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In reply refer to:
AESO/SE
22410-2006-F-0459

April 13, 2016

Memorandum

To: Regional Director, Fish and Wildlife Service, Albuquerque, New Mexico (ARD-ES) (Attn: Michelle Shaughnessy)

Chief, Arizona Branch, Regulatory Division, Army Corps of Engineers, Phoenix, Arizona

From: Acting Field Supervisor

Subject: Biological and Conference Opinion on the Pima County Multi-Species Conservation Plan, Arizona

This biological and conference opinion (BCO) responds to the Fish and Wildlife Service (FWS) requirement for intra-Service consultation on the proposed issuance of a section 10(a)(1)(B) incidental take permit (TE-84356A-0) to Pima County and Pima County Regional Flood Control District (both herein referenced as Pima County), pursuant to section 7 of the Endangered Species Act of 1973 (U.S.C. 1531-1544), as amended (ESA), authorizing the incidental take of 44 species (4 plants, 7 mammals, 8 birds, 5 fishes, 2 amphibians, 6 reptiles, and 12 invertebrates). Along with the permit application, Pima County submitted a draft Pima County Multi-Species Conservation Plan (MSCP). On June 10, 2015, the U.S. Army Corps of Engineers (ACOE) requested programmatic section 7 consultation for actions under section 404 of the Clean Water Act (CWA), including two Regional General Permits and 16 Nationwide Permits, that are also covered activities in the MSCP. This is an action under section 7 of the ESA that is separate from the section 10 permit issuance to Pima Couny. However, this BCO provides section 7 coverage of these actions provided they are consistent with the MSCP covered activities. The ACOE will implement or assure implementation of all avoidance, minimization, and mitigation measures that are associated with the MSCP to minimize incidental take of listed and covered species, as applicable, and in compliance with section7 of the ESA. As a separate action, the MSCP permit covers non-Federal land in Pima County, AZ as shown in Figure 1 of this BCO. As outlined in the MSCP and associated Environmental Impact Statement (EIS), the FWS worked closely with Pima County and the ACOE, as well as other Federal and non-Federal partners to develop the MSCP, EIS, and other associated documents.

Federal actions considered in this BCO include: 1) the issuance of a section 10(a)(1)(B) incidental take permit by the FWS, and 2) specified actions by the ACOE related to section 404 of the CWA that are consistent with, and including implementation of, the MSCP. The focus of our evaluation is to ensure that all Federal actions considered in this consultation do not appreciably reduce the likelihood of survival and recovery of the covered species, do not destroy or adversely modify proposed or designated critical habitat, and that the MSCP minimizes and mitigates the effects of incidental take to the maximum extent practicable.

In the late 1990s, Pima County embarked on a county-wide planning process to address the unique natural and cultural resources of the county. This effort is known as the Sonoran Desert Conservation Plan (SDCP), and included the development of the MSCP to address endangered species compliance and conservation. During the 15+ year development of the MSCP, the FWS worked with Pima County and the ACOE to evaluate the effects (and resultant incidental take) of their actions to the range of habitats in Pima County, especially riparian and aquatic habitats, that support a diversity of wildlife species, including species and habitats protected under the ESA. Many of the activities proposed for coverage by Pima County require the involvement of the ACOE as they implement section 404 of the CWA. This requirement makes it difficult to separate out the effects of project approval by Pima County and the effects of the actions requiring permitting by the ACOE. By combining the consultation requirements of these two Federal actions, it also streamlines the regulatory processes that applicants must navigate to make their project compliant. As a result, there is a reduction in time and work required by Pima County and the two agencies but, more importantly, it provides a framework for the consistent application of landscape-level conservation and mitigation measures that are more effective and efficient at achieving meaningful conservation of the species covered by the MSCP. This single analysis of effects for both Federal actions is included in this BCO to address the effects to species from both the section 7 perspective of the Federal agencies, but also the section 10(a)(1)(B) permit perspective of the non-Federal applicants.

In this combined BCO, the FWS will document the intra-Service consultation for our Federal action of the issuance of a permit authorizing incidental take under section 10(a)(1)(B) of the ESA for the non-Federal actions proposed for coverage under the MSCP. A summary of these non-Federal actions is provided in the Description of the Proposed Action section of this BCO, with a complete description found in the MSCP and relevant appendices that are included herein by reference.

As indicated, this BCO also serves as the consultation document for ACOE actions included in the consultation. The ACOE has included specific portions of their discretionary programs within the MSCP permit area in their request for consultation. A summary of these ACOE actions is provided in the Description of the Proposed Action section of this BCO, with a more detailed discussion of these actions in the MSCP and in the ACOE's request for consultation; these documents are incorporated herein by reference.

In the standard analysis to determine the amount of take in a section 7 consultation on Federal actions, the FWS determines the amount of take that would occur, and provides reasonable and prudent measures, with associated terms and conditions, to minimize the amount of take. For the issuance of a section 10(a)(1)(B) permit, the amount of incidental take is to be minimized to the

"maximum extent practicable". This is a more robust standard than for Federal agencies under section 7, but is consistent with Federal agency responsibilities under section 7(a)(1) owned by the Pima County.

Because this is a combined BCO and there is no separation of effects and the resultant incidental take for the Federal and non-Federal covered actions, this section 7 consultation will use the standard for reduction of incidental take to the "maximum extent practicable" as required for section 10(a)(1)(B) permits with the understanding that this standard does not apply to Federal agencies generally, but only applies to the ACOE actions as provided herein due to the inclusive nature of the covered actions in the MSCP. In other words, the ACOE will ensure that their actions (issuance of permits) as covered in the MSCP and this BCO will be mitigated to the maximum extent practicable.

The FWS and ACOE have determined that the proposed action may affect, and is likely to adversely affect the following listed covered species and/or designated critical habitats:

Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*): endangered
Huachuca water umbel (*Lilaeopsis schaffneriana* ssp. *recurva*): endangered with critical habitat
Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*): endangered
Yellow-billed cuckoo (*Coccyzus americanus;* western distinct population segment): threatened DPS with proposed critical habitat
Southwestern willow flycatcher (*Empidonax traillii extimus*): endangered with critical habitat
Gila chub (*Gila intermedia*): endangered with critical habitat
Gila topminnow (*Poeciliopsis occidentalis occidentalis*): endangered
Chiricahua leopard frog (*Lithobates chiricahuensis*): threatened with critical habitat
Northern Mexican gartersnake (*Thamnophis eques megalops*): threatened with proposed critical habitat
Jaguar (*Panthera onca*): endangered with critical habitat.

For all other listed or proposed species, and their designated or proposed critical habitats that occur within Pima County, FWS and the ACOE have determined that the proposed actions will have no effect and these species and critical habitat are not addressed in this BCO. This includes the jaguar for which we have determined there are effects to designated critical habitat, but do not anticipate effects to or take of individual jaguars and, therefore, is not a covered species under the MSCP.

Consistent with our policies for intra-Service consultations dealing with the consideration of candidate species and those regarding treatment of unlisted species in applications for section 10(a)(1)(B) permits, for the purposes of this BCO, the 35 unlisted animal and plant species included for coverage under the MSCP are considered to be proposed for listing as threatened or endangered. Therefore, in addition to the 10 federally-listed species listed above, we have determined that the following candidate species and species not currently listed under the ESA may also be adversely affected by the proposed actions:

Needle-spined pineapple cactus (*Echinomastus erectocentrus* var. *erectocentrus*)
Tumamoc globeberry (*Tumamoca macdougalii*)

Mexican long-tongued bat (*Choeronycteris mexicana*)
Western red bat (*Lasiurus blossevillii*)
Western yellow bat (*Lasiurus xanthinus*)
California leaf-nosed bat (*Macrotus californicus*)
Pale Townsend's big-eared bat (*Corynorhinus townsendii pallescens*)
Merriam's mouse (*Peromyscus merriami*)
Western Burrowing owl (*Athene cunicularia hypugaea*)
Cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*)
Rufous-winged sparrow (*Aimophila carpalis*)
Swainson's hawk (*Buteo swainsoni*)
Abert's towhee (*Melozone aberti*)
Arizona Bell's vireo (*Vireo bellii arizonae*)
Longfin dace (*Agosia chrysogaster*)
Desert sucker (*Catostomus clarki*)
Sonora sucker (*Catostomus insignis*)
Lowland leopard frog (*Lithobates yavapaiensis*)
Desert box turtle (*Terrapene ornata luteola*)
Sonoran desert tortoise (*Gopherus morafkai*)
Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*)
Giant spotted whiptail (*Aspidoscelis stictogramma*)
Groundsnake (valley form) (*Sonora semiannulata*)
San Xavier talussnail (*Sonorella eremita*)
Black Mountain/Papago talussnail (*Sonorella ambigua ambigua* syn. *papagorum*)
Total Wreck talussnail (*Sonorella imperatrix*)
Empire Mountain talussnail (*Sonorella imperialis*)
Sonoran talussnail (*Sonorella magdalensis* syn. *tumamocensis*)
Santa Rita talussnail (*Sonorella walkerii*)
Pungent talussnail (*Sonorella odorata odorata* syn. *marmoris*)
Posta Quemada talussnail (*Sonorella rinconensis*)
Santa Catalina talussnail subspecies (*Sonorella sabinoenis buehmanensis*)
Santa Catalina talussnail subspecies (*Sonorella sabinoensis tucsonica*)
Las Guijas talussnail (*Sonorella sitiens sitiens*)
Tortolita talussnail (*Sonorella tortillita*)

The FWS actively participated in the 15+ year development of the MSCP and associated documents. FWS representatives served on the Steering Committee, various sub-committees, and participated in discussions associated with all phases of development. Draft documents prepared by Pima County and the ACOE or their contractors were reviewed by the FWS. This extensive involvement contributed to the completeness and suitability of the MSCP as submitted by Pima County. This BCO was prepared using information from the MSCP, the EIS, the ACOE request for consultation, information in our files (including the many reports, letters, emails, and other documents prepared by Pima County, their contractors, the Steering Committee, the Science Technical Advisory Team [STAT], etc.), and other sources of information referred to herein. In preparing this BCO, we reviewed other published and unpublished information pertaining to the covered species and covered activities, and the types of effects resulting from the covered activities, in addition to the information cited in this BCO.

Literature cited in this BCO is not a complete bibliography of all literature available on the covered species, the covered activities and their effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file in our office. We have assigned consultation number 22410-2006-F-0459 to this project. Please refer to this number in any future correspondence related to this consultation.

CONSULTATION HISTORY

- November 22, 2010: Pima County submitted a draft MSCP and an application for the section 10(a)(1)(B) incidental take permit.
- January 2011 through December 2012: Pima County and the FWS revised the draft MSCP through a series of meetings, calls, and electronic mail to finalize the draft that would go out for public review and comment. A public draft EIS was also prepared by RECON consulting on behalf of the FWS and this draft was reviewed and approved by the FWS and by Pima County.
- September 2011: ACOE, FWS, and Pima County initiated discussion on the feasibility of a programmatic consultation for CWA section 404 actions included as covered activities in the MSCP. Regular meetings to discuss this approach and identify the process were held from 2011 through 2014.
- December 7, 2012: FWS published a Notice of Availability in the Federal Register, opening the public review and comment period for the draft MSCP and draft EIS.
- March 15, 2013: The public review and comment period ended.
- April 2013 through October 2015: Pima County and FWS worked to address the public comments and finalize MSCP and the EIS.
- July 16, 2014: FWS provided the ACOE with the MSCP for review and comment to determine if it is adequate to act as the Biological Assessment for the programmatic consultation with the ACOE for the covered ACOE permitting actions.
- June 10, 2015: The ACOE requested consultation for programmatic coverage of CWA section 404 actions that are covered activities in the MSCP.
- November 17, 2015: Draft BCO sent to the ACOE for review.
- December 7, 2015: The ACOE provided comments on the draft BCO.

BIOLOGICAL AND CONFERENCE OPINION

DESCRIPTION OF THE PROPOSED ACTION

The Federal actions covered in this BCO are the issuance of a section 10(a)(1)(B) incidental take permit to Pima County to permit the incidental take of covered species resulting from the implementation of the non-Federal actions described in the MSCP, as well as actions undertaken by the ACOE in implementing discretionary programs under the Clean Water Act. The following is a brief description of these non-Federal and Federal actions; these brief descriptions are not intended to fully describe or document these actions. This consultation addresses Pima County activities as described in detail in the MSCP and appendices, as well as in the final EIS. In addition, the ACOE provided a complete description of the applicable nationwide permits and

regional general permits in their June 10, 2015 request for consultation. All information contained in these final documents is incorporated herein by reference. The analysis and conclusions reached in this BCO are, however, exclusively those of the FWS and this issuing office.

Pima County, using a process that solicited input from experts, stakeholders, and the FWS, identified those species that warranted section 10 permit coverage, given the scope of the covered activities and the requirements of section 10 of the ESA (see Sections 2.2 and 2.3 of the MSCP). These species, known as the covered species, are the focus of the MSCP (see Appendix A of the MSCP). Pima County's permit covers 44 species: 4 plants, 7 mammals, 8 birds, 5 fishes, 2 amphibians, and 6 reptiles, and 12 invertebrates. Nine species are currently listed as threatened or endangered under the ESA and an additional two species are candidates or have been petitioned for listing under the ESA. The remaining species are included in the County's MSCP based on their potential to be listed within the permit period and their distribution relative to the covered activities. Detailed information on the covered species can be found in Appendix A of the MSCP; additional information can be found in Pima County's Priority Vulnerable Species Analysis (2001).

The proposed action includes two main categories of activities: 1) the covered activities consisting of those actions undertaken or authorized by Pima County or the ACOE that may result in take of or impacts to covered species and their associated habitats; and 2) conservation activities or measures undertaken by Pima County or the ACOE to avoid, minimize, and/or mitigate the effects to covered species and their associated habitats.

Covered Activities

The primary covered activities under the permit are maintenance and construction activities carried out by Pima County and the Pima County Regional Flood Control District (collectively referred to herein as 'Pima County' or 'the County') and certain development activities of the private sector that occur within the permit area. The permit area is primarily a subset of the area within the geographic boundaries of Pima County, but also includes some area in adjacent counties (see Figure 1 of this BCO) (see Section 4.3.1 of the MSCP) owned by Pima County. The permit area is subject to change as described and addressed in the MSCP. Permit coverage will be provided to private sector, single-dwelling residential lots at the time Pima County issues a building permit to authorize grading of 14,000 square feet or more, unless the property owner declines coverage. Impacts related to private-sector development of residential subdivisions and non-residential facilities will be covered under the County's Section 10(a)(1)(B) permit only when the property owner elects to participate, provided that the property owner has applied for a site construction permit and that certain other criteria are met. In other words, private sector entities have the ability to opt in or opt out of coverage under the permit.

The following are considered covered activities under the MSCP (for a more detailed description of these covered activities, see Section 3.4 and Appendix D of the MSCP):

- Ground disturbances on individual, single-dwelling lots that occur subsequent to the County's issuance of a building permit that authorizes grading of 14,000 square feet or

more provided that the property owner elects to participate in the County's Section 10 permit;

- Ground disturbances that occur as part of—and are subsequent to—the development of a residential subdivision where such actions are subject to the County's issuance of a site construction permit provided the property owner elects to participate in the County's Section 10 permit after the submittal of the site construction permit application but prior to the County's issuance of the site construction permit (see Section 3.4.1.1 of the MSCP);
- Ground disturbances that occur as part of—and are subsequent to—the development of a non-residential facility where such actions are subject to the County's issuance of a site construction permit, provided the property owner elects to participate in the County's Section 10 permit after submittal of the site construction permit application, but prior to the County's issuance of the site construction permit (see Section 3.4.1.1 of the MSCP);
- Activities of the County including construction, repair, maintenance, and operation of County facilities and infrastructure (see section 3.4.1.2 of the MSCP for details);
- Construction, operation, and maintenance of renewable energy generation projects located on County-owned lands leased to others specifically for that purpose;
- Relocation of utilities within County rights-of-way, where required by Pima County;
- Monitoring and land management activities including surveys, scientific studies, and other such activities carried out by Pima County and its cooperators for the purposes of the MSCP;
- Restoration activities such as vegetation treatments (including fire management activities) that are intended to improve the biological and ecological values of county-owned and/or managed lands;
- Recreation activities authorized by Pima County; and
- County ranch-management activities—exclusive of livestock herbivory and trampling—on land owned by the County and lands managed by the County through grazing leases issued by the State of Arizona.

Based on the suite of covered activities and a modeling of urban growth projections, Pima County anticipates 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 (see Figure 2 of this BCO). The County will reserve approximately 5,000 acres of permitted disturbance to cover its construction and maintenance activities; the remaining 31,000 acres of disturbance is allocated for ground disturbances caused by covered private-sector development. To address the anticipated amount of disturbance in compliance with the requirements of Section 10(a)(1)(B) of the ESA, Pima County will provide approximately 116,000 acres of mitigation (see Avoidance, Minimization, and Mitigation Measures section below).

Activities not specifically proposed for coverage (as presented in Section 3.4 of the MSCP) will not be covered by Pima County's Section 10 permit. These non-covered activities include, but are not limited to:

- Grading of less than 14,000 square feet on individual, single-dwelling lots;
- Ground-disturbing activities conducted on State Trust land by private or state parties, for which Pima County has no legal authority to control;

- Groundwater pumping or effluent discharges that increase, decrease, or otherwise alter water quality or quantity, except for groundwater pumping or effluent discharges carried out by Pima County and having all required Federal permits;
- Actions on lands conserved as Section 7 (ESA) conservation lands set aside as part of a previous section 7 consultation;
- Management, monitoring, or research within mitigation lands conducted by entities other than Pima County or its cooperators. This includes all activities of the Arizona Game and Fish Department (AGFD). All researchers on County-managed lands are responsible for their own take permits, unless they are employees, contractors, or volunteers of Pima County specifically working under the lead of Pima County on actions included in the MSCP;
- The physical act of grazing, specifically trampling and herbivory, by livestock on lands owned or leased by Pima County (see Section 3.4.1.2.2 of the MSCP for further explanation); and
- County activities located on Federal or Tribal lands.

This BCO will also cover actions of the ACOE in implementing the Clean Water Act. The following actions related to Clean Water Act implementation are covered under this BCO for those non-Federal project proponents that have opted in to coverage under the MSCP. These actions are:

- RGP 63 for emergency authorizations;
- RGP 81 maintenance and bank stabilization activities in Pima County;
- NW 3 maintenance;
- NW 7 outfall structures and associated intake structures;
- NW 12 utility line activities;
- NW 13 bank stabilization;
- NW 14 linear transportation;
- NW 18 minor discharges;
- NW 25 structural discharges;
- NW 27 aquatic habitat restoration, establishment and enhancement activities;
- NW 29 residential development;
- NW 31 maintenance of existing flood control facilities;
- NW 37 emergency water protection and rehabilitation;
- NW 33 temporary construction access and dewatering;
- NW 39 commercial and institutional development;
- NW 42 recreational facilities;
- NW 43 stormwater management facilities;
- NW 46 discharges in ditches.

For a more detailed description of these covered activities, see the descriptions attached to the ACOE's June 10, 2015 request for consultation.

Avoidance, Minimization, and Mitigation Measures

To address the anticipated amount of disturbance in compliance with the requirements of Section 10(a)(1)(B) of the ESA, Pima County will provide approximately 116,000 acres of mitigation. Despite not yet having a Section 10(a)(1)(B) permit, Pima County has acquired over 76,000 acres of fee-owned lands and over 134,000 acres of lease lands that provide the portfolio of lands Pima County will use to fulfill the Section 10(a)(1)(B) permit mitigation obligations (see Figure 5 of this BCO). Partial mitigation credit will be granted for lease lands and for improving natural resource conditions on those lease lands (as opposed to full credit for lands owned in fee title where conservation actions are implemented). Other important avoidance, minimization, and mitigation measures related to the MSCP rely upon the County's continued application of various County Code requirements and departmental procedures that mandate the avoidance and mitigation of impacts to on-site sensitive resources.

Pima County has spent approximately $150 million on land acquisitions since 2004 in preparation for the Section 10(a)(1)(B) permit mitigation needs. These dollars came primarily from bond funds approved by voters in 2004. Pima County is already exercising it regulatory land use authorities in a manner consistent with the MSCP as they implement the natural resource and open-space elements of the Sonoran Desert Conservation Plan (SDCP) and the County's Comprehensive Plan. Implementation of the more comprehensive ecological monitoring program, which is required subsequent to the issuance of the Section 10(a)(1)(B) permit, will result in new programmatic costs for the County.

Since 2002, the County has been implementing the Maeveen Marie Behan Conservation Lands System (CLS; Pima County's conservation reserve system) and the associated conservation guidelines as the Pima County Comprehensive Plan's Environmental Element. For purposes of the MSCP, the CLS will be adapted to serve as the primary tool by which Pima County will—along with species' Priority Conservation Areas (see below)—evaluate habitat loss and determine mitigation necessary to maintain compliance with the terms of the Section 10 permit.

The CLS is a key element of the MSCP and its implementation (see Figure 3 of this BCO). The scientific foundation for the CLS is 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 (species identified through the SDCP and MSCP processes from which the MSCP covered species were selected) and unique landscape features known as Special Elements (Fonseca and Connolly 2002) (see Section 2.4 of the MSCP). Pima County, in consultation with species experts, modeled species habitat and also identified critical conservation areas for each covered species. These areas are known as Priority Conservation Areas (PCAs) and are the primary mechanism for estimating acres of take for individual covered species for the MSCP/EIS (see Section 3.7.1 of the MSCP for more information on the use of the PCAs).

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 (see Figure 3 of this BCO). Details about how the CLS is used to determine Pima County's mitigation commitments for the MSCP are presented in Section 4.3 of the MSCP and Appendix

Q. Additional information regarding conservation guidelines for each CLS category as applied through the Comprehensive Plan can be found in Appendix B of the MSCP. The seven CLS categories are:

Biological Core Management Areas are primarily distinguished from other lands within the CLS by their potential to support habitat for *five* or more Priority Vulnerable Species. They also overlay large blocks of contiguous habitat and biological reserves.
Multiple Use Management Areas are primarily distinguished from other lands within the CLS by their potential to support habitat for *three* or more Priority Vulnerable Species and they connect large blocks of contiguous habitat and biological reserves. As such they are not as biologically rich as those lands designated as Biological Core Management Areas.
Important 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 are lands currently managed for scientific research and include: the Santa Rita Experimental Range and the University of Arizona Desert Laboratory (at Tumamoc Hill). Land management is a critical component of the MSCP. These Scientific Research Areas provide important information related to improved grazing management and the health of the Sonoran Desert.
Agricultural In-holdings within the CLS are 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 are defined as crucial for the conservation of three animal species of special concern to Pima County (cactus ferruginous pygmy-owl, southwestern willow flycatcher, and Mexican spotted owl [the Mexican spotted owl is not a covered species because no take is anticipated, but it was considered in the planning process for the Special Species Management Area]).
Critical Landscape Connections are broadly defined areas that provide connectivity for movement of native biological resources, but which also contain potential or existing barriers that can isolate major conservation areas.

Pima County's SDCP conservation strategy operates at spatial scales ranging from the regional landscape scale to the site-specific project scale and incorporates avoidance and minimization, as well as mitigation measures. At the landscape scale, the CLS map—by identifying those areas that are most suitable for development, as well as those areas where development is least desirable—is the County's most definitive tool and is used to direct development-related impacts away from sensitive resources (see Figure 3 of this BCO). At the site-specific, project scale, most projects (regardless of whether they are in or out of the CLS) are subject to protocols or regulations that seek to avoid, minimize, or mitigate impacts to on-site sensitive resources (e.g., floodplains, riparian areas, native vegetation) as well as promote a project design that avoids and/or minimizes impacts to off-site resources (e.g., surface and groundwater) (see Table 4.1 of the MSCP).

As part of the SDCP, a number of existing regulations or standards were modified to improve species protections. Even before the SDCP, Pima County had developed and honed a host of ordinances and other administrative tools to protect scenic beauty, cultural resources, and

wildlife habitat. Continued implementation of certain aspects of these commitments will specifically benefit covered species and their habitats and Pima County will rely on these commitments to avoid and minimize future impacts to covered species. These specific, permit-related avoidance and minimization measures are described in Table 4.1 of the MSCP.

Above and beyond those avoidance and minimization elements listed in Table 4.1 of the MSCP, Pima County views ranch conservation as the key mechanism to preserve what remains of Pima County's last undeveloped and otherwise unprotected natural landscapes. Ranching in its current, low intensity form is consistent with the conservation goals of the MSCP through:

- Landscape and watershed protection by maintaining an unfragmented ecosystem that is largely devoid of roads and other infrastructure;
- Providing connectivity of plant and animal populations across valleys to adjacent, higher elevation areas, thereby providing conservation of areas ranging from valley bottoms to mountain tops;
- Bringing together private, State, and Federal land units into unified, large management units that make management activities more uniform and efficient; and
- More clearly defining the metropolitan and rural interface, which maintains a more compact urban form.

Additionally, County departments will also be provided with information on sensitive areas, including, but not limited to, known nesting and roost sites of covered species prior to their initiation of construction and maintenance activities. In the case of covered bat species that may be particularly sensitive to disturbance at roost sites under bridges, the Pima County Department of Transportation will be informed of known roost locations in addition to being provided with information on appropriate timing of maintenance activities to avoid disturbance, especially during the breeding season.

Pima County will acquire, protect, manage, and monitor in perpetuity approximately 116,000 acres as mitigation to offset impacts from covered activities that occur over the life of the permit (Table 4.2 of the MSCP and see Figure 5 of this BCO). Applying the landscape-level mitigation tool, mitigation for covered activities will be calculated based on the projected acres of impact and its location relative to the CLS. Below are the mitigation ratios that will be used to determine the amount of mitigation acreage required to satisfy the Section 10 permit (acres conserved: acres impacted; see additional details in Appendix Qof the MSCP):

Biological Core Management Area = 5:1;
Important Riparian Area = 5:1;
Special Species Management Area = 5:1;
Multiple Use Management Area = 3:1;
Agricultural In-holding = 2:1;
Outside of the CLS = 2:1.

Assuming that development proceeds at the projected pace and location as described in the MSCP, MSCP implementation will be phased (10 year phases) to provide for appropriate interim milestones: protection of 49,863 acres of land during Permit Phase I; 53,920 acres during Permit Phase II, and 12,538 acres during Permit Phase III (see Table 4.2 of the MSCP). A vast majority

of these acres will be within the CLS, but mitigation credit will also be claimed for lands outside of the County, which are (by default) outside of the CLS (see Section 4.3.1 of the MSCP). In some instances where a species-specific mitigation need exists, the County may also secure lands outside the CLS in Pima County. For example, Pima County may elect to acquire non-CLS lands for the benefit of the Pima pineapple cactus in order to meet the objective of conserved habitat for this species.

Based on previous affirmation from the FWS (FWS 2002c), Pima County has, over the last several years, been actively acquiring a land portfolio to rely upon as mitigation for impacts resulting from covered activities (Table 4.3 of MSCP; see Figure 5 of this BCO). In this fashion, the County has secured mitigation lands prior to impacts and permit issuance. This arrangement created a financial incentive for the County to acquire land at a lower value and (most importantly) the purchase of large, contiguous blocks of undeveloped land that would likely not be available for purchase or conservation in the future because of the pace of development in the area.

Taking into account the 25% mitigation credit for leased State Trust Land agreed to by the FWS (see section 4.4 of the MSCP; FWS 2012a), Pima County has already acquired over 110,000 acres with which to mitigate future impacts (see Figure 4.1, Table 4.3, and Appendix G of the MSCP). This represents 95% of the mitigation projected to be needed over the 30-year permit (see Table 4.2 of the MSCP). Based on where impacts are likely to occur relative to the CLS, mitigation will be provided according to the ratios reported in Table 4.2 of the MSCP. Based on the current projected footprint of covered activities, Pima County's existing land portfolio will be sufficient for all mitigation needs except for those needed to off-set impacts within Multiple Use Management Areas. However, because of the lower biological value and mitigation ratio of the Multiple Use Management Areas, Agriculture, and Outside CLS categories, Pima County will—where feasible—seek mitigation acres in higher-value CLS categories (Biological Core, Important Riparian Areas, and Special Species Management Areas) and acres in these categories can be used to offset any insufficient conservation in areas of lower mitigation value.

The PCAs and modeled habitat for each covered species are not equally distributed across Pima County's proposed mitigation lands. In order to ensure like-for-like mitigation that adequately addresses impacts to each of the covered species, mitigation will be appropriately located with respect to habitat such that a minimum equivalency conservation ratio of 1:1 (acres of habitat loss: acres of mitigation) will be achieved (see Section 4.3 of the MSCP for information regarding how this will occur), insuring there is mitigation for each covered species.

Mitigation credit for fee title, State Trust lands, and land within private developments 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 where the conservation effect may occur in an area outside of or larger than the immediate area of the action. These conservation measures are known as species enhancements. 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;
- Establishment of additional populations or supplement currently occupied locations of covered species;
- Restoration of special elements, especially riparian and aquatic;
- Nonnative 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; and
- Technology transfer and/or labor to neighboring land owners, land managers, or municipalities for covered species restoration efforts.

Pima County will work with the FWS to determine, on a case-by-case basis, appropriate mitigation credit for these projects. Pima County and the FWS will likely seek input from subject matter experts to assist in the evaluation of proposed species' enhancements. In some instances, and for a variety of reasons, species' enhancements may only be temporary. In these cases, species occupancy may be allowed to be taken back to a previously agreed upon baseline condition (see Section 4.7 of the MSCP and associated species' take statements in the Conclusion Section of this BCO). Take of species related to a return to baseline will be covered under the County's Section 10 permit associated with the MSCP. Mitigation credit for such temporary enhancements will be adjusted accordingly with agreement by Pima County and the FWS.

The primary focus of conservation efforts for the Pima County MSCP will be in protecting, improving, and creating habitat for covered species. Yet sometimes these efforts are insufficient if a species cannot gain access to the habitat. In these cases, it is often required to facilitate this process using reintroduction techniques. Reintroductions can either be (1) wild-to-wild, where a covered species in any life stage is removed from one area and directly introduced into another (usually referred to as translocations); or (2) facilitated, by head-starting or propagating individuals of any life stage that are reared in a captive environment until they reach an age class with higher survivorship and subsequently released into the wild. Either form of reintroduction could be utilized by Pima County, in coordination with FWS, as a species enhancement action. If a species that Pima County is seeking to reintroduce or translocate is covered by an existing Safe Harbor agreement, Pima County and the FWS will determine if it is appropriate to pursue the proposed reintroduction under the existing Safe Harbor agreement. However, Pima County will not be required to use a Safe Harbor agreement approach if it chooses not to.

Over time, many of the management activities highlighted in the MSCP will be informed and improved through a monitoring and adaptive management program (see Chapter 6 of the MSCP). Management actions 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 (see Appendix M of the MSCP). 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 and/or enhanced over time.

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

- Work toward long-term viability and sustainability of native ecosystem structure and function and natural processes in the County-controlled mitigation lands;
- Protect biological resources within County-controlled mitigation lands from threats and other disturbance activities, while also accommodating compatible public uses;
- Enhance and restore conservation targets in appropriate locations to improve habitat for covered species and other species of interest; and
- Respond to monitoring information in a timely manner and use adaptive management, where and when such an approach is warranted.

To achieve these objectives, Pima County will implement management approaches, which directly address those significant threats which Pima County has some ability to control. Management approaches will be implemented by the appropriate Pima County department. Management actions to be implemented by Pima County include: invasive species management; riparian restoration and protection; upland restoration; recreation and trails management; prevention of trash and illegal dumping; and ranchland management.

A primary focus of the Pima County MSCP is on the acquisition of mitigation lands to create a County preserve system with long-term habitat protection and enhancements for covered species. Though land acquisition is a critical piece of the County's conservation program, monitoring and adaptive management of those lands are also important for ensuring that the values for which they were purchased are maintained over time and to assess progress toward determining if 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); and
- Identify the occurrence of changed and/or unforeseen circumstances, and suggest appropriate management responses.

Monitoring under the MSCP will be guided by the Pima County Ecological Monitoring Program (PCEMP). The MSCP incorporates a different approach to monitoring than many other existing habitat conservation plans. Monitoring of individual covered species is used as the primary monitoring approach for most existing habitat conservation plans, but this approach can be costly and may not efficiently or effectively provide the needed information to assess the effectiveness of the plan. Therefore, Pima County's approach to monitoring focuses on a hierarchy of monitoring, including landscape parameters tied to the needs of covered species. Habitat monitoring is a key component of the PCEMP and reflects the understanding that changes in key habitat features can parallel changes in species abundance and distribution. Determining what constitutes habitat and how to monitor it was a two-year planning process, and is detailed by Steidl *et al.* (2010) and summarized in Appendix N of the MSCP. Though not a specific component considered during development of the monitoring plan, Pima County has determined that caves, mines, and adits will also be a part of habitat monitoring for the PCEMP.

Because a section 10 permit is issued to cover specific species, some level of monitoring of individual covered species is informative and useful. Species-level monitoring is also an element of the PCEMP and Pima County will commit to monitor population parameters for 15 species (see Table 6.1 of the MSCP), chosen to represent a range of taxa, habitats, and degree of spatial distribution; from species with very small distributions in Pima County to species with widespread distributions. The goal of species monitoring will be to detect biologically meaningful changes to these populations, particularly declining populations. Table 6.1 of the MSCP provides summary information about the monitoring effort and Appendix N of the MSCP provides in-depth information about the PCEMP.

Pima County will prepare and submit an annual report to the FWS for the purpose of permit compliance (see Appendix P of the MSCP). This annual report will be the primary document in support of FWS-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 FWS in ways that will assist their regional conservation efforts; for example, information can be arranged by vegetation type, covered species, or some other ecologically meaningful units. Maps will be included that show the locations and configuration of areas where incidental take has occurred and where mitigation has been provided. The report will also provide updates on implementation 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, the results of monitoring and adaptive management, and other requirements of the permit. The results of the compliance monitoring report will be discussed with FWS in an annual meeting, followed by a presentation 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 conditions of the permit or Implementing Agreement are not being met;
- Changes to improve the compliance monitoring program or management strategies (adaptive management);
- Detailed maps and corresponding tabular data that depict habitat loss and mitigation.

Additional details related to the covered activities, mitigation, conservation measures, and monitoring and reporting can be found in the appropriate sections of the MSCP and associated appendices and are incorporated herein by reference.

STATUS OF THE SPECIES RANGEWIDE

Aquatic Species

Huachuca Water Umbel and Designated Critical Habitat

The Huachuca water umbel is an herbaceous semi-aquatic perennial plant with tiny 3- to 10-flowered umbels that arise from nodes of creeping shallow (1.0-2.0 cm [0.4-0.8 inches]) underground rhizomes. Cylindrical hollow leaves are pale green in color and are typically borne

2 or 3 per node, having septa at irregular intervals. Leaves are generally 1.0-3.0 mm (0.04-0.12 inches) in diameter; however, length varies depending on microhabitat. The species reproduces sexually through flowering and asexually from rhizomes, the latter probably being the primary reproductive mode. An additional dispersal opportunity occurs as a result of the dislodging of clumps of plants that may then re-root in a different site along aquatic systems.

The Huachuca water umbel was historically found in Pima County (Tucson, along the Santa Cruz River); Cochise County (Huachuca Mountains, San Pedro area, Saint David, San Bernardino Valley/Black Draw); and Santa Cruz County (Sonoita Creek, Canelo Hills/Turkey Creek, San Rafael Valley) in Arizona. This species has been extirpated from a significant portion of its historical range.

Wetland and riparian areas, key habitat for the Huachuca water umbel, are rare and declining in the Sonoran desert region (Hendrickson and Minckley 1984; Pima County 2000). Historic watershed degradation has resulted from excessive livestock grazing, development, and diversion of water. Some of these activities may still be occurring and continue to deteriorate habitat for this species, or keep it unsuitable for re-establishment. Individual plants or entire populations can be destroyed when flooding is too frequent or intense, although an intermediate level of flooding frequency may reduce competition from other plant species (FWS 1997).

Huachuca water umbel populations are threatened by loss of wetland aquatic habitat that may result from: drawdown of shallow groundwater, alteration of watershed conditions, development, overgrazing and trampling by livestock, diversion of water, and flash flooding. Also, overcrowding by other plants may result in reduction of local populations of this species. Huachuca water umbel populations have declined, perhaps in part due to competition when their habitat is aggressively colonized by other wetland species, both native (e.g., cattails [*Typha* spp.]), and nonnative (e.g., water cress [*Rorippa nasturtium-aquaticum*]). Giant cane [*Arundo donax*] and Johnson grass [*Sorghum halepense*] are also species of concern in some areas because it might crowd out the umbel. Crayfish (*Orconectes* spp.) are likely detrimental to this species, because they have been documented consuming a wide variety of aquatic plants and impacting desert ecosystems (Moody and Sabo 2013; Fernandez and Rosen 1996).

Maintenance of perennial water flow and excessive erosion are key management issues. Huachuca water umbel populations are restricted to wetland areas that are rare in the southwest United States and adjacent Mexico. Protective measures should include procurement of instream flow rights and management of watersheds to reduce flood intensity. Rural and urban development, road building, chaining, agriculture, mining, fire, and other land disturbances that degrade Huachuca water umbel need to be assessed and managed in order to conserve and recover this species.

The current distribution of the species is in Arizona in the U.S. and in Sonora, Mexico. Fifty one sites are believed to be currently occupied in five watersheds: San Pedro River, Santa Cruz River, Rio Yaqui, Rio Sonora, and Rio Concepcion (FWS 2014b), with most sites between 610 to 2,164 m (2,000 and 7,100 feet (ft)) elevation (FWS 1997). Although new populations have been discovered in the past decade (primarily in Sonora, Mexico), no population is increasing in size (FWS 2014b), with the exception of at least short-term increases seen in Cienega Creek. In

the United States, the Huachuca water umbel occurs on lands administered by the United States Army Fort Huachuca, the Forest Service, the Bureau of Land Management, the Service, Arizona State Parks, Pima County, The Nature Conservancy, and private landowners. In Mexico, most Huachuca water umbel occurs on private lands (Anderson 2006).

Huachuca water umbel populations are highly dynamic and expand and contract depending on the presence of "refugia" where this species can escape the effects of scouring floods in a watershed that has an unaltered hydrograph and a healthy riparian community that stabilizes the channel. From these refugia, the species can rapidly expand if conditions are favorable. However, entire patches can be lost due to flooding or drought, or may be greatly reduced due to competition with other species (FWS 1997).

The Huachuca water umbel was listed as Endangered by the FWS in 1997. Critical habitat designated in 1999 (FWS 1999). It is considered Highly Safeguarded by the State of Arizona and is a U.S. Forest Service and Bureau of Land Management Sensitive Species.

Critical habitat for Huachuca water umbel includes seven critical habitat units covering the following areas: Sonoita Creek, Santa Cruz River in Santa Cruz County; Scotia Canyon, Sunnyside Canyon, Garden Canyon in Cochise County; the Verde River in Yavapai County; lower Gila River, the San Pedro River, and Aravaipa Creek in Pinal and Graham counties; portions of Eagle Creek in Graham and Greenlee counties, and upper Gila River in Catron, Grant, and Hidalgo counties in New Mexico (70 FR 75546 and 71 FR 32496).

The primary constituent elements identifying critical habitat are:
• Sufficient perennial base flows to provide a permanently or nearly permanently wetted substrate for growth and reproduction of Huachuca water umbel;
• A stream channel that is relatively stable, but subject to periodic flooding that provides for rejuvenation of the riparian plant community and produces open microsites for Huachuca water umbel expansion;
• A riparian plant community that is relatively stable over time and in which nonnative species do not exist or are at a density that has little or no adverse effect on resources available for Huachuca water umbel growth and reproduction; and
• In streams and rivers, refugial sites in each watershed and in each reach, including, but not limited to, springs or backwaters of mainstem rivers, that allow each population to survive catastrophic floods and recolonize larger areas.

Activities that may result in the destruction or adverse modification of critical habitat include those that result in a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of the species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of the species or that preclude or significantly delay development of such features (81 FR 7214); however, because no designated critical habitat for the Huachuca water umbel exists within the action area, these activities are not applicable to our analysis in this BCO.

Our May 16, 2014 Biological Opinion for the Ongoing and Future Military Operations and Activities at Fort Huachuca, Arizona (FWS 2014d) includes a detailed Status of the Species for

the Huachuca water umbel. This biological opinion is available on our website at: http//:www.fws.gov/arizonaes, under the Documents Library; Section 7 Biological Opinions. That status of the species discussion is incorporated herein by reference.

Gila Chub and Designated Critical Habitat

The Gila chub is a small-finned, deep-bodied, chunky member of the minnow family (Cyprinidae) that ranges from dark olive green to silvery with a lighter belly. Adult males average about 150 millimeters (6 inches) in total length; females can exceed 200 millimeters (8 inches). Gila chub feed primarily on aquatic insects and algae.

Gila chub commonly inhabit pools in smaller streams, cienegas, and artificial impoundments ranging in elevation from 609 to 1,676 m (2,000 to 5,500 ft). Common riparian plants associated with these populations include willow (*Salix* spp.), tamarisk (*Tamarix* spp.), cottonwoods (*Populus* spp.), seep-willow (*Baccharis glutinosa*), and ash (*Fraxinus* spp.). Typical aquatic vegetation includes watercress (*Nasturtium officianale*), horsetail (*Equisetum* spp.), rushes (*Juncus* spp.), and speedwell (*Veronica anagallis-aquatica*). Gila chub are highly secretive, preferring quiet deeper waters, especially pools, or remaining near cover including terrestrial vegetation, boulders, and fallen logs. Adults are often found in deep pools and eddies below areas with swift currents. Young-of-the-year inhabit shallow water among plants or debris, while older juveniles use higher velocity stream areas.

Historically, Gila chub was recorded from nearly 50 rivers, streams, and spring-fed tributaries throughout the Gila River basin in southwestern New Mexico, central and southeastern Arizona, and northern Sonora, Mexico (Miller and Lowe 1967, Rinne and Minckley 1970, Minckley 1973, Rinne 1976, DeMarais 1986, Sublette *et al.* 1990, Weedman *et al.* 1996) ; occupancy of Gila chub throughout its range was more dense; and currently-occupied sites were likely more expansive in distribution (Hendrickson and Minckley 1984, Minckley 1985, Rinne and Minckley 1991). Gila chub now occupies an estimated 10 to 15 percent of its historical range (Weedman *et al.* 1996, FWS 2005) and approximately 25 of these current localities are considered occupied, but all are small, isolated, and face one or more threats (Weedman *et al.* 1996, FWS 2005). The biological status of several of these populations is uncertain, and the number of localities currently occupied may overestimate the number of remnant populations in that some might not persist if its core connected population was extirpated (eliminated).

Approximately 85-90 percent of the Gila chub's habitat has been degraded or destroyed, and much of it is unrecoverable. Today, much of the remaining Gila chub habitat is still extensively grazed, current mining operations still operate in its watersheds, increased recreation use adds to habitat alteration, and the introduction of nonnatives adds to habitat degradation. The Gila chub was listed as endangered with critical habitat on November 2, 2005 (70 FR 66664).

Our final rule designating critical habitat (70 FR 66664) contains a description of the requirements of the critical habitat needed to sustain the essential life history functions of the species; these requirements are incorporated into this BCO by reference. The following is a brief summary of the seven primary constituent elements of critical habitat, which include those habitat features required for the physiological, behavioral, and ecological needs of the species: 1)

perennial pools with areas of higher velocity between pools; 2) appropriate water temperatures; 3) adequate water quality; 4) appropriate prey base; 5) sufficient cover; 6) habitat devoid of nonnative aquatic species or habitat in which detrimental nonnative species are kept at a level that allows Gila chub to continue to survive and reproduce; and 7) streams that maintain a natural flow pattern including periodic flooding (70 FR 66664).
Fifty-nine percent of the land supporting all of the extant populations occurs on Bureau of Land Management and U.S. Forest Service lands. Other ownership includes Arizona State Land Department, the Audubon Society, the Nature Conservancy, Tribal lands, and multiple private landowners. Critical habitat consists of 258.1 kilometers (160.3 miles) in 24 rivers and creeks within the Gila River Basin. Critical habitat includes portions of the Agua Fria, Babocomari, Gila, San Francisco, San Pedro, Santa Cruz, and upper Verde rivers in Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai counties, Arizona, and in Grant County, New Mexico. States recognize the Gila chub as a species of special concern in Arizona, and as an endangered species in New Mexico.

Our October 30, 2013 Biological and Conference Opinion for the Rosemont Copper Mine in Pima County, Arizona (FWS 2013b) includes a detailed Status of the Species for the Gila chub. This biological and conference opinion is available on our website at: http//:www.fws.gov/arizonaes, under the Documents Library; Section 7 Biological Opinions. That status of the species discussion is incorporated herein by reference.

Gila Topminnow

The Gila topminnow is a small (2.5-5 cm (1-2 in) long), guppy-like, live-bearing fish. Breeding males are jet black with yellow fins, and both sexes lack dark spots on the fins. Males are smaller than the females and rarely measure more than 2.5 cm (1 inch) standard length; the females sometimes reach lengths of 5 cm (2 inches) or more, but are usually 3.0 to 4.5 cm (1.2 to 1.8 inches) standard length (Minckley 1973).

The basic habitat requirement for the Gila topminnow is water that is permanent and free from nonnative predators. Beyond that, habitat requirements of Gila topminnows are broad. The Gila topminnow occurs in small streams, springs, and cienegas below 1,350 m (4,500 ft) elevation, primarily in shallow areas with aquatic vegetation and debris for cover. This species can tolerate relatively high water temperatures and low dissolved oxygen.

Historically, the Gila topminnow was one of the most common fish found throughout the Gila River drainage in Arizona. It also extended into Mexico and New Mexico. It currently occurs in Mexico and Arizona. In Arizona, most of the remaining native populations are in the Santa Cruz River system. This species also occurs in small streams, springs, and cienegas in Gila, Pinal, Graham, Yavapai, Santa Cruz, Pima, Maricopa, and Coconino counties in Arizona.

Primary impacts to the Gila topminnow include the introduction and spread of nonindigenous predatory and competitive fishes, water impoundment and diversion, water pollution, groundwater pumping, stream channelization, and habitat modification.

The Gila topminnow was listed as endangered under the ESA in 1967 as one of the original species protected under the ESA. A Recovery Plan for this species was approved in March 1984 and a revision is currently in progress. A statewide safe harbor agreement administered by the AGFD was completed in 2008 which paved the way for conservation actions by private landowners to support recovery of this species. It is currently being reared at many locations for reestablishment into numerous sites in Arizona. The Gila topminnow has been released at almost 200 locations in efforts to reestablish populations. It is listed as a Species of Special Concern by the State of Arizona.

Our October 30, 2013 Biological and Conference Opinion for the Rosemont Copper Mine in Pima County, Arizona (FWS 2013b) includes a detailed Status of the Species for the Gila topminnow. This biological and conference opinion is available on our website at: http//:www.fws.gov/arizonaes, under the Documents Library; Section 7 Biological Opinions. That status of the species discussion is incorporated herein by reference.

Longfin Dace

The longfin dace is a small silvery fish that is usually found in water with a sandy substrate. The body of the longfin dace is fusiform, with small scales. Adults rarely exceed 2.6 inches (6.5 cm) standard length. The head is thick and blunt, and the mouth is small. The back and upper sides are silvery gray to olive, sides sometimes with golden flecks; the lower sides and abdomen are whitish, and the peritoneum black. A diffuse, dusky lateral stripe originates at the upper corner of the opercle, terminating in a black spot at the base of the caudal fin.

The habitat of the longfin dace is variable, ranging from intermittent hot low-desert streams to clear and cool higher elevation streams. They tend to occupy relatively small or medium size streams, with sandy or gravely bottoms; eddies, pools near overhanging banks or other cover (AGFD 2006a). They are usually found in water less than 0.2 m (6 inches) deep with moderate velocities of around 0.3m/s (1.1f/s). They are rarely abundant in large streams or above 5,000 ft (1524 m). Generally, the longfin dace is found in water less than 24° C (75° F), but they are tolerant of high temperatures and low dissolved oxygen. During low water, they may take refuge in moist detritus and algal mats (Sublette *et al.* 1990).

The longfin dace was historically found throughout Arizona, New Mexico, and northwestern Mexico (AGFD 2006a), and is still one of the most widespread native fishes in the southern half of Arizona. The longfin dace is currently found in a broad area that consists of disjunct populations. It is known to be present in the Bill Williams and Gila River drainages in Arizona; south into Sonora, Mexico (coastal streams and Rio Yaqui basin), the Rio Sinaloa, Mexico, and perhaps farther south (AGFD 2006a). It is native to the Gila River basin (including the San Francisco River), the Bill Williams, Yaqui, Magdalena, and Sonoyta drainages and has been introduced into the Virgin River basin, Arizona, and into the Zuni and Mimbres rivers, and the Rio Grande basin, New Mexico (BISON 2000; AGFD 2006a).

Suitable aquatic areas throughout the range of the longfin dace have been significantly reduced and widespread alteration of hydrologic regimes has occurred as a result of groundwater pumping, drought, and climate change. Many watercourses that likely supported longfin dace at

one time no longer have perennial flows; rather, they convey water only during storm events. Therefore, continued loss of perennial stream habitat will negatively impact this species. Flood control programs and groundwater pumping may contribute to the drying-out of suitable stream habitat and overgrazing may impact habitat quality.

Longfin dace are known to be vulnerable to five species of native parasites (Mpoame and Rinne 1983). Like all native fish, longfin dace are subject to predation by nonnative and invasive fish, frogs, and crayfish. The longfin dace is a Forest Service sensitive species and also has special status and protection in Mexico.

This summary does not reflect all information available on this species. More detailed status and life history information for the longfin dace is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

Desert Sucker

The desert sucker grows to approximately 33 cm (13 inches) in length. Its color varies from green to silver or tan above and silver to yellow below. During the spawning season, breeding males develop a striped pattern consisting of one or two light lateral stripes on a darker background. The desert sucker has a downward-pointed mouth with an enlarged cartilaginous ridge behind the lower lip.

Adult desert suckers live in riverine pools, moving at night to feed on gravel and cobble riffles. Young inhabit riffles throughout the day, feeding on aquatic insects. The desert sucker is omnivorous; it feeds on diatoms and algae that grow on cobbles and boulders. It uses the cartilage ridge below its lower lip to scrape food items from stream channel bottom. Any animal material present within the algae would also be eaten. Young sucker fry feed primarily on small aquatic insects, such as midge and black fly larvae.

Historically, desert suckers were found in the Bill Williams River, Gila River, and Virgin River basins in Arizona, New Mexico, Utah, and northern Sonora, Mexico. In Nevada, it is found in the Virgin River, White River (White Pine County), and Meadow Valley Wash (Clark County). Currently, desert suckers still occur over a relatively broad area and are currently found in river and stream systems throughout their historical range. The species is stable throughout most of its range, but there are no known populations within the action area. Alteration of historical flow regimes and construction of reservoirs have diminished available running-water habitat. Habitat is also lost when poor land management increases sedimentation which covers diatoms and algae growing on channel substrate. In addition, nonnative fish stocking has increased competition with and predation on desert suckers.

Loss, fragmentation or modification of habitat from water development projects, stream diversions, and aquifer pumping is a major threat to the species. Invasion of nonnative fishes in the systems occupied by the desert sucker is an equal or greater threat. The red shiner is present in the Gila River and has been suggested as a potential competitor for native species. At early

life stages, the desert sucker may be preyed upon by nonnative fish in some areas. Hybridization with other sucker species is also a threat to desert suckers at some locations.

Desert suckers are known to be vulnerable to six species of native parasites (Mpoame and Rinne 1983). Like all native fish, desert suckers are subject to predation by nonnative and invasive fish, frogs, and crayfish. The desert sucker is a Forest Service sensitive species.

This summary does not reflect all information available on this species. More detailed status and life history information for the desert sucker is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

Sonora Sucker

This is a large catostomid fish, attaining adult size of 20 to 79 cm (8 to 31 inches) standard length. Its lower lip is about three times as thick as its upper lip. There are 10 to 11 rays in the dorsal fin. The body is sharply bicolored, olive brown above and deep yellow below. The scales on the upper half of the body have dark spots forming faint dashed lines. Weights of Sonora suckers range from 113 grams (4 ounces) to 1.8 kilograms (4 pounds) (AGFD 2002a).

The Sonora sucker is found in a variety of habitats from warm water rivers to trout streams. "It has an affinity for gravelly or rocky pools, or at least for relatively deep, quiet waters" (Minckley 1973). Adults tend to remain near cover in daylight, but move to runs and deeper riffles at night. Young live in and utilize runs and quiet eddies. They exhibit varying levels of site fidelity and appear to move less than desert suckers (Booth and Shipley 2012).

Populations of the Sonora sucker are declining, although its distribution is relatively widespread. The status of the species is stable in the San Francisco and Gila River drainages, New Mexico (Sublette *et al.* 1990). The Sonora sucker is thought to be lost from the entire Santa Cruz watershed (AGFD 2002a). The Sonora sucker is a Forest Service sensitive species and is listed as endangered in Mexico.

Alteration of historical flow regimes and construction of reservoirs have diminished available habitat for Sonoran Sucker. General watershed erosion causing excessive sand deposition in streams has eliminated much pool habitat required by the species. A winter snagging season for anglers currently (1994) exists for this sucker and the desert sucker below Stewart Mountain Dam on the Lower Salt River. This management action was taken as a measure to encourage harvest of the species, as many die during the extremely low winter water flows.

This summary does not reflect all information available on this species. More detailed status and life history information for the Sonora sucker is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

Chiricahua Leopard Frog and Designated Critical Habitat

Adult Chiricahua leopard frogs *(Lithobates chiricahuensis*) are distinguished from other leopard frogs by their unique "salt and pepper" thigh pattern. This distinctive pattern on the rear of the thigh consists of small, raised, cream-colored spots or tubercles on a dark background. Other characteristics include dorsolateral folds that are interrupted and deflected medially; stocky body proportions; relatively rough skin on the back and sides; and often green coloration on the head and back. The species also has a distinctive call consisting of a relatively long snore of 1 to 2 seconds in duration. Snout-vent lengths of adults range from approximately 54 to 120 mm (2.1 to 4.7 in). Eggs are black and white and strongly demarcated between the animal and vegetal poles. Tadpoles are darkly pigmented with darkly blotched tails.

The Chiricahua leopard frog is an aquatic and riparian species. This species historically occurred in cienegas, pools, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 1,000 to 2,710 m (3,281 to 8,890 ft). It is now often restricted to springs, livestock tanks, and streams in the upper portions of watersheds where nonnative predators either have yet to invade or habitats are marginal for them. Specifically, habitat includes a variety of water sources including rocky streams with deep, rocky pools, overflow pools and oxbows of rivers, permanent springs, ponds, and wetlands at elevations from 1,067 to 2,450 m (3,500 to 8,040 ft) in central and eastern Arizona, and from 372 to 1,226 m (1,219 to 4,023 ft) in southeastern Arizona (FWS 2007b). It also occurs in thermal springs and seeps, stock tanks, wells, and river reaches. Adjacent upland communities include oak and pine-oak woodland, chaparral, grassland, and desert. Ideal habitat includes permanent water (during breeding season, and at least muddy conditions otherwise for survival), aquatic heterogeneity (deep pools with nearby shallow areas), undercut banks (retain moisture during drought), overhanging terrestrial vegetation, and abundant aquatic vegetation (FWS 2007b). Home range requirements are not known, although recent work suggests that they can disperse overland for 4-5 miles from breeding sites (David Hall and Phil Rosen, *unpublished data*).

Historical distribution of this species is difficult to ascertain because it was formerly considered *Rana pipiens*, and so classified by observers before it was described as a separate species in 1979. Distribution and habitat use of the Chiricahua leopard frog in Mexico are poorly known. Positive historical records are known from over 114 sites in southeastern Arizona, where it occupied most large rivers and lakes, as well as many small tributaries and ponds. From 1990 to 1994, 265 potential sites, including 87 of the 114 known historical sites, were surveyed, and Chiricahua leopard frogs were found in 12 historical and 51 previously unknown sites (Sredl and Howland 1994). The total range includes montane regions in central and southern Arizona, southwestern New Mexico south into the Sierra Madre Occidental to western Jalisco, Mexico, at elevations from 1,066 to 2,450 m (3,500 to 8,400 ft). Two disjunct distributions exist within central and southeastern Arizona, from montane central Arizona east and south along the Mogollon Rim to montane areas of west-southwestern New Mexico, and southeastern montane areas of Arizona into Sonora and Chihuahua, Mexico (FWS 2007b).

The most serious threats to this species include predation by nonnative organisms, especially American bullfrogs (*Lithobates catesbeianis*), spiny-rayed fishes, and crayfish (*Oronectes*

virilis); and a fungal skin disease (chytridomycosis or "Bd") that is killing frogs and toads around the globe. Today, invasive species such as introduced fishes, crayfish, and bullfrogs are one of the most important threats to the Chiricahua leopard frog on the local scale (FWS 2007b). The introduced crayfish is having major negative effects on native populations of frogs in North America (Kats and Ferrer 2003), probably contributing to the statewide decline of Chiricahua leopard frogs in Arizona (FWS 2007b). Bullfrogs are also important predators of native frogs and recent eradication efforts in southern Arizona (Atascosa Mountains and Cienega Valley) appear to have established conditions that are favorable to the reestablishment of the Chiricahua leopard frog.
Chytridiomycosis and nonnative organisms, coupled with habitat fragmentation and loss resulting from water diversion, groundwater pumping, and pollution have meant that recovery criteria outlined in the recovery plan have not been met for this species. Climate change and increases in UV radiation will likely impact this species in the future. Other threats include drought, floods, wildfires, degradation and destruction of habitat, water diversions and groundwater pumping, disruption of metapopulation dynamics (relationships among populations of frogs), increased chance of extirpation or extinction resulting from small numbers of populations and individuals, and environmental contamination.

The Chiricahua leopard frog was originally listed as threatened under the ESA on June 13, 2002 (67 FR 40790). Subsequently, listing was re-evaluated due to taxonomic information related to the Ramsey Canyon leopard frog and on March 20, 2012, FWS determined that the Chiricahua leopard frog, including the Ramsey Canyon leopard frog (which was subsumed by the Chiricahua leopard frog taxon), should remain listed as threatened (77 FR 16324). In March 2011, the FWS proposed critical habitat for the Chiricahua leopard frog in Arizona and New Mexico. Final designation of critical habitat for the Chiricahua leopard frog occurred on March 20, 2012 (77 FR 16324), and was essentially the same as the proposed designation.

Critical habitat includes a total of 10,346 acres (4,187 hectares) in Apache, Cochise, Gila, Graham, Greenlee, Pima, Santa Cruz, and Yavapai Counties, Arizona; and Catron, Grant, Hidalgo, Sierra, and Socorro Counties, New Mexico. The final rule designating critical habitat for the Chiricahua leopard frog also contains a description of the requirements of the critical habitat needed to sustain the essential life history functions of the species; these requirements are incorporated into this BCO by reference. The following is a brief summary of the two primary constituent elements of critical habitat, which include those habitat features required for the physiological, behavioral, and ecological needs of the species: (1) Aquatic breeding habitat and immediately adjacent uplands exhibiting the following characteristics: (a) Standing bodies of fresh water; (b) Emergent and/or submerged vegetation, root masses, undercut banks, fractured rock substrates, or some combination thereof; (c) Nonnative predators (e.g., crayfish, bullfrogs, nonnative fish) absent or occurring at levels that do not preclude presence of the Chiricahua leopard frog; (d) Absence of chytridiomycosis, or if present, then environmental, physiological, and genetic conditions are such that allow persistence of Chiricahua leopard frogs; (e) Upland habitats that provide opportunities for foraging and basking that are immediately adjacent to or surrounding breeding aquatic and riparian habitat; and (2) Dispersal and nonbreeding habitat, consisting of areas with ephemeral, intermittent, or perennial water that: (a) Are not more than 1.6 kilometers (1.0 mile) overland, 4.8 kilometers (3.0 miles) along ephemeral or intermittent drainages, 8.0 kilometers (5.0 miles) along perennial drainages; (b) In overland and nonwetted

corridors, provide some vegetation cover or structural features for shelter, forage, and protection from predators; in wetted corridors, provide some ephemeral, intermittent, or perennial aquatic habitat; and (c) Are free of barriers that block movement by Chiricahua leopard frogs (77 FR 16324).

Our May 16, 2014 Biological Opinion for the Ongoing and Future Military Operations and Activities at Fort Huachuca, Arizona (FWS 2014d) includes a detailed Status of the Species for the Chiricahua leopard frog. This biological and conference opinion is available on our website at: http//:www.fws.gov/arizonaes, under the Documents Library; Section 7 Biological Opinions. That status of the species discussion is incorporated herein by reference.

Lowland Leopard Frog

The lowland leopard frog is a relatively small leopard frog. The dorsal field color of adults is a light gray-green, green, tan, or brown, with dark brown spots and no halos. Adults can be distinguished from other leopard frogs by a combination of characters, including prominent dorsolateral folds that are broken and inset towards the rear, a dark brown relatively tight reticulate pattern on the rear and thigh, and usually no spots on the snout. Adult males lack prominent vocal sacs.

The range of the lowland leopard frog once included lower elevations of the lower Colorado River and its tributaries in Nevada, California, Arizona, New Mexico, northern Sonora and extreme northeast Baja California, Mexico. This frog occurred in the Colorado River near Yuma in extreme southwestern Arizona, in west, central, and southeastern Arizona south of the Mogollon Rim, and the Virgin River drainage in extreme northwestern Arizona (AGFD 2006c). Although no records exist for the lower Gila River downstream of the Phoenix area, they almost certainly occurred there historically, but are now replaced by the Rio Grande leopard frog (*Rana berlandieri*) and American bullfrog (Rorabaugh *et al.* 2002). The lowland leopard frog currently occurs in central and southeastern parts of Arizona. It is absent from the lower Colorado River and have declined significantly in southeastern Arizona. Where its range overlaps with the Chiricahua leopard frog (*L. chiricahuensis*), hybridization has occured between the two species. For example, the two frogs hybridize in California Gulch and Big Casa Blanca Canyon, Santa Rita Mountains, Santa Cruz County (Stebbins 2003).

Lowland leopard frogs inhabit aquatic systems in desert grasslands to pinyon-juniper (Platz and Frost 1984). They are habitat generalists and breed in a variety of natural and man-made aquatic systems. Natural systems include rivers, permanent streams, permanent pools in intermittent streams, beaver ponds, cienegas (=wetlands), and springs, while man-made systems include earthen cattle tanks, livestock drinkers, canals, irrigation sloughs, wells, mine adits, abandoned swimming pools, and ornamental backyard ponds (Platz and Frost 1984; Scott and Jennings 1985; Sredl and Saylor 1998). Most historical localities are small to medium-sized streams and rivers (Jennings 1987; Sredl and Saylor 1998). In semi-permanent aquatic systems, this species may survive the loss of surface water by retreating into deep mud cracks, mammal burrows, or rock fissures (Howland *et al.* 1997). Lowland leopard frogs, on average, are found at lower elevations than Chiricahua leopard frogs, generally occurring below 1,676 m (5,500 feet). In Arizona, elevation ranges from 146-2499 m (480 – 8200 ft), but generally 1951 m (<6400 ft)

(unpublished records, AGFD, HDMS accessed 2006). Rangewide, they are found from sea level to 1,817 m (5,960 ft) (Jennings and Hayes 1994); sea level to 1700 m (5,577 ft) as reported by Stebbins (2003).

Adequate data is lacking and is needed to determine status of lowland leopard frogs in central Arizona, but populations are thought to be stable in this area of the state (Sredl *et al.* 1997a). According to NatureServe (2006), "Large numbers of occurrences still exist in central Arizona (the largest portion of United States range) but, apparently extirpated from other portions of range in the southwestern United States; information is not available for Mexico." The species is declining in southeastern Arizona and is extirpated from southwestern Arizona and New Mexico (FWS 1991; Sredl *et al.* 1997b).
Causes of decline and extirpations are complex, and some are operating on a local or regional level, while others appear to be global problems. Worldwide, habitat loss and pollution are the leading threats to amphibians (Stuart *et al.* 2004). In the Southwest, although habitat loss and perhaps pollution locally are problems, currently one of the most pervasive threats to ranid frogs is predation by introduced predators, particularly American bullfrogs, fishes (e.g. sunfishes, bass, carp, catfishes, mosquitofish), and crayfish (Moyle 1973, Fernandez and Rosen 1996; Rosen *et al.* 1996). Where aquatic habitats have been eliminated, ranid frogs have disappeared. For instance, lowland leopard frogs once occupied the now dry reaches of the Santa Cruz River through Tucson (Arnold 1940). In many cases, aquatic habitats remain (albeit altered) or have been replaced by stock tanks or agricultural developments that include canals, ditches, and drains. Lowland leopard frogs often can use these altered habitats, as long as non-native predators are absent.

As with the Chiricahua leopard frog, lowland leopard frogs also experience die-offs from chytridiomycosis (Sredl *et al*. 2000). A lowland leopard frog collected from Sycamore Canyon in 1972 was found positive for the disease and is the earliest record of a chytrid positive anuran in the U.S. Populations of lowland leopard frogs have persisted with the disease at some locations (e.g. lower San Pedro River, Arizona), but have disappeared from other sites where disease has occurred (e.g. Sycamore Canyon and Las Cienegas National Conservation Area, Arizona). Habitat fragmentation and water manipulation can lead to local extirpation by disrupting the metapopulation dynamics of lowland leopard frogs in arid landscapes (Jennings and Scott 1991). Other threats include heavy grazing and post wildfire siltation. Increased watershed erosion caused by grazing can accelerate sedimentation of deep pools used by frogs (Gunderson 1968). Sediment can alter primary productivity and fill interstitial spaces in streambed materials with fine particulates that impede water flow, reduce oxygen levels, and restrict waste removal (Chapman 1988). Eggs, tadpoles, metamorph frogs, and frogs hibernating at the bottom of pools or stock tanks are probably trampled by cattle (Bartelt 1998, Ross *et al.* 1999, FWS 2007b). At the same time, lowland leopard frogs have benefited in many places by construction of stock tanks and other impoundments for cattle, which often create suitable frog habitats in environments that are otherwise too arid for ranid frogs. Fire and subsequent degradation of watershed condition immediately after fires can also result in dramatically increased runoff and debris flow that can scour aquatic habitats in canyon bottoms or bury them, and ash flow that can create toxic conditions.

This summary does not reflect all information available on this species. More detailed status and life history information for the lowland leopard frog is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

Northern Mexican Gartersnake and Proposed Critical Habitat

The northern Mexican gartersnake has a relatively stout body with a total length of up to 111.8 cm (44 inches). Individuals are brown to greenish brown with a yellow-white dorsal stripe flanked by stripes on the third and fourth scale rows in the anterior region. Large brown blotches are on the back of the head that are separated from the corner of the mouth by light-colored crescents (Stebbins 1985).

In the United States, ecological settings for the northern Mexican gartersnakerange from the Lower Colorado subdivision of Sonoran Desertscrub up to Madrean Oak Woodland, generally between 914 and 1,524 m (3,000 and 5,000 ft). In Mexico, it may occur as high as 2,591 m (8,500 ft) (Rossman *et al.* 1996). The northern Mexican gartersnake is found in both lotic and lentic habitats that include cienegas and stock tanks (in southern Arizona), as well as river habitat that includes protected backwaters, braided side channels and beaver ponds, and isolated pools near the river mainstem (Emmons and Nowak 2013). This subspecies is also associated with low-gradient streams in valley floors and generally open areas.

Northern Mexican gartersnakes often forage along the banks of waterbodies feeding primarily upon native fish and adult and larval leopard frogs. It may also supplement its diet with earthworms and leeches and vertebrates such as lizards, small rodents, salamanders, treefrogs, and toads. In some populations where native prey species are rare or nonexistent, northern Mexican gartersnakes will prey upon juvenile nonnative bullfrogs, bullfrog tadpoles, or nonnative fish where they co-occur (Holycross et al. 2006; Emmons and Nowak 2013; Emmons 2013a, pers. comm.). Within streams and cienegas, the species uses areas that are characterized by shallow, slow moving, and at least partially vegetated water bodies, such as springs. In general, this species requires intact riparian vegetation communities along permanent water that is free from harmful nonnative species, and sustains a reliable prey base.

The historical range of the northern Mexican gartersnake includes Arizona, New Mexico, and northwest Mexico, from southern Arizona to Oaxaca, Mexico. In Arizona, this subspecies ranges from the southeast corner of the state, through central Arizona, to the Colorado River near Lake Havasu. Within Mexico, northern Mexican gartersnakes historically occurred within the Sierra Madre Occidental and the Mexican Plateau in the Mexican states of Sonora, Chihuahua, Durango, Coahuila, Zacatecas, Guanajuato, Nayarit, Hidalgo, Jalisco, San Luis Potosí, Aguascalientes, Tlaxacala, Puebla, México, Veracruz, and Querétaro, comprising approximately 85 percent of the total rangewide distribution of the subspecies.

In our final rule to list the northern Mexican gartersnake, Appendix A is a table giving specific details related to our current understanding of the status of the northern Mexican gartersnake throughout the U.S. This appendix is found on our website at: http//:www.fws.gov/arizonaes,

under the Document Library; Documents by Species; Reptiles/Amphibians; Northern Mexican Gartersnake, and is included herein by reference.

Harmful nonnative species (bullfrogs, predatory, warm water sportfish, and crayfish) are the most significant threat to the northern Mexican gartersnake. These harmful nonnative species compete with and prey upon both the gartersnake itself and its native prey species causing both direct mortality and starvation within populations. Other threats, such as the destruction and modification of habitat (including the loss of aquatic habitats from water use and management, as well as drought), impacts to prey species from chytrid fungus, and genetic effects from fragmentation of populations, affect the species.

The northern Mexican gartersnake was listed as threatened under the ESA on July 8, 2014 (79 FR 38677). It is also a Tier 1b Species of Greatest Conservation Need for the AGFD, is considered a State Endangered Species by the New Mexico Department of Game and Fish, and is listed as Threatened by the Republic of Mexico. It is a sensitive species in Region 3 of the Forest Service and is a listed as a sensitive species by the New Mexico Bureau of Land Management.

Areas proposed as critical habitat for the northern Mexican gartersnake were published in the Federal Register on July 10, 2013 (78 FR 41550). Fourteen units of critical habitat were proposed. These 14 units include lands in the following areas: (1) Gila River Mainstem; (2) Mule Creek; (3) Bill Williams River; (4) Agua Fria River Subbasin; (5) Upper Salt River Subbasin; (6) Tonto Creek; (7) Verde River Subbasin; (8) Upper Santa Cruz River Subbasin; (9) Redrock Canyon; (10) Buenos Aires National Wildlife Refuge; (11) Cienega Creek Subbasin; (12) San Pedro River Subbasin; (13) Babocomari River Subbasin; and (14) the San Bernardino National Wildlife Refuge (SBNWR).

The proposed rule designating critical habitat for the northern Mexican gartersnake (78 FR 41550) also contains a description of the requirements of the critical habitat needed to sustain the essential life history functions of the species; this description is incorporated into this BCO by reference. The following is a brief summary of the four primary constituent elements of critical habitat, which include those habitat features required for the physiological, behavioral, and ecological needs of the species: (1) Aquatic or riparian habitat that includes:(a) Perennial or spatially intermittent streams with associated pool and backwater habitat within a system that allows for natural channel process; or (b) Lentic wetlands such as livestock tanks, springs, and cienegas; and (c) Shoreline habitat with adequate organic and inorganic structural complexity to allow for life history activities; and (d) Aquatic habitat with characteristics that support a native amphibian prey base; (2) Adequate terrestrial space (182.9 m (600 ft)) lateral extent to either side of bankfull stage) adjacent to designated stream systems with sufficient structural characteristics to support life-history functions; (3) A prey base consisting of viable populations of native amphibian and native fish species; and (4) An absence of nonnative fish species and/or crayfish, or occurrence of these nonnative species at low enough levels such that recruitment of northern Mexican gartersnakes and maintenance of viable native fish or soft-rayed, nonnative fish populations (prey) is still occurring.

Our December 30, 2014 Biological and Conference Opinion for the Proposed Southline Transmission Project (FWS 2014e) includes a detailed Status of the Species for the northern Mexican gartersnake. This biological and conference opinion is available on our website at: http//:www.fws.gov/arizonaes, under the Documents Library; Section 7 Biological Opinions. That status of the species discussion is incorporated herein by reference. The final listing rule (79 FR 38677) also provides a detailed assessment of the species' natural history, threats, and population status. These sources of information are incorporated herein by reference.

Riparian Species

Yellow-Billed Cuckoo and Proposed Critical Habitat

Adult yellow-billed cuckoos have moderate to heavy bills, somewhat elongated bodies and a narrow yellow ring of colored bare skin around the eye. The plumage is grayish-brown above and white below, with reddish primary flight feathers. The tail feathers are boldly patterned with black and white below. They are a medium-sized bird about 12 inches in length, and about 2 ounces in weight. Males and females differ slightly; the males have a slightly smaller body size, smaller bill, and the white portions of the tail tend to form distinct oval spots. In females the white spots are less distinct and tend to be connected (Hughes 1999).

Morphologically, the yellow-billed cuckoos throughout the western continental United States and Mexico are generally larger, with significantly longer wings, longer tails, and longer and deeper bills (Franzreb and Laymon 1993). Birds with these characteristics occupy the Western Distinct Population Segment (DPS) and we refer to them as the "western yellow-billed cuckoo." Only the Western DPS was listed as a threatened species (FWS 2014b). Yellow-billed cuckoos in the west arrive on the breeding grounds 4 to 8 weeks later than eastern yellow-billed cuckoos at similar latitude (Franzreb and Laymon 1993, Hughes 1999).

The yellow-billed cuckoo is a member of the avian family Cuculidae and is a Neotropical migrant bird that winters in South America and breeds in North America. The breeding range of the entire species formerly included most of North America from southeastern and western Canada (southern Ontario and Quebec and southwestern British Columbia) to the Greater Antilles and northern Mexico [American Ornithologists Union (AOU) 1957, 1983, 1998].

Based on historical accounts, the western yellow-billed cuckoo was formerly widespread and locally common in California and Arizona, more narrowly distributed but locally common in New Mexico, Oregon, and Washington and uncommon along the western front of the Rocky Mountains north to British Columbia (AOU 1998, Hughes 1999). The species may be extirpated from British Columbia, Washington, and Oregon (Hughes 1999). The western yellow-billed cuckoo is now very rare in scattered drainages in western Colorado, Idaho, Nevada, and Utah, with single, nonbreeding birds most likely to occur (FWS 2014a, 2014b). The largest remaining breeding areas are in southern and central California, Arizona, along the Rio Grande in New Mexico, and in northwestern Mexico (FWS 2014b).

In Arizona, the species was a common resident in the (chiefly lower) Sonoran zones of southern, central, and western Arizona; scarce in the north-central part of the state, and very rare in the

northeast (Phillips *et al.* 1964). In Arizona, the yellow-billed cuckoo now nests primarily in the central and southern parts of the state. It has been extirpated from most of the lower elevation localities, especially the Colorado River valley (BISON 2008c).

Yellow-billed cuckoos spend the winter in South America, east of the Andes, primarily south of the Amazon Basin in southern Brazil, Paraguay, Uruguay, eastern Bolivia, and northern Argentina (Ehrlich et al. 1992, AOU 1998). Wintering yellow-billed cuckoos generally use woody lowland vegetation near fresh water. However, wintering habitat of the western yellow-billed cuckoo is poorly known.

Western populations of yellow-billed cuckoos are most commonly found in dense riparian woodlands, consisting primarily of cottonwood (*Populus fremontii*), willow (*Salix* spp.), and mesquite (*Prosopis* spp.), along riparian corridors in otherwise arid areas (Laymon and Halterman 1989, Hughes 1999). Occupied riparian habitat in Arizona may also contain box elder (*Acer negundo*), Arizona alder (*Alnus oblongifolia*), Arizona walnut (*Juglans major*), Arizona sycamore (*Platanus wrightii*), oak (*Quercu*s spp.), netleaf hackberry (*Celtis reticulata*), velvet ash (*Fraxinus velutina*), Mexican elderberry (*Sambuccus mexicanus*), tamarisk (also called salt cedar), acacia (*Acacia* spp.), and seepwillow (*Baccharis glutinosa*)(Corman and Magill 2000, Corman and Wise-Gervais 2005, FWS unpubl. data). Tamarisk may be a component of breeding habitat, but there is usually a native riparian tree component within the occupied habitat (Gaines and Laymon 1984, Johnson et al. 2008a, McNeil et al. 2013, Carstensen et al. 2015). Although cuckoos are most commonly found in gallery riparian forest, in Arizona they may also use narrow bands of riparian woodland (AGFD 2015, Cornell Lab of Ornithology 2015). Adjacent habitat on terraces or in the upland (such as mesquite) can enhance the value of these narrow bands of riparian woodland.

Throughout the western yellow-billed cuckoo range, a large majority of nests are placed in willow trees, but cottonwood, mesquite, walnut, box elder, sycamore, hackberry, oak, alder, soapberry (*Sapindus saponaria*), acacia, and tamarisk are also used (Laymon 1980, Hughes 1999, Corman and Magill 2000, Corman and Wise-Gervais 2005, Holmes et al. 2008, Tucson Audubon 2015a, Tucson Audubon 2015b, FWS unpubl. data).

Within the boundaries of the distinct population segment DPS (see Figure 2 at 78 FR 61631), cuckoos occur from sea level to 2,134 m (7,000 ft) (or slightly higher in western Colorado, Utah, and Wyoming) in elevation. The moist conditions that support riparian plant communities that provide western yellow-billed cuckoo habitat typically exist in lower elevation, broad floodplains, as well as where rivers and streams enter impoundments. In southeastern Arizona, however, cuckoos are also found nesting along more arid ephemeral and intermittent drainages with sycamore, mesquite, walnut, hackberry, alder, or mixed oak assemblages (Corman and Magill 2000; Corman and Wise-Gervais 2005;Westland Resources, Inc. 2011, 2013a, 2013b, 2013c, 2015a, 2015b, 2015c; American Birding Association 2014; AGFD 2015; Tucson Audubon 2015a, 2015b; Cornell Lab of Ornithology 2015). In the southwest, cuckoos can also breed in higher gradient drainages, and narrower and drier reaches of riparian habitat. In the extreme southern portion of their summer range in the States of Sonora (southern quarter) and Sinaloa, Mexico, western yellow-billed cuckoos also nest in upland thorn scrub and dry

deciduous habitats away from the riparian zone (Russell and Monson 1988), though their densities are lower in these habitats than they are in adjacent riparian areas.

Habitat for the western yellow-billed cuckoo in much of its range is largely associated with perennial rivers and streams that support the expanse of vegetation characteristics needed by breeding western yellow-billed cuckoos. The range and variation of stream flow frequency, magnitude, duration, and timing that will establish and maintain riparian habitat can occur in different types of regulated and unregulated flows depending on the interaction of the water and the physical characteristics of the landscape (Poff et al. 1997; FWS 2002b). Hydrologic conditions at western yellow-billed cuckoo breeding sites can vary widely between years and during low rainfall years, water or saturated soil may not be present. Cuckoos may move from one area to another within and between years in response to hydrological conditions. They may also nest at more than one location in a year. Some individuals also roam widely (several hundred miles), apparently assessing food resources before selecting a nest site (Sechrist et al. 2012).

Humid conditions created by surface and subsurface moisture appear to be important habitat parameters for western yellow-billed cuckoo. The species has been observed as being restricted to nesting in drainages where humidity is adequate for successful hatching and rearing of young (Hamilton and Hamilton 1965, Gaines and Laymon 1984, Rosenberg et al. 1991).

At the landscape level, the available information suggests the western yellow-billed cuckoo requires large tracts of willow-cottonwood or mesquite forest or Madrean evergreen woodland for their nesting season habitat. Habitat can be relatively dense, contiguous stands, irregularly shaped mosaics of dense vegetation with open areas, or narrow and linear. The association of breeding with large tracts of suitable riparian habitat is likely related to home range size. Individual home ranges during the breeding season average over 40 ha, and home ranges up to 202 ha have been recorded (Laymon and Halterman 1987, Halterman 2009, Sechrist et al. 2009, McNeil et al. 2011, McNeil et al. 2012). Within riparian habitat, western yellow-billed cuckoos require relatively large (>20 hectares (49 ac)), patches of multilayered habitat for nesting, with optimal size generally greater than 80 ha (198 ac) (Laymon and Halterman 1989). The multilayered canopy provides shade and traps moisture to create the relatively cooler and more humid streamside conditions which are believed to be important for nesting success. They are also known to nest in early to mid-successional native riparian habitat.

In addition to the dense nesting grove, western yellow-billed cuckoos need adequate foraging areas near the nest. Foraging areas can be less dense or patchy with lower levels of canopy cover and may be a mix of shrubs, ground cover, and scattered trees (Carstensen et al. 2015, Sechrist et al. 2009, FWS, unpubl. data). Cuckoos often forages in open areas, woodlands, orchards and adjacent streams (Hughes 1999), which include stands of smaller mesquite trees and even tamarisk (Rosenberg et al. 1991). In Arizona, adjacent habitat is usually more arid than occupied nesting habitat. This adjacent habitat can be used for foraging where large insects are produced. Habitat types include Sonoran desertscrub, Mojave desertscrub, Chihuahuan desertscrub, chaparral, semidesert grassland, plains grassland, and Great Basin grasslands (Brown 1994, Brown et al. 2007, Brown and Lowe 1982).

Migration habitat needs are not well known, although they appear to include a relatively wide variety of conditions. Migrating yellow-billed cuckoos have been found in coastal scrub, second-growth forests and woodlands, hedgerows, forest edges, and in smaller riparian patches than those used for breeding.

Yellow-billed cuckoos detected between 15 June and 30 August, 1998 to 2015, in more than one year and/or where pairs have been detected in southeastern Arizona mountain ranges include Box, Walker, Madera, Florida, and Montosa canyons in the Santa Rita Mountains; Carr, Ash, Garden, Ramsey, and Miller canyons in the Huachuca Mountains; Turkey Creek, O'Donnell Creek, Collins Canyon, Lyle Canyon, Merritt Canyon, and Korn Canyon in Canelo Hills; Babocomari River; Arivaca Lake and tributaries, Rock Corral Canyon, Pena Blanca Lake and Canyon, Scotia Canyon, Sycamore Canyon, and California Gulch in the Atascosa/Pajarito Mountains; Kitt Peak on Baboquivari Mountain; Sycamore Canyon, Corral Canyon, Hermosa Creek, Harshaw Canyon, Goldbaum Canyon, Willow Springs Canyon, and Paymaster Spring in the Patagonia Mountains; and a few locations in the Chiricahua Mountains (AGFD 2015, Cornell Laboratory of Ornithology 2015; Tucson Audubon 2015a, 2015b; Westland Resources, Inc. 2011, 2013a, 2013b, 2013c, 2015a, 2015b, 2015c). In addition, cuckoos were documented during surveys for the first time at two locations in 2015 in the Whetstone Mountains (Tucson

Audubon 2015). Yellow-billed cuckoos are likely breeding in these locations, with nesting confirmed in Sycamore Canyon in the Atascosa/Pajarito Mountains, Pena Blanca Lake, and Kitt Peak (American Birding Association 2014, Cornell Lab of Ornithology 2015, Tucson Audubon 2015a).

The primary threat to the western yellow-billed cuckoo is loss or fragmentation of high-quality riparian habitat suitable for nesting (Corman and Wise-Gervais 2005, FWS 2014a, 2014b). Habitat loss and degradation from several interrelated factors include alteration of flows in rivers and streams, encroachment into suitable habitat from agricultural and other development activities on breeding and wintering grounds, stream channelization and stabilization, diversion of surface and ground water for agricultural and municipal purposes, livestock grazing, wildfire, establishment of nonnative vegetation, drought, and prey scarcity due to pesticides (Ehrlich et al. 1992, FWS 2014b). Pesticide use is widespread in agricultural areas in the western yellow-billed cuckoo breeding range in the United States and northern Mexico. Yellow-billed cuckoos have also been exposed to the effects of pesticides on their wintering grounds, as evidenced by DDT found in their eggs and eggshell thinning in the United States (Grocki and Johnston 1974, Laymon and Halterman 1987b, Hughes 1999, Cantu-Soto et al. 2011). Because much of the species' habitat is in proximity to agriculture, the potential exists for direct and indirect effects to a large portion of the species in these areas through altered physiological functioning, prey availability, and, therefore, reproductive success, which ultimately results in lower population abundance and curtailment of the occupied range (Laymon 1980, Laymon 1998, Hughes 1999, Colyer 2001, Mineau and Whiteside 2013, Hopwood et al. 2013, Mineau and Palmer 2013, FWS 2014b).

The ongoing threats, including small isolated populations, cause the remaining populations to be increasingly susceptible to further declines and local extirpations through increased predation rates, barriers to dispersal by juvenile and adult yellow-billed cuckoos, chance weather events,

fluctuating availability of prey populations, collisions with tall vertical structures during migration, defoliation of tamarisk by the introduced tamarisk leaf beetle (*Diorhabda* spp.), increased fire risk, and climate change events (Thompson 1961, McGill 1975, Wilcove et al. 1986). The warmer temperatures already occurring in the southwestern United States may alter the plant species composition of riparian forests over time. An altered climate may also disrupt food availability for the western yellow-billed cuckoo if the timing of peak insect emergence changes in relation to when the cuckoos arrive on their breeding grounds to feed on this critical food source.

Habitat for the western yellow-billed cuckoo has been modified and curtailed, resulting in only remnants of formerly large tracts of native riparian forests, many of which are no longer occupied by western yellow-billed cuckoos. Despite recent efforts to protect existing, and restore additional, riparian habitat in the Sacramento, Kern, and Colorado Rivers, and other rivers in the range of the western yellow-billed cuckoo, these efforts offset only a small fraction of historical habitat that has been lost. Therefore, we expect the threat resulting from the combined effects associated with small and widely separated habitat patches to continue to affect a large portion of the range of the western yellow-billed cuckoo.

The western distinct population segment of the yellow-billed cuckoo was listed as a threatened species under the ESA on October 3, 2014 (79 FR 59992). Critical habitat for the yellow-billed cuckoo was proposed on August 15, 2014 (FWS 2014a). Proposed critical habitat encompasses 546,335 acres across the western United States. The yellow-billed cuckoo is protected under the Migratory Bird Treaty Act. The Migratory Bird Treaty Act makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird, including feathers, parts, nests, or eggs. Violations of the Migratory Bird Treaty Act are considered criminal offenses and can result in significant fines and imprisonment.

Our October 30, 2013 Biological and Conference Opinion for the Rosemont Copper Mine in Pima County, Arizona (FWS 2013b) includes a detailed Status of the Species for the yellow-billed cuckoo. This biological and conference opinion is available on our website at: http//:www.fws.gov/arizonaes, under the Documents Library; Section 7 Biological Opinions. Additional details on the status of this species and proposed critical habitat are found in our final rule to list the species as threatened (79 FR 59992) and our proposed rule to designate critical habitat (79 FR 48548). The discussions of the status of this species in these documents are incorporated herein by reference. It is important to point out that a revised proposed rule for cuckoo critical habitat, that may include additional proposed critical habitat within Pima County, is under development.

Southwestern Willow Flycatcher and Designated Critical Habitat

The southwestern willow flycatcher is a small, migratory bird about 15 centimeters (6 inches) long, with grayish-green back and wings, a white throat, a light gray-olive breast, and a pale yellowish belly. Two wingbars are visible and the eye ring is faint or absent. Both sexes are alike. The subspecies is most easily identified by its vocalizations (Sogge *et al.* 2010; AGFD 2002c).

The southwestern willow flycatcher nests and forages in dense riparian habitats along streams, rivers, lakesides, and wetlands. Some of the more common plant species used for nesting are: willow, tamarisk, box elder, Russian olive, buttonbush, and mesquite. Nests are found in dense thickets of these and other plants species that are about 4-7 meters (13-23 feet) in height. This subspecies prefers dense canopy cover, a large volume of foliage, and surface water during midsummer. Migration habitat is typically along riparian corridors. Nesting habitat is currently known to occur at elevations below 2,590 meters (8,500 ft).

The southwestern willow flycatcher shows adaptability in habitat selection, as the dominant plant species (both native and exotic), size and shape of breeding patch, and canopy height and structure for foraging and nesting can be variable (Paradzick 2005; Paxton *et al.* 2007; Bakian *et al.* 2012). However, habitat variables are consistent enough to be modeled and predicted (Hatten *et al.* 2010). This use of diverse plant species suggests that vegetation structure, not species composition, is the most important feature of flycatcher habitat. Habitat characteristics such as plant species composition, size and shape of habitat patch, canopy structure, vegetation height, and vegetation density vary across the subspecies' range. However, regardless of the plant species composition or height, occupied sites usually consist of dense vegetation in the patch interior, or an aggregate of dense patches interspersed with openings. In most cases this dense vegetation occurs within the first 3 - 4 m (10-13 ft) above ground. These dense patches are often interspersed with small openings, open water or marsh, or shorter/sparser vegetation, creating a mosaic that is not uniformly dense (FWS 2002b).

Southwestern willow flycatchers nest in thickets of trees and shrubs ranging in height from 2 m to 30 m (6 to 98 ft). Lower-stature thickets (2-4 m or 6-13 ft tall) tend to be found at higher elevation sites, with tall stature habitats at middle and lower elevation riparian forests. Nest sites typically have dense foliage at least from the ground level up to approximately 4 m (13 ft) above ground, although dense foliage may exist only at the shrub level, or as a low dense canopy (FWS 2002b).

Southwestern willow flycatchers are known from southern Nevada, southern Utah, southern California, most of Arizona and New Mexico, western Texas, and southwestern Colorado (Finch and Stoleson 2000). They winter in Mexico, Central America, and/or northern South America (AGFD 2002c). As of the end of the 2007 breeding season, almost 1,300 territories were estimated to occur across its range. Since this subspecies was listed breeding territories have been detected in all states of its historical range, with the exception of Texas. In Arizona, since listing, territories were detected on the Agua Fria, Gila, Little Colorado, Salt, San Pedro, Colorado, San Francisco, Hassayampa, Verde, Big Sandy, Santa Maria, Virgin, and Bill Williams rivers, and Pinal, Tonto, Cherry, and Cienega creeks.

In Arizona, willow flycatchers have been documented along 12 drainages. The major concentrations have occurred near the confluence of the Gila and San Pedro Rivers, Roosevelt Lake, and the Gila River near Safford. Three high elevation sites are known, two on the Little Colorado River near Greer and one on the San Francisco River near Alpine (Paradzick *et al.* 2000). The subspecies has relatively high breeding densities in Arizona along the San Pedro River at the confluence with the Gila River (Pinal County) (Ellis *et al.* 2008). The subspecies suffered a significant decline in numbers and distribution, which led to the FWS decision to list

the subspecies in 1995 (FWS 1995). Since its listing, considerable attention went into surveying for the subspecies. In Arizona, for example, the number of known territories increased from 111 at the time of listing to 495 in 2005, an increase that was attributed to increased survey effort (Durst *et al.* 2007).

Southwestern willow flycatchers are exposed to threats throughout their range. Riparian habitat loss and fragmentation is the major cause for willow flycatcher decline. This includes impacts from water and land uses (damming, groundwater pumping, diversion, cattle grazing, etc.), diversion of water, draining of wetlands, channelization and levying of streambeds, construction of canals, drains and impoundments, livestock grazing, off-road vehicles, and the cutting of woodlands. Other possible threat factors are predation and nest parasitism. The ongoing invasion of riparian habitat by exotic tamarisk is a concern. The manipulation and changes to rivers that cause tamarisk to flourish and loss of native riparian habitat, etc. is a threat to willow flycatchers. However, because over half of all known flycatcher territories contain the exotic plant, tamarisk, the introduced tamarisk-eating leaf beetle is another threat. This beetle is spreading on its own and is also believed to be being transported by humans into the flycatcher's range. Tamarisk often flourishes in areas where native trees are unable to grow due to land/water management actions (river damming, flow regulation, diversion, groundwater pumping, etc.). Loss of tamarisk vegetation without replacement by native trees will likely impact the flycatcher and other riparian obligate wildlife in Arizona, New Mexico, southern Nevada, southern Utah, and southern Colorado, and possibly areas in California.

The southwestern willow flycatcher is listed as endangered under the ESA (60 FR 10694, February 27, 1995). Various designations of critical habitat have occurred since the southwestern willow flycatcher was listed, with a 2013 revision of critical habitat (78 FR 344, January 3, 2013) being the most recent. Revised critical habitat identifies 1,227 stream miles within the 100-year floodplain of waters in Arizona, California, Colorado, New Mexico, Nevada, and Utah, encompassing approximately 84,568 ha (208,973 ac) total. Designated critical habitat in Arizona includes stream segments in: Apache, Cochise, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pima, Pinal, Santa Cruz, and Yavapai counties (78 FR 344). A recovery plan for this subspecies was completed in 2002. The southwestern yellow-billed cuckoo is protected under the Migratory Bird Treaty Act. The Migratory Bird Treaty Act makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird, including feathers, parts, nests, or eggs. Violations of the Migratory Bird Treaty Act are considered criminal offenses and can result in significant fines and imprisonment.

Our December 30, 2014 Biological and Conference Opinion for the Proposed Southline Transmission Project (FWS 2014e) includes a detailed Status of the Species for the southwestern willow flycatcher. This biological and conference opinion is available on our website at: http//:www.fws.gov/arizonaes, under the Documents Library; Section 7 Biological Opinions. Additional details on the status of this subspecies and designated critical habitat are found in our final rule to list the subspecies as endangered (60 FR 10694) and our final rule to designate critical habitat (78 FR 344). The discussions of the status of this subspecies in these documents are incorporated herein by reference.

Abert's Towhee

The Abert's towhee is a large sparrow with gray-brown upperparts. There is little or no contrast between crown and back. The breast, flanks, and belly are pinkish brown. There is black on the lores, malar region, chin, and extreme anterior forehead surrounding a pale bill, giving the appearance of a black mask around the bill. The male and female plumages are identical (Tweit and Finch 1994).

The Abert's towhee is nonmigratory and spends most of its life on a permanent territory concealed by dense shrubs. The Abert's towhee is a riparian obligate (Johnson *et al.* 1987: Tweit and Finch 1994), but the specific type of riparian association required by this species is not defined and can vary from xeroriparian to hydroriparian associations. It appears to be present at greater densities where there is permanent water with dense riparian vegetation. However, the dependency appears to be based more on vegetation density and structure than on the species of vegetation or presence of water (Pima County 2001, 2015). Abert's towhee prefers Sonoran Riparian Deciduous Woodland and Riparian Scrubland, with a dense understory of shrubs. The plant species used for nesting vary considerably, but the towhee consistently uses very dense vegetation in which to place its nest (Corman and Wise-Gervais 2005). This species appears to be able to adapt to urban development in some areas where wash vegetation has been preserved, such as Tucson (McCaffrey *et al.* 2012). However, density in urban areas may be less than in natural areas and these areas do not equal or replace the extent of habitat lost.

This species is resident from southeastern California, southern Nevada, southwestern Utah, central Arizona, and southwestern New Mexico south to northeastern Baja California and northern Sonora (Tweit and Finch 1994). Since the mid-1970s, the range of Abert's towhee has expanded from the upper Santa Cruz to Nogales, up Sonoita Creek, up Oak Creek nearly to Sedona, and from the upper San Pedro into Mexico (Corman and Wise-Gervais 2005). The species has also been found utilizing exotic shrubs along irrigation ditches and suburban backyards in Phoenix and Tucson. The range of the species has contracted in other areas, and Abert's towhees have completely disappeared from some areas of Utah. In Arizona, loss of native riparian habitat has fragmented the species' range, and invasive species such as tamarisk has reduced the suitability of much existing habitat (Tweit and Finch 1994), although the species can be abundant in some tamarisk-dominated habitats.

Much riparian habitat has been lost through the clearing of land for agriculture, development or grazing, or through groundwater depletion that has lowered the water table. Exotic species such as tamarisk have become established in many remaining riparian areas and may have reduced habitat quality for Abert's towhee. After removal of cattle from the San Pedro Riparian National Conservation Area, spring densities of Abert's towhees in cottonwood-willow habitat almost doubled (Tweit and Finch 1994). S. Hedges estimates that the Utah population has declined by 50% in the last 20 years because of habitat loss from housing and golf-course development (Tweit and Finch 1994). Cowbirds are sometimes parasites of Abert's towhee nests (Ehrlich *et al.* 1988).

Although there have been no specific studies on the effects of pesticides or other contaminants on Abert's towhees, these are potential threats to this species as they are for many other migratory birds.
The Abert's towhee is protected under the Migratory Bird Treaty Act. The Migratory Bird Treaty Act makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird, including feathers, parts, nests, or eggs. Violations of the Migratory Bird Treaty Act are considered criminal offenses and can result in significant fines and imprisonment.

This summary does not reflect all information available on this species. More detailed status and life history information for the Abert's towhee is included in Appendix A of the MSCP (Pima County 2015) and in the Pima County's Priority Vulnerable Species document (Pima County 2001); these are incorporated herein by reference.

Arizona Bell's Vireo

The Arizona Bell's vireo (*Vireo bellii arizonae*) is a small vireo, with a length of 115-125 mm (4.5-4.9 in) and a weight of 7-10 g (0.2-0.4 oz). This vireo has short, rounded wings, which makes the tail look long. The bill is short, straight, and slightly compressed at the base. Male and female Bell's vireos are the same in plumage color throughout the year. This plumage color varies from generally drab gray to green above, white to yellow below, with an unstreaked breast. The Bell's vireo has a faint white eye ring. There are two pale wing bars, with the lower bar more prominent. The plumage of juveniles resembles that of adults in worn summer plumage —essentially white and gray, but whiter below with more distinct wing bars.

The Arizona Bell's vireo prefers dense, low, shrubby vegetation in riparian areas. Characteristically it is found in dense shrubland or woodland along lowland stream courses, with willows (*Salix* spp.), mesquite (*Prosopis* spp.), and seepwillows (*Baccharis glutinosa*) being characteristic plant species (Brown 1993). It is known to be a habitat generalist in riparian scrubland dominated by the introduced shrub tamarisk (*Tamarix ramosissima*) along the Colorado River in Grand Canyon, Arizona (Brown *et al.* 1983); it is a specialist in native seepwillow and mesquite habitats of the lower Colorado River Valley, Arizona where tamarisk is rarely used by the species (Brown 1993). In southern Arizona, it uses a wide range of plants for nesting, including willows, hackberry, and ash (Powell and Steidl 2000, 2002; Kirkpatrick *et al.* 2007). Where present during the breeding season, they can often be found nesting near the edge of dense thickets of vegetation (AGFD 2002d).

The Bell's vireo, until the 1950s, was quite abundant and much more widespread. The Bell's vireo is still widespread in central and southwest United States and northern Mexico (Brown 1993). It breeds from southern California to southern Nevada, Utah, northwest and southern Arizona and New Mexico; and from Texas north to North Dakota, east to Ohio, and south to Tennessee, and in the northern half of Mexico. The winter range is not well known. Records have been reported from southern Baja California and southern Sonora south along the west coast of Mexico and Central America to Honduras and casually to northern Nicaragua. It has also been reported from the east coast of Central America from Veracruz south to Honduras.

There are scattered winter records from extreme southern California, southern Arizona, southern Texas, Louisiana, and southern Florida (Brown 1993).

The Arizona Bell's vireo has been declining along the lower reaches of the Colorado River and along the lower reaches of the Gila, Santa Cruz, and Salt rivers (Rosenberg *et al.* 1991; AGFD 2002d), but it remains common throughout its range at higher elevations (Brown 1993); this probably includes eastern Pima County. The near elimination of the Bell's vireo as a common breeding resident throughout much of its range has been attributed to a combination of loss of preferred willow habitats and increased pressure from parasitism by brown-headed cowbirds, primarily in areas with agricultural development. The continued loss and degradation of habitat is the result of a number of land use activities, including urbanization (Mills *et al.* 1989), water projects, flood control projects, agriculture, livestock grazing, introduced competitors, exotic invasive plants (especially giant reed), and off-road vehicles (Brown 1993).

The Arizona Bell's vireo is protected under the Migratory Bird Treaty Act. The Migratory Bird Treaty Act makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird, including feathers, parts, nests, or eggs. Violations of the Migratory Bird Treaty Act are considered criminal offenses and can result in significant fines and imprisonment.

This summary does not reflect all information available on this species. More detailed status and life history information for the Arizona Bell's vireo is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

Western Red Bat

The western red bat is a medium-sized bat, with a forearm 1.5 to 1.7 inches (38 to 43 mm) long, weight 0.25 to 0.5 ounces (7 to 15 g); wings long, narrow, and pointed, wingspan 11 to 13 inches (290-332 mm), ears short and rounded, 0.3 to 0.5 inches (11-13 mm) in length; interfemoral membrane (uropatagium) is completely furred on the dorsal surface. Pelage color ranges from bright orange to yellow/brown with white-tipped hairs, and whitish patches near the shoulder; wing membranes black.

Preferred habitat includes riparian and wooded areas. The western red bat is primarily a solitary rooster. They roost during the day in trees. Summer roosts are usually in tree foliage, sometimes in leafy shrubs or herbs. They have been found roosting in fruit orchards (AGFD 2003a). They may also roost in saguaro boots, and occasionally in cave-like situations (E.L. Cockrum pers. comm. 1992); although they generally avoid caves and buildings during both summer/winter. Solitary females roost with young in tree foliage. This species primarily roosts in cottonwood trees, and its notable decline in abundance is suspected to be attributable to the 70-98% loss of cottonwood habitat in North America. Restoration in riparian corridors where cottonwoods historically existed is thought to be necessary for the continued existence of this species. Because western red bats migrate seasonally between the southwestern United States and South America

and, in Arizona, occur primarily in riparian regions, it is assumed that they travel along riparian corridors and that some level of quality of the riparian corridors is necessary for this species.

The total range of western red bat extends from extreme southern Canada through the United States and west of the Great Plains south to Panama and South America. Apparently it is only a summer resident in the southwestern United States (Barbour and Davis 1969; Shump and Shump 1982; AGFD 2003c) and it winters southward from coastal California to Mexico and South America (Findley *et al.* 1975).

The western red bat is generally distributed in south central to southern and southeastern Arizona, with a few observations along the Colorado River near Bill Williams, and occasionally in the Grand Canyon. Historical records include observations from the Grand Canyon, Sierra Ancha, Queen Creek, San Pedro Valley, Santa Rita Mountains, Canelo Hills, Huachuca and Peloncillo mountains, and San Bernardino Ranch. Hoffmeister (1986), reported that this is a summer resident only, with collections recorded from June 12 to August 21. E.L. Cockrum reviewed 61 records for Arizona and found they ranged in date from May 30 to September 30 (AGFD 2003a).

The current loss of dense, mature cottonwood tree habitat throughout the western United States is believed to be a key factor in the seemingly declining abundance of *L. blossevillii* across its range. This habitat loss and degradation of riparian and other broad-leaf deciduous forests and woodlands results from water withdrawal, the destruction of stream banks and accelerated erosion related to grazing, dam construction, water diversions, aquifer pumping, and pasture and cropland conversion (AGFD 2003c). Toxic chemicals may also negatively impact local populations of this and other bat species (Clark 1988).

This summary does not reflect all information available on this species. More detailed status and life history information for the western red bat is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

Western Yellow Bat

The western yellow bat is a medium-large sized bat, sexually dimorphic in size, with females being larger than males. Forearm 4.15 – 4.9 cm (1.6 - 1.9 in., n = 224); wings long, with wingspan 33.5-35.5 cm (13.4-14.2 in.); weight 9.2-22.5 g (0.32-0.79 oz). Their fur is yellowish-buff/light brownish, tipped with gray or white (color slightly darker than the similarly-colored pallid bat (*Antrozous pallidus*)). Ears are short, longer than wide at 17.0 mm (0.68 in) long. The anterior half of dorsal surface of interfemoral tail membrane (uropatagium) is well furred, while posterior half is bare or with scattered hairs.

The western yellow bat's preferred habitat is not completely understood. They may be associated with Washington fan palm trees or other palms, and they are also found in riparian deciduous forests and woodlands (Jason *et al.* 2006) supporting other leafy vegetation such as sycamores, hackberries and cottonwoods, which provide roost sites. Individuals have been observed roosting

about 15 feet above the ground in a hackberry (*Celtis reticulata*) and sycamores (*Platanus wrightii*). They were netted over a water hole in Guadalupe Canyon, New Mexico, and over a swimming pool in oak woodland habitat in the Chiricahua Mountains.

Because western yellow bats migrate seasonally between the southwestern United States and South America and, in Arizona, occur primarily in riparian regions, it is assumed that they travel along riparian corridors and that some level of quality of the riparian corridors is necessary for this species.

In the upper Moapa Valley of southern Nevada, *L. xanthinus* is clearly associated with exotic California fan palms (*Washingtonia filifera*). Several observations have been made of *L. xanthinus* roosting in the dead leaf skirts of palm trees. In more urban areas, it appears that the western yellow bat is likely to be found primarily in association with planted fan palms (*Washingtonia filifera* and *W. robusta*) in residential and park areas up to 1,829 m (6,000 ft) (AGFD 2003d). It is known to occur in association with Washington fan palms at Yuma, and in broad-leaved riparian areas along the Bill Williams River (Hoffmeister 1986; AGFD 2003d).

The western yellow bat is a tropical species that barely enters the United States in southern Arizona, southern California, Texas, and New Mexico, and ranges south to Uruguay and Argentina (Noel and Johnson 1993). There are very few records of this species in the U.S. and existing records are primarily in urban areas (Noel and Johnson 1993; AGFD 2003d). The historical range of this species is not well known and, in Arizona, it was not known until relatively recently (Noel and Johnson 1993). The species was not reported from Arizona until 1960.

The most obvious threat to this species is the loss of roosting habitat. For example, *L. xanthinus* roost in the dead leaf skirts of palm trees. Trimming of palm trees for aesthetic or fire management purposes in most cases completely removes viable roosting habitat. In addition, modification or possible destruction of riparian forest and woodland habitats may be harmful by elimination of roosting habitat and habitat for their prey species. Loss and degradation of riparian woodlands results from a number of activities, including the trampling of stream banks and increased erosion associated with grazing, construction of dams, water diversions, aquifer pumping, urban growth and development, and pasture and cropland conversion (AGFD 2003d).

This summary does not reflect all information available on this species. More detailed status and life history information for the western yellow bat is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

Merriam's Mouse

Merriam's mouse has a pale gray body, faintly washed with tawny; the belly is cream-colored, and the tail is long, thinly haired and bicolored, and is more than half the length of the head and body. The ears are small and without white rims. The head and body are 3.8 to 4.0 inches (97 to

102 mm) long, and the tail is 4.0 to 4.8 inches (102 to 122 mm) long (Burt and Grossenheider 1976).

Merriam's mice are known primarily from heavy, forest-like stands of mesquite (bosques), but are also found in other low desert riparian habitats. They have also been found in dense brush and thick stands of cholla, prickly pear, paloverde, and grasses (Hoffmeister 1986).

Merriam's mouse was found in the large mesquite forests along rivers throughout Pinal, Pima, and Santa Cruz counties in Arizona and into Sonora, Mexico (Arnold 1940). In Arizona, it has been found in the south-central part of the state, from just north of Florence at the north, southeast of Tucson to the east, and Quitobaquito to the west (Hoffmeister 1986; AGFD 2001g). Most areas where Merriam's mice were historically present have been altered and recent records are lacking, so it is unknown whether the species persists in these areas.

The greatest threat to Merriam's mouse is loss and degradation of mesquite-forest habitat. Loss of habitat occurs through cutting of firewood or clearing for grazing or other development. Groundwater depletion in many places resulted in loss of formerly lush riparian areas supporting large mesquites or dense vegetation. Reestablishment and regeneration of suitable habitat for this species may be precluded by groundwater depletion. There are no identified pest species. However, near human habitation, feral cats may impact this species, and house mice may compete with it.

This summary does not reflect all information available on this species. More detailed status and life history information for the Merriam's mouse is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

Giant Spotted Whiptail

Formerly referred to as the canyon spotted whiptail, this is a large, slender, fast-moving lizard. The adult size for the species reaches 5.5 inches (14 cm) snout-vent length, with a tail generally longer than the snout-vent length. The medial and upper surfaces of the neck, legs, and feet are dark grayish green to bluish, with green or pale spots, and a reddish brown to reddish orange color on the head and neck. The tail is brown in adults and reddish or orange in young. Large males may have no stripes (Stebbins 1985).

Giant spotted whiptails are found in lower Sonoran (chiefly riparian areas) and upper Sonoran life zones, as well as within lower Madrean Oak Woodlands in mountain canyons, arroyos, and mesas in arid and semi-arid regions, entering lowland deserts along stream courses (Stebbins 1985, Rosen 2009). It is found in dense shrubby vegetation, often among rocks near permanent and intermittent streams, and in grassy areas within riparian areas (Degenhardt et al. 1996; AGFD 2001a) with an elevation range of near sea level to around 4,500 feet (1,370 m). It is not a valley bottom species, except rarely along riparian corridors (such as the West Branch of the Santa Cruz River), but rather is usually found in montane canyons, slopes, and adjacent bajadas at elevations ranging from 2,700-4,000 ft (822-1,219 m) (Rosen 2009).

The historical range of the giant spotted whiptail includes Arizona, the extreme southwestern edge of New Mexico, and Sonora, Mexico (Rosen 2009). Its range in Arizona extends from the Baboquivari and Pajarito Mountains on the west, to Guadalupe Canyon in extreme southwestern New Mexico. It includes the Santa Cruz and San Pedro river basins in the south-central part of the state, from the Santa Catalina Mountains near Oracle southward to the Yaqui River basin and the Rio de la Concepcion in Sonora (Lowe 1964).

Giant spotted whiptails could be impacted by uncontrolled wildfire or by loss of riparian vegetation in its limited habitat. In New Mexico, habitat alteration and overcollecting represent the major perceived threats to the species (BISON 2008a). It is probable that invasive nonnative grasses, such as red brome and buffelgrass, may increase incidence and severity of fires in the limited habitat of this species, and invasive riparian species, such as tamarisk, can degrade the value of riparian communities for this species.

This summary does not reflect all information available on this species. More detailed status and life history information for the giant spotted whiptail is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

Upland Species

Pima Pineapple Cactus

The Pima pineapple cactus is a succulent perennial cactus that is hemispherical or cylindroid in shape, and is 5 to 46 centimeters (cm) (1.9 to 18.1 inches (in)) in height and 5 to 21 cm (1.9 to 8.3 in) in diameter. The spines are very stout and are straw-colored when young, but blacken with age (Ecosphere Environmental Services Inc. 1992). Each spine cluster has 1 strong central spine that is usually curved or hooked at the abruptly narrowed tip. There are 6 radial spines in young plants, and these increase to 10 to 15 in older plants. The tubercles are grooved along their upper surface. The stems can branch by developing basal offsets (clones) from the oldest tubercles (Roller 1996). The plant may occur in clusters which are formed either by producing basal offsets, or when seeds germinate at the base of the mother plant. Flowers are bright silky yellow, or rarely white, with coral edges and have a narrow floral tube. The fruit is green, ellipsoid, succulent, and sweet. The seeds are brown or black and finely veined or netted.

This cactus generally grows on slopes of less than 10 percent and along the tops (upland areas) of alluvial bajadas. The plant is found at elevations between 719 and 1,432 m (2,360 and 4,700 ft) (Phillips *et al.* 1981, Benson 1982, Ecosphere Environmental Services Inc. 1992), in vegetation characterized as Arizona upland Sonoran desertscrub community and semi-desert grasslands, or some combination/transition of these communities (Brown and Lowe 1982, Johnson 2004). In addition, Paredes-Aguilar *et al.* (2000) reports the subspecies from oak woodlands in Sonora, while Baker's (2005) surveys in Sonora found Pima pineapple cactus at low densities (approximately one plant per hectare), mostly in mesquite scrub.

Although little information is available regarding specific habitat requirements, the limited range and sparsely distributed populations of this cactus suggest specialized needs that may be revealed by further research. Probably the most consistent observation is that the cactus is found most often in "open" areas not associated with dense grass cover, although the degree to which this is an artifact of the ease with which it can be found in "open" areas is not known.

The historical range of the Pima pineapple cactus is assumed to be the same as the present range. The subspecies inhabits southeastern Arizona and north-central Sonora. In southeastern Arizona, the known range lies within Santa Cruz and Pima Counties and is generally bounded to the east by the Santa Rita Mountains, to the west by the Baboquivari Mountains and does not extend to the north past the south side of Tucson (AGFD 2001d; Schmalzel 2004; WestLand Resources Inc. 2004; Baker 2005, 2006, 2007; Schmalzel 2008). It is found in low densities in the northern areas of Sonora, Mexico (FWS 2007a).

The Pima pineapple cactus was listed as an endangered species on September 23, 1993 (58 FR 49875), and critical habitat has not been designated. Factors that contributed to the listing include habitat loss and degradation, habitat modification and fragmentation, limited geographical distribution and species rareness, illegal collection, and difficulties in protecting areas large enough to maintain functioning populations. Protection for plants under the ESA is somewhat limited when they occur on private land. The Arizona Native Plant Law protects the species as a "Highly Safeguarded Species" requiring a permit for collection and salvage. The species is included in Appendix II of CITES, which requires that a permit be obtained for export from the country of origin. In 2005, a 5-year review was initiated for the Pima pineapple cactus (70 FR 5460). This review was completed in 2007 and recommended no change to the cactus's classification as an endangered species (FWS 2007a).

Our April 14, 2014 Biological Opinion for the proposed construction of the Sierrita Pipeline project (FWS 2014f) includes a detailed Status of the Species for the Pima pineapple cactus. This biological opinion is available on our website at: http//:www.fws.gov/arizonaes, under the Documents Library; Section 7 Biological Opinions. That status of the species discussion is incorporated herein by reference.

Needle-Spined Pineapple Cactus

The needle-spined pineapple cactus is a succulent perennial cactus that is 4 to 6 inches (10-15 cm) tall (although occasionally 12 to 15 inches [30-37 cm] tall) and 3 to 5 inches (7.5-13 cm) wide. The plant has tubercles that are about 0.25 inch (0.6 cm) long and are borne on longitudinal ridges. There are 1 or 2 central spines, distinguishing this variety from *E. e. acunensis*, which has 2 or 3 central spines. The flowers are pink, 1.5 inches (3.8 cm) long and 1.5 to 1.8 inches (3.8-4.5 cm) wide, and have bright red stigma lobes. The fruit is green when young and tan when dry and is 0.4 inch (1.0 cm) long and 0.3 inch (0.8 cm) wide.
The needle-spined pineapple cactus has been found on alluvial fans and hills with southern and western exposures, generally from 915 to 1403 m (3,000 to 4,600 ft) in elevation (AGFD 2009). Substrates consist of alluvial soils with rock and gravel over sandstone conglomerate, and limestone outcrops. It appears *E. e. erectocentrus* may grow over a wider range of substrates than the subspecies *E. e. acuñensis*, which was listed under the ESA in 2013.

Benson (1969) described the range as "Southeastern Arizona from southeastern Pima County to western Cochise County." However, his map shows three localities in eastern Pinal County and one in eastern Cochise County. The species primarily occurs in Pima and Cochise counties, south, east, and northeast of Tucson and in southeastern Pinal County near the San Pedro River (AGFD 2009). This species is scattered in a few locations, apparently disjunct from each other. Recent search efforts by Baker (Baker 2000; Baker 2005, 2006, 2007) have revealed >1,000 individuals southeast of Tucson. Large areas of the potential range between known locations have never been searched adequately to find this species, so expansion of known range is likely. Population trends of the needle-spined pineapple cactus are unknown at present.

Illegal collection for the cactus trade and urbanization are management factors of concern for the needle-spined pineapple cactus (AGFD 2009). Road development, overgrazing, and off-road vehicle use may also impact this species. There are no known records of potential damage to needle-spined pineapple cactus by insects, herbivores, or competition with nonnative species, but all of these factors likely influence the status of the needle-spined cactus because they affect similar species such as Acuña cactus and Pima pineapple cactus. However, it is possible that invasive nonnative grasses such as Lehmann lovegrass and red brome could create conditions that would foster fires that may be detrimental to this species, but no known studies demonstrate this. There is speculation that this species may also be affected by the loss or degradation of habitat from trampling by livestock, being run over by vehicles, and illegal collection; however, these potential threats have not been clearly documented (AGFD 2009).

This summary does not reflect all information available on this species. More detailed status and life history information for the needle-spined pineapple cactus is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

Tumamoc Globeberry

The Tumamoc globeberry is a cryptic perennial vine with grasping tendrils. It arises each summer rainy season from a cluster of tuberous roots that are united into a woody crown with a short stem. The slender annual stems have many nodes. Each node along the stem produces 1 tendril, 1 leaf, 1 male flower raceme, and 1 female flower bud. Leaves vary widely in size and shape. Most are rounded in outline, divided into 3 lobes; these lobes are about 2.0 to 4.0 cm (0.8 to 1.6 inches) long, with secondary lobes. The flowers have pale yellow petals that are united below their middle, 1.0 to1.5 cm (0.4 to 0.6 inches) long. Round, green fruit (that give the common name to the plant), about size of a seedless grape, striped like watermelon when young, develop and turn red after 4 to 5 weeks.

The species is capable of occupying a wide range of habitats from halophytic coastal scrub communities on clayey saline hardpans only a few hundred feet from the Gulf of California shoreline to rocky loamy soils derived from weathered granite at nearly 914 m (3,000 ft.) elevation in south central Arizona (AGFD 2004). Biotic communities in which it has been found include Arizona Upland and Lower Colorado Valley, Plains of Sonora and Central Gulf Coast

subdivisions of Sonoran Desertscrub Biotic Community; and the Sinaloan Thornscrub Biotic Community (AGFD 2004). This species occurs in xeric situations, in the shade of a variety of nurse plants along gullies and sandy washes of hills and valley scrub communities (Reichenbacher 1990).

At the time of its discovery, and for many years thereafter, this vine was thought to be very rare and very limited in its distribution. Over time, with acquisition of effective search images and application of extensive and intensive efforts by field crews working primarily for consultants doing surveys for a plant that was initially considered a critically endangered species, the Tumamoc globeberry was found to be more abundant and widespread than had been initially thought. The range of the Tumamoc globeberry covers approximately 31,000 square miles of Sonoran Desert from just southeast of Guaymas, Sonora, Mexico, to Tucson, Arizona, west to Organ Pipe Cactus National Monument and north to Pinal County, Arizona.

Monitoring from 1986-1990 showed several populations to be stable. According to NatureServe (2004), there were 78 known U.S. populations in 1992, and many populations in Sonora, Mexico. In addition, new surveys in 1991 in Sonora, Mexico, indicate this species to be much more common and widespread than previously thought. In 1993, because of its wide range, non-specific habitat requirements and known populations, this species was delisted (FWS 1993a). However, monitoring in recent years indicates serious declines in populations in Pima County. A summary by Reichenbacker (2012) and survey results from 2013 (Reichenbacker 2013), show that three sites in the vicinity of Tucson have significantly declined from relatively healthy populations in the 1980's to populations of generally fewer than 10 plants.

Large areas of potentially suitable habitat are found within the species' range, which has not been adequately surveyed. Much of the species' range in the United States is on protected land or land that is not likely to be developed. However, some development has occurred within the species range, and habitat has been lost. Threats include urbanization, farming, overgrazing, recreation, habitat conversion, javelina (eating tubers), off-road vehicle use, and pesticides (AGFD 2004). As mentioned above, recent survey and monitoring work in Pima County indicate declines in populations,

This summary does not reflect all information available on this species. More detailed status and life history information for the Tumamoc globeberry is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

Lesser Long-Nosed Bat

The lesser long-nosed bat is a medium-sized bat, is grayish to reddish brown and has an elongated snout. This bat has a nose-leaf, no tail, and an interfemoral membrane that is reduced to a narrow band along each hind leg; this species has large eyes and reduced ears compared to other bats in Arizona (AGFD 2003e). It is easily confused with the Mexican long-tongued bat, which has a visible tail enclosed in the interfemoral membrane. Structural adaptations of the mouth of the lesser long-nosed bat serve to procure nectar, their primary food source. The

tongue is long and tipped with brush-like papillae that facilitate nectar lapping and the teeth are modified, having lost the cutting and crushing cusps essential to successfully forage on insects.

Within the U.S., habitat types occupied by the lesser long-nosed bat include Sonoran Desertscrub, semi-desert and plains grasslands, and oak and pine-oak woodlands. Farther south in their range (Mexico), the lesser long-nosed bat occurs at higher elevations. Maternity roosts, suitable day roosts, and concentrations of food plants are all critical resources for the lesser long-nosed bat. All of the factors that make roost sites suitable have not yet been identified, but maternity roosts tend to be very warm and poorly ventilated (FWS 1997). Such roosts reduce the energetic requirements of adult females while they are raising their young (Arends *et al*. 1995).

The lesser long-nosed bat is known from semi-desert Grasslands and Sonoran Desertscrub, Arizona Upland Subdivision at elevations below 1,067 m (3,500 ft) from April until July; they then move up to Madrean Evergreen Woodland (oak transition regions) at elevations up to 1,676 m (5,500 ft) from July until late September/early October (FWS 2007c). In Arizona, there appear to be both sexual and seasonal differences in the range of the lesser long-nosed bat. During the early part of their stay (late April to late July), pregnant females congregate at traditional roost sites, give birth, and raise their young at lower elevations (below about 1,068 m (3,500 ft)) within the range of columnar cacti. Males and perhaps nonreproductive females may be found at this time in roosts in the eastern part of the state. By late July, most females and young have dispersed from the maternity colonies and some have moved to higher elevations (up to about (1,678 m (5,500 ft)) where they are found feeding on agave flowers. By late September or October, all of these bats migrate south to Mexico (AGFD 2003a).

The lesser long-nosed bat is migratory and found throughout its historical range, from southern Arizona and extreme southwestern New Mexico, through western Mexico, and south to El Salvador. It has been recorded in southern Arizona from the Picacho Mountains (Pinal County) southwest to the Agua Dulce Mountains (Pima County) and Copper Mountains (Yuma County), southeast to the Peloncillo Mountains (Cochise County), and in far southwestern New Mexico in the Animas, Big Hatchet, and Peloncillo Mountains. Recent information indicates that lesser long-nosed bat populations appear to be increasing or stable at most Arizona roost sites identified in the recovery plan (AGFD 2005, Tibbitts 2005, Wolf and Dalton 2005, FWS 2007c; electronic mail from Tim Tibbitts 2009). Lesser long-nosed bat populations additionally appear to be increasing or stable at other roost sites in Arizona and Mexico not included for monitoring in the recovery plan (Sidner 2005, FWS 2007c). Less is known about lesser long-nosed bat numbers and roosts in New Mexico.

As a seasonal resident in Arizona, the lesser long nosed bat usually arrives in early April and departs in mid-to-late September. However, it has been seen visiting hummingbird feeders in Tucson in January and February in recent years. It apparently resides in New Mexico only from mid-July to early September (FWS 1997). Because lesser long-nosed bats migrate seasonally between the southwestern United States and central Mexico, it is assumed that they utilize migration corridors, and that some quality of the corridor is necessary for this species, but there is no specific information known that supports conclusions regarding corridor needs. Specific migratory requirements are not known. It is presumed that food and shelter along the migration route are necessary.

The primary threat to lesser long-nosed bat is roost disturbance or loss. The colonial roosting behavior of this species, where high percentages of the population can congregate at a limited number of roost sites, increases the risk of significant declines or extinction due to impacts at roost sites. Lesser long-nosed bats remain vulnerable because they are so highly aggregated (Nabhan and Fleming 1993). Some of the most significant threats known to lesser long-nosed bat roost sites are impacts resulting from use and occupancy of these roost sites by people crossing the border illegally for a number of reasons. Mines and caves, which provide roosts for lesser long-nosed bats, also provide shade, protection, and sometimes water, for border crossers. The types of impacts that result from illegal border activities include disturbance from human occupancy, lighting fires, direct mortality, accumulation of trash and other harmful materials, alteration of temperature and humidity, destruction of the roost itself, and the inability to carry out conservation and research activities related to lesser long-nosed bats. These effects can lead to harm, harassment, or, ultimately, roost abandonment (FWS 2007c). Though they roost colonially, they are unlikely to be impacted by white-nosed syndrome because they do not hibernate and are migratory.

Threats to lesser long-nosed bat forage habitat include excess harvesting of agaves in Mexico; collection and destruction of cacti in the U.S.; conversion of habitat for agricultural and livestock uses; the introduction of bufflegrass and other invasive species that can carry fire in Sonoran Desertscrub; wood-cutting; urban development; fires; and drought and climate change.

The lesser long-nosed bat was listed as Endangered in 1988 without critical habitat. A recovery plan was completed in 1997. It is a U.S. Forest Service sensitive species and classified as a "Red" priority species by Western Bat Working Group. FWS completed a 5-year status review for this species in 2007 (FWS 2007c) that recommended downlisting for the lesser long-nosed bat.

Our October 30, 2013 Biological and Conference Opinion for the Rosemont Copper Mine in Pima County, Arizona (FWS 2013b) includes a detailed Status of the Species for the lesser long-nosed bat. This biological and conference opinion is available on our website at: http//:www.fws.gov/arizonaes, under the Documents Library; Section 7 Biological Opinions. Additional information related to the status of the lesser long-nosed bat is also found in our 5-year status review (FWS 2007c). Those status of the species discussions are incorporated herein by reference.

Mexican Long-Tongued Bat

The Mexican long-tongued bat has a long and slender nose, with a leaf-like structure that is broad at the base, pointed at tip, and about 5.0 mm (0.2 inches) high. The forearm is 42.0-48.0 mm (1.68-1.92 inches) long, and the hind foot is 11.0-14.0 mm (0.44-0.56 inches) long. The tail is approximately 10 mm (0.3 inch) in length, about 1/3 the length of the interfemoral membrane. Dorsal pelage varies from buffy brown to dark grayish brown, palest on shoulders; the venter is paler, and the short ears are pale brownish gray.

The Mexican long-tongued bat can be distinguished from the lesser long-nosed bat which is larger (forearm 51 – 55 mm (2.0 – 2.2 in)) and has no visible tail. The only other Phyllostomid bat in Arizona, the California leaf-nosed bat, is also easily differentiated from the Mexican long-tongued bat by its much larger ears (29 – 38 mm (1.1 – 1.5 in)).

The Mexican long-tongued bat is known from the canyons of mixed oak-conifer forests in mountain ranges surrounded by desert (AGFD 2006b). It requires caves, inactive mines, or unoccupied buildings to use as both day and night roosts. Most roost sites are located near a water source and near areas of riparian vegetation (Cryan and Bogan 2003). There is some range overlap with the lesser long-nosed bat, but it is not great. Mexican long-tongued bats usually occupy higher elevations than lesser long-nosed bats, particularly in the spring and early summer. There are occurrence records for this species from 976 – 2233 m (3200 – 7320 ft.), but most are from 1220 – 1830 m (4000 – 6000 ft.).

Mexican long-tongued bats feed on nectar and pollen, also probably ingesting insects found in the flowers (Hevly 1979). Food plants include paniculate agaves and occasionally columnar cacti (Hevly 1979). These bats have also been observed feeding at hummingbird feeders on the edges of urban Tucson (AGFD 2006b). The value of this resource has not been determined.

This species is known from Venezuela northward through Central America and Mexico to southeastern Arizona, southwestern New Mexico, and San Diego, California (Barbour and Davis 1969). Only adult females migrate into the United States, but juvenile bats of both sexes wander widely after they leave the maternity roost (AGFD 2006b). Because Mexican long-tongued bats migrate seasonally between the southwestern United States and central Mexico, it is assumed that they utilize migration corridors, and that some quality of the corridor is necessary for this species, but there is no specific information known that supports conclusions regarding corridor needs. Specific migratory requirements are not known. It is presumed that food and shelter along the migration route are necessary.

Loss of or disturbance at roost sites is one of the primary threats to the Mexican long-tongued bat. Although there may be more potential roosts sites available now than before mining occurred in the mountain ranges occupied by this species, both natural caves and mine roost sites are threatened by human disturbance, destruction, mining activities, mine closures, and border activities. This species is extremely sensitive to disturbance at roost sites, and may abandon roosts if disturbed with the females taking babies with them and subjecting them to additional mortality factors (Arroyo-Cabrales *et al.* 1987). In addition to threats at mine sites, loss of forage plants (agave and saguaro flower nectar and pollen) and loss of riparian vegetation may also impact the species (AGFD 2006b). Although they roost colonially, they are unlikely to be impacted by white-nosed syndrome because they do not hibernate and are migratory.

This summary does not reflect all information available on this species. More detailed status and life history information for the Mexican long-tongued bat is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

California Leaf-Nosed Bat

The California leaf-nosed bat is a bat with an erect, lanceolate nose-leaf. The ears are large, 1.16 to 1.52 inches (29.0-38.0 mm) long, and joined together near the base. The tail extends free past the edge of the uropatagium for 0.2-0.4 inches (5.0 to 10.0 mm). The forearm measures 1.88 to 2.25 inches (47.0-55.0 mm), and the wingspan is about 13.5 inches (35 cm). The color is grey (AGFD 2001f). The California leaf-nosed bat can be identified by the combination of large ears and the nose leaf. It is easily distinguished from the lesser long-nosed bat and the Mexican long-tongued bat, both of which have much smaller ears.

The California leaf-nosed bat is known from caves, mines, and rock shelters, mostly in Sonoran Desertscrub (AGFD 2001f). Day roosts in mines usually occur within approximately 80 feet of the entrance and the bats prefer areas with abundant ceiling and flying space. In the colder areas of the range, roosts are chosen with temperatures equal to or exceeding 80 degrees Fahrenheit; the roosts are usually approximately 80 to 100 feet or more from the back of the entrance (Noel and Johnson 1993; AGFD 2001f). Night roost sites can include open buildings, cellars, bridges, and porches. The California leaf-nosed bat does not hibernate and is not migratory. A key habitat component for this species is the availability of appropriate roost sites during both summer and winter seasons. Winter and summer roost sites can differ, with an apparent requirement for winter roost sites that maintain the warmer temperatures needed by this non-hibernating, non-migrating species. The species forages widely. Because this is not a migratory species, no known migration corridor needs exist for this species. However, some evidence indicates that this species forages primarily along desert washes, and so foraging corridors may be a need. It is not unusual for California leaf-nosed bats to move between roost sites, and some roosts are used more during some seasons than during others.

This species is known from southern California, southern Nevada, across the southwestern half of Arizona (with one report from northwestern Mohave County) and southward to the southern tip of Baja California, northern Sinaloa, and southwestern Chihuahua, Mexico (AGFD 2001f). The historical range of *M. californicus* does not include New Mexico. In Arizona, the species is known to occur in the Sonoran desertscrub from south of the Mogollon Plateau. At some roosts, this species is a year-round resident; the winter range for *M. californicus* is nearly the same as the summer range (AGFD 2003a). Because this species does not hibernate, the identification and protection of winter roost sites with appropriate conditions is crucial to the conservation of this species. This species does not always use the same roost sites in the summer and winter due to different requirements as the seasons change. Sustained exposure to low temperatures, which could be lethal, is largely avoided in the desert conditions in which they live and by selection of warm roost sites. This species may be found at elevations up to 5160 ft. (1560 m), but most records are below 2500 ft. (757 m).

The most important threat potentially affecting this species is usually considered to be human disturbance to roosts (AGFD 2001f), although habitat conversion and pesticide use are also a concern. Although they roost colonially, they are unlikely to be impacted by white-nosed syndrome because they do not hibernate. This species depends on the roosts it uses for its

survival, especially when nursing young and in the winter. Disturbance may cause the bats to abandon their roost and likely perish unless they can find another suitable roost (AGFD 2003a). Also, destruction or modification of the roost may make it unusable to the bats.

This summary does not reflect all information available on this species. More detailed status and life history information for the California leaf-nosed bat is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

Pale Townsend's Big-Eared Bat

The pale Townsend's big-eared bat is a pale yellowish brown, medium-sized bat, the forearm length is 1.56 to 1.88 inches (39.0-47.0 mm), its wingspan averages between 11.5 and 12.5 inches (29 31 cm), and a body length of 2 to 2.5 inches (5 to 7 cm). It has large, hairless ears, 1.2 to 1.6 inches (30.0-39.0 mm) in length. It has a large glandular lump on each side of the nose (Noel and Johnson 1993; AGFD 2001h).

This species is known to use caves, mines, and buildings (generally abandoned or inactive) through a range of elevations and vegetation communities. It has been found in Sonoran Desertscrub (both Arizona Upland and Lower Colorado River Valley subdivisions), Madrean Evergreen Woodland (oak woodland, oak/pine, and pinyon/juniper), and coniferous forests in Arizona (Hoffmeister 1986; Noel and Johnson 1993; AGFD 2001h). Night roosts may often be in abandoned buildings. In winter, they hibernate in cold caves, lava tubes, and mines mostly in uplands and mountains from the vicinity of the Grand Canyon to the southeastern part of the state (AGFD 2001h). The bats prefer to hang from open ceilings at roost sites and do not use cracks or crevices. At maternity roosts these bats apparently prefer dim light near the edge of the lighted zone (AGFD 2001h). Winter roosts generally contain fewer individuals (usually singles or small groups and, in Arizona, occasionally as many as 50) than summer roosts (AGFD 2003a). For hibernation, they prefer roost sites with temperatures between about 32° and 54° F (0° and 12° C). The bats may arouse and move to other spots in the roost during the winter so as to be in areas of more stable cold temperatures. The ears are erectile and can be collapsed and rolled up while at rest and expanded to usual size when alert. The availability of both summer, especially maternity, roosts and roosts for hibernation are key habitat components for this species.

This species is known from western North America from southern British Columbia south through the Pacific Northwest and southern California on the west and the Black Hills of South Dakota and West Texas on the east through the Mexican uplands to the Isthmus of Tehuantepec in southern Mexico. Isolated (and presumable relict) populations also exist in the Ozark Mountains of Oklahoma, Missouri, Arkansas, Kentucky, Virginia, and West Virginia (Hoffmeister 1986; Noel and Johnson 1993; AGFD 2001h). Townsend's big-eared bat is widespread in Arizona, although it is not considered common anywhere, and is least common in northeastern grasslands and southwestern desert areas (AGFD 2003a).

Population trends for Townsend's big-eared bats are unclear, though there have been losses or reductions of maternity colonies reported (AGFD 2003a). Disturbance of roosts appears to be the most important threat. Renewed mining, closure and sealing of abandoned mines naturally or for hazard abatement, and, possibly, the use of non-target pesticides are all considered threats (AGFD 2001h). A number of post-maternity roosts have also been discovered in the Santa Rita Mountains at and near the proposed Rosemont Mine site which, if approved and mining proceeds, will impact these roosts (U.S. Forest Service 2013). Historical alteration in the vegetation community along the Lower Colorado River is considered to have changed the available food supply for this species (U.S. Bureau of Reclamation 2008), and similar conditions have occurred along the Santa Cruz River. Because this species hibernates in cold caves, it is thought to be the only species of bat covered under the County's MSCP that may be susceptible to white-nosed syndrome. Disturbance during hibernation can also cause depletion of necessary fat reserves and the potential for fatalities. Maternity colonies are also easily disturbed, which can result in roost abandonment.

This summary does not reflect all information available on this species. More detailed status and life history information for the pale Townsend's big-eared bat is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

Cactus Ferruginous Pygmy-Owl

The cactus ferruginous pygmy-owl is a small bird, averaging 6.5 inches (16.5 cm) in length and weighing 2.5 ounces (70 g). The owl is gray-brown or rufous (reddish) brown in color. The head is small, compared to some other owls, and it lacks ear tufts. The eyes are yellow. The crown is finely streaked with flecks of buff. The tail is relatively long compared to those of other owls. There are subtle differences in coloration and size between the sexes (females are larger than males), and juveniles have somewhat different plumage from adults (Cartron and Finch 2000).

Pygmy-owls are found in a mix of dense thicket or woodland vegetation types in the Sonoran Desert, requiring saguaros or trees that are large enough for nesting cavities. A variety of multilayered vegetation cover and canopy cover are important to provide habitat for the owl's prey. Historical accounts of pygmy-owls indicate the species used riparian habitats within Arizona, primarily within Sonoran desertscrub and semi-desert grassland communities. In addition, in these historical riparian locations, nest sites were often in large trees, but currently nearly all known nest sites in Arizona and northern Mexico are in columnar cacti, often associated with xeroriparian drainages.

Most of the known pygmy-owls detected since 1993 were found in an area that is a mixture of private, State, Tribal, and BLM lands. Residential development within occupied areas ranges from scattered ranches on hundreds of acres to six residences per acre, and pygmy-owls do appear to be able to occupy areas with low density residential or ranch development if adequate blocks of native vegetation remain.

The historical distribution and decline of the species was described by Johnson *et al.* (2000). Evidence suggests that the species is at the edge of its range in Arizona, and that most of its range is in Mexico, Central, and South America. Evidence indicates that the species was often historically found in riparian areas, including xeroriparian washes, but also occurred in areas of Sonoran desertscrub and semi-desert grassland. Most current locations occur in Sonoran desertscrub, semi-desert grasslands, and the drainages within those communities. Baseline information is limited, and most of the early bird studies were fairly concentrated along rivers. It is possible, although not certain, that the species occurred primarily along rivers, but may have also occupied desertscrub. Records of the species extend along the southern Arizona river valleys, as far north as New River, north of Phoenix, west to Agua Caliente on the Gila River, and east to (possibly) the confluence of the San Francisco and Gila Rivers. At one time, it was considered common in the Phoenix area. The species' status in Pima County is discussed below in the Status of the Species in the Action Area section below. The cactus ferruginous pygmy-owl is also distributed throughout areas of southern Texas and Mexico.

Historical habitat losses, current habitat losses and alterations, reduction in prey density, and competition have all been mentioned as threats. Also, the possibility of natural fluctuations of a species at the edge of its range has been raised (Johnson *et al.* 2000). Drought and predation play a role in reduced pygmy-owl productivity. There is also an inherent risk of extinction in small populations due to stochastic variation in demographic parameters, sex ratio, genetic diversity, environmental conditions and disease (Cartron *et al.* 2000).

Specific threats have been defined as historical loss of riparian habitat, as well as current loss and fragmentation of habitat due to urbanization. There has been an historical loss of riparian woodlands and scrublands, and an historical and ongoing loss of upland vegetation due to human activities. Climate change and associated drought and weather extremes also affect the viability of populations of this species. Adequate rainfall during the right seasons has been correlated with prey abundance and pygmy-owl productivity. Screech owl predation has been identified as a significant factor in pygmy-owl fatalities. Domestic pets, particularly cats, have been identified as nonnative predators on pygmy-owls in areas in proximity to urban development. Parasites have also been documented in nest materials in Arizona and may affect the health and vigor of nestlings.

The cactus ferruginous pygmy-owl is protected under the Migratory Bird Treaty Act. The Migratory Bird Treaty Act makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird, including feathers, parts, nests, or eggs. Violations of the Migratory Bird Treaty Act are considered criminal offenses and can result in significant fines and imprisonment. The legal status of the cactus ferruginous pygmy-owl has been the subject of ongoing litigation. The current status was resolved in the most recent 12-month finding related to the cactus ferruginous pygmy-owl published by the FWS in 2011 (76 FR 61856), but is currently under litigation related to the FWS's "significant portion of the range" policy. This document contains the most recent detailed status of this species and is incorporated herein by reference.

Rufous-Winged Sparrow

The rufous-winged sparrow is a small (5.1-5.5 inches [13-14 cm], 15 g), distinctly marked sparrow. The adult has a gray head with black moustachial and malar stripes, narrow rufous postocular stripe, and rufous crown streaked with gray, often with a vague gray median stripe. The tail is long and rounded, and the bill is distinctly bicolored. The sexes are similar, and the adult plumages remain similar throughout the year. The juvenile plumage is similar but buffier, with distinct spotting or streaking on underparts, head streaked brown, less distinct facial pattern, and an all-dark bill.

Rufous-winged sparrows use flat or gently hilly Sonoran desertscrub and Sinaloan thorn scrub, characterized by scattered spiny trees and shrubs. This species apparently does not use the steeper hillsides. Grasses are essential components of the species' habitat. Hackberry (*Celtis* sp.), cholla species (*Cylindropuntia* spp.), and paloverde (*Parkinsonia microphylla and P. florida*) almost invariably are present. Territories typically include some wash (riparian) habitat.

The rufous-winged sparrow is year-round resident from south-central Arizona (Pinal County), south through Pima County, and along the Pacific slope of Mexico through central Sonora to central Sinaloa. In Arizona, it is a resident in central and southern portions of eastern Pinal County (Red Rock, Oracle Junction), and northern portions of the San Pedro River near Winkelman. The species' status in Pima County is discussed in the Status of the Species in the Action Area section, below.

Loss of grassland habitat as a result of overgrazing and urban development is believed to have had the greatest effect on sparrow populations. Overgrazing in the desert habitats was alleged to have caused the local extirpation of the species in the 1880s from at least part of its range. Apparent recovery of this species over the past 50 years may be related, at least in part, to improved grazing management. The rufous-winged sparrow is protected under the Migratory Bird Treaty Act. The Migratory Bird Treaty Act makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird, including feathers, parts, nests, or eggs. Violations of the Migratory Bird Treaty Act are considered criminal offenses and can result in significant fines and imprisonment.

This summary does not reflect all information available on this species. More detailed status and life history information for the rufous-winged sparrow is included in Appendix A of the MSCP (Pima County 2015) and in Pima County's Priority Vulnerable Species document (Pima County 2001); these are incorporated herein by reference.

Sonoran Desert Tortoise

The Sonoran desert tortoise (*Gopherus morafkai*) is a terrestrial species that reaches adult sizes of about 20 to 38 centimeters (cm) (8 to 15 inches (in)) carapace length (Brennan and Holycross 2006). The Sonoran desert tortoise has a high domed shell, usually a brown or grey carapace, with a definite pattern and growth lines on the carapace. The plastron is unhinged and often pale yellow in coloration. The limbs are very stocky, including elephant-like rear conical limbs; the

forelimbs are flattened and covered with large conical scales. The tail is short. Males have long gular (throat) shield and larger chin glands on each side of the lower jaw.

The Sonoran desert tortoise reaches peak population densities in paloverde-mixed cacti associations in the Arizona Upland subdivision of Sonoran Desertscrub. Approximately 95% of known U.S. records for the species occur between 274 – 1,280 m (900-4,200 ft) elevation (Zylstra and Steidl 2009). Sonoran desert tortoise records are found within five distinct biotic communities (or habitat types) in addition to the Arizona Upland subdivision of Sonoran Desertscrub within Arizona. They are: Lower Colorado River (subdivision) Sonoran Desertscrub, Mohave Desertscrub, Semidesert Grassland, Interior Chaparral, and Madrean Evergreen Woodland [as defined in Brown (1994)]. Washes and valley bottoms provide habitat and are especially important for dispersal. Sonoran desert tortoises may spend as much as 98% of their life in shelters (Nagy and Medica 1986) making available shelter sites one of the most important habitat features for this species. In the Lower Colorado River Valley subdivision, caliche caves in cut banks of washes (arroyos) are also used for shelter sites. Shelter sites are rarely found in shallow soils. According to several short-term telemetry studies, male Sonoran desert tortoises are reported to have variable home range sizes, from 6.4 acres to 640 acres (2.6 – 259 ha) (Barrett 1990; Meyer 1993; Averill-Murray and Klug 2000; Averill-Murray *et al.* 2002). Individual home ranges overlap both within and between the sexes.

The Sonoran desert tortoise lives south and east of the Colorado River, from locations near Pearce Ferry in Mohave County, to the south beyond the International Boundary, and many scattered locations in between. The northeastern-most tortoise records in Arizona occur along the Salt River near Roosevelt Lake in Gila County. The middle San Pedro River drainage in Cochise County harbors the eastern-most substantial populations. Tortoises have been found as far west as the Barry M. Goldwater Range, Yuma Proving Ground, and the Cabeza Prieta National Wildlife Refuge (AGFD 2001e). Populations throughout its range are becoming increasingly fragmented due to threats to habitat in valley bottoms used for dispersal and exchange of genetic material (FWS 2008).

A 2015 Species Status Assessment Report for the Sonoran desert tortoise found the tortoise's status revolves around six primary risk factors: 1) altered plant communities, primarily due to the invasion of nonnative grasses; 2) altered fire regimes, also related to the changes in plant communities; 3) habitat conversion of native vegetation to developed landscapes; 4) habitat fragmentation by the construction of permanent linear structures like highways and canals; 5) human-tortoise interactions such as handling, collecting, and killing individual tortoises intentionally or unintentionally (especially by vehicle strikes); and 6) climate change as it relates to increases in the frequency, scope, and duration of drought conditions in the Sonoran Desert (FWS 2015).

Mountain lions are one of the few, if not only, natural predators capable of breaking through an adult tortoise's shell, but other carnivores, including coyote, kit fox, bobcat, gray fox, and badger, may prey on hatchlings, juveniles, and eggs or kill adults by chewing on exposed limbs. Feral dogs are also a threat. Other potential predators of small tortoises include golden eagle, other raptors, common raven, and greater roadrunner.

This summary does not reflect all information available on this species. More detailed status and life history information for the Sonoran desert tortoise is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml). The most current and complete treatment of the status of the species is found in our Species Status Assessment Report for the Sonoran desert tortoise Sonoran desert tortoise (FWS 2015) which is incorporated herein by reference.

Tucson Shovel-Nosed Snake

The adult Tucson shovel-nosed snake is 10 to 17 inches (25 to 42 cm) long. Markings vary considerably between individuals and between subspecies. Tucson shovel-nosed snakes have a cream-colored, whitish or yellowish body with approximately 21 or more black or brown bands across the back, reaching almost to the belly or encircling the body. Between these bands are black or brown smaller bands. The snout is flattened and shaped somewhat like a shovel (Stebbins 1985). The taxonomy of this subspecies is a subject of debate (Wood *et al.* 2008), although this was resolved to some extent in FWS's 2014 12-month finding that listing this subspecies under the ESA was not warranted (79 FR 56730).

The Tucson shovel-nosed snake is restricted to the desert where it frequents sandy washes, dunes, sandy flats, loose soil, and rocky hillsides where there are sandy gullies or pockets of sand among rocks, often with little vegetation. In Arizona, they are found at elevations ranging from near sea level to about 2,500 ft (762 m) (Brennan and Holycross 2006). This species is most often associated with the Lower Colorado River Sonoran Desertscrub plant community. It is usually found in association with sandy washes or dunes in the desert flats or on gently sloping bajadas (Brennan and Holycross 2006). Vegetation may include creosote bush, desert grass, cactus, or mesquite. The Tucson shovel-nosed snake prefers areas with scattered mesquite-creosote bush (Behler and King 1979). It is absent or infrequent in rocky desert terrain.

This subspecies has been found in an area from northern Pima County across southwestern Pinal County into southern Maricopa County (Stebbins 1985). However, recent genetic information is available from a U.S. Geological Survey study that used both mitochondrial DNA and 11 microsatellite loci to assess whether patterns of population genetic structure follow the spatial structuring of phenotypic variation that originally led to the subspecies description and included samples from all subspecies of the western shovel-nosed snake throughout its range (Wood *et al.* 2008). The genetic data indicate that the Tucson shovel-nosed snake is a much wider ranging subspecies than originally thought. Therefore, the current range of the Tucson shovel-nosed snake, as defined by the FWS, includes portions of central and western Arizona in Pinal, Maricopa, Yavapai, Yuma, Pima, and La Paz counties.

Loss of habitat to agricultural and urban development is likely to impact this species in portions of its range. Off-road vehicle activities are likely to adversely affect this species in some areas. Road building is likely to have destroyed and possibly fragmented some habitat and increased traffic probably increases road kill of individuals. This subspecies has probably suffered significant losses of habitat due to agricultural and urban development in the Avra Valley. It

also is impacted by highway traffic within its habitat, and it may be affected by scientific and commercial collecting.

It is possible that invasion of its habitat by nonnative plants, such as red brome, buffelgrass, or Sahara mustard may be detrimental to this species by reducing or eliminating open ground and increasing the occurrence of fire.

This summary does not reflect all information available on this subspecies. More detailed status and life history information for the Tucson shovel-nosed snake is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), and our 2014 12-month finding on a petition to list the Tucson shovel-nosed snake (79 FR 56730), all of which are incorporated herein by reference.

Groundsnake (Valley Form)

The groundsnake is a small species that may reach about 18 inches (45 cm) total length. The species is highly polymorphic. Dorsal color is brownish, orange, reddish, or gray. Patterns include plain, cross-banded, longitudinally banded (red or orange if present), or a combination (Stebbins 1985). Plain, striped, and cross-banded individuals sometimes occur at the same locality (Stebbins 1985).

This species occupies plains, valley, and foothill habitats (Lowe 1964; Degenhardt *et al.* 1996). It has been found mostly near mountains with higher slopes and areas with poorly drained soils, and speculation is that this is because subsurface moisture is required for the species and its prey (Stebbins 1985; Degenhardt *et al.* 1996). Vegetation may be scant (Great Basin sagebrush plains and creosote desert), or dense (lower Colorado River thickets of mesquite, arrowweed, and willow communities). The species ranges from prairies through desert communities, thornscrub, and pinyon-juniper woodland to the pine-oak zone (Stebbins 1985). This harmless snake is commonly encountered in yards in the Phoenix metropolitan area.

The groundsnake in the southwest is known to occur in New Mexico, Arizona, Colorado, Utah, Texas, and Chihuahua and Sonora, Mexico at elevations from 2,000 to 5,500 feet (Stebbins 1985). The valley form is known only from an undetermined limited area in Pima County. The overall range of *S. semiannulata* includes grassland areas of the central United States from southeastern Colorado to southwest Missouri, south and west into northern Mexico. It ranges across the deserts of west Texas, New Mexico, Mexico, Arizona, Nevada, and California. Apparent isolated populations exist in eastern Oregon and western Idaho, Baja California, northern Utah, and northern Kansas (Stebbins 1985; Degenhardt *et al.* 1996). Scattered localities occur from the southern half and northwestern quarter of Arizona (Lowe 1964).
The valley form of the groundsnake is thought to be impacted by habitat destruction, primarily conversion to agriculture and development. It is likely also impacted by road mortality as a result of seeking out roads for warmth. Recent increases in the spread of buffelgrass and the associated impacts of fire and desiccation may also be impacting this species.

This summary does not reflect all information available on this species. More detailed status and life history information for the ground snake is included in Appendix A of the MSCP (Pima County 2015) and Pima County's Priority Vulnerable Species document (Pima County 2001), which are incorporated herein by reference.

Talussnails

Snails in the genus *Sonorella* have a "depressed globose, helicoids shell, 0.5 to 1.2 inches (12 to 30 mm) in diameter, umbilicate or perforate, with a wide, unobstructed mouth and a thin, barely expanded peristome, smoothish or slightly sculptured with growth-lines, occasionally with fine oblique or spiral granulation and short hairs (mainly on the early whorls), lightly colored, and normally with a dark peripheral band.

All *Sonorella* species live in isolated, undisturbed areas of rocks, generally, or exclusively, limestone, mostly, if not exclusively, on north-facing or trending slopes, usually near hilltops or in rocky canyons (Pilsbry and Ferriss 1915; Pilsbry and Ferriss 1918; Terkanian 1999). Talussnails generally live in talus, or coarse broken rock slides, and generally live in crevices one to several feet below the talus surface which provides the necessary temperature and humidity microclimate needed for these species to survive. They are mostly surface active at night during the monsoon season when temperatures are cooler and humidity levels are higher. Weather conditions are the most important factor affecting activity of *Sonorella* species, with talussnails only active above ground during or following summer monsoon rains, and occasionally after winter rains (Jontz et al. 2002, Weaver and Guralnick 2010). Talussnails can spend up to three years at a time below the surface in aestivation. To prepare for estivation, the talussnail uses mucus and calcium to attach the aperture of its shell to the face of a rock to make a waterproof seal. Once sealed, the individual is completely isolated from the air outside. Respiration does not stop completely in an estivating talussnail; the individual does generate small amounts of carbon dioxide. The carbon dioxide combines with water molecules to produce carbonic acid, which is neutralized by calcium carbonate. Talussnails that estivate for comparatively short periods survive by mining calcium carbonate from their shells, which is redeposited when active feeding resumes.

All available evidence supports the hypothesis that all of the localized taxa are relicts of previously widespread taxa isolated by repeated episodes of isolation and dispersal during repeated climate changes in the distant past (McCord 1994; Terkanian 1999). Current distribution is probably not different from historic distribution, but there has been no known systematic search effort in approximately 30 years, and some species may be extinct. Some that were described by Pilsbry and Ferriss in 1915 and 1918 were not relocated by Miller in the 1960s and 70s (Bequaert and Miller 1973). The total range of many of the known species may be less than the land occupied by one moderate-sized house, but because most talussnail species lack adequate surveys or study, ranges of some species may be more extensive.

The total known and likely range of many of these species is very small and is isolated from any other potential habitat. Relatively minor perturbations of the habitat may result in changes that impact the spatially restricted talussnails. These species are thought to be particularly sensitive to potential global climate change (Terkanian 1999).

This summary does not reflect all information available on these species. More detailed status and life history information for the talussnails is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

Grassland Species

Swainson's Hawk

The Swainson's hawk is a large, slim-winged, long-tailed buteo. This buteo is the most variable in terms of coloration of any raptor in Arizona (Glinski and Hall 1998). The only color patterns that seem consistent are the two-toned underwing, with the leading edge appearing lighter than the trailing edge, and the white patch on the throat and forehead. The species is adapted for hunting in the open country and has more pointed wings and a longer tail than the more familiar red-tailed hawk (*B. jamaicensis*). In a soar, the bird somewhat resembles a peregrine falcon (*Falco peregrinus*) with its long pointed wings, but when it is gliding, the wings are crooked like those of an osprey (*Pandion haliaetus*). When soaring, the wings are held in a dihedral. Total length of males is 19 to 20 inches (48 to51 cm) and of females is 20 to 22 inches (51 to 56 cm), and the wingspan is 47 to 57 inches (119 to 144 cm).

Grasslands, semidesert grasslands, and savanna grassland, either apart or intermixed with open desertscrub habitats of the Sonoran, Mohave, Chihuahuan, and Great Basin deserts, are home to nesting Swainson's hawks in Arizona. Many nests in Cochise County are in agricultural and sparsely settled residential settings that border native grassland habitats. Migrating Swainson's hawks are frequently seen in agricultural fields where they forage (Glinski and Hall 1998). They often can be seen resting on utility poles and fence posts. They can be found, but are uncommon, in urban or suburban developed areas, woodlands, forests, or dense scrublands.

Swainson's hawks forage in open stands of grass-dominated vegetation, sparse shrub-lands, and small open woodlands. In many parts of their range today, they have adapted well to foraging in agricultural areas (e.g., wheat and alfalfa), but cannot forage in most perennial crops or in annual crops that grow much higher than native grasses, making prey more difficult to find (England *et al.* 1997).

Swainson's hawks breed throughout most of the western U.S., from northern Mexico to Alaska (The National Geographic Society 1987; England *et al.* 1997). They are very rare fall visitors to the eastern U.S., and they winter primarily in South America (England *et al.* 1997). Although the nesting range has remained relatively stable, Swainson's hawks have suffered major declines in certain portions of their range, especially in California, Oregon, and Nevada (England *et al.* 1997; AGFD 2001c). In Arizona, data are inadequate to determine trends (Bednarz 1988). Habitat loss, degradation, fragmentation, and use of pesticides are likely contributors to the decline of this species (AGFD 2001c). Throughout their Arizona range, Swainson's hawks must contend with habitat loss through a continually expanding human population and associated development and recreation activities (AGFD 2001c). Use of pesticides in areas of wintering

hawk concentrations may significantly affect some North American breeding populations. Pesticides also reduce prey on wintering grounds and most likely impact the breeding grounds as well, depending on the setting. Direct mortality is caused by shooting, as the species is sometimes erroneously perceived as a pest, and it is often an easy target because it habitually perches on utility poles and fence posts along roads in open country.

The Swainson's hawk is protected under the Migratory Bird Treaty Act. The Migratory Bird Treaty Act makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird, including feathers, parts, nests, or eggs. Violations of the Migratory Bird Treaty Act are considered criminal offenses and can result in significant fines and imprisonment.

This summary does not reflect all information available on this species. More detailed status and life history information for the Swainson's hawk is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

Western Burrowing Owl

The burrowing owl is a small owl that measures from 7.5 to 10 inches (19 to 25 cm) in length and weighs about 5 ounces (150 g). The legs are long and sparsely feathered below the tibiotarsal joint. It has a round head with no ear tufts and a distinct oval facial ruff, framed by a broad, buffy white eyebrow-to-malar stripe on the interior part. The iris is usually bright lemon yellow. The wings are relatively long and rounded, with 10 brown and buffy white barred rectrices. The dorsum is brown; back, scapulars and crown are profusely spotted with buffy white. The throat and undertail coverts are white; and the remainder of the underparts of adults is buffy white with broad barring on both sides. Females are generally darker than males overall, particularly in worn plumage (Haug *et al.* 1993).

Within their geographic range, burrowing owls inhabit open areas such as grasslands, pastures, coastal dunes, desertscrub, and the edges of agricultural fields. They also inhabit golf courses, airports, cemeteries, vacant lots, and road embankments, wherever there is sufficient friable soil for a nesting burrow (Haug *et al.* 1993; Estabrook and Mannan 1998; Bartok and Conway 2010). Agricultural areas such as fields and croplands often provide optimal habitat for burrowing owls, as do moderately grazed areas (Moulton *et al.* 2006). While some elements associated with urban development can provide habitat for burrowing owls, urban development in many of these areas may result in a loss of habitat (Klute *et al.* 2003). Unlike most other owls, this owl is often found in colonies of varying size.

The historical range of the western burrowing owl includes Arizona, California, Colorado, Idaho, Iowa, Kansas, Louisiana, Minnesota, Montana, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, Oregon, South Dakota, Texas, Washington, Wyoming, Canada, and Mexico. Migratory populations breed in North America and may winter as far south as Guatemala or El Salvador (BISON 2008b). They withdraw from the northernmost portions of their breeding range in winter. In Arizona, the burrowing owl has a widespread, but sporadic nesting

distribution (AGFD 2001b; Corman and Wise-Gervais 2005). Burrowing owls have declined in abundance throughout most of their range (Haug *et al.* 1993; Brown and Mannan 2002; Klute *et al.* 2003; Tucson Bird Count 2012). In the western states, 54% of 24 jurisdictions reported burrowing owl populations decreasing, and there were no reported increases (U.S. Bureau of Reclamation 2008).

The primary threat to the species appears to be habitat loss from housing development and agriculture; shrub encroachment; and fire from invasive plants (especially grasses) (Klute *et al.* 2003). Predation is a major cause of mortality in burrowing owls. Other observed causes of mortality include human disturbance or burrow destruction through agricultural and construction activities, collisions with vehicles (the owls habitually sit and hunt on roads at night), and toxic chemicals such as insecticides and strychnine-laced grains (often dispersed for rodent and insect pest control in agricultural areas where birds nest). Also, a decline in the population of burrowing mammals may adversely affect owls by way of a reduced number of burrows (Haug *et al.* 1993).

The western burrowing owl is protected under the Migratory Bird Treaty Act. The Migratory Bird Treaty Act makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird, including feathers, parts, nests, or eggs. Violations of the Migratory Bird Treaty Act are considered criminal offenses and can result in significant fines and imprisonment.

This summary does not reflect all information available on this species. More detailed status and life history information for the western burrowing owl is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

Desert Box Turtle

This chiefly terrestrial turtle reaches 5.75 inches (15 cm) in carapace length. The plastron has a single hinge in front and can be drawn tightly against the carapace. The carapace is high and round, and is typically marked with pale radiating lines or a series of black or dark brown dots on a yellow field. The plastron may have similar markings. The markings become less distinct as age advances and are eventually lost. The shells of older individuals are uniform straw color or pale greenish brown. The first nail on each hind foot turns inward on males. The iris and spots on forelimbs are reddish (yellowish in females), and the head is sometimes greenish. Females grow larger than males (Stebbins 1985; Degenhardt *et al.* 1996).

Desert box turtles occur in Semidesert Grassland, Chihuahuan Desertscrub, lower elevation Madrean Oak Woodland, and rarely found in Montane Conifer Woodlands (Brennan and Holycross 2006). It has also been in rather unusual settings, such as in pecan orchards in Sahuarita (K. Kingsley, *unpublished data*). This species is chiefly diurnal, often active during the morning and frequently following rain, and uses kangaroo rat burrows or self-created burrows for cover (Brennan and Holycross 2006). Principle food items for the omnivorous desert box

turtle include insects, worms, eggs, carrion, cactus fruit, sprouts, grasses, and leaves (Brennan and Holycross 2006).

The desert box turtle ranges from south-central New Mexico south to central Chihuahua and Sonora, Mexico, and from western Texas across New Mexico to the eastern base of the Baboquivari Mountains at elevations from sea level to about 6,000 feet (Stebbins 1985). There are no trend data for this species.

The primary causes of the decline in box turtles are not well-understood, but might be associated with loss of grassland habitat to development, shrub encroachment, invasive species, and a change in the fire regime. The desert box turtle is sensitive to road mortality and collecting (Hall and Steidl 2007). It may also have been affected by Compound DRC-1339 used by Animal Damage Control and has apparently been caught in leghold traps as well (BISON 2008e). In Arizona, collection of this species is prohibited without a scientific collecting permit.

This summary does not reflect all information available on this species. More detailed status and life history information for the desert box turtle is included in Appendix A of the MSCP (Pima County 2015), Pima County's Priority Vulnerable Species document (Pima County 2001), and the AGFD Heritage Data Management Systems Plant and Animal Abstracts (www.azgfd.gov/w_c/edits/hdms_abstracts.shtml), which are incorporated herein by reference.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts from all Federal, State, or private actions in the action area, the anticipated impacts from all proposed Federal actions in the action area that have undergone formal, informal, or early section 7 consultation, and the impact from State and private actions which are contemporaneous with this consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the actions now under consideration.

Action Area

Section 7 analyses require the definition of an "action area" for use in describing the environmental baseline and the effects of the action (including indirect, interrelated, and interdependent effects). Based on the proposed actions, the FWS determines the "action area" that will be considered in a section 7 consultation. The action area is defined as the area likely to be affected by the direct and indirect effects of the proposed agency action (50 CFR §402.02). Because there may be indirect effects from the actions included in the consultation that occur outside of the geographic area of the proposed action as described by the action agency, the action area of the biological opinion may not be the same as the actual geographic area of the proposed action.

Federal actions that have already undergone section 7 consultations do not factor into the indirect effects analysis. The effects of these actions are part of the environmental baseline for the action area. Section 10 permits that have already been issued by the FWS are part of the environmental baseline. For the period from 2000 to the current time, FWS has conducted 133 formal section 7

consultations within Pima County. These are actions with a Federal nexus that are likely to adversely affect listed species. Most of these consultations anticipated take of one or more listed species and include an incidental take statement. These consultations covered proposed actions including, but not limited to, residential and commercial development, drainage and flood control projects, land use and management plans (fire management plans, grazing management plans, land use plans, etc.), fire suppression, border issues, utility infrastructure, mining activities, and road construction and maintenance.

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 the 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. Ranching, recreation, military facilities, and prospecting and mining for copper, silver, and other minerals have been and continue to be important land-use activities that have shaped the development and economy of the area.

Pima County occurs within the global arid and semi-arid zone. Average summer highs are in the upper 90 degrees Fahrenheit, with peak temperatures above 100 degrees Fahrenheit. Snow is rare and generally only falls above 3,000 feet elevation. Rainfall averages vary across the county and range from three to fifteen inches per year, generally falling in two rainy seasons, winter and the summer monsoon. There is an increasing gradient of rainfall from west to east in Pima County. As expected in a desert environment, water resources are scarce and extremely valuable, both for human use and to support wildlife and wildlife habitat. Watercourses with perennial or intermittent flows, and springs are uncommon, but provide important aquatic and riparian resources. Water for human use typically has priority over providing adequate water for wildlife and habitat needs. However, as Pima County works towards water conservation and assured water supplies for human use, it also considers and works toward conserving important aquatic and riparian habitat resources in the county. Most watercourses in Pima County drain to the north and northwest and are ephemeral, flowing only for short periods during seasonal rains.

Pima County's plant and animal communities are constantly changing in response to climate and ongoing evolutionary processes and by the sequence of profound events: the end of the glacial period; the advent of people to North America; and the dramatic increases in human population, groundwater pumping, and land clearing during the last century. Within the last 100 years most cienegas and riverine marshes have been eliminated, along with most perennial stream flows. Most of the aquatic and semi-aquatic areas have been lost or are imperiled, which has impacted many species of conservation concern in Pima County.

Pima County can be divided into two eco-regions (Marshall *et al.* 2006). The higher elevation eastern portion of Pima County has forests, woodlands, and grasslands of the Apache Highlands. The central and western portions of Pima County are much lower in elevation and characterized by Sonoran Desert vegetation. The biological diversity of the region can be attributed to these elevational differences and because of the County's location between the subtropics of Central America and the temperate climatic zones of North America. One aspect of the biodiversity is the level of endemism of plants, small mammals, fish, reptiles, and insects that occurs in Pima County (Fonseca *et al.* 1999). Many species are at the northern limits of their range because

Pima County is positioned at the edge of the tropics. The sky islands that occur in the mountains in Pima County are considered to be the northern extent of the mountain range of Sierra Madre Occidental of Mexico. By contrast, few species are at the southern limit of their range because of higher elevations to the south in Mexico.

Important and rare natural resources in Pima County include the remaining aquatic and riparian communities. They are rich in biodiversity and critical for many species, especially birds, fish, amphibians; and aquatic reptiles, invertebrates, and plants. Rivers serve as primary migration corridors for dispersing and colonizing species. For example, important north-south corridors, such as the Santa Cruz, San Pedro, and Colorado rivers are critical to birds that migrate between the United States and Mexico (Skagen *et al.* 1998). These corridors and the remaining riparian and aquatic communities that exist along them are used by approximately 75 percent of all the bird species that migrate between the United States and Mexico (Finch 1991; Hardy *et al.* 2004). Native fish, frogs, snakes, and other aquatic species have become increasingly imperiled as the amount and distribution of riparian and wetland ecosystems of Pima County have diminished (Scalero *et al.* 2000; Rosen and Mauz 2001).

The Tohono O'odham Nation is the single largest land holder in Pima County and, together with the Pascua Yaqui Nation, results in Tribal lands accounting for 42% of Pima County's land ownership (see Figure 4 of this BCO). The Federal government and the State of Arizona are the second and third largest land owners in Pima County, respectively. Pima County owns <2% of the land in the County. Incorporated jurisdictions within Pima County include the cities of Tucson and South Tucson, and the towns of Oro Valley, Marana, and Sahuarita.

Most Pima County residents live in eastern Pima County, within the urbanized Tucson basin and along the Santa Cruz River corridor south to Green Valley and north to Marana. Human settlement along this river corridor has prehistoric roots. The topography of the Tucson basin and the patterns of Federal land ownership have also greatly influenced distribution and pattern of the urbanized area.

During the past century, the area covered by the incorporated urban footprint of Tucson has expanded from two square miles in 1900, to almost 10 square miles in 1950, to 100 square miles in 1980, to around 200 square miles today. Population levels experienced a steady climb, but the density of residents within a square mile has actually declined from nearly 5,200 in 1953 to around 2,400 persons per square mile today. Pima County's growth patterns reflect the market forces of leap frog development and unregulated development, both of which have led to fragmentation of the natural resource base and an urbanized footprint spread across the Tucson basin. Low-density platted developments, as well as unregulated lot splitting (also referred to as "wildcat" subdividing), have contributed to sprawl in the County. For additional information related to the existing conditions within the action area, please refer to the Public Draft Environmental Impact Statement for the Pima County MSCP (FWS 2012c).

The area in which Pima County is seeking a Section 10 permit (herein "the permit" unless otherwise noted), is known as the permit area and is primarily a subset of Pima County that includes those lands under the legal authority of the Pima County Board of Supervisors or the Pima County Regional Flood Control District Board of Directors (collectively referred to herein

as “Pima County” or the “County” unless otherwise noted), as well as a few areas in adjacent counties. The permit area is shown in Figure 1 of this BCO, but is subject to change as described and addressed in the MSCP, and includes all:

- Private lands within unincorporated Pima County under the legal authority of Pima County, including those State Trust lands that are sold by the state to the private sector and which subsequently come under the legal authority of Pima County;
- Lands the County owns in fee simple and lands on which the County possesses a property right, including those located within other jurisdictions such as the cities and towns of Tucson, Marana, Oro Valley, and Sahuarita, and adjacent counties; and
- Lands on which Pima County constructs and maintains infrastructure, including lands within the incorporated areas of Tucson, Marana, Oro Valley, South Tucson or in adjacent counties (Santa Cruz, Cochise, and Pinal). See Section 3.4.1.2 of the MSCP for clarifications to Pima County activities in adjacent counties.

The permit area also includes State Trust lands:
- Leased to Pima County or used as road or drainage-way easements; or
- Where Pima County may acquire the land in fee simple.

The permit area also includes certain lands that:
- Pima County might patent from the BLM for open-space purposes either through the Recreation and Public Purposes Act (RPPA) or through future land exchanges, or
- Are expected to be released by the BLM to the private sector for development and which would subsequently come under the regulatory authority of Pima County.

The following are explicitly excluded from the permit area:
- All other Federal lands not identified above;
- Federally-reserved tribal lands;
- Lands within incorporated areas, except where Pima County possesses a property right or constructs or maintains infrastructure;
- Lands in unincorporated Pima County that are owned by incorporated jurisdictions;
- Lands annexed into incorporated areas and which are not subject to the County building or site construction permit requirements, excluding those lands owned by Pima County;
- County-maintained roadways within Federal or Tribal lands, and
- State Trust lands within Federal reserves.

The permit area is expected to change as: 1) cities and towns annex unincorporated lands, 2) Pima County acquires or disposes of land, 3) Federal land is disposed of or exchanged, or 4) Tribal lands are federally reserved. If these occur, some of these changes may require an amendment to the Permit (see Section 4.11 and the Implementing Agreement [Appendix C] in the MSCP for permit amendment conditions and procedures).

Therefore, the action area considered in this BCO includes all of the planning area and permit area as described above.

Status of Species in the Action Area

Aquatic Species

Huachuca Water Umbel
A. Status of the Species in the Action Area – There are 20 historical locations for this species in the Tucson area, none of which are currently suitable. There were three populations of Huachuca water umbel that were thought to historically exist in Pima County: (1) Cienega Creek in Las Cienegas National Conservation Area; (2) Cienega Creek Natural Preserve; and (3) Bingham Cienega Preserve. Currently, there is only one metapopulation thought to be extant. The species was found in Cienega Creek Natural Preserve in 2001 (Engineering and Environmental Consultants Inc. 2001), but subsequent visits failed to detect the species. The species was not present on a 2001 survey of the La Cebadilla Property, but it was thought to be present there previously (Engineering and Environmental Consultants Inc. 2001). Wetland conditions required by the species have not been found at Bingham Cienega Preserve since 2007. If water conditions continue to improve, it may be possible to reestablish populations in the effluent-dominated portion of the Santa Cruz River, as well as in the portion of the San Pedro River within Pima County.

No critical habitat for the Huachuca water umbel occurs in Pima County or the action area. It does occur in some adjacent areas in Santa Cruz and Cochise counties, but covered activities within the action area have not likely affected designated critical habitat.

B. Factors Affecting the Species' Environment in the Action Area - Endangered status for this species implements Federal protection under the ESA (FWS 1997). Designation of the San Pedro Conservation Area was accomplished by legislation that states that the BLM is charged with conservation, protection, and enhancement of the riparian area, which includes populations of Huachuca water umbel. Management of Las Cienegas National Conservation Area may protect this species there, and surveys conducted in 2011 show robust populations there (Jeff Simms, personal communication to Brian Powell, November 2011). Coronado National Forest monitors all of their known populations and has protective measures such as livestock exclosures in place in critical habitat. Populations on Fort Huachuca are monitored and recreational use is excluded. The species shows excellent response to reintroductions, so there is a good likelihood of reestablishing the species if conditions are favorable (Titus and Titus 2008).

Over the past 10 years, FWS has conducted 10 formal section 7 consultations within the action area that included anticipated adverse effects to the Huachuca water umbel. These consultations included seven land use/management plans, two species reintroduction or enhancement projects, and one mine project.

Gila Chub
A. Status of the Species in the Action Area – The distribution of the Gila chub in Pima County is very restricted; the chub is found only in Sabino Creek (Dudley and Matter 2000), Romero Canyon (Ehret and Dockens 2009), and Cienega Creek (Marsh *et al.* 2010), including the County's Cienega Creek Natural Preserve.

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 (FWS 2005). 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).

Long-term monitoring of this species in Pima County and surrounding areas has occurred as a result of a number of efforts. Monitoring is undertaken throughout central and southern Arizona as part of the Central Arizona Project's nonnative species detection effort (Marsh *et al.* 2009; Clarkson *et al.* 2011). This monitoring takes place in the Cienega Creek Natural Preserve. The BLM monitors for this and other native species annually at Las Cienegas National Conservation Area (Simms *et al.* 2006). Also, monitoring for this and other native species has occurred annually in Aravaipa Canyon since 1970 (Eby *et al.* 2003). Finally, the species is regularly monitored at the Muleshoe Ranch (Cochise County) (Love-Chezem *et al.* 2015).

B. Factors Affecting the Species' Environment in the Action Area - The inability of Gila chub populations to reproduce successfully and thrive after the introduction of green sunfish was documented at Sabino Canyon by Dudley and Matter (2000). Many water bodies in Pima County have been colonized by a wide array of other nonnative species that may contribute to the decline of the chub. These may include the following: introduced plants such as tamarisk, which change habitat characteristics; invertebrates such as the Asian clam (*Corbicula fluminea*) and crayfish (*Orconectes* sp.); amphibians such as the bullfrog; and numerous other nonnative fish such as smallmouth bass (*Micropterus dolomieu*) (Weedman *et al.* 1996). Additionally, parasites introduced incidentally with nonnative species may jeopardize Gila chub populations (FWS 2002a).

Over the past 10 years, FWS has conducted 12 formal section 7 consultations within the action area that included anticipated adverse effects to the Gila chub. These consultations included one drainage/flood control project, five land use/management plans, four species reintroduction or enhancement projects, one utility infrastructure project, and one mine project.

Gila Topminnow

A. Status of the Species in the Action Area – The only stable populations of the Gila topminnow in Pima County are along stretches of Cienega Creek including the County-owned Cienega Creek Natural Preserve and Las Cienegas National Conservation Area (Weedman and Young 1997; Voeltz and Bettaso 2003; Simms *et al.* 2006; Bodner *et al.* 2007). Numerous reintroductions have occurred for this species in Pima County, but these efforts have had limited success (Constantz 1979; Weedman and Young 1997; Sheller *et al.* 2006). There are populations upstream of Pima County in the Santa Cruz River (Voeltz and Bettaso 2003; Powell *et al.* 2005; Duncan 2013) and following floods, individuals may potentially establish in the Pima County reach of the river. Captive-bred populations can be found throughout the County.

Long-term monitoring of this species in Pima County and surrounding areas has occurred as a result of a number of efforts. Monitoring is undertaken throughout central and southern Arizona

as part of the Central Arizona Project's nonnative species detection effort (Marsh *et al.* 2009; Clarkson *et al.* 2011; Timmons and Upton 2013). This monitoring takes place annually in the Cienega Creek Preserve. The BLM monitors for this and other native species annually at Las Cienegas National Conservation Area (Simms *et al.* 2006). The Sonoran Institute and its partners also conduct some annual monitoring.

B. Factors Affecting the Species' Environment in the Action Area - The inability of Gila topminnow populations to survive and thrive after the introduction of mosquitofish has been well documented (Weedman *et al.* 1998; Minckley 1999; Duncan 2013). Pima County water bodies support a wide array of other nonnative species that may reduce their suitability to support the Gila topminnow. These include introduced plants such as tamarisk and water primrose (*Ludwigia peploides*) which hange habitat characteristics; invertebrates such as the Asian clam and crayfish; amphibians such as the bullfrog; and numerous additional nonnative fish such as smallmouth bass (*Micropterus dolomieu*), green sunfish (*Lepomis cyanellus*), and western mosquitofish (Weedman *et al.* 1998). Habitat alteration and destruction, and introduction of predaceous nonnative fish, principally mosquitofish, as well as other nonnative species, are the main reasons for decline of the Gila topminnow (Weedman *et al.* 1998).

Over the past 10 years, FWS has conducted 20 formal section 7 consultations within the action area that included anticipated adverse effects to the Gila chub. These consultations included one drainage/flood control project, 12 land use/management plans, five species reintroduction or enhancement projects, one utility infrastructure project, and one mine project.

Longfin Dace

A. Status of the Species in the Action Area – Known populations of the longfin dace in Pima County occur in: Cienega Creek Natural Preserve and further upstream in Las Cienegas National Conservation Area (Rosen and Schwalbe 1988; Simms *et al.* 2006; Bodner *et al.* 2007); Buehman Canyon (including lands owned by Pima County); upper reaches of the Canada del Oro; Wakefield Canyon; and in Arivaca Creek. There are populations upstream of Pima County in the Santa Cruz River (Voeltz and Bettaso 2003; Powell *et al.* 2005) and following significant floods, individuals may potentially become established in the Santa Cruz River in Pima County. They were reintroduced to Bingham Cienega Preserve in 2006, but have since been lost because that site is now dry.

Long-term monitoring of this species in Pima County and surrounding areas has occurred as a result of a number of efforts. Monitoring is undertaken throughout central and southern Arizona as part of the Central Arizona Project's nonnative species detection effort (Marsh *et al.* 2009; Clarkson *et al.* 2011; Timmons and Upton 2013). This monitoring takes place in the Cienega Creek Natural Preserve. The BLM monitors for this and other native species annually at Las Cienegas National Conservation Area (Simms *et al.* 2006). Monitoring for this and other native species has occurred annually in Aravaipa Canyon since 1970 (Eby *et al.* 2003). Finally, the species is periodically monitored at the Muleshoe Ranch (Cochise County) (Brunson *et al.* 2001; Love-Chezem et al. 2015).

B. Factors Affecting the Species' Environment in the Action Area – This species is currently not listed under the ESA and, therefore, there is no recovery plan or agency-mandated recovery

goals. This species is listed as a BLM sensitive species, so longfin dace are given some consideration on BLM-managed lands. All known habitat for this species in Pima County is under some form of protection. Although natural flood events are normal occurrences in aridland stream systems, these events can decimate local populations even if they are adapted to such events. However, loss of stream habitat through water management practices or high water consumption is still occurring and an ongoing threat. Any activities that affect water quality or quantity may impact this species. Flood control projects, dams, and drawdown of the water table may dry up drainages that support longfin dace. Most aquatic systems in the action area are also occupied by nonnative species which can prevent occupancy by longfin dace, or reduce population growth and expansion for this species.

Although we do not conduct section 7 consultations for unlisted species, the longfin dace is likely affected by the same types of actions we consult on for listed fish species. These include drainage and flood control projects, land use and management plans, species reintroduction and enhancement projects, utility infrastructure, and mining activities.

Desert Sucker

A. Status of the Species in the Action Area – This species was eliminated from the area near Tucson by 1937 and is currently extirpated from all of Pima County. There are populations upstream of Pima County in the Santa Cruz (Powell *et al.* 2005) and San Pedro rivers and following floods, individuals may potentially establish in Pima County. Although research and monitoring programs for this species are limited at this time, the large-scale monitoring AGFD does includes suckers as part of the overall fish community, as does the Bureau of Reclamation Central Arizona Project and Conservation and Mitigation Program monitoring, although not specifically targeting suckers.

B. Factors Affecting the Species' Environment in the Action Area – The same factors affecting the longfin dace as described above likely also affect the desert sucker. See that account for details related to factors affecting this species in the action area.

Sonora Sucker

A. Status of the Species in the Action Area – The species is known historically from Pima County both in the lower part of Redfield Canyon and the Santa Cruz River. Currently, no known natural populations of this species occur in Pima County. There are populations upstream of Pima County in the Santa Cruz (Powell *et al.* 2005) and San Pedro rivers and following floods, individuals may potentially establish in Pima County.

B. Factors Affecting the Species' Environment in the Action Area - The same factors affecting the longfin dace as described above likely also affect the Sonora sucker. See that account for details related to factors affecting this species in the action area.

Chiricahua Leopard Frog

A. Status of the Species in the Action Area – Populations of Chiricahua leopard frogs in Pima County primarily occur in stock tanks on the Buenos Aires National Wildlife Refuge, Sierrita Mountains, Santa Rita Mountains, and Las Cienegas National Conservation Area. Chiricahua leopard frogs are also notably extant in two streams in Pima County: Cienega Creek and Empire

Gulch on Las Cienegas National Conservation Area. Buenos Aires NWR supports the strongest metapopulation of Chiricahua leopard frogs known within the range of the species (FWS 2011). The Las Cienegas National Conservation Area also supports a very robust metapopulation of the species after recent bullfrog eradication efforts that were followed by reestablishment of Chiricahua leopard frogs in this area. To date, there are no populations of Chiricahua leopard frogs within county-owned and leased lands, although they are extant on BLM lands adjacent to Clyne Ranch (C. Crawford, pers. comm.). If frogs do not naturally disperse to Clyne Ranch in the next year, renovation of two sites on the Sands or Clyne ranches will facilitate reintroductions of the species after the MSCP is finalized.

In March 2012, the FWS designated critical habitat for the Chiricahua leopard frog in Arizona and New Mexico, of which 3,463 acres (33%) are in Pima County (FWS 2012b). There are six critical habitat units in Pima County included in the critical habitat designation: Buenos Aires National Wildlife Refuge Central Tanks (1,720 acres), Garcia Tank (<1 acre), Twin Tanks and Ox Frame Tank (<2 acres), Florida Canyon (4 acres), East Slope of the Santa Rita Mountains (186 acres), and Las Cienegas National Conservation Area (1,550 acres). Only 1 acre of critical habitat is within the permit area and it will not be impacted by covered activities. Therefore, critical habitat is geographically within the limits of the action area, but MSCP covered activities will not affect critical habitat for this species as promulgated.

B. Factors Affecting the Species' Environment in the Action Area – A recovery plan was completed for this species in 2007. The recovery plan includes 8 recovery units for the species, two of which are located in the action area (FWS 2007b). A key focus of conservation efforts in the action area has been eradication of bullfrogs on the Buenos Aires National Wildlife Refuge and Las Cienegas National Conservation Area. Other conservation efforts have included restoration of breeding habitat and reestablishment of individuals. In addition, the AGFD and the FWS developed a safe harbor agreement for the species that currently includes 3 sites within Pima County. All metapopulations of Chiricahua leopard frogs in the action area are annually monitored by the AGFD, the FWS, US Geological Survey, Bureau of Land Management, or other partners in recovery of the species.

The AGFD implements a closed season for the Chiricahua leopard frog, as well as implementing a year round, open season on bullfrogs, and set an unlimited bag and possession limit for dead bullfrogs across the entire state. The regulations will simplify efforts to pressure bullfrog populations in specific areas to favor native species.

Threats to the species in the action area include (1) lack of surface water due to human water use and drought, (2) die-offs from disease such as chytridiomycosis, and (3) predation by American bullfrogs, crayfish, and non-native fishes. First, as stated in the status of the species, there are very few natural perennial lotic habitats remaining to support the Chiricahua leopard frog, and most of the current breeding habitats for the frog within the action area are stock tanks that are highly vulnerable to drying during times of drought. Second, although chytridiomycosis is present in the action area, the frog seems to be persisting with the disease in some areas. Populations on the Buenos Aires National Wildlife Refuge have experienced periodic die-offs and frogs have bounced back on their own. A 2014 die-off from the disease was detected at many sites in the eastern Santa Rita Mountains and Las Cienega National Conservation Area,

and frogs have been detected at many of the die-off sites in 2015. Both of these metapopulations have numerous sites from which frogs can repatriate sites that experience die-offs. Finally, predation by non-native aquatic species including bullfrogs, crayfish and nonnative fish continue to be a threat to the Chiricahua leopard frog in the action area. Over the past 15 years, a tremendous amount of effort has gone into eradication bullfrogs on the Buenos Aires National Wildlife Refuge and Las Cienegas National Conservation Area. Management efforts will need to continue to keep this threat at bay.

Over the past 10 years, FWS has conducted 18 formal section 7 consultations within the action area that included anticipated adverse effects to the Chiricahua leopard frog. These consultations included nine land use/management plans, five species reintroduction or enhancement projects, two border projects, one utility infrastructure project, and one mine project.

Lowland Leopard Frog

A. Status of the Species in the Action Area – The population dynamics of the frog in the action area remains largely unknown, although the lowland leopard frog appears to have declined in Pima County over the past few decades. Hall (2013) depicts the most current status of the species in the action area and is summarized herein. The frog is currently found in the Santa Catalina Mountains, Rincon Mountains, lower San Pedro River, Cienega Creek, and Whetstone Mountains. In the Santa Catalina Mountains area, the frog is extant at five sites: upper and lower Edgar Canyon, Peck Spring, Alder Canyon, and Buehman Canyon. These sites are spring-fed and support stable populations of the frog. Frogs were found at Youtcy Spring and Ridge Line Tanks near the Oracle Mine in 2012, but have not been detected since then (D. Hall, pers. comm., 2015). There is also a small population in Romero Canyon last detected in 2014, but it is not considered a stable population. The lower San Pedro River supports a population of frogs on The Nature Conservancy's Cascabel property, and there are other populations on the San Pedro just downstream of the action area. Cienega Creek on Las Cienega National Conservation Area supports a population of frogs that has been expanding in recent years with detections as far north as "The Narrows" area. Frogs also apparently dispersed up to five miles from a drying stocktank also located on Las Cienegas NCA. In contrast, a population of frogs on lower Cienega Creek on the Cienega Creek Natural Preserve is not stable and fluctuates greatly in numbers. There are small stable populations at Chimena Canyon in the Rincon Mountains and Wakefield Canyon in the Whetstone Mountains. Saguaro National Park has an ongoing monitoring program for this species that has been conducted for approximately 20 years. The species is notably absent from Sabino Canyon, Molino Canyon, and Agua Caliente Wash in Pima County and is no longer found in the Pajarito and Atascosa Mountains in nearby Santa Cruz County.

B. Factors Affecting the Species' Environment in the Action Area – This species is currently not listed under the ESA and, therefore, there is no recovery plan or agency-mandated recovery goals. This species is listed as a Forest Service sensitive species, so lowland leopard frogs are given some consideration on FS-managed lands. The AGFD implements a closed season for the lowland leopard frog, as well as implementing a year round, open season on bullfrogs, and set an unlimited bag and possession limit for dead bullfrogs across the entire state. The regulations will simplify efforts to pressure bullfrog populations in specific areas to favor native species. Most of the areas known to be currently occupied by this species are under management by a variety of

land management agencies and their various regulations may provide some positive support for conservation of this species.

Urbanization and associated water loss, nonnative predators, post-wildfire siltation, drought and disease have likely resulted decline of the species in Pima County (Ratzlaff 2012, Rosen and Funicelli 2009, Rosen and Schwalbe 2002, Savage et al. 2011, Sredl *et al.* 1997b, Swann and Wallace 2008). Water drawdown has decreased habitat in previously perennial waters in the action area including the Santa Cruz River, Rillito River, and Canada del Oro. Nonnative predators, including bullfrogs and spiny-rayed fish, were major factors in the decline of the lowland leopard frog in the region in the past two decades. Green sunfish are now absent from a number of sites currently occupied by the species in the Catalina and Rincon mountains and bullfrogs are now absent from Las Cienegas National Conservation Area. Disease has likely affected populations of lowland leopard frogs. This species may also be the more tolerant of non-native predators than the Chiricahua leopard frog because it can live and breed in relatively shallow, flowing water that is marginal or unsuitable for bullfrogs and introduced fishes. Hall (2013) infers that exotic disease may have contributed to the extirpation of frogs in Sabino Canyon (Lazaroff et al. 2006) and in Tanque Verde Canyon (Ratzlaff 2011; Savage et al. 2011). Wildfire has likely affected the distribution of the species in the action area. In Romero Canyon in the Santa Catalina Mountains, lowland leopard frogs and their habitat were severely reduced due to runoff and sedimentation following the Aspen Fire in 2003. Loss of occupied habitat also occurred in Montrose Canyon due to other catastrophic fires in the past decade (Hall and Steidl 2007). At Saguaro National Park East, similar loss of lowland leopard frog habitat has also occurred due to post-fire sedimentation and ash flow (Swann and Wallace 2008). Regarding drought, Hall (2013) states that drought has caused extirpation of the species in Cargodera Canyon and Buckhorn Spring, which are likely unrecoverable.

Northern Mexican Gartersnake

A. Status of the Species in the Action Area – In our final rule to list the northern Mexican gartersnake, Appendix A is a table giving specific details related to our current understanding of the status of the northern Mexican gartersnake throughout the U.S. This appendix is found on our website at: http//:www.fws.gov/arizonaes, under the Document Library; Documents by Species; Reptiles/Amphibians; Northern Mexican Gartersnake, and is included herein by reference. See that appendix for specific information related to status of this species in drainages within the action area. The following is a brief summary of those areas:

Las Cienegas National Conservation Area and Cienega Creek Natural Preserve—Several records for the northern Mexican gartersnake in the Las Cienegas National Conservation Area and Cienega Creek Natural Preserve have been documented in the literature, predominantly from Cienega Creek, the first dating to 1986 (Rosen and Schwalbe 1988). Cienega Creek maintains perennial surface flow in two reaches; from its headwaters to just downstream of "the Narrows;" and from the confluence with Mescal Wash to just downstream of the Colossal Cave Road crossing in Vail, Arizona. The upper portion of the creek has historically been occupied by bullfrogs, but continues to support a native fish community, as well as both Chiricahua and lowland leopard frogs (Rosen *et al.* 2001). The lower perennial portion of Cienega Creek runs through Pima County's 3,979 ac (1,610 ha) Cienega Creek Natural Preserve for approximately 12 river miles (19.3 km). This reach supports a native fish community (Timmons *et al*. 2013),

including Gila chub and longfin dace as well as lowland leopard frogs (Caldwell 2014), although there is a persistent threat of bullfrog invasion from a nearby house pond that continues to contribute immigrant bullfrogs to Cienega Creek. Despite this source, bullfrog numbers have remained somewhat low in recent years (Caldwell 2012, pers. comm.). In addition to Cienega Creek, the Las Cienegas National Conservation Area supports several tanks, springs, and wetlands that provide physically suitable northern Mexican gartersnake habitat and that may be used by northern Mexican gartersnakes sporadically as they emigrate from Cienega Creek and explore new foraging opportunities in the area. According to GIS analysis, Mattie Canyon, a tributary of Cienega Creek also supports suitable northern Mexican gartersnake habitat, as a well as a native prey base.

As a recovery cooperator, the Arizona –Sonora Desert Museum (ASDM) has been successfully propagating northern Mexican gartersnakes in captivity since 2011 and releases of captively-bred snakes occurred in 2012, 2014, and 2015. Although no follow-up surveys have been conducted in areas where the releases occurred, there have been no recaptures reported thus far. Regardless, conservation and recovery efforts for native aquatic species in this area have reduced the influence of harmful nonnative species and provide a net-positive effect on the areas aquatic communities. Recent records and recovery efforts confirm the northern Mexican gartersnake still exists in within Cienega Creek and surrounding lands, but likely as a low density population that appears to also still be in decline.

Lower Santa Cruz River—Numerous historical records dating to the 1890s document the northern Mexican gartersnake from the lower Santa Cruz River (downstream of the International Border) and (possibly) several tributaries in the Tucson area (Rillito River, Sabino Canyon, Tanque Verde Creek, Pantano Wash) labeled as "Tucson" (Rosen and Schwalbe 1988; Holycross *et al*. 2006). Significant reaches, and in some cases the entire length, of these streams in the Tucson area no longer have reliable surface flow and are largely ephemeral. The Santa Cruz River headwaters are located in the San Rafael Valley where the river flows south into Mexico, bends to the west, and then flows due north, back into the United States just east of Nogales, Arizona. There are no obvious barriers to northern Mexican gartersnake movement along its course from the San Rafael Valley to the International Border and downstream of there. Rosen and Schwalbe (1988) performed northern Mexican gartersnake surveys of the lower Santa Cruz on three different days spanning the years of 1985 and 1986; no northern Mexican gartersnakes were found, but bullfrogs were noted as "super abundant." Abbate *et al.* (2007) spent 90 person-search hours and approximately 935 trap-hours surveying for northern Mexican gartersnakes along the lower Santa Cruz River from the Trico-Marana Road Bridge downstream to the Arizona Army National Guard Training facility, but no northern Mexican gartersnakes were detected. We consider the northern Mexican gartersnake as likely extirpated in the lower Santa Cruz River, downstream of the International Border.

Buenos Aires National Wildlife Refuge—Historical records from 1970 and 2000, document the persistence of the northern Mexican gartersnake at the Arivaca Cienega on the Buenos Aires National Wildlife Refuge (BANWR). A June 13, 1985, survey failed to detect the subspecies there, but noted that bullfrogs were "extremely abundant" at this location (Rosen and Schwalbe 1988). A significant survey effort consisting of trapping and visual searches occurred at the Arivaca Cienega in both 1993 and 2000 (the last surveys that we know of in the area) which

confirmed bullfrogs remained abundant (Rosen *et al.* 2001). The presence of dense cover probably helps any remaining northern Mexican gartersnakes to avoid predation. Arivaca Cienega is found within the eastern-most portion of the BANWR and, in terms of northern Mexican gartersnake movement, Arivaca Cienega is connected, via Arivaca Creek and nearby associated drainages, to the larger, more contiguous block of BANWR lands and associated wetlands in the Altar Valley to the west. In recent years, there has been a concerted management effort on the BANWR to recover the Chiricahua leopard frog in an array of tanks (known as the "central tanks" which include Carpenter, Rock, State, Triangle, New Round Hill, Banado, Choffo, Barrel Cactus, Sufrido, Hito, Morley, McKay, and Chongo Tanks) and their associated drainages, all of which have been designated as critical habitat for the Chiricahua leopard frog. As a result, it is likely that any northern Mexican gartersnakes that successfully immigrate into the central tanks area of the BANWR have an increased chance of persistence because of improved available habitat and a stable prey base in an area that is likely free of nonnative predators. However, Arivaca Lake, associated with Arivaca Creek and Arivaca Cienega, is a naturally reproducing warm water fishery consisting of harmful nonnative species including largemouth bass, channel catfish, bluegill, and redear sunfish (FWS 2011). When the lake spills, these species may influence other aquatic habitats, on- or off-Refuge in the area. Slightly off-refuge to the west, a single record for a northern Mexican gartersnake was reported by an AGFD amphibian biologist from 2001 in a stock tank in Los Encinos Wash in the Pozo Verde Mountains (Tonn 2013, pers. comm.) indicates the subspecies may occur in low densities, outside of the Refuge boundary. Based on historical and recent records, and the abundance of available habitat in the vicinity of the most recent record, we consider the northern Mexican gartersnake to be extant as a low density population on the BANWR, which may remain depressed as a result of negative interactions with a regional harmful nonnative species community.

Critical habitat for the northern Mexican gartersnake was proposed on July 10, 2013, with approximately 157,000 acres in Pima County. Final designation is still pending. In the proposed critical habitat, three areas of Pima County are included: (1) Buenos Aires National Wildlife Refuge in the Altar Valley, (2) Cienega Creek, and (3) San Pedro River. The area of the Cienega Creek Natural Preserve is being proposed for exclusion from the critical habitat designation.

B. Factors Affecting the Species' Environment in the Action Area - The northern Mexican gartersnake likely occurs as isolated populations that were historically connected both hydrologically and genetically. Now the northern Mexican gartersnake may occur as a more traditional metapopulation within the action area. The conditions that would foster maintenance of local populations and connectivity between them them have been eliminated as a result of harmful nonnative species and human activities on the local landscape. Artificial maintenance of local populations and gene flow may be necessary.

The continued presence of harmful nonnative species and the effect of groundwater pumping on connected surface water are the dominate factors affecting the species' status in Pima County. Other activities occurring in the action area which potentially affect the northern Mexican gartersnake and its habitat include border activities, utility infrastructure development, and mining activities. This species has only been listed under the ESA for approximately one year, but we have conducted five formal section 7 consultations for this species within the action area.

These consultations included one land use plan, one species reintroduction and enhancement, one border project, one utility infrastructure project, and one mine project.

Riparian Species

Yellow-Billed Cuckoo

A. Status of the Species in the Action Area – The yellow-billed cuckoo has been extirpated from many lower elevation localities, including much of the Santa Cruz River in Pima County (Corman and Magill 2000). The yellow-billed cuckoo currently breeds in Pima County in cottonwood/willow forests, mesquite woodlands, drainages in Madrean Evergreen woodlands, and along vegetated tree and shrub-lined ephemeral washes. Suitable habitat in Pima County may contain one or more tree species including cottonwood, willow, mesquite, hackberry, sycamore, ash, alder, walnut, oak, acacia, mimosa (*Mimosa dysocarpa*), Mexican elder berry (*Sambucus Mexicana*), and juniper (*Juniperus* spp.). Within Pima County, cuckoos have been found during the breeding season in Cienega Creek (from Empire Ranch downstream to Cienega Creek Natural Preserve); Arivaca Creek; Penitas Wash; Arivaca Lake and tributaries in the Pajarito/Atascosa Mountains; Florida Canyon, lower Madera Canyon, and Box, Barrel, and McCleary canyons in the Santa Rita Mountains; a few sites in the Catalina Mountains; Santa Cruz River; Tanque Verde Wash; Buehman Canyon; lower San Pedro River; and several sites in the Altar Valley (Corman and Magill 2000; AGFD 2003b, AGFD 2015,Tucson Audubon 2015, Cornell Lab of Ornithology 2015, Westland Resources, Inc. 2015a, 2015c) including confirmed nesting in Brown Canyon in the Baboquivari Mountains (B. Powell, *unpublished data*).

Within Pima County, yellow-billed cuckoos have also been recorded in the pecan groves in Green Valley and Sahuarita (Kingsley 1989). They have been recorded as rare transients in the Rincon Mountain District of Saguaro National Park, but no breeding has been reported in Rincon Creek, the most likely habitat for the species in the park (Powell 2004, 2006). Recent unconfirmed breeding in eastern Pima County includes along the Santa Cruz River north of Tucson in 2005 (Crawford 2005) and along Tanque Verde Creek in 2002 (Sage Landscape Architecture and Environmental Inc 2003). In Pima County-owned and managed lands, the yellow-billed cuckoo has been recently observed at the Cienega Creek Natural Preserve and Buehman Canyon. A high density of nesting pairs were found along the Santa Cruz River in adjacent Santa Cruz County in 2000 (Powell 2000) and again in 2009 (Krebbs and Moss 2009).

We also identified potential cuckoo habitat in arid ephemeral and intermittent reaches containing large mesquite, oak, and other tree species within Pima County. Cuckoo habitat may be present in oak and mesquite lined xeroriparian Class A or B level drainages (http://webcms.pima.gov/cms/one.aspx?portalId=169&pageId=68928). These reaches are downstream from mountain drainages that may contribute flow during the monsoon season, thus enhancing cuckoo habitat. An additional 66 acres of possible cuckoo habitat projected to be impacted due to covered activities occur in drainages north of E. Old Spanish Trail, east of Pantano Wash, west of Camino Loma Alta, and south of Saguaro National Park East (Pima County, unpubl. data). However, these more upland drainages are likely less suitable for cuckoos than much of the riparian habitat identified as cuckoo habitat in Pima County and it is unknown whether cuckoos would occupy these areas. General bird surveys conducted in these drainages in the past resulted in no cuckoo detections (B. Powell, pers. comm. 2015), but these

surveys ended in early July, prior to when some breeding season cuckoos may have arrived. Cuckoo-specific surveys using cuckoo-playback vocalizations and survey protocol (Halterman et al. 2015) have not been conducted.

We considered two other modeled impact areas identified in Figure 3.2 of the MSCP, but upon further exploration of habitat and hydrological conditions we eliminated two of the areas because trees were too small or tree coverage was too sparse and because they contained no Class A or B drainages. In addition, because most of these smaller drainages do not connect to a major drainage, surface flow from upstream would be unlikely to contribute water during the monsoon season. Projected covered impact areas considered, but eliminated as cuckoo habitat were:

- Corona de Tucson. South of I-10, in the foothills of the Santa Rita Mountains, south of Sahuarita Road, east of Kolb Road, west of S Wentworth Road, north of Forest Service lands. Tree cover is sparse, no A or B level drainages are present, and cuckoo habitat is unlikely to develop.
- West of Oracle Road (Highway 77), south of the northern boundary of Pima County, east of the Tortolito Mountains, north of Honey Bee Canyon. Trees are small, habitat is dry, soil is sandy, no A or B level drainages are present, and cuckoo habitat is unlikely to develop. Drainages in this area do not connect to larger drainages that would contribute flow during the monsoon season.

Monitoring is ongoing along the San Pedro River at the San Pedro River Conservation Area. The National Park Service hopes to conduct periodic monitoring at the Tumacacori National Historical Park to follow up on the work of Powell (2000) and Krebbs and Moss (2009).

Three areas in Pima County are included in the proposed designation of critical habitat for the yellow-billed cuckoo: San Pedro River, Cienega Creek, and Arivaca Cienega and adjacent areas in the Buenos Aires National Wildlife Refuge. Notwithstanding the proposed exclusion of County mitigation lands from the final rule, Pima County current owns or leases approximately 2,000 acres of proposed yellow-billed cuckoo critical habitat as potential mitigation within the MSCP.

B. Factors Affecting the Species' Environment in the Action Area – In addition to the protections of the ESA, this species is also protected under the Migratory Bird Treaty Act. The Migratory Bird Treaty Act makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird, including feathers, parts, nests, or eggs. Violations of the Migratory Bird Treaty Act are considered criminal offenses and can result in significant fines and imprisonment. Pima County has a floodplain ordinance that prevents some destruction of habitat for this species. The Federal Clean Water Act, in its Section 404, may also protect some of the habitat of this species.

The primary threat to yellow-billed cuckoo habitat is the degradation and fragmentation of riparian woodlands, specifically mature cottonwood-willow riparian habitat, and failure of these to regenerate because of flood management practices. Threats to remaining populations in central and southern Arizona are stated as: degradation and loss of riparian habitat from vegetation clearing, stream diversion, water management, agriculture, urbanization, overgrazing,

and recreation (FWS 2014a, 2014b). Depletion of groundwater has dried many riparian areas and resulted in the loss of riparian vegetation.

This species has only been listed under the ESA since November, 2014, but we have conducted four formal section 7 consultations for this species within the action area. These consultations included one border project, two utility infrastructure projects, and one mine project.

Southwestern Willow Flycatcher

A. Status of the Species in the Action Area – Surveys and monitoring studies have been done under the coordination of the AGFD and FWS since 1993. However, no long-term monitoring is taking place in Pima County, but considerable effort is focused on the confluence of the San Pedro and Gila rivers in adjacent Pinal County (Ellis *et al.* 2008). The southwestern willow flycatcher has been documented breeding at Redington, along the San Pedro in Pima County in 1998 (AGFD 2002c). It has also been documented as a breeder along Upper Cienega Creek in Pima County, although only sporadic records exist (Finch and Stoleson 2000). In Pima County, surveys along the Santa Cruz River in recent years have been limited, essentially looking only in the area around the Ina Road bridge and the County's wastewater treatment plants. No breeding individuals have been found (Scott Wilbor, in personal communication to the Town of Marana, 2009). For Pima County-owned and managed lands, the southwestern willow flycatcher has not been found during recent surveys at the Cienega Creek Natural Preserve in 2008, 2010 (Rodden 2010), or 2014 (Brian Powell and Susan Sferra, *unpublished data*).

The final designation of critical habitat occurred in January 2013 (78 FR 344). Critical habitat for the willow flycatcher occurs primarily in northeastern Pima County along the San Pedro River. This segment occurs between much larger segments of critical habitat located upstream (Cochise County) and downstream (Pinal County). However, critical habitat is also on the Santa Cruz River (Santa Cruz County) and Cienega Creek (Pima County) based upon the strategy in the 2013 revision to identify important areas of conservation needed for recovery. Critical habitat was proposed in each management unit believed important to reach recovery goals. The Santa Cruz Management Unit has a goal of 25 territories and to double the habitat, and have associated conservation plans to maintain habitat into the future.

B. Factors Affecting the Species' Environment in the Action Area – In addition to the protections of the ESA, this subspecies is also protected under the Migratory Bird Treaty Act. The Migratory Bird Treaty Act makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird, including feathers, parts, nests, or eggs. Violations of the Migratory Bird Treaty Act are considered criminal offenses and can result in significant fines and imprisonment. Pima County has a floodplain ordinance that prevents some destruction of habitat for this subspecies. The Federal Clean Water Act, in its Section 404, may also protect some of the habitat of this subspecies.

The primary threat to southwestern willow flycatcher habitat is the degradation and fragmentation of riparian woodlands, specifically dense willow and other shrubby riparian habitat, and failure of these to regenerate because of water management practices. These water management practices result in threats to remaining populations in central and southern Arizona and include: stream diversion, dams, levees, flood control, degradation and loss of riparian

habitat from vegetation clearing, agriculture, urbanization, overgrazing, and recreation (FWS 2014c; AGFD 2002c). Depletion of groundwater has dried many riparian areas and resulted in the loss of riparian vegetation.

Because the areas within Pima County that are designated as southwestern willow flycatcher critical habitat primarily occur under ownership outside of Pima County's jurisdiction and are areas primarily managed for the conservation and enhancement of riparian systems, there are no projected direct or indirect impacts on the species' critical habitat as a result of the covered activities.

Over the past 10 years, FWS has conducted 12 formal section 7 consultations within the action area that included anticipated adverse effects to the southwestern willow flycatcher. These consultations included nine land use/management plans, two utility infrastructure projects, and one mine project.

Abert's Towhee

A. Status of the Species in the Action Area – In Pima County, Abert's towhees are common along brushy washes and the effluent-dominated portion of the Santa Cruz River, and they may be present in urban backyards, especially those that are along washes. It is common along many of the major washes and rivers of eastern Pima County including the Santa Cruz River, Brawley Wash, Rillito River, Pantano Wash; and Rincon, Cienega, and Arivaca creeks (Tweit and Tweit 1986; Powell 2004; Corman and Wise-Gervais 2005; Powell 2006; Tucson Bird Count 2012). In Pima County-owned and managed lands, the Abert's towhee has been observed at the A7 Ranch, Cienega Creek Natural Preserve, Colossal Cave Mountain Park, Tucson Mountain Park, Santa Cruz River parcels, Canoa Ranch, and Sopori Ranch.

B. Factors Affecting the Species' Environment in the Action Area – The Abert's towhee is protected under the Migratory Bird Treaty Act. The Migratory Bird Treaty Act makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird, including feathers, parts, nests, or eggs. Violations of the Migratory Bird Treaty Act are considered criminal offenses and can result in significant fines and imprisonment. Pima County has a floodplain ordinance that prevents some destruction of habitat for this species. The Federal Clean Water Act, in its Section 404, may also protect some of the habitat of this species.

The primary threat to Abert's towhee in the action area is the degradation and fragmentation of riparian woodlands, specifically dense, shrubby riparian habitat, and failure of these to regenerate because of flood management practices. Similar to yellow-billed cuckoo, threats to remaining populations in central and southern Arizona are stated as: degradation and loss of riparian habitat from vegetation clearing, stream diversion, water management, agriculture, urbanization, overgrazing, and recreation (AGFD 2002b). Depletion of groundwater has dried many riparian areas and resulted in the loss of riparian vegetation.

Although not protected under the ESA, factors affecting the Abert's towhee in the action area are likely to be very similar to those affecting the southwestern willow flycatcher. Refer to that species' discussion for information related to those factors and actions that have occurred in the action area that also likely affect the Abert's towhee.

Arizona Bell's Vireo

A. Status of the Species in the Action Area – In Pima County, locations for the Arizona Bell's vireo include the foothills of the Santa Catalina, Rincon, Santa Rita, and Baboquivari mountains (Lloyd *et al.* 1998; Powell and Steidl 2000; AGFD 2002d; Powell and Steidl 2002; Corman and Wise-Gervais 2005; Powell 2006; Tucson Bird Count 2012); large rivers, creeks, and washes of eastern Pima County including the Santa Cruz River, Rillito River, Pantano and Brawley washes, and Rincon and Cienega creeks (Mills *et al.* 1989; Powell 2004; Kirkpatrick *et al.* 2007; Tucson Bird Count 2012). In western Pima County, they nest in xeroriparian washes such as at the Organ Pipe Cactus National Monument and Barry M. Goldwater Range (Groschupf *et al.* 1988; AGFD 2002d; Hardy *et al.* 2004; Organ Pipe Cactus National Monument 2006; Schmidt *et al.* 2007). In Pima County-owned and managed lands, the Arizona Bell's vireo has been observed at most properties with natural open space and xeroriparian vegetation, excluding properties in the upper Cienega Valley and at the Oracle Ridge property.

B. Factors Affecting the Species' Environment in the Action Area - The Arizona Bell's vireo is protected under the Migratory Bird Treaty Act. The Migratory Bird Treaty Act makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird, including feathers, parts, nests, or eggs. Violations of the Migratory Bird Treaty Act are considered criminal offenses and can result in significant fines and imprisonment. Pima County has a floodplain ordinance that prevents some destruction of habitat for this species. The Federal Clean Water Act, in its Section 404, may also protect some of the habitat of this species.

The primary threat to Arizona Bell's vireo in the action area is the degradation and fragmentation of riparian woodlands, including both xeroriparian and mesoriparian communities, and failure of these to regenerate because of flood management practices. Threats to remaining populations in central and southern Arizona, including the action area are stated as: degradation and loss of riparian habitat from vegetation clearing, stream diversion, water management, agriculture, urbanization, overgrazing, and recreation (AGFD 2002d). Depletion of groundwater has dried many riparian areas and resulted in the loss of riparian vegetation.

Although not protected under the ESA, factors affecting the Arizona Bell's vireo in the action area are likely to be very similar to those affecting the southwestern willow flycatcher. Refer to that species' discussion for information related to those factors and actions that have occurred in the action area that also likely affect the Arizona Bell's vireo.

Western Red Bat

A. Status of the Species in the Action Area – It is presumed to be found throughout Pima County, including the Santa Rita Experimental Range, Empire Gulch, SE of the Baboquivari Mountains, Santa Catalina Mountains including Sabino Canyon, Buenos Aires National Wildlife Refuge (AGFD 2003c), Rincon Creek (Swann and Powell 2006), and Colossal Cave Mountain Park. As of 2003, there have been <20 documented occurrences of the bat in Pima County (AGFD 2003a). There have been no confirmed observations of western red bats on County-owned and managed properties, although they are likely to be found at the Cienega Creek Natural Preserve and other sites with large cottonwood and willow trees.

B. Factors Affecting the Species' Environment in the Action Area - No protective measures are known to currently exist specifically for this species except that all bats are protected by State wildlife regulations against direct taking. Pima County has a floodplain ordinance that prevents, minimizes or mitigates some destruction of habitat for this species. The Federal Clean Water Act, in its Section 404, may also protect some of the habitat of this species.

The primary threat to the western red bat is the degradation and fragmentation of riparian woodlands, specifically mature cottonwood-willow riparian habitat, and failure of these to regenerate because of flood management practices. Threats to remaining populations in central and southern Arizona are stated as: degradation and loss of riparian habitat from vegetation clearing, stream diversion, water management, agriculture, urbanization, overgrazing, and recreation (AGFD 2003c). Depletion of groundwater has dried many riparian areas and resulted in the loss of riparian vegetation.

Although not protected under the ESA, factors affecting the western red bat in the action area are likely to be very similar to those affecting the yellow-billed cuckoo as described above. Refer to that species' discussion for information related to those factors and actions that have occurred in the action area that also likely affect the western red bat.

Western Yellow Bat

A. Status of the Species in the Action Area – Within the action area, the western yellow bat has been found in recent years in Sasabe, Sabino Canyon, and the Galiuro Mountains (Graham County). The species is said to be encountered by tree trimmers in urban Tucson. There have been no confirmed observations of western yellow bats on County-owned and managed properties, though they are likely to be found at the Cienega Creek Natural Preserve and other sites with large cottonwood and willow trees.

Population trends are not known, although records of this species appear to be increasing (Noel and Johnson 1993; Fahey 1997), however, this may be a result of better observation and reporting. It is also possible that this species has declined along the Santa Cruz River and Rillito Wash as a result of historic loss of riparian woodland, and that the population has shifted to palm trees in the absence of riparian deciduous trees.

B. Factors Affecting the Species' Environment in the Action Area - No protective measures are known to currently exist specifically for this species except that all bats are protected by State wildlife regulations against direct taking. Pima County has a floodplain ordinance that prevents, minimizes or mitigates some destruction of habitat for this species. The Federal Clean Water Act, in its Section 404, may also protect some of the habitat of this species.

The primary threat to the western yellow bat is the degradation and fragmentation of riparian woodlands, specifically mature cottonwood-willow riparian habitat, and failure of these to regenerate because of flood management practices. Threats to remaining populations in central and southern Arizona are stated as: degradation and loss of riparian habitat from vegetation clearing, stream diversion, water management, agriculture, urbanization, overgrazing, and recreation (AGFD 2002b). Depletion of groundwater has dried many riparian areas and resulted in the loss of riparian vegetation. In urban areas in particular, the ongoing maintenance of

landscaping palms for aesthetics and fire prevention is an ongoing threat to potential roosting sites.

Although not protected under the ESA, factors affecting the western yellow bat in the action area are likely to be very similar to those affecting the yellow-billed cuckoo as described above, at least with regard to their relationship with mesic riparian vegetation communities. Refer to that species' discussion for information related to those factors and actions that have occurred in the action area that also likely affect the western red bat.

Merriam's Mouse

A. Status of the Species in the Action Area – Most areas where Merriam's mice were historically present within the action area have been altered; recent records are lacking so it is unknown whether the species persists in these areas. These areas include the Santa Cruz River area (San Xavier) before the bosques were removed in the early part of the twentieth century for firewood (Phillips *et al.* 1964), and at Wilmot Station southeast of Tucson where they were formerly taken in large numbers (BISON 2008d). It now occurs in isolated pockets throughout the County, including at Organ Pipe Cactus National Monument (Petryszyn and Russ 1996) and in a number of sites in eastern Pima County including the Tucson Mountains, Cienega Creek, the northwest foothills of the Santa Rita Mountains, and the Altar Valley (Kingsley 2006). Hoffmeister (1986) reports the species from historical Ft. Lowell, Sabino Canyon, Baboquivari Mountains, and near Arivaca. There have been no confirmed observations of Merriam's mouse on County-owned and managed properties, though they are likely to be found at the Cienega Creek Natural Preserve and Canoa Ranch, and other sites with mesquite trees.

B. Factors Affecting the Species' Environment in the Action Area – The Merriam's mouse is potentially impacted when channelization or other alteration/destruction occurs along both permanent and intermittent riparian areas, including adjacent desertscrub. The loss of mesquite stands due to cutting for firewood, and grazing by livestock is a concern in the continued existence of proper habitat for *P. merriami* (BISON 2000).

The primary threat to Merriam's mouse in the action area is the degradation and fragmentation of riparian woodlands, specifically mesquite and other woodland riparian habitat, and failure of these to regenerate because of flood management practices. Threats to remaining populations in central and southern Arizona are stated as: degradation and loss of riparian habitat from vegetation clearing, stream diversion, water management, agriculture, urbanization, overgrazing, and recreation (AGFD 2001g). Depletion of groundwater has dried many riparian areas and resulted in the loss of riparian vegetation.

Although not protected under the ESA, factors affecting the Merriam's mouse in the action area are likely to be very similar to those affecting other riparian species such as the southwestern willow flycatcher and yellow-billed cuckoo. Refer to those species' discussions for information related to those factors and actions that have occurred in the action area that also likely affect the Merriam's mouse.

Giant Spotted Whiptail

A. Status of the Species in the Action Area – In Pima County, the giant spotted whiptail currently occurs in the foothills of the Santa Catalina, Rincon, San Luis, Baboquivari and Santa Rita mountains; and along the West Branch of the Santa Cruz River, Arivaca Creek, and Empire Gulch (AGFD 2001a; Edwards and Swann 2003; Flesch *et al.* 2006; Rosen 2008c). Within Pima County-owned and leased lands, the species has been confirmed at Canoa Ranch and along Santa Cruz River parcels, though it is probably more widespread. Rosen *et al.* (2002) concluded that populations in montane canyons were faring well, but that the few valley bottom populations were not.

B. Factors Affecting the Species' Environment in the Action Area - Because this species is often found in thickets, including riparian bottomlands, it is susceptible to direct or indirect effects from fire, livestock grazing, groundwater pumping, and other processes and human impacts that reduce vegetation density in those thickets. Direct loss of individuals by collecting (probably very limited), and loss of habitat resulting from all factors that cause degradation of riparian habitat are primary threat mechanisms.

Although not protected under the ESA, factors affecting the giant spotted whiptail in the action area are likely to be very similar to those affecting other riparian species such as the southwestern willow flycatcher and yellow-billed cuckoo. Refer to those species' discussions for information related to those factors and actions that have occurred in the action area that also likely affect the giant spotted whiptail.

<u>Upland Species</u>

Pima Pineapple Cactus

A. Status of the Species in the Action Area – Because of the lack of information related to the specific habitat requirement of the Pima pineapple cactus, considerable habitat for this species appears to exist in Pima and Santa Cruz counties, but occupancy of this apparently suitable habitat has not been documented. The Pima pineapple cactus occurs at low densities, widely scattered, sometimes in clumps, across the valley bottoms and bajadas. The species can be difficult to detect, especially in dense grass cover. For this reason, systematic surveys are expensive and have not been conducted extensively throughout the range of the Pima pineapple cactus. As a result, location information has been gathered opportunistically, either through small systematic surveys, usually associated with specific development projects, or larger surveys that are typically only conducted in areas that seem highly suited for the species. Furthermore, our knowledge of the distribution and status of this species is gathered primarily through the section 7 process; and we only see projects that require a Federal permit or have Federal funding. There are many projects that occur within the range of Pima pineapple cactus that do not undergo section 7 consultation, and we have no information regarding the status or loss of plants or habitat associated with those projects. For these reasons, it is difficult to address abundance and population trends for this species.

Pima County encompasses the majority of this variety's known range. There are individuals in the Vail area and just south of Interstate 10 and west of Highway 83, north of Mt. Fagan. The Pima pineapple cactus has been confirmed on a number of County owned and managed

properties in the Altar (Madera Highlands, Diamond Bell Ranch, King 98 Ranch, Marley Ranch, and Rancho Seco) and Santa Cruz (Bar-V Ranch, Canoa Ranch, Southeast Regional Park, and Elephant Head) valleys.

B. Factors Affecting the Species' Environment in the Action Area - There is some evidence that threats to this species likely include direct loss of individuals, loss or degradation of habitat by trampling or grazing by livestock, recreation, and agricultural or land development; illegal collection; competition with nonnative plants; changing fire regime; climate change and drought; and predation and damage by insects and rodents. However, many of these threats have not been studied and the only threat that has been clearly documented to impact this species is direct disturbance of land with individuals on it. Lack of one of the important pollinators for this species, a ground-nesting bee (*Diadasia rinconis*) may limit the distribution of the cactus (McDonald 2005).

Through 2010, section 7 consultations on development projects (e.g., residential and commercial development, mining, infrastructure improvement) considered 2,680 Pima pineapple cactus plants found on approximately 15,192 acres within the range of the Pima pineapple cactus. Of the total number of plants, 1,985 Pima pineapple cacti (74 percent) were destroyed, removed, or transplanted as a result of development, mining, and infrastructure projects. In terms of Pima pineapple cactus habitat, some of the 15,192 acres likely did not provide Pima pineapple cactus habitat, but that amount is difficult to quantify because Pima pineapple cactus habitat was not consistently delineated in every consultation. Of the 15,192 acres, however, we are aware that 14,545 acres (96 percent) have been either permanently or temporarily impacted.

Through section 7 consultation on non-development-related projects (e.g., fire management plans, grazing, buffelgrass control), we are aware of an additional 781 plants within an unknown number of acres; we do not know the number of acres because these types of projects are often surveyed for Pima pineapple cactus inconsistently, if at all. Across the entire Pima pineapple cactus range, it is difficult to quantify the total number of Pima pineapple cactus lost and the rate and amount of habitat loss for three reasons: 1) we review only a small portion of projects within the range of Pima pineapple cactus (only those that have Federal involvement and are subject to section 7 consultation), 2) development that takes place without any jurisdictional oversight is not tracked within Pima and Santa Cruz counties, and 3) many areas within the range of the Pima pineapple cactus have not been surveyed; therefore, we do not know how many plants exist or how much habitat is presently available.

Pima County regulates the loss of native plant material associated with ground-disturbing activities through their Native Plant Protection Ordinance (NPPO) (Pima County 1998). The NPPO requires inventory of the site and protection and mitigation of certain plant species slated for destruction by the following method: the designation of a minimum of 30 percent of on-site, permanently protected open space with preservation in place or transplanting of certain native plant species from the site. There are various tables that determine the mitigation ratio for different native plant species (e.g. saguaros, ironwood trees, Pima pineapple cacti) with the result that mitigation may occur at a 1:1 or 2:1 replacement ratio. Mitigation requirements are met through the development of preservation plans.

Other specific threats that have been previously documented (FWS 1993), such as overgrazing, illegal collection, prescribed fire, and mining, climate change and drought, and predation by insects and rodents have not yet been analyzed to determine the extent of effects to this species. However, limited, anecdotal information exists identifying these threats. Overgrazing by livestock, illegal collection, and fire-related interactions involving exotic Lehmann lovegrass and buffelgrass may negatively affect the Pima pineapple cactus population. Mining has resulted in the loss of hundreds, if not thousands, of acres of potential habitat throughout the range of the plant. Much of the mining activity has been occurring in the Green Valley area, which is the center of the plant's distribution and the area known to support the highest densities of pineapple cactus.

There have been some notable conservation developments for this species. Currently, there are two conservation banks for Pima pineapple cactus, one on a private ranch in the Altar Valley (Palo Alto Ranch Conservation Bank) and another owned by Pima County that includes areas in both the Altar Valley and south of Green Valley.

Over the past 10 years, FWS has conducted 38 formal section 7 consultations within the action area that included anticipated adverse effects to the Pima pineapple cactus. These consultations included seven development projects, one drainage/flood control project, seventeen land use plans, two border infrastructure projects, five utility infrastructure projects, two mine projects, and four road projects.

Needle-Spined Pineapple Cactus

A. Status of the Species in the Action Area – Pima County encompasses much of the known range for this variety. All of the known locations within the action area occur in the eastern portion of the county. The needle-spined pineapple cactus has been confirmed on a number of County-owned and managed properties near Vail, including the Bar-V, A-7, MDiamond, and Six Bar ranches, Cienega Creek Natural Preserve, and Colossal Cave Mountain Park.

B. Factors Affecting the Species' Environment in the Action Area – Portions of the range of the needle-spined pineapple cactus in the action area have been affected by agricultural, urban, and mining activities. Areas within the remaining range of this species are subject to potential development and a variety of other land uses including grazing and other forms of agriculture, and recreational use. Known populations are distributed near disturbed areas; one population is divided by Interstate 10. It is reasonable to conclude that some portion of this species' range is likely to be lost as a result of various land use activities. However, the species is distributed over a fairly large area of undeveloped or minimally developed land and, because the specific habitat requirements are essentially unknown, it is difficult to determine habitat and population trends for this species with any accuracy. Probably the most pressing management need related to the conservation of the needle-spined pineapple cactus is the acquisition of more information about the species. In particular, additional survey work is needed, as well as demographic studies, to help better define the range of this taxon and to better understand if current populations are stable.

Although not protected under the ESA and occurring in somewhat different habitat, factors affecting the needle-spined pineapple cactus in the action area are likely to be very similar to

those affecting the Pima pineapple cactus. Refer to that species' discussion for information related to those factors and actions that have occurred in the action area that also likely affect the needle-spined pineapple cactus.

Tumamoc Globeberry

A. Status of the Species in the Action Area – Large areas that are known to be within the species' range and that are known to have the species present are under management control of a variety of government agencies. Some preserves (e.g., Bureau of Reclamation CAP preserve) have been created and surrounded with fences to keep out javelina. Many plants were transplanted from the CAP right of way, placed in preserves, and monitored for a number of years (Reichenbacher and Perrill 1991). Monitoring is very difficult, confounded by the difficulties of relocating plants once discovered, distinguishing them from neighbors only a few millimeters away, and accounting for dormant plants.

The species' range in Pima County covers much of the County, with the highest concentrations of the species found west of I-10 and east of the Tohono O'Odham Nation (Reichenbacher 1990; Rondeau *et al.* 1996), but also some populations exist west to Organ Pipe Cactus National Monument (cited in Schmidt *et al.* 2007). Frank Reichenbacher maintains long-term monitoring sites at Sabino Canyon, Tumamoc Hill, and the Tucson Mountains. Bureau of Reclamation maintains long-term monitoring sites in the Avra Valley. Additional surveys for this species, if resources allow, will likely increase its known range in Pima County.

Reichenbacher (2009) reported on monitoring results of three populations in eastern Pima County, with the original surveys starting in the mid-1980s through the mid-1990s (Tumamoc Hill, CAP aqueduct, and Sabino Canyon). All three populations have declined by >85%. Subsequent surveys and monitoring continue to show local population decline in Pima County (Reichenbacker 2012, 2013). The Tumamoc globeberry has been confirmed on a number of County-owned and managed properties west of Tucson, including Tucson Mountain Park, Tumamoc, and King 98. It is very likely to occur on Rancho Fundoshi in Bear Canyon, but a single survey in 2010 did not detect the species.

B. Factors Affecting the Species' Environment in the Action Area - Large areas of potentially suitable habitat are found within the action area, which has not been adequately surveyed. Areas within the species' range in the action area are on protected land or land that is not likely to be developed. However, some development has occurred within the species range, and habitat has been lost. Threats include urbanization, farming, overgrazing, recreation, habitat conversion, javelina (eating tubers), off-road vehicle use, and pesticides (AGFD 2004). Local population declines have been observed.

Although not protected under the ESA and occurring in somewhat different habitat, factors affecting the Tumamoc globeberry in the action area are likely to be very similar to those affecting the Pima pineapple cactus. Refer to that species' discussion for information related to those factors and actions that have occurred in the action area that also likely affect the Tumamoc globeberry.

Lesser Long-Nosed Bat

A. Status of the Species in the Action Area – In Pima County, the occupancy period for the lesser long-nosed bat is in the spring and summer. Most of the currently known roost sites are inactive mine adits. In eastern Pima County, roosts are found in the Santa Catalina, Rincon, Whetstone, and Santa Rita mountains (Davis and Sidner 1992; AGFD 2003e; Swann and Powell 2006; WestLand Resources Inc 2009), though they are apparently not found in abundance on the east and north sides of the Santa Catalina Mountains due to the lack of *Agave palmeri* there (Ronnie Sidner, *personal communication* to Brian Powell, October 2011). The species has been recorded in a number of locations in western Arizona including Cabeza Prieta National Wildlife Refuge and Organ Pipe Cactus National Monument (Cockrum 1981; Cockrum and Petryszyn 1986; Petryszyn and Cockrum 1990).

Monitoring efforts associated with the Town of Marana's and the City of Tucson's Habitat Conservation Plans indicate that the lesser long-nosed bat forages in the exurban areas of Tucson and avoids the densely populated areas (AGFD, *unpublished data*). As of February 2014, there are no known roost sites on Pima County preserves. However, based on the species' foraging habitat (including foraging at hummingbird feeders in some ex-urban areas), the species is thought to occur in all Pima County-owned and managed properties except perhaps those in the San Pedro River Valley. A maternity roost of this species once occurred in Colossal Cave Mountain Park and efforts have been made to restore the suitability of this roost for the lesser long-nosed bat (FWS 1997).

B. Factors Affecting the Species' Environment in the Action Area - Two laws provide some measure of protection at cave roosts, subject to enforcement capability. The Federal Cave Protection Act of 1988 prohibits persons from activities that "destroy, disturb, deface, mar, alter, remove, or harm any significant cave or alters free movement of any animal or plant life into or out of any significant cave located on Federal lands, or enters a significant cave with the intent of committing any act described …". The Arizona Revised Statute (ARS) 13-3702 makes it a class 2 misdemeanor to "deface or damage petroglyphs, pictographs, caves, or caverns." Activities covered under ARS 13-3702 include "kill, harm, or disturb plant or animal life found in any cave or cavern, except for safety reasons." Of course, the effectiveness of these laws in protecting bat roosts is related to enforcement efforts, which are currently minimal. Protective measures such as gating may actually lead to abandonment (FWS 2007c), so guidelines need to be developed to ensure that gates are appropriate for lesser long-nosed bat roosts.

Climate change impacts to the lesser long-nosed bat in this portion of its range likely include loss of forage resources. Of particular concern is the prediction that saguaros, the primary lesser long-nosed bat forage resource in the Sonoran Desert, will decrease or even disappear within the current extent of the Sonoran Desert as climate change progresses (Weiss and Overpeck 2005). Shifts in flowering phenology of both saguaros and agaves as a result of climate change may have population effects on this migratory species. Monitoring of bats and their forage during drought years and in relation to changing temperatures is needed to better understand the effects of drought and climate change on this species.

Over the past 10 years, FWS has conducted 21 formal section 7 consultations within the action area that included anticipated adverse effects to the lesser long-nosed bat. These consultations

included eleven land use plans, seven border infrastructure projects, one utility infrastructure project, and two mine projects.

Mexican Long-Tongued Bat

A. Status of the Species in the Action Area – The Mexican long-tongued bat is found throughout Pima County, particularly in the eastern portion (Hoffmeister 1986). Roost sites have been found in the Santa Catalina, Rincon, Baboquivari, and Santa Rita mountains and lower Cienega Creek (Don Carter, unpublished data; Cryan and Bogan 2003; AGFD 2006b; WestLand Resources Inc 2009). Individuals have been netted at Rincon Creek (AGFD 2006b; Swann and Powell 2006) and in Organ Pipe Cactus National Monument (Organ Pipe Cactus National Monument 1999, 2006). Work by Wolf and Shaw (*unpublished data*) at hummingbird feeders in and around Tucson found Mexican long-tongued bats throughout the Tucson Basin, particularly along the Pantano, Rillito, and Agua Caliente washes and Tanque Verde Creek. Ronnie Sidner has studied the species extensively at the Fort Huachuca Military Reservation (Cochise County; *unpublished data*). Populations in Arizona appear to be highly variable (AGFD 2006b) and there is little information available to determine population trend. The Mexican long-tongued bat has been confirmed roosting at the Cienega Creek Natural Preserve, but is also thought to occur on most County-owned and managed properties.

B. Factors Affecting the Species' Environment in the Action Area - Two laws provide some measure of protection at cave roosts, subject to enforcement capability. The Federal Cave Protection Act of 1988 prohibits persons from activities that "destroy, disturb, deface, mar, alter, remove, or harm any significant cave or alters free movement of any animal or plant life into or out of any significant cave located on Federal lands, or enters a significant cave with the intent of committing any act described …". The Arizona Revised Statute (ARS)13-3702 makes it a class 2 misdemeanor to "deface or damage petroglyphs, pictographs, caves, or caverns." Activities covered under ARS 13-3702 include "kill, harm, or disturb plant or animal life found in any cave or cavern, except for safety reasons." The effectiveness of these laws in protecting bat roosts is related to enforcement efforts, which are currently minimal. Protective measures such as gating may actually lead to abandonment (FWS 2007c), so guidelines need to be developed to ensure that gates do not negatively impact bats. Pima County's Natural Resources, Parks, and Recreation Department has stabilized soil pipe caves at the Cienega Creek Natural Preserve with some success, so restoration of roosting habitat is possible.

Climate change impacts to Mexican long-tongued bats in this portion of its range likely include loss of forage resources. Of particular concern is the prediction that saguaros, a Mexican long-tongued bat forage resource in the Sonoran Desert, will decrease or even disappear within the current extent of the Sonoran Desert as climate change progresses (Weiss and Overpeck 2005). Shifts in flowering phenology of both saguaros and agaves as a result of climate change may have population effects on this migratory species. Monitoring of bats and their forage during drought years and in relation to changing temperatures is needed to better understand the effects of drought and climate change on this species.

Although not protected under the ESA, factors affecting the Mexican long-tongued bat in the action area are likely to be very similar to those affecting the lesser long-nosed bat. Refer to that

species' discussion for information related to those factors and actions that have occurred in the action area that also likely affect the Mexican long-tongued bat.

California Leaf-Nosed Bat

A. Status of the Species in the Action Area – In Pima County, this is one of the most common species of bats to find in caves, mines, and rock shelters throughout the County, especially low elevation ranges including in Organ Pipe Cactus National Monument (Cockrum 1981; Cockrum and Petryszyn 1986; Petryszyn and Cockrum 1990) and mountain ranges near Tucson including the Tucson Mountains (Swann and Powell 2007), and Waterman, Silverbell, Santa Catalina, Rincon, Sierrita, and Baboquivari mountains (AGFD 2001f). There is one known roost site of the California leaf-nosed bat on County-owned and managed properties (in Tucson Mountain Park).

B. Factors Affecting the Species' Environment in the Action Area - Population trends are poorly known, but concerns have been expressed regarding roost abandonment and reduced numbers as a result of disturbance by both recreationists and scientists at a number of well-known and accessible roost sites (AGFD 2003a), as well as impacts associated with border activities.

Two laws provide some measure of protection at cave roosts, subject to enforcement capability. The Federal Cave Protection Act of 1988 prohibits persons from activities that "destroy, disturb, deface, mar, alter, remove, or harm any significant cave or alters free movement of any animal or plant life into or out of any significant cave located on Federal lands, or enters a significant cave with the intent of committing any act described …". The Arizona Revised Statute (ARS) 13-3702 makes it a class 2 misdemeanor to "deface or damage petroglyphs, pictographs, caves, or caverns." Activities covered under ARS 13-3702 include "kill, harm, or disturb plant or animal life found in any cave or cavern, except for safety reasons." Of course, the effectiveness of these laws in protecting bat roosts is related to enforcement efforts, which are currently minimal.

Mine closures for hazard abatement and renewal of mining activity at previously abandoned mines represent potential actions that could negatively affect this species. However, California leaf-nosed bats have been documented to accept properly designed gates at roost sites, which may allow these activities to occur and still maintain roost resources for this species.

Although not protected under the ESA and occupying somewhat different habitat, factors affecting the California leaf-nosed bat in the action area are likely to be very similar to those affecting the lesser long-nosed bat. Refer to that species' discussion for information related to those factors and actions that have occurred in the action area that also likely affect the California leaf-nosed bat.

Pale Townsend's Big-Eared Bat

A. Status of the Species in the Action Area – In Pima County, this species is frequently found in small groups in inactive mines and caves, and occasionally in buildings. It has been found across a wide elevational range in Pima County (AGFD 2001h). This species has been observed in the Rincon Mountains (Davis and Sidner 1992; Swann and Powell 2006), Tucson Mountains (Swann and Powell 2007), Sierrita Mountains (Snow *et al.* 1996), Baboquivari Mountains (Hoffmeister 1986), Santa Rita Mountains (Snow *et al.* 1996; WestLand Resources Inc 2009), and Organ Pipe

Cactus National Monument (Cockrum 1981; Cockrum and Petryszyn 1986). There are likely roosts that are not currently identified in the Tortolita, Tucson, and Silverbell mountains. Within the County's preserve system, there have been confirmed roosts of pale Townsend's big-eared bat at Colossal Cave Mountain Park and at Oracle Ridge (Tetra Tech 2011). Population trends for Townsend's big-eared bats are unclear, though there have been losses or reductions of maternity colonies reported (AGFD 2003a).

B. Factors Affecting the Species' Environment in the Action Area - Because this species hibernates in cold caves, it is thought to be the only species of bat covered under the County's MSCP that may susceptible to white-nosed syndrome. If ongoing monitoring indicates that white-nosed syndrome manifests itself in the action area, significant impacts to populations of this species could occur.

The availability of appropriate roost sites is key to the conservation of the pale Townsend's big-eared bat and any activities that result in disturbance to maternity and hibernation roost are particularly significant. Two laws provide some measure of protection at cave roosts, subject to enforcement capability. The Federal Cave Protection Act of 1988 prohibits persons from activities that "destroy, disturb, deface, mar, alter, remove, or harm any significant cave or alters free movement of any animal or plant life into or out of any significant cave located on Federal lands, or enters a significant cave with the intent of committing any act described …". The Arizona Revised Statute (ARS) 13-3702 makes it a class 2 misdemeanor to "deface or damage petroglyphs, pictographs, caves, or caverns." Activities covered under ARS 13-3702 include "kill, harm, or disturb plant or animal life found in any cave or cavern, except for safety reasons." Of course, the effectiveness of these laws in protecting bat roosts is related to enforcement efforts, which are currently minimal.

Mine closures for hazard abatement and renewal of mining activity at previously abandoned mines represent potential actions that could negatively affect this species. However, pale Townsend's big-eared bats have been documented to accept properly designed gates at roost sites, which may allow these activities to occur and still maintain roost resources for this species.

Although not protected under the ESA and occupying somewhat different habitat, factors affecting the pale Townsend's big-eared bat in the action area are likely to be very similar to those affecting the lesser long-nosed bat. Refer to that species' discussion for information related to those factors and actions that have occurred in the action area that also likely affect the pale Townsend's big-eared bat.

Cactus Ferruginous Pygmy-Owl

A. Status of the Species in the Action Area – The current distribution and abundance in Pima County is unknown. However, the information that is available suggests that the population in southern Arizona and northern Sonora, Mexico has been declining for approximately 10 years. In 1999, a total of 78 individual owls were detected in Arizona in the Organ Pipe Cactus National Monument, Tohono O'odham Nation, Altar Valley, northwest Tucson and the Tortolita Mountains, and the Roskruge Mountains (Richardson *et al.* 2000). The owls are thought to currently persist in three areas of Pima County: the Tohono O'odham Nation, the Altar Valley, and in Organ Pipe Cactus National Monument. Monitoring has taken place in northern Sonora,

Mexico since 2000 where a documented decline in occupancy and abundance has been noted in most years (Flesch and Steidl 2006; Flesch 2008a; Flesch 2008b). In recent years, the only observation of the species on County-owned and managed lands was on the Old Hayhook Ranch in the Altar Valley.

B. Factors Affecting the Species' Environment in the Action Area – Ongoing urban growth and development continue to contribute to the loss and fragmentation of pygmy-owl habitat in the action area. Riparian habitat is being affected by ongoing drought and continuing groundwater depletion. Climate change has the potential to affect the long-term occurrence and distribution of saguaros, the key nest substrate for the pygmy-owl. It is predicted that saguaros will decrease or even disappear within the current extent of the Sonoran Desert as climate change progresses (Weiss and Overpeck 2005).

A captive breeding pilot project for the cactus ferruginous pygmy-owl was initiated in 2006 and is ongoing. The objective of this captive breeding program is to evaluate the feasibility of using captive-bred pygmy-owls to augment the remaining populations of pygmy-owls in Arizona. This project may result in the release of pygmy-owls within the action area.

The cactus ferruginous pygmy-owl was delisted in 2006. Prior to delisting, the FWS conducted 49 formal section 7 consultations within the action area that included anticipated adverse effects to the pygmy-owl. These consultations included nine land use plans, nine roadway projects, 25 development projects, three flood control/water infrastructure projects, and three border infrastructure projects.

Rufous-Winged Sparrow

A. Status of the Species in the Action Area – The rufous-winged sparrow is found in the eastern two-thirds of Pima County including the Santa Cruz and Avra valleys, and the foothills of the major mountain ranges of eastern Pima County (Phillips *et al.* 1964; Lowther *et al.* 1999; Corman and Wise-Gervais 2005; Powell 2006, 2007a; Tucson Bird Count 2012). Arizona Breeding Bird Atlas records (Corman and Wise-Gervais 2005) indicate that this species is fairly widespread in appropriate habitat in Pima County, and that there are no specific concentrations that should be deemed especially significant. There have been observations of rufous-winged sparrows on numerous County owned and managed properties including Rancho Seco, Sopori Ranch, Colossal Cave Mountain Park, Tucson Mountain Park, Canoa Ranch, Catalina Regional Park, Diamond Bell Ranch, and Cienega Creek Natural Preserve.

Comparing historical distribution to current distribution shows a species that is highly variable. Rufous-winged sparrows were found by Bendire near old Fort Lowell, Tucson, in "the early part of June," (1882). By 1884, the species had disappeared from the area. It was considered by the American Ornithologist's Union to be extirpated in Arizona due to overgrazing. The species reappeared, or was rediscovered, in the Tucson area in 1936 and has been recorded locally with some consistency (Phillips *et al.* 1964; Lowther *et al.* 1999), and is now fairly common and widespread (Corman and Wise-Gervais 2005).

B. Factors Affecting the Species' Environment in the Action Area – Continuing urban growth and development is the biggest threat to rufous-winged sparrows in the action area. Overgrazing

is a historical threat, but current grazing practices have significantly improved and the reappearance of this species may, at least in part, be due to improved grazing practices. Invasive, nonnative vegetation is also likely affecting the status of this species in the action area. Nest parasitism by brown-headed cowbirds may also be a factor affecting this species in certain areas.

Although not protected under the ESA and occupying somewhat different habitat, factors affecting the rufous-winged sparrow in the action area are likely to be very similar to those affecting the cactus ferruginous pygmy-owl. Refer to that species' discussion for information related to those factors and actions that have occurred in the action area that also likely affect the rufous-winged sparrow.

Sonoran Desert Tortoise

A. Status of the Species in the Action Area – In Pima County, the Sonoran desert tortoise is widespread across many low-elevation areas of the county where rocky outcrops, caliche-incised washes, and bajadas occur. Sonoran desert tortoises occur in nearly ubiquitous fashion across all of Pima County within the Lower Colorado River and Arizona Upland subdivisions of Sonoran Desertscrub, as well Semidesert Grassland communities (AGFD Heritage Database Management System), with most records falling within elevations between 900-4,200 ft (Zylstra and Steidl 2009).

B. Factors Affecting the Species' Environment in the Action Area - The same risk factors mentioned above all occur in Pima County: 1) altered plant communities; 2) altered fire regimes; 3) habitat conversion; 4) habitat fragmentation; 5) human-tortoise interactions; and 6) climate change-driven drought (FWS 2015). Buffelgrass is a significant concern for tortoise populations in Pima County and could have significant effects on fire behavior and ultimately, a burned areas' ability to recover after fire. Interstates 10 and 19 as well as State Routes 85 and 86 present concerns about population fragmentation as well as road mortality. Populations found in the Tucson, Santa Catalina, and Rincon Mountains are at continued risk from human-tortoise interactions, such as through collection or release of captives. Release of captive tortoises may result effects to population genetics or a disease risk (Jones et al. 2005). Jones et al. (2005) found that tortoises in suburban areas were significantly more likely than those from remote areas to possess antibodies for the URTD, suggesting that urbanization may have a negative impact on tortoise health in adjacent wild populations.

Although not protected under the ESA, and even though it occurs in different habitats, factors affecting the Sonoran desert tortoise in the action area are likely to be very similar to those affecting the cactus ferruginous pygmy-owl and the Pima pineapple cactus. Refer to those species' discussions for information related to those factors and actions that have occurred in the action area that also likely affect the Sonoran desert tortoise.

Tucson Shovel-Nosed Snake

A. Status of the Species in the Action Area – In Pima County, the last known records of the Tucson shovel-nosed snake in or near the County were: (1) Sanders Road and Avra Valley Road in 1979 (Rosen 2003) and (2) near Picacho Reservoir (Pinal County) in 2006 and 2007 (Rosen 2008b), and (3) north of the West Silverbell Mountains (Pinal County) (Rosen 2008b). One individual was found in the Sonoran Desert National Monument on State Route 238. Despite

extensive survey efforts to locate the species in the Avra Valley, particularly in 2007-2008, no individuals were found (Rosen 2003, 2007; Rosen 2008b). It is unknown if the species currently persists in the action area.

B. Factors Affecting the Species' Environment in the Action Area - Habitat loss due to agricultural and urban development; off-road vehicle activity, including military activity, may compact soil or crush buried snakes; increased highway traffic may cause direct mortality. Collection by herpetologists and illegal commercial collectors may cause local population losses and disrupt habitat. Recent increases in the spread of buffelgrass and the associated impacts of fire and desiccation may also be impacting this species.

Although not protected under the ESA, and even though it occurs in different habitats, factors affecting the Tucson shovel-nosed snake in the action area are likely to be very similar to those affecting the Sonoran desert tortoise and the Pima pineapple cactus. Refer to those species' discussions for information related to those factors and actions that have occurred in the action area that also likely affect the Tucson shovel-nosed snake.

GroundSnake (Valley Form)

A. Status of the Species in the Action Area – In Pima County, the species is found in desert grassland areas around the base of the Tortolita, Santa Catalina, and Rincon mountains. Two individuals were found at the Rincon Mountain District of Saguaro National Park in 2001-2002 (Flesch *et al.* 2006), but no individuals were found in the Tucson Mountain District of Saguaro National Park (Flesch *et al.* 2006). Rosen (2004) reports other credible historical sightings near Oracle and Redington Pass and throughout the Avra Valley. Four historical records of the groundsnake show that it once occurred along the Blanco Wash, from the confluence with the Santa Cruz River south to Avra Valley Road (City of Tucson 2008). In June 2003, one groundsnake was found at Blanco Wash and Silverbell Road (Rosen 2004). In 2004, groundsnakes were confirmed to persist at Red Rock (Pinal County). Surveys in 2004 found no reconfirmation of the species along I-10, near the Marana exit (Rosen 2004), but surveys in 2008 revealed two individuals (Rosen 2008a). A photographic voucher was collected at the base of the Tortolita Mountains in the Town of Marana, near Stone Canyon (Rosen 2004). No individuals have been confirmed in the lands that are owned or leased by Pima County, but the species may occur on Avra Valley FLAP parcels.

B. Factors Affecting the Species' Environment in the Action Area - Habitat loss due to agricultural and urban development; off-road vehicle activity, including military activity, may compact soil or crush buried snakes; increased highway traffic may cause direct mortality. Collection by herpetologists and illegal commercial collectors may cause local population losses and disrupt habitat. Recent increases in the spread of buffelgrass and the associated impacts of fire and desiccation may also be impacting this species.

Although not protected under the ESA, and even though it occurs in different habitats, factors affecting the groundsnake in the action area are likely to be very similar to those affecting the Sonoran desert tortoise and the Pima pineapple cactus. Refer to those species' discussions for information related to those factors and actions that have occurred in the action area that also likely affect the groundsnake.

Talussnails
A. Status of the Species in the Action Area – In Pima County, as in the rest of the genera's distribution, this diverse genus of talussnail is usually found in loose masses or "slides" of coarse broken volcanic or limestone rock known as talus. Evidence of talussnails has been found in a number of Pima County-owned and leased properties, including Bar-V Ranch, Colossal Cave Mountain Park, and Old Hayhook Ranch. Many different species are known to occur in Pima County, at a variety of elevations.

B. Factors Affecting the Species' Environment in the Action Area - Minor to major disruption of habitat by road building, development, or other land uses. Recent increases in the spread of buffelgrass and the associated impacts of fire and desiccation may also be impacting these species. Some species populations are within protected lands, and most are difficult to access. Pima County's Hillside Ordinance may minimize loss of habitat. Some habitat in the Tucson Mountain Park is protected by a reversionary clause under the Recreation and Public Purposes Act. The San Xavier talussnail is protected through a Conservation Agreement.

Because these talussnails occupy habitats in areas similar to areas occupied by the Sonoran desert tortoise, many of the same things affecting the tortoise can potentially affect these talussnails. Refer to that species' discussion for information related to those factors and actions that have occurred in the action area that also likely affect these talussnails.

<u>Grassland Species</u>

Swainson's Hawk
A. Status of the Species in the Action Area – The Swainson's hawk is a common breeder in semi-desert grasslands of southeastern Arizona, particularly east of Pima County (Corman and Wise-Gervais 2005). In Pima County, it is an uncommon breeder in the Altar Valley and other isolated pockets of semi-desert grasslands such as in the foothills of the Santa Rita, Santa Catalina and Las Guijas mountains and near the Pantano Wash (Nishida *et al.* 2001; Hobbs 2004; Corman and Wise-Gervais 2005). In Pima County-owned and managed lands, the Swainson's hawk has been observed at the Sands Ranch, Clyne Ranch, Bar-V, Rancho Seco, and Diamond Bell Ranch.

B. Factors Affecting the Species' Environment in the Action Area – Impacts to habitat are the greatest threats to Swainson's hawks in Pima County. Conversion of native grasslands and agricultural areas to urban development reduces habitat resources for this species for both nesting and migration. Increased recreational use of open country has the potential to increase harassment from birders and increase potential shootings of this species.

Although not protected under the ESA, and even though it occurs in some different habitats, factors affecting the Swainson's hawk in the action area are likely to be very similar to those affecting the cactus ferruginous pygmy-owl and the Pima pineapple cactus. Refer to those species' discussions for information related to those factors and actions that have occurred in the action area that also likely affect the Swainson's hawk.

Western Burrowing Owl

A. Status of the Species in the Action Area – In western Pima County, the burrowing owl breeds on and near to the Barry M. Goldwater Range (Corman and Wise-Gervais 2005) and has been observed at Organ Pipe Cactus National Monument (Groschupf *et al.* 1988). Burrowing owls have been well studied in eastern Pima County (Brown and Mannan 2002). They are found primarily in three areas of the County: (1) in the Altar Valley north to the Santa Cruz River in Marana; (2) along the Santa Cruz River, primarily south of downtown Tucson to the Santa Cruz County line, and (3) in and around the Davis-Monthan Air Force Base (Estabrook and Mannan 1998; AGFD 2001b; Alanen 2003; Corman and Wise-Gervais 2005; Garcia and Conway 2007; Town of Marana 2009; Tucson Bird Count 2012). On County owned and managed properties, they have been found along the Santa Cruz River, at the Kino Ecosystem Restoration area, Canoa Ranch, and Southeast Regional Park.

B. Factors Affecting the Species' Environment in the Action Area - Threats include loss of habitat through urban development in agricultural or rural areas; direct toxicity or loss of prey resulting from use of insecticides or rodenticides for pest management purposes in areas where burrowing owls breed; reduction in nest sites resulting from decreases in burrowing mammal population; and direct mortality from vehicular collisions and loss of artificial and natural burrows.

Although not protected under the ESA, and even though it occurs in some different habitats, factors affecting the burrowing owl in the action area are likely to be very similar to those affecting the cactus ferruginous pygmy-owl and the Pima pineapple cactus. Refer to those species' discussions for information related to those factors and actions that have occurred in the action area that also likely affect the burrowing owl.

Desert Box Turtle

A. Status of the Species in the Action Area – The distribution of this species in Pima County is not well known, but it likely occurs within Semidesert Grassland, Chihuhuan Desertscrub, or lower Madrean Evergreen Woodland communities within its overall distribution in the county. Specific areas where the species has been confirmed include the Las Cienega Conservation Area, in the Santa Cruz River valley near Sahuarita, and in the Altar Valley. A few historical specimens have been found along the San Pedro River in Pima County (Hall and Steidl 2007). A dead carcass was located on Esperanza Ranch south of Tucson (Llewellyn and Zetlan 2007). Two individuals were found in the Rincon Mountain District of Saguaro National Park in 2005 (Flesch *et al.* 2006), but it is unclear if these are natural populations or released pets. Within Pima County-owned and leased lands, the species has been confirmed at the Cienega Creek Natural Preserve in 2012 (Trevor Hare, p*ersonal communication* to J. E. Fonseca; and Don Carter, photos). It likely occurs on the Sands and Clyne ranches in the Cienega Valley and in the Sopori and Rancho Seco ranches in the Altar Valley.

B. Factors Affecting the Species' Environment in the Action Area – Road mortality and possibly collecting, as well as residential development (subdivisions) in this species' limited habitat are the major threats. Fires may also cause mortality.

Although not protected under the ESA, and even though it occurs in some different habitats, factors affecting the desert box turtle in the action area are likely to be very similar to those affecting the cactus ferruginous pygmy-owl and the Pima pineapple cactus. Refer to those species' discussions for information related to those factors and actions that have occurred in the action area that also likely affect the desert box turtle.

Critical Habitat in the Action Area

Huachuca Water Umbel

A. Status of Critical Habitat in the Action Area – Critical habitat for the Huachuca water umbel covers areas in Santa Cruz and Cochise counties (FWS 1999). No critical habitat occurs in Pima County or the action area.

B. Factors Affecting Critical Habitat in the Action Area – Because no critical habitat for the Huachuca water umbel occurs within the action area, there are no factors affecting critical habitat that affect our analysis of the proposed actions.

Gila Chub

A. Status of Critical Habitat in the Action Area – 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 (FWS 2005).

B. Factors Affecting Critical Habitat in the Action Area – Factors affecting the primary constituent elements of Gila chub critical habitat include ongoing uses of both surface and ground water; loss of riparian vegetation due to development, livestock grazing, and recreation; nonnative species; and fire. Climate change is expected to affect water quality and availability, as well as riparian and aquatic vegetation. Conservation in areas of critical habitat within the action area is achieved primarily 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).

Chiricahua Leopard Frog

A. Status of Critical Habitat in the Action Area – In March 2012, the FWS designated critical habitat for the Chiricahua leopard frog in Arizona and New Mexico, of which 3,463 acres (33%) are in Pima County (FWS 2012b). There are six critical habitat units in Pima County included in the critical habitat designation: Buenos Aires National Wildlife Refuge Central Tanks (1,720 acres), Garcia Tank (<1 acre), Twin Tanks and Ox Frame Tank (<2 acres), Florida Canyon (4 acres), East Slope of the Santa Rita Mountains (186 acres), and Las Cienegas National Conservation Area (1,550 acres). Only 1 acre of critical habitat is within the permit area and it will not be impacted by covered activities. Therefore, critical habitat is geographically within the limits of the action area, but MSCP covered activities will not affect critical habitat for this species as promulgated.

B. Factors Affecting Critical Habitat in the Action Area - Factors affecting the primary constituent elements of Chiricahua leopard frog critical habitat include ongoing uses of both surface and ground water; loss of riparian vegetation due to development, livestock grazing, and recreation; nonnative species; the presence of chytrid fungus; and fire. Climate change is expected to affect water quality and availability, as well as riparian and aquatic vegetation. No critical habitat will be affected by the proposed action, but ongoing activities, as described above, may be impacting critical habitat within the action area.

Northern Mexican Gartersnake

A. Status of Critical Habitat in the Action Area – Critical habitat for the northern Mexican gartersnake was proposed on July 10, 2013, with approximately 157,000 acres in Pima County. In the proposed critical habitat, three areas of Pima County are included: (1) Buenos Aires National Wildlife Refuge in the Altar Valley, (2) Cienega Creek, and (3) San Pedro River. The area of the Cienega Creek Natural Preserve is being proposed for exclusion from the critical habitat designation. Covered activities are not expected to affect any acres of proposed critical habitat for the northern Mexican gartersnake.

B. Factors Affecting Critical Habitat in the Action Area - Factors affecting the primary constituent elements of northern Mexican gartersnake proposed critical habitat do occur within the action area, but are outside the County's jurisdiction or authority including ongoing uses of both surface and ground water; loss of riparian vegetation due to development, livestock grazing, and recreation; the occurrence of nonnative species; and fire. Climate change is expected to affect water quality and availability, as well as riparian and aquatic vegetation. Covered activities are not anticipated to directly affect any acres of proposed critical habitat for the northern Mexican gartersnake.

Yellow-Billed Cuckoo

A. Status of Critical Habitat in the Action Area – Critical habitat for the yellow-billed cuckoo was proposed on August 15, 2014 (FWS 2014a). Proposed critical habitat encompasses 546,335 acres across the western United States, with three areas in Pima County subject to the proposed designation: San Pedro River, Cienega Creek, and Arivaca Cienega and adjacent areas in the Buenos Aires National Wildlife Refuge.

B. Factors Affecting Critical Habitat in the Action Area – Factors affecting the primary constituent elements of yellow-billed cuckoo proposed critical habitat include ongoing uses of both surface and ground water; loss of riparian vegetation due to development, livestock grazing, and recreation; the occurrence of nonnative species; and fire. Climate change is expected to affect water quality and availability, as well as riparian and aquatic vegetation.

Because of the relatively remote nature of these lands and the fact that most areas of proposed critical habitat in the action area are not under the jurisdiction of Pima County, the number of acres of proposed critical habitat that are anticipated to be impacted by covered activities is likely to be quite small. Notwithstanding the proposed exclusion of County mitigation lands from the final rule, Pima County current owns or leases approximately 2,000 acres of proposed yellow-billed cuckoo critical habitat as potential mitigation.

Southwestern Willow Flycatcher
A. Status of Critical Habitat in the Action Area – A portion of the southwestern willow flycatcher's critical habitat occurs in northeastern Pima County along the San Pedro River and along Cienega Creek. A short section of the lower San Pedro River in Pima County (~ 10 miles) occurs in between longer sections upstream in Cochise Country and downstream in Pinal County. The FWS revised the critical habitat designation in 2013 to include areas along Cienega Creek in the Las Cienegas National Conservation Area that are upstream of Pima County' Cienega Creek Natural Preserve (FWS 2013a) and that final designation of critical habitat occurred in January 2013 (78 FR 344).

B. Factors Affecting Critical Habitat in the Action Area - Factors affecting the primary constituent elements of southwestern willow flycatcher critical habitat include ongoing uses of both surface and ground water; loss of riparian vegetation due to development, livestock grazing, and recreation; the occurrence of nonnative species; and fire, but primary threats are from land and water use activities. Climate change is expected to affect water quality and availability, as well as riparian and aquatic vegetation. Due to the location of the subspecies' critical habitat in areas where ownership is outside of Pima County's jurisdiction and that are primarily managed for the conservation and enhancement of riparian systems, there are no projected direct or indirect impacts on the species' critical habitat as a result of the covered activities.

Jaguar
A. Status of Critical Habitat in the Action Area – The FWS proposed critical habitat for the jaguar on August 17, 2012 and finalized the rule on March 5, 2014 (FWS 2014). Of the approximately 764,207 acres designated as critical habitat in southern Arizona and southwestern New Mexico, about 102,000 acres are located in Pima County, consisting primarily of Federal lands in the Baboquivari, Santa Rita, and Whetstone mountains. Approximately 31,000 acres are in the MSCP action area. Approximately 48 acres of critical habitat are expected to be impacted by development under the County's permit.

B. Factors Affecting Critical Habitat in the Action Area – The primary constituent elements of jaguar critical habitat are related to adequate prey, water, open space, canopy cover, terrain ruggedness, elevation, human population density, roads, nighttime lighting, and connectivity, particularly to Mexico. The primary factors affecting these primary constituent elements in the action area are urban growth and development, transportation infrastructure, border traffic and infrastructure, mining activities, and utility infrastructure development and maintenance. Many of these activities and land uses do not fall under the jurisdiction or authority of Pima County.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

The proposed action is the issuance of a section 10(a)(1)(B) incidental take permit to Pima County for the incidental take of the covered species resulting from the implementation of the covered activities in the MSCP. In addition, the proposed action also includes the use of certain permits by the ACOE in their implementation of the Clean Water Act. No direct effects to any covered species are expected from the issuance of these permits. All effects of implementing the covered activities proposed in the MSCP are indirect effects of permit issuance and are discussed below. Because of the scope of the covered activities and the similarity of effects on similar species groups, this section is organized, for the most part, according to species habitat associations: aquatic and riparian species, upland species, and grassland species. Effects unique to specific species within these associations will be discussed separately in the Conclusion section of this BCO, as will effects to designated critical habitat (see also Appendix A of the MSCP).

The section 9 prohibitions of the ESA differ between animals and plants; however, for simplicity, the following discussion of effects from covered activities on plants is analogous to the discussion of effects of take on the covered animal species.

Because of the scale of the MSCP, both geographic and for the number of covered activities and covered species, the analysis of effects of the covered activities on individuals or even populations of the covered species is complex and difficult. For these effects, including the incidental take of covered species for which Pima County is seeking coverage, quantification of take of individuals is difficult, if not impossible. This is due to a number of reasons, but includes factors like small body size; behavior (nocturnal, secretive, occupying remote areas of habitat, hibernation or estivation, etc.); cryptic coloration; the fact that losses may be masked by normal seasonal fluctuations in numbers and other causes (predation, migration, starvation, etc.); natural events (runoff, floods, scavenging, decomposition, etc.) may remove, bury, or destroy dead or injured individuals, making them difficult to detect; and the difficulty of finding rare species in a very large action area.

However, all species rely upon habitat (the place where species live and can include such characteristics as landform, elevation, soil, water, and vegetation). Each species has a unique template of what constitutes habitat for them and, therefore, the presence, absence, and abundance of a species on the landscape is largely determined by that habitat template. If key elements of a species' habitat are missing in an area, it can result in the loss of that species even if other environmental components necessary for a species' survival (e.g., food) are present. Consequently, most conservation actions that seek to promote populations of a species focus attention on maintaining or improving habitat. Conversely, effects to individuals or species are most often a result of the loss, reduction, or alteration of that species' habitat. Effects to habitat, therefore, often equate to effects to individuals or populations of a species. Because of the difficulty of detecting effects to individuals or populations as described above, and because effects to habitat have a demonstrable tie to effects to species and populations, we will use acres of habitat impacted by covered activities (see Table 3.3 in the MSCP) as a surrogate for effects (including incidental take) to the covered species. The rationale for using habitat as a surrogate for each of the covered species is presented in Appendix A of the MSCP and is incorporated herein by reference.

Effects resulting from covered activities in the MSCP can generally be classified as those associated with urban growth and development. Habitats can be completely lost as they are replaced with urban developments. However, fragmentation of habitat also affects individuals and populations by reducing habitat to patches that are inadequate to meet the life history needs of the species, including the need to be able to make necessary movement within and among habitat patches, home ranges, and populations. Fragmentation can result in landscapes with many small habitat patches rather than few large patches. Small habitat patches tend to have altered species composition, reduced community diversity, and smaller population sizes for individual species. Species with greater susceptibility to the effects of reduced habitat patch size are more likely to be extirpated from these small patches. Reduced community diversity and altered species composition can change natural ecological functions, which can result in unpredictable effects given the complexity of community dynamics. Smaller populations are more susceptible to extirpation due to random fluctuations in population dynamics or catastrophic events (Ewens et al. 1987; Shaffer 1987). Small habitat patches also have high perimeter to area ratios, which increases edge effects that can result in even smaller populations. If small populations are isolated from nearby populations, they will be susceptible to deleterious genetic effects of inbreeding depression (Lande and Barrowclough 1987), and extirpated populations may not be replaced by dispersing individuals from other populations (Gilpin 1987).

The deleterious effects of conversion of natural habitats to other land uses often extend beyond project footprints resulting in “edge effects.” The biological integrity of habitats adjoining development can be diminished by adverse effects of noise, lighting, exotic plant and animal invasion, predators, parasitism, disturbance from human activities, changes in fire regimes, and other factors. The severity of these effects depends on distance to land alteration boundaries, source of disturbance, and the affected species. Species that are particularly vulnerable to edge effects, known as interior species, require large patches of habitat that are relatively free from edge effects.

Urbanization may result in changes to local (and regional) hydrology, run-off, and sedimentation. Increased urban run-off into natural habitats and channelization for flood control could result in highly erosive rain-flows and increased rates of scouring, which could result in downstream habitat loss. Urban run-off may also increase sediment loads that could result in downstream habitat degradation. Conversely, reduced flow caused by water diversion may reduce scouring events that maintain appropriate habitat for flood plain-dependent species. Urban run-off may also contain contaminants that may impact downstream habitat and/or species.

Roads and associated infrastructure are one of the most common elements of urbanization. Placement of roadways within the natural landscape and maintenance of existing roadway can cause direct loss of habitat and individuals, alter quality of adjacent habitats, disrupt hydrologic regimes, cause road kills, and fragment habitat. This in turn can result in the decline of certain species populations (particularly smaller populations that can be more susceptible to genetic isolation and local extinction), a loss in species diversity near roadways, and impede animal movements.

Hydrologic alteration is one of the largest causes of habitat degradation, fragmentation, and species imperilment in aquatic systems (Stern and Stern 1980; Simpson et al. 1982). The channelization of streams for irrigation, industrial use, recreation, power generation, and to maximize land development has increased with human population growth. Once developed, flood control channels often require maintenance of vegetation and sediment which can compound the impacts of the initial construction by periodically (sometimes annually) removing riparian vegetation and sediment, thereby suppressing riparian habitat functions for many species, particularly those species that require vegetative structural diversity.

Recreational activity authorized by Pima County is a covered activity. Developed recreation facilities, by design, focus use in specific areas. Therefore, areas in and adjacent to these sites generally exhibit signs of habitat degradation. Habitat degradation may include trampling of vegetation, direct removal of habitat during maintenance activities, invasion of nonnative species, habitat losses due to escaped campfires, development of exploratory trails fanning out from developed sites, human-induced alteration to hydrological patterns, and soil compaction (Gutzwiller 1995, Cole and Landres 1995, Cole and Spildie 1998). Direct impacts of trampling and habitat destruction can also occur from associated recreational activities such as cross-country motorized vehicle use and trash dumping.

Recreational use can directly impact birds and other animals by bringing human activity into sensitive areas. Increased recreational access afforded by trails may cause native fauna to avoid potential foraging and breeding sites and alter patterns of parental care. Chronic disturbance during the breeding season may lead to higher predation and/or nest abandonment rates and thus reduced reproductive success. Some disturbance, injury, or loss of individuals could occur as a result of domestic pets that may accompany humans in recreational areas.

When located in occupied habitats, the maintenance of recreational and ranch facilities can also have adverse effects on species through the disturbance of vegetative cover and mineral soil which may cause habitat loss or degradation. The maintenance activity may destroy burrow systems and other fossorial habitats along with surface cover used for hiding and protection from predators. Disturbance and possible displacement of individuals may occur due to lights and recurring noise from people and equipment. Maintenance of existing facilities and trails can also result in direct loss of individual plants or habitat due to removal of vegetative cover growing alongside the recreational facility site or trail, as well as within the trail itself. Indirect effects from maintenance include the introduction of nonnative weeds into habitat from ground-disturbing activities. Compaction of soils, which may increase runoff and sedimentation in adjacent stream habitat, and pollution of water, due to runoff from paved surfaces of products such as gasoline, diesel, and oil, may also result in a loss of habitat and individuals.

Vegetation management activities on lands owned by Pima County can have both positive and negative effects on covered species and their habitats, which may be temporary or permanent. Wildland fire (planned or unplanned) could result in loss of vegetative cover and organic litter, while fire suppression activities may require soil disturbance to establish fire breaks during and after fires, which may fragment habitat for some species. Disturbance and possible displacement of individuals may occur to prescribed and natural fires, along with changes in habitat quality that may last several or more years. Post-fire sedimentation is also a concern for some species,

especially acquatic species such as the lowland leopard frog. Invasive species management may inadvertently disturb individuals, and alter soil conditions at least temporarily.

Restoration of many upland areas within the County's mitigation lands may benefit from the use of fire as a management tool to improve ecosystem conditions for covered species, as well as a host of other species. Wildland fire is particularly valuable in ensuring that semi-desert grasslands maintain natural structure and function by reducing shrub cover and promoting perennial grasses. Therefore, wildland fire will constitute a special type of upland management activity because of its potentially broad spatial scale, which includes short-term, temporary impacts on habitat and covered species, but much greater long-term benefits for land condition (i.e., habitat) and covered species. Wildland fire activities will include both prescribed fire and actions taken to allow other wildland fires (human or natural caused) to be allowed to burn. Prior to a prescribed burn, Pima County will coordinate with the USFWS and other appropriate entities. Wildland fire that is not prescribed will be allowed to burn unless the area has been identified by Pima County and the USFWS as having special resource value for which wildland fire is not compatible. Acres burned in wildland fires will not be deducted from the acres of impact identified in Section 3.6 of the MSCP.

It is appropriate to use acres of habitat affected as surrogate for effects to and incidental take of individuals because effects to habitat generally lead to effects to individuals and populations such as the following: abandonment of young due to noise, activity, light, etc.; injury or death of young if they are abandoned or forced to move; being forced into suboptimal habitat; increased predation; starvation and reduced reproductive output due to reduced habitat quality and increased competition; loss of crucial habitat elements (roosts, nests, burrows, perches, breeding sites, etc.); collisions with and crushing by vehicles and equipment; effects to drainage patterns causing mortality or loss of forage resources, increased occurrence of nonnative competitors and predators (e.g., bullfrogs and crayfish); increased erosion and sedimentation affecting life history requirements; or the loss of aquatic vegetation as breeding, feeding and sheltering habitat. The identification of habitat within the action area for each of the covered species relies upon both habitat models developed by the Science Technical Advisory Team (STAT) and the Priority Conservation Areas (PCAs) identified by species experts (see Section 3.7 of the MSCP for information on the development of use of these habitat elements).

To summarize, the general effects to covered species from the covered activities can be attributed to habitat loss, alteration, and fragmentation. Therefore, the approach being taken by Pima County to address these effects is the development of system of conservation lands that will include the range of habitats affected by the covered activities, as well as an appropriate ratio of protected habitats needed to meet the life history requirements of each of the covered species.

The following discussion describes in more detail the specific effects to species groups covered by the MSCP:

Aquatic and Riparian Species

MSCP

In general, the potential effects to aquatic species that may result from the covered activities of the MSCP include the loss or reduction in available surface and ground water resources and the reduction of water quality resulting from non-point source contaminants and/or sedimentation. With regard to riparian species, effects include the loss or reduction in available riparian habitat and loss or reduction of water resources that support riparian habitat. Recreational use within aquatic and riparian habitats can result in habitat impacts, as well as direct disturbance of individuals occupying those habitats. There is also the potential for an increased occurrence of nonnative, invasive species that are predators on and competitors with native aquatic and riparian species through illegal releases, unintentional transport, or escapees from back yard ponds, etc. A more detailed description of the covered activities affecting aquatic and riparian species is found in Chapter 3 of the MSCP.

Within the action area, there is a limited amount of aquatic habitat. Because of the limited extent and high value of these remaining aquatic habitats in Pima County, the County has ordinances and policies in place to avoid, minimize, mitigate, protect and enhance aquatic habitats. Any covered activities with the potential to affect aquatic habitats undergo a rigorous review process to avoid or reduce any impacts to these rare resources. For example, habitat effects for the covered fish species are anticipated to generally be under one acre of impact. The greatest habitat effects are for two aquatic species that also have an upland component to their habitat use: the northern Mexican gartersnake (3,210 acres) and the lowland leopard frog (7,145 acres) (see Table 3.3 of the MSCP). Although more extensive than aquatic areas, riparian habitats in the action area have also been identified as high value resources by the County and are also protected through ordinances and policies. Anticipated habitat effects for riparian species range from 0 to 4,355 acres, with all but one of the species having habitat effects of less than 600 acres (see Table 3.3 of the MSCP).

The proposed actions will not increase effects to aquatic and riparian species; the covered activities would continue to occur regardless of whether or not the FWS issued a section 10 permit. The proposed action simply addresses the effects of these ongoing, legal activities and facilitates the compliance required under the ESA. However, there are effects to the covered species, as described above and in Section 3.7 of the MSCP, which will result from the covered activities. The MSCP anticipates that, over the life of the permit, approximately 2,134 acres of Important Riparian Areas (IRA) will be impacted by the covered activities. IRAs likely include the majority of the aquatic habitats with potential to be affected within the action areas (some springs, stock tanks or ponds may not be included), but may not include all of the riparian habitats within the action area. Consequently, effects to riparian habitat will be greater than the effects to the IRAs. Pima County will implement measures that will avoid, minimize, or mitigate for these effects.

Implementation of covered activies following issuance of a Section 10(a)(1)(B) permit for proposed covered activities would not likely affect the regional water supply (quantity available), but could have an adverse effect (reduction of water supply) on smaller local scales, particularly

in areas proposed for high-density development outside the CLS, where water provider wells can affect local aquifers, and some Capital Improvement Program project areas. Generally, the conservation of open space to minimize the effects of covered activities on federally-listed species would continue to be one of the primary tools used to protect the water supply found within Pima County's watersheds. The Section 10(a)(1)(B) permit would result in conservation easements and ranch management agreements that would result in restrictions on water development within these mitigation lands, a beneficial impact to water resources in the action area. However, because the projected development in Pima County is likely to occur regardless of whether an incidental take permit is issued, we do not anticipate that the proposed action will significantly affect overall water use and supply when compared to the ongoing, current baseline of water use and supply within the action area.

Under the MSCP, covered actions will adopt those SDCP principles as the guiding document that directs resources for protection, restoration, enhancement, and monitoring of water and riparian and aquatic resources. Therefore, the MSCP will adopt or continue to adhere to the following riparian area protection and management principles:

- maintain or restore the connection between interdependent components of river systems (channel, overbank floodplain, distributary flow zones, riparian vegetation, and connected shallow groundwater) and maintain or restore natural flooding and sediment balance;
- preserve or re-establish the connection between channels and their floodplains, and channels and their distributary flow zones;
- maintain or re-establish hydrologic connections between riparian, aquatic ecosystems, and shallow groundwater zones;
- manage watershed uplands as appropriate to protect the functioning of riparian and aquatic ecosystems within the watershed;
- manage point-source and non-point-source pollution to maintain water quality at a level needed to support Pima County MSCP biological goals;
- ensure sufficient in-stream flows to achieve and protect natural functions of riparian and aquatic ecosystems; and
- continue to acquire, manage, monitor, and protect water rights and water resources.

Additionally, Pima County has projected that they will acquire and conserve approximately 10,672 acres of IRA in the action area (see Figure 5 of this BCO). This roughly translates to a 5:1 ratio of IRA acres protected to IRA acres impacted (see Table 4.2 of the MSCP). The conservation of this IRA acreage will result in ratios of protected to impacted habitat for aquatic and riparian covered species ranging from > 100:1 to, at a minimum, 3:1, with the majority of aquatic and riparian species at >100:1 (see Table 4.4 of the MSCP).

Based on the habitat and effects modeling completed by Pima County, no effects to the habitats of some covered aquatic and riparian species are anticipated. However, take, in the form of fatality or harm, is anticipated from actions, such as those related to Safe Harbor type coverage discussed in of the MSCP. In addition, actions such as surveys, monitoring, some management activities, and, potentially, population augmentation for these covered species need take coverage if they are not covered by existing 10(A)(1)(a) permits held by those implementing these actions. While these covered activities have as their primary objective the conservation of the covered species and, in fact, may be required under the MSCP or terms of the incidental take permit, the

nature of these activities can result in the harm or, potentially, the death of individuals of these species. It is challenging to quantify this type of take because it is difficult, if not impossible, to predict the extent and nature of these activities. However, these effects are analyzed in this BCO to the extent reasonable and will be covered by the incidental take permit for Pima County.

Clean Water Act

Under the Clean Water Act, the ACOE regulates actions that occur within those areas designated as Waters of the United States (WUS). In general, the ACOE limits their evaluation of the effects of the action to the limits of the designated WUS. This includes the evaluation of the effects to species listed under the ESA. However, FWS in evaluating effects to listed species under the ESA, will often consider effects of actions permitted by the ACOE as interdependent or interrelated actions and effects. As a result, actions within WUS may also result in effects to upland or riparian habitat located outside of the designated WUS. The potential effects to aquatic species that may result from proposed actions related to section 404 permitting by the ACOEs are related to locating infrastructure within aquatic habitats, diverting or altering sources of water, and the reduction of water quality resulting from contaminants and/or sedimentation. Effects related to riparian species are similar to those resulting from actions under the MSCP, primarily the loss or reduction in available riparian habitat and loss or reduction of water resources that support riparian habitat. A more detailed description of the covered activities affecting aquatic and riparian species is found in Chapter 3 of the MSCP.

As discussed above, the extent of aquatic habitat in the action area is limited. Therefore, the effects of the proposed action are also likely to be limited. With regard to riparian habitats, the effects will also likely be limited by existing regulation and policy, but will be greater than for aquatic habitats.

Pima County analyzed impacts on species habitats within WUS as part of the MSCP (Section3.10), using the same model of projected development that was used for other habitat impacts described within the MSCP. WUS impacts are a subset of habitat impacts resulting from covered activities under the MSCP. Appendix F of the MSCP explains assumptions made regarding the extent of WUS for the purposes of a habitat effects analysis. The actual extent of WUS would need to be identified project-by-project with a preliminary or approved jurisdictional delineation. Species habitat maps or PCAs were used to help understand the impacts that activities within WUS would have on covered species and other threatened and/or endangered species.

As discussed in Appendix F of the MSCP, uncertainty exists with regards to the exact location, extent, and severity of future disturbance, particularly with respect to private covered activities. Disturbances to WUS by the County's public-sector covered activities are better known (see Appendix F of the MSCP) and often take place in areas that are already disturbed, such as along the Santa Cruz River (see Figure 3.3 of the MSCP), which contains bank protection and other features of past disturbance. Here, some of the new, covered impacts are anticipated to be temporary and the results of the impacts will actually improve conditions for some species (see Appendix D of the MSCP for a list of bond projects along the Santa Cruz River; many of these projects have an ecological restoration component to them).

Another source of uncertainty is that some covered activities that impact WUS may require Individual 404 permits from the ACOE and thus will be consulted upon separately through the Section 7 process, not this Section 10 permit. At the time of each Individual 404 permit application, further analysis will be provided to the ACOE regarding project extent and level of impacts. As a result, the project footprint may be reduced.

Based on the modeling exercise, there are estimated to be approximately 700 acres of direct impacts attributable to covered activities in WUS. Impacts to covered aquatic and riparian species' habitat range from 0 acres for seven species to 231.2 acres for the lowland leopard frog (see Table 3.4 of the MSCP). Impacts to the total number of acres of aquatic and riparian habitat in Pima County resulting from impacts to WUS range from 0% (for eight species) to 0.15% (for the Huachuca water umbel). Finally, the amount of habitat disturbed by projects that impact WUS as a percentage of the total anticipated impacts resulting from covered activities under the MSCP range from 0% (for eight species) to 36.4% (for the yellow-billed cuckoo).

A closer look at individual species reveals some important things about the impacts and the modeling exercise in general. First, in any ground-disturbance project in an aquatic system, there are some disturbances on adjacent upland areas, but the modeling likely overestimates impacts to species that occur outside of the impacts to WUS because these species, such as the Tumamoc globeberry, Pima pineapple cactus, and the lesser long-nosed bat, are over-represented in these areas. This is likely because the boundaries for some habitat models (globeberry, for example) and PCAs (Pima pineapple cactus, for example) did not exclude riparian areas in which these species have little to no opportunities of occurring; the models were never meant to map that level of detail.

Other species that are currently listed under the ESA and for which there are modeled, direct impacts are also worth mentioning. The Huachuca water umbel is estimated to have almost 52 acres of impacts, but the species is not known to currently occur in the area of impacts to the WUS. Instead, these areas are included because of the future potential, during the life of the permit, of these areas to support the species and its habitat if, for example, water quantity, stability of flows, water quality, etc. improves along the Santa Cruz River or the species naturally expands its occurrence during favorable conditions or is translocated to areas of appropriate habitat. Similarly, yellow-billed cuckoos are not currently found in the area of impact as modeled by projected develop, but may occur if habitat conditions improve along drainages in the action area. In addition, some impacts of covered activities such as ranchland management may affect yellow-billed cuckoos in areas away from WUS. No impacts are projected to occur for the Mexican garter snake or Chiricahua leopard frog because they do not occur in the action area, but may in the future.

In addition to direct effects from covered activities that would also impact WUS, there are also indirect effects such as changes in hydraulic functions or reduction on channel meandering that might occur as a result of the covered activity (see Section 3.8 of the MSCP). These indirect effects would likely result in changes to geologic features, streambed elevation, soil conditions, conveyance capacities, and/or flow patterns of watercourses. This is especially true along washes and drainages where the County is planning to construct bank protection infrastructure. To help

minimize and mitigate for these impacts to WUS, Pima County will implement a series of conservation measures, which are highlighted in Section 4 of the MSCP.

In general, the number of acres of disturbance and direct effects resulting from impacts to the WUS modeled here are quite small in comparison to the impacts resulting from the full list of covered activities under the MSCP. Considering that many of the impacts to the WUS will actually be relatively short-lived and some positive results are likely to come from the activities that cause the impacts, we anticipate that effects to species as listed in Table 3.4 of the MSCP will likely be reduced to some extent. In addition, Pima County is has acquired and is proposing to conserve 10,672 acres of important riparian areas to offset/mitigate for effects of the covered activities on aquatic and riparian habitats (see Figure 5 of this BCO).

Recovery and Conservation Potential

While implementation of the MSCP and Army Corps covered activities may result in some short-term adverse effects and, potentially, some minor ongoing effects, the overall approach of the MSCP is to provide greater overall protection of aquatic and riparian habitats than are projected to be impacted as a result of Covered Activities. Voluntary and obligated measures agreed to in the MSCP (and associated appendices) should result in improvements in select riparian communities and aquatic sites. These improvements—where they occur— are anticipated to reduce the severity of flash floods; increase the amount of time needed for water to move from the uplands through arroyos, washes, intermittent streams, and the length of perennial reaches of streams in and downstream from the action area; and promote riparian woodland development and protection of riparian woodlands.

One of the biological objectives of the MSCP is to “support species establishment or recovery” (Section 1.2) of covered species. Mechanisms to address this objective have been built into the MSCP planning process and species-specific conservation measures (Appendix A). 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.

When considered as a whole, the implementation of the proposed action will have a net benefit as compared to other alternatives on the recovery and conservation of the riparian and aquatic species covered by the MSCP and this BCO.

<u>Upland Species</u>

MSCP

For the covered activities that will occur within the upland habitats of the action area, the effects to the covered species are generally related to the loss or alteration of habitat. Beyond effects to habitat, individuals may also be affected by disturbance from noise or lighting, fatalities related to collisions or being run over, or increased predation and competition. A more detailed description of the covered activities affecting upland species is found in Chapter 3 of the MSCP.

With the exception of the Huachuca water umbel, all of the covered plants in the MSCP are considered upland species. Because of their stationary nature, plants are heavily impacted by covered activities that result in the grading or alteration of upland habitats. In addition, the use of heavy equipment for covered activities, even if the activity does not directly remove habitat, can result in individual plants being run over and crushed. Covered activities related to soil disturbance can increase the likelihood that invasive, nonnative plant species will infest the area of disturbance. Linear projects such as roadways, pipelines, or other utilities can often facilitate the establishment and spread of invasive, nonnative species over a relatively large area. Nonnative plant species can result in increased competition with native species, including covered plants, but also can compete with forage and cover plants that are important to native, covered wildlife species. The presence of nonnatives can also alter the natural fire regime on the desert landscape, resulting in mortality or reduction of native species when fire occurs in vegetation communities that are not fire-adapted, and can promote conditions favorable for ongoing expansion of invasive, nonnative species. All of the above threats can also affect the habitat and distribution of important pollinators of these sensitive plant species.

In general, habitat fragmentation and edge effects, which can vary considerably in type and magnitude, are the most significant indirect effects associated with covered activities. Other indirect effects to covered upland 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; short-term, temporary effects to habitat from restoration and enhancement activities (including fire management) with primarily beneficial effects; increased level of human activities (e.g., greater off-road recreational use); greater access to previously less- or undisturbed areas; and introduction of free-roaming/feral pets and invasive species into areas where they previously did not occur.

Total habitat impacts under the MSCP, minus the important riparian areas, are projected to be 32,954 acres. Not all of these acres are upland habitat acres, but upland habitats are the most extensive habitats within the action area for the MSCP. Therefore, effects from the covered activities in upland habitats will also be the most extensive effects resulting from the covered activities of the MSCP. Four species have anticipated habitat effects of over 10,000 acres, with the greatest habitat effect being almost twice that (19,434 and 19,108 acres) for the Tumamoc globeberry and rufous-winged sparrow, respectively (see Table 3.3 of the MSCP).

In order to mitigate for these anticipated upland habitat effects, Pima County has projected that they will acquire and conserve approximately 105,648 acres of conservation lands (total acres of mitigation minus acres for important riparian areas), the majority of which will include upland habitats in the action area (see Figure 5 of this BCO). This translates to a range of ratios of acres protected to acres impacted of upland habitat from 2:1 to 5:1 (see Table 4.2 of the MSCP). The conservation of this upland acreage will result in ratios of protected to impacted habitat for covered upland species ranging from > 100:1 to, at a minimum, 1:1, with the majority of covered upland species at >5:1 (see Table 4.4 of the MSCP).

Clean Water Act

In general, areas designated as WUS, the area where the ACOE issues permits under the Clean Water Act, only include limited areas of habitats that support the covered upland species. However, as discussed above, actions within WUS may be considered interdependent or interrelated actions or effects that can have effects to upland habitat areas and their associated species. Additionally, there are also indirect effects such as changes in hydraulic functions or reduction on channel meandering that might occur as a result of the covered activity, in addition to the indirect effects discussed in Section 3.8 of the MSCP. These indirect effects would likely result in changes to geologic features, streambed elevation, soil conditions, conveyance capacities, and/or flow patterns of watercourses. This is especially true along washes and drainages where the County is planning to construct bank protection infrastructure. Such indirect effects can extend into upland areas adjacent to WUS. A more detailed description of the covered activities affecting upland species is found in Chapter 3 of the MSCP.

Acres of impact to upland species habitat that occur within WUS range from 0.1 acre for two species to 357.4 acres for Tumamoc globeberry. To help minimize and mitigate for these impacts to WUS, Pima County will implement a series of conservation measures, which are highlighted in Section 4 of the MSCP. In addition, Pima County is proposing to acquire and manage for conservation approximately 116,320 acres. These mitigation lands include upland habitats that will contribute to offsetting the impacts to adjacent uplands that will be affected by actions permitted by the ACOE in WUS (see Figure 5 of this BCO).

Recovery and Conservation Potential

While implementation of the MSCP and Army Corps covered activities may result in the permanent loss of upland habitat within the permit area, as well as some short-term adverse effects and, potentially, some minor ongoing effects, the overall approach of the MSCP is to reduce impacts to upland habitats across the landscape. As mitigation for impacts to upland habitats, Pima County will conserve and manage upland habitats as specified in Chapter 4, including actions to manage rangelands... Where Pima County manages the uplands in accordance with the range standard and guidelines (Appendix F) and implements site-specific actions, there is anticipated to be greater improvements in key indicators such as proper functioning condition of these upland areas. The anticipated improvements are anticipated to result in promoting diversity of the plant communities, limit downstream impacts from erosion, and improve habitat conditions supported by the conservation lands identified in the MSCP. This is particularily true for the County fee-owned lands that will be protected in perpetuity.

One of the biological objectives of the MSCP is to “support species establishment or recovery” (Section 1.2) of covered species. Mechanisms to address this objective have been built into the MSCP planning process and species-specific conservation measures (Appendix A). 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.

When considered as a whole, implementation of the proposed action will result in a net increase in conserved upland habitats as compared to other alternatives and will have minimal or positive effects on the recovery and conservation of the upland species covered by the MSCP and this BCO.

Grassland Species

MSCP

The grasslands of southern Arizona include some of the most biologically diverse habitat in the Southwest. Grasslands are of particular importance because they serve as important core habitat for a large number of species, as well as providing corridors for species traveling from one habitat core to another. Grasslands in the southwestern U.S. occur primarily on private and State Trust lands, most of which currently have no long-term conservation protection. Because of their favorable topographic relief, climate and aesthetic qualities, grasslands are a prime target for subdivision and suburban/rural development. This development threatens the viability of grassland species, reduces the opportunities for habitat corridors linking adjacent mountain ranges, and prevents the restoration of important ecological processes like fire that are critical in maintaining plant species diversity and preventing shrub encroachment in grasslands (Ockenfels 1994; Heckert 1994; McPherson 1995; Valone and Kelt 1999). Based on demographic projections and population movement patterns within the U.S., if significant grassland sites are not protected in the next 10 years, they will likely be lost to development.

In Pima County, remaining grassland habitat primarily occurs in the eastern and southeastern portions of the county. These portions of the county are subject to similar development and activity pressures as the upland habitats discussed above. However, grassland habitats have been impacted even more by the invasion of nonnative grasses. This is primarily related to the history of efforts to improve livestock forage conditions in the southwest. Invasion of native grasslands by nonnative species, in combination with the ongoing encroachment of grasslands by shrubs, has significantly reduced the extent of remaining, healthy, native grasslands in the action area. Therefore, any further loss or reduction of these grassland habitats as a result of the covered actions under the MSCP will result in effects to the covered grassland species.

In general, habitat fragmentation and edge effects, which can vary considerably in type and magnitude, are the most significant indirect effects associated with covered activities. Other indirect effects to covered grassland 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; short-term, temporary effects to habitat from restoration and enhancement activities (including fire management) with primarily beneficial effects; increased level of human activities (e.g., greater off-road recreational use); greater access to previously less- or undisturbed areas; and introduction of free-roaming/feral pets and invasive species into areas where they previously did not occur. A more detailed description of the covered activities affecting grassland species is found in Chapter 3 and Chapter 5 of the MSCP.

Total habitat impacts under the MSCP, minus the important riparian areas, are projected to be 32,954 acres. Only a portion of this will be grassland habitats. While not as extensive as upland habitats, grassland habitats in the action area will nonetheless be affected by the activities covered under the MSCP. Only three covered species are identified as grassland species (Swainson's hawk, burrowing owl, and desert box turtle) and habitat for each of these species will be impacted by the covered activities. These three covered grassland species have anticipated habitat effects ranging from 748 acres to 10,981 acres (see Table 3.3 of the MSCP).

In order to mitigate for these anticipated habitat effects, Pima County has projected that they will acquire and conserve approximately 105,648 acres of conservation lands (total acres of mitigation minus acres for important riparian areas to identify primarily grassland/upland acres), which will include grassland habitats in the action area (see Figure 5 of this BCO) . This translates to a range of ratios of acres protected to acres impacted of grassland habitat from 2:1 to 5:1 (see Table 4.2 of the MSCP). The conservation of this grassland acreage will result in ratios of protected to impacted habitat for covered grassland species ranging from 8:1 to, at a minimum, 2:1 (see Table 4.4 of the MSCP).

Clean Water Act

In general, areas designated as WUS, the area where the ACOE issues permits under the Clean Water Act, only include limited areas of habitats that support the covered grassland species. However, as discussed above, activities within WUS may be considered interdependent or interrelated actions that can have effects to grassland habitat areas and their associated species. Additionally, there are also indirect effects such as changes in hydraulic functions or reduction on channel meandering that might occur as a result of the covered activity, in addition to the indirect effects discussed in Section 3.8 of the MSCP. These indirect effects would likely result in changes to geologic features, streambed elevation, soil conditions, conveyance capacities, and/or flow patterns of watercourses. This is especially true along washes and drainages where the County is planning to construct bank protection infrastructure. Such indirect effects can extend into grassland areas adjacent to WUS. A more detailed description of the covered activities affecting grassland species is found in Chapter 3 of the MSCP.

Acres of impact to grassland species habitat that occur within WUS range from 129.9 acres for the box turtle to 169.1 acres for the Swainson's hawk. To help minimize and mitigate for these impacts to WUS, Pima County will implement a series of conservation measures, which are highlighted in Section 4 of the MSCP. In addition, Pima County is proposing to acquire and manage for conservation approximately 116,320 acres (see Figure 5 of this BCO), of which 110,156 acres are already acquired. These mitigation lands include grassland habitats that will contribute to offsetting the impacts to adjacent grasslands that will be affected by actions permitted by the ACOE in WUS.

Recovery and Conservation Potential

While implementation of the MSCP and Army Corps covered activities may result in the permanent loss of some grassland habitat within the permit area, as well as some short-term adverse effects and, potentially, some minor ongoing effects, the overall approach of the MSCP

is to reduce impacts to grassland habitats across the landscape. As mitigation for impacts to grassland habitats, Pima County will conserve and manage species reliant on grassland habitats in perpetuity at a ratio of greater than 1:1. As a result of the compulsory and voluntary conservation actions outlined in the MSCP, overall improvements to the areas of watersheds to which Pima County directs avoidance, minimization and mitigation efforts, should result in improvements in indicators such as proper functioning condition of these grasslands. The anticipated improvements are anticipated to result in promoting diversity of the plant communities, limit downstream impacts from erosion, and improve habitat conditions supported by the conservation lands identified in the MSCP. This is particularily true for the Pima County fee-owned lands that will be protected in perpetuity.

One of the biological objectives of the MSCP is to "support species establishment or recovery" (Section 1.2) of covered species. Mechanisms to address this objective have been built into the MSCP planning process and species-specific conservation measures (Appendix A). 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.

When considered as a whole, implementation of the proposed action will result in a net increase in conserved grassland habitats as compared to other alternatives and will have minimal or positive effects on the recovery and conservation of the upland species covered by the MSCP and this BCO.

Critical Habitat

Please note that this biological and conference opinion relys on the definition of "destruction or adverse modification" found in our February 11, 2016 final rule amending the definition of destruction or adverse modification of critical habitat (81 FR 7214). Critical habitat is defined in section 3 of the ESA "as the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical and biological features essential to the conservation of the species and that may require special management considerations or protection; and specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species." We have also relied upon the Consultation Handbook which provides guidance on determining adverse modification of critical habitat and jeopardy pursuant to the following: "Adverse effects on individuals of a species or constituent elements or segments of critical habitat generally do not result in jeopardy or adverse modification determinations unless that loss, when added to the environmental baseline, is likely to result in significant adverse effects throughout the species' range, or appreciably diminish the capability of the critical habitat to satisfy essential requirements of the species" (FWS and NMFS 1998). Please note that for the purposes of this BCO, the "primary constituent elements" described above in the Status of the Species sections are equivelant to the "physical or biological features essential to the conservation of the species" as discussed in the amended definition of "destruction or adverse modification" found in 81 FR 7214.

Huachuca Water Umbel – No designated critical habitat is within the action area.

Gila Chub – The effects of the covered activities will primarily occur within areas that do not include, nor are they adjacent to, areas designated as critical habitat for the Gila chub. Only one acre of Gila chub critical habitat is expected to be impacted by covered activities. Conversely, Pima County will acquire and conserve 3,556 acres of Gila chub PCA or modeled habitat, some of which will be within designated critical habitat (see Figure 5 of this BCO).

Chiricahua Leopard Frog - Within the action area, only 1 acre of designated Chiricahua leopard frog critical habitat occurs within the MSCP permit area and that acre will not be affected by the proposed actions. Most of the designated critical habitat within the action area falls within the Buenos Aires National Wildlife Refuge and the Las Cienegas National Conservation Area. Covered activities of the MSCP cannot occur within either of these areas of critical habitat because Pima County lacks jurisdiction or authority in those areas. Therefore, while critical habitat is geographically within the action area, no critical habitat will be affected by the covered activities.

Northern Mexican Gartersnake - Critical habitat for the northern Mexican gartersnake was proposed on July 10, 2013, with approximately 157,000 acres in Pima County. In the proposed critical habitat, three areas of Pima County are included: (1) Buenos Aires National Wildlife Refuge in the Altar Valley, (2) Cienega Creek, and (3) San Pedro River. The area of the Cienega Creek Natural Preserve is being considered for exclusion from the critical habitat designation. Covered activities are not expected to impact any acres of proposed critical habitat for the northern Mexican gartersnake. If the final designation of critical habitat changes from the proposed critical habitat and critical habitat could be impacted by covered activities, potential effects of the covered activities to the primary constituent elements of northern Mexican gartersnake critical habitat include the loss or reduction in available surface and ground water resources and the reduction of water quality resulting from contaminants and/or sedimentation. Additional effects include the loss or reduction in available riparian habitat and loss or reduction of water resources that support riparian habitat. Recreational use within aquatic and riparian habitats can result in habitat impacts, as well as direct disturbance of individuals occupying those habitats. There is also the potential for an increased occurrence of nonnative, invasive species that are predators on and competitors with aquatic and riparian species. Pima County anticipates acquiring and conserving 10,856 acres of northern Mexican gartersnake PCA and modeled habitat, some of which will likely occur within proposed critical habitat (see Figure 5 of this BCO).

Yellow-billed Cuckoo – Critical habitat for the yellow-billed cuckoo was proposed on August 15, 2014 (FWS 2014a). Proposed critical habitat encompasses 546,335 acres across the western United States, with three areas in Pima County subject to the proposed designation: the San Pedro River, Cienega Creek, and the Arivaca Cienega, including adjacent areas in the Buenos Aires National Wildlife Refuge. The implementation of covered MSCP activities will be very limited within these areas of proposed critical habitat. In addition, because of the relatively remote nature of these lands and the existing Pima County policies and ordinances, the number of acres of proposed critical habitat that are anticipated to be impacted is likely to be quite small. Notwithstanding the proposed exclusion of County mitigation lands in the Cienega Creek

Preserv from the final critical habitat rule, Pima County currently owns or leases approximately 2,000 acres of yellow-billed cuckoo proposed critical habitat as potential mitigation, as noted in the MSCP (see Figure 5 of this BCO). It is important to note that a revision of proposed critical habitat is being developed that may include additional acres of proposed yellow-billed cuckoo critical habitat in Pima County.

Southwestern Willow Flycatcher - A portion of the southwestern willow flycatcher's critical habitat occurs in northeastern Pima County along the San Pedro River and along Cienega Creek. An approximate 10 mile stretch of the San Pedro River in Pima County was included in the 1997, 2005, and 2013 flycatcher critical habitat designations. In 2013 (78 FR 344), the FWS revised the critical habitat designation to include areas along Cienega Creek in the Las Cienegas National Conservation Area that is upstream of Pima County' Cienega Creek Natural Preserve (FWS 2013a). The 2013 critical habitat revision included areas important for flycatcher conservation and recovery. As a result, in addition to the previously designated areas along the San Pedro River in the Middle Gila/San Pedro Management Unit, we included portions of Cienega Creek within the Santa Cruz Management Unit. Due to the location of this subspecies' critical habitat in the Las Cienegas National Conservation Area and other areas under conservation status which are outside of the modeled development impacts of the MSCP, there are no modeled direct or indirect impacts on the species' critical habitat as a result of the covered MSCP activities, although short-term, temporary impacts may result from restoration or enhancement activities with overall beneficial effects. Pima County is proposing to commit approximately 360 acres of mitigation lands within southwestern willow flycatcher critical habitat (see Figure 5 of this BCO).

Jaguar - The FWS proposed critical habitat for the jaguar on August 17, 2012 and finalized the rule on March 5, 2014 (FWS 2014g). Of the approximately 764,207 acres designated as critical habitat in southern Arizona and southwestern New Mexico, about 102,000 acres are located in Pima County, consisting primarily of Federal lands in the Baboquivari, Santa Rita, and Whetstone mountains. Over 31,000 acres are in the MSCP action area. Approximately 48 acres of critical habitat are expected/modeled to be impacted by covered MSCP activities, primarily roadway improvements and urban development. Although the jaguar is not a covered species under the MSCP (no anticipated take) and effects and mitigation offsets have not been analyzed or calculated for this species, Pima County is proposing to acquire 116,320 acres of conservation/mitigation lands, including lands (approximately 4,178 acres) that occur within the area designated as critical habitat for the jaguar (see Figure 5 of this BCO). These acquisitions offset the potential limited effects to jaguar critical habitat.

Interdependent and Interrelated Actions

Interrelated activities are parts of the proposed action that depend on the action for their justification, and interdependent activities have no independent utility apart from the proposed action. Because the MSCP and associated incidental take permit do not actually authorize any of the covered activities within the MSCP; rather, they simply address and cover the potential incidental take associated with otherwise lawful activities; none of the covered activities depends on the issuance of the incidental take permit for their justification. Additionally, each of the covered activities does have independent utility apart from the proposed actions. Therefore,

there are no interdependent or interrelated actions associated with the proposed actions or covered activities under the MSCP.

Cumulative Effects

Cumulative effects include the effects of future state, Tribal, local, or private actions that are reasonably certain to occur in the action area.. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Non-Federal actions meeting the definition of cumulative effects in the action area are generally related to the increasing human population of the action area and the associated need for natural resources, with subsequent increases in economic development, recreation and visitation (including risks of accidental or intentional nonnative species introduction and human-caused wildfire), and introduction of environmental contaminants. Most of these types of effects within the action area will result from the covered activities of the MSCP and would not be considered cumulative effects. However, other municipalities or unincorporated cities and towns within the action area (Tucson, Marana, Oro Valley, South Tucson, Sahuarita, Green Valley, Catalina, etc.) will all continue to experience growth and development and experience all of the associated cumulative effects. Because of the long-term nature of this consultation, most of the specific actions that may have cumulative effects have not been identified or have a status that is not reasonably certain to occur; however, the general types of effects that may occur can be defined as indicated in the following list.

Effects to covered species from these potential future non-Federal actions include, but are not limited to:
• Loss or degradation of covered species habitat through conversion of undeveloped lands for residential, commercial, or other types of development together with their supporting infrastructure;
• Increased use of undeveloped lands for recreation that may disturb or result in mortality of individuals of the covered species;
• Increased predation or competition from domestic animals, native or nonnative birds more suited to the altered habitats (including starlings and cowbirds) created by new development;
• Introduction of additional nonnative plants and animals to the action area that compete with, prey on, or alter the habitat components for covered species;
• Increased potential for contamination of the habitats, particularly aquatic and riparian habitats, with municipal effluent, storm-water discharge, chemical spills, petroleum residues from vehicles, and non-point source discharges; and
• Increased risk of wildfires started by recreational activities, private land-management actions, or arson.

The magnitude of these effects over the 30-year term of the MSCP is unknown. Any analysis of these effects at this time is complicated by the lack of specific information on actual projects. This raises questions with respect to the reasonable certainty of occurrence, uncertainty regarding the potential for increases in numbers of nonnative species, and uncertainty regarding the likelihood of contamination incidents. It is also important to consider that if there are

increases in effects to covered species from these types of actions, these other municipalities would likely have ordinances or policies or other regulations that would result in some sort of a response to address those increases. For example, most municipalities have riparian, native plant, hillside, or other ordinances or regulations that address these important resources that support covered species. Nonnative invasive species are a particular issue being addressed by local groups and municipalities. Future introductions of nonnative species would likely elicit a response to eliminate or reduce those species.

Given this analysis and the recent history of the types of urban growth and development that incorporate some type of environmental review, we cannot currently anticipate any cumulative effects sufficient to jeopardize covered species or to adversely modify designated or proposed critical habitats.

Climate Change

While climate change is not an effect of the proposed actions or covered activities under the MSCP, the effects of implementing the MSCP and associated incidental take permit are likely to be exacerbated by the ongoing effects of climate change. Thus, the potential influence of climate change on the anticipated effects of the covered activities needs to considered in this BCO. Pima County is addressing the potential effects of climate change as a changed circumstance for the purposes of the MSCP. Climate change is a considerable threat to the biota of Pima County and beyond (Powell 2010) and, therefore, warrants special analysis regarding the Section 10 permit. During the twentieth century, the earth's surface warmed by an average of 0.74 degrees Celsius (IPCC 2007), a trend that appeared to be even more severe in the southwestern U.S. (Lenart and Crawford 2007). Climate models for the twenty-first century show an acceleration of temperature increases and more severe and prolonged drought in the southwestern U.S. (Overpeck et al. 2012, Cook et al. 2015). In Pima County, as in the rest of southeastern Arizona (Seager et al. 2007) precipitation is expected to become more variable, with reduced winter precipitation. Because temperature and precipitation influence the abundance and distribution of biota and impact ecosystem processes, climate change impacts could be far-reaching and unprecedented (Parmesan 2006).

Modeled impacts of climate change on biodiversity, while uncertain and often based on limited data, can give us insight into the potential effects of climate change. In one model, scientists estimate substantial increases in the potential for species' extinctions by as early as 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 the species covered in Pima County's MSCP. Climate-driven impacts on ecosystem structure and function (e.g., fire, nutrient cycling, and succession), coupled with non-climate related threats (e.g., the covered activities, ORV use, mining, pollution, etc.), 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, although 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 to increase the resilience of the natural systems to respond to climate-induced changes. Under the direction of the Science Technical Advisory Team, Pima County applied key principles of conservation biology as they relate to the likely challenges to 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 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 land 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; and
- Buffelgrass management in County preserves and along County roadways.

We support Pima County's findings 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 were not implemented, 2) carbon storage in natural and restored environments, 3) hands-on efforts to assist the persistence of at-risk species from climate change, 4) increased ecosystem connectivity as a means to foster ecosystem and species' population resilience, and 4) increased resiliency of covered species to the effects of future 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 STAT, Pima County will evaluate, at 10-year periods, the adequacy of ongoing activities to address observed changes in ecosystem conditions, and will employ an adaptive management methodology to maintain examine whether these or other measures might be more effective in maintaining a high degree of ecosystem structure and function.

CONCLUSION

LISTED SPECIES

Huachuca Water Umbel and Critical Habitat

We anticipate that up to 364 acres of Huachuca water umbel habitat will be affected due to covered activities. Because of the limited occurrence of aquatic systems in the action area, any loss of these types of habitat can affect the conservation of species dependent on aquatic habitats. We also acknowledge that Pima County anticipates providing 4,088 acres of protected and managed conservation lands for the Huachuca water umbel (see Figure A-3 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 11:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the Huachuca water umbel in the MSCP will reduce the impacts to this species. We anticipate that the Huachuca water umbel will persist in the areas where it currently occurs within the action area and additional occurrences of this species may be established as a result of the implementation of the MSCP. These areas will be monitored and managed for the benefit of the species under the MSCP.

Critical habitat for the Huachuca water umbel covers areas in Santa Cruz and Cochise counties (FWS 1999) adjacent to the action area. However, no critical habitat occurs in Pima County or the action area; the covered activities of the MSCP will not affect critical habitat for this species.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's biological opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the Huachuca water umbel, nor will there be any adverse modification of designated critical habitat. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the Huachuca water umbel as described below.

<u>Management and Conservation Commitments</u>

Pima County will implement the following management actions and conservation commitments for the Huachuca water umbel:

- Work with the FWS to reestablish populations where conditions are shown to be appropriate; Pima County will monitor the outcome of that work;
- Although the umbel has been surveyed at other potential sites on County preserve lands, Pima County will investigate any credible observations of this species on other preserve lands and if presence is confirmed, Pima County will monitor at that site if conditions are appropriate (i.e., there is a chance for long-term establishment of the populations);
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database;

- Implement the Pima County Floodplain Ordinance as described in Chapter 4 of the MSCP to minimize loss of habitat for this species;
- Protect existing habitat in the County-controlled mitigation lands from invasive species and controllable desiccation, where such efforts have a good chance for success;
- Continue to seek protection of water rights at Cienega Creek Natural Preserve and Bingham Cienega Natural Preserve to maintain and restore habitat;
- Continue to seek opportunities to acquire water rights to protect habitat for any newly detected, natural populations located on Pima County preserves;
- Survey for this species in suitable habitat during inventories of new properties;
- Consider establishing or re-introducing this species at aquatic sites on County-controlled mitigation lands; such activities would be conducted in a manner consistent with the Recovery Plan for this species, should one be completed; and
- Aid in the development of a Recovery Plan for this species, as requested.

Amount or Extent of Take

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of Federally listed endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species in any other area in knowing violation of any regulation of any State or in the course of any violation of a State criminal trespass law.

Pima Pineapple Cactus

We anticipate that up to 18,963 acres of Pima pineapple cactus habitat will be affected due to covered activities. Because of the limited range of this species, any loss of Pima pineapple cactus habitat can affect the conservation of this species. We also acknowledge that Pima County anticipates providing 19,322 acres of protected and managed conservation lands for the Pima pineapple cactus (see Figure A-1 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 1:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the Pima pineapple cactus in the MSCP will reduce the impacts to this species. We anticipate that the Pima pineapple cactus will generally persist in the areas where it currently occurs within the action area. While Pima County may use prescribed fire as a habitat enhancement activity, the effects of fire on the Pima pineapple cactus are not clear and are currently the subject of ongoing research and investigation. We believe effects to the Pima pineapple cactus from Pima County's restoration and enhancement activities, including fire management, will be primarily beneficial to this species. Additional occurrences of this species may be established as a result of the implementation of the management and conservation measures in the MSCP. Areas of Pima pineapple cactus habitat in the action area will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's biological opinion

that the actions, as proposed, are not likely to jeopardize the continued existence of the Pima pineapple cactus. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the Pima pineapple cactus as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the Pima pineapple cactus:

- Work with experts to maintain and post a habitat suitability map and Priority Conservation Area map on a publicly accessible website, such as the SDCP Mapguide site, to be used as a reference for where the species may be encountered;
- Review land acquisitions in the range of the species, as defined by the PCA, for evidence of occupancy of the species and its habitat as part of the due diligence (pre-closing), unless precluded by the property owner;
- Seek funds or partnerships to conduct surveys on County-controlled lands in areas south of the Sierrita Mountains and west of Interstate 19, in an attempt to verify whether additional locations exist, and to determine whether additional acres of acquisition may be counted as habitat mitigation under the MSCP;
- Encourage studies and other scientific investigations that are designed to increase knowledge about the species. This may include, but is not limited to, habitat/connectivity requirements, population viability analyses, effectiveness of transplant methodologies, evaluation of population monitoring methodologies, persistence over time in developed areas, etc.;
- Place restrictive covenants or conservation easements on the County's fee simple lands within the Pima pineapple cactus PCA at Marley Ranch, Rancho Seco, King 98, Canoa, Cienega Creek Natural Preserve, and Diamond Bell Ranch, as described in Chapter 4 of the MSCP. Additional future land acquisitions will also likely include areas of occupancy for the species and will be protected by the same legal protections as discussed above;
- If necessary, and where feasible, acquire additional high-value areas to offset impacts of covered activities. Planned future land acquisitions include areas of likely occupancy for the species;
- Either utilize mitigation credits from County conservation banks or other non-County operated conservation banks to offset impacts of covered activities, or ensure that the 1:1 species habitat mitigation ratio is met with allocations of other mitigation lands;
- Continue to protect, manage and monitor lands in its conservation bank for this species at Madera Highlands (Altar Valley) and Elephant Head (Santa Cruz Valley) as required under the conservation easements. Management plans and master plans for County-owned open space lands in the Pima pineapple cactus PCA will include attempts to avoid or minimize impacts to the species due to such activities as prescribed fire, and ground-disturbing activities such as new trails or ranch infrastructure on those lands that Pima County owns;
- Continue to apply avoidance and minimization measures, as described in Chapter 4 of the MSCP;

- Continue to work with the Altar Valley Conservation Alliance to promote conservation activities throughout the valley;
- Participate in recovery planning with the FWS and assist them in developing a new monitoring protocol, if appropriate;
- At County mitigation banks and long-term monitoring plots, Pima County will note the collection and/or destruction of tagged individuals during periodic surveys. These data, along with data collected by others in the region, can be used by the FWS to investigate the effects of collecting on this species; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

Sections 7(b)(4) and 7(o)(2) of the ESA generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the ESA prohibits the removal and reduction to possession of Federally-listed endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any regulation of any State or in the course of any violation of a State criminal trespass law.

Gila Chub and Critical Habitat

We anticipate that only 0.1 acre of Gila chub habitat will be affected due to covered activities. Because of the limited occurrence of aquatic systems in the action area, any loss of these types of habitat can affect the conservation of species dependent on aquatic habitats; however, the loss of this very small amount of Gila chub habitat will have very little impact with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 3,556 acres of protected and managed conservation lands for the Gila chub (see Figure A- 21 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of >100:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the Gila chub in the MSCP will reduce the impacts to this species. Because of the ongoing actions of conservation partners in the area, including Pima County, we anticipate that the Gila chub will persist in the areas where it currently occurs within the action area and that additional occurrences of this species may be established as a result of the implementation of the MSCP. These areas will be monitored and managed for the benefit of the species under the MSCP.

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 (FWS 2005). 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). Less than one acre of critical habitat is expected to be impacted by the covered activities.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's biological opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the Gila chub, nor will there be any adverse modification of designated critical habitat. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the Gila chub, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the Gila chub:

- Seek to prohibit Pima County Health Department from using *Gambusia* (mosquito fish) for mosquito control in watersheds with tributaries to reintroduction sites and in the Cienega Creek watershed upstream of Colossal Cave Road;
- Support protection of Cienega Creek water quality via ADEQ's Outstanding Waters program;
- Identify and address management of nonnative aquatic organisms through management plans and ranch infrastructure projects on County-controlled mitigation lands in the Cienega watershed;
- Implement the Pima County Floodplain Ordinance as described in Chapter 4 of the MSCP to minimize loss of habitat for this species;
- Work with AZGFD and USFWS to carry out the County's intention to reestablish Gila chub (as articulated in the Riparian and Aquatic Species Management Plan) on mitigation and County-owned lands; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 0.1 acre of Gila chub habitat will be affected as a result of the implementation of the covered activities. Additionally, a small, but undeterminable number of Gila chub may be taken as a result of the management and monitoring actions prescribed in the MSCP. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the Gila chub for reasons discussed above in our conclusion.

Gila Topminnow

We anticipate that only 0.5 acre of Gila topminnow habitat will be affected due to covered activities. Because of the limited occurrence of aquatic systems in the action area, any loss of these types of habitat can affect the conservation of species dependent on aquatic habitats; however, the loss of this very small amount of Gila topminnow habitat will have very little impact with regard to the conservation of this species. We also acknowledge that Pima County

anticipates providing 4,480 acres of protected and managed conservation lands for the Gila topminnow (see Figure A-22 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of >100:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the Gila topminnow in the MSCP will reduce the impacts to this species. Because of the ongoing actions of conservation partners in the area, including Pima County, we anticipate that the Gila topminnow will persist in the areas where it currently occurs within the action area and that additional occurrences of this species may be established as a result of the implementation of the MSCP. These areas will be monitored and managed by Pima County for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's biological opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the Gila topminnow. There is no critical habitat designated for this species; therefore, the covered activities will have no effect on critical habitat. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the Gila topminnow as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the Gila topminnow:

- Continue to support protection of Cienega Creek water quality via Arizona Department of Environmental Quality's Outstanding Waters program;
- Identify and address management of nonnative aquatic organisms through management plans and ranch infrastructure projects on County-controlled mitigation lands in the Cienega watershed;
- Continue to support eradication of nonnative predatory, invasive aquatic species in select areas;
- Use Gila topminnow as mosquito control if suitable agreements can be reached with AGFD and FWS;
- Work with AZGFD and USFWS to carry out the County's intention to reestablish Gila topminnow (as articulated in the Riparian and Aquatic Species Management Plan) on mitigation and County-owned lands;
- Prohibit Pima County Health Department from using *Gambusia* for mosquito control in watershed tributaries that are contiguous to reintroduction sites as well as in the Cienega Creek watershed upstream of Colossal Cave Road;
- Continue to prohibit Pima County Health Department from using *Gambusia* for mosquito control;
- Implement the Pima County Floodplain Ordinance as described in Chapter 4 of the MSCP to minimize loss of habitat for this species; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 0.5 acre of Gila topminnow habitat will be affected as a result of the implementation of the covered activities. In addition, should Pima County choose to establish a new population(s) of topminnow for conservation purposes (stock tanks, mosquito control), there is the potential for these entire populations to be lost. However, because of the ongoing actions of conservation partners in the area, including Pima County, we expect that during the life of the permit, there will always be populations of Gila topminnow extant. Additionally, a small, but undeterminable number of Gila topminnow may be taken as a result of the management and monitoring actions prescribed in the MSCP. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the Gila topminnow for reasons discussed above in our conclusion.

Chiricahua Leopard Frog and Critical Habitat

We anticipate that only two acres of Chiricahua leopard frog habitat will be affected due to covered activities. Because of the limited occurrence of aquatic systems in the action area, any loss of these types of habitat can affect the conservation of species dependent on aquatic habitats; however, the loss of this very small amount of Chiricahua leopard frog habitat will have very little impact with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 13,471 acres of protected and managed conservation lands for the Chiricahua leopard frog (see Figure A-25 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of >100:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the Chiricahua leopard frog in the MSCP will reduce the impacts to this species. Because of the ongoing actions of conservation partners in the area, including Pima County, we anticipate that the Chiricahua leopard frog will persist in the areas where it currently occurs within the action area and that additional occurrences of this species may be established as a result of the implementation of the MSCP. These areas will be monitored and managed for the benefit of the species under the MSCP.

The two primary sites in Pima County included in the critical habitat designation for the Chiricahua leopard frog are within the Buenos Aires National Wildlife Refuge (1,721 acres) and Las Cienegas National Conservation Area (1,421 acres) and fall outside of the permit area. Only one acre of critical habitat is in the permit area for the MSCP and no critical habitat acres are anticipated to be impacted by covered activities. Therefore, although critical habitat occurs in the action area, we do not anticipate any effects to Chiricahua leopard frog critical habitat as a result of the implementation of the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's biological opinion

that the actions, as proposed, are not likely to jeopardize the continued existence of the Chiricahua leopard frog, nor will there be any adverse modification of designated critical habitat. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the Chiricahua leopard frog as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the Chiricahua leopard frog:

- Actively manage this species on county-controlled mitigation lands; maintain and/or re-establish several viable populations in springs, tinajas, stock ponds and other suitable sites, where appropriate and in consultation with AGFD and FWS;
- Continue to support eradication of nonnative predatory, invasive aquatic species in select areas;
- Acquire and protect water rights to maintain and restore habitat for this species where appropriate;
- Manage county-controlled mitigation lands >3,400 feet in elevation for control/removal of invasive aquatic exotic species to create suitable habitat for this species and protect sites from other stresses such as spread of chytrid fungus and controllable desiccation, where prudent and feasible;
- Support simultaneous removal of bullfrogs and crayfish across whole landscapes, where feasible, such as is being accomplished in the Cienega watershed;
- Where feasible, incorporate wildlife crossings into transportation project design in appropriate locations;
- Implement the Pima County Floodplain Ordinance as described in Chapter 4 of the MSCP to minimize loss of habitat for this species; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that two acres of Chiricahua leopard frog habitat will be affected as a result of the implementation of the covered activities. Additionally, a small, but undeterminable number of Chiricahua leopard frogs may be taken as a result of the management and monitoring actions prescribed in the MSCP, including any incidental take associated with returning populations established or augmented under the MSCP to baseline conditions as outlined in Sections 4.7 and 4.8 of the MSCP. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the Chiricahua leopard frog for reasons discussed above in our conclusion.

Northern Mexican Gartersnake and Proposed Critical Habitat

We anticipate that 3,210 acres of northern Mexican gartersnake habitat will be affected due to covered activities. While this acreage also includes some upland habitat, the majority is aquatic and riparian habitat and, because of the limited occurrence of aquatic and riparian systems in the action area, any loss of these types of habitat can affect the conservation of species dependent on them. However, the loss of this amount of northern Mexican gartersnake habitat, in relation to the extent of habitat within the range of this species (see Status of the Species section above), will have limited impact with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 10,856 acres of protected and managed conservation lands for the northern Mexican gartersnake (see Figure A-30 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 3:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the northern Mexican gartersnake in the MSCP will reduce the impacts to this species. Because of the ongoing actions of conservation partners in the area, including Pima County, we anticipate that the northern Mexican gartersnake will persist in the areas where it currently occurs within the action area and that additional occurrences of this species may be established as a result of the implementation of the MSCP. These areas will be monitored and managed for the benefit of the species under the MSCP.

Critical habitat for the northern Mexican gartersnake was proposed on July 10, 2013, with approximately 157,000 acres in Pima County. In the proposed critical habitat, three areas of Pima County are included: (1) Buenos Aires National Wildlife Refuge in the Altar Valley, (2) Cienega Creek, and (3) San Pedro River. The area of the Cienega Creek Natural Preserve is being considered for exclusion from the critical habitat designation. Modeled covered activities are not expected to impact any acres of proposed critical habitat for the northern Mexican gartersnake, but there may be some short-term, temporary impacts related to vegetation restoration and enhancement activities associated with the MSCP. However, we acknowledge that Pima County anticipates providing 4,459 acres of conservation/mitigation lands within the 10,856 acres of northern Mexican gartersnake habitat.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's biological and conference opinions that the actions, as proposed, are not likely to jeopardize the continued existence of the northern Mexican gartersnake, nor will there be any destruction or adverse modification of proposed critical habitat. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the northern Mexican gartersnake as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the northern Mexican gartersnake:

- Continue to support eradication of predatory, invasive aquatic species in select areas;

- Implement the Pima County Floodplain Ordinance to minimize loss of habitat as described in Chapter 4 of the MSCP;
- Place restrictive covenants or conservation easements on County-owned mitigation lands, as described in Chapter 4 of the MSCP;
- Work with AZGFD and USFWS to carry out the County's intention to reestablish northern Mexican gartersnakes (as articulated in the Riparian and Aquatic Species Management Plan) on mitigation and County-owned lands;
- Acquire and protect existing water rights to maintain and restore habitat, where feasible;
- Where feasible, incorporate wildlife crossings into transportation project design in appropriate locations; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 3,210 acres of northern Mexican gartersnake habitat will be affected as a result of the implementation of the covered activities. Additionally, a small, but undeterminable number of northern Mexican gartersnakes may be taken as a result of the management and monitoring actions prescribed in the MSCP, including any incidental take associated with returning populations established or augmented under the MSCP to baseline conditions as outlined in Sections 4.7 and 4.8 of the MSCP. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the northern Mexican gartersnake for reasons discussed above in our conclusion.

Yellow-Billed Cuckoo and Proposed Critical Habitat

We anticipate that 28 acres of yellow-billed cuckoo habitat will be affected due to covered activities. Because of the limited occurrence of aquatic and riparian systems in the action area, any loss of these types of habitat can affect the conservation of species dependent on them; however, the loss of this small amount of yellow-billed cuckoo habitat will have limited impact with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 9,966 acres of protected and managed conservation lands for the yellow-billed cuckoo (see Figure A-16 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of >100:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the yellow-billed cuckoo in the MSCP will reduce the impacts to this species. Because of the ongoing actions of conservation partners in the area, including Pima County, we anticipate that the yellow-billed cuckoo will persist in the areas where it currently occurs within the action area. These areas will be monitored and managed for the benefit of the species under the MSCP.

An additional 66 acres of possible cuckoo habitat are projected to be impacted by covered activities in xeroriparian Class A or B level drainages north of E. Old Spanish Trail, east of Pantano Wash, west of Camino Loma Alta, and south of Saguaro National Park East (Pima

County, unpubl. data). However, these more upland drainages are likely less suitable for cuckoos than much of the riparian habitat identified as cuckoo habitat in Pima County and it is unknown whether cuckoos would occupy these areas. Pima County currently is projected to provide four acres of mitigation lands in nearby similar habitat (Pima County, unpubl. data) in addition to the 9,966 acres they are already committed to providing as cuckoo mitigation.

Critical habitat for the yellow-billed cuckoo was proposed on August 15, 2014 (FWS 2014a). Proposed critical habitat encompasses 546,335 acres across the western United States, with three areas in Pima County subject to the proposed designation: San Pedro River, Cienega Creek, and Arivaca Cienega and adjacent areas in the Buenos Aires National Wildlife Refuge. Because only a very limited portion of these lands fall under the jurisdiction of Pima County and because no modeled covered activities are likely to occur in these areas, we anticipate that limited acres of proposed critical habitat (approximately 9 acres) will be impacted by covered activities. Notwithstanding the proposed exclusion of some County mitigation lands from the final rule, Pima County currently owns or leases approximately 2,000 acres of proposed yellow-billed cuckoo critical habitat that they are committed to using as potential mitigation.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's biological and conference opinions that the actions, as proposed, are not likely to jeopardize the continued existence of the yellow-billed cuckoo, nor will there be any destruction or adverse modification of proposed critical habitat. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the yellow-billed cuckoo as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the yellow-billed cuckoo:

- Implement the Pima County Floodplain Ordinance to minimize loss of habitat for this species as described in Chapter 4 of the MSCP;
- Pima County will apply avoidance, minimization and mitigation measures as described in Chapter 4;
- Continue to prioritize protection and acquisition of high-quality habitat;
- Seek to protect additional water rights at Cienega Creek Natural Preserve and Buehman Canyon Natural Preserve to maintain and restore habitat;
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database; and
- Enact a 400-meter buffer "restricted activity zone" around known nests and nesting areas during the nesting period. Only short duration "pass through" activities with no vegetation or noise disturbance would be allowed.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 28 acres of yellow-billed cuckoo habitat will be affected as a result of the implementation of the covered activities. Additionally, a small, but undeterminable number of yellow-billed cuckoos may be taken as a result of the management and monitoring actions prescribed in the MSCP. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the yellow-billed cuckoo for reasons discussed above in our conclusion.

Southwestern Willow Flycatcher and Critical Habitat

While we do not anticipate any effects to southwestern willow flycatcher habitat due to covered activities, we cannot be completely certain due to the uncertainty of the location and extent of impacts for each covered activity and because modeled impacts may not match the actual impacts; therefore, there may be some limited potential for incidental take of willow flycatchers based on using acres of habitat impacted as surrogate for incidental take. In addition, Pima County will be conducting survey and monitoring for this subspecies as outlined in the monitoring plan for the MSCP (see Appendix N of the MSCP). There may be some level of incidental take resulting from harm or harassment during the implementation of these activities. However, any take of individuals due to habitat impacts or monitoring will be limited and have a limited impact with regard to the conservation of this subspecies because of Pima County's existing policies and ordinances protecting riparian habitat, as well as the extent of conservation lands being provided as mitigation by Pima County. We acknowledge that Pima County anticipates providing 420 acres of protected and managed conservation lands for the southwestern willow flycatcher (see Figure A-19 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of >100:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this subspecies. Implementation of the avoidance, minimization, and mitigation measures outlined for the southwestern willow flycatcher in the MSCP will reduce the impacts to this subspecies. Because of the ongoing actions of conservation partners in the area, including Pima County, we anticipate that the southwestern willow flycatcher will persist in the areas where it currently occurs within the action area. These areas will be monitored and managed for the benefit of the subspecies under the MSCP and will contribute to the goals outlined for recovery in the recovery plan for this species (FWS 2002b).

A final designation of critical habitat occurred in January 2013 (78 FR 344). A portion of the southwestern willow flycatcher's critical habitat occurs in northeastern Pima County along the San Pedro River and another portion along Cienega Creek in the Las Cienegas National Conservation Area upstream of Pima County' Cienega Creek Natural Preserve (FWS 2013a). Because of the ownership and management of these areas, both of these areas are generally managed for the protection and conservation of the riparian resources found there. There may be some short-term, temporary effects to designated critical habitat that result from habitat restoration and management actions included in the MSCP, but those actions are expected to have primarily beneficial effects. Therefore, we anticipate that there will only limited direct or

indirect impacts on southwestern willow flycatcher critical habitat as a result of the covered activities within or adjacent to the action area. Additionally, of the approximately 420 acres of mitigation lands that Pima County will conserve for the southwestern willow flycatcher, 360 acres occur within designated critical habitat.

After reviewing the current status of the subspecies, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's biological opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the southwestern willow flycatcher, nor will there be any destruction or adverse modification of designated critical habitat. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the southwestern willow flycatcher as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the southwestern willow flycatcher:

- Implement the Pima County Floodplain Ordinance as described in Chapter 4 of the MSCP to minimize loss of habitat for this subspecies;
- For County-controlled mitigation lands, enact a 100-meter buffer "restricted activity zone" around known nests during the nesting period. Only short duration "pass through" activities will be allowed;
- Develop management guidelines for County-controlled mitigation lands that include efforts to reduce impacts from feral pets (e.g., cats and dogs), recreation, shooting, invasive species, etc. in the vicinity of occupied habitat;
- Protect all known and potential habitat for this subspecies on County-controlled mitigation lands as described in Chapters 4 and 5 of the MSCP;
- Acquire and protect water rights to maintain or enhance riparian function and value, where appropriate; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the action area as a result of the MSCP covered activities. However, while we do not anticipate that any southwestern willow flycatcher habitat will be affected as a result of the implementation of the covered activities, there is some uncertainty of the location and extent of future covered activities because modeled impacts may not represent the actual impacts. Therefore, there is the potential for a limited amount of flycatcher habitat to be adversely affected. If this occurs in excess of fifty acres (based on unknown actions on existing single-lot private properties within flycatcher PCAs), we will coordinate with Pima County to determine if there is a need to amend the incidental take permit or reinitiate this consultation. Even if this level of activity occurs, the ratio of conservation acres provided by Pima County will still be at over 8:1. Additionally, a

small, but undeterminable number of southwestern willow flycatchers may be taken as a result of the management and monitoring actions prescribed in the MSCP. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the southwestern willow flycatcher for reasons discussed above in our conclusion.

Lesser Long-Nosed Bat

We anticipate that 15,978 acres of lesser long-nosed bat habitat will be affected due to covered activities. Because of the unique habitat elements used by lesser long-nosed bats within this habitat (columnar cacti, agaves, and roost sites), any loss of this type of habitat can affect the conservation of this species. However, the loss of this projected amount of lesser long-nosed bat habitat will have a limited impact with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 85,501 acres of protected and managed conservation lands for the lesser long-nosed bat (see Figure A-5 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 5:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the lesser long-nosed bat in the MSCP will reduce the impacts to this species. Because of the ongoing actions of conservation partners in the area, including Pima County, we anticipate that the lesser long-nosed bat will persist in the areas where it currently occurs within the action area and that additional occurrences of this species may be documented as a result of the implementation of the MSCP. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's biological opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the lesser long-nosed bat. There is no critical habitat designated for this species; therefore, the covered activities will have no effect on critical habitat. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the lesser long-nosed bat, as described below.

<u>Management and Conservation Commitments</u>

Pima County will implement the following management actions and conservation commitments for the lesser long-nosed bat:

- Protect known roosts and foraging habitats of this species on County-controlled mitigation lands using appropriate means;
- Investigate the purchase of valid mining claims for mines with known roosts; look into opportunities for creating roost preserves and install bat-friendly exit gates, where appropriate and economically feasible;
- Restrict County activities within 1 kilometer of known roosts during May to September if this can be accomplished without disclosure of roost locations;
- Evaluate known roosts of this species on County preserves for conditions and needs for structural stabilization. Where appropriate, such stabilization will be carried out using

techniques that minimize disturbance and alteration of conditions and whenever possible will occur when bats are not present (e.g., October-April);

- Apply avoidance, minimization and mitigation measures as described in Chapter 4 of the MSCP; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 15,978 acres of lesser long-nosed bat habitat will be affected as a result of the implementation of the covered activities. Additionally, a small, but undeterminable number of lesser long-nosed bats may be taken as a result of the management and monitoring actions prescribed in the MSCP. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the lesser long-nosed bat for reasons discussed above in our conclusion.

Jaguar Critical Habitat

The FWS proposed critical habitat for the jaguar on August 17, 2012 and finalized the rule on March 5, 2014 (FWS 2014). Of the approximately 764,207 acres designated as critical habitat in southern Arizona and southwestern New Mexico, about 102,000 acres are located in Pima County, consisting primarily of Federal lands in the Baboquivari, Santa Rita, and Whetstone mountains. Approximately 48 acres of critical habitat are expected to be impacted by the covered activities of the MSCP, primarily roadway improvements and urban development. However, the areas where these limited impacts will occur are small in extent (two bridge crossings), or occur in areas already being impacted by urban development (Corona de Tucson) and, therefore, will have very little added effect to designated critical habitat. We also acknowledge that Pima County anticipates providing 116,320 acres of conservation/mitigation lands, including lands (approximately 4,178 acres) that occur within the area designated as critical habitat for the jaguar. These acquisitions offset the potential effects to jaguar critical habitat.

After reviewing the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's biological opinion that the actions, as proposed, are not likely to destroy or adversely modify designated critical habitat for the jaguar.

OTHER COVERED SPECIES

Longfin Dace

While we do not anticipate that any acres of longfin dace habitat will be affected due to covered activities, we cannot be completely certain due to the uncertainty of the location and extent of impacts for each covered activity and because modeled impacts may not match the actual impacts; therefore, there may be some limited potential for incidental take of longfin dace based

on using acres of habitat impacted as a surrogate for incidental take. In addition, Pima County will be conducting survey and monitoring for this species as outlined in the monitoring plan for the MSCP (see Appendix N of the MSCP). There may be some level of incidental take resulting from harm or harassment during the implementation of these activities. However, any take of individuals due to habitat impacts or monitoring will be limited and have a limited impact with regard to the conservation of this species because of Pima County's existing policies and ordinances protecting aquatic habitat, as well as the extent of the conservation lands being provided as mitigation by Pima County. We acknowledge that Pima County anticipates providing 4,868 acres of protected and managed conservation lands for the longfin dace (see Figure A-20 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of >100:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the longfin dace in the MSCP will reduce the impacts to this species. Because of the ongoing actions of conservation partners in the area, including Pima County, we anticipate that the longfin dace will persist in the areas where it currently occurs within the action area and that additional occurrences of this species may be established as a result of the implementation of the MSCP. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the longfin dace. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the longfin dace, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the longfin dace:

- Continue current efforts to obtain surface-water rights for wildlife in Buehman Canyon;
- Support Outstanding Waters protection by ADEQ for Cienega Creek, Davidson Canyon and Buehman Canyon;
- Work with AZGFD to carry out the County's intention to reestablish longfin dace (as articulated in the Riparian and Aquatic Species Management Plan) on mitigation and County-owned lands;
- Place restrictive covenants or conservation easements on County-controlled mitigation lands as described in Chapter 4 of the MSCP;
- Implement the Pima County Floodplain Ordinance as described in Chapter 4 of the MSCP to minimize loss of habitat for this species; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within

the permit area as a result of the MSCP covered activities. However, while we do not anticipate that any longfin dace habitat will be affected as a result of the implementation of the covered activities, there is some uncertaintly of the location and extent of future covered activities because modeled impacts may to represent actual impacts. Therefore, there is the potential for a limited amount of longfin dace habitat to be affected. If this occurs in excess of five acres, we will coordinate with Pima County to determine if there is a need to amend the incidental take permit or reinitiate this consultation. In addition, should Pima County choose to establish a new population(s) of longfin dace for conservation purposes, there is the potential for these entire populations to be lost. However, because of the ongoing actions of conservation partners in the area, including Pima County, we expect that during the life of the permit, there will always be populations of longfin dace extant. Additionally, a small, but undeterminable number of longfin dace may be taken as a result of other management and monitoring actions prescribed in the MSCP. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the longfin dace for reasons discussed above in our conclusion.

Desert Sucker

While we do not anticipate that any acres of desert sucker habitat will be affected due to covered activities, we cannot be completely certain due to the uncertainty of the location and extent of impacts for each covered activity and because modeled impacts may not match the actual impacts; therefore, there may be some limited potential for incidental take of desert sucker based on using acres of habitat affected as a surrogate for incidental take. In addition, Pima County will be conducting survey and monitoring for this species as outlined in the monitoring plan for the MSCP (see Appendix N of the MSCP). There may be some level of take resulting from harm or harassment during the implementation of these activities. However, any take of individuals due to habitat impacts or monitoring will be limited and have a limited impact with regard to the conservation of this species because of Pima County's existing policies and ordinances protecting aquatic habitat, as well as the extent of conservation lands being provided as mitigation by Pima County. We acknowledge that Pima County anticipates providing 99 acres of protected and managed conservation lands for the desert sucker (see Figure A-23 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 100:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the desert sucker in the MSCP will reduce the impacts to this species. We anticipate that additional occurrences of this species may be established as a result of the implementation of the MSCP. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the desert sucker. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the desert sucker, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the desert sucker:

- Continue to support eradication of nonnative, predatory, invasive aquatic species in select areas;
- Work with AZGFD to carry out the County's intention to reestablish desert sucker (as articulated in the Riparian and Aquatic Species Management Plan) on mitigation and County-owned lands;
- Place restrictive covenants or conservation easements on County-controlled mitigation lands in the San Pedro watershed, as described in Chapter 4 of the MSCP;
- Protect its existing water rights associated with County-owned mitigation lands in the San Pedro watershed;
- Implement the Pima County Floodplain Ordinance as described in Chapter 4 of the MSCP to minimize loss of habitat for this species; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. However, while we do not anticipate that any desert sucker habitat will be affected as a result of the implementation of the covered activities, there is some uncertainty regarding the location and extent of future covered activities because modeled habitat impacts may no represent the actual impacts that occur, and there may be unanticipated effects because of potential future efforts by State, Federal or local authorities to establish suckers in the action area and because the PCA may be modified over time to reflect changes in species distributions. Therefore, there is the potential for a limited amount of desert sucker habitat to be impacted. If this occurs in excess of five acres, we will coordinate with Pima County to determine if there is a need to amend the incidental take permit or reinitiate this consultation. In addition, should Pima County choose to establish a new population(s) of desert sucker for conservation purposes, there is the potential for these entire populations to be lost. However, because of the ongoing actions of conservation partners in the area, including Pima County, we expect that during the life of the permit, there will always be populations of desert sucker extant outside the action area, if not within it, that are either established by Pima County or Federal or State action. Additionally, a small, but undeterminable number of desert suckers may be taken as a result of the management and monitoring actions prescribed in the MSCP. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the desert sucker for reasons discussed above in our conclusion.

Sonora Sucker

While we do not anticipate that any acres of Sonora sucker PCA habitat will be affected due to covered activities, we cannot be completely certain due to the following factors: uncertainty of

the location and extent of each covered activity, modeled impacts may not match the actual impacts, the species may be reintroduced to the action area, and the species PCA may be changed if the species over time if the species takes occupancy. Therefore, there may be some limited potential for incidental take of Sonora sucker based on the use of impacted habitat acres as a surrogate for incidental take. In addition, Pima County will be conducting survey and monitoring for this species as outlined in the monitoring plan for the MSCP (see Appendix N of the MSCP). There may be some level of take resulting from harm or harassment during the implementation of these activities. However, any take of individuals due to habitat impacts or monitoring will be limited and have a limited impact with regard to the conservation of this species because of Pima County's existing policies and ordinances protection aquatic habitat, as well as the extent of conservation lands being provided by Pima County as mitigation. We acknowledge that Pima County anticipates providing 50 acres of protected and managed conservation lands for the Sonora sucker (see Figure A-24 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 50:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the Sonora sucker in the MSCP will reduce the impacts to this species. We anticipate new occurrences of this species may be established either as a result of the implementation of the MSCP or due to action of State or Federal agencies. Areas of Pima County re-establishments will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the Sonora sucker. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the Sonora sucker, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the Sonora sucker:

- Continue to support eradication of nonnative, predatory, invasive aquatic species in select areas;
- Work with AZGFD to carry out the County's intention to reestablish Sonora sucker (as articulated in the Riparian and Aquatic Species Management Plan) on mitigation and County-owned lands;
- Place restrictive covenants or conservation easements on County-controlled mitigation lands in the San Pedro watershed, as described in Chapter 4 of the MSCP;
- Protect its existing water rights associated with County-owned mitigation lands in the San Pedro watershed;
- Implement the Pima County Floodplain Ordinance as described in Chapter 4 of the MSCP to minimize loss of habitat for this species; and

- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. However, while we do not anticipate that any Sonora sucker habitat will be affected as a result of the implementation of the covered activities, there is some uncertainty of the exact location and extent of future covered activities due to the following factors: uncertainty of the location and extent of each covered activity, modeled impacts may not match the actual impacts, the species may be reintroduced to the action area, and the species PCA may be changed if the species over time if the species takes occupancy. Therefore, there is the potential for a limited amount of Sonora sucker habitat to be impacted. If this occurs in excess of five acres, we will coordinate with Pima County to determine if there is a need to amend the incidental take permit or reinitiate this consultation. In addition, should Pima County choose to establish a new population(s) of Sonora sucker for conservation purposes, there is the potential for these entire populations to be lost. Additionally, a small, but undeterminable number of Sonora suckers may be taken as a result of the management and monitoring actions prescribed in the MSCP. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the Sonora sucker for reasons discussed above in our conclusion.

Lowland Leopard Frog

We anticipate that up to 7,145 acres of lowland leopard frog habitat will be affected due to covered activities. Because of the limited occurrence of aquatic systems in the action area, any loss of these types of habitat can affect the conservation of species dependent on aquatic habitats; however, the loss of this amount of lowland leopard frog habitat will have a limited impact with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 44,316 acres of protected and managed conservation lands for the lowland leopard frog (see Figure A-26 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 6:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the lowland leopard frog in the MSCP will reduce the impacts to this species. Because of the ongoing actions of conservation partners in the area, including Pima County, we anticipate that the lowland leopard frog will persist in the areas where it currently occurs within the action area and that additional occurrences of this species may be established as a result of the implementation of the MSCP. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the lowland leopard frog. This conclusion is based on, in addition to the establishment of

conservation lands, Pima County's commitment to implement management and conservation actions that benefit the lowland leopard frog, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the lowland leopard frog:

- Actively manage this species on County-controlled mitigation lands; maintain and/or re-establish several viable populations in springs, tinajas, stock ponds and other sites, where appropriate and in coordination with the FWS and AGFD;
- Continue to support eradication of nonnative, predatory, invasive aquatic species in select areas;
- Acquire and protect select water rights to maintain and restore habitat for this species;
- Manage and monitor county-controlled mitigation lands for the detection and subsequent removal of aquatic invasive species to create suitable habitat for this species and to protect sites from other stresses;
- Support simultaneous removal of bullfrogs, crayfish, and nonnative fish across whole landscapes, such as is being conducted in the Cienega watershed;
- Where feasible, incorporate wildlife crossings into transportation project design in appropriate locations;
- Implement the Pima County Floodplain Ordinance as described in Chapter 4 of the MSCP to minimize loss of habitat for this species; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 7,145 acres of lowland leopard frog habitat will be affected as a result of the implementation of the covered activities. Additionally, a small but undeterminable number of lowland leopard frogs may be taken as a result of the management and monitoring actions prescribed in the MSCP, including any incidental take associated with returning populations established or augmented under the MSCP to baseline conditions as outlined in Sections 4.7 and 4.8 of the MSCP. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the lowland leopard frog for reasons discussed above in our conclusion.

Western Red Bat

We anticipate that up to 178 acres of western red bat habitat will be affected due to covered activities. Because of the limited occurrence of riparian systems in the action area, any loss of these types of habitat can affect the conservation of species dependent on riparian habitats; however, the loss of this amount of western red bat habitat will have a limited impact with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing

21,441 acres of protected and managed conservation lands for the western red bat (see Figure A-7 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of >100:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the western red bat in the MSCP will reduce the impacts to this species. We anticipate that the western red bat will persist in the areas where it currently occurs within the action area. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the western red bat. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the western red bat, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the western red bat:

- Implement the Pima County Floodplain Ordinance to minimize loss of habitat for this species, as described in Chapter 4 of the MSCP; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 178 acres of western red bat habitat will be affected as a result of the implementation of the covered activities. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the western red bat for reasons discussed above in our conclusion.

Western Yellow Bat

We anticipate that up to 48 acres of western yellow bat habitat will be affected due to covered activities. Because of the limited occurrence of riparian systems in the action area, any loss of these types of habitat can affect the conservation of species dependent on riparian habitats; however, the loss of this amount of western yellow bat habitat will have a limited impact with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 13,276 acres of protected and managed conservation lands for the western yellow bat (see Figure A-8 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of >100:1. In addition, Pima County will implement a number of management and

conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the western yellow bat in the MSCP will reduce the impacts to this species. We anticipate that the western yellow bat will persist in the areas where it currently occurs within the action area. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the western yellow bat. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the western yellow bat, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the western yellow bat:

- Implement the Pima County Floodplain Ordinance to minimize loss of habitat as described in Chapter 4 of the MSCP;
- Because this species is thought to be associated with untrimmed palm trees within the urban environment, Pima County will support public education about the importance of leaving palm trees untrimmed (or only conducting minimal trimming in the case of a safety issue), and may support a small project to map the location of palm tree resources;
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database; and
- Conduct tree maintenance at Agua Caliente Park in such a way as to promote and protect potential roost sites, where these efforts do not interfere with other park goals.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 48 acres of western yellow bat habitat will be affected as a result of the implementation of the covered activities. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the western yellow bat for reasons discussed above in our conclusion.

Merriam's Mouse

We anticipate that up to 330 acres of Merriam's mouse habitat will be affected due to covered activities. Because of the limited occurrence of riparian and mesquite woodland systems in the action area, any loss of these types of habitat can affect the conservation of species dependent on these types of habitats; however, the loss of this amount of Merriam's mouse habitat will have a limited impact with regard to the conservation of this species. We also acknowledge that Pima

County anticipates providing 9,301 acres of protected and managed conservation lands for the Merriam's mouse (see Figure A-11 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 28:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the Merriam's mouse in the MSCP will reduce the impacts to this species. We anticipate that the Merriam's mouse will persist in the areas where it currently occurs within the action area. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the Merriam's mouse. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the Merriam's mouse, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the Merriam's mouse:

- Implement the Pima County Floodplain Ordinance to minimize loss of habitat, as described in Chapter 4 of the MSCP;
- Restore mesquite bosque and associated communities, where feasible;
- Where feasible, incorporate wildlife crossings into transportation project design in appropriate locations to benefit the species; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 330 acres of Merriam's mouse habitat will be affected as a result of the implementation of the covered activities. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the Merriam's mouse for reasons discussed above in our conclusion.

Abert's Towhee

We anticipate that up to 554 acres of Abert's towhee habitat will be affected due to covered activities. Because of the limited occurrence of riparian and mesquite woodland systems in the action area, any loss of these types of habitat can affect the conservation of species dependent on these types of habitats; however, the loss of this amount of Abert's towhee habitat will have a

limited impact with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 10,506 acres of protected and managed conservation lands for the Abert's towhee (see Figure A-17 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 19:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the Abert's towhee in the MSCP will reduce the impacts to this species. We anticipate that the Abert's towhee will persist in the areas where it currently occurs within the action area. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the Abert's towhee. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the Abert's towhee, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the Abert's towhee:

- Implement the Pima County Floodplain Ordinance as described in Chapter 4 of the MSCP to minimize loss of habitat;
- Identify and pursue opportunities for restoration of mesquite bosques on appropriate portions of the County-controlled mitigation lands; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 554 acres of Abert's towhee habitat will be affected as a result of the implementation of the covered activities. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the Abert's towhee for reasons discussed above in our conclusion.

Arizona Bell's Vireo

We anticipate that up to 72 acres of Arizona Bell's vireo habitat will be affected due to covered activities. Because of the limited occurrence of riparian and woodland systems in the action area, any loss of these types of habitat can affect the conservation of species dependent on these types of habitats; however, the loss of this amount of Arizona Bell's vireo habitat will have a

limited impact with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 8,244 acres of protected and managed conservation lands for the Bell's vireo (see Figure A-18 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of >100:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the Arizona Bell's vireo in the MSCP will reduce the impacts to this species. We anticipate that the Arizona Bell's vireo will persist in the areas where it currently occurs within the action area. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's biological opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the Arizona Bell's vireo. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the Arizona Bell's vireo, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the Arizona Bell's vireo:

- Implement the Pima County Floodplain Ordinance as described in Chapter 4 of the MSCP to minimize loss of habitat for this species;
- Identify and pursue opportunities for restoration of mesquite bosques and xeroriparian vegetation communities on appropriate County-controlled mitigation lands; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 72 acres of Arizona Bell's vireo habitat will be affected as a result of the implementation of the covered activities. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the Arizona Bell's vireo for reasons discussed above in our conclusion.

Giant Spotted Whiptail

We anticipate that up to 4,355 acres of giant spotted whiptail habitat will be affected due to covered activities. Because of the limited occurrence of riparian and woodland systems in the action area, any loss of these types of habitat can affect the conservation of species dependent on these types of habitats; however, the loss of this amount of giant spotted whiptail habitat will have a limited impact with regard to the conservation of this species. We also acknowledge that

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Pima County anticipates providing 11,771 acres of protected and managed conservation lands for the giant spotted whiptail (see Figure A-27 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 2.7:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the giant spotted whiptail in the MSCP will reduce the impacts to this species. We anticipate that the giant spotted whiptail will persist in the areas where it currently occurs within the action area. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the giant spotted whiptail. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the giant spotted whiptail, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the giant spotted whiptail:

- Implement the Pima County Floodplain Ordinance to minimize loss of habitat as described in Chapter 4 of the MSCP;
- Place restrictive covenants or conservation easements on County-owned mitigation lands, as described in Chapter 4 of the MSCP;
- Where feasible, incorporate wildlife crossings into transportation project design in appropriate locations;
- Enforce off-highway vehicle laws on County properties and work with Arizona Game and Fish to address additional off-highway vehicle enforcement needs; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 4,355 acres of giant spotted whiptail habitat will be affected as a result of the implementation of the covered activities. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the giant spotted whiptail for reasons discussed above in our conclusion.

Needle-Spined Pineapple Cactus

We anticipate that up to 852 acres of needle-spined pineapple cactus habitat will be affected due to covered activities. Because of the limited range of this species, any loss of needle-spined pineapple cactus habitat can affect the conservation of this species. We also acknowledge that Pima County anticipates providing 8,654 acres of protected and managed conservation lands for the needle-spined pineapple cactus (see Figure A-2 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 10:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the needle-spined pineapple cactus in the MSCP will reduce the impacts to this species. We anticipate that the needle-spined pineapple cactus will generally persist in the areas where it currently occurs within the action area. Areas of needle-spined pineapple cactus habitat in the action area will be monitored as part of the overall monitoring plan for the MSCP.
After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the needle-spined pineapple cactus. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the needle-spined pineapple cactus, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the needle-spined pineapple cactus:

- Include measures to avoid and minimize impacts to the species in management and master plans in Pima County-controlled mitigation lands within the PCA for this species;
- Continue to apply avoidance, minimization and mitigation measures as described in Chapter 4 of the MSCP;
- Explore partnerships with developers and ranchers to jointly achieve conservation of this species;
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database; and
- Encourage and support studies and research to better understand the status and life history requirements of the needle-spined pineapple cactus.

Amount or Extent of Take

Sections 7(b)(4) and 7(o)(2) of the ESA generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the ESA prohibits the removal and reduction to possession of Federally-listed endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any regulation of any State or in the course of any violation of a State criminal trespass law.

Tumamoc Globeberry

We anticipate that up to 15,706 acres of Tumamoc globeberry habitat will be affected due to covered activities. We also acknowledge that Pima County anticipates providing 21,266 acres of protected and managed conservation lands for the Tumamoc globeberry (see Figure A-4 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 1:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the Tumamoc globeberry in the MSCP will reduce the impacts to this species. We anticipate that the Tumamoc globeberry will generally persist in the areas where it currently occurs within the action area. Areas of Tumamoc globeberry habitat in the action area will be monitored as part of the overall monitoring plan for the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the Tumamoc globeberry. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the Tumamoc globeberry, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the Tumamoc globeberry:

- Evaluate newly discovered populations within the County preserve system for the presence of threats and protective measures to be taken;
- Minimize impacts by participating in buffelgrass management efforts within the Sonoran desertscrub vegetation community;
- Work with the City of Tucson and Bureau of Reclamation to conserve suitable habitat in the Avra Valley; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

Sections 7(b)(4) and 7(o)(2) of the ESA generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the ESA prohibits the removal and reduction to possession of Federally-listed endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any regulation of any State or in the course of any violation of a State criminal trespass law.

Mexican Long-Tongued Bat

We anticipate that up to 5,735 acres of Mexican long-tongued bat habitat will be affected due to covered activities. Because of the unique habitat elements used by Mexican long-tongued bats within this habitat (columnar cacti, agaves, and roost sites), any loss of this type of habitat can affect the conservation of this species. However, the loss of this projected amount of Mexican long-tongued bat habitat will have a limited impact with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 52,925 acres of protected and managed conservation lands for the Mexican long-tongued bat (see Figure A-6 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 9:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the Mexican long-tongued bat in the MSCP will reduce the impacts to this species. We anticipate that the Mexican long-tongued bat will persist in the areas where it currently occurs within the action area and that additional occurrences of this species may be documented as a result of the implementation of the MSCP. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the Mexican long-tongued bat. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the Mexican long-tongued bat, as described below.

<u>Management and Conservation Commitments</u>

Pima County will implement the following management actions and conservation commitments for the Mexican long-tongued bat:

- Evaluate known roosts of this species on County preserves for conditions and needs for structural stabilization. Where appropriate, such stabilization will be carried out using techniques that will minimize disturbance and alteration of conditions. Install bat-friendly exit gates, where appropriate and feasible;
- Emphasize management for this species within Cienega Creek Natural Preserve and Colossal Cave Mountain Park;
- Apply avoidance, minimization, and mitigation measures as described in Chapter 4 of the MSCP;
- Encourage the purchase and installation of new lighting within the cave tour portion of Colossal Cave Mountain Park to reduce stress on bats and to promote higher abundance and occupancy;
- Continue to maintain FWS-funded soil piping project at Cienega Creek Natural Preserve, as budget and site conditions allow; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 5,735 acres of Mexican long-tongued bat habitat will be affected as a result of the implementation of the covered activities. Additionally, a small, but undeterminable number of Mexican long-tongued bats may be taken as a result of the management and monitoring actions prescribed in the MSCP. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the Mexican long-tongued bat for reasons discussed above in our conclusion.

California Leaf-Nosed Bat

We anticipate that up to 111 acres of California leaf-nosed bat habitat will be affected due to covered activities. Because of the unique behavioral requirements of this species (needs seasonal roosts with varying characteristics due to being non-hibernating and non-migrating), any loss of these habitat elements can affect the conservation of this species. However, the loss of this projected amount of California leaf-nosed bat habitat will have a limited impact with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 12,202 acres of protected and managed conservation lands for the California leaf-nosed bat (see Figure A-9 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of >100:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the California leaf-nosed bat in the MSCP will reduce the impacts to this species. We anticipate that the California leaf-nosed bat will persist in the areas where it currently occurs within the action area and that additional occurrences of this species may be documented as a result of the implementation of the MSCP. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the California leaf-nosed bat. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the California leaf-nosed bat, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the California leaf-nosed bat:

- Protect existing known roosts and foraging habitat from all potentially detrimental activities on County preserve lands;

- Investigate the purchase of valid mining claims for mines with known roosts; look into opportunities for creating roost preserves. Each roost will be considered for gating, and where appropriate, proper gates will be installed;
- On County preserves, restrict county activities near known roosts if this can be accomplished without disclosure of roost locations;
- Evaluate known roosts of this species on County-controlled mitigation lands for conditions and needs for structural stabilization. Where appropriate, such stabilization will be carried out using techniques that minimize disturbance and alteration of conditions;
- Encourage the purchase and installation of new lighting within the cave tour portion of Colossal Cave Mountain Park to reduce stress on bats and to promote higher abundance and occupancy; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 111 acres of California leaf-nosed bat habitat will be affected as a result of the implementation of the covered activities. Additionally, a small, but undeterminable number of California leaf-nosed bats may be taken as a result of the management and monitoring actions prescribed in the MSCP. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the California leaf-nosed bat for reasons discussed above in our conclusion.

Pale Townsend's Big-Eared Bat

We anticipate that up to 1,525 acres of pale Townsend's big-eared bat habitat will be affected due to covered activities. Because of the unique behavioral requirements of this species (needs seasonal roosts with varying characteristics used for maternity roosts and hibernacula), any loss of these habitat elements can affect the conservation of this species. However, the loss of this projected amount of pale Townsend's big-eared bat habitat will have a limited impact with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 26,277 acres of protected and managed conservation lands for the pale Townsend's big-eared bat (see Figure A-10 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 17:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the pale Townsend's big-eared bat in the MSCP will reduce the impacts to this species. We anticipate that the pale Townsend's big-eared bat will generally persist in the areas where it currently occurs within the action area and that additional occurrences of this species may be documented as a result of the implementation of the MSCP. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the pale Townsend's big-eared bat. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the pale Townsend's big-eared bat, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the pale Townsend's big-eared bat:

- Where possible, protect existing known roosts and foraging habitats of this species in County preserves from all potentially detrimental activities;
- Investigate the purchase of valid mining claims for mines with known roosts; look into opportunities for creating roost preserves. Each roost will be considered for gating, and where appropriate and financially feasible, proper gates will be installed;
- On County-controlled mitigation lands, restrict county activities within 1 kilometer of known summer roosts during May to September, and known hibernacula from October to April, if this can be accomplished without disclosure of roost locations;
- Map and document all known active and inactive mine/adits on county lands;
- Evaluate known roosts of this species, including buildings, on County-controlled mitigation lands for conditions and needs for structural stabilization. Where appropriate, such stabilization will be carried out using techniques that minimize disturbance and alteration of conditions;
- Implement white-nosed syndrome prevention guidelines during all roost visits;
- Encourage the purchase and installation of new lighting within the cave tour portion of Colossal Cave Mountain Park to reduce stress on bats and to promote higher abundance and occupancy; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 1,525 acres of pale Townsend's big-eared bat habitat will be affected as a result of the implementation of the covered activities. Additionally, a small, but undeterminable number of pale Townsend's big-eared bats may be taken as a result of the management and monitoring actions prescribed in the MSCP. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the pale Townsend's big-eared bat for reasons discussed above in our conclusion.

Cactus Ferruginous Pygmy-Owl

We anticipate that up to 7,394 acres of cactus ferruginous pygmy-owl habitat will be affected due to covered activities. Because certain habitat elements of limited occurrence occur within areas of cactus ferruginous pygmy-owl habitat (saguaros and large trees used as nest sites), any loss of these types of habitat elements can affect the conservation of this species; however, the loss of this amount of cactus ferruginous pygmy-owl habitat is unlikely to have significant impacts with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 43,248 acres of protected and managed conservation lands for the cactus ferruginous pygmy-owl (see Figure A-13 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 6:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the cactus ferruginous pygmy-owl in the MSCP will reduce the impacts to this species. We anticipate that the cactus ferruginous pygmy-owl will persist in the areas where it currently occurs within the action area and that additional occurrences of this species may be established as a result of the implementation of the MSCP. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the cactus ferruginous pygmy-owl. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the cactus ferruginous pygmy-owl, as described below.

<u>Management and Conservation Commitments</u>

Pima County will implement the following management actions and conservation commitments for the cactus ferruginous pygmy-owl:

- Apply avoidance and minimization measures as described in Chapter 4 of the MSCP;
- Place restrictive covenants or conservation easements on County-owned mitigation lands, as described in Chapter 4 of the MSCP;
- Support and participate in research experiments and other scientific efforts to benefit and increase knowledge of this species in collaboration with the FWS, AGFD, and other partners;
- Implement the Floodplain Ordinance to minimize loss of habitat, as described in Chapter 4 of the MSCP;
- Facilitate the release of captive-bred birds on Pima County lands, if such a program is carried out;
- If possible, work with citizen's group to build and install nest boxes on County-owned or managed properties that the FWS deems appropriate for such use;
- On County-owned lands, enact a 250-meter buffer "restricted activity zone" around known nests during the nesting period. Allow only short duration "pass through" activities; and

- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 7,394 acres of cactus ferruginous pygmy-owl habitat will be affected as a result of the implementation of the covered activities. Additionally, a small, but undeterminable number of cactus ferruginous pygmy-owls may be taken as a result of the management and monitoring actions prescribed in the MSCP. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the cactus ferruginous pygmy-owl for reasons discussed above in our conclusion.

Rufous-Winged Sparrow

We anticipate that up to 19,108 acres of rufous-winged sparrow habitat will be affected due to covered activities. Because of the limited occurrence of riparian and grassland systems in the action area, any loss of these types of habitat can affect the conservation of species dependent on these types of habitats; however, the loss of this amount of rufous-winged sparrow habitat is unlikely to have a significant impact with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 37,361 acres of protected and managed conservation lands for the rufous-winged sparrow (see Figure A-14 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 2:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the rufous-winged sparrow in the MSCP will reduce the impacts to this species. We anticipate that the rufous-winged sparrow will persist in the areas where it currently occurs within the action area. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the rufous-winged sparrow. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the rufous-winged sparrow, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the rufous-winged sparrow:

- Apply avoidance, minimization and mitigation measures as described in Chapter 4 of the MSCP;

- Monitor grazing on Pima County lease lands for range health and avoid over-grazing on all County-controlled mitigation lands, as indicated in Chapter 5 of the MSCP; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 19,108 acres of rufous-winged sparrow habitat will be affected as a result of the implementation of the covered activities. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the rufous-winged sparrow for reasons discussed above in our conclusion.

Sonoran Desert Tortoise

We anticipate that up to 9,473 acres of Sonoran desert tortoise habitat will be affected due to covered activities. Because Sonoran desert tortoise habitat is relatively widespread across the action area, the loss of this amount of habitat for this species is unlikely to have significant impacts with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 52,069 acres of protected and managed conservation lands for the Sonoran desert tortoise (see Figure A-29 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 5:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the Sonoran desert tortoise in the MSCP will reduce the impacts to this species. We anticipate that the Sonoran desert tortoise will persist in the areas where it currently occurs within the action area. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the Sonoran desert tortoise. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the Sonoran desert tortoise.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the Sonoran desert tortoise:

- Where feasible, incorporate wildlife crossings into transportation project design in appropriate locations;

- Place restrictive covenants or conservation easements on County-owned mitigation lands, as described in Chapter 4 of the MSCP;
- Enforce off-highway vehicle laws on County properties and work with Arizona Game and Fish to address additional off-highway vehicle enforcement needs;
- Implement the Floodplain and Hillside ordinances as described in Chapter 4 of the MSCP;
- Investigate opportunities for minimizing lethal take; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 9,473 acres of Sonoran desert tortoise habitat will be affected as a result of the implementation of the covered activities. Additionally, a small, but undeterminable number of Sonoran desert tortoises may be taken as a result of the management and monitoring actions prescribed in the MSCP. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the Sonoran desert tortoise for reasons discussed above in our conclusion.

Tucson Shovel-Nosed Snake

We anticipate that up to 63 acres of Tucson shovel-nosed snake habitat will be affected due to covered activities. Because certain habitat elements of limited occurrence make up areas of Tucson shovel-nosed snake habitat (sandy, loose soils with limited rocky areas and sparse vegetation), any loss of these types of habitat elements can affect the conservation of this species; however, the loss of this amount of Tucson shovel-nosed snake habitat is unlikely to have significant impacts with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 1,276 acres of protected and managed conservation lands for the Tucson shovel-nosed snake (see Figure A-32 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 20:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the Tucson shovel-nosed snake in the MSCP will reduce the impacts to this species. We anticipate that the Tucson shovel-nosed snake will persist in the areas where it currently occurs within the action area. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the Tucson shovel-nosed snake. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the Tucson shovel-nosed snake, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the Tucson shovel-nosed snake:

- Implement the Pima County Floodplain Ordinance to minimize loss of habitat as described in Chapter 4 of the MSCP;
- Place restrictive covenants or conservation easements on County-owned mitigation lands, as described in Chapter 4 of the MSCP;
- As funds permit, acquire and restore flood-prone lands along the Brawley Wash corridor;
- Work with City of Tucson and Town of Marana to encourage conservation of lands in northern Avra Valley;
- Where feasible, incorporate wildlife crossings into transportation project design in appropriate locations;
- Enforce off-highway vehicle laws on County properties and work with Arizona Game and Fish to address additional off-highway vehicle enforcement needs; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 63 acres of Tucson shovel-nosed snake habitat will be affected as a result of the implementation of the covered activities. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the Tucson shovel-nosed snake for reasons discussed above in our conclusion.

Groundsnake (Valley Form)

We anticipate that up to 11 acres of groundsnake habitat will be affected due to covered activities. Because of the limited range of this species, any loss of groundsnake habitat can affect the conservation of this species; however, the loss of this small amount of groundsnake habitat is unlikely to have significant impacts with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 904 acres of protected and managed conservation lands for the ground snake (see Figure A-31 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 80:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the groundsnake in the MSCP will reduce the impacts to this species. We anticipate that the groundsnake will persist in the areas where it currently occurs within the action area. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference

opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the groundsnake. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the groundsnake, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the groundsnake:

- Implement the Pima County Floodplain Ordinance to minimize loss of habitat as described in Chapter 4 of the MSCP;
- Place restrictive covenants or conservation easements on County-owned mitigation lands, as described in Chapter 4 of the MSCP, especially for lands in northern Avra Valley, north of Avra Valley Road;
- Address the means to detect and limit off-road vehicular impacts to habitat in management plans for mitigation lands in northern Avra Valley;
- Work with City of Tucson and Town of Marana to encourage conservation of lands in northern Avra Valley;
- Where feasible, incorporate wildlife crossings into transportation project design in appropriate locations;
- Enforce off-highway vehicle laws on County properties and work with Arizona Game and Fish to address additional off-highway vehicle enforcement needs; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 11 acres of ground snake habitat will be affected as a result of the implementation of the covered activities. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the ground snake for reasons discussed above in our conclusion.

Swainson's Hawk

We anticipate that up to 10,981 acres of Swainson's hawk habitat will be affected due to covered activities. Because of the limited occurrence of grassland systems in the action area, any loss of these types of habitat can affect the conservation of species dependent on these types of habitats; however, the loss of this amount of Swainson's hawk habitat is unlikely to have a significant impact with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 56,457 acres of protected and managed conservation lands for the Swainson's hawk (see Figure A-15 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 5:1. In addition, Pima County will implement a

number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the Swainson's hawk in the MSCP will reduce the impacts to this species. We anticipate that the Swainson's hawk will persist in the areas where it currently occurs within the action area. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the Swainson's hawk. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the Swainson's hawk, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the Swainson's hawk:

- Apply avoidance, minimization and mitigation measures as described in Chapter 4 of the MSCP;
- Continue to prioritize protection and acquisition of high-quality habitat;
- Where feasible, restore semi-desert grasslands by introducing prescribed fire and other methods to reduce shrub cover;
- Enact a 400-meter buffer "restricted activity zone" around known nests on County-controlled mitigation lands during the nesting period. Allow only short-duration "pass through" activities; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 10,981 acres of Swainson's hawk habitat will be affected
as a result of the implementation of the covered activities. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the Swainson's hawk for reasons discussed above in our conclusion.

Western Burrowing Owl

We anticipate that up to 1,392 acres of burrowing owl habitat will be affected due to covered activities. Because of the limited occurrence of grassland systems in the action area, any loss of these types of habitat can affect the conservation of species dependent on these types of habitats; however, the loss of this amount of burrowing owl habitat is unlikely to have a significant impact

with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 2,879 acres of protected and managed conservation lands for the burrowing owl (see Figure A-12 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 2:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the burrowing owl in the MSCP will reduce the impacts to this species. We anticipate that the burrowing owl will persist in the areas where it currently occurs within the action area. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the burrowing owl. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the burrowing owl, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the western burrowing owl:

- Continue to apply avoidance and minimization measures as described in Chapter 4 of the MSCP;
- Place restrictive covenants or conservation easements on County-owned mitigation lands, as described in Chapter 4 of the MSCP;
- Offer to collaborate with the Town of Marana and City of Tucson on their HCPs to develop management strategies for the protection of this species;
- Collaborate with Federal partners and conservation groups (e.g., Tucson Audubon Society) to develop guidelines for successful implementation of artificial burrows;
- On County preserve lands, enact a 100-meter buffer "restricted activity zone" around known nests during the nesting period. Allow only short duration "pass through" activities;
- Request clearance surveys prior to Capital Improvement Projects constructed in burrowing owl Priority Conservation Areas; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 1,392 acres of burrowing owl habitat will be affected as a result of the implementation of the covered activities. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to

jeopardize the continued existence of the western burrowing owl for reasons discussed above in our conclusion.

Desert Box Turtle

We anticipate that up to 748 acres of desert box turtle habitat will be affected due to covered activities. Because of the limited occurrence of grassland systems in the action area, any loss of these types of habitat can affect the conservation of species dependent on these types of habitats; however, the loss of this amount of desert box turtle habitat is unlikely to have a significant impact with regard to the conservation of this species. We also acknowledge that Pima County anticipates providing 5,799 acres of protected and managed conservation lands for the desert box turtle (see Figure A-28 of Appendix A of the MSCP). This will result in offsetting impacted habitat at a ratio of approximately 8:1. In addition, Pima County will implement a number of management and conservation actions as described below that will contribute to the conservation of this species. Implementation of the avoidance, minimization, and mitigation measures outlined for the desert box turtle in the MSCP will reduce the impacts to this species. We anticipate that the desert box turtle will persist in the areas where it currently occurs within the action area. These areas will be monitored and managed for the benefit of the species under the MSCP.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference opinion that the actions, as proposed, are not likely to jeopardize the continued existence of the desert box turtle. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit the desert box turtle, as described below.

<u>Management and Conservation Commitments</u>

Pima County will implement the following management actions and conservation commitments for the desert box turtle:

- Keep track of credible sightings of individuals within Pima County, including the submission of photo vouchers with coordinates to the U of A Natural History Museum, when possible;
- Place restrictive covenants or conservation easements on County-owned mitigation lands, as described in Chapter 4 of the MSCP;
- Protect and enhance habitat conditions for existing natural populations (mainly Cienega Creek and San Pedro River) as indicated by emerging research and where feasible;
- Where feasible, incorporate wildlife crossings into transportation project design in appropriate locations;
- Enforce off-highway vehicle laws on County properties and work with Arizona Game and Fish to address additional off-highway vehicle enforcement needs; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. We anticipate that 748 acres of desert box turtle habitat will be affected as a result of the implementation of the covered activities. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of the desert box turtle for reasons discussed above in our conclusion.

San Xavier talussnail (*Sonorella eremita*)
Black Mountain/Papago talussnail (*Sonorella ambigua ambigua* syn. *papagorum*)
Total Wreck talussnail (*Sonorella imperatrix*)
Empire Mountain talussnail (*Sonorella imperialis*)
Sonoran talussnail (*Sonorella magdalensis* syn. *tumamocensis*)
Santa Rita talussnail (*Sonorella walkeri*)
Pungent talussnail (*Sonorella odorata odorata* syn. *marmoris*)
Posta Quemada talussnail (*Sonorella rinconensis*)
Santa Catalina talussnail subspecies (*Sonorella sabinoenis buehmanensis*)
Santa Catalina talussnail subspecies (*Sonorella sabinoensis tucsonica*)
Las Guijas talussnail (*Sonorella sitiens sitiens*)
Tortolita talussnail (*Sonorella tortillita*)

We anticipate that any effects from the covered activities on talussnail habitat will be able to be avoided through the implementation of management and conservation actions included in the MSCP for all of these talussnail species. However, because the location and extent of impacts for each covered activity are unknown and because modeled impacts may not match the actual impacts, there is still some potential for take of these talussnail species. In addition, Pima County will be conducting survey and monitoring for these species as outlined in the monitoring plan for the MSCP (see Appendix N of the MSCP). There may be some level of take resulting from harm or harassment during the implementation of these activities. However, any take of individuals due to habitat impacts or monitoring will be limited and have a limited impact with regard to the conservation of these species. We also acknowledge that, while Pima County does not specifically identify any acres of protected and managed conservation lands for these talussnail species, they have identified some areas of occupancy on certain ranches they have acquired for conservation. Other areas of talussnail habitat will be identified and protected through the implementation of the MSCP, particularly through such ordinances as the Hillside Ordinance and through required monitoring and management activities. Implementation of the avoidance, minimization, and mitigation measures outlined for these talussnails in the MSCP will reduce the impacts to these species. We anticipate that all of these talussnail species will continue to exist within the action area and that additional occurrences of these species may be documented as a result of the implementation of the MSCP. These areas will be monitored and managed for the benefit of these species under the MSCP.

After reviewing the current status of these species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the FWS's conference

opinion that the actions, as proposed, are not likely to jeopardize the continued existence of any of the covered talussnail species. This conclusion is based on, in addition to the establishment of conservation lands, Pima County's commitment to implement management and conservation actions that benefit these talussnail species, as described below.

Management and Conservation Commitments

Pima County will implement the following management actions and conservation commitments for the covered talussnail species:

- Talus deposits will be identified in rapid assessments for preserve management purposes, and prioritized for survey efforts;
- Management plans for County reserves that include talus deposits will recommend specific measures to avoid and minimize disturbances from County activities. Discretionary projects under Pima County control may not be routed across potentially occupied habitat;
- If buffelgrass management is needed on occupied talus deposits in County-controlled mitigation lands, best management practices will be developed first, in consultation with mollusk experts;
- Requests from outside agencies for right-of-way and grading permits will be reviewed for potential habitat impacts. Further investigations of potentially suitable habitat will be required, inclusive of focused surveys and support for confirmation of species taxonomy;
- Continued adherence to protected peaks and ridges standards in the County code (Hillside Ordinance) as described in Chapter 4 of the MSCP;
- If state or Federal agencies permit an activity on County-controlled mitigation lands over which Pima County has no jurisdiction, Pima County will request avoidance, inclusive of donation of property rights on remaining habitat and taxonomic studies;
- Map talus deposits on the urban periphery;
- Develop avoidance and minimization measures that apply to utility construction across such deposits;
- Evaluate, with BLM, the potential for talussnail occurrences located on BLM Recreation and Public Purposes Act lands; and
- Implement monitoring as described in Appendix N of the MSCP, including recording and entering incidental observations in the Covered Species Information Database, as well as the submission of photo vouchers with coordinates to the U of A Natural History Museum, when possible.

Amount or Extent of Take

For the reasons discussed above (see Effects of the Action section above), we are quantifying incidental take as the number of acres of modeled or PCA habitat that will be impacted within the permit area as a result of the MSCP covered activities. This has been a challenge with regard to the talussnails because we cannot currently quantify all talus deposits in the action area. However, as the MSCP is implemented, Pima County will map talus deposits on the urban periphery and will search for talussnails on County properties to refine our understanding of habitat and occupancy over time. Until such time as we have a better idea of how much and

where talussnail habitat is located within the action area, we do not anticipate that any talussnail habitat will be affected as a result of the implementation of the covered activities, but there is a limited amount of habitat may be affected. We anticipate that up to 0.1 acre of each covered talussnail species' habitat will be affected as a result of the implementation of the covered activities. Take will be in the form of harm, harass, death, or injury. This level of take is not likely to jeopardize the continued existence of any of the covered talussnail species for reasons discussed above in our conclusion.

EFFECT OF THE TAKE

In the accompanying biological and conference opinion, the FWS determined that the levels of anticipated take outlined in the above take statements are not likely to result in jeopardy to the covered species or destruction or adverse modification of critical habitat. Incidental take coverage under Pima County's section 10 incidental take permit can be extended to currently unlisted, covered species upon the listing of those species as threatened or endangered. Upon listing of any unlisted, covered species, FWS and the ACOE should request reinitiation of this consultation to assess the appropriateness of converting this conference opinion to a biological opinion for that/those species.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

The proposed MSCP and its associated documents clearly identify anticipated impacts to affected species likely to result from the proposed actions and the measures that are necessary and appropriate to minimize those impacts. All minimization measures described in the proposed MSCP, together with the terms and conditions described in the section 10(a)(1)(B) permit issued with respect to the proposed MSCP, are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this incidental take statement pursuant to 50 CFR 402.14(I). The full description of these measures is found in the MSCP (see Chapters 4, 5, 6, and 9). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(B) and section 7(o)(2) of the Act to apply. If the permittees fail to adhere to these terms and conditions, the protective coverage of the section 10(a)(1)(B) permit and section 7(o)(2) may lapse. No additional reasonable and prudent measures were identified during the consultation. Reporting requirements to document the implementation of reasonable and prudent measures and terms and conditions are included in Section 9.1 of the MSCP. As long as those reporting requirements are met, the requirements of this incidental take statement will be met.

For the ACOE, all mitigation, minimization, avoidance, survey, monitoring, and reporting measures described in the proposed MSCP, together with the terms and conditions described in the section 10(a)(1)(B) permit issued with respect to the proposed MSCP, are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this incidental take statement pursuant to 50 CFR 402.14(I). Such terms and conditions are nondiscretionary and must be undertaken for the exemption under section 7(o)(2) of the Act to apply. If the ACOE fails to adhere to these terms and conditions, the protective coverage of section 7(o)(2) may lapse. The ACOE may submit a separate annual report on their activities or may submit a joint report with Pima County on ACOE activities covered by this BCO within the

permit area. The incidental take coverage for the nine listed species included in the MSCP becomes effective on the signing of the section 10(a)(1)(B) permit, and the acceptance of the BCO by ACOE. For the 35 unlisted species covered by the MSCP, the incidental take statement and permit will become effective upon the listing of these species as threatened or endangered under the ESA and following the conversion of this conference opinion to a biological opinion for any species listed in the future.

Disposition of Dead or Injured Listed Species`

Upon locating a dead, injured, or sick listed species, initial notification must be made to the FWS's Law Enforcement Office, 2450 W. Broadway Rd, Suite 113, Mesa, Arizona, 85202, telephone: 480/967-7900, within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care and in handling dead specimens to preserve the biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent any Federal agency's complete fulfillment of the section 2(c) or 7(a)(1) responsibilities for the currently listed or covered species. In furtherance of the purposes of the Act, we recommend implementing the following discretionary actions:

- As an implementing agency for the MSCP, the ACOE should participate in organized recovery planning for the covered species to ensure coordination of the MSCP conservation efforts with programs elsewhere in the species' range.
- The ACOE should work with other CWA section 404 permittees that do not receive coverage under the MSCP to ensure that mitigation and conservation measures implemented to address impacts to covered species are consistent with and complement those actions outlined in the MSCP.
- The FWS and ACOE should work with Pima County and other entities within the action area to identify and obtain resources to expand and enhance the conservation lands in the action area in a manner compatible with the objectives of the MSCP.
- The FWS and ACOE should use their resources and programs to provide landscape level information that would inform and complement the information being gathered by Pima County under the MSCP to expand the scope and applicability of the information to improve adaptive management within the action area.

In order for the FWS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes the biological and conference opinion for the section 10(a)(1)(B) incidental take permit associated with the Pima County MSCP and for the ACOE to implement similar actions as described within the MSCP within the action area. You may ask us to confirm the conference opinion as a biological opinion issued through formal consultation if a currently unlisted covered species is listed or critical habitat is designated. The request must be in writing. If we review the proposed action and find there have been no significant changes in the action as planned or in the information used during the conference, we will confirm the conference opinion as the biological opinion for the proposed actions and no further section 7 consultation will be necessary. After listing a species as threatened or endangered and any subsequent adoption of this conference opinion, the Federal agency shall request reinitiation of consultation if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect the species in a manner or to an extent not considered in the conference opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the species that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. These same criteria define when reinitiation is required for currently listed species, in cases where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law). For listed species, in instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The incidental take statements provided in this BCO, for the unlisted species, the candidate species and listed species with special rules, does not become effective until the species is listed or the special rule is removed, and the conference opinion is adopted as the biological opinion issued through formal consultation. At that time, the project will be reviewed to determine whether any take of the proposed species has occurred. Modifications of the opinion and incidental take statement may be appropriate to reflect that take. No take of the proposed species may occur between the listing of the species and the adoption of the conference opinion through formal consultation or the completion of a subsequent formal consultation.

Approved:

For Steven L. Spangle, Field Supervisor
Arizona Ecological Services Office

4/13/16
Date

Concur:

Michelle Shaughnessy
Assistant Regional Director – Ecological Services,
Southwest Region

4/26/16
Date

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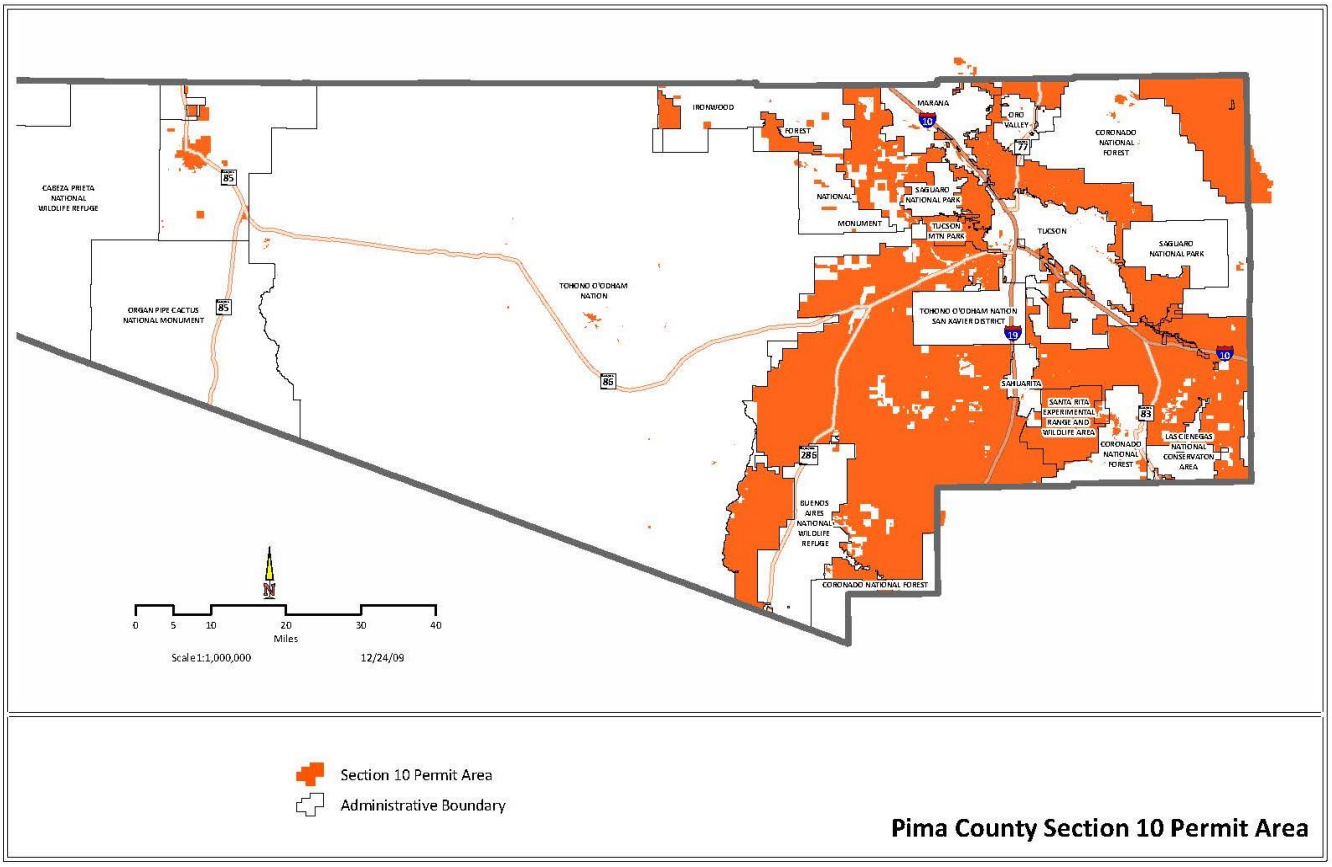

Figure 1. Permit Area of the Pima County MSCP, representing the area within which Covered Activities under the Section 10 permit could occur. This map is an approximation of the Permit Area; see text for Permit Area description.

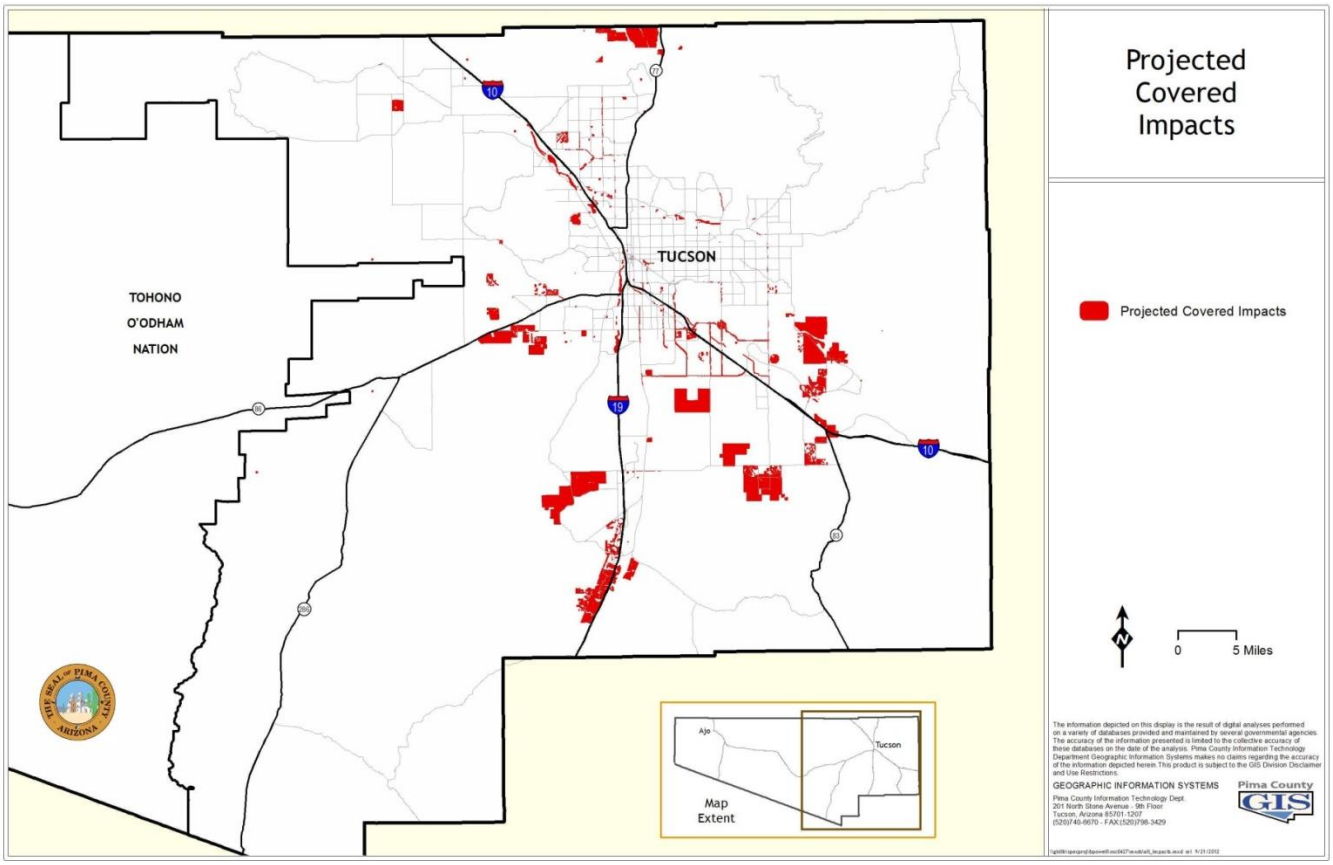

Figure 2. Impacts that are projected to occur as a result of Covered Activities in the Permit Area. Projected impacts are for analytical purposes and are not intended to be used for parcel-specific determination of permit coverage. The location and rate of development are likely to change during the 30-year permit.

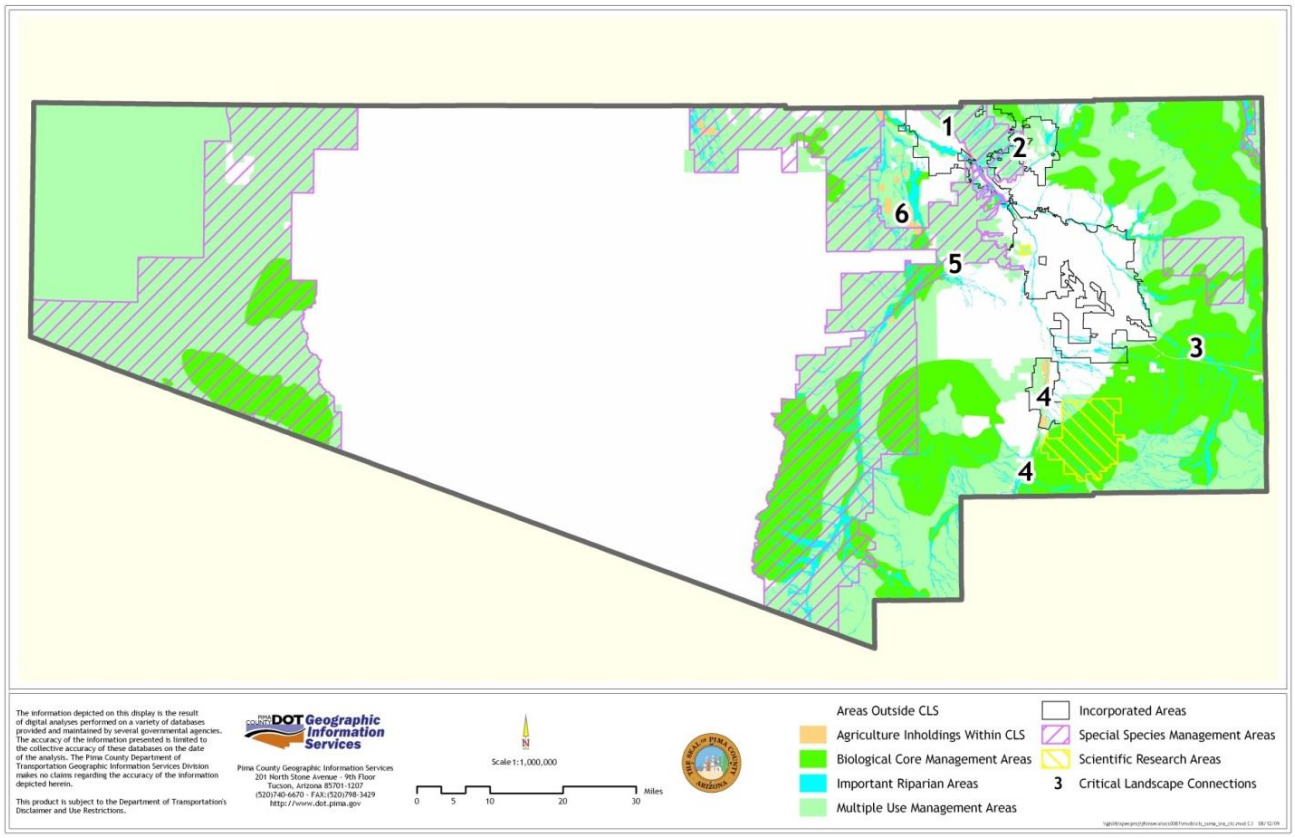

Figure 3. Maeveen Marie Behan Conservation Land System (CLS) in Pima County

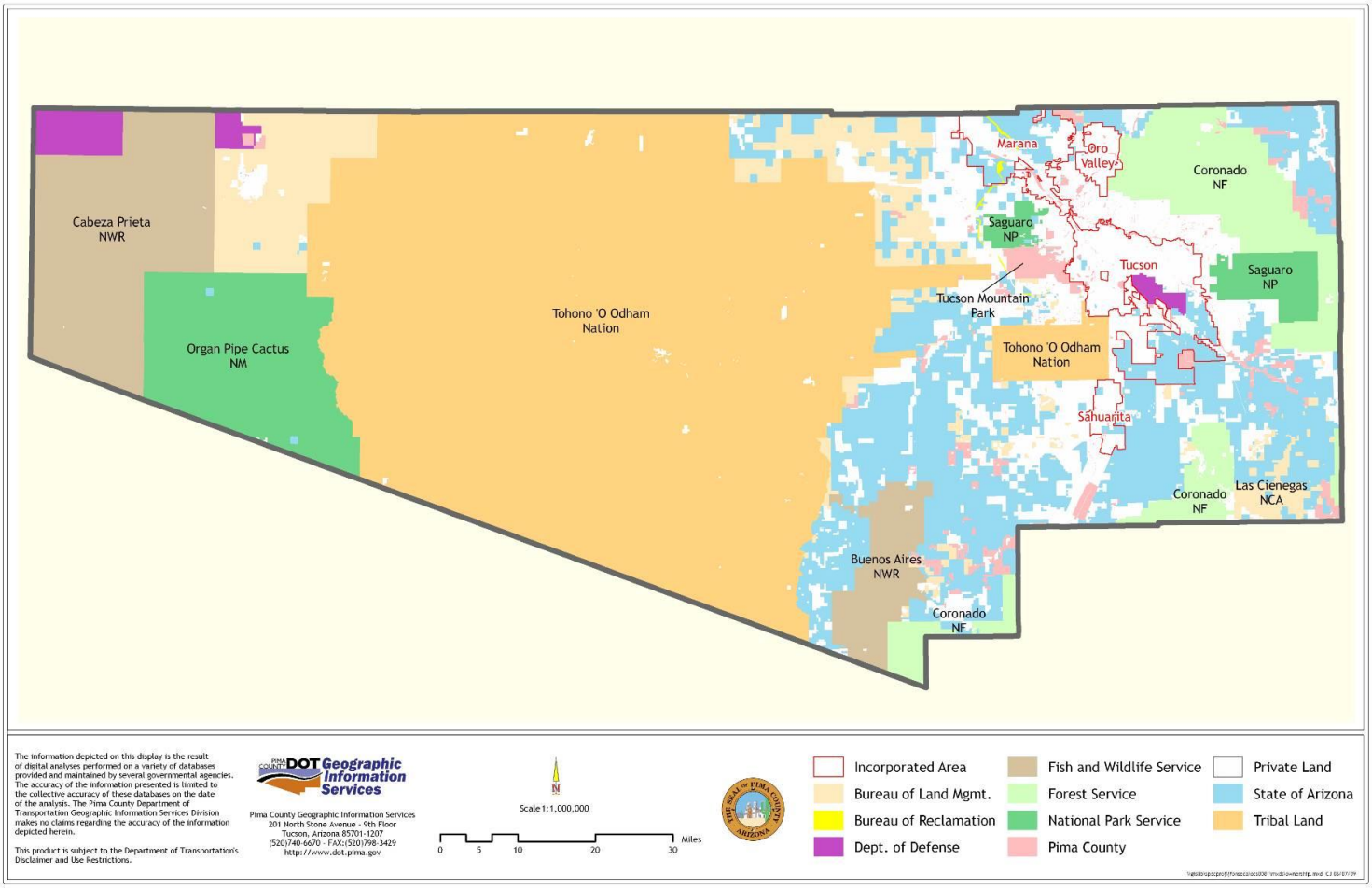

Figure 4. Landownership for Pima County

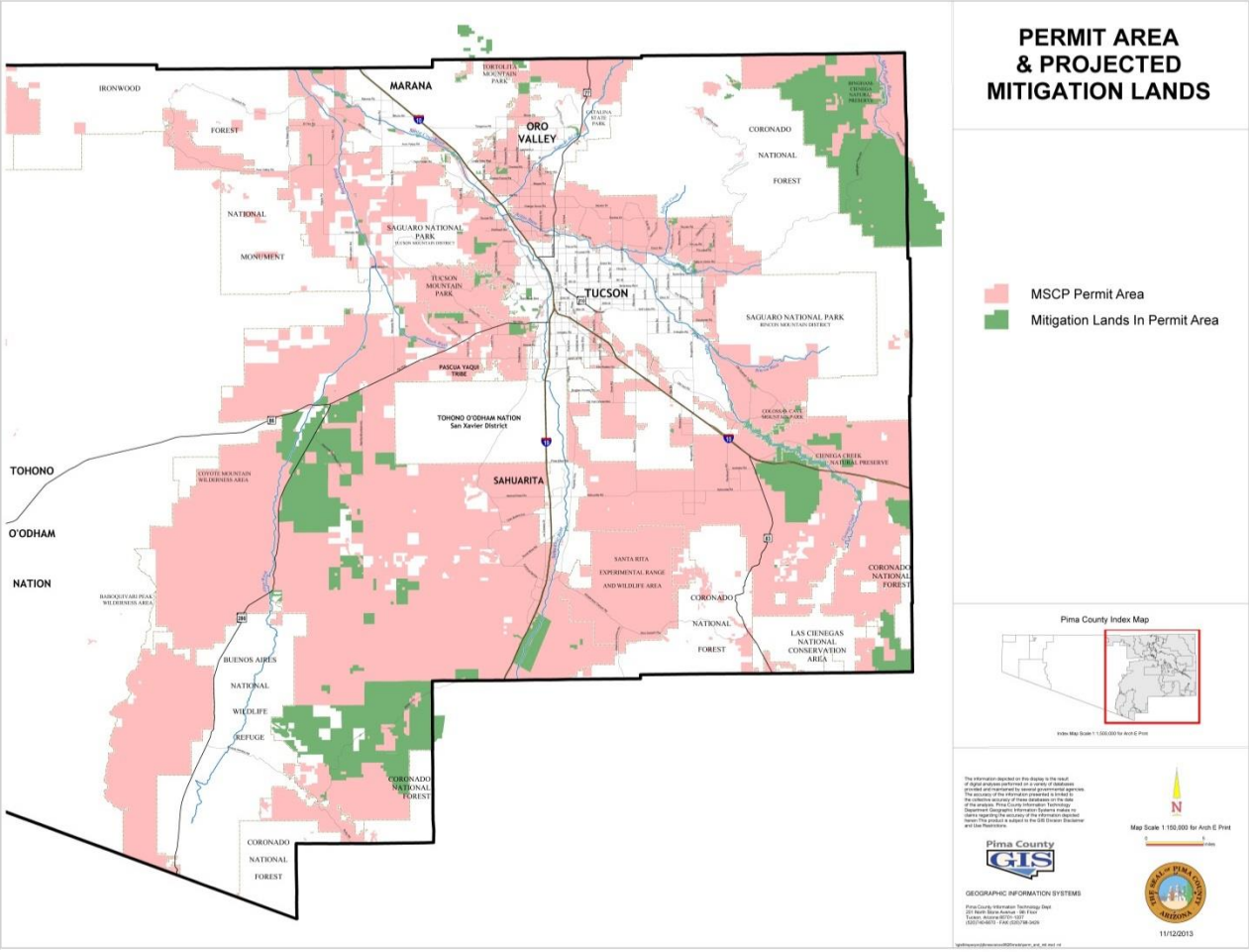

Figure 5. Fee and lease land acquired by Pima County for mitigation of activities covered under the Section 10 permit; includes about 2,000 acres of proposed RPPA patents and near-term donations. Additional mitigation lands are likely to be acquired in the future.