MEMORANDUM

Date: February 28, 2017

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

From: C.H. Huckelberry
County Administrator

Re: **2016 Annual Report for the Pima County Multi-Species Conservation Plan**

I am pleased to present the Board of Supervisors with the first annual report prepared by the Office of Sustainability and Conservation that summarizes the results and activities undertaken for the Multi-Species Conservation Plan (MSCP). As the Board knows, the MSCP is the part of the Sonoran Desert Conservation Plan that addresses endangered species; and this memorandum reviews the activities relating to the Section 10 (Endangered Species Act) permit undertaken in Calendar Year 2016. A report of activities must be submitted to the U.S Fish and Wildlife Service (USFWS) each year by March 1. This report will also be made available to the public on the MSCP webpage at www.pima.gov/mscp.

Background

The permit requires the County to report annually to the USFWS, primarily to quantify impacts and mitigation, provide updates on implementation of the MSCP and results of the ecological monitoring program, and identify any emerging issues with the programs.

Findings

Notable achievements during 2016 include the following:

- The Section 16 permit came into effect on July 13, 2016.
- The County and Regional Flood Control District (RFCD) Boards acted to permanently protect MSCP mitigation lands owned by County or the RFCD through restrictive covenants on October 18, 2016.
- Covered activities during 2016 included 66 County or RFCD projects.
- Private lands voluntary coverage began January 9, 2017.
- Most covered Capital Improvement Projects either did not disturb ground or required no mitigation under the terms of the permit. An existing process has been in place for several years to minimize and measure the impacts of County projects. Using that process, it was determined that four projects resulted in a loss of 20 acres of habitat, which equated to a mitigation obligation of 53 acres.

- Pima County and the RFCD selected the Bingham Cienega property to allocate as the first County-owned property for impact mitigation. This property includes valuable habitat within the Maeveen Marie Behan Conservation Lands System, has an existing management plan in need of updating, and provides enough acres for several years of impact mitigation. A description of the Bingham Cienega mitigation land is provided in the report, along with recent management activities.
- Pima County and the RFCD have been conducting conservation activities on other mitigation lands, in partnership with Arizona Conservation Corps, Southern Arizona Quail Forever, Arizona Game and Fish Department and many others. These include restoring grasslands at King98 Ranch, building wildlife waters at Clyne Ranch and removing invasive plants. County and RFCD field staff are identifying and plugging open pipes that can attract and kill cavity-nesting birds. Such open pipes are associated with fences and gates.
- As part of ecological monitoring, staff visited many of the County/RFCD mitigation properties in 2016, making note of resource issues and species sightings that inform management. Three new perennial sources of water were found. Chiricahua leopard frogs have naturally colonized a stock tank in the upper Cienega watershed. Over 1,000 separate observations were made of species covered in the MSCP.
- A number of pre-existing evaluation processes and actions taken by County departments provide avoidance, minimization and mitigation of impacts related to the MSCP. We estimate that during the Fiscal Year 2016/17, approximately $3.5 million will be spent on activities that support various aspects of the MSCP. These activities primarily include the administration of various ordinances and the management of park and ranch lands acquired with voter-approved bonds.
- Volunteers and partnering organizations assisted with improving habitat and monitoring conditions on open space lands that will be used for mitigation. Private lands donations also contributed to the protection of additional habitat.

Calendar Year 2017 Planned Activities

Continued extension of Section 10 (Endangered Species Act) streamlining to the private sector is one of staff's primary activities during 2017. As of February 23, 2017, seven Certificates of Coverage have been issued, granting coverage under the County's Section 10 permit to seven individual private sector development projects. Pima County RFCD has initiated discussions with the Federal Emergency Management Agency (FEMA) about streamlining species impact reviews for proposed alterations of floodplains that require approvals from that agency, and we are working with a private developer on streamlining a species review under the Clean Water Act program.

Other planned activities include the following:

- Several land acquisitions of open space were finalized in the latter half of 2016. Board approval of restrictive covenants on these lands will be proposed in 2017.
- Preparation of a comprehensive updated management plan for the Bingham Cienega.
- Initiate monitoring and evaluation of designated MSCP mitigation lands to ensure restrictive covenants are being observed for biennial report.
- Continued efforts to minimize impacts of the SunZia power line, Southline power line, the Arizona Department of Transportation/Federal Highway Administration Interstate 11 corridor, Sierrita pipeline, and Rosemont mine on potential County and RFCD mitigation lands, and to evaluate any relevant information these projects generate.
- Pima County will work with USFWS and others on the potential for using native fish for vector control, and continue to respond to the Arizona Game and Fish Department regarding native species introductions.
- Seek additional authorizations from USFWS and Arizona State Land Department to enable species monitoring mandated by the Ecological Monitoring Plan.
- Continued advancement of the MSCP ecological monitoring program working under cooperative agreements with the National Park Service, Audubon Society, and other partners.
- Continued public outreach and education regarding the benefits of the MSCP.

After nearly 18 years of development of the Sonoran Desert Conservation Plan and Multi-Species Conservation Plan and the acquisition of natural open space approved by voters, Pima County and the private sector can be assured of certainty in the regulatory process concerning endangered species and the opportunity for economic development to proceed in a streamlined and efficient manner. This report demonstrates the value of realizing this long-term vision.

CHH/mjk
Attachment

c: Carmine DeBonis, Jr., Deputy County Administrator for Public Works
Nanette Slusser, Assistant Deputy County Administrator for Public Works
Suzanne Shields, Director, Regional Flood Control District
Chris Cawein, Director Natural Resources, Parks and Recreation
Linda Mayro, Director, Sustainability and Conservation

Pima County's Section 10(a)(1)(B) Permit and Multi-species Conservation Plan: 2016 Annual Report

March 1, 2017

Submitted to the U.S. Fish and Wildlife Service, Southwest Region

MSCP
Pima County Multi-Species Conservation Plan

Report Prepared by Pima County Office of Sustainability Staff:
Julia Fonseca
Brian Powell
Ian Murray

Sharon Bronson, Chair, District 3
Richard Elias, District 5
Ramon Valadez, District 2
Ally Miller, District 1
Steve Christy, District 4

C. H. Huckelberry County Administrator

PIMA COUNTY

Photos on report cover (left to right): Sonoran desert tortoise at the McKenzie property (2015), talussnail at Old Hayhook Ranch (January 2016) and Bar-V Ranch landscape (December 2016).

Table of Contents

List of Tables

List of Figures

List of Appendices

1. Introduction

This report is prepared for the U.S. Fish and Wildlife Service (USFWS) under Incidental Take permit #TE84356A. The Section 10(a)(1)(B) permit (herein Section 10 permit or permit) for the Pima County Multi-species Conservation Plan (MSCP; Pima County 2016) was signed by the Pima County Administrator on July 13, 2016. This annual report covers the time period July 14 through December 31, 2016.

Most of the activities discussed in this annual report occur on lands managed or regulated by Pima County and/or Pima County Regional Flood Control District (RFCD), the two permittees under the Section 10 permit. (Pima County and RFCD are herein referred to collectively as "Pima County" unless otherwise noted). Private lands coverage was not yet available during the reporting period.

The permit area is located within Pima County, Arizona (Figure 1). Land ownership in Pima County is primarily tribal, federal and state trust land (Figure 2).

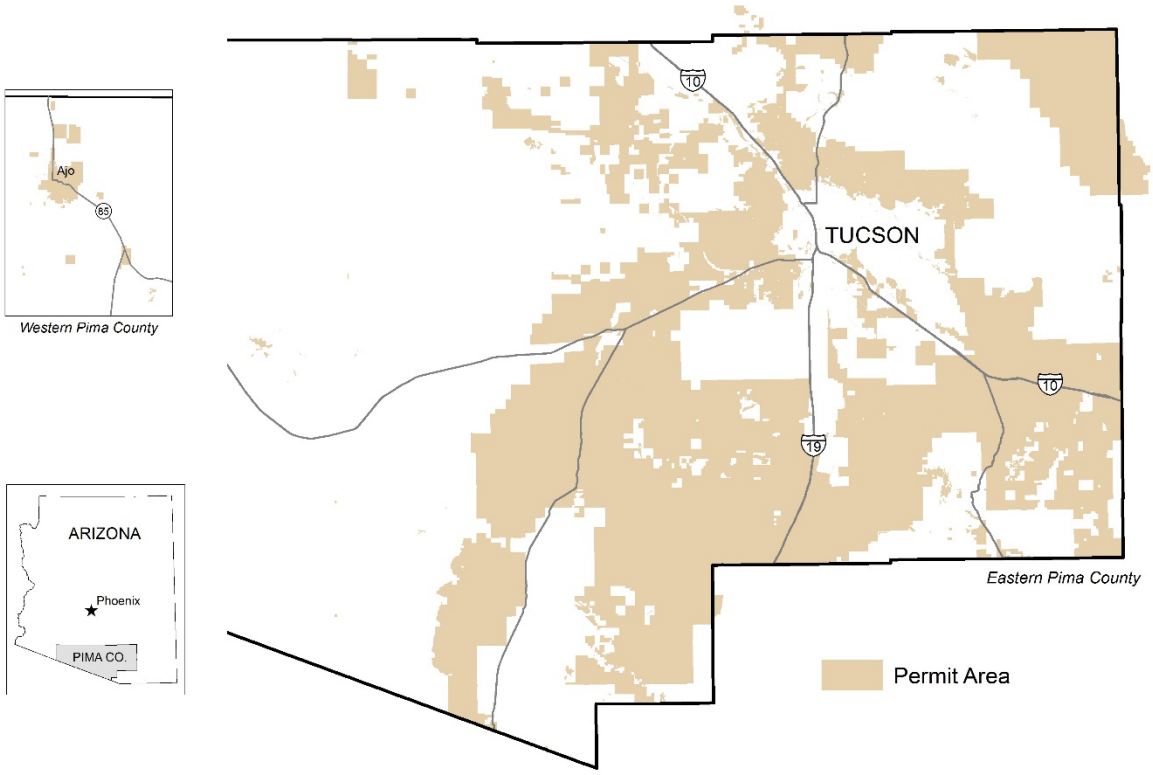


Figure 1. Permit Area of Pima County's Multi-species Conservation Plan.

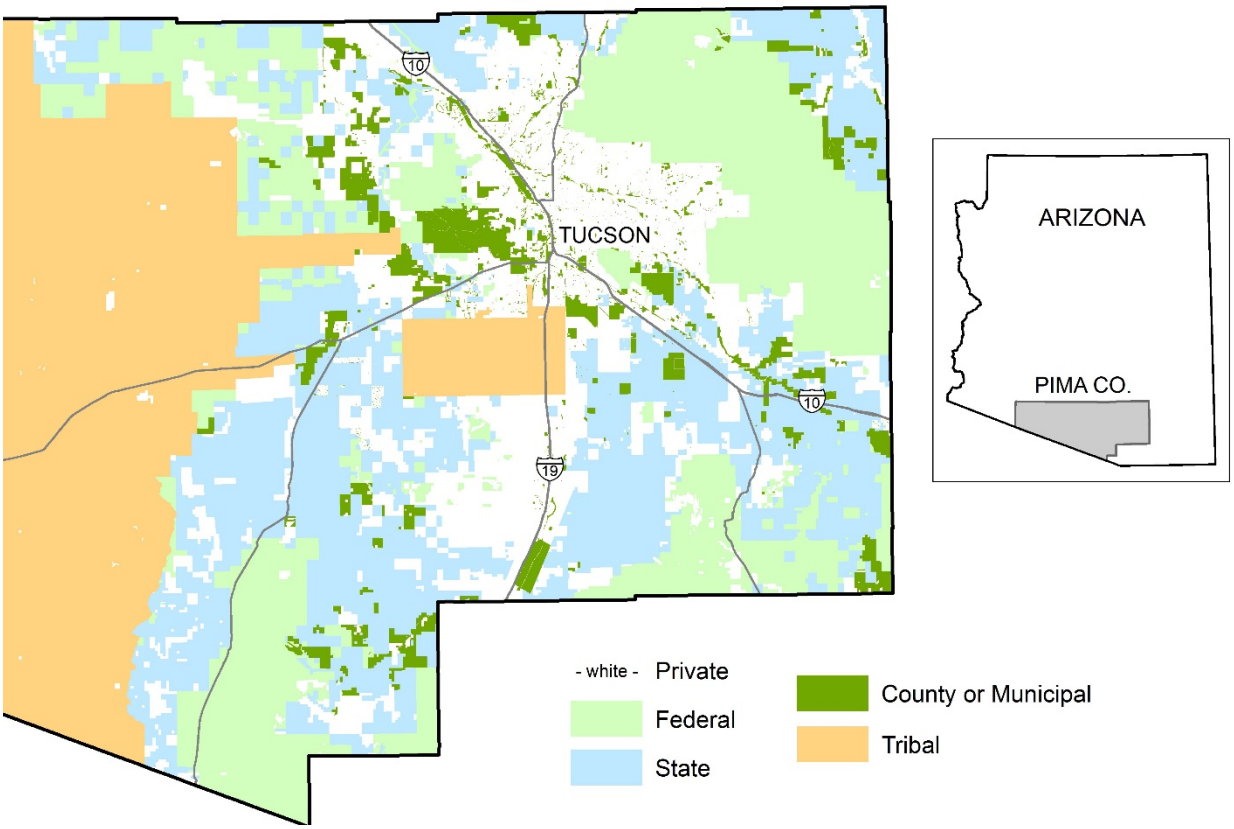


Figure 2. Land ownership in eastern Pima County as of December 2016. See Figure 3 for location of changes in land ownership during the reporting period.

Annual reporting is required under the terms of the permit. The primary purposes of this annual report, as described in Chapter 9 of the MSCP, are to:

1. Quantify impacts of Covered Activities and mitigation;
2. Provide updates on the implementation of the MSCP; and
3. Inform the decision-making process if conditions of the permit or Implementing Agreement are not being met, or when adaptive management is needed.

The format of this report follows the template in the Appendix P of the MSCP. A glossary of terms and acronyms (Pages 43-45) is included to assist the reader and ensure consistency between this document and the MSCP.

2. Permit Changes

Pima County's Section 10 permit went into effect on July 13, 2016 and no amendments to the MSCP or permit language have occurred since then. The Implementing Agreement with the USFWS was signed on October 13, 2016.

3. Administrative Changes

3.1. Permit Area

The Permit Area represents the area within which covered activities could occur. The Permit Area as described in the approved MSCP has changed slightly (Figure 3) for the following reasons:

- Annexations and changes in state and federal land status (Figures 1, 2). Annexation has the effect of slightly reducing the Permit Area in which coverage of private activities would become available.
- Sales of State Trust land to private owners has the effect of increasing the Permit Area. This increase in private land ownership in unincorporated Pima County might have little practical effect for permit coverage if this land is primarily used for future expansion of mines. Mining is not a covered activity.
- There are also a few minor parcels in the urban area that were also conveyed by Arizona which are not visible on this map.
- Pima County acquired over 2,000 acres of State Trust lands in the Tortolita Mountains in late 2012 and in 2014. These lands became potential mitigation lands and are discussed elsewhere in this document.

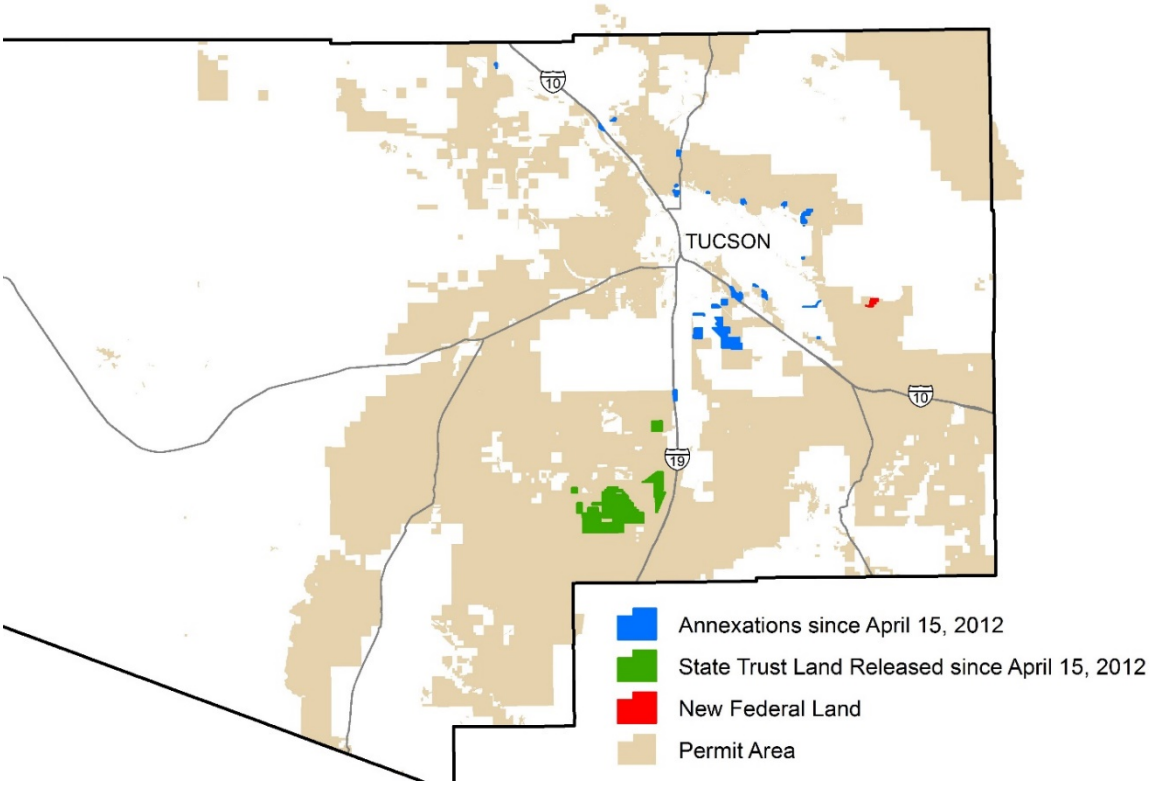


Figure 3. Permit Area changes for Pima County's Multi-species Conservation Plan. Annexations and a federal land acquisition diminished the Permit Area extent, but a great deal of state trust land was added to the Permit Area.

3.2. Land Protection

On October 18, 2016, the Pima County and District boards approved master restrictive covenants on 64,487 acres of County-owned land, thereby protecting mitigation lands against future changes in land-use activities (Appendix 1). Restrictive covenants are like deed restrictions and, in this instance, are used to prohibit the County from authorizing many types of development such as cell phone towers, golf courses, subdivisions and other land uses that are incompatible with the purposes for which the lands were originally acquired. The restrictive covenants address the MSCP commitment and Section 10 permit requirements that the County and RFCD provide perpetual legal protection for those open-space lands that are to be used to mitigate for Covered Activities. Lands that had restricted covenants placed on them are considered to be encumbered.

Encumbered lands are already owned in fee-simple by Pima County, and most were acquired using voter-approved bonds for open space and/or flood prone land. Some mitigation lands were already protected by provisions in a contract with the Arizona State Parks Board; the new covenants imposed additional restrictions on future land uses that Pima County may allow. Legal recordation of restrictive covenants is ongoing and is expected to be completed in 2017.

The County chose the Arizona Land and Water Trust (ALWT) as the third-party beneficiary for our restrictive covenants (Table 1). During the negotiations with—and review by—ALWT, Pima County made changes to the restrictive covenants that deviated from the restrictive covenant template in the MSCP (Appendix J). The primary purpose of this change was to clarify responsibilities among the County and ALWT (Table 1). The USFWS was provided an opportunity to review the changes prior to adoption.

Table 1. Restrictive covenant roles and duties for the Pima County Multi-species Conservation Plan and Section 10(a)(1)(B) permit.

Name (Role)	Duty	Frequency
County or District (landowner)	Inspection and reporting	Biennially, at a minimum
	Violation identification and reporting	Within 2 days of identifying
	Determine when Board action may be necessary for exceptions	As needed
County or District (holder of covenant)	Review potential violations	When delivered
	Review biennial inspection reports	When delivered
	Enforce covenant	At their discretion
	Grant permission for release or alteration of covenants	At their discretion
Arizona Land and Water Trust (beneficiary)	Review biennial inspections	When delivered
	Decide when to enforce	At their discretion
USFWS (regulator)	Grant permission for release or alteration of MSCP covenants	At their discretion

These changes ensure that ALWT will receive adequate documentation and indemnity and will be compensated for its time. The changes also clarified and specified responsibilities among the various land managers of potential mitigation lands, including lessees. The County now has procedures and timeframes to meet for compliance monitoring and responses to any violations. The changes also acknowledge overriding mandates that affect the County's discretion to manage the land, and eliminated some unintentionally ambiguous language. All of these changes were made prior to the adoption of master restrictive covenants by the County and District Boards on October 18, 2016.

3.3. Army Corps of Engineers Programmatic Consultation

Pursuant to the programmatic consultation with U. S. Army Corps of Engineers (Corps), Pima County worked with the USFWS and the Corps to develop a template for streamlining Endangered Species Act compliance for the 18 nationwide and regional general Clean Water Act permits listed in the MSCP. The parties have agreed to exchange information about the completion status of any projects which might be streamlined via MSCP coverage. No projects utilized this streamlining process during this reporting period; such projects and their associated Clean Water Act (Section 404) permits will be identified in future annual reports.

3.4. Miscellaneous Administration Items

- There were no information requests by the USFWS to Pima County for the purpose of assessing whether the terms and conditions of the permit are being met.
- There were no changes to habitat models or Priority Conservation Areas.
- There were no changes in regional Endangered Species Act listings or critical habitat designations since permit issuance.
- In December 2016, the USFWS recommended a classification change to the lesser long-nosed bat from *Leptonycteris curasoae yerbabuenae* to *Leptonycteris yerbabuena*e (U.S. Fish and Wildlife Service 2016). Pima County has conformed to that recommendation.

4. Incidental Take

This section describes incidental take caused by the covered activities identified in the MSCP. As noted in section 3.7.1 (MSCP), incidental take is determined by acres of habitat lost and (if appropriate) reported take of individuals. Permit coverage for private lands was not available in 2016; therefore, there were zero acres of habitat loss due to private land activities in 2016. (The Board-authorized program for private lands coverage commenced in January 2017).

There were 66 County Capital Improvement Projects (CIP) covered by the permit (Appendix 2) during 2016. Many of the covered projects listed in Appendix 2 did not cause ground disturbance, and others occurred in the urban areas where no habitat take occurred. Covered activities also include non-CIP projects and activities that occurred in various locations throughout the permit area but these are not required to be listed each year in the annual report. Refer to the MSCP for a description of all covered activities.

After discussion with the USFWS Tucson Field Office, it was mutually determined that a County Capital Improvement Program (CIP) project would be reported as a covered activity whenever it is substantially complete. Substantial completion occurs after most of the earthwork is done but prior to completion of all activities, such as landscaping and payment of invoices. For this first reporting period only, we report as covered activities projects that were financially complete after July 13, 2016 and before January 1, 2017. Using this broader definition during the first year allows for reporting projects that may have caused habitat loss after the permit was issued.

Appendix B of the MSCP describes the methodology used to calculate take for covered activities. For the impacts caused by County and District, this involves tracking the location and size of areas altered by CIP projects. The tracking process for CIP projects has been in place for several years and requires the submittal of Geographic Information System (GIS) "polygons" which describe the location and aerial extent of completed projects. This tracking process is discussed in greater detail in Section 5.2.

Polygons for ground-disturbing CIP projects that were completed by December 31, 2016 were used to calculate impacts. These "final polygons" were intersected with the Built Environment GIS layer known as CIPBUILT. Those portions outside the built environment were then intersected with the Maeveen Marie Behan Conservation Lands System (CLS) to determine the habitat loss, as described in Appendix B of the MSCP. Each CLS category has a specific mitigation ratio that is used to calculate the MSCP mitigation obligation (as described in Section 4.3.1. of the MSCP).

Table 2 summarizes the acres of impact for ground-disturbing, completed CIP projects along with the CLS category and mitigation ratios that applied to these impacts. The total habitat loss was 20.4 acres. The corresponding mitigation obligation for 2016 is 52.6 acres. This is the first year in which the Section 10 permit is effective, so this represents the total mitigation obligation to date for the MSCP.

Table 2. Habitat loss and associated mitigation ratios for 2016, Pima County MSCP.

CLS category	Habitat Loss Acreage	Mitigation Ratio	Mitigation Obligation
Biological Core	0.4	5:1	2.0
Important Riparian Area	3.4	5:1	17.0
Multiple Use Management Area	0.4	3:1	1.2
Special species management area (outside other categories)	0	5:1	0
Outside the CLS	16.2	2:1	32.4
Total	20.4		52.6

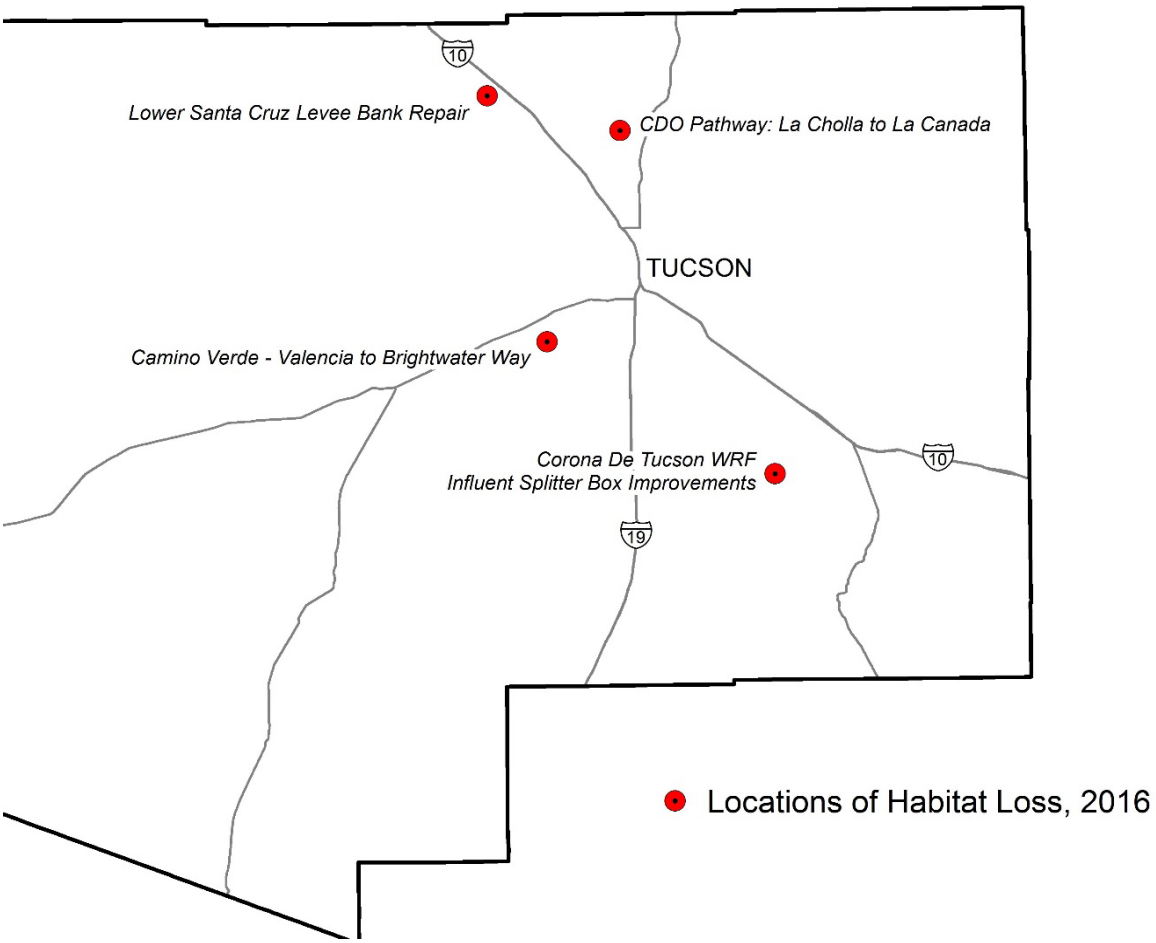


Figure 4. Location of habitat loss due to covered activities, July 13-December 31, 2016. Locations are enlarged for clarity.

5. Conservation Measures

5.1. Avoidance and minimization

5.1.1. Changes to Ordinances and Standards

In 2015 and 2016, Pima County updated various County ordinances and standards and thereby changed the placement or format of several of the avoidance and minimization measures listed in the MSCP. These changes occurred during the review of the MSCP and before issuance of the Section 10 permit and therefore are not reported here. None of the changes triggered a formal USFWS review (as described in Section 4.2 of the MSCP) and no changes weakened existing avoidance and minimization measures.

5.2. CIP Reporting Process

The Capital Improvement Project (CIP) impact reporting process was updated upon approval of the permit. Through an automated GIS script, this process notifies CIP project managers of the intersections between proposed project locations, site-specific natural resources, and protected areas in order to promote avoidance and minimization during planning. The Pima pineapple cactus Priority Conservation Area, burrowing owl Priority Conservation Area, potential bat habitat under bridges, and the need for floodplain compliance are specifically included. Staff briefed the CIP Advisory Group, and provided training to CIP project managers and RFCD about the importance of avoidance and minimization measures embedded in the CIP impact reports.

5.3. Miscellaneous Avoidance and Minimization Measures

- The Priority Conservation Area for the Pima pineapple cactus is shown on the Sonoran Desert Conservation Plan Mapguide as required by the MSCP.
- No weed ordinance letters or violations were issued on MSCP or potential MSCP mitigation lands.
- Eighty-five (85) weed ordinance letters were sent to private property owners in the Permit Area since permit issuance.
- County staff began discussions with the USFWS and the Arizona Game and Fish Department about the possibility of using native fish or macroinvertebrates as an alternative to nonnative mosquitofish for vector control under the MSCP permit.

5.4. Mitigation and Allocated Lands

To compensate for the take of covered species, Pima County allocates credits as described in Appendix B of the MSCP. Land that has become allocated is known herein as Mitigation Land. Bingham Cienega Natural Preserve, the County's first allocated property, is located along the San Pedro River (Figures 5, 6).

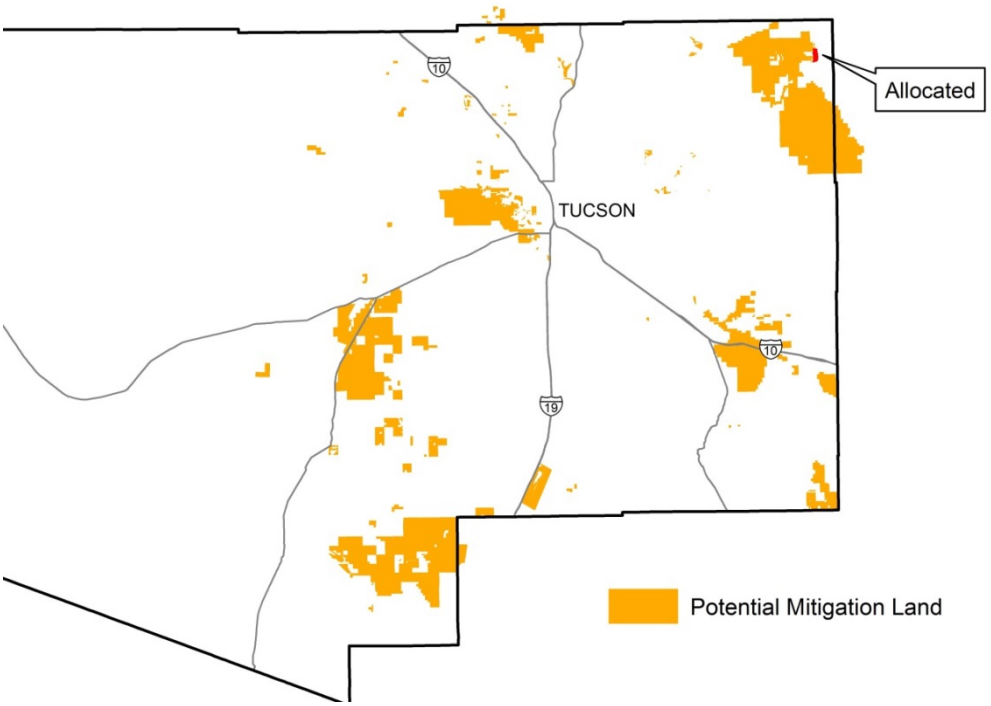


Figure 5. Location of Bingham Cienega Natural Preserve (small, red area in northeast Pima County) in relationship to other potential mitigation lands. State grazing leases, conservation easements on ranch lands held by Pima County, and fee-owned lands are included in this depiction of the potential MSCP mitigation lands.

The number of credits available from Mitigation Land is determined by the Mitigation Land's acreage and the kind of legal protection that the property has. When Mitigation Land is owned in fee title (as opposed to owning partial rights or a grazing lease), the property acreage is eligible for 100% credit.

Pima County has developed a method to track the inventory of potential mitigation lands and where allocations have occurred. These are represented in MSCPPORT, a GIS layer that summarizes the diverse portfolio of lands which may be used for credit under the MSCP. (This layer may now be viewed by the public on SDCP Mapguide.)

CLS designations are an index to an area's qualitative biological value and are used to ensure that the quality of Mitigation Land is of equal or higher value than the land where take occurred (see Appendix B and page 49 of the MSCP for more information). Bingham Cienega Natural Preserve is 267 acres in size and lies entirely within an area designated as an Important Riparian Area and is also a CLS-designated Special Species Management Area. Because the credits for Bingham Cienega exceed the mitigation obligation for take during 2016, both in acres and CLS value, the annual mitigation obligation for 2016 has been satisfied (Table 3).

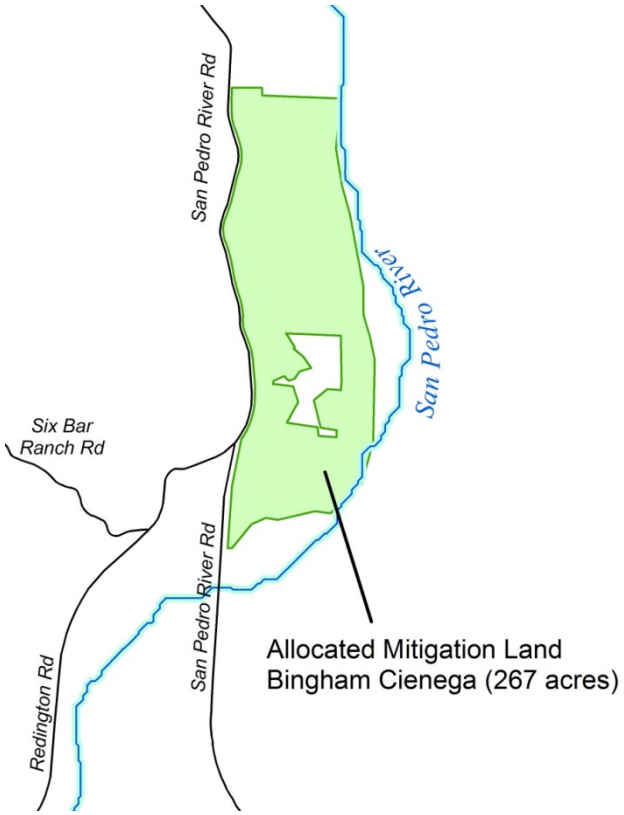


Figure 6. Mitigation Land at Bingham Cienega Natural Preserve that was allocated to offset take that occurred during the 2016 Section 10 permit reporting period.

Table 3. Total Mitigation Obligated and Allocated To Date

Year Obligated	Impacts (Acres)	Mitigation Allocated (Acres)
2016	52.6	267
Total (to date)	52.6	267

In future years, additional habitat loss from covered activities will trigger new mitigation obligations that will be applied against the Bingham Cienega "credits" in Table 3 until additional mitigation lands must be allocated.

As part of the 10-year review, Pima County will review the habitat equivalency for individual species (as discussed in MSCP Section 4.3.3.) such that a minimum 1:1 ratio of habitat loss: acres of mitigation will be maintained for each covered species.

No replacement of lost mitigation credit was needed in 2016.

5.4.1. Water Rights in Relation to Mitigation Lands

There are a number of water rights associated with the Bingham Cienega allocation. The allocated lands and associated water rights have been legally protected with restrictive covenants as described in the Management section of this report. The restrictive covenants for MSCP lands limit the kinds of uses to which water can be put, and prohibit increased levels of surface water or groundwater use without permission from U. S. Fish and Wildlife and others.

Pima County has and will continue to protect its water rights at Bingham Cienega and other potential mitigation lands in the San Pedro watershed through participation in the San Pedro River Adjudication, and through appropriate papers filed with Arizona Department of Water Resources. The County Attorney's Office monitors new requests for surface water appropriations for threats to County's water rights, and is determining whether additional pre-Statehood or pre-1919 water rights claims could bolster the County's legal standing in the Adjudication.

6. Land Management

Land management actions on allocated lands must be reported annually. Therefore, this section summarizes management activities at Bingham Cienega Natural Preserve, our first allocated mitigation lands (see Section 5 of this report). Because of the importance of land management—and the many actions Pima County is undertaking to promote sound stewardship of our extensive portfolio of mitigation lands—this section will also highlight key management actions and initiatives that impact this broader suite of conservation lands.

6.1.1.1. Park Designations

On October 18, 2016 the Pima County Board of Supervisors and RFCD Board of Directors designated or reaffirmed 154 County- and RFCD-owned properties as County Parks (Resolutions 2016-65 and 2016-FC3, respectively) as allowed by A.R.S. Section 11-932. The resolutions were intended to complement the County Restrictive Covenant items (see below). While the Restrictive Covenant discussion is related primarily to the future uses of County-owned conservation lands, the parks Resolution strengthens the County's land management authority over public uses on those properties. Many of the lands that are now designated as parks are already being used by the public, whether for passive recreation (e.g., hiking or birding), or for more intensive recreational uses (e.g., hunting). The parks resolution was needed because formal acceptance of those lands as parks lacked consistency by the Pima County Board of Supervisors. Without this, law enforcement personnel lack a consolidated regulatory authority to regulate visitor use through park rules.

6.2. Land-use Impacts of Restrictive Covenants

The restrictive covenants (discussed in Section 3.2) provides guidance to future land managers on how to address a host of potential land-use decisions and delegates specific actions by and in coordination with other County departments, ALWT, and the USFWS. As mentioned in Section 3.2, the ALWT is the third-party beneficiary that will review biennial reports and—if necessary—enforce the restrictions, thereby providing an additional safeguard to USFWS's powers under the Section 10 permit. Appendix 1 provides further detail on the restrictions and coordination process.

The restrictive covenants do not prevent the sale of applicable land by a future Board, nor do they prevent condemnation of land by qualified entities. Any sale of land so encumbered would, however, remain subject to the restrictive covenants. The covenants and the inclusion of a third-party beneficiary will serve as mechanisms to Pima County accountable for ensuring that all future, discretionary uses of the land are compatible with the mitigation commitment under the Section 10 Permit.

In addition to the encumbered land used for MSCP mitigation, 26,953 additional acres were placed under restrictive covenants to ensure their conservation values are retained. Land-use restrictions on these lands are somewhat more flexible to accommodate future needs as compared to the MSCP restrictions. Some of these conservation lands might ultimately be used for MSCP mitigation; in which case, the covenants would be altered to meet the restrictions on other MSCP lands.

6.3. Land Management Activities and Planning: Allocated Lands

Pima County is required to report on management activities that took place on all obligated mitigation lands. As noted in Section 5, Bingham Cienega Natural Preserve is the first property to be obligated, and therefore, management actions and planning actions there will be the primary focus for this report. However, many other management practices have taken place on County-controlled lands that have an impact on Covered Species. Those actions will be briefly reviewed.

6.3.1. Bingham Cienega Natural Preserve (Preserve)

Introduction. The Preserve was established by the Pima County Regional Flood Control District (District) in 1989 and is located on the west side of the San Pedro River, just north of Redington, Arizona and the confluences of Buehman, Edgar, and Redfield canyons. The Preserve historically provided habitat for threatened and endangered species such as the Huachuca water umbel and the Southwestern willow flycatcher.

The Preserve was originally purchased because of the Arizona ash-dominated Cienega and associated spring flows. Early efforts focused on restoring abandoned farmlands with sacaton grass, mesquite and other native species. Site conditions have changed significantly over the years as a result of drought and groundwater pumping outside of the Preserve, leading to a decline in groundwater levels at the Preserve (Figures 7, 8). Spring flows have ceased since at least 2007 and groundwater levels have now dropped so far that most of the cottonwood, Arizona ash and some netleaf hackberry have died.

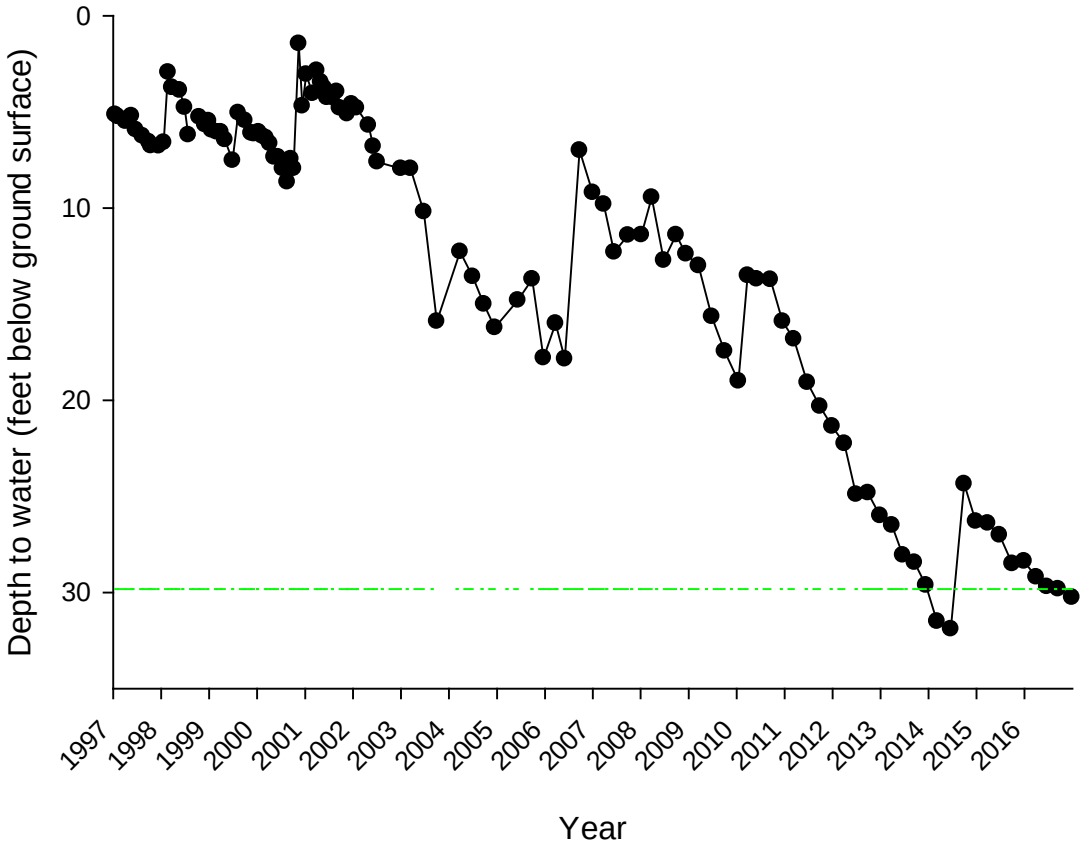


Figure 7. Depth to groundwater at the Kelly Well, Bingham Cienega Natural Preserve, 1997-2016 showing significant declines that have led to a lack of open water and die-off of trees on the property. Depth to water at permit issuance (29.8 feet) is noted by the green dashed line. See Figure 8 for a more in-depth view of water levels before and after issuance.

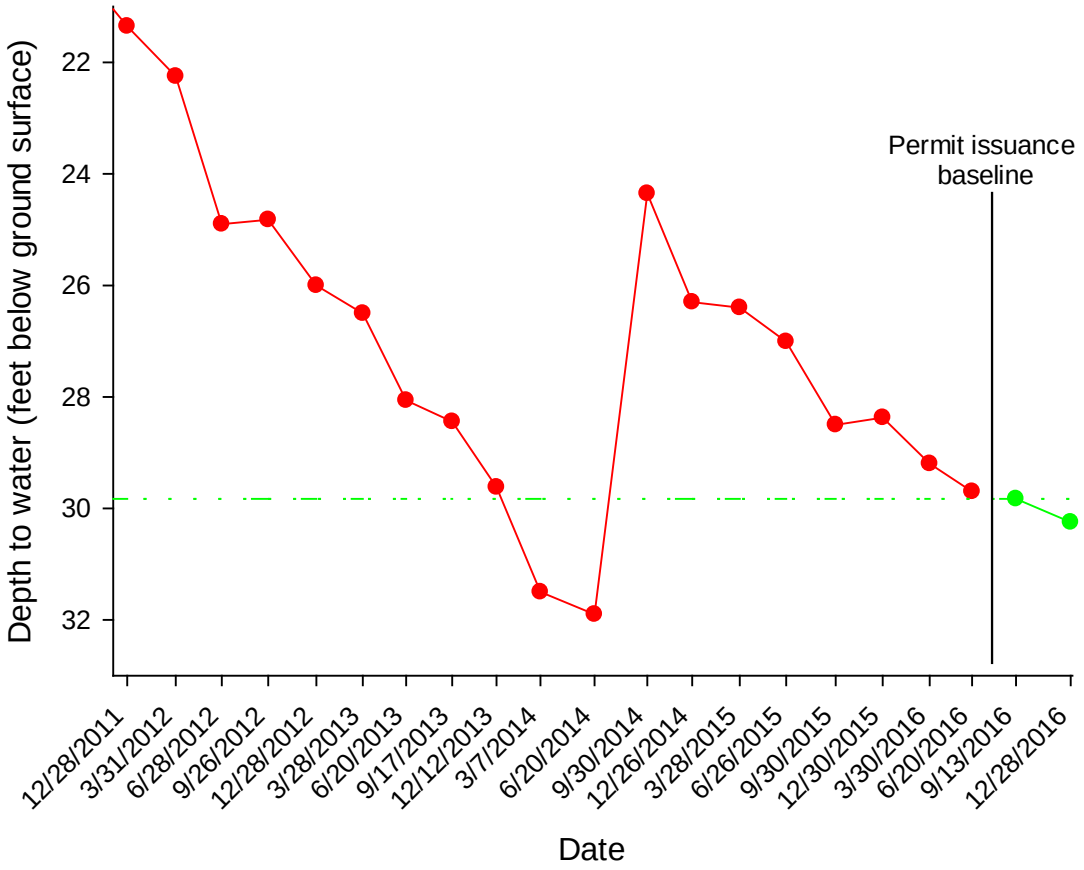


Figure 8. Depth to groundwater at the Kelly Well, Bingham Cienega, 2012-2016. Data same as Figure 7 (although note difference in Y axis scale), but the graph provides more details for the last 5 years. Depth to water at permit issuance (29.8 feet) is noted by the green dashed line.

Fire Management. The changing conditions necessitated that management focus shift from restoration maintenance to fire management. Creating, expanding, and maintaining fire breaks and promoting fire suppression actions—in part to protect the health and safety of the residents in the inholding within the Preserve—began in 2005 and continues today. There are six fire management units in the Preserve (Figure 9). In 2016, there was a focus on pruning of annual growth and larger deadfalls to continue to open and widen the fire lanes to accommodate type six fire suppression vehicles. To provide additional protection to the sites, RFCD plans to install a fire hydrant in March 2017, just south and west of the Kelly Well. An update to the 2006 Fire Management Plan is planned due to changing condition of the vegetation and fuel-related hazards.

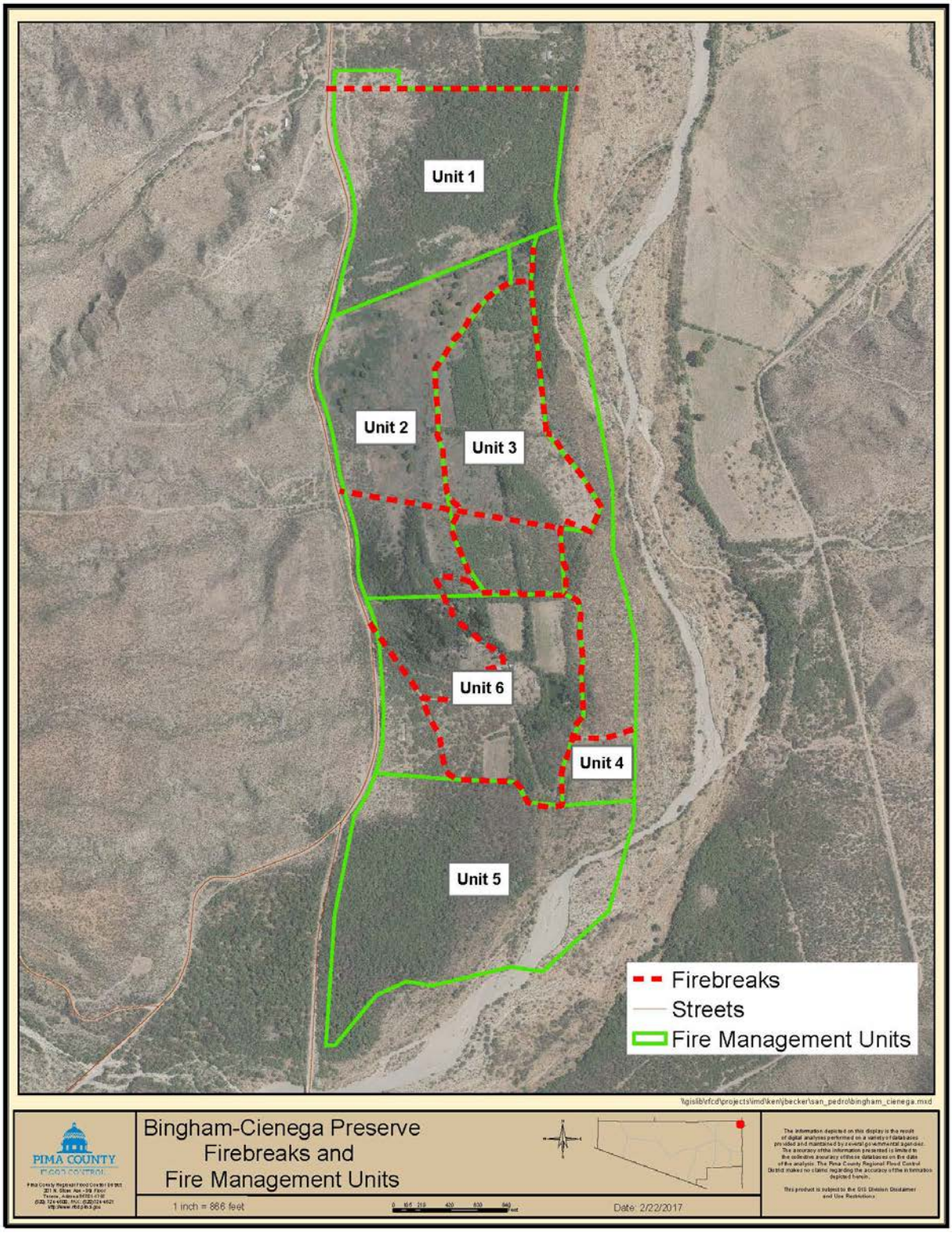


Figure 9. Fire breaks and fire management units for the Bingham Cienega Natural Preserve. Fire management units are based on the location in the floodplain, plant communities, and structures.

Figure 10. Fire line completed in the fall of 2016 at the Bingham Cienega Natural Preserve. Note removal of invasive species (tumbleweed) as well as woody debris along this existing power line.

Fence Maintenance. Perimeter fence repairs continued to be a focus in 2016, primarily as a result of falling trees that died due to past wildfires and continuing drought. In April 2016, the Arizona Conservation Corp returned to the preserve for the second consecutive year to work on the west boundary fence line that parallels the San Pedro River Road. They cleared encroaching brush and dead fall away from the fences and roads of the main entrance, north to a main powerline that cuts through the middle of the Preserve.

Figure 11. A new invasive species at the Bingham Cienega Natural Preserve: soft feathered pappus grass (*Enneapogon cenchroides*; light colored plant in the foreground).

6.4. Management Actions on Unallocated Mitigation Lands

Pima County is required to report land management activities on allocated lands, as for Bingham Cienega Natural Preserve (Section 6.3.1, above). However, staff from three Pima County departments have been involved in a wide range of management activities on unallocated lands that further demonstrate our commitment to the Covered Species and their habitats. Key highlights of these management actions are included here; this is not an exhaustive list.

6.4.1. Invasive species control

Pima County has a long history of making significant commitments to controlling invasive species. The County was a founding member of the Southern Arizona Buffelgrass Coordination Center. Focal species for eradication efforts have included giant reed grass (*Arundo donax*), fountaingrass (*Pennisetum setaceum*), saltcedar (*Tamarisk* sp.), and especially buffelgrass (*Pennisetum ciliaris*). Since 2000, Pima County and our partners with the Sonoran Desert Weedwackers (a volunteer organization) have removed an estimated 541 tons of buffelgrass. Over 36,000 hours of volunteer time have made this a reality. In 2016, Pima County and volunteers removed an estimated 34 tons of buffelgrass using 2300 volunteer hours. Most of this effort has been focused on Tucson Mountain Park (not an MSCP eligible mitigation property) but has also included other MSCP eligible properties such as Cienega Creek Natural Preserve and A7 Ranch.

6.4.2. Mapping and filling open-topped pipes.

Metal pipes are common features of working landscapes and are used for a wide range of applications, most commonly fencing and mining claim markers. Unfortunately, most pipes are left unfilled or uncapped and therefore become traps for wildlife, especially cavity nesting birds such as ash-throated flycatchers and woodpeckers. For example, 11 open-topped vertical PVC pipes at Canoa Ranch were examined and all but one contained at least one dead bird.

In 2016, Pima County staff documented 119 open-topped pipes of 3 inches in diameter or greater. Fifty eight open-topped pipes were completely filled with material (rock and/or dirt) or removed, and 33 were temporarily capped. Capping or otherwise eliminating open-topped pipes will continue to be a priority in 2017.

Figure 12. One of 91 open-topped pipes on Pima County's open-space properties that were capped, taken down, or filled with material in 2016. This PVC pipe, located at Canoa Ranch, contained the remains of an ash-throated flycatcher.

6.4.3. Open-space infrastructure mapping

Pima County owns and leases dozens of open-space properties, but for many of these properties there is scant information on the physical infrastructure. This dearth of information began to change in 2016 with a focus on using GPS units to map infrastructure on a single property (Bar-V Ranch) as a prototype. Infrastructure elements mapped included: roads, water lines, fences, and stock tanks. To accommodate this new information, NRPR created a geo-database and standard operating procedures for the collection, storage, and mapping of this information. This information is key to the development of coordinated resources management plans (see section 5.2 of the MSCP) and in the placement of long-term monitoring plots for vegetation and soils (see Appendix Q of the MSCP).

6.4.4. Habitat Restoration Activities

Both the NRPR and RCFD departments have staff focused on restoration activities such as pond creation (Figure 13) and restoration of agricultural land (Figure 14). This section highlights a few projects that were initiated in 2016.

6.4.4.1. Goat Pond and Other Wildlife Water Projects

In 2011, the NRPR department improved Hospital Tank on the Clyne Ranch, in part to make the site more appropriate for the establishment of threatened Chiricahua leopard frogs, which were noted by David Hall (University of Arizona) as naturally recolonizing this feature in September 2016. With that project complete, the County looked next to the Goat Well site as another area to make suitable for Chiricahua leopard frogs (Figure 13). The Goat Well and Pond site was modified starting in 2015 to create a small, perennial water site using water from the well. The project was completed in 2016 and now awaits the natural establishment or reintroduction of frogs.

6.4.4.2. Northern Altar Watershed Area Project

In 2005, Pima County acquired the 4,500-acre King 98 Ranch as part of the 2004 Open Space Conservation Bond program. Over two miles of the Altar Wash wind through the property and approximately 400 acres had been farmed for decades. Since that time the farmed lands have suffered significant drying, wind and water erosion, and a general decline in surface vegetative cover.

In 2013, the Altar Valley Conservation Alliance and Pima County began discussions about possible restoration actions in the sites and to test new restoration techniques and strategies. The final project scope was designed to test the effectiveness of low contour following berms of different width spacing (50', 75' and 100' apart; Figure 14) laid out to capture sheet flow and provide additional moisture to an area planted on the upstream edge of the berms with a native plant seed mix. In addition, as resources became available to the project, several sites on either end of the berm test site would be plowed and seeded with a mix of different species planted to examine different restoration strategies. The site was plowed and seeded in the spring of 2016 and while data is not yet available, early estimates indicate enough success to carry the project to the next phase of development.

Figure 13. Created specifically for the Chiricahua leopard frog, Goat Well pond was built by NRPR staff and funded by Partners for Fish and Wildlife, a program of the U.S. Fish and Wildlife Service. Occupancy by Chiricahua leopard frogs is expected in 2017, either through introduction or because of natural dispersal from Hospital Tank. Photo taken on December 5, 2016.

Figure 14. Restoration of retired agricultural fields on the King 98 Ranch was a focus of management activity in 2016. The goals of the project are to create conditions to allow for revegetation of the site and to arrest erosion.

6.4.5. Water Rights Management

Pima County has a policy of managing water rights on County and District–owned land. Pima County has a process to assure that water rights are transferred to the County or District upon acquisition of a property. In 2016, ADWR granted a Certificate of Water Right for in-stream flow at Buehman Canyon, which is a potential mitigation property. Buehman flows into the San Pedro upstream of Bingham Cienega and contains occupied habitat for a number of Covered Species, including the longfin dace, Arizona Bell's vireo, and lowland leopard frog.

Pima County is also participating in the adjudication of water rights in the Gila River watersheds, along with many other parties in the state.. In 2016, at the state's request, the County began reviewing the abstracts prepared for a small subset of potential mitigation land located in the Sands Ranch area. Pima County also documented water rights and water resources at Bar-V Ranch, and other ranches.

6.4.6. Miscellaneous Land Management Actions

Responsive Management Actions. Pima County continues to use annual grazing monitoring information to set stocking rates. The County hired a new Range Management Program Manager who is working with ranchers to update ranch management plans. Also, Pima County lost a grazing lease holder at Bar-V Ranch and has decided to rest that property in an effort to increase forage for wildlife and future grazing.

Adaptive Management. No reported actions.

7. Monitoring

The Pima County Ecological Monitoring Program (PCEMP) is a new program directly tied to the issuance of the permit. As indicated in the MSCP, three main elements of the PCEMP will be addressed in first year: inventories of county preserves, single species monitoring, and field visit protocols. Progress was made on these and other PCEMP elements, as highlighted below.

7.1. Required PCEMP Elements

7.1.1. Property Inventories and Assessments

Monitoring activities for the PCEMP will take place on all County-owned and leased properties greater than 100 acres, as well as certain smaller properties with relevant biological resources. For many of these properties, the County knows very little about the natural resources, conditions, and threats. An important first step in the program is to document key features to better inform the sampling design and focus of subsequent monitoring efforts.

Pima County staff performed a total of 82 individual visits to 42 properties from January through December 2016 (Figure 15). All properties greater than 2,000 acres (N=17) were visited at least once. Staff visited Sands Ranch more than any other property (N=7).

Each visit to a property had one or more goals prior to each visit; the goal was often to visit an area with very little information or few or no previous visits, make species-specific observations that would help inform the monitoring program, and/or determine the condition of a known resource. While in the field, staff used GPS units to record routes traveled and used the "waypoint" function to record observations of species, threats, or other features of interest. Data collected were used to write a property visit report (see Appendix 3 for one example; other trip reports are available upon request). Observations related to threats (e.g., invasive species, open-topped pipe) or resource damage (e.g., cut fence, road conditions) were passed along to the managing department.

A key feature of property inventories was the collection of observations on Covered Species. Towards this end, staff made 1,389 separate observations, of which 642 (46%) were of talus snails (Table 4). Staff made observations on 18 of the 32 (56%) vertebrate Covered Species. The Arizona Bell's vireo was found at the most preserves (Table 5; N=16).

7.1.2. Single-species Monitoring

Pima County will monitor various parameters for 15 species to fulfill permit obligations (see Appendix Q of the MSCP). In order to carry out the monitoring program for most species on County preserves, data specific to each species needs to be collected, including species' distribution, relative abundance, and most effective survey method. The property inventories and assessment (reported in the previous section) were also used to collect important information about Covered Species for which species-specific monitoring is required. The following provides a brief summary of findings from 2016 and how those findings will be used to inform the monitoring requirement of each species.

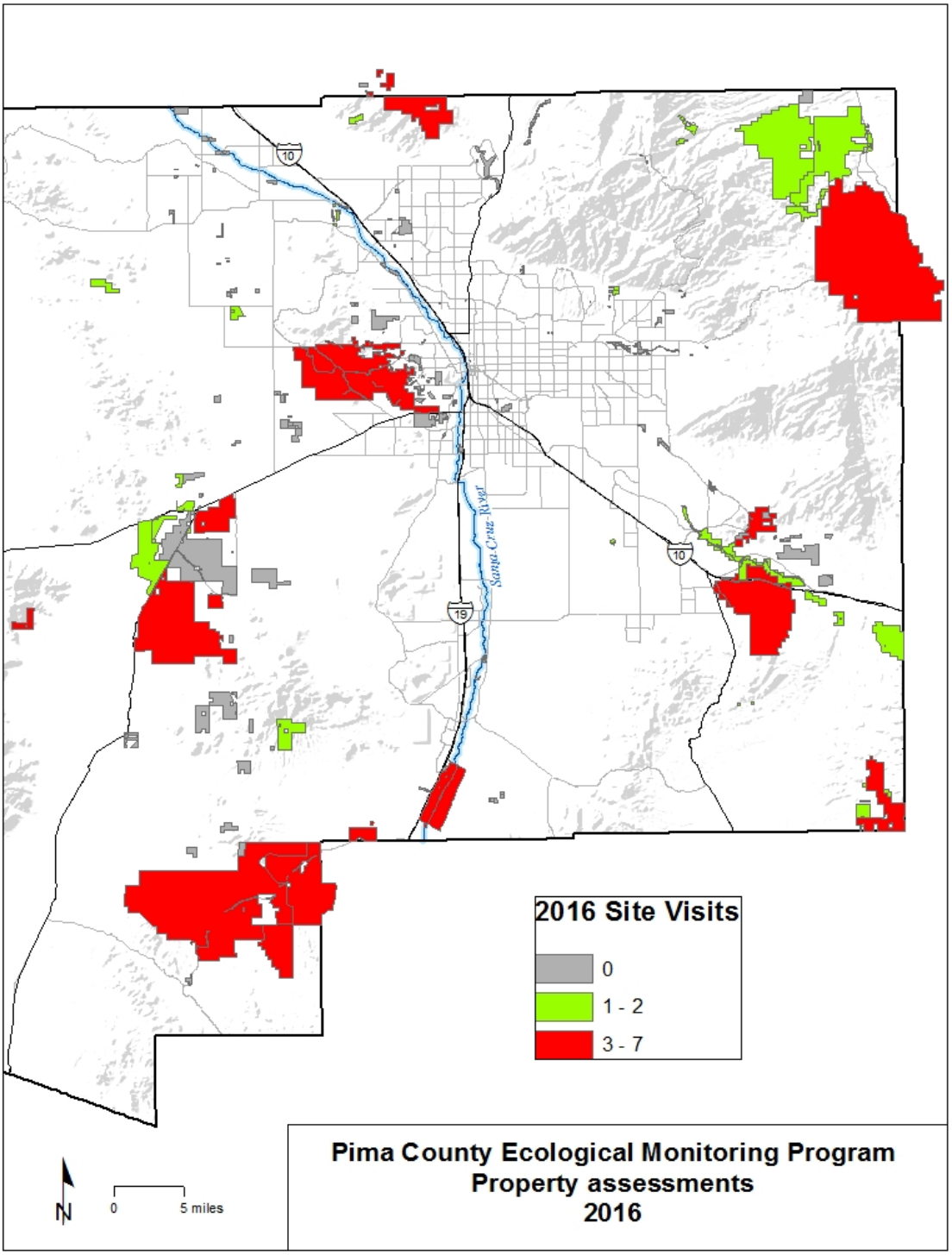


Figure 15. Number of property site visits in 2016 by PCEMP staff.

Table 4. Pima County staff recorded a total of 1,389 observations of Covered Species in 2016. For many species, the number of observations does not correspond to the number of individuals; however those data are recorded. Also, for the Sonoran desert tortoise and talussnail, the number of observations includes both live individuals and sign such as scat and shells.

Taxon Group	Species	Number of observations
Plants	Huachuca water umbel	0
	Needle-spined pineapple cactus	128
	Pima pineapple cactus	225
	Tumamoc globeberry	21
Mammals	Merriam's mouse	0
	Lesser long-nosed bat	0
	Mexican long-tongued bat	0
	California leaf-nosed bat	0
	Townsend's big-eared bat	2
	Western red bat	0
	Western yellow bat	0
Birds	Abert's towhee	36
	Arizona Bell's vireo	94
	Cactus ferruginous pygmy owl	3
	Rufous-winged sparrow	58
	Southwestern willow flycatcher	0
	Swainson's hawk	3
	Western burrowing owl	1
	Western yellow-billed cuckoo	17
Fishes	Desert sucker	0
	Sonora sucker	0
	Gila chub	1
	Gila topminnow	1
	Longfin dace	13
Reptiles	Desert box turtle	0
	Giant spotted whiptail	8
	Groundsnake (valley form)	0
	Northern Mexican gartersnake	0
	Sonoran desert tortoise	101
	Tucson shovel-nosed snake	0
Amphibians	Lowland leopard frog	19
	Chiricahua leopard frog	16
Invertebrates	Talussnail species	642

Table 5. Covered species and Pima County properties where each was found, 2016. List includes only those properties where live individuals were found by either county staff or a partner organization working on a County preserve (e.g., yellow-billed cuckoos were found by the Tucson Audubon Society).

Covered Species	Property
Townsend's big-eared bat	Old Hayhook Ranch
	Oracle Ridge
Abert's Towhee	Bingham Cienega
	Brawley Wash/Manville-Garcia
	FLAP 1001
	M Diamond Ranch
	Rancho Fundoshi
	West Branch Preserve
Arizona Bell's Vireo	A7 Ranch
	Bar V Ranch
	Bingham Cienega
	Buehman Canyon
	Cienega Creek Natural Preserve
	Empirita Ranch
	FLAP 1001
	Marley Ranch
	M Diamond Ranch
	Rancho Fundoshi
	Rancho Seco
	Six Bar Ranch
	Tortolita Mountain Park
	Verdugo
	West Branch Preserve
Cactus ferruginous pygmy owl	Old Hayhook Ranch
Rufous-winged sparrow	Buckelew Properties
	Canoa Ranch
	Cienega Creek Natural Preserve
	Colossal Cave Mountain Park
	FLAP 654
	King 98 Ranch
	Marley Ranch
	Morkis Property
	Rancho Seco
	Sopori Ranch
	Tortolita Mountain Park
	Verdugo
	West Branch Preserve
Swainson's hawk	Bar V Ranch
	Rancho Seco
Western yellow-billed cuckoo	Bingham Cienega
Gila Chub	Cienega Creek Natural Preserve
Gila Topminnow	Cienega Creek Natural Preserve
Longfin Dace	Buehman Canyon
	Cienega Creek Natural Preserve
Giant spotted whiptail	Empirita Ranch
	Rancho Fundoshi
Sonoran Desert Tortoise	Carpenter Ranch
	Cochie Canyon
	Marley Ranch
	Morkis Property
Lowland leopard frog	A7 Ranch
	Bingham Cienega
	Buehman Canyon
	Cienega Creek Natural Preserve

Covered Species	Property
	M Diamond Ranch
	Oracle Ridge
Chiricahua leopard frog	Clyne Ranch
Needle-spined pineapple cactus	Bar V Ranch
	Buehman Canyon
	Colossal Cave Mountain Park
	Empirita Ranch
	Six Bar Ranch
Pima Pineapple Cactus	Bar V Ranch
	Canoa Ranch
	Diamond Bell Ranch
	Sopori Ranch
	Southeast Regional Park
Tumamoc globeberry	Buckelew Properties
	Morkis Property
Talussnail species	Cienega Creek Natural Preserve
	Old Hayhook Ranch
	Rancho Fundoshi
	Rancho Seco
	Six Bar Ranch
	Tortolita Mountain Park
	Tucson Mountain Park

7.1.2.1. Talussnail

Twelve species and subspecies of talussnail are covered under the permit, but prior to the initiation of the PCEMP, there were only a few observations of the species on County preserves. As part of the property inventories, identifying talussnail habitat via observation and collection of live individuals and empty shells was a high priority (Figure 16). As noted earlier, 642 separate observations were made (Figure 16). This total included 33 live individuals[1] from 7 properties. Data from these survey efforts will be integral to designing the monitoring for this species' habitats (20 sites every 5 years).

7.1.2.2. Sonoran Desert Tortoise

Pima County's commitment to monitoring the Sonoran desert tortoise is probably greater than any other single species. However, their distribution and density varies greatly across County preserves, and an understanding of these factors will greatly aid the development of the monitoring effort. A key focus of property inventories was to look for tortoise sign such as burrow and scat in order to assess habitat suitability for this species (Figure 17). Data from these outings are being used in the development of the tortoise monitoring framework.

7.1.2.3. Pima Pineapple Cactus

The Pima pineapple cactus is an important species in the County's MSCP, in part because of its distribution relative to projected covered activities. The County has agreed to monitor the species at 10 sites within the County preserves. However, unlike for many other species that will be monitored as part of the PCEMP, the method used to survey the species has not been determined. To address this, Pima County and Dr. Aaron Flesch (University of Arizona) applied

[1] All live individuals were collected and sent to snail experts Nick Waters and Dr. Kat Weaver (University of La Verne) for morphological and genetic analysis.

for—and received—a small grant from the USFWS to determine if distance sampling is an appropriate method for monitoring populations of the cactus. Most of the field work for the grant was completed in 2016 with final project completion expected in 2017.

7.1.3. Other Monitoring Elements

Though not required to be worked on or reported in the first year of the program, County staff made progress on the following elements:

- Perennial water sources. Annual wet/dry mapping of all known and potentially perennial water sources took place in June 2016. Three previously unknown sites were discovered in 2016 and will be added to future monitoring activities.
- Database development. Pima County IT department staff have been working on a cross-departmental geodatabase for all types of monitoring observations.
- Cave, mine and adit inventory. County staff continue to inventory cave, mine and adits for presence (or possibility) of Covered Species. Staff from NRPR are leading the effort and so far hundreds of sites with the potential to host Covered Species have been identified. A total of two observations of Covered Species were made in 2016 associated with adits/caves (both Townsend's big-eared bats).
- Shallow groundwater. The RFCD has a long history of monitoring shallow groundwater, starting first along Cienega Creek Natural Preserve and now monitoring six shallow groundwater areas in the County. Appendix 4 is the most current annual report and future reports will continue to support the MSCP monitoring objectives for assessing depth to water in select shallow groundwater systems, as outlined in Appendix Q of the MSCP.

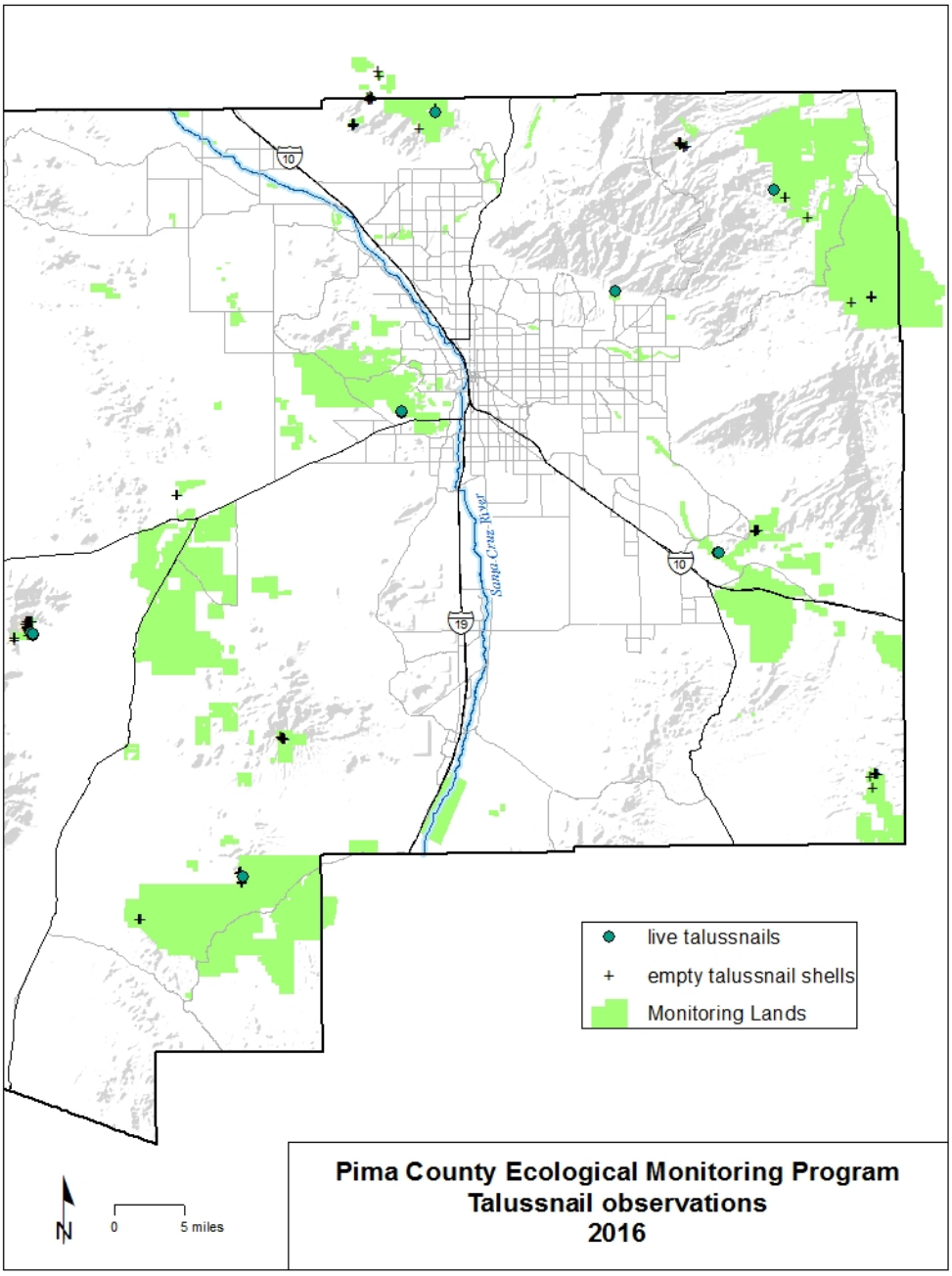


Figure 16. The distribution of talussnails on County preserves was unknown prior to 2016, but because of a concerted effort, talussnail shells or live individuals were found on 15 properties.

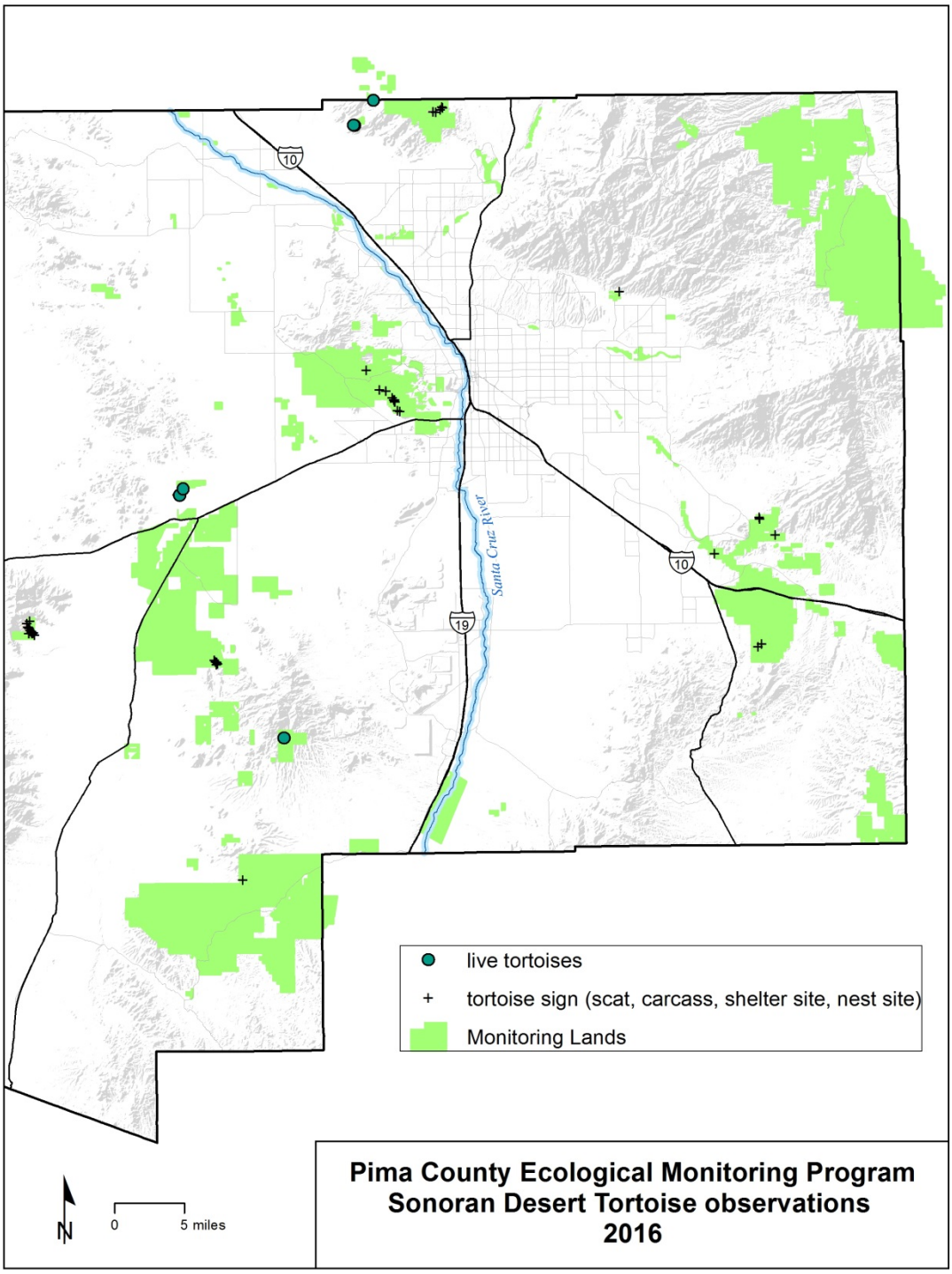


Figure 17. Observations of Sonoran Desert Tortoise (live individuals and sign) were made on 13 properties in 2016. Staff now have a much better understanding of the distribution of this species and these observations will help inform the monitoring design.

8. Changed or Unforeseen Circumstances

Changed circumstances are scenarios that could affect Covered Species (Table 7.2 of the MSCP) and are differentiated from unforeseen circumstances in that the latter cannot reasonably be anticipated. The listing of a new species is one example of a changed circumstance, whereas warfare would be an unforeseen circumstance.

8.1. Changed Circumstances

Changed circumstances are "changes in circumstances affecting a species or geographic area covered by a Habitat Conservation Plan (HCP) that can reasonably be anticipated by Plan developers and the [USFWS] and that can be planned for" (50 CFR §17.3). Table 7.1 of the MSCP lists identifiable changed circumstances and Pima County's potential responses.

8.1.1. Reporting

Some changed circumstances cannot be fully evaluated until new MSCP program and reporting mechanisms are underway. Table 6 lists the reporting frequency for changed circumstances along with the proposed methods of evaluation. A number of changed circumstances determinations will be based on ecological monitoring data for species, vegetation or landscape-related elements.

Table 6. Minimum reporting frequency and data sources used to address changed circumstances. Reporting frequency may be more often than indicated depending on data availability and staffing.

Circumstance/Scenario	Minimum reporting frequency	Data source and/or reporting mechanism
County loses ability to hold state grazing leases that have been identified as mitigation.	Annually	Lease records
Climate change affects a host of resources and processes, including water availability, precipitation events, etc.	10 years	Review of best available science
Increased warming increases the length of the growing season. More annual growth in plants when sufficient water exists.	10 years	Review of best available science
Central Arizona Project recharge creates aquatic habitat, and expands riparian habitat.	5 years	PCEMP: Landscape pattern analysis
Due to the efforts of The Nature Conservancy and discontinued mining downstream, Lower San Pedro River becomes better watered.	Annually or as data become available	Annually based on TNC wet-dry reporting. If TNC data is not available, then reporting will be based on other (as yet defined) data source
Land is graded on County-held grazing leases, County conservation easements, or County-owned mitigation lands for infrastructure or other developments beyond County's control (e.g., condemnation)	Annually or as data become available	PCEMP: Landscape pattern and threats monitoring
Conversion of desert, riparian areas, or grasslands to agriculture in Permit Area or on adjacent tribal lands.	5 years	PCEMP: Landscape pattern monitoring
Conversion of desert, riparian, or grasslands to development due to Federal projects or federally authorized projects of others in the Permit area or on adjacent tribal lands	10 years	As data become available on projects and through PCEMP (Landscape pattern monitoring)
Mitigation lands are compromised and can no longer be used for mitigation. Scenarios could include condemnation for a utility right-of-way, or unauthorized impacts within privately owned mitigation land	5 years	Pima County needs to build a process to query inspection records and project files. Aerial photo inspection of private lands will be used for privately owned mitigation lands.
New unplanned foot trails adversely affect Covered Species.	5 years	PCEMP: Threats monitoring

Circumstance/Scenario	Minimum reporting frequency	Data source and/or reporting mechanism
Loss or degradation from increased off-road vehicle use in existing and proposed mitigation land	5 years	PCEMP: Threats monitoring and property inspections
Construction of expanded international port-of-entry and highway improvements in Altar Valley	Annually or as information is obtained	Based on Pima County Department of Transportation (DoT) knowledge
Interstate 10 bypass placed in Avra Valley	Annually or as information is obtained	Based on data from Arizona DoT
New roads or utilities established in CLS outside Preserves.	5 years	PCEMP: Landscape pattern monitoring
Paved road over Redington Pass.	Annually or as information is obtained	County monitoring activities and coordination with USFS
Paving San Pedro River Road from Pomerene to San Manuel	Annually or as information is obtained	Based on observation
Severe freezes lead to widespread mesquite or ironwood die back and incidence of bacterial necrosis in saguaros increases.	10 years or as information is obtained	Best available science
Reduction in effluent discharge from County treatment facility (below permit issuance baseline) contributes to die-offs of riparian forest and elimination of aquatic vegetation along the Santa Cruz River in Pima County	Annually or every 5 years	Annually while Living River information is available; thereafter every 5 years using PCEMP, Landscape Pattern monitoring
Elimination of natural, restored or created wetlands, cienega and cienega-like environments due to social conflict or public perception (airport restrictions; mosquito, other vector and aesthetic preference issues).	10 years	Regional evaluation and as data become available
Desiccation of other groundwater-dependent riparian systems [i.e.. not Cienega Creek at the Preserve or stretches of the effluent dominated Santa Cruz River]	Annually or 10 years	Annually for groundwater levels and surface water extent monitored by Pima County and others. Every 10 years from regional analysis.
Increase in desiccation of Lower Cienega Creek by groundwater pumping by residential and commercial development in the Vail, Empirita, and Mescal areas, below permit baseline	Annually (flow extent and groundwater levels) or as information becomes available (pumping)	PCEMP: Change in groundwater levels and June flow extent. Baseline levels of streamflow and groundwater are in Appendix of this 2016 Annual Report Pumping will be reported periodically via regional evaluations.
Arrival of fire ants (*Solenopsis invicta*) into riparian areas	Annually or as information is obtained	Arizona Department of Agriculture
Establishment of feral pigs, sheep, or goats in additional conserved riparian areas (outside of the San Pedro River)	Annually or as information is obtained	Arizona Game and Fish Department
Invasion by exotic species or species-specific disease that threaten Covered Species or their habitats which cannot be effectively controlled by currently available methods or technologies or which cannot be effectively controlled without resulting in greater harm to other Covered Species.	10 years	Will seek input from scientific community
Invasive aquatic species (e.g., bullfrog, crayfish, non-native fish) enter Cienega Creek or other aquatic sites from non-Central Arizona Project sources.	Annually or as information is obtained	Based on Cienega Creek walk-throughs, site inspections, and partner reporting
New species of landscaping plants are discovered to be invasive into wildland settings, affecting habitat of Covered Species.	Annually (Pima County lands) or as information is obtained (regional partners)	PCEMP for county-controlled lands, partners will supply other data
Utilization of Central Arizona Project water introduces new non-native aquatic species to Santa Cruz watershed.	10 years or as data become available	As reported by USFWS or in scientific literature
Future listing of a Covered Species that was not listed at the time permit was originally issued	Annually	Based on USFWS website
Natural establishment of Yuma clapper rail (*Rallis*	Annually or as	County monitoring activities or partner

Circumstance/Scenario	Minimum reporting frequency	Data source and/or reporting mechanism
longirostris yumanensis), least tern (*Sturnula antillarum*), or other currently listed species that are not considered for Section 10 permit coverage.	information is obtained	reporting
Native species (e.g., beaver or prairie dog) introduced or re-established, which reduce the abundance, distribution or habitat for Covered Species within the Permit Area.	Annually or as information is obtained	Partners
Delisting of Covered Species	Annually or as information is obtained	USFWS
New designation of critical habitat for Covered Species.	Annually or as information is obtained	USFWS
Designation of critical habitat for species that are not covered under the permit	Annually or as information is obtained	USFWS
Changes in monitoring protocols are proposed to STAT or other technical group because of failures to detect trends, high cost or inefficiencies in the current design.	Annually or as information is obtained	This will be addressed each year under the annual report's monitoring section
Copper or other mining begins at Rosemont, Davidson Canyon, Buehman Canyon, or other watersheds.	Annually or as information is obtained	Partners provide data
New limestone quarries established in various areas outside County preserves.	Annually or as information is obtained	Partners provide data
Major expansion of existing mines	Annually or as information is obtained	Partners provide data
The acreage of Covered Impacts exceeds available mitigation land credits and Pima County offers no additional mitigation credit to meet the obligation	Annually based on annual report	Analysis is provided elsewhere in this report
State legislative or judicial action could diminish the County's authority to comply with the terms of the permit	Annually or as change occurs	Annual report
Pima County revises regulations or policies listed in Table 4.1	Annually	Incorporated into Section 5 of the annual report;
Pima County loses State trust lands grazing leases or right to operate as a result of voluntary or involuntary actions by the County	Annually	Annual report.
Federal land is conveyed to private sector	Annually	Reported under changes to the Permit Area, not changed circumstances.
State land is conveyed to private sector in Permit Area	Annually	Reported under changes to the Permit Area, not changed circumstances.
Loss of a known population of Covered Species within Pima County.	Annually or as information is obtained	County monitoring activities or partner reporting
Immigration of Covered Species into County-controlled mitigation lands or elsewhere in the Permit Area.	Annually or as information is obtained	County monitoring activities or partner reporting
Precipitous population decline in other [covered] species outside Pima County	Annually or as information is obtained	
New genetic information reclassifies species	Annually or as information is obtained	Review of best available science
Toxic or hazardous waste spill into Cienega Creek or the Santa Cruz River either from the railroad or from the interstate highway.	Annually or as information is obtained	
Pathogens affect Covered Species or key habitat feature of Covered Species	Annually or as information is obtained	Review of best available science
Wildland fire exceeding 1,000 acres in size occur inside or outside the County preserve network. Not all County preserves are affected at the same time, but at least one is.	5 years	PCEMP: Landscape pattern monitoring

8.1.2. Assessment of Changed Circumstances for 2016

As discussed with the USFWS Tucson Field Office, we report changed circumstances for the 2016 reporting period (July 14, 2016 through December 31, 2016; Table 7). Because the Section 10 permit was in review for many years before the permit was actually issued, Table 8 also includes several changes that occurred prior to permit issuance, but which were not reflected in the final MSCP.

Table 7. Status of changed circumstances through the 2016 reporting period. Because changed circumstances can require management actions, the County's responses are also included.

Circumstance/Scenario	Occurred during reporting period?	Evidence	If yes, what Response(s)
Reduction in effluent discharge from County treatment facility (below permit issuance baseline) contributes to die-offs of riparian forest and elimination of aquatic vegetation along the Santa Cruz River in Pima County.	No evidence of die off during 2016 flight over river	Based on Living River monitoring, certain reductions in effluent discharge and die-off occurred prior to permit issuance.	Pima County is already evaluating strategies to reverse or minimize impacts to Covered Species and engaging effluent owners in minimization or mitigation strategies
Increase in desiccation of Lower Cienega Creek by groundwater pumping by residential and commercial development in the Vail, Empirita, and Mescal areas, below permit baseline	No	Baseline information is gathered by the Pima Association of Governments and RFCD. Declines in flow and groundwater occurred prior to permit issuance, as evidenced by baseline report (Appendix 4 of this report) and other reports (e.g., Powell 2013)	Monitoring and evaluation is ongoing by RFCD; groundwater levels have improved since lows in 2013 and 2014.
Invasive aquatic species (e.g., bullfrog, crayfish, non-native fish) enter Cienega Creek or other aquatic sites from non-Central Arizona Project sources.	Yes	Gambusia found in Hospital Tank; Bullfrogs already present prior to permit issuance on Cienega Creek	
Native species (e.g., beaver or prairie dog) introduced or re-established, which reduce the abundance, distribution or habitat for Covered Species within the Permit Area.	None known	AZGFD released cactus ferruginous pygmy owls on County preserves, but no impacts to covered species are known to us	
Delisting of Covered Species.	No, but delisting of lesser long-nosed bat was proposed on January 5, 2017	Based on USFWS website	If bat is delisted, there will be no change in the permit nor to the conservation measures
State land is conveyed to private sector in Permit Area	Yes	Based on GIS inquiry, see Figure 1	Automatically becomes part of the Permit Area per the terms of the MSCP. See Section 3.1 of this report
Immigration of Covered Species into County-controlled mitigation lands or elsewhere in the Permit Area.	Yes	Chiricahua leopard frogs colonized a stock tank on Clyne Ranch	This is a desirable outcome; no action needed

8.2. Unforeseen Circumstances

The USFWS did not identify any unforeseen circumstances that affect covered species or their habitats in 2016.

9. Fiscal Year Funding

Table 8 summarizes expenditures which contributed to the implementing the MSCP. Many of these programs existed long before the MSCP and fulfill other County needs, but they are included here because their continued existence contributes to conservation, enforcement, management, monitoring and administration of MSCP elements. These estimates are based primarily on the percentages of various budget units for the Fiscal Year ending June 2017, except for the Sherriff's estimate, which is based on calendar year 2016.

Table 8. Estimated expenditure (in thousands of dollars) by County department for avoidance, minimization, management, and monitoring activities in support of Pima County's Multi-species Conservation Plan, July 2016-June 2017.

Department	Expenditure
County Administrator	48
Communications	11
Development Services	358
Regional Flood Control District	506
Information Technology	100
Natural Resources, Parks and Recreation	1,520
Public Works Administration	186
Sheriff's Department	27
Office of Sustainability and Conservation	544
Transportation	58
MSCP and Section 10 Program Total	$3,458

In general, the County funding resources have not materially changed from the estimates provided in Chapter 8 of the MSCP. Most notably, failure of the bond vote in 2015 reduced opportunities for acquiring additional mitigation land, but there are sufficient lands to meet needs for at least the coming decade.

Highlights from the reporting period for the departments listed in Table 8 include:

- The **County Administrator's Office** vetted actions needed by the Board of Supervisors to implement the permit.
- **Communications** helped provide publicity for the new Section 10 permit actions in FY2016.
- **Development Services** continued to administer various avoidance and minimization measures embedded in existing ordinances.
- **Information Technology** department provided assistance in preparing the MSCP and subsequent reporting.
- **Sheriff's Department** enforced laws on mitigation lands and provided search and rescue.
- **Department of Transportation** minimized impacts along roadways.
- **Public Works Administration** (Real Property staff) worked to acquire several new floodprone lands and donations, and helped with legal protections for the fee-owned mitigation lands.

- **Natural Resources, Parks, and Recreation** (NRPR) manages most of the potential mitigation lands. There have been declines in staffing since the permit application was filed in 2010 due to attrition and re-organizations, but a new ranch program manager, Vanessa Prileson, has been hired and Kerry Baldwin's vacant position (Natural Resources Superintendent) will also be filled in 2017. Additional funds are requested for FY2017-2018 budget for NRPR for management.
- **Regional Flood Control District** has important roles in stewardship of land and water, and also fulfills a regulatory role in minimizing effects on habitat for riparian species;
- **Office of Sustainability and Conservation** supports the land managers with information and monitoring data, and a new staff member, Jenny Neeley, has taken an existing vacant position to support the Certificate of Coverage program. Additional funds are being budgeted next year, sufficient to support the required duties of the ecological monitoring program. The Office of Sustainability and Conservation and RFCD both have budgeted funds to support ALWT's role in reviewing inspection reports for the lands with restrictive covenants.

The USFWS's Partners for Wildlife program granted Pima County monies prior to permit issuance of the Section 10 permit for several projects. One grant was for erosion-control work at Peck Spring, a site that contained lowland leopard frogs, a covered species. There were no new grant monies or fees received by Pima County or the District since permit issuance that contributed to fulfilling MSCP requirements. However, we benefitted from partnerships with a number of organizations, some of which received grants to improve habitat or monitor species or their habitats. These are described in relevant sections of this report.

10. Non-mitigation Lands Transactions and Processes

In addition to covenants on potential mitigation lands discussed in Section 3.2, the County Board of Supervisors and the Pima County Regional Board of Directors approved restrictive covenants on lands in Tucson Mountain Park, Tortolita Mountain Park and other locations that cannot be used as MSCP mitigation (Figure 18). The restrictions contribute to minimizing edge effects on adjacent potential MSCP mitigation lands.

Some County-owned lands that were identified in the MSCP as potential mitigation lands were not protected with restrictions in order to facilitate future uses (Figure 18). Most of the lands shown in blue are floodprone. These will likely be used for open space and floodplain restoration or management purposes, and may be suitable for use in mitigating impacts relating to floodplain development. The two of tracts of land acquired with open space bonds (shown in red on Figure 18) will remain as a mix of farmland and open space. A floodprone parcel of land near the Pinal County line was reallocated for economic development, and a tract of land north of a levee at the Ajo airport (not shown below) will be used for airport expansion. Changes in land classification (from potential mitigation land released to other uses) are allowed under the Implementing Agreement, and require no permission from USFWS.

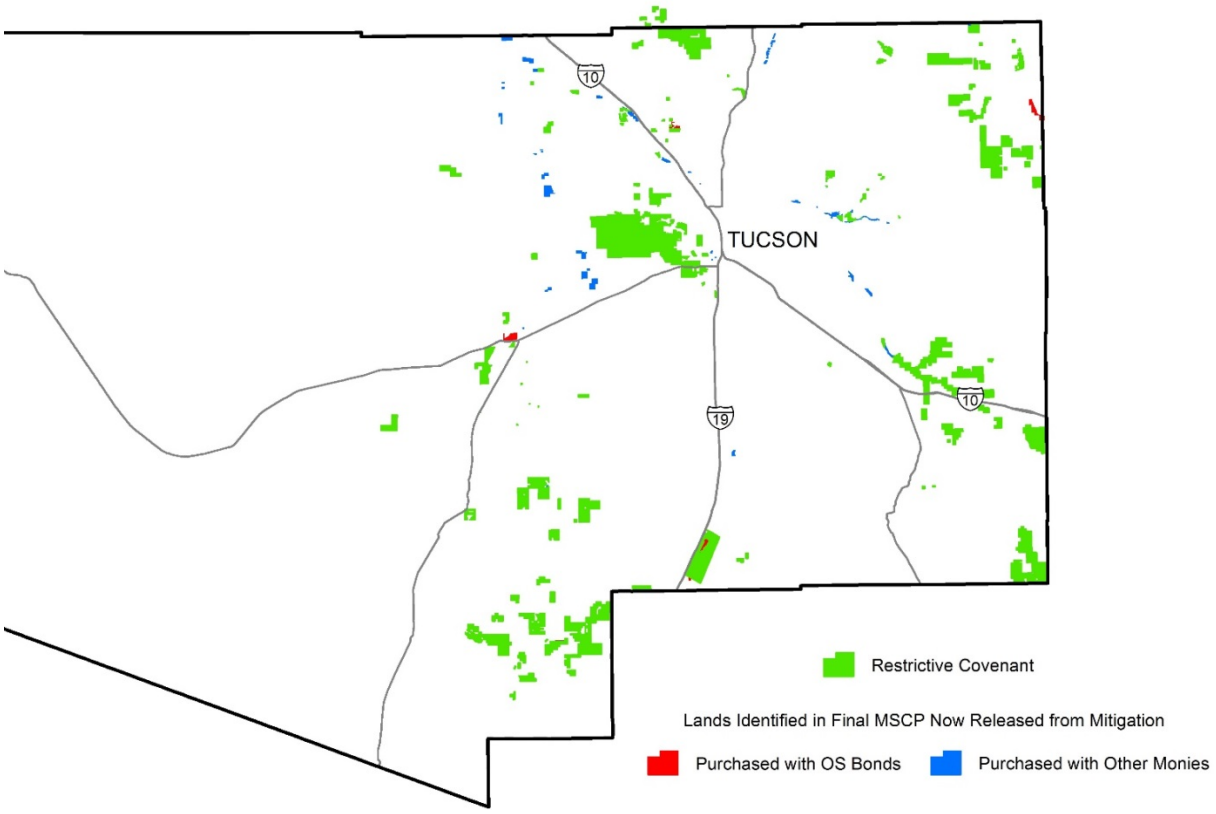


Figure 18. Lands that were identified in the MSCP which are no longer being considered as potential MSCP mitigation lands are shown in red and blue. Most will remain as open space.

Several donations and other land acquisitions of open space were finalized in the latter half of 2016 (e.g., Figure 19). Restrictive covenants on these lands will be proposed for 2017. If the Board approves these restrictions, then these lands will be added to the inventory of potential MSCP mitigation lands available for future allocation.

Pima County now holds a restrictive covenant with rights of enforcement on 213 acres of City land in Avra Valley that provides movement habitat for cactus ferruginous pygmy-owls. The covenant prohibits construction on these lands, which are located on the Central Avra Valley Storage and Recovery Project property. These Section 7 mitigation lands are managed by Tucson Water.

Figure 19. This donation of 65 acres of Sonoran Desert upland is located in Multiple Use Management Area adjacent to the Tucson Mountains. It also includes a portion of an Important Riparian Area. It was donated in 2016 as natural open space with a life estate on the single residence.

11. Partnerships

Arizona Conservation Corps

Arizona Conservation Corps aims to continue the legacy of the Civilian Conservation Corps of the 1930s by connecting youth, young adults and recent era military veterans with conservation projects on public lands. Pima County's NRPR has utilized the services of AZCC for a number of years to help out with management of potential MSCP mitigation lands. Local and urban youth from metropolitan areas in southern Arizona works with NRPR staff to construct and repair fences, remove invasive species, plant native species, and clean up wildcat dumps. In February 2016, one crew received Zeedyk erosion control training, and later installed erosion control structures at Rancho Seco. Crews also prepared the artificial pool for the Chiricahua leopard frog at Sands Ranch (Figure 20).

Figure 20. Two crews from Arizona Conservation Corps (AZCC) worked with County staff to create habitat for the Chiricahua Leopard Frog at Sands Ranch. This work was completed prior to issuance of the Section 10 permit. Photos from AZCC.

Arizona Land and Water Trust

As noted in Section 3.2, Pima County entered into an agreement with the ALWT to provide Pima County with third-party beneficiary for both types of restrictive covenants. The ALWT is a nationally-recognized organization working to preserve southern Arizona's western landscapes, wildlife habitat, and working farms and ranches. The ALWT staff and board are experienced in land management and are familiar with many of the County and RFCD lands identified as mitigation and conservation land. In addition to their land management experience and knowledge, they have also acted as a land trust for various private property owners and ranchers in southern Arizona.

The role of the ALWT will be to ensure that any changes made by Pima County or the District are consistent with the terms of the agreement. It is essential to have a third party involved because the County and RFCD are administered by the same elected members, who sit as both the Board of Supervisors and the RFCD Board of Directors. Should violations occur, the covenants mandate that the ALWT will work with the County and RFCD to remedy the situation.

University of Arizona

In December 2016, Pima County finalized a contract with the University of Arizona for Dr. Aaron Flesch (School of Natural Resources and the Environment) to assist Pima County in the development of a monitoring program for the cactus ferruginous pygmy owl and to conduct the first surveys for the species on lands owned and leased by Pima County. Dr. Flesch is a world-renowned expert on cactus ferruginous pygmy owl ecology and habitat and he has published extensively on the species.

Arizona Game and Fish Department

Pima County has long-standing, prior access agreements with Arizona Game and Fish Department to maintain access to backcountry areas through Rancho Seco, Six Bar, and A7 Ranch. Under these access agreements, Arizona Game and Fish Department may grant funds to Pima County for land management. Since permit issuance, Pima County has conferred with AZGFD on the potential use of native fish for vector control. AZGFD used County land for release of several cactus ferruginous pygmy-owls. AZGFD and Pima County both participated in identifying conservation opportunities in Avra Valley.

Southern Arizona Quail Forever

This organization is supporting provision of a wildlife guzzler on Sands Ranch, using a modified well and storage system with attached solar. This system will provide water year-round, independent of the livestock operation. This organization has donated funds and labor for the project. Southern Arizona Quail Forever is a relatively new organization focused on quail hunting and quail habitat in Pima, Cochise, and Santa Cruz Counties.

Frank Reichenbacher

We are fortunate to have experts donate their time to assist staff. Frank Reichenbacher, the leading expert on Tumamoc globeberry, visited several potential mitigation lands to inventory globeberry plants during August and September 2016. During one recent visit, he identified new plants, which will be added to a GIS database that he is compiling for globeberry occurrences throughout Pima County.

12. Prospective Issues

- During 2017, the Natural Resources, Parks and Recreation Department may revise the Standards and Guidelines for rangelands. If this occurs, the effort will be coordinated with USFWS, other County departments, County ranch partners, and members of the public. NRPR also intends to update park rules for all types of park lands, with public involvement.
- In the first quarter of 2017, Pima County Office of Sustainability and Conservation intends to submit a proposal for USFWS consideration regarding species enhancement credits.
- Pima County is working to minimize the potential impacts of the SunZia power line, the Interstate 11 road corridor, and the Rosemont mine on the potential mitigation lands, and to evaluate any relevant information that these projects generate.
- Pima County will work with USFWS and others on the potential for using fish for vector control.
- Pima County will continue to respond to AZGFD and others regarding potential native species introductions, such as the prairie dogs planned for Sands Ranch in 2017. An internal procedure for evaluating proposed species introductions of any kind on County lands will be considered.
- USFWS assistance will be needed to continue dialogue with other federal agencies on streamlining their Section 7 consultations in light of the MSCP.
- Timely approval of Pima County's Section 10(a)1(A) endangered and threatened species permit is needed to implement species surveys for yellow-billed cuckoo, Chiricahua leopard frogs, and southwestern willow flycatcher.
- Pima County is working to determine the appropriate permissions needed for species monitoring and management on State Trust land.

13. Acknowledgments and Certification

This report is prepared in partial fulfillment of the terms of permit TE-84356A-0.

Preparers of this report include: Julia Fonseca, Brian Powell, and Ian Murray. Internal reviewers included Nicole Fyffe, Linda Mayro, Sherry Ruther and Jenny Neeley.

This report reflects the continued collaboration of many County departments who provide stewardship to open space lands or provide basic services like information technology, financial reporting, and law enforcement. Our thanks go to the many individuals in the departments who provided assistance: Information Technology, Natural Resources, Parks and Recreation, Sheriff, County Attorney's Office, County Administration, Regional Flood Control District, Finance, Transportation, Environmental Quality, Real Property, Office of Sustainability, and Public Works Administration.

We also appreciate the information shared by Arizona Game and Fish Department for evaluating changed circumstances.

To the best of my knowledge, I certify that the information submitted is true, accurate, and complete.

C. Huckelberry 2/28/17

C.H. Huckelberry, County Administrator

14. Glossary and Acronyms

14.1. Glossary

Adaptive management. Adaptive management is an iterative learning process that identifies gaps in understanding, facilitates action, and modifies management based on new information (Walters 1986). Pima County will employ two types of adaptive management: 1) those decisions for which a single management action is needed (responsive management actions) and 2) decisions that require recurrent actions (recurrent decisions).

Board. Referred to collectively as the Board of Supervisors for Pima County and the Board of Directors for the Pima County RFCD.

Built environment The GIS shapefile representing pre-permit land uses in Pima County. It was developed in 2008 by Pima Association of Governments, and updated by Pima County.

Changed circumstances. "Changes in circumstances affecting a species or geographic area covered by an HCP that can reasonably be anticipated by Plan developers and the USFWS and that can be planned for (e.g., the listing of a new species, or a fire or other natural catastrophic event in areas prone to such events)" (50 CFR §17.3).

County. When referring to the applicants, Pima County and Pima County RFCD. When referring to mitigation lands, lands managed by either of the two applicants.

Covered Species. Species covered under Pima County's Section 10 permit.

Fee simple. A term of property law where the owner has title (i.e., ownership) to the land.

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

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

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

Maeveen Marie Behan Conservation Lands System (CLS). The biological reserve system design adopted as the Regional Environmental Element of Pima County's 2001 Comprehensive Plan Update, and any subsequent revisions. The CLS provides the principal basis for the selection of lands for mitigation under the permit.

Mitigation lands. Those lands, leases, or rights held by Pima County and committed as compensation for impacts to habitat of Covered Species stemming from Covered Activities under Pima County's Section 10 permit. Mitigation lands are either owned in fee simple, leased, or held as a partial property right (e.g. conservation easement or other legally enforceable property right).

Mitigation lands, County-controlled. All mitigation lands for which Pima County has a property interest (e.g, fee simple ownership, conservation easement, or grazing lease). Excludes mitigation lands derived from the Opt-in Provision.

Mitigation lands, County-owned. All lands that are owned by Pima County in fee simple and used as compensation for impacts under the terms of Pima County's Section 10 permit.

Opt-in Provision. The process through which the County will grant Section 10 permit coverage to any property owner, at their discretion, who requires a site construction permit to develop their property as a residential subdivision or as a non-residential development. In addition to the property owner's election, receipt of permit coverage requires fulfillment of several criteria and the payment of appropriate fees.

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

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

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

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

Regional Flood Control District (RFCD). The Pima County RFCD is a separate legal entity from Pima County, and one of the two applicants in the MSCP.

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

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

Unforeseen Circumstance: "changes in circumstances affecting a species or geographic area covered by an HCP that could not reasonably have been anticipated by plan developers and the

USFWS at the time of the HCP's negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species" (50 CFR §17.3).

14.2. Acronyms

AGFD	Arizona Game and Fish Department
ALWT	Arizona Land and Water Trust
AZCC	Arizona Conservation Corps
CFR	Code of Federal Regulations
CIP	Capital Improvement Program
CLS	Maeveen Marie Behan Conservation Lands System
Corps	U.S. Army Corps of Engineers
FY	Fiscal year
GIS	Geographical Information System
HCP	Habitat Conservation Plan
MSCP	Multi-species Conservation Plan
NRPR	Natural Resources, Parks and Recreation Department (Pima County)
PCEMP	Pima County Ecological Monitoring Program
RFCD	Pima County Regional Flood Control District
USFWS	United States Fish and Wildlife Service

15. Literature Cited

Pima County (2016). Pima County Multiple Species Conservation Plan. Final plan approved by the U.S. Fish and Wildlife Service, Tucson, Arizona.

Powell, B. F. (2013). Water resource trends in the Cienega Creek Natural Preserve, Pima County, Arizona. An unpublished report to the Pima County Flood Control District, Tucson, AZ.

U.S. Fish and Wildlife Service (2016). "Species status assessment for the lesser long-nosed bat. U.S. Fish and Wildlife Service, Southwest Region, Albuquerque, NM."

Walters, C. J. (1986). Adaptive management of renewable resources. New York, New York, Macmillan Press.

Appendix 1. Final restrictive covenant language adopted by the County Board of Supervisors on October 18, 2016. Language in these covenants differs slightly from that in the MSCP (Appendix J).

Master Restrictive Covenant for Pima County MSCP Mitigation Land

This Master Restrictive Covenant ("**MSCP Master Covenant"**) is entered into by Pima County, a political subdivision of the State of Arizona ("**County**"), the Pima County Regional Flood Control District, a political taxing subdivision of the State of Arizona ("**District**"), and the Arizona Land and Water Trust, Inc., an Arizona nonprofit corporation ("**Beneficiary**") (County, District, and Beneficiary being collectively the "**Parties**").

1. **Background and Purpose**

1.1. The United States Fish and Wildlife Service issued permit #TE84356A to County (the "**Permit**") for the incidental take of threatened and endangered species caused by specific, lawful activities within Pima County. To direct the mitigation of these incidental takes and ensure compliance with the permit, the County has established its Multi-Species Conservation Plan ("**MSCP**"). The objectives of the MSCP (the "**Objectives**") include managing mitigation lands to prioritize conservation of Covered Species and their habitats, prevent landscape fragmentation, and support species establishment or recovery.

1.2. The County owns the real property listed in Exhibit A (the "**Restricted Property**" or "**Restricted Properties**"). A map identifying the Restricted Property is attached hereto as Exhibit B. Individual maps of each of the Restricted Properties are attached hereto as Exhibit C. The Restricted Property contains significant undisturbed natural open space that the County wishes to preserve and protect for the mitigation of incidental take covered by the County's incidental take permit.

1.3. The Parties intend this MSCP Master Covenant to prohibit uses of the Restricted Properties that would impair or interfere with the mitigation efforts of the County, except for any pre-existing uses as shown on imagery by Pictometry or Pima Association of Governments dated 2015 or 2016, whichever is more recent (the "**Pre-existing Uses**").

1.4. The Parties intend that this MSCP Master Covenant assure that the Restricted Properties will be forever preserved as natural open space for the conservation of natural habitat for wildlife, the protection of rare and unique native plants and animals and the scenic enjoyment of the general public.

2. **Recording of Site Specific Restrictive Covenants**

2.1. The Parties intend that a site specific agreement ("**Site Specific Agreement**") be recorded for each individual property listed on Exhibit A and depicted on Exhibits B and C. The

Site Specific Agreement shall be in the form of Exhibit D attached hereto. The Parties intend that each Site Specific Agreement incorporate all of the terms and conditions contained in this MSCP Master Covenant. Each Site Specific Agreement will contain the legal description of the referenced property, and recordation of a Site Specific Agreement will subject the real property described therein to the terms of this MSCP Master Covenant and cause such property to be a Restricted Property.

2.2. County hereby delegates to the County Administrator or his designee the authority to sign each of the Site Specific Agreements on behalf of County. District hereby delegates to the General Manager of the District or his designee the Authority to sign each of the Site Specific Agreements on behalf of District.

3. **Nature of MSCP Master Covenant**

3.1. This MSCP Master Covenant runs with each Restricted Property and binds the County and its successors and assigns.

3.2. This MSCP Master Covenant remains in perpetuity with respect to each Restricted Property, unless released by written consent of County, District, and Beneficiary, with the written concurrence of the U. S. Fish & Wildlife Service. Any release will specify if it relates to a specific Restricted Property or to this Master Agreement and, therefore, all the Restricted Properties.

3.3. The uses of the Restricted Properties prohibited by this MSCP Master Covenant remain in effect notwithstanding any future annexation of all, or any portion, of a specific Restricted Property by a municipality.

3.4. This MSCP Master Covenant may not be amended or modified except upon written agreement of County, District, and Beneficiary, and written concurrence from the U.S. Fish and Wildlife Service.

3.5. This MSCP Master Covenant may be enforced by District or Beneficiary as provided in Section 9 below.

4. **The Restrictions**. Except as provided in Section 5 of this MSCP Master Covenant, the following uses of the Restricted Properties are prohibited (collectively the "**Restrictions**"):

4.1. Development of the Restricted Properties, including subdividing or lot splitting of a Restricted Property;

4.2. Construction or placement of new or additional buildings or structures on a Restricted Property, unless the construction supports the purposes for which the Restricted Property was originally intended including any adopted master plan, and does not degrade the Restricted Property's values as expressed in the purpose statement;

4.3. Alteration of the ground surface or natural vegetation, except as may be needed for ranch, range improvement, or trail-based recreational uses, and only if such alterations are consistent with other provisions of the Multi-species Conservation Plan;

4.4. Impoundment, diversion or alteration of any natural watercourse unless for watershed enhancement to improve species habitat or to maintain a Restricted Property's mitigation values;

4.5. Development of, or the granting of, access, rights-of -way or easements for new roads or new utilities, including telecommunications facilities, except where County has no discretion to prohibit the activity;

4.6. Filling, excavation, dredging, mining, drilling, exploration, or extraction of minerals, hydrocarbons, soils, sand, gravel, rock or other materials on or below the surface of the Restricted Property, except where County has no discretion to prohibit the activity;

4.7. Storage, accumulation or disposal of hazardous materials, trash, garbage, solid waste or other unsightly material on the Restricted Property;

4.8. Introduction of non-native fish or amphibians or other non-native animals to or from catchments, tanks, springs or creeks. Other non-native species that might adversely affect the mitigation of permitted activities are also prohibited except for the purposes of supporting existing ranching operations, if any, and limited to those areas identified that have historically been devoted to the growing of such species, as shown on 2015 or 2016 aerial photographs;

4.9. Storage and use of biocides and chemical fertilizers except for residential and agricultural purposes. Aerial application of biocide or other chemicals is prohibited except where County and District concur that it is an appropriate and necessary management technique to promote the recovery and re-establishment of native species, to reduce threats to ecosystem structure and function, or to protect public health, safety and welfare;

4.10. Pumping of water from existing diversions for purposes other than on-site residential, wildlife, recreational, habitat enhancement and agricultural uses associated with livestock grazing on the Restricted Property. Increases in the pumped amounts of surface or subsurface water as allowed by the Arizona Department of Water Resources are not permitted without joint approval from the County and District and concurrence from the U.S. Fish and Wildlife Service;

4.11. Installation of underground storage tanks for petroleum or other polluting substances, except for already existing or permitted septic tanks;

4.12. Confinement of livestock where animals are permanently located in enclosures and the majority of their feed supplied from outside sources. This includes feeder cattle, dairy, pig, poultry and exotic animal farm operations;

4.13. Commercial enterprises inconsistent with the Objectives, excluding farming and ranching. The County and District may jointly approve commercial enterprises, other than farming or ranching, that provide for ecotourism or wildlife-related recreation provided that it is consistent with the Objectives and does not degrade the Restricted Property's mitigation value;

4.14. Residential use for mobile homes, travel trailers, tent trailers, self-propelled recreational vehicles and like structures or vehicles, except temporary use as permitted by County Park Rules or reasonable use as needed to support the protection or enhancement of the Restricted Property's mitigation value;

4.15. Paving of roads using asphalt or concrete except where required by County ordinance;

4.16. Any modification of the topography of the Restricted Property through the placement of soil, dredging spoils, or other material, except for those uses permitted under this document, or to reduce soil erosion or to protect public health, safety and welfare;

4.17. Severance of water rights appurtenant to the Restricted Property including the transfer, encumbrance, lease and sale of water rights;

4.18. Off-road vehicular travel except to facilitate permitted activities on the Restricted Property; and

4.19. Removal of natural, mineral, or cultural resources that is not authorized by County.

5. **Exceptions to Restrictions.** Notwithstanding any other provision of this MSCP Master Covenant, the following uses of the Restricted Properties are not prohibited:

5.1. Any use of the Restricted Property which the County Board of Supervisors in its reasonable discretion determines is necessary to retain, restore, or enhance the mitigation of incidental take covered by the Permit;

5.2. Any Pre-existing Use of the Restricted Property;

5.3. Any use of the Restricted Property expressly permitted by a contract in effect between the County and a third party as of the date this MSCP Master Covenant is recorded; and

5.4. Any use of the Restricted Property which the County Board of Supervisors determines, based on clear and convincing evidence presented to said Board, is necessary to protect the public health, safety or welfare.

6. **Obligations of County**

6.1. County, through its employees, agents and contractors, retains all responsibilities and will bear all costs and liabilities of any kind related to the ownership, operation, upkeep, and maintenance of the Restricted Properties. County remains solely responsible for obtaining any applicable governmental permits and approvals for any activity or use undertaken on the Restricted Properties. All such activity shall comply with all applicable Federal, state, and local laws, regulations, and requirements.

6.2. County, through its employees, agents and contractors, at County's expense, will conduct an inspection of the Restricted Properties at least biennially to determine if there are any violations of the Restrictions. The inspection will be completed by either examination of aerial photographs or by physical inspections with onsite photographs taken at the time of the inspections. The County will prepare and deliver copies of biennial reports ("Reports") of its inspections, which reports will describe the then current condition of the Restricted Properties inspected and note any violations of the Restrictions. Copies of the Reports will be provided to District and Beneficiary upon completion, and in no event later than October 15 of each biennial reporting year. County will maintain the Reports as County records in accordance with Arizona state law.

6.3. County shall report any violations of the terms of this MSCP Master Covenant to District and Beneficiary within 2 working days of County discovery and confirmation of any such violation. For purposes of this Section 6.3, the determination of what shall constitute a reportable violation of this MSCP Master Covenant shall be at County's reasonable discretion. However, County's determination of what is reportable pursuant to this Section 6.3 will not limit District or Beneficiary's right to enforce this MSCP Master Covenant as provided for in Sections 7, 8, and 9 of this MSCP Master Covenant.

6.4. The parties acknowledge that Beneficiary has no legal ownership interest in the Restricted Properties, and it is the parties' intent that the Beneficiary not undertake any responsibility or liability with respect to the Restricted Properties, other than liability related to Beneficiary's negligence ("Beneficiary's Negligence"), as more specifically limited below. Therefore, County agrees:

6.4.1. County (as indemnifying party) shall indemnify, defend and hold harmless, Beneficiary and its officers, directors, employees, agents, affiliates, successors and permitted assigns (collectively, "**Indemnified Party**") against any and all losses, damages, liabilities, deficiencies, claims, actions, judgments, settlements, interest, awards, penalties, fines, costs, or expenses of whatever kind, including attorneys' fees, that are incurred by

Indemnified Party (collectively, "**Losses**"), arising out of or related to any third-party claim alleging:

6.4.1.1. breach or non-fulfillment of any provision of this Agreement by County, District, or County or District's personnel;

6.4.1.2. any negligent or more culpable act or omission of County, District, or County or District's personnel (including any reckless or willful misconduct) in connection with the performance of County, District, or County or District's personnel under this Agreement;

6.4.1.3. any bodily injury, death of any person or damage to real or tangible personal property caused by the negligent or more culpable acts or omissions of County, District, or County or District's personnel (including any reckless or willful misconduct);

6.4.1.4. any failure by County, District, or County or District's personnel to comply with any applicable federal, state or local laws, regulations or codes, including any failure related to their performance under this Agreement; or

6.4.1.5. any claim by any third party asserting a failure of Beneficiary to enforce Beneficiary's rights, or perform Beneficiary's duties, under this Agreement. County's obligation to indemnify Beneficiary against third party claims related to any failure of Beneficiary perform Beneficiary's duties, under this Agreement will not preclude County from replacing Beneficiary as provided in Section 8.5. Replacement of Beneficiary will be County's sole remedy for Beneficiary's breach of its obligations under this Agreement.

6.4.2. Beneficiary must give notice to County (a "**Claim Notice**") of any claim filed which may give rise to a Losses. Indemnified Party's failure to provide a Claim Notice does not relieve County of any liability, but in no event shall County be liable for any Losses that result directly from a delay in providing a Claim Notice, which delay materially prejudices the defense of the claim. County's duty to defend applies immediately after receiving a Claim Notice.

6.4.3. County may select legal counsel to represent Beneficiary in any action for which County has an obligation to indemnify, defend and hold harmless Beneficiary, and County shall pay all costs, attorney fees, and Losses.

6.4.4. County shall give prompt written notice to Beneficiary of any proposed settlement of a claim that is indemnifiable under this Agreement. County may settle or compromise any claim without Beneficiary's consent, so long as Beneficiary is not responsible for paying any Losses.

7. **Obligations of District**

7.1. District shall review any and all reports on potential violations of the Restrictions provided by County to District as required by this MSCP Master Covenant, at District's expense.

7.2. If the event of any action that may constitute a violation of the terms of this MSCP Master Covenant, District shall determine, in its reasonable discretion, whether to take any action to enforce the terms of this MSCP Master Covenant.

7.3. In the event that County desires to take action with respect to the Restricted Properties that may constitute a violation of this MSCP Master Covenant, County will obtain District's prior approval of such action, and District shall respond to any such request from County in a timely manner.

7.4. District and County will advise Beneficiary in writing of any non-privileged communications between County and District with regard to the matters referred to in Sections 7.2 and 7.3. District and County will also provide Beneficiary with copies of any written communications, in whatever form, between District and County with regard to the matters referred to in Sections 7.2 and 7.3.

8. **Obligations of Beneficiary**

8.1. Beneficiary shall review any and all reports provided by County to Beneficiary as required by this MSCP Master Covenant, at County's expense. County shall compensate Beneficiary for performing its actions under this Section 8.1 on a time and materials basis, pursuant to the terms of professional services contract entered into between County and Beneficiary (the "Services Agreement"). In the event (i) County and Beneficiary cannot agree upon the Services Agreement; (ii) the Services Agreement is terminated, for any reason; (ii) County fails to timely pay Beneficiary under the Services Agreement; or (iii) County materially breaches any other term of the Services Agreement, then Beneficiary will have the right to terminate its obligations under this MSCP Master Covenant by providing County and District ten days prior written notice.

8.2. If the event of any action that may constitute a violation of the terms of this MSCP Master Covenant, Beneficiary shall determine, in its reasonable discretion, whether to take any action to enforce the terms of this MSCP Master Covenant. Beneficiary shall be reimbursed for any expenses incurred by Beneficiary to enforce this Master Agreement in accordance with the Services Agreement.

8.3. In the event that County desires to take action with respect to a Restricted Property that may constitute a violation of this MSCP Master Covenant, County will obtain Beneficiary's prior approval of such action, and Beneficiary shall respond to any such request from County in a timely manner. Beneficiary shall be compensated for any services performed in response to any such request in accordance with the Services Agreement.

8.4. In the event Beneficiary is no longer able to perform its obligations under this MSCP Master Covenant, or no longer desires to serve as Beneficiary, then Beneficiary shall provide not less than sixty (60) days' notice to County. Beneficiary may designate a replacement Beneficiary subject to County's approval. In the event Beneficiary does not designate a replacement Beneficiary within 45 days' after delivery of the notice, then County will be solely responsible to designate a replacement Beneficiary. Beneficiary's resignation shall be effective sixty (60) days after the delivery of the notice by Beneficiary to County.

8.5. County's sole remedy for Beneficiary's failure to perform Beneficiary's obligations under this Agreement will be to terminate the Services Agreement and replace Beneficiary with a new party who will fill the role of Beneficiary. County will be solely responsible to designate a replacement Beneficiary in such event.

9. **District and Beneficiary's Right To Enforce.**

9.1. District and/or Beneficiary (for purposes of this Section 9, collectively or individually the "**Enforcing Party**") may enforce this MSCP Master Covenant against the County and its successors and assigns.

9.2. If the Enforcing Party has reason to believe that a violation of the Restrictions may have occurred, the Enforcing Party has the right to enter upon the Restricted Properties. The Enforcing Party must provide at least two (2) business days' notice to County prior to entering upon a Restricted Property.

9.3. The Enforcing Party shall hold County harmless from liability for any injuries to its employees or agents occurring on a Restricted Property in the course of its duties pursuant to this MSCP Master Covenant which are not directly or indirectly the result of acts, omissions, or the negligence of County, or County's employees, agents, successors and assigns.

9.4. If the Enforcing Party determines that there is a breach of the terms of the Restrictions, the Enforcing Party may, but is not obligated to, enforce the terms of this MSCP Master Covenant as provided in this Section 9. When evaluating any possible breach or enforcement action, the Enforcing Party will have the right to consult experts (e.g., biologists, engineers, etc.) to assist it in determining both whether or not there is a violation and appropriate remedial action, provided that the cost of any such experts is subject to the maximum dollar limitation in the Services Agreement. Beneficiary will be reimbursed by County for any such expenses in accordance with the Services Agreement.

9.5. Prior to any enforcement action by the Enforcing Party, the Enforcing Party must give written notice to County of such breach (the "**Notice of Breach**") and demand corrective action sufficient to cure the breach and, where the breach involves injury to a Restricted Property resulting from any activity inconsistent with the purpose of this MSCP Master Covenant, to restore the portion of the Restricted Property so injured.

9.6. If (i) under circumstances where an alleged breach can be cured within a 30 day period, County fails to cure an alleged breach within 30 days after receipt of the Notice of Breach, or (ii) under circumstances where an alleged breach cannot reasonably be cured within a 30 day period, County fails to begin curing such breach within the 30 day period, or County fails to continue diligently to cure such breach until finally cured, the Enforcing Party may in any such event bring an action at law or equity to enforce the terms of this MSCP Master Covenant or to enjoin the breach by temporary or permanent injunction, and to recover any damages caused by the breach of the terms of this MSCP Master Covenant or injury to any protected uses or mitigation, including damages for any loss, and to require the restoration of any Restricted Property to the condition that existed prior to the injury.

9.7. In the event any action, suit or proceeding at law or in equity is instituted with respect to this MSCP Master Covenant, the Enforcing Party shall be entitled to reasonable attorneys' fees, expenses and court costs incurred if it is the prevailing party.

9.8. Nothing contained in this MSCP Master Covenant can be construed to entitle the Enforcing Party to bring any action against the County for any injury to or change in the Restricted Property resulting from causes beyond the County's control including unforeseeable acts of trespassers, fire, flood, storm, drought, pests, natural earth movement, vegetative disease, or resulting from any action taken by the County under emergency conditions to prevent, abate or mitigate significant injury to any Restricted Property resulting from such causes.

10. **General Provisions**

10.1. The laws and regulations of the State of Arizona govern this MSCP Master Covenant. Any action relating to this MSCP Master Covenant must be brought in a court of the State of Arizona in Pima County.

10.2. Unless the context requires otherwise, the term "including" means "including but not limited to".

10.3. Each provision of this MSCP Master Covenant stands alone, and any provision of this MSCP Master Covenant found to be prohibited by law is ineffective only to the extent of such prohibition without invalidating the remainder of this MSCP Master Covenant.

10.4. This instrument sets forth the entire Agreement of the County, District and Beneficiary with respect to this MSCP Master Covenant.

10.5. Any notice given under this MSCP Master Covenant must be in writing and served by delivery or by certified mail upon the other Parties as follows:

If to County: Office of Sustainability and Conservation
Attn: Director

Pima County Public Works
201 N Stone Ave., 6th FL
Tucson, Arizona 85701

If to District: Regional Flood Control District
Attn: Director
Pima Works Building
201 N Stone Ave., 9th FL
Tucson, Arizona 85701

If to Beneficiary: The Arizona Land and Water Trust
Attn: Diana Freshwater, President
3127 N. Cherry Ave.
Tucson, Arizona 85719

The Parties have executed this MSCP Master Covenant by their duly authorized representatives.

COUNTY: PIMA COUNTY, a political subdivision of the State of Arizona:

_____ _____
Chair, Board of Supervisors Date

ATTEST:

_____ _____
Robin Brigode, Clerk of Board of Supervisors Date

DISTRICT: The Pima County Regional Flood Control District

_____ _____
Chair, Board of Directors Date

ATTEST:

_____ _____
Robin Brigode, Clerk of Board of Directors Date

APPROVED AS TO CONTENT:

_____
Neil J. Konigsberg, Manager, Real Property Services

_____
John Bernal, Deputy County Administrator, Public Works

APPROVED AS TO FORM:

_____
Tobin Rosen, Deputy County Attorney

BENEFICIARY: The Arizona Land and Water Trust, Inc.

_____ _____
Diana Freshwater, President Date

Appendix 2. Capital Improvement Projects completed in 2016.

Project ID	Project Name	Program Description	Location
CWW.3MR515	WW - Sewer Manhole Rehabilitation # 5	Repairing, rehabilitating, or replacing defective manholes throughout the sanitary sewer system.	County Wide
CIT.ANAREP	IT - Analog Line Replacement for VoIP Project - Telecom	Replace analog lines w/Cat 6a network cabling for connection of analog devices to a VoIP network.	DO NOT PLOT
CIT.DISUPG	IT - 10 Gig Downtown Distribution Upgrade-Telecom	Upgrade LAN backbone at all major downtown facilities to 10 Gig connections	All downtown facilities
CWW.3CRP15	WW - Conveyance Rehabilitation Program	Repairs including sewer mains & pump stations, replacements & rehab of conveyance sys components	3355 N. Dodge Blvd
CWW.3MMP16	WW - Sewer Utility Minor Modification Projects	Minor modifications to RWRD sanitary swer system due to roadway improvement projects by Arizona Department of Transportation	3355 N. Dodge Blvd, Tucson, AZ
CPR.PCCPRK	PR - Catalina Community Park	Develop a new community park to improve sports fields facilities and landscape.	15300 N. Lago Del Oro Parkway
CTR.4PPP15	TR - Pavement Preservation Program FY15	Pavement Preservation FY15	Countywide
CTR.4RTKVI	TR - Valencia Rd - Wilmot Rd to Kolb Rd RTA24 & 36	Safety projects that are a part of the RTA Plan.	T15A, R15E, Sec 07,08
CWW.3SR773	WW - ADOT SR77 Oracle Rd to Tangerine Rd to Pinal County Ln	Existing sewer mains in the vicinity of SR77 will be relocated or modified due to HWY improvement.	Oracle Rd - Tangerine Rd to Pinal County Line.
CFC.5SCRBR	FC - Lower Santa Cruz Levee Bank Repair	Assess RFCD property rights along Santa Cruz River watercourse, focusing on constructed flood contro	Tangerine Farms Rd
CFM.XFUREM	FM - Forensics Remodel	Renovate Forensics Unit to modernize & increase the efficiency of the suite & create a break room l	1650 E. Benson Hwy, Tucson, AZ
CFM.XAJOSH	FM - Ajo Way Shops Relocation	FM Ajo shop relocation from Abrams Warehouse to new space.	Relocate Ajo Shops from Abrahms
CFM.XINDDF	FM - Indigent Defense Tenant Improvement	Remodel 2200 sq ft of existing office space on 18th fl of BOA	Remodel 18th fl BOA 2200 sq ft for Indigent Defense
CFM.XLIBLI	FM - Library Sustainable Landscaping Improvements	Replace current landscape with native Sonoran desert plants	Various libraries within the County
CFM.XSTLTG	FM - Kino Stadium Lighting Controls	Installation of Musco Controls System for more efficient & cost effective lighting @ Kino Stadium.	2500 E. Ajo Way, Tucson, AZ
CWW.322C14	WW - 22nd to Congress Osborne to Toole	Rehabilitate 30 manholes and approximately 4,500 feet of existing sewer with cured-in-place pipe.	S. Osborne Ave. and W. 22nd St.
CWW.3APS13	WW - Arivaca Pump Station	Modifications will repair rehabilitate or replace mechanical & electrical equipment	28655 S Nogales Highway
CWW.3CPS13	WW - Cardenal Pump Station	Modifications will repair, rehabilitate or replace mechanical & electrical equipment	4400 N. Camino Cardenal
CWW.3HE614	WW - Helen St to Elm St 6th Ave to 1st Ave	To rehabilitate approx. 6,600 feet of existing sewer with cured-in-place pipe.	Helen St. & 6th Ave.
CWW.3ICB12	WW - Ina Rd WRF Centrifuge Bldg Sludge Screen	Purchase & install a self-cleaning automatic screening system.	7101 N. Casa Grande Highway
CWW.3IPR14	WW - Ina Rd WRF Emergency Overflow Basin Pump Replacement	Replace the current trailer mounted diesel pump with electric pumps to ensure contingency action.	7101 N. Casa Grande Highway

CWW.3KMP12	WW - Kostka Ave Michigan to Pennsylvania	Kosta Ave: Michigan Street to Pennsylvania Street	Kostka Ave between Michigan St and Pennsylvania St
CWW.3MLS13	WW - Mt Lemmon WRF SCADA & Automation Improvements	Design & construct SCADA Improvements for the MT Lemmon WRF	MH#5300-01 Mt Lemmon WRF SCADA
CWW.3RCI13	WW - Randolph Pk WRF & Pump Station Security Improvements	Design & construct security improvements for Randolph Park	3805 E. 22nd Street
CFM.XJUVRF	FM - Juvenile Courts Roofing Replacement	Replace roof areas that are failing at the Juvenile Court Complex	2225 E. Ajo Way
CIT.DCTCUP	IT - Data Center Communications Upgrade - Telecom	Provide full redundancy on our core data center switches upgraded blades & optics will be purchased	Downtown Complex
CIT.VOIPH2	IT - VoIP Phone System - Telecom	This project extends the new Shore Tel Voice over IP system that will reside in Admin West	Downtown Complex
CFM.XCOCCD	FM - Clerk of Superior Court Civil Desk Renovation	Provide architectural drawings to renovate a 3,000sf for Civil desk, Superior Ct, bid and execute.	110 W. Congress 1st Floor
CFM.XLSBLB	FM - Legal Services Bldg Lobby Improvements	This program will encompass performing improvements to the lobby of Legal Services.	32 N. Stone
CWW.3PIC15	WW - Pantano Interceptor Chemical Dosing Unit at Houghton Rd	Signs of corrosion and emission of odors along PTI and SRI undergo rehab. Inject Mag-hydro for CDUs.	Pantano Interceptor Chem Dosing Unit @ Houghton Rd; T15 R16 S17 & 22
CFM.XMSLIB	FM - Mission Library Interior Enhancements	Remodel check out pods, study rooms, computer commons, shelving, furniture, signage, paint, carpet	3770 S. Mission Rd
CTR.4WVDMG	TR - Davis-Monthan AFB Wilmot Road Paving	Repaving Wilmot Road from Valencia Road, north to Davis-Monthan South Gate Complex & concrete walls.	Wilmot Rd north of Valencia Rd to the Davis Monthan AFB entrance gate.
CFM.XGVJCA	FM - Green Valley Justice Court Addition	Green Valley Courthouse addition approx. 1,116 gsf to match existing building.	601 N. La Canada Dr. Green Valley, AZ
CWW.3SRF13	WW - Sub-Regional Facilities Security Improvements	Will provide the physical & cyber security needed to protect the SRF bldgs & storage yards	4257 W. Walker Rd
CFC.5AIRPO	FC - Airport Wash - Economic Development Zone	District will oversee & prepare a Master Drainage report which establishes all hydrologic constraint	Adjacent to TIA and Raytheon
CFM.BPSYSC	FM-UAMC South Campus Improvements	Incorporate campus improvements to support continued success in patient care, academic teaching	Kina Medical Campus
CTR.4CORSC	TR - Coronado School Cougars	Construct paved shoulders along Wilds Rd & Bowman Rd	Wilds Rd from Coronado School to Bowman Rd. and Bowman Rd from Wilds Rd to Golder Ranch Rd
CTR.4KINOP	TR - 22nd St I-10 to Tucson Blvd Improvements	Construct an overpass for Kino Blvd over 22nd St and ramps from Kino at-grade to 22nd St.	Kino Parkway Overpass at 22nd Street
CWW.3MR616	WW - Sewer Manhole Rehabilitation #6	Repairing, rehabilitating or replacing defective manholes throughout the sanitary sewer system	County Wide
CWW.3SHARP	WW - SE Houghton Area Recharge Project	Construct recharge facilities in the Southeast are of Pima County jointly with COT	5820 S. Houghton Rd
CWW.3RWC15	WW - Addition to RWRD Central Laboratory	Approximately 23,000 square feet of floor space would be added incorporating add'l laboratory, administration space	3035 w. El Camino del Cerro

CCD.HR5003	CD - SALT Corona Road Estates	Commit $240,000 County Affordable Housing Bonds to construct nine single-family, low-income units.	138-21-3670;138-21-3720;138-21-3730;138-21-3750;-138-21-3800;138-21-3820;138-21-3830;138-21-3840
CFC.5CDOLL	FC - CDO Pathway La Cholla to La Canada	Secure add'l flood prone lands & provide a River Park pathway connection along the eastside	Lat 32.377628, Long 111.005544
CWW.3RIR08	WW - Ina Rd WPCF Class A Biosolids Improvements	Design & construct new facilities and modifications to upgrade the Biosolids production from Class B	7101 N. Casa Grande Highway
CIT.WISYUP	IT - Wireless Upgrade and Refresh - Telecom	To increase bandwidth and reliability of the wireless protocol.	150 West Congress 6th Floor
CWW.3IRS09	WW - Ina Rd WPCF SCADA Process Optimization	Design the Ina SCADA process optimization. Construct & implement instrumentation & control systems.	7101 N Casa Grande Hwy
CFM.XCNCSS	FM - Kino Sports Concession Stand Upgrades (South)	Update concession stands to include enclosed patio area, storage room and shade ramadas	2500 E. Ajo Way, Tucson, AZ
CTR.4CVBWV	TR - Camino Verde Brightwater Way to Valencia	A two lane roadway between the northern border of Star Valley & Valencia Road with bike lanes	Section 15, T15S R12E Camino Verde: Bridgewater Way to Valencia Rd.
CWW.3MRP15	WW - Minor Rehabilitation Projects FY14/15	correct defective components in the sanitary sewer system to add life to the value of the assest.	County Wide
CWW.3RIR09	WW - Biogas Sales and Utilization	Sale of biogas generated from the anaerobic digesters at INA Rd WRF	Sec 01, T13S, R12E
CWW.3CSC14	WW - Corona de Tucson WRF SCADA & Operations Upgrade	To provide SCADA process control and automation improvements for the Corona de Tucson WRF.	1100 W. Sahuarita Road - 305-22-0450
CWW.3DBS13	WW - Dodge Blvd Security Improvements	Design & construct security improvements for the Dodge Blvd offices & Richey Rd	3390 N. Richey Rd
CWW.3RSC15	WW - ROMP SCADA	Design and construct a SCADA System for control and monitoring of the ROMP Projects.	In vicinity of existing Roger Rd
CWW.3GSC13	WW - Green Valley WRF SCADA & Automation Improvements	Design SCADA improvements @ Green Valley WRF.	19600 S Old Nogales Hwy, Green Valley
CWW.3CDS16	WW - Corona De Tucson WRF Influent Splitter Box Improvements	Improvements to the influent diversion structure, installation of slide gates both manuel & motor	1100 W. Sahuarita T17.0 R15.0E s10
CWW.3CSI21	WW - Corona de Tucson WRF Security Improvements	Design, construct and install security elements at the Corona de Tucson WRF.	1100 W. Sahuarita Road
CIT.LIBSOT	IT - Library ShoreTel	To update the library district to the new Shoretel system.	Library District.
CFM.XABPGS	FM - Dwn Gov Cen A & B Parking Garage Sewer & Storm Line Rep	Replace sewer lines in A & B parking garages of downtown gov complex	110-150 W. Congress
CFM.BJUSCT	FM - Downtown Court Complex	Design, construct a 165,000 sf Pima County Justice Court and City of Tucson Municipal Court.	240 North Stone Avenue Garage: 38 E. Alameda Street
CFM.XDMTLC	FM - Demolition of Theresa Lee Clinic	Demolish building at 332 S. Freeway along with all other site improvements to better utilize.	332 S. Freeway
CFC.5CDOTY	FC - CDO Linear Park - Thornydale Rd to I-10	CDO Linear Park - Thornydale to I-10	CDO Wash from Thornydale to I-10
CIT.POSWUP	IT - PoE Switches & UPS Devices - Telecom	Project is to replace end of life access level switching equipment with PoE switches.	All County Facilities

CIT.WLSEXP	IT - Wireless Network Expansion - Telecom	Refresh & upgrade wireless systems to use 802.11n secure authentication & guest access	All County locations
CWW.3GSI10	WW - Green Valley WRF Security Improvements	Design, construct and install security elements at the Green Valley Wastewater Reclamation Facility.	19600 S. Old Nogales Hwy, Green Valley
CWW.3MRP16	WW - Minor Rehabilitation Projects FY15/16	Minor rehab correct defective components in the sanitary sewer system adds life to the value	County Wide
CWW.3RIR11	WW - Side Stream Treatment	Side stream is a unique wastewater emerging from the sludge dewatering process	Sec 01, T13S, R12E

Appendix 3. Example of a trip report from 2016 demonstrating the types of data collected and reported.

Old Hayhook Ranch : January 26, 2016

We left Tucson at 6:30 AM to return to the Old Hayhook Ranch (see document in the Site-specific folder on the X-drive dated December 18, 2015, January 5, 2016, and January 8, 2016). Relevant details concerning this site may be found in the aforementioned word documents. These notes will include observations and information specific to this trip where we made an effort to explore the southwestern corner of the property (see tracklog below, Figure A1). We planned to make additional efforts to search some of the shrubby grassland habitats below the slopes for Pima pineapple cactus (Figure A2).

Figure A1. Tracklog of survey of the south and southwestern portions of Old Hayhook Ranch. Note the portion of the track outside of the green border demarcation in the southwest portion. At the points where the tracks were seemingly outside of the property, we were in fact paralleling an east-west fence which we assume to be the property line.

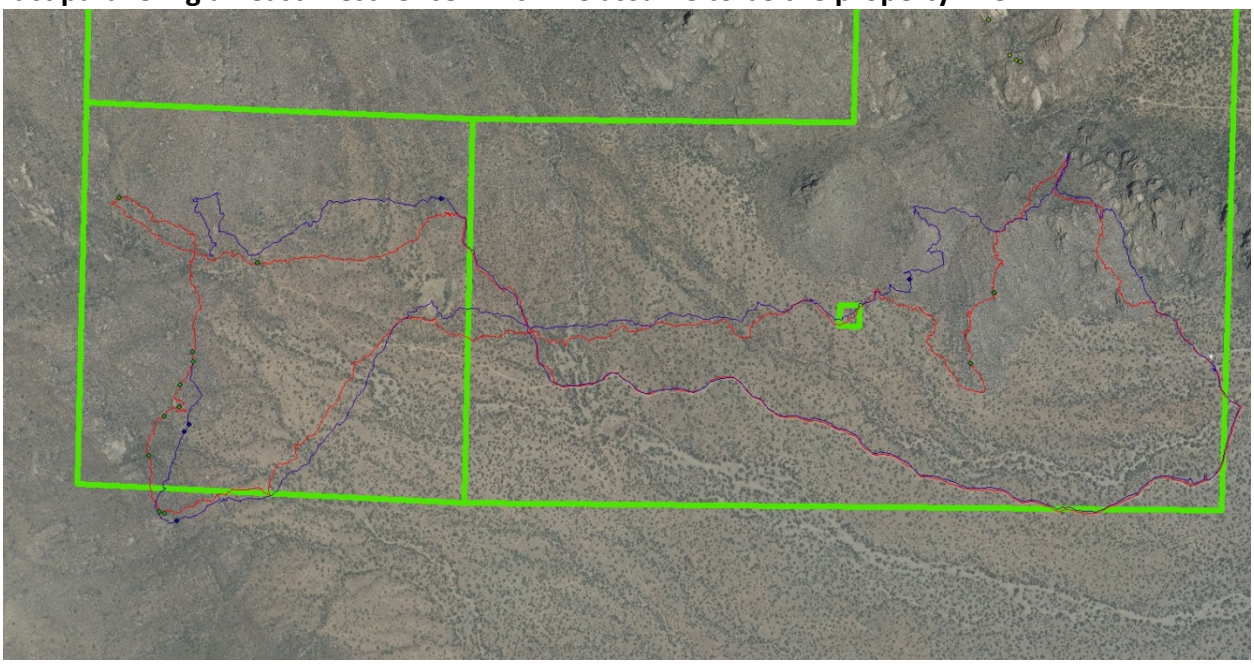


Figure A2. Looking south towards the southern end of the Old Hayhook Ranch including shrubby grassland at the base of the hill side. The Baboquivari Mts. can be seen in the far distance.

The gate allowing access through the King Anvil Ranch (west of highway 286) are still open and will remain so until the end of February. Sign-in and use of a provided ranch pass (returned upon sign-out) are required as usual. Brian spotted two crested caracara flying overhead as we pass by the ranch headquarters.

We parked at the abandoned Old Hayhook ranch house at 7:57am, noting that hunters continue to use the adjacent fire ring and to stockpile wood, including large pieces of chainsaw-cut mesquite/palo verde, hopefully from already downed wood. We hiked up the gradually sloping ridge side immediately to the northwest of the ranch house in order to retrieve a lost trekking pole (we did not find it) and to cover additional ground on this east-west rocky ridge before heading to the southwestern area of the property. Although temperatures started out chilly, the exposed ground was dry. Many grasses were starting to 'green up' particularly the widely prevalent rose natal grass, *Melinis repens*, which in some cases was already putting out new seed heads. Clumps of *Setaria* grass, which are very common on the hillsides here and likely to be the perennial *S. leucopila*, were also starting to show green blades in the lower portions of the clumps. Many areas on and near the ridgetop had extensive and dense patches of a dried annual grass, probably *Aristida adscensionis*. We noted relatively few, and scattered green clumps of red brome growing. Lehmann's lovegrass, *Eragrostis lehmanniana*, is also incredibly common and dense in many areas of the property, especially the flatter areas at the bases of the hillsides, and it was also widely showing new growth in its clumps. Ferns were still growing and green, including *Astrolepis sinuata*, *Notholaena standleyi*, *Pentagramma triangularis*, *Argyrochosma limitanea*, and *Cheilanthes lindheimeri* and *C. aurea*. Desert wishbone bush, *Mirabilis laevis,* was also widely noted to be green and actively growing,

although its phenology hadn't progressed to the flower bud point. The perennial *Rumex hymenosepalus* was showing new growth in scattered locations on the more flat areas at the bases of the ridges. Chuparosa was still blooming heavily in places, although many chuparosa plants were at the tail end of their flowering cycle. We noted individuals of both Anna's and Costa's hummingbirds (on the hillside opposite the ranch house), but the southwestern part of the property that we walked had significantly less chuparosa than other hill slopes to the east, and we did not note hummingbirds in the southwestern part. Some *Lycium* bushes were also blooming and Anna's hummingbirds were also feeding from these flowers.

On top of the east-west ridge above the ranch house, and in a natural saddle of sorts with relatively flat land there is a 4-stranded barbed wire fence running between (20-30 m) rock outcrops which bookend it on either side, at (451238.0804E, 3535818.734N). Another segment of this fence was at (451067.4801E, 3535794.275N) and extended across another relatively open area on the ridge top for about 60 – 100 m, until the next rocky hillside. At (450967.7969E, 3535797.967N) there was an open gate in the fence line (a gate of the type formed from strands of barbed wire fixed to a stake which may be anchored in a loop of sturdy wire on the opposite side of the fence).Note that this fence does not represent the County property line. Within this open area on the ridge we noted several fresh pocket gopher mounds, and additionally encountered pocket gopher mounds scattered throughout the flat areas we hiked at the southern end of the property, although nowhere where they common. Mounds of what we think could be banner-tailed kangaroo rat mounds were observed closer to the general area of the southeast corner of the property (seeming to increase in density east of the actual property) and we did not notice these mounds at the western end of the property. If there were desert box turtles in the area, they would likely be using banner-tailed kangaroo rat mounds as shelter.

The shrubby Dalea*, Dalea pulchra*, was present here and encountered throughout the day on the rocky slopes, and was beginning to form flowering buds. Some of the larger saguaros observed throughout the survey showed unilateral and extensive tissue scarring , assumed to be from frost damage, rather than fire, given the absence of charred shrub stumps as well as the height of the scarring which in some cases extended to not far below the apical meristems.

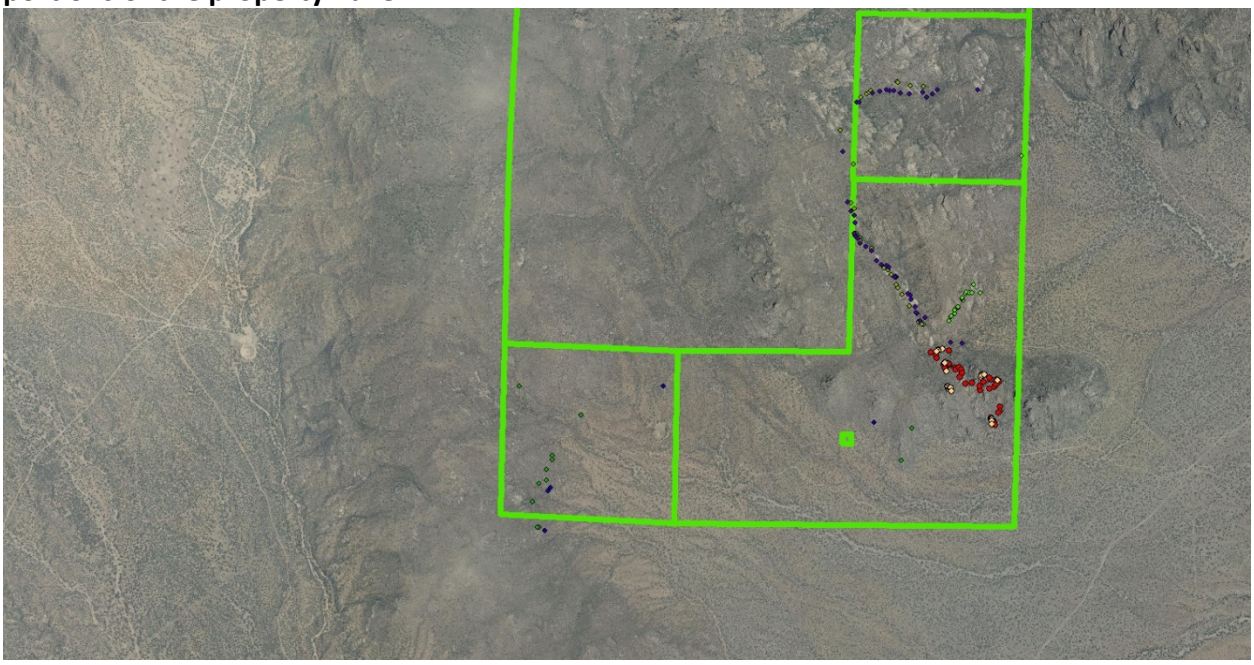
At (451228.8266E, 3535800.488N) was the well-preserved carcass of an adult male desert tortoise, resting on its carapace (Figure A3). The carcass was dried, with no soft tissue remaining and some of the scutes loose and falling off, but the limbs and neck were largely intact. The rear limbs especially, were dried in an extended position. No large scavengers had damaged the carcass. Judging by the growth ring morphology the animal had been well into adulthood, but probably not very old. Perhaps the animal had succumbed to the effects of drought, or from exposure when flipped over? The carcass was near the aforementioned saddle on the ridge top among scattered boulders, and within sight of the Hayhook ranch house. We collected the carcass as a specimen to submit to the University of Arizona collection. Brian additionally found old tortoise scat in the immediate vicinity. We marked several potential tortoise shelter sites nearby (see spreadsheet of observations).

Figure A3. Desert tortoise carcass found (plastron side up) on Old Hayhook Ranch. Note that the limbs are intact, and that together with the lack of damage suggests that the tortoise was not killed by a predator. While there is some beveling of the scute seams the scute annuli are still largely distinct with their structure preserved rather than abraded away as they often are on very old individuals.

Additional rock shelters which held desert tortoise scat were found at (450838.2296E, 3535797.259N) and (450869.0574E, 3535781.703N).

We did not see as many talussnail shells in this part of the property relative to other portions of the Old Hayhook Ranch. See Figure A4 for an overall map showing the locations for all talussnail shells that we have observed over several surveys.

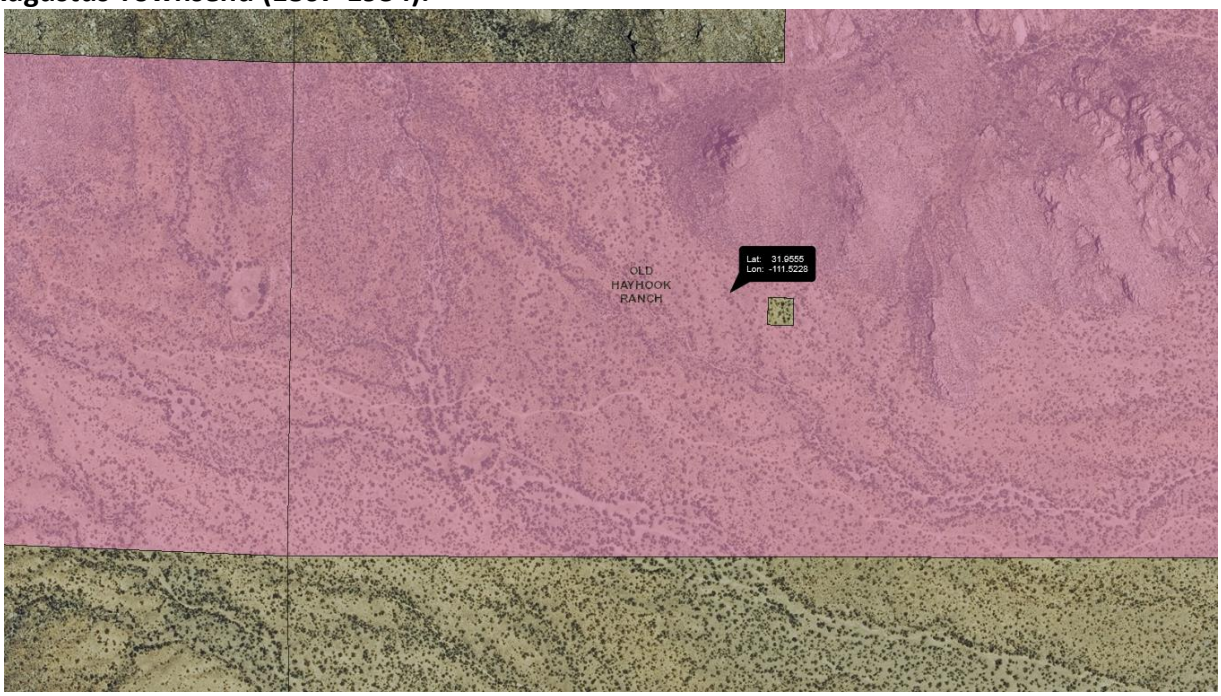
Figure A4. Old Hayhook ranch cumulative talussnail shell locations over several survey trips. Different colors represent different trips/surveyors. Note that rocky areas in the southwestern portion of the property did not yield the high density of old shells that other portions of the property have.



We encountered a large boulder with a small area of land pipe-fenced in to one side that had a plaque in honor of Father John Augustus Townsend (1867-1934) (Figure A5). The 0.5 acre inholding within the Old Hayhook Ranch is owned by a John Townsend Jr. The GPS location of the boulder and plaque (450598.286E, 3535621.172N) are outside of the private inholding (Figure A6).

Figure A5. Plaque memorial to Father John Augustus Townsend on the Old Hayhook Ranch.

Figure A6. Private inholding (0.5 acre) within Old Hayhook Ranch owned by John Townsend Jr. The GPS coordinates demarcate the boulder/plaque memorial marked for Father John Augustus Townsend (1867-1934).



At (450244.0083E, 3535567.244N) we kicked up a grasshopper sparrow out of the dense grass. An additional grasshopper sparrow was flushed out of grass at (450128.5107E, 3535564.813N).

At (450181.1118E, 3535576.307N) I noted an approximately 2 foot tall piece of sturdy rebar firmly planted into the ground and adjacent to a straight line of 6 or 8 small rocks. What this was marking is not clear.

At (449840.088E, 3535605.02N) we noted a downed 4-strand barbed wire fence adjacent to a large dirt berm created to form a stock tank (Figure A7). This dirt tank can be seen in the image above and is directly left of the straight, north-south line in the map. Perhaps this downed fence represents this pasture boundary? The large dirt tank had a small amount of muddy water in the bottom, with many deer, and to a lesser extent javelina, tracks in the mud. We couldn't ascertain the depth, but it must not have been too deep, and the diameter was perhaps 30 feet across or so. A large flock of chipping sparrows were hanging around the mesquites nearby. This is likely to be an important amphibian breeding site in the area (e.g., couch's spadefoots, great plains toads, Colorado River toads, etc.) Dried patches of what looked like a short sort of *Panicum* sp. grass grew abundantly in the dried ground just outside of the mud-zone to the water. Between us we saw 2 white-tailed deer does in this general area.

Figure A7. Dirt tank created by a dirt berm at the southwest side of the Old Hayhook Ranch property.

At (449417.9887E, 3535195.747N) we noted an antelope jackrabbit, as well as an individual of the same species at (451470.7168E, 3535473.783N) close to the Hayhook ranch house.

At (449335.7311E, 3535188.727N) the east-west running barbed wire fence that we assumed was the property boundary (but see tracklog and discussion above about the mismatch of map

layer boundary versus actual fence on the ground) was cut creating a large gap in the fence. At (449325.4216E, 3535187.115N) this fence was downed on the ground, to the extent that a cow could easily walk across it. This fence continued up the slope to the west, with gaps in areas with extensive rocks. We did not walk to the exact end (according to GPS map layer) of the property here. We did document talussnail shells here (see map above) as well as noting extensive patches of native grasses (e.g., *Bouteluoa hirsuta*) on the gentle slopes. A few clumps of *B. repens* were starting to become green at their bases on a southerly facing slope. A large and loose flock of sparrows, including many individuals of black-chinned as well as black-throated sparrows were noted foraging on the bushy slopes, as well as a Bewick's wren.

At the western end of the property we encountered a scattered handful of Saturniid silk moth cocoons from various shrubs including limber bush and coursetia. These cocoons are probably from the moth *Rothschildia cincta*, whose cocoons have been collected for hundreds of years to create bands of ankle rattles on Native American garb (http://nitro.biosci.arizona.edu/zeeb/butterflies/Sat.html). Collection localities for this species include the Kitt Peak area as well as Brown Canyon. There is some indication that some populations may have been overharvested over the years. This moth often feeds on limber bush, *Jatropha cardiophylla*, although it will pupate on other species of adjacent vegetation. We did not thoroughly canvas adjacent plants for the cocoons found on Coursetia, but it is my general feeling that Jatropha were nearby. Most of the handful of cocoons found had been parasitized by something that left a small exit hole in the sides of the cocoon (probably a parasitoid wasp). We collected 2 possibly intact cocoons in the hopes of identifying the species upon emergence.

Yucca baccata is not a common plant on the property, but one cluster was photographed growing near the southwestern end of the Old Hayhook Ranch Property on a hillside (Figure A8).

Figure A8. *Yucca baccata* on Old Hayhook Ranch property.

One of the goals today had been to continue looking for Pima pineapple cactus growing in the flat shrubby grasslands at the southern end of the property (see picture below). These areas are well within the elevational range of PPC which is given as 2297 feet – 4921 feet (Kidder 2015; unpublished MS Thesis) as much of the flat areas at the south end of Old Hayhook Ranch are <3600 feet. The very dense grass cover, particularly from Lehmann's lovegrass (Figures A9, A10) means that there are relatively few open areas to easily see any potential PPC. Indications from data collected elsewhere and from observations of PPC elsewhere also indicate that PPC may often grow in more exposed areas with less grass cover. Furthermore, when one is on the ground on the Old Hayhook it is evident that what at first seems like fairly flat land from above, is actually laced with drainages of different sizes (for example with blue palo verde, desert hackberry, and desert honeysuckle) that are not good PPC habitat. It wouldn't hurt to perform additional targeted searches for PPC here, but we think it unlikely that they would be found here.

Figure A9. Southern end of the Old Hayhook Ranch property. Note the relatively thick grass and shrub, especially mesquite cover, as well as the small drainages bisecting the land.

Figure A10. Southern end of Old Hayhook Ranch property showing extensive cover of grasses, largely exotic Lehmann's lovegrass.

At (451420.0541E, 3535233.376N) not far from the Hayhook ranchhouse and adjacent to the still extant above ground water tank is an old circular pool/cistern left over without any water in it (Figure A11). It is fenced in which would prevent cattle from stumbling in, but the fact that it is flush with the ground level means that this structure would have the potential to trap certain types of animals, such as desert tortoises and amphibians. The rough and irregular surface on the inside walls of the pool would likely allow most snakes and lizards, and some small mammals to escape.

Figure A11. Dried in-ground water tank near Old Hayhook ranch house.

Conclusions

1. The flatter south end of this property does not appear to be 'text book' habitat for PPC, and while it is possible that some specimens may grow in the area and be detectable by additional searches, the resources required for these searches would be best served elsewhere. Iris Rodden at NRPR has not found them on Old Hayhook either.
2. The dried in-ground water reservoir below the water tank at the Hayhook ranch house should be filled in to prevent the unnecessary trapping of small animals.
3. The barbed wire fence running east-west in a location suggesting that it is the southern boundary of the property does not align (assessing using GPS field data) with this part of the border indicated on property boundary layer. A similar situation may exist for part of the eastern border further to the north on the property. At some point it would be beneficial to be clear about this.
4. In general, it is thought that mesquite is fairly invasive in the grassland habitats in this area, and further south on the BANWR mesquite is considered to be an invasive and efforts are made to remove/control it. Since mesquite is likely to be invasive here, over the long term if kept unchecked it may change the state of this habitat, especially for sensitive species, such as grasshopper sparrows, which are currently using the habitat. The use of controlled burns may be a way to keep it in check, although the cactus ferruginous pygmy owl, which is known from this property, does require some canopy structure from plants such as mesquite.
5. We are getting a better handle on talussnail distribution across the property by using empty shells as a proxy for occupied range. While we did not search all rocky habitat on the western end of the property, it is noteworthy to see that the more westerly facing, and probably hotter and drier areas at the west end had fewer shells.
6. Fences are not completely intact in different parts of the property, potentially allowing trespass cattle into the area. However, there is a lack of cattle grazing sign, and particularly during the hot time of the year, they wouldn't likely be able to go too far from a water source, so this is unlikely to be a pressing problem.
7. See notes from December 18, 2016, January 5, 2017, and January 8, 2017 for additional comments

Species Observed

Grasshopper sparrow
Black-chinned sparrow
Black-throated sparrow
Chipping Sparrow
House finch
Verdin
Gambel's quail
Northern mockingbird

Phainopepla
Black-tailed gnatcatcher
Bewick's wren
Anna's hummingbird
Costa's hummingbird
Red-tailed hawk
Sharp-shinned hawk (off property)
Crested caracara (off property)
Kestrel
Canyon wren
Cactus wren
Curve-billed thrasher
Gilded flicker
Gila woodpecker
Ladder-backed woodpecker
Canyon towhee
Greater roadrunner (off property)

Sonoran desert tortoise (carcass)
Antelope jackrabbit
Harris's antelope ground squirrel
White-tailed deer

Appendix 4. Baseline of hydrological conditions at Cienega Creek Natural Preserve.

The Cienega Creek Natural Preserve (CCNP or Preserve) is a one of the County's most important properties and allocation of the Preserve for Section 10 mitigation is virtual assured. The Preserve contains some of the region's best examples of mesic riparian forest its associated tall cottonwood, willow, and mesquite forests that were once abundant along streams and rivers of southern Arizona. Unlike the nearby Santa Cruz River, which is much different now than it was historically, Cienega Creek, which flows through the Preserve, retains some characteristics of its former hydrological and ecological function.

Because the Preserve provides habitat for a host of aquatic and riparian Covered Species, Pima County agreed to include baseline conditions (relative to permit issuance) of groundwater and surface water features in the first annual report. This Appendix highlights some of the key baseline conditions on or near in time to permit issuance, but it is suggested to read Powell (2013) for a more in-depth description and analysis of the long-term water resource data. Below are graphs of pertinent data collected through permit issuance.

Depth to Groundwater

Depth to groundwater is measured at eight wells that are distributed throughout the Preserve. Reported here are wells associated with shallow groundwater: Cienega, Davidson 2, Jungle and PS-1. For all four wells, mean groundwater levels increased as compared to the previous few years (Figure A.12). In the Cienega well in 2016, depth to water at permit issuance (July 2016) was the highest in that calendar year, whereas for the other three wells, the opposite was true: water levels increased after permit issuance (Figures A.13).

Extent of Surface Flow

A key water measurement at the Preserve has been the extent of surface water flow, which has been monitored quarterly since 2001 (Figure A.14). Baseline conditions improved, with a key measure, flow length pre-monsoon improving significantly as compared to the previous five years.

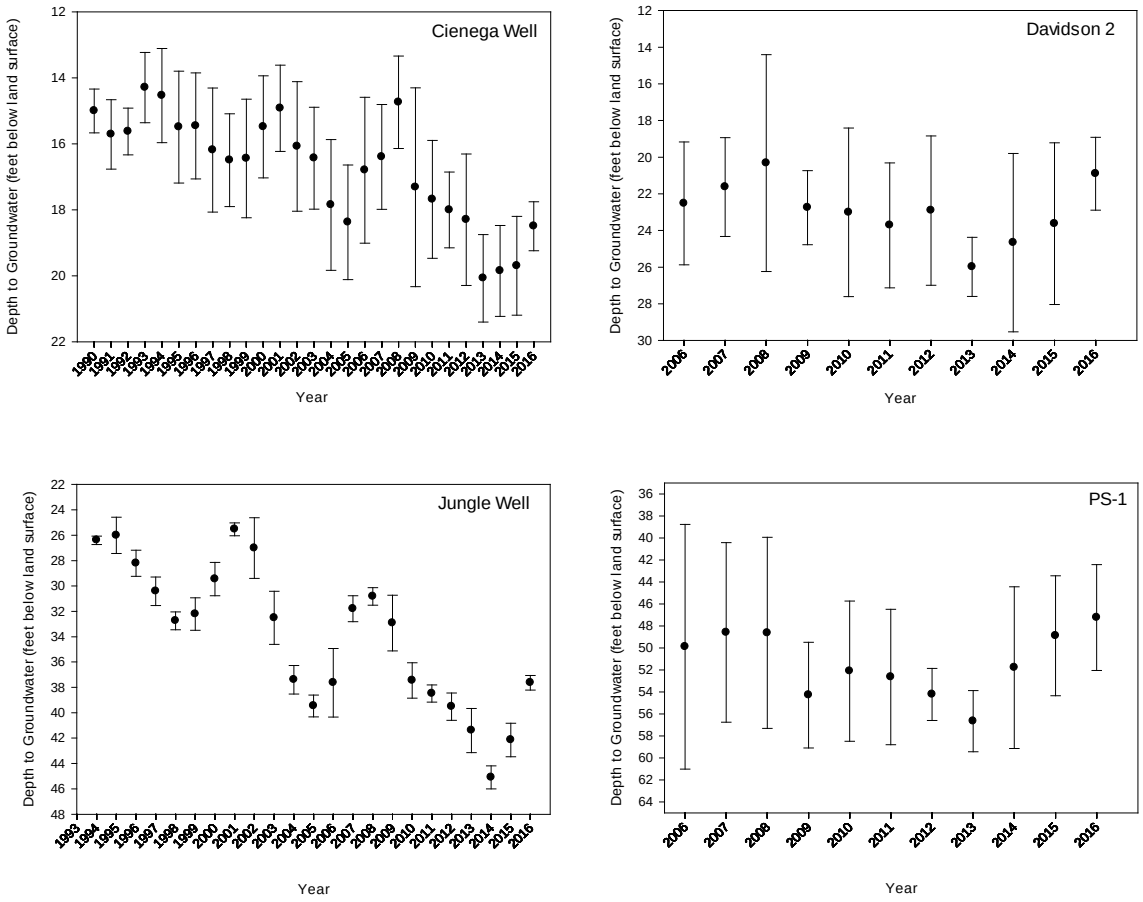


Figure A.12. Depth to water (mean + 1 standard deviation) at four wells associated with shallow groundwater. Note differences in axes scaling.

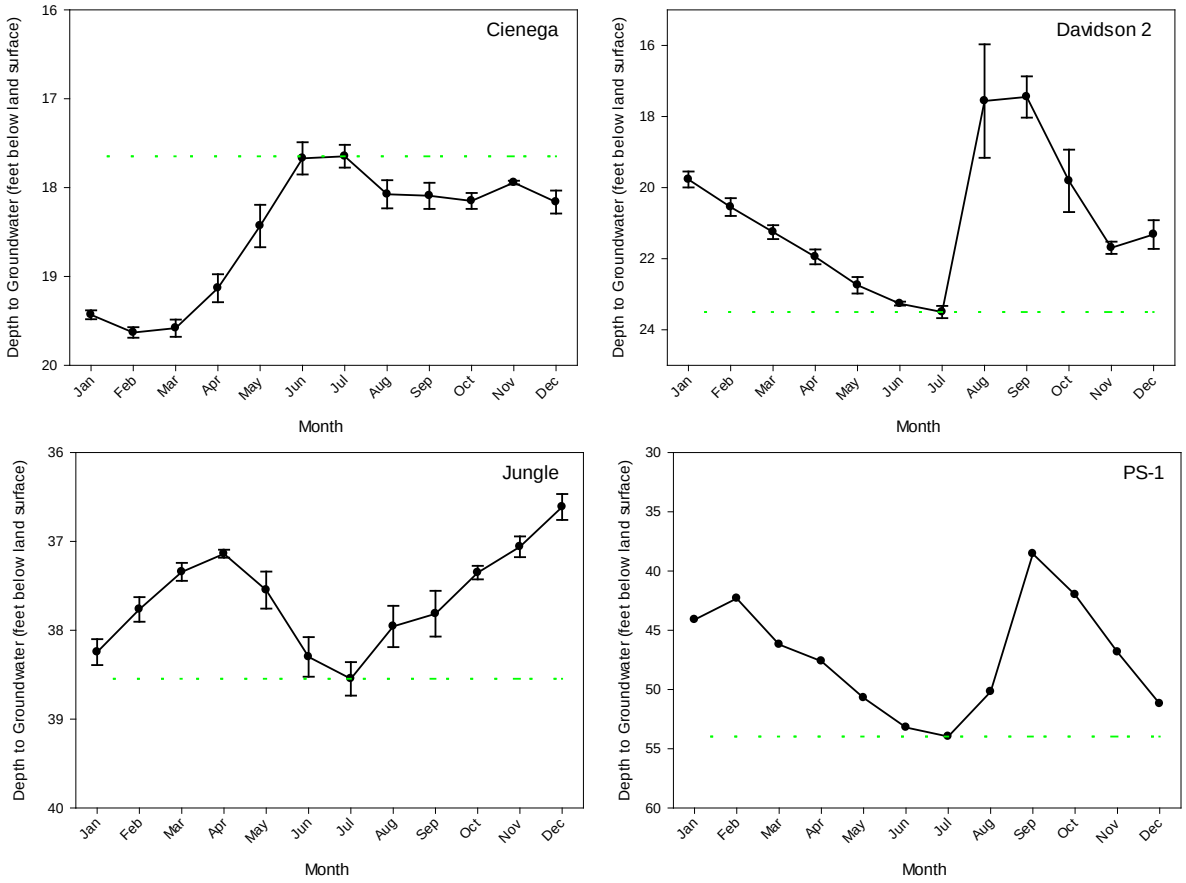


Figure A.13. Depth to groundwater (mean ± 1 standard deviation) at four wells located in shallow groundwater areas, Cienega Creek Natural Preserve, 2016. Dotted green line is baseline conditions (July 2016). Error bars are possible at three wells because of the recent addition of automatic data loggers, which provide measurements on depth to water every 6 hours. Note differences in Y axis scaling.

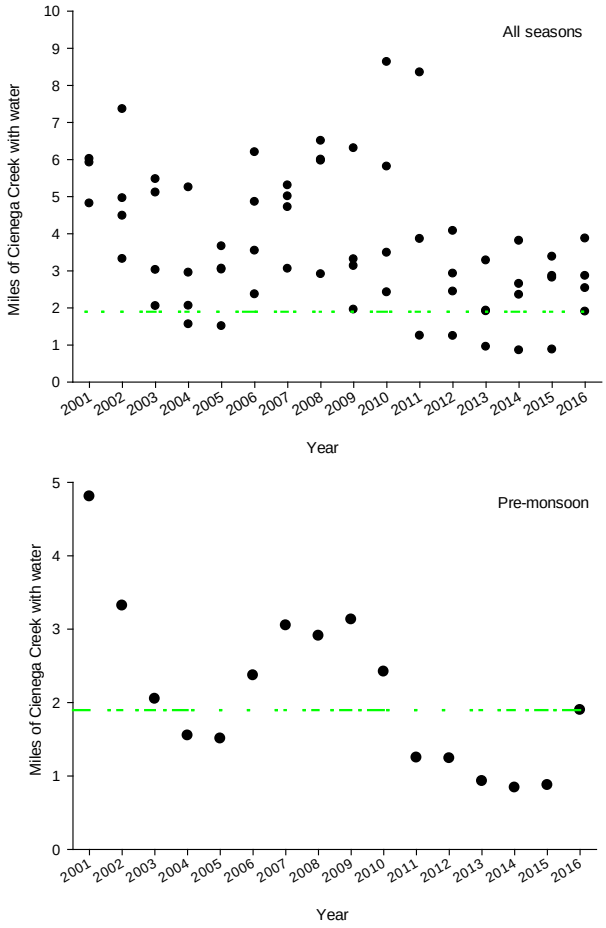


Figure A.14. Extent of surface water at the Cienega Creek Natural Preserve, 1999-2016. Permit issuance baseline (1.9 miles) is denoted with the green dashed line. Pre-monsoon (June) is typically the time of year when the least amount of surface water is present.