AGFD et al. 2005). Current counts (September 2005) of wolves indicate a minimum of 51-63 wolves in 2005.
20. **Comment:** Have 70% of all wolves that have been released left the recovery zone? **Response:** No. Data reported in the 5-Year Review indicates that 68% of single wolves (those either dispersing, or that left the pack following release) were outside the boundary for one location (see Technical Component). Of 39 yearly home ranges of wolf packs that have been delineated, only 11 had small portions of their total areas that occurred outside the BRWRA.
21. **Comment:** Why haven't more wolves been collared in the last couple of years? **Response:** The IFT has not been fully staffed or funded over the last couple of years, which restricted the Team's ability to pursue wolves for collaring. The IFT focuses on trying to ensure having one or more collars in a pack of wolves instead of trying to collar every wolf. The Team continued to attempt to collar pups, and uncollared adults, however, this is a lesser priority than management situations regarding livestock depredations, human nuisance, or boundary removals. For example, in 2001 the IFT captured 17 wolves a total of 19 times, with 10 of the captures being removals (six captures were made from a helicopter). Similar patterns occurred in 2002 (15 wolves in 20 captures, with six removals), 2003 (15 wolves in 15 captures, with 14 removals), 2004 (nine wolves in nine captures, with seven removals), and 2005 (18 wolves [including four pups] in 18 captures, with 15 removals). The IFT has averaged 15 wolves captured per year. The proportion of removals to animals released generally will dictate how many additional collars will be placed in the wild. With a fully staffed Team more emphasis

will be focused on trying to put more collars on wolves, but this does not mean every wolf will have a collar. However, first priority will continue to be given to management scenarios, followed by capture for collaring purposes. The ability to achieve both of these goals increases with a fully staffed and funded team.

22. **Comment:** Why doesn't the Federal government have an Outreach Coordinator? **Response:** All AMOC Lead Agencies are full partners in Mexican wolf reintroduction in the BRWRA. To minimize redundancy and maximize efficiency of finite resources, the six agencies share human resource and fiscal assets. In this case, AGFD funded an IFT outreach coordinator, stationed in Alpine AZ. She is supported in this endeavor by the entire IFT, and by External Affairs Offices of the various member agencies.
23. **Comment:** Given the AGFD policy of not managing elk below the Mogollon Rim, should wolves not be allowed below the Rim as well? **Response:** AGFD does not have a policy to not manage elk below the Rim. It is, however, AGFD's desire not to have year-round elk populations in marginal habitats, and hunt recommendations are structured for this desired result. The purpose of the Mexican Wolf reintroduction effort is to attain a self-sustainable population distributed throughout the BRWRA, including available suitable habitat below the Rim.
24. **Comment:** What are State and Federal expenditures for predator control? **Response:** As the primary agency conducting predator control, WS does not track funding by predator control. WS tracks funding based on groups of resources protected such as agriculture, human health and safety, natural resources, and property. Congress has provided annual funding in the amount of \$150,000 for wolf depredation work in AZ and NM which after overhead amounted to \$59,209 per State at the field level.
25. **Comment:** What is the estimate in AZ for how much game the wolf has taken in the last year? **Response:** No such estimate has been made. The Mexican Wolf FEIS (USFWS 1996) estimates 4800-10,000 fewer deer and 1200-1,900 fewer elk at a point in time five years after the initial wolf population goal of at least 100 wolves is achieved. Data gathered on free-ranging wolves since their release in 1998 suggest a heavier reliance on elk than what was estimated in the FEIS.
26. **Comment:** Is the purpose of AMOC wolf policies to remove the wolf from the wild? **Response:** No. AMOC's intent is to further recovery of the Mexican wolf, pursuant to the ESA, in a manner that balances biological science with economic and social considerations for effective implementation of reintroduction and recovery efforts.
27. **Comment:** Does each member of the AMOC panel support the delisting of wolves? **Response:** Yes. Each agency (Federal, State, and Tribal) represented on the panel is dedicated to the recovery, and eventual delisting, of the Mexican wolf.
28. **Comment:** Are decisions pre-made before going to the public? **Response:** No. Any time proposed actions or draft documents are brought to the public for comment, they are

considered to be open questions. Many decisions within the Reintroduction Project are guided by SOPs, which we made available as drafts for public comment. Occasionally, the management agencies may make decisions regarding management actions that are not addressed by the SOPs, and require decisions to be made in a time frame that does not allow for public input specific to that management action. In these cases, information will be reported to the public as decisions and actions that have already occurred, not as a proposal open for comment. Any proposal that includes an opportunity for public comment could ultimately be implemented as presented, implemented as modified by public comments, or not implemented at all, based on public input that is received.

29. **Comment:** Is there a committee set up beyond AMOC to handle conflicts? **Response:** No. However, twice each year, AMOC meets with Directors of the cooperating agencies for a day-long discussion of all aspects of the Reintroduction Project, including conflicts, problems, and progress. In addition, when a key issue arises during the year, AMOC consults with the Directors as needed before a decision is made.
30. **Comment:** Are ranchers and rural residents receiving timely notification of wolves in proximity to their domestic animals and places of residence? **Response:** It is a priority of the IFT to notify landowners and permittees in a timely fashion when wolves are in the immediate vicinity of domestic animals and residences. Based on the locations of wolves, the appropriate landowners and permittees are contacted following telemetry flights. Landowners, permittees, and residents may also receive personal contacts from IFT members if wolves are detected in their immediate vicinity based on ground observations. However, wolves have the ability to move long distances within small amounts of time, and wolves may show up anywhere within the reintroduction area on short notice. Also, as natural reproduction plays an increasing role in the growth of the wolf population, uncollared wolves will make up a larger proportion of the overall population. Uncollared wolves are unable to be tracked via telemetry, and are therefore more likely to be observed by landowners or permittees before being contacted by the IFT. Notification of all landowners, permittees, and residents within the reintroduction area exceeds the capabilities of the IFT, but staff resources are prioritized to direct efforts toward those individuals within the immediate vicinity of Mexican wolves.
31. **Comment:** Should IFT members assist or be involved with WS in depredation investigation? **Response:** All suspected or reported wolf depredations and wolf-human conflicts will be investigated immediately and reported appropriately, in strict accordance with SOP 11.0 (including reporting obligations). WS IFT members will respond within 24 hours to each incident or allegation of wolf-livestock conflict, and other IFT members will provide assistance as requested, appropriate, and/or necessary. Non-WS IFT members, with assistance from WS IFT members as available and appropriate, will handle wolf-human conflicts involving attacks on pets or domestic animals other than livestock, and other nuisance behavior as defined within SOP #13 – Control of Mexican Wolves.

32. **Comment:** Agency personnel in both the reintroduction and recovery programs have made broad, sweeping statements that have not withstood the test of time, which has led to distrust between ranchers and the program. What can be done to re-establish trust in the ranching community? **Response:** Without more specifics, it is possible that some of the broad, sweeping statements referenced were stated as generalities and unfortunately interpreted as absolutes. In addition, changes to government regulations, policies, and procedures over the years may make prior statements obsolete or inaccurate. It is inherent upon all of us to make sure that we say what we mean, mean what we say, and do our best not to misrepresent the truth. Trust is a two-way street predicated on such virtues as courtesy, honesty, and willingness to truly listen to what are oftentimes strongly held opposing viewpoints. Members of the Mexican wolf reintroduction team may not have always been as effective at relaying information as we would have liked, however, we continue to learn and we are dedicated to the truth, in dealing with our various publics openly and honestly. Over time, we hope to re-build and strengthen the bonds of trust. We acknowledge that agreement between parties may not always be possible, but one of our highest goals is for our constituents to believe that we are communicating forthrightly and are telling the truth as we know it at any given point in time.
33. **Comment:** What can be done to improve interactions with local government with the goal of a full partnership? **Response:** Local governments are urged to participate in the public process; such input provides the foundation for adaptive management in the reintroduction program. Local governments that have participated (and that continue to do so) have provided immensely beneficial information and insight into local concerns. In addition, AMOC can increase efforts to attend and participate in county government meetings to ensure that they have opportunities to engage in dialogue with us, and begin building or rebuilding the desired partnership. It is not necessary to support wolf recovery to participate in the reintroduction effort. A commitment to participate in a constructive manner is all that is necessary. Although responsibility for the program's decisions lies with the AMOC lead agencies (AGFD, NMDGF, USFS, USFWS, WS, and WMAT), such decisions are best shaped through participation by the full spectrum of stakeholders, including the counties.
34. **Comment:** Does the IFT take or make opportunities to meet with ranchers and community leaders, or are these contacts avoided due to fear of difficult conversations? **Response:** IFT members converse with ranchers routinely while engaged in on-the-ground wolf management. They also meet with ranchers and community leaders when planning releases, translocations, or participating in AMOC/AMWG meetings. Such meetings are not avoided due to fear of anything. During the 5-Year Review, AMOC determined the level of interaction between its members and members of the community is not sufficient, and will seek to increase face-to-face communication through the new IFT outreach position and other avenues.
35. **Comment:** Why do the numbers of wolves in the wild necessary to declare the program a success keep changing? **Response:** A Recovery Plan for the Mexican wolf was developed in 1982 (USFWS 1982). Its primary goals were to maintain a captive breeding

program and to re-establish a self-sustaining wild population of Mexican wolves. When the plan was developed, there was considerable uncertainty whether recovery and ultimately delisting of the Mexican wolf was feasible because it was unknown if captive breeding efforts would be successful. Therefore, in lieu of formal downlisting/delisting criteria, the plan included a preliminary goal to establish and maintain a population of at least 100 wild Mexican wolves. This has served as an interim goal for Mexican wolf reintroduction in the BRWRA. Thus, the number of wolves (i.e. “at least 100”) has not changed. In response to the April 2003 gray wolf reclassification, USFWS convened a Recovery Team to develop a Recovery Plan for the Southwestern Gray Wolf Distinct Population Segment (an area that included Colorado and Utah south of I-70, NM and AZ, western portions of Oklahoma and Texas, and Mexico). This Plan would supersede the 1982 Mexican Wolf Recovery Plan. The Team met quarterly through 2003-2004, but was put on hold in 2005 due to litigation (*Defenders of Wildlife v. Norton – “Oregon case”*). The Team will reconvene when USFWS has publicly announced whether it will appeal the court decision. The Team had not yet developed draft recovery criteria when it was put on hold, but had recognized that multiple wolf populations would be needed to reach recovery. That is, reintroduction and/or translocation outside the BRWRA would be necessary for recovery. Therefore, the interim goal of at least 100 Mexican wolves may be revised in the future, as the best available science is used in the new recovery planning effort to develop legally sufficient recovery criteria.

36. **Comment:** Are you aware there are uncollared wolves in the San Mateos? **Response:** Two wolves, a male and a female, were located in the San Mateo Mountains NM (outside the reintroduction area) in fall 2004. The male wolf lost its collar due to a malfunction, and was uncollared until being recaptured in spring 2005. The pair of wolves was relocated to AZ, where they remain today. While these wolves were in the San Mateos, there were unconfirmed reports of uncollared wolves with this pair. No uncollared wolves (except the male with the dropped collar) were confirmed in the area through observations or trapping, and there is currently no indication of any wolves remaining in the San Mateos. However, it is possible that other uncollared wolves remained in the San Mateos following trapping and relocation of the pair, or that additional wolves have dispersed to the San Mateos since that time. Observations of wolves in the San Mateo Mountains should be reported to the IFT for evaluation and follow-up.
37. **Comment:** With all the problems regarding livestock depredations and wolf/human encounters, why isn't the program scheduled for termination? **Response:** Conservation of the Mexican wolf is required by the ESA. Mexican wolf program data to date suggests that livestock depredations are within the projections of the FEIS. While the Socioeconomic Component acknowledges that most significant impacts of Mexican wolf reintroduction have been to ranchers, it also states regional impacts are <1% of livestock cash receipts. Regarding wolf/human encounters, while Mexican wolves do occasionally come into proximity of humans (primarily when dogs are present, although this is not always the case), there have been no confirmed Mexican wolf attacks on humans.

38. **Comment:** Why can't the agencies develop a reliable estimate of the actual number of wolves in the wild? **Response:** Several possible methods exist for developing either population indices or population estimates of the number of wolves in the wild. Territory mapping with telemetry is the most commonly used method to develop a minimum population count (Kunkel et al. 2005). This method is used by managers and researchers in Michigan, Quebec, Minnesota, Yellowstone National Park, Yukon Charley National Park, Northwest Territories, Glacier National Park, British Columbia, Alaska Department of Fish and Game, Kenai National Wildlife Refuge, and Wisconsin (Kunkel et al. 2005). This is also the method that the Mexican wolf project uses for population counts. The primary drawback to this method is that it is costly and requires trapping and radio monitoring of individual animals. However, early in the recovery process, the information gained using this method is important because of the small number of wolves and the need for accurate estimates of population decline or increase (Kunkel et al. 2005). These data are also generally considered the baseline from which other population estimates are derived and compared. One other recently developed method suggests that DNA analysis of scat could be used for mark-recapture methodology of population estimates and/or minimum count estimates (Kohn et al. 1999). However, this method requires equal defecation rates among sex and age classes (an assumption that may not be true for wolves [Lucchini et al. 2002]), and also has some limitations (e.g. degraded DNA samples and expense). Nevertheless, DNA analysis of scats for population estimates is being discussed and considered by the Mexican wolf project and may ultimately provide accurate population estimates with small confidence intervals (Khon et al. 1999).
39. **Comment:** Are IFT personnel available for contact by ranchers and the general public at any time? **Response:** IFT personnel are operating out of the Alpine Field Office seven days a week and are available for contact by ranchers and the general public toll free either through 1-888-459-9653. If there is no answer, the public can leave a message that will be returned at the earliest possible time. Depredation or public safety issues can also be reported to the AGFD hotline at 1-800-325-0700 if there is no answer at the previous number.
40. **Comment:** Why doesn't AMOC spend time in the field with ranchers? **Response:** To date, AMOC has been primarily focused on establishing a solid administrative foundation for the Reintroduction Project, including (among other things) regular interagency and public meetings, SOPs, a 5-Year Review, and expanded resources for the IFT (more staff, more funding, a common office, adequate equipment, etc.). In addition, most AMOC members have responsibilities within their agencies in addition to the wolf program. Unfortunately, these factors severely limit our ability to spend extensive time in the field with members of the public. We have made one field trip thus far, to visit several AZ ranches where wolf problems have occurred, but the logistical aspects of such endeavors preclude our ability to conduct visits frequently. However, on an individual basis, we are very receptive to invitations from any individual or group that might help us better understand, communicate, and adaptively manage for the issues involved in wolf reintroduction. In fact, several individual AMOC members have made trips to the field to visit with ranchers and other members of the public.

41. **Comment:** How does the money spent to date on wolf recovery compare with EIS projections? **Response:** Average annual costs to AMOC agencies have been approximately \$545,000/year (1982-2004). The FEIS (USFWS 1996; Appendix B-1) estimated an annual estimated management cost of between \$546,600/year from 1997-2001 and \$501,600/year from 2002-2010.
42. **Comment:** Who do we report to with information on wolf sightings? **Response:** The administrative site for the IFT is in Alpine AZ. The phone numbers are 888-459-9653 (toll free) or 928-339-4329.
43. **Comment:** What can be done to quell the activities of extreme wolf advocates? **Response:** Such activities are subject to regulation by Federal, State, Tribal and local laws and regulations, except as protected by constitutional rights (e.g. freedom of speech). Wolf advocates have not appreciably interfered with on-the-ground management of Mexican wolves. In one instance, a few wolf advocates showed up in an area where a trapping-and-removal effort was ongoing. They were contacted in the field by members of the IFT, and the situation was resolved without incident.
44. **Comment:** How much revenue is lost due to game taken by wolves? **Response:** The Mexican wolf FEIS estimated an annual hunter expenditure loss of \$579,100-\$1,079,100 and an annual hunting value loss of \$716,800-\$1,336,600. However, to date there has been no detectable change in hunting practices due to the Mexican wolf and lost revenues are likely negligible. See also the Socioeconomic Component.
45. **Comment:** If loss of game doesn't affect us, then why is it affecting Montana and Wyoming? **Response:** Management of the Yellowstone northern range elk herd (which is found along the northern border of the national park and the Wyoming/Montana State lines) has been complex and controversial. Elk numbers in the Yellowstone northern range elk herd reached a low of 3,000-4,000 in the mid-1960s. At that time, removals of elk for the purpose of population reduction were terminated. The elk population responded, and grew to over 12,000 animals by the mid-1970s. Late season elk hunts were initiated to reduce elk populations and maintain elk numbers within the perceived ecological carrying capacity. Elk populations were reduced following the implementation of these hunts, and have since fluctuated from 9,000-19,000 individuals. In the mid-1990s, wolves were reintroduced to Yellowstone, a severe snow pack in 1997 resulted in a winter kill of elk, followed by a series of drought years shortly after. These factors led to an average 6% decline in the elk population over a 10-year period beginning in the mid-1990s. The current population estimate for the Yellowstone northern range herd is 9,000-12,000 animals, well within the historic range of elk populations in the area. Elk may have undergone behavioral changes in response to the presence of wolves, but numerical changes in elk populations and associated hunting opportunities cannot be attributed to wolves alone. Research in the Greater Yellowstone Area has indicated that presence of wolves was not a variable that explained differences in the number of elk

harvested, and that wolf presence was not associated with areas where cow elk harvest was below harvest objectives (Haney and Lawrence 2004).

46. **Comment:** What are the statistics on private lands versus public lands? **Response:** The BRWRA consists of 96% public land (USFS), approximately 4% private land, and small amounts of State and National Park Service land (USFWS 1996). However, most of the areas surrounding the BRWRA consist of a mixture of private land, State land, BLM land, and 2 Native American Reservations. We examined 5995 aerial locations of wolves from 1998-2004 and determined the land ownership of these locations. The majority of the locations occurred within general USFS administered land (52.6%) or USFS Wilderness Areas (23.7%). The remainder occurred on Indian Reservations (19.1%), private (2.4%), State trust (1.7%), and BLM (0.5%). During the same period, there were 43 confirmed or probable depredations by Mexican wolves on livestock (cattle, horses, and sheep that were either killed or injured). These depredations occurred on general USFS administered land (57.5%), private (25.5%), and Indian Reservations (17.0%). In addition, 13 dog injuries/fatalities have been confirmed or were probably caused by Mexican wolves during 1998-2004. These incidents occurred on general USFS administered land (five injuries [38.5%]), USFS Wilderness Area (four injuries [30.75%]), and private land (two killed, two injured [30.75%]). In addition from 1998-2004, Mexican wolves were involved in 31 incidents of nuisance behavior toward humans that did not involve an injury to a dog. These incidents occurred on general USFS administered land (54.8%), private (38.7%) and Indian Reservations (6.5%).

I. Standard Operating Procedures

General

1. **Comment:** Isn't having set rules as laid out in the SOPs contradictory to the concept of Adaptive Management? **Response:** SOPs are entirely consistent with adaptive management if they are revised as new information becomes available, including information gained as a result of implementation of the procedures. Moreover, the Reintroduction Project's SOPs provide sidebars within which Project personnel can choose from a variety of alternatives so they can ensure that the management action is appropriate to the need. This approach is fundamental to adaptive management: plan, implement, evaluate, and revise the plan. SOPs are nothing more or less than plans for how to handle certain issues, situations, etc. Recognition of the need to change them over time, as we learn from experience, is precisely the reason we treat SOPs as living documents rather than rules set in concrete regardless of their effectiveness.
2. **Comment:** Why doesn't the Outreach SOP include Defenders' program approach and various preventative techniques? **Response:** SOP 3.0: Outreach focuses on mechanisms and approaches for public outreach and education. It does not provide detail regarding the content of particular outreach methods or activities. Thus, Defenders' compensation program is not mentioned, nor are specific techniques by which to prevent, or at least reduce, likelihood of, depredation. However, outreach presentations made by Project

personnel always provide information about the compensation program, including providing copies of any materials provided by Defenders, and they address topics such as techniques for reducing the likelihood of wolf depredation.

SOP 13.0: Control of Mexican Wolves

3. **Comment:** If three strikes and you're out, in terms of livestock depredation, is the rule, why is the slate wiped clean on an offending wolf after a year with no confirmed depredations? **Response:** Resolution of wolf conflicts with livestock can be achieved through management of the specific situation, not just the management of the offending wolf. More than half the Mexican wolves that have been translocated following depredations successfully bred and produced pups in the wild following translocation. The success rate for wolves translocated following their involvement in depredation was double the success rate for wolves released directly from captivity. This indicates that relocating depredating wolves to a different setting may allow them to contribute to successful wolf reintroduction if wolf behavior or situations can be modified before a "third strike" occurs. A one-year period without any depredation events provides a strong indication that the situation has been effectively resolved.
4. **Comment:** Why doesn't SOP 13.0 have a provision in it, or discuss if a human is killed by a wolf? **Response:** Human safety issues are covered in the Final Rule, thus eliminating the need to re-address in SOP 13.0. The Final Rule for this nonessential experimental reintroduction states that a Mexican wolf may be taken in self defense or in the defense of others. In addition, if USFWS or an authorized agency determines that a wolf presents a threat to human life or safety, USFWS or an authorized agency may kill it, capture and euthanize it, or place it in captivity.
5. **Comment:** The Mexican wolf reintroduction program is being sabotaged by pulling the wolf out for one year and then putting the same animal(s) back in the same place where they committed their so-called crime. **Response:** Deliberately holding a wolf or wolves in captivity for one year after they have been removed from the wild (for whatever reason, e.g. nuisance or problem issues, leaving the Blue Range Wolf Recovery Area, injury) is not a standard procedure. Typically, if a wolf is eligible for re-release into the wild, and there is an approved release site without other wolves present (some exceptions to this may occur, such as when the objective is to pair a wolf held in captivity with a free-ranging lone wolf), then the goal is to return the animal(s) to the wild as soon as practical. However, wolves are occasionally held in captivity for longer periods for a variety of reasons, including: a) lack of availability of a suitable release site; b) pair bonding and breeding of two genetically desirable animals; c) allowing a late-term female to whelp and raise her pups until they are 8-10 weeks of age; d) veterinary care; and e) retirement from the reintroduction effort or from the recovery program. Wolves that have been pulled from the wild may be returned to an area at or near where they were originally removed, if they meet criteria outlined in various SOPs (i.e. SOP 5.0: Initial Wolf Releases, SOP 6.0: Wolf Translocations, SOP 13.0: Control of Mexican Wolves).

Finally, wolves have excellent homing instincts, and the ability to return to a former home range even after being re-released many miles distant.

6. **Comment:** Why was the Aspen Pack re-released before a year was up since when they're removed from the wild for cause they're supposed to be kept in captivity for a year. **Response:** There is no requirement within the reintroduction program to hold a wolf or wolves in captivity for a year, following removal from the wild for cause. The only reference to one year made in Draft SOP13.0 is that "a wolf (or wolves) that has (or have) been involved in fewer than 3 depredation incidents will, if 365 days have passed since the last incident, be considered a new wolf, with no strikes against it."
7. **Comment:** A wolf's record (i.e. livestock depredations) should follow the animal throughout its life. **Response:** AMOC and the IFT have developed a set of SOPs to help guide the Reintroduction Project. The proposed scenarios for management of problem wolves are outlined in SOP 13.0. As stated in SOP 13.0, a wolf with less than 3 depredations that has not depredated in over a year is assumed to have no depredations. AMOC and the IFT consider management intervention to have been successful if the wolf have not depredated on livestock for more than one year since the initial offense(s).
8. **Comment:** Wolves that commit depredations on livestock should not be killed, but instead should be captured alive in order to conserve their genetics. **Response:** Wolves that are chosen for the Reintroduction Project must fit several criteria, one being that they are not genetically important to the captive population (i.e. an experimental nonessential population). Under the Final "nonessential experimental population" Rule for the Project, wolves released to the wild are considered expendable to the Recovery Program. AMOC SOP 13.0 carefully defines the progression of actions to be taken if a wolf or wolves begin to become a nuisance or begin to depredate. Attempts will be made to live capture such animals; however, if certain circumstances are met, permanent removal (which includes lethal control as an option) may be used. Under a permanent removal order, a wolf may still be captured alive, if live capture occurs before an opportunity for lethal control, or if live capture is the most expeditious approach to removing the animal from the wild. However, by law (i.e. the Final Rule), the released wild wolves are redundant to and not needed in the captive program (i.e. returning them to captivity would not benefit the Recovery Program/Reintroduction Project or "conserve their genetics").
9. **Comment:** Why are ranchers responsible for, or have any voice in removal of wolves? **Response:** SOP 13.0 was developed to list criteria for determining the status of nuisance and problem wolves, and to provide guidelines to the IFT for conducting wolf control actions. Management responses to nuisance and problem wolf issues are implemented in a stepwise fashion, and are a function of the number and severity of incidences. Ranchers and property owners in and adjacent to the BRWRA are arguably the most immediately and directly affected when a nuisance or problem wolf issue arises. Rancher comments are thus given the same fair and equal consideration as any other interest (pro-, neutral, and anti- wolf) in terms of crafting the final version of SOP 13.0 and determining when and how wolf removal will occur. See also Response to Comment C.12.

10. **Comment:** How sure are investigators that a wolf actually preyed on a cow? **Response:** WS IFT members are professional wildlife damage management experts in the field of predator depredations. Their investigations to determine which species caused the depredation consider the following criteria, when relevant information is present (see Roy and Dorrance 1976 for complete guidelines):
- i. Subcutaneous hemorrhaging associated with wounds on the carcass.
 - ii. Additional morphological evidence associated with the carcass.
 - iii. Size of the canine spread on the hide.
 - iv. Attack points on the carcass (i.e. wolves and coyotes typically attack the hamstring and armpit area, whereas lions generally attack the back of the neck).
 - v. Size and extent of bones chewed by the predator.
 - vi. Tracks/scat/hair in the area.
 - vii. Disturbed vegetation and terrain in the area, with areas of blood on the ground.
 - viii. Any additional evidence around the site (e.g. poisonous plants, skinned carcass).
 - ix. Presence or history of wolves or other predators in the immediate area.
 - x. Witness accounts.

Cause of death is classified as follows, based on evidence at the site: confirmed, probable, possible, or not a wolf kill. Determination and classification of cause of death does not need to be made at the initial scene of investigation, but should be completed as soon as possible after the on-site investigation has been completed. The extent to which an absolute (definitive) determination of cause of death can be made depends on the available evidence.

11. **Comment:** Can a section be included in SOP 13 that identifies when wolves locate into new areas that ranchers are notified and informed of proactive solutions to living with wolves (e.g. Defender of Wildlife's proactive program)? **Response:** This information will be included in SOP 3.0: Outreach. See also responses to H.17 and H.30.
12. **Comment:** Can SOP 13 be amended to provide incentives to ranchers who are good stewards (e.g. work actively to remove carcasses from their allotments, employ range riders)? **Response:** In lieu of adding incentives information to SOP 13.0, AMOC is considering developing another SOP or a companion document to focus on "living in wolf country." The intent would be to provide information on incentive programs that already exist, including those that can provide funding to ranchers to underwrite the costs of at least some of the measures by which wolf depredation might be reduced, or prevented.
13. **Comment:** Can SOP 13 be amended such that there is no action taken against a livestock-depredating wolf on a rancher's allotment unless that rancher is being proactive to minimize wolf/livestock conflicts? **Response:** The Reintroduction Project is authorized under a nonessential experimental population rule (i.e. the Final Rule) that

reflects a commitment to integrate wolf reintroduction and recovery into existing multiple-uses of public lands and to minimize conflicts on private lands. The Final Rule is not structured, nor is the Reintroduction Project empowered or administered, to force changes in public or private grazing practices to accommodate presence of wolves. Thus, the 5-Year Review and ongoing adaptive management of the Project will continue to focus on finding and implementing incentives for voluntary actions by ranchers and other stakeholders that would help accommodate presence of wolves by reducing conflicts such as livestock depredation. Clearly, there is a need for more effective and better-funded incentives, and for more effective compensation for losses incurred by private property owners. As progress is made in these areas, SOP 13.0 will be revised to reflect the new information and opportunities. See also Response to Comment I.12.

14. **Comment:** Instead of being killed when found guilty of excessive livestock depredations (i.e. 3 strikes and you're out), can they be captured and homes found for them? **Response:** SOP 13.0 charts the progression of actions taken if a wolf or wolves begin to cause nuisance problems or depredate. Attempts are made to live capture these animals; however, if certain circumstances are met, permanent removal (which includes lethal control as an option) orders may be given. Efforts to capture the offending wolf will continue even if lethal control measures are implemented. If the animal is live-captured, it may be placed in one of the 44 captive facilities in the USA and Mexico that participate in the Mexican Wolf SSP.
15. **Comment:** Having WS determine if a wolf killed a cow on Reservation lands is a conflict of interest. **Response:** The United States has a unique legal relationship with Indian Tribal governments as set forth in the Constitution of the United States, treaties, statutes, Executive Orders, and court decisions. Since the formation of the Union, the United States has recognized Indian tribes as domestic dependent nations under its protection. The Federal Government has enacted numerous statutes and promulgated many regulations that establish and define a trust relationship with Indian tribes. WS has the Federal responsibility under the trust relationship to provide Federal leadership in the field of wildlife damage management, which includes wolf depredations.
16. **Comment:** There is a delayed response by WS when a report of a possible livestock depredation on Tribal lands is made, such that the evidence of the attack is often gone. **Response:** Since 1998, WS has responded to 16 reported cases of potential wolf depredations on Tribal lands (unpublished data). The time between when WS received the report and when they arrived on site varied from the same day of the report to two days after the report was received. WS had six same-day responses, nine next-day response times and one two-day response time. There is no evidence supporting the contention that delayed response is or has been a problem.
17. **Comment:** Can USFWS provide more infrastructure to run the program, such that the SSCAT can have someone to work with that they're more comfortable with? **Response:** The nature and extent of the asserted discomfort cannot be determined from the comment offered. Currently, the USFWS Mexican Wolf Field Projects Coordinator, who is a

member of the IFT, is USFWS liaison with SCAT on wolf control issues. The Coordinator works directly with the Tribal wildlife department to conduct management actions (e.g. radiotracking, hazing, trapping). USFWS provides funding to the Tribal wildlife department each year to offset the cost of equipment and personnel for Tribal involvement in the wolf program. Reports of possible wolf depredation on Tribal lands are investigated by WS, in accordance with Tribal guidance and SOP 13.0: Control of Mexican Wolves. USFWS is working with SCAT and WS to train Tribal game officers in investigative procedures, which would in turn allow SCAT to assume more responsibility in conducting depredation investigations in the future. In the meantime, USFWS has hired a SCAT member, permanently stationed in San Carlos, who divides his time between Mexican wolf and fisheries issues.

18. **Comment:** The practice of lethal control of wolves that have been involved in excessive livestock killing (three strikes and you're out) is not working. **Response:** The orders for wolf removal are for permanent removal from the wild. Lethal control is only one of the many tools available to remove wolves from the wild. To date, three Mexican wolves have been lethally removed under permanent removal orders. Livestock depredation is inevitable when free-ranging wolves occur, but depredation is being managed by permanent removal (including lethal take).
19. **Comment:** What is the SOP for removal of denning females from the wild? **Response:** SOP 13.0: Control of Mexican Wolves is currently in draft form. Public comment in regard to this issue is being evaluated by AMOC. The current draft does not differentiate between denning females and any other segment of the wolf population. This issue will be explored further between now and the period in 2006 when denning recommences.
20. **Comment:** Why isn't there a one strike and you're out policy? **Response:** The Reintroduction Project is obligated to address (provide relief for) depredation issues, but it is also legally compelled to pursue recovery, which requires growth in the wild wolf population. Conflicts between wild wolves and livestock are inevitable. However, resolution of wolf conflicts with livestock can be achieved through management of the specific situation, not just management of the offending wolf. More than half the Mexican wolves that have been translocated following depredations successfully bred and produced pups in the wild following translocation. The success rate for wolves translocated following their involvement in depredation was twice the success rate for wolves released directly from captivity. This indicates that depredating wolves relocated to a different setting may significantly contribute to successful wolf reintroduction. Interventions such as hazing, fladry, movement of wolves or livestock, and removal of individual pack members can be employed to increase the probability of successfully "rehabilitating" wolves that have been involved in a depredation situation.
21. **Comment:** Why are problem wolves translocated and not put in permanent captivity? **Response:** Translocation of problem (and other) wolves enables the Reintroduction Project to continue progress toward its population goal, while providing relief for local situations. See also responses to comments I.3 and I.20.

22. **Comment:** Why doesn't the program incorporate more aversive conditioning of wolves and cattle? **Response:** Aversive conditioning, such as hazing wolves out of an area (i.e. livestock pasture) with rubber bullets, cracker shells, and radio- activated guard boxes (a device that emits loud noises when a collared wolf is in close vicinity of the box), is applied to free-ranging Mexican wolves whenever appropriate in efforts to prevent livestock, human, or dog interactions (Breck et al. 2002, Shivik and Martin 2001, Shivik et al. 2003). It has been used successfully on some occasions, but is most effective on a small-scale, such as deterring specific wolves from calving pastures and residential areas. It is less useful in larger-scale applications, such as keeping wolves away from entire grazing allotments. Other types of aversive conditioning, such as taste aversion to prevent wolves from killing livestock, have been the subject of many research projects in the past, with little, if any, demonstrated effectiveness. More recently, research in Wisconsin evaluated the use of shock collars to assess the effectiveness of reducing livestock depredations which resulted in some success (Schultz et al. 2005). However, this type of aversive conditioning appears to have limited use and may not be practical on a large-scale basis, especially in the Southwest. Based on this, it does not seem prudent to expend resources and efforts attempting to aversively condition wolves using either of these techniques at this time.
23. **Comment:** Why is there lethal control prior to achievement of a fully recovered population? **Response:** The Reintroduction Project is authorized by a nonessential population rule under Section 10(j) of the ESA. By Federal law, the "nonessential" designation means that wolves released to the wild within the experimental population boundary are not essential to recovery. That is, even if all of the Mexican wolves in the wild died, extinction would not occur because there are now sufficient Mexican wolves in captivity. The Final Rule recognized that, as the wild population grows toward levels that contribute to rangewide recovery, situations will occur that require removal of individuals or even entire packs for the overall benefit of the Recovery Program. Although lethal control of wolves may seem contradictory to recovery, active management of wolves released to the wild is a critical component of recovery. Lethal control, one of the tools for permanent removal, is simply the final alternative in a hierarchy of management alternatives that must be considered when a problem occurs in the field.
24. **Comment:** How many wolf lethal take orders have been issued? **Response:** Since the Mexican wolf program's inception, five permanent removal (which includes lethal take as an option) orders have been issued for eight wolves, including: 1) two un-collared wolves from the Francisco Pack, which were never lethally controlled because they could not be located; 2) Wolf F592 of the Sycamore Pack (shot 05-27-03); 3) Wolf M574 of the Saddle Pack (shot 07-11-04); 4) Wolves M904, M919, and F511 of the Francisco Pack were removed by live trapping; and 5) Wolf M729 of the Ring Pack (shot 06-26-05).

J. Livestock Depredations

1. **Comment:** The Mexican wolf EIS is based on bad science since it used livestock depredation estimates for northern wolves. **Response:** The EIS based predictions of what *might* occur based on the best available science. Since Mexican wolves were extirpated from the southwestern USA and likely Mexico before rigorous scientific studies could be conducted, the best available science was that from extant wolf populations in the northern USA and Canada. The EIS specifically recognized grazing patterns were different in the southwestern USA compared to areas from which depredation data had been collected. It tried to account for this by using a multiplier (see pages 4-7 and 4-8 of the EIS; USFWS 1996). The EIS prediction of 1-34 confirmed cattle depredations/year by a population of 100 wolves is consistent with EIS projections. The Socioeconomic Component models three ranges of depredation. See also Response to Comment J.19.
2. **Comment:** You need to change the forensic confirmation approach for wolves depredating on livestock. **Response:** Research is being conducted by the USDA-APHIS WS National Wildlife Research Center to improve forensic diagnostic capabilities. The research is focusing on genetic markers in predator saliva as a future diagnostic tool to identify the species of predator and potentially the individual predator causing the depredation. New tools such as the aforementioned will be incorporated as funding becomes available and the techniques are practicable for field use.
3. **Comment:** Wolf depredation investigations are biased in the way they're conducted. Can an independent third party, such as the County, be used to investigate potential kills? **Response:** Investigators are not biased for or against the Mexican wolf. Currently, there are 162 potential Mexican wolf depredation reports (see Technical Component). Of the 162 reports, 96 attribute the cause of death or injury to Mexican wolves as possible, probable or confirmed. Investigated reports using the best available evidence have also attributed deaths or injuries to accidents, lightning, noxious weeds, coyotes, black bears, mountain lions, feral dogs, hybrid animals (not Mexican wolf hybrids), birthing, and unknown causes. The Final Rule states that "Depredation means the confirmed killing or wounding of lawfully present domestic livestock by one or more wolves. The U.S. Fish and Wildlife Service (Service), Wildlife Services (WS), or other Service-authorized agencies will confirm cases of wolf depredation on domestic livestock." Further guidance is provided in SOP 11.0, which affirms that AMOC intent is for the IFT to respond to all wolf depredation reports by accessing the incident site within 24 hours, and for WS IFT members to be the primary investigators for such incidents. Thus, other IFT members contacted initially will make every effort to reach a WS IFT member to initiate follow-up. However, other IFT members will initiate follow-up as necessary, if a WS employee is not immediately available, and may assist WS at the scene or as requested or is otherwise appropriate.
4. **Comment:** Ranchers are being told one thing in the field by wolf depredation investigators and then the findings are being changed once they get back to the office. **Response:** Ranchers are often on-site during an investigation of a potential Mexican wolf depredation. Discussions may occur between the ranchers and multiple IFT members. All information discussed is based on preliminary findings. The final call is made after a

review of all available evidence. Ranchers should refer to the final printed report for the final determination regarding the potential Mexican wolf depredation.

5. **Comment:** There are only 1-2 people in each State checking for wolf kills and they are not finding them all. **Response:** WS responds to potential Mexican wolf depredations reported by livestock owners, the public, and the IFT. WS does not have the resources to commit all of their time to look for carcasses, nor do they have any authority or Congressional direction to do so. Congress has provided annual funding of \$150,000 for wolf depredation work in AZ and NM, which amounted to \$59,209 per State (after overhead) at the field level. The funding provided partially covers the two primary individuals conducting wolf depredation work. In addition to verifying wolf kills, the funding also covers required training and wolf damage management.
6. **Comment:** Requiring the removal of livestock carcasses from public lands is not practical. **Response:** We understand the difficulty in locating livestock carcasses and removing or rendering them unpalatable. There are no laws, regulations, or policies that would allow USFS or BLM to make these practices mandatory or enforce such a program.
7. **Comment:** What can be done to improve husbandry practices, including livestock carcass removal and/or treatment (e.g. liming, burning, burial) to keep wolves from scavenging on them? **Response:** Locating livestock carcasses on the large and typically rugged allotment pastures is difficult. Some ranchers remove and/or treat livestock carcasses whenever possible, but this is a voluntary practice and not enforceable under current law, regulation, or policy. See also Response to Comment J.6. There are numerous things that can be done to lessen the potential for livestock depredations. Several methods have been used and studied, including use of guard dogs, improved husbandry practices, electric fences, carcass removal, fladry, and others. Many of these methods show promise in reducing livestock depredations under various circumstances and situations, but none has been shown to consistently prevent depredations. Furthermore, everyone must realize that these practices take time money, along with a high level of cooperation, and therefore they are not inexpensive or necessarily easy. For the most part these techniques are good in a localized area for a relatively short period of time.
8. **Comment:** Reintroduction of the wolf causes restrictions on the use of M-44 for other predators which further compounds the livestock depredation problem. **Response:** The Final Rule states that “the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS) division will discontinue use of M-44's and choking-type snares in “occupied Mexican wolf range” (see definition in section 17.84(k)(15)).” USFWS Biological Opinion issued to WS allows for M-44 use in the recovery area outside “occupied habitat.” However, WS has chosen to be even more restrictive. The Final Rule does allow “selective lethal control of coyotes by traps, calling and shooting, and aerial shooting, as well as a variety of non-lethal techniques.”

Furthermore, in NM, NMDA restricts use of M-44 by private applicators in areas of Mexican wolf habitat.

9. **Comment:** Livestock die all the time for many reasons other than wolves. **Response:** Livestock operators provide an annual end of the year report to the Forest Service. They have traditionally reported a wide variety of “causes of death” including accidents, disease, predation, and others.
10. **Comment:** Since most cattle wear ear tags, can a device that emits a high level frequency be attached to these ear tags and used to drive away wolves? **Response:** We are not aware of this technique being used; however, several non-lethal methods to prevent or deter livestock predation by wolves have been tried including: guard animals, electric fences, fladry, sirens and strobe lights, improved animal husbandry practices, wolf translocations or lethal control, electronic training collars, sterilization, and taste aversion methods. Many of these methods show promise in reducing livestock depredations under various circumstances and situations, but none has been shown to consistently prevent depredations. These techniques seem to be most effective in a localized area for a relatively short period of time.
11. **Comment:** Ranchers should leave the horns on cows to protect themselves and their calves. **Response:** Many ranchers in the southwest do leave horns on their cattle, however it is unknown if they provide a significant deterrent.
12. **Comment:** How effectively are mechanical devices such as strobe lights, noise boxes, and radio-activated guard boxes being used to keep wolves from depredating on livestock? **Response:** Sirens and strobe lights (radio-activated guard box) may be placed around a pasture and set to act at regular or irregular intervals or when a radio-collared wolf is in the area. They may reduce depredations temporarily by scaring the wolves from the area, but this is not always affective and wolves can become habituated to these deterrents and eventually ignore them (Breck et al. 2002, Breck and Meier 2004, International Wolf Center 2005, Shivik and Martin 2001, Shivik et al. 2003). Several other wolf aversion methods have been used and studied; however, none have been shown to consistently prevent depredations under all conditions and situations. Typically these techniques are most effective in a localized area for a relatively short period of time.
13. **Comment:** The Federal Register pertaining to wolves in the northern Rocky Mountains prohibits control activities (e.g. captures, removals, lethal control?) where there are attractants (i.e. livestock carcasses left on the land); why is the Blue Range Wolf Recovery Area different? **Response:** The northern Rocky Mountain nonessential experimental rule states “The Service and authorized agencies of the Service would use the following conditions and criteria to determine the status of problem wolves within the nonessential experimental population area: (2) No evidence of artificial or intentional feeding of wolves can be present. Improperly disposed livestock carcasses located in the area of depredation will be considered attractants. On Federal lands, removal or a

decision on the use of such attractants must accompany any control action. If livestock carrion or carcasses are not being used as bait for an authorized control action on Federal lands, it must be removed or otherwise disposed of so that they will not attract wolves” (USFWS 1994). The nonessential experimental rule for the Mexican wolf does not contain similar wording within it, but SOP 13.0 states: “When feasible, removal or elimination (e.g. by burial or chemical treatment) of attractants, such as visceral remains or carcasses of livestock or wildlife, will accompany control action(s) (per SOP #11).” Overall, the first point is that the northern Rocky Mountain nonessential experimental rule does not prohibit control actions where there are attractants, but instead requires the agency to make a decision on the removal of attractants or use of such attractants to accompany the control action. In this way, the language in SOP 13.0 is similar to the language in the northern Rocky Mountain nonessential experimental rule.

14. **Comment:** Does liming a livestock carcass (in terms of making it unpalatable for a wolf) kill the soil? **Response:** According to USFS, soils scientists adding lime to soils in the Southwest improves soil productivity.
15. **Comment:** It seems depredation rates are increasing, what can be done to reverse this trend? **Response:** The confirmed cattle killed per 100 wolves per year has been 0, 33, 5, 22, 27, 5, 17, and 31 for 1998, 1999, 2000, 2001, 2002, 2003, 2004, and an estimate for 2005 based on current figures, respectively (Technical Component; see also AGFD et al. 2005). Thus, although the absolute number of confirmed cattle kills (18) is the highest in the project’s history for a given year, the depredation *rate* is not the highest because the estimated minimum population is currently the highest in the project’s history (51-63 wolves [average 57]). In response to depredations, the wolf project has removed seven adult wolves and four pups. These removals should help reduce the depredation rate. The past data does not show a clear trend of increase or decrease in depredation rates. Rather, the data tends to indicate some high depredation rate years (1999, 2002, and 2005), some moderate depredation rate years (2001 and 2004), and some low depredation rate years (1998, 2000, and 2003), perhaps in a cyclical fashion related to the removal of problem wolves following particularly bad depredation years, and subsequent years having fewer depredations.
16. **Comment:** How do you determine which wolf killed a head of livestock, particularly if the wolf or wolves doesn’t have a collar? **Response:** See response to I.10.
17. **Comment:** What is the percentage of wolf livestock kills that can be determined? **Response:** Not all wolf livestock kills are found or reported to the IFT for investigation. Currently, there are 162 potential Mexican wolf depredation reports (see Technical Component). Of the 162 reports, 96 (59%) attribute cause of death or injury to Mexican wolves as possible, probable, or confirmed.
18. **Comment:** Is it a conflict of interest having AMOC and the IFT verifying livestock depredations? **Response:** WS is the Federal agency responsible for providing Federal leadership in mitigating human wildlife conflicts. WS has been mitigating human wildlife

conflicts since 1885. WS signed the 2003 MOU for managing the experimental nonessential population of Mexican wolves in AZ and NM (see Appendix 1). As a signatory on the MOU, WS is an active Lead Agencies in AMOC and participates as field members of the IFT. WS is designated as the Lead Agency on wolf depredations.

19. **Comment:** What are the actual cattle kill numbers? **Response:** The actual number of livestock killed by Mexican wolves is impossible to determine since not all livestock carcasses are found and/or reported, and because sometimes sufficient evidence no longer exists to determine the cause of death. Our best available information for the numbers of cattle killed by Mexican wolves are as reported in the Technical Component; that is, 26 confirmed livestock kills, four probable kills, and 13 possible kills from 1998 through 2003. We recognize there is a large discrepancy between the number of livestock kills reported by the Mexican wolf project and numbers reported by livestock producers. However, we rely on reports verified by WS when determining actual wolf depredation numbers. To account for this discrepancy, the Socioeconomic Component presents a range of estimates of wolf depredation from 1998 to 2004. The low estimate represents the average of the agency records of confirmed kills (including records from USFWS, WS, and the Defenders compensation program). The medium estimate incorporates a multiplier from published literature that estimates unconfirmed kills in addition to confirmed kills. The high estimate reflects estimates of losses due to wolf depredation provided by ranchers. According to these estimates, wolves have killed an average of five to 33 cattle each year, or less than one percent of the estimated 34,800 cattle grazed in the Blue Range Wolf Recovery Area annually.
20. **Comment:** Can reporting livestock depredations be made mandatory? **Response:** This would require a change in the Final Rule or other Federal, State, or Tribal legislation. However, livestock owners generally benefit from reporting depredations from all causes. WS is involved in the control of all predators that depredate. As such, livestock depredations subsequently confirmed by WS (or appropriate State or Tribal agencies) may be controlled under Federal State, or Tribal laws. In addition, damages caused by wolves may be compensated by Defenders. Similarly, control and compensation for wolf depredations cannot occur if reports are not turned in.
21. **Comment:** Ranchers have inadequate resources to look for wolf kills on a daily basis. **Response:** We agree, although we also assume that ranchers managing livestock operations and holding Federal grazing permits have the resources needed to adequately monitor the status of their herds.
22. **Comment:** What is the breakdown for budgets on predator control for AZ and NM? **Response:** WS does not track funding by predator control. WS tracks funding based on groups of resources protected such as agriculture, human health and safety, natural resources, and property. Congress has provided annual funding in the amount of \$150,000 for wolf depredation work in AZ and NM which amounted to \$59,209 (after overhead) per State at the field level.

K. Human/Wolf Interactions

1. **Comment:** Wolves are dangerous to people and sooner or later a child will be attacked. **Response:** Although attacks by wolves on humans do occur, it is considered an extremely rare event in North America. Wolves, like any other animal, may occasionally develop some level of habituation to humans and human activity. Observations of wolves in proximity to human-created structures do not mean that wolves are likely to attack. The vast majority of wolf attacks have resulted from situations involving rabid wolves, wolves habituated to humans (such as being fed by humans at campgrounds or near settlements), or provoked wolves (e.g. wolves were beaten or attempted to be killed), and the attacks were attempts by the wolves to get away. There are no documented accounts in North America of wolves killing people (adults or children) (Linnell et al. 2002, McNay 2002). From 1998 through 2003, there were 11 documented cases of wolves approaching humans within the Blue Range Wolf Recovery Area (see Technical Component). In eight of these cases, wolves approached humans in a non-threatening manner. In three cases, wolves charged groups of people and dogs. The presence of domestic dogs may provoke wolves, and all three instances of wolf charges involved domestic dogs, as did five of the eight cases where wolves approached humans non-aggressively. The three cases of wolves charging resulted in: 1) a wolf being shot by a camper when the wolf attacked the camper's dog and due to the camper's close proximity to the attack he felt threatened (this was considered a legal action under the experimental population rule, and there were no ramifications for take under the ESA, 2) shots being fired in the air to scare away a wolf charging a camper's dog, and 3) removal of wolves by the IFT after the wolves left the area where a dog was attacked. Although threats to human safety are considered unlikely, all of the agencies participating in the Mexican wolf Reintroduction Project regard protection of human health and safety to be of paramount importance. The IFT has posted signs notifying the public of possible wolf presence throughout the reintroduction area. The participating agencies are interested in working with local interests to develop educational programs, post additional signs, and take additional measures to disseminate information and assist people in alleviating safety concerns relating to Mexican wolves. See also Response to Comment I.4.
2. **Comment:** Wolves are not a danger to children or other humans. **Response:** See response to K.1.
3. **Comment:** Why aren't wolves afraid of people? **Response:** See response to K.1.
4. **Comment:** Does the sound of little children screaming attract wolves? **Response:** We are not aware of any verifiable reports or literature (i.e. peer-reviewed, gray, or popular) that indicate the voices (e.g. talking, screaming) of small children attract wolves. McNay (2002) references a number (~six) of wolf/human child interactions, but none of these reports specify that a child's screams may have elicited the interaction. When asked this same question, Dr. David Mech, one of the world's most respected wolf experts, replied that he was not aware of any specific instances where the voices of children could be specifically tied to a wolf attack on a child. However, he also stated "...that if small

children are in an area where large predators occur, be they bears, mountain lions, bobcats, coyotes, domestic dogs, or wolves, it is only prudent, no matter how unlikely an attack, that adults maintain an extra level of vigilance” (David Mech personal communication, 5 October 2005). See also Response to Comment K.1.

5. **Comment:** Wolves are not afraid of children and there are well-documented attacks on children in Catron County. **Response:** There are no reports or documented attacks on children in Catron County. See also Response to Comment K.1 and K.4.
6. **Comment:** How do wolves make the distinction not to attack children? **Response:** See response to K.1.
7. **Comment:** Since wolves have been sighted near occupied dwellings, are children at risk of a wolf attack? **Response:** See response to K.1.
8. **Comment:** Will AMOC consider posting signs warning parents of the presence of wolves? **Response:** See response to K.1.
9. **Comment:** Isn't human life more important than a wolf? What are you going to do if a wolf kills one of our children? Do you have children? [This question was addressed directly to the Chair, who replied he has two sons.] If a wolf kills one of our children, shouldn't we be allowed to kill one of yours? [Audience discussion ensued, during which the Commenter indicated he would pursue retribution against the AMWG Chair's sons if a local child were killed by wolves.] **Response:** The Final Rule states that a person may lawfully take a Mexican wolf in self defense or in the defense of another human. In addition, if USFWS, or an authorized agency, determines that a wolf presents a threat to human life or safety, USFWS or the authorized agency may kill it, capture and euthanize it, or place it in captivity. See also Response to Comment K.1. With regard to the retribution threat, Catron County law enforcement officials present failed to address the issue overtly, so AMOC curtailed further discussion by taking a break in the proceedings, then moving to the next speaker. No further action was taken, and the incident was dismissed as an exception to the civility that has typified wolf public meetings in AZ and NM over the past 20 years.
10. **Comment:** Will AMOC develop an education program for parents in wolf country? **Response:** See response to K.1.

L. Wolves in Captivity

1. **Comment:** Why are Mexican wolves in captivity being fed carnivore logs and Alpo, both of which the primary ingredient is beef? **Response:** Mexican wolves in captivity that are candidates for release to the wild are fed three primary food items, none of which contain beef. The three food items are:
 - a) Road-killed wild animal carcasses; primarily elk and deer.

b) A specially prepared raw meat product specifically formulated for the zoo trade and referred to commonly as “carnivore logs.” The primary ingredient in carnivore logs is horsemeat. Other ingredients as stated on the label includes meat byproducts (i.e. horse organs such as the heart, lungs, and spleen), dried beet (the root vegetable) pulp, salt, D-activated animal sterol (source of vitamin D3), vitamin A supplement, vitamin B12 supplement, vitamin E supplement, menadione sodium bisulfite (source of vitamin K activity), riboflavin supplement, niacin, biotin, sodium selenite, calcium pantothenate, choline chloride, thiamine hydrochloride, pyridoxine hydrochloride, folic acid, copper oxide, cobalt carbonate, iron carbonate, manganous oxide, ethylene diamine dihydriodide, and zinc oxide.

c) A dried, pelleted food (Mazuri Exotic Canine Diet) specifically formulated for the zoo trade and referred to commonly as “kibble.” The primary meat ingredients in kibble are poultry and pork. Other ingredients as detailed on the label include ground corn, poultry byproduct meal, ground brown rice, corn gluten meal, animal fat preserved with BHA, poultry fat preserved with ethoxyquin, poultry digest, porcine meat meal, brewer’s dried yeast, dried beet (the root vegetable) pulp, ground soybean hulls, dried whey, dried egg product, flash dried blood meal, calcium carbonate, dicalcium phosphate, potassium chloride, salt, choline chloride, pyridoxine hydrochloride, menadione dimethylpyrimidinol bisulfite, DL-methionine, taurine, cholecalciferol, biotin, DL-alpha tocopheryl acetate, vitamin A acetate, inositol, folic acid, calcium pantothenate, thiamine mononitrate, ethoxyquin (a preservative), riboflavin, nicotinic acid, cyanocobalamin, manganous oxide, ferrous sulfate, cobalt carbonate, copper sulfate, zinc oxide, calcium iodate, and sodium selenite. Mexican wolves held in zoos and other cooperating facilities that will never be released to the wild may be fed additional food items, including beef products.

2. **Comment:** Road-killed wildlife used to support the Mexican wolf reintroduction program should go to income-deprived families in rural areas. **Response:** Due to food safety concerns, donation or sale of road-killed game is prohibited by U.S. Department of Health and Human Services EPA Food Code, NM Environment Department (NMED) Food Services and Food Processing Regulations, and AZ Department of Health Services (ADHS) regulations that prevent road-kill wild game from being processed for public consumption. For more information on regulations concerning wild game donations, visit the following websites:
EPA <http://www.cfsan.fda.gov>
NMED http://www.nmenv.state.nm.us/fod/Food_Program/regulatory_4.html
ADHS <http://www.azdhs.gov/phs/oe/rs/pdf/fc2000.pdf>
3. **Comment:** Facilities for placing wolves in captivity are overcrowded, what about getting a grant for making more space for wolves in captivity? **Response:** The Mexican Wolf SSP actively solicits and constantly seeks new facilities to house Mexican wolves. Currently there are 44 facilities in the USA and Mexico participating in the bi-national captive breeding program. Most of these facilities apply for and receive grants to offset

the costs of providing food and care for the animals, as well as to build new enclosures to house additional wolves.

4. **Comment:** Can more money be provided to the captive breeding program for more space to house wolves? **Response:** Additional funding could be provided by private individuals or groups, and/or legislative bodies. See also Response to Comment L.3.

M. Recovery Planning

1. **Comment:** The dismissal of the Mexican Wolf Recovery Team is an example of how the program is being dismantled. **Response:** The Southwestern Gray Wolf Distinct Population Segment Recovery Team has not been dismissed; rather, recent litigation caused USFWS to put the team on indefinite hold until the court decision is appealed or proposed reclassification processes take place. The Mexican Wolf Recovery Program is not being dismantled; agencies involved are still working toward recovery of the species.

N. 1-Year Moratorium

1. **Comment:** The proposed 1-Year Moratorium is not conducive to the genetic health of the wolves in the wild. **Response:** The genetics of the wild population are now a reflection of breeding in the wild, as well as which (if any) captive-born/reared animals are released. The proposed moratorium states that halting releases of packs of wolves that have not previously been in the wild will allow time to assess more clearly the total number of wolves (i.e. both collared and uncollared) in the wild. A more accurate assessment of the number of wolves in the wild may result in a more accurate assessment of the genetic health of the population, which can then be considered during future management actions. Regardless, AMOC does not believe a 1-year hiatus in releases of new packs will appreciably affect the genetics of the wild population. Moreover, even if a moratorium on new releases of packs were enacted, it might be possible to include provisions for release of individual wolves as necessary to address any genetics issues and for translocations as necessary to achieve management objectives, including addressing nuisance and problem (depredation) situations. Finally, pursuant to the 1998 Final Rule and the 1998 Interagency Management Plan, management flexibility begins when the number of breeding pairs in the wild is six or higher. Thus, the proposed moratorium affirmed that it would not be enacted if the number of breeding pairs in the wild fell below this benchmark.
2. **Comment:** How does the proposed 1-Year Moratorium contribute to recovery and what is the science behind the proposal? **Response:** The concept of a moratorium on new releases of packs from captive origin stems from the premise that a transition from captive-born/reared animals to wild-born/reared animals is generally, if not always, an effective and efficient path to success. Wild-born/reared animals are typically more successful than captive-born/reared animals in surviving in the wild. In 2004, AMOC began considering whether the time had arrived to transition to reliance on wild-born/reared wolves for population growth, rather than continue new releases of captive

wolves (naive packs). Recovery is achieved when threats to the species have been lessened or alleviated such that the species is no longer threatened or endangered in all or a significant portion of its range. When a population demonstrates that it is self-sustaining (that is, able to persist in the wild in sufficient numbers in the absence of significant population augmentation by management), this may be interpreted as an indication that threats have been sufficiently alleviated. However, achieving a numeric goal is not the only consideration in recovery, nor is it the only factor relevant to consideration of a moratorium on new releases. The ability to manage the species well enough to sustain the population at recovery levels is of paramount significance. Management capability revolves around staff capacity, funding, knowledge-based management guidelines, and social acceptance. Given that significant new resources (funding, staff, equipment) were infused into the Reintroduction Project by the cooperating agencies in 2004 and 2005, a host of SOPs were in various stages of development, the wild wolf population had reached a level that seemed sufficient to ensure that it would not decline and most likely would continue to increase over the next two years, and a 5-Year Review was being conducted that might result in significant recommendation for change in the Project in 2006 et seq., public discussion of a possible moratorium on new releases in 2006 seemed timely and appropriate. Thus, the proposed moratorium was announced as a draft and discussed at a public meeting in April 2005, where it was made clear that no final decisions had been made and public comment on any and all aspects was desired. In fact, in that first public discussion, it was made clear that one element that needed particular attention was mechanisms by which genetic issues could be addressed within a moratorium, such as targeted release of single individuals into wild packs or into areas occupied by unpaired wolves. In other words, a moratorium on new releases of packs does not of itself preclude the ability to address any genetic issues in the wild population.

3. **Comment:** Because there were no releases of captive-reared wolves planned for 2005, hasn't there already been a moratorium? **Response:** The lack of releases of new packs in 2005 occurred largely due to several problems that a moratorium in 2006 would enable AMOC and the IFT to address. For example, the IFT was so occupied with managing nuisance and problem wolves in October-December 2004 that a proposal for new releases in 2005 was not submitted to AMOC. In the available time, the IFT was unable to identify sufficient high quality unoccupied areas wolf territory within the Primary Recovery Zone that would ensure a good probability of successful new releases of packs of wolves. These issues have been resolved, at least to some extent, by hiring more IFT staff in 2005. As alluded to in the Response to Comment N.2, one aspect of hiring new staff is the obligation to train them. That training, including gaining on-the-ground experience managing wolves under a new suite of SOP, requires time. A moratorium on new releases in 2006 would help provide that time, thus promoting more capable wolf management on the ground and addressing some of the primary concerns of local stakeholders most affected by wolf reintroduction. These issues notwithstanding, in 2005 the IFT did propose and complete several translocations (i.e. Aspen pack, San Mateo pack, 613, and 872 and 873) into the Secondary Recovery Zone. Monitoring the success of these translocations, and the outcomes of the eight pairs of wolves that as of September 2005 might meet the definition of breeding pairs on December 31, 2005, will

enable AMOC to determine the need for new releases in 2005 and to begin evaluating the need for new pack releases in 2007. Even so, such things as staffing requirements, protocol/SOP evaluation, evaluating the current wild population of Mexican wolves, and ongoing management issues will continue to be important aspects of future decisions about wolf releases. The Project should not release more wolves than the agencies can collectively manage.

4. **Comment:** Why is a moratorium being proposed at a time when the wolf population is decreasing? **Response:** Some of the public controversy on this issue seems to reflect confusion about the rate of change and the direction of change for the wild population. The population of wolves in the Blue Range Wolf Recovery Area shows an increasing trend. Some would argue the rate of increase is not fast enough, while others argue it is too fast. In any event, the number of radio-collared wolves present at any given time is not a reliable indicator of overall population status. The proportion of uncollared wolves in the population increases as natural reproduction becomes more frequent. A moratorium is being considered to allow a one-year period for management agencies and local stakeholders to learn how to best operate under the recently-approved SOPs, to develop methods for a more reliable estimate of the number of wolves in the wild, and to do so at a time when there would be limited impact to the reintroduction effort because no new releases for the upcoming year had been scheduled.
5. **Comment:** Won't implementation of a 1-Year Moratorium on releases of captive-reared (naïve) wolves slow the recovery process? **Response:** AMOC does not believe that a 1-Year Moratorium on initial release of captive-reared wolves would significantly, or even appreciably, slow the recovery process. The primary factor in progress to date was the spate of unlawful mortalities in 2003 and the first quarter of 2004. In 2004 and 2005, the wild population began to recover from that loss. As of September 2005, monitoring indicates that as many as eight wild pairs of wolves might be present when the final annual population estimate is made, on December 31. In any event, the proposed 1-Year Moratorium does not prevent free-roaming wolves from breeding and dispersing within the designated recovery area. Therefore, given all these considerations, a 1-Year Moratorium should not affect the recovery process. See also Response to Comment N.2.
6. **Comment:** Can the 1-Year Moratorium be used as a time to work with livestock operators to figure out better ways to make the program work? If during this time, a better way can't be found, can you buy ranchers out? **Response:** Yes. If a 1-Year Moratorium were enacted, the time could be used to work with livestock operators to increase the effectiveness of management actions. However, AMOC has no funding or authority with which to buy ranchers out. A rancher who is interested in selling has other avenues to explore that possibility. A variety of private land trusts and even various government agencies have land protection programs (for endangered species purposes) that an interested rancher might consider. Some of these are focused on outright acquisition, but others provide opportunities to continue existing land uses while conveying conservation values (e.g. conservation easements). However, even if an allotment on Forest Service lands is "bought out," the subsequent owner is required to

stock the allotment to full numbers unless non-use is approved for personal convenience or resource protection. If the intent is simply not to stock the allotment, the forage on the allotment can be allocated to neighboring operations or used as a swing allotment for drought or other forage shortfalls on nearby allotments. Permanent retirement of an allotment requires full NEPA analysis and disclosure, and rarely occurs. Regardless, the Reintroduction Project's intent is not to cause ranchers to abandon their chosen lifestyle, but to find ways to accommodate wolf reintroduction/recovery and other legitimate multiple-uses of public lands, including ranching. Thus, whether or not there is a moratorium in 2006, AMOC will indeed make every reasonable effort to work with ranchers and all other stakeholders and interested parties to make the Reintroduction Project work better.

7. **Comment:** Is the issue of swapping problem wolves back and forth between States being addressed? **Response:** The draft proposed moratorium would place a 1-year hiatus on translocation of wolves involved in livestock depredations (within one year prior to release) from one State to another.
8. **Comment:** Why isn't the proposed 1-Year Moratorium proposed as permanent? **Response:** AMOC believes that a permanent moratorium, whether on new releases of packs or translocations of individuals or packs, is not justifiable at this time, from any perspective. A request for a 1-Year Moratorium on all wolf releases and on translocations across State and Tribal boundaries was presented to USFWS representatives at two non-public meetings sponsored by Congressman Pearce (R-NM), in Glenwood and Socorro NM, on February 12, 2005. Following these meetings, USFWS evaluated whether the moratorium request (and other requests offered in the meetings) was consistent with the Recovery Program's progress, given the status of Mexican wolf reintroduction at that point in time. USFWS initially believed that elements of the request (i.e. a one-year hiatus on initial releases, and no translocations of problem wolves across State and Tribal jurisdictions) would have a minimal effect on the program, if certain conditions within the wolf population were met, and would facilitate much-needed evaluation of various aspects of the Reintroduction Project. Thus, USFWS forwarded a rough draft moratorium proposal to AMOC for consideration. AMOC agreed the proposal had merit, modified it to address some concerns, and sent it out for public comment. No decision had been made on the proposal as of September 2005. However, a longer moratorium on new releases and/or translocation is not appropriate at this point because of the dynamic nature of the Reintroduction Project. The need for initial releases and/or translocations can change appreciably from year to year, due, for example, to unexpected mortalities (e.g. 13 in 2003) and/or the desire to address genetic diversity issues in the wild population. Moreover, translocations will clearly be necessary for the foreseeable future because of emergent management issues (e.g. nuisance and depredation problems), until the wild population achieves and sustains population objectives for the Recovery Area. See also Response to Comment N.2.
9. **Comment:** If the moratorium is put into place, will wolves be left alone? **Response:** If "left alone" means not managed, regardless of their behavior, the simple answer is "no." Wolves are a species that requires active, aggressive management, due to conflicts with

other multiple-uses of public lands, conflicts with other species of wildlife, and conflicts with private property rights. Thus, regardless of whether a moratorium is enacted, Mexican wolves in the BRWRA will continue to be managed in accordance with AMOC's draft and approved SOPs.

O. Livestock Grazing on Public Lands

1. **Comment:** Grazing fees for ranchers on public lands should be increased. **Response:** The present formula for calculating the grazing fees on Federal lands in the West was set forth in the Public Rangelands Improvement Act (PRIA) of 1978. On February 14, 1986, after the expiration of the PRIA formula, President Ronald Reagan issued Executive Order 12548 directing the Secretaries of the Interior and Agriculture to continue to use the PRIA fee formula to calculate the annual grazing fees. The order established a minimum fee of \$1.35. It also directed that for any given year the annual change in the fee shall not be greater than plus or minus 25 percent of the previous' years fee. In 1988, the fee formula from Executive Order 12548/PRIA was incorporated into 36 CFR 222 Subpart C.
2. **Comment:** Why are cattle raised like wildlife on the public lands? **Response:** Livestock grazing on national forest lands is authorized and regulated by the following national legislation: the Multiple Use-Sustained Yield Act of 1960, the Federal Land Policy and Management Act of 1976, [Section 402(a)], the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976, the NEPA of 1969 and the Rescission Act of 1995. Livestock grazing is a traditional use of the national forest and part of our multiple-use mandate. Unlike wildlife, livestock on public lands are restricted to a given grazing allotment and do not have free-range over public lands.
3. **Comment:** Are the practices of cattle growers ever investigated? **Response:** Livestock grazing on national forest system lands are authorized by a grazing permit and administered through annual operating instructions and an allotment management plan. Annual inspections of range conditions, and improvements, proper use levels and the required movement of livestock are made to help ensure compliance. In the arid southwest, limited quantities of forage require large areas to be used for sustainable grazing of livestock. Livestock frequently range over large pastures, and it may be impractical to roundup and move all cattle from these large pastures on a frequent basis.
4. **Comment:** Shouldn't it be the rancher's responsibility to keep cattle away from wolves versus the other way around? **Response:** Under the multiple-use mandate of the USFS, both uses have value on national forest system lands. Livestock grazing on national forest system lands is authorized and regulated by the Multiple Use-Sustained Yield Act of 1960, Federal Land Policy and Management Act of 1976, [Section 402(a)], Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976, NEPA of 1969, and the Rescission Act of 1995. Livestock grazing is a traditional use of the National Forest and part of its multiple-use

mandate. It AMOC's intent to reduce conflicts between Mexican wolf reintroduction and grazing. The IFT informs livestock operators of wolf locations so the operator has the opportunity to take actions (e.g. additional herd riding, moving animals) to reduce potential conflicts. See also responses to comments C.11, I.22, and J.7.

5. **Comment:** Is the objective of the Mexican wolf reintroduction/recovery program to remove all ranching from this land? **Response:** No. It is not the intent of the reintroduction/recovery program to remove ranching from National Forest System lands. The USFS operates under a multiple-use mandate in which both uses have value on National Forest System lands.
6. **Comment:** Can an area of overlap between livestock and wolves be designated where ranchers graze at their own risk? **Response:** There is currently no law, regulation or policy which could accommodate such a proposal on national forest system lands. Ranchers are already aware the Forest Service lands are managed for multiple-use, and not just for optimum livestock grazing conditions.
7. **Comment:** Why are wolves being singled out, they are just a pawn in the game, and western ranching is failing anyway? **Response:** Under the multiple-use mandate of the USFS, both uses have value on National Forest system lands.
8. **Comment:** If ranchers leave because of the wolf, won't that lead to more subdivisions? **Response:** Given the increasing population in the West and current development trends, there is a potential that ranchlands will be subdivided for housing or commercial purposes if sold. However in the Blue Range Wolf Recovery Area, ~96% of the land occupied by wolves is Federally owned and designated National Forest Wilderness where residential and commercial development is not allowed.
9. **Comment:** Can ranchers grazing leases be bought out? **Response:** A "buyout program" would have to be approved by Congress and signed into law by the President. There is currently no law, regulation or policy that would allow for the buyout and retirement of livestock grazing permits. By regulation, once a permit is acquired it must be stocked with at least 90% of the permitted numbers unless non-use is approved by the Forest Service for personal convenience or resource protection.
10. **Comment:** What are the principal differences in ranching practices in AZ and NM versus the northern Rockies? **Response:** The principal difference between ranching practices in AZ and NM versus the northern Rocky Mountains is the timing of cattle presence in the National Forest due to climatic conditions in the two regions. In the northern Rocky Mountains, cattle are present on allotments in the national forest for 4-6 months, and then removed to private ground for the winter. As such, each ranch in the northern Rocky Mountains must have enough private ground to support their cattle for 6-8 months. Most of these private areas are irrigated and the ranchers spend significant time in the summer cutting hay for the winter months. Further, most of the calves in the northern Rocky Mountains are born on private ground in February-early April prior to being put on

allotments in the national forest. This grazing system is required because the winters and snow depth are such that grazing year around on Forest Allotments is not practical. The grazing system in the Southwest is a mixture of year-round grazing and seasonal grazing similar to the northern Rocky Mountains. In the Blue Range Wolf Reintroduction Area (BRWRA), these two patterns prevail in different areas. The NM portion of the BRWRA is principally year-round grazing. Similarly, the southern portion of the BRWRA in AZ is year-round grazing. However, the northern portion of the BRWRA in AZ is seasonal grazing. In year-round grazing systems, cattle can calve at any time of year in large allotments. Further, cattle remain on the allotments throughout the year. Because this system was established long ago for forested allotments, the amount of private land associated with these allotments is small and generally there is no hay produced on the private land. Thus, private land is not of adequate size to winter the number of cattle that are stocked on the forest. Cattle are generally rotated between pastures within the allotment, and most contain a calving pasture (winter/spring pasture) where the majority of the cattle calve.

Written Public Comment on a Proposed 1-Year Moratorium

The comments below were received on a proposed 1-Year Moratorium on initial releases of Mexican wolves in the Primary Recovery Zone. Embedded comments on other issues, ranging from recovery to various SOPs are not addressed in these AMOC responses.

1. **Comment:** Simply put, neither of these moratorium proposals is in any way supported by the scientific findings of the 3- or 5-Year Reviews; in fact they are in direct opposition to the recommendations of both. The 3-Year Review (which was undertaken by independent scientists) reported that both survival and recruitment were much too low to sustain the population. The 5-Year Review reports an extremely high failure rate of 62%, and notes that current population numbers are sustained only by a high number of releases. Obviously the wild population is not meeting established objectives for growth, persistence or self-sufficiency, and there was a precipitous (13-20%) decline in the population between 2003 and 2004. Given these findings, there is simply no scientific justification for the proposed moratorium. The findings and recommendations are quite clear – we need more wolves released and higher success rates, not fewer wolves. Both reviews noted that frequent management by capture or relocation may be impairing the wolves' ability to form packs and exploit their territories. Although translocations contribute to the high failure rate and are best avoided, we recognize that they are sometimes necessary. Given this, wolf managers need to use the best available biological data, and their own expertise and judgment, to choose locations for transfer where the wolves are most likely to succeed. The proposed limitation on cross-jurisdictional translocations only ties their hands – making translocations less likely to succeed and therefore further impairing the wolves' ability to survive and reproduce.” We recommend both proposals be rejected. **Response:** In any wildlife reintroduction, the desire is to reach a point at which the wild population no longer needs enhancement by release of captive individuals. Captive releases are costly in terms of time,

money, and other resources. Moreover, wild-born/reared individuals are generally superior to captive-born/reared animals in several ways.

The point at which a transition could or should be made to reliance on growth in the wild Blue Range Mexican wolf population has been a discussion topic for several years, dating back to development of the EIS addressing the proposed reintroduction effort. Initial AMOC discussion in 2003 revolved around biological aspects of the question. However, other factors also needed to be considered, in view of the fact the reintroduction is occurring across a mosaic of public and Tribal land ownership and management, with private in-holdings. Guidance offered by the nonessential experimental population rule under which reintroduction is authorized must also be considered.³ Events early in 2005 brought these issues to the forefront.

On February 12, 2005, at constituent request, Congressman Pearce (R-NM) convened two meetings, in Glenwood and Socorro NM, to discuss local concerns about Mexican wolf recovery efforts in NM. At the Congressman's request, senior staff from USFWS Region 2 attended the meetings to listen and respond to concerns of invited participants, who were primarily members of the livestock industry in central NM.

In response to the February 2005 meetings, USFWS crafted a proposed moratorium for AMOC consideration. AMOC received the rough draft proposal on April 20, and discussed it at a previously-scheduled meeting on April 21. Cooperator consensus indicated the proposal, with modifications, had sufficient merit from an administrative and managerial perspective to be brought forth for public comment, discussion, and final AMOC action (i.e. approval or rejection). AMOC made various modifications, and brought the Draft Proposed Moratorium to the public for initial discussion in a previously-scheduled public meeting on April 22 (San Carlos AZ).

From April 22 through July 31, 2005, the Draft Proposed Moratorium was available to the public for comment. It was also discussed in eight AMWG public meetings in June 2005, four each in AZ and NM. All comment received, whether verbal or written, was evaluated and carefully considered in reaching a final decision on this matter.

This moratorium is being enacted because AMOC believes the administrative and social contexts of this reintroduction effort warrant it, and because a hiatus on new pack releases for one calendar year will not substantially impede progress toward population objectives. The moratorium covers CY2006 only, and provision is made for replacing individual wolves lost to unnatural or other causes.

³The January 12, 1998 Final Rule establishes, through guidance on "take" of wild wolves, that management flexibility (i.e. the ability to control wolves by removal from the wild) begins when the number of breeding pairs in the wild is six or more.

In closing, AMOC notes that the question of whether to enact a moratorium, and the justification for and composition of a moratorium, should have been melded into the pre-existing Five-Year Review, review of relevant SOPs, and development of the Project's Annual Work Plan for 2006. Thus, the need for, and elements of, any future guidelines for new releases will be discussed as AMOC and the Project's IFT construct Annual Work Plans for each year beyond 2006. These documents will be discussed at AMOC's quarterly AMWG public meetings in AZ and NM, with ample opportunity for public comment to ensure full consideration of relevant concerns before decisions are made.

2. **Comment:** The proposed moratorium on releases and translocations and proposed SOP 13 on wolf control have been issued during the ongoing 5-Year Review process, thus creating new proposals and a new public review process within an existing public review process. How can the cooperating agencies possibly have completed a thorough and legitimate analysis as a basis for proposing sweeping changes to the project when the 5-Year Review and analysis has not been completed? It is disingenuous of the agencies to ask for public comments and claim that they value and will carefully consider those comments and then propose project changes before having done so. **Response:** See Response to Comment 1.
3. **Comment:** The proposed 1-Year Moratorium is not conducive to the genetic health of the wolves in the wild. **Response:** The genetics of the wild population are now a reflection of breeding in the wild, as well as which (if any) captive-born/reared animals are released. The proposed moratorium states that halting releases of packs of wolves that have not previously been in the wild will allow time to assess more clearly the total number of wolves (i.e. both collared and uncollared) in the wild. A more accurate assessment of the number of wolves in the wild may result in a more accurate assessment of the genetic health of the population, which can then be considered during future management actions. Regardless, AMOC does not believe a 1-year hiatus in releases of new packs will appreciably affect the genetics of the wild population. Moreover, even if a moratorium in new releases of packs were enacted, it might be possible to include provision for release of individual wolves as necessary to address any genetics issues and for translocations as necessary to achieve management objectives, including addressing nuisance and problem (depredation) situations. Finally, pursuant to the 1998 Final Rule and the 1998 Interagency Management Plan, management flexibility begins when the number of breeding pairs in the wild is six or higher. Thus, the proposed moratorium affirmed that it would not be enacted if the number of breeding pairs in the wild fell below this benchmark.
4. **Comment:** How does the proposed 1-Year Moratorium contribute to recovery and what is the science behind the proposal? **Response:** The concept of a moratorium on new releases of packs from captive origin stems from the premise that a transition from captive-born/reared animals to wild-born/reared animals is generally, if not always, an effective and efficient path to success. Wild-born/reared animals are typically more successful than captive-born/reared animals in surviving in the wild. In 2004, AMOC began considering whether the time had arrived to transition to reliance on wild-born/reared wolves for population growth, rather than continue new releases of captive wolves (naive packs). Recovery is achieved when threats to the species have been lessened or alleviated such that the species is no longer threatened or

endangered in all or a significant portion of its range. When a population demonstrates that it is self-sustaining (that is, able to persist in the wild in sufficient numbers in the absence of significant population augmentation by management), this may be interpreted as an indication that threats have been sufficiently alleviated. However, achieving a numeric goal is not the only consideration in recovery, nor is it the only factor relevant to consideration of a moratorium on new releases. The ability to manage the species well enough to sustain the population at recovery levels is of paramount significance. Management capability revolves around staff capacity, funding, knowledge-based management guidelines, and social acceptance. Given that significant new resources (funding, staff, equipment) were infused into the Reintroduction Project by the cooperating agencies in 2004 and 2005, a host of SOPs were in various stages of development, the wild wolf population had reached a level that seemed sufficient to ensure that it would not decline and most likely would continue to increase over the next two years, and a 5-Year Review was being conducted that might result in significant recommendation for change in the Project in 2006 et seq., public discussion of a possible moratorium on new releases in 2006 seemed timely and appropriate. Thus, the proposed moratorium was announced as a draft and discussed at a public meeting in April 2005, where it was made clear that no final decisions had been made and public comment on any and all aspects was desired. In fact, in that first public discussion, it was made clear that one element that needed particular attention was mechanisms by which genetic issues could be addressed within a moratorium, such as targeted release of single individuals into wild packs or into areas occupied by unpaired wolves. In other words, a moratorium on new releases of packs does not of itself preclude the ability to address any genetic issues in the wild population.

5. **Comment:** Because there were no releases of captive-reared wolves planned for 2005, hasn't there already been a moratorium? **Response:** The lack of releases of new packs in 2005 occurred largely due to several problems that a moratorium in 2006 would enable AMOC and the IFT to address. For example, the IFT was so occupied with managing nuisance and problem wolves in October-December 2004 that a proposal for new releases in 2005 was not submitted to AMOC. In the available time, the IFT was unable to identify sufficient high quality unoccupied areas wolf territory within the Primary Recovery Zone that would ensure a good probability of successful new releases of packs of wolves. These issues have been resolved, at least to some extent, by hiring more IFT staff in 2005. As alluded to in the response to comment N.2, one aspect of hiring new staff is the obligation to train them. That training, including gaining on-the-ground experience managing wolves under a new suite of SOPs, requires time. A moratorium on new releases in 2006 would help provide that time, thus promoting more capable wolf management on the ground and addressing some of the primary concerns of local stakeholders most affected by wolf reintroduction. These issues notwithstanding, in 2005 the IFT did propose and complete several translocations (i.e. Aspen pack, San Mateo pack, 613, and 872 and 873) into the Secondary Recovery Zone. Monitoring the success of these translocations, and the outcomes of the eight pairs of wolves that as of September 2005 might meet the definition of breeding pairs on December 31, 2005, will enable AMOC to determine the need for new releases in 2005 and to begin evaluating the need for new pack releases in 2007. Even so, such things as staffing requirements, protocol/SOP evaluation, evaluating the current wild population of Mexican wolves, and

ongoing management issues will continue to be important aspects of future decisions about wolf releases. The Project should not release more wolves than the agencies can collectively manage.

6. **Comment:** Why is a moratorium being proposed at a time when the wolf population is decreasing? **Response:** Some of the public controversy on this issue seems to reflect confusion about the rate of change and the direction of change for the wild population. The population of wolves in the Blue Range Wolf Recovery Area shows an increasing trend. Some would argue the rate of increase is not fast enough, while others argue it is too fast. In any event, the number of radio-collared wolves present at any given time is not a reliable indicator of overall population status. The proportion of uncollared wolves in the population increases as natural reproduction becomes more frequent. A moratorium is being considered to allow a 1-year period for management agencies and local stakeholders to learn how to best operate under the recently-approved SOPs, to develop methods for a more reliable estimate of the number of wolves in the wild, and to do so at a time when there would be limited impact to the reintroduction effort because no new releases for the upcoming year had been scheduled.
7. **Comment:** Won't implementation of a 1-Year Moratorium on releases of captive-reared (naïve) wolves slow the recovery process? **Response:** AMOC does not believe that a 1-Year Moratorium on initial release of captive-reared wolves would significantly, or even appreciably, slow the recovery process. The primary factor in progress to date was the spate of unlawful mortalities in 2003 and the first quarter of 2004. In 2004 and 2005, the wild population began to recover from that loss. As of September 2005, monitoring indicates that as many as eight wild pairs of wolves might be present when the final annual population estimate is made, on December 31. In any event, the proposed 1-Year Moratorium does not prevent free-roaming wolves from breeding and dispersing within the designated recovery area. Therefore, given all these considerations, a 1-Year Moratorium should not affect the recovery process. See also response to comment N.2.
8. **Comment:** Can the 1-Year Moratorium be used as a time to work with livestock operators to figure out better ways to make the program work? If during this time, a better way can't be found, can you buy ranchers out? **Response:** Yes. If a 1-Year Moratorium were enacted, the time could be used to work with livestock operators to increase the effectiveness of management actions. However, AMOC has no funding or authority with which to buy ranchers out. A rancher who is interested in selling has other avenues to explore that possibility. A variety of private land trusts and even various government agencies have land protection programs (for endangered species purposes) that an interested rancher might consider. Some of these are focused on outright acquisition, but others provide opportunities to continue existing land uses while conveying conservation values (e.g. conservation easements). However, even if an allotment on Forest Service lands is "bought out," the subsequent owner is required to stock the allotment to full numbers unless non-use is approved for personal convenience or resource protection. If the intent is simply not to stock the allotment, the forage on the allotment can be allocated to neighboring operations or used as a swing allotment for drought or other forage shortfalls on nearby allotments. Permanent

retirement of an allotment requires full NEPA analysis and disclosure, and rarely occurs. Regardless, the Reintroduction Project's intent is not to cause ranchers to abandon their chosen lifestyle, but to find ways to accommodate wolf reintroduction/recovery and other legitimate multiple-uses of public lands, including ranching. Thus, whether or not there is a moratorium in 2006, AMOC will indeed make every reasonable effort to work with ranchers and all other stakeholders and interested parties to make the Reintroduction Project work better.

9. **Comment:** Is the issue of swapping problem wolves back and forth between States being addressed? **Response:** The draft proposed moratorium would place a 1-year hiatus on translocation of wolves involved in livestock depredations (within one year prior to release) from one State to another.

10. **Comment:** Why isn't the proposed 1-Year Moratorium proposed as permanent? **Response:** AMOC believes that a permanent moratorium, whether on new releases of packs or translocations of individuals or packs, is not justifiable at this time, from any perspective. A request for a 1-Year Moratorium on all wolf releases and on translocations across State and Tribal boundaries was presented to USFWS representatives at two non-public meetings sponsored by Congressman Pearce (R-NM), in Glenwood and Socorro NM, on February 12, 2005. Following these meetings, USFWS evaluated whether the moratorium request (and other requests offered in the meetings) was consistent with the Recovery Program's progress, given the status of Mexican wolf reintroduction at that point in time. USFWS initially believed that elements of the request (i.e. a 1-year hiatus on initial releases, and no translocations of problem wolves across State and Tribal jurisdictions) would have a minimal effect on the program, if certain conditions within the wolf population were met, and would facilitate much-needed evaluation of various aspects of the Reintroduction Project. Thus, USFWS forwarded a rough draft moratorium proposal to AMOC for consideration. AMOC agreed the proposal had merit, modified it to address some concerns, and sent it out for public comment. No decision had been made on the proposal as of September 2005. However, a longer moratorium on new releases and/or translocation is not appropriate at this point because of the dynamic nature of the Reintroduction Project. The need for initial releases and/or translocations can change appreciably from year to year, due, for example, to unexpected mortalities (e.g. 13 in 2003) and/or the desire to address genetic diversity issues in the wild population. Moreover, translocations will clearly be necessary for the foreseeable future because of emergent management issues (e.g. nuisance and depredation problems), until the wild population achieves and sustains population objectives for the Recovery Area. See also response to comment N.2.

11. **Comment:** If the moratorium is put into place, will wolves be left alone? **Response:** If "left alone" means not managed, regardless of their behavior, the simple answer is "no." Wolves are a species that requires active, aggressive management, due to conflicts with other multiple-uses of public lands, conflicts with other species of wildlife, and conflicts with private property rights. Thus, regardless of whether a moratorium is enacted, Mexican wolves in the Blue Range Wolf Recovery Area will continue to be managed in accordance with AMOC's draft and approved SOPs.

12. **Comment:** We support the proposed 1-year moratorium on the release or translocation of captive-reared wolves. We would also strongly suggest that the moratorium be extended until such time that a more widely accepted and more appropriately funded program can be put into place. From our perspective the current effort is not widely supported by the local communities, is not satisfactorily funded by the other cooperating agencies and is not adequately embraced by our neighbors in NM. As we have experienced over the past several years the reintroduction effort is destined to fail without fulfilling these critical elements. The experiment should be abandoned unless a broader commitment is secured and a more responsive program established. **Response:** See Response to Comment 1.
13. **Comment:** We oppose the proposed moratorium on wolf reintroduction. We believe that the currently defined boundaries of the wolf recovery are too limited and should be expanded to allow natural dispersal and range expansion of existing and future wolf populations in AZ and NM and beyond. **Response:** See Response to Comment 1.
14. **Comment:** The Draft Proposal indicates that the proposed 1-Year Moratorium on the initial release of captive-reared wolves and the proposed restrictions on translocations of experienced wolves came about as a response to concerns raised in meetings between AMOC and constituents of U.S. Representative Steve Pearce (R-NM). According to the Draft Proposal, the "general message conveyed by meeting participants was that they strongly opposed the Mexican wolf reintroduction program." Clearly, this meeting was attended by stakeholders representing a narrow set of viewpoints and attitudes toward wolves and the reintroduction program. For other stakeholders, such as conservation biologists, wolf restoration advocates, and the majority of AZ residents who support recovery of the Mexican wolf, AMOC apparently did not provide any such special additional opportunities for input beyond the public open houses. It is clear that the Draft Proposal is flawed from the start as it came about based only on input from the select group of stakeholders who oppose the reintroduction program and the restoration of Mexican wolves. We understand that human attitudes are likely the primary threat to Mexican wolves, but surely there are ways to improve attitudes in a meaningful and lasting way, rather than simply taking unfounded and potentially dangerous steps for the sole purpose of appeasing this group of stakeholders in the short-term. **Response:** See Response to Comment 1.
15. **Comment:** The reintroduction of Mexican Grey Wolves into these recovery areas should be immediately placed in moratorium. This reintroduction program was ill conceived, poorly implemented, and is currently totally out of control. All reintroductions should immediately cease. This program should undergo a congressional investigation and an audit by the Department of Interior. If you continue on your current path without regard for the damage you are doing to the social and economic fabric of our community, the results will be a grassroots "firestorm" that you cannot extinguish. You simply cannot continue to run roughshod over the rights of the citizens of these United States. **Response:** See Response to Comment 1.

16. **Comment:** I oppose the 1-Year Moratorium on wolf releases. Decisions should be made by the recovery team, and not mandated by such a moratorium. If too many releases have occurred in too limited an area, causing undo hardship on local people, then other release areas should be opened up. The Gila National Forest is the most obvious location, but others within the recovery area may be available as well. Wolves are not long-lived mammals, and several important breeding animals that have maybe 2 or 3 years realistic capacity for producing surviving young in the wild may NOW be available for release. We do not need a moratorium to assess the program – its myriad problems outweigh its small but steady successes and we need no such hindrance to agency efforts to comply with the law that clearly mandates the recovery of Mexican Wolves. The moratorium is a response to LOCAL stakeholders and while respect for this is noted, we need a much larger view here. **Response:** See Response to Comment 1.
17. **Comment:** BEFORE a moratorium be put in place, or even considered, an assessment of current livestock management operations to address areas of potential conflict should be completed. This assessment should compare local operations to other areas in the country that have wolves – Minnesota, Wisconsin, Michigan, Montana, Idaho, etc. Are local operations in line with average conflict – above, below – what is the true picture for the BRWMA? Depredations should be assessed IN LIGHT OF other deaths inherent in running livestock on rugged terrain, and with management practices of remote and year-round calving. Sample questions - if carcasses continue to be a problem, can management practices be revised to lessen the rate of death from non-wolf causes, and is the rate of death above or below national averages under other management practices. I am not opposed in the least to ranching, but question whether small size ranches (160 acres with 65,000 public land leased acres?) cannot adjust operations to cause less conflict. Less emphasis should be placed on managing wolves, while greater emphasis must be placed on managing factors encouraging conflict with livestock and humans. **Response:** See Response to Comment 1.
18. **Comment:** The moratorium on releases of Mexican Wolves, as written, seems to be a smokescreen designed to protect wolves over livestock and individual families. Inexperienced wolves are seldom released in the BRWRA anymore and when released have only been released into AZ. FWS is in effect, thumbing their nose at Congressman Pearce's efforts to help his constituents through this little to no change-recommendation. As soon as a certain number of the wolves already marked for removal from the wild due to excessive depredation are taken out, the clause in the moratorium that allowed more releases, when breeding pairs in the wild are reduced, will kick in and nullify the moratorium. FWS, AMOC and the IFT can now release anything, anytime anywhere. As long as there are fewer than 6 breeding pairs in the wild according to FWS collared numbers, the moratorium is invalidated. **Response:** See Response to Comment 1.
19. **Comment:** A temporary moratorium on **all** releases for a year or more was requested at the Pearce meetings, simply to give the agency time and free up their budget to get their wolves counted and collect better data. As opposed to constantly releasing- re-releasing and cleaning up problem animals and the messes the current policy is creating. At the most recent NM Game Commission meeting Commissioner Pino stated that he believed a 4 year moratorium

was necessary to rectify the programs current problems. **FACT:** FWS, AMOC and IFT simply do not know how many breeding pairs are out there, they do not know how many wolves are out there. They do not count uncollared wolves, nor do they investigate wolf sightings even when handed photographic evidence. There are many more wolves out in the BRWRA and beyond it than AMOC and FWS and IFT know about. **Response:** See Response to Comment 1.

20. **Comment:** The request to slow things down (via a moratorium) and reassess the situation should be considered a benefit to the **entire wolf program** and if it ever happens, the likely results would show the real wolf numbers and given the agency a much needed boost in the confidence of the program. Some attention needs to go into investigating what has happened to all the born in the wild litters, FWS themselves report litters from the 4-8 breeding pairs that have been on the ground in the past several years. Those packs have been reported to have successful litters each year. Those litters have been ignored for 4 years, a blatant violation of the final rule. To comply with their obligation to have a fairly accurate count on wild born and distributed animals, FWS needs to shift priorities from re-releasing animal after animal to discovering what they have and where it is. At the Pearce meetings, several instances were cited where attendees had seen wolves and wolf sign in and out of the recovery area and the general feeling was that FWS has been unable or unwilling to collect data on actual wolf numbers in the wild. **Response:** See Response to Comment 1.
21. **Comment:** A moratorium would also allow time to look at hybrid issues. The removal and euthanasia of yet another hybrid litter of pups in AZ earlier this month, and the identification of unknown wolf-like animals near St Johns and Vernon AZ, is another reason to refocus the program's policies and try to identify the born in the wild, packs roaming the BRWRA. Efforts must also be made to determine whether male wolves are creating hybrid litters in the coyote population. **Response:** See Response to Comment 1.
22. **Comment:** Illegitimate anger and criticism of Congressman Pearce's role in proposal of a moratorium should have no bearing on your decision. Constituents can legitimately invite a congressional representative to a meeting to hear their concerns when they are not being heard any other way. The meetings were a legitimate use of Congressman Pearce's time and were very much appreciated in the rural communities that host and end up feeding their livestock to wolves. Nothing prevents the folks upset about the NM meetings from inviting their representative to hear them out and they have had the same kinds of meetings themselves early and often. There are enough small family ranching operations paying the feed bill for the wolves, and even at times, providing lodging and food for the employees, of the Mexican wolf program. These contributions are above and beyond our income tax contribution and above and beyond the average citizen's contribution to wolf recovery. My constituency of 120 members (NM ranchers) deserves to be heard. We live here; we are the local affected interest. We suffer such a disproportionate burden from to this program that we deserve input into policy changes, above and beyond the average citizen. **Response:** See Response to Comment 1.

23. **Comment:** A moratorium on releases will help to find time for habitat improvement that should go hand in hand with this endeavor. Not one pack of wolves has stayed in the Gila Wilderness and there have been at least 10 releases there. They have all moved to livestock operations and all have gone on to kill cattle. There are currently no wolves in the Gila Wilderness the IFT and AMOC has simply been using it as the staging area. Wolves stay there for varying amounts of time then they have always left to settle on neighboring allotments or private land ranches. FWS then simply release another pack compounding the problems. Habitat improvement should be done in the wilderness to encourage an adequate prey base and to encourage wolves to stay there. **Response:** See Response to Comment 1.
24. **Comment:** I urge you to support a total, year-long moratorium or better yet a longer moratorium of two to four years, on all wolf releases and engage in a plan to inventory wild wolves and count them as part of the population in the during the moratorium. Only when a moratorium on releases is implemented, will FWS will have the time and budget to locate their lost and unknown wolves. The tally of wolves in the wild will go up not down. **Response:** See Response to Comment 1.
25. **Comment:** There is no indication in the Draft Proposal that there is any scientific support for the effectiveness of the proposed moratorium in addressing the concerns of the select group of stakeholders who attended the aforementioned meeting. We are aware of no scientific research documenting a greater likelihood of livestock depredations by naïve wolves when compared to wolves that have experience in the wild. If AMOC is aware of any documentation on the relationship between a wolf's experience in the wild and the likelihood of livestock depredations - whether it is in the form of peer-reviewed scientific research articles or raw data-such data must be made available so that the public, including independent scientists, may meaningfully comment on the rationale for the moratorium and its likely effectiveness in addressing the concerns of a select group of stakeholders. The Draft Proposal refers vaguely to "the apparent greater success in translocations of 'experienced' wolves versus initial releases of naïve animals" but neither provides scientific support for this claim nor even goes so far as to define "success." (In contrast, there is some indication that experience with livestock carcasses increases the likelihood that a wolf will attack living livestock in the future, but this is not addressed in the Draft Proposal; see below.) Moreover, the moratorium on new releases of naïve wolves will unnecessarily limit the introduction of new genetic material from additional lineages into a population consisting predominantly of a single lineage. There would have to be strong justification, based on science, for this move; at this point, the only justification appears to be political rather than biological. The proposed restrictions on translocations of wolves, if enacted, would further limit the number of wolves captured in AZ that could be released in NM. Because such translocations are currently the primary means of establishing wolves in NM, the proposed restrictions on translocations are likely to significantly impede establishment and recovery of the Mexican wolf in NM. **Response:** See Response to Comment 1.
26. **Comment:** The 3-Year Review noted that both survival and recruitment were too low to sustain a population. According to the 5-Year Review, the current population numbers are maintained only through new releases of wolves. In addition, Dr. Philip Hedrick of Arizona

State University wrote that only one of the three genetic lines comprising the Mexican wolf population is represented in the current wild population. Given this information a one year moratorium on new releases will detrimentally affect the sustainability of a population and seriously threaten its genetic viability. **Response:** See Response to Comment 1.

27. **Comment:** Under current policy, new releases of wolves are not permitted in NM. Translocation of wolves captured in AZ has been the only process available for establishing a NM population. Therefore, a moratorium on translocations will end the ability to release wolves in NM. **Response:** See Response to Comment 1.
28. **Comment:** The justification provided for the proposed 1-year moratorium on releases and translocations is that a select group of project opponents meeting privately with high-level FWS regional officials at the request of Congressman Pearce (R-NM) asked for it. The proposal notes that the additional time saved by not releasing wolves will be allocated to five ongoing project activities. This action flies in the face of the adaptive management process and is neither appropriate, ethical, nor acceptable. And it is an insult to those who have expended considerable time and effort to participate in this process under established rules. **Response:** See Response to Comment 1.
29. **Comment:** The proposed moratorium on releases and translocations appears politically motivated, premature, and unjustified on the basis of findings of the 3-Year Review and preliminary findings of the 5-Year Review, both summarized above. We fail to find any compelling justification in support of the necessity or urgency of the proposed moratorium and we recommend that it be rescinded immediately. Furthermore, the proposed moratorium contains a self-rescinding provision of the prohibition of initial releases of captive-reared wolves that is triggered when the number of breeding pairs in the wild falls below six. Following the currently ordered and ongoing efforts to kill or capture the Francisco Pack, this criterion will be met—the resulting number of breeding pairs will be five or fewer. That the number of breeding pairs currently in the wild is already this low also supports our conclusion that the proposed moratorium is unjustified and our recommendation that it should be rescinded in its entirety. **Response:** See Response to Comment 1.
30. **Comment:** Wolf recovery is controversial; and the FWS adopted the “nonessential experimental population” classification under Section 10(j) of the ESA to have more flexibility in finding and applying creative solutions for reducing conflicts while recovering the Mexican wolf. But there is one legally-binding criterion that the agencies appear to be ignoring—releases of listed species under Section 10(j) provisions must “further the conservation” of the species. Based on our analysis presented herein, we conclude that the “conservation” test (ESA 10(j)(2)(A)) is not being met. **Response:** See Response to Comment 1.
31. **Comment:** We oppose the moratorium on releases of wolves from the captive breeding program, and the moratorium on translocations across jurisdictional boundaries of wolves that have depredated. These measures have no scientific basis. The moratoria will serve to greatly lower the number of wolves added to the population. Given that the most important

indexes to population progress are significantly below projections, the opposite effect should be endeavored. There were projected to be 15 breeding pairs by the end of this year, but in fact the number is at most half that. The censused wolves declined during 2004 by 20% -- from 55 to 44 animals -- while the number projected at the end of last year was 68. The number on the ground reflects continuation of releases from the captive breeding population beyond what was projected. Releases (including translocations) have served to mask the unsustainably high number of wolves succumbing to Federal predator control -- while the number of breeding pairs tells the more compelling and disturbing story of how predator control is suppressing population viability. In addition, the proportion of wolves from the Ghost Ranch and Aragon lineages is significantly below what scientists (e.g. Philip Hedrick, Ph.D.) have described as ideal. It is important, according to Dr. Hedrick, to improve the genetic ratio as soon as possible -- but the moratorium would prevent that. Control that already takes place has eliminated key wolves with important genetic characteristics. Reducing the genetic heritage stemming originally from only seven founding animals risks inbreeding depression -- which may already be vexing the population (as possibly evidenced by low litter sizes and body weights). This also poses an unacceptable risk that the wolves will eventually succumb to a host of other maladies that may be incidental to inbreeding depression, including disease. **Response:** See Response to Comment 1.

32. **Comment:** Not only is there no scientific basis for the moratoria, but the option of resuming releases if the number of breeding pairs falls below six has no basis either (the reference to maximum management flexibility notwithstanding). Six breeding pairs is not close to a viable population; if the moratoria are to be enacted, the number of breeding pairs that would suspend it should be no lower than that identified as the threshold for a viable population -- and if that number hasn't been identified then no moratoria can be scientifically justified. Since variability in estimates of how many wolves in the wild has been used as an excuse for excessive agency control of wolves, and for the moratorium, it should be noted that since 2001 USFWS has insisted that there are many more uncollared wolves than those it can find, and that the next season's radio-collaring will prove the matter. But year after year only a small number of uncollared wolves can be caught and collared -- thus lending strong credence to the possibility that in fact there are few uncollared wolves out there. In addition, this year's wide peregrinations of wolves such as the Aspen Pack sisters and the lone male recently trapped in the Horse Springs area of NM, all of whom remain (or remained in the case of the Horse Springs animal) single with no evidence of mates, argues that the number of uncollared wolves are few and not widely distributed across the landscape; alternately, the population would be increasing exponentially. A biologically conservative approach would be to assume that the population is not significantly higher than can be counted, and the moratorium and SOP 13 will take the population in the opposite direction of what is needed for eventual recovery. **Response:** See Response to Comment 1.
33. **Comment:** The moratoria are also not justified on procedural grounds, as they stem from two private meetings on February 12, 2005 at which senior regional officials of USFWS were lobbied by the livestock industry. Those senior officials did not attend the public meetings at which a majority of people expressed opposition. Furthermore, the decision making process for the moratoria is concurrent with but separate from the 5-Year Review,

and contradicts recommendations within the 5-Year Review; it is as if these decision-making processes addressed a different wolf population -- or a different universe of facts. It is especially undemocratic and cynical that both the moratoria and SOP 13 were being implemented while the public comment process for them was still open -- and the prejudicial nature of this timing is accentuated by contrast with USFWS's continued failure to abide by the recommendations of the 3-Year Review that was completed over four years ago. The government's dilatory conduct when it comes to protecting wolves, coupled with its undue and unseemly haste to stop releasing wolves and trap and kill more of them, does not seem designed to win public confidence. **Response:** See Response to Comment 1.

34. **Comment:** In sum, we request that that both moratoria be rejected and that SOP 13 be rejected. Instead, we request that a moratorium on all predator control targeted on Mexican wolves be enacted except in the exceedingly rare cases in which control may serve the interests of public health and safety. Such an alternate moratorium should be in place until the recommendations of the 3-Year Review regarding the boundary rule and preventing wolves from scavenging on livestock carcasses are enacted through changes in the Federal Register, or until there is unequivocal evidence that the number of breeding pairs in the wild meets or exceeds the number projected in the reintroduction EIS. Both addressing the boundary rule and preventing the ongoing habituation of wolves to livestock via scavenging on livestock carcasses through a rule change would reduce the necessity for much of the predator control targeted at wolves. **Response:** See Response to Comment 1.
35. **Comment:** Furthermore, we request that the agencies' written response to these comments include an analysis of the likely alternate demographic effects of our proposed moratorium on wolf-targeted predator control, versus the likely demographic effects of the USFWS's proposed two moratoria and SOP 13, versus the likely demographic effects of the regulatory status quo. **Response:** See Response to Comment 1.

Summary of Written Public Comment on SOP 13.0: Control of Mexican Wolves

Many of the issues raised in the comments below are addressed in more detail in the AMOC responses to written 5-Year Reviews comment (i.e. at the beginning of this document).

1. **Comment:** If 3 strikes and you're out, in terms of livestock depredation, is the rule, why is the slate wiped clean on an offending wolf after a year with no confirmed depredations? **Response:** Resolution of wolf conflicts with livestock can be achieved through management of the specific situation, not just the management of the offending wolf. More than half the Mexican wolves that have been translocated following depredations successfully bred and produced pups in the wild following translocation. The success rate for wolves translocated following their involvement in depredation was double the success rate for wolves released directly from captivity. This indicates that relocating depredating wolves to a different setting may allow them to contribute to successful wolf reintroduction if wolf behavior or situations can be modified before a "third strike" occurs. A one-year period without any depredation events provides a strong indication that the situation has been effectively resolved.

2. **Comment:** Why doesn't SOP 13 have a provision in it, or discuss if a human is killed by a wolf? **Response:** Human safety issues are covered in the Final Rule, thus eliminating the need to re-address in SOP 13.0. The Final Rule for this nonessential experimental reintroduction states that a Mexican wolf may be taken in self defense or in the defense of a human. In addition, if USFWS or an authorized agency determines that a wolf presents a threat to human life or safety, USFWS or an authorized agency may kill it, capture and euthanize it, or place it in captivity.
3. **Comment:** The Mexican wolf reintroduction program is being sabotaged by pulling the wolf out for one year and then putting the same animal(s) back in the same place where they committed their so-called crime. **Response:** Deliberately holding a wolf or wolves in captivity for one year after they have been removed from the wild (for whatever reason, e.g. nuisance or problem issues, leaving the BRWRA, injury) is not a standard procedure. Typically, if a wolf is eligible for re-release into the wild, and there is an approved release site without other wolves present (some exceptions to this may occur, such as when the objective is to pair a wolf held in captivity with a free-ranging lone wolf), then the goal is to return the animal(s) to the wild as soon as practical. However, wolves are occasionally held in captivity for longer periods for a variety of reasons, including: a) lack of availability of a suitable release site; b) pair bonding and breeding of two genetically desirable animals; c) allowing a late-term female to whelp and raise her pups until they are 8-10 weeks of age; d) veterinary care; and e) retirement from the reintroduction effort or from the recovery program. Wolves that have been pulled from the wild may be returned to an area at or near where they were originally removed, if they meet criteria outlined in various SOPs (i.e. SOP 5.0 – Initial Wolf Releases, SOP 6.0 – Wolf Translocations, SOP 13.0 – Control of Mexican Wolves). Finally, wolves have excellent homing instincts, and the ability to return to a former home range even after being re-released many miles distant.
4. **Comment:** Why was the Aspen Pack re-released before a year was up since when they're removed from the wild for cause they're supposed to be kept in captivity for a year. **Response:** There is no requirement within the Reintroduction Project to hold a wolf or wolves in captivity for a year, following removal from the wild for cause. The only reference to one year made in Draft SOP 13.0 is that "a wolf (or wolves) that has (or have) been involved in fewer than 3 depredation incidents will, if 365 days have passed since the last incident, be considered a new wolf, with no strikes against it."
5. **Comment:** A wolf's record (i.e. livestock depredations) should follow the animal throughout its life. **Response:** AMOC and the IFT have developed a set of SOPs to help guide the Reintroduction Project. The proposed scenarios for management of problem wolves are outlined in SOP 13.0. As stated in SOP 13.0, a wolf with less than 3 depredations that has not depredated in over a year is assumed to have no depredations. AMOC and the IFT consider management intervention to have been successful and the wolf or wolves have learned from their experiences if they have not depredated on livestock for over a year from their initial offense(s).

6. **Comment:** Wolves that commit depredations on livestock should not be killed, but instead should be captured alive in order to conserve their genetics. **Response:** Wolves that are chosen for the Reintroduction Project must fit several criteria, one being that they are not genetically important to the captive population (i.e. an experimental nonessential population). Under the Final Rule for the Project, wolves released to the wild are considered expendable to the Recovery Program. AMOC SOP 13.0 carefully defines the progression of actions to be taken if a wolf or wolves begin to become a nuisance or begin to depredate. Attempts will be made to live capture such animals; however, if certain circumstances are met, permanent removal (which includes lethal control as an option) may be used. Under a permanent removal order, a wolf may still be captured alive, if live capture occurs before an opportunity for lethal control, or if live capture is the most expeditious approach to removing the animal from the wild. However, by law (i.e. the Final Rule), the released wild wolves are redundant to and not needed in the captive program (i.e. returning them to captivity would not benefit the Recovery Program/Reintroduction Project or “conserve their genetics”).
7. **Comment:** Why are ranchers responsible for, or have any voice in removal of wolves? **Response:** SOP 13.0 was developed to list criteria for determining the status of nuisance and problem wolves, and to provide guidelines to the IFT for conducting wolf control actions. Management responses to nuisance and problem wolf issues are implemented in a stepwise fashion, and are a function of the number and severity of incidences. Ranchers and property owners in and adjacent to the BRWRA are arguably the most immediately and directly affected when a nuisance or problem wolf issue arises. Rancher comments are thus given the same fair and equal consideration as any other interest (pro-, neutral, and anti- wolf) in terms of crafting the final version of SOP 13.0 and determining when and how wolf removal will occur. See also response to Comment C.12.
8. **Comment:** How sure are investigators that a wolf actually preyed on a cow? **Response:** WS IFT members are professional wildlife damage management experts in the field of predator depredations. Their investigations to determine which species caused the depredation consider the following criteria, when relevant information is present (see Roy and Dorrance 1976 for complete guidelines):
- xi. Subcutaneous hemorrhaging associated with wounds on the carcass.
 - xii. Additional morphological evidence associated with the carcass.
 - xiii. Size of the canine spread on the hide.
 - xiv. Attack points on the carcass (i.e. wolves and coyotes typically attack the hamstring and armpit area, whereas lions generally attack the back of the neck).
 - xv. Size and extent of bones chewed by the predator.
 - xvi. Tracks/scat/hair in the area.
 - xvii. Disturbed vegetation and terrain in the area, with areas of blood on the ground.
 - xviii. Any additional evidence around the site (e.g. poisonous plants, skinned carcass).
 - xix. Presence or history of wolves or other predators in the immediate area.
 - xx. Witness accounts.

Cause of death is classified as follows, based on evidence at the site: confirmed, probable, possible, or not a wolf kill. Determination and classification of cause of death does not need to be made at the initial scene of investigation, but should be completed as soon as possible after the on-site investigation has been completed. The extent to which an absolute (definitive) determination of cause of death can be made depends on the available evidence.

9. **Comment:** Can a section be included in SOP 13 that identifies when wolves locate into new areas that ranchers are notified and informed of proactive solutions to living with wolves (e.g. Defender of Wildlife's proactive program)? **Response:** This information will be included in SOP 3.0, Public Outreach.
10. **Comment:** Can SOP 13 be amended to provide incentives to ranchers who are good stewards (e.g. work actively to remove carcasses from their allotments, employ range riders)? **Response:** In lieu of adding incentives information to SOP 13.0, AMOC: is considering developing another SOP or a companion document to focus on "living in wolf country." The intent would be to provide information on incentive programs that already exist, including those that can provide funding to ranchers to underwrite the costs of at least some of the measures by which wolf depredation might be reduced, or prevented.
11. **Comment:** Can SOP 13 be amended such that there is no action taken against a livestock-depredating wolf on a rancher's allotment unless that rancher is being proactive to minimize wolf/livestock conflicts? **Response:** The Reintroduction Project is authorized under a Final Rule that reflects a commitment to integrate wolf reintroduction and recovery into existing multiple-uses of public lands and to minimize conflicts on private lands. The Final Rule is not structured, nor is the Reintroduction Project empowered or administered, to force changes in public or private grazing practices to accommodate presence of wolves. Thus, the 5-Year Review and ongoing adaptive management of the Project will continue to focus on finding and implementing incentives for voluntary actions by ranchers and other stakeholders that would help accommodate presence of wolves by reducing conflicts such as livestock depredation. Clearly, there is a need for more effective and better-funded incentives, and for more effective compensation for losses incurred by private property owners. As progress is made in these areas, SOP 13.0 will be revised to reflect the new information and opportunities.
12. **Comment:** Instead of being killed when found guilty of excessive livestock depredations (i.e. 3 strikes and you're out), can they be captured and homes found for them? **Response:** SOP 13.0 charts the progression of actions taken if a wolf or wolves begin to cause nuisance problems or depredate. Attempts are made to live capture these animals; however, if certain circumstances are met, permanent removal (which includes lethal control as an option) orders may be given. Efforts to capture the offending wolf will continue even if lethal control measures are implemented. If the animal is live-captured, it may be placed in one of the 44 captive facilities in the USA and Mexico that participate in the Mexican Wolf SSP.
13. **Comment:** Having WS determine if a wolf killed a cow on Reservation lands is a conflict of interest. **Response:** The United States has a unique legal relationship with Tribal

governments as set forth in the Constitution of the United States, treaties, statutes, Executive Orders, and court decisions. Since the formation of the Union, the United States has recognized Indian tribes as domestic dependent nations under its protection. The Federal Government has enacted numerous statutes and promulgated numerous regulations that establish and define a trust relationship with Indian tribes. WS has the Federal responsibility under the trust relationship to provide Federal leadership in the field of wildlife damage management, which includes wolf depredations.

14. **Comment:** There is a delayed response by WS when a report of a possible livestock depredation on Tribal lands is made, such that the evidence of the attack is often gone. **Response:** Since 1998, WS has responded to 16 reported cases of potential wolf depredations on Tribal Trust Lands (unpublished data). The time between when WS received the report and when they arrived on site varied from the same day of the report to two days after the report was received. WS had six same-day responses, nine next-day response times and one two-day response time. There is no evidence supporting the contention that delayed response is or has been a problem.
15. **Comment:** Can USFWS provide more infrastructure to run the program, such that the San Carlos Apache Tribe can have someone to work with that they're more comfortable with? **Response:** The nature and extent of the asserted discomfort cannot be determined from the comment offered. Currently, the USFWS Mexican Wolf Field Projects Coordinator, a member of the IFT, is the USFWS liaison with SCAT on wolf control issues. The Field Projects Coordinator works directly with the Tribal wildlife department to conduct management actions (e.g. radiotracking, hazing, trapping). USFWS provides funding to the Tribal wildlife department each year to offset the cost of equipment and personnel for Tribal involvement in the wolf program. Reports of possible wolf depredation on Tribal lands are investigated by WS, in accordance with Tribal guidance. USFWS is working with the Tribe and WS to train Tribal game officers in investigative procedures, which would in turn allow the Tribe to assume more responsibility in conducting depredation investigations in the future. In the meantime, USFWS has hired a Tribal member, permanently stationed in San Carlos, who divides his time between Mexican wolf and fisheries issues.
16. **Comment:** The practice of lethal control of wolves that have been involved in excessive livestock killing (3 strikes and you're out) is not working. **Response:** The orders for wolf removal are for permanent removal from the wild. Lethal control is only one of the tools available to remove wolves from the wild. To date, three Mexican wolves have been lethally removed under permanent removal orders. Livestock depredation is inevitable when free-ranging wolves occur, but depredation is being managed by permanent removal (including lethal take).
17. **Comment:** What is the SOP for removal of denning females from the wild? **Response:** SOP 13.0 – Control of Mexican Wolves, is currently in draft form. Public comment in regard to this issue is being evaluated by AMOC. The current draft of SOP 13.0 does not differentiate between denning females and any other segment of the wolf population. This issue will be explored further between now and the period in 2006 when denning will recommence.

18. **Comment:** Why isn't there a one strike and you're out policy? **Response:** The Reintroduction Project is obligated to address (provide relief for) depredation issues, but it is also legally compelled to pursue recovery, which requires growth in the wild wolf population. Conflicts between wild wolves and livestock are inevitable. However, resolution of wolf conflicts with livestock can be achieved through management of the specific situation, not just management of the offending wolf. More than half the Mexican wolves that have been translocated following depredations successfully bred and produced pups in the wild following translocation. The success rate for wolves translocated following their involvement in depredation was twice the success rate for wolves released directly from captivity. This indicates that depredating wolves relocated to a different setting may significantly contribute to successful wolf reintroduction. Interventions such as hazing, fladry, movement of wolves or livestock, and removal of individual pack members can be employed to increase the probability of successfully "rehabilitating" wolves that have been involved in a depredation situation.
19. **Comment:** Why are problem wolves translocated and not put in permanent captivity? **Response:** Translocation of problem (and other) wolves enables the Reintroduction Project to continue progress toward its population goal, while providing relief for local situations.
20. **Comment:** Why doesn't the program incorporate more aversive conditioning of wolves and cattle? **Response:** Aversive conditioning, such as hazing wolves out of an area (i.e. livestock pasture) with rubber bullets, cracker shells, and radio- activated guard boxes (a device that emits loud noises when a collared wolf is in close vicinity of the box), is applied to free-ranging Mexican wolves whenever appropriate in efforts to prevent livestock, human, or dog interactions. It has been used successfully on some occasions, but is most effective on a small-scale, such as deterring specific wolves from calving pastures and residential areas. It is less useful in larger-scale applications, such as keeping wolves away from entire grazing allotments. Other types of aversive conditioning, such as taste aversion to prevent wolves from killing livestock, have been the subject of many research projects in the past, with little, if any, demonstrated effectiveness. More recently, research in Wisconsin evaluated the use of shock collars to assess the effectiveness of reducing livestock depredations which resulted in some success (Schultz et al. 2005). However, this type of aversive conditioning appears to have limited use and may not be practical on a large-scale basis, especially in the Southwest. Based on this, it does not seem prudent to expend resources and efforts attempting to aversively condition wolves using either of these techniques at this time.
21. **Comment:** Why is there lethal control prior to achievement of a fully recovered population? **Response:** The Reintroduction Project is authorized by a Final Rule under Section 10(j) of the ESA. By Federal law, this "nonessential" designation means that wolves released to the wild within the experimental population boundary are not essential to recovery. That is, even if all the Mexican wolves in the wild died, extinction would not occur because there are now sufficient Mexican wolves in captivity. The Final Rule recognized that, as the wild population grows toward levels that contribute to rangewide recovery, situations will occur that require removal of individuals or even entire packs for the overall benefit of the

Recovery Program. Although lethal control of wolves may seem contradictory to recovery, active management of wolves released to the wild is a critical component of recovery. Lethal control, one of the tools for permanent removal, is simply the final alternative in a hierarchy of management alternatives that must be considered when a problem occurs in the field.

22. **Comment:** How many wolf lethal take orders have been issued? **Response:** Since the Mexican wolf program's inception, five permanent removal (which includes lethal take as an option) orders have been issued for eight wolves, including: (1) two un-collared wolves from the Francisco Pack, which were never lethally controlled because they could not be located; (2) Wolf F592 of the Sycamore Pack (shot 05-27-03); (3) Wolf M574 of the Saddle Pack (shot 07-11-04); (4) Wolves M904, M919, and F511 of the Francisco Pack were removed by live trapping; and (5) Wolf M729 of the Ring Pack (shot 06-26-05).
23. **Comment:** There should be no lethal control of Mexican wolves until the population goal (i.e. at least 100 Mexican wolves) has been achieved. **Response:** Lethal control is an essential tool in wolf management, as will be reflected in the final version of SOP 13.0.
24. **Comment:** SOP 13 requires lethal removal of wolves responsible for attacking three head of livestock if the wolves cannot be trapped within ten days. Current control policies resulted in a 20% drop (from 55 to 44 wolves) of the known Mexican wolf population between the end of 2003 and the end of 2004. Implementation of SOP 13 will increase the frequency of capture and lethal control. We object to this operating procedure that could significantly reduced wolf numbers. In addition, we question the absence of any pro-active measures to lower the incidence of wolf-livestock interactions. The Project should first attempt to reduce the potential for wolf-livestock conflicts before resorting to a lethal policy. The 3-Year Review strongly recommended that livestock operators share responsibility for carcass management and disposal on public lands in order to reduce the likelihood that wolves become habituated to feeding on livestock. Unfortunately this was never implemented, nor adequately addressed in the five-year review. In addition, other husbandry practices should be encouraged, such as monitoring cows and calves during calving season. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
25. **Comment:** On SOP 13, can we also consider supporting a no kill program that provides a semi-wild environment for wolves habituated to livestock? This facility would hold wolves in captivity but allow them to have social relationships, pursue prey, while maintaining them as elements in the gene pool. This facility should not be an urban exhibition environment and its purpose should be to try to maintain survival of animals and the gene pool until all recovery goals have been reached and there is a viable, sustainable, free-ranging population. When that goal has been reached, we could decommission the facility and surplus any remaining animals to urban exhibition programs focused on wildlife education. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.

26. **Comment:** This draft SOP 13 should be scrapped. It is contrary to the 3-Year and 5-Year Review recommendations. Ironically, it will cause even fewer wolves to be released into NM and more wolves to be removed. If AMOC is determined to adopt something of this sort, the following changes are imperative: 1. Insertion of some category preliminary to nuisance to allow the IFT and AMOC an opportunity to intervene and resolve potential problems before they escalate; 2. Amendments to make it clear that no wolf will be defined as a nuisance and no incident would be defined as a depredation unless the complaining party has engaged in good husbandry practices such as those outlined in Paragraph 2(b) of SOP 13 and recommended in the three-year review; 3. Amendments stating that no take would occur unless the complaining party could demonstrate that he or she had engaged in accepted husbandry practices to minimize wolf/livestock conflicts; 4. All investigations described in Paragraph 1 would include investigations as to whether the complaining party or parties had followed prescribed or recommended husbandry practices to avoid conflict. If they had not, no take would occur. The only allowed agency action would be to work with the complaining party to institute appropriate husbandry practices. These amendments would provide incentives to ranchers to learn to coexist with wolves. The current proposals actually encourage ranchers to create conflicts with wolves. Not to say that they would do so, but why provide the temptation? **Response:** AMOC and the IFT do not need to wait for a nuisance incident or depredation incident to intervene and resolve potential problems before they escalate. AMOC has no regulatory authority by which to require good husbandry practices by public lands grazing permittees or by private lands ranchers. See also previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
27. **Comment:** A policy of “zero tolerance” should be adopted rather than a “3 strikes and out”. As it is inevitable that a wolf will eventually cause depredation this program needs to more proactively address these losses and the associated costs in livestock, wildlife and wolves. Anything short of a “zero tolerance” policy is only postponing the inevitable and the sooner it is addressed the sooner the program might become more widely accepted. If the program cannot successfully administer and manage a “zero tolerance” policy it should be abandoned. **Response:** A policy of “zero tolerance” is unacceptable until recovery has been achieved and the Mexican wolf has been delisted..
28. **Comment:** SOP 13 does not address control of wolf hybrids. The removal and euthanasia of yet another hybrid litter of pups in AZ earlier this month, and the identification of unknown wolf-like animals near St Johns and Vernon AZ, is another reason to refocus the program’s policies and try to identify the born in the wild, packs roaming the BRWRA. Efforts must also be made to determine whether male wolves are creating hybrid litters in the coyote population. **Response:** See written responses to the 5-Year Review that address these hybrid issues.
29. **Comment:** The Francisco pack is representative of dangerous but normal wolf behavior, wolves are livestock killers whether exposed to beef in zoo logs as these have been since they cut their first teeth in the pens, or they happen on a carcass somewhere. Removal of Livestock carcasses is a non-solution, it would further burden the small family rancher currently affected by this program it would do nothing to stop the killing of cattle in wolf

recovery areas. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review that address the carcass removal.

30. **Comment:** The behavior of wolves that have been involved in human encounters is representative of feral pack behavior -- they have shown themselves not to be shy and wary of humans. In fact that language from the Final Rule is now changed to curious, intelligent and interested. Unfortunately people involved in these encounters feel otherwise describing them as aggressive, stalking, attacking. Removal of problem animals is yet another reason for a moratorium on releases. Problem wolves on the ground beget more problem feral wolves. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review that address wolf-human interaction issues.
31. **Comment:** Several factors contribute to livestock death on the land, the main three causes are, severe drought, disease, or predator involvement in birthing. The high mountain allotments in wolf recovery area are relatively immune to severe drought. When there is drought, it is seldom severe enough to cause the livestock death that pro-wolf but anti-cattle grazing faction would have the public believe. Worse, would have the agencies and our elected officials believe. The disease factor simply does not exist with the availability of modern day vaccines, especially in the clean open, un-crowded mountain ranches. Cattle do not simply expire by the dozens as indicated by several anti grazing proponents of wolf reintroductions. These folks seem bent on using the recovery program as leverage to remove the last of the livestock industry on the Gila and Apache forests. Do not let the program be used this way. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
32. **Comment:** The predator factor cannot be controlled, especially in areas where Mexican wolves are roaming due to regulation on predator control options. The rancher should not be held liable for predator related deaths or other unforeseen and minimal contributors to livestock death in the area. Examples such as oak brush poisoning, new oak leaves freeze in the spring, are eaten by cattle in that state causing death, the situation is very rare. Another example, lightning struck cattle, is also very rare. In both of those situations, the livestock are normally found and disposed of rapidly. At this time, the major predator in the area is the Mexican wolf. As supported by the past two weeks with 6 confirmed kills by the Francisco pack near Reserve NM. 4 grown cows and two confirmed calves one of the calves was killed and not even eaten. In the same area, there are also the numerous missing calves and tight bagged cows on the allotments where the confirmed deaths occurred. This pack is on a killing spree something USFWS told all of us never happens. The owners of the allotments where this year's killings have taken place report that in the past two to three years they have collectively lost at least 100 calves to wolves. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
33. **Comment:** There are enough small family ranching operations paying the feed bill for the wolves, and even at times, providing lodging and food for the employees, of the Mexican wolf program. These contributions are above and beyond our income tax contribution and above and beyond the average citizen's contribution to wolf recovery. My constituency of

120 members deserve to be heard, we live here, we are the local affected interest. We suffer such a disproportionate burden from to this program that we deserve input into policy changes, above and beyond the average citizen. The Council for Environmental Quality regulations on Environmental Justice, make this very clear. Federal agencies must successfully mitigate disproportionately high consequences of their actions on affected low income populations. We are not asking for that much in the way of mitigation. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.

34. **Comment:** Your so called SOPs for dealing with livestock killer wolves are ill conceived and reflect absolute and total disregard for the social and economic welfare of the citizens living within your release areas. I am astounded and dismayed that Federal and State agents are capable of such poor and callous judgment when promulgating regulations affecting this program. These SOPs in actual practice constitute continual deprivation of private property without compensation, plain and simple. This is outrageous, immoral and a clear violation of constitutional legal principles. The outworking of these SOPs will be the eventual economic ruin of law abiding citizens engaged in animal husbandry within your release areas. The indirect impact will be the undermining of the economic base of the counties wherein you are perpetuating this travesty of justice. You have a legal and moral responsibility to make every possible effort to keep the livestock killings to an absolute minimum. You have an even greater responsibility to protect the lives of the men, women and children living in your recovery areas from the Mexican Grey Wolf. With regard to livestock and domestic animals, you have failed dismally. With regard to the protection of life, you are walking on the edge of potential disaster of great proportion. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
35. **Comment:** Your so called "3 strikes" policy fails miserably in this regard, and should be immediately countermanded. Fair and equitable management of this program would mandate immediate elimination of livestock killer wolves from this program. One strike. Not two. Not three. The so called "wiping clean of the slate" for a livestock killer wolf after 365 days is the most asinine concept I have ever heard. Your adoption of this policy is absolutely incredulous. A livestock killer wolf should NEVER be returned to any recovery area where they can kill again. **Response:** See Comment 27, above.
36. **Comment:** Citizen range managers should be given full authority to take whatever action is necessary to eliminate a livestock killer wolf, once that status has been determined. This includes the authority to shoot and kill a wolf. The SOP which mandates that identified and verified livestock killer wolves must be trapped and removed from the area only by your agents is absolutely unrealistic from a practical standpoint. The outworking of this policy is the continual slaughtering of livestock during your inept efforts to trap. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
37. **Comment:** Your SOPs to verify livestock kills are excessively and unrealistically stringent. In the real world of law enforcement, probable cause is sufficient to affect an arrest and

deprive a citizen of liberty. According to your procedures evidence that would convict in a court of law beyond a reasonable doubt doesn't seem to make the grade to establish a wolf kill. It is absolutely obvious to anyone familiar with forensic evidence that these SOPs are poorly conceived, excessively restrictive and reek with bias. Your SOPs to verify livestock kills should be in accordance with well established principles used in criminal investigations, and should be based upon the standard of probable cause. **Response:** Livestock depredation by wolves or other wildlife is not a criminal offense, and to apply criminal investigation standards would nonsensical.

38. **Comment:** Your apparent lack of any SOPs for compensation of citizens who are deprived of personal property as a result of this program, and your dependence upon a non-governmental agency to try to placate those who have suffered real losses is absolutely dismal, and speaks volumes. One of the outworkings of this failure is the rapid development of a socioeconomic crisis in Catron County NM. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
39. **Comment:** The threshold of impact to other game populations (before control measures are implemented) should be lowered. The proposed 35% reduction in game populations seems extremely high and arbitrary. This threshold places too much of a hardship on sportsmen and could result in unrecoverable losses to our wild game. Since this is 1/3 of the game populations that sportsmen and several organizations have worked hard at establishing and protecting this taking should not be treated lightly. We believe the threshold should be closer to 15-20% with a funding mechanism to more closely and accurately monitor game populations. The present survey and population estimating system is not adequate to manage these losses and to accurately evaluate the risks to the resource. A funding mechanism or mitigation plan should also be established to reimburse the State and its sportsmen for the losses associated with feeding wolves. The anticipated loss in hunting opportunities and hunt quality should be evaluated in this proposal. Any losses should be mitigated with aggressive management and game population enhancement activities within the wolf recovery area and elsewhere within the State. It must be realized that a robust population of prey species (wild game) is necessary for a successful wolf reintroduction program and that this does not happen accidentally. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
40. **Comment:** The procedures should also include an element that at some point prescribes hunting as a tool for the management of wolf populations. If this program is to be successful the eventual management of this predator should be no different than the management of other predators and the prey species they depend upon. Perpetuating special status is not acceptable or necessary. **Response:** Hunting as a predator population management tool could only be used for wolves under an ESA Section 4(d), which would first require downlisting to threatened status, or delisting, which would first require full recovery. When and if either of these status changes occurs, hunter take will be considered in structuring a more flexible management program that is simply not feasible or legally acceptable under the current endangered status.

41. **Comment:** The definition of depredation to also include the killing of reintroduced or supplemented bighorn sheep. These transplants are not being conducted for the sole benefit of feeding wolves and these losses or the associated complications should be minimized. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review. Since wolves were first reintroduced in 1998, they have killed one (1) bighorn sheep. This is not excessive mortality by any standard.
42. **Comment:** The proposed SOP 13 on wolf control has been issued during the ongoing 5-year review process, thus creating new proposals and a new public review process within an existing public review process. How can the cooperating agencies possibly have completed a thorough and legitimate analysis as a basis for proposing sweeping changes to the project when the 5-Year Review and analysis has not been completed? It is disingenuous of the agencies to ask for public comments and claim that they value and will carefully consider those comments and then propose project changes before having done so. **Response:** First comes a proposal, then comes a decision. Thus, a proposal must first be made to elicit comment that is used to help make a decision. Still, AMOC notes that the question of whether to enact a moratorium, and the justification for and composition of a moratorium, should have been melded into the pre-existing Five-Year Review, review of relevant SOPs, and development of the Project's Annual Work Plan for 2006. Thus, the need for, and elements of, any future guidelines for new releases will be discussed as AMOC and the Project's IFT construct Annual Work Plans for each year beyond 2006. These documents will be discussed at AMOC's quarterly public meetings in AZ and NM, with ample opportunity for public comment to ensure full consideration of relevant concerns before decisions are made.
43. **Comment:** We do not support lethal management (except in the case of risk of spread of deadly disease) of the wild wolves. Specifically, we do not support the proposed changes contained in SOP13 allowing lethal control measures to be applied to "3 time losers." **Response:** Points taken.
44. **Comment:** We ask you to consider the viability of innovative use of deterrents and conditioning as a method of reducing wolf depredation on cattle (and conceivably, other forms of livestock). It is possible to make adaptations to the current technology used in "shock collars" so that they can be used as a protective device for livestock and a deterrent measure to wolves. I have spoken to a technical representative of a leading radio collar design/manufacture company and discussed the viability of such an approach (from the technical perspective of portability, battery life, and range. (I have not researched the cost aspects, security considerations and the behavioral/social impacts with experts in these areas.) In brief, a transmitter could be worn by livestock and receivers (with shock capability) could be worn by wolves. If the wolves approach the livestock (within a predetermined range) they would be given an audible warning. If they approach closer (within an even closer range) they would be shocked. This method could be applied and "learned" while wolves are in captivity – and carried forward into the wild. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.

45. **Comment:** We also ask you to consider the viability of alternative approaches to lethal control for the management of wolves considered to be habituated to livestock predation. Rather than using lethal methods to control “problem” wolves, I propose that a “problem” wolf should be recaptured and deemed unsuitable for re-release. To create a balance in wild vs. captive wolf numbers, a captive wolf could be released in their place. This swap method would help retain the genetic material of the total wolf population while helping manage the size of the captive population. Understanding that the captive wolf will not directly replace the “problem” wolf (in social structure, etc), the method and timing of release would need to be carefully considered. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
46. **Comment:** SOP 13 on wolf control measures appears to completely ignore important findings from the 3 and 5-Year Reviews and proposes no new policies or procedures that would reduce the removal or mortality of wolves or promote changes in livestock husbandry or management practices that would reduce conflicts or increase the compatibility of wolf restoration and livestock grazing on our public lands. To the contrary, the proposed measures would potentially increase removal and mortality rates. We note that the draft 5-year review found that current wolf control methods were adequate which calls into question the need for revisions, especially prior to completion of the 5-Year Review process. The resolution of conflicts between wolf recovery goals and livestock grazing on public lands calls for “novel ideas” and “creative solutions” not more trapping and shooting of wolves. Government wolf control procedures and private compensation programs combine to form a perverse incentive—under existing and proposed wolf control policies, if a rancher wants wolves removed all he needs to do is encourage a conflict between wolves and livestock for which he will be compensated. We’re not suggesting that wolf recovery area ranchers would resort to such tactics, but current policies certainly provide the temptation. The proposed SOP 13 contains no provisions that would encourage innovations in ranching practices that would reduce wolf-livestock conflicts and, thus, reduce wolf removals and mortality. See additional discussion and proposed solutions for resolving this problem in Appendix A. As with the proposed moratorium, we fail to find any compelling justification in support of the necessity, urgency, or appropriateness of SOP 13 as currently proposed, and we recommend that it be rescinded immediately. Any future wolf control policy should be firmly based on the best current data and findings from the 3 and 5-year reviews addressed through the adaptive management process such that proposed solutions promote attainment of wolf reintroduction goals. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
47. **Comment:** Wolf recovery is controversial; and USFWS adopted the “nonessential experimental population” classification under Section 10(j) of the ESA to have more flexibility in finding and applying creative solutions for reducing conflicts while recovering the Mexican wolf. But there is one legally-binding criterion that the agencies appear to be ignoring—releases of listed species under Section 10(j) provisions must “further the conservation” of the species. Based on our analysis presented herein, we conclude that the

“conservation” test (ESA 10(j)(2)(A)) is not being met. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.

48. **Comment:** SOP 13 would result in an increase in the removal from the wild and lethal control of Mexican wolves at a time when the population is already small and has even declined due to lethal control actions and removals. While we understand the frustration of livestock producers in the current range of the Mexican wolf, an increase in lethal take and removal of wolves from the wild is likely to stall or reverse any progress that has been made in recovering the Mexican wolf. The conflict between Mexican wolf recovery and livestock producers is made worse by the fact that none of the proposed SOPs addresses the need for producers take reasonable steps to protect their livestock or other domestic animals non-lethally. SOP 13 indicates, under "Criteria for Determining Status of Problem and Nuisance Wolves," that "(h)umans in areas occupied by wolves can help avoid provoking wolf behavior that might require a management response by voluntarily (i.e. these are not legal requirements):" What follows is a list of the most reasonable and obvious steps that a livestock producer or pet owner could take to prevent conflicts with wolves. But the language of SOP 13 makes it clear that such obvious, common-sense steps are not currently required of producers and will not be under the Draft Proposal. The increase in lethal wolf control that would occur under SOP 13 is especially inappropriate if landowners within current wolf range are not required to take these common sense precautions before lethal wolf control or removal from the wild can occur. The prompt removal of carcasses and other attractants is known to be of utmost importance in preventing the loss of livestock to predators in general and to wolves in particular. The three-year review specifically recommended that livestock producers on public lands "take some responsibility for carcass management/disposal to reduce the likelihood that wolves become habituated to feeding on livestock." As noted in the Five-Year Review, 91% of Mexican wolves known to have scavenged on dead livestock carcasses were confirmed to have subsequently killed living domestic livestock. Therefore, the removal of livestock carcasses in particular should be an absolute requirement of livestock producers on public lands; further, livestock producers on private lands should be required to take this common-sense step before lethal wolf control or removal from the wild can occur in response to conflicts or losses. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.

49. **Comment:** SOP 13 appears to be designed to maximize wolf removal and minimize any required non-lethal techniques that might be feasible prior to resorting to lethal control or removal from the wild. For example, on p. 9 ("Guidelines for Conducting Wolf Control Actions," 3.g.ii.2.a) "(s)econd-depredation wolves will be hazed for a period of up to 7 days and/or trapped for removal to captivity, or radio-collared and immediately translocated or released on-site...." This is problematic because no hazing is required; instead a maximum (but not a minimum) period of hazing is allowed. As a result of this wording, wolf control actions in such circumstances will favor removal from the wild over hazing. If AMOC is aware of scientific research to support this provision (e.g. research regarding the effectiveness of hazing vs. removal and research indicating that an increase in removals will not jeopardize the long-term viability of the Mexican wolf), then such information must be referenced in the SOP. Without scientific support, this provision should be modified such

that hazing is a required component of this management response and must be attempted for a minimum period of time prior to removal from the wild. We understand that capture, collaring, and on-site release is an option in such circumstances under this provision, but there is also no requirement that on-site release or translocation be attempted prior to removal from the wild. Furthermore, in this same section, SOP 13 indicates that any hazing beyond 7 days would require approval through IFT consultation and that "(a)ny such extension request must be well justified, carefully examined, and appropriately documented." But, for removal from the wild, even with no attempt at hazing, no further justification is required and no documentation of factors affecting the likelihood of depredations (e.g. poor husbandry) is required. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.

50. **Comment:** SOP 13 does not require the IFT to locate-or even to attempt to locate-surviving dependent pups of female wolves that have been lethally controlled (p. 11, 3.g.v). This provision would not only allow for the orphaning of dependent young-an outcome that would not be acceptable to many members of the public concerned about animal welfare-but would also greatly increase the impact of the removal on the population by taking out, not only a single adult, but also her offspring and the potential for future genetic contribution of these animals to the population. This provision should be modified such that, in the event that a lactating adult female wolf is killed, a systematic search must be undertaken to locate the den and dependent young and to place such young that are not capable of surviving on their own in the captive breeding program for future release. If such pups cannot be placed in a captive breeding program for eventual release, they should be humanely euthanized. There is no justification for failing to even attempt to find offspring of lactating females that are killed and this inaction on the part of the IFT would have implications for the conservation of the population, as well as the welfare of the young. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
51. **Comment:** With respect to wolves outside of the recovery area, SOP 13 would potentially result in more lethal wolf control on public lands than on private lands. In particular, SOP 13 states (3.g.i.3.b) that first-depredation wolves on public lands outside the recovery area "will immediately be trapped for removal" unless pups would be jeopardized. A similar provision is proposed for second-depredation wolves (3.g.ii.3.b), and in this case apparently there is no requirement that the survival of pups be considered in wolf removal. It also appears that SOP 13 would prevent the establishment of packs on public lands outside of the recovery area but within the MWEPA (5.a.i.). No justification is provided for this. Nor is there any justification provided for the removal of wolves found outside of the recovery area (but within the MWEPA), apparently even if such wolves have not caused any livestock losses. In the three-year review, Paquet et al. (2001) found that "(r)etrieving animals because they wander outside the primary recovery area is inappropriate because it ... needlessly excludes habitat that could substantially contribute to recovery of *Canis lupus baileyi*" among other reasons. Considering the high current rate of lethal control and removal and the 13 - 25% decline in Mexican wolves from 2003 to 2004, restrictions on Mexican wolf expansion may jeopardize the Mexican wolf. Paquet et al. (2001) note that restricting wolves to such a small geographical area will hinder the recovery of a self-sustaining, viable population.

Furthermore, removal of wolves from lands that are owned by and managed for all Americans, when such removal is done for the benefit of one specific set of stakeholders, is inappropriate. Wolf removal and lethal control should be minimized, not maximized, on public lands. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.

52. **Comment:** This proposal is an open invitation for ranchers to bait wolves with cow carcasses and turn them into problem wolves. Wouldn't SOP 13 open the door for further illegal behavior by humans to kill wolves and blame it on depredation? **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
53. **Comment:** Contrast the convoluted guidelines in SOP 13 with the following statement from the 2002 SOP 32, Control of Mexican Wolves, from the section titled Background: "The USFWS Mexican Wolf Recovery Leader or his designee will make the determination if a wolf is to be captured alive or killed. All decisions regarding the capture, relocation, or lethal taking of wolves will be made by the Mexican Wolf Recovery Leader, or the USFWS Mexican Wolf Field Coordinator in his absence, and carried out by authorized personnel under their direction or oversight. In emergency situations necessitating the capture, relocation, or lethal taking of wolves when neither the USFWS Recovery leader or Field Coordinator are available, such decisions for actions involving livestock depredations or problem or nuisance wolves will be made by the USDA WS Wolf Management Specialist or, in his absence, by the AGFD Mexican Wolf Field Team Leader. The latter has decision authority for all other situations requiring emergency wolf management actions when neither the USFWS Mexican Wolf Recovery Leader nor the USFWS Mexican Wolf Field Coordinator are available. They will be informed of such management decisions and actions as soon as possible (pp. 1 and 2 of 14)." Had the drafters of the new SOP 13.0 operated according to the principle, "if it isn't broken, don't fix it," they could easily have recognized the change in circumstances precipitated by the MOU of October 31, 2003, by simply adding the words "or his counterparts in NMDGF and the WMAT, depending upon where the management action takes place," following the words "or, in his absence, by the AGFD Mexican Wolf Field Team Leader," in the section quoted above. In order to clarify exactly who is responsible for a given decision, language should have been added to require a written decision in all cases, signed by the decision maker, with findings as to cause. Under SOP 13.0 it is almost impossible for the interested citizen to identify the actual decision maker amid the overlapping responsibilities of the IFT, AMOC, and the Mexican Wolf Recovery Coordinator. When everybody is responsible, nobody is responsible. **Response:** Responsibility for the Reintroduction Project is clear and unequivocal, as has been stated to the Commenter on several occasions: it rests with AMOC. Placing responsibility with a collective group rather than with a single individual is as fundamental as any element of this representative democracy (e.g. Congress, the Supreme Court, and innumerable Commissions, Councils, Boards of Supervisors, etc. In the case of AMOC, appropriate checks and balances are also provided, through general and twice-annual specific oversight by the AMOC Lead Agency Directors. See also previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.

54. **Comment:** Both the old and the new control SOPs fail to deal adequately with the problem of minimizing the necessity for controlling wolves by requiring reasonable modifications of husbandry practices and timely removal or liming and tarping of livestock carcasses. Yet here, too, the older version is preferable. Consider the following examples of treatment of attractants under the old SOP and as watered down in the proposed SOP 13.0. First, the old version: “ii. Intentional feeding or attracting of wolves must not have occurred. Undisposed livestock carcasses in an area where depredations have occurred may be considered attractants depending upon local circumstances. The feasibility of and legal requirements (if any) for carcass disposal will be considered (SOP 32, 2002, Criteria for Determining Status of Problem and Nuisance Wolves, 2.d, p. 5 of 14, emphasis added).” In the new version, the text reads: “b. The Final Rule provision to take “nuisance wolves is broad, so the IFT must evaluate each incident on its own merit (see Table below) and discuss it with the affected landowner or permittee and AMOC as necessary to ensure appropriate management response.... Humans also provoke unacceptable wolf behavior that can require management response. Examples of human actions that should be avoided in areas inhabited by wolves include: ... (6) Feeding wolves or otherwise intentionally attracting them. Or... (7) Failing to remove, bury, or render inedible visceral remains or carcasses of livestock,... (SOP 13, 2005, Criteria for Determining Status of Problem and Nuisance Wolves, 2.b. pp. 4 and 5 of 21, emphasis added).” By changing the language from “must not have occurred” to “should be avoided,” the authors of SOP 13 have effectively pulled the already blunt teeth in the original control procedure dealing with untreated livestock carcasses. Again the new SOP moves in precisely the opposite direction from that recommended by the scientists, who said in the Three-Year Review Report: “Require livestock operators on public land to take some responsibility for carcass management/disposal to reduce the likelihood that wolves become habituated to feeding on livestock.” (Three-Year Review Report, p. 67). Rather than weaken admonitions against baiting wolves and attracting them through inadequate disposal of carcasses, the new SOP ought to address the problem by holding harmless any wolf that preys, having first scavenged on carcasses. Such a policy would render moot any arguments that U. S. Forest Service policy does not allow writing carcass removal and treatment requirements into grazing permits. Were this “hold harmless” policy in place on all public lands, permittees would quickly find ways to deal with the carcass problem, instead of fighting it, as they are currently doing. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
55. **Comment:** Eighteen wolves have been killed with no arrests prior to SOP 13. Need to increase enforcement, 20 wolves have been shot and only one successful prosecution. **Response:** Point taken.
56. **Comment:** If SOP 13 had been in existence from the onset, several packs in existence would never have developed, or would have been captured or destroyed (e.g. the Bluestem Pack). **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.

57. **Comment:** Under the proposed SOP 13, why is a whole wolf pack targeted not just the problem wolf? **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
58. **Comment:** Increase the number of depredation incidents allowed. Put depredating wolves on probation and if they don't attack again within a certain time period remove the depredation count. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
59. **Comment:** Wolves are being micromanaged and this leads to their death and loss of health. Implementation of SOP 13 will increase the frequency of capture and lethal control. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
60. **Comment:** Consider the alternative to SOP 13 that includes a permanent holding facility for problem animals; animals are then held for genetic purposes or shipped off for educational purposes. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
61. **Comment:** Is the recovery effort furthered by lowering the bar at which point lethal control may occur? **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
62. **Comment:** Does the leg hold trap assure the capture of a defined "problem" wolf? **Response:** No.
63. **Comment:** What justification is there for killing an entire pack in response to livestock depredation, instead of just the alphas or adults? If lethal take must be used, it should only be used for wolves that have been confirmed as depredators. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
64. **Comment:** Why is the language in 2 separate areas of SOP 13 not consistent? The attached appendix containing the Federal rule states (p. 18): "Depredation means the confirmed killing or wounding of lawfully present domestic livestock by one or more wolves. USFWS, WS, or other USFWS-authorized agencies will confirm cases of wild depredation on domestic livestock." This definition is quoted on page 7 of the SOP. This confirmation should be consistently followed throughout the SOP. However, on page 10 under sub item d under item iii, the words "known or likely to have been involved in the third depredation incident" are not consistent with a confirmed depredation, which requires real, not assumed or circumstantial evidence. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
65. **Comment:** Why do none of the proposed SOPs address the need for producers (ranchers) to take reasonable steps to protect their livestock or other domestic animals? SOP 13 indicates, under "Criteria for Determining Status of Problem and Nuisance Wolves" that "humans in

areas occupied by wolves can help avoid provoking wolf behavior that might require a management response by voluntarily (i.e. these are not legal requirements)...” What follows is a list of the most reasonable and obvious steps that a livestock producer or pet owner could take to prevent conflicts with wolves. But the language in SOP 13 makes it clear that such obvious, common-sense steps are not currently required, and will not be under the Draft Proposal. Why? **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.

66. **Comment:** Why does SOP 13 appear to be designed to maximize wolf removal and minimize any required non-lethal techniques that might be feasible prior to resorting to lethal control or removal from the wild (e.g. hazing)? SOP 13 indicates that any hazing beyond 7 days would require approval through IFT consultation, and that “any such extension request must be well justified, carefully examined, and appropriately documented.” But, for removal from the wild, even with no attempt at hazing, no further justification is required and no documentation of factors affecting the likelihood of depredations (e.g. poor husbandry) is required. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
67. **Comment:** Why doesn’t SOP 13 require the IFT to locate, or even attempt to locate, surviving dependent pups of lactating female wolves that have been lethally controlled? **Response:** Ever reasonable effort would be made to capture surviving lactating pups. The SOP need not require this.
68. **Comment:** Why are there no proactive measures to lower the incidence of wolf-livestock interactions? Incentives to those who participate? **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
69. **Comment:** Why are wolves not allowed to wander outside of the recovery area when gray wolves in other parts of the USA are allowed to do so? **Response:** This comment is not pertinent to SOP 13.0. See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
70. **Comment:** If a wolf scratches or bites wolf management personnel in the process of wolf control is that a cause for the wolf/wolves to be euthanized? **Response:** Not necessarily. It would depend on the circumstances.
71. **Comment:** Why does hazing include actions that intentionally result in injury to a wolf? **Response:** Hazing by Project staff is consistent with the Final Rule under which wolf management is conducted. To date, hazing has not resulted in any injuries to wolves.
72. **Comment:** Ranchers should be allowed to shoot wolves caught in the act of depredating livestock. **Response:** Such actions can only take place as allowed by the Final Rule. See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.

73. **Comment:** Requiring confirmation of depredation before control actions begin, or for payment of compensation, places an unfair burden on the rancher. The topography of AZ-NM is such that most depredations cannot be found, let alone confirmed as to cause of death. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
74. **Comment:** It is unreasonable to lump all depredations within 24 hours as a single incident. Each animal lost is real, and costly, to the rancher. Common sense should be used to determine whether depredations are part of the same incident, or separate. **Response:** The 24-hour timeframe was reached after extensive discussion in which AZ and NM County representatives and WS participated. It seemed to be the best compromise between treating each animal lost as a separate incident and treating all losses in a longer timeframe as a single incident.
75. **Comment:** The time limits for hazing and lethal take should be removed. The control action should continue until they succeed. **Response:** SOP 13 achieves this, by providing for renewal requests from the IFT for permanent removal actions and by providing the IFT with appropriate authority for hazing actions.
76. **Comment:** The wolf project looks for loopholes to avoid lethal take and other control actions when depredations occur. They must be required to follow procedure and act quickly and effectively. **Response:** This was in fact a problem before AMOC began functioning. It no longer is a problem.
77. **Comment:** All hazing and lethal take responsibilities should be assigned to WS personnel not associated with the wolf project. Experience to date shows that wolf project personnel are either inept, or they are refusing to do their jobs. When given lethal take orders, the person shoots to miss. The same person made statements to the effect that cattle do not belong on public lands and he would be glad to help us remove them. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
78. **Comment:** Killing wolves that responsible for attacking three head of livestock if trapping has does not succeed within 10 days, and immediate killing of wolves if a fourth depredation occurs, is exceedingly prejudicial. A much better practice would be to fund depredation compensation. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
79. **Comment:** We suggest that SOP 13 be improved by incorporating identification of what we call “Probable Incident Areas” (PIAs), and define procedures for undertaking proactive measures in these areas to decrease the likelihood of depredation. PIAs could be identified by the IFT based on factors likely to result in wolf/livestock interactions (e.g. carcasses, sloppy husbandry, lack of monitoring, calving in areas where wolves have localized, denning in calving grounds). Formal identification of a PIA would authorize and direct IFT personnel to intervene to various degrees before wolves became “nuisances” or “problems.” The extent of

the IFT's intervention might be controversial, but there are several very valuable preventative measures that could be undertaken without much resistance. For example, in a PIA, the IFT could immediately approach permittees, describe the likelihood of conflicts and provide information on deterrents and husbandry changes which have proven successful in other areas. The IFT could also provide information on available resources to help implement anti-depredation practices, such as Defenders' Bailey Wildlife Foundation Proactive Carnivore Conservation Fund, EQIP funds, State-provided fencing, etc. Currently, the IFT is not allowed express concerns about "problem areas" outside the Team itself, and this practice must change in order to prevent depredations and resulting wolf mortality and capture/translocation. Formalizing the identification of PIAs with prescribed tasks for the IFT would also enable IFT personnel to intervene in a non-threatening/information providing role before problems occur, which might improve relationships with local livestock producers. The identification of PIAs would also help groups like Defenders direct resources into proactive projects before we are faced with dead livestock and dead wolves. Finally, there may be a way to approach the controversial topic of carcass removal within the PIA context. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.

80. **Comment:** With 91% of wolves known to have scavenged dead livestock carcasses subsequently confirmed to have killed domestic livestock at least once, the need for carcass removal is obvious. **Response:** See the revised "scavenged livestock" discussion in the Administrative Component. See also previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review on the carcass removal issue.
81. **Comment:** Carcass removal is simply not an option in wolf control actions. You would have to hire several riders for that task, and work them full time. Even then, they could never find let alone remove all carcasses. Besides, it's not just livestock carcasses that attract wolves to an area occupied by cattle. Wildlife carcasses also attract them. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review on the carcass removal issue.
82. **Comment:** Your mention of site enhancements in SOP 13 (such as fencing or changes in livestock husbandry) leaves me confused. Do you mean ranchers should develop a breed of killer cows? You've brought the wolves on us, and tied our hands to keep us from taking control action ourselves, and now you want to tell us how to change our livestock husbandry practices to accommodate your wolves? Instead, let ranchers help you count wolves, keep logs of wolf sightings, and when you have a lethal take order allow that permittee who has been affected to take action against the depredating wolf. Not only would that work, it would be cost efficient. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
83. **Comment:** We oppose SOP 13 on the control of Mexican wolves. This measure has no scientific basis. The control protocol will serve to significantly reduce the numbers of wolves already in the population. Given that the most important indexes to population progress are significantly below projections, the opposite effect should be endeavored. There were

projected to be 15 breeding pairs by the end of this year, but in fact the number is at most half that. The censused wolves declined during 2004 by 20% -- from 55 to 44 animals -- while the number projected at the end of last year was 68. And the number on the ground reflects the continuation of releases from the captive breeding population beyond what was projected. Releases (including translocations) have served to mask the unsustainably high number of wolves succumbing to Federal predator control -- while the number of breeding pairs tells the more compelling and disturbing story of how predator control is suppressing population viability. In addition, the proportion of wolves from the Ghost Ranch and Aragon lineages is significantly below what scientists (such as Philip Hedrick, Ph.D.) have described as ideal. It is important, according to Dr. Hedrick, to improve the genetic ratio as soon as possible -- but the moratorium on new releases would prevent that. And control as it already takes place has eliminated key wolves with important genetic characteristics. Reducing the genetic heritage stemming originally from only seven founding animals risks inbreeding depression -- which may already be vexing the population (as possibly evidenced by low litter sizes and body weights). This also poses an unacceptable risk that the wolves will eventually succumb to a host of other maladies that may be incidental to inbreeding depression, including disease. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.

84. **Comment:** SOP 13 improperly and deleteriously reduces the flexibility of agency personnel to decide whether special circumstances (including but not limited to genetics) merit greater forbearance in the face of depredating wolves. In at least three circumstances -- that of the Bluestem Pack, the two uncollared and ultimately unidentified wolves in AZ for which death sentences were issued (but not carried out) in 2002, and the Ring Pack alpha female currently -- wolves that had begun depredating stopped doing so of their own accord. But agency personnel would have no options to allow alternate resolutions of a depredation problem if a wolf crosses over an arbitrary number of depredations; they would be forced to capture or kill a wolf potentially prematurely and unnecessarily. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.
85. **Comment:** Since variability in estimates of how many wolves in the wild has been used as an excuse for excessive agency control of wolves, and for the moratorium, it should be noted that since 2001 USFWS has insisted that there are many more uncollared wolves than those it can find, and that the next season's radio-collaring will prove the matter. But year after year only a small number of uncollared wolves can be caught and collared -- thus lending strong credence to the possibility that in fact there are few uncollared wolves out there. In addition, this year's wide peregrinations of wolves such as the Aspen Pack sisters and the lone male recently trapped in the Horse Springs area of NM, all of whom remain (or remained in the case of the Horse Springs animal) single with no evidence of mates, argues that the number of uncollared wolves are few and not widely distributed across the landscape; alternately, the population would be increasing exponentially. A biologically conservative approach would be to assume that the population is not significantly higher than can be counted, and the moratorium and SOP 13 will take the population in the opposite direction of what is needed for eventual recovery. We request that the agencies' written response to these comments include an analysis of the likely alternate demographic effects of our proposed moratorium

on wolf-targeted predator control, versus the likely demographic effects of the USFWS proposed two moratoria and SOP 13, versus the likely demographic effects of the regulatory status quo. **Response:** See previous Responses (above, in this section) and Responses to written public comment on the 5-Year Review.

**Mexican Wolf Blue Range Reintroduction Project 5-Year Review:
Literature Cited Component**

by

Adaptive Management Oversight Committee
and
Interagency Field Team

Arizona Game and Fish Department
New Mexico Department of Game and Fish
U.S.D.A. – APHIS, Wildlife Services
U.S.D.A. Forest Service
U.S. Fish and Wildlife Service
White Mountain Apache Tribe

December 31, 2005

Mexican Wolf Blue Range Reintroduction Project

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- Andelt, W.F. 1985. Behavior ecology of coyotes in south Texas. Wildlife Monographs, No. 94. The Wildlife Society, Bethesda, Maryland. 45 pages.
- Arizona Game and Fish Department and New Mexico Department of Game and Fish. 2002. Arizona-New Mexico review of the U.S. Fish and Wildlife Service's 3-year review of the Mexican wolf reintroduction project. Report to U.S. Fish and Fish and Wildlife Service, Region 2, Albuquerque, New Mexico. 27 pages.
- _____, _____, U.S. Fish and Wildlife Service, and White Mountain Apache Tribe. 2004. Mexican wolf reintroduction project, interagency field team annual report, reporting period: January 1 – December 31, 2003. Arizona Game and Fish Department, Phoenix, Arizona. 27 pages.
- _____, _____, U.S. Fish and Wildlife Service, U.S. Department of Agriculture-Wildlife Services, and White Mountain Apache Tribe. 2005. Mexican wolf reintroduction project, interagency field team annual report, reporting period: January 1 – December 31, 2004. Arizona Game and Fish Department, Phoenix, Arizona. 28 pages.
- Bailey V. 1907. Wolves in relation to stock, game, and the national forest reserves. U.S. Department of Agriculture, Forest Service Bulletin 72: 1-31.
- _____. 1931. The mammals of New Mexico. United States Bureau of Biological Survey, North American Fauna Number 53, Washington, D.C.
- Ballard, W.B., J.S. Whitman, and C.L. Gardner. 1987. Ecology of an exploited wolf population in south-central Alaska. Wildlife Monographs 98.
- _____, L.A. Ayres, P.R. Krausman, D.J. Reed, and S.G. Fancy. 1997. Ecology of wolves in relation to a migratory caribou herd in northwest Alaska. Wildlife Monographs 135.
- _____ and P.R. Krausman. 1997. Occurrence of rabies in wolves of Alaska. Journal of Wildlife Diseases 33: 242-245.
- _____, W.B., L.N. Carbyn, and D.W. Smith. 2003. Wolf interactions with non-prey. Pages 259-271 in L.D. Mech and L. Boitani, editors. Wolves: behavior, ecology, and conservation. The University of Chicago Press, Chicago, Illinois. 448 pages.
- Ballou, J.D. and T.J. Foose. 1996. Demographic and genetic management of captive populations. Pages 263-283 in D.G. Kleiman, M. Allen, K. Thompson, and S. Lumpkin, editors. Demographic and genetic management in wild mammals in captivity. University of Chicago Press, Illinois.

- Bangs, E.E. and S.H. Fritts. 1996. Reintroducing the gray wolf to central Idaho and Yellowstone National Park. *Wildlife Society Bulletin* 24: 402-413.
- _____, _____, J.A. Fontaine, D.W. Smith, K.M. Murphy, C.M. Mack and C.C. Niemeyer. 1998. Status of gray wolf restoration in Montana, Idaho, and Wyoming. *Wildlife Society Bulletin* 26: 785-798.
- Bednarz, J.C. 1988. The Mexican wolf: biology, history, and prospects for reestablishment in New Mexico. *Endangered Species Report* 18. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 70 pages.
- _____. 1989. An evaluation of the ecological potential of White Sands Missile Range to support a reintroduced population of Mexican wolves. *Endangered Species Report* 19. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 96 pages.
- Bengis, R.G., R.A. Kock, and J. Fischer. 2002. Infectious animal diseases: the wildlife/livestock interface. *Rev. Sci. Tech. Off. Int. Epiz.* 21: 53-65.
- Berger, J., P.B. Stacey, L. Bellis, and M.P. Johnson. 2001. A mammalian predator-prey imbalance: grizzly bear and wolf extinction affect avian neotropical migrants. *Ecological Applications* 11: 947-960.
- Biggs, J.R. 1988. Reintroduction of the Mexican wolf into New Mexico – an attitude survey. M.S. Thesis, New Mexico State University, Las Cruces, New Mexico. 66 pages.
- Bjorge, R.R. and J.R. Gunson. 1985. Evaluation of wolf control to reduce cattle predation in Alberta. *Journal of Range Management* 38: 483-487.
- Bogan, M.A. and P. Mehlhop. 1983. Systematic relationships of gray wolves (*Canis lupus*) in southwestern North America. *Occasional Papers, University of New Mexico, Museum of Southwestern Biology*, No. 1. 21 pages.
- Boitani, L. 2003. Wolf conservation and recovery. Pages 317-340 in L.D. Mech and L. Boitani, editors. *Wolves: behavior, ecology, and conservation*. The University of Chicago Press, Chicago, Illinois. 448 pages.
- Boyd, D.K. and D.H. Pletscher. 1999. Characteristics of dispersal in a colonizing wolf population in the central Rocky Mountains. *Journal of Wildlife Management* 63: 1094-1108.
- Bradley, E.H., D.H. Pletscher, E.E. Bangs, K.E. Kunkel, D.W. Smith, C.M. Mack, T.J. Meier, J.A. Fontaine, C.C. Niemeyer, and M.D. Jimenez. 2005. Evaluating wolf translocation as a nonlethal method to reduce livestock conflicts in the northwestern United States. *Conservation Biology* 19: 1498-1508.

- Breck, S.W., R. Williamson, C. Niemeyer, and J.A. Shivik. 2002. Non-lethal radio activated guard for deterring wolf depredation in Idaho: summary and call for research. *Proceedings Vertebrate Pest Conference* 20: 223-226.
- _____ and T. Meier. 2004. Managing wolf depredation in the United States: past, present, and future. *Sheep and Goat Research Journal* 19: 41-46.
- Breitenmoser, U., C. Breitenmoser-Wursten, L.N. Carbyn, and S.M. Funk. 2001. Assessment of carnivore reintroductions. Pages 241-281 *in* J.L. Gittleman, S.M. Funk, D.W. MacDonald, and R.K. Wayne, editors. *Carnivore conservation*. Cambridge University Press, Cambridge, United Kingdom. 675 pages.
- Brewster W.G. and S.H. Fritts. 1995. Taxonomy and genetics of the gray wolf in western North America: a review. Pages 353-373 *in* L.N. Carbyn, S.H. Fritts, and D.R. Seip. *Ecology and conservation of wolves in a changing world*. Canadian Circumpolar Institute, Occasional Publication No. 35.
- Brown, D.E., editor. 1983. *The wolf in the Southwest*. The University of Arizona Press, Tucson, Arizona. 195 pages.
- Brown, W.M. and D.R. Parsons. 2001. Restoring the Mexican gray wolf to the desert southwest. Pages 169-186 *in* D.S. Maehr, R.F. Noss, and J.L. Larkin, editors. *Large mammal restoration: ecological and sociological challenges in the 21st Century*. Island Press, Washington, D.C.
- Burbank, J.C. 1990. *Vanishing lobo*. Johnson Publishing Company, Boulder, Colorado. 208 pages.
- Burch, J.W. 2001. Evaluation of wolf density estimation from radiotelemetry data. M.S. Thesis, University of Alaska, Fairbanks, Alaska.
- Burnham, K.P. and D.R. Anderson. 1998. *Model selection and inference: a practical information – theoretic approach*. Springer - Verlag New York, Inc. New York, New York.
- Carbyn, L.N. 1983. Management of non-endangered wolf populations in Canada. *Acta Zoologica Fennica* 174: 239-243.
- Carrera, J. 1994. Mexican wolf recovery program. Annual report. PROFAUNA, A.C. Saltillo, Coahuila, Mexico.
- Carroll, C., M.K. Phillips, C.A. Lopez Gonzalez, and N.A. Schumaker. *In press*. Defining recovery goals and strategies for endangered species: the wolf as a case study. *BioScience* 56(1): 1-13.
- Chapman, R.C. 1978. Rabies: decimation of a wolf pack in arctic Alaska. *Science* 201: 365-367.

Chavez, A.S. and E.M. Gese. 2005. Food habits of wolves in relation to livestock depreations in northwestern Minnesota. *American Midland Naturalist* 154: 253-263.

Coalition of Arizona/New Mexico Counties v. United States Fish and Wildlife Service et al., CV-03-0508-MCA/LCS.

Coppinger, R. and L. Coppinger. 1995. Interactions between livestock guarding dogs and wolves. Pages 523-526 in L.N. Carbyn, S.H. Fritts, and D.R. Seip, editors. *Ecology and conservation of wolves in a changing world*. Canadian Circumpolar Institute Occasional Publication 35, Edmonton, Alberta.

Cox, D.R. and D. Oakes. 1984. *Analysis of survival data*. Chapman and Hall, New York, New York.

Defenders of Wildlife. 2005. The Bailey Wildlife Foundation Wolf Compensation Trust: payments to ranchers for livestock losses caused by wolves. Accessed January 24, 2005, at <<http://www.defenders.org/wildlife/wolf/wolfcomp.pdf>>.

Defenders of Wildlife et al. v. Secretary, U.S. Department of Interior et al., 03-1348-JO.

Defenders of Wildlife. 2005. The Bailey Wildlife Foundation Wolf Compensation Trust. <http://www.defenders.org/wildlife/new/facts/faq/html>.

Duda, M., S.J. Bissell, and K.C. Young. 1998. *Wildlife and the American mind: public opinion on attitudes toward fish and wildlife management*. Responsive Management National Office, Harrisburg, Virginia. 775 pages.

Environmental Systems Research Institute. 2000. Arcview, version 3.2. Redlands, California.

Evans, G.W. 1951. *Slash Ranch hounds*. University of New Mexico Press, Albuquerque, New Mexico. 244 pages.

Federoff, N.E. 1999. Antibody response to rabies vaccination in captive and free-ranging wolves (*Canis lupus*). *Journal of Zoo and Wildlife Medicine* 32: 127-129.

Findley, J.S., Harris, A.H., Wilson, D.E. and Jones, C. 1975. *Mammals of New Mexico*. University of New Mexico Press, Albuquerque, New Mexico. 360 pages.

Fritts, S.H. 1982. *Wolf depredation on livestock in Minnesota*. U.S. Fish and Wildlife Service, Washington, D.C., Resource Publication 145. 11 pages.

_____. 1985. Can relocated wolves survive? *Wildlife Society Bulletin* 13: 459-463.

- _____ and L.N. Carbyn. 1995. Population viability, nature reserves, and the outlook for gray wolf conservation in North America. *Restoration Ecology* 3: 26-38.
- _____, C.M. Mack, D.W. Smith, K.M. Murphy, M.K. Phillips, M.D. Jimenez, E.E. Bangs, J.A. Fontaine, C.C. Niemeyer, W.G. Brewster, and T.J. Kaminski. 2001. Outcomes of hard and soft releases of reintroduced wolves in central Idaho and the Greater Yellowstone Area. Pages 125-147 *in* D.S. Maehr, R.F. Noss, and J.L. Larkin, editors. *Large mammal restoration*. Island Press, Washington, D.C.
- _____ and L.D. Mech. 1981. Dynamics, movements, and feeding ecology of a newly protected wolf population in northwestern Minnesota. *Wildlife Monographs* 80: 1-79.
- _____, W.J. Paul, L.D. Mech, and D.P. Scott. 1992. Trends and management of wolf-livestock conflicts in Minnesota. Resource Publication 181. U.S. Fish and Wildlife Service, Washington, D.C. 27 pages.
- _____, R.O. Stephenson, R.D. Hayes, and L. Boitani. 2003. Wolves and humans. Pages 289-316 *in* L.D. Mech and L. Boitani, editors. *Wolves: behavior, ecology, and conservation*. The University of Chicago Press, Chicago, Illinois. 448 pages.
- Fuller, T.K. 1989. Population dynamics of wolves in north-central Minnesota. *Wildlife Monographs* 105: 1-41.
- _____, W.E. Berg, G.L. Radde, M.S. Lenarz, and G.B. Joselyn. 1992. A history and current estimate of wolf distribution and numbers in Minnesota. *Wildlife Society Bulletin* 20: 42-55.
- _____, L.D. Mech, and J.F. Cochrane. 2003. Wolf population dynamics. Pages 161-191 *in* L.D. Mech and L. Boitani, editors. *Wolves: behavior, ecology, and conservation*. The University of Chicago Press, Chicago, Illinois. 448 pages.
- _____ and D.L. Murray. 1998. Biological and logistical explanations of variation in wolf population density. *Animal Conservation* 1: 153-157.
- _____ and B.A. Sampson. 1988. Evaluation of a simulated howling survey for wolves. *Journal of Wildlife Management* 52: 60-63.
- _____ and W.J. Snow. 1988. Estimating wolf densities from radiotelemetry data. *Wildlife Society Bulletin* 16: 367-370.
- Garcia-Moreno, J., M.D. Matocq, M.S. Roy, E. Geffen, and R.K. Wayne. 1996. Relationships and genetic purity of the endangered Mexican wolf based on analysis on microsatellite loci. *Conservation Biology* 10 (2): 376-389.

- Garton, E.O., M.J. Wisdom, F.A. Leban, and B.K. Johnson. 2001. Experimental design for radiotelemetry studies. Pages 15-42 *in* J.J. Millspaugh and J.M. Marzluff, editors. Radio tracking and animal populations. Academic Press, San Diego, California.
- Gates, C.C., B. Elkin, and D. Dragon. 2001. Anthrax. Pages 396-412 *in* E.S. Williams and I.K. Baker, editors. Infectious diseases of wild mammals, third edition. Iowa State Press, Ames, Iowa.
- Gese, E.M., S.P. Keenan, and A.M. Kitchen. 2004. Lines of defense: coping with predators in the Rocky Mountain region. Utah State University Cooperative Extension, Logan, Utah. 33 pages.
- Green-Hammond, K.A. 1994. Assessment of impacts to populations and humans harvests of deer and elk caused by the reintroduction of Mexican wolves. Contractor report to U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 30 pages.
- Grooms, S. 1993. The return of the wolf. NorthWord Press, Minocqua, Wisconsin. 192 pages.
- Grosso, A.M. 1957. Foot-and-mouth disease in the Buenos Aires Zoo. *Gac. Vet.* 19: 54-55.
- Haney, J.C. and K. Lawrence. 2004. Elk harvest and wolf presence in Idaho: is there a link? Abstract of presentation *in* Defenders of Wildlife's Carnivores 2004: expanding partnerships in carnivore conservation. November 14-17, 2004. Santa Fe, New Mexico. Abstract available at http://carnivoreportal1.free.fr/archives2004_4.htm.
- Harrington, F.H. and L.D. Mech. 1982. An analysis of howling response parameters useful for wolf pack censusing. *Journal of Wildlife Management* 46: 686-693.
- Hayes, R.D., R. Farnell, R.M.P. Ward, J. Carey, M. Dehn, G.W. Kuzyk, A.M. Baer, C.L. Gardner, and M. O'Donoghue. 2003. Experimental reduction of wolves in the Yukon: ungulate responses and management implications. *Wildlife Monographs* 152: 1-35.
- Hedger, R.S. 1981. Foot-and-mouth disease in wildlife. Pages 87-96 *in* J.W. Davis, L.H. Karstad, and D.O. Trainer, editors. Infectious diseases of wild mammals. Iowa State University Press, Ames, Iowa.
- Hedrick, P.W., P.S. Miller, E. Geffen, and R.K. Wayne. 1997. Genetic evaluation of the three captive Mexican wolf lineages. *Zoo Biology* 16: 47-69.
- _____, R.N. Lee, and C. Buchanan. 2003. Canine parvovirus enteritis, canine distemper, and major histocompatibility complex genetic variation in Mexican wolves. *Journal of Wildlife Diseases* 39: 909-913.
- Heisey, D.M. and T.K. Fuller. 1985. Evaluation of survival and cause-specific mortality rates using telemetry data. *Journal of Wildlife Management* 49: 668-674.

- Hesselton, W.T and R.M. Hesselton. 1982. White-tailed deer. Pages 878901 *in* J.A. Chapman, and G.A. Feldhamer, editors. Wild mammals of North America: biology, management, economics. Johns Hopkins University Press, Baltimore, Maryland. 1147 pages.
- Hoffmeister, D.F. Mammals of Arizona. The University of Arizona Press, Tucson, Arizona. 602 pages.
- Holaday, B. 2003. Return of the Mexican gray wolf: back to the Blue. The University of Arizona Press, Tucson, Arizona. 220 pages.
- Hooge, P.N., W. Eichenlaub, and E. Solomon. 1999. The animal movement program. U.S. Geological Survey, Alaska Biological Science Center.
- Hosmer, D.W. and S. Lemeshow. 2000. Applied logistic regression: second edition. John Wiley & Sons, Inc., New York, New York.
- Huggard, D.J. 1993. Prey selectivity of wolves in Banff National Park. I. Prey species. Canadian Journal of Zoology 71: 130-139.
- Hughes, H. 2004. What's a beef cow worth? BEEF Magazine; web-based publication available at: http://beef-mag.com/ar/beef_whats_beef_cow/.
- Husseman, J.S. 2002. Prey selection patterns of wolves and cougars in east-central Idaho. M.S. Thesis, University of Idaho, Moscow, Idaho.
- Interorganizational Committee on Guidelines and Principles of Social Impact Assessment. 2003. Principles and guidelines for social impact assessment in the United States. Impact Assessment and Project Appraisal 21(3): 231-250.
- International Wolf Center. 2005. Non-lethal wolf depredation control methods: how well do they work? http://www.wolf.org/wolves/learn/intermed/inter_mgmt/nonlethal.asp.
- Johnson, T.B. 1990. Preliminary results of a public opinion survey of Arizona residents and interest groups about the Mexican wolf. Nongame and Endangered Wildlife Program Technical Report. Arizona Game and Fish Department, Phoenix, Arizona.
- _____, D.C. Noel, and L.Z. Ward. 1992. Summary of information on four potential Mexican wolf introduction areas in Arizona. Nongame and Endangered Wildlife Program Technical Report. Arizona Game and Fish Department, Phoenix, Arizona.
- Keith, L.B. 1983. Population dynamics of wolves. Pages 66-77 *in* L.N. Carbyn, editor. Wolves in Canada and Alaska: their status, biology, and management. Canadian Wildlife Service Report Series 45.

- Kelly, B., M. Brown, and O. Byers, editors. 2001. Mexican wolf reintroduction program three-year review workshop: final report. IUCN/SSC Conservation Breeding Specialist Group, Apple Valley, Minnesota.
- Kernohan, B.J., R.A. Gitzen, and J.J. Millspaugh. 2001. Analysis of animal space use and movements. Pages 125-187 in J.J. Millspaugh and J.M. Marzluff, editors. Radio tracking and animal populations. Academic Press, San Diego, California.
- Kohn, M.H., E.C. York, D.A. Kamradt, G. Haught, R.M. Sauvajot, and R.K. Wayne. 1999. Estimating population size by genotyping faeces. Proceedings of the Royal Society of London, Biological Sciences Series B 266: 657-663.
- Kreeger, T.J. 2003. The internal wolf: physiology, pathology, and pharmacology. Pages 192-217 in L.D. Mech and L. Boitani, editors. Wolves: behavior, ecology, and conservation. The University of Chicago Press, Chicago, Illinois. 448 pages.
- Kunkel, K., C. Mack, and W. Melquist. 2005. An assessment of current methods for surveying and monitoring wolves. Contract report prepared for The Nez Perce Tribe, Lapwai, Idaho. 59 pages.
- Leonard J.A., C. Vila, and R.K. Wayne. 2005. Legacy lost: genetic variability and population size of extirpated US grey wolves (*Canis lupus*). Molecular Ecology 14: 9-17.
- Leopold, A.S. 1959. Wildlife of Mexico: The game birds and mammals. University of California Press, Berkeley, California.
- Lindsey, S.L. 1987. The effect of food availability on the social organization and behavior of captive coyotes (*Canis latrans*). Ph.D. dissertation, Colorado State University, Boulder, Colorado. 162 pages.
- Linnell, J.D.C., R. Aanes, J.E. Swenson, J. Odden, and M.E. Smith. 1997. Translocation of carnivores as a method for managing problem animals: a review. Biodiversity and Conservation 6: 1245-1257.
- _____, R. Andersen, Z. Andersone, L. Balciauskas, J.C. Blanco, L. Boitani, S. Brainerd, U. Breitenmoser, I. Kojola, O. Liberg, J. Loe, H. Okarma, H.C. Pedersen, C. Promberger, H. Sand, E.J. Solberg, H. Valdmann, and P. Wabakken. 2002. The fear of wolves: a review of wolf attacks on humans. NINA Oppdragsmelding. 731: 1-65.
- Lucchini, V., E. Fabbri, F. Marucco, S. Ricci, L. Boitani, and E. Randi. 2002. Noninvasive molecular tracking of colonizing wolf (*Canis lupus*) packs in the western Italian Alps. Molecular Ecology 11: 857-68.

- Mackie, R.J., Hamlin, K.L. and Pac, D.V. 1982. Mule deer. Pages. 862-877 in J.A. Chapman, and G.A. Feldhamer, editors. Wild mammals of North America: biology, management, economics. Johns Hopkins University Press, Baltimore, Maryland. 1147 pages.
- Manfredo, M.J., A.D. Bright, J. Pate, and G. Tischbein. 1994. Colorado residents' attitudes and perceptions toward reintroduction of the gray wolf (*Canis lupus*) in Colorado. Human Dimensions in Natural Resources Unit, Colorado State University. Contract with U.S. Fish and Wildlife Service, Ecological Services, Golden, Colorado.
- McBride, R.T. 1980. The Mexican wolf (*Canis lupus baileyi*): a historical review and observations on its status and distribution. Endangered Species Report 8. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 38 pages.
- McLaren, B.E. and R.O. Peterson. 1994. Wolves, moose, and tree rings on Isle Royale. Science 226: 1555-1558.
- McNay, M.E. 2002a. A case history of wolf-human encounters in Alaska and Canada. Wildlife Technical Bulletin 13. Alaska Department of Fish and Game, Juneau, Alaska. 44 pages.
- _____. 2002b. Wolf-human interactions in Alaska and Canada: a review of the case history. Wildlife Society Bulletin 30: 831-843.
- Mech, L.D. 1970. The wolf: the ecology and behavior of an endangered species. Natural History Press, Garden City, New York. 384 pages.
- _____, L.G. Adams, T.J. Meier, J.W. Burch, and B.W. Dale. 1998. The wolves of Denali. University of Minnesota Press, Minneapolis, Minnesota.
- _____, S.H. Fritts, and W.J. Paul. 1988. Relationship between winter severity and wolf depredations on domestic animals in Minnesota. Wildlife Society Bulletin 16: 269-272.
- _____, L.D., E.K. Harper, T.J. Meier, and W.J. Paul. 2000. Assessing factors that may predispose Minnesota farms to wolf depredations on cattle. Wildlife Society Bulletin 28: 623-629.
- _____ and R.O. Peterson. 2003. Wolf-prey relationships. Pages 131-160 in L.D. Mech and L. Boitani, editors. Wolves: behavior, ecology, and conservation. The University of Chicago Press, Chicago, Illinois. 448 pages.
- _____, D.W. Smith, K.M. Murphy, and D.R. MacNulty. 2001. Winter severity and wolf predation on a formerly wolf-free elk herd. Journal of Wildlife Management 64: 998-1003.
- Mengel, R.M. 1971. A study of dog-coyote hybrids and implications concerning hybridization in *Canis*. Journal of Mammalogy 52: 316-336.

- Meriggi, A., P. Rosa, A. Brangi, and C. Matteucci. 1991. Habitat use and diet of the wolf in northern Italy. *Acta Theriol.* 36: 141-51.
- Messier, F. 1985. Solitary living and extraterritorial movements of wolves in relation to social status and prey abundance. *Canadian Journal of Zoology* 63: 239-245.
- _____. 1994. Ungulate population models with predation: a case study with the North American moose. *Ecology* 75: 478-488.
- Mladenoff, D.J., T.A. Sickley, R.G. Haight, and A.P. Wydeven. 1995. A regional landscape analysis and prediction of favorable gray wolf habitat in northern Great Lakes region. *Conservation Biology* 9: 279-294.
- Musiani, M. and E. Visalberghi. 2001. Effectiveness of fladry on wolves in captivity. *Wildlife Society Bulletin* 29: 91-98.
- _____, C. Mamo, L. Boitani, C. Callaghan, C.C. Gates, L. Mattei, E. Visalberghi, S. Breck, and G. Volpi. 2003. Wolf depredation trends and the use of barriers to protect livestock in western North America. *Conservation Biology* 17: 1538-1547.
- National Wildlife Federation et al. v. Secretary, United States Department of Interior. 1: 03-CV-340.
- Naughton-Treves, L., R. Grossberg, and A. Treves. 2003. Paying for tolerance: rural citizens' attitudes toward wolf depredation and compensation. *Conservation Biology* 17(6): 1500-1511.
- Nie, M.A. 2003. Beyond wolves: the politics of wolf recovery and management. University of Minnesota Press, Minneapolis, Minnesota. 253 pages.
- Nelson, M.E. and L.D. Mech. 1981. Deer social organization and wolf predation in northeastern Minnesota. *Wildlife Monographs* 77: 1-53.
- _____ and _____. 1986. Relationship between snow depth and gray wolf predation on white-tailed deer. *Journal of Wildlife Management* 50: 691-698.
- Neugebauer, W. 1976 (as cited in Hedger 1981). Maul-un klauenseuche bei kragenbaeren (*Ursus thibetanus*). *Der Zoologische Garten* 46: 195-197. (In German)
- Nowak, R.M. 1983. A perspective on the taxonomy of wolves in North America. Pages 10-19 in L.N. Carbyn, editor. *Wolves in Canada and Alaska: their status, biology, and management*. Report Series, No. 45. Canadian Wildlife Service, Edmonton, Alberta.

- _____. 1995. Another look at wolf taxonomy. Pages 375-397 *in* L.N. Carbyn, S.H. Fritts, and D.R. Seip, editors. Ecology and conservation of wolves in a changing world. Canadian Circumpolar Institute Occasional Publication 35.
- _____. 2003. Wolf evolution and taxonomy. Pages 239-258 *in* L.D. Mech and L. Boitani, editors. Wolves: behavior, ecology, and conservation. The University of Chicago Press, Chicago, Illinois. 448 pages.
- Oakleaf, J.K. 2002. Wolf-cattle interactions and habitat selection by recolonizing wolves in the northwestern United States. M.S. Thesis, University of Idaho, Moscow, Idaho.
- _____, C. Mack, and D.L. Murray. 2003. Effects of wolves on livestock calf survival and movements in central Idaho. *Journal of Wildlife Management* 67(2): 299-306.
- Office of Management and Budget (Executive Office of the President). 2005. Final information quality bulletin for peer review. *Federal Register* 70: 2664-2677.
- Packard, J.M. and L.D. Mech. 1980. Population regulation in wolves. Pages 135-150 *in* M.N. Cohen, R.S. Malpass, and H.G. Klein, editors. Biosocial mechanisms of population regulation. Yale University Press, New Haven, Connecticut.
- Paquet, P.C., J. Vucetich, M.L. Phillips, and L. Vucetich. 2001. Mexican wolf recovery: three year program review and assessment. Prepared by the Conservation Breeding Specialist Group for the U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 86 pages.
- Parker, G.R. 1973. Distribution and densities of wolves within barren-ground caribou range in mainland Canada. *Journal of Mammalogy*. 54: 341-348.
- Parsons, D.R. 1996. Case study: the Mexican wolf. Pages 101-123 *in* E.A. Herrera and L.F. Huenneke, editors. New Mexico's natural heritage: biological diversity in the Land of Enchantment. *New Mexico's Journal of Science* 36: 101-123.
- _____. 1998. Mexican wolf interagency management plan. Unpublished document. U.S. Fish and Wildlife Service, Region 2, Albuquerque, New Mexico.
- _____. 1998. "Green fire" returns to the Southwest: reintroduction of the Mexican wolf. *Wildlife Society Bulletin* 26: 799-807.
- _____ and J.E. Nicholopolous. 1995. An update of the status of the Mexican wolf recovery program in the Unites States. Pages 141-146 *in* L.N. Carbyn, S.H. Fritts, and D.R. Seip, editors. Ecology and conservation of wolves in a changing world. Canadian Circumpolar Institute Occasional Publication 35.

- Peek, J.M. 1982. Elk. Pages 851-861 *in* J.A. Chapman and G.A. Feldhamer, editors. Wild mammals of North America: biology, management, economics. Johns Hopkins University Press, Baltimore, Maryland. 1147 pages.
- Peterson, R.O. 1977. Wolf ecology and prey relationships on Isle Royale. U.S. National Park Service. Science Monograph. Serv. 11. 210 pages.
- _____ and R.E. Page. 1988. The rise and fall of Isle Royale wolves. *Journal of Mammalogy* 69: 89-99.
- Phillips, M.K., V.G. Henry, and B.T. Kelly. 2003. Restoration of the red wolf. Pages 272-288 *in* L.D. Mech and L. Boitani, editors. *Wolves: behavior, ecology, and conservation*. The University of Chicago Press, Chicago, Illinois. 448 pages.
- Pletscher, D.H., R.R. Ream, D.K. Boyd, D.M. Fairchild, and K.E. Kunkel. 1997. Population of a recolonizing wolf population. *Journal of Wildlife Management* 61: 459-465.
- Powell, R.A. 2000. Animal home ranges and territories and home range estimators. Pages 65-110 *in* L. Boitani and T.K. Fuller, editors. *Research techniques in animal ecology: controversies and consequences*. Columbia University Press, New York, New York. 464 pages.
- Reading, R.P., T.W. Clark, and B. Griffith. 1997. The influence of valuational and organizational considerations on the success of rare species translocations. *Biological Conservation* 79: 217-225.
- Reed, J.E. 2004. Diets of free-ranging Mexican gray wolves in Arizona and New Mexico. M.S. Thesis, Texas Tech University, Lubbock, Texas.
- Ripple, W.J. and R.L. Beschta. 2003. Wolf reintroduction, predation risk, and cottonwood recovery in Yellowstone National Park. *Forest Ecology and Management* 184: 299-313.
- _____. 2004. Wolves, elk, willows, and trophic cascades in the upper Gallatin Range of southwestern Montana, USA. *Forest Ecology and Management* 200: 161-181.
- Robbins, J. 2005. Weaving a new web: wolves change an ecosystem. Smithsonian National Zoological Park document. <http://nationalzoo.si.edu>.
- Robinson, M.J. 2005. *Predatory bureaucracy: the extermination of wolves and the transformation of the West*. University Press of Colorado, Boulder, Colorado. 473 pages.
- Roy, L.D. and M J. Dorrance. 1976. *Methods of investigating predation of domestic livestock: a manual for investigating officers*. Alberta Agriculture, Edmonton, Alberta, Canada.
- Salganik, M.J. and D.D. Heckathorn. 2004. Sampling and estimation in hidden populations using respondent-driven sampling. *Sociological Methodology* 34: 193-239.

- Salvador, A. and P.L. Abad. 1987. Food habits of a wolf population in Leon Province, Spain. *Mammalia* 51: 45-52.
- Schultz, R.N., K.W. Jonas, L.H. Skuldt, and A.P. Wydeven. 2005. Experimental use of dog-training shock collars to deter depredation by gray wolves. *Wildlife Society Bulletin* 33: 142-148.
- Shivik, J.A. and D.J. Martin. 2001. Aversive and disruptive stimulus applications for managing predation. *Proceedings of the Eastern Wildlife Damage Management Conference* 9: 111-119.
- _____, J.A., A. Treves, and P. Callahan. 2003. Non-lethal techniques: primary and secondary repellents for managing predation. *Conservation Biology* 17: 1531-1537.
- Seaman, D.E., J.J. Millspaugh, B.J. Kernohan, G.C. Brundige, K.J. Raedeke, and R.A. Gitzen. 1999. Effects of sample size on kernel home range estimates. *Journal of Wildlife Management* 63: 739-747.
- Siminski, D.P. 2003. 2003 Mexican wolf Species Survival Plan annual meeting. Tucson: Arizona-Sonora Desert Museum. Tucson, Arizona.
- _____ and E.M. Spevak. 2004. Mexican wolf (*Canis lupus baileyi*) Species Survival Plan. 62 pages.
- Smietana, W. and A. Klimek. 1993. Diet of wolves in the Bieszczady Mountains, Poland. *Acta Theriol.* 38: 245-251.
- Smith, D.W., T.D. Drummer, K.M. Murphy, D.S. Guernsey, and S.B. Evans. 2004. Winter prey selection and estimation of wolf kill rates in Yellowstone National Park, 1995-2000. *Journal of Wildlife Management* 68: 153-166.
- _____, R.O. Peterson, and D.B. Houston. 2003. Yellowstone after wolves. *Journal of BioScience* 53 (4): 330-340
- Smith, M.E., J.D.C. Linnell, J. Odden, and J.E. Swenson. 2000a. Review of methods to reduce livestock depredation: I. Guardian animals. *Acta Agriculturae Scandinavica Section A - Animal Science* 50: 279-290.
- _____. 2000b. Review of methods to reduce livestock depredation II. Aversive conditioning, deterrents and repellents. *Acta Agriculturae Scandinavica Section A - Animal Science* 50: 304-315.
- Sokal, R.R. and F.J. Rohlf. 1981. *Biometry*. W.H. Freeman and Company, New York.

- Terborgh, J., J. Estes, P. Paquet, K. Ralls, D. Boyd-Heger, B. Miller, and R. Noss. 1999. The role of top carnivores in regulating terrestrial ecosystems. *Wild Earth* 9: 42-56.
- Theberge, J.B., G.J. Forbes, I.K. Baker, and T. Bollinger. 1994. Rabies in wolves of the Great Lakes region. *Journal of Wildlife Diseases* 30: 563-566.
- Thomson, G.R., R.G. Bengis, and C.C. Brown. 2001. Picornavirus infections. Pages 119-130 *in* E.S. Williams and I.K. Baker, editors. *Infectious diseases of wild mammals*, third edition. Iowa State Press, Ames, Iowa.
- Thompson, J.G. 1993. Addressing the human dimensions of wolf reintroduction: an example using estimates of livestock depredation and costs of compensation. *Society and Natural Resources* 6: 165-179.
- Torell, L.A., N.R. Rimbey, O.A. Ramirez, and D.W. McCollum. 2004. New faces and the changing value of rangeland. Pages 57-86 *in* L.A. Torell, N.R. Rimbey, and L. Harris, editors. *Current issues in rangeland resource economics*. Research Report 190. Utah State University, Logan, Utah.
- _____, L.A., O.A. Ramirez, N.R. Rimbey, and D.W. McCollum. 2005. Income earning potential versus consumptive amenities in determining ranchland values. *J. Agricultural Resource Economics* 30(3): 537-560.
- U.S. Department of Agriculture. 1999. Meat animals production, disposition, and income: final estimates 1993-1997. National Agricultural Statistics Service Statistical Bulletin Number 959a.
- _____. 2002. National Agricultural Statistics Service [2002], 2002 census of agriculture, accessed March 9, 2005, at <http://www.nass.usda.gov/census/>.
- _____. 2005. Arizona livestock. U.S. Department of Agriculture, National Agriculture Statistics Service and University of Arizona, College of Agriculture, Tucson, Arizona.
- U.S. Fish and Wildlife Service. 1978. Reclassification of the gray wolf in the United States and Mexico, with determination of critical habitat in Michigan and Minnesota. *Federal Register* 43: 9607-9615.
- _____. 1982. Mexican wolf recovery plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 115 pages.
- _____. 1987. Northern Rocky Mountain wolf recovery plan. Denver, Colorado. 119 pages.
- _____. 1992. Recovery plan for the eastern timber wolf. U.S. Fish and Wildlife Service, Twin Cities, Minnesota.

- _____. 1993. Comparison of habitat suitability attributes of five areas being considered for the reintroduction of Mexican wolves. Unpublished report. U.S. Fish and Wildlife Service, Albuquerque, New Mexico.
- _____. 1994a. Establishment of a nonessential experimental population of gray wolves in Yellowstone National Park in Wyoming, Montana, and Idaho and central Idaho and southwestern Montana. Final Rule. Federal Register 59: 60252-60281.
- _____. 1994b. Notice of interagency cooperative policy for peer review in Endangered Species Act activities. Federal Register 59: 34270.
- _____. 1994c. Notice of interagency cooperative policy on recovery plan participation and implementation under the Endangered Species Act. Federal Register 59: 34272.
- _____. 1995. Revision of special rule for nonessential experimental populations of red wolves in North Carolina and Tennessee: Final Rule. Federal Register 60: 18940-18948.
- _____. 1996. Final environmental impact statement: reintroduction of the Mexican wolf within its historic range in the southwestern United States. U.S. Fish and Wildlife Service, Albuquerque, New Mexico.
- _____. 1997. Notice of record of decision and statement of findings on the environmental impact statement on reintroduction of the Mexican gray wolf to its historic range in the southwestern United States. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 21 pages.
- _____. 1998. Establishment of a nonessential experimental population of the Mexican gray wolf in Arizona and New Mexico. Federal Register 63: 1752-1772.
- _____. 2003. Final rule to reclassify and remove the gray wolf from the list of endangered and threatened wildlife in portions of the conterminous United States; establishment of two special regulations for threatened gray wolves; final and proposed rules. Federal Register 68: 15804-15875.
- Vila, C. and R.K. Wayne. 1999. Hybridization between wolves and dogs. *Conservation Biology* 13: 195-198.
- Vucetich, J.A., M.P. Nelson, and M.K. Phillips. *In press*. The normative dimension and legal meaning of *endangered* and *recovery* in the U.S. Endangered Species Act. *Conservation Biology*.
- Weiler, G.J., G.W. Garner, and D.G. Ritter. 1995. Occurrence of rabies in a wolf population in northeastern Alaska. *Journal of Wildlife Diseases* 31: 79-82.
- White, G.C. 2000. Population viability analyses: data requirements and essential analyses. Pages 228-331 *in* L. Boitani and T.K. Fuller, editors. *Research techniques in animal ecology*:

controversies and consequences. Columbia University Press, New York, New York. 464 pages.

_____ and R.A. Garrott. 1990. Analysis of wildlife radio-tracking data. Academic Press Incorporated, New York, New York.

World Health Organization. 1994. World survey of rabies 28 for the year 1992. Geneva: World Health Organization, 1994.

Worton, B.J. 1989. Kernel methods for estimating the utilization distribution in home range studies. *Ecology* 70: 164-168.

Wydeven, A.P., R.N. Schultz, and R.P. Thiel. 1995. Monitoring of a recovering gray wolf population in Wisconsin. Pages 169-175 in L.N. Carbyn, S.H. Fritts, and D.R. Seip, editors. Ecology and conservation of wolves in a changing world. Canadian Circumpolar Institute, Edmonton, Alberta, Canada.

Young, S.P. and E.A. Goldman. 1944. The wolves of North America. The American Wildlife Institute, Washington, D.C. 632 pages.

PERSONAL COMMUNICATIONS

Collinge, M. December 12, 2005. USDA-APHIS Wildlife Services, Idaho. Stated that about 40 to 50% of the livestock "wolf depredation" carcasses reported to Idaho USDA-APHIS Wildlife Services are found through investigation to be confirmed or probable wolf depredations.

Mech, L.D. October 5, 2005. U.S. Geological Service Biological Resources Division. Stated he was not aware of any specific instances where the voices of children could be specifically tied to a wolf attack on a child.

Miller, C. March 20, 2005. Defenders of Wildlife. Clarification on the purposes for which payments may be made from Defenders of Wildlife wolf depredation compensation fund.

Paquet, P.C. December 13, 2005. University of Calgary, Alberta, Canada. Discussed circumstances pertaining to his ongoing investigation for the Saskatchewan Provincial Coroner of the death of Kenton Joel Carnegie on November 8, 2005, possibly as a result of wolf attack.

Spevak, E. September 23, 2005. Cincinnati Zoo. Clarified a question concerning the number of founders based on the genetic formula to determine percent heterozygosity retained in a sample of unrelated founders, allelic diversity sampling, and also on realism and common sense.