



MEMORANDUM

Date: December 8, 2010

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

From: C.H. Huckelberry,
County Administrator

A handwritten signature in black ink, appearing to be "CHH", is written over the printed name "C.H. Huckelberry".

Re: Section 10(a) Permit Application Submittal

After more than 11 years of planning, today Pima County submitted its Section 10(a) Permit application to the United States Fish and Wildlife Service (the Service). Once Pima County and the Service agree to the terms and conditions of the Permit, the County will have achieved a significant milestone in providing regulatory certainty for the County and much of its development community with regard to compliance with the Endangered Species Act. The County's acceptance of the Permit will also complete an essential part of our Sonoran Desert Conservation Plan.

The Board's opportunity to deliberate the County's acceptance of the Section 10 Permit is, because of the various steps necessary to complete the federal review process, still at least another year away. During this time, there will be ample opportunity to discuss and debate details of the plan and its effects on County operations, the development community and environmental stewardship in Pima County.

The Section 10 Permit application materials submitted include a preliminary draft of the Implementing Agreement (IA) and the Administrative Draft of the Multi-species Conservation Plan (MSCP). The Service will review these documents over the next few months. Their comments will be addressed in the Public Review Draft MSCP that will be released by the Service, along with the Draft Environmental Impact Statement (DEIS), for public review later in 2011.

While the Service does not make the application materials available for public comment, the County is providing the application materials to the public. However, because of the strictures of the federal process, any public comments that are received on the Administrative Draft or the Public Review Draft the Service will release in 2011 cannot be incorporated until the Final MSCP is released at the conclusion of the federal process. Additional information about the federal application process and the Administrative Review Draft can be found at <http://www.pima.gov/cmo/sdcp/MSCP/MSCP.html>. Comments may

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be directed to Ms. Neva Connolly, 201 N. Stone Avenue, Sixth Floor, Tucson, Arizona 85701 or email them to Neva.Connolly@pima.gov.

During recent stakeholder meetings, we heard a number of concerns that merit attention, but which are not directly related to the issuance of a permit by the Service. These issues include the programmatic details and administration of the opt-in program as well as matters related to specific staff and departmental responsibilities. I have directed staff to engage the stakeholders and rely on their input for the development of key program elements. These conversations and program development will occur and be concluded without being incorporated into the terms of a Section 10 Permit. However, because these issues do relate to how we implement the terms of the Permit, we intend to finalize these elements prior to issuance of any Section 10 Permit.

CHH/mjk

Attachments

c: Julie Fonseca, Environmental Planning Manager

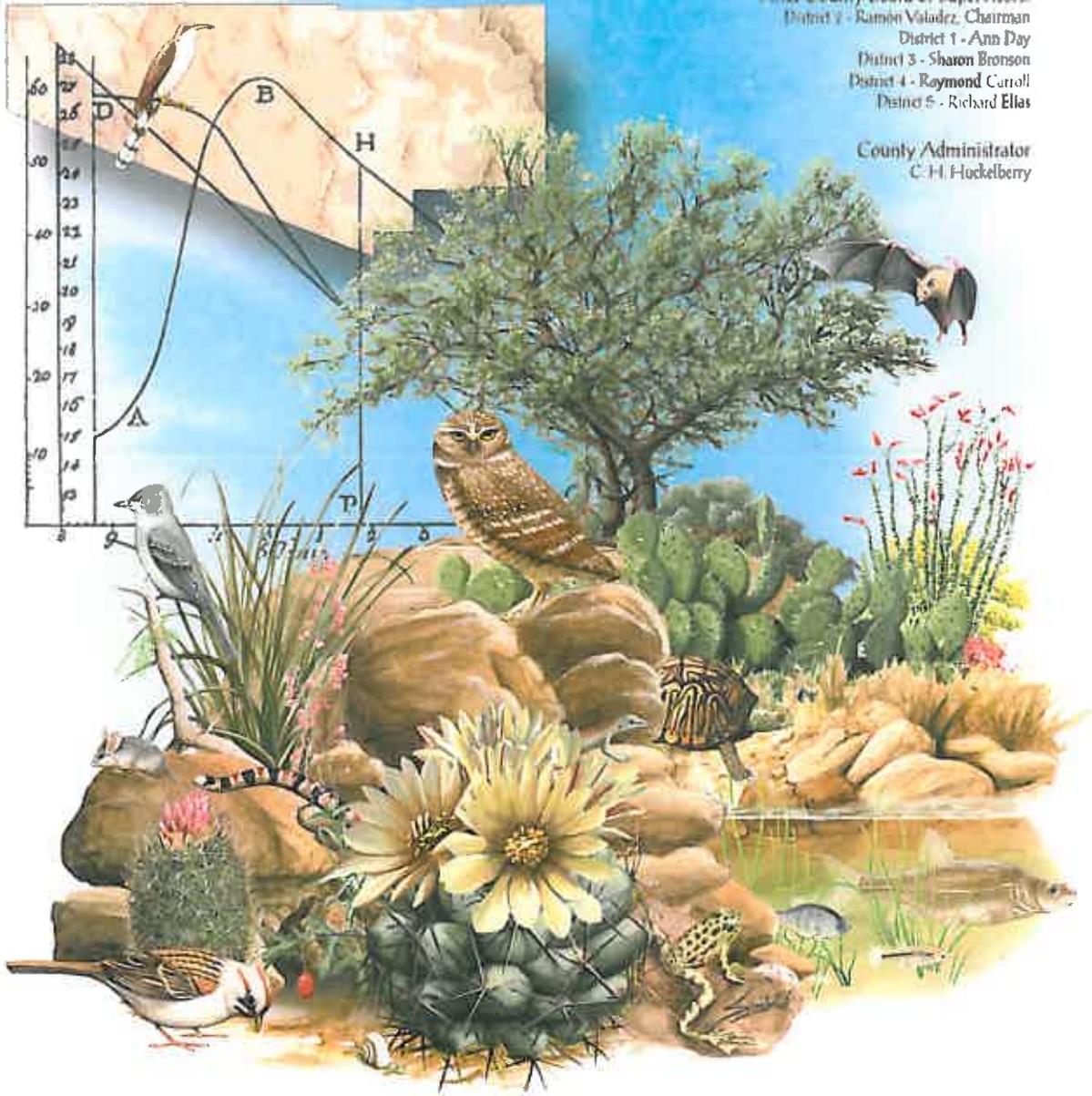
Pima County Multi-species Conservation Plan

Administrative Draft



Pima County Board of Supervisors:
District 2 - Ramon Valadez, Chairman
District 1 - Ann Day
District 3 - Sharon Bronson
District 4 - Raymond Carroll
District 5 - Richard Elias

County Administrator
C.H. Hockelberry



Recommended Citation:

Pima County. 2010. Multi-species Conservation Plan: Administrative Draft. Submitted to the U.S. Fish and Wildlife Service, Tucson, Arizona.

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EXECUTIVE SUMMARY

The continued growth of the human-built environment in Pima County, Arizona will result in the “incidental take” of species that are currently—or have the potential to be—listed under the Endangered Species Act (ESA). To avoid, minimize, and mitigate impacts to species and their habitat, Pima County is submitting this Multi-species Conservation Plan for 49 species (4 plants, 8 mammals, 8 birds, 6 fish, 2 amphibians, 7 reptiles, and 14 invertebrates) that may be harmed as a result of the otherwise lawful, Covered Activities of Pima County and its development community. The Incidental Take permit, also called a Section 10 permit, will be for 30 years.

The primary Covered Activities are development activities of the private sector through rezonings approved by the Board of Supervisors and non-discretionary activities through a process known as “opting in” and County maintenance and construction activities. Pima County is seeking Section 10 permit coverage for activities within the Permit Area (a subset of the County) that are under the regulatory authority of the Pima County Board of Supervisors and Pima County Regional Flood Control District Board.

Pima County projects that there will be approximately 36,000 acres of disturbance resulting from the Covered Activities within the Permit Area during the 30-year permit period. For this amount of disturbance, Pima County will provide approximately 112,000 acres of mitigation. Despite not yet having a Section 10 permit, Pima County has acquired over 71,000 acres of fee-owned lands, and over 130,000 acres of lease lands. Pima County is proposing a method whereby partial mitigation credit will be granted for lease lands and for improving conditions on those lands. Other important avoidance, minimization, and mitigation efforts for this MSCP include open space set asides within planned subdivisions and zoning restrictions and enforcement.

Land management is a critical component of this MSCP, and current efforts are directed at protecting and perpetuating the resources for which land was either set aside or acquired. Management emphasizes restoring selected conservation targets (e.g., riparian areas) and minimizing on-site threats such as invasive species and illegal trash

dumping. Particular emphasis is being placed on the management of Pima County's extensive ranch holdings. To inform these management programs and directives, Pima County will continue ranch monitoring efforts and also initiate a broad-scale monitoring program for a suite of program elements: individual species, species' habitat, threats, and climate. Particular attention will be placed on monitoring aquatic, riparian, and ranchland elements. Adaptive management may be employed in select settings, for example in the ranchland element and in riparian restoration. The monitoring and adaptive management programs will be reviewed periodically to ensure they are providing timely and relevant information.

This MSCP highlights a set of circumstances that may change after the USFWS issues a Section 10 permit and for which Pima County will make efforts to address. These Changed Circumstances range from increased groundwater withdrawal impacts on riparian resources to increased off-road vehicle traffic. Unforeseen Circumstances are those that the County can not reasonable anticipate and therefore will not be held responsible for addressing through management actions.

Pima County has spent approximate \$150 million on land acquisitions since 2004 to satisfy the requirements of the forthcoming Section 10 permit. These dollars came primarily from bond funds that were approved by voters in 2004. Most of the management and enforcement functions associated with this MSCP are already taking place as the County implements natural resource conservation and open-space preservation elements of the Sonoran Desert Conservation Plan. New costs will be incurred for the monitoring programs.

Public participation and expert oversight have been a hallmark of the development of the MSCP and this participation will continue in the implementation stage. In addition to this participation, Pima County will adhere to annual and decennial reporting of take and habitat loss and resulting mitigation activities.

The suite of conservation measures in this MSCP provide a level of protection for the Covered Species and their habitats that would not otherwise exist if Pima County were

not to pursue this MSCP. The proposed conservation plan also provides regulatory certainty and streamlined compliance with the ESA for both the County and its development community.

1 INTRODUCTION TO THE PIMA COUNTY MULTI-SPECIES CONSERVATION PLAN

Following the 1997 listing of the cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*) as a federally endangered species, the Pima County Board of Supervisors initiated the Sonoran Desert Conservation Plan (SDCP). The purpose of the SDCP was to develop a regional plan to address the long-term conservation needs of the full range of natural and cultural resources (Pima County 2001a). The development of the SDCP has been an iterative process whereby planning tools were developed using science-based principles, shaped by public input and review, and subsequently refined into proposals that reflect community values. Many SDCP initiatives are now being implemented.

This document represents the culmination of many years of planning and studies in the development of the biological element of the SDCP. That work effort has been driven by the SDCP biological goal, as established by the Science Technical Advisory Team (STAT):

“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.”

In 2001, the Pima County Board of Supervisors adopted the Pima County Comprehensive Land Use Plan Update (Pima County 2001b), which adopted land-use concepts, policies, and principles of conservation that were identified in the draft SDCP (Pima County 2001a). Other milestones in the development of the SDCP have included defining land-protection priorities, obtaining funds for new land acquisitions, managing new preserves, and revising existing regulations and creating new regulations. The next step in implementing the SDCP is to formalize the suite of conservation commitments as they relate to obtaining an Incidental Take permit (i.e., Section 10 permit) for non-federal actions as authorized by the Endangered Species Act (ESA).

1.1 Purpose and Need for Document

The Pima County Multi-species Conservation Plan (MSCP) is an integral component of the SDCP; it provides Pima County with incidental take protection under the ESA for Covered Species and Covered Activities, as identified herein. Specifically, Section 9 of the ESA prohibits the "take" of threatened and endangered species including "the attempt or action to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" such species. However, Section 10 (a)(1)(B) of the ESA authorizes exceptions for take that may occur incidentally to otherwise lawful activities through the issuance of a Section 10 permit (henceforth Section 10 or permit) that requires development and implementation of a Habitat Conservation Plan (HCP) is in place. The HCP must thoroughly describe the effects of anticipated take on affected species and the measures that will be proposed to avoid, minimize, and mitigate these impacts. The general purposes of Section 10 of the ESA and associated HCP requirement is to:

- Permit non-Federal projects to take Federally listed species while not jeopardizing their long-term survival in the wild;
- Promote the long-term conservation of Covered Species and their habitats;
- Reduce conflicts between Covered Species and economic activities;
- Develop partnerships both within the public sector and between the public and private sectors. Examples of partnerships include monitoring and property management;
- Provide regulatory streamlining for county operations and the private sector;
- Provide opportunities for the conservation of State Trust lands.

For Pima County, the proposed HCP addresses the needs of more than one species and their habitats, hence the multi-species designation (i.e., Multi-species Conservation Plan; MSCP). As part of the MSCP and SDCP planning efforts, Pima County and its cooperators developed a host of planning documents that together provide a thorough

analysis of Pima County's natural resources, conditions, and needed conservation measures. This MSCP document is not intended as a summary of these studies (see section 2.2 for summary information), but rather it:

- Serves as the document of record for anticipated incidental take, habitat loss, mitigation, management, and monitoring of Covered Species and their habitats as a result of Covered Activities;
- Establishes a phased approach to implementing the Pima County MSCP with appropriate interim milestones for meeting requirements associated with projected impacts;
- Provides a means for tracking mitigation obligations and credit; and
- Provides a programmatic framework for developing other Section 10 permits for non-Pima County jurisdictions and potentially facilitating Section 7(a)(1) consultations for Federal land management partners.

1.2 Pima County Multi-species Conservation Plan (MSCP): Required Elements

As stipulated in Section 10(a)(2)(A) of the ESA, Pima County must address the following HCP elements in this document:

- The impact which will likely result from [such] proposed taking (Chapter 3);
- What steps Pima County will take to avoid, minimize and mitigate such impacts (Chapter 4);
- The funding that will be available to implement such steps (Chapter 8);
- What alternative actions to such taking that Pima County considered (see next section);

- Other measures that may be required or appropriate for the purposes of the plan.

In the updated addendum to the HCP Handbook (U.S. Fish and Wildlife Service 2000), a “5-point policy” further articulates components of the Habitat Conservation Planning program, namely: biological goals, adaptive management, monitoring, permit duration, and public participation. These elements will be addressed throughout this document.

1.3 Habitat Conservation Plan (HCP) Alternatives

Pima County has considered a full range of alternative actions to the incidental take proposed in this MSCP. Further details of these alternatives will be evaluated in the forthcoming Environmental Impact Statement.

Alternative A: This is the “No Action” alternative under which Pima County would not proceed with the Section 10 permit. Instead, individual projects or actions would be evaluated for their respective ESA nexus.

The remaining three action alternatives (B, C, and D) differ in the activities that will be covered under the permit. They all assume permit coverage for 49 species and continued partnerships with those entities that have signed cooperative working agreements. However, the alternatives do not rely upon partnerships with other land owners and jurisdictions within Pima County (e.g., Native American tribes, Federal agencies, Arizona State Land Department and other State of Arizona agencies, the City of Tucson, and the towns of Marana, Sahuarita, and Oro Valley) to carry out required conservation measures, including avoidance, minimization, and mitigation. Land development models are the basis for analysis of the environmental effects of these alternatives.

Alternative B. This alternative applies only to activities that the County undertakes, most importantly construction and maintenance activities. Private development within Pima County would continue to be responsible for Section 7 consultations for their projects, when necessary. Conservation measures of the SDCP would continue, as highlighted in Alternative A.

Alternative C. This alternative would provide Section 10 permit coverage for County activities (as in Alternative B) and for all activities that are under the regulatory authority of the Board (i.e., Board of Supervisors for Pima County and the Board of Directors for the Pima County Regional Flood Control District), most importantly rezonings and the issuance of building permits. This alternative covers the broadest range of actions that would result in take and habitat loss. Under this scenario, there would be no need for Section 7 consultations for private development in unincorporated Pima County.

Alternative D. This alternative would provide Section 10 permit coverage for activities that the County undertakes (as in Alternative B), but also includes rezonings, a subset of development within unincorporated Pima County for which the Board has direct control. Also, this alternative includes an Opt-in Program whereby development activities that are not rezonings would be eligible for permit coverage by paying a fee. This alternative is intermediate between Alternatives B and C. Alternative D is the preferred alternative and is the focus of the County's Habitat Conservation Plan.

2 BACKGROUND PLANNING EFFORTS

2.1 Pima County MSCP Planning Area

The Planning Area for the Pima County MSCP is the entire 9,184 square miles (5,879,669 acres) of Pima County. Elevations range from 1,200 feet in the western portion of the County to over 9,000 feet in the Catalina Mountains in northeastern portion of the County. Geographically, the Planning Area is representative of the Basin and Range Province, with mountainous "sky islands" separated by the desert valleys.

Native American tribal lands (Pascua Yaqui Reservation and the Tohono O'odham Nation) represent the single largest ownership type in Pima County, together accounting for 42% of Pima County's land ownership (Table 2.1; Figure 2.1). The Federal government and State of Arizona are the second and third largest land owners in Pima County, respectively. Pima County owns <2% of the County. Incorporated jurisdictions within Pima County include the cities of Tucson and South Tucson, and the towns of Oro Valley, Marana, and Sahuarita.

Table 2.1. Land ownership in Pima County.

Owner	Acres	Percent Ownership in Pima County
Federal: Bureau of Land Management	375,486	6.4
Federal: Bureau of Reclamation	2,997	<0.1
Federal: Department of Defense	68,251	1.2
Federal: U.S. Fish and Wildlife Service	514,157	8.7
Federal: National Park Service	409,629	7.0
Federal: U.S. Forest Service	336,890	5.7
State of Arizona	863,858	14.7
Tribal	2,476,159	42.1
Pima County	110,868	1.6
Municipal	44,059	0.7
Private	686,911	11.8
Total acres	5,879,669	

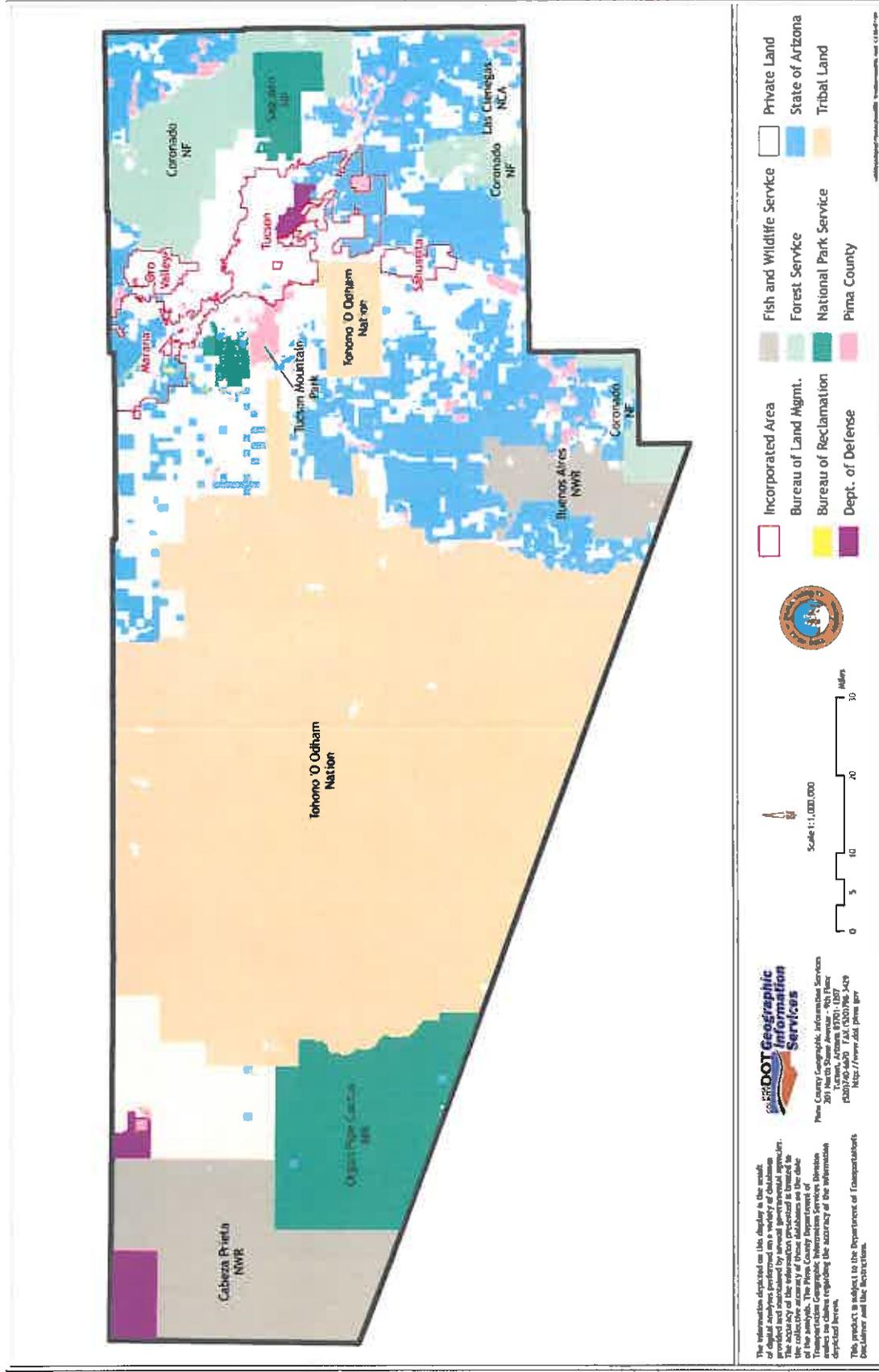


Figure 2.1. Pima County MSCP Planning Area by land owner type and major preserves.

2.2 Collection and Synthesis of Data for the SDCP and MSCP

Pima County began a comprehensive planning process for the SDCP in 1998 (see Chapter 1). That effort was guided by a team of regional natural resource scientists, known as the Science Technical Advisory Team (STAT; see section 11.2.1 for list of participants). The STAT, Pima County staff, consultants, and other biologists and natural resource managers identified key planning elements and information such as: species of greatest conservation concern (see section 2.2.1); threats and stressors (Pima County 2000a); and mapping and data gathering needs (RECON Environmental Inc. 2000a). This work led to the design for a biological reserve system, known as the Maeveen Marie Behan Conservation Lands System (herein Conservation Lands System or CLS; Pima County 2001a; see section 2.2.2). The results of this process, which is detailed in an extensive series of technical documents (Pima County 2000a, d, c, b, 2001a), form the foundation of the proposed Pima County MSCP. The following subsections provide a brief description of important planning elements of the MSCP.

2.2.1 Priority Vulnerable Species

Plant and animal species represented the most important planning unit for the MSCP. To begin the process, Pima County, under the direction of the STAT, developed a list of the most vulnerable plants and animals within Pima County (RECON Environmental Inc. 2000b). Planners began with a list of over 100 species recognized by the Federal government as imperiled, species extirpated from Pima County, and additional species whose populations are in decline or jeopardy. That list was then refined based on species' occurrence, residency status, and opportunities for conservation in Pima County (Fonseca and Scalero 1999). This review resulted in a list of 56 species that became known as the Priority Vulnerable Species (RECON Environmental Inc. 2000a, b). These species played an instrumental role in the development of the biological component of the SDCP and many of the subsequent planning tools, such as the CLS. For purposes of the MSCP, the list of Priority Vulnerable Species was further reduced to those species warranting Section 10 permit coverage. These species, known as the Covered Species, are the focus of this MSCP.

2.2.2 The Maeveen Marie Behan Conservation Lands System (CLS) and Reserve Design Process

For purposes of this MSCP, the CLS is the primary tool by which Pima County will, along with species Priority Conservation Areas, evaluate habitat loss and determine mitigation necessary to maintain compliance with the terms of the Section 10 Permit. Pima County's application of the CLS for the permit will differ from how it is used to implement the Environmental Element of the County's Comprehensive Plan. Although the CLS map and categories are the same in both applications, Pima County will hold itself to higher mitigation ratios for impacts that occur on lands within the CLS than those mitigation ratios the Board of Supervisors uses when applying the Environmental Element of the Comprehensive Plan to discretionary land use changes on private property. The remainder of this section provides background information on the development of the CLS.

The scientific foundation for the CLS was information relating to both the natural and built environments in Pima County, especially the identification of areas of high species richness (i.e., total number of species) of Priority Vulnerable Species and unique landscape features known as Special Elements (Fonseca and Connolly 2002). For this process, Pima County and its cooperators used a Geographic Information System to map the distribution of known locations for Priority Vulnerable Species and their potential habitat by modeling important, broad-scale environmental variables (e.g., vegetation, soils, and water features) for each Priority Vulnerable Species (RECON Environmental Inc. 2000a). Areas of high species richness provided the starting point for drawing the initial reserve system boundaries, which were delineated on the basis of a complex set of rules developed by STAT and guided by principles of reserve design (RECON Environmental Inc. 2001). In addition to modeling species' habitat, Pima County, in consultation with species experts, also identified critical conservation areas for each Covered Species. These areas are known as Priority Conservation Areas (PCAs) and are the basis for take analyses of the Covered Species.

In summary, the CLS is a reserve system that seeks to:

- Retain the diverse representation of physical and environmental conditions;
- Conserve the greatest number of species and their habitats;
- Preserve an intact functional ecosystem;
- Maximize the extent of roadless areas;
- Minimize the expansion of exotic or invasive species; and
- Retain the connectivity of reserve areas with functional corridors.

There are seven CLS categories that are largely distinguished by their comparative values in supporting and representing biological diversity. Tribal lands are excluded from the CLS (Fig. 2.2, Table 2.2). Details about how the CLS is used to determine Pima County’s mitigation commitments for this MSCP are presented in section 4.2.

Table 2.2. Acres of land in each Maeveen Marie Behan Conservation Land System (CLS) category and non-CLS lands in Pima County, excluding tribal lands.

Relationship to CLS	CLS Category	Total (acres)
Inside CLS	Biological Core Management Areas	899,915
	Multiple Use Management Areas	950,505
	Important Riparian Areas	158,178
	Scientific Research Areas	54,000
	Agricultural Inholdings	9,691
	Special Species Management Area	997,582
Outside CLS		456,513
Total		3,526,384

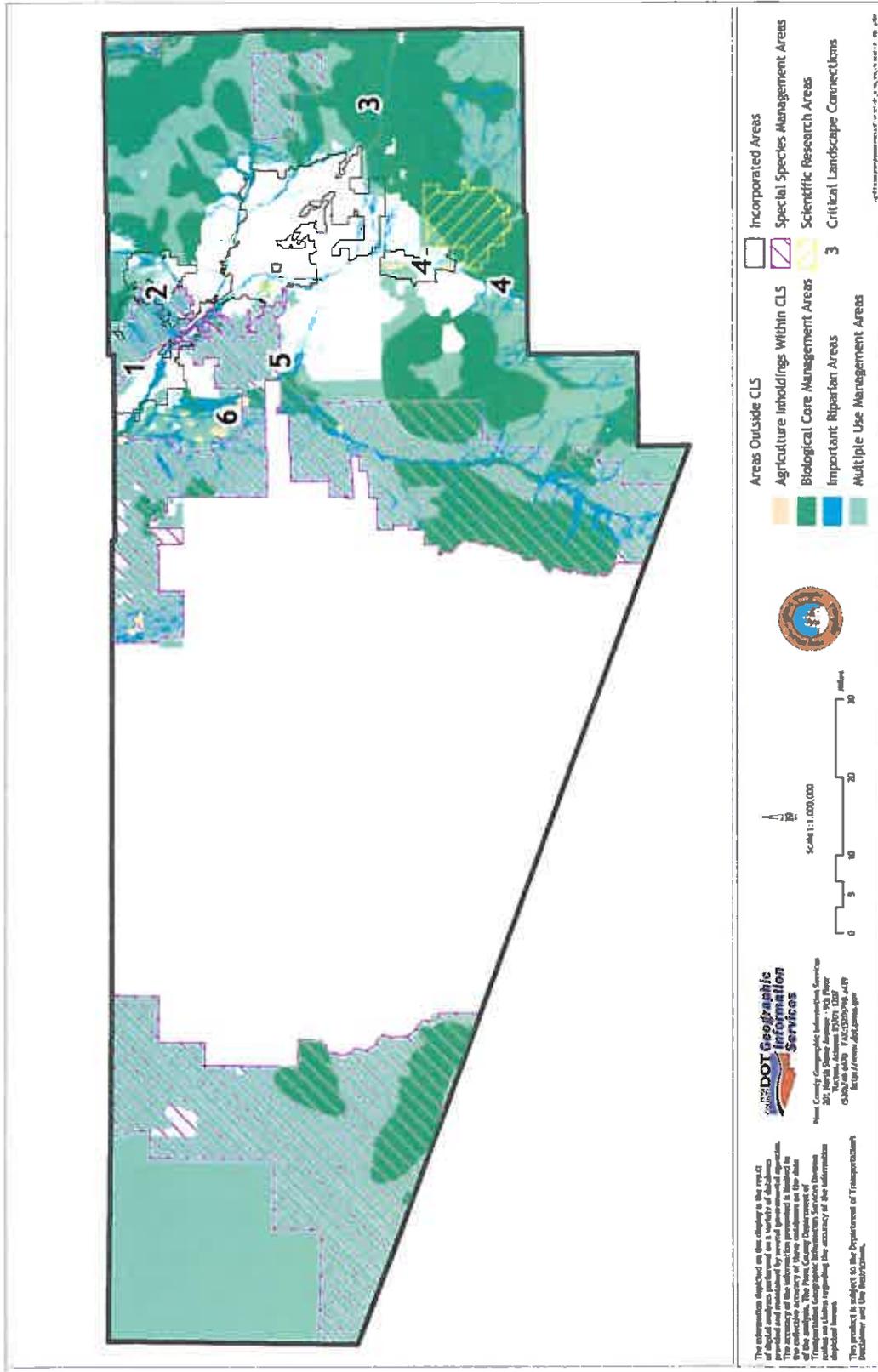


Figure 2.2. Maeveen Marie Behan Conservation Land System (CLS) in Pima County. See section 2.2.2 for descriptions of CLS categories.

The seven CLS categories are:

Biological Core Management Areas. These areas are primarily distinguished from other non-riparian lands within the CLS by their potential to support high value habitat for five or more Priority Vulnerable Species. They also connect large blocks of contiguous habitat and biological reserves.

Multiple Use Management Areas. These areas are primarily distinguished from other non-riparian lands within the CLS by their potential to support high value habitat for three or more Priority Vulnerable Species. As such they are not as biologically rich as those lands designated as Biological Core Management Areas.

Important Riparian Areas. These riparian areas are valued for their higher water availability, vegetation density, and biological productivity. They are also fundamental to preserving landscape connectivity.

Scientific Research Areas. Lands currently managed for scientific research: the Santa Rita Experimental Range and the University of Arizona Desert Laboratory (at Tumamoc Hill).

Agricultural In-holdings within the CLS. Lands utilized for agricultural purposes and lands where agricultural uses have been abandoned. Agricultural land uses, in general, are more conducive to the movement of native fauna and functional pollination processes than other lands supporting higher intensity human uses.

Special Species Management Areas. These areas are defined as crucial for the conservation of specific native plants and animal species of special concern to Pima County. Currently, three species are designated as Special Species: cactus ferruginous pygmy-owl, southwestern willow flycatcher, and Mexican spotted owl. (Mexican spotted owl is not a Covered Species, but it was considered in the planning process for the Special Species Management Area).

Critical Landscape Connections. These are broadly defined areas that provide connectivity for movement of native biological resources, but which also contain potential or existing barriers that tend to isolate major conservation areas.

2.2.3 Public Participation in the SDCP and MSCP

Pima County has made participation by government agencies, organizations, and interested citizens a top priority in the SDCP and MSCP planning processes (see Chapter 11). Participation has included public scoping meetings and comment periods, a citizens' Steering Committee (see section 11.2.6 for list of over 80 members), over 400 public meetings, a series of educational sessions and workshops, meetings of 12 advisory and technical teams, and numerous informal meetings held with a variety of interest groups and concerned citizens. Contributions of information and review from more than 150 scientists, both local and nationally recognized experts in conservation biology, were incorporated into the MSCP and SDCP.

Local jurisdictions and state and Federal agencies participated in meetings, on committees, and as members of the STAT and Government Working Group. Their concerns and input have been included in the reserve design and conservation planning processes. Entities that Pima County has formal Working Agreements and/or Cooperative Agreements are discussed throughout this document.

Five previous drafts of the MSCP have been made available to stakeholders for review and comment over a seven-year period. This administrative draft supersedes all other drafts.

3 PIMA COUNTY MULTI-SPECIES CONSERVATION PLAN IMPACTS

3.1 Permit Area

The Permit Area, for which Pima County is seeking a Section 10 permit (herein the permit), is a subset of Pima County and includes those lands under the legal authority of the Board. The Permit Area is shown on Fig. 3.1 and includes all:

- County-owned lands, including those within the cities and towns of Tucson, Marana, Oro Valley, and Sahuarita, and adjacent counties,
- Lands where Pima County constructs and maintains infrastructure on lands owned by another jurisdiction, including in adjacent counties.
- State Trust lands leased to Pima County or used as road easements.

The Permit Area also includes the maximum potential extent of:

- State Trust lands that could be released to the private sector and thus become subject to regulatory control of Pima County, or
- State Trust lands where Pima County holds a lease or acquires the land in fee.

The Permit Area also includes certain Bureau of Land Management (BLM) lands that:

- Pima County might secure for open-space purposes either through the Recreation and Public Purposes Act, or through land exchanges, or
- Are expected to be released to private sector development under the regulatory authority of the Pima County Board of Supervisors.

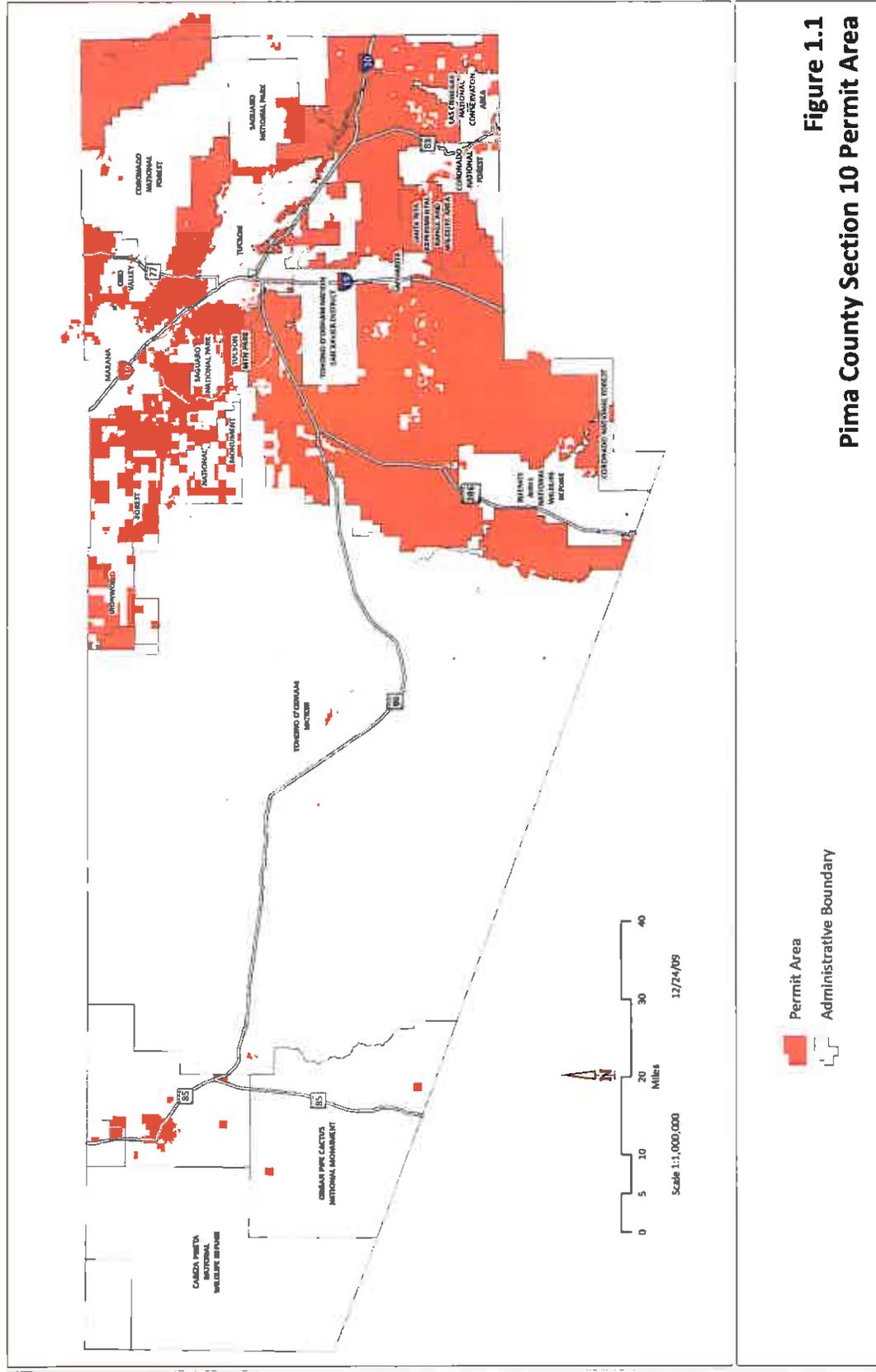


Figure 1.1
Pima County Section 10 Permit Area

Figure 3.1. Permit Area of Pima County, representing where the Covered Activities under the Section 10 permit could occur. See text for limitations on Permit Area and Covered Activities.

Excluded from the Permit Area are the following lands:

- Other Federal lands, not as above;
- Federally-reserved tribal lands;
- Lands within incorporated areas, except as used by Pima County for construction or maintenance of County's covered activities, or that are owned by Pima County;
- Lands in unincorporated Pima County that are owned by municipal jurisdictions;
- Lands annexed by incorporated areas, excluding those lands owned by Pima County;
- County-maintained roadways within Federal or tribal lands.

The Permit Area is expected to change over the course of the 30-year permit period as (1) cities and towns annex unincorporated lands, (2) the Board acquires or disposes of land, and (3) federal land is disposed or exchanged with the State Trust. Some of these changes may require an amendment to the Permit (see section 4.9 for permit amendment procedures).

3.2 Covered Species

Pima County is seeking permit coverage for 49 species: 4 plants, 8 mammals, 8 birds, 6 fish, 2 amphibians, and 7 reptiles, and 14 invertebrates (i.e., Covered Species; Table 3.1). Eight species are currently listed as threatened or endangered under the Endangered Species Act and an additional five species are candidates or have been petitioned for listing under the Endangered Species Act.

3.3 Covered Activities for the Pima County MSCP

Activities to be covered by the incidental take provisions of the Pima County MSCP are:

- Within the Permit Area as described in section 3.1; and
- Likely to result in incidental take; and

Table 3.1. Species to be covered under Pima County’s Section 10 permit. For additional natural history information on the species, see Pima County (2001c). For current location information and management and conservation actions as part of this MSCP, see Appendix A.

Taxon	Common Name	Scientific name	ESA Status ^a
Plants	Pima pineapple cactus	<i>Coryphantha scheeri</i> var. <i>robustispina</i>	E
	Needle-spined pineapple cactus	<i>Echinomastus erectocentrus</i> var. <i>erectocentrus</i>	
	Huachuca water umbel	<i>Lilaeopsis schaffneriana recurva</i>	E
Mammals	Tumamoc globeberry	<i>Tumamoca maddougali</i>	
	Mexican long-tongued bat	<i>Choeronycteris mexicana</i>	
	Allen’s big-eared bat	<i>Idionycteris phyllotis</i>	
	Western red bat	<i>Lasiurus blossevillii</i>	
	Southern yellow bat	<i>Lasiurus ega</i>	
	Lesser long-nosed bat	<i>Leptonycteris curasoae yerbabuena</i>	E
	California leaf-nosed bat	<i>Macrotus californicus</i>	
	Pale Townsend’s big-eared bat	<i>Plecotus townsendii pallescens</i>	
Birds	Merriam’s mouse	<i>Peromyscus merriami</i>	
	Burrowing owl	<i>Athene cunicularia hypugaea</i>	
	Cactus ferruginous pygmy-owl	<i>Glaucidium brasilianum cactorum</i>	C
	Rufous-winged sparrow	<i>Aimophila carpalis</i>	
	Swainson’s hawk	<i>Buteo swainsoni</i>	
	Western yellow-billed cuckoo	<i>Coccyzus americanus</i>	P/R
	Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E
	Abert’s towhee	<i>Pipilo aberti</i>	
Fishes	Bell’s vireo	<i>Vireo bellii arizonae</i>	
	Longfin dace	<i>Agosia chrysogaster</i>	
	Desert sucker	<i>Catostomus clarki</i>	
	Sonora sucker	<i>Catostomus insignis</i>	
	Desert pupfish	<i>Cyprinodon macularius</i>	E
	Gila chub	<i>Gila intermedia</i>	E
	Gila topminnow	<i>Poeciliopsis occidentalis occidentalis</i>	E
Amphibians	Chiricahua leopard frog	<i>Rana chiricahuensis</i>	T
	Lowland leopard frog	<i>Rana yavapaiensis</i>	
Reptiles	Desert box turtle	<i>Terrapene ornata luteola</i>	
	Sonoran desert tortoise	<i>Gopherus agassizii</i>	P/R
	Tucson shovel-nosed snake	<i>Chionactis occipitalis klauberi</i>	C
	Northern Mexican garter snake	<i>Thamnophis eques megalops</i>	C
	Giant spotted whiptail	<i>Aspidoscelis burti stictogramma</i>	
	Red-backed whiptail	<i>Aspidoscelis burti xanthonota</i>	
	Ground snake (valley form)	<i>Sonora semiannulata</i>	
	Arkenstone cave pseudoscorpion	<i>Albiorix anophthalmus</i>	
Invertebrates	San Xavier talus snail	<i>Sonorella eremita</i>	
	Talus snail sp.	<i>Sonorella ambigua ambigua</i> ; syn. <i>papagorum</i>	
	Talus snail sp.	<i>Sonorella imperatrix</i>	
	Talus snail sp.	<i>Sonorella imperialis</i>	
	Talus snail sp.	<i>Sonorella magdalensis</i> ; syn. <i>tumamocensis</i>	
	Talus snail sp.	<i>Sonorella meadi</i>	
	Talus snail sp.	<i>Sonorella odorata odorata</i> ; syn. <i>marmoris</i>	P/R
	Talus snail sp.	<i>Sonorella rinconensis</i>	P/R
	Talus snail sp.	<i>Sonorella rosemontensis</i>	
	Talus snail sp.	<i>Sonorella sabinoensis buehmanensis</i>	
	Talus snail sp.	<i>Sonorella sabinoensis tucsonica</i>	
	Talus snail sp.	<i>Sonorella sitiens sitiens</i>	P/R
	Talus snail sp.	<i>Sonorella tortillita</i>	

^a Endangered Species Act status: E = Endangered; T = Threatened; P/R = Petitioned or under Review by USFWS for possible listing; C = candidate.

- Reasonably certain to occur over the life of the permit; and
- Subject to the authority of Pima County.

Using these criteria, Pima County will cover the following activities within the Permit Area:

- Rezoning approved by the Board of Supervisors after the issuance of the Section 10 permit and any development-related activity subject to the authority of Pima County that occurs on those properties;
- Private development-related activities subject to the authority of Pima County where the property owner receives a Development Certificate of Inclusion (a procedure henceforth known as “opting in”; see section 3.3.1.1);
- Construction, maintenance and operation of Pima County facilities and infrastructure;
- Monitoring and management activities such as surveys, scientific studies, and other activities carried out by Pima County and its cooperators;
- Restoration and enhancement activities that are intended to improve biological and ecological values including vegetation treatments such as wildland fire;
- County ranch-management activities, exclusive of livestock herbivory and trampling, on County-owned lands and State Trust lands held under lease;

The County will cover up to approximately 36,000 acres of new ground-disturbing activities, which can come from any combination of Covered Activities. The County will reserve approximately 5,000 acres to cover its construction and maintenance activities; the remaining 31,000 acres will be available to the private sector on a first-come, first-served basis.

3.3.1 Additional Details on Select Covered Activities

The section provides additional details on key Covered Activities, but does not itemize the full complement of activities to be covered under this permit.

3.3.1.1 Development on Private Property: Opting In

Pima County would also grant, through the issuance of a Development Certificate of Inclusion, Section 10 permit coverage for entitled properties (i.e., those properties where a discretionary decision by the Board of Supervisors is not necessary to commence with development) and properties rezoned prior to the issuance of the Section 10 Permit. As with properties rezoned subsequent to the issuance of the Section 10 Permit, any development-related activity subject to the authority of Pima County that occurs on those properties where a Development Certificate of Inclusion is issued will also be covered.

Pima County is in the process of developing the details of the Opt-in Program, which will determine compliance requirements for properties to be issued a Development Certificate of Inclusion. Though the County intends to work with the stakeholder community in creating the Opt-in Program and expects to be able to operationalize this program immediately upon receiving the Section 10 Permit, Pima County will not submit the Opt-In Program's implementation protocols as part of this MSCP. However, properties that are seeking participation in the Opt-In Program must, at minimum, meet the following eligibility criteria:

- Request for participation must be initiated by the property owner; and
- The subject site must not yet be developed;

Pima County will, at the end of the initial 10-year permit phase, evaluate the Opt-In Program and make a determination as to whether the program will continue, with or without modification, or whether termination is warranted.

3.3.1.2 Pima County Projects

County activities, including on-going projects, maintenance of County rights-of-way, easements, properties, and ground-disturbing projects associated with the Capital Improvement Program (CIP) will be covered by the permit (see Appendix B). Permit coverage includes activities associated with the duties and operations of all Pima County departments (e.g., Sheriff, Transportation, Cultural and Historic Preservation, Regional Water Reclamation, and Natural Resources, Parks and Recreation) and the associated Regional Flood Control District. County projects on Federal lands, including within Coronado National Forest (e.g., Mt. Lemmon Highway repairs, Summerhaven spray field modifications), and County projects which are not yet listed are not currently proposed for coverage. Updated CIP project listings will be provided with annual compliance reports.

3.3.1.3 Enhancement and Restoration Actions

Enhancement and restoration activities (i.e., conservation actions) that are intended to improve ecological values, especially for Covered Species, are covered under the permit. Enhancement and restoration projects can include manipulation of resources such as vegetation removal, wildland fire, and stock tank creation. If Covered Species colonize an area or increase in numbers as a result of these conservation actions, no additional future regulatory restrictions will be imposed provided that population sizes of Covered Species do not decrease below the baseline numbers identified at the onset of the enhancement or restoration action. In effect this allows the incidental take and modification of habitat for the purpose of returning population levels and habitat conditions to those agreed upon (with the USFWS) as representing baseline conditions. If necessary, a Biological Certificate of Inclusion Program would be developed to include neighboring properties if those properties are determined to be impacted by the proposed conservation action and/or contribute to its success. Biological Certificates of Inclusion will only be employed where the neighboring land owner is a willing partner to the County. Pima County will submit to the USFWS the location, duration, and methods used for enhancement and restoration activities.

3.3.1.4 Mosquito Control for Public Health

Pima County will continue to monitor and actively manage for mosquito control for the purposes of public health. Future control actions will be evaluated to determine the feasibility of controlling mosquito populations using native fish species, including the Gila topminnow, desert pupfish, and Gila chub (Childs 2006). Pima County will be responsible for administering and implementing the mosquito control program in coordination and consultation with the Arizona Game and Fish Department (AGFD) and USFWS.

3.3.1.5 Ranching Activities

On County-owned and leased lands, ranch activities such as construction and maintenance of infrastructure (e.g., construction of new stock waters, cattle guards, and fencing) are covered under the Section 10 permit. Activities by livestock (i.e., trampling and herbivory) on these lands will not be a Covered Activity because: (1) it was not recommended by the Steering Committee, (2) other, more quantifiable ranch management activities are being covered, (3) monitoring impacts on habitats and Covered Species resulting from cattle grazing is difficult and done correctly would divert resources from other monitoring efforts, (4) there is minimal likelihood of needing coverage for this category, and (5) coverage could be made available later through a permit amendment. If necessary, take of Covered Species can be addressed through Section 7 consultations (for County leases on federal lands) or considered for inclusion in this Section 10 permit via the permit amendment process.

Pima County will implement a management and monitoring program to improve resource conditions as compared to those present at the time of the County's lease or acquisition (see Chapters 5, 6). These actions by County staff or its agents are Covered Activities. Persons conducting scientific research or monitoring on County-managed lands are not covered for take unless they are acting as agents of Pima County's MSCP.

In addition to the goal of improving on-the-ground conditions, Pima County sees regional-scale conservation benefits by maintaining grazing operations. Pima County

views ranch conservation as the key mechanism to preserving what remains of Pima County's last undeveloped and otherwise unprotected natural landscapes. This conservation approach was endorsed by the SDCP Steering Committee, the STAT, and the Ranch Conservation Technical Advisory Committee (Pima County 2001a). Ranch conservation and grazing in its current, low intensity form, are consistent with the conservation goals of the MSCP through:

- Landscape and watershed protection by maintaining an unfragmented ecosystem by having few developed roads and associated infrastructure;
- Providing connectivity across valleys and therefore providing conservation of communities ranging from riparian to bajadas and foothills;
- Bringing together private, state, and Federal land units into unified, large land-management units that make land management activities easier and more uniform;
- Defining the metropolitan and rural interface, thereby maintaining a more compact urban form;

3.4 Activities Not Covered by the Permit

Activities not specifically proposed for coverage either as a Covered Activity or included via Development Certificate of Inclusion will not be covered by Pima County's Section 10 Permit. These activities include:

- Development activities on private properties for which Pima County has no direct control (i.e., non-discretionary activities) excepting those properties that are part of the Opt-in Program;
- Development activities on State Trust land by private or state parties, for which Pima County has no direct control;

- Impacts of increased, decreased or otherwise altered water quality or availability, except for those impacts directly resulting from activities carried out by Pima County and having all required federal permits;
- Federal actions reviewed under Section 7 of the ESA in the Planning Area, except for those triggered by Section 404 of the Clean Water Act;
- Management, monitoring, or research within the mitigation lands by entities other than Pima County or its cooperators as it relates to the MSCP.
- Cattle grazing and herbivory by livestock on lands owned or leased by Pima County as explained in section 3.3.1.5.

3.5 Additional Benefits of the Permit

Though not covered under this permit, federal land managers and applicants for federal actions will benefit from the planning and conservation measures explained in this MSCP, specifically:

- A reduced likelihood of the need to list additional species within the Planning Area and thereby the resultant need for additional Section 7 consultations;
- The well-defined regional goals that will provide a framework for meeting Section 7 requirements consistent with the provisions of the Pima County MSCP; and
- Opportunity to make use of the conservation benefits brought about by the Pima County MSCP, including collaboration in monitoring and management efforts.

3.6 Projected Spatial Footprint of Covered Activities

The principal direct effect of the impacts of Covered Activities is the clearing, development, and on-going ground-disturbing maintenance of lands that will affect populations and habitats of Covered Species. To help predict the area and location of direct impacts due to Covered Activities and to estimate the County's potential

mitigation obligation, Pima County developed a land absorption model (Appendix C) for three permit phases: Permit Phase 1 (Years 1-10), Permit Phase 2 (Years 11-20), and Permit Phase 3 (Years 21-30). Growth projections for private-sector development within the Permit Area in eastern and western Pima County were combined with the estimated footprint of covered County projects to develop this

The land absorption model estimates that Covered Activities are projected to impact 8,507 acres in Permit Phase 1, 17,996 acres in Permit Phase 2, and 9,197 acres in Permit Phase 3 for a total of 35,700 acres (Table 3.2; Fig. 3.2). These development activities are anticipated to occur on approximately 20,000 acres within the CLS and 16,000 acres outside of the CLS.

Mitigation to offset the direct effects of projected ground-disturbing activities is discussed in Chapter 4. Pima County will revisit the growth projections and adjust the mitigation projection required at the end of Permit Phase I and II, to ensure that adequate mitigation has been acquired for continuation of the Section 10 permit.

3.7 Direct Effects of the Pima County MSCP on Covered Species: Habitat Loss

Through our modeling effort, Pima County estimated habitat loss for Covered Species relative to the impacts on the Priority Conservation Areas (PCAs) or modeled habitat (high and medium quality; Table 3.3). PCAs were identified by species experts and are

Table 3.2. Projected acres of impacts from Covered Activities in the Pima County MSCP Permit Area, both inside and outside the CLS.

Relationship to CLS	CLS Category	Impacts in Permit Phase ^a			Total Impacts
		Phase I	Phase II	Phase III	
Inside CLS	Biological Core Management Area	1,315	3,766	1,708	6,789
	Important Riparian Area	677	1,645	444	2,766
	Multiple Use Management Area	2,968	5,167	1,241	9,376
	Special Species Management Area	270	432	151	853
	Agricultural In-holdings	74	1	0	75
	CLS Total	5,304	11,011	3,544	19,859
Outside CLS		3,203	6,985	5,653	15,841
Total CLS + Outside CLS		8,507	17,996	9,197	35,700

^aPermit phases: I = Permit years 1-10; II = Permit years 11-20; III = Permit years 21-30.

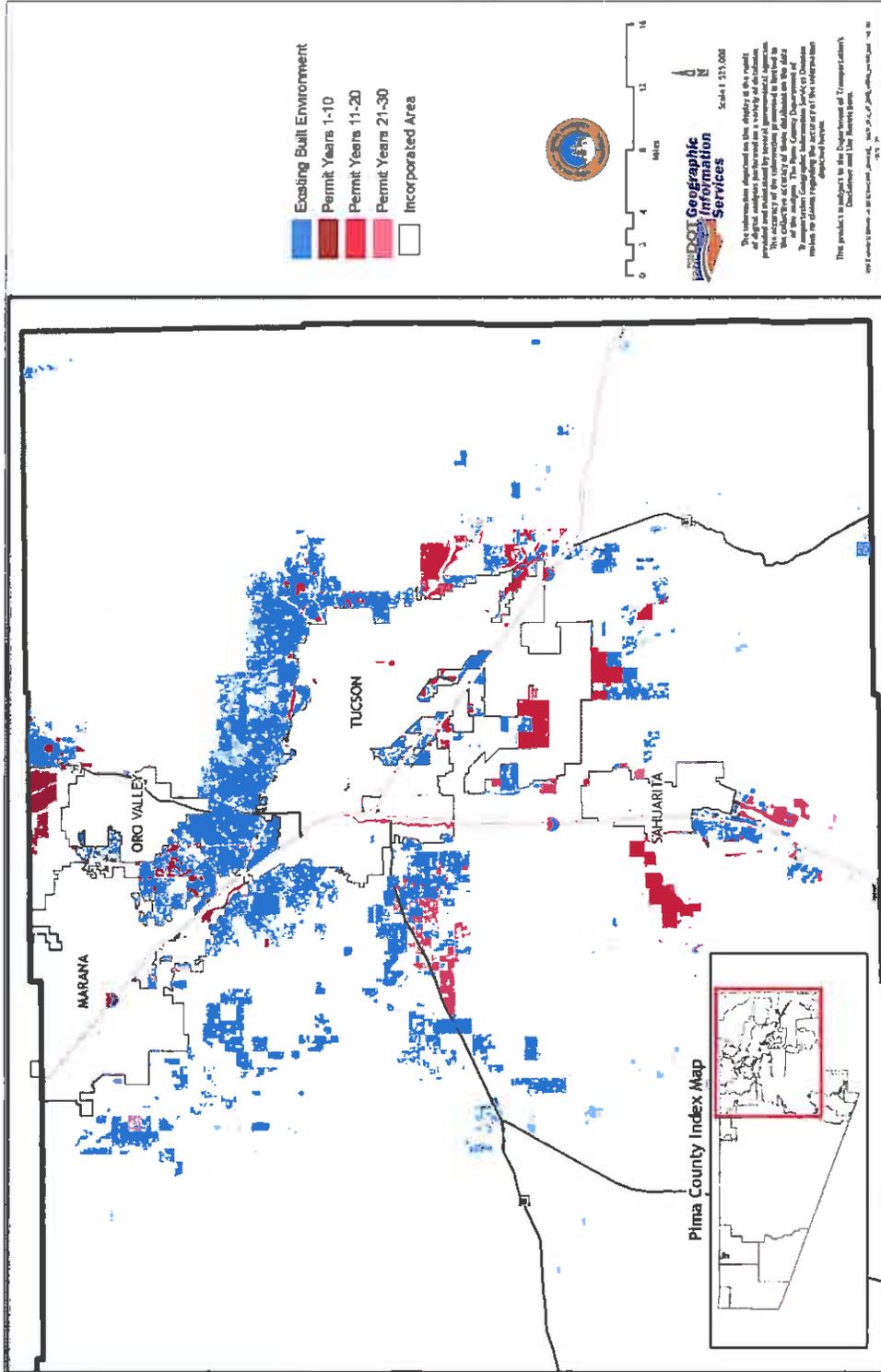


Figure 3.2. Existing built environment (blue; as of June 2008) and impacts that are anticipated to occur as a result of Covered Activities in the Permit Area (red). Projection is for analytical purposes and it is not intended to be used for parcel-specific determination of permit coverage. Location and rate of development are likely to change during the 30-year permit.

those areas that contain significant populations of the species, contribute to the species' persistence through connectivity, and/or can be restored to promote occupancy. PCAs for most species represent a spatial footprint that is larger than the current distribution of the species in Pima County. Therefore, using PCAs to calculate impacts on Covered Species' habitat (Table 3.3) overestimates habitat loss.

Neither the Tumamoc globeberry nor the Sonoran desert tortoise had PCAs designated because the experts felt that these species were too difficult to map. Instead, Pima County developed habitat models for these species and the model was used as the measure of habitat loss. No habitat loss analysis was performed for the desert pupfish because it does not occur in the Permit Area and no habitat loss analysis was performed for the talus snail species or the Arkenstone pseudoscorpion because Pima County does not project that any Covered Activities will impact PCAs for these species; therefore, habitat loss is not anticipated (see Appendix A; though lethal take of individuals is possible).

For those species for which habitat loss was estimated, Projected loss ranged from zero acres for four species (southwestern willow flycatcher, desert and Sonora sucker, and red-backed whiptail) to over 15,000 acres for four species (Pima pineapple cactus, Tumamoc globeberry, lesser long-nosed bat, and rufous-winged sparrow; Table 3.3; see also Appendix A for maps of habitat loss projected for each species).

3.8 Direct Effects of the Pima County MSCP on Covered Species: Lethal Take

During the 30-year permit period, it is anticipated that there will be lethal take of all Covered Species (Table 3.4). The number of individuals that may be subject to lethal take ranges from one individual (Tucson shovel-nosed snake) to 200 (talus snails). The ESA does not typically provide lethal take protection for plants.

Table 3.3. Acres of habitat loss projected to occur as a result of Covered Activities within the Permit Area. Desert pupfish, all talus snails, and the Pseudoscorpion were not part of this analysis because there were no anticipated habitat loss of those species. Habitat loss was calculated using Priority Conservation Areas for all species except the Tumamoc globeberry and Sonoran desert tortoise, for which loss was calculated using modeled habitat.

Species	Permit Phase			Total Projected Habitat loss
	Phase I	Phase II	Phase III	
Pima pineapple cactus	1,026	9,995	4,023	15,044
Needle-spined pineapple cactus	0	0	439	439
Huachuca water umbel	34	470	124	628
Tumamoc globeberry	0	9,791	5,915	15,706
Mexican long-tongued bat	1,449	1,574	1,678	4,701
Allen's big-eared bat	0	1	0	1
Western red bat	5	114	51	170
Southern yellow bat	541	127	86	755
Lesser long-nosed bat	2,513	0	2,982	5,495
California leaf-nosed bat	229	27	1,615	1,872
Pale Townsend's big-eared bat	205	881	1,015	2,100
Merriam's mouse	0	540	0	540
Burrowing owl	220	1,128	1,042	2,390
Cactus ferruginous pygmy-owl	3,167	3,534	2,111	8,812
Rufous-winged sparrow	4,989	5,979	2,479	13,446
Swainson's hawk	608	3,822	775	5,205
Western yellow-billed cuckoo	619	76	0	695
Southwestern willow flycatcher	0	0	0	0
Abert's towhee	521	538	109	1,168
Bell's vireo	408	156	117	681
Longfin dace	0	3	79	82
Desert sucker	0	0	0	0
Sonora sucker	80	0	0	80
Gila chub	66	0	0	66
Gila topminnow	1	54	0	55
Chiricahua leopard frog	0	0	0	0
Lowland leopard frog	0	6,479	1,903	8,382
Desert box turtle	582	797	497	1,875
Sonoran desert tortoise	0	0	2,838	2,838
Tucson shovel-nosed snake	2	42	37	81
Northern Mexican garter snake	1,825	1,787	1,339	4,951
Giant spotted whiptail	2,273	2,593	1,188	6,054
Red-backed whiptail	0	0	0	0
Ground snake (valley form)	2	9	61	72

Table 3.4. Estimated number of individuals and potential causes of lethal take as a result of activities covered under Pima County’s Section 10 permit. Lethal take that results from non-permitted activities (e.g., ATV use) are not included in this assessment. Lethal take was estimated based on abundance and potential for take from Covered Activities.

Taxon	Species	Likely cause(s) of lethal take	Number of individuals	
Mammals	Mexican long-tongued bat	Potential exists as a consequence to securing mine features, adits, caves, and other features by NRPR. Stabilized habitat in Cienega Creek Natural Preserve may collapse.	25	
	Allen’s big-eared bat	Potential exists if efforts to secure mine adits by NRPR do not follow clearance procedures for bats	2	
	Western red bat	Potential exists if efforts to secure mine adits by NRPR do not follow clearance procedures for bats	20	
	Southern yellow bat	Chance for disturbance of roosts/nests in palm trees.	25	
	Lesser long-nosed bat	Potential exists if efforts to secure mine adits by NRPR do not follow clearance procedures for bats	50	
	California leaf-nosed bat	Potential exists if efforts to secure mine adits by NRPR do not follow clearance procedures for bats	10	
	Pale Townsend’s big-eared bat	Potential exists if efforts to secure mine adits by NRPR do not follow clearance procedures for bats	10	
Birds	Merriam’s mouse	Ground disturbances during construction and vehicular traffic.	20	
	Burrowing owl	Potential for lethal take is primarily in relation to construction and maintenance activities along major watercourses, and at the Ajo Detention Basin. Also development activity in the Altar Valley	15	
	Cactus ferruginous pygmy-owl	Given the low number of individuals in the Permit Area, lethal take is highly unlikely, but an active nest site may be disturbed.	2	
	Rufous-winged sparrow	Take possible during vegetation clearance. Most likely cause is disturbance of nests where mortality will be on eggs and/or nestlings.	20	
	Swainson’s hawk	Take possible during vegetation clearance and use of fire to restore grasslands. Mortality will be on eggs and/or nestlings.	5	
	Western yellow-billed cuckoo	Mortality will be on eggs and/or nestlings. Disturbance is expected to be minimal due to location of nesting habitat.	5	
	Southwestern willow flycatcher	Mortality will be on eggs and/or nestlings. Disturbance is expected to be minimal due to location of nesting habitat	2	
Fishes	Abert’s towhee	Take possible during vegetation clearance. Most likely cause is disturbance of nests where mortality will be on eggs and/or nestlings.	20	
	Bell’s vireo	Take possible during vegetation clearance. Most likely cause is disturbance of nests where mortality will be on eggs and/or nestlings.	40	
	Longfin dace	No permitted impacts will likely take place in current refugia, but maintenance accidents may occur.	100	
	Desert sucker	Does not currently occur in Permit Area, but reintroduction efforts may cause lethal take	10	
	Fishes cont.	Sonora sucker	Does not currently occur in Permit Area, but reintroduction efforts may cause lethal take	10
		Desert pupfish	Does not currently occur in Permit Area, but reintroduction efforts may cause lethal take	25
		Gila chub	No permitted impacts will likely take place in the Permit Area, but maintenance accidents	100
Amphibians	Gila topminnow	No permitted impacts will likely take place in the Permit Area, but maintenance accidents may occur.	100	
	Chiricahua leopard frog	Does not currently occur in Permit Area, but reintroduction efforts may cause lethal take.	25	
Reptiles	Lowland leopard frog	No permitted impacts will likely take place in the Permit Area, but maintenance accidents may occur.	50	
	Desert box turtle	Take possible during vegetation clearance and use of fire to restore grasslands.	10	
	Sonoran desert tortoise	Ground disturbances during construction, and from vehicular traffic.	20	
	Tucson shovel-nosed snake	Ground disturbance during construction and vehicular traffic, but because of low population and secretive nature, it is anticipated that take will be		

Taxon	Species	Likely cause(s) of lethal take	Number of individuals
		minimal	
	Northern Mexican garter snake	Few impacts are expected to occur in known locations, but some construction activities and maintenance accidents may cause mortality.	5
	Giant spotted whiptail	Ground disturbances during construction, and from vehicular traffic. Take is expected to be minimal because of location of their habitat.	5
	Red-backed whiptail	Take is possible if species expands into the Permit Area.	2
	Ground snake	Ground disturbance during construction and vehicular traffic, but because of low population and secretive nature, it is anticipated that take will be minimal.	5
Invertebrates	Talus snails, all species	Accidental disturbance is possible. Take estimates are for each species.	200
	Arkenstone cave pseudoscorpion	Maintenance activities in habitat may cause some take	10

3.9 Indirect Effects of Covered Activities

Indirect effects are those that impact the populations and/or habitats of Covered Species, but are different from direct effects in that they are separated by time. In general, habitat fragmentation and edge effects are the most significant indirect effects associated with Covered Activities. Other effects to Covered Species and natural resources include: increased illumination from streetlights leads to changes in movement patterns and increased predation; greater potential for wildlife to be killed by vehicles; modification of ambient noise levels; changes in water-use patterns; exacerbation of air pollution; increased level of human activities; and introduction of free-roaming/feral pets and invasive species into areas where they presently do not occur. A foreseeable indirect impact with a positive consequence is the improvement of effluent quality and diminution of effluent discharge at the Roger Road Wastewater Treatment Facility as a result of the Regional Optimization Master Plan.

3.10 Effects of the Pima County MSCP on Critical Habitat

3.10.1 Southwestern willow flycatcher

A portion of the southwestern willow flycatcher's Critical Habitat occurs in northeastern Pima County along the San Pedro River. However, there are no anticipated impacts to the species' Critical Habitat as a result of Covered Activities.

3.10.2 Desert pupfish

Critical Habitat for desert pupfish includes Quitobaquito Springs in Organ Pipe Cactus National Monument and is outside of the Permit Area. Conservation of this species' Critical Habitat is achieved by the National Park Service.

3.10.3 Gila chub

Critical Habitat for the Gila chub was designated in several sections of watercourses in Pima County: Sabino Canyon (Coronado National Forest), Cienega Creek (Pima County owned lands, Las Cienegas National Conservation Area, and Arizona State Land), and Mattie Canyon and Empire Gulch (Bureau of Land Management). Conservation in these areas is achieved by Federal agencies and, in the case of the County-owned portion of Cienega Creek Natural Preserve, by the County's implementation of the Cienega Creek Management Plan (McGann and Associate Inc. 1994). Approximately 1 acre of Critical Habitat is expected to be impacted by the Covered Activities (see Appendix A).

3.10.4 Mexican spotted owl

Critical Habitat for Mexican spotted owl (*Strix occidentalis lucida*) in Pima County is primarily within the Coronado National Forest and Saguaro National Park. The Critical Habitat designation covers a small portion of private lands in Pima County, including Summerhaven and a portion of the Tanque Verde Valley. Neither Pima County nor private activities are covered for this species, but Pima County has acquired and commits to manage for the conservation of this species on lands located within Critical Habitat as part of this MSCP. Avoidance, minimization and mitigation measures applied for the benefit of other species will contribute to conservation of the Mexican spotted owl.

3.10.5 Huachuca water umbel

Critical Habitat for Huachuca water umbel covers areas in Santa Cruz and Cochise counties. No Critical Habitat occurs in Pima County; implementation of the MSCP will not affect Critical Habitat for this species.

4 AVOIDANCE, MINIMIZATION, MITIGATION AND IMPLEMENTATION OF THE CONSERVATION PROGRAM

This chapter details the tools that will be employed to ensure that the projected impacts, as described in Chapter 3, are effectively avoided, minimized, and mitigated.

4.1 Avoidance and Minimization

Pima County's conservation strategy includes avoidance and minimization at spatial scales ranging from the regional landscape to individual projects. The CLS map is the primary tool that addresses impact avoidance from the landscape level by identifying those areas that are most suitable for development as well as those areas where development is least desirable. Most Covered Activities (public and private), regardless of whether they are in or out of the CLS, trigger protocols or requirements that implement impact-minimization mechanisms at the scale of individual projects. The following sections describe how avoidance and minimization practices are incorporated into Covered Activities.

4.1.1 Avoidance and Minimization: Private Developments

Avoidance and minimization measures applied to private-sector Covered Activities occurs as a two-part process. The first stage comes as part of the standard rezoning process; the second comes as the subsequent development achieves mandatory compliance with Pima County Code requirements. Relevant to this MSCP are those Code requirements that relate to environmental resources such as the Native Plant Preservation Ordinance (Pima County Code Title 18.72), Riparian Protection and Mitigation Requirements (Pima County Code Title 16.30), and the Outdoor Lighting Code (Pima County Building Code).

Significant rezonings are characterized as:

- >1 acre to be developed for non-residential uses;

- >1 acre to be developed at a residential density of ≥ 4 residences per acre;
- >1 acre to be developed as a mixed use residential/non-residential project; and
- >5 acres.

All properties rezoned in Pima County disclose the presence of important on-site resource features such as ironwood trees, saguaros, rock outcrops, and riparian areas. If the proposed rezoning is significant, a Site Analysis is required, which, in addition to disclosing features such as ironwood trees, etc., also requires disclosure of anticipated impacts to water resources including groundwater-dependent ecosystems, water conservation practices to be applied upon development, and maps showing how on-site Open Space Set Asides maximize protection-in-place of inventoried environmental elements (Table 4.1).

Upon approval by the Board of Supervisors, rezoned properties often result in some on-site, Open Space Set Asides. The amount of set-aside varies depending on several factors including: (1) the property owner's anticipated approach to compliance with the Native Plant Preservation Ordinance, (2) the amount of riparian area regulated by the Regional Flood Control District, and (3) whether or not the property is within the CLS.

Table 4.1. Species and natural elements that are subject to Site Analysis inventory requirements. Covered Species thought to benefit from the protection of these features are also noted.

Site Analysis Inventory Element	Covered Species to potentially benefit
Saguaro cactus	Cactus-ferruginous pygmy owl, Mexican long-tongued and lesser long-nosed bats
Ironwood trees	Cactus-ferruginous pygmy owl, Tumamoc globeberry, rufous-winged sparrow
Pima pineapple cactus	Pima pineapple cactus
Needle-spined pineapple cactus	Needle-spined pineapple cactus
Rock outcrops & talus slopes, and other features	Talus snails and most bats
Riparian areas	Merriam's mouse, western red bat, southern yellow bat, Bell's vireo, Abert's towhee, southwestern willow flycatcher, western yellow-billed cuckoo, giant spotted whiptail, and northern Mexican garter snake
Lakes, ponds, wetlands, springs or other sources of perennial surface water	Northern Mexican garter snake, all fishes, leopard frogs, and Huachuca water umbel

For rezoned properties within the CLS, the Board of Supervisors routinely applies a requirement for substantial amounts of Open Space Set Asides as they implement the Sonoran Desert Conservation Plan via the Regional Environmental Element of the Comprehensive Plan. Such natural set-asides regularly result in set-asides of 66⅔ percent or greater of the property.

In all cases, once the owner of the rezoned property is ready to develop and construct the site, avoidance and minimization measures are implemented to comply with Pima County's Code requirements. Beyond any Open Space Set Asides attained through the rezoning, compliance with Code requirements becomes more refined in that the focus becomes topic specific: avoiding, minimizing, and mitigating impacts to individual plants (Native Plant Preservation Ordinance – Pima County Code Title 18.72) and the Watercourse and Riparian Habitat Protection and Mitigation Requirements – Pima County Code Title 16.30); restricting indirect effects of outdoor lighting (Pima County Building Code - Outdoor Lighting); and controlling weed species including buffelgrass (Pima County Code - Title 7.33).

The two-part process of rezoning private development and Code compliance allows Pima County to avoid and minimize impacts to environmentally-sensitive resources. Setting aside areas of natural open space, mitigating for impacts to specific resources, and addressing indirect effects unequivocally contribute to and benefit the landscape permeability and connectivity goals of the CLS.

4.1.2 Avoidance and Minimization: Public Sector

There are a variety of protocols that County departments employ that contribute to avoiding and minimizing impacts to sensitive resources, including:

- The Community Participation and Mitigation Ordinance that requires alternative analysis and community input on County roadway designs;
- Environmentally Sensitive Roadway Design Manual requiring avoidance and minimization activities for County roadways;

- "Exit Gate" project management procedure for the Capital Improvement Program requiring avoidance and minimization during initial planning and consultation with County compliance staff regarding riparian habitat, floodplain, and cultural resource impacts;
- Checklist for Natural Resources, Parks, and Recreation projects requiring biological assessment;
- Reduction of impacts from public access, trails, and recreation (e.g., All-terrain vehicles) and associated infrastructure (see section 5.1.3)
- Consideration of impacts resulting from disposition of County lands to other parties;
- Sustainability Plan requiring siting of new County facilities and infrastructure to avoid or minimize impacts to the CLS and cultural resources;
- Policy requiring new sewers to be placed under roadways, not in washes;

Pima County will seek to avoid disturbance to known nesting and roost sites of Covered Species by providing known information to the appropriate County department prior to the initiation of construction and maintenance activities. A few Covered bat species may be particularly sensitive to disturbance at roost sites under bridges. Pima County Department of Transportation staff will be informed of known roost locations and be provided with information on appropriate timing of maintenance activities to avoid disturbance during the breeding season, in particular.

4.1.3 Avoidance and Minimization: Indirect Effects

Section 3.9 of this report highlights a number of indirect effects that are likely to result from the Covered Activities. Many of these indirect effects are minimized by a "toolset" of conservation measures that Pima County currently employs comprehensively to areas under its jurisdiction. This toolset includes:

- Code requirements mandating control of non-native weeds (especially buffelgrass) on private property;
- Outdoor Lighting Code requirements that limit trespass lighting from one property to another and reduces the allowable amount of lighting depending on an area's need to maintain dark sky conditions;
- County leash laws for pets;
- Air-quality permits; and
- Land-use plans and policies.

On private property, the County will rely upon the cumulative effect of these mechanisms. On County-owned or lease lands, minimizing indirect effects will be accomplished through management actions and strategic implementation of property-specific management plans. Management actions on County-controlled Mitigation Lands will be periodically updated to minimize potential adverse impacts of indirect effects and will be informed by the monitoring and adaptive management program (see Chapter 6).

4.1.4 Other Avoidance and Minimization Efforts: RTA Wildlife Crossings

The Regional Transportation Authority oversees many of the large transportation infrastructure improvements that will occur in eastern Pima County in the next 20 years. As part of this program, which was approved by the voters and paid for by a County-wide sales tax, \$45M has been reserved for the purpose of building new roadway structures or retrofitting existing roadways with structures that allow the movement of animals across roadways. Though only a fraction of the \$45M has been spent, expenditures will increase in the coming years as more projects are approved and built. This program will minimize impacts of various transportation projects both within and outside the Permit Area.

4.2 Mitigation Tools

Mitigation will be the primary mechanism to address impacts from the Covered Activities. In anticipation of the Section 10 permit, Pima County has been acquiring lands that will be used to mitigate the impacts of Covered Activities (County-controlled Mitigation Lands; see glossary for complete definition). To set target mitigation requirements, Pima County proposes two complementary accounting tools. In accordance with the overarching goals of the SDCP, Pima County proposes to use a landscape-level mitigation program, as informed by the CLS, to provide mitigation for impacts to the Covered Species and their habitats, but also attains other conservation targets relating to Special Elements, uncovered species, and ecosystem processes. As an additional level of assessment, Pima County will seek to achieve a minimum level of conservation for each of the Covered Species that achieves at least one acre of conservation for each acre lost to the Covered Activities. This “fine” and “coarse” filter approach to mitigation follows similar planning processes in the development of the SDCP.

4.2.1 Land Acquisition in the Conservation Lands System and Outside of Pima County

Pima County will acquire, protect, manage, and monitor up to approximately 112,000 acres as mitigation to offset development-related impacts associated with Covered Activities for the life of the permit (Table 4.2). A vast majority of these acres will be within the CLS, but mitigation credit will also be claimed for lands outside of the County, and in some instances for lands outside the CLS (but inside Pima County) in those instances where Pima County purchases parcels for species-level mitigation. An example of species-level mitigation is for the purchase of lands that contain the Pima pineapple cactus. Mitigation needs are calculated based on the projected area and location of Covered Activities and the established mitigation ratios that vary depending on where the activities take place in relation to the CLS. Proposed mitigation ratios (acres conserved:acres impacted; see additional details in Appendix D) for Covered Activities are:

- Biological Core Management Areas = 5:1;
- Important Riparian Areas = 5:1;
- Special Species Management Areas = 5:1;
- Multiple Use Management Areas = 3:1;
- Agriculture = 2:1;
- Outside the CLS (excluding agricultural lands) = 2:1.

Assuming that development proceeds at the projected pace and location, the implementation of the Pima County MSCP will be phased to provide for appropriate interim milestones: protection of approximately 27,000 acres of land during Permit Phase I; 59,000 acres during Permit Phase II, and 27,000 acres during Permit Phase III (Table 4.2).

Under a previous agreement with the USFWS, Pima County has begun amassing land to mitigate impacts from Covered Activities (Table 4.3; Fig. 4.2). These County-controlled Mitigation Lands secure mitigation prior to the actual impacts, which begins accruing when the permit is approved by the USFWS. This arrangement creates a financial incentive for the County to acquire land at a lower value and—most

Table 4.2. Acres of mitigation necessary for the Pima County Section 10 permit based on projected impacts (Table 3.2) and corresponding MSCP mitigation ratios.

Relationship to CLS	CLS Category	MSCP Mitigation Ratio	Mitigation in Permit Phase			Total Mitigation
			Phase I	Phase II	Phase III	
Inside CLS	Biological Core Management Area	5:1	6,575	18,830	8,540	33,945
	Important Riparian Area	5:1	3,385	8,225	2,220	13,830
	Multiple Use Management Area	3:1	8,904	15,501	3,723	28,128
	Special Species Management Area	5:1	1,350	2,160	755	4,265
	Agricultural In-holdings	2:1	148	2	0	150
	CLS Total		20,362	44,718	15,238	80,318
Outside CLS		2:1	6,406	13,970	11,306	31,682
Total CLS + Outside CLS			26,768	58,688	26,544	112,000

importantly—the purchase of large pieces of undeveloped land that may not be an available for purchase in the future.

Assuming that Pima County will obtain at least 25% mitigation credit for State Trust Land (see section 4.3), Pima County has already acquired over 103,000 acres to mitigate future impacts (Fig. 4.1, Table 4.3, Appendix E). This is 82% of the mitigation that is likely to be needed over the 30-year permit based on projected impacts (see Table 3.2).

Pima County will have a goal of ensuring that mitigation is appropriately located within each CLS category. The amount of mitigation required will be based on the location of impacts relative to each CLS category, multiplied by the mitigation ratios highlighted above. Based on the current projected footprint of development, Pima County is close to achieving this goal for all but one CLS category (Important Riparian Area; Table 4.4).

Table 4.3. Acres of mitigation credit that Pima County has already acquired for the Section 10 permit, as it relates to the CLS and State Trust lands. Mitigation acres are “adjusted” because Pima County is requesting at least 25% mitigation credit for State Trust Lands (see section 4.3). See Table 4.4 for mitigation credit for each Covered Species. Figures exclude land conserved via Natural Open-space Set Asides.

Relationship to the CLS	CLS Category	Unadjusted			Adjusted	
		Fee	State	Total Acres	25% Credit for State Lands	Total mitigation to date ^a
Inside CLS	Biological Core	27,997	50,906	78,903	12,726	40,724
	Important Riparian Area	10,930	3,270	14,200	818	11,748
	Multiple Use	24,264	38,852	63,116	9,713	33,977
	Special Species Management Area	4,535	27,679	32,214	6,920	11,455
	Agriculture	17	0	17	0	17
	CLS Total	67,744	120,707	188,451	30,177	97,921
Outside CLS		1,556	62	1,618	15	1,571
Outside of Pima County ^b		1,705	9,639	11,344	2,410	4,115
Total (Inside CLS + Outside CLS + Outside of PCA)		71,005	130,408	201,413	32,602	103,607

^a Unadjusted fee acres plus adjusted State Trust Lands.

^b Lands outside of Pima County are associated with the A7 Ranch (168 acres of fee title lands and 9,630 acres of lease lands), Tortolita Mountain Park (796 acres of fee title lands) and 722 acres of fee title lands that are expected to be acquired from the BLM through the Recreation and Public Purposes Act.

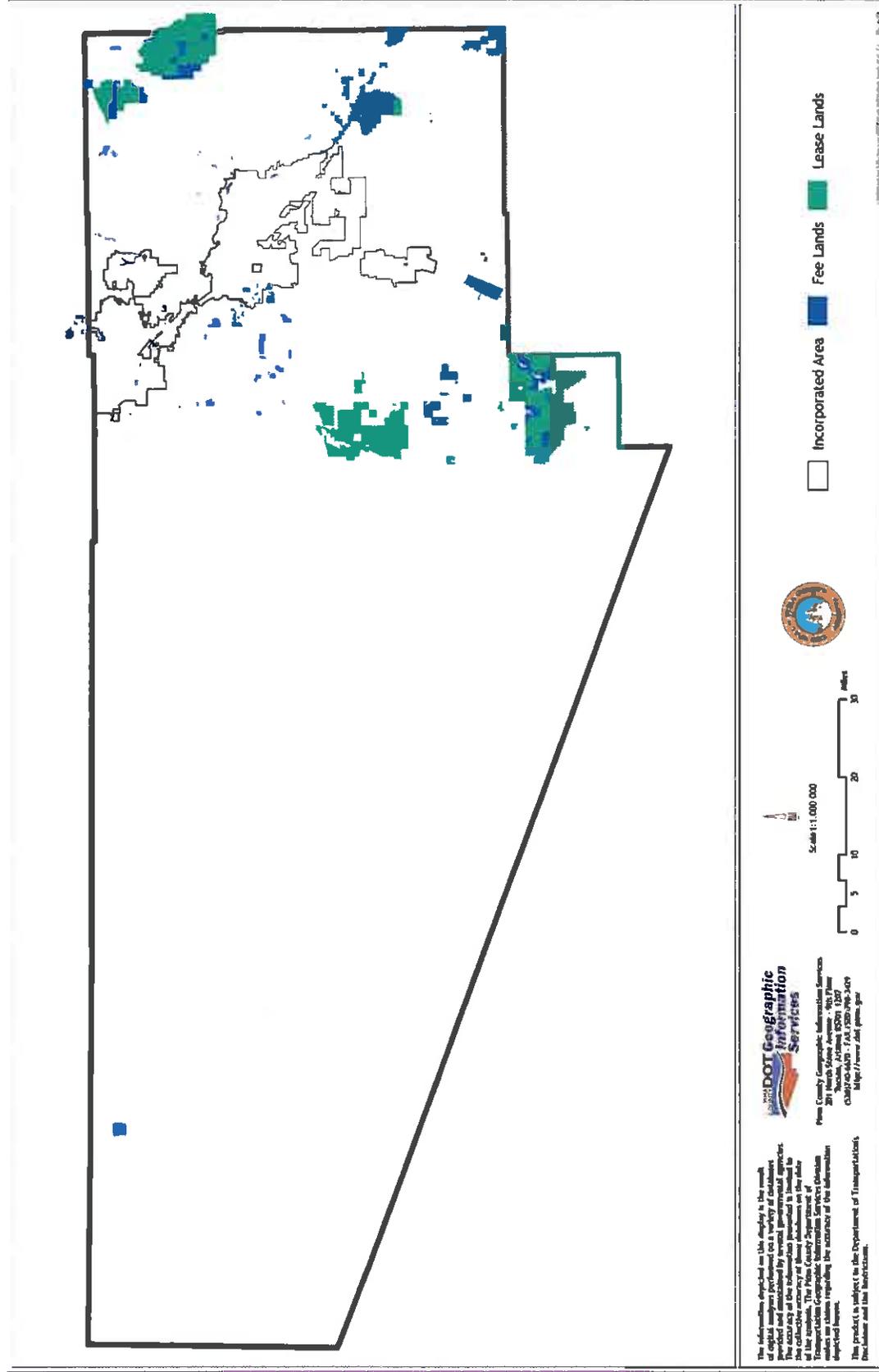


Figure 4.1. Fee and lease land acquired as of October 2010 by Pima County for mitigation of activities covered under the Section 10 permit. Additional Mitigation Lands are likely to be acquired in the future.

Table 4.4. Additional acres of mitigation credit needed to achieve full mitigation of projected development within each CLS category. This analysis assumes at least 25% mitigation credit for State Trust land (from Table 4.3). Figures exclude land conserved via Natural Open-space Set Asides.

CLS Category	Mitigation goal	Total mitigation to date	Difference
Biological Core	33,945	40,724	6,779
Important Riparian Area	13,830	11,748	-2,082
Multiple Use	28,128	33,977	5,849
Special Species Management Area	4,265	11,455	7,190
Agriculture	150	17	-133
CLS Total	80,318	97,921	17,603

4.2.2 Mitigation Equivalency Analysis for Individual Species

Pima County will seek to offset acres impacted by Covered Activities with similar habitat acres elsewhere in the CLS and within respective PCAs or modeled habitat. Pima County will have the goal of ensuring that mitigation is appropriately located with respect to habitat so that we achieve a minimum conservation ratio (acres of habitat loss: acres of mitigation) of 1:1. Based on the current set of County-controlled Mitigation Lands, Pima County has achieved this ratio for all but one species (Sonora sucker, which is currently absent from the Permit Area), assuming that Pima County gets a minimum of 25% mitigation credit for State Trust Lands (Table 4.5). To ensure that mitigation stays ahead of impacts for all Covered Species, Pima County will undertake a species-by-species analysis of impacts in each 10-year program review.

4.2.3 Acquisition of Water Rights

Pima County has and will continue to acquire, manage, monitor, and protect water rights and water resources to mitigate for the impact of Covered Activities. Water may be derived from:

- The Conservation Effluent Pool;
- County-owned effluent;
- Groundwater rights controlled by Pima County, as allowed by state statute;
- Surface water rights and resources managed by Pima County.

Table 4.5. Habitat mitigation to date for the Covered Species based on the current suite of Mitigation Lands. This assessment assumes that Pima County will receive 25% mitigation credit for State Trust Lands. A mitigation to habitat loss ratio of <1 indicates that more acres of habitat are expected to be lost over the 30-year permit period than the current mitigation suite of Mitigation Lands provide. Mitigation acres listed here do not include (1) future acquisitions or Natural Open-space Set-asides by the private sector and (2) lands outside of Pima County that are owned or leased by the County; these will add additional mitigation acres for most species, but PCA and modeled habitat did not extend outside of Pima County.

Species ^a	Anticipated loss after 30 years ^b	Pima County Mitigation ^b			Difference (Current mitigation minus projected take)	
		Fee title	25% State Trust land acres	Total achieved to date	Mitigation minus Habitat loss	Ratio
Pima pineapple cactus	15,044	9,063	9,641	18,704	3,660	1.2
Needle-spined pineapple cactus	439	5,866	2,788	8,654	8,215	19.7
Huachuca water umbel	628	3,885	171	4,056	3,428	6.5
Tumamoc globeberry	15,706	13,449	7,817	21,266	5,560	1.4
Mexican long-tongued bat	4,701	32,498	11,975	44,473	39,772	9.5
Allen's big-eared bat	1	2,263	0	2,263	2,262	>100
Western red bat	170	17,818	3,032	20,850	20,680	>100
Southern yellow bat	755	7,553	823	8,376	7,621	11.1
Lesser long-nosed bat	5,495	52,468	26,830	79,298	73,803	14.4
California leaf-nosed bat	1,872	10,049	2,583	12,632	10,760	6.7
Pale Townsend's big-eared bat	2,100	18,994	7,179	26,173	24,073	12.5
Merriam's mouse	540	8,163	197	8,360	7,820	15.5
Burrowing owl	2,390	2,663	0	2,663	273	1.1
Cactus ferruginous pygmy-owl	8,812	27,882	13,912	41,794	32,982	4.7
Rufous-winged sparrow	13,446	26,005	11,232	37,237	23,791	2.8
Swainson's hawk	5,205	40,430	13,303	53,733	48,528	10.3
Western yellow-billed cuckoo	695	7,930	1,032	8,962	8,267	12.9
Southwestern willow flycatcher	0	314	0	314	314	>100
Abert's towhee	1,168	9,838	378	10,216	9,048	8.7
Bell's vireo	681	7,396	528	7,924	7,243	11.6
Longfin dace	82	2,762	312	3,074	2,992	37.4
Desert sucker	0	99	0	99	99	>100
Sonora sucker	80	50	0	50	-30	0.6
Gila chub	66	3,342	122	3,464	3,398	52.2
Gila topminnow	55	4,161	319	4,480	4,425	81.6
Chiricahua leopard frog	0	10,175	3,296	13,471	13,471	>100
Lowland leopard frog	8,382	26,707	12,003	38,710	30,328	4.6
Desert box turtle	1,875	5,554	20	5,574	3,699	3.0
Sonoran desert tortoise	2,838	33,134	13,573	46,707	43,869	16.5
Tucson shovel-nosed snake	81	1,175	0	1,175	1,094	14.6
Northern Mexican garter snake	4,951	10,100	464	10,564	5,613	2.1
Giant spotted whiptail	6,054	6,275	1,132	7,407	1,353	1.2
Ground snake (valley form)	72	809	0	809	737	11.2

^a Species not evaluated in this analysis (Arkenstone cave Pseudoscorpion, red-backed whiptail, desert pupfish, and all talus snails) were excluded because neither habitat loss nor mitigation were expected to occur during the permit period.

^b See Table 3.3.

Specific commitments of water will be addressed in conservation easements for County-controlled Mitigation Lands, and in permit amendments or measures to address Changed Circumstances.

4.3 Calculating Credit for Mitigation Lands

Pima County proposes an incentive-based approach to gaining mitigation credit on Mitigation Lands through the implementation of a hierarchical Stewardship Level (SL) Program (Table 4.6). Under this program the amount of mitigation credit on a parcel is adjusted as successive Stewardship Levels are reached, as established by defined benchmarks. Under the proposed framework, up to 100% mitigation credit can be achieved on County-owned fee land with a conservation easement. Additional mitigation credit shall act as an incentive for the County to expend resources on activities that will improve site conditions or in increasing the level of mitigation to 100% by acquiring lease lands and placing a conservation easement on the parcel.

Less than full mitigation credit will be granted for two categories of land:

State Trust (Lease) Lands. Pima County will receive 25% mitigation credit for all properties that are held for all or part of the Permit Period (Table 4.6). Mitigation credit can increase to 50% on lease lands if certain conditions are met, most importantly in meeting or exceeding condition goals that are set and approved by an independent advisory body (see section 4.3.1). If a grazing lease being used for mitigation is lost, Pima County will be responsible for replacing it with combination of lands that meet or exceed the mitigation credit that was represented by the lands for which Pima County no longer holds a lease.

Open Space Set Asides (privately held). Pima County will receive 50% mitigation credit for parcels that are designated as Open Space Set Asides (Table 4.6). Mitigation credit increases to 100% if the lands are conveyed to Pima County or other approved entity and the property receives a conservation easement.

Table 4.6. Stewardship levels (SL) for the three categories of Mitigation Lands to be used in the Pima County Section 10 Permit.

SL	Mitigation Credit (%)	Ownership Type		
		Pima County fee Title lands	Leased Lands	Open Space Set Asides
1	25		Hold grazing and management lease for the entire 30 years of the permit; and ensure compliance with terms of agreement or termination for non-compliance.	
2	50		Develop Coordinated Resource Management Plan (CRMP) or similar plan that sets specific and measureable conditions goals AND monitoring data indicate that conditions goals have been i met or exceeded	Legal designation and retention of open space in undeveloped state. Monitoring continues to ensure no encroachment occurs.
3	100	Fee title with conservation easement, which is conveyed to approved entity, or reversionary clause.	Acquisition of lands in fee title with appropriate conservation easements. Grazing continues if it is deemed compatible with achieving and maintaining resource condition goals.	Lands are conveyed to the County or other entity in fee simple OR lands receive conservation easement held by the County or other approved entity.

In rare cases where there is evidence that an unavoidable circumstance has compromised a property that was previously secured as mitigation, Pima County will first attempt to rectify the cause or source of the degradation. An example of unavoidable circumstance may be land condemnation for a utility right-of-way. If the source or cause of the problem is not identifiable or if the remedy is not feasible or practicable, Pima County will work with the USFWS to replace the land with land that have a conservation value that is equal to or exceeds that land that was lost. Examples of the loss of mitigation might include involuntary loss of grazing leases and annexation of Open-space Set Asides by an incorporated jurisdiction. The replacement of lost lands will maintain the appropriate ratio of Mitigation Lands to lands impacted by Covered Activities.

4.3.1 Evaluating Changes in Stewardship Level and Mitigation Credit

Determining when a parcel warrants a change in SL status will be critical to the success of this incentive-based effort. In the case of a State Trust parcel that is elevated from SL1 to SL2, Pima County will employ a defensible process, one that will be carried out by an independent advisory committee of scientists. Members of this committee would be experts in the appropriate field and they would establish criteria for determining success; only those projects that met the criteria would be awarded credit. As a model

of independence for the scientific advisors, Pima County will use that of the STAT during the development of the SDCP. The makeup of the committee as well as the specific target goals will be finalized after the issuance of the permit and in consultation with USFWS staff. The USFWS will need to be satisfied with the process prior to agreeing to granting extra mitigation credit.

Criteria and thresholds for success will vary by the type of project, but will be based on the best available science. Improvements in rangeland conditions will likely focus on a combination of standard rangeland measures (e.g., grass cover) and wildlife habitat measures. Determining success of Species Enhancement will vary depending on the projects, whereby some projects would use the presence or abundance of a Covered Species, while other projects such as wildlife crossings might use a reduction of roadkill as a measure of success. These standards will be developed in coordination with the USFWS.

Changes in SL status for Open Space Set Asides will not be subjective as there will be no questions as to whether the County has or has not received ownership in fee simple or whether a conservation easement has been conveyed.

4.3.2 Mitigation Credit for Species Enhancements

Mitigation credit for fee title, State Trust Lands, and Privately-held Open Space Set Asides is relatively straightforward because it is based on an acre-by-acre calculation. More difficult to quantify are those actions that lead to conservation of Covered Species, but that may be greater than their immediate area of impact. These conservation measures are known as Species Enhancements (SE). Species Enhancements have benefits that are greater or different than their spatial footprint and are typically more expensive to implement. As such they are typically over and above what is required in HCP management and mitigation. Examples include:

- Construction of wildlife crossing structures to improve connectivity among populations;

- Restoration of special elements, especially riparian and aquatic;
- Non-native species removal and control efforts that are above and beyond those required in the MSCP as well as efforts that take place outside of Mitigation Lands;
- Technology transfer and/or labor to neighboring land owners for Covered Species restoration effort;

Pima County will work with the USFWS to determine, on a case-by-case basis, appropriate mitigation credit for these projects. For those projects that are built as part of the RTA and for which mitigation credit may be sought by multiple jurisdictions with HCPs, Pima County will work with the USFWS and the other jurisdictions to devise a fair and equitable distribution of mitigation credit.

4.4 Implementation of the Mitigation Program

Mitigation represents the most significant conservation element of the Pima County MSCP; it is intended to secure and maintain sufficient lands to offset impacts associated with Covered Activities in a manner that conforms to the USFWS's criteria. These criteria require that Pima County:

- Possess an ownership or management interest in the mitigation property;
- Exercise legal protection over the mitigation property;
- Manage the mitigation property to retain the biological and species habitat values; and
- Monitor the mitigation property to ensure that biological and species habitat values persist over time.

Mitigation Lands will receive full or partial mitigation credit based on the degree to which the above criteria are met. The nature of Pima County's ownership on any given mitigation property pre-determines the tools Pima County will use to meet the remaining criteria. To that end, acquisition of fee title lands (including appurtenant water rights

when possible) and acquisition of partial interests in real property such as leases and receipt of conservation easements are—and will continue to be—the primary conservation tools for achieving mitigation for the Section 10 permit.

As noted earlier, Pima County has secured a significant down payment of mitigation lands: approximately 71,000 acres of fee-simple lands, 130,000 acres of lease lands, and almost 980 acres of CLS set asides via approved rezonings. To date, the approximate total of Mitigation Lands approaches 202,000 acres. It is Pima County's intention to acquire additional lands in the future, either through purchase (fee simple or acquisition through the Recreation and Public Purposes Act) or lease. Pima County also intends to acquire additional State Trust land and combine the acquired land with the associated fee title lands to create contiguous blocks of land ownership.

Mitigation lands also include properties outside the CLS in adjacent counties, where Pima County may acquire land in fee or hold State grazing leases. The mitigation credit for these lands will be determined by Pima County at the time when credit is sought, by considering the same factors used in developing the CLS.

Mitigation lands will also include properties within the CLS on which the County holds no property interest, but are Open Space Set Asides pursuant to the Board of Supervisors' approval of a rezoning. The County will exercise its regulatory and enforcement powers to accomplish monitoring and management on these Mitigation Lands. Because Pima County's management and monitoring of Open Space Set Asides is limited to those powers established through zoning and regulation rather than real property rights, Pima County is seeking only 50% mitigation credit for these lands (see Table 4.4).

During the life of the Permit, it is possible that permanent loss of natural cover on fee-simple mitigation lands will occur due to circumstances beyond the control of Pima County, most likely because they are condemned for purposes such as a utility right-of-way or lost to mining. These situations will be treated as changed circumstances, and

Pima County will seek to replace lost acres with mitigation lands elsewhere; the USFWS will be consulted on the appropriate location and configuration of replacement lands.

4.4.1 Options for Obtaining Mitigation Lands

4.4.1.1 Fee-simple Purchase

The most direct option for satisfying the County's mitigation needs is for Pima County to obtain lands in fee simple through purchase, including the acquisition of associated water rights whenever possible. Fee simple maximizes Pima County's control over those activities that will occur on a property and leaves the County as the sole determinant of management and monitoring activities. Fee simple property acquisitions may be initiated either through Pima County staff making initial contact with a property owner or by a property owner initiating contact with Pima County.

Although Pima County may acquire fee simple lands anywhere within or in the immediate vicinity of Pima County, the 2004 Conservation Bond program (and future iterations) guides implementation. In order to ensure conservation of Covered Species and Special Elements and establishment of a viable reserve design, acquisitions are most likely to focus on approximately 525,000 acres of biologically significant parcels of land eligible to be acquired for purposes of this MSCP (Appendix F). Once acquired, the long-term conservation of fee simple lands will be ensured by grant of a conservation easement (see section 4.4.1.2).

Pima County has also applied to obtain fee title to 2,406 acres of Bureau of Land Management (BLM) land under the Recreation and Public Purposes Act (RPPA). Most of these RPPA applications are either adjacent to Tucson Mountain Park or near to Tortolita Mountain Park. When obtained, RPPA land will be committed to biological conservation under the MSCP. RPPA lands are not part of the BLM's National Landscape Conservation System and have been identified for disposal by BLM. Conservation values of RPPA lands will be legally protected via a reversionary clause which will revert ownership to the BLM if the lands should ever be used for purposes other than open space protection. Pima County expects full credit for managing and

monitoring RPPA-acquired lands as part of the overall network of County-controlled Mitigation Lands.

4.4.1.2 Conservation Easements on Pima County's Fee Simple Lands

Conservation easements will be used to provide assurances to the USFWS that the biological values of County Mitigation Lands, which are owned in fee simple will be maintained over time, including for the term after the permit would expire. As it relates to this MSCP, a conservation easement grants specified rights to another party, thereby creating a legally enforceable agreement to restrict certain activities on properties designated as MSCP Mitigation Lands, especially those lands that Pima County holds in fee simple.

As allowed by state statute, Pima County or the Pima County Regional Flood Control District (RFCD; a separate legal entity from Pima County) can execute a conservation easement in one of three ways:

- As a grantor (party who grants the easement);
- As grantee (party who accepts the easement); and
- As third party beneficiary (named party that, along with the grantee, benefits from the easement).

Pima County currently owns most of the fee title lands that would be subject to conveyance of conservation easements. For these lands Pima County will be the grantor and the RFCD will be the grantee. Conversely, Pima County will be the grantee for those lands that the RFCD owns. For those Mitigation Lands where Pima County or the RFCD, as the grantor, conveys a conservation easement, a third party beneficiary will be designated; first preference will be to designate an entity such as the USFWS or the AGFD whose persistence over time is not questionable. This additional layer of protection provides USFWS with an assurance that biological values on fee simple Mitigation Lands will be maintained over time.

As grantee, Pima County or RFCD will acquire and extinguish development rights to the Mitigation Land as well as other rights gained through negotiation with the property owner to protect the site's conservation values.

The timing of recordation of these conservation easements will be in the year prior to impacts or at the time that Covered Activities are issued a permit. In this way, conservation will stay at least one year ahead of covered impacts. Because acres of impacts—and therefore mitigation requirements—are not known precisely each year, Pima County will complete a full review of the acres and location of conservation easements at each 10-year review period, or more frequently if this information becomes available. The County will be responsible for identifying the appropriate parcels to receive conservation easements and coordinate with the appropriate entities to develop an executable conservation easement for presentation to the Board. A draft conservation easement for use on County or District lands is provided in Appendix G. Following Board approval, Pima County Real Property will record the easements.

4.4.1.3 Partial Interest: Conservation Easements on Private Property

The 2004 Conservation Bond Program stipulates that conservation easements are the preferred means of protecting conservation values on private lands. It further states that landowner participation in a conservation easement will be entirely voluntary, which is also mandated by existing state statute (A.R.S. 33-272). Pima County already holds conservation easements on several parcels where ranchers chose to retain certain private property rights, generally in the vicinity of the ranch headquarters. Conservation easements of this kind are tailored to the property it covers in order to best conserve on-site resources and meet the seller's needs.

Pima County has developed a conservation easement template (Appendix H) that is used to guide the development of conservation easements on private land. This template will continue to be used for conservation easements on private land. Appendix I is a list of typical permitted and prohibited actions for use in preparing conservation easements. Permitted and prohibited activities have been tiered to the type of lands (e.g. habitat protection versus community open space) acquired under the 2004 bond

election. In those cases where Pima County purchases easements on fee title lands from another entity, Pima County will do so with fair market compensation for such interest, as determined by a valid appraisal, and shall enter into such an arrangement only if it has a legal basis for recovering that property interest should the easement holder become defunct.

4.4.1.4 Partial Interest: State Trust Grazing Leases

Pima County leases land owned by the State of Arizona for grazing purposes. This is one of the most important tools for acquiring Mitigation Lands and for support of the ranch conservation element of the SDCP (Pima County 2000b). This is because each parcel for which Pima County holds a grazing lease has an associated fee-simple ranch property that is owned by the County. As a result, lease lands play an integral role in maintaining an unfragmented ecosystem across the landscape and are therefore a critical element of this MSCP.

The lease period for State lands is 10 years with renewal options. A number of situations may arise whereby leases are either lost or land under lease is lost. Reasons for this could include: 1) because Pima County terminates the lease, 2) the lease is not renewed by the Arizona State Land Department, 3) Pima County no longer commits to managing lease lands in accordance with the MSCP biological goals, or 4) power of condemnation from utility rights of way. In any of these cases, mitigation credit for those acres will be debited from the total acres of Mitigation Lands. To comply with its mitigation obligations, Pima County may need to acquire additional Mitigation Lands as a result of the loss of state leases.

4.4.1.5 Deed Restrictions, Life Estates, and Other Devices

Pima County may also employ other tools to obtain a controlling interest over lands with valuable conservation assets. These may include—but are not limited to—acquiring property with deed restrictions limiting uses of the property, life estates, and reverter clauses or other conditional fee interests. Pima County shall evaluate the appropriateness of such acquisitions on a case-by-case basis with the primary

evaluation criteria being whether such ownership interests assure protection of the parcel's conservation values.

4.4.1.6 Donations of Property Interests

Pima County may also choose to accept property interests—ranging from fee simple to partial interest—that are donated by property owners. Pima County shall evaluate such proffered donations for the properties' natural resource values, CLS status, contribution to Pima County MSCP goals, and long-term costs of management and monitoring.

Pima County may, at its discretion, request a monetary donation or endowment from the beneficiary to cover management costs.

4.4.1.7 Open Space Set Asides

For the purposes of this MSCP, set-asides on properties within the CLS that are pursuant to a Board of Supervisors' approval of a rezoning will be included as Mitigation Lands. Responsibilities for protecting the conservation values of those Mitigation Lands fall to the property owner(s) with oversight and enforcement by Pima County. Mitigation credit will be claimed at 50% for set-asides occurring within the CLS. If, however, any Open Space Set-Aside is found to no longer provide the Stewardship Level criteria justifying receipt of mitigation credit, mitigation credit for those acres will be debited from the total acres of Pima County Mitigation Lands. To maintain conformity with mitigation requirements, Pima County may need to acquire additional Mitigation Lands.

4.5 Regulatory Standards and Relationship to Recovery

Section 10(a)(2)(B) of the ESA identifies Permit Issuance Criteria that must be met before the USFWS can issue a Section 10 permit. Most importantly, the proposed taking can not appreciably reduce the likelihood of survival and recovery of the species in the wild. Specifically, ESA Section 7 regulations (50 CFR § 402.02), define the phrase "jeopardize the continued existence of" as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species."

4.5.1 Recovery: Mandate vs. Enhancement

The ESA does not explicitly require the Pima County MSCP to recover species or contribute to the objectives identified by adopted Recovery Plans, but the USFWS must consider the extent to which the Pima County MSCP is likely to enhance the habitat of the Covered Species or increase the long-term survivability of the species or their habitat. Mechanisms to address this issue have been built into the MSCP planning process. Mitigation measures outlined in this MSCP will benefit the conservation of listed species in the region. In particular, the mitigation credit structure provides incentives for measures that will contribute toward improvement of habitat conditions and potential for re-establishment of extirpated populations.

4.5.1.1 Recovery Plans and Goals

Some of the Pima County MSCP Covered Species have a Recovery Plan (draft or final):

- Lesser long-nosed bat

- Southwestern willow flycatcher

- Desert pupfish

- Gila topminnow

- Chiricahua leopard frog

Recovery Plans for these species have been used as the basis for identifying minimization and mitigation measures for information on appropriate management strategies, and for identifying monitoring needs and protocols. In the absence of other information approved by the USFWS or STAT, final or draft Recovery Plans will continue to constitute the “best available science” for a species.

4.6 Conservation and Recovery of Aquatic and Riparian Species

4.6.1 Species Enhancement Areas

Pima County will develop a Riparian and Aquatic Species Management Plan within three years after permit issuance. The AGFD and USFWS may assist with this effort, the intent of which will be to contribute to full occupancy of available habitat within the County's preserve system for covered fish, leopard frogs, the Huachuca water umbel and the Northern Mexican garter snake. The implementation of this plan will focus on developing, modifying, or affirming appropriate site-specific goals and objectives based on the appropriateness of a site to host Covered Species. Known as *Species Enhancement Areas*, Pima County will designate habitat at these sites according to their relative importance or appropriateness for reintroductions. There are three hierarchical tiers for Species Enhancement Areas:

Tier I: These are places where populations of existing and/or re-established populations of native fish and/or amphibians will be managed by Pima County with assurances that all reasonable efforts will be made to ensure that the population contributes to recovery of the species. Those properties where Pima County has sufficient control to guarantee water quantity and quality adequate to support such populations will be eligible for Tier I designation. Examples of include the Cienega Creek Natural Preserve and certain Pima County-owned lands at springs. Pima County will ensure that employees and/or other scientists involved in species re-establishment efforts for these areas have the requisite Section 10(a)(1)(A) Recovery Permits, appropriate state permits, and that activities be coordinated with the AGFD and USFWS.

Tier II. These are sites where Pima County management efforts will provide suitable habitat and improve habitat conditions for existing or re-established populations of native fish and/or amphibians and at the same time allow permitted maintenance and other Covered Activities. Tier II areas would be designated by Pima County at the time of permit approval and their management would be the responsibility of Pima County. Maintenance, construction, management, or other activities that may decrease habitat values will be preceded by efforts to salvage aquatic vertebrates and other riparian

species with the intent of translocating them to nearby suitable locations. Examples of Tier II areas include the Kino Ecosystem Restoration Project at Ajo Detention Basin, Agua Caliente Park, and Pima County-owned lands along the Santa Cruz River. Species will be returned to the original locations once adequately supportive habitat conditions are established.

Tier III. These are sites where there is suitable habitat for native fish and/or amphibians (though populations are expendable from species recovery efforts), but which may have the potential to contribute to recovery. Such areas may include ponds on Pima County lands where native fish and frogs are grown for public distribution; and private ponds, including golf course water features, for which landowners request assistance in efforts to replace non-native with native species. Recovery efforts may use sites that are temporary, artificial, heavily managed, and/or impacted. These population re-establishment activities would be conducted with concurrence and appropriate permits, and Pima County may use Safe Harbor Permits and Certificates of Inclusion.

4.6.2 Use of Native Fish for Mosquito Control

Pima County may, where feasible, initiate and administer a new aspect of their mosquito control program in cooperation with the AGFD, whereby Pima County will utilize native fish (e.g., Gila topminnow, desert pupfish, and other aquatic species) in addition to other currently practiced methods of mosquito control. Mosquito control by native fish would be an important component of the Riparian and Aquatic Species Management Plan. The objective would be to no longer utilize, distribute or promote non-native mosquitofish (*Gambusia affinis*) for mosquito control.

4.7 Additional Implementation Elements

4.7.1 Migratory Birds and Eagles

The issuance of Pima County's Section 10 permit, in association with the Pima County MSCP, also constitutes a Special Purpose Permit under 50 CFR 21.27 for the take of ESA listed birds in the amount and/or number and subject to the terms and conditions specified herein. Any such take will not be in violation of the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C 703-712). Unlisted birds that are covered by the HCP

are not covered by the Special Purpose Permit and may be taken only if such take is not in violation of the Migratory Bird Treaty Act. This Special Purpose Permit will be valid for a period of three years from the effective date of the Section 10 permit, provided that the permit also remains in effect for that period. The Special Purpose Permit will be renewed automatically, provided that Pima County continues to fulfill its obligations under the permit and its associated Implementation Agreement. Each automatic renewal will be valid for the maximum time period allowed by 50 CFR 21.27 or its successor at the time of renewal.

4.7.2 Unlisted Species

Assurances will be given for those species that are adequately covered by the MSCP, pursuant to the HCP Assurances (i.e., “No Surprises”) rule. ‘No Surprises Policy’ (63 FR 8859 February 23, 1998, revised 50 CFR 17) provided the MSCP is being properly implemented. Implicit in this is that 1) the MSCP must address the conservation of the species and its habitat, and 2) all Section 10 issuance criteria specified in the Act and its implementation regulations must be met. If a species is added to the list of endangered species and that species is not covered under this permit, Pima County will work with the USFWS to determine if inclusion onto the permit is warranted (see Table 7.1 for more information). Such an inclusion would require a permit amendment.

4.7.3 Plants in HCP and Permit

The Federal take prohibitions under the ESA for listed plants on non-Federal lands are limited, unless taking of those plants is in violation of State law or regulations or in the course of any violation of a state criminal trespass law. However, before the USFWS issues a Section 10 permit, the effects of the permit on listed plants must be analyzed. This is because Section 7 of the ESA requires that any Federal action—in this case issuance of a Section 10 permit—must not jeopardize any listed species, including plants.

The USFWS encourages applicants to consider listed plants in HCPs and this has been addressed in this MSCP as part of the overall ecosystem approach adopted by Pima County and recommended by STAT; four species of plants are proposed for coverage

under this Section 10 Permit (Table 2.3). Two of these species are listed as endangered under the ESA and one is a candidate for listing. All covered plant species are protected under the Arizona Native Plant Law as “highly safeguarded” (i.e., no collection is allowed) or “salvage restricted” (i.e., collection is allowed only with permit.)

4.8 Permit Duration and Phasing

Phasing of the Pima County MSCP is necessary to provide a long-term, temporally comparable program to secure mitigation in a manner that parallels the projection of future growth (Appendix C). This phasing strategy creates benchmarks at which to monitor the plan’s implementation and effectiveness, but it is not the same as permit renewal or a permit amendment. The proposed duration of the permit will be 30 years, which is subdivided into three, 10-year phases. Prior to the end of each Permit Phase, Pima County will initiate an analysis of the biological effectiveness of the conservation and mitigation actions implemented to date under the Permit. This analysis will be subject to peer review.

4.8.1 Permit Phase I: Years 1-10

This permit phase will include the initial “down payment” on the County’s anticipated mitigation requirements. Funding will be provided for acquiring or otherwise securing lands at a level adequate to meet mitigation needs as determined by the projected growth in the first decade of the permit. Pima County will place special emphasis on the pursuit of other funding strategies as discussed in Chapter 8. Land and conservation easements acquired by Pima County since 1999, as agreed upon with the USFWS, will be included as Mitigation Lands subject to the accrual of mitigation credits described in section 4.3. Lands owned by Pima County prior to 1999, and for which Pima County commits to mitigation, will be credited towards meeting goals and mitigation requirements.

4.8.2 Permit Phase II: Years 11-20

During this permit phase, Pima County will continue to fund MSCP implementation and to pursue additional funding sources. Pima County will also continue to acquire or otherwise secure Mitigation Lands at a level necessary to meet or exceed mitigation

requirements for the projected growth of the second decade. Lands and conservation easements acquired by Pima County during Permit Phase I that have not already been used to meet Permit Phase I mitigation requirements will be credited towards meeting the goals and mitigation requirements of Permit Phase II, as appropriate.

4.8.3 Permit Phase III: Years 21-30

During this permit phase Pima County will continue to fund MSCP implementation and pursue additional funding sources. Pima County will also continue to acquire or otherwise secure Mitigation Lands at a level necessary to meet or exceed mitigation requirements for the projected growth in the third decade. Lands and conservation easements acquired by Pima County during Permit Phase II that have not already been used to meet Permit Phase II mitigation requirements will be credited towards meeting the goals and mitigation requirements of Permit Phase III, as appropriate.

4.9 Amendments

Amendments to the Pima County MSCP may be sought based on the terms of the final Implementation Agreement (Appendix J). Amendments may be either major or minor, as determined by the Implementation Agreement and suggested below. Minor amendments will be handled administratively. Major amendments generally relate to situations where a significant change is made to a fundamental aspect of the permit such as an expansion of Covered Activities or adding to the list of Covered Species. Major amendments will require amending the permit and will involve a full public review process. Procedurally, a permit amendment application is treated in the same way as the original permit application. However, documentation required by USFWS in support of a proposed amendment will vary depending on the nature of the amendment and the content of the original Pima County MSCP documents. In general, if the circumstances necessitating the amendment have been addressed in the original documents, then only amendment of the permit itself will be needed. If the amendment involves an action that was not addressed in the original documents, Implementing Agreement, or National Environmental Policy Act analysis, these documents may need to be revised or new versions prepared addressing the proposed amendment(s).

Major amendments might include:

- Extension of the Section 10 Permit Area to cover additional incidental take;
- Additional Covered Species;
- Changes in conservation or mitigation measures for Covered Species as agreed upon by both parties;
- Additional Covered Activities.

5 LAND AND RESOURCE MANAGEMENT

This chapter outlines the ongoing and proposed land and resource management programs and tools that contribute to fulfillment of MSCP goals. Over time, many of the management activities highlighted in this chapter will be informed by the monitoring and adaptive management program (Chapter 6). Management actions highlighted in this chapter include the set of activities that are currently committed or are anticipated to be used on County-controlled Mitigation Lands, as well as those that prohibit certain uses on those lands (Appendix H). In this way, management refers to those activities that take place after the acquisition or lease of specific properties to ensure that the biological values for which they were acquired are being maintained or enhanced over time.

In order to assure that the goals of the Pima County MSCP are realized, land and resource management will:

- Ensure the long-term viability and sustainability of native ecosystem structure and function and natural processes throughout the County-controlled Mitigation Lands;
- Protect the biological resources from threats and other disturbance activities within County-controlled Mitigation Lands while accommodating compatible public uses;
- Enhance and restore conservation targets in appropriate locations to improve habitat for Covered (and other) Species;
- Respond to monitoring information in a timely manner and use adaptive management, where and when such an approach is needed.

To achieve these objectives, Pima County will implement the following management directives, which directly address those significant threats for which Pima County has some ability to control. Directives will be implemented by the appropriate Pima County department.

5.1 General Management Directives

5.1.1 Invasive Species

Invasive species represent an important challenge to many Covered Species and their habitat and therefore the control and/or removal of select species is a priority for the MSCP. Toward this end, the Pima County Board of Supervisors adopted Resolution 2005-265 which directs the County to address and mitigate for the continuing spread and potential introduction of invasive species by establishing the Pima County Invasive Species Working Group. In compliance with the Board's directive, staff is currently participating in multi-jurisdictional invasive species groups, providing public outreach on invasive species, and implementing control and eradication of invasive species on County-owned lands by all relevant County departments. This program will continue to evolve through collaboration with and in the context of other on-going regional, multi-agency efforts. Elements of the program will be incorporated into all management plans developed by Pima County and will be addressed in property-specific conservation easements.

The most pressing invasive species management issue in Pima County is buffelgrass and the County's response to this species demonstrates its commitment to invasive species management, in general. Pima County Natural Resources, Parks and Recreation Department is an important partner the inter-agency Buffelgrass Work Group to coordinate mapping, control, and eradication efforts. This Work Group recently completed a 5-year Southern Arizona Buffelgrass Strategic Plan to facilitate buffelgrass management throughout the region (Rogstad 2008). More recently, the County is working with utilities that operate within County-owned rights of way to ensure that the utilities address buffelgrass control issues.

In addition to buffelgrass management, Pima County focuses attention on other invasive species management activities including:

- Working with AGFD and USFWS to prepare emergency response plans for exotic fish, crayfish, and bullfrog management for the Cienega Creek Natural Preserve;

- Collaborating with other Cienega Watershed Partnership members on invasive species management across jurisdictional boundaries;
- Ensuring that concerns and lists of invasive plants and animals in Pima County are routinely updated, evaluated, and prioritized.

5.1.2 Restoration and Enhancement

The goals of the MSCP cannot be achieved through protection and mitigation activities alone. This is because past land- and water-use decisions have resulted in the degradation or elimination of significant resources throughout Pima County. Therefore, to achieve MSCP goals and ensure the persistence of many Covered Species in Pima County, ecological restoration is necessary to improve selected site-specific conditions. Nowhere are restoration activities more important than for riparian areas that provide critical habitat for riparian obligate species and other riparian-dependant species.

5.1.2.1 Riparian Restoration

Riparian restoration will focus on repairing the degraded riparian environments of major drainage systems and by enhancing protection and connectivity of the remaining riparian fragments along their tributaries. Towards this end, Pima County has initiated a range of actions and has participated in numerous agreements that will have long-term positive effects on aquatic and riparian habitat and watercourse functions. These activities are expected to improve conditions for aquatic and riparian species and therefore reduce the need for future listings.

Some riparian restoration projects require a supplemental water source (e.g., effluent and reclaimed water) to re-establish the types of facultative or obligate riparian vegetation plant communities that once occurred on the site. Pima County currently allocates County-owned effluent to riparian restoration projects. Some projects would require USFWS approval of a Section 10(a) permit to gain access to additional effluent, which would be made possible through the use of the Conservation Effluent Pool. This would allow for allocation of up to 10,000 acre-feet of treated effluent water per year for riparian projects from metropolitan area wastewater treatment facilities.

Riparian projects that would use the Conservation Effluent Pool are not anticipated to be used as mitigation during Permit Phase I because the projects are incomplete and satisfactory results have not yet been achieved. Based on the success of these projects, Pima County may seek mitigation credits in subsequent permit phases.

5.1.2.2 Management Guidelines for Riparian Systems

The STAT prioritized protecting existing self-sustaining riparian and aquatic ecosystems over the creation of new or enhanced areas of riparian and aquatic life which depend on continuing inputs of water, energy and materials. Below are guidelines adopted by STAT that will be used in management activities related to water:

- Protect systems that are self-sustaining over those that need continual inputs;
- Restore or enhance native riparian and aquatic ecosystems by releasing water to restore local aquifer conditions;
- Sites which augment existing high-quality riparian areas are favored;
- Enhance the ability of secondary effluent or reclaimed water to support aquatic life;
- Manage riparian and aquatic ecosystems for native species.
- If plantings are to be used:
- Revegetation is favored in areas where perpetual irrigation will not be needed;
- Conflicts with other public health and safety objectives (e.g. fire, flood, crime, aircraft safety, and disease) should be minimized before proceeding with these projects;
- Native species appropriate to the site must be used.

5.1.3 Public Access, Trails, and Recreation

Some County-controlled Mitigation Lands preclude or otherwise limit public access because of the sensitive nature of the resources. However, other properties have and

will continue to have some level of recreational access. Recreation on lands leased by Pima County is regulated by the State of Arizona (through AGFD and State Land Department) or Bureau of Land Management. For most other Mitigation Lands, Pima County will seek to minimize impacts from public recreation by:

- Locating trails and other infrastructure (overlooks, parking areas, picnic areas) in areas that will cause the least impact to soils, vegetation, and other sensitive environmental elements. Where possible trails will be located along existing dirt roads;
- Providing sufficient signage to clearly identify public access points and appropriate type of allowable activities;
- Erecting barriers (e.g., vegetation, rocks/boulders or fencing) to protect sensitive areas or to block access for off-road vehicles;
- When possible, use natural materials in the construction and maintenance of trails;
- Providing trail repair/maintenance to correct effects of trail erosion;
- Restoring disturbed areas;
- Minimizing trail widths to reduce impacts to important resources;
- Providing trail fences or other barriers at strategic locations when protection of sensitive resources is required;
- Prohibiting off-road use of motor vehicles except for law enforcement, preserve management or emergency purposes;
- Limiting recreational uses to passive uses such as photography, hiking, and hunting where other uses are incompatible with the values for which the property was acquired;

- In areas where they are allowed, restricting pets to only being on leash except in open space properties where the use of dogs for hunting purposes is allowed.

In general, Pima County will avoid actions that limit access to County-controlled Mitigation Lands for the recreational purposes of sportsmen lawfully engaged in activities related to the legal taking of fish and game, as authorized by the Arizona Game and Fish Commission. In some circumstances, Pima County may exert its authority to limit the discharge of firearms and bows and arrows which can effectively preclude hunting of big and small game species. The determination as to whether to restrict hunting and fishing on a particular mitigation property will be decided on a case-by-case basis, and the County will do so in conjunction with AGFD. Any Park Rules changes are initially presented to the Pima County Parks and Recreation Commission in noticed public meetings for approval and then forwarded to the Pima County Board of Supervisors for adoption.

5.1.4 Trash and Illegal Dumping

To prevent littering and dumping of trash on County-controlled Mitigation Lands and to address trash accumulated there, Pima County will, where staffing and circumstance permit:

- Post signage to prevent littering in trail and road access areas;
- Provide and maintain trash cans and bins at select trail access points;
- Impose fines for littering and dumping;
- Remove litter and trash on a regular basis;
- Prohibit storage of materials such as hazardous and toxic chemicals, and equipment;
- Keep roads and wildlife corridor undercrossings free of debris, trash and all other obstructions to wildlife movement;

- Provide additional monitoring and/or enforcement as needed.

Trash is a significant management issue in many of the County-controlled Mitigation Lands, particularly those lands south of Interstate 10 that are traveled by undocumented migrants. Though the signage and enforcement activities outlined above will be used in many natural areas, they are unlikely to have an effect on the amount of discarded trash from undocumented migrants. To address this management issue, Pima County regularly organizes multi-day Ranch Cleanups. In 2008, Pima County and its volunteers collected approximately 5 tons of garbage.

5.1.5 Adjacent Management Issues

Many County-controlled Mitigation Lands are adjacent to areas of high human use such as housing developments, roads, and washes; thereby creating management challenges with regards to invasive species, trash, and trespassing. As discussed in section 4.1.3, the measures in the Pima County Code limit the indirect effects associated with human use. These measures are applicable to most occupied areas and not just limited to those private sector Covered Activities. Where Pima County believes that extra measures are appropriate to address threats particular to specific Mitigation Lands, Pima County may:

- Disseminate educational information to residents adjacent to these areas to heighten awareness of issues relevant to the particular property (e.g., appropriate plantings, construction, pets, lighting, and fire);
- Install barriers and maintain fencing, where appropriate.
- Evaluate and recommend to the Board of Supervisors, as appropriate, specific measures to decrease the potential that a rezoning proposed adjacent to Mitigation Lands may have on exacerbating issues the Mitigation Land is experiencing related to invasive species, free-roaming pets, and trespass lighting.

5.2 Ranchland Management

A critical element of the MSCP is the acquisition and lease of ranchland for mitigation. To date, Pima County has acquired 13 large ranches (Fig. 5.1). Pima County intends to maintain livestock on these ranches under renewable ten-year agreements from the State Land Department. Even though impacts potentially related to grazing are not being proposed for coverage under the MSCP, Pima County is committing to monitor and manage fee and lease lands according to a strict set of standards and guidelines to govern grazing on Mitigation Lands.

With one current exception (A7 Ranch), ranches purchased by Pima County are leased to independent operators (previous owners), who own the cattle, manage day-to-day operations, and are responsible for operational costs under terms of a management agreement. Management agreements are negotiated with each rancher and lists of prohibited and permitted activities are included in these agreements (Appendix H).

Pima County manages ranch properties with the intent of achieving sustainable use of natural resources and maintaining functionally healthy habitat for both wildlife and livestock. As a foundation for employing a sustainable ranchland model, Pima County developed standards and guidelines for ranch operations (Pima County 2010) by using techniques developed by the U.S. Department of Agriculture's Agricultural Research Service (ARS), Natural Resources Conservation Service (NRCS), and the Bureau of Land Management (BLM).

Pima County will develop and implement a management plan for each of its ranch properties as time and resources permit. In some cases it may be appropriate to develop a single management plan for multiple ranch properties that are in close proximity to each other. Management plans will include an assessment of rangeland resources (ecological sites, cultural features, etc.), current rangeland conditions, and management goals related to both ranch operations and wildlife. Managers will utilize range monitoring results and results from the Pima County Ecological Monitoring Program to periodically update and revise management plans. Draft management

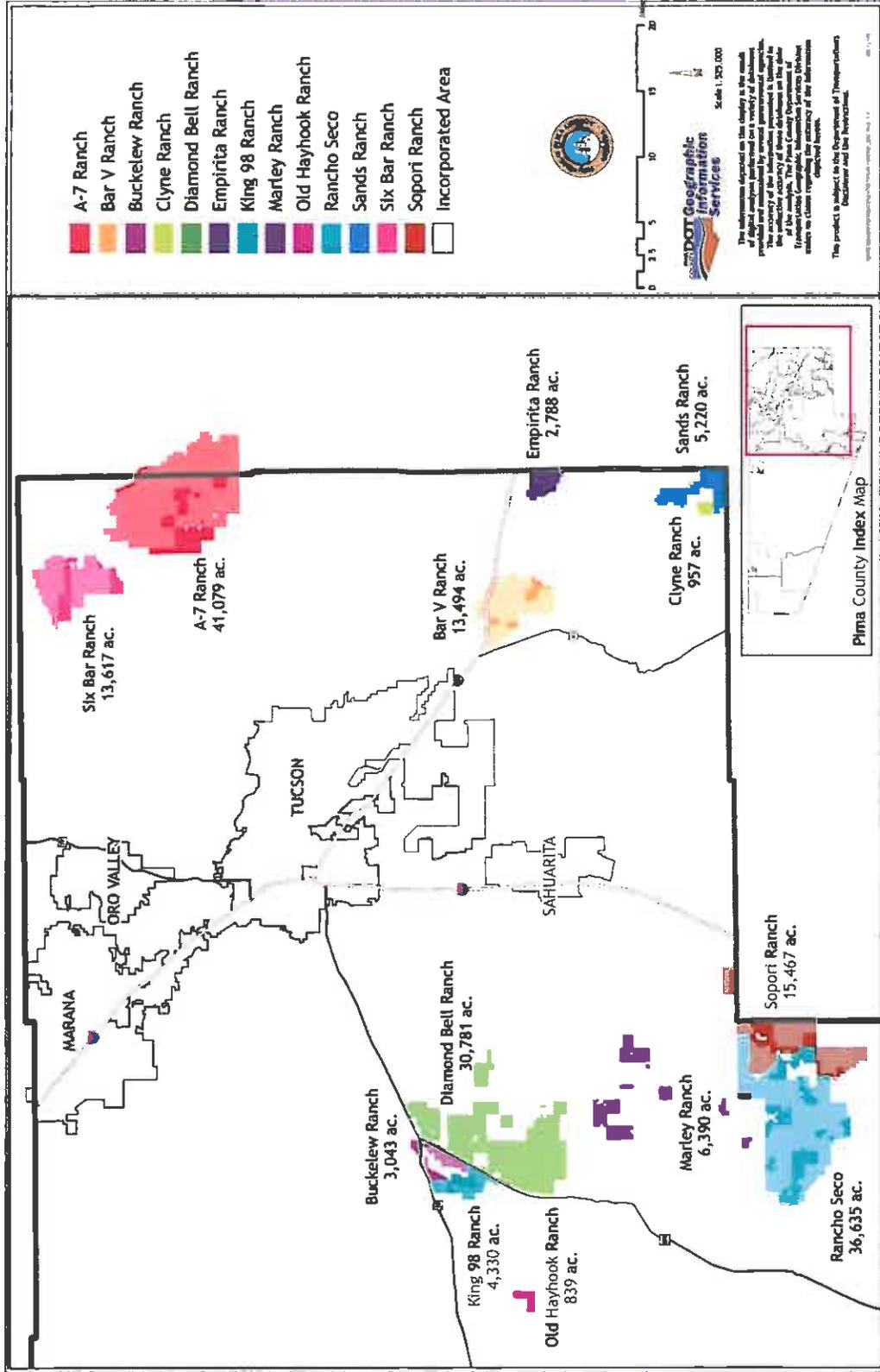


Figure 5.1. Working cattle ranches are a cornerstone of the SDCP and represent the bulk of the lands for which Pima County seeks mitigation for the Section 10 Permit. Where applicable, fee lands are a lighter shade than associated grazing leases.

plans will be available for public review and comment as a part of the planning process. Each management plan will contain the following goals:

- Establish stocking rates, timing, frequency, and duration of grazing that are consistent with utilization guidelines.
- Attain a stable or positive trend in rangeland conditions (vegetative, soils, productivity) over time.
- Utilize grazing systems that will allow for sufficient plant growth, reproduction and residual cover to protect soils from accelerated erosion.
- Adjust stocking rates to account for variation in precipitation and forage production.
- Practice cooperative management and collaboration with ranch operators, other agencies and the public.
- Maintain public access to and across the ranch properties where public health and safety and negative impacts to wildlife habitat are not an issue.

To address these goals, Pima County Natural Resources, Parks, and Recreation Department staff is developing rangeland standards and guidelines to monitor rangeland conditions and prescribe management actions and practices necessary to achieve desired future conditions of rangelands. Guidelines will include utilization levels of key forage species that will be set at an average level of 40%, the recommended utilization by the Natural Resources Conservation Service, but lower than current utilization levels on most ranches.

5.3 Land Protection and Enforcement

5.3.1 County Preserve Lands

On County Preserve Lands (i.e., those lands where Pima County possesses a property interest), all environmental ordinances and property-specific rules and terms of legal agreements where applicable, will be enforced and monitored for compliance to ensure

that the conservation value of these lands are not being diminished. Illegal activities include but are not limited to off-road vehicle use, illegal trash and toxic chemical dumping, human and livestock trespass, harmful law enforcement activities, destruction of infrastructure important for wildlife and their habitat. Pima County Sheriff's Department provides a special unit assigned to enforce these areas.

5.3.2 Park Rules

Pima County currently maintains a set of Rules for its park system (P.C.P.R. 4-040; Appendix J). Park Rules are being updated because of the increase in the extent of the County preserves, particularly since 2004. The new Rules will focus on limiting or prohibiting activities that might compromise the basic ecological values of a set of mitigation properties whose primary purposes are to maintain unfragmented habitat for wildlife and as a working landscape. The Rules will provide the range of management flexibility to restrict public access to a property altogether to controlled access and use by the public for recreational purposes.

Under A.R.S. 11-931, violation of adopted Pima County Park Rules is considered a Class II misdemeanor, which is punishable by a sentence of up to four months in jail and \$750 dollar fine and is considered fairly strict for many of the types of violations of park rules now being observed. The proposed Park Rules to be adopted for County-controlled Mitigation Lands are intended to be consistent with current Pima County Code but may be more restrictive. In any areas open to interpretation or as required by law, the Pima County Code will take precedent.

In addition to the Pima County Park Rules and local ordinances that Pima County will use for property protection and law enforcement purposes, all applicable State and Federal law (e.g., Clean Water Act, ESA) will be applied. At the state level, the AGFD Title 17 wildlife laws will be enforceable as would the new State Title 28 vehicle code rules for all-terrain vehicle licensing and use.

5.3.3 Open Space Set Asides

Pima County will monitor and pursue enforcement actions on Mitigation Lands comprised of Open Space Set Asides. Pima County will monitor compliance with rezoning conditions, especially those pertaining to natural open space and invasive species control and eradication, and natural resource-related ordinance requirements such as the Native Plant Preservation Ordinance. Maintaining the integrity, location, and configuration of on-site set asides is a pivotal element. Monitoring of on-site set-asides will primarily be accomplished by visual examination of aerial photography and other products to investigate encroachment into—and disturbance of—set asides. The availability of imagery that can be used for this application varies, but is typically collected every three years. Monitoring will be carried out as part of the County's monitoring program; potential violations will be reported to the appropriate Department. Investigation of citizen-reported violations and issuance of citations will continue to occur and provide a secondary method of maintaining the mitigation credit for set-asides. Investigation of those cases where evidence suggests on-site set-asides have been compromised will be granted a high priority status.

5.4 Management Plan Development

Pima County and RFCDD will develop site-specific management plans or update existing management plans for most properties >100 acres. For properties <100 acres, and where it is prudent to do so for larger properties, Pima County may develop management plans that cover >1 property. This approach will be employed where such “complexes” of properties have similar resources, threats, and/or management opportunities. Management plans will only be required for County-controlled Mitigation Lands or for those properties that the County has conveyed a conservation easement to a third party. The level of detail of management plans will vary by property, from plans that address a wide range of resources and activities (e.g., natural and cultural resources, visitor experience, etc.) to brief documents that focus only on the natural resources for which the property was acquired. Despite the level of complexity that will be implemented for each property, all management plans will directly address the management activities related to the maintenance of MSCP resources including, but not

limited to, avoidance and minimization efforts to ensure protection, species and habitat needs, emerging threats, invasive species removal needs, ordinance enforcement activities, and anticipated future resource needs. If a property was acquired to provide habitat for a particular species or resource, management plans will directly address the specific management actions that will be undertaken to ensure the continued survival and may assist recovery of the species or maintenance/improvement of the resource condition. Even if a parcel does not have an active management plan, park rules and prohibited and permitted activities will apply.

5.5 Cooperative Wildlife Management

The Pima County MSCP was developed, in large part, with the goal of wildlife conservation. Yet, Pima County recognizes that the authority to manage resident wildlife is reserved to the state through the Arizona Game and Fish Commission and migratory wildlife through the USFWS. Pima County will work in close consultation with AGFD and USFWS prior to engaging in any species re-introduction efforts.

6 MONITORING AND ADAPTIVE MANAGEMENT

The primary focus of the Pima County MSCP is on the acquisition of Mitigation Lands such that the resulting landscape context promotes the assembly of the County's preserve system. Another critical component of Pima County's MSCP is the monitoring and adaptive management program. Monitoring is an essential component of the Pima County MSCP; it will provide data for assessing progress towards determining if the MSCP goals are being met. Specifically, the monitoring program must provide information to:

- Evaluate compliance with the terms and conditions of the Pima County MSCP (Compliance Monitoring);
- Assess the achievement of the biological goals and objectives of the Pima County MSCP (Effectiveness Monitoring);
- Provide direction for and assess the success of management actions (adaptive management);
- Identify the occurrence of changed and/or unforeseen circumstances, and suggest appropriate management responses.

6.1 Compliance Monitoring

Pima County will provide the USFWS with an annual compliance report that will provide sufficient information to determine if the County is carrying out the terms and conditions of the permit, as outlined in the Implementation Agreement and associated agreements. Compliance reporting activities will include annual reporting of habitat loss for each Covered Species—based on accounting of acres of habitat impacted and any reported lethal take—and relevant avoidance, minimization and mitigation activities. The report will also provide updates on implementation of the terms and conditions of the Pima County MSCP, including financial responsibilities and obligations, management responsibilities, changes due to annexations by other entities, changes to the Capital

Improvement Program, and other requirements of the permit. The results of the compliance monitoring report will be discussed with USFWS in an annual meeting and presented to the public. To the extent possible, the annual report should inform the decision-making process with:

- Clear and detailed contingency action steps or plans if terms are not being met;
- Prescribed changes to improve the monitoring program or management strategies;
- Detailed GIS maps and corresponding tabular data that depict habitat loss and mitigation; and
- Updated and/or revised evaluation criteria and review questions for subsequent year(s).

6.2 Effectiveness Monitoring

The majority of the monitoring effort for the MSCP will be focused on determining the effectiveness of the mitigation efforts at maintaining species' habitat and populations. To this end, Pima County will create the Pima County Ecological Monitoring Program (PCEMP). This program is to be designed to:

- Measure progress toward meeting the defined biological goals and objectives of the Pima County MSCP, and
- Detect meaningful ecological change(s) and provide information to managers in a timely manner to ameliorate or mitigate for adverse effects.

The PCEMP will be developed over time to include five primary elements, which are briefly discussed in the following sections. The parameters (sometimes referred to as indicators) suggested for the program and the phased approach to implementation is discussed below. For a more complete description of the PCEMP, see Powell (2010a) and associated documents, which are available on the SDCP monitoring website:

<http://www.pima.gov/cmo/sdcp/Monitoring/index.html>

6.2.1 Species-level Monitoring

The PCEMP will directly monitor 18 species (Table 6.1). The goal of species-level monitoring will be to detect changes in population parameters of these Covered Species over time: abundance, density, or occupancy. Most species are aquatic or riparian obligate species and are restricted to a few sites in both eastern Pima County and in the County preserves, but others are more widespread. Table 6.1 includes information about the proposed monitoring protocol to be used, where and how often monitoring will take place, and what issues—if any—remain to be resolved before Pima County can commit to monitoring.

For most of the species, the location of monitoring will occur within occupied habitat or those areas known or suspected to be occupied in the recent past. This approach will not provide information on their expansion to other areas, which would likely be documented if monitoring were to take place throughout their potential habitat. However, monitoring areas that have a low probability of being occupied is difficult to justify given the high cost of monitoring for these species. Many of the species proposed for restricted monitoring are conspicuous species and sightings within the County preserves will be investigated. Similarly, reintroductions of species to County-managed conservation lands will also be monitored to determine success of reintroduction efforts.

It should be noted that species monitoring does not preclude habitat monitoring, threats monitoring, landscape-pattern monitoring, and climate monitoring. Instead, for some of these species, the combination of these monitoring approaches will help ensure that important changes are detected and properly addressed.

6.2.2 Habitat-based Monitoring

Habitat-based monitoring will focus on monitoring those environmental parameters that, according to the best available information, control the distribution and abundance of

Table 6.1. Covered Species that are being proposed for direct monitoring. Additional information about the connection between the species and other program elements (e.g., habitat and threats monitoring) can be found in Appendix A.

Taxon group	Species	Key Information
Plants	Pima pineapple Cactus	Pima County will monitor numbers and survival of a suite of known individuals on County-owned and maintained mitigation banks every 2-3 years. Additional surveys for recruitment and additional individuals will take place every four years. Pima County will work with USFWS to establish monitoring on other sites within the Preserve system (e.g., Altar Valley near Aravaca). Pima County will use line transect surveys (Roller 1996) but Pima County will work the USFWS to refine the sampling protocol to possibly incorporate the use of occupancy models that account for imperfect detectability. In addition, Pima County may employ an adaptive cluster sampling design for this species. Finally, Pima County will develop a database for incidental observations of this species so that County staff and cooperators can record observations made while performing other functions.
	Huachuca water umbel	Presence at known locations (Cienega Creek and Bingham Cienega preserves) will be monitored every 2-3 years and in accordance with the methods used by Engineering and Environmental Consultants Inc. (2001). Additional surveys for presence in the Cienega Creek Preserve will be conducted every four years. Pima County will facilitate and encourage research on this species, particularly improved methods for detection of this difficult-to-survey species.
Mammals	Lesser long-nosed bat	Pima County has determined that species-level monitoring is warranted for this species because ongoing monitoring of roost sites is being implemented and provides local information on lesser long-nosed bat use patterns and occupancy. Therefore, Pima County will: (1) participate in coordinated exit counts at sites that contain bats that use the Permit Area and in coordination with other agency personnel; (2) visit known cave, mine, and adit roost sites within the County Preserve System every 2-3 years to observe presence of this and other bat species. Exit counts should use infra-red video cameras, and Pima County will provide technical assistance to the USFWS to develop a more detailed protocol. Pima County will develop a cave visitation protocol (including what kinds of equipment to be used) to minimize disturbance to this and other species. Surveys will take place at appropriate times of year (June-August) to ensure the greatest chance of recording occupancy. Additional monitoring of populations through the employment to passive detectors (e.g., Duchamp et. al. 2006) will be reviewed periodically to determine application of this technology to the County's needs. Pima County may participate in species-level monitoring for this and other bat species as part of Arizona Game and Fish Department's bat monitoring plan; that plan is not complete. Finally, with funding from the USFWS, Dr. Robert Steidl (University of Arizona) and a graduate student are developing a regional monitoring program for this species. Pima County will evaluate a role in that program after it is complete.
	Mexican long-tongued bat, Allen's big-eared bat, California leaf-nosed bat, Pale Townsend's big-eared bat	Pima County will monitor for the presence of these species while conducting surveys of known cave, mine, and adit roost sites in the County Preserve System, as well as periodic checks of habitat improvement (stabilization) projects, such as along Cienega Creek. Monitoring will take place every 2-3 years. Pima County will develop a cave visitation protocol (including what kinds of equipment to be used) to minimize disturbance to these species. This is particularly important because many of these species are sensitive to disturbance. As a result, abundance estimation at roost sites may not be appropriate. Surveys will take place at appropriate times of year to ensure occupancy by this species. Additional monitoring of populations through the employment to passive detectors (e.g., Duchamp et al. 2006) will be reviewed periodically to determine application of this technology to the County's needs. Pima County may participate in species-level monitoring for this and other bat species as part of Arizona Game and Fish Department's bat monitoring plan; that plan has not yet been released.
Birds	Cactus ferruginous pygmy owl	Pima County will assist with the delineation and mapping of high-quality habitat within the Permit Area. Once that map is complete, Pima County will conduct surveys for abundance and/or occupancy at a subset of those lands within the County Preserve System according to a survey protocol that is acceptable to the USFWS. The number of monitoring sites and revisit pattern will be determined after the habitat model has been developed. Pima County may also continue surveys for this species prior to construction of Capital Improvement Projects.
	Southwestern willow flycatcher	Pima County will monitor biennially for abundance and/or occupancy at Cienega Creek Preserve and at the A7 Ranch along the San Pedro River. Pima County will use the survey method in Sogge (2010), which calls for three surveys per year during the nesting season.
	Western yellow-billed cuckoo	Pima County will monitor for abundance and/or occupancy every other year at the Cienega Creek Preserve using a standardized protocol by Wiggins (2005) that uses a broadcasted call of the species to elicit a response. Pima County will survey suitable habitat within the Preserve at least twice during June.
Fishes	Gila chub	Pima County will monitor abundance and/or relative abundance of this species using backpack shocker and/or passive sampling at the Cienega Creek Preserve. Monitoring will take place within pools and

Taxon group	Species	Key Information
		runs, and multiple-pass depletion sampling will be used for deeper pools. Monitoring will take place every other year, as recommended by Bodner (2007) when monitored in combination with other species for which different methods are used (e.g., seine netting; Gila topminnow). By alternating seining and electroshocking (for Gila chub) each year, Pima County minimizes sampling impacts to the species and maximizes opportunities for finding invasive species.
	Gila topminnow and Longfin dace	Pima County will monitor abundance and/or relative abundance of these species using seine nets and employing depletion sampling at the Cienega Creek Preserve. Monitoring will occur every two years. The number of monitoring sites at other locations will be determined prior to permit issuance. By alternating seining and electroshocking (for Gila chub) each year, Pima County minimizes sampling impacts to the species and maximizes opportunities for finding invasive species.
Amphibians	Lowland leopard frog	Pima County will monitor for occupancy at least two times in late spring and early summer (pre-monsoon) every other year at select sites. Monitoring will be for any stage of the species' life cycle (eggs, tadpoles, adults) using a visual encounter survey (Heyer 1994) that has been modified by the Arizona Game and Fish Department for the Chiricahua leopard frog (U. S. Fish and Wildlife Service 2007). Don Swann (Saguaro National Park) has also developed a survey protocol for this species and Pima County will investigate the use of that protocol, which includes a rapid assessment of habitat conditions (mostly water availability) during each visit. Pima County will develop a database for incidental observations of this species so that County staff and cooperators can record observations made while performing other functions. Pima County will also note other aquatic species such as the Sonoran mud turtle and canyon treefrog. Pima County may also work with researchers at the UA to test populations for <i>Chytridiomycosis</i> .
	Chiricahua leopard frog	No known populations of this species currently exist within the County Preserve System. However, Pima County will inventory new acquisitions and leased lands for new populations. For populations that are found within the County Preserve System, Pima County will monitor for occupancy at least two times in late spring and early summer (pre-monsoon) at least every other year. Monitoring will be for any stage of the species' life cycle (eggs, tadpoles, adults) using a visual encounter survey (Heyer 1994) that has been modified by the Arizona Game and Fish Department for this species (U. S. Fish and Wildlife Service 2007). Don Swann (Saguaro National Park) has also developed a survey protocol for the lowland leopard frog and Pima County will investigate the use of that protocol, which also includes a rapid assessment of habitat conditions during each visit. Pima County will also note other aquatic species such as the Sonoran mud turtle and canyon treefrog. Pima County may also work with researchers at the UA to test frog populations for <i>Chytridiomycosis</i> .
Reptiles	Desert tortoise	Pima County will commit to monitoring occupancy for the desert tortoise at approximately 15 sites, which will be surveyed every other year according to the field protocol used by Zylstra (2008). This protocol suggests at least 4 visits to sites each season. Of course, monitoring this species would best be accomplished at a larger spatial scale than the County's preserve network. To this end, Pima County awaits the development of a long-term monitoring protocol to be developed by the Arizona Game and Fish Department. Once that plan is released, Pima County will decide if the plan is appropriate for Pima County to be involved. Pima County will develop a database for incidental observations of this species so that County staff and cooperators can record observations made while performing other functions.
	Mexican garter snake	Pima County will monitor occupancy of this species every three years at Cienega Creek Preserve using either visual encounter surveys (Heyer 1994) or minnow traps, which have been successful for capturing this species (Rosen and Caldwell 2004). Because of the low detectability of this species, Pima County will survey a select set of sites at least four times within a seasonal period of peak activity for this species.
Invertebrate	Arkenstone Cave pseudoscorpion	Recent sightings of this species in Colossal Cave may represent an opportunity to monitor its presence without entering Arkenstone Cave. Pima County will work with park staff to determine the feasibility of this approach.

Covered Species. Habitat-based monitoring is a key component of the PCEMP and reflects the understanding that changes in key habitat features reflect changes in species abundance and distribution. But what constitutes habitat and how do we monitor it? The response to this question has been a two-year planning process, and which is detailed by Steidl et al. (2010). The design process considered a host of

potential environmental features (i.e., habitat features used by many different species) and compared environmental features based on different objectives that focused on issues of management, importance of Covered Species relative to other species considered in the planning process, etc. Some environmental features emerged as the most important to monitor regardless of the weighting scheme used. Most notably, vegetation characteristics were among the most important because of their importance as habitat to many of the vertebrates included in the planning process. In fact, of the top 12 Environmental Features, ten are related to vegetation. Not surprisingly, water was another critical feature that emerged and together, these two groups of parameters will form the foundation of the habitat-based monitoring effort for the PCEMP. Though not part of the design process in Steidl et al. (2010), caves and mines will be a part of habitat monitoring for the PCEMP.

6.2.2.1 Vegetation

Two aspects of vegetation were consistently chosen in the design process, no matter the weighting scheme used: (1) *structure* is the physical formation, arrangement, and physiognomy of vegetation and is often measured as density or volume of vegetation; and (2) *composition* refers to the plant species present on a site and includes measures of stem density, abundance, or frequency. The emergence of vegetation features as top-ranked parameters is not surprising: plants are fundamental aspects of many species' habitat and vegetation is an indicator of site characteristics, past disturbance events, climate patterns, and in the case of some annual vegetation, the timing and intensity of weather events.

In the spring of 2010, Pima County developed and pilot tested a field-based protocol to monitor vegetation and other resources at long-term monitoring plots (see the SDCP website). The results from the 2010 field season will also be used to provide a basis for developing an appropriate stratification strategy and establishment of the number of plots necessary to monitor vegetation and other environmental features effectively during the 30-year permit period.

6.2.2.2 Water Resources

Water drives most ecological patterns and processes, especially in arid environments. In riparian areas, water availability determines the extent, composition, and structure of the vegetation community and has profound effects on biodiversity in general.

Four primary water resources will be monitored as part of the PCEMP: (1) seeps and springs, (2) shallow groundwater in select systems, (3) perennial streams, and (4) water quality (Table 6.2).

6.2.2.3 Caves and Mines

Caves and mines are key habitat components for a number of Covered Species, most importantly bats, and therefore will be an important part of the habitat monitoring element. As noted in the species-specific monitoring effort for cave-dwelling bats (see Table 6.1) caves and mines on County preserves will be visited every 2-3 years. Initial site visits to many mines will entail a detailed survey of conditions including size and

Table 6.2. Water resources that are proposed for inclusion into the Pima County Ecological Monitoring Program.

Resource	Parameter(s)	Monitoring Approach and Commitments
Spring and Seeps	Presence of water and relative flow	Observation and measurement of all springs in the County Preserve System. Pima County will monitor each spring at least once every two years. Pima County will engage other land management agencies (especially the U.S. Forest Service) in the development of regional spring monitoring protocol. Pima County may employ citizen scientists to visit springs and evaluate conditions.
Perennial and intermittent creek flow	Proportion of stream with water	Pima County will conduct wet/dry mapping of select creeks (e.g., Cienega Creek, Youtcry, Edgar, Davidson, and Posta Quemada) using the protocol used by the Pima Association of Governments along Cienega Creek. Monitoring will take place at least once per year and will likely be conducted in combination with aquatic species surveys. Surveys should be conducted during the driest parts of the year.
Shallow groundwater	Level in relation to established threshold	Groundwater monitoring will continue at sites along Cienega Creek, but the application of monitoring to other systems has not been determined. Fonseca (2008a) provides an in-depth analysis and discussion of this topic and we refer the reader there for more information.
Water Quality	Total dissolved solids, temperature, conductivity, and pH	Data being collected at Cienega Creek Preserve by Pima Association of Governments (Pima Association of Governments 2009). Data also collected on the Santa Cruz River as part of the operations for Pima County's wastewater operations. Additional water quality monitoring may take place as part of fish and amphibian monitoring using a multi-parameter meter.

dimensions of the mine, recent evidence of vandalism, and any structural issues that may cause deterioration of the cave or preclude subsequent visits, as well as a determination about the potential for installing bat-friendly gating. An inventory of caves and mines is currently being undertaken by County staff.

6.2.3 Landscape Pattern

As its name implies, landscape pattern takes a broader view than does the single-species monitoring or habitat monitoring; it includes land-cover type, land use and a variety of derived parameters such as fragmentation and roads. This approach is even more anticipatory than habitat-based monitoring in that many of these features are among the best leading indicators of change.

Analysis of landscape pattern will focus on detecting short-term change in land use (per existing tax codes), land ownership, preserve status, and the extent and configuration of County roads and sewers. At intervals determined by the availability of appropriate products, most notably the National Land Cover Dataset, Pima County will analyze changes in land cover across the entire County. In addition to and in support of the National Land Cover Dataset, the County will use other remotely sensed products, especially multi-spectral, high resolution satellite imagery, as they are made available to enumerate finer-scale changes in land-cover types throughout the County.

Future growth projections will likely be updated at each permit phase. To accomplish this, the County anticipates integrating analyses of local and national data on land cover and land-use change with a prognosis for potential future land-cover change based on appropriate scenarios of private, state, and Federal land-use changes in the planning area. The objective of this analysis is to facilitate review of the County's operations and conservation actions relative to the impacts of the MSCP and to meet the SDCP biological goal.

6.2.4 Threats

Like landscape pattern, threats monitoring can be similarly broad and anticipatory and can have some overlap with landscape pattern for parameters such as land use and

road networks. In addition, threats monitoring will include collecting data on other types of threats on County-owned and lease lands such as the extent and severity of: off-road vehicle use, invasive species, groundwater pumping, vandalism and littering, and toxic chemical spills. Pima County will report changes in these parameters at intervals appropriate to the data being collected.

6.2.5 Climate Monitoring

Climate is an important driver of natural processes and therefore will play an important role in the PCEMP. Fortunately, many other governmental entities have extensive climate monitoring stations and Pima County will use these data, including those from: Arizona Automated Local Evaluation in Real Time Network, Arizona Meteorological Network, National Weather Service Cooperative Observer Program, Colorado River Basin Forecast Center, Citizen Weather Observer Program, Remote Automated Weather Station Network, and others. Because of the high spatial variability of precipitation in this region, Pima County will install precipitation gauges at appropriate monitoring sites on County-controlled Mitigation Lands.

6.3 Program Duration and Phasing

The PCEMP will last for 30 years—the same time period as the County's Section 10 permit—though some program elements and parameters will likely continue after the expiration of the permit. Prior to permit issuance Pima County will continue program planning activities, but (with a few exceptions) on-the-ground monitoring will not get underway until after the permit is issued. The PCEMP will be fully implemented within five years of obtaining a Section 10 permit and the monitoring program will be implemented in three planning phases. Within one year of permit issuance the County will enact an implementation plan to guide program development through the end of Planning Phase III. The reason for the phasing, rather than starting all program elements and parameters at once, is to provide sufficient time to develop each piece with the appropriate care and attention. In this way, each planning phase builds on the success and lessons learned from the previous phase(s).

6.3.1 Planning Phase I: Permit Years 1-2

Planning Phase I will take place within two years of permit issuance. The primary programmatic activities in Phase I will include:

- Rapid assessment of County-managed properties to locate significant features that might not already be known about the properties such as presence of Covered Species, identification of habitat elements that might be important for Covered Species (e.g., caves, mine shafts, presence of water, etc.), and identification of threats. This information, combined with that already collected on the properties will provide a good baseline of information that will assist in the development of Coordinated Resource Management Plans that have been and will continue to be developed for large properties.
- Single species monitoring for all Covered Species that are indicated in Table 4.1. The first year of survey effort for each species will be devoted to protocol development, field testing the protocols, and subsequent revision. Other activities will include development of species-specific databases.
- Habitat monitoring: Riparian vegetation. Work in Phase I will involve the use of GIS to establish the location of plots, field work to develop appropriate protocols, and surveys at most plots.
- Field visit protocol will involve standard operating procedures for all field crews to follow when conducting field work. Data collected will include: (1) information about the area and time visited; (2) incidental observations of select species; (3) observation of a list of invasive species (approximately 15-20) that all field crews will be required to know and record if seen; and (4) evidence of recent disturbance such as trash or off-road vehicle use.

6.3.2 Monitoring Phase II: Permit Year 3

Monitoring activities in Phase II will involve continuing many of the activities from Phase I (except rapid assessments) and the following activities:

Upland habitat monitoring. Continue to develop and field test the protocol that was started in 2010. Full implementation on all plots will take place during Phase III and beyond.

Water resource monitoring at:

- Seeps and springs which will involve periodic assessments of flow at all known County managed springs and seeps;
- Perennial and intermittent creek flow, which will involve wet/dry mapping at select creeks (most likely Youtcry, Edgar, Davidson, and Posta Quemada) at least once per year. Wet/dry mapping at Cienega Creek will continue as part of the effort by Pima Association of Governments (Pima Association of Governments 2009).

Threats monitoring will include protocol development for:

- County data related to the built environment (e.g., miles of new roads, CIP projects, and extent and location of the built environment) and the extent and location of some future development based on Comprehensive Plan Amendments, rezoning, etc.
- Changes in land cover type, as products such as the National Land Cover Dataset and Southwestern ReGAP become available.

Other activities during Planning Phase II will include: development and finalizing a safety plan and working with interested citizens and citizen groups to determine appropriate projects for their involvement.

6.3.3 Monitoring Phase III: Permit Years 4-5

Phase III will be completed within five years of permit issuance. Activities in Planning Phase III will include continuation of elements from Phases I and II, which will all be finalized during Phase III. New program activities will be:

- Development and implementation of the climate monitoring protocol, which will focus on precipitation monitoring at most long-term habitat monitoring sites;

- Development and implementation of a protocol for the use of LiDAR and multispectral imagery to monitor a host of resources, most importantly vegetation and stream channel morphology;
- Finalizing the program's data management and communications plans.

6.4 Location of Monitoring and Adaptive Management Activities

Most on-the-ground monitoring will be on County preserve lands. An exception will be employing remote sensing assessments of Open Space Set Asides for mitigation to ensure that those lands are being conserved according to their original intention. An exception to the restriction of on-the-ground monitoring efforts will be in those instances where Pima County works with an agency or organization partner to monitor on lands outside of the County's preserve system.

6.5 Data Management

The draft PCEMP data management plan provides a comprehensive strategy to ensure that all PCEMP data are well documented, secure, accessible, and useful for the life of the permit and beyond (Powell 2010b). The data management plan is based on a set of core principles:

- **Quality:** Ensure that appropriate quality assurance measures are taken during all phases of data development: acquisition, processing, summary and analysis, reporting, documenting, and archiving.
- **Interpretability:** Ensure that complete documentation accompanies each data set so that users will be aware of its context, applicability, and limitations.
- **Security:** Ensure that both digital and analog data are maintained and archived in a secure environment that provides appropriate levels of access to project leaders, technicians, and other users.

- **Longevity:** Ensure that data sets are maintained in an accessible and interpretable format, accompanied by sufficient documentation.
- **Availability:** Ensure that the data are made available and easily accessible to managers and other users.

As part of the data management enterprise, the PCEMP will distribute natural resource monitoring information to make data available to a wide community of users, including County staff, other researchers and scientists, and the public. To ensure that all appropriate audiences are reached, Pima County will develop a communications plan.

Pima County will also work with the City of Tucson and Town of Marana HCP programs to share data management tools and results to both leverage resources and provide communication among these entities. Pima County envisions being the central data repository of all scientific data for the Pima County MSCP for the term of the permit. The County will cooperate with the relevant oversight committees (See Section 9.4) to facilitate collection, maintenance, management, analysis, and distribution of the data collected for the purposes of compliance, effectiveness monitoring, and management actions. Pima County will ensure data security, compliance with Federal standards, and provision of guidance with respect to standards for data submitted by participants.

6.5.1 Covered Species Information Database

Monitoring activities will form the foundation of the program and will be used to determine permit compliance and effectiveness. Yet the program will benefit from the fact that Tucson is a regional center for ecological research and monitoring activities, much of which could contribute to an understanding of the distribution and abundance of Covered Species. To provide an effective means of collecting and summarizing this information, Pima County will develop the Covered Species Information Database. Each year Pima County will query researchers and other governmental entities and non-governmental organizations regarding any data collected on Covered Species in the preceding year. Information sought will include reports, sightings, or emergence of new threats. Information from these sources will be part of the annual report to the

USFWS. Participating researchers and government and non-governmental entities would be encouraged to participate through public outreach activities, but the program would be on a voluntary basis. These data will be available to other HCP efforts in the region.

6.6 Management Responses to Trends

The proposed approach to monitoring involves five program elements (species, habitat, ecosystem, threats, climate) and a subset of possible parameters will be chosen from each of these elements to form the foundation of the program. In addition, inventories will provide information on Covered Species' occurrences and habitat for the development of management plans. Over time, management response will be needed to address issues that arise from monitoring data and these management responses will be placed within two management response contexts – Responsive Management Actions and Adaptive Management.

6.6.1 Responsive Management Actions

This type of management response focuses on implementing management action(s) and subsequent monitoring activities where there is little or no uncertainty about the causes of observed resource change or where there is only a single management action to pursue, such as the purchase of additional lands or herbicide treatment. This will most likely be applied to many changed circumstances (Chapter 7) or if it is determined that the mitigation measures outlined in this MSCP are not achieving their desired goals. Management actions in this context are typically one-time decisions affecting activities or policies on County-controlled Mitigation Lands. Potential responses include:

- Revisions to internal protocols and standard operating procedures that improve avoidance and minimization practices;
- Amendments to or additional Pima County Code requirements that improve avoidance and minimization practices contingent upon approval by the Board of Supervisors;

- Intergovernmental assistance decisions;
- Cooperative management;
- Adjustments to the land acquisition program;
- Seeking new authorities or funding sources.
- Revisions to regulatory programs applicable to County-owned Mitigation Lands;

6.6.2 Adaptive Management

Throughout the SDCP process, resource management decisions have been based on the best available scientific information. This guiding principle will continue during the development and implementation of the PCEMP. Adaptive management has been cited as an ideal platform for evaluating the effectiveness of management actions in the face of ecological and management uncertainty and it has been suggested by the USFWS as being appropriate for HCPs (U.S. Fish and Wildlife Service 2000). Rather than a one-time management event or a programmatic revision, such as described above for responsive management actions, adaptive management places an emphasis on recurrent decisions for which there is considerable uncertainty.

Adaptive management is a process of improving management actions through the use of management experiments to evaluate how a system operates and is managed (Walters 1986). This approach places emphasis on modeling ecological parameters of interest and the focus of monitoring efforts. Based on monitoring results, models and management actions are subsequently refined. Examples of adaptive management processes might include control of invasive species where control efforts and/or drivers of species spread are unknown.

Pima County has—and will continue to have—an active management program that relies on responsive management actions. However, whether to adopt a more formal adaptive management process will be at the discretion of Pima County. A notable exception to the discretionary use of adaptive management is when the Covered

Activities are thought to “pose a significant risk to the species at the time the permit is issued due to significant data or information gaps” (U.S. Fish and Wildlife Service 2000). Based on the amount of information that is known about the Covered Species and the conservation measures that have been conducted or are proposed to be implemented, Pima County is unlikely to employ adaptive management for Covered Species at the beginning of the permit process. However, Pima County anticipates that adaptive management may be appropriate for applications such as eradication of non-native species, restoration activities, evaluation of monitoring effectiveness, and ranch-management activities, or in select cases of Changed Circumstances where Pima County and the USFWS deem it is appropriate.

6.7 Adapting the Monitoring Program: Changed Circumstances and New Methods

An objective of the PCEMP is to provide timely information to managers. To enable this feedback process, it is essential that the program be broad in scope, flexible in design, and responsive to unforeseen management issues and threats as they arise. These changed and unforeseen circumstances (see Chapter 7) will inform changes to existing monitoring protocols as well as the potential to implement entirely new protocols to address them. Many changes to the monitoring program will be carried out in coordination with the AGFD (if vertebrates and some invertebrates), USFWS, and STAT. An evaluation of the need for additional funding will be included in any assessment of Changed Circumstances.

In addition to Changed Circumstances, it is inevitable that, during the course of the 30-year permit period, new and better monitoring tools and analytical methods will be developed. Therefore, Pima County will notify the USFWS of any emerging technologies or methods that might have direct application to the PCEMP. If a new technology or method is adopted by the program, Pima County will provide a detailed report on the technical issues, most importantly how to crosswalk legacy data (i.e., data already collected) with the new data collection protocol or analytical technique. This will ensure consistency of results and ensure that legacy data are properly incorporated into the new protocol.

The final type of change that may be needed is the possible discontinuation of a monitoring protocol if the information being received is not meeting expectations. Discontinuation of protocols is common in ecological monitoring programs because of labor/equipment cost increases, or more commonly because the level of sampling required to detect an ecologically meaningful trend is greater than originally budgeted. Because cost and sampling design issues are being considered in the design of the PCEMP, Pima County does not anticipate that significant changes will occur. Nevertheless, it may be necessary. Prior to discontinuation of a protocol, Pima County will convene a review by subject-matter experts to determine if the existing protocol can be modified to meet budgetary constraints and change detection goals. Changes to protocols or discontinuation of protocols will be carried out in consultation with the USFWS, with technical oversight provided by STAT.

6.8 PCEMP Oversight

Input and support from the public and scientific communities was one of the keys to the successful implementation of the SDCP. Pima County will continue to employ input from the public and scientific communities as part of PCEMP implementation. Specifically, Pima County will engage three groups for their input: County staff, external peer reviewers, and local stakeholders. These groups will evaluate different facets of the PCEMP to help ensure scientific credibility, feasibility, and efficient implementation into management actions. Roles and processes are described in Chapter 9.

6.9 Monitoring Partnerships

One of the key lessons learned from regional-scale conservation planning efforts elsewhere in the U.S. is the importance of cooperation and coordination among relevant entities. Ultimately, the success of the PCEMP will hinge, in part, upon the application of the best scientific and management principles that are shared by all the major land owners and managers of the region. The most likely partners early in the program's implementation will be the National Park Service's Sonoran Desert Network Inventory and Monitoring Program and Bureau of Land Management's Las Cienegas National

Conservation Area, the Town of Marana, City of Tucson, Arizona Game and Fish Department, and the USFWS, as well as many other entities.

7 CHANGED CIRCUMSTANCES, UNFORESEEN CIRCUMSTANCES, NO SURPRISES, AND OTHER FEDERAL COMMITMENTS

Section 10 regulations [50 CFR 17.22(b)(2)(iii)] require that an HCP specify the procedures to be used for dealing with changed and unforeseen circumstances that may arise during the implementation of the HCP. In addition, the Habitat Conservation Plan Assurances (“No Surprises”) Rule defines “changed circumstances” and “unforeseen circumstances,” and describes the obligation of HCP permittee and the USFWS.

7.1 Introduction

Pima County has made every effort to implement avoidance, minimization, and mitigation measures (conservation measures) necessary to conserve the Covered Species and their habitats. In addition, the management of Mitigation Lands, the 10-year initial permit evaluation, and the flexible provisions regarding the expenditure of mitigation funds provided by Pima County are intended to meet and address future exigencies and emergency situations. Thus, the Pima County MSCP is well situated to reduce the potential for adverse changed or unforeseen circumstances on the Covered Species and their habitats. Notwithstanding the provisions of the Pima County MSCP, if adverse changes or unforeseen circumstances result in, or threaten, a substantial change in the population of any Covered Species or the overall quality of any habitat of that species, as determined pursuant to the procedure outlined herein, Pima County and USFWS shall cooperate to resolve the adverse impacts in accordance with this section. For the purposes of this MSCP the terms “changed circumstances” and “unforeseen circumstances” are defined in the Habitat Conservation Plan Assurances (“No Surprises”) Rule.

7.2 Changed Circumstances

Changed Circumstances are “changes in circumstances affecting a species or geographic area covered by an HCP that can reasonably be anticipated by Plan

developers and the Service and that can be planned for (e.g., the listing of a new species, or a fire or other natural catastrophic event in areas prone to such events)” (50 CFR §17.3). Table 7.1 lists identifiable Changed Circumstances and Pima County’s potential responses.

Table 7.1. Changed circumstances for the Pima County Section 10 permit.

Category	Circumstance/Scenario	Potential Impact on Covered Species and/or their Habitat	Potential Response(s)
Annexation	An incorporated jurisdiction annexes private development with open-space set asides that are used as mitigation for the MSCP	The habitat quality may decline or be lost due to actions approved by other jurisdictions..	If the development occurs after annexation, the habitat take is allocated to the new jurisdiction. If the development occurred before annexation and Pima County satisfied the MSCP mitigation ratios, no action is necessary. If the development occurred before annexation, and Pima County has not fully satisfied the MSCP mitigation ratio, additional land will be committed to satisfy the MSCP mitigation obligation.
Climate Change	Climate change affects a host of resources and processes, including water availability, precipitation events, etc.	Declines in habitat quality and extent for species that are dependent on riparian forest structure and aquatic habitat. Periodic elimination of non-native or native fish, potentially other covered aquatic vertebrates.	See section 7.2.1
	Increased warming increases the length of the growing season. More annual growth in plants when sufficient water exists.	Shifts in plant community composition and distribution that could indirectly affect Covered Species.	See Section 7.2.1. No management response, but monitoring rainfall will be a priority for the PCEMP.
Habitat Improvement	Central Arizona Project recharge along Santa Cruz River near Martinez Hill creates aquatic habitat, and expand riparian habitat.	Improved habitat for riparian and aquatic Covered Species; potential for providing habitat for invasive aquatic species.	No action, however Pima County will remain available to assist tribal governments in developing projects or programs consistent with the Pima County MSCP.
	Due to the efforts of The Nature Conservancy and discontinued mining downstream, Lower San Pedro River becomes better watered, with bigger pools and more beaver.	Some aquatic species benefit, but it is possible for longfin dace and lowland leopard frog to decline due to improved habitat conditions for invasive species. Riparian, forest-dependent Covered Species benefit.	Coordinate with The Nature Conservancy and others on land management and acquisition opportunities.
Habitat Loss/Degradation: Development	Clearing of pecan groves for urban development.	Loss of yellow-billed cuckoo habitat or other Covered Species resulting in decrease in numbers in the County	If rezoned, will pursue Open Space Set Asides; if not rezoned, developers will be approached to minimize impacts to Covered Species.
	Conversion of desert, riparian areas, or grasslands to agriculture in Permit Area or on adjacent tribal lands.	Fragmentation of landscape, reducing viability of some Covered Species populations	No action, because Pima County has no regulatory authority over agricultural land use. However Pima County will continue to offer support and assistance to Tribal governments in developing their own conservation programs that are consistent with the Pima County MSCP.
	Developer set asides are developed	Loss of habitat and permeability (connectivity).	County may pursue enforcement action for remedy; If enforcement does not yield remedy to satisfy mitigation commitment, County will make up for impacted set asides with lands elsewhere.

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Category	Circumstance/Scenario	Potential Impact on Covered Species and/or their Habitat	Potential Response(s)
	New unplanned foot trails adversely affect Covered Species.	More disturbances of roosting and nesting of Covered Species. Spread of invasive species.	Consider systematic monitoring; incorporate requirements for mapping, removal, and restoration of wildcat trails in Conservation Easements and/or Management Plans; Ensure approved trails will have limited, designated access points.
	Land is graded on County-held grazing leases, County conservation easements, or County-owned mitigation lands for infrastructure or other developments beyond County's control (e.g., condemnation)	Loss of habitat and fragmentation of landscape, reducing viability of some Covered Species populations.	Verify that loss has occurred; if so, replace with lands elsewhere in the CLS according to acres of impacts and MSCP mitigation ratios of the condemned lands, if mitigation credit is needed. Attach conservation easements to new mitigation lands.
Habitat Loss/Degradation: ORVs	Increased off-road vehicle (ORV) use in existing and proposed preserves.	General habitat degradation with potential lethal take of terrestrial Covered Species.	Pursue increasing enforcement; road restoration efforts; consideration for designated ORV areas to be established. Existing laws ban ORVs from public washes and riverbeds.
Habitat Loss/Degradation: Roads	Construction of expanded international port-of-entry and highway improvements in Altar Valley.	Increase in lethal take, particularly along State Routes 286 and 86; increased risk of influx of invasive species; potential adverse effect on cactus ferruginous pygmy-owl and Pima pineapple cactus.	Support state and Federal agencies in efforts to minimize impacts and monitor conditions, especially for Covered Species. Propose tools for reducing impacts (e.g., wildlife underpasses and fencing).
	Interstate 10 bypass placed in Avra Valley	Additional incidental take and fragmentation of Covered Species habitat, especially Tucson shovel-nosed snake, burrowing owl, and cactus ferruginous pygmy-owl.	Discuss with Arizona Department of Transportation alternative routes or ways to minimize and mitigate damage, suggest incorporating appropriate wildlife crossing structures in the design phase of the project.
	New roads established through talus slopes.	Potential for talus snails to be affected.	Solicit conservation easements on occupied habitat; target additional areas for acquisition program.
	Paved road over Redington Pass.	Likely significant increase in vehicular traffic, ORV use, habitat destruction and fragmentation, roadkill, and spread of invasive species.	Such paving is not a Covered Activity. Pima County has already purchased many of the developable lands, and has targeted additional developable lands in the San Pedro Valley.
	Paving San Pedro River Road from Pomerene to San Manuel	Loss of Huachuca water umbel habitat at Bingham Cienega; more development in San Pedro basin, resulting in fragmented Covered Species habitat.	Monitor conditions at Bingham Cienega.
Habitat Loss/Degradation: Vegetation	A few severe freezes leads to widespread mesquite die back and incidence of bacterial necrosis in saguaros increases.	Minor effects to pygmy-owl nesting sites. Minor loss of foraging habitat for lesser long-nosed bat.	Landscape-scale reserve design covers broad areas, not all of which would be affected equally at any given time. Continue with acquisition program that is focused on securing diversity of vegetation communities
	Reduction in effluent flow from County treatment facility contributes to dieoffs of riparian forest and elimination of aquatic vegetation along the Santa Cruz River in Pima County.	Increase in burrobrush, decrease in aquatic habitat area. Riparian forest-dependent and aquatic Covered Species decline.	Determine what impacts to Covered Species have occurred. Evaluate strategies to reverse or minimize impacts to Covered Species. Engage effluent owners in minimization or mitigation strategies. Consider allocations of alternative water sources to the river.

Category	Circumstance/Scenario	Potential Impact on Covered Species and/or their Habitat	Potential Response(s)
	Elimination of natural, restored or created wetlands, cienega and cienega-like environments due to social conflict or public perception (airport restrictions; mosquito, other vector and aesthetic preference issues).	Destruction of existing wetlands may affect for one or more Covered Species and their habitat(s).	Threats to natural wetlands and cienegas will be assessed to determine possible interventions.
	Desiccation of other groundwater-dependent riparian systems.	Habitat quality and quantity for Covered Species associated with riparian forest will decline. Mesquite bosques and broadleaved deciduous trees will be more stressed, and fewer recruitment events will occur. Habitat quality and quantity for Covered Species aquatic species will decline.	Seek to acquire important aquatic areas and water rights; Participate in multi-jurisdiction efforts to increase water conservation and public education; Asses site-specific circumstances for possible interventions; evaluate effectiveness of monitoring.
	Increase in desiccation of Lower Cienega Creek by groundwater pumping by residential and commercial development in the Vail, Empirita, and Mescal areas	Shift to less aqualic habitat, more strand vegetation over time. Mesquite bosques and broadleaved deciduous trees will be more stressed, and fewer recruitment events will occur. Habitat quality and quantity for aquatic and riparian Covered Species	Coordinated and concerted effort to work with landowners and developers in minimizing high-water using elements; purchase riparian habitat and/or water rights (ongoing); long-term potential for treating and reusing wastewater for landscape irrigation and support of natural systems.
Invasive Species	African sumac, Arundo, and other existing invasive and/or invasive species expand further into riparian areas.	Effects upon Covered Species are difficult to forecast. Arundo already invading Santa Cruz River, Rillito River, and Sabino Canyon.	Attempt to restrict use in landscaping or sales; implement control and monitoring efforts.
	Arrival of fire ants (<i>Solenopsis invicta</i>) into riparian areas or Arkenstone Cave.	Potential impact on leopard frogs, northern Mexican garter snake, giant spotted whiptail lizard, and pseudoscorpion.	Fire ant reports should be conveyed immediately to the Arizona Department of Agriculture, with whom a response should be coordinated. Immediate response may prevent establishment. Consider enhanced monitoring effort.
	Establishment of feral pigs, sheep, or goats in additional conserved riparian areas (outside of the San Pedro River).	Potentially problematic for riparian and aquatic Covered Species.	Establish a program under which feral pigs, sheep, and goats are removed from County-controlled Mitigation Lands. Include removal actions in all Conservation Easements and/or Management Plans developed for Conserved Lands.
	New invasive plant species appear	Potential direct negative effect will be species dependant	Expand monitoring and control efforts in County-controlled Mitigation Lands. Support ongoing coordinated regional efforts to raise awareness, and actively monitor and remove invasive plant species to fullest extent possible.
	Invasive aquatic species (e.g., bullfrog, crayfish, non-native fish) enter Cienega Creek or other aquatic sites from non-Central Arizona Project sources.	Bullfrogs: negative effect on Covered Species aquatics vertebrates. Crayfish: negative effect on Covered Species aquatic vertebrates and Huachuca water umbel. Mosquitofish (<i>Gambusia</i>): adverse effects upon Gila topminnow and would be difficult to remove. Sunfish could affect topminnow and chub. Effects greater if the fish get into Upper Cienega watershed as opposed to	Work to eradicate invasive species. Identify and manage problematic stock ponds on County-controlled Mitigation Lands. Initiate Safe Harbor Agreements for native species; support crayfish restrictions on commerce; public education, encourage fish management by AGFD, develop interagency contingency plans. Seek voluntary restriction on distribution of <i>Gambusia</i> for mosquito control.

Category	Circumstance/Scenario	Potential Impact on Covered Species and/or their Habitat	Potential Response(s)
		Lower Cienega.	
	New species of landscaping plants are discovered to be invasive into wildland settings.	Effects upon Covered Species is not possible to forecast.	Seek revisions to Pima County approved plant lists and recommend new species be added to the State of Arizona list of noxious weeds. Develop protocols to restrict commercial distribution of landscaping species found to be invasive. Removal of invasive plants and follow-up monitoring.
	Periodic rainy winters will result in dense growth of red brome, black mustard, fiddleneck, and other invasive winter annuals.	Spring and early summer fires will eliminate local populations of Pima pineapple cactus.	Support ongoing coordinated regional efforts to raise awareness, actively monitor, and remove invasive plant species from County-controlled Mitigation Lands to the extent possible.
	Utilization of Central Arizona Project water introduces new non-native aquatic species to Santa Cruz watershed.	Harm could be great to covered native aquatic vertebrates and their habitat. New species could include quagga mussel (<i>Dreissena rostriformis bugensis</i>) zebra mussel, (<i>Dreissena polymorpha</i>) New Zealand mudsnail (<i>Potamopyrgus antipodarum</i>), and <i>Salvinia</i> .	Identify likelihood of harm to Pima County populations of Covered Species. Work with Federal partners; seek voluntary restrictions on untreated Central Arizona Project discharge to watercourses
Listed Species	Natural establishment of Yuma clapper rail (<i>Rallus longirostris yumanensis</i>), least tern (<i>Sturnula antillarum</i>) or other currently listed species that is not currently considered for Section 10 permit coverage.	Unlikely to affect Covered Species.	Evaluate necessity of amending permit to add species to the permit. Surveys, management, and additional monitoring efforts would be established when new species are added. (see Section 7.5)
Listing Change	Delisting of Covered Species.	None	A delisted species would be considered a covered, unlisted species and Pima County would continue to implement any associated species-specific conservations strategies.
	New designation of Critical Habitat for Covered Species.	None	Update permit to indicate new status; no further action by Pima County is needed. The MSCP has adequately addressed habitat for Covered Species.
	Designation of Critical Habitat for species that are not covered under the permit	NA	Pima County will assess the importance of critical habitat on a species-by-species basis and may choose to amend the permit to cover the species or seek a Section 7 consultation.
Monitoring	Changes in monitoring protocols are proposed to STAT or other technical group because of high cost or inefficiencies in the current design.	None, but it will increase precision of estimates and of the monitoring effort	Any changes will be made with the approval of the USFWS.

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Category	Circumstance/Scenario	Potential Impact on Covered Species and/or their Habitat	Potential Response(s)
Mining	Copper or other mining begins at Rosemont, Davidson Canyon, Buehman Canyon, or other watersheds.	Potential contamination of streams with heavy metals, and watershed diversions or habitat losses. Potential effects upon Covered Species located in the direct impact areas or upon downstream aquatic Covered Species. Increased tamarisk along watercourses laden with salts.	Support the USFS or other agencies in their efforts to develop permit requirements to avoid or minimize potential adverse impacts. Seek anti-degradation provisions from state, and withdrawals from Federal government, if authorized by the County Board. Compliance with all monitoring, permit amendments and closure requirements are the main activities that can be taken afterwards.
	New limestone quarries established in various areas outside County preserves.	Could affect needle-spined cactus and potentially certain bat roosts.	Seek additional limestone lands as part of the County-controlled Mitigation Lands. Board may choose to direct staff to take additional action
	Major expansion of existing mines	Loss of habitat for Covered Species, especially Pima pineapple cactus	Pima County will encourage authorities to mitigate consistent with SDCP policies & guidelines
Ordinance change	Pima County revises environmental ordinances and guidelines related to the MSCP	No harm if ordinances provide equal or greater protection of resources. Weakening of avoidance and minimization measures may impact some species	No response if protections are equal or greater than existing ordinances and guidelines. Weakening of ordinances and guidelines will likely trigger a review by the USFWS to determine if Pima County remains in compliance with the terms of the permit.
Permit Area Change	Pima County loses State trust lands grazing leases or right to operate as a result of voluntary or involuntary actions by the County	Stewardship might change and more impacts are apparent	Pima County will replace with fee-owned or leased land elsewhere to maintain the appropriate balance of mitigation credits, if needed
	Federal land is conveyed to private sector	Stewardship might change and more impacts might ensue	No action required by Pima County, however the County may wish seek a permit amendment to cover private development if the released land is not in the permit area.
	State land is conveyed to private sector	Stewardship might change and more impacts might ensue	Pima County will impose the MSCP measures to Covered activities in the permit area.
Population change	Loss of a known population of Covered Species within Pima County.	Effects are species dependant. Tucson shovel-nosed snake may be extirpated from Pima County.	Where appropriate, Pima County will participate in reestablishment of species on committed lands, in coordination and collaboration with USFWS and AGFD.
	Immigration of Covered Species into County-controlled Mitigation Lands or elsewhere in the Permit Area and establishment.	Increase in population(s) of Covered Species.	This is a desirable outcome. A response is not compulsory.
Population change	Populations of leopard frogs and other aquatic Covered Species decline in areas adjacent to Pima County	Viability of species' continued existence declines.	USFWS and AGFD complete Safe Harbor Agreements and allow land owners with suitable sites to "host" re-establishment of leopard frogs and other aquatic Covered Species, resulting in establishment of many new, small populations.
	Precipitous population decline in other species outside Pima County	Viability of species' continued existence declines.	Encourage USFWS and AGFD to include Pima County in regional surveys; review County monitoring data for evidence of decline.
Taxonomic Change	New genetic information about Tucson shovel-nosed snake; desert box turtle; ground snake subpopulations; red-backed whiptail subpopulations; and	No physical effect on Covered Species, but legal status may change.	No change. If legal status changes, this will be addressed by minor amendment to the permit.

Category	Circumstance/Scenario	Potential Impact on Covered Species and/or their Habitat	Potential Response(s)
	other Covered Species shows that they are a separate species.		
Toxic spill	Toxic or hazardous waste spill into Cienega Creek or the Santa Cruz River either from the railroad or from the Interstate Highway.	Potential adverse effect on Covered Species native fish and frogs, including kill-off; loss of vegetation within Important Riparian Area.	Seek to adopt a County-level contingency plan that parallels and/or supports state and Federal response plans, especially for Cienega Creek Preserve.
Vandalism	Vandalism of Arkenstone Cave	Possible impact on Arkenstone pseudoscorpion	Periodic security checks to ensure no break-ins; potential measures to reduce incursions.
Wildlife/Plant disease	Wasting disease affects deer population; predators are also affected.	Loss of top predator could affect the entire ecosystem.	Support on-going monitoring efforts by AGFD and Federal land managers.
	West Nile Virus impacts to Covered Species.	Viral impacts are not yet apparent on Covered Species. May cause increased bird mortality and place restrictive constraints on riparian restoration element.	Proactive vector management with multi-jurisdiction/multi-agency involvement; intensify public education program.
	White-nosed syndrome affects bats in Pima County	Impact to populations of covered bat species is unknown, but potentially devastating to the Allen's big-eared bat and pale Townsend's big-eared bat are likely the most susceptible.	Restrict all recreational access to caves and work with AGFD to follow additional protocols to minimize the spread of the syndrome. Monitor roosts on County-controlled Mitigation Lands.
	Windthrow or disease affects saguaros	Potential to lose cactus ferruginous pygmy-owl nest sites and foraging habitat for lesser long-nosed bats.	Determine appropriate level of revegetation strategy, if any.
Wildland Fire	Wildland fire exceeding 1,000 acres in size occur inside or outside the County preserve system. Not all County preserves are affected at the same time, but at least one is.	Direct mortality of Covered Species. Enhanced erosion and siltation. Fire may open up the forested environments on mountains possibly harming some species. In lower elevations, potential loss or alteration of habitat for most Covered Species. The result of wildland fires may benefit Covered Species such as the Swainson's hawk. May be instrumental in improving watershed condition over the long term.	Determine whether the fire will improve long-term conditions. Participate in cross-jurisdictional fire evaluation and management actions. Continue to protect lands that span different mountain ranges and watersheds. Rest mitigation lands from grazing if severely burned to facilitate recovery and forage production.

7.2.1 Changed Circumstances: Climate Change

Climate change is a considerable threat to the biota of Pima County and beyond (Powell 2010c) and therefore warrants special analysis regarding the Section 10 permit. During the 20th Century, the earth's surface warmed by an average of 0.74°C (IPCC 2007), a trend that appeared to be even more severe in the southwestern U.S. (Lenart and Crawford 2007). Climate models for the 21st Century show ever-increasing temperature and prolonged drought in the Southwest U.S. (Christensen et. al. 2007, Seager et. al. 2007). Here precipitation is expected to become more variable, with more summer and fall precipitation and reduced winter precipitation. Because temperature and

precipitation influence the abundance and distribution of biota and impact ecosystem processes, climate change impacts will be far-reaching and unprecedented (e.g., Parmesan 2006).

Modeled impacts of climate change on biodiversity, in particular, predict extraordinary change; by one estimate 15-37% of the earth's species may go extinct by 2050 as a result of climate change (Thomas et. al. 2004). Not surprisingly, the potential for extinction is greatest for those species that are already at risk, such as many of Pima County's Covered Species. Climate-driven impacts on ecosystem structure and function (e.g., fire, nutrient cycling, and succession), coupled with non-climate related threats (e.g., Covered Activities, off-road vehicle use, mining, and pollution), will impact Covered Species and their habitats in Pima County in ways that are difficult to predict. Indeed, no comprehensive assessment has been undertaken to determine vulnerabilities of species in Arizona to climate change, though efforts are now underway, including for some Covered Species.

Even with species assessments, considerable uncertainty will remain as to the severity and timing of impacts. Rather than wait for these uncertainties to be resolved, Pima County has taken a number of steps to plan for and mitigate the effects of climate change and increase the resilience of the natural systems to respond to climate-induced changes. Under the direction of STAT, Pima County applied key principles of conservation biology as they relate to the likely challenges faced by species in the face of climate change, including connectivity and heterogeneity of natural landscape features. In response to the threat of climate change, Pima County has voluntarily taken action to adapt to or mitigate for the effects of climate change on species and their habitats through:

- Land-use planning practices that seek to reduce the footprint of transportation and infrastructure projects that would contribute to climate-changing greenhouse gas emissions;

- Acquisition and long-term retention of natural open space, some of which would be otherwise be developed during the permit period. In their natural, vegetated state, these areas act as a carbon sink relative to developed areas;
- Acquisition priorities that are geographically diverse and biased toward acquisition of riparian habitat;
- Diversity in latitude and elevation of acquisitions that expand existing reserves or assist in retaining ecosystem connectivity;
- Infrastructure spending to make vehicle transportation more efficient and at the same time provide opportunities for alternative modes of transportation such as busing, biking, and walking;
- Adoption of Sustainability Initiative that supports sustainable development; green building design; use of effluent to sustain river flow and riparian and aquatic resources; and the pursuit of alternative energy sources;
- Identification of ecological refugia (riparian areas, talus, limestone) as conservation targets;
- Sponsorship of NRCS drought assistance to achieve temporary reductions in stocking rates on ranches not owned or managed by Pima County
- Modifications of stock-watering systems to provide safer and more lasting access to water for wildlife;
- Buffelgrass management in County preserves and along County roadways;

Pima County believes that these and future MSCP-related planning and on-the-ground efforts will contribute to (1) a greater reduction in the emissions of greenhouse gases than would take place if the MSCP is not been implemented, (2) carbon storage in natural and restored environments, and (3) hands-on efforts to assist the persistence of

at-risk species from climate change. Planning efforts to mitigate for the effects of climate change on Covered Species will also take place in coordination with the local scientific community. Pursuant to the advice of the Science Technical Advisory Team, Pima County will evaluate, at ten-year periods, adequacy of ongoing activities to observed changes in ecosystem conditions, and examine whether these or other measures might be more effective in maintaining ecosystem structure and function.

7.2.2 Management response to Changed Circumstances

Pima County believes that the proposed management and monitoring measures to be funded by Pima County will be effective to conserve the Covered Species and their habitats. However, conditions within the Permit Area, the status of Covered Species' habitat, and the population status of individual species will change over time (i.e., are Changed Circumstances). The proposed monitoring program will be important to determine the effectiveness of the proposed conservation measures and to determine if additional management actions are necessary. If additional actions are warranted, an adaptive management or responsive management action framework (See Chapter 6 for more information) will be used to address changed circumstances, at the discretion of Pima County and in consultation with the USFWS.

To address changed circumstances that may occur during the Section 10 Permit period, Pima County and the appropriate state and federal agencies, along with input from the academic community, would develop an expedited analysis to determine the appropriate management responses for the conservation target (species, habitats, or key areas). If specific management strategies have been developed previously for such targets or circumstances, those strategies would be reviewed in light of the changed circumstances. Development of management and monitoring protocols for the targets or circumstances would be a priority where such protocols do not exist.

The outcome of these analyses will be the development of appropriate response measures to minimize, to the extent practicable, the occurrence of adverse effects resulting from the changed circumstances. The response measures would then be implemented. Ongoing management activities are likely to continue until new measures

derived from the analyses are developed. However, in consultation with the USFWS, measures could be promptly implemented to minimize adverse effects prior to completion of the analysis, to the extent feasible.

7.3 Unforeseen Circumstances

For the purposes of this Pima County MSCP, "unforeseen circumstances" are any events that could not reasonably have been anticipated by Pima County and the USFWS at the time of the HCP's negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species. Examples include:

- Natural catastrophic events such as fire, drought, severe wind or water erosion, floods, and landslides (also landslides associated with earthquakes) of a magnitude exceeding that expected to occur during the term of the permit, and
- Invasion by exotic species or species-specific disease that threaten Covered Species or their habitats which cannot be effectively controlled by currently available methods or technologies or which cannot be effectively controlled without resulting in greater harm to other Covered Species.

Table 7.2 lists potential Unforeseen Circumstances for the Pima County Section 10 permit. During the 30-year permit period, the USFWS may determine that an event constitutes an unforeseen circumstance. To do this the USFWS will consider—but not be limited to—the level of knowledge about the affected species and the degree of specificity of the species' conservation program under the Pima County MSCP. The USFWS will also consider whether or not failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected species in the wild.

Table 7.2. Example of unforeseen circumstances, their impact on the Covered Species and/or habitat, and potential responses by Pima County that may warrant contingency efforts or funds from the USFWS.

Circumstance/Scenario	Potential Impacts	Potential Responses
Weapons of mass destruction affect the urbanized area, causing social breakdown; warfare along international border extends into biologically sensitive areas	Potential for large-scale destruction of Covered Species' habitat.	Support Federal efforts, with priority given to public health, safety, and welfare.
Massive internal or external population shifts overwhelm public services, causing the appearance of shantytowns.	Increase in landscape fragmentation, decrease in connectivity, possible isolation of Covered Species populations, influx and spread of non-indigenous species.	Continue to conduct advance planning for future growth and development; maintain strong and adequate measures through the Pima County Comprehensive Land Use Plan and zoning ordinances.
Greatly reduced pumping along Santa Cruz River allows formation of new intermittent and perennial stream segments at Canoa, Tucson, and Marana.	Increase in riparian and aquatic vegetation communities likely to have a positive effect, particularly for native fish, frogs, and other Covered Species; potential for contamination with invasive species. Potential increase in invasive species.	Maintain strong vector and disease control monitoring and response measures at County level; coordinate efforts with State and Federal agencies.
Broad-scale poaching for subsistence. Greatly increased reliance on mesquite as fuelwood.	Unlikely to directly impact Covered Species; indirect effects more likely. Reduced canopy cover in mesquite savanna and mesquite forest would affect different Covered Species differently.	Coordinate biological monitoring with AGFD and other state and Federal Agencies. Potential strengthening of Park Rules and increased enforcement
Ranchers decide to shift to planting and irrigating exotic grasses rather than using and managing semi-natural ecosystem.	Potential for exotic species to out-compete native species and provide less suitable habitat for Covered Species; potential for increased wildfire risk.	Such actions will be prohibited on conserved lands owned by Pima County or for which they hold a conservation easement. Work with other agencies to develop guidelines and recommendations.
Arkenstone Cave dries up.	Pseudoscorpion and its food supply possibly affected.	Evaluate possible contingency actions and reasons for desiccation.
Establishment of new, non-native game animals (e.g., oryx, red or Sitka deer).	Unlikely to directly affect Covered Species; may have an indirect effect due to transmission of disease and/or due to competition for food sources and other habitat elements.	Pima County will discourage AGFD from taking such actions.
Increased acid rain.	pH changes in ponds, lakes and mountain streams which lack limy substrates, potential loss of species and populations of aquatic and other Covered Species.	Incorporate water quality monitoring into management of aquatic ecosystems.
Sustained cooling trend shortens the growing season over the permit period.	Gradual long-term shifts in vegetative composition; possible decrease or die-off in species sensitive to cold (e.g., saguaro and ironwood) and increase in extent of montane species (juniper, oaks, pine).	Incorporate regional climate monitoring information into Pima County MSCP monitoring and management decision-making.

Circumstance/Scenario	Potential Impacts	Potential Responses
Bioengineered organisms affect functioning of Covered Species directly or indirectly	Changes in species characteristics, changes in ecosystem functioning or ecosystem structures, changes in the water and energy efficiencies of organisms.	Support Federal efforts to detect or mitigate.

7.3.1 Procedure for Determining Occurrence of Unforeseen Circumstances

Prior to making a determination regarding the occurrence of any unforeseen circumstance, the USFWS shall initiate the following steps:

Notice to Pima County. The USFWS shall provide written notice to Pima County, together with a detailed statement of the facts, regarding the unforeseen circumstance involved, the anticipated impact on the Covered Species and its habitat, and all information and data that supports the allegation. In addition, the notice shall include any proposed conservation measure(s) that is/are likely to effectively address the unforeseen circumstance, an estimate of the cost of implementing such conservation measure(s), and the likely effects upon a) Pima County and b) the existing plans and policies of any involved Federal or state agencies.

Management Response. Pima County, in consultation with the USFWS, may choose to perform an expedited analysis of the Covered Species or its habitat affected by the alleged unforeseen circumstance and to modify or redirect existing conservation measures to mitigate the effects of the unforeseen circumstance, within the scope of existing funded conservation actions. To the extent that these modified or redirected conservation measures do not affect conservation of other species, habitats, or key areas, this may be deemed an adequate response to the unforeseen circumstance. If the proposed modifications or redirected conservation actions could affect the conservation of other Covered Species or its habitat, the procedure outlined below will be followed.

Submission of Information by Others. Pima County and/or other entities shall have a meaningful opportunity to submit information to the USFWS and shall submit such

information to the USFWS within 60 days of the written notice as provided above. Upon the written request of any applicant or participant, the time for submission of this information may be extended by the USFWS, which will not be unreasonably denied.

County Review. Within 30 days after the close of the period for submission of additional information, Pima County shall assess: a) the alleged unforeseen circumstances; b) the proposed additional conservation measure(s); c) its effects upon the Covered Species and its habitat and the economy and lifestyles of Pima County; and d) possible alternatives to the proposed additional conservation measures which would result in the least adverse impacts upon the economy and lifestyles of Pima County and Opt-in participants, while at the same time leading to the survival and recovery of the affected species.

Findings. The USFWS shall have the burden of demonstrating that an unforeseen circumstance has occurred, that such unforeseen circumstance is having or is likely to have a significant adverse impact on the Covered Species or its habitat, and that the proposed conservation measure(s) are appropriate. The findings of the USFWS must be clearly documented and be based upon the best scientific and commercial data available regarding the status and habitat requirements of the species. In addition, based on the results of an expedited analysis of the changed or unforeseen circumstance and the information provided by the applicants and participants, the USFWS shall provide the justification and approval for any reallocation of funds or resources necessary to respond to the unforeseen circumstance within the existing commitments of Pima County under the Pima County MSCP.

7.3.2 Response to Occurrence of Unforeseen Circumstances: No Surprises

If, after the conclusion of the process outlined above, the USFWS determines that an unforeseen circumstance has occurred and (1) additional conservation measures are required and (2) it is determined that Pima County has fully complied with the terms of the Pima County MSCP, any proposed additional conservation measures shall fit—to the maximum extent possible—within the terms of Pima County's Section 10 permit. To

the extent allowed by law, additional conservation measures shall not require the payment of additional compensation by the County. This is known as “No Surprises”. If additional expenditures are required, the USFWS or any other Federal agency shall take additional actions that might lead to the conservation or enhancement of a species that is being adversely affected by an unforeseen circumstance. The costs of these additional actions shall be borne by the USFWS or any other Federal agency. However, the USFWS agrees that, prior to undertaking or attempting to impose any action or conservation measure, it shall consider all practical alternatives to the proposed conservation measures and adopt only those actions or conservation measures which would have the least effect upon the economy and lifestyle of Pima County, while at the same time addressing the unforeseen circumstance and the survival and recovery of the affected species and/or its habitat. The purpose of this provision is to recognize that even in the event of unforeseen, extraordinary, or changed circumstances, additional mitigation requirements are not imposed upon a Section 10 permittee who has fully implemented the requirements pursuant to an approved habitat conservation plan.

If additional monitoring and conservation measures do not adequately respond to unforeseen circumstances, the County will assist, to the extent possible, with additional conservation efforts undertaken by the USFWS.

7.4 Additional Federal Commitments

7.4.1 Limitations on USFWS Funds

Implementation of this Pima County MSCP is subject to the requirements of the Anti-Deficiency Act (31 U.S.C. §1341) and the availability of appropriated funds. Nothing in this Pima County MSCP shall be construed to require the obligation, appropriation, or expenditure of any funds from the U.S. Treasury. Pima County acknowledges that the USFWS will not be required, under this Pima County MSCP, to expend any Federal agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

7.4.2 Section 7 Consultations and Conferences

Except as may be specifically provided elsewhere in this Pima County MSCP, nothing in the Pima County MSCP is intended to apply to any activity on Federal lands or Federally funded projects that are governed by Section 7 of the ESA. All minimization measures that result from the authorization of incidental take pursuant to Section 7 and contained within any biological opinion or conference report shall be generally consistent with the minimization measures required by the Pima County MSCP. However, nothing in this Pima County MSCP is intended to limit the USFWS from requiring minimization in excess of that provided for in the Pima County MSCP, if the circumstances so warrant.

7.4.3 Consideration of Pima County MSCP in Section 4 Findings

The USFWS will specifically inform Pima County of any listing proposal under Section 4 of the ESA for species in the Plan Area in writing. To the extent permitted by law, the USFWS will consider conservation actions undertaken by Pima County in making their determination.

7.4.4 Coordinating Requirements of the National Historic Preservation Act with the MSCP

USFWS actions require compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires the federal agency take into account the effects of the undertaking on historic properties eligible to or listed in the National Register of Historic Places, consult with the State Historic Preservation Officer and affected parties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. Both the NHPA and National Environmental Policy Act (NEPA) encourage coordination in the implementation of the two laws and their regulations.

Compliance with Section 106 is regulated by 36 Code of Federal Regulations (CFR) 800 and requires that federal agencies follow a compliance process to fulfill their obligations under the NHPA. The U.S. Fish and Wildlife Service is currently working with Pima County to finalize this MSCP. The USFWS will consult and coordinate with tribal groups, the State Historic Preservation Office, Advisory Council on Historic Preservation, Pima County, and other parties as part of the consultation process. The

consultation will be completed prior to or concurrent with the issuance of the Pima County MSCP Section 10(a) permit, thus providing USFWS compliance with Section 106 of the NHPA for this undertaking.

7.5 New or Proposed Listings of Uncovered Species and Increased Populations of Listed but Uncovered Species: Permit Amendment

The new listing of a species not covered by this Pima County MSCP or designation of critical habitat may constitute a changed circumstance. If the new circumstance increases the risk of incidental take, Pima County may wish to amend the permit. Increases of populations or geographic distribution of listed species not covered by the Pima County MSCP, for example the jaguar (*Panthera onca*) or Mexican grey wolf (*Canis lupus baileyi*), may also trigger Pima County to request a permit amendment, to the extent that the likelihood of incidental take from otherwise lawful activities covered by the plan is no longer negligible.

The USFWS shall immediately notify the County upon becoming aware of these situations. Upon receipt of notice of the potential listing of an uncovered species, Pima County may, but is not required to, enter into negotiations with the USFWS regarding necessary modifications, if any, to the Pima County MSCP. An amendment to the Federal permit is then required to cover the species. If Pima County elects to pursue an amendment of the applicable permit, the USFWS will provide technical assistance to Pima County in identifying any modifications to the Pima County MSCP that may be necessary to amend the applicable Federal permit.

In determining whether any further conservation or mitigation measures are required in order to amend the affected permit to authorize incidental take of such species, the USFWS shall take into account the conservation and mitigation measures already provided in the Pima County MSCP and cooperate with Pima County to minimize the adverse effects of the listing of such uncovered species on the Covered Activities consistent with Section 10(a)(1)(B) of the ESA, as required by the Implementing Agreement.

In the case of an unlisted species that is proposed or petitioned and is found to be warranted for protection under the ESA, the USFWS shall use its best efforts to identify any necessary measures to avoid the likelihood of jeopardy to or incidental take of the uncovered species ("no take/no jeopardy" measures).

8 FUNDING MECHANISMS AND COMMITMENTS

Pima County commits to funding the implementation of the Pima County MSCP by securing and/or pursuing a variety of funding sources described in this chapter.

Funding will be used to carry out acquisition, management, and monitoring elements of the Pima County MSCP including, but not limited to:

- New land acquisitions and other similar protections;
- Creation of mitigation banks;
- Management and monitoring of Mitigation Lands and associated conservation targets such as species;
- Contingency funding for private property compensation for takings pursuant to U.S. or Arizona constitutions;
- Contingency funding for changed and unforeseen circumstances;
- Periodic independent review; and
- Administration.

8.1 Summary of MSCP Costs

The estimated cost for administration, management, and monitoring of the Pima County MSCP for the first 10 years of the permit is, at a minimum, approximately \$40 million with increases over the subsequent 20 years due to inflation. Most of these costs are already incorporated into existing programs. Estimated costs are based on a range of land acquisition and land management costs, as experienced during the current, non-regulatory implementation of the plan.

Table 8.1. Estimated annual cost, in thousands of dollars, for Pima County to carry out Section 10 permit activities for Permit Phase I (Permit Years 1-10). Costs for managing the land acquisition program is included, but not the purchase price and associated due diligence costs. Estimated costs are indexed to inflation (2.8%; mean from 2000-2010) and Permit Year 1 estimates are based on 2009 costs, plus one year of inflation. Employee related expenses ("M1"; 28.8%), overhead ("M3"; 28.0% unless otherwise noted), and other expenses such as equipment and supplies are included in estimates. Salary increases for performance are not included. Compliance and effectiveness monitoring costs are the only costs that are in addition to the County's current MSCP activities. Pima County Departments/Divisions Acronyms: NRPR = Natural Resources, Parks and Recreation; OCSEP = Office of Conservation Science and Environmental Policy; RFCD = Regional Flood Control District.

Department/ Division	Function	Permit Year										Permit Phase 1 Total
		1	2	3	4	5	6	7	8	9	10	
Administration	Land acquisition/bonds ^a	23	49	51	54	57	59	29	31	32	34	419
Development Services ^b	Planning and zoning	248	255	261	268	275	281	288	295	302	308	2,781
Graphic Services	Report editing, design, and production	6	6	7	7	7	7	7	7	8	8	69
Information Technology	GIS services	114	100	76	78	80	82	84	86	88	89	876
NRPR	Mitigation Lands management ^c	1,779	1,827	1,875	1,923	1,971	2,019	2,068	2,116	2,164	2,212	19,954
OCSEP	Compliance and effectiveness monitoring	579	706	795	1,091	1,154	1,196	1,203	1,251	1,280	1,316	10,569
RFCD	Riparian Ordinance enforcement ^d	271	278	286	293	300	308	315	322	330	337	3,041
Sheriff	Law enforcement ^e	121	124	128	131	134	137	141	144	147	150	1,358
Transportation	Compliance and roadway design ^f	57	58	60	61	63	64	66	67	69	70	634
Totals		3,197	3,403	3,538	3,906	4,040	4,154	4,200	4,319	4,419	4,525	39,701

^a Staff time will be devoted to future bond elections and acquisition activities. Budgeted amounts include time for Real Property and County Attorneys for acquisition activities; those costs are not accounted for in purchase (i.e., Due Diligence) costs.

^b Overhead = 39%. Most of the work is related to implementing the County Comprehensive Plan and Board of Supervisors policies related to development.

^c Budget is likely to increase as number of properties under management increases; this is not reflected in these estimates. This figure excludes non-mitigation related programs within the Natural Resource Division of NRPR (e.g., environmental education) and management of non-committed lands (e.g., Tucson Mountain Park, Agua Caliente Park, etc.).

^d Includes \$10,000 per year paid to Pima Association of Governments for work primarily performed at Cienega Creek Preserve. Overhead = 45%.

^e Costs for patrolling mitigation properties.

^f Excludes compliance for Section 404 or the Clean Water Act.

Table 8.1 cont.

Department/ Division	Function	Permit Year										Permit Phase II	
		11	12	13	14	15	16	17	18	19	20		
Administration	Land acquisition/bonds	35	35	36	37	38	39	40	41	41	41	41	381
Development Services	Planning and zoning	315	322	328	335	342	355	362	369	375	375	375	3,451
Graphic Services	Report editing, design, and production	8	8	8	8	9	9	9	9	9	9	9	86
Information Technology	GIS services	91	93	95	97	99	103	105	107	109	109	109	1,002
NRPR	Mitigation Lands management	2,260	2,308	2,356	2,404	2,452	2,501	2,549	2,597	2,645	2,693	2,693	24,765
OCSEP	Compliance and effectiveness monitoring	1,381	1,411	1,440	1,470	1,499	1,529	1,558	1,587	1,617	1,646	1,646	15,138
RFCD	Riparian Ordinance enforcement	344	352	359	366	374	381	388	396	403	410	410	3,774
Sheriff	Law enforcement	154	157	160	164	167	170	173	177	180	183	183	1,685
Transportation	Compliance and roadway design	72	73	75	76	78	79	81	83	84	86	86	787
Totals ^a		4,660	4,760	4,859	4,958	5,057	5,156	5,256	5,355	5,454	5,553	5,553	51,069

^a Higher costs per year are due to inflation.

Table 8.1 cont.

Department/ Division	Function	Permit Year										Permit Phase III	
		21	22	23	24	25	26	27	28	29	30		
Administration	Land acquisition/bonds	42	43	44	44	45	46	47	47	48	49	49	454
Development Services	Planning and ordinance revisions	382	389	395	402	409	416	422	429	436	442	442	4,122
Graphic Services	Report editing, design, and production	10	10	10	10	10	10	11	11	11	11	11	103
Information Technology	GIS services	111	113	115	117	119	121	123	124	126	128	128	1,196
NRPR	Mitigation Lands management	2,741	2,789	2,837	2,886	2,934	2,982	3,030	3,078	3,126	3,174	3,174	29,577
OCSEP	Compliance and effectiveness monitoring	1,676	1,705	1,734	1,764	1,793	1,823	1,852	1,881	1,911	1,940	1,940	18,080
RFCD	Riparian Ordinance enforcement	418	425	432	440	447	454	462	469	476	484	484	4,507
Sheriff	Law enforcement	187	190	193	196	200	203	206	209	213	216	216	2,012
Transportation	Compliance and roadway design	87	89	90	92	93	95	96	98	99	101	101	940
Totals ^a		5,653	5,752	5,851	5,950	6,049	6,149	6,248	6,347	6,446	6,546	6,546	60,991

^a Higher costs per year are due to inflation.

Land Acquisitions Since 2004. Pima County will have spent approximately \$138 million since June 2004 on the acquisition of approximately 168,000 acres of Mitigation Lands (approximately 46,000 acres of fee lands and 127,000 acres of lease lands; Table 8.2; see Fig. 4.1). On properties with no associated lease lands, Pima County spent an average of \$16,697 per acre, while on lands with both a lease and fee component, the County spent an average of \$3,954 per acre of fee lands (Table 8.2).

County-controlled Mitigation Lands Management. Management of Mitigation Lands is currently funded at approximately \$1.8 million per year (Table 8.1). Future estimates are tiered to the level of stewardship provided at each site. Active management would include those used for public recreation, conservation or cultural resource education, or have portions of the property that require more intensive biological management and/or enhancements. Third party management occurs when there is day-to-day management through a contractual agreement. On these lands, protection of conservation values is the primary purpose, but other activities such as grazing and recreation may be allowed. Most of the ranch lands, except A7, are managed primarily through third party agreements. The actual costs of third-party management have varied from \$5,000 to \$15,000 per agreement approved by the Board of Supervisors, but \$10,000 per agreement is assumed for the purpose of projections.

Monitoring. There is currently no monitoring program. Future cost estimates include surveys, mapping, data collection, data management and analysis, and reporting. As noted in Chapter 6, the proposed monitoring program will be phased in over the first five years, from an estimated cost of approximately \$579,000 in Year 1 to \$1.2 million by Year 5, at which time the annual cost is expected to increase by the rate of inflation.

Program Administration and Compliance Monitoring. These costs include compliance data management, compliance reporting, permit negotiation, Inter-governmental Agreements administration, and future bond oversight costs. These costs accrue to the County Administrator's Office at present and are estimated to decline after the fifth year of the program due to less bond acquisition activity.

Table 8.2. Properties acquired since June 2004 to fulfill future mitigation obligations for the Pima County MSCP.

Property Name	Acres		Acquisition Cost (\$) ^a
	Fee	Lease	
Sweetwater Preserve	695		11,733,653
Jacobs Trust	80		601,336
A-7 Ranch	6,828	33,000	2,041,933
Baker	155		226,342
Doucette	21		569,608
Bee	120		60,873
Mordka	40		20,265
Bar V Ranch	1,763	12,000	8,189,228
King 98 Ranch	1,034	3,000	2,102,921
Rancho Seco	9,574	27,000	18,503,948
Madera Highlands	366		385,733
Carpenter Ranch	360		1,100,000
Berard	7		81,792
Canoa Ranch	33		1,801,106
Poteet	83		275,820
Heater	50		991,743
Hiett	25		721,863
Selective Marketing	10		92,372
Matesich	4		85,586
Pacheco	20		241,010
Serr	10		94,776
Belvedere	72		615,972
Hynlington	4		72,163
Firkins	1		30,987
Cates	39		132,957
Nuñez	19		68,502
South Wilmot LLC	36		112,690
Knez	80		240,967
Six Bar Ranch	3,330	9,000	11,525,322
Des Rochers	19		294,028
Bucklew Farms	505	2,200	5,080,467
Route 606	22		241,134
Canoa Ranch Phase II	52		1,200,581
Amadon	39		122,257
Chess	37		124,865
Linda Vista/Patrick	9		451,561
Reid Property	3		257,500
Tang Property	40		2,356,417
Continental Ranch Development LLC	15		750,448
Diamond Bell Ranch	191	30,600	897,730
Cochie Canyon Property	290		2,901,044
Habitat for Humanity	80		1,002,832
Sopori Ranch Phase 1	4,135	10,480	18,600,000
Turnamoc	320		4,700,000
Marley Phase 1	6,337		20,006,112
Empirita/Hartman/Cortaro	2,746		12,010,000
Clyne	800		4,900,000
Sands Ranch	5,040		21,000,000
Total	45,489	127,280	\$138,618,444

^a Does not include Due Diligence costs, which has averaged 1.9% of the total expenditures.

Implementation of avoidance and minimization measures for the private sector.

Regional Flood Control District, Development Services, and Department of Transportation are charged with the responsibility of ensuring that Covered Activities are complying with the terms of the Section 10 permit. Together they are expected to cost approximately \$575,000 per year.

8.2 Assured Funding Mechanisms: Minimization and Mitigation

Pima County will ensure that adequate funding will be available to implement the acquisition, management, and monitoring activities identified in this MSCP. This section highlights the mechanisms for achieving adequate and consistent funding.

8.2.1 Private Sector Funding for Mitigation of Habitat Loss

Costs associated with the avoidance and minimization practices exercised through compliance with Pima County Code requirements (e.g., compliance with rezoning conditions required by the Board of Supervisors including designation of Open Space Set Asides, Native Plant Preservation Ordinance, Watercourse and Riparian Protection and Mitigation Requirements, Outdoor Lighting Code, etc.) are borne by the developer/property owner. This includes maintaining the undeveloped nature of any set-asides associated with native plants and riparian habitat. For Opt-in Participants, Pima County will collect a fee.

8.2.2 Public Sector Funding for Mitigation of Acres Lost to Development

In 2004, voters approved \$174.3 million in open space bond funds, which included \$112 million for purchasing lands that will be committed to the MSCP for conservation. Almost all of these funds have been used to purchase Mitigation Lands. In addition, Pima County has spent almost all of its \$5 million in general obligation bonds for acquiring flood-prone lands. Because past approval rating of open space general revenue bonds by Pima County citizens has been high, it is anticipated that such support will continue.

Pima County will continue to use the RFCD taxing authority to acquire valued floodprone land, riparian habitat, and water rights. To accomplish this, the RFCD will

increase its line-item budget for this Capital Improvement Program project with flood control tax levy funds as economic conditions allow, and create incentives for property dedications and donations.

County project funding will be used to offset losses of Pima pineapple cactus habitat due to County projects through use of the County's Pima pineapple cactus mitigation bank established through the USFWS. Impacts to other protected native plants and riparian habitat are also mitigated with project funds. Project funds are derived from a variety of sources, including local and state funds.

8.2.3 Funding Regional Transportation Improvements to Reduce Fragmentation

In 2006 the Regional Transportation Authority was given voter approval for \$45 million for improving biological connectivity under and over new roads and highways and for retrofitting older roads and highways throughout eastern Pima County. Funding will also be used to assess the efficacy of these measures and to investigate the general impacts of roads on wildlife populations. These funds will help leverage other funds, such as Federal Highway Administration funds. The amount of money applicable to the Permit Area is not available at this time.

8.3 Assured Current Funding Mechanisms

8.3.1 General Fund

The general fund will be the primary fund that will pay for the ongoing responsibilities related to management and monitoring. The most significant commitment from the General Fund, as it relates to this MSCP, is the Natural Resource Division within the Natural Resources, Parks, and Recreation Department, which has approximately 12 personnel to manage most County-controlled Mitigation Lands, excluding trails crews and those assigned to Tucson Mountain Park and Agua Caliente Park (i.e., non-Mitigation Lands). Positions include rangeland staff, open-space maintenance and operation staff, and natural resource staff. The County will increase the amount of the designated open space line-item budget as the County budget permits and such increases will be proportionate to the size, distribution, and particular needs of the lands acquired.

8.3.2 Open-space Bonds

Bond funds are used prior to or immediately after the purchase of lands as part of the due diligence process. Here the focus is on establishing boundaries of the new acquisitions; and identifying, investigating, and securing imminent hazards such as open wells or shafts.

8.3.3 Flood Control District Tax Levy

Pima County Flood Control District operating funds are used to fund management of acquired floodprone lands, including fencing, signage and development of management plans. Once acquired, the District ensures the property is secured, cleared of hazards, and managed, maintained and (if necessary) restored to the open-space character appropriate for the property. The funds may be used to demolish most structures in the floodplain. In addition, these funds are used to manage invasive plants, conduct resource surveys, and to fund water resource monitoring on acquired lands. District funds also support 2 full-time equivalents for completion of the MSCP during FY09/10.

8.3.4 Development Agreements

Developers and the Board of Supervisors may, from time to time, agree to provide funding for management and monitoring. Terms and conditions of agreements (e.g., assessments, structures, and use of funds) will vary. The following are agreements that have been made since the adoption of the County's Comprehensive Land Use Plan update (2001) and they highlight the range of options available to Pima County and its partners:

- Starr Pass Marriott, adjacent to Tucson Mountain Park, provides funding from hotel sales to Pima County Natural Resources, Parks and Recreation Department. During FY 07/08, the fund produced \$375,000. The funds are administered with input from an advisory board and are used to support Tucson Mountain Park. Major action areas include biological corridor surveys, park and trail maintenance, open-space acquisition, and buffelgrass management.

- The Walmart Enhancement Contributions (Docket 12939, Page 7309) will be derived from sales at future location of a Walmart store on Ajo Way and Kinney Road. Funds are to be used for transportation and natural resource management issues in proximity of Tucson Mountain Park.
- A provision of Oro Valley's General Plan Amendment for the 9,000 acres of State Trust land (referred to as the Arroyo Grande Plan) contains a provision for an enhancement fee. If a resort is constructed adjacent to Tortolita Mountain Park, an enhancement fee will be assessed on the resort with the revenues to be spent on conservation activities associated with the park.
- The Stone Canyon development agreement provided for set-asides of the Honey Bee biological corridor and is now funding rehabilitation of former farm fields along Big Wash. Post-construction maintenance and monitoring of the Big Wash Xeroriparian Project on County Flood Control District was privately funded.
- Local utilities have agreed to fund buffelgrass management and monitoring in public rights-of-way for 2009; if utilities do not make progress, then Pima County will consider imposing regulations via right-of-way licensing. Utilities will donate money toward the recently created Arizona Buffelgrass Coordination Center.

8.3.5 Pima County Sheriff's Department

Law enforcement is provided by the Pima County Sherriff's Department, which has assigned various parks and preserves to a special parks enforcement unit. Funding comes out of the budget allocations to the County Sheriff.

8.3.6 Permit Fees

Permit fees taken in by the Development Services Department and the Regional Flood Control District provide funding to implement and enforce the requirements in the Pima County Zoning Code and the Water Course and Riparian Habitat Protection and Mitigation Requirements that generate Open Space Set Asides on private properties. The Development Services Department is also responsible for implementing the

Comprehensive Plan Regional Environmental Policies that result in Open Space Set Asides.

8.4 Additional Potential Funding Sources

8.4.1 Mitigation Fee Program

Pima County will explore the feasibility of collecting revenue from a mitigation fee program. Pima County Regional Flood Control District already collects riparian habitat mitigation fees for use in off-site projects to rehabilitate or enhance riparian areas. In the future, these fees may increase.

8.4.2 State Grants

Heritage Fund. Pima County has received funds from AGFD for allowing recreational access onto County lease lands, and the County has received Heritage Funds for various projects and will continue to submit grant requests for Heritage and other AGFD programs. Pima County will request that the Arizona legislature abide by the will of the voters when establishing the Heritage Fund in 1990 (Arizona Revised Statutes §5-22), and maintain the Heritage Fund as dedicated funding for the purposes for which it was established.

Arizona Water Protection Fund. Pima County and its Regional Flood Control District will consider using this source for water rights acquisitions if the authority to do so is granted to this agency.

Arizona Preserve Initiative. Pima County will encourage legislators to assist Pima County in working with the State Land Department so that the Arizona Preserve Initiative can support conservation efforts in Pima County. Use of the Arizona Preserve Initiative program allows State funds from Growing Smarter Act to pay one-half of the acquisition costs.

8.4.3 Public Lotteries

Pima County will explore the feasibility of State legislation to establish county-by-county lotteries, the proceeds for which would be spent in the county in which the tickets are

sold. Fifty percent of the proceeds could fund Arizona Preserve Initiative projects in the respective county. Other revenues generated by these games could be used for the purchase of development rights.

8.4.4 Federal Line-item Appropriations

Pima County will continue to encourage Congressional Representatives to pursue line-item appropriations to support partnerships and other efforts (excluding mitigation) that contribute to the goals of the Pima County MSCP.

8.4.5 Section 6 Grants: Federal

Pima County will continue to pursue Section 6 grants that are a part of the Cooperative Endangered Species Conservation Fund. This grant opportunity provides funding to States and Territories for species and habitat conservation actions on non-Federal lands. Funded activities include land acquisition, habitat restoration, species status surveys, public education and outreach, captive propagation and reintroduction, nesting surveys, genetic studies, and development of management plans. Section 6 grants are not allowed to be used for mitigation purposes, but nevertheless can be very an invaluable tool for further the conservation goals of the Pima County MSCP. Pima County has applied for and received Section 6 planning and acquisition grants from the USFWS to acquire properties and, most recently, to provide assistance to develop the monitoring program.

8.4.6 Other Federal Grants

Pima County has obtained and completed projects using U.S. Department of Agriculture Wildlife Habitat Improvement Project grants to build wildlife waters, re-introduce species, restrict access to bat roosts and fence riparian areas appropriately. Pima County has cooperated with U. S. Bureau of Land Management on several grant sources to fence riparian areas and clean up trash from undocumented migrants. Pima County will continue to pursue Federal funding to support non-mitigation activities from sources such as:

- Department of Interior,

- Department of Agriculture,
- Department of Defense,
- The Land and Water Conservation Fund,
- National Fish and Wildlife Foundation Challenge Grants,
- Applicable Farm Bill funding,
- National Oceanic and Atmospheric Administration (NOAA),
- Other Federal programs.

8.5 Program Structure: Endowment Fund

One means to achieve assured long-term funding for management and monitoring of the Pima County MSCP would be the establishment of an endowment fund to generate sustainable revenue to ensure that adequate conservation measures are undertaken. The fund could be established to receive fees or contributions from any legal source, but the source of those fees has not been identified.

9 REPORTING AND PUBLIC PARTICIPATION

9.1 Reporting

9.1.1 Annual Reporting

Pima County will prepare and submit an annual report to the USFWS for the purpose of permit compliance. This annual report will be the primary document in support of USFWS-required status reports for permit continuance. The primary focus of the report will be to quantify impacts of Covered Activities, acres of Mitigation Lands and their location by way of the mitigation categories (Outside CLS, Biological Core Management Area, Multiple Use Management Area, and Important Riparian Area). This information will also be provided to the USFWS in ways that will assist their regional conservation efforts, for example by arranging the information by vegetation type. Maps will be included that show the locations and configuration of areas where incidental take has occurred and where mitigation has been provided.

As information becomes available from the management, monitoring, and supporting research efforts, annual reports will address topics such as resource inventories, changes in land cover, change in threats such as invasive species, ground and surface water conditions, ranch resources, wildland fire management, and abiotic resources such air, soil, precipitation, weather, and climate. Annual reports will also include brief summaries of joint or concurrent conservation and important research findings by partnering entities.

9.1.1.1 Reporting Lethal Take and Habitat Loss

All verified incidences of lethal take will be reported each year to the USFWS. Documentation of take will include relevant information summarized as an incidence report. Information can include location and circumstances of take, photographs, and specimens.

Within the Permit Area, habitat loss for each Covered Species will be reported to the Office of Conservation Science and Environmental Policy or other entity within the County. Habitat loss will be quantified by comparing the impacts (in acres) from

Covered Activities and any impacts affiliated with permitted Opt-In projects to acres of modeled habitat or PCA for each Covered Species. The location and amount of habitat loss relative to mitigation categories will also be compared to the amount of mitigation categories provided for on Mitigation Lands. After the initial year, annual reports will, to the extent possible, present a cumulative analysis as well as an analysis that calls out this information for the current year.

Variations in this annual analysis may occur as the result of factors such as (1) changes to the geographic extent of the Permit Area because of annexations of land into incorporated jurisdictions; and (2) modifications to modeled habitat or PCAs which reflect improved knowledge about any Covered Species.

9.1.1.2 Reporting Lease Lands that Contribute to Mitigation

Pima County is proposing the use of lease lands to fulfill our annual mitigation requirements, as outlined in Section 4.3.1 of this report. Unlike fee-simple lands upon which we will place conservation easements to fulfill our mitigation requirements, Pima County can not commit lease lands to conservation in perpetuity. Therefore, for each annual report, Pima County will identify the acreage and location of lease lands that contributed to mitigation during that time period. For example, if Pima County has a mitigation requirement of 3,000 acres, we may choose to place 2,000 acres of fee lands under conservation easement. The remaining 1,000 acres would require the use of lease lands. Based on the partial credit of lease lands (25%), Pima County would identify 4,000 acres of lease land to mitigate for the remaining 1,000 acres. Over the years, the acreage and location of mitigation would be subject to change as grazing leases are relinquished or sold, or fee-land is committed in their place.

9.1.1.3 Other Information Included in Annual Reports

In addition to lethal take and habitat loss analyses, the following information will be included in annual reports:

Expenditures and Funding:

- Amount spent on acquisition, management, and monitoring;

- New funding sources and mechanisms identified or secured.

Monitoring:

- Activity summary and draft findings update;
- Management overview;
- Activity summary and draft findings update (as they become available).

Parks and Preserves:

- Conservation easements/donations;
- Ranch lands;
- Recommendations for future activities, adjustments, and needs.

Partnership Activities:

- Activity summary and draft findings update.

9.1.2 Decennial Reporting

At the end of each of the three permit phases, Pima County will submit a report to the USFWS containing a complete accounting of habitat acreage impacted by Covered Activities and mitigated during the previous 10-year phase. Similar to the annual reporting, this accounting will specify the number of acres mitigated and impacted by mitigation category and vegetation type. The report will also describe how mitigation is proceeding relative to impacts and how the preserve assembly is consistent with the biological goals and preserve design criteria established by STAT (i.e. conservation of Priority Conservation Areas, potential habitat, and vegetative communities). Prior to the end of each permit phase, Pima County will initiate an analysis of the levels of conservation and mitigation achieved under the permit, which will be subject to peer review.

9.1.3 Comparison of Annual and Decennial Reports

To summarize, the annual report and the decennial report vary in function, scope, focus, and intended use (Table 9.1). The annual report will provide a cumulative snapshot view of annual changes, identify necessary adjustments, and document compliance. The decennial report is intended to evaluate progress, identify potential need for change, and set the goals and direction for subsequent permit phases.

9.2 Audit

Once every three or more years, as needed, the USFWS may conduct an audit of those Covered Activities which have been implemented; all Mitigation Lands acquired; and all monies received, invested, and expended on acquisition, management, and monitoring activities.

Table 9.1. Comparison of annual and decennial reports.

Function	Annual Report	Decennial Report
Effectiveness Monitoring	Annual or as needed depending on parameter	Determination if the goals and objectives of all parameters are being met.
Breadth of Geographic Scope	Pima County's Permit Area	Planning Area and Permit Area in order to gain a landscape-level understanding of biodiversity and ecosystem health in a regional context (i.e., relationship of Pima County's Permit Area with adjacent jurisdictions' conservation and development patterns)
Focus of Effort	Trends reporting (as appropriate). Data and tracking. Evaluate progress, level of success, and compliance	Evaluate progress and level of success in meeting SDCP goals; project future course of action
Participation	Pima County & USFWS	Pima County & USFWS; partnering entities; adjacent jurisdictions, the general public.
Reviewing Entities	Pima County staff, Science Commission, and USFWS	Public, external review committee of scientists, and USFWS
Primary display tools	Aerial photographs, satellite imagery, GIS, monitoring and management data, Pima County departmental information	Summaries of monitoring and management information; new knowledge gained on conditions, trends, and needs
Desired Outcome	Determination that conservation and mitigation levels are staying ahead of impact levels, and that the specific, quantitative terms of the Section 10 permit are being met	Review and update goals for the next Permit Phase of the permit (research, monitoring, management, acquisitions, funding, conservation levels for CLS categories, PCAs, species' potential habitat). Determine if biases exist in the conservation and acquisition program and if additional conservation measures are needed to achieve goals

9.3 Permit Participants

9.3.1 Pima County

Pima County's role is that of the permittee, with central responsibility of ensuring that all requirements of the Pima County MSCP are met—most importantly that:

- Any taking will not appreciably reduce the likelihood of the survival and recovery of the species;
- Take is incidental;
- Impacts are minimized and mitigated to the maximum extent practicable;
- Adequate funding is provided, and
- Other permit requirements are met.

9.3.2 U.S. Fish and Wildlife Service

The USFWS is responsible for ensuring National Environmental Policy Act compliance for the Pima County MSCP and making the final determination of permit requirements and issuance. Local and regional USFWS staff will track and monitor permit compliance annually and decennially and may enforce permit restrictions when permit requirements are not being met. The USFWS may provide Federal funding for the implementation of various activities that are unrelated to the mitigation and monitoring requirements of the Pima County MSCP.

9.3.3 Opt-In Participants

Pima County will cover non-discretionary development activities as permitted activities, thereby granting the Opt-in Participants full coverage under the permit (see section 3.3.1.1). Opt-in Participants will receive a Development Certificate of Inclusion (see Glossary).

9.4 Public Participation and Oversight

The public has demonstrated strong support for and involvement in the conservation of Pima County's natural resources throughout the development of the MSCP and SDCP. Maintaining this public support is vital to Pima County's ability to fulfill the commitments made in this MSCP. This participation means that the public provides a 'watchdog' function to monitor Pima County's implementation of the MSCP. Pima County will continue to foster and welcome the public's role in the MSCP. Examples of public participation that Pima County intends to pursue include, but are not limited to:

- Oversight. The STAT and Conservation Acquisition Committee are comprised of members of the conservation and scientific communities.
- Public Outreach. Pima County staff will be available for presentations at public or special interest group meetings to report on the program and its progress. Pima County will also prepare reports and newsletters, maintain space on Pima County's website for MSCP information, and make use of other forms of media to communicate the status and progress of Pima County MSCP. Ten-year reviews will also have significant involvement by the public.
- Site Stewards. Pima County will establish a site steward program using citizen volunteers to aid in periodically visiting County-controlled Mitigation Lands to monitor for threats and activities that may adversely impact the resource values of the property. Site stewards may also engage in routine maintenance activities such as trash pick-up and will employ photo monitoring.
- Data Collection. Pima County may develop a Resource Stewardship Certification program that establishes a resource-based curriculum to educate program candidates in a variety of resource-related subjects, such as Arizona arid and riparian ecosystems, cultural resource protection, historic preservation, interpretive methods, data collection techniques and methodologies, and documentation procedures. Graduates of the program would be available to establish and maintain data collection

programs at various County-controlled Mitigation Lands in order to provide baseline and future monitoring information.

- **Collaborative Partnering.** Many of the environmental issues facing the management of the County-controlled Mitigation Lands are complex and transcend political boundaries and ownership categories, making it essential for Pima County to work with its neighbors and other interested entities. The County anticipates partnerships with the City of Tucson and Town of Marana, and on targeted issues with the University of Arizona, various non-governmental organizations, land resource management agencies, and multi-disciplinary groups such as the Desert Southwest Cooperative Ecosystem Studies Unit.

9.4.1 Program Oversight: County Management

Pima County intends to create an internal community of representatives from all Pima County departments responsible for implementing the permit: Development Services; Environmental Quality; Natural Resource, Parks and Recreation; Pima County Regional Flood Control; Technical Services; Transportation; and Wastewater Management. Coordination of department activities will be the responsibility of the Pima County Office of Conservation Science and Environmental Policy. A primary focus of this group will be to refine protocols to account for habitat loss and lethal take (ongoing through the "Exit Gate" project management process) and coordinate existing management and monitoring activities.

9.4.2 Science and Technical Advisory Team (STAT)

The STAT was instrumental in the development of the SDCP and MSCP. Their technical and scientific expertise will continue to be employed, particularly in the development and implementation of the PCEMP by:

- Overseeing the implementation of the Effectiveness Monitoring and Adaptive Management components of the Pima County MSCP including integration among parameters;

- Reviewing the annual Effectiveness Monitoring Report that summarizes work completed during the previous year regarding monitoring species, habitat, ecosystem, climate, and threats parameters;
- Identifying and prioritizing research needs;
- Providing guidance for integration with other monitoring and research efforts in the region;
- Reviewing proposed changes to protocols.

9.5 Voluntary Partnership Opportunities

Pima County will continue to seek out partnership opportunities in support of implementing the goals of the Pima County MSCP on a landscape scale, thereby extending its effectiveness beyond the boundaries of the Permit Area. To formalize these relationships, Pima County intends to seek formal agreements that commit signatories to a long-term course of action and management towards fulfilling the biological goals set forth during the preserve planning process, as reflected by the CLS.

Pima County will also foster partnerships with other local jurisdictions within and adjacent to Pima County and will support their habitat conservation planning and implementation efforts, particularly the HCPs of the Town of Marana and City of Tucson. Pima County will also foster cooperation and provide resources to those partners that contribute to the implementation of the Pima County MSCP. Pima County will foster partnerships with the University of Arizona, Pima Community College, and public and private schools in order to maximize effectiveness of research and education efforts pertaining to the Pima County MSCP goals.

Pima County will pursue partnering opportunities in association with private landowners and non-profit organizations with common conservation goals (e.g., The Nature Conservancy of Arizona, Arizona-Sonora Desert Museum, Sky Islands Alliance, Tucson Audubon Society, Tucson Herpetological Society, the Sierra Club, Arizona Land and

Water Trust, the Sonoran Institute, and the National Wildlife Federation). Such partnering efforts may include but are not limited to:

- Shared staffing and use of equipment;
- Matching or other shared funding of land acquisitions and/or conservation easements;
- Joint efforts in management activities;
- Public information, outreach, and environmental education efforts and materials; and
- Coordination and use of local contributions, including land, trusts, volunteer support, and other in-kind services.

10 GLOSSARY OF TERMS AND ACRONYMS

10.1 Terms

Adaptive Management. Adaptive management is a process of improving management actions through the use of management experiments to evaluate how a system operates and is managed (Walters 1986). Adaptive management places an emphasis on recurrent decisions for which there is considerable uncertainty about the correct course of management action.

Biological Core Management Areas. One of four CLS land type categories that are the underpinnings of MSCP mitigation requirements. Originally identified through development of the CLS and which denotes those areas that support high biological diversity, as noted by the presence of modeled habitat for five or more Priority Vulnerable Species.

Board. Referred to collectively as the Board of Supervisors for Pima County and the Board of Directors for the Pima County Regional Flood Control District.

Cienega. A permanently or seasonally saturated "seep wetland," dominated by sedges and other herbaceous and woody wetland plants.

Candidate species. Plants and animals for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a listing regulation is precluded by other higher priority listing activities.

Certificate of Inclusion (Biological). A County-issued certificate that affords protection under Pima County's Section 10 permit for implementation of biological enhancements.

Certificate of Inclusion (Development). A County-issued certificate to an Opt-In Participant that affords protection under Pima County's Section 10 Permit for development-related impacts not identified as an outright Covered Activity. As with

development subsequent to rezoning, gaining permit coverage through possession of a Development Certificate of Inclusion does not exclude the landowner from complying with County regulations including those that promote avoidance and minimization of impacts to natural resources such as the Site Analysis Requirements (when applicable), the Native Plant Preservation Ordinance, and Riparian Protection and Mitigation Requirements that are required as part of the normal development process

Changed Circumstances. “Changes in circumstances affecting a species or geographic area covered by an HCP that can reasonably be anticipated by Plan developers and the Service and that can be planned for (e.g., the listing of a new species, or a fire or other natural catastrophic event in areas prone to such events)” (50 CFR §17.3). If additional conservation and mitigation measures are deemed necessary to respond to changes in circumstances that were provided for in the HCP, the permittee(s) will be expected to implement the measures specified in the HCP, but only those measures and no others.

Conservation target. Species, their habitat, or other environmental feature that are the subject of management action or concern.

Covered Species. Subset of Priority Vulnerable Species that are proposed for coverage under Pima County’s Section 10 permit.

Critical habitat (designation). Once USFWS designates critical habitat at the time of the listing of a species as endangered or threatened, the ESA prohibits any Federal action that would destroy or adversely modify it.

Desired future condition (DFC). Condition in which Pima County’s biological resource conservation goals are met over the course of the permit period and in the context of the commitments and requirements of the ESA, the SDCP, and the current comprehensive land use plan. Desired future conditions can be defined for the key participants for habitat characteristics of species proposed for coverage in the Pima County MSCP, and for ecological restoration actions, and management. The DFCs

provide an overall set of goals upon which the implementation and management elements of the Pima County MSCP can be developed, and ultimately, measured.

Ecosystem. A dynamic and interrelating complex of plant and animal communities and their associated nonliving (such as physical and chemical) environment.

Endangered species. Designation under the Endangered Species Act of 1973 (as amended) which identifies an animal or plant species in danger of extinction throughout all or a significant portion of its range.

Endangered Species Act (ESA) of 1973, as amended. Federal legislation that is intended to provide a means to conserve the ecosystems upon which endangered and threatened species depend and provide programs for the conservation of those species, thus preventing extinction of plants and animals. Some relevant sections of ESA to this MSCP are:

Section 4. Addresses the listing and recovery of species and designation of critical habitat.

Section 6. Focuses on cooperation with the states and authorizes USFWS and NOAA Fisheries to provide financial assistance to states that have entered into cooperative agreements supporting the conservation of endangered and threatened species.

Section 7 (a) (2). Requires Federal agencies, in consultation with USFWS and/or National Marine Fisheries Service, to ensure that any Federal action is not likely to jeopardize the continued existence of any endangered or threatened species or result in destruction or adverse modification of designated critical habitat.

Section 9. Defines prohibited actions, including the import and export, take, illegally taken possession of illegally taken species, transport, or sale of endangered or threatened species.

Section 10. Lays out the guidelines under which a permit may be issued to authorize prohibited activities, such as take of endangered or threatened species.

Section 10(a)(1)(A). Allows for permits for the taking of threatened or endangered species for scientific purposes or for purposes of enhancement of propagation or survival.

Section 10(a)(1)(B). Allows for permits for incidental taking of threatened or endangered species.

Exotic species. A species of plant or animal that is not native to the ecosystem in which it is living. See invasive species.

Federally listed species. See under Endangered Species Act of 1973, as amended, Section 4. Also see Endangered Species and Threatened Species.

Geographic Information System (GIS). Means of digital mapping and data analysis on computers.

Habitat. Environmental features that provide resources for species to carry out their life-history functions.

Habitat Conservation Plan (HCP). A plan that specifies (1) the impact which will likely result from such taking (of Endangered Species); (ii) what steps the applicant will take to minimize and mitigate such impacts, and the funding that will be available to implement such steps; (iii) what alternative actions to such taking the applicant considered and the reasons why such alternatives are not being utilized; and (iv) such other measures that the Secretary of the Interior may require as being necessary or appropriate for purposes of the plan. An HCP is required before an Section 10 permit may be issued.

(to) harass. ESA implementing regulations define “to harass” as “intentionally or negligently, through act or omission, create the likelihood of injury to wildlife by

annoying it to such an extent as to significantly disrupt normal behavior patterns such as breeding, feeding, and sheltering.”

(to) harm. ESA implementing regulations define “to harm” as to “perform an act that kills or injures wildlife; may include significant habitat modification or degradation when it [*sic*] kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering.”

Hydroriparian. Community most often found where vegetation is supported by perennial watercourses or springs.

Implementing Agreement. Specifies all terms and conditions of activities under the Habitat Conservation Plan. By signing the Implementing Agreement, USFWS explicitly acknowledges approval of the plan and declares that it meets the requirements of a Habitat Conservation Plan to allow issuance of appropriate permits for target or other named species, should those species become listed.

Important Riparian Areas. One of 4 categories of lands that are the underpinnings of MSCP mitigation requirements. Originally identified through development of the CLS and which denotes those riparian areas valued for their higher water availability, vegetation density, and biological productivity. These areas are also fundamental to preserving landscape connectivity.

Incidental take. Take that results from, but is not the purpose of, carrying out an otherwise lawful activity. Take can be both lethal and non-lethal.

Incidental take permit (also called Section 10 permit). A permit issued under Section 10(a)(1)(B) of the ESA to a non-Federal party undertaking an otherwise lawful project that might result in the incidental take of an endangered or threatened species. Application for an incidental take permit is subject to certain requirements, including preparation by the permit applicant of a conservation plan, generally known as a HCP.

Indirect effect. An effect caused by a proposed action that takes place later in time than the action, but is still reasonably certain to occur.

Invasive species. Organisms that invade ecosystems beyond their historical range. Their invasion can threaten native ecosystems or commercial, agricultural, or recreational activities dependent on these ecosystems costing the economy billions annually.

(to) jeopardize a species. To engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.

Listed species. A species, subspecies, or distinct population segment that has been added to the Federal list of endangered and threatened wildlife and plants.

Mesoriparian. Area that is supported by perennial or intermittent streams, or areas of shallow groundwater.

Mitigation (programs/measures). Activities contributing to preserving resources and offsetting resource loss. The primary mitigation mechanism for Pima County's Section 10 permit is land acquisition, management and monitoring, but other methods include species research and restoration.

Mitigation Categories. Lands identified in the CLS (see Appendix D) and which, when impacted by Covered Activities, require mitigation under the MSCP.

Mitigation Lands. All lands for which Pima County pledges to offset loss of habitat of Covered Species stemming from Covered Activities under Pima County's Section 10 permit. Mitigation lands are either owned or leased by Pima County (known as Pima County preserves) or are Open Space Set Asides (see definition).

Mitigation Lands, County-controlled. All Mitigation lands for which Pima County has a property interest (i.e., ownership, conservation easement, or grazing lease). Excludes set-asides on private lands.

Multi-species Conservation Plan. A proposal to minimize and mitigate, to the maximum extent practical, incidental take of multiple species that may occur in the plan area due to specified, lawful activities. Serves as Pima County's HCP for purposes of obtaining a Section 10 permit under the ESA.

Multiple Use Management Areas. Originally identified through development of the CLS and which denotes those areas that support significant biological diversity, but which do not attain the level associated with Biological Core Management Areas. They connect large blocks of contiguous habitat and biological preserves and support high value potential habitat for three or more Priority Vulnerable Species.

Non-native Species. See exotic and invasive species.

Open Space Set-Aside. Land that is undeveloped and retained as natural open space through development processes and approvals. Ownership of these areas remains with the property owner.

Opt-in Participant. Those property owners who voluntarily solicit protections afforded by Pima County' Section 10 permit and who, after fulfillment of certain requirements, are issued a Development Certificate of Inclusion.

Outside the Conservation Lands System. One of 4 categories of lands that are the underpinnings of MSCP mitigation requirements. Generally represents those lands within Pima County that do not have a designation under the Conservation Lands System.

Parameter. A component of the Pima County Ecological Monitoring Program that is measured and reported as an indicator of change. Examples of parameters include

population size of a species, number of new miles of roads, and acres of habitat destroyed.

Pima County. When referring to the proposed permit holder, the term includes Pima County Regional Flood Control District, a separate taxing authority that is governed by the same elected officials as Pima County.

Preserve Network (Pima County). Land owned and managed for open space preservation, considered in the aggregate. Includes all County-controlled Mitigation Lands, as well as other Pima County Preserves (e.g., Tucson Mountain Park) for which no habitat mitigation credit is being sought.

Planning Area (MSCP). The entire 9,184 square miles of Pima County.

Priority Conservation Area. Those areas identified by species experts where conservation is necessary for the Priority Vulnerable Species' long-term survival.

Priority Vulnerable Species. A list of species that Pima County used early in the development of the MSCP and SDCP; most species are thought to be threatened and/or in decline. Most PVS were considered for Section 10 permit coverage (see Covered Species).

Proposed species. An animal or plant species that is proposed in the Federal Register to be listed under Section 4 of the Endangered Species Act.

Recovery Contribution Areas. Sites where Pima County management efforts will provide suitable habitat and improve habitat conditions for existing or re-established populations of species and at the same time allow permitted maintenance and other Covered Activities.

Regional Flood Control District. The Pima County Regional Flood Control District (RFCD) is a separate legal entity from Pima County, but for the purposes of this MSCP it is considered to be a department within Pima County.

Riparian. Related to, living in, or located on the bank of a natural watercourse.

Riparian area. Area influenced by surface or subsurface water flows that are expressed (visually) by facultative wetland or obligate wetland plant species and hydric soils.

Safe Harbor Agreement. A voluntary arrangement between the USFWS (or the National Oceanic and Atmospheric Administration) and cooperating non-Federal landowners. The main purpose is to promote voluntary management for listed species on non-Federal property, while giving assurances to participating landowners that no additional future regulatory restrictions will be imposed through the issuance of a Section 10(a)(1)(A) permit under the ESA. The agreements benefit endangered and threatened species, while giving landowners assurances from additional restrictions.

Sonoran Desert Conservation Plan. Overarching conservation plan for Pima County. The Pima County MSCP is one element of the plan, which included cultural resource goals as well as biological goals.

Species Enhancement Areas. Places where populations of existing and/or re-established populations of species will be managed by Pima County in relation to recovery plans.

State Trust Lands. Those lands that are held in trust for the Common Schools and other beneficiaries and whose management is overseen by the State Land Department in accordance with the Arizona State Enabling Act of 1910, the State Constitution and the 1915 State Land Code.

Supplementary Population Management Areas. Sites where there is suitable habitat for species (though populations are expendable from species recovery efforts), but which may have the potential to contribute to recovery.

(to) Take. Section 9 of the ESA prohibits the take of threatened and endangered species. Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or

collect, or to attempt to engage in any such conduct; may include significant habitat modification or degradation if such actions kill or injure wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering. Under Section 10(a) of the ESA, a level of take may be permitted if it is incidental to otherwise lawful activity and a Habitat Conservation Plan (HCP) is accepted by the USFWS.

Threatened species. Designation under the Endangered Species Act of 1973 (as amended) which identifies an animal or plant species likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Unforeseen circumstances: "changes in circumstances affecting a species or geographic area covered by an HCP that could not reasonably have been anticipated by plan developers and the Service at the time of the HCP's negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species" (50 CFR §17.3). The USFWS will not require the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources, even upon a finding of unforeseen circumstances, unless the permittee(s) consents. Upon a finding of unforeseen circumstances, the USFWS will be limited to modifications within conserved habitat areas and the HCP's operating conservation program.

Watershed. A region or area bounded peripherally by topographic high points and draining ultimately to a particular watercourse or body of water.

Xeroriparian. Areas associated with intermittent water supplies and that may include species from adjoining upland areas.

10.2 Acronyms

AGFD	Arizona Game and Fish Department
BLM	Bureau of Land Management
CIP	Capital Improvement Program

CLS	Maeveen Marie Behan Conservation Lands System
CRMP	Coordinated Resource Management Plan
ESA	Endangered Species Act (Federal)
GIS	Geographical Information System
HCP	Habitat Conservation Plan
MSCP	Multi-species Conservation Plan
PCA	Priority Conservation Area
PCEMP	Pima County Ecological Monitoring Program
RFCD	Pima County's Regional Flood Control District
SDCP	Sonoran Desert Conservation Plan
SEA	Species Enhancement Area
SL	Stewardship Level
STAT	Science Technical Advisory Team
USFWS	United States Fish and Wildlife Service

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