



Sonoran Desert Conservation Plan Pima County, Arizona



Photo by Gene Whitaker/USFWS

Overview

In 1997, the U.S. Fish and Wildlife Service declared the cactus ferruginous pygmy owl (Figure 1) a federally endangered species. Surveys found a dozen birds nesting in saguaro cacti in Pima County, Arizona. This discovery suddenly meant that the county had to do a better job planning its growth. The county's Science Technical Advisory Team (STAT) conducted habitat surveys and recommended that the county develop a plan to protect the owl and a multitude of other species that depend on similar habitat and whose numbers were declining. The county heeded this advice and

Figure 1: Cactus ferruginous pygmy owl.



Credit: Bob Miles, Arizona Fish and Game

began to develop a Multispecies Conservation Plan (MSCP). This would allow the county to meet its obligations under the Endangered Species Act (ESA), yet continue to grow in an environmentally sustainable way.

With increasing awareness of the perils of unplanned growth, county citizens and officials wanted to protect other special aspects of the area. They were concerned about the loss of cultural identity and quality of life in the region. They eventually set forth an ambitious six-pronged plan called the Sonoran Desert Conservation Plan (SDCP). The MSCP, which protects critical habitat for priority vulnerable species, and corridors connecting these lands, is the main biological component of the SDCP. The SDCP also includes plans for the protection of mountain parks, restoration of riparian areas, historical and cultural preservation, ranch preservation, and a conservation reserve known as the Conservation Lands System (CLS). The CLS gives extra protection to hillsides and riparian areas for their habitat and scenic values and uses relative habitat value to determine how much land should be left in its natural state when a parcel is developed. The county updated its comprehensive land use plan to incorporate the CLS land protection guidelines. Together, the components of the SDCP represent a far-reaching and groundbreaking approach to smart growth and strategic conservation planning based on green infrastructure principles.

Highlights

- The MSCP is one part of the SDCP, a larger land use and protection plan. In developing the SDCP, the county went above and beyond the requirements of the ESA to conserve biological corridors, habitat important to vulnerable species, and mountainous and riparian areas, as well as ranches and historic and cultural sites.
- The county updated its comprehensive land use plan to include the CLS and incorporated the CLS guidelines into the draft MSCP. The county Board of Supervisors has, for the most part, been holding developers to the CLS guidelines, even though they are just recommendations at this time.
- Citizen participation was critical to the development of the MSCP. A large public steering committee widely represented the various interests in the debate. In the process of deciding how the committee would operate, many of the members grew to trust each other. A subcommittee put forward recommendations for the content of the MSCP and persuaded the larger committee to endorse them. These recommendations weighed heavily in the plan the county produced for citizen review.
- The STAT stayed focused on the science of habitat protection and was not swayed by politics or the hot-button issues of the day. County administrators made it clear from the beginning that this was what they wanted, and they helped keep the STAT out of the limelight.
- The planning process led to the creation of a new national reserve—Ironwood Forest National Monument, managed by the Bureau of Land Management.
- The county and the Coalition for Sonoran Desert Protection, an alliance of conservation groups and neighborhood associations, have won more than a dozen local, regional, and national awards for their

approaches to multiagency coordination, geographic information systems use, public education, community advocacy, and habitat modeling during the SDCP process.

Background and Context

The Tucson area has been one of the fastest growing regions of the country since World War II. Pima County currently loses an acre of desert every 2 hours to development. In 2000–2001, an average of almost 1,800 new residents moved to Pima County each month. By the end of the twentieth century, the region's steady population growth had outpaced the county's ability to establish and implement effective regional land-use and conservation planning, and the rapid development threatened many native plants and animals as well as the open space that makes the area special.

Pima County lies at the intersection of four ecological regions—the Sonoran and Chihuahuan deserts and the Rocky and Sierra Madre mountains—which makes the area home to a great diversity of wildlife and plants. The lush, undeveloped mountains also provide an important north-south migratory pathway for animals and birds.

The Sonoran Desert Conservation Plan

To protect these natural treasures Pima County has been working for more than 6 years on the Sonoran Desert Conservation Plan, a multifaceted plan to safeguard the area's biological corridors and ecologically important wildlife habitat, riparian areas, ranches, and cultural and historical resources. The area covered by the SDCP includes 5.9 million acres, over which more than a dozen federal, state, and local governments and agencies have jurisdiction. The main component of the SDCP focused on protection of biological corridors and critical wildlife habitat is the Multispecies Conservation Plan (MSCP).

“Pima County is a really important model because it is a comprehensive, general land-use, habitat protection plan. It goes a long ways beyond the specific requirements [of the ESA].”

— Bruce Babbitt, former Secretary of the Interior



An Endangered Owl Gets the Ball Rolling

The impetus for developing the SDCP and the MSCP was the discovery in the late 1990s of the federally endangered cactus ferruginous pygmy owl in Pima County. The decline of the owl is caused by the growth of urban and agricultural areas, wood cutting, engineered changes in natural water flow patterns, and predation by house cats, which are now prevalent in the area due to rapid growth.

In response to finding the endangered owl in the county, officials enlisted a volunteer Science Technical Advisory Team (STAT), which advised the county that it would be wise to protect the habitat of a number of other rare species while they were protecting the owl's habitat. The area's rapid development threatens many animals and plants besides the owl. A broad habitat protection plan would help the county save money by keeping ahead of future endangered species issues.

The U.S. Fish and Wildlife Service (USFWS), which manages endangered species in the United States, requires jurisdictions where endangered species live to develop a habitat conservation plan (HCP) before new development is allowed in the endangered species' habitat. County administrators opted to take the STAT's advice and develop an MSCP (an HCP for more than one vulnerable species) to secure the future of the owl as well as 54 other "priority vulnerable species." These species include the Arizona shrew, southwestern willow flycatcher, desert box turtle, Tucson shovel-nosed snake, lowland leopard frog, and Sonora sucker, as well as other species of mammals, birds, reptiles, amphibians, fish, invertebrates, and plants. These organisms share the owl's preferred habitat—wooded riparian areas, desert scrub, plains, and desert grasslands—and their numbers are also declining.

One option for long-term management of endangered species allows the county to plan for economically and environmentally efficient growth and natural resource use through the process of applying for a "Section 10," or "incidental take," permit under the ESA. Development of an MSCP is part of this permit application process. A Section 10 permit allows a small number of the endangered species to be harmed, killed, or captured in the course of development and land use as long as habitat is protected in the most

important areas. Without this permit, a "take," or killing of an endangered species, is a federal crime. The MSCP helps minimize the effects on the listed species of development allowed under the Section 10 permit.

Work on MSCP Inspires Development of SDCP

The discovery that the owl was nesting in Pima County prompted the county to begin developing an MSCP. However, the county wanted not just to meet the requirements of the ESA, but also to comply with the spirit and intent of that law. The county wanted to address the problems that led to the owl's listing in the first place and reverse the decline of a host of other vulnerable species. The community also recognized that its economic viability depended in part on protecting its natural assets and preserving its cultural identity.

The result is the Sonoran Desert Conservation Plan (SDCP), which extends protection to a range of species by conserving and restoring large-scale natural systems and addressing protection of other natural and cultural resources in the county that residents value. The initial elements of the plan were protection of critical habitat and biological corridors (from the MSCP), riparian areas, mountain parks, cultural resources, and ranches. As the SDCP evolved, historical preservation was added, as was a new conservation reserve system (the Conservation Lands System [see below]).

The strong interconnections of all these elements are critical to a viable land management plan that ensures continuing protection of biodiversity in Pima County. When fully implemented, the plan will help to define urban boundaries, slow sprawl, and protect the lands with the highest quality resources. Together, the planning components represent a far-reaching and groundbreaking approach to strategic conservation planning.

Process

Development of the MSCP

The Draft Pima County Multi-species Conservation Plan lays out how the county proposes to meet the requirements of the ESA by focusing development on the least environmentally important lands, thereby protecting species habitat and increasing efficiency of urban growth by concentrating development. The goal of the MSCP is to “ensure the long-term survival of the full spectrum of plants and animals that are indigenous to Pima County through maintaining or improving the habitat conditions and ecosystem functions necessary for their survival” (Fromer, 2004)(Figure 2).

Area conservation groups were initially opposed to the development of an MSCP under Section 10 of the ESA because these plans have typically been geared toward developers and there has often been only one representative from the conservation community on MSCP committees in other areas. The Coalition for Sonoran Desert Protection organized specifically to serve as a voice for conservation in this process. The Coalition consists of about 40 conservation groups,

including representatives of Defenders of Wildlife, Sierra Club, Tucson Audubon Society, and local neighborhood groups. The Coalition hired staff specifically to monitor and participate in the process. The Coalition and its director, Carolyn Campbell, have been integral to the whole SDCP planning effort.

Despite initial opposition, the county government set a goal of obtaining a Section 10 permit, which would allow continued development to expand the county’s tax base and let development projects move forward. Area developers saw the Section 10 permit as the surest way to minimize fines and regulatory delays to new building projects.

The conservation community insisted early on that sound science serve as the basis for the plan. They pointed to examples of other HCPs that hadn’t worked well because they did not have a sound scientific basis. County officials established the STAT, which over the course of about 4 years identified 54 priority vulnerable species besides the owl. The STAT worked with county personnel to use GIS modeling to identify important habitat for these organisms. The STAT consists

entirely of people with biological expertise, including specialists in all the major species groups (plants, birds, reptiles, etc.). The county assembled the STAT with input from its chair, Dr. William Shaw, professor of wildlife and fisheries resources at the University of Arizona. The STAT includes representatives of most of the major land management agencies in the area. That they were all volunteers lent credibility to their work.

SDCP project director Maeveen Behan and Leslie Dierauf, then a USFWS biologist, created a “firewall” between the STAT and the politics of the process, which also gave credibility to the science. The STAT did not have to consider political or economic impacts in their work. Their charge was to tell the

Figure 2 : Although desert bighorn sheep are not a priority vulnerable species in the Pima County MSCP, they will benefit from habitat protection.



Photo by Gary M. Stoltz/USFWS



community what it would take to protect the owl and the other vulnerable species; the issue of obtaining the Section 10 permit was separate. The thinking was that if the STAT used sound science to delineate important habitat, the county would qualify for the permit. All the information on which decisions were based was available to the public and well documented.

The county's focus on protecting a number of species allowed the STAT to take more of an ecosystem-oriented approach. Shaw said, "This was not the traditional approach for an HCP, which is very species-level. But biodiversity is more than a species-level phenomenon. We developed a land use plan to preserve the full spectrum of biodiversity in the county; the 55 species are surrogates for getting at the bigger picture of preserving biodiversity." The STAT made land use recommendations based on the potential vulnerability of each species' habitat to impacts from the county's land use decisions. Shaw said they ended up with a robust model of critical habitat, which means that the map of important habitat doesn't change much if you drop out individual species because many depend on the same habitats, such as riparian areas.

MSCP Designates Critical Habitat through the Conservation Lands System

The STAT prepared a map of interconnected habitat to be protected for the owl and other priority vulnerable species and designated land categories based on the importance of various land types as habitat for these species. Together, the map and the land category designations represent the Conservation Lands System (CLS). The CLS incorporates the information on critical habitat into the MSCP and SDCP. The three most biologically important categories of land in the CLS, in order, are

- important riparian areas,
- biological core areas (Figure 3, page 6), including the corridors connecting them, and
- multiple use areas.

The county used GIS to map the land categories so citizens could see and comment on the system. Based on USFWS mitigation plans in other places, the STAT produced guidelines on how land development could occur in each of the categories. For example, one guideline states that 80% of a parcel within the biological core area must be preserved in its natural state. This means that if a 10-acre lot falls entirely within the biological core zone, development can occur on only 2 acres. The CLS restrictions are on a per-parcel basis rather than regionwide to help protect private property rights. The CLS designations represent an important part of both the MSCP and the SDCP.

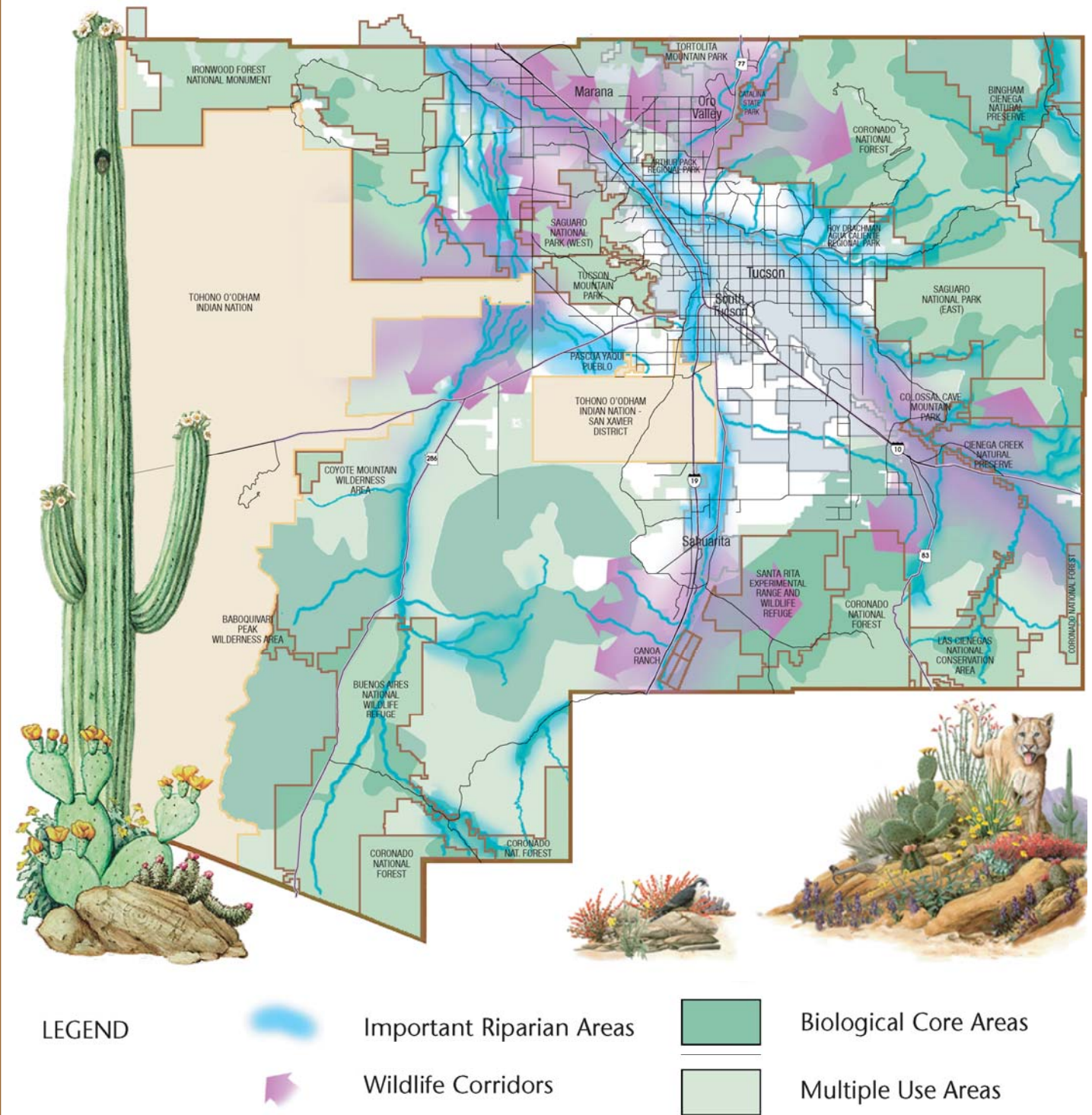
The CLS applies to about 2 million acres mainly in eastern Pima County, where the fastest growth has occurred. Reserves of various kinds already protect about half of the area covered by the CLS. The CLS grandfathered all current land use zoning, but the CLS applies now when a developer submits a request to change the zoning on an area or to increase the density above that for which it is already zoned. The county's environmental planning manager works with developers affected by the CLS to help them determine exactly how the guidelines affect their projects. The CLS development percentages are currently only guidelines, but so far planning and zoning officials and the Board of Supervisors have been following them fairly strictly, with ongoing pressure from the Coalition. The county may have to codify the CLS guidelines or something similar to them into law to satisfy USFWS requirements for the Section 10 permit.

In 2001 the Arizona state legislature passed legislation called Growing Smarter, which required that all counties create or update their comprehensive land use plan. In a groundbreaking display of green infrastructure-based planning, Pima County adopted the CLS guidelines and map of critical habitat as the basis for its updated comprehensive land use plan. In this way, the MSCP, of which the CLS is a part, is already influencing how growth occurs in Pima County.

“The work on the biological corridors and critical habitat elements of the Sonoran Desert Conservation Plan revealed that biology is the basis for all other elements.”

— SDCP Pima County Web site

Figure 3: Biological core areas in Pima County and the corridors that connect them. This network of land represents the region's important linked habitat.



Courtesy of Pima County

Public Involvement

Public involvement has been critical to the development of the MSCP and SDCP. The centerpiece of the public participation process involved the work of the public steering committee. SDCP project director Behan is widely credited with encouraging the various stakeholder groups to come to the negotiating table. Nearly 90 people answered the county's call for applications for the steering committee. The county accepted them all, making for an unwieldy group representing just about every land-based interest in the county. This group worked steadily for about 4 years; more than 50 active participants attended regularly, including representatives of developers, ranchers, realtors, neighborhood groups, conservation organizations, off-road enthusiasts, businesses, property rights groups, mining interests, and others. The county charged the steering committee with making recommendations to the Board of Supervisors about what the MSCP should entail, but provided little additional direction.

The first year of the steering committee's meetings consisted of a series of educational lectures on topics such as the science of the cactus ferruginous pygmy owl, the contents of an HCP, and historic land use patterns in the county. The group hired a professional facilitator to guide the committee meetings, and spent a

“Most of the ranchers look at open space and protection of the habitat as positive.”

— *Rancher Mac Donaldson, quoted in Seattle Post-Intelligencer, May 5, 2005*

lot of time deciding on process issues, such as how they would vote and what constituted a consensus. They decided that recommendations would need a supermajority (two-thirds of a quorum) plus one vote to be accepted. People were reluctant to elect any leaders for the steering committee because they feared loss of control to other interests. The conservation community had a strong voice in the proceedings due to the ongoing involvement of Carolyn Campbell, the Coalition for Sonoran Desert Protection's director (Figure 4). Representatives of the various interest groups stuck it out through this time-intensive process because they feared that if their positions weren't clear and known, the county would develop its own recommendations, which might not address their concerns. Bill Arnold, a real estate agent in the county, told *Time Magazine*, “We believed it was better to be at one table rather than have a huge fight. Everyone was a winner in the end.”

Figure 4: Carolyn Campbell, director of the Coalition, presents at a public meeting.



Photo courtesy of C. Campbell, Coalition for Sonoran Desert Protection

In 2004 the Coalition published a report called “Community Vision for the Sonoran Desert Conservation Plan.” It outlines objectives that, in the Coalition’s view, must be part of the MSCP for it to be effective:

- specify conservation goals for each of the 55 priority vulnerable species based on its current status and threats,
- protect the most important lands,
- improve and consolidate current land use ordinances to ensure protection for the most important lands and most threatened species and habitats and to ease the permitting process for development,
- manage and monitor conserved land, and
- provide dedicated funding for implementation.

Eventually a subcommittee of about a dozen extraordinarily committed people, including Campbell, emerged and met repeatedly to hammer out some general recommendations, which they then convinced others on the committee to accept. The steering committee put forth a “Preferred Alternative” that described preferred details of the MSCP, including which methods should be used to protect land, which areas should be protected, and how the plan should be financed. The county accepted the steering committee’s recommendation report, but the MSCP is still a work in progress, and there is no guarantee that the recommendations will make it into the final plan.

The county has continued to work with this smaller citizens committee, the MSCP-Implementation Agreement (MSCP-IA) Drafting Committee, to reach consensus on some of the finer details of the plan, such as how offsite mitigation might occur. It’s currently uncertain whether the county will allow a developer to build on, say, 100% of a parcel within the biological core and instead purchase for conservation an area of the same relative habitat value elsewhere. If this is an option, the required rate of mitigation must be established (the number of acres preserved for every acre developed) and a process must be in place to determine how the mitigation lands will be laid out so that they form useful habitat for the priority vulnerable species. These issues are currently being deliberated by the MSCP-IA Drafting Committee.

All meetings of the public steering committee and STAT are open to the public and include public comment periods, and the county seeks comments on various aspects of the process and the project’s reports. The county estimates that there have been more than 400 public meetings since the process began. The county held open houses about once a month at various area libraries and meeting halls, at which scientists and county staff presented draft maps and were available to answer related questions. The county held additional public meetings in various regions during the processes of updating the comprehensive land use plan and deciding which lands to include in a 2004 open space bond, which was overwhelmingly approved by voters (see below for more information on this bond issue).

As part of the public education process, Pima County created Sonoran Desert Kids, which uses education, recreation, communication, and action to engage children in the issues and to educate them about the SDCP. The Sonoran Desert Kids Web site (<http://www.co.pima.az.us/cmo/sdcp/kids>) provides information, games, and activities (Figure 5) to engage children in conservation action.

Figure 5: A sample of children’s artwork created during an SDCP educational event.



Courtesy of Pima County



Current Status

The county released the first draft of the MSCP in January 2004 and the second draft in February 2005. The county has already begun implementing some of its recommendations by holding developers to the CLS guidelines, purchasing important habitat as funds allow, and assisting with the designation of a new national reserve—the Ironwood Forest National Monument. In spring 2005, consultants were working on the official documentation for submittal of the MSCP and associated documents to the USFWS. Under the STAT's supervision, a consulting firm was developing an environmental impact statement and preparing a take permit analysis, which quantifies the incidental take (incidental harm or killing of the species allowed in the course of development as long as habitat is protected in the most important habitat areas) of owls and how to mitigate it, for submittal to the USFWS. The public will have additional opportunities to comment on these documents before they're finalized by the end of 2005. The Pima County Board of Supervisors will eventually vote to approve submittal of the final MSCP, Section 10 permit application, and other associated documents to the USFWS for review. The USFWS estimates that it may be a year after submittal before they reach a decision on the permit. The Coalition looks forward to a pioneering agreement between the parties, and has said, "when this visionary model plan is completed, it will serve as a model for other communities embarking on systematic habitat conservation plans for protecting biologically important and sensitive areas" (CSDP, 2003b) throughout the West and the country.

Management/ Stewardship

A plan for long-term management, monitoring, and stewardship of owl populations and publicly acquired lands is still being worked out by the STAT and its consultants. The MSCP must provide for monitoring of owl takes if the county is to receive its Section 10 permit.

Financing and Cost-Benefit Analysis

Financing for Planning

When the planning process got off the ground, Bruce Babbitt, of Arizona, was the U.S. Secretary of Interior. He was interested in the process of planning on such a large scale for the protection of so many different organisms, and was impressed by the community's interest. He was instrumental in earmarking almost \$1 million per year for 3 years to support the development of the science behind the plan. These monies came through Section 6 of the ESA for planning and paid mainly for the work of environmental consulting companies.

Financing for Implementation

Open Space Bonds

Pima County voters passed a 10-year bond dedicated partially to open space in May 2004. The county subsequently appointed a citizens' committee to oversee the use of bond funds. The citizens' advisory committee adopted a Nature Conservancy map depicting recommendations for priority land purchases to be funded by the bond ordinance. The total bond issue was \$175 million; of that, at least \$112 million will go toward habitat protection. This sum is about half of what the conservation community hoped for. Some of the remaining money is set aside specifically for protection of land important for cultural resources or flood control, but there may be some overlap of those

"If you create a better community in the end, doesn't everybody win?"

— *Developer Peter Backus, quoted in Audubon, May/June 2005*

categories with important habitat. So far the county has acquired 20,000 acres for \$45 million under the 2004 bond program. A previous open space bond in 1997 (\$36.3 million total) had a similar allocation of funding.

Exploring Alternatives

Implementation is estimated to cost \$40 million to \$2 billion, depending which lands are protected. A commonly cited number is \$500 million over 5 years. The highest land costs are northwest of the Tucson metropolitan area. However, the county needs to preserve important habitat land, not just the cheapest land. The open space bond can not fund land management and monitoring, and those costs are as yet unquantified.

The Coalition for Sonoran Desert Protection partnered with several other national, regional, and state conservation organizations to form the Financing Group, which researched the various open space and HCP funding mechanisms existing in the Southwest and made recommendations to the county. They found that communities that are most successful in attaining their conservation goals have (i) established multiple funding sources, and (ii) gained from strong partnerships between local government and concerned citizens.

The Financing Group recommended that the county

- issue a general obligation bond. (The county did this and voters approved it in 2004. A large part of the bond went for open space preservation and related concerns. [See above for more details.]
- impose a sales tax to take advantage of the area's tourism business, which thrives on open space.
- pursue private foundation funding sources.
- dedicate a percentage of general funds and property taxes to open space protection.

The group also made the following recommendations for state-based funding, among others:

- create a new state lottery game with proceeds going to open space protection,
- increase travel and tourism taxes,

- adopt a state tax credit for people who donate conservation easements,
- allocate state general funds for open space purchases, operation, and preservation, and
- organize a state-sponsored pro-open space public relations campaign.

The economic analysis report completed for the county by a consultant lists state and federal grants, property taxes, sales taxes, and mitigation fees as options to consider as additional funding sources for plan implementation. The report makes the following recommendations, among others:

- build an endowment to stabilize the plan over the long-term,
- set up a mitigation land bank,
- build in regular revenue adjustments to account for inflation and increases in land values,
- be flexible with developers' funding options, and
- develop a balance between taxes and fees so that the benefits and costs are shared by all beneficiaries.

The county has not yet proposed any other major funding source for implementing the plan besides the bond fund. County staff are pursuing Arizona Department of Transportation ISTE (Intermodal Surface Transportation Efficiency Act Enhancements Program) money for scenic vistas acquisitions and matching grants under Section 6 of the ESA. With the Section 10 permit in hand, the county will be eligible for additional grant funding for land protection, but this will not fulfill the entire need.



Costs vs. Benefits

County officials hired a consultant to complete an economic impact analysis of potential costs and benefits of obtaining the Section 10 permit. The analysis showed that the county will realize important benefits by implementing a plan with strong conservation measures. Having the certainty of the permit will allow for a more straightforward and cost-efficient development process. The consultant predicts that this will lead to more development in a shorter period of time than if the county does not obtain the permit.

Without the Section 10 permit, the county would have to stop all development in areas where the owl occurs or require a separate MSCP for each new proposed development in the owl's habitat area. County officials emphasize that the MSCP and the SDCP are not about stopping development but about fostering responsible growth while minimizing impacts to the landscapes that make the area special. Having a countywide strategy enables developers to plan further into the future because there is less uncertainty about which land uses will be permissible where. Failure to get approval for the MSCP and the Section 10 permit may result in continued, expensive lawsuits by developers and conservation organizations.

The Coalition notes an economic shift in the county away from removing resources from the land and toward increased demand for unspoiled natural places and experiences and the ecosystem benefits these places provide. Coalition staff note that many benefits of the SDCP are intangible and difficult to quantify and that opponents of the plan don't count these intangibles when discussing the costs and benefits of the plan, so the costs may sometimes appear to outweigh the benefits. The Coalition argues that taking into account intangible benefits such as cleaner water, less traffic because of less sprawl, and the preservation of vistas puts the balance clearly in favor of implementing the plan. Research has established that scenic views and access to open space and the recreational opportunities it provides can be important factors when people decide where to live. These factors positively affect housing values, thereby generating more tax revenues.

Benefits

County officials realized the county would save money if they could redirect growth to areas close to existing infrastructure such as roads and sewer lines. They used this advantage to sell the community on the idea of applying for the Section 10 permit. Other benefits of the MSCP and the SDCP include:

- protect native species and their habitats
- protect ranch lands, which provide important habitat, a traditional way of life, and open space
- protect culturally and historically important sites
- provide recreational opportunities and preserve aesthetic beauty
- save money in the long run by protecting native species and their habitats before they're at the brink of extinction
- slow urban sprawl, thereby reducing traffic congestion, commuting times, air pollution, and other costs associated with sprawl
- increase property values by preserving views, open space, clean water, recreational opportunities, and protecting against flood damage
- protect jobs by creating a more diverse economy and bringing more tourism dollars to the area
- improve efficiency of the economy by controlling wasteful uses of natural resources
- improve citizens' health by encouraging walking and outdoor recreation and discouraging driving, thereby lessening pollution
- promote social unity among neighborhoods and communities as more people take advantage of outdoor recreational opportunities.

“The health of Arizona’s economy increasingly depends on having a healthy environment.”

— *Coalition for Sonoran Desert Protection*

Application of Green Infrastructure Principles

Principle 1: Protect green infrastructure before development.

The establishment of the CLS and its integration into the county land use plan demonstrates Pima County's efforts to get out ahead of development, as does the county's decision to protect habitat not just for the endangered cactus ferruginous pygmy owl but for 54 other priority vulnerable species (Figure 6) that share similar habitats. This strategy recognizes that it's less expensive to protect species before they're threatened or endangered.

Principle 2: Engage a diverse group of stakeholders.

The county allowed all citizens who were interested in sitting on the MSCP public steering committee to do so. The group included representatives of virtually all the interests in growth and development in the area. The large size of the group proved unwieldy at first, until the die-hard members of the group emerged. This smaller group still meets to develop recommendations on issues related to the MSCP and SDCP. Letting the group develop its own strategy for tackling the issues ensured representation of the various interests throughout the process. People with diverse interests gradually learned to trust each other and compromise.

The Coalition for Sonoran Desert Protection, which served as a voice for conservation in the SDCP process, represents a broad cross-section of local and national environmental groups who learned to collaborate to achieve a mutually agreeable goal. This sector's voice was stronger because the groups spoke with one reasonable voice.

County administrators recruited experts from multiple government agencies and in various fields for the STAT. A citizen advisory committee oversees the open space bond issue and another is researching options for funding implementation of the SDCP. All meetings of the public steering committee and the STAT are open to the public and include public comment periods. In addition the county has held dozens of public meetings about various aspects of the SDCP and MSCP process.

Figure 6: Bell's vireo, a priority vulnerable species in the Pima County MSCP.



Photo by Steve Maslowksi/USFWS

Principle 3: Linkage is key.

Recognizing the great biodiversity in their area, the county chose to use the MSCP approach to protect habitat for the cactus ferruginous pygmy owl as well as for 54 other priority vulnerable species (Figure 7, page 13). Many of the species' habitat requirements overlap. Because riparian areas provide some of the most important and rare habitat types, habitat protection can go hand-in-hand with flood control projects. Leaving riparian areas undeveloped is best for both habitat protection and flood damage control, which may allow bond issue funding to serve a dual purpose. The CLS aims to protect important linked habitat on a regionwide basis.

Principle 4: Work at different scales and across boundaries.

The SDCP is a countywide plan encompassing lands managed by various entities for different objectives. The SDCP set out from the beginning to accommodate various land use goals, from habitat protection and open space conservation to preserving ranches and historic and cultural resources. Through the CLS, the STAT identified the most important habitat areas and designated appropriate levels of development for the different categories of land.

Principle 5: Use sound science.

About 150 different experts commented on various aspects of the STAT's work, and models were refined based on their input. Reed Noss, an early practitioner of landscape-scale conservation planning, and Laura Hood Watchman, director of habitat conservation planning for Defenders of Wildlife, reviewed the broader process to ensure that the methods used and the assumptions made were valid. County administrators staunchly protected the STAT from the political side of the issues, a fact that Noss and Watchman praised. The two reviewers also commended the county's provision of the STAT with adequate financial resources and staff to get the job done. The reviewers described the SDCP as "a credible, science-based process designed to achieve clear and laudable goals for the long term conservation of biodiversity in Pima County" (Noss and Watchman, 2001). Noss said that the plan was in the "top 10% in scientific credibility of more than 300 habitat conservation plans that have won federal approval" (Davis, 2001).

Principle 6: Fund up-front as a public investment.

Since 1997 the voters of Pima County have approved two bonds, about \$150 million of which are dedicated to open space protection. The county and various citizens' groups are studying additional options for funding implementation of the SDCP in order to spread the financing responsibility among local, state, and national users of the area's resources.

Principle 7: Green infrastructure benefits all.

Intense citizen participation provided a cornerstone of the MSCP and SDCP development processes and identified approaches acceptable to all parties. It is impossible to stop growth, so it's preferable to develop a plan to ensure that it's done in an environmentally responsible manner. Pima County government will save money by focusing growth in areas where roads, sewers, and electric lines already exist. Developers benefit from reduced regulatory review times, more

clearly defined requirements, and less uncertainty about whether projects will be permitted. Citizens benefit through reduced commuting times, cleaner air and water, improved access to open space and its associated recreational opportunities, and flood control.

Principle 8: Make green infrastructure the framework for conservation and development.

Pima County's SDCP embodies this principle. The habitat preservation needs of the region's remaining undeveloped land now come before development needs. Incorporation of the CLS into the comprehensive land use plan gives the CLS greater regulatory strength. Through the SDCP, administrators have already identified the top priority parcels for conservation so they can move quickly to protect them when the parcels and/or funding become available.

Figure 7: Swainson's hawk, a priority vulnerable species in the Pima County MSCP.



Photo by Karen & John Hollingsworth/USFWS

“The old debate about whether growth is good or bad is irrelevant. We have been growing for 50 years [in Tucson]. But we control where our growth occurs so it maximizes benefits and minimizes impacts.”

— Chuck Huckelberry, Pima County administrator, quoted in Time Magazine, March 28, 2005

Evaluation

Unique, innovative, outstanding elements

- County administrators saw that the presence of the owl in the county presented them with an opportunity to encourage comprehensive land use planning. They understood that this type of planning could benefit the county in many ways.
- The integration of the CLS into the county land use plan and the large scale and multiple facets of the SDCP provide for a more comprehensive planning approach than most areas have undertaken. This should minimize conflicts between land use and conservation measures.
- Tremendous public participation and volunteer work enabled the effort to succeed. A subcommittee of the steering committee worked out the details of the committee's recommendations to the county and convinced the others in their groups to support them. The result was increased trust among the various interests, rather than polarization, as so often happens with land use planning. Carolyn Campbell said, "This plan only sets a precedent if everyone's holding hands and agreeing to this."
- The county shielded the STAT from political pressures to favor one interest over another, and as a result, the STAT findings were based strictly on well documented science. Outside experts provided specialized knowledge and peer review. The STAT satisfied the concerns of most of the mainstream environmental and development groups.

Challenges

- The continuity of county leadership could become a problem because the SDCP process has been ongoing for several years. The sitting board of supervisors is supportive, but that could change as time passes.
- The 109th Congress may reauthorize the ESA and in the process weaken the act's protections. It is unclear how reauthorization of the ESA ranks in comparison to the slate of other issues on the table. The act has been up for reauthorization for more than 12 years. The owl could be down-listed or de-listed, possibly because of healthy populations across the U.S. border in Mexico.
- Some areas of the county—the city of Tucson and the town of Marana—are working on their own Section 10 permit applications. It's unclear how these will affect the county plan. Some developers were trying to have their land annexed into Marana so they would face less stringent building requirements. Both Tucson and Marana are using the county's data and have many of the same experts working with them. The CLS does not cover the town of Marana. The town has recently annexed a lot of state land, and the county has requested that they apply the CLS requirements to those lands.
- The MSCP and SDCP are long-term plans based on the best currently available scientific data. But no amount of scientific knowledge can completely predict future events. This could mean that circumstances may change and the intended results may be unobtainable. For example, the "no surprises" clause of the ESA says that developers are not subject to further restrictions in the future even if the plan isn't working to save owls. Developers favor the certainty this clause brings, but their certainty comes at the expense of the

"The SDCP has taken conservation planning to the next level by integrating ecosystems, economic growth, cultural resources, and development. This is an excellent model of creative planning that shows growing communities how to balance our built and natural environments."

— Bruce Knight, American Institute of Certified Planners



conservation community's certainty that the species will be protected.

- Developing an effective and efficient resource management and associated monitoring plan remains a challenge.
- Finding the financial resources to implement the various parts of the SDCP, including the MSCP, is, as always, an issue. Some of the proposed funding mechanisms would require passage of state legislation. If the plan will serve as a model for other places facing ESA issues, the area might receive additional federal implementation funding. It is currently unclear how the management of protected lands will be funded.
- Implementation funding must be in place before the Section 10 permit is obtained, as mandated by the ESA.
- Combining concerns about the continuity of county leadership and financing for implementation, STAT chair Bill Shaw said, "It's still a plan; it's not real. How well it's implemented is what's important. I'm quite confident that if we really stick to the land use plan over the long-term we will actually conserve the species." But the pressures of growth and politics will be great.
- The lack of detailed status and habitat information about some species makes it challenging to develop a plan that adequately protects them.

Lessons Learned

- It is essential early in the process to involve and educate all stakeholders on the issues covered by the plan, including elected and agency officials.
- The more public participation, the better. If people aren't given their say from the beginning and allowed to feel ownership of the process and the outcome, they may be unhappy with the end result. The SDCP is a long-term plan, and the county needs widespread buy-in because community leadership will change.
- What happens between the beginning and the end of the permit planning process is very important. The conservation community wanted to see interim conservation measures enacted during the planning

process, and they did—the CLS. This allowed the community to get used to changes gradually and built trust in county leaders.

- Elected officials should not just blindly follow the pattern set by other places facing ESA issues. Keeping the focus on planning and conserving biodiversity rather than on getting the permit brings a different perspective to the process and lends greater credibility to the science.
- Having a separate environmental advocacy group in addition to the STAT allowed the scientists to stay out of the politics. The Coalition was the environmental watchdog of both the Board of Supervisors and the STAT. Because the STAT members and the Coalition members had previously been colleagues in the conservation community, the Coalition members trusted them.
- It is essential to assemble a science committee with excellent credentials and respect in the conservation community.
- Everyone involved must document why each decision is made and be very open and honest about data and decisions and meetings.
- People must accept that there will never be enough data and that you have to put together a model that reflects the best expertise available.

What began as a plan for a specific species has become increasingly inclusive and comprehensive over time. The inclusiveness of the planning process has resulted in a groundswell of support for the SDCP. The SDCP and MSCP are not about whether Pima County continues to grow; it is about where the county will grow. By designing a plan for the urban environment that will work within a natural and cultural resource protection framework, Pima County is fostering an environmental ethic that will protect the community's most valuable assets and contribute to a sustainable economy for many years to come.

References

- Behan, M. and B. Changkakoti. 2001. Pima County Comprehensive Plan. <http://www.pimaxpress.com/planning/default.htm>
- Coalition for Sonoran Desert Protection. 2004. Comments on the Multi-Species Conservation Plan. Submitted to Mr. Chuck Huckelberry, Pima County Administrator.
- Coalition for Sonoran Desert Protection. 2003a. Community vision for the Sonoran Desert Conservation Plan and Multi-Species Conservation Plan.
- Coalition for Sonoran Desert Protection. 2003b. The Sonoran Desert Conservation Plan. (all articles in the series)
- Coalition for Sonoran Desert Protection. 2002. Protecting the Sonoran Desert: An exploration of open space and HCP funding mechanisms with recommendations for Pima County.
- Coalition for Sonoran Desert Protection. n.d. Economic benefits of protecting natural resources in the Sonoran Desert: Summary of findings.
- Davis, T. 2001. "Desert Conservation Plan 'credible.'" Arizona Daily Star. Oct. 27.
- ESI Corp Study Team. 2003. Pima County economic analysis Section 10 permit. Prepared for Pima County.
- Fromer, P. 2004. Advance draft Pima County Multiple Species Conservation Plan, Pima County, Arizona. Prepared by Recon Consulting for Pima County. <http://www.pima.gov/cmo/sdcp/mscp/mscp.pdf>
- Fromer, P. and L. Jones Woods. 2005. Draft II Pima County Multiple Species Conservation Plan, Pima County, Arizona. Prepared by Recon Consulting for Pima County. <http://www.pima.gov/cmo/sdcp/reports/d30/MSD2.pdf>
- Huckelberry, C. 2002. The Sonoran Desert Conservation Plan. Endangered Species Bulletin. XXVII, no. 2: 12-15.
- Kloor, K. 2005. Score one for the desert. Audubon, May-June.
- Lerner, J.A. 2003. The Sonoran Desert Conservation Plan, in: Integrating Land Use Planning & Biodiversity. J.P. Cohn and J.A. Lerner. Defenders of Wildlife, Washington, DC. pp. 15-16.
- McCarthy, T. 2005. Living with the desert. Time Magazine, March 28.
- Noss, R. and L.H. Watchman. 2001. Report of independent peer reviewers: Sonoran Desert Conservation Plan. Submitted to Pima County.
- Pima County. 1999. Determining vulnerable species within Pima County, Arizona. Revised draft 11/19. Section 1.3.3 Human Population Increase in Historic Era. <http://www.pima.gov/cmo/sdcp/sdcp2/reports/scigis/vulsp/vsp01.htm>
- Pima County. n.d. An overview of the Sonoran Desert Conservation Plan. <http://www.co.pima.az.us/cmo/sdcp/intro.html>
- Pima County. n.d. A vision for biological corridors and critical habitats. <http://www.co.pima.az.us/cmo/sdcp/habitat.html>
- Pima County Planning and Zoning. n.d. Comprehensive plan—regional plan policies: Natural resources. <http://www.pimaxpress.com/planning/ComprehensivePlan/Natural.htm>
- Society of Environmental Journalists. 2005. SEJ Tipsheet, Jan. 19. Special Endangered Species Act outlook review. <http://www.sej.org/pub/index1.htm>
- Stiffler, L. 2005. Lessons learned elsewhere put to good use in Arizona. Seattle Post-Intelligencer, May 5. http://seattlepi.nwsource.com/specials/licensetokill/222656_tucson05.html
- U.S. Fish and Wildlife Service. n. d. Consultation and Habitat Conservation Planning around the Nation.
- U.S. Fish and Wildlife Service. March 2005. Habitat Conservation Plans.
- U.S. Fish and Wildlife Service. n. d. "No Surprises" questions and answers.

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About Green Infrastructure

Green infrastructure is a strategic approach to land and water conservation that links lands for the benefit of nature and people, helps identify conservation priorities, and provides a planning framework for conservation and development. Green infrastructure is different from conventional approaches to conservation because it looks at conservation values and actions in concert with land development and growth management. Green infrastructure projects bring public and private partners together to work collaboratively toward a common land conservation goal. They help move beyond jurisdictional and political boundaries by providing a process for identifying, protecting, and restoring interconnected green space networks that conserve natural ecosystem functions and provide associated benefits to human populations. The green infrastructure approach appeals to people concerned about biodiversity, habitat, and land conservation as well as people interested in open space and land use planning at the community, region, or statewide scale. It also appeals to smart growth advocates because of its potential to lessen impacts and reduce the costs of built infrastructure.

Green Infrastructure Case Study Series

This series of case studies highlights successful and innovative green infrastructure projects from around the country. The series was undertaken so that readers can learn from and improve upon approaches tried by others. We hope that thorough, well-documented examples will allow readers to see the many possibilities and to adapt successful practices to their unique situations and challenges. Each case study addresses the same basic pieces of the story: overview, highlights, background and context, process, public education and participation, results and products, management and stewardship, financing, application of green infrastructure principles, and evaluation. Eight principles of green infrastructure, which are elements of most successful efforts, form the core of the case studies. The series illustrates concrete, real-life examples of how to assess and protect green infrastructure, including details about how each step was implemented.

About The Conservation Fund

The Conservation Fund is a national, nonprofit land conservation organization that forges partnerships to protect America's legacy of land and water resources. Through land acquisition, community planning, and leadership training, the Fund and its partners demonstrate sustainable conservation solutions emphasizing the integration of economic and environmental goals. Since 1985, the Fund has protected more than 4 million acres of open space, wildlife habitat, and historic sites across America.

The Conservation Fund's Green Infrastructure Program was created in 1999 to build the capacity of land conservation professionals and their partners to undertake strategic conservation activities that are proactive, systematic, well integrated, and applied at multiple scales. The program is a cooperative effort of the Fund and multiple public and private partners. Program products include a national course, workshops and conference sessions, publications, case studies, demonstration projects, a Web site, and related educational materials.

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