

DRAFT

Pima County Reserves

A Summary of Existing Master and Management Plans

Sonoran Desert Conservation Plan

May 2001



Pima County, Arizona Board of Supervisors

Ann Day, District 1
Dan Eckstrom, District 2
Sharon Bronson, District 3
Raymond J. Carroll, District 4
Raúl M. Grijalva, Chairman, District 5

County Administrator

Chuck Huckelberry



MEMORANDUM

Date: May 25, 2001

To: The Honorable Chair and Members
Pima County Board of Supervisors

From: C.H. Huckelberry
County Administrator *[Signature]*

Re: **Pima County Reserves, A Summary of Existing Master and Management Plans**

Background

As we finalize the research for the Sonoran Desert Conservation Plan and begin to understand the program needs for implementation, a number of assessments and proposed options have been forwarded to the Board. This week studies have been issued in the areas of adaptive management for cultural resources and purchase of development rights programs for ranch lands. The attached study by Ms. Lauren Harvey entitled *Pima County Reserves, A Summary of Existing Master and Management Plans*, reviews the planning efforts and analyzes the existing background reports, master plans, and management plans of the following parks and preserves owned by Pima County:

- Arthur Pack Regional Park
- Cienega Creek Natural Preserve
- Colossal Cave Mountain Park
- River Park System
- Roy Drachman, Agua Caliente Regional Park
- Southeast Regional Park
- Tortolita Mountain Park
- Tucson Mountain Park

Suggestions for the Next Steps in the Planning and Program Design Process

A comparison of the planning documents, natural and cultural resources, threats and stressors, inventories, monitoring and research activities is presented. This analysis sets the stage for framing management issues and proposing actions that can benefit the overall biological reserve under the Sonoran Desert Conservation Plan. The staff from the Natural Resources, Parks and Recreation Department recommends that adaptive management planning proceed in this order: Tucson Mountain Park, the Colossal Cave Mountain Park, Cienega Creek Natural Preserve, Tortolita Mountain Park, Arthur Pack Regional Park, and the Agua Caliente Regional Park. This approach and the management options for Pima County's parks and reserve areas will be discussed by the Steering Committee and the newly formed Recreation Technical Advisory Team so that recommendations can be forwarded to the Board about (1) the level of protection that should be adopted under the Section 10 permit of the Sonoran Desert Conservation Plan, and (2) priorities for funding research, monitoring and conservation efforts.

Attachment

Pima County Reserves
A Summary of Existing Master and Management Plans

Table of Contents

Introduction	1
Existing Reserve Plans:	
Status	9
Priority Vulnerable Species	35
Cultural Resources	49
Threats and Stressors	54
Inventory, Monitoring and Research Activities	65
Management Issues and Proposed Management Actions	67
Conclusions and Recommendations	80
 Appendix A Excerpts from Cienega Creek Natural Preserve Management Plan	
 Appendix B Excerpts from the Tortolita Mountain Park Master Plan	
 Appendix C References	

Introduction

Pima County Natural Resources, Parks and Recreation Department

In 1947 the City of Tucson organized a recreation program in the unincorporated areas of Pima County with \$25,000 appropriated by the Tax Commission. Gilbert Ray was selected to head this new program and within four months of its inception, the new Pima County Parks and Recreation Department was given independent status.

However, many years before the Parks and Recreation Department was formed, C.B. Brown and Jack Kinney worked to set aside Pima County's first natural reserve, Tucson Mountain Park. In order to establish the park, they orchestrated the withdrawal from mining activity of some 988 acres of land. Their efforts led to the designation of the original Tucson Mountain Park boundaries in 1929. As agreed, Pima County continued to acquire a section (640 acres) a year to expand the park.

The acquisition plan for Tucson Mountain Park continued until 1959 when the U.S. Department of the Interior reopened acreage within the park boundary to mining. The Pima County Board of Supervisors worked tirelessly to rescind the order and held a public meeting at the Pioneer Hotel that was attended by more than 1,000 people. On December 17, 1959 their efforts were rewarded and the area was closed to mining forever. In 1961, Secretary of the Department of the Interior Stuart Udall created the Tucson Mountain District of the Saguaro National Monument that covered the northern part of the Tucson Mountains, while the Tucson Mountain Park was retained in the southern part of the range.

Tucson Mountain Park isn't the only Pima County reserve with an interesting history. Frank Schmidt provided guided tours of Colossal Cave continuously from 1923-1944 interrupted only by the CCC to provide park improvements. In 1944, Pima County leased Colossal Cave Park from the Arizona State Land Department and appointed Mr. Schmidt as the park supervisor. 1956 saw the beginning of a unique situation when the park was leased to a private operation while still being administered as a Pima County park. This arrangement prevailed until 1992 when Pima County purchased Colossal Cave and the adjacent La Posta Quemada Ranch thereby creating Colossal Cave Mountain Park.

Arthur Pack Regional Park was patent to the Pima County Parks and Recreation Department by the Bureau of Land Management in 1975. Roy P. Drachman – Agua Caliente Regional Park, Tortolita Mountain Park and Cienega Creek Natural Preserve are fairly recent additions to the Pima County reserve system having been acquired in 1984, 1985 and 1986 respectively. Southeast Regional Park was acquired from the State of Arizona and the Bureau of Land Management in 1975, and river park acquisition occurred primarily for flood control purposes beginning in the 1970s.

Over the years the Pima County Parks and Recreation Department has grown and changed to address its scope of responsibility and funding levels. With acceptance of the draft Preliminary Sonoran Desert Conservation Plan (SDCP) in September 2000, the Pima County Board of Supervisors directed the Parks and Recreation Department to renew a focus on natural resources.

The new Pima County Natural Resources, Parks and Recreation Department has a role in the implementation of the SDCP through management of our existing natural resource park lands and those lands proposed for acquisition under the SDCP. Implementation of the Sonoran Desert Conservation Plan will guide the mission of the Natural Resources, Parks and Recreation Department over at least the next twenty-five years.

In his memo preceding the *Preliminary Mountain Parks Element* as presented to the Pima County Board of Supervisors, C.H. Huckelberry, County Administrator, identified three reasons why there is a mismatch between past preservation efforts and the currently declining natural systems in Pima County.

- First, parks in Pima County and across the country have often been created to set aside areas of great beauty, but plant and animal communities do not make location decisions based on aesthetics.
- Second, areas that have been set aside for wildlife protection purposes often are too small to support viable populations of the species. It was not until 1985 that scientists in the relatively new field of conservation biology could calculate how badly we have misjudged the area needs of wide ranging carnivores. Large animals are becoming extinct within the boundaries of the very parks that were created to protect them.
- And third, existing protected areas are disconnected. This fragmentation between even large public areas relegates the existing open space patches to the role of a zoo, when the natural functions of the system are replaced by human management and maintenance of the plant and animal communities.

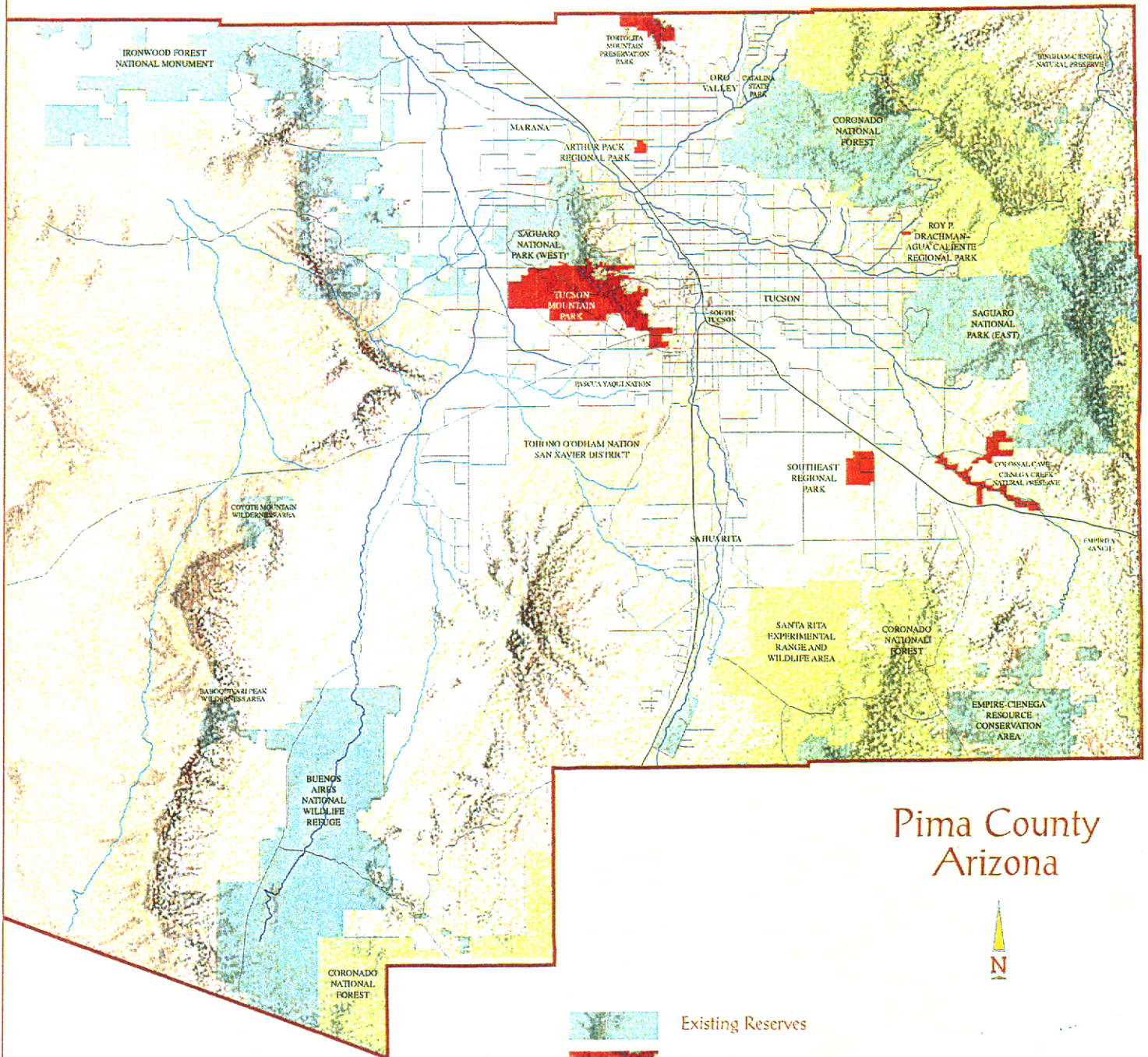
This is our challenge and if we are to succeed as stewards of the Sonoran Desert we must understand the plant and animal communities that exist within our reserve boundaries, the habitat requirements of these species, and plan for biological connections between Pima County reserves and those managed by other entities.

In order to fulfill the vision established by the Sonoran Desert Conservation Plan, the Pima County Natural Resources, Parks and Recreation Department has adopted a new focus on resource management. We will remain providers of parks and recreational experiences, and will effectively manage reserves of significant natural and cultural diversity.

Pima County Natural Reserves

In Pima County, natural reserves are defined as those parklands that have been set aside for the purpose of preserving open space and resource values. We are fortunate to have significant holdings of public lands in Pima County that are owned or supported by the Pima County Natural Resources, Parks and Recreation Department. The map on the following page illustrates the Pima County Natural Reserves.

Pima County Reserves



Pima County
Arizona



- Existing Reserves
- Pima County Reserves
- Other Public Lands
- Areas not included in Preliminary reserve system - open to urban development and other uses
- Tohono O'odham Nation

Reserves managed by the Pima County Natural Resources, Parks, and Recreation Department will play a role in the establishment of a core reserve system and in development of buffers and connections between other publicly owned lands. Core reserves are those areas identified as having the greatest potential for preservation of priority vulnerable species. The Sonoran Desert Conservation Plan, Science and Technical Advisory Team (STAT) will define what park lands will be considered as core reserves, buffers, and connections.

Substantial biological value exists within some of the Pima County reserves. In these parks, the entire area may be included in the core reserve system. In other cases, only a portion of the park may be designated as a reserve, buffer or connection. The STAT is using the national Gap Analysis Program (GAP) to assist in the designation of the reserve system. GAP establishes a hierarchy of land conservation status. A recently released document titled *The Role of Adaptive Management* contains a more detailed discussion of GAP Status.

Pima County reserves with the highest level of protection include those with a GAP Status of 1a, 1b, 2 and 3a. These areas will be the focus of adaptive management planning efforts including the inventory, monitoring and research of priority vulnerable species identified by the STAT.

- Cienega Creek Natural Preserve
- Colossal Cave Mountain Park
- Roy P. Drachman - Agua Caliente Regional Park
- Tortolita Mountain Park
- Tucson Mountain Park including the Tucson Mitigation Corridor

Lands that may be more valuable in terms of offering buffers or connectivity to larger core reserves include the remainder of Pima County reserves identified as GAP Status 3b, 4b and 4c.

- Arthur Pack Regional Park
- River Parks
- Southeast Regional Park

In the next section, each Pima County reserve is described in terms of its physical description and unique characteristics.

Arthur Pack Regional Park

A 505 acre park located within the Tortolita Fan drainage area and characterized by the ironwood plant community. This park is in the rapidly growing northwest portion of the Tucson metropolitan area, and is within critical habitat for the Cactus Ferruginous Pygmy Owl. The Pima County Natural Resources, Parks and Recreation Department manages Arthur Pack Regional Park. A 210-acre golf course is located within the park and is leased to a private concern.

Cienega Creek Natural Preserve

Cienega Creek Natural Preserve encompasses 4,105 acres between Colossal Cave Road to the northwest and Empirita Ranch to the southeast approximately 30 miles east of Tucson. Land for this preserve, including a twelve mile stretch of Cienega Creek, was acquired by the Pima County Flood Control District to preserve riparian habitat, provide for natural flood storage and to facilitate ground water recharge. Six miles of perennial stream flow are found within the preserve. Cienega Creek is designated as a "Unique Water of Arizona". The Pima County Flood Control District and the Pima County Natural Resources, Parks and Recreation Department jointly manage the Preserve.

Colossal Cave Mountain Park

The Pima County Parklands Foundation manages this 2,586 acre park located 14 miles southeast of Tucson in the foothills of the Rincon Mountains. Coronado National Forest borders part of the eastern boundary, and when Pima County purchased La Posta Quemada Ranch in 1989 a significant riparian area was conserved. Eventually Colossal Cave Mountain Park will connect to Cienega Creek Natural Preserve via Posta Quemada and Agua Verde Creeks. Land within the park is owned by Pima County, the Foundation, or is included in a grazing lease with the Arizona State Land Department. In 1992, Colossal Cave Mountain Park was listed on the National Register of Historic Places. Private individuals operate the park including the cave attraction and a ranching operation under separate agreements with the Parklands Foundation.

River Parks

Pima County Natural Resources, Parks and Recreation Department currently manage some 15 miles of linear parks along the Rillito and Santa Cruz Rivers in the Tucson metropolitan area. These lands were originally purchased for flood control purposes and have since been enhanced to provide recreational opportunities. Existing river parks are only part of a larger vision for Pima County management of most washes in the Tucson Basin. This vision is articulated in the *Eastern Pima County Trail System Master Plan* and in the *Pima County River Parks Master Plan*. Within this proposed system lies the potential for creation of interconnected biological linkages between areas of publicly held land.

Roy P. Drachman – Agua Caliente Regional Park

This is a unique park within the regional system of Pima County and is managed by the Natural Resources, Parks and Recreation Department. It encompasses 101 acres in the northeast part of Tucson nestled between the Catalina and Rincon Mountains. A natural warm spring surfaces on the property and provides water to a series of man made ponds that were once the site of an 1880's resort catering to the infirm. Prehistoric people in this area made use of the spring, with the majority of the park included in the Hohokam Whiptail archaeological site. The park is an important water source for a wide variety of wildlife. Due to the

presence of water and the park's location near Agua Caliente Creek, it has been selected as the site favored for the reintroduction of native fish, reptiles and amphibians.

Southeast Regional Park

Southeast Regional Park encompasses some 2,992 acres in Pima County south of Interstate 10 and west of Houghton Road. This area is managed by the Pima County Natural Resources, Parks and Recreation Department and is the site of the Pima County Fairgrounds and the Southwest International Raceway, both of which are facilities leased to private concerns. In addition, the new Pima Motorsports Park will also be a leased facility. In spite of this intensely developed part of the park, more than half of this large park remains in an undeveloped state. As such, it has potential benefit as a Pima County reserve.

Tortolita Mountain Park

Tortolita Mountain Park includes 3,446 acres of nearly pristine Sonoran Desert in northern Pima and southern Pinal Counties. When initial acquisitions occurred in 1986-1987, it was located on the periphery of the Tucson Basin. Due to the dramatic growth experienced in the northwest metropolitan region, urban pressures will increasingly impact Tortolita Mountain Park. The reserve is currently undeveloped with no legal public access to the park.

Tucson Mountain Park

This is the oldest park within the Pima County reserve system. Established in 1928 to preserve and protect the natural and scenic resources of the Tucson Mountains, the park has grown to just over 22,000 acres including the 2,500 acre Bureau of Reclamation Tucson Mitigation Corridor. The Arizona-Sonora Desert Museum and Old Tucson Studios, both of which contribute significantly to local tourism, are located within the park boundaries on leased land. Although physical development is limited, recreational use continues to increase and is permitted with few restrictions. Future management must give priority to vulnerable species since Tucson Mountain Park is within critical habitat for the Cactus Ferruginous Pygmy Owl. Development of a long-term management plan to set policies for resource protection and public recreation is a critical endeavor that must begin as soon as species goals and management prescriptions are identified under the Sonoran Desert Conservation Plan.

Report Sequence and Relationship

Pima County Reserves, A Summary of Existing Master and Management Plans is offered as the first in a series of reports prepared by the Pima County Natural Resources, Parks and Recreation Department to set the stage for future adaptive management planning of the Pima County reserves. This first report combines and

analyzes information contained in a variety of master plans and management plans for the reserves. It answers the question of what is known about the Pima County reserves.

A valid criticism of the Pima County reserve system is that no consistent management planning process has been applied that is adaptive in nature and considers the pivotal role of inventory, monitoring and research. As we embark in our new role as managers of significant core reserve lands, the department will need to embrace a management planning process and use a standardized template for the preparation of adaptive management plans that includes both resource protection and recreational benefit. A second report to address these issues will be prepared following issuance of the *Pima County Reserves, A Summary of Existing Master and Management Plans*.

Upon completion of a management planning process and template, and initial drafts of the Adaptive Management Plan and the Multi-Species Habitat Conservation Plan, the department will embark on the first adaptive management plan for Tucson Mountain Park. This public planning effort will involve a scientifically based resource inventory of the park, will recommend management policies and actions designed to preserve priority vulnerable species and cultural resources while at the same time allowing for public recreational use, and will identify ongoing research efforts and monitoring activities.

Contained within the Final Sonoran Desert Conservation Plan will be a Final Mountain Parks Element. It is anticipated this document will recommend acquisition and management of lands to preserve the viability of priority vulnerable species and the many significant cultural resources to be found in Pima County.

Existing Reserve Plans: Status

Introduction

In the past, the Pima County Natural Resources, Parks and Recreation Department managed planning efforts for most of the identified reserve lands. Some of these efforts resulted in the creation of master plans while others produced management plans. The two terms, master plans and management plans, seem to have been used interchangeably.

Given the renewed focus of the department on resource management, future planning efforts for the reserve lands will concentrate on the creation of adaptive management plans. Specific development projects within the boundaries of Pima County reserves may be the subject of future site plans or master plans depending on the scale of the proposed development.

Following is a discussion of each reserve and the planning efforts to date. The description includes mention of the consultant(s), project team, approvals, planning process, goals and objectives, and a summary of the plan itself.

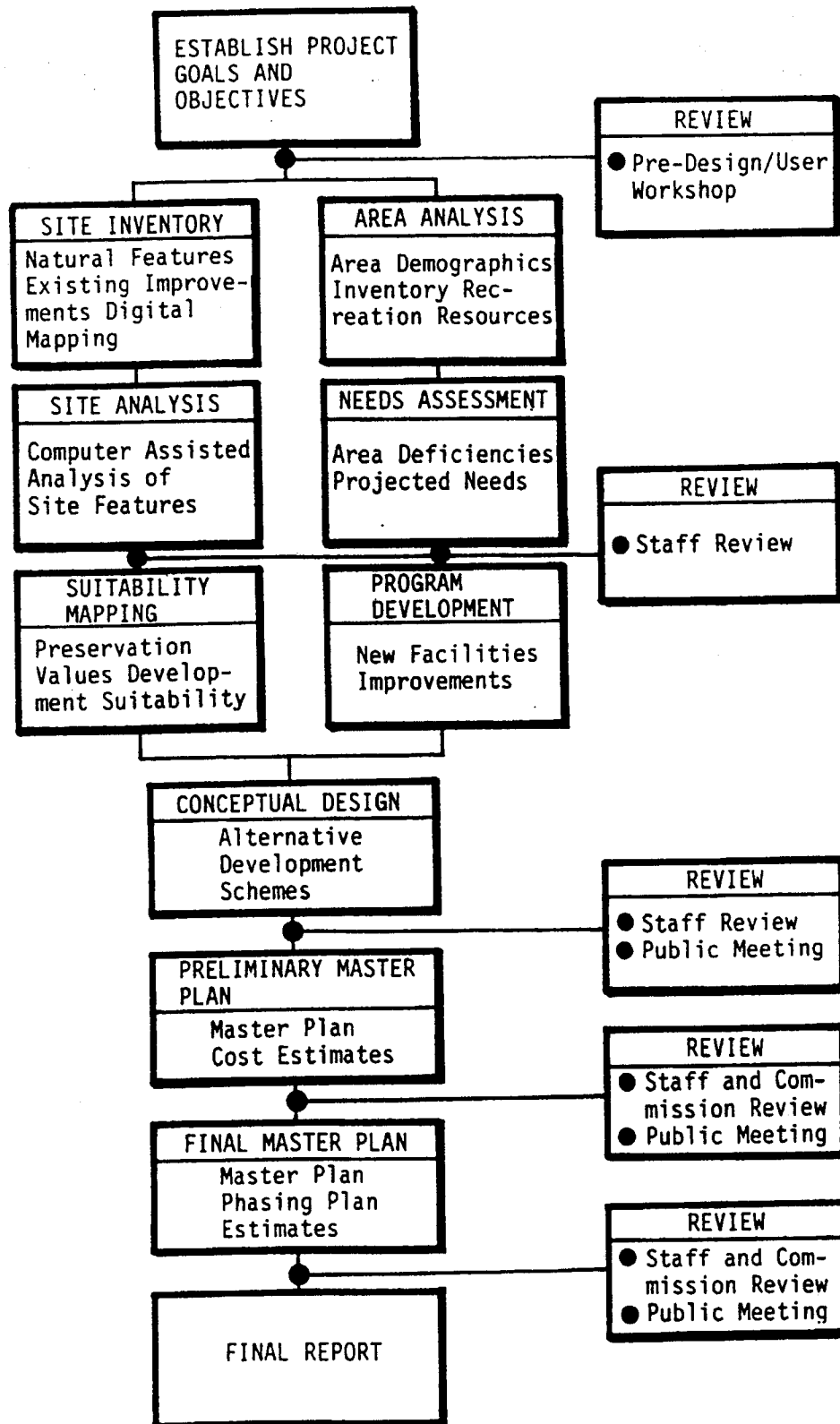
Arthur Pack Regional Park

On May 18, 1988, the Pima County Parks and Recreation Commission approved the Arthur Pack Regional Park Master Plan. This planning effort was led by the consultant firm of McGann & Associates Inc. and included several subconsultants. Digital Land Systems Inc. provided a resource analysis and Dr. Gregory McPherson contributed to the effort as a plant community specialist.

Pima County Parks and Recreation Department managed this project funded by the 1986 General Obligation Bond. In addition to the consultant team, a number of other organizations participated including the Arizona Department of Game and Fish, Arizona State Museum, and The Audubon Society. Four public meetings were held during the course of the planning process.

McGann & Associates followed a defined process that culminated in the preparation of a Final Master Plan for Arthur Pack Regional Park. A final report titled *Master Plan for the Development of Arthur Pack Regional Park* completed by McGann & Associates outlines this process.

THE MASTER PLANNING PROCESS



With input from the Pima County Parks and Recreation Department, Parks and Recreation Commission and the public, goals were established for Arthur Pack Regional Park. These goals are as follows:

- To provide for the protection and preservation of significant portions of the natural desert environment within the park, and to make those preserved areas a principal feature of Arthur Pack Regional Park
- To provide for the existing and future recreational needs of the residents of Pima County, and in particular, the residents of the principal service area of Arthur Pack Regional Park
- To develop facilities that complement, and do not duplicate, facilities existing or planned for other parks within the Pima County Park System
- To identify opportunities for the development of joint use facilities; facilities that would be constructed, used, and/or maintained jointly by the Pima County Parks Department or the YMCA.

A considerable effort was made during the master planning process to define areas within the park suitable for development. This evaluation was based on an inventory of the site resources that culminated in mapping of the vegetation preservation value, wildlife habitat potential, and slopes. Then, these maps were overlaid and an analysis performed that resulted in an assessment of development suitability. Areas of high vegetation preservation and wildlife habitat potential value were not recommended for development, while areas of low vegetation preservation and low wildlife habitat potential value were suggested for future park development.

The Final Master Plan was based on this assessment of development suitability and calls for the development and/or improvement of the following six principal use areas:

- Sports Field Complex
- Community Center and Picnic Area
- YMCA Center
- Environmental Education/Interpretive Center
- Westside Neighborhood Park
- Golf Course

These areas were envisioned as surrounded by the undisturbed natural desert environment and connected by a trail system. The Final Master Plan for Arthur Pack Regional Park is included on the following page.

community and the fact this park is within critical habitat for the Cactus Ferruginous Pygmy Owl as designated by the U.S. Fish and Wildlife Service, future park development will be limited.

Cienega Creek Natural Preserve

A management plan for Cienega Creek Natural Preserve is contained within two volumes prepared by McGann & Associates, Inc. The *Cienega Creek Natural Preserve Background Report* was completed in January 1994, and the *Cienega Creek Natural Preserve Management Plan* followed in October of the same year. Many consultants contributed to the management planning effort including wildlife, aquatic and avian ecologists; herpetologists; wildlife biologists; archaeologists and a historian.

This planning effort was funded in part by a grant from the Arizona Heritage Fund and was led by the Pima County Department of Transportation and Flood Control District who provided the balance of funding needed to complete the plan. The Arizona Game and Fish Department as well as other Pima County departments including Parks and Recreation participated in the management planning process.

When the Cienega Creek Natural Preserve was established in 1986, the Pima County Board of Supervisors adopted a Declaration of Restrictions, Covenants and Conditions stating the Preserve was established "...for the purposes of the preservation and protection of the natural and scenic resources of the property, ...for the benefit and protection of the County, its resources, residents, and visitors". To accomplish this broad goal, three principal management objectives were established that guided preparation of the management plan.

- To preserve and protect the perennial stream flow in Cienega Creek
- To preserve and protect the existing natural riparian community along the stream corridor
- To provide opportunities for public use of the Preserve for recreation, education, and other appropriate activities

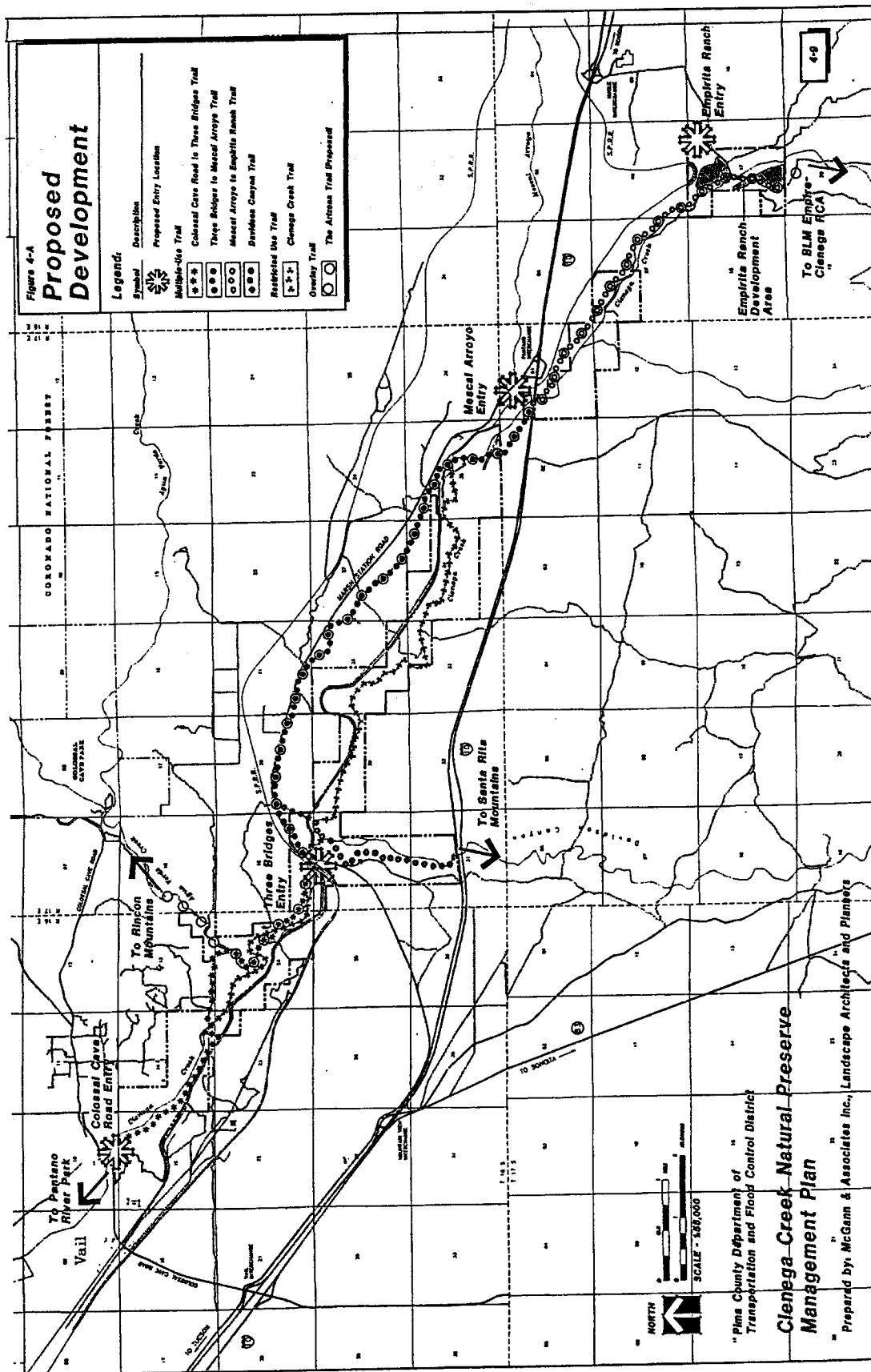
In addition, management zones were created that reflect the level of existing development and the sensitivity of resources. Management Zone A contains the reaches of Cienega Creek with perennial stream flow and areas containing riparian vegetation. Policies identified by the management plan are most restrictive in this zone. Management Zone B incorporates a previously designated park site near Colossal Cave Road and all lands south of Interstate 10 including the Empirita Ranch. Policies regarding development and public use are less restrictive in this zone that does not exhibit perennial stream flow.

An extensive inventory and analysis was conducted by McGann & Associates Inc. and is contained in the *Cienega Creek Natural Preserve Background Report*. Following is an outline of this information:

- Regional Setting
 - Regional significance of the Preserve
 - Regional open space network
 - The Empire-Cienega Resource Conservation Area
- Local Conditions
 - Overview of local conditions
 - Existing ownership of surrounding properties
 - Existing use of surrounding properties
 - Existing zoning of surrounding properties
 - Land use designations for surrounding properties
 - Local transportation network
 - Area trail system
- Biological and Physical Resources
 - Overview of vegetative conditions
 - Existing plant associations
 - Special status plant species
 - Previous disturbances and exotic plant species
 - Overview of wildlife resources
 - Wildlife habitat
 - Special status wildlife species
 - Riparian corridors
 - Mammals
 - Birds
 - Fish
 - Reptiles and amphibians
 - Invertebrates
 - Soils
 - Geology
 - Groundwater hydrology
 - Surface water hydrology
- Cultural Resources
 - Historical overview
 - Occupation and settlement of the Cienega Creek area
 - Stage line and railroad history
 - Ranching and agricultural history
 - Summary of cultural resource sites
 - Cultural resource site descriptions
- Visual Resources
 - Visual quality
- Existing Development
 - Overview of existing development
 - The Southern Pacific Railroad
 - Existing roads
 - Existing buildings and related improvements

- Miscellaneous development
 - Existing utilities
- Current Use of the Preserve
 - Summary of user survey results
 - Survey response data
 - Hunting and trapping within the Preserve
 - Grazing within the Preserve

The Cienega Creek Natural Preserve Management Plan is included on the following page and addresses proposed development, administration and staffing, public use, resource management, wildland fire management, the preserve boundary, and cooperative management practices.



Since the planning effort concluded, a parking area was created at the intersection of Marsh Station Road and Cienega Creek. A key acquisition has enhanced the resource value of the preserve, and efforts were made in terms of restoration and invasive species management. In addition, numerous studies have taken place within the preserve boundaries including monitoring of the water resources and the leopard frog population. Other implementation efforts wait for future funding. Included in the management plan is recognition that resources within the Preserve are dynamic and changes will occur in response to plan implementation. In addition, the development of lands surrounding the Preserve has and will continue to increase. To address these issues, it was recommended the Cienega Creek Preserve Management Plan be reviewed every five years and amended as necessary to incorporate required changes. If significant change were recommended regarding public use, then those proposed revisions would be subject to public review and comment.

Colossal Cave Mountain Park

Unlike Arthur Pack Regional Park and Cienega Creek Natural Preserve, staff from the Pima County Parks and Recreation Department and the Pima County Parklands Foundation undertook the planning effort for Colossal Cave Mountain Park. Area experts assisted a nine member committee and local professionals reviewed their work. In March of 1998 the committee produced the *Colossal Cave Mountain Park Master Plan Background Report*. Master planning efforts continued into the fall of 1998 when a draft version of a development plan for the park was issued. Future efforts including completion of a full management plan will benefit from these documents.

As envisioned in the Background Report, a future planning process will set forth a framework for the use and protection of the park. A balanced approach regarding park management is expected to deal with increasing pressure for recreational opportunities while protecting the natural environment. Stressed in the Background Report is the need for a full, public planning process incorporating the views of private citizens, relevant organizations, and government agencies.

The County's vision for Colossal Cave Mountain Park is threefold. First, the park should establish a continuous link to the Coronado National Forest and Saguaro National Park. Colossal Cave Mountain Park should also provide recreational opportunities and natural resource experiences for the population of the Tucson Basin. Finally, the park should preserve the ecological, historical, archaeological, and recreational value of the land from the pressures of regional growth and development in the area.

An outline similar to that used for the Cienega Creek Management Plan was followed to prepare the *Colossal Cave Mountain Park Master Plan Background Report*. Information can be found in this report regarding the regional setting, local conditions, physical and biological resources, cultural resources, visual resources, existing development and current use of the park.

River Parks

Planners Ink prepared the *Pima County River Parks Master Plan* for the Department of Transportation and Flood Control District in 1996. They were assisted in their efforts by the local consultant firms of McGann & Associates and Johnson-Brittain & Associates.

Management of this planning effort was provided by the Department of Transportation and Flood Control District with assistance from the Parks and Recreation Department. Significant contributions were made by the Center for Desert Archaeology, De Anza Trail Coalition, The Sonoran Institute and Pima Trails Association. Community participation was provided in several forms including user/special interest workshops, two open houses, user surveys, and interviews with representatives of governmental agencies.

The *River Parks Master Plan* focused on evaluating the existing system and the defining needs and trends based on population growth and future flood control projects. It establishes criteria for various levels of development, identifies missing linkages, and outlines design standards for future development. The process itself included:

- Inventorying and assessing the existing river park system
- Determining user's needs and issues related to the river parks
- Defining a three-tiered river park classification scheme for each of the various river bank conditions (i.e. based on existing land use, bank protection, regional growth development, etc.)
- Applying the appropriate trail classification to each segment of river corridor
- Integrating the river park system into the regional trails network as indicated in the *Eastern Pima County Trail System Master Plan*

The overall goal of the Pima County River Parks Master Plan is to establish a continuous river trails system along the approximately 100 linear miles of river corridors that exist on the Santa Cruz, Rillito, Tanque Verde, Pantano and Canada del Oro washes. Benefits identified in the planning document associated with the development of a regional river parks plan include:

- Development of a continuous interconnected corridor networking the metropolitan area
- Creating a region-wide trails system that can integrate with established primary and secondary trails
- Opportunities to maintain and enhance wildlife corridors
- Provide for multi-objective management of floodplain, visual, recreational, natural and cultural resources
- Establish a cohesive "sense of regional distinction"
- Create educational and interpretive opportunities
- Enhance property values, economic development and tourism
- Provide for alternative modes of transportation that can reduce vehicular use and air pollution in the community

A study area was defined as 1200 feet beyond the floodway limits of the major watercourses. Inventory and analysis for this planning effort was focused on the existing facilities and developed parks along the washes and did not include resource values. Although not specifically identified, resource values emerged in one of several planning issues:

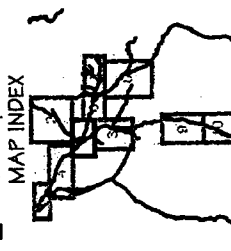
"A third limitation to the development of an interconnected continuous river park system is the emphasis on the River Parks as primarily serving a recreational purpose. While this is an important function of the River Parks, there needs to be a shift toward a multi-objective management approach with the intent of creating a more efficient and sustainable community. This approach emphasizes alternative modes of transportation, considerations of wildlife habitat and conservation areas and recognizing the diversity and history of the Tucson community through cultural interpretation and educational opportunities. Broadening and strengthening a multi-objective management approach to the River Parks system will increase the functionality of the system, provide principles of sustainable development and provide greater community support and funding sources for their continued development."

Planners Ink prepared a series of ten master plans that cover the major rivers in the Tucson metropolitan area. In addition, where obstacles prevented linkage of the river parks along the major washes in four distinct areas, they recommended alternative solutions to re-route the linear parks along streets or other trail system. Following is a representative master plan from this effort for the confluence of the Rillito, Santa Cruz and Canada del Oro.

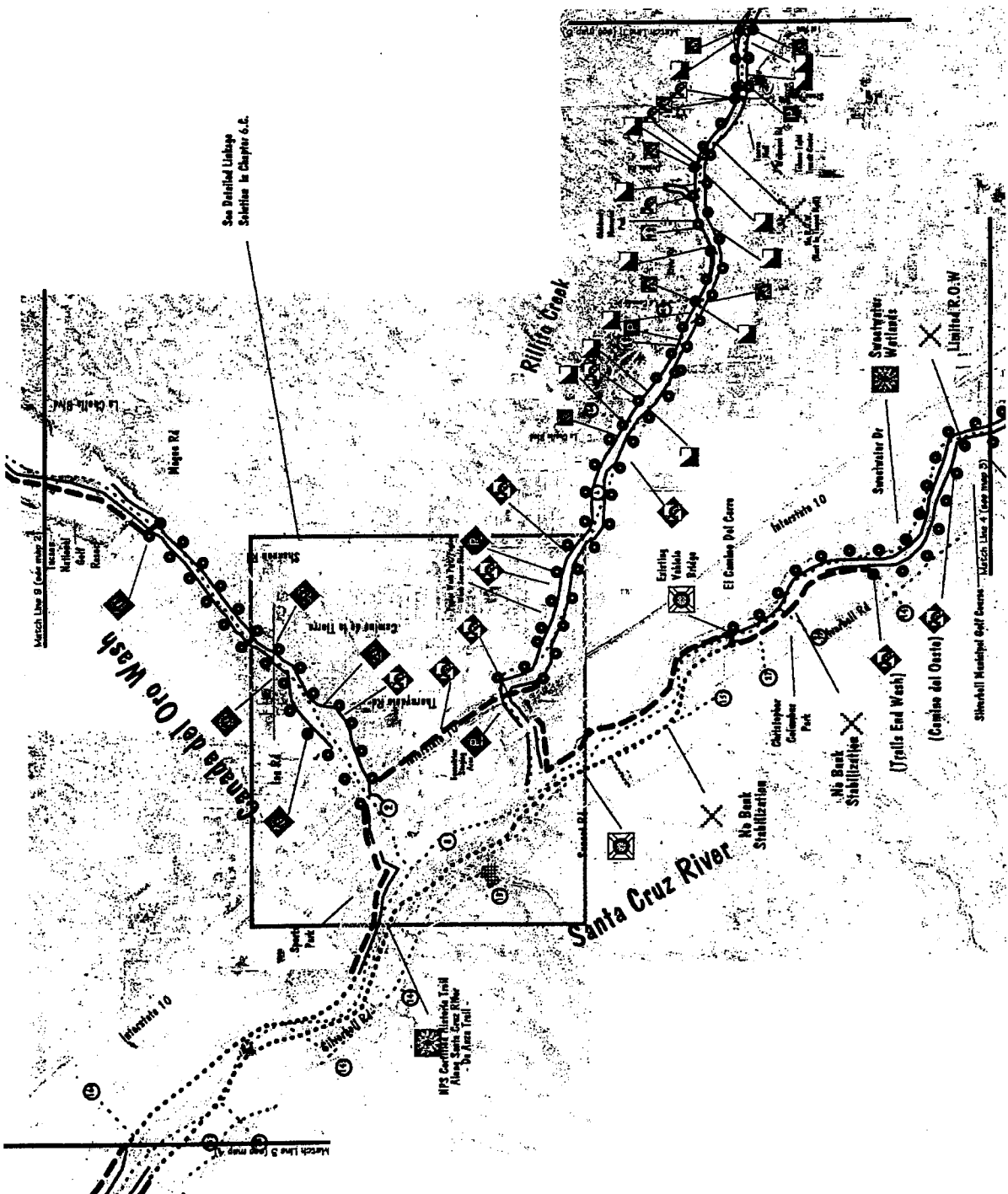
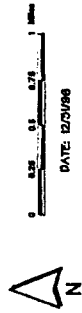
Pima County River Parks Master Plan

- PROPOSED PARK SYSTEM -
MAP 1 : Santa Cruz River/Rillito Creek/
Canada del Oro Confluence

- LEGEND**
- Proposed Features
- Ab-Grade Road Crossing
 - Pedestrian Bridge
 - Recreational/Cultural Opportunity
 - Parking/Storage Area
 - Underpass Ramp
 - Constrains
 - River Park
 - River Path
 - River Trail
 - Inventory Features
 - Santa Cruz River
 - Rillito Creek
 - Frederick Bridge
 - Kestrel
 - Underpass Ramp
 - EPIC/SMUP Trail and Number
 - Rillito River Park
 - Sign and Designated Bikes Routes
 - Public Ownership
 - Mesa-Riparian Habitat
 - Xero-Riparian Habitat
 - Bank Stabilization
 - Open Space/Park/Golf Course
 - Study Area Boundary
 - Access Ramp



PLANNERS Ink
340 NORTH COURT AVENUE, SUITE 200, TUCSON, AZ 85711
(520) 455-1111 • FAX (520) 455-1111



As identified in the plan, priorities and funding both change over time and the planning horizon was realistically set at 10 years. It was recommended the plan be reviewed and updated every five years.

Eastern Pima County Trail System

The *Eastern Pima County Trail System Master Plan* was originally prepared in 1989 for the Pima County Parks and Recreation Department by Dames & Moore in conjunction with 2M Associates, Drake & Associates and Rich & Associates. The Pima County Parks and Recreation Commission and the Pima County Board of Supervisors approved the results of this two-year planning effort in 1989. A comprehensive revision in 1996 was re-adopted by the Board of Supervisors as a formal county ordinance.

The Parks and Recreation Department provided project management with assistance from the Department of Transportation and Flood Control and the Department of Development Services. Many other organizations were involved in the original planning process that included a 13 member Steering Committee of citizens and representatives of special interest groups, and a 22 member Advisory Committee of agency personnel. In addition to subregional panel meetings, there were numerous opportunities for public involvement including a trails bulletin, six public open houses, three general public meetings, and a workshop for the development community.

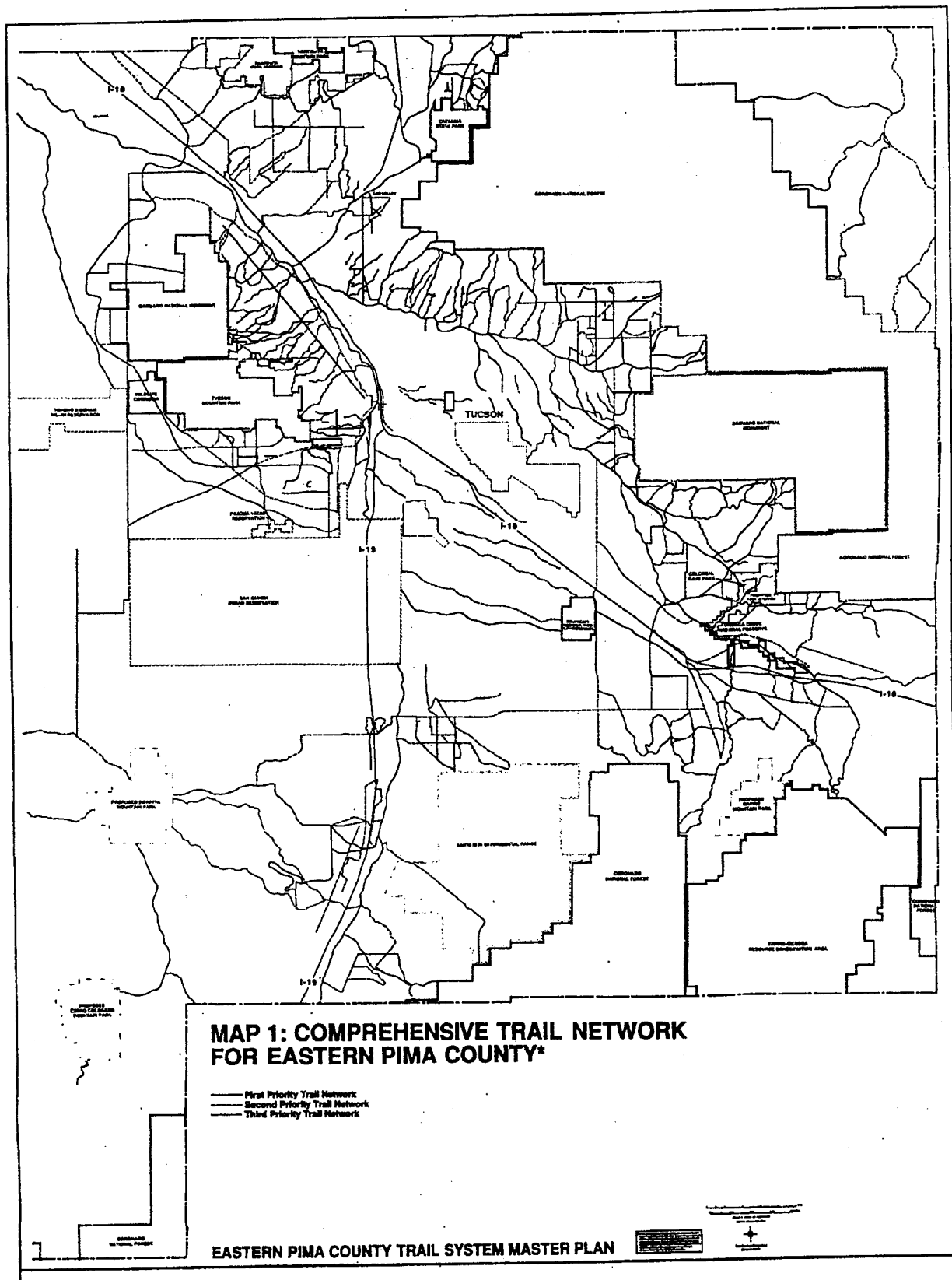
The study area was defined as that part of Pima County lying east of Anway Road in Avra Valley and included some 2,880 square miles. This area was broken into eight subregions for the purpose of identifying opportunities for trails and boundary access points and for assigning acquisition priorities. Priorities established by the subregional panels were then reconsidered in light of a regional trail system.

During the planning process the conservation of areas containing wildlife habitat was seen as an integral part of planning a regional trail system. Like the river parks, trail corridors offer the opportunity to form biological linkages between areas of public ownership. Goals identified in the *Eastern Pima County Trail System Master Plan* include:

- Expand on the existing and planned river parks system to form a trails network that will interconnect the major public recreation lands and the protected open space in Eastern Pima County
- Provide for trail recreation in all subregions of Eastern Pima County
- Extend trail service into local areas
- Accommodate pedestrian, equestrian, bicycle and whole access types of trail use within the network
- Take advantage of trail locations that offer the community multiple benefits such as flood control, groundwater recharge, wildlife habitat and mitigation corridor preservation, and open space in addition to trail recreation

Inventory and analysis was limited to existing trails and the opportunities for an expanded system. The master plan does recognize regional characteristics in terms of topography, vegetation, wildlife, and cultural resources. The product of this planning effort, the 1,500 mile comprehensive trail network for Eastern Pima County, is presented on the following page.

In order to address changes in land use patterns and to further prioritize trail development, the plan was reviewed and revised in 1996. Thirty new trial corridors were added, and several originally proposed trails were adjusted to reflect current conditions. This planning effort remains flexible, and another revision to the Eastern Pima County Trail System Master Plan is anticipated in the near future.



Roy P. Drachman – Agua Caliente Regional Park

Bryce Lloyd and Associates completed a master plan for Agua Caliente Regional Park in January of 1989. They were assisted in this effort by a team made up of a wildlife specialist, environmental ecologist, aquatic ecologist, geophysicist, hydrologist and archaeologist among others. A comprehensive inventory and analysis of natural resources was a primary focus of this planning effort.

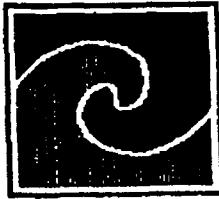
Project management was provided by the Pima County Natural Resources, Parks and Recreation Department and funded by the 1986 General Obligation Bond. This planning effort was unique for its time because the consultant team made extensive use of computer assisted inventory and analysis. An Advisory Board also contributed to the plan and its members include representatives from many local resource oriented agencies and organizations. There was an extensive public involvement process including a public opinion survey designed to assist in determining the balance between preservation, development and interpretation of the parks natural and cultural features. In addition to the survey, the consultant team led four public meetings at key points during the planning process.

An extensive inventory and analysis phase was conducted at the onset of this project. This work, coupled with a public participation process, defined the issues to be addressed in the master plan. The consultant then determined a potential development program for the following areas before proceeding with a preliminary concept plan:

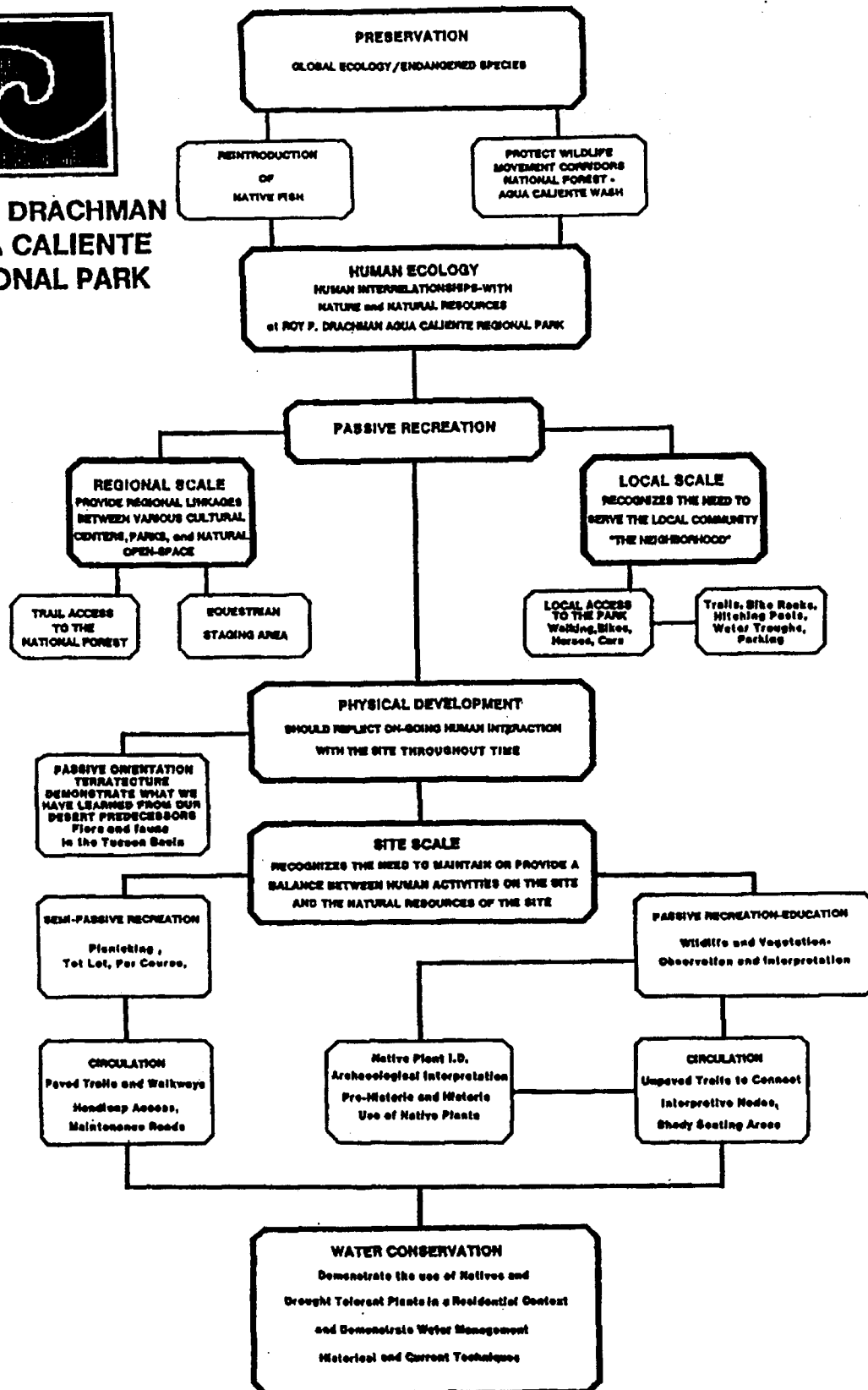
- Biological
- Archaeological
- Architectural

A preliminary concept was subject to several iterations and eventually became the *Roy P. Drachman - Agua Caliente Regional Park Masterplan*.

The master planning effort recognized the interrelationship between the natural environment and those who make use of it that has existed in this location for many thousands of years. The following diagram outlines goals that were identified early in the planning process.



**ROY P. DRACHMAN
AGUA CALIENTE
REGIONAL PARK**



Resource information, public participation and development programming came together as a master plan. A computer-generated image contained within the plan shows degrees of development suitability on which the master plan is based. Following is the final master plan for Roy P. Drachman – Agua Caliente Regional Park.



Recently, the Department of Transportation and Flood Control began an effort to fulfill a vision of the master plan to reintroduce native fish, reptiles and amphibians to the site. A native fish waterway was recommended in the plan as a preserve and a breeding fishery for the conservation of threatened species of fish. This effort is just getting underway in conjunction with the Natural Resources, Parks and Recreation Department. In addition to this project, Agua Caliente is also seen as the ideal site for development of an extensive environmental education center.

Southeast Regional Park

Southeast Regional Park encompasses some 2,992 acres in Pima County south of Interstate 10 and west of Houghton Road. This area is managed by the Pima County Natural Resources, Parks and Recreation Department and is the site of the Pima County Fairgrounds and the Southwest International Raceway, both of which are facilities leased to private concerns. In addition, the new Pima Motorsports Park will also be a leased facility. In spite of this intensely developed part of the park, more than half of this large park remains in an undeveloped state. As such, it has potential benefit as a Pima County reserve.

There has been no master planning efforts undertaken to date for Southeast Regional Park. Development plans for recreational facilities are provided by lease holders, and are limited to their facilities. In the near future, a master plan for a district park site will begin. This is already factored into the calculations of planned development within the park.

Tortolita Mountain Park

In 1996, the Pima County Parks and Recreation Department retained McGann & Associates Inc. to prepare a Background Report and Master Plan for Tortolita Mountain Park. The resulting *Tortolita Mountain Park Master Plan* was completed in April 1997, and approved by the Pima County Board of Supervisors the same month. Local subconsultants provided assistance in this endeavor including a wildlife ecologist, native plant specialist and an archaeologist.

The Pima County Parks and Recreation Department led the planning effort. Following completion of the Background Report, three public meetings were held to present the results of the resource inventory and solicit input from interested citizens. Additional public meetings were held upon completion of the draft master plan. In addition, information about the project was sent to citizens, user groups, and agency representatives.

An interesting aspect of the planning process was the inclusion of an area much larger than the actual park boundaries in the study. At the time the master plan was complete, Pima County only owned 15% of the land within the planning boundary, while lands managed by the Arizona State Land Department and private property accounted for 72% of the area. This study boundary extended up to four miles from Tortolita Mountain Park and allowed consideration of the physiographic context in which the park rests. This strategy also addresses the encroaching urbanization found within nearby incorporated and unincorporated areas.

The Tortolita Mountain Park Master Plan is based on the following five principal management objectives:

- To preserve and protect the biologic and other natural resources of Tortolita Mountain Park
- To preserve and protect the cultural resources of Tortolita Mountain Park
- To preserve and protect the visual resources of Tortolita Mountain Park
- To provide opportunities for low-intensity public uses of the Park for recreation, education and other appropriate activities
- To provide an extension of the existing open space network around the Tucson Basin

An extensive inventory and analysis was conducted prior to initiation of the master plan. Results are included in the document titled *Tortolita Mountain Park Master Plan Background Report*. Essentially the same outline used for the *Cienega Creek Natural Preserve Background Report* was employed to describe the resources of Tortolita Mountain Park.

The Tortolita Mountain Park Master Plan provides a policy framework to guide its development and management. The plan seeks to balance increasing recreational needs with protection of the natural environment. A stated purpose of the master plan is to "...present a plan that identifies objectives, articulates policies, recommends facilities, and lists specific recommendations and planned actions that should be taken relative to the development of Tortolita Mountain Park." A copy of the master plan is included on the following page.

Since adoption of the master plan, the Pima County Natural Resources, Parks and Recreation submitted an application under the Arizona Preserve Initiative to the Arizona State Land Department to secure a large percentage of the land contained within the original study boundary.

Tucson Mountain Park

Tucson Mountain Park is currently managed by the Pima County Natural Resources, Parks and Recreation Department according to guidelines set forth in a 1975 document titled *A Plan for Tucson Mountain Park* prepared by a natural resource planning class at the University of Arizona and by policies and rules subsequently established by the Pima County Parks and Recreation Commission. Although this guidance was beneficial at the time, there have been significant changes in the demand for recreational use of the park, increasing urbanization along park boundaries and growing awareness of the vulnerability of certain plant, wildlife and invertebrate species.

Tucson Mountain Park includes the 2,514 acre Tucson Mitigation Corridor set aside as mitigation for construction of the Central Arizona Project. The Pima County Natural Resources, Parks and Recreation Department manages this area under the *Cooperative Agreement for Use of Project Lands for Wildlife and Plant Conservation and Management, Tucson Mitigation Corridor, Central Arizona Project* with the Bureau of Reclamation. The agreement is very specific regarding uses of the corridor.

The Tucson Mitigation Corridor is managed according to a plan that prohibits any future developments in the area, except for the improvement of wildlife habitat. Management goals include: 1) to compensate for wildlife movement disruptions caused by aqueduct construction by providing an undeveloped wildlife movement corridor; 2) to preserve areas containing the Tumamoc globeberry, the night-blooming cereus, Thornber's fishhook cactus, desert tortoise, and Gila monster as compensation for populations impacted by project construction; 3) and to compensate for wildlife habitat lost due to aqueduct construction by prohibiting deleterious activities within the area boundaries.

Management actions include: 1) to prohibit any future developments within the area other than existing wildlife habitat improvements, or future improvements, management, or developments agreed to by Reclamation, Arizona Game and Fish Department, U.S. Fish and Wildlife Service, and Pima County; (2) to prohibit grazing, mining, dumping, discharge of firearms, trapping, recreation developments, and off-road vehicles to maintain the integrity of the area for both wildlife and special status plant species.

In recent years, the consultant firm of McGann and Associates, Inc. was asked to prepare a *Tucson Mountain Phase One Planning Study* in order to begin the management planning effort. This study was completed in 1998 with assistance from planners, a wildlife biologist and an archaeologist. The purpose of the planning study was to:

- Update and consolidate various maps and records related to Tucson Mountain Park
- Provide a general summary of the existing conditions within, and adjacent to, the Park
- Describe specific public use and resource management issues to be addressed in the master plan
- Identify existing sources of information that should be consulted during preparation of the master plan
- Identify a detailed scope of work and an initial planning area boundary for the subsequent master planning work

One reason for preparing this planning study was to provide a general summary of the existing conditions within, and adjacent to, the Park. Funding limited the scope of this task, and in the future a detailed resource inventory and assessment will form the basis of the management plan. It is anticipated that a comprehensive management planning effort will take two years to complete and will also involve extensive public input.

The Tucson Mountain Park Phase One Planning Study identified a number of issues for consideration during future planning. Although not a comprehensive list, the following outline highlights issues in several important categories:

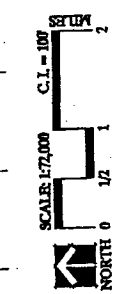
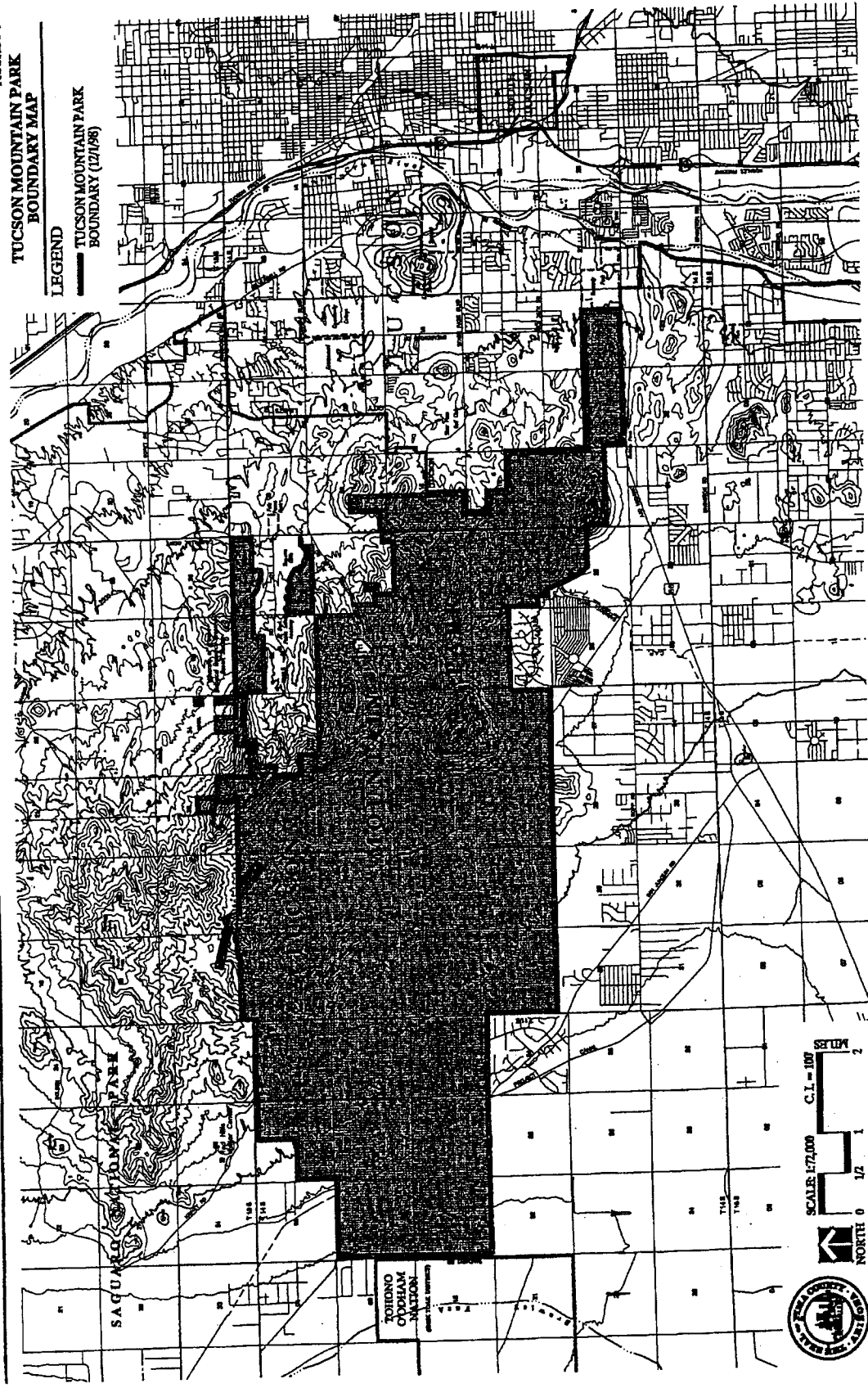
- Biological Resources
 - The disappearance of undeveloped connections between Tucson Mountain Park and other natural resource areas
 - The presence of special status plant and animal species (including critical habitat of the Cactus Ferruginous Pygmy Owl)
 - The introduction of exotic plant and animal species to the region
 - The impact of vehicular traffic, human feeding of wildlife and sport hunting within the park
- Cultural Resources
 - An incomplete record of cultural resources present
 - The absence of a cultural resource protection, interpretation and monitoring plan
- Visual Resources
 - The impact of urban development (homes, roads, utility lines, etc.) within the foothills of the Tucson Mountains adjacent to, or near, the Park
 - The potential loss or degradation of natural desert gateways into the Tucson metropolitan area resulting from the development of lands adjacent to, or near, Tucson Mountain Park
- Adjacent Land Ownership
 - Together Tucson Mountain Park and Saguaro National Park form the largest reserve of Sonoran Desert Scrubland in Eastern Pima County
 - Opportunities for joint resource management are created by the close proximity of these two parks
 - The need to identify lands with the highest biological or scenic resource value so that they can be acquired and incorporated into the Park

- The need to consider other strategies and techniques, such as conservation easements, to protect resources associated with privately owned lands outside the Park boundary

As previously discussed, a long-term management plan for Tucson Mountain Park that incorporates the existing agreement with the Bureau of Reclamation for management of the Tucson Mitigation Corridor will commence as soon as species goals and management prescriptions are identified under the Sonoran Desert Conservation Plan.

Two maps indicating the 1998 boundary of Tucson Mountain Park and the boundary proposed for incorporation into future planning efforts are included on the following pages.

FIGURE 1-C



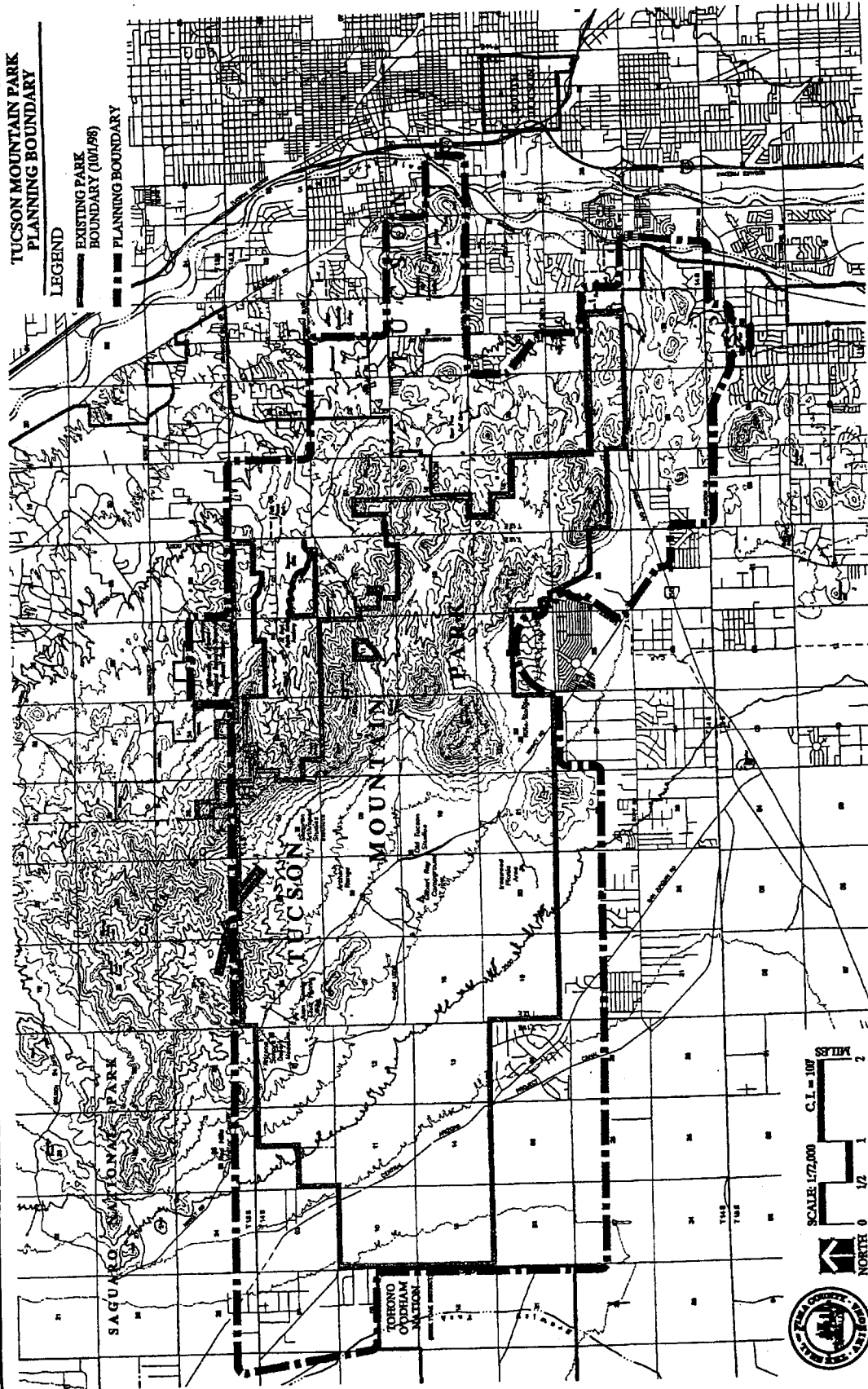
TUCSON MOUNTAIN PARK - PHASE ONE PLANNING STUDY
TMA COUNTY PARKS AND RECREATION DEPARTMENT

FIGURE 8-A

**TUCSON MOUNTAIN PARK
PLANNING BOUNDARY**

LEGEND

- EXISTING PARK BOUNDARY (10/1/96)
- - - PLANNING BOUNDARY



SCALE: 1:77,000 G.I. = 100'
NORTH 0 1/2 1 2
MILES

TUCSON MOUNTAIN PARK - PHASE ONE PLANNING STUDY

PIMA COUNTY PARKS AND RECREATION DEPARTMENT

PAGE 8-2

Existing Reserve Plans: Priority Vulnerable Species

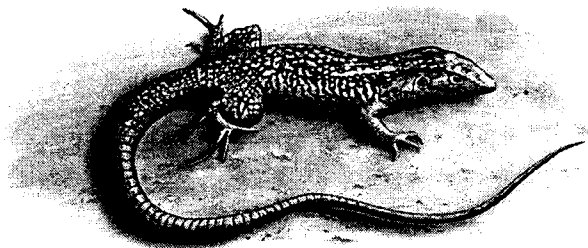
Introduction

In 1999, over 100 vulnerable species in Pima County were reviewed to determine which of these species would be recommended for inclusion in the U.S. Fish and Wildlife Service permitting process. Six criterion were used in this evaluation:

1. Species conservation can be accomplished as a result of other species, habitat, or plant community protection afforded by the Sonoran Desert Conservation Plan.
2. Insignificant or non-viable numbers of the species occur in the planning area and conservation is best accomplished elsewhere.
3. The species is not known to occur in the study area, nor is it likely to occur in the study area within the planning horizon
4. The species is too broadly distributed to help differentiate among a range of plan alternatives.
5. Species known only from or predominantly within Pima County on lands managed by the U.S. Forest Service, the U. S. Fish and Wildlife Service, and/or the National Park Service
6. Species known only from or predominantly within Pima County on the Tohono O'odham Reservation.

The Science Technical Advisory Team, working in conjunction with the project consultants recommended approximately half of the original species listed for further consideration.

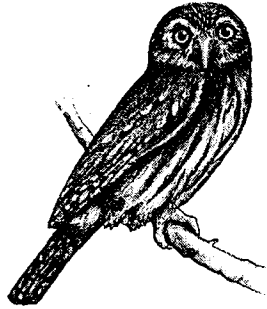
The Science and Technical Advisory Team continues their analysis and efforts to model habitat deemed suitable for the fifty-six priority vulnerable species and the umbrella species. As additional information becomes available, it will be considered during subsequent management planning efforts for the Pima County reserves.



Arthur Pack Regional Park

Known Occurrence

The Role of Adaptive Management issued in January 2001 documents the occurrence of a single priority vulnerable species within the boundaries of Arthur Pack Regional Park, the Cactus Ferruginous Pygmy Owl.



During the inventory and analysis phase of the *Master Plan for the Development of Arthur Pack Regional Park* completed in 1988, McGann & Associates, Inc. identified wildlife observed at the Arthur Pack and conducted an extensive inventory of the vegetation found within the park. This data documents the presence of the Bell's Vireo as being seen year-round in association with the washes.

In addition, the Kit Fox was observed on site during the master planning process and may be included by the Science and Technical Advisory Team (STAT) as a potential umbrella or modeling species.

A comparison was also made between species currently listed in Pima County by the U.S. Fish and Wildlife Service and those observed on site in 1988 during the development of the resource inventory. No additional special status species were noted as observed.

Potential Occurrence

Staff of the Pima County Natural Resources, Parks and Recreation Department conducted a literature search in the fall of 2000, and noted that in addition to the observed species, the following priority vulnerable species may occur within Arthur Pack Regional Park:

Mammals:

Merriam's Mesquite Mouse (*Peromyscus merriami*) - May use food and shelter resources in the Hardy Wash Corridor

Birds:

Rufous Winged Sparrow (*Aimophila caralis*) - May use food and shelter resources in the Hardy Wash Corridor

Swainson's Hawk (*Buteo swainsoni*) – May be incidental to the Hardy Wash Corridor

Abert's Towhee (*Pipilo aberti*) – Likely to be found in the Hardy Wash Corridor

Reptiles:

Tucson Shovel-Nosed Snake (*Chionactis occipitalis klauberi*) – May be found in the Hardy Wash Corridor

Giant Spotted Whiptail (*Cnemidophorus burti stictogrammus*)- Likely to be found in the Hardy Wash Corridor

Ground Snake (valley form) (*Sonora semiannulata*) - May be found in the Hardy Wash Corridor

Plants:

Gentry Indigo Bush (*Dalea tentaculoides*) –May be incidental

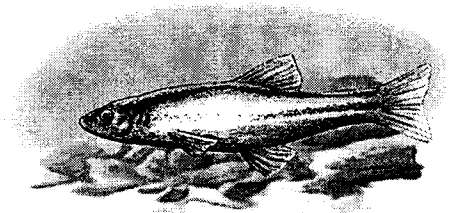
Tumamoc Globeberry (*Tumamoca macdougallii*) – May be found in Hardy Wash Corridor

Cienega Creek Natural Preserve

Known Occurrence

There are a number of priority vulnerable species documented to exist within Cienega Creek Natural Preserve according to *The Role of Adaptive Management*. These species include:

- Abert's Towhee
- Merriam's Mesquite Mouse
- Western Red Bat
- Mexican Long-Tongued Bat
- Cactus Ferruginous Pygmy Owl
- Bell's Vireo
- Mexican Garter Snake
- Lowland Leopard Frog
- Longfin Dace
- Pima Pineapple Cactus
- Needle-Spined Pineapple Cactus



A review of the *Cienega Creek Natural Preserve Management Plan Background Report* identified no additional priority vulnerable species.

Potential Occurrence

There are a number of species that may potentially occur within Cienega Creek Natural Preserve. Future inventories should focus on these species.

The *Cienega Creek Natural Preserve Management Plan Background Report* noted the following priority vulnerable species are likely to be present on site:

- Arizona Shrew
- California Leaf-nose bat
- Bell's Vireo

In addition, this report identifies the following umbrella species are likely to occur:

- Mountain Lion
- Sacaton

Staff of the Pima County Natural Resources, Parks and Recreation Department conducted a literature search and noted the following additional priority vulnerable species may occur within Cienega Creek Natural Preserve.

Mammals:

Allen's Big-Eared Bat (*Idionycteris phyllotis*)-May use food resources
Southern Yellow Bat (*Lasiurus xanthinus*)-May use food and shelter resources
Lesser Long-Nosed Bat (*Leptonycteris curasoae yerbanbuena*)-May use food resources

Birds:

Rufus Winged Sparrow (*aimophila caralis*)-May be found in Cienega Creek Preserve
Swainson's Hawk (*Buteo swainsoni*)-May be incidental
Western Yellow-Billed Cuckoo (*Coccyzus americanus ssp. occidentalis*)- May be incidental

Reptiles:

Chiricahua Leopard Frog (*Rana chiricahuensis*)-May be found in Cienega Creek Preserve

Fish:

Gila Chub (*Gila intermedia*)-May be found in Cienega Creek Preserve
Gila Topminnow (*Poeciliopsis occidentalis occidentalis*)-May be found

Invertebrates:

Arkenstone Cave Psuedoscorpion (*Albiorix anophthalmus*)-May be found

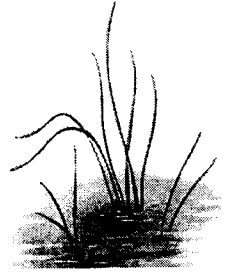
Plants:

Gentry Indigo Bush (*dalea tetaculoides*)-May be found

Nichol Turk's Head Cactus (*Echinocactus horizonthalonius* var. *nicholii*)-May be found

Huachuca Water Umbel (*Lilaeopsis schaffneriana recurva*)-May be found

Tumamoc Globeberry (*Tumamoca macdougalii*)-May be found in Cienega Creek



Colossal Cave Mountain Park

Known Occurrence

Like Cienega Creek, Colossal Cave Mountain Park is rich with priority vulnerable species largely due to the complex geology and cave environment found within the park. *The Role of Adaptive Management* identifies documented observations of the following species:

- Mexican Garter Snake
- Allen's Big-Eared Bat
- Western Red Bat
- Southern Yellow Bat
- Lesser Long-Nosed Bat
- California Leaf-Nosed Bat
- Pale Townsend's Big-Eared Bat
- Bell's Vireo
- Arkenstone Cave Pseudoscorpion
- Needle-Spined Pineapple Cactus



The Role of Adaptive Management also documents the presence of the following umbrella species:

- Desert Tortoise
- Mountain Lion
- Kit Fox

When staff prepared the *Colossal Cave Mountain Park Master Plan Background Report* they compiled inventories of species known to exist within the park from a variety of sources. The following list of priority vulnerable species does not include those already documented in *The Role of Adaptive Management*.

- Mexican Long-Tongued Bat
- Longfin Dace
- Abert's Towhee
- Talus Snails

In addition to these species, the *Colossal Cave Mountain Park Master Plan Background Report* confirmed the presence of Sacaton, an umbrella species identified by the STAT.

No additional species are known to exist within Colossal Cave Mountain Park that are included on the U.S. Fish and Wildlife Service threatened and endangered species list.

Potential Occurrence

The *Colossal Cave Mountain Park Master Plan Background Report* does lend credence to the idea that the following additional priority vulnerable species are possibly present in the park.

- Merriam's Mesquite Mouse
- Ground Snake
- Chiricahua Leopard Frog
- Lowland Leopard Frog

Since inventories were compiled in order to prepare the background report, a comparison was also made between species currently listed in Pima County by the U.S. Fish and Wildlife Service and those documented in the *Colossal Cave Mountain Park Master Plan Background* as potentially present on site. The Mexican Gray Wolf was noted as theoretically possible, but not recorded in the immediate region.

Based on a literature search conducted by staff of the Pima County Natural Resources, Parks and Recreation Department the following additional priority vulnerable species may occur within Colossal Cave Mountain Park.

Birds:

Rufous Winged Sparrow (*Aimophila caralis*)-Likely found

Swainson's Hawk (*Buteo swainsoni*)-May be incidental

Western Yellow-Billed Cuckoo (*Coccyzus americanus* ssp. *occidentalis*)-May be incidental

Cactus Ferruginous Pygmy Owl (*Glaucidium brasilianum* *cactorum*)-May be incidental

Reptiles:

Tucson Shovel-Nosed Snake (*Chionactis occipitalis* *klauberi*)- May be found

Giant Spotted Whiptail (*Cnemidophorus burti* *stictogrammus*)-Likely to be found

Desert Box Turtle (*Terrapene ornata* *luteola*)-May be found

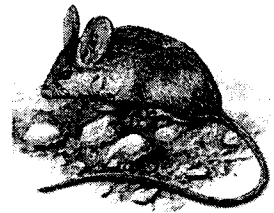
Plants:

Pima Pineapple Cactus (*Coryphantha scheeri* var. *robustispina*)-May be found

Gentry Indigo Bush (*Dalea tentaculoides*)-May be found

Nichol's Turk 'S Head Cactus (*Echinocactus horizonthalonius* var. *nicholii*)- May be found

Tumamoc Globeberry (*Tumamoc macdougalii*) – May be found



River Parks

Known Occurrence

Although neither the *Eastern Pima County Trail System Master Plan* nor the *Pima County River Parks Master Plan* document the presence of priority vulnerable species, the Burrowing Owl is known to exist on the Santa Cruz River within areas managed by Pima County. Other priority vulnerable species may use the riverbeds as travel corridors.

Roy P. Drachman – Agua Caliente Regional Park

Known Occurrence

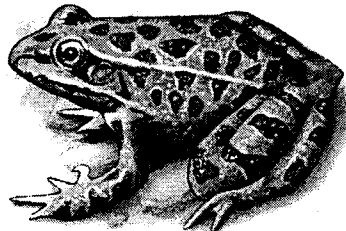
No priority vulnerable species were documented within Agua Caliente Park in *The Role of Adaptive Management*.

An inventory of plant species was conducted during the site analysis phase of the master planning effort, but this information yielded no documentation of priority vulnerable species or species listed by the U.S. Fish and Wildlife Service.

Potential Occurrence

Although not inventoried, the following species are noted in the *Roy P. Drachman Agua Caliente Regional Park Masterplan* as potentially occurring within the park and should be inventoried in the future.

- Mexican Long-Tongued Bat
- California Leaf-Nose Bat
- Merriam's Mesquite Mouse
- Rufus Winged Sparrow
- Western Yellow-Billed Cuckoo
- Abert's Towhee
- Giant Spotted Whiptail
- Tumamoc Globeberry
- Bell's Vireo
- Ground Snake
- Desert Box Turtle
- Lowland Leopard Frog



Umbrella species identified in the master plan as possibly existing in the park are Desert Tortoise and Kit Fox.

Staff of the Pima County Natural Resources, Parks and Recreation Department conducted a literature search in the fall of 2000, and noted that in addition to the preceding species, the following priority vulnerable species may occur within Agua Caliente Regional Park. Like the potential species identified in the master plan, these species should be inventoried.

Mammals:

Allen's Big-Eared Bat (*Idionycteris phyllostis*)-May use the area for food resources
Western Red Bat (*Lasiurus blossevillii*)-Likely uses the area for roost and food resources

Southern Yellow Bat (*Lasiurus xanthinus*(ega))-Likely uses the area for food resources

Lesser Long-Nose Bat (*Leptonycteris curasoae yerbanbuena*)-May use food and shelter resources
Pale Townsend's Big-Eared Bat (*Plecotus townsendii pallescens*)-May use the area for food resources

Birds:

Swainson's Hawk (*Buteo swainsoni*)-May be incidental

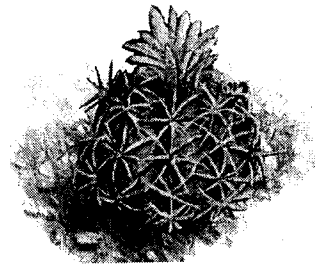
Reptiles:

Mexican Garter Snake (*Thamnophis eques megalops*)-May be found in park

Southeast Regional Park

Known Occurrence

The only priority vulnerable species known to exist at Southeast Regional Park is the Pima Pineapple Cactus as documented in *The Role of Adaptive Management*.



Potential Occurrence

According to a literature search conducted by staff of the Pima County Natural Resources, Parks and Recreation Department during the fall of 2000, the following priority vulnerable species may be present within Southeast Regional Park. Future inventories are recommended to confirm this information

Mammals:

Mexican Long-Tongued Bat (*Choeronycteris mexicana*) – Likely uses food resources

Lesser Long-Nosed Bat (*Leptonycteris curasoae yerbanbuena*) - Likely uses food resources

California Leaf-Nose Bat (*Macrotus californicus*) - Likely uses food resources

Merriam's Mesquite Mouse (*Peromyscus merriami*) - May be present in Southeast Regional Park

Pale Townsend's Big-Eared Bat (*Plecotus townsendii pallescens*) - Likely to use food resources

Birds:

Swainson's Hawk (*Buteo swainsoni*) – May be incidental

Abert's Towhee (*Pipilo aberti*) – May be incidental to Southeast Regional Park

Bell's Vireo (*Vireo bellii*) – Likely to be found in Southeast Regional Park

Reptiles:

Tucson Shovel-Nosed Snake (*Chionactis occipitalis klauberi*) - May be found in Southeast Regional Park

Giant Spotted Whiptail (*Cnemidophorus burti stictogrammus*) - May occur

Ground Snake (valley form) (*Sonora semiannulata*) - May occur

Plants:

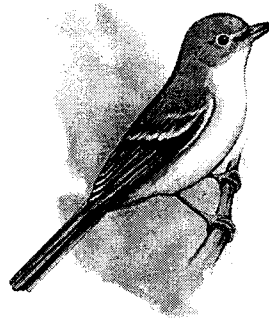
Tumamoc Globeberry (*Tumamoca macdougallii*) – May be found in Southeast Regional Park

Tortolita Mountain Park

Known Occurrence

The following three priority vulnerable and umbrella species exist within Tortolita Mountain Park according to *The Role of Adaptive Management*.

- Bell's Vireo
- Abert's Towhee
- Mountain Lion



During preparation of the *Tortolita Mountain Park Master Plan*, limited biological surveys were conducted that identified the presence of the following priority vulnerable species not already noted in *The Role of Adaptive Management*. In addition, this inventory did confirm the presence of the three species listed above.

- Rufous-winged Sparrow

No species were observed on site during the inventory phase that are listed by the U.S. Fish and Wildlife Service.

Potential Occurrence

A number of priority vulnerable species are noted in the *Tortolita Mountain Park Master Plan Background Report* as potentially being present within the park boundaries. Future inventories should be conducted to confirm this speculation.

- Cactus Ferruginous Pygmy Owl
- Lesser Long-Nosed Bat
- Mexican Long-Tongued Bat
- California Leaf-Nosed Bat

No species listed by the U.S. Fish and Wildlife Service potentially live within Tortolita Mountain Park except as identified above.

Staff of the Pima County Natural Resources, Parks and Recreation Department noted that in addition to the observed species, the following priority vulnerable species might occur within Tortolita Mountain Park. Again, future inventories will need to be conducted to verify occurrence of these species.

Mammals:

Allen's Big-Eared Bat (*Idionycteris phyllotis*) – May use the riparian areas
Western Red Bat (*Lasiurus blossevi illii*) – May use the riparian areas
Southern Yellow Bat (*Lasiurus xanthinus (ega)*) - May use the riparian areas
Merriam's Mesquite Mouse (*Peromyscus merriami*) - Likely uses food and shelter
Pale Townsend's Big-Eared Bat (*Plecotus townsendii pallescens*) - Likely to use food

Birds:

Burrowing Owl (*Cunicularia hypugaea*) – Possibly on the flat bajadas to the west
Swainson's Hawk (*Buteo swainsoni*) – May be incidental to Tortolita Mtn. Park
Western Yellow-Billed Cuckoo (*Coccyzus americanus ssp. occidentalis*) – May be found in the riparian areas
Southwestern Willow Flycatcher (*Empidonax traillii extimus*) - May be found in the riparian areas

Reptiles:

Tucson Shovel-Nosed Snake (*Chionactis occipitalis klauberi*) - May be found in
Giant Spotted Whiptail (*Cnemidophorus burti stictogrammus*) - Likely to be found
Ground Snake (valley form) (*Sonora semiannulata*) - Likely to be found
Mexican Garter Snake (*Thamnophis eques megalops*) - Likely to be found in riparian areas



Invertebrates:

Talus Snails (*Sonorella* sp.) – May occur in Tortolita Mtn. Park

Plants:

Pima Pineapple Cactus (*Coryphantha scheeri* var. *robustispina*) – May be found

Gentry Indigo Bush (*Dalea tentaculoides*) - May occur in Tortolita Mtn. Park

Nichol Turk's Head Cactus (*Echinocactus horizonthalonius* var. *nicholii*) - May occur

Acuna Cactus (*Echinomastus erectocentrus* var. *acunensis*) - May occur

Needle-Spined Pineapple Cactus (*Echinomastus erectocentrus* var. *erectocentrus*) -

May occur in Tortolita Mtn. Park

Tumamoc Globeberry (*Tumamoca macdougallii*) – May be found

Tucson Mountain Park (including the Tucson Mitigation Corridor)

Known Occurrence

The Role of Adaptive Management identifies a number of priority vulnerable species in Tucson Mountain Park including the Tucson Mitigation Corridor. The mitigation corridor is managed by the Pima County Natural Resources, Parks and Recreation Department as part of the park and is considered as such in this report. In addition to providing habitat for vulnerable species, this reserve also experiences the greatest pressure from increased recreational use and visitation. Following are priority vulnerable species known to occur in Tucson Mountain Park.

- California Leaf-Nosed Bat
- Mexican Long-Tongued Bat
- Pale Townsend's Big-Eared Bat
- Abert's Towhee
- Bell's Vireo
- Tumamoc Globeberry



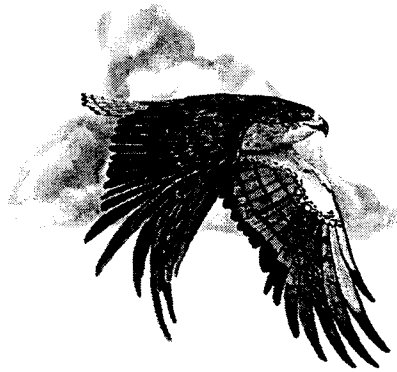
In addition to these species, *The Role of Adaptive Management* also documents the existence of these umbrella species:

- Mountain Lion
- Desert Tortoise
- Kit Fox

In 1975, *A Plan for the Tucson Mountains* was prepared by a natural resource planning class at the University of Arizona. Although in excess of twenty-five years old, the analysis phase of this planning effort contains information regarding additional priority vulnerable species known at that time to inhabit Tucson Mountain Park.

- Merriam's Mesquite Mouse
- Swainson's Hawk

Neither the 1975 effort nor the more recent *Tucson Mountain Park Phase One Planning Study* identifies additional species listed by the U.S. Fish and Wildlife Service.



Potential Occurrence

The *Tucson Mountain Park Phase One Planning Study* does identify several priority vulnerable species including several species listed by the U.S. Fish and Wildlife Service that are thought to occur within the park boundaries. These species are identified below.

- Cactus Ferruginous Pygmy Owl
- Lesser Long-Nosed Bat
- Pima Pineapple Cactus
- Nichol's Turk Head Cactus
- Acuna Cactus

According to a literature search conducted by staff from the Pima County Natural Resources, Parks and Recreation Department, the following additional priority vulnerable species may occur within the park. During upcoming management planning, inventories will focus on all species known to occur, or thought to occur, within Tucson Mountain Park.

Birds:

Rufous Winged Sparrow (*Aimophia caralis*)-May be found in Tucson Mountain Park

Reptiles:

Tucson Shovel-Nosed Snake (*Chionactis occipitalis klauberi*)-May be found
Giant Spotted Whiptail (*Cnemidophorus burti stictogrammus*)-Likely to found
Ground Snake (valley form) (*Sonora semiannulata*)-May be found

Plants:

Gentry Indigo Bush (*Dalea tentaculoides*)-May be found in Tucson Mountain Park
Needle-Spined Pineapple Cactus (*Echinomastus erectocentrus* var. *erectocentrus*)-
May be found in Tucson Mountain Park

Existing Reserve Plans: Cultural Resources

Introduction

The vast majority of existing reserve master or management plans include an analysis of cultural resources found within the park boundaries. In most cases this is limited to a summary of known cultural resource sites as identified by the Arizona State Museum. Following is a summary of the information regarding cultural resources that can be derived from existing planning efforts.

Arthur Pack Regional Park

The 1988 *Master Plan for the Development of Arthur Pack Regional Park* prepared by McGann and Associates Inc. indicates that based on a 100% archaeological survey of the site that no significant archaeological sites within or around the park. The 100% survey is documented by the Arizona State Museum. However, the document titled *Saving the Past for the Future, Cultural and Historical Resources Element of the Sonoran Desert Conservation Plan* suggests Arthur Pack Regional Park may be adjacent to an area noted as a highly sensitive archaeological survey zone. Future inventory should confirm the status of this park.

Cienega Creek Natural Preserve

There are many significant cultural sites within the boundaries of Cienega Creek Natural Preserve including the following sites identified in the *Cienega Creek Natural Preserve Management Plan Background Report*. All of the following sites have been identified, recorded and assigned a Site Number by the Arizona State Museum.

AZ BB:14:16	Open Hohokam site with checkdam
AZ BB:14:62	Camp Site (Cochise)
AZ BB:14:63	Hohokam Village
AZ BB:14:66	Hohokam Village (Tanque Verde Phase)
AZ BB:14:67	Sherd Scatter/Ranch Buildings
AZ BB:14:68	Historic Camp and Trash
AZ BB:14:69	Lithic Scatter/Possible Village
AZ BB:14:71	Habitation Site (Hohokam)
AZ EE:2:147	Hohokam Lithic and Sherd Scatter
AZ BB:14:160	Bedrock Mortars
AZ BB:14:498	Cienega Stage Station
AZ EE:2:46	Mescal Stage Station
AZ EE:2:50	Camp Site with Burials (Cochise)
AZ EE:2:51	Hohokam and Mogollon Scatter

AZ EE:2:164	Hohokam Habitation (Tanque Verde Phase)
AZ EE:2:165	Historic Construction Site
AZ EE:2 (1985-1)	Hohokam Village

In addition to these sites, there are many more sites that have been recorded by the Arizona State Museum in the vicinity of the Cienega Creek Natural Preserve. According to the report titled *Preserving Cultural and Historic Resources, A Conservation Objective of the Sonoran Desert Conservation Plan*, two nearby areas are listed on the National Register of Historic Places. They are the Empire Ranch and the Upper Davidson Canyon Archaeological District. In addition, this report notes that Empirita Ranch may be eligible for listing in the National Register. A 1997 bond project to assess and restore the buildings is planned to allow preservation and continued use of the historic structures by the public.

Colossal Cave Mountain Park

Colossal Cave Mountain Park is included within the Colossal Cave Preservation Park Historic District as identified on the National Register of Historic Places. Restoration efforts planned for historic buildings used by the public include removing inappropriate modifications to the buildings, reconstructing roofs to correct structural deficiencies and to restore the integrity of the architectural design. The *Colossal Cave Mountain Park Master Plan Background Report* identifies a total of 27 sites and 55 isolated finds within the park and adjacent Pistol Hill areas. Like Cienega Creek, all of the following sites have been recognized by the Arizona State Museum and assigned official site numbers.

AZ BB:14:19	Cave/Historic Buildings
AZ BB:14:64	Artifact Scatter
AZ BB:14:473	Cave
AZ BB:14:474	Artifact Scatter
AZ BB:14:475	Lithic Quarry
AZ BB:14:476	Lithic Quarry
AZ BB:14:477	Lithic Quarry
AZ BB:14:478	Artifact Scatter/Historic Buildings
AZ BB:14:479	Lithic Quarry
AZ BB:14:480	Historic Mine
AZ BB:14:481	Artifact Scatter
AZ BB:14:482	Lithic Quarry
AZ BB:14:483	Artifact Scatter
AZ BB:14:484	Single Feature
AZ BB:14:485	Historic Dump
AZ BB:14:486	Single Feature
AZ BB:14:487	Artifact Scatter
AZ BB:14:488	Single Feature
AZ BB:14:489	Lithic Quarry

AZ BB:14:490	Single Feature
AZ BB:14:491	Single Feature
AZ BB:14:492	Artifact Scatter
AZ BB:14:493	Historic Buildings
AZ BB:14:494	Bedrock Mortars
AZ BB:14:495	Rock Shelter/Bedrock Mortar
AZ BB:14:496	Mine
AZ BB:14:497	Historic Dump

River Parks

The Mission San Agustin located on the Santa Cruz River at the base of "A" Mountain is the birthplace of Tucson. *Preserving Cultural and Historic Resources, A Conservation Objective of the Sonoran Desert Conservation Plan* notes this site has been occupied since prehistoric times and was first noted by Father Kino in the 1690s as San Cosme de Tucson. Ruins of the mission, convento and gardens dating from the 1700s remain in addition to many prehistoric features. This site is eligible for the National Register of Historic Places.

The Anza National Historic Trail extends for 1200 miles from the border of Mexico to San Francisco. Within Pima County, acquisition and interpretation of 60 miles of this trail along the Santa Cruz River and six historic campsites are planned. The Anza Trail has been nominated as a "Millennium Trail" and is one site for the celebration of Spanish contributions to the settlement and development of the United States.

Consistent with the Sonoran Desert Conservation Plan are plans to restore the riparian habitat and conserve, protect, and interpret cultural resources along the segment of the Santa Cruz River from San Xavier Mission to the Mission San Agustín del Tucson, a distance of 8-9 miles. Creation of Paseo de las Iglesias will result from this effort.

There are also significant cultural resources to be found along the Rillito River including the proposed Binghampton Rural Historic District in the "riverbend" area between Country Club Road and Alvernon Way.

Roy P. Drachman – Agua Caliente Regional Park

During preparation of a 1989 master plan for Roy P. Drachman, Agua Caliente Park a systematic survey of 100% of the park area was provided and yielded a virtually continuous distribution of cultural material. This is not surprising in that the majority of the park is include in AZ BB:10:3, or the Whiptail site as recorded by the Arizona State Museum. The Whiptail Site was a large Hohokam village site that was constructed, occupied, and abandoned within a period of 150 years during the Tanque Verde Phase of the Hohokam Classic Period that lasted from A.D. 1150-1300.

The archaeological survey conducted in 1988 indicates there are five areas within the park where surface indications suggest the presence of significant archaeological resources. In 1996, an additional archaeological survey was conducted by SWCA Environmental Consultants prior to commencing the Phase 1 park improvements.

There are a number of historic resources within the park including the old ranch buildings. A 1997 bond project will provide funding to restore and rehabilitate these buildings and allow adaptive reuse for public programs including environmental education. The historic site has been determined to be eligible for the National Register of Historic Places.

Southeast Regional Park

There are no known cultural resource surveys of this regional park site. *Saving the Past for the Future, Cultural and Historical Resources Element of the Sonoran Desert Conservation Plan* indicates the very northern part of the park may be adjacent to an area of moderate archaeological sensitivity.

Tortolita Mountain Park

The *Tortolita Mountain Park Master Plan Background Report* indicates only a small portion of one recorded, prehistoric archaeological site (AZ AA:12:246) exists within the park boundary. However, the interior of the park has never been surveyed and is likely to contain a number of sites based on the prevalence of recorded cultural sites adjacent to the park. There are 19 recorded sites within one mile of the park boundary, and 43 sites noted within the vicinity of Tortolita Mountain Park.

Tucson Mountain Park (including the Tucson Mitigation Corridor)

In 1998, McGann and Associates, Inc prepared a Phase One Planning Study for Tucson Mountain Park. This study indicates there are a number of historic and prehistoric sites within the park, but the number and scope of these sites is unknown because much of the park has not been surveyed for cultural resources. The Phase One Planning Study recommends the entire park should be surveyed as soon as possible, that a resource protection and interpretation plan be prepared, and that cultural resource sites within the park should be monitored.

Acquisition of nearby Tumamoc Hill will ensure the preservation of a 320 acre significant and extensive prehistoric dry-farming site currently listed on the National Register of Historic Places. In addition, the Desert Laboratory is also a listed site.

Although not within Tucson Mountain Park, the Los Morteros site is located along the north end of the Tucson Mountains. Acquisition and interpretation of this Hohokam

ballcourt village site is planned for protection and interpretation under the 1997 bond. In addition to its prehistoric significance, this site is also known as the 1775 Anza Expedition "Llano del Azotado" campsite and the 1858 "Point of the Mountain" Butterfield Stage Station. Creation of Los Morteros Heritage Park is planned to commemorate the many cultural aspects of this site.

Existing Reserve Plans: Threats and Stressors

Introduction

Threats and stressors are defined as having the potential to negatively impact the priority vulnerable species and/or cultural resources discussed in the previous sections. Threats and stressors are largely impacts from human intervention including introduced plants and animals that compete with the more vulnerable species, land uses such as mining, agriculture and increased urban development, and the diversion of perennial stream flow and groundwater pumping to support a growing population.

At least six previously issued documents serve to outline threats and stressors. They are the March 2000 *Biological Stress Assessment*, April 2000 *Review of Vulnerable Species List*, June 2000 *Priority Vulnerable Species, Data Compilation and Synthesis*, August 2000 *Mountain Parks, Reserves and Biologically Significant Resource Lands*, August 2000 *Saving the Past for the Future, Cultural and Historical Resources Element of the Sonoran Desert Conservation Plan* and January 2001 *The Role of Adaptive Management*.

This report will summarize general information regarding threats and stressors to the priority vulnerable species and cultural resources from these documents as well as from existing master or management plans for the Pima County reserves. In addition, information regarding known or suspected threats and stressors to individual priority vulnerable species identified in the *Priority Vulnerable Species, Data Compilation and Synthesis* is outlined for each reserve.

Arthur Pack Regional Park

This park is located within the Tortolita Fan subarea in a rapidly growing part of the Tucson Basin. The general threats to the park are those associated with increasing development pressures and include:

- Habitat Loss and Fragmentation
- Decline of Ground Water Levels
- Impacts from Invasive Species
- Urbanization
- Increasing Recreational Use of the Hardy Wash Corridor

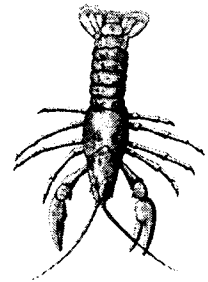
Given the priority vulnerable species known to inhabit the park, specific threats and stressors to those species include the following:

Cactus Ferruginous Pygmy Owl

- Loss of Riparian Habitat
- Increased Urbanization
 - Pest control and pollution
 - Collision with cars, towers and windows
 - Electrocution by power lines
- Impact by Non-Native or Invasive Species
 - House sparrow
 - European starling
 - Domestic cats

Bell's Vireo

- Loss of Riparian Habitat
- Increased Urbanization
 - Water and flood control projects
 - Agriculture
 - Livestock grazing
 - Off highway vehicles
- Competition by Non-Native or Invasive Species
 - Brown-headed Cowbird



Cienega Creek Natural Preserve

Due to the unique nature of this preserve created to conserve a perennial stream and associated riparian habitat, the primary threats revolve around loss of that habitat due to stream flow diversion and groundwater pumping. Although located some distance from the metropolitan Tucson area, conversion of ranch lands and increasing urbanization also impact Cienega Creek. Other stressors include the following:

- Illegal entrance and use of the preserve
- Illegal off-road vehicle use
- Illegal hunting
- Illegal harvesting of firewood
- Wildcat dumping
- Railroad-potential derailment
- Non-point source pollution-Golf Course fertilizer/chemical impacts
- Fence destruction causes impacts from cattle grazing
- Construction impacts (pipeline/cable/power)
- Interstate 10-potential chemical spills
- Impact of non-native and invasive species

There are a number of priority vulnerable species within Cienega Creek Natural Preserve. Following is an outline of those species and the specific threats to their survival.

Abert's Towhee

- Loss of Riparian Habitat
- Impact by Non-Native or Invasive Species
 - Saltcedar
 - Cattle
 - Brown-headed Cowbird

Merriam's Mesquite Mouse

- Loss of Mesquite Forest Habitat
- Impact by Non-Native or Invasive Species
 - Domestic Cats
 - House Mice



Western Red Bat

- Loss of Riparian Habitat
- Introduction of Pesticides

Mexican Long-Tongued Bat

- Roost Disturbance
- Loss of agave and saguaro forage plants

Cactus Ferruginous Pygmy Owl

- Loss of Riparian Habitat
- Increased Urbanization
 - Pest control and pollution
 - Collision with cars, towers and windows
 - Electrocution by power lines
- Impact by Non-Native or Invasive Species
 - House sparrow
 - European starling
 - Domestic cats

Bell's Vireo

- Loss of Riparian Habitat
- Increased Urbanization
 - Water and flood control projects
 - Agriculture

- Livestock grazing
 - Off highway vehicles
- Impact by Non-Native or Invasive Species
 - Brown-headed Cowbird

Mexican Garter Snake

- Loss of Riparian Habitat
- Increased Urbanization
 - Groundwater pumping
 - Stream flow diversion
- Impact by Non-Native or Invasive Species
 - Bullfrogs
 - Fish
 - Crayfish
- Historic Overgrazing

Lowland Leopard Frog

- Loss of Aquatic Habitat
 - Groundwater pumping
 - Stream flow diversion
- Impact by Non-Native or Invasive Species
 - Bullfrogs
 - Bass, Sunfish and Catfish
 - Rio Grande Leopard Frog
 - Crayfish
- Presence of Chytrid Fungus
- Human Impacts

Longfin Dace

- Loss of Aquatic Habitat
 - Groundwater pumping
 - Stream flow diversion
 - Flood Control Projects
- Presence of Native Parasites
- Presence of Non-native Species

Pima Pineapple Cactus

- Loss of habitat
 - Grazing
 - Recreation including Off Highway Vehicles
 - Agriculture
 - Land development
- Impact by Non-Native or Invasive Species
 - Buffleggrass
 - Lehman's lovegrass
 - Red Brome

- Overutilization for commercial, recreational, scientific or educational purposes
- Poaching
- Disease
 - Larval stage of moth from the family Phycitidae
 - Unidentified beetle

Needle-Spined Pineapple Cactus

- Poaching
- Increased urbanization
 - Road development
 - Overgrazing
 - Off-road Vehicles
- Impact by Non-Native or Invasive Species
 - Lehman's lovegrass
 - Red Brome

Colossal Cave Mountain Park

Colossal Cave is home to many of the priority vulnerable bat species and invertebrates. General threats and stressors include increasing development pressure, impacts from invasive species and recreational use of the park.

Threats and stressors to the individual priority vulnerable species found within Colossal Cave Mountain Park are outlined below.

Mexican Garter Snake

- Loss of Riparian Habitat
- Increased Urbanization
 - Groundwater pumping
 - Stream flow diversion
- Impact by Non-Native or Invasive Species
 - Bullfrogs
 - Fish
 - Crayfish
- Historic Overgrazing

Allen's Big-Eared Bat

- Roost disturbance
- Loss of roosting sites, surface water and forage habitat
 - Urban expansion
 - Agricultural development

Western Red Bat

- Loss of Riparian Habitat
- Introduction of Pesticides

Southern Yellow Bat

- Loss of Riparian Habitat
- Introduction of Pesticides

Lesser Long-Nosed Bat

- Roost disturbance

California Leaf-Nosed Bat

- Roost disturbance

Pale Townsend's Big-Eared Bat

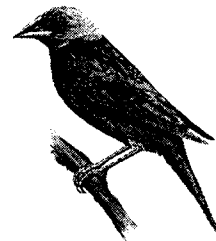
- Roost disturbance
- Use of non-target pesticides
- Loss of roosting sites and forage habitat

Mexican Long-Tongued Bat

- Roost Disturbance
- Loss of agave and saguaro forage plants

Abert's Towhee

- Loss of Riparian Habitat
- Impact by Non-Native or Invasive Species
 - Saltcedar
 - Cattle
 - Brown-headed Cowbird



Bell's Vireo

- Loss of Riparian Habitat
- Increased Urbanization
 - Water and flood control projects
 - Agriculture
 - Livestock grazing
 - Off highway vehicles
- Impact by Non-Native or Invasive Species
 - Brown-headed Cowbird

Longfin Dace

- Loss of Aquatic Habitat
 - Groundwater pumping
 - Stream flow diversion
 - Flood Control Projects

- Presence of Native Parasites
- Presence of Non-native Species

Arkenstone Cave Pseudoscorpion

- Threatened by introduced fire ant
- Destruction and pollution of caves and/or cave drainage areas
- Loss of troglodytes
- Disturbance by recreational cavers
- Scientific studies and collection

Talus Snails

- Global climate change
- Increased Urbanization
 - Road building
 - Development

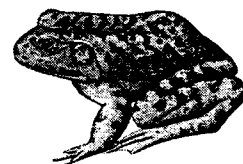
Needle-Spined Pineapple Cactus

- Poaching
- Increased urbanization
 - Road development
 - Overgrazing
 - Off-road Vehicles
- Impact by Non-Native or Invasive Species
 - Lehman's lovegrass
 - Red Brome

River Parks

The Burrowing Owl is known to inhabit banks along the Santa Cruz River. Specific threats and stressors to this species include:

- Predators
- Parasites
- Urbanization
 - Construction activities
 - Maintenance activities
 - Collisions with vehicles
- Decline in burrowing mammals
- Pesticides



Roy P. Drachman – Agua Caliente Regional Park

No priority vulnerable species are known to live within Agua Caliente Park. However, there are impacts to the park from the following sources:

- Non-point source pollution
- Illegal fishing
- Releasing of domestic pets
- Dogs off leash
- Blasting outside the park may have an adverse impact on the spring
- Human impacts within the park on the spring
- Invasive species

Southeast Regional Park

One priority vulnerable species, the Pima Pineapple Cactus occurs within this park and is protected in a reserve near Pima Motorsports Park. General impacts to the park occur from the following sources:

- Off-road vehicle use
- Cattle grazing
- Illegal dumping
- Illegal hunting
- Utilities
- Invasive species

Impacts specific to the Pima Pineapple Cactus include the following:

Pima Pineapple Cactus

- Loss of habitat
 - Grazing
 - Recreation including Off Highway Vehicles
 - Agriculture
 - Land development
- Impact by Non-Native or Invasive Species
 - Buffleggrass
 - Lehman's lovegrass
 - Red Brome
- Overutilization for commercial, recreational, scientific or educational purposes
- Poaching
- Disease
 - Larval stage of moth from the family Phycitidae
 - Unidentified beetle

Tortolita Mountain Park

Like Arthur Pack Regional Park, Tortolita Mountain Park is within the rapidly developing area north and west of Tucson. Threats and stressors are primarily from the impacts associated with development such as habitat loss and fragmentation. Within the park, there are a number of general impacts such as those from grazing, mining and utility corridors.

Tortolita Mountain Park is a largely undisturbed area home to several priority vulnerable species. Following is a list of those species and the identification of known or suspected threats and stressors to these species from the June 2000 issue of *Priority Vulnerable Species, Data Compilation and Synthesis*.

Abert's Towhee

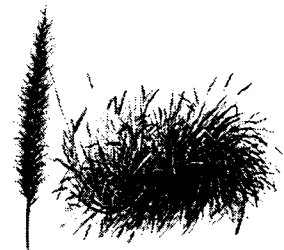
- Loss of Riparian Habitat
- Impact by Non-Native or Invasive Species
 - Saltcedar
 - Cattle
 - Brown-headed Cowbird

Bell's Vireo

- Loss of Riparian Habitat
- Increased Urbanization
 - Water and flood control projects
 - Agriculture
 - Livestock grazing
 - Off highway vehicles
- Impact by Non-Native or Invasive Species
 - Brown-headed Cowbird

Rufous-winged Sparrow

- Loss of Habitat
 - Over grazing
 - Urban development
- Impact by Non-Native or Invasive Species
 - Brown-headed Cowbird



Tucson Mountain Park (including the Tucson Mitigation Corridor)

Tucson Mountain Park is the oldest and most well used of the Pima County reserves. Its location just west of the Tucson metropolitan area makes it desirable as a place to relax and recreate. Urban encroachment now surrounds the Tucson Mountain range and has a negative impact of isolating plant and animal species within a "Sky Island". The Tucson Mitigation Corridor does allow wildlife movement to the west. Additional corridors that connect to other public lands must be implemented in order to preserve species within Tucson Mountain Park.

These are a number of identified threats and stressors in Tucson Mountain Park including:

- Recreational impacts from off-trail use
- Lessee special events and activities
- Archery/Shooting ranges
- Road killed wildlife
- Uncontrolled domestic pets
- Invasive species
- Air traffic noise pollution
- Utilities, including a proposal by the Public Service Company of New Mexico to construct and operate high-voltage electrical transmission lines through the Tucson Mitigation Corridor

Specific threats and stressors for those priority vulnerable species found with Tucson Mountain Park are identified below.

California Leaf-Nosed Bat

- Roost disturbance

Mexican Long-Tongued Bat

- Roost Disturbance
- Loss of agave and saguaro forage plants

Pale Townsend's Big-Eared Bat

- Roost disturbance
- Use of non-target pesticides
- Loss of roosting sites and forage habitat

Merriam's Mesquite Mouse

- Loss of Mesquite Forest Habitat
- Impact by Non-Native or Invasive Species
 - Domestic Cats
 - House Mice

Abert's Towhee

- Loss of Riparian Habitat
- Impact by Non-Native or Invasive Species
 - Saltcedar
 - Cattle
 - Brown-headed Cowbird

Bell's Vireo

- Loss of Riparian Habitat
- Increased Urbanization
 - Water and flood control projects
 - Agriculture
 - Livestock grazing
 - Off highway vehicles
- Impact by Non-Native or Invasive Species
 - Brown-headed Cowbird

Swainson's Hawk

- Habitat loss, degradation and fragmentation
 - Urban development
 - Recreational impacts
- Predation
- Pesticides
- Shooting

Tumamoc Globeberry

- Loss of habitat
 - Increased urbanization
 - Farming
 - Overgrazing
- Recreation
 - Off-highway vehicle use
- Pesticides
- Consumption by
 - Javelina
 - Rabbits
 - Leaf-mining insect
- Failure to reproduce

Inventory, Monitoring and Research

Introduction

The Pima County reserve system is built upon lands acquired for both resource protection and recreational use. Limited funding and a historical emphasis on recreational values have left the system lacking an understanding of the natural and cultural resources within these parks. With renewed focus on resource management, one of the tasks that lies ahead is to implement inventory, monitoring and research programs. These, and other implementation efforts will take place cooperatively with other agencies, universities and resource professionals and as funding permits.

The following section describes the inventory, monitoring and research efforts conducted in the recent past or currently underway throughout the Pima County reserve system.

Arthur Pack Regional Park

Inventory: 1988 Vegetation Inventory and Mapping
 1988 Wildlife Inventory and Habitat Mapping

Cienega Creek Natural Preserve

Inventory: 1994 Vegetation Mapping
 1994 Wildlife Inventory and Habitat Mapping
 1994+ Partial Flora and Fauna Lists
 Grey Hawk Inventory
 1994+ Archaeological Inventory
 1998 Water Chemical, Flow and Source Analysis by Pima Association of Governments (PAG)

Monitoring: 2000 Southeastern Arizona Winter Amphibian Monitoring Project
 Lowland Frog Research
 Groundwater Levels in Empirita, Cienega and Del Lago Wells by PAG
 Surface Water and Stream Flow Observations by PAG
 1996+ Pantano Jungle Revegetation Monitoring
 Leopard Frog Monitoring

Research: 2001 *Cienega Creek Storm Flow Frequency Analysis*, PAG
 2001 Lower Cienega Basin Source Water Study, PAG
 Groundwater Model of Empirita Ranch, Damares Chong-Diaz
 Sacaton Research

Colossal Cave Mountain Park

Inventory: 1998 Vegetation Inventory
1998 Wildlife Inventory

Monitoring: Bat Roosting Habits and Colony Size
Cave Formation and Species
Climate Historical Studies
Saguaro Phenology

River Parks

Research: 2001 Mission San Agustin Archival and Archaeological Assessment
2001 Marana Mound Limited Archaeological Excavation

Roy P. Drachman – Agua Caliente Regional Park

Inventory: 1989 Vegetation Inventory and Mapping
1989 Wildlife Habitat Mapping
1989 Cultural Resource Inventory
1996 Cultural Resource Survey

Research: 2001 Hydrology Research including pH, conductivity, flow rates, temperature, ion concentration, source studies, chemical analysis and species

Southeast Regional Park

Monitoring: 2001 Pima Pineapple Cactus Reserve

Tortolita Mountain Park

Inventory: 1996 Vegetation Mapping
1996 Wildlife Inventory and Habitat Mapping

Tucson Mountain Park (including the Tucson Mitigation Corridor)

Inventory: 1975 Vegetation Inventory and Mapping
1975 Wildlife Inventory

Research: 1998 Mitigation and Movement Corridors for Large Mammals along the Tucson Aquaduct, Krausman, et al.

Management Issues and Proposed Management Actions

Introduction

Thus far, previous planning efforts for the Pima County reserves have been summarized, known information presented regarding the presence of priority vulnerable species and cultural resources, and threats and stressors to resource preservation identified.

Now that the need for comprehensive management planning has been established, the following section outlines management issues within each Pima County reserve, and presents corresponding potential actions to resolve those issues.

The intent of identifying management issues and actions is to lay a foundation on which future adaptive management planning for the Pima County reserve system can be built. In most cases, current funding levels do not allow for the creation of adaptive management plans or the implementation of the identified actions. Funding for these items, and for the ongoing operations and maintenance of the reserve system will be the greatest challenge in managing Pima County reserve lands in the future.

The following series of tables illustrate the management issues and proposed management actions for each Pima County reserve. Information was gathered from a variety of sources including existing planning documents and research completed by the resource management staff of the Pima County Natural Resources, Parks and Recreation Department.

Arthur Pack Regional Park

Priority	Management Issue	Proposed Management Actions
1	Critical habitat for the Cactus Ferruginous Pygmy Owl	<ul style="list-style-type: none">• Inventory and monitor species• Perform research to determine recreational impacts• Consult with U.S. Fish and Wildlife Service prior to any future park development
2	Use of Hardy Wash as a cross country track course	<ul style="list-style-type: none">• Consult with U.S. Fish and Wildlife Service to determine impact on the Cactus Ferruginous Pygmy Owl
3	Known occurrence of: Bell's Vireo Cactus Ferruginous Pygmy Owl Kit Fox	<ul style="list-style-type: none">• Inventory and monitor species• Perform research to determine recreational impacts

4	<p>Potential occurrence of:</p> <p>Abert's Towhee Gentry Indigo Bush Giant Spotted Whiptail Ground Snake Merriam's Mesquite Mouse Rufous Winged Sparrow Swainson's Hawk Tucson Shovel-Nosed Snake Tumamoc Globeberry</p>	<ul style="list-style-type: none"> • Inventory to determine species presence
5	Increasing urbanization	<ul style="list-style-type: none"> • Maintain majority of reserve as a biological linkage
6	<p>Presence of invasive plant and animal species:</p> <p>Bermuda grass Buffelgrass European starling Feral cats Fountain grass Lehmann lovegrass Mouse barley Red brome Salt cedar</p>	<ul style="list-style-type: none"> • Institute removal and education programs
7	Increasing demand for recreation	<ul style="list-style-type: none"> • Depending on resource sensitivity, recreation may co-exist with resource conservation. If not, condense recreation within existing developed area leaving remainder of site devoted to conservation purposes. • Inventory for cultural resources if additional areas are developed • Divert future park construction projects to nearby Ted Walker Regional Park

Cienega Creek Natural Preserve

Priority	Management Issue	Proposed Management Actions
1	<p>Known occurrence of:</p> <p>Abert's Towhee Bell's Vireo Cactus Ferruginous Pygmy Owl Longfin Dace Lowland Leopard Frog Merriam's Mesquite Mouse Mexican Garter Snake Mexican Long-Tongued Bat Needle-Spined Pineapple Cactus Pima Pineapple Cactus Western Red Bat</p>	<ul style="list-style-type: none"> • Inventory and monitor species • Perform research to determine recreational impacts • Continue to implement resource management policies and actions as identified in the <i>Cienega Creek Natural Preserve Management Plan</i> (Refer to Appendix A)
2	<p>Potential occurrence of:</p> <p>Allen's Big-Eared Bat Arizona Shrew Arkenstone Cave Pseudoscorpion Bell's Vireo California Leaf-nose bat Chiricahua Leopard Frog Gentry Indigo Bush Gila Chub Gila Topminnow Huachuca Water Umbel Lesser Long-Nosed Bat Mountain Lion Nichol Turk's Head Cactus Rufous Winged Sparrow Sacaton Southern Yellow Bat Swainson's Hawk Tumamoc Globeberry Western Yellow-Billed Cuckoo</p>	<ul style="list-style-type: none"> • Inventory to determine species presence • Continue to implement resource management policies and actions as identified in the <i>Cienega Creek Natural Preserve Management Plan</i> (Refer to Appendix A)
3	Preserve and enhance perennial stream flow	<ul style="list-style-type: none"> • Restore and protect creek from diversions of water supply
4	Maintain and enhance natural, cultural and visual resource values	<ul style="list-style-type: none"> • Continue to implement resource management policies and actions as identified in the <i>Cienega Creek Natural Preserve Management Plan</i> (Refer to Appendix A)

5	Promote reintroduction of native species	<ul style="list-style-type: none"> • Reintroduce species such as the Huachuca Water Umbel and the Gila Topminnow
6	Accommodate public use that will not result in degradation of natural, cultural and visual resources	<ul style="list-style-type: none"> • Continue to implement public use policies and actions as identified in the <i>Cienega Creek Natural Preserve Management Plan</i> (Refer to Appendix A)
7	Manage resources cooperatively with other Pima County department, other agencies and area landowners	<ul style="list-style-type: none"> • Continue to implement inter-agency and inter-department policies and actions as identified in the <i>Cienega Creek Natural Preserve Management Plan</i> (Refer to Appendix A)
8	Acquire lands to expand the Preserve boundary to facilitate effective resource management	<ul style="list-style-type: none"> • Continue to implement preserve boundary policies and actions as identified in the <i>Cienega Creek Natural Preserve Management Plan</i> (Refer to Appendix A)
9	Prevent wildland fires from causing personal injury and damage to the Preserve and adjacent properties	<ul style="list-style-type: none"> • Continue to implement wildland fire management policies and actions as identified in the <i>Cienega Creek Natural Preserve Management Plan</i> (Refer to Appendix A)

Colossal Cave Mountain Park

Priority	Management Issue	Proposed Management Actions
1	<p>Known occurrence of:</p> <p>Abert's Towhee Allen's Big-Eared Bat Arkenstone Cave Pseudoscorpion Bell's Vireo California Leaf-nose Bat Desert Tortoise Kit Fox Lesser Long-Nosed Bat Longfin Dace Mexican Garter Snake Mexican Long-Tongued Bat Mountain Lion Needle-Spined Pineapple Cactus</p>	<ul style="list-style-type: none"> • Inventory and monitor species • Perform research to determine recreational impacts

	<p>Pale Townsend's Big-Eared Bat Sacaton Southern Yellow Bat Talus Snails Western Red Bat</p>	
2	<p>Potential occurrence of:</p> <p>Cactus Ferruginous Pygmy Owl Chiricahua Leopard Frog Desert Box Turtle Gentry Indigo Bush Giant Spotted Whiptail Ground Snake Lowland Leopard Frog Merriam's Mesquite Mouse Mexican Gray Wolf Nichol Turk's Head Cactus Pima Pineapple Cactus Rufous Winged Sparrow Swainson's Hawk Tucson Shovel-Nosed Snake Tumamoc Globeberry Western Yellow-Billed Cuckoo</p>	<ul style="list-style-type: none"> • Inventory to determine species presence
3	Potential impact to cultural resources	<ul style="list-style-type: none"> • Inventory, monitor and research cultural resources found within the reserve
4	Increasing urbanization	<ul style="list-style-type: none"> • Maintain site as a reserve and a biological linkage between the Rincon Mtns. and Cienega Creek • Acquire lands to link Colossal Cave Mtn. Park to Cienega Creek Natural Preserve
5	<p>Presence of invasive plant and animal species:</p> <p>Bermuda grass Buffelgrass European starling Feral cats Fountain grass Lehmann lovegrass Mouse barley Red brome Salt cedar</p>	<ul style="list-style-type: none"> • Institute removal and education programs

6	Potential impact of recreational use on riparian areas	<ul style="list-style-type: none"> • Monitor and adapt management strategy as needed
7	Increasing demand for recreation	<ul style="list-style-type: none"> • Depending on resource sensitivity, recreation may co-exist with resource conservation. If not, condense recreation within existing developed area leaving remainder of site devoted to conservation purposes. • Site Arizona Trail to minimize impacts to resources

River Parks

Priority	Management Issue	Proposed Management Actions
1	Known occurrence of: Burrowing Owl	<ul style="list-style-type: none"> • Inventory and monitor species • Perform research to determine recreational impacts
2	Increasing urbanization	<ul style="list-style-type: none"> • Maintain majority of site as a biological linkage • Increase the corridor width by acquiring additional lands along the major washes to serve as habitat
3	Presence of invasive plant and animal species: Buffelgrass Fountain grass Rhus lancea	<ul style="list-style-type: none"> • Institute removal and education programs
4	Increasing demand for recreation	<ul style="list-style-type: none"> • Condense recreation within existing developed area, leaving future acquisitions devoted to conservation purposes • Inventory for cultural resources if additional areas are developed

Roy P. Drachman – Agua Caliente Regional Park

Priority	Management Issue	Proposed Management Actions
1	<p>Potential occurrence of:</p> <p>Abert's Towhee Allen's Big-Eared Bat Bell's Vireo California Leaf-Nose Bat Desert Box Turtle Desert Tortoise Giant Spotted Whiptail Ground Snake Kit Fox Lesser Long-Nose Bat Lowland Leopard Frog Merriam's Mesquite Mouse Mexican Garter Snake Mexican Long-Tongued Bat Pale Townsend's Big-Eared Bat Rufus Winged Sparrow Southern Yellow Bat Swainson's Hawk Tumamoc Globeberry Western Red Bat Western Yellow-Billed Cuckoo</p>	<ul style="list-style-type: none"> • Inventory to determine species presence
2	<p>Increasing urbanization</p>	<ul style="list-style-type: none"> • Maintain majority of site as a reserve and a biological linkage between the Rincon Mtns. and Agua Caliente Creek • Acquire lands along Agua Caliente Creek to link the park with the Rincon Mtns. • Monitor to determine impacts on the spring
3	<p>Presence of invasive plant and animal species:</p> <p>Bermuda grass Broom snakeweed Buffelgrass Bullfrog Bulrush Cattails Crayfish</p>	<ul style="list-style-type: none"> • Institute removal, education and enforcement programs

	European starling Feral cats Fountain grass Lehmann lovegrass Mouse barley Non-native fish Non-native turtles Red brome Tamarisk sp.	
4	Potential impact from non-point source pollution	<ul style="list-style-type: none"> • Eliminate potential run-off from entrance roadway
5	Uncontrolled domestic animals	<ul style="list-style-type: none"> • Enhance education and enforcement program
6	Potential impact on the spring from recreational use	<ul style="list-style-type: none"> • Monitor and adapt management strategy if needed
7	Illegal fishing	<ul style="list-style-type: none"> • Enhance education and enforcement program
8	Increasing demand for recreation	<ul style="list-style-type: none"> • Depending on resource sensitivity, recreation may co-exist with resource conservation. If not, condense recreation within existing developed area leaving remainder of site devoted to conservation purposes. • Monitor cultural resource sites for recreational impact

Southeast Regional Park

Priority	Management Issue	Proposed Management Actions
1	Known occurrence of: Pima Pineapple Cactus	<ul style="list-style-type: none"> • Inventory and monitor species • Perform research to determine recreational impacts
2	Potential occurrence of: Abert's Towhee Bell's Vireo California Leaf-Nose Bat Giant Spotted Whiptail Ground Snake Lesser Long-Nosed Bat	<ul style="list-style-type: none"> • Inventory to determine species presence

	Merriam's Mesquite Mouse Mexican Long-Tongued Bat Pale Townsend's Big-Eared Bat Swainson's Hawk Tucson Shovel-Nosed Snake Tumamoc Globeberry	
3	Increasing urbanization	<ul style="list-style-type: none"> • Maintain part of site as a buffer or biological linkage
4	Presence of invasive plant and animal species: Bermuda Grass Lehmann lovegrass Mouse barley Red brome Salt cedar	<ul style="list-style-type: none"> • Institute removal and education programs
5	Impact from off-road vehicle use	<ul style="list-style-type: none"> • Enhance signage, fencing and enforcement programs
6	Impact from cattle grazing	<ul style="list-style-type: none"> • Maintain fencing and work with adjacent grazing lease holders to eliminate issue
7	Illegal dumping	<ul style="list-style-type: none"> • Enhance signage, fencing and enforcement programs
8	Increasing demand for recreation	<ul style="list-style-type: none"> • Depending on resource sensitivity, recreation may co-exist with resource conservation. If not, condense recreation within existing developed area leaving remainder of site devoted to conservation purposes. • Inventory for cultural resources if additional areas are developed

Tortolita Mountain Park

Priority	Management Issue	Proposed Management Actions
1	<p>Known occurrence of:</p> <p>Abert's Towhee Bell's Vireo Mountain Lion Rufous-winged Sparrow</p>	<ul style="list-style-type: none"> • Inventory and monitor species • Perform research to determine recreational impacts • Continue to implement resource protection and management policies and actions as identified in the <i>Tortolita Mountain Park Master Plan</i> (Refer to Appendix B)
2	<p>Potential occurrence of:</p> <p>Acuna Cactus Allen's Big-Eared Bat Burrowing Owl Cactus Ferruginous Pygmy Owl California Leaf-Nosed Bat Gentry Indigo Bush Giant Spotted Whiptail Ground Snake Lesser Long-Nosed Bat Mexican Garter Snake Mexican Long-Tongued Bat Merriam's Mesquite Mouse Needle-Spined Pineapple Cactus Nichol Turk's Head Cactus Pale Townsend's Big-Eared Bat Pima Pineapple Cactus Southern Yellow Bat Southwestern Willow Flycatcher Swainson's Hawk Talus Snails Tucson Shovel-Nosed Snake Tumamoc Globeberry Western Red Bat Western Yellow-Billed Cuckoo</p>	<ul style="list-style-type: none"> • Inventory to determine species presence • Continue to implement resource protection and management policies and actions as identified in the <i>Tortolita Mountain Park Master Plan</i> (Refer to Appendix B)
3	<p>Presence of invasive plant and animal species:</p> <p>Bermuda Grass Fountain grass Feral Horses</p>	<ul style="list-style-type: none"> • Institute removal and education programs

	Lehmann Lovegrass Mouse Barley Red Brome Salt Cedar	
4	Maintain and enhance natural, cultural and visual resource values	<ul style="list-style-type: none"> Continue to implement resource protection and management policies and actions as identified in the <i>Tortolita Mountain Park Master Plan</i> (Refer to Appendix B)
5	Accommodate public use in a manner compatible with the protection of the parks natural, cultural and visual resources	<ul style="list-style-type: none"> Continue to implement public use policies and actions as identified in the <i>Tortolita Mountain Park Master Plan</i> (Refer to Appendix B)
6	Acquire lands to expand the Preserve boundary to protect resource values, buffer development and provide for appropriate recreational opportunities	<ul style="list-style-type: none"> Continue to implement preserve boundary policies and strategies as identified in the <i>Tortolita Mountain Park Master Plan</i> (Refer to Appendix B)

Tucson Mountain Park (including the Tucson Mitigation Corridor)

Priority	Management Issue	Proposed Management Actions
1	Critical habitat for the Cactus Ferruginous Pygmy Owl	<ul style="list-style-type: none"> Inventory and monitor species Perform research to determine recreational impacts Consult with U.S. Fish and Wildlife Service prior to any future park development
2	Known occurrence of: Abert's Towhee Bell's Vireo California Leaf-Nosed Bat Desert Tortoise Kit Fox Merriam's Mesquite Mouse Mexican Long-Tongued Bat Mountain Lion Pale Townsend's Big-Eared Bat Swainson's Hawk Tumamoc Globeberry	<ul style="list-style-type: none"> Inventory and monitor species Perform research to determine recreational impacts

3	<p>Potential occurrence of:</p> <p>Acuna Cactus Cactus Ferruginous Pygmy Owl Gentry Indigo Bush Giant Spotted Whiptail Ground Snake Lesser Long-Nosed Bat Needle-Spined Pineapple Cactus Nichol's Turk Head Cactus Pima Pineapple Cactus Rufous Winged Sparrow Tucson Shovel-Nosed Snake</p>	<ul style="list-style-type: none"> • Inventory to determine species presence
4	Potential impact to cultural resources	<ul style="list-style-type: none"> • Inventory, monitor and research cultural resources found within the reserve
5	Potential impact to natural and visual resources from a proposal for high-voltage electrical power lines by the Public Service Company of New Mexico	<ul style="list-style-type: none"> • Respond during public scoping and environmental review process • Continue to manage the Tucson Mitigation Corridor under the existing Cooperative Agreement with the Bureau of Reclamation
6	Core reserve lacks a management plan	<ul style="list-style-type: none"> • Begin a management planning process as soon as the species goals and management prescriptions are developed
7	Increasing urbanization	<ul style="list-style-type: none"> • Maintain majority of site as a reserve and a biological linkage between the Tucson Mtns., Tohono O'odham Nation, and the Ironwood National Monument • Acquire lands to protect resource values
8	<p>Presence of invasive plant and animal species:</p> <p>Bermuda grass Buffelgrass European starling Fountain grass Lehmann lovegrass Mouse barley Red brome</p>	<ul style="list-style-type: none"> • Institute removal and education programs

9	Creation of "wildcat trails"	<ul style="list-style-type: none"> • Continue to monitor, close and revegetate • Institute education and enforcement programs
10	Lessee special events increase traffic	<ul style="list-style-type: none"> • Provide traffic control and enforcement of vehicle code
11	Road killed wildlife	<ul style="list-style-type: none"> • Provide education and enforcement programs
12	Uncontrolled domestic animals	<ul style="list-style-type: none"> • Enhance education and enforcement program
13	Archery and Shooting Ranges	<ul style="list-style-type: none"> • Monitor and maintain sites • Perform research to determine impacts • Seek alternative locations
14	Noise impacts from air traffic	<ul style="list-style-type: none"> • Include the Tucson Airport Authority in future management planning
15	Potential impact of recreational use	<ul style="list-style-type: none"> • Monitor and adapt management strategy as needed
16	Increasing demand for recreation	<ul style="list-style-type: none"> • Depending on resource sensitivity, recreation may co-exist with resource conservation. If not, condense recreation within existing developed area leaving remainder of site devoted to conservation purposes.

Conclusion and Recommendations

Pima County reserves will contribute to the land base under the Sonoran Desert Conservation Plan that is set aside for the protection and preservation of natural and cultural resources. Larger areas such as the mountain parks provide species habitat, while smaller parks like Roy P. Drachman – Agua Caliente and Arthur Pack may provide biological connections to larger protected areas, or may serve as sites for the reintroduction of native species.

Most of the Pima County reserves have been the subject of some type of planning effort. These plans vary greatly in terms of focus and content from a management plan for Cienega Creek Natural Preserve to conserve resource values to recreation oriented planning of the river park system. Scopes of the planning efforts also vary with some reserves such as Colossal Cave Mountain Park having simply a background report while others like Tortolita Mountain Park have a full master plan. This variation is due, in large part, to the availability of funding for planning endeavors.

Another point is the difference in terminology between “master plans” and “management plans”. These two types of plans seem to have been used interchangeably with regard to the Pima County reserve system. In the future, planning efforts for Pima County reserves will need to focus on the preservation of priority vulnerable species and protection of cultural resource sites. As such, these plans should rightfully be called “management plans” because they will incorporate policies for resource conservation and public use, and include adaptive management strategies that have the flexibility to change over time as more is learned about the Sonoran Desert environment.

In order to prepare for future planning efforts, and for the funding opportunities that will drive the preparation and implementation of these plans, it is important to review and prioritize the Pima County reserves. Although other factors should be considered in assigning a priority to future planning efforts, a simple comparison showing the level of planning completed to date and the priority vulnerable species and umbrella species known to exist within the reserve boundaries may assist in establishment planning priorities. The following table illustrates the comparison.

Pima County Reserve	Number of Known Priority Vulnerable Species	Completed Planning
Arthur Pack Regional Park	3	1988 Master Plan
Cienega Creek Natural Preserve	11	1994 Background Report and Management Plan
Colossal Cave Mountain Park	18	1998 Background Report
River Parks	1	1996 Master Plan
Roy P. Drachman – Agua Caliente Regional Park	0	1989 Master Plan
Southeast Regional Park	1	None

Tortolita Mountain Park	4	1996 Background Report and Master Plan
Tucson Mountain Park (including the Tucson Mitigation Corridor)	11	1975 Plan and a 1998 Phase One Planning Study

Based on the information presented above, it is interesting to note that two of the three reserves with the greatest numbers of priority vulnerable species do not have management plans. Those reserves are Tucson Mountain Park and Colossal Cave Mountain Park.

The County Administrator has already seen the need for a full management plan of Tucson Mountain Park. He has directed staff to embark on this effort as soon as the Science and Technical Advisory Team develops specific goals, objectives and management prescriptions for those priority vulnerable species found within Tucson Mountain Park. The Pima County Natural Resources, Parks and Recreation Department intends to begin a Tucson Mountain Park Adaptive Management Plan during the summer of 2001.

The Pima County Parklands Foundation manages Colossal Cave Mountain Park. Private interests operate the park including the cave attraction and ranching operation under separate agreements with the Parklands Foundation. Funding will need to be identified in the future to complete management-planning efforts begun several years ago with preparation of a background report.

Both Cienega Creek Natural Preserve and Tortolita Mountain Park have completed plans. These plans should be evaluated in terms of guidelines for adaptive management that will be generated during the Sonoran Desert Conservation Plan. It will be important for all Pima County reserves to have management plans that include provisions for the inventory, monitoring and research of natural and cultural resources.

A planning effort for a district park site within Southeast Regional Park is anticipated to begin in the near future. Based on what is learned about the resource values of the park during the inventory phase of this planning effort, and the possible designation of a nearby site as a reserve for Pima Pineapple Cactus, this area should be further evaluated in terms of its value and contribution to the preservation of priority vulnerable species. Should future research indicate this site has such value, a management planning effort should be funded and begun.

Roy P. Drachman – Agua Caliente was originally acquired to preserve the natural and cultural resources associated with the unique spring location. As such, the planning effort that was completed in 1989 was a fairly comprehensive study of the resource values. Like Cienega Creek and Tortolita, the master plan for this park should be brought up to the level of an adaptive management plan and include provisions for inventory, monitoring and research. This park is also being considered as a potential site for the reintroduction of native fish, amphibians and reptiles.

Arthur Pack Regional Park and the River Parks have been viewed historically primarily in terms of their recreational value. With the Sonoran Desert Conservation Plan, these sites may be seen in a new light of providing biological connections to larger reserve areas. The Hardy Wash corridor of Arthur Pack Regional Park is particularly valuable since it is within critical habitat of the Cactus Ferruginous Pygmy Owl. As such, management of these parks will need to address their new roles in the preservation of priority vulnerable species.

In summary, future adaptive management planning of the Pima County reserve system is recommended to proceed in the following priority order pending the acquisition of funding for this purpose.

Pima County Reserve	Priority for Adaptive Management Plan
Tucson Mountain Park (including the Tucson Mitigation Corridor)	1
Colossal Cave Mountain Park	2
Cienega Creek Natural Preserve	3
Tortolita Mountain Park	4
Arthur Pack Regional Park	5
Roy P. Drachman – Agua Caliente Regional Park	6
River Parks	7
Southeast Regional Park	8

In a subsequent report that will be prepared in support of the Sonoran Desert Conservation Plan titled *Pima County Reserves, A Management Planning Process and Template*, a public and cooperative management planning process and an adaptive management planning template will be presented that can be utilized by Pima County during future management planning efforts.

Appendix A

**Excerpts from Cienega Creek Natural Preserve Management Plan
prepared in 1994 by McGann & Associates Inc.**

Management Objectives:

The Cienega Creek Natural Preserve will be managed with the objective of accommodating public use to the degree that such use will not result in degradation of the natural and scenic resources of the site.

Restrictions on Type and Level of Public Use:

The types and levels of public use permitted within the Preserve shall be subject to the restrictions outlined herein. These restrictions serve several purposes, including:

- *The protection of natural and scenic resources as prescribed by the adopted Declaration of Restrictions, Covenants, and Conditions for the Cienega Creek Natural Preserve.*
- *The protection of public (visitor) welfare and safety relative to natural hazards such as flooding.*
- *A reduction in the need for capital improvements such as access roads, toilet buildings, and supporting utility lines.*
- *A reduction in the need for on-going maintenance services such as trash collection and removal.*
- *A reduction in the potential for conflicts between incompatible uses.*
- *The maintenance of on-site conditions that will allow the public to enjoy an outdoor experience not available in other Pima County Parks and natural areas.*

6.2 Public Use - Management Zone A

Management Zone A Policies:

The following policies shall apply to public use within Management Zone A.

- *All visitors will be required to obtain a permit from the Pima County Parks and Recreation Department before entering the Preserve except that use of the proposed overlook area located at the Three Bridges Entry will be excluded from this requirement. (See Section 6.4 of this document for information related to the proposed permit system.)*
- *Permits will be issued to individuals and to groups of up to four persons. Permits for larger groups involved in educational programs or other approved activities may be issued at the discretion of the Parks Superintendent of Natural Resources.*
- *Except as approved by the Parks Superintendent of Natural Resources, permits will be issued to no more than 50 persons for access to the Preserve on a single day.*
- *The maximum number of permits issued for a single day may be reduced by the Parks Superintendent of Natural Resources on a temporary or permanent basis if deemed necessary to protect the natural and scenic resources of the site or to protect the welfare of the public.*
- *All or portions of the Preserve may be temporarily closed to public use by the Parks Superintendent of Natural Resources if deemed necessary to protect the natural or scenic resources of the site or to protect the welfare of the public.*

Activities Permitted within Management Zone A:

The following activities will be allowed within Management Zone A subject to all applicable rules and regulations.

- *Hiking, walking, backpacking, picnicking, and related activities.*
- *Railroad train watching and photography or painting.*
- *Non-intrusive bird and wildlife observation and photography or painting.*
- *Wading in pools and stream.*
- *Other non-consumptive recreational or educational activities.*
- *Scientific research subject to the requirements listed herein.*

6.2 Public Use - Management Zone A (Continued)

Activities Restricted with Management Zone A:

The following activities shall be restricted within Management Zone A:

- *Horseback riding and mountain bicycle operation by the public which shall be restricted to designated equestrian and bicycle trails. (Until such trails are developed, equestrian and bicycle use will be restricted to areas identified by the Parks Superintendent of Natural Resources).*
- *Horseback riding by Pima County personnel or caretakers which shall be limited to that required for monitoring or administrative activities or as approved by the Superintendent of Natural Resources.*
- *The filming of movies, videos, or television shows which shall be subject to the restrictions established by the Parks Superintendent of Natural Resources on a case-by-case basis.*
- *Hunting, fishing, trapping, and the discharge of a firearm which shall be subject to the rules and regulations published annually by the Arizona Game and Fish Department.*
- *The installation of new utility lines which shall be subject to the provisions of the Restrictions, Covenants, and Conditions applicable to the Preserve site.*

Activities Prohibited within Management Zone A:

The following activities are expressly prohibited within Management Zone A:

- *The use of motorized vehicles, except as may be required for emergency or administrative purposes and approved by the Parks Superintendent of Natural Resources.*
- *Livestock grazing.*
- *Overnight camping or other overnight activities.*
- *The starting of campfires, cooking fires, fires for any other purpose.*
- *The harvesting of fuelwood.*
- *The destruction, disturbance, harvesting, or removal of plants, seeds, or plant parts except as may be authorized by the Parks Superintendent of Natural Resources.*

6.2 Public Use - Management Zone A (Continued)

Activities Prohibited within Management Zone A (Continued):

- *The destruction, disturbance, or removal of cultural resources, except as may be authorized by the Parks Superintendent of Natural Resources and appropriate state authorities.*
- *The mining of minerals, the quarrying of aggregate materials, or the placement of fill soils or debris.*
- *The discharge or storage of waste materials, hazardous materials, or any other materials that might result in the degradation of the natural and scenic resources of the Preserve.*
- *The construction of buildings, structures, fences, or any other site improvement except as may be authorized by the Parks Superintendent of Natural Resources.*
- *The carrying out of trade or commercial activities except as approved by the Parks Superintendent of Natural Resources.*
- *Any other activity identified by the Parks Superintendent of Natural Resources as detrimental to the natural and scenic resources of the Preserve. Such additional use restrictions shall be posted or published to inform the public of their existence.*

Planned Actions:

The following actions related to public use of Management Zone A are planned.

- *Amendment of the declaration of Restrictions, Covenants and Conditions to make the provisions applicable to all areas within Management Zone A including future acquisitions but excluding the proposed Preserve entrances.*
- *The implementation of a permit system as described in Section 6.4 of this document.*
- *The posting of notices at Preserve entries and at other appropriate locations to inform the public of access permit requirements and Preserve use regulations.*
- *The monitoring of public use and the enforcement of regulations including the prosecution of violators as appropriate.*
- *Periodic review of the impact of public uses on the natural and scenic resources of the Preserve and the development and adoption of amendments to this Management Plan as appropriate.*

6.2 Public Use - Management Zone A (Continued)

Planned Actions (Continued):

- *The submittal of a petition to the Arizona Game and Fish Department (AGFD) requesting that the Department's management unit boundaries be revised to consolidate all areas of the Preserve within a single AGFD management unit.*

6.3 Public Use - Management Zone B

Management Zone B Policies:

The following policies shall apply to public use within Management Zone B.

- *A permit will be required for access to Management Zone B until such time as the area is developed for the types of public uses described in Section 4 of this document. Thereafter, public access will be controlled, but a permit will not be required.*
- *Specific public uses and activities allowed on the site shall be as defined by master plans for the Empirita Ranch Area of the Cienega Creek Natural Preserve and the proposed County park near Colossal Cave Road, the preparation of which shall be coordinated by the Pima County Parks and Recreation Department. These master plans shall restrict public uses to those activities that will not be detrimental to the natural and scenic resources of the Preserve.*

Activities Permitted within Management Zone B:

The following activities will be allowed within Management Zone B subject to all applicable rules and regulations.

- *All activities permitted within Management Zone A plus those activities that are subsequently identified in the Master Plan for the Empirita Ranch Area of the Cienega Creek Natural Preserve and the Master Plan for the proposed County park.*

Activities Restricted within Management Zone B:

The following activities shall be restricted within Management Zone B:

- *All activities restricted in Management Zone A except as may be amended by the Master Plan for the Empirita Ranch Area of the Cienega Creek Natural Preserve and the Master Plan for the proposed County park.*

Activities Prohibited within Management Zone B:

The following activities are expressly prohibited within Management Zone B:

- *All activities prohibited in Management Zone A except as may be amended by the Master Plan for the Empirita Ranch Area of the Cienega Creek Natural Preserve and the Master Plan for the proposed County park.*

6.3 Public Use - Management Zone B (Continued)

Planned Actions:

The following actions related to public use of Management Zone B are planned.

- *Periodic review of the impact of public uses on the natural and scenic resources of the Preserve and the development and adoption of amendments to this Management Plan as appropriate.*
- *The preparation of a Master Plan for the development and use of the Empirita Ranch Area of the Cienega Creek Natural Preserve.*
- *The preparation of a Master Plan for the development and use of the proposed District Park.*

6.4 Permit System

Purpose of the Permit System:

The permit system will serve four functions:

- *It will serve as a mechanism to monitor and control the number of individuals using the site so that use levels do not degrade the resource.*
- *It will provide the Parks and Recreation Department with advance notice of large or unusual activities that may warrant monitoring or supervision.*
- *It will serve to assist in the enforcement of Preserve use regulations.*
- *It will provide an opportunity to convey safety and resource protection information to visitors.*

Description of the Permit System:

The permit system to be utilized at the Preserve will allow for the issuance of three types of permits. These permits are as follows:

- **Day Use Permits** *issued to individuals and small groups that allow for access into the Preserve for recreational and educational activities. Day Use Permits will be valid for a single entry only during a specified 1 to 7 day period.*
- **Special Use Permits** *issued to organizations, groups, or individuals for activities such as trail rides, film making, or research. Special Use Permits will be valid for a specified period of time only. Conditions may be attached to each Special Use Permit.*
- **Multiple Entry Permits** *issued to individuals such as utility company personnel who must enter the Preserve to inspect existing utility lines. Multiple Entry Permits will be valid for a period not exceeding one year. Multiple entry permit holders will be required to periodically report their activities to the Preserve Manager.*

All three types of permits will require that the holder comply with all of the rules and regulations that have been established for the Preserve.

Issuance of Permits:

Permits will be issued on a first come - first served basis. The Parks Department will receive requests for permits by telephone, fax, or letter. Permits will be issued and held for pick-up, mailed, or transmitted via fax. The faxing of permits to designated government

6.6 Use of the Preserve for Scientific Research

Introduction:

The resources of the Cienega Creek Natural Preserve create numerous opportunities for scientific research. In as much as research can add to what is currently known about the Preserve and potentially result in new information relevant its management, scientific research will be encouraged. Research will, however, be subject to the following policies and procedures listed below.

Policies Related to Scientific Research:

The following policies shall apply to all scientific research conducted at the Preserve.

- *Appropriate scientific research by qualified individuals or organizations related to the biophysical and cultural resources of the Preserve will be encouraged.*
- *Cooperative agreements between the Pima County Flood Control District and research institutions such as the University of Arizona will be encouraged to the extent that they result in on-going research related to the biophysical and cultural resources of the site.*
- *Research that involves the destruction of resources or other negative environmental impacts, as determined by the Parks Superintendent of Natural Resources, shall be prohibited.*
- *All research programs and activities shall be reviewed, in advance, by the Parks Superintendent of Natural Resources and the Flood Control District, and approved by the District.*
- *All research activities shall comply with the public use regulations identified herein including, but not limited to prohibitions related to: motorized vehicle use, camping, construction of structures, removal of plants, and the discharge of hazardous or waste materials.*
- *Information generated by research conducted at the Preserve shall be made available to Pima County for its use related to the on-going management of the Preserve.*

Procedures Related to Scientific Research:

A research proposal letter shall be submitted to the Parks Superintendent of Natural Resources and approved prior to the commencement of any research project. The research proposal shall, at a minimum, identify the following.

- *The name of the organization or individual responsible for the proposed research activities and funding agency, if applicable.*

6.6 Use of the Preserve for Scientific Research (Continued)

Procedures Related to Scientific Research (Continued):

- *The purpose of the research with supporting information related to why the Preserve is an appropriate location for the proposed study.*
- *The identification of proposed research activities, number of individuals to be involved, and equipment to be utilized or temporarily installed.*
- *Dates when on-site research activities will occur.*
- *A statement acknowledging all applicable restrictions related to use of the Preserve.*

If the proposal is found to have scientific merit and if it is determined that the Preserve is an appropriate location for its implementation, a Special Use Permit will be issued to the applicant. Conditions, as deemed appropriate by the Parks Superintendent of Natural Resources or the Flood Control District, may be attached to the Special Use Permit.

A final report or summary of findings resulting from the research project shall be submitted to the Pima County Flood Control District for its information and files.

7.1 Water Resources

Management Objectives:

The Cienega Creek Natural Preserve will be managed with the objective of maintaining or enhancing the existing conditions on the Preserve site related to; perennial stream flow, ground water levels, surface water quality, and ground water quality.

Policies:

The following policies shall apply to all areas of the Preserve.

- *No use or activity shall be conducted within the Preserve that will materially diminish the quality of the ground water or surface water within the Preserve.*
- *The pumping of ground water to support public use facilities proposed for Management Zone B shall be limited to rates that will not have a negative influence on surface water flows or ground water levels within the Preserve.*

Planned Actions:

The following actions related to management of water resources within the Preserve are planned.

- *Continued monitoring at the Empirita Ranch by Errol Montgomery and Associates consisting of annual data summaries as described in the 1993 "Hydrology Monitoring Program".*
- *Continued surface water quality monitoring at Marsh Station Road by the Arizona Department of Environmental Quality (ADEQ) during May, August, November, and February. (Sampling to be conducted in May and November if ADEQ reduces its sampling schedule to twice yearly).*
- *Continued flow monitoring at the Pantano Wash near Vail gage (00948450) by the U.S. Geological Survey.*
- *Continued operation of flood warning system stream gages and precipitation gages at; Pantano Wash near Vail (4250), Cienega Creek at I-10 (4280), and Davidson Canyon near I-10 (4310).*
- *Measurement of water levels on an monthly basis at wells: 16-17-33abb, 16-17-35caa, 16-17-35dbcz, and 16-16-14ddc and observation of stream flow in Section 35 (T16E-R17S).*
- *The maintenance and protection of existing water rights by active participation in the adjudication process and by defense of existing claims and certificates to surface waters and subflows.*

7.1 Water Resources (Continued)

Planned Actions (Continued)

- *The provision of support to legislative measures to strengthen Arizona's in-stream flow program.*
- *The encouragement of research regarding the relationship of stream flows to ground water levels and the water resource needs of riparian habitat.*
- *Continued coordination with the Arizona Department of Transportation (ADOT) to identify means to prevent and mitigate roadway spills on I-10 so that hazardous materials are not released into Cienega Creek.*
- *The monitoring, reporting, and remediation of potential sources of contaminants within and adjacent to the Preserve.*
- *Participation in the review of development proposals for adjacent lands whenever possible to assess and comment on the potential impacts of such development on the water resources of the Preserve.*
- *The submittal of a petition to the State Land Department requesting that the Pima County Flood Control District be allowed to review and comment on all applications related to the sale, lease, or permitting of State Trust Land within the contributing watershed for mineral extraction purposes.*
- *The submittal of a petition to the Bureau of Land Management and to the U.S. Forest Service requesting that the Pima County Flood Control District be allowed to review and comment on all applications related to the sale, lease, or permitting of federal land within the contributing watershed for mineral extraction purposes.*
- *The development and periodic updating of a plan for responding to hazardous material releases within or near the Preserve.*
- *On-going coordination between the Pima County Flood Control District and the Southern Pacific Railroad, the Arizona Department of Transportation, and the various pipeline companies with facilities within the Preserve regarding hazardous material response plans.*
- *The study of stream flow and ground water table effects arising out of or from the implementation of the Empirita Ranch Water Facilities Master Plan and its development of well field / extraction.*

7.1 Water Resources (Continued)

Planned Actions (Continued):

- *An inventory of existing mineral claims or mineral status of title within Preserve and determination if such claims are subject to appropriation without surface owner consent or knowledge.*
- *An inventory of existing mineral claims or mineral status of title within the watershed contributing to the Preserve on State, Federal, and privately owned properties within the watershed.*

7.2 Vegetation

**Management
Objective:**

The Cienega Creek Natural Preserve will be managed with the objective of preserving, protecting, and enhancing the existing native vegetation with greatest emphasis given the protection and restoration of riparian woodlands and other areas with riparian vegetation.

Policies:

The following policies shall apply to all areas of the Preserve.

- *The introduction of non-native plant species shall be prohibited.*
- *To the extent feasible noxious, non-native plant species such as tamarisk that threaten to displace native plant species shall be monitored and, if necessary, controlled or removed from the Preserve.*
- *Livestock grazing within the Preserve shall be limited to those areas in Management Zone B located south of I-10 and to the existing 60 acre pasture located adjacent to the existing caretaker's residence in Section 35 (T16S-R17E).*
- *All areas of the Preserve previously cleared for agricultural crop production will be revegetated with native vegetation. The implementation of this revegetation program will be accomplished on a phased basis. (This policy shall not apply to areas within Management Zone B, that will be used for the development of public use facilities.)*
- *All areas disturbed by the construction of entrances or other facilities shall be revegetated utilizing native plant species as identified in Section 4 of the Background Report prepared in conjunction with this project.*

Planned Actions:

The following actions related to the management of on-site vegetation are planned.

- *The completion of perimeter fencing and the maintenance of such fencing as required to prevent livestock from entering the Preserve from adjacent properties.*
- *The submittal of an application to the Arizona Game and Fish Department Heritage Fund for a grant that would allow for on-going monitoring of vegetative and wildlife resources and the identification of restoration needs and priorities.*

7.2 Vegetation (Continued)

Planned Actions (Continued):

- *The development of a cooperative program involving the Arizona Game and Fish Department and the University of Arizona related to the long-term monitoring of vegetative resources within the Preserve. The program will include monitoring of the presence and status of invasive exotic species such as tamarisk.*
- *The establishment of permanent photo points for the monitoring of changes in vegetation over time especially in areas subject to high visitor use and grazing.*
- *Coordination with the University of Arizona and other research organizations related to the implementation of studies to monitor the long-term dynamics of streambed recovery and long-term changes in vegetative communities.*
- *The restriction of activities within portions of the Preserve when the vegetation becomes degraded due to overuse and the revegetation of disturbed areas with native plant species if necessary.*
- *The closure and revegetation of existing roads not necessary or desirable for public access, utility access, or fire management.*
- *The utilization of inter-governmental agreements with the Arizona Game and Fish Department to monitor and assess the status of the on-site vegetation and to engage in enhancement programs when appropriate.*

7.3 Wildlife Resources

**Management
Objective:**

The Cienega Creek Natural Preserve will be managed with the objective of maintaining healthy and diverse wildlife populations on the site and to accommodate wildlife movement patterns on and through the Preserve site.

Policies:

The following policies shall apply to all areas of the Preserve.

- *The introduction of non-native wildlife species shall be prohibited.*
- *Pets and other domestic animals shall be prohibited on-site except for those appropriately restrained by leashes or cages.*
- *Public use of portions of the Preserve may be restricted on a temporary basis, if necessary, to protect habitat essential to the survival or healthy condition of native wildlife species.*
- *Hunting and trapping on-site shall be in accordance with the rules published annually by the Arizona Game and Fish Department.*
- *The protection of significant habitat areas and the maintenance of corridors that facilitate the movement of wildlife from the Preserve to other protected public lands shall be given consideration when assessing potential land acquisitions and expansion of the Preserve.*
- *The Preserve will be monitored for the presence of Honeybee swarms. Colonies and/or swarms of bees located near trails or high-use public areas will be removed in accordance with established Pima County procedures.*

Planned Actions:

The following actions related to the management of wildlife resources are planned.

- *The submittal of an application to the Arizona Game and Fish Department Heritage Fund for a grant that would allow for on-going monitoring of vegetative and wildlife resources.*
- *The Preserve site will be monitored for the presence of noxious, non-native animal species and, if necessary, measures will be taken to control or remove such species.*

7.6 Cultural Resources

**Management
Objective:**

The Cienega Creek Natural Preserve will be managed with the objective of preserving and protecting the cultural resources present on the Preserve site.

Policies:

The following policies shall apply to all areas of the Preserve.

- *All applicable federal, state, and county regulations pertaining to the protection of cultural resources shall be enforced at the Preserve.*
- *Preserve facilities shall be located and designed to avoid conflicts with known cultural resource sites.*
- *Access to certain cultural resource sites will be permitted in conjunction with educational and interpretive programs.*

Planned Actions:

The following actions related to the management of cultural resources on the Preserve site are planned.

- *The implementation of a Class III Cultural Resource Survey covering all lands currently within the boundaries of the Preserve and the recording of identified sites with the Arizona State Museum.*
- *The implementation of a Class III Cultural Resource Survey covering all lands that are acquired and added to the Preserve.*
- *The rigorous enforcement of all applicable federal, state, and county statutes related to the protection of cultural resources present within the Preserve.*
- *The periodic inspection of known sites within the Preserve to monitor the condition of these cultural resources.*

8.1 Wildland Fire Management

Management Objectives:

The Cienega Creek Natural Preserve shall be managed with the objective of preventing wildland fires from causing personal injury and with the objective of preventing wildland fires from causing unnecessary damage to the Preserve or adjacent properties.

Policies:

The following policies related to wildland fire management shall apply to the Preserve.

- *All wildland fires, regardless of ignition source, shall be appropriately managed and controlled.*
- *The response to all wildland fires that pose a threat to human life, residential structures, non-residential structures, fixed improvements, or other personal property on adjacent lands shall be maximum suppression.*
- *The response to all wildland fires that do not pose a threat to human life, residential structures, non-residential structures, fixed improvements, or other personal property on adjacent lands shall be to effectively control or to suppress such fires as deemed appropriate by the Parks Superintendent of Natural Resources after consultation with fire management and resource management agency representatives.*
- *The preferred response to wildland fires within the "Unique Resource Fire Management Zone" as illustrated in Figure 8-A, shall be to appropriately control such fires without the use of mechanized equipment and without the cutting of fire breaks if possible. The basis for this response is the desire to prevent damage to significant natural and cultural resource areas.*
- *The preferred response to wildland fires outside of the "Unique Resource Fire Management Zone" as illustrated in Figure 8-A, shall be to appropriately control such fires with minimal use of mechanized equipment and through the use of existing trails and roads as fire breaks if possible.*
- *Pima County recognizes that fire is a natural phenomenon and that occasional fires may be necessary for the maintenance of a healthy, natural ecosystem.*

8.1 Wildland Fire Management (Continued)

Policies (Continued):

- *Pima County will consider the use of prescribed burns if and when it is deemed to be an appropriate and necessary resource management tool. Prior to any prescribed burn, Pima County will prepare a Prescribed Burn Plan and will circulate the plan to local fire districts, area landowners and other resource management agencies for review and comment. No prescribed burn shall be initiated without the concurrence of the Flood Control District, the State Land Department, the Arizona Game and Fish Department, and the Bureau of Land Management.*
- *Livestock grazing will not be utilized as a fuel reduction technique in Management Zone A except within the existing 60 acre pasture in Section 35 (T16S-R17E). Control and maintenance of fencing in this area shall be assigned to the grazer. Livestock grazing may, however, be utilized for this purpose within those portions of Management Zone B located south of I-10 if control of livestock and maintenance of fencing is assumed by the grazer.*

Planned Actions:

The following actions related to wildland fire management within the Preserve are planned.

- *The prohibition against overnight camping and the starting of fires for any purpose within Management Zone A, as described in Section 6.2 of this report, shall be enforced in an effort to reduce the likelihood of man-caused wildland fires.*
- *Pima County shall work cooperatively with the Arizona State Land Department (the agency with responsibility for controlling wildland fires on the Preserve and on other undeveloped County lands) and shall provide the ASLD with information and maps as may be required for an appropriate and effective response to fires that occur on the site.*
- *Pima County shall work cooperatively with all local fire districts, including, but not limited to; the Rincon Valley Fire District, the Mescal Fire District, the Corona de Tucson Fire District, and the Rural-Metro Fire Company and shall provide these fire districts with information and maps as may be required for an appropriate and effective response to fires that occur on the site.*
- *Pima County shall from time-to-time invite representatives of the Arizona State Land Department and representatives of the local fire districts to on-site inspections of the Preserve for the purpose of familiarizing these representatives with the site conditions and with site-specific fire management issues.*

8.1 Wildland Fire Management (Continued)

Planned Actions (Continued):

- *Pima County shall construct in conjunction with the development of the proposed District Park, an accessible water source with appropriate plumbing for use by wildland fire fighting crews.*
- *Pima County shall construct in conjunction with the development of facilities at the former Empirita Ranch headquarters area, an accessible water source with appropriate plumbing for use by wildland fire fighting crews.*
- *Pima County shall provide all on-site caretakers with the names and phone numbers of agencies and individuals to contact to report the occurrence of wildland fires on or near the Preserve site.*

9.1 The Preserve Boundary

Management Objectives:

The objective of all land acquisitions and the associated expansion of the Preserve will be to create boundaries that allow for and facilitate effective resource management.

Policies:

The following policies related to land acquisition and boundary adjustments shall apply to all areas of the Preserve.

- *The Pima County Flood Control District will actively seek to acquire lands along the Cienega Creek channel to provide continuous Pima County ownership along the riparian corridor between the Empirita Ranch and Colossal Cave Road.*
- *Pima County will actively seek to acquire lands adjacent to the current boundary of the Preserve as may be required for the protection of significant natural or cultural resource areas.*
- *Pima County will seek to acquire, when appropriate, lands surrounding the Preserve as required to create an effective natural buffer between the sensitive riparian areas of the site and off-site areas that could be developed in a manner that would materially compromise the natural and scenic resources of the Preserve.*
- *The Pima County Flood Control District will seek to dispose of those parcels of land within the Preserve that are not essential for effective resource management or that do not provide an effective natural buffer between the Preserve and off-site areas that are currently developed if such parcels could potentially be developed with compatible land uses.*

Planned Actions:

The following actions related to the acquisition of property and the adjustment of Preserve boundaries are planned.

- *Discussion with impacted landowners and if willing sellers are identified, acquisition of properties listed as high priority acquisitions in Section 9.2 of this document.*
- *Discussion with the State Land Department and if possible, acquisition by purchase or trade of all State Trust Lands located between Interstate Highway 10 and Marsh Station Road.*

9.1 The Preserve Boundary

Planned Actions (Continued):

- *Upon completion of the County park and the Empirita Ranch developments, the Flood Control District will remove these areas from the Preserve through a land exchange with Pima County.*
- *The marketing and potential sale of excess properties such as that parcel located south of the Southern Pacific Railroad's No. 1 track in Section 24 (T16S-R16E). See Figure 9-A.*

10.1 Inter-Agency and Inter-Departmental Coordination

Management Objective:

Effective management of resources must be addressed on a regional scale. Close and on-going coordination between the Pima County Flood Control District and other agencies, other departments, and area landowners is therefore an objective of this Management Plan.

Policies:

The following policies shall apply to the on-going management of the Preserve.

- *The Pima County Flood Control District and the Parks and Recreation Department will work cooperatively with the Bureau of Land Management, the U.S. Forest Service, the National Park Service, the State Land Department, the Arizona Game and Fish Department, the Arizona Department of Water Resources, the Arizona Department of Environmental Quality and area landowners in an effort to provide effective resource management within the Preserve and on surrounding lands.*
- *The Pima County Flood Control District and the Parks and Recreation Department will work cooperatively with, and will request as-needed technical assistance from, other Pima County departments including but not limited to: the Flood Control District, the Department of Transportation, the Planning and Development Services Department, the Department of Environmental Quality, and the Sheriff's Department in an effort to provide effective management of the Preserve.*

Planned Actions:

The following actions related to inter-agency and inter-departmental coordination are planned.

- *An inter-governmental agreement (IGA) will be developed between the Flood Control District and the Pima County Parks and Recreation Department to facilitate coordinated management of the Cienega Creek Natural Preserve.*
- *An inter-governmental agreement (IGA) will be developed between the Flood Control District and the Arizona Game and Fish Department to facilitate coordinated management of the Cienega Creek Natural Preserve.*
- *An inter-governmental agreement (IGA) between the Flood Control District, the Pima County Parks and Recreation Department, and the Bureau of Land Management will be developed to facilitate coordinated management of the Cienega Creek Natural Preserve and the Empire-Cienega Resource Conservation Area.*

10.1 Inter-Agency and Inter-Departmental Coordination (Continued)

Planned Actions (Continued)

- *An IGA between the Flood Control District, the Pima County Parks Department, and the U.S. Forest Service will be developed to coordinate the use of the Arizona Trail through the Preserve and other issues of mutual interest.*
- *The convening of an annual coordination meeting involving representatives of the public agencies that manage land or resources within the Cienega Creek watershed including; the Pima County Flood Control District, the Pima County Parks and Recreation Department, the Bureau of Land Management, the U.S. Forest Service, and the Arizona State Land Department. The purpose of the meeting will be to coordinate management efforts and to identify critical issues that require management or monitoring.*

Appendix B

**Excerpts from Tortolita Mountain Park Master Plan
Prepared in 1997 by McGann & Associates Inc.**

3.1 Public Use

Management Objective:

Tortolita Mountain Park will be managed with the objective of accommodating public use in a manner compatible with the protection of the Park's natural, cultural and visual resources.

Policies:

The following policies shall apply to the public use of Tortolita Mountain Park.

- *The opening of the Park to the public and the subsequent expansion of public uses will be concurrent with acquisition of safe, legal public access to the site and the development of facilities necessary to support public recreational activities.*
- *Public access to the Park will be limited to designated Park entries only. Points of access to the Park from adjacent private property will not be developed.*
- *Pima County Parks shall have the authority to impose temporary closures in all or portions of the Park if necessary to protect the Park's resources or to ensure public safety.*
- *Pima County Parks, through the Parks and Recreation Commission, shall have the authority to impose regulations restricting recreational uses to approved trails if necessary to protect the Park's natural resources.*
- *Non-consumptive day use activities, including but not limited to, hiking, picnicking, birding, horseback riding, mountain biking and photography will be allowed within Tortolita Mountain Park.*
- *Overnight uses, such as dispersed camping, are prohibited in Tortolita Mountain Park. Overnight camping will, however, be allowed in designated campgrounds if and when they are developed.*
- *Open campfires are prohibited in all areas of Tortolita Mountain Park. Cooking fires will be allowed in designated campgrounds and picnic areas but will be restricted to cooking/barbeque grills.*
- *Resource consumptive uses including, but not limited to, fuelwood gathering, mineral collection, mineral prospecting and extraction, and plant collection are prohibited in Tortolita Mountain Park.*

3.1 Public Use (Continued)

- Policies (Continued):***
- *Off-Highway Vehicle (OHV) and all other motorized vehicle use is prohibited in Tortolita Mountain Park except on designated roadways, and then only by licensed vehicles. Motorized vehicle use as required for emergency evacuations or essential administrative activities will, however, be allowed.*
 - *Commercial use of Tortolita Mountain Park will be restricted and shall only occur on a special permit basis. Requests for commercial use of the Park for group trail rides, film making, etc., shall be reviewed on a case-by-case basis. These requests shall be subject to all formal policies regarding commercial use of the Park that may be developed by Pima County. Requests for commercial activities that could result in damage to the resources of the Park will be rejected. Fees, as determined appropriate by Pima County, may be charged for special commercial use permits. Other conditions may also be imposed by Pima County.*
 - *Commercial group trail rides will be restricted as needed to protect the physical and aesthetic conditions of the trails. Mitigation and/or maintenance agreements may be required as a condition attached to permits.*
 - *Special group recreational activities, environmental education programs and scientific research will be allowed in the Park, subject to regulations on group size and time of use as may be established by Pima County.*
 - *Hunting in Tortolita Mountain Park will be permitted under the rules and regulations published annually by the Arizona Game and Fish Commission.*
 - *The discharge of firearms in Tortolita Mountain Park for the purpose of target shooting or for any other reason not sanctioned by Arizona Game and Fish Commission regulations or applicable state statutes is prohibited.*

***Discussion of
Specific Public Use
Activities:***

There are several public uses proposed for Tortolita Mountain Park that have the potential to create user conflicts, public safety concerns and administrative difficulties. These include trail use and hunting. These public uses are discussed on the following pages.

3.1 Public Use (Continued)

**Discussion of
Specific Public Use
Activities
(Continued):**

Trail Use:

To the greatest extent possible, all trails within Tortolita Mountain Park will be developed for multiple-use. To the greatest extent possible, hiking, mountain biking and horseback riding will be accommodated on all trails.

There may, however, be trails developed that due to their gradient, location, visibility or other conditions are not appropriate for a specific type of use. In such instances, Pima County shall have the authority to prohibit or restrict specific uses on any and all trails within the Park.

It is also possible that the amount of public use will grow to levels where trail user conflicts jeopardize public safety. In such instances, Pima County shall have the authority to impose regulations related to the time, level and type of uses to be accommodated on Park trails.

Hunting:

Hunting in the State of Arizona is subject to the rules and regulations published annually by the Arizona Game and Fish Commission (AZGF). At the present time, hunting during specified seasons is permitted in Tortolita Mountain Park and in those areas included within the Park planning boundary.

As the Park develops, Pima County Parks and Recreation may decide to review existing rules and regulations as they pertain to hunting within the Park. Steps in this process include:

- The review of appropriate uses of the Park with the Pima County Parks and Recreation Commission;*
- The initiation of discussions with the Regional Supervisor of the Arizona Game and Fish Department regarding hunting opportunities in Tortolita Mountain Park as specified in the "Cooperative Agreement between the Arizona Game and Fish Commission and the Pima County Parks and Recreation Commission" dated May 16, 1988 (AG No. KR88-099-CIV); and*
- If mutual agreement between the Arizona Game and Fish Department and the Pima County Parks and Recreation Department can be reached, the submittal of a formal solicitation to the Arizona Game and Fish Commission.*

3.1 Public Use (Continued)

**Discussion of
Specific Public Use
Activities
(Continued):**

Prior to a formal submittal to the Commission, it will be important to have the support of the AZGF Regional Supervisor. At this time, there are two potential options which may serve as starting points for discussions with AZGF. These are:

- The northward expansion of the 37M Metro Unit boundary, which is currently located south of Tangerine Road, to include the area of Tortolita Mountain Park. (The reassignment of Tortolita Mountain Park from Unit 37A to 37M would result in restrictions on rifle hunting within the Park); and*
- The establishment of a special agreement, modeled after the existing agreement between AZGF and Maricopa County (R12-4-301 "Restrictions for Taking Wildlife on Maricopa County Parks") that would establish site specific rules for hunting in Tortolita Mountain Park.*

It should be noted that the existing rules which apply to Tucson Mountain Park, as delineated in Section R12-04.8.a of the Arizona Administrative Code, Title 12, Chapter 12, represent a unique situation. Because Tucson Mountain Park is located within an AZGF "designated wildlife area," the opportunity existed for AZGF to write specific regulations for Tucson Mountain Park. Tortolita Mountain Park is not located within a designated wildlife area, and as such, does not have this option.

3.1 Public Use (Continued)

Table 3.1-1. Public Use and Development in the Park

Activity	Allowed	Prohibited	Notes
Backpacking	✓		Day use only.
Birding	✓		
Open Camp Fires		✓	Except in designated campgrounds.
Cooking Fires	✓		Restricted to Grills Provided
Camping (Overnight)	✓		In designated Sites Only
Environmental Education Programs	✓		Subject to Pima County Parks Department Policies
Film Making	✓		Permit Required
Fuelwood Harvesting		✓	
Group/ Commercial Activities	✓		Permit Required
Hiking/Walking	✓		Use of Trails Encouraged
Horseback Riding	✓		On Designated Trails Only
Hunting	✓		Subject to AGFD Regulations
Mineral Extraction		✓	
Mountain Bike Riding	✓		On Designated Trails Only
Motorized Vehicle Use		✓	Except Designated Roadways, Licensed Vehicles Only
Painting/Photography	✓		
Picnicking	✓		
Plant / Wildlife Collection		✓	Except for Approved Research
Scientific Research	✓		Subject to Pima County Parks Department Policies
Target Shooting		✓	
Wildlife Observation	✓		

5.1 Resource Protection and Management

Introduction:

As identified in the Introduction to this Master Plan report, the management objectives for Tortolita Mountain Park include the protection of natural, cultural and visual resources within the Park. This section of the report outlines specific objectives, policies and actions that will be utilized to accomplish these goals.

Five principal Park resource areas are addressed. These are:

- Water Resources*
- Vegetation*
- Wildlife Resources*
- Cultural and Historic Resources*
- Visual and Scenic Resources*

An additional section is provided on Wildland Fire Management. The wildland fire issue impacts not only the resources of the Park but also public use and enjoyment of the area. As such, specific recommendations related to wildland fire management are included herein.

5.2 Water Resources

Introduction:

From a regional water resource management perspective, the surface and subsurface water flows from the Tortolita Mountain range contribute to the replenishment of the regional aquifer. As such, maintenance of the quantity and quality of the water entering the aquifer is important.

On a site level, the springs, seeps and developed water sources found in the Park's major canyons, though small, are critical to the survival of many plant and animal species. They also provide a cool respite for the human visitor. Protection of these localized water sources is of importance to the biological well-being of the Park.

Because these water resources are important on both a regional and site level, they will be actively managed and protected.

Management Objectives:

Tortolita Mountain Park will be managed with the objectives of:

- Protecting the quality of water that flows from Park lands into the regional aquifer;*
- Maintaining conditions that create localized surface water flows and shallow ground water conditions within the Park; and*
- Ensuring that Pima County has full legal rights to use and manage the surface and ground water present within the Park.*

Policies:

The following policies shall apply to the management of water resources within the Park.

- No activity shall be conducted in the Park that will materially diminish the quality of the Park's surface or ground water.*
- Existing wells on the site may be used for the production of water for purposes deemed appropriate by Pima County to the extent that such production does not jeopardize localized surface water flow and/or eliminate shallow ground water conditions necessary for the maintenance of existing riparian plant communities.*

5.2 Water Resources (Continued)

Planned Actions:

The following actions related to water resource management within Tortolita Mountain Park are planned.

- The securing of full legal rights to the surface and ground water resources present on lands currently owned by Pima County.*
- The acquisition of water rights on all lands acquired by Pima County for incorporation into the Park.*
- The periodic monitoring of water quality at water sources within the Park.*
- The operation of existing wells and the development of new wells for the production of potable water and/or water for wildlife.*
- The review and provision of comment to the Arizona State Land Department related to all new applications for the sale, lease or permitted use of State Trust Lands within the Park planning boundary or contributing watershed areas.*
- The periodic review, with the Arizona State Land Department and mining companies leasing state land, of the impacts of mining activities on watersheds within the Park.*

5.3 Vegetation

Introduction:

The vegetative communities within Tortolita Mountain Park include significant areas of Sonoran Desertscrub (Palo Verde-Cacti-Mixed Scrub Series), with lesser amounts of Interior Chaparral (Scrub Oak Series) and Riparian Forest (Mesquite Series, Cottonwood-Willow Series, and Mixed Scrub Series). These vegetative communities provide diverse habitat and help to define the visual character of the site.

The current vegetation within Tortolita Mountain Park has been influenced by a century of livestock grazing in the area.

Management Objectives:

Tortolita Mountain Park will be managed with the objective of:

- Protecting, preserving and enhancing the existing native vegetation within the Park with emphasis being given to the restoration of riparian areas and other areas that have been impacted by livestock grazing.*

Policies:

The following policies shall apply to the management of vegetative resources within the Park.

- Livestock grazing within the Park is prohibited except as may periodically be deemed necessary by Pima County for natural resource management and/or wildland fire management.*
- The introduction of non-native plant species is prohibited.*
- The presence of noxious non-native plant species, such as tamarisk, shall be monitored and if necessary, active eradication programs shall be implemented.*
- All Park areas disturbed by the construction of new facilities shall be revegetated using native plant species as listed in Section 4 of the "Background Report."*

Planned Actions:

The following actions related to the management of vegetative resources within Tortolita Mountain Park are planned.

- The installation of a perimeter fence to restrict livestock access to the site.*

5.3 Vegetation (Continued)

***Planned Actions
(Continued):***

- *The creation of fenced exclosures around riparian and other sensitive areas, if complete perimeter fencing cannot be accomplished within a reasonable period of time.*
- *The utilization of intergovernmental agreements with the Arizona Game and Fish Department and the University of Arizona to monitor and assess the status of on-site vegetation and to engage in enhancement programs when appropriate.*
- *The closure and revegetation of existing roads not necessary or desirable for public access, recreational use, utility access or fire management.*

5.4 Wildlife

Introduction:

The Tortolita Mountain range within Pima County currently supports diverse wildlife populations. Included are large and small mammals, reptiles, amphibians and birds. The expansion of the Park to include those areas within the planning boundary and the active management of the site will significantly enhance the long-term viability of these wildlife populations.

The Sonoran Desert Tortoise, which is listed by the Arizona Game and Fish Department as "Wildlife of Special Concern," has been documented as present on the site. Other special status wildlife species, including the Cactus Ferruginous Pygmy-Owl, the American Peregrine Falcon, and three species of leaf-nosed bats, may be present within the Park planning boundary.

Management Objectives:

Tortolita Mountain Park will be managed with the objectives of:

- Maintaining healthy and diverse native wildlife populations on the Park site;*
- Accommodating wildlife movement patterns on and through the Park; and*
- Protecting habitat necessary for the survival of special status wildlife species.*

Policies:

The following policies shall apply to the management of wildlife resources within the Park.

- Public use of the Park will be balanced with the objectives outlined above for wildlife resource management.*
- The introduction of non-native animal species within the Park shall be prohibited.*
- Pets and other domestic animals shall be prohibited within the Park except for those appropriately restrained with leashes.*
- The feeding of wild animals shall be prohibited within the Park.*
- Hunting in the Park shall occur in accordance with the rules published annually by the Arizona Game and Fish Commission, including amended rules as may be requested by Pima County.*

5.4 Wildlife (Continued)

Planned Actions:

The following actions related to wildlife resource management are planned.

- The utilization of an intergovernmental agreement with the Arizona Game and Fish Department to periodically assess the status of wildlife resources with emphasis being given to special status species.*
- The imposition of temporary public use restrictions within portions of the Park when necessary to avoid conflicts with wildlife breeding and nesting activities.*
- The maintenance and enhancement of water sources (natural and/or developed) for use by wildlife.*
- The monitoring of the site for the presence of non-native animal species and, where appropriate, the removal of such species.*
- The rigorous enforcement of Pima County leash laws and regulations related to domestic animals within the Park.*
- Monitoring of potential conflicts between hunting and other public uses and, if appropriate, the submittal of a petition to the Arizona Game and Fish Commission requesting amendments to hunting rules and regulations in Tortolita Mountain Park.*
- Removal of feral horses currently present within the Park by the Rail-X Ranch, the owner of the subject horses.*

5.5 Cultural Resources

Introduction:

A significant number of archaeological and historic sites are known to exist in the Tortolita Mountains in the vicinity of the Park. These known sites are typically found in the southern foothills of the range where cultural resource surveys have been performed in conjunction with private real estate development. Additional information about these sites is contained in the "Background Report." It is quite likely that there are many additional sites within the Park planning boundary, in areas not yet surveyed.

The presence of cultural resource sites creates an opportunity for education and interpretation but at the same time requires that stewardship of cultural resources be an integral component of the Park Master Plan.

Management Objectives:

Tortolita Mountain Park will be managed with the objective of:

- Protecting and preserving the cultural resources present within the Park.*

Policies:

The following policies shall apply to the management of cultural resources within the Park.

- All applicable federal, state and county regulations pertaining to the protection of cultural resources shall be enforced in the Park.*
- Park facilities and trails shall be located and designed to minimize impact on known cultural resource sites.*
- Where appropriate, the site's cultural resources should be integrated into educational and interpretive programs implemented at the Park.*
- The protection of significant cultural resource sites will be given consideration when assessing potential land acquisitions and expansion of the Park.*
- Pima County Parks shall have the authority to take appropriate measures to protect cultural resources from impacts of public use as the need arises.*

5.5 Cultural Resources (Continued)

Planned Actions:

The following actions related to the protection and management of cultural resources within Tortolita Mountain Park are planned.

- The implementation of a Class III Cultural Resource Survey covering all land within the current boundary of the Park and the recording of all identified archaeological and historic sites with the Arizona State Museum.*
- The implementation of a Class III Cultural Resource Survey of all land acquired and incorporated into the Park and the recording of all identified archaeological and historic sites with the Arizona State Museum.*
- The rigorous enforcement of all applicable federal, state and county statutes related to the protection of cultural resources present within the Park.*
- Consideration of an Arizona Site Steward Program, a program sponsored by the State Historic Preservation Office which trains volunteers to visit sites on a regular basis, documenting and reporting vandalism or other problems.*
- The implementation of a partnership with the Pima Community College archaeology program to involve staff and students in field work and other studies beneficial to the Park.*
- Before selling or leasing State Trust lands for incorporation into the Park, the Arizona State Land Department shall consult with the State Historic Preservation Office on the future treatment of affected cultural resources, as required by the State Historic Preservation Act.*
- In consultation with the State Historic Preservation Office, Pima County Parks shall develop a long term plan for managing cultural resources sites within the Park.*
- Before causing or allowing any ground disturbance within the boundaries of cultural resource sites within the Park, Pima County Parks shall consult with the State Historic Preservation Office, and shall obtain a permit from the Arizona State Museum.*

5.6 Visual Resources

Introduction:

The Tortolita Mountain range provides a strong visual backdrop for a large portion of Pima County. Through the establishment of Tortolita Mountain Park, the visible peaks, ridges and slopes will be protected from activities such as mineral extraction, road construction and residential development that would diminish this important community resource.

As a natural resources area, the visual resources associated with the canyons and the less visible interior portions of the Park are also important. These visual elements will similarly be protected.

Management Objectives:

Tortolita Mountain Park will be managed with the objective of:

- *Protecting the visual resources of the site with both on-site and off-site vantage points given consideration.*

Policies:

The following policies shall apply to the management of visual resources within the Park.

- *The visual resources of the Park shall be protected through the maintenance and protection of vegetation, landforms and other natural features that contribute to the visual quality of the site.*
- *All facilities and trails constructed within the Park shall be designed to minimize their visual impact when viewed from on-site and off-site vantage points.*
- *All facilities and trails constructed within the Park shall be designed to take advantage of vistas and views of on-site and regional landforms.*

Planned Actions:

The following actions related to the management of visual resources are planned.

- *All facility and trail designs will be reviewed by Pima County for their potential impact on visual quality.*
- *All areas disturbed by new construction will be revegetated to restore and enhance visual quality.*

5.6 Visual Resources (Continued)

Planned Actions (Continued):

- *Pima County will attempt to work with the Arizona State Land Department regarding amelioration of visual impacts of the existing surface mine in Section 33 (T10S-R13E).*
- *Acquisition of the mineral rights associated with all lands acquired by Pima County for incorporation into the Park.*
- *Pima County will review development plans for private land holdings within and adjacent to the Park planning boundary with the intent of working with developers to limit visual impacts.*
- *Pima County will attempt to ameliorate the impacts of development in Ruelas Canyon by working with the developer of RedHawk to protect as much open space as possible.*

5.7 Wildland Fire Management

Introduction:

Wildland fires within Tortolita Mountain Park can be natural occurrences that enhance the health of the natural ecosystem. At the same time wildland fires can be serious threats to on-site and off-site improvements. As with all natural areas adjacent to developed urban lands, the careful assessment of fire hazard and the development of policies and procedures for responding to them will be an important component of the management of the mountain park.

Management Objectives:

Tortolita Mountain Park will be managed with the objectives of:

- Preventing wildland fires within the Park from causing personal injury; and*
- Preventing wildland fires from causing unnecessary damage to improvements constructed on site or on adjacent properties.*

Policies:

The following policies shall apply to the management of wildland fires within the Park.

- Pima County recognizes that fire is a natural phenomenon and that occasional fires may be necessary for the maintenance of a healthy natural ecosystem.*
- All wildland fires, regardless of ignition source, shall be appropriately managed and controlled.*
- The response to all wildland fires that pose a threat to human life, residential structures, non-residential structures, fixed improvements or other personal property within the Park or on adjacent lands shall be maximum suppression.*
- The response to all wildland fires that do not pose a threat to human life, residential structures, non-residential structures, fixed improvements or other personal property within the Park or on adjacent lands, shall be to effectively control or suppress such fires as deemed appropriate by Pima County after consultation with fire management and resource management agencies.*
- Pima County will consider the use of prescribed burns if and when it is deemed to be an appropriate resource management tool. Prior to any prescribed burn, Pima County will prepare a*

5.7 Wildland Fire Management (Continued)

Policies (Continued):

Prescribed Burn Plan and will circulate the plan to local fire districts, area landowners and other resource management agencies for review and comment. No prescribed burn shall be implemented without the concurrence of the Arizona Game and Fish Department and the Bureau of Land Management.

Livestock grazing will not be utilized as a standard fuel reduction technique within the Park. Short term grazing in limited areas of the Park may be considered, however, in extreme cases where fuel loads and weather conditions combine to create, in the opinion of Pima County and local fire districts, a severe fire hazard that threatens on-site or off-site improvements.

Planned Actions:

The following actions related to wildland fire management within the Park are planned.

- The enforcement of a prohibition on dispersed overnight camping and on the starting of cooking and/or camp fires except in designated campground locations.*
- On-going cooperation with the Arizona State Land Department (ASLD, the agency responsible for controlling wildland fires in the Park and on other undeveloped county lands) including the provision of maps and other information to the ASLD as may be required for a timely and effective response to fires that occur on the site.*
- On-going cooperation with local fire districts and companies, (including, but not limited to: Rural Metro Fire Company, Golder Ranch Fire District, Northwest Fire District, and the Catalina Fire Department) including the provision of maps and other information as may be required for a timely and effective response to fires that occur on the site. Cooperation with local fire districts may also include the development and maintenance of joint facilities and equipment in the Park's developed areas.*
- Development of reliable water sources at the Crow Wash, Wild Burro, and Cochie Canyon development sites to assist in wildland fire control efforts.*

Appendix C

References

A Plan for Tucson Mountain Park, Natural Resource Planning 224, School of Renewable Natural Resources, University of Arizona, December 1975

Biological Stress Assessment, An Overview Discussion of Issues and Concerns, Sonoran Desert Conservation Plan, March 2000

Cienega Creek Natural Preserve Management Plan Background Report, McGann & Associates, Inc., January 1994

Cienega Creek Natural Preserve Management Plan, McGann & Associates, Inc., October 1994

Colossal Cave Mountain Park Master Plan Background Report, March 1998

Eastern Pima County Trail System Master Plan, Dames & Moore, August 1989

Eastern Pima County Trail System Master Plan, Revised Master Trails List, Pima County Parks and Recreation Department, August 1996

Master Plan for the Development and Use of Arthur Pack Regional Park, McGann & Associates, Inc., June 1988

Mountain Parks, Reserves and Biologically Significant Resource Lands, Mountain Parks Element, Sonoran Desert Conservation Plan, Preliminary August 2000

Pima County River Parks Master Plan, Planners Ink, December 1996

Preserving Cultural and Historic Resources, A Conservation Objective of the Sonoran Desert Conservation Plan, May 1999

Priority Vulnerable Species, Data Compilation and Synthesis, Sonoran Desert Conservation Plan, June 2000

Review of Vulnerable Species List, Sonoran Desert Conservation Plan, April 2000

Roy P. Drachman – Agua Caliente Regional Park Master Plan, WM. Bryce Lloyd and Associates, January 1989

Saving the Past for the Future, Cultural and Historical Resources Element, Sonoran Desert Conservation Plan, Preliminary August 2000

The Role of Adaptive Management, Sonoran Desert Conservation Plan, January 2001

Tortolita Mountain Park Master Plan Background Report, McGann & Associates, Inc., October 1996

Tortolita Mountain Park Master Plan, McGann & Associates, Inc., April 1997

Tucson Mountain Park Phase One Planning Study, McGann & Associates, Inc.,
November 1998