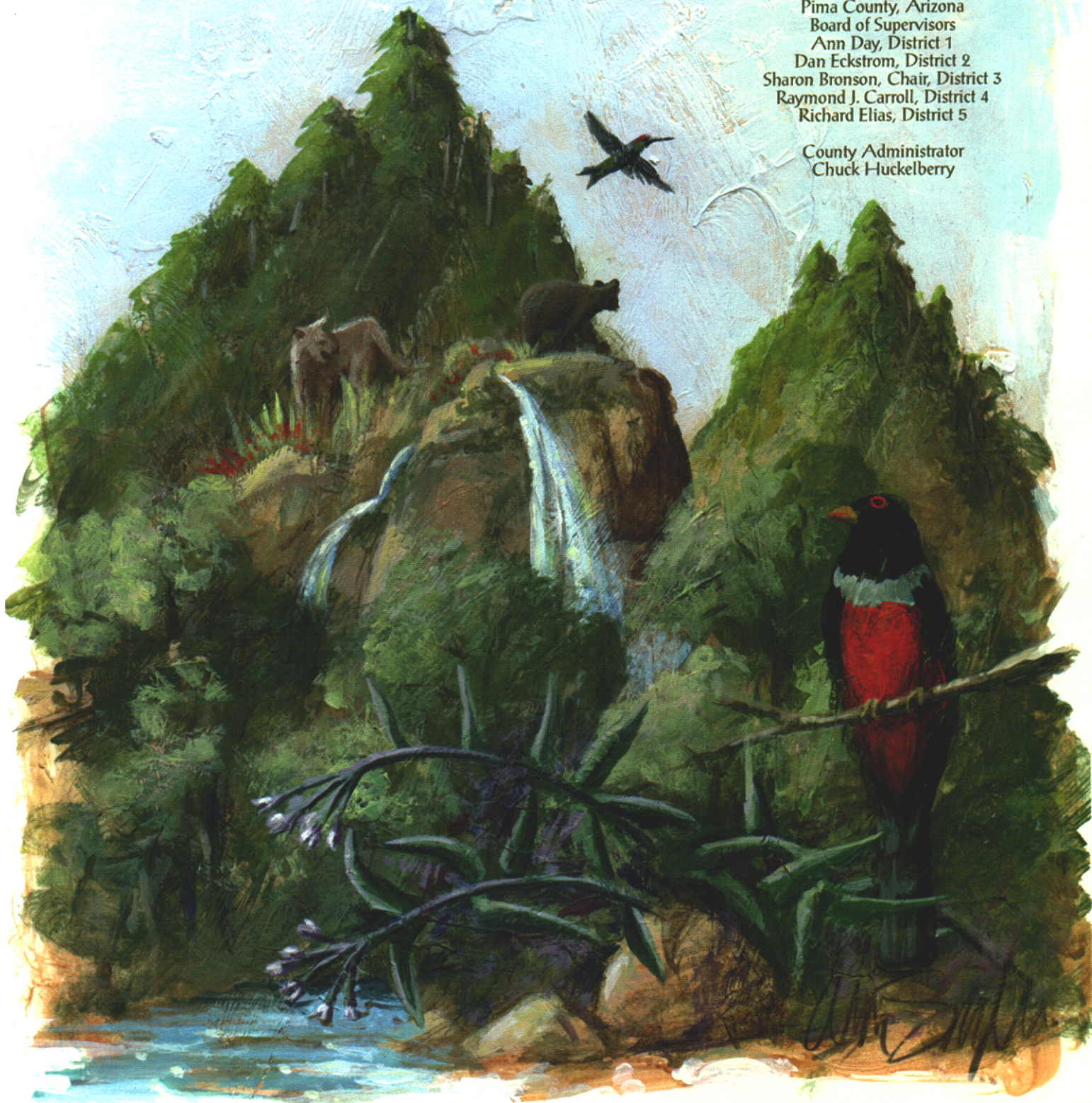


Pumas and Pollinators: Restoring Connectivity in the Sky Islands

Sonoran Desert Conservation Plan
2002

Pima County, Arizona
Board of Supervisors
Ann Day, District 1
Dan Eckstrom, District 2
Sharon Bronson, Chair, District 3
Raymond J. Carroll, District 4
Richard Elias, District 5

County Administrator
Chuck Huckelberry





MEMORANDUM

Date: September 13, 2002

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

From: C.H. Huckelberry
County Administrator *CHH*

Re: **Pumas and Pollinators: Restoring Connectivity**

The Science Technical Advisory Team for the Sonoran Desert Conservation Plan identified six regional scale areas that contain potential or existing barriers that tend to isolate major conservation areas:

- Across the I-10 / Santa Cruz River corridors in the northwest
- Through Oro Valley between the Catalina and Tortolita Mountains
- Across the I-10 corridor along Cienega Creek in the east
- Across the I-19 and Santa Cruz corridors in southern Pima County
- Across the Garcia strip extension of the Tohono O'odham Nation
- Across the Central Arizona Project (CAP) canal in Avra Valley.

The Team's recommendation, which has been adopted as part of the Conservation Lands System Guidelines, is that since habitat loss and fragmentation by roads and other infrastructure pose major challenges to wildlife movement in these areas, high priority should be given to identifying, preserving and reconnecting habitat linkages. The map of Eastern Pima County on the following page shows the location of the major critical landscape connections and their relation to existing conservation areas.

This memorandum forwards the map of critical landscape connections along with a summary of a talk by Dr. Gary Nabhan entitled Pumas to Pollinators: Restoring Connectivity in the Sky Islands, and a brief white paper by Kim Vacariu of the Wildlands Project, which places the Sonoran Desert Conservation Plan in the larger context of the Continental Wildlands Network.

These three views inform the Habitat, Corridors, Mountain Park, Ranch and Riparian Elements of the Sonoran Desert Conservation Plan and support the wisdom of identifying the combinations of these elements that will function to ensure the long term survival of the full spectrum of plants, animals and biological communities that are indigenous to Pima County, which is the biological goal and underpinning of our regional conservation planning effort.

Attachments

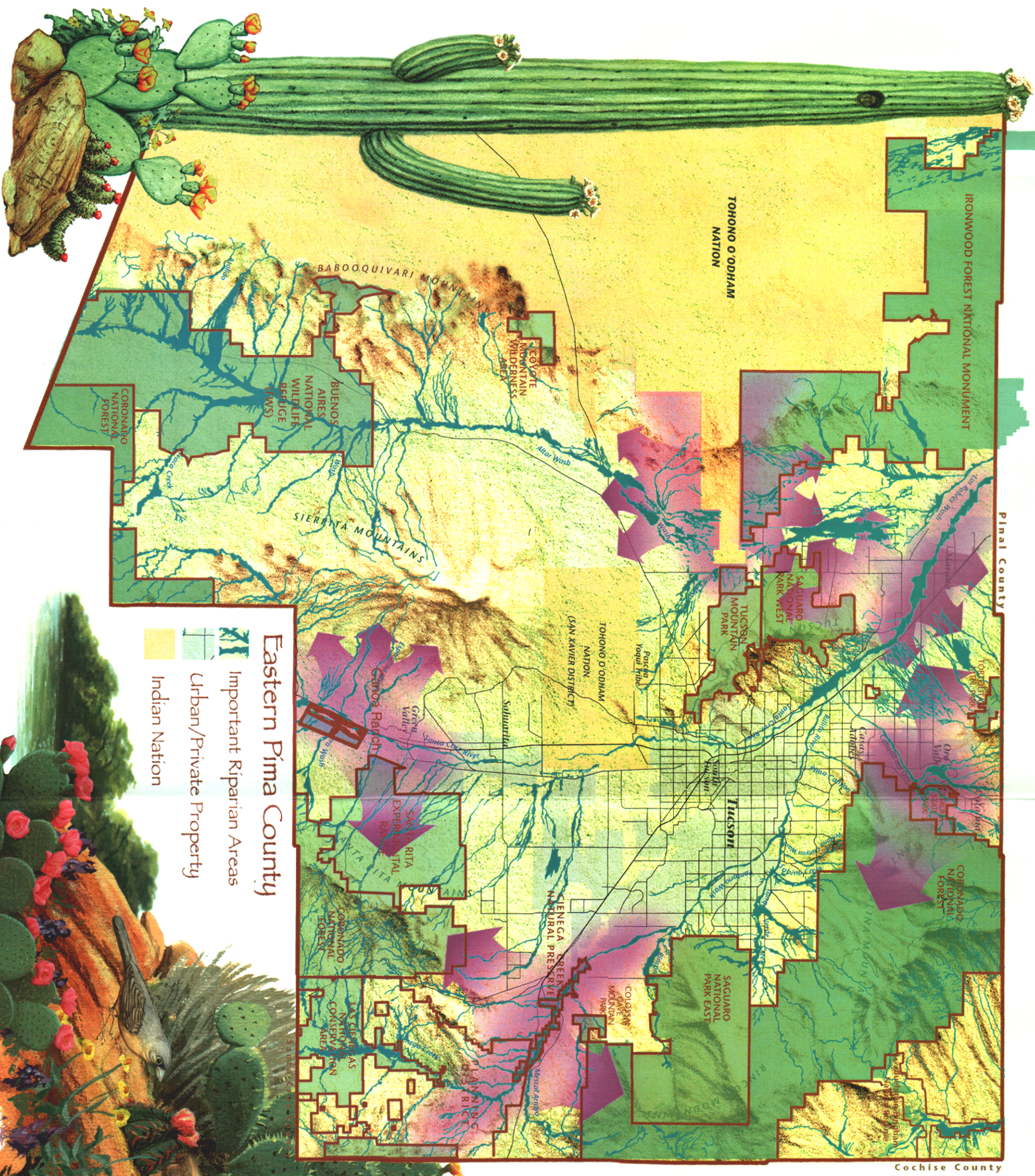
Sonoran Desert Conservation Plan

A long term vision for protecting the heritage and natural resources of the west.



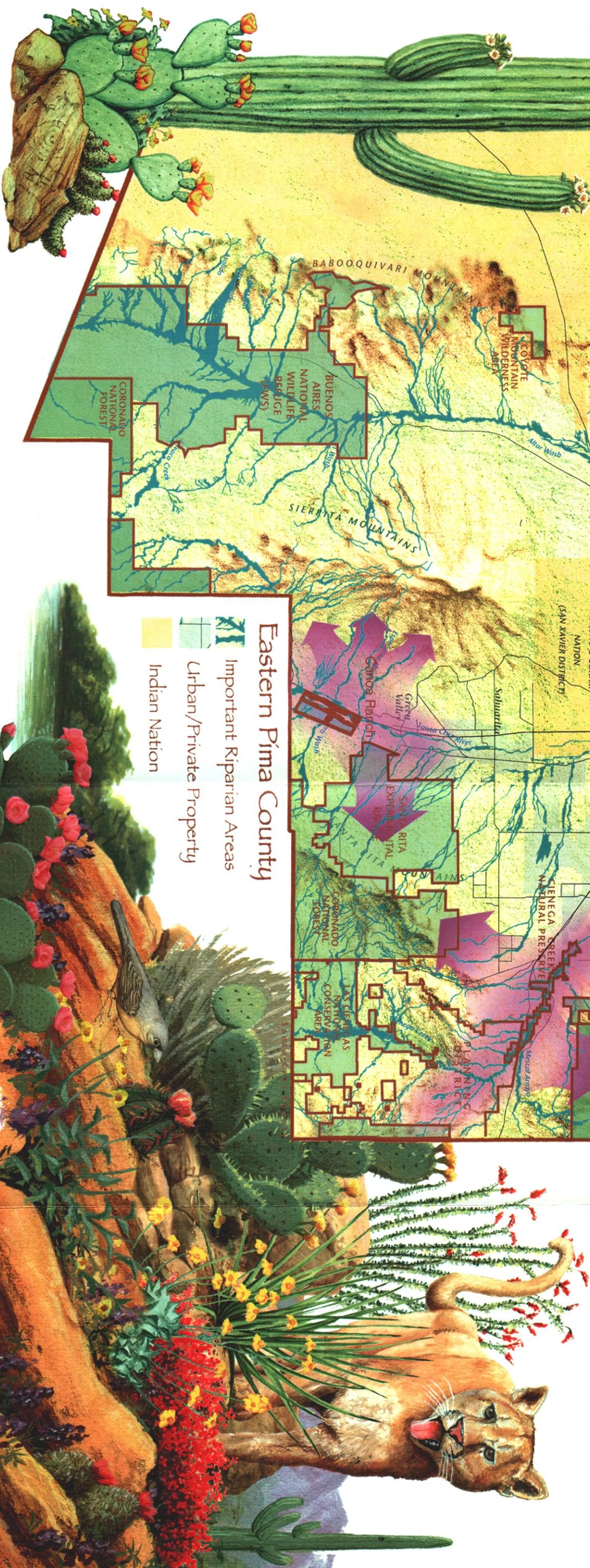
Critical Landscape Connections

Existing Reserves



Eastern Pima County

- Important Riparian Areas
- Urban/Private Property
- Indian Nation



**The Role of the
Sonoran Desert Conservation Plan
in a Continental Wildlands Network**

**by Kim Vacariu
Southwest Representative
Wildlands Project**

Introduction

The Sonoran Desert Conservation Plan (SDCP) is a multi-species habitat conservation plan that proposes to protect vulnerable, threatened and endangered native species and their habitats within Pima County, Arizona. To achieve this goal, the plan also recognizes the importance of designating and protecting important biological landscape linkages between critical habitats. Such habitat connectivity will ensure that the natural movements of animals and plants required for long-term species survival remain viable.

Although the SDCP is limited to a single county, it is important to recognize that the wildlife linkage system it will protect represents a vital connection between a much broader network of similar linkages that ultimately will stretch from northern Mexico's Sierra Madre Occidental to the wildlands of Canada's Yukon Territory.

The vision of such a continental system of connected wildlands networks was introduced in 1991 by the Wildlands Project — a vision now being implemented in conjunction with many of the group's regional conservation partners across North America, including the Sky Island Alliance, the New Mexico Wilderness Alliance, and the Wilderness Society. This vision relies on a science-based conservation strategy known as "rewilding" that includes the reconnection of fragmented landscapes between wilderness core areas as a primary tool for slowing and reversing the current extinction crisis. It is this same extinction crisis that is the basis for Pima County's Sonoran Desert Conservation Plan.

Building blocks in a "megalinkage" system

Successful implementation of a vast continental wildlands network, achieved through the connecting of several large North American landscape "megalinkages," will ultimately hinge on the implementation of many smaller, ecoregional wildlands networks. Each of those ecoregional networks will be made up of yet smaller networks, such as the SDCP.

To illustrate, the Sonoran Desert Conservation Plan, which encompasses the eastern half of Pima County, Arizona, is part of the larger, ecoregional Sky Islands Wildlands Network,

which encompasses a planning area that stretches across northern Mexico, southeastern Arizona, and southwestern New Mexico. The Sky Islands Wildlands Network, in turn, is but one component of the much larger Spine of the Continent megalinkage, which includes five additional ecoregional wildlands networks extending from central Arizona north along the Continental Divide to the Yukon and Alaska. The Spine of the Continent megalinkage further connects with other equally extensive megalinkages along the west coast of North America, across the boreal forests of northern Canada, and along the east coast of North America, to form a complete continental wildlands network that is remarkable in both size and vision.

In essence, the Sonoran Desert Conservation Plan, which is large at the local perspective, actually represents but one of dozens of similar, interconnected building blocks needed for such a viable continental wildlands network.

A critical connection

The functionality of large-scale wildlands networks depends on the degree to which each constituent network also functions. Yet, when viewed in the context of the Spine of the Continent wildlands megalinkage, the Sonoran Desert Conservation Plan plays the role of not only an interconnected building block, but also that of a particularly irreplaceable landscape linkage, without which migrations of flora and fauna between the subtropics of Mexico and the temperate Rocky Mountains could be blocked. If the success of a major megalinkage depended solely on the success of a single "minor" linkage, that minor linkage could well be the Sonoran Desert Conservation Plan in Pima County, Arizona.

The significant north-south biological corridor that crosses the Mexico-U.S. border into southeastern Arizona includes a critical linkage that joins the wildlands of Sonora, Mexico to southern Pima County through the Baboquivari Mountains, Buenos Aires National Wildlife Refuge, and the Altar Valley. This linkage also contains other key adjoining wildlife pathways extending from Mexico north to Pima County through Santa Cruz County, Arizona via the Tumacacori, Pajarito, Santa Rita, and Patagonia Mountains. The SDCP will also offer a means to connect the important "Missing Link" lands north of I-10 between Saguaro National Park East and the Las Cienegas National Conservation Area — another crucial linkage that, left

unprotected, will eventually cut off species movements between the borderlands and the important wildlands megalinkage to the north.

The Sonoran Desert Conservation Plan, if successfully implemented, will help ensure that native species ranging from the jaguar (*Panthera onca*) to lesser long-nosed bats (*Leptonycteris curasoae yerbabuena*) to the tetreus dagger-winged butterfly (*Marpesia petreus*) will be able to continue their historic migrations between northern Mexico and Pima County. In addition, the SDCP will allow other important species including black bear (*Ursus americanus*), mountain lion (*Felis concolor*), and coues white-tailed deer (*Odocoileus virginianus couesi*) continued passage between the borderland mountains of southeastern Arizona and the Santa Catalina and Rincon Mountains of Pima County, from where connections to the Spine of the Continent megalinkage are more easily accessed. Without the SDCP, continued habitat fragmentation in fast-developing Pima County will jeopardize and likely prevent these species, and others, from completing their important north-south movements.

A solution for connectivity fragmentation by highways?

The Sonoran Desert Conservation Plan also presents a landmark opportunity to address the problems of habitat fragmentation posed by highways within its planning boundaries. Highway habitat fragmentation is one of the most potent destroyers of landscape connectivity, particularly that resulting from multi-lane highways such as U.S. Interstate 10, which bisects Pima County east and west, splitting and blocking the entire biological corridor between Mexico and the Rocky Mountain megalinkage.

The SDCP does not specifically address the incorporation of "wildlife-friendly" highway crossing structures as part of its transportation-related recommendations. However, the fact that the plan includes recommendations for adoption of county and regional transportation impact fees to be used for roadwork related to "severe congestion and air quality problems" gives the county a strong opportunity to include wildlife friendly overpasses and underpasses into any new highway construction occurring across its biological corridors. If the SDCP is to accomplish its goal of species preservation through landscape connectivity, reasonable consideration for

incorporation of wildlife crossing structures into all future road repair and new construction projects is essential.

Conclusion

It is clear that the Sonoran Desert Conservation Plan presents a unique window of opportunity not only for regional species preservation, but for continental conservation as a whole. In particular, the unique ecoregional positioning of lands to be included in the SDCP is critically important for the protection of a landscape connectivity gap between habitats in northern Mexico and habitats along the Spine of the Continent wildlands megalinkage. Without the protections afforded by a fully implemented SDCP, the ability of native wildlife species to move throughout their native trans-boundary ranges, to maintain genetic strength through regional interbreeding, and ultimately to avoid the worsening extinction crisis now driven by habitat fragmentation will be seriously compromised.

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Pumas to Pollinators: Restoring Connectivity in the Sky Islands
Gary Paul Nabhan, Director of Center for Sustainable Environments
Northern Arizona University

sponsored by

University of Arizona Office of Arid Lands
and The Sky Island Alliance

Highlights from Dr. Nabhan's talk included the following points:

- The main reason for coming back to Tucson to give this talk is that Southern Arizona is a place that is translating biology into policy. Twenty-five years ago the initiatives we are carrying out today would not have been imagined as possible -- like the Sonoran Desert Conservation Plan and the native seed bank which has brought back plants formerly on the brink of extinction. So we can now imagine the best for the region and think about what kind of region we want to live in, and what kind of diversity we want to interact with in the future.
- Sky Islands is the most advanced large scale planning effort on the continent in part because of (1) TNC work initially in the early stages; (2) Wildlands work through Dale Turner and others during the last decade; and (3) the Sonoran Desert Conservation Plan, most recently.
- We have a long way to go. One puzzle to solve is the question of what makes an effective corridor?
- This is the best place to study the question because of the confluence of natural systems.
- A strategy of the past was to try to secure large landscapes in public ownership. North of the international border our best success is the Ironwood Forest National Monument; but there is a realization in Mexico that there won't be public land set asides and instead farmers and ranchers have to be brought into the reserve design and conservation goal setting processes
- The same is true north of Mexico; here "we ought to get smart and collaborate with ranchers and farmers. We need to bring ranchers into the conservation discussion. Never before have ranchers experimented so much with their own destiny as they are doing now. You will be surprised to find how much conservationists and ranchers both dislike the same thing: subdivided, fragmented and developed land."
- "What I want to see 50 years from now is (1) that the rarest of the rare is still around. (2) Connectivity for pollinators -- not greenbelts as the planners lay out, but functional corridors, something that allows gene flow, movement and ecological connection; and

(3) riparian forests, healthy functioning riparian systems. Maeveen asked a few years ago what we would choose if we could only save one species and remembered my answer -- cottonwood. That would reflect intact corridors of the kind we are seeking when try to define corridors in biology."

- We really need as much restoration as preservation. Remember that we are losing one species per year within the protected boundaries of the Grand Canyon because our management strategies don't prevent this rate of loss.
- So in order to start to return to the system health we had 100 years ago we need to open the gates of conversation between ranchers and conservationists, and not just talk to each other.
- I'm inclined to say that we need bigger patches of riparian than we sought to protect in the past -- 40 hec. in places.
- So we have to think at different scales -- corridors that work for pumas and for pollinators. We have to look at the big picture and the particular.
- An example of technical expertise and intense funding going wrong is a field commitment we made over 10 years to bring back Kearny Bluestar in a place where it has no recruitment -- we did not look at the whole ecological picture.
- Even within a single species there will be different behavior. Bats act like they are at a shiner's convention and all stay together in one place -- it makes us nervous to see so much of one thing at one time. But carnivores stay in small groups. We know we can't make a viable corridor for coyotes that works for wolves and pumas -- only coyotes prefer that we sting together Circle K parking lots to facilitate their movements.
- And there are complex dynamics within a single species. This was shown in the study of white wing doves, who use corridors differently in agricultural situations than they did in uplands.
- So this is a lot about what we don't know. From the pollinator studies we can begin to see results that can guide stewardship though. Farmers and ranchers are not going to be sold on corridors if we try to convince them that they want wolves and pumas in their back yards. Instead we need to build support for corridors by talking about flood control benefits to the ranchers and ecotourism to the chambers of commerce, and in this way piece back together the fragments.
- Is it realistic to think that people will be sensitized in time? Yes. Wolf recovery in Italy is more effective than in the while of the US because they worked slowly.
- We need to be strategic about what we save first -- the highest priority is places where the whole connection can be broken forever if we fail.
- The best system is a mosaic -- small patches of agriculture with healthy riparian.

- We need to go to the San Pedro and that river with lower self esteem, the Santa Cruz, and realize the opportunities for mammal diversity and for pollinator corridors. In 1985 there was a pollinator crisis; about 3/4 of bees were gone; some biologists were able to go in to some farms and ranches and attempt restoration. We tried the range from bee boxes to effluent based riparian restoration, and what really mattered was the regeneration of riparian habitat. Every other benefit was negligible in comparison. The pollinators came back through the riparian -- and we did it with effluent water.
- Putting this together with large carnivore corridor work allows us to ask: where do the corridors converge? What areas are critical to both large and small? What are the minimum sizes we need to protect?
- When you begin to use effluent based or CAP based restoration that's when it is most important to monitor to document the benefit.
- In Mexico, farmers are planting willow / cottonwood for erosion control. In Northern Arizona the Hopi are saving and restoring springs because of their cultural significance. Who should be involved here in Southern Arizona: farmers; birders; school kids; conservationists.
- If you do that then the goals will grow and become generally accepted so that even the chambers will accept riparian restoration and work to promote it.

