ROOSEVELT
HABITAT CONSERVATION PLAN
ANNUAL REPORT
2013

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Cover Photograph: Camp Verde Riparian Preserve, Verde River, Yavapai County, AZ.
Photograph taken August 1, 2013.

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CERTIFICATION

Under penalty of law, I certify that, to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of this report, the information submitted is true, accurate, and complete.

January 24, 2014

Marc W. Wicke
Senior Scientist
Biological & Cultural Resource Services
Salt River Project

Date

I. INTRODUCTION

In February 2003, the U.S. Fish and Wildlife Service (FWS) issued an Incidental Take Permit (ITP) pursuant to Section 10(a)(1)(B) of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended, to Salt River Project (SRP) for southwestern willow flycatcher (*Empidonax traillii extimus*) ("flycatcher"), yellow-billed cuckoo (*Coccyzus americanus*) ("cuckoo"), bald eagle (*Haliaeetus leucocephalus*), and Yuma clapper rail (*Rallus longirostris yumanensis*) ("clapper rail"). The activity covered by the ITP is the continued operation by SRP of Roosevelt Dam and Lake up to an elevation of 2,151'. The ITP is conditioned upon SRP's implementation of the Roosevelt Habitat Conservation Plan ("Roosevelt HCP") (Salt River Project 2002). The Roosevelt HCP provides measures to minimize and mitigate incidental take of the four species listed above "*to the maximum extent practicable and ensures that incidental take will not appreciably reduce the likelihood of the survival and recovery of these species in the wild*" (FWS 2002a).

SRP is in its eleventh year of implementing the Roosevelt HCP. This report documents all mitigation and minimization efforts conducted over the past water year, November 1, 2012 through October 31, 2013, including a summary of reservoir operations, management activities, monitoring results, status reports, and planned future activities.

II. ANNUAL REPORTING COMPLIANCE

Obligation: SRP is required to submit an annual report to FWS, U.S. Bureau of Reclamation (USBR) and the Tonto National Forest (TNF) describing all Roosevelt HCP activities occurring during the past year. A draft report must be sent to FWS prior to the annual meeting in October/November of each year. The report is to be finalized by February 1st of the following year.

Actions: SRP submits this report to FWS, USBR, and the Tonto Basin Ranger District Office of the TNF to fulfill the annual reporting requirement.

III. ROOSEVELT LAKE AREA COMPLIANCE

A. Summary of Reservoir Operations–Water Year 2013

Obligation: Data on reservoir elevations are used in conjunction with habitat monitoring information to determine permit compliance. Impacts to covered species will primarily occur from effects on occupied vegetation resulting from changes in water levels and duration of inundation or desiccation in Roosevelt Lake.

Action: SRP monitors lake levels throughout the year to evaluate impacts and ITP compliance.

Summary: The potential to have one of the driest winters in SRP's history had the greatest influence on Salt and Verde reservoir operations this past water year. The strongest indicator, El Niño Southern Oscillation (ENSO), was in neutral condition, the Pacific Decadal Oscillation (PDO) was in a negative (cool) phase and the Atlantic Multi-decadal Oscillation (AMO) was in positive (warm) phase. These conditions were in place during the winter of 2002 when the Salt and Verde watersheds produced just 106 KAF (kilo acre feet or thousand acre feet) of runoff which is the lowest amount of inflow into the reservoirs in SRP's history. The runoff this winter was 84% of median. However, 30% of the seasonal volume came from one event beginning in late January. The precipitation this monsoon season on the Salt and Verde watersheds was

126% of normal but runoff volumes from the monsoon season typically do not impact operations. Overall, the watershed received an average of 17.37 inches (95% of normal) during Water Year 2013.

Precipitation: Precipitation during Water Year 2013 may be characterized as a near normal winter preceded by a dry fall and a wet summer monsoon preceded by a very dry spring. That is, the two wet seasons, winter and summer, were normal to wet, but the transition seasons were quite dry.

Ocean surface temperatures in the equatorial Eastern Pacific Ocean were near normal during the winter and neither an El Niño (warmer waters) nor a La Niña (cooler waters) was ever present. Since anomalously warm or cool tropical ocean temperatures are known to influence mid-latitude weather systems affecting the western United States during the cool part of the year, impact from the tropical Eastern Pacific was minimal this winter. Other atmospheric factors, that are less apparent more than a couple weeks ahead of time, dominated Arizona's weather. Fortunately significant multi-day storms appeared over Arizona in mid-December, late January and early March and brought near-normal precipitation to the Salt-Verde watershed (Figure 1).

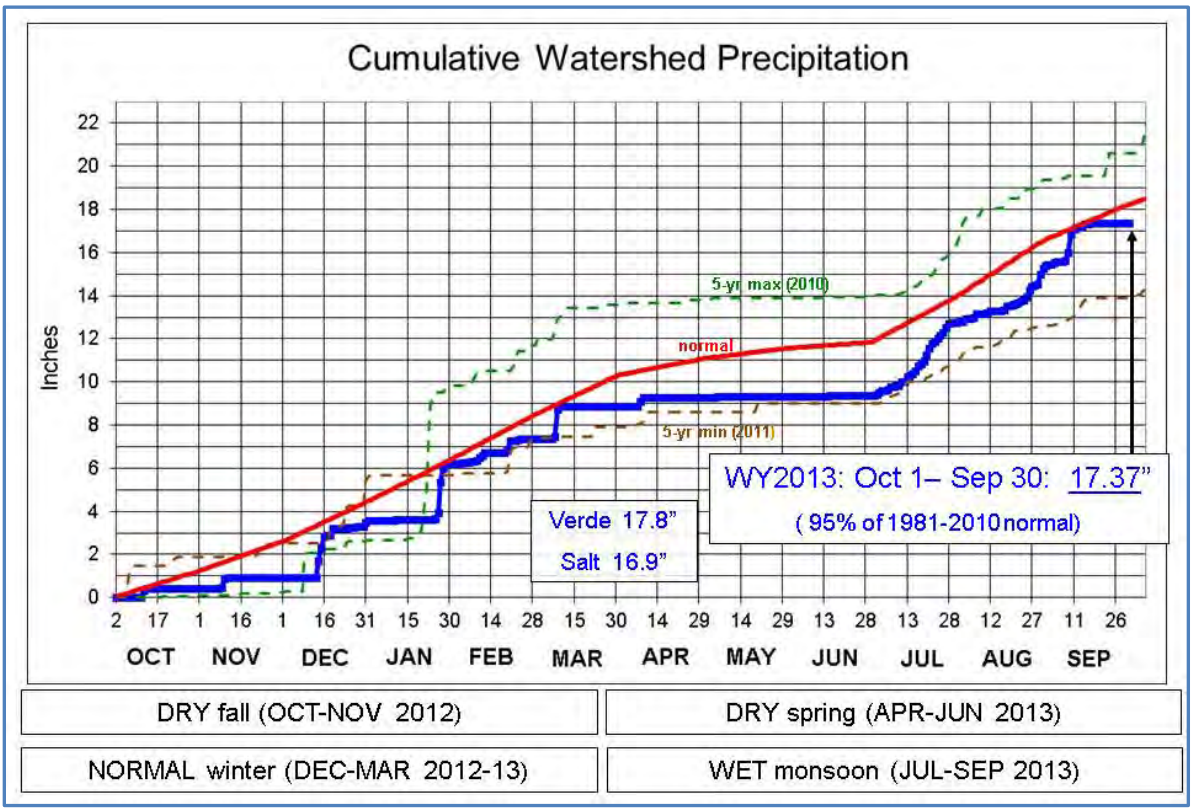


Figure 1: Water Year 2013 Precipitation Graph for the Salt-Verde Watershed.

Winter precipitation was well-balanced between the Verde and Salt watersheds. However, during the summer monsoon, the Verde watershed received significantly more rainfall than did the Salt.

Water Year 2013: December of 2012 was the sixth consecutive December with above normal precipitation. December through March precipitation was the 37th wettest in 113 years of record.

A dry spring (32% of normal precipitation) added to the water year deficit that could not be offset by the wet summer (126% of normal rainfall). In all, water year 2013 precipitation of 17.37 inches was 95% of normal. This is 2.65” more than the 14.72 inches that fell during water year 2012.

Reservoir Status: Even though the 2013 winter precipitation (December-March) ranked as the 37th wettest it did not translate to runoff. The 2013 winter produced 449,000 acre-feet from January through May which is 84% of median. This winter represents the third consecutive winter with below median runoff. The 2011, 2012, and 2013 winter seasons were the 23rd, 16th and 39th lowest winter runoff seasons respectively in SRP’s history. Runoff from the monsoon (July-September) produced about 165,000 acre-feet. While the precipitation and runoff from this monsoon was above normal it had little impact on SRP’s total storage.

Groundwater production was increased to 300,000 acre-feet for calendar year 2013 due to the consecutive very dry years in 2011 and 2012. The 2013 winter runoff provided approximately 250,000 acre-feet more runoff than the previous winter season. The increase in pumping and winter inflow allowed the reservoir system to recover slightly as total storage capacity increased 4% from 52% to 56% during water year 2013. Total runoff for water year 2013 was approximately 691,000 acre-feet (Figure 2).

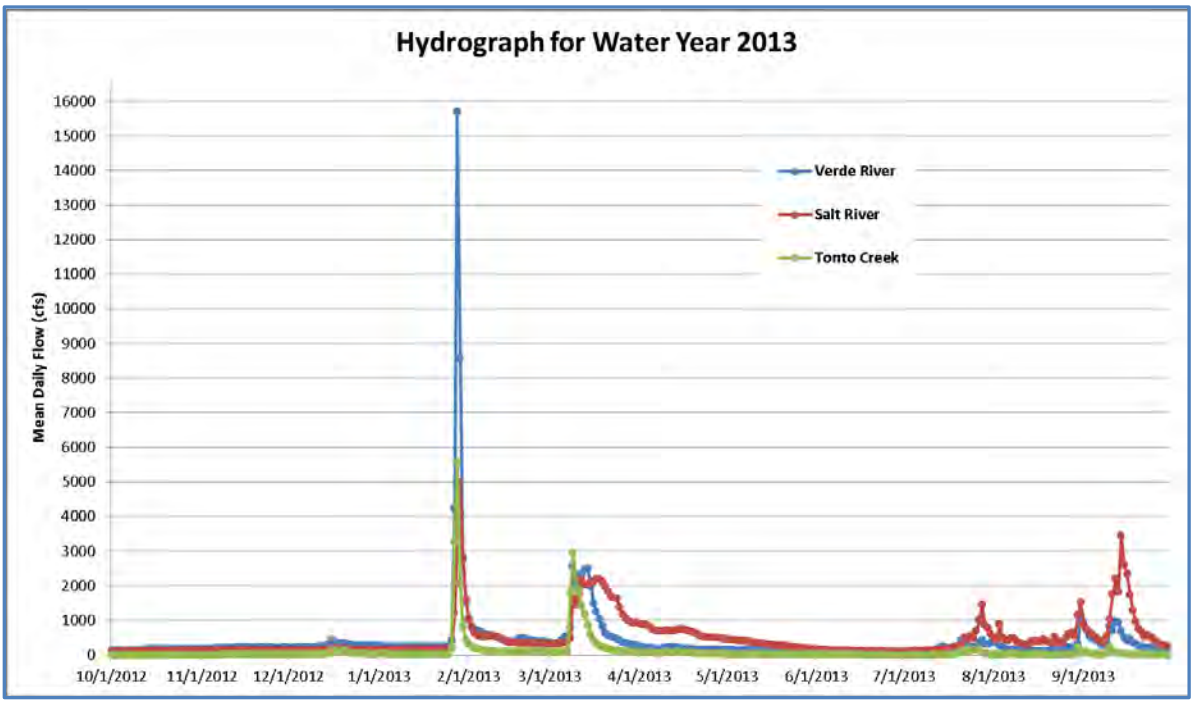


Figure 2: Verde River, Salt River, and Tonto Creek 2013 Water Year Hydrograph
Data from USGS and are preliminary

Reservoir Operations: Climatic conditions matching the driest year in SRP’s history had the greatest influence on reservoir operations. Climatic indicators including ENSO, PDO, and the AMO were in the same phase as they were in 2002 which is the driest runoff year in SRP’s history.

Roosevelt Operations: Roosevelt Lake entered the season with just over 766,000 acre-feet of storage which is 46% of capacity (Figure 3). The winter of 2012 produced only 266,000 acre

feet of runoff into Roosevelt Lake. The elevation at Roosevelt Dam varied little through the winter with below normal inflows through the winter season (Figure 4). On June 17, 2013 the water order transitioned back to the Salt system. Reservoir levels began to decline as water order increased in the late spring and into the summer. Roosevelt storage on September 30, 2013 was 751,000 acre-feet which is 45% of normal. The water order was switched back to the Verde system on October 15, 2013.

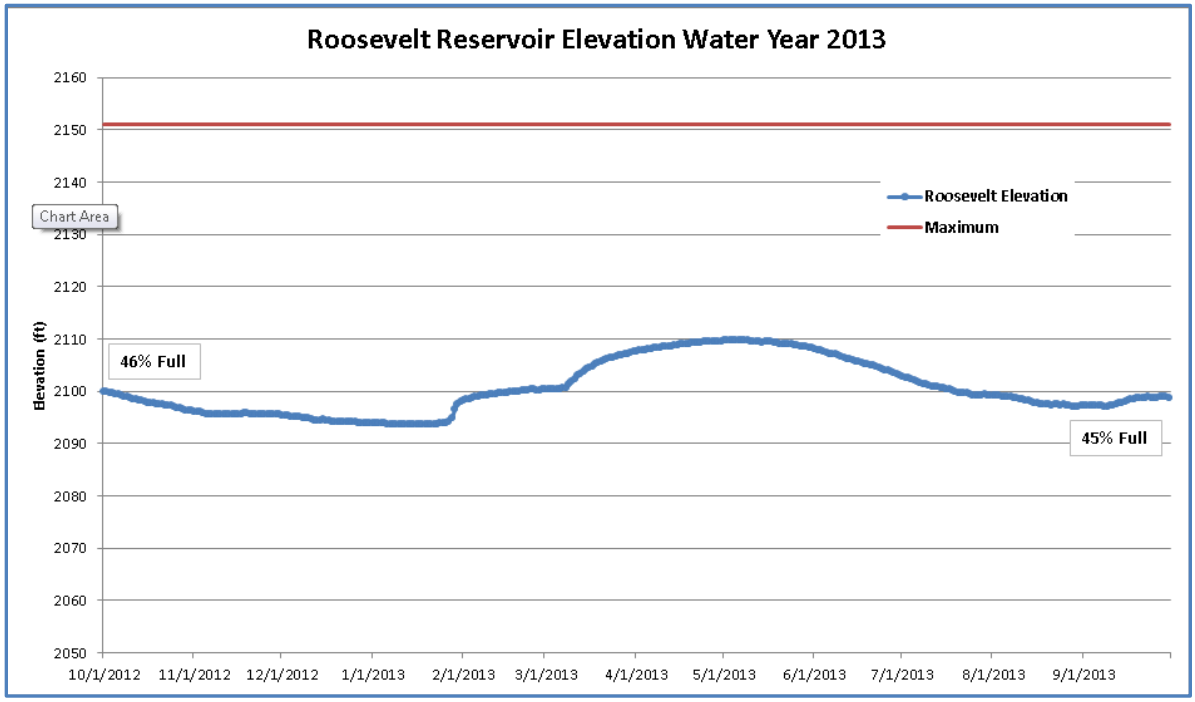


Figure 3: Roosevelt Reservoir Elevation for Water Year 2013

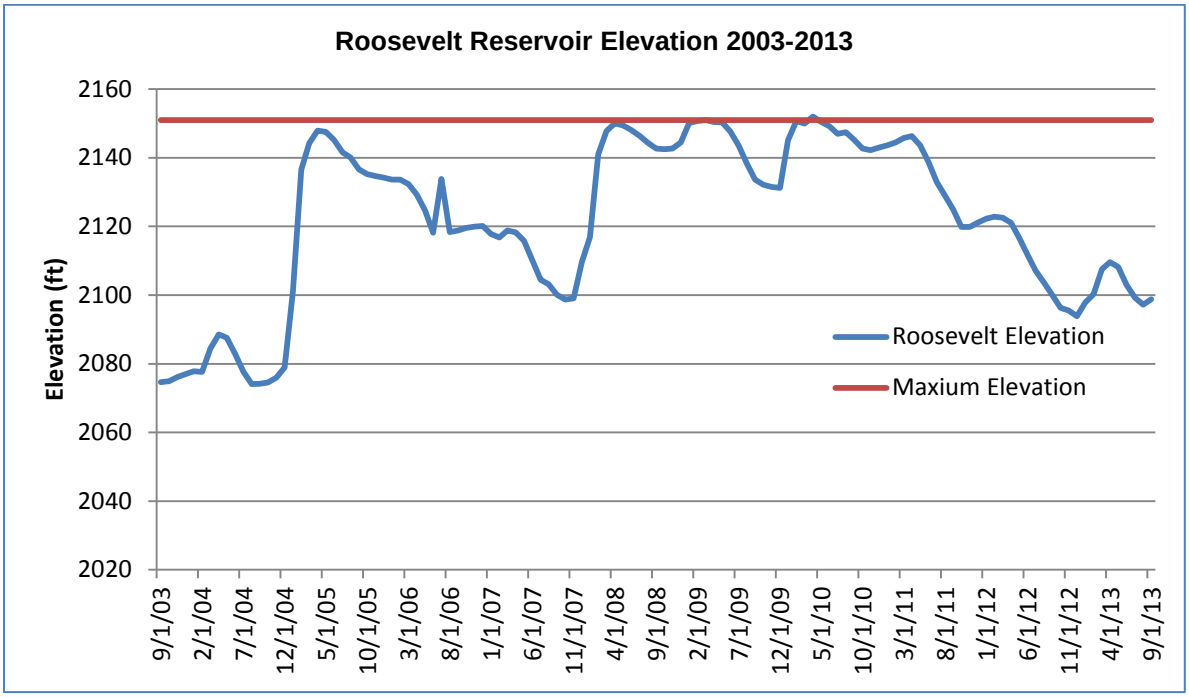


Figure 4. Roosevelt Reservoir Elevation 2003-2013

B. Incidental Take Permit Compliance Monitoring

The Roosevelt HCP states that SRP will periodically collect and evaluate information on occupied habitats and population status of flycatchers, cuckoos, clapper rails, and bald eagles at Roosevelt Lake to monitor compliance with the ITP. Vegetation monitoring is to be conducted to ensure that adaptive management thresholds or permit limits are not exceeded. In addition, populations of flycatchers, cuckoos, and clapper rails will be monitored for ITP compliance and to identify long-term trends using appropriate field survey techniques or protocols.

1. Roosevelt Lake Habitat Monitoring

Obligation: To ensure that permit limits or adaptive management thresholds are not exceeded, SRP will monitor riparian vegetation at the Salt River and Tonto Creek arms of Roosevelt Lake on an annual basis beginning in 2007, continuing for the life of the permit. SRP will use a method to estimate tall dense vegetation likely to be occupied by flycatchers using satellite imagery information (calculations of relative density of vegetation).

2013 Actions: SRP uses a multi-scaled flycatcher breeding habitat model to monitor habitat compliance at Roosevelt Lake. Results are presented in section B.2. of this report.

2014 Actions: For 2014 SRP will work with USGS to modify the habitat model to accommodate differences between the previous Landsat 5 data and the new Landsat 8 data. SRP may also compare the results between the pre- and post-model modifications to determine the degree of underestimation of habitat in the 2013 model results.

Obligation: The extent of cattail marshes will be monitored by helicopter survey each year that there is a potential for more than 3 acres of marsh below elevation 2,151'. If more than 3 acres exist, clapper rail surveys will be conducted to determine ITP compliance.

2013 Actions: Low water levels in the lake prevented the development of cattail marsh below 2,151' in 2013. Therefore, clapper rail surveys were not conducted.

2014 Actions: Lake elevation and development of cattail marsh habitat will be monitored. If more than 3 acres of habitat develop below 2,151', SRP will conduct clapper rail surveys.

Obligation: Periodic surveys for flycatchers and cuckoos will be conducted to determine ITP compliance. The trigger to initiate surveys is when the habitat model identifies 500 or more acres of potential breeding habitat.

2013 Actions: SRP did not conduct flycatcher or cuckoo surveys in 2013 on the Salt and Tonto arms of Roosevelt Lake because only approximately 15 acres of habitat existed below 2,151' in 2012.

2014 Actions: SRP will initiate surveys when the amount of tall, dense vegetation below 2,151' elevation identified by habitat modeling nears or exceeds 500 acres. Results of habitat monitoring suggest that approximately 11.9 acres of potentially suitable habitat existed in 2013, therefore SRP will not be conducting flycatcher or cuckoo surveys in 2014 (see *Habitat Monitoring Results* below).

2. Habitat Monitoring Results

Methods: Each year, SRP monitors the amount of potential flycatcher breeding habitat that exists below the 2,151' elevation mark at Roosevelt Lake through modeling which requires

remotely-sensed, Landsat images to create the NDVI (Normalized Difference Vegetation Index) to identify spectral value thresholds of productive riparian habitat (Figure 5). This multi-scaled GIS (Geographic Information Systems) model approach was developed using Landsat 5 data (Hatten and Paradzick, 2003) and evaluates four predictor variables: (1) width of floodplain, extracted from a digital elevation model; (2) relative density and biomass of green riparian vegetation within 900-m^2 cells (NDVI); (3) amount of densest vegetation within 4.5 ha (11.1 acre) neighborhoods, and (4) variation in vegetation density within 4.5 ha neighborhoods. The GIS-based model produces in a spatially explicit manner the probability of flycatcher breeding site occurrence (1–98%) for each cell.

The output files (ArcView shapefile polygons, grid cells) identify breeding habitat probability classifications (1 through 5) in a summary table of acres within each probability class for the Tonto Creek and Salt River arms. Each habitat probability class identifies a probability range indicating the likelihood that vegetation potentially suitable for flycatcher breeding exists in that grid cell. Habitat probability class 1 grid cells identify areas with the lowest probability (0-20%) for locating flycatcher breeding areas, whereas class 5 grid cells indicate areas with highest probability (80-98%). For purposes of tracking permit compliance, SRP considers habitat probability classes 3 through 5 as potentially occupied habitat because much of class 3 tends to be clustered around class 4 or 5 cells. By evaluating the data set in this way, we are taking a conservative approach.

Previously, SRP ran the multi-scaled habitat model using Landsat 5 satellite images. However, Landsat 5 images are no longer available for time periods after November 2011 when the satellite experienced catastrophic failure. Because of this, SRP ran the multi-scaled habitat model in 2012 using Landsat 7 ETM satellite images. However, Landsat 7 images can contain gaps of missing information in individual scene data due to a scan line corrector malfunction in the satellite that occurred in 2003. Due to these potentially missing data, SRP switched to Landsat 8 in February 2013. Unfortunately it appears that Landsat 8 has its own issues. The threshold to identify riparian habitat is different from that of Landsat 5, specifically, the “red” and “nIR” band wavelengths. By comparing recent years’ modeled habitat probability outputs at locations with nearly identical vegetative composition to the current modeled output, 2013 results appear somewhat underestimated due to this difference between Landsat 5 and Landsat 8. Currently, SRP’s GIS department is working with the author of the model to redefine parameters associated with the thresholds in the model to deliver the most accurate estimate of habitat.

In previous years, SRP found that the habitat model tended to misclassify areas of dense forbs and grasses as high quality flycatcher habitat based on its NDVI reflectance value (greenness). This type of error potentially could be eliminated if we had tree canopy height data. In 2012, we were able to test whether the use of LIDAR (Light Detection and Ranging) data, which would provide canopy height, could improve model accuracy within the conservation space at Roosevelt Lake.

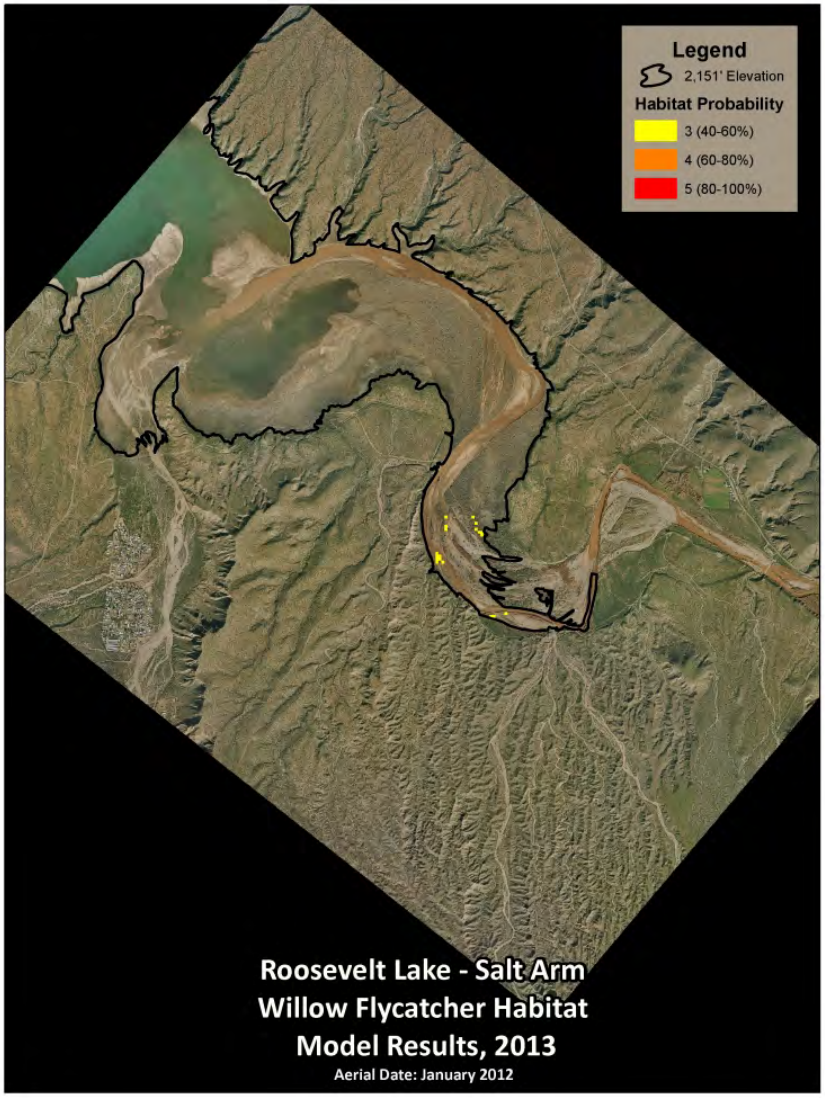
LIDAR is an optical remote sensing technology that can measure distance to a target by illuminating the target with light, typically using some type of laser beam. In this case, the targets are tree tops and/or the ground surface. The scatter of points generated by LIDAR was used to generate tree canopy heights. At this point, the LIDAR data set has a much higher resolution than the habitat model, which is based on a 30 x 30 meter cell. SRP queried the data sets to identify cells in classes 3, 4, and 5 where all tree heights within a modeled “cell” fell below the threshold of 20 feet (6 meters). These cells were reclassified to lower probability classes and were not considered in the final tally. In addition, SRP staff visually verified the final results by helicopter.

Model Results: Using acreages from model classes 3 through 5, SRP estimates that 11.91 acres of potentially suitable flycatcher breeding habitat existed below the 2,151' elevation at Roosevelt Lake during the 2013 breeding season (Table 1). Results suggest a decrease of approximately 3 acres of estimated potential habitat from 2012.

Table 1. Multi-scaled Southwestern willow flycatcher breeding habitat probability model results, 2012 versus 2013.

Habitat Probability Class	Probability Range	Acres Below 2,151' Elevation					
		Salt Arm		Tonto Arm		Total Acres	
		2012	2013	2012	2013	2012	2013
1	0-20%	539.97	0.00*	252.42	0.00*	792.39	0.00*
2	21-40%	31.14	0.00	8.45	3.11	39.59	3.11
3	41-60%	14.14	4.33	1.01	7.36	15.15	11.69
4	61-80%	0.00	0.00	0.00	0.22	0.00	0.22
5	81-98%	0.00	0.00	0.00	0.00	0.00	0.00
Total 3 thru 5	41-98%	14.14	4.33	1.01	7.58	15.15	11.91
Total 4 and 5	61-98%	0.00	0.00	0.00	0.22	0.00	0.22

* Due to an unknown issue with Landsat 8, the entire reservoir bottom was modeled as a '1' and was therefore not included in the results.



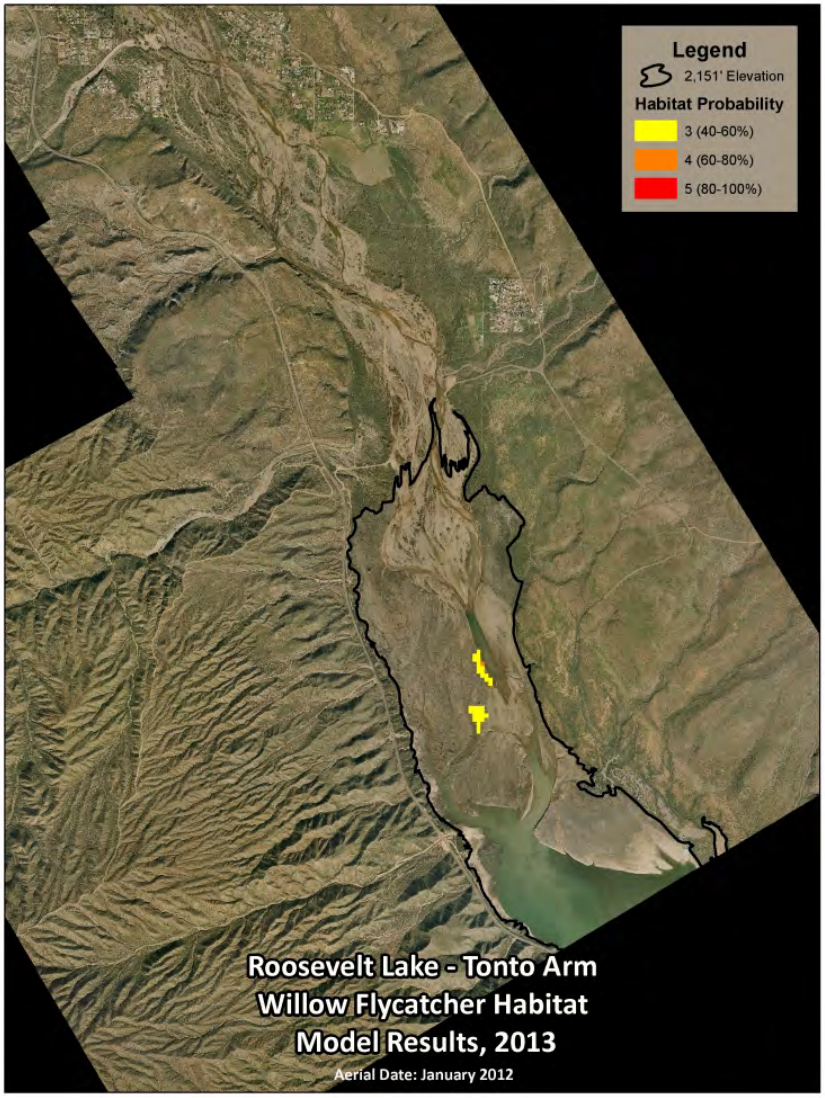


Figure 5. Salt River and Tonto Creek arms of Roosevelt Lake showing 2013 flycatcher habitat model results. Satellite image was taken on June 27, 2013 at lake elevation 2104' (50% full). The aerial Photograph was taken in January 2012 when the lake was 66% full.

Figure 6. Vegetation at A-Cross Road, looking downstream. The 2,151' elevation is adjacent to A-Cross Road on the downstream side. Photograph taken August 13, 2013

Figure 7. Tonto Creek arm of Roosevelt Lake looking upstream toward A-Cross Road. Photograph taken August 12, 2013.

Figure 8. Tonto Creek inlet to Roosevelt Lake. Photograph taken August 12, 2013.

Figure 9. Downstream of the Pinto Creek Inflow looking upstream along the Salt River. Photograph taken August 13, 2013

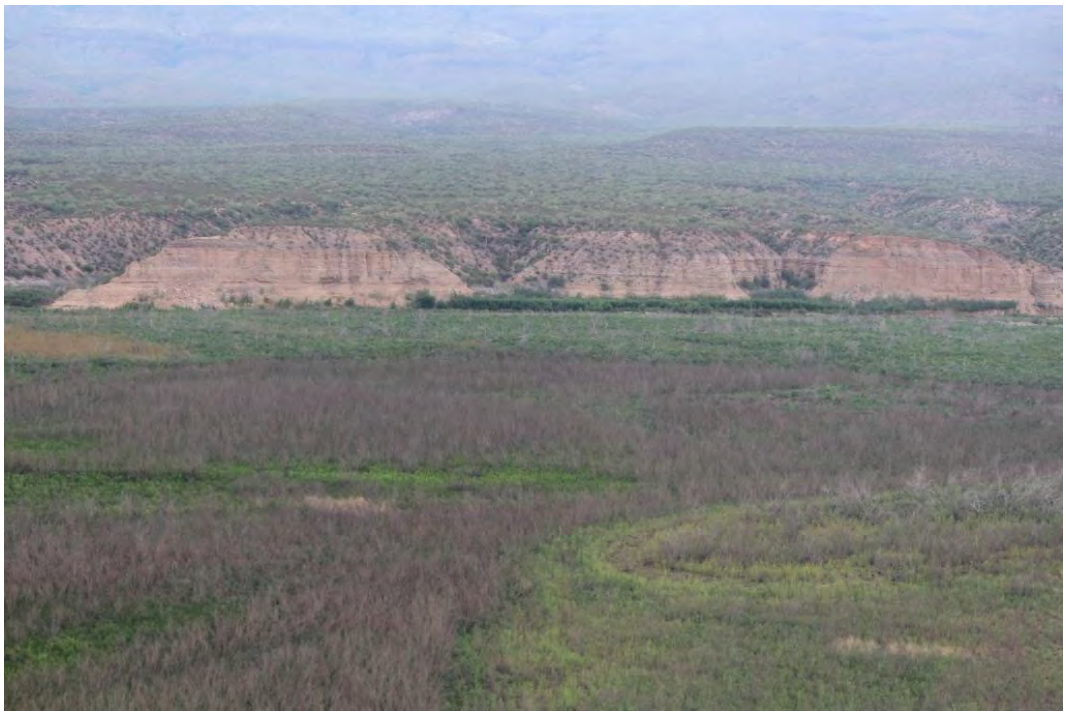


Figure 10.Upstream of the Pinto Creek Inflow looking north toward the Salt River. Photograph taken August 13, 2013.

3. Bald Eagle Program

Obligation: SRP is required to provide annual funding for a pair of seasonal bald eagle nest watchers through an existing Arizona Bald Eagle Nestwatch Program.

2013 Actions: SRP provided $25,900 to fund a pair of bald eagle nestwatchers during the 2013 breeding season.

2014 Actions: The agreement between SRP and AGFD allows AGFD to invoice for the 2014 Nest Watch Program in November 2013.

Obligation: Each year, SRP will assist with three Occupancy and Reproduction Assessment and nest search helicopter events and will provide funding for coordination and attendance by existing bald eagle management personnel. In addition, a maximum of three flights for rescue and management efforts will be provided.

2013 Actions: SRP provided three flights totaling approximately $7,400 worth of helicopter service to the AGFD during this period.

2014 Actions: Provide helicopter service as described.

Obligation: SRP will develop a coordinated plan with AGFD and FWS to rescue any bald eagles, eggs, or nestlings at Roosevelt Lake that may be threatened by rising reservoir levels.

2013 Actions: Completed. Contact list was updated in October 2012.

2014 Actions: Implement plan, if necessary. Contact list was updated in November 2014.

2013 Breeding Status: Over the past several years, AGFD has monitored bald eagle productivity at five breeding areas (BA) associated with Roosevelt Lake. In 2013, two additional BAs were discovered at the Lake; Campaign Bay and Bachelor Cove. On the Salt end of the Lake a pair was documented in late winter 2012, this has become the Campaign Bay BA. The nest was determined to have at least one egg but had failed by the end of February. The Bachelor Cove BA is located on the Tonto end of the lake, up a small side canyon away from the lake itself. This new BA was successful, fledging one individual by mid-April.

The results of the 2013 breeding season for Bas associated with Roosevelt Lake are shown below in Table 2.

Table 2. Bald eagle breeding productivity*, 2011-2013, Roosevelt Lake.

Breeding Area	2011		2012		2013	
	# of Eggs	# Fledged	# of Eggs	# Fledged	# of Eggs	# Fledged
Tonto	2	2	2+	2	Occupied**	
Pinal	2	2	2	2	2	2
Pinto	1	Failed	1+	Failed	2	2
Rock Creek	Unoccupied		Unoccupied		Unoccupied	
Dupont @ Sierra Anchas	Unoccupied		Unoccupied		Unoccupied	
Campaign Bay	n/a	n/a	n/a	n/a	1	Failed
Bachelor Cove	n/a	n/a	n/a	n/a	1	1
TOTALS	5	4	5+	4	6	5

* Source: Unpublished data, Southwest Bald Eagle Management Committee, AGFD (2011, 2012, 2013).
** The Tonto BA pair built a nest, but never laid eggs.

Arizona's bald eagle population continues to increase. In 2013, by the end of the breeding season, bald eagles set two new records for the number of breeding areas identified (68) and the number of eggs laid (71). Number of nestlings fledged fell from 52 in 2012 to 46 in 2013, which is equivalent to the 10 year average (46.1). The species' productivity records year after year indicate that bald eagles continue to flourish in the state.

C. Tonto Forest Protection Officer

Obligation: Fund a Forest Protection Officer (FPO) at the Tonto Basin Ranger District, TNF, to protect, enhance and manage habitat at Roosevelt Lake in support of the Roosevelt HCP, including posting and maintaining signs and fences in restricted areas, contacting individuals found in those areas and issuing citations, public education and planning and implementing management activities in regard to threatened and endangered species.

2013 Actions: The following report has been provided by Amy Madara-Yagla, FPO, TNF.

Enforcement Activities:

With the decreasing lake levels, many areas required increased signage and/or signage repair at the north end of Bermuda Flat/Horse Pasture and Indian Point. Signage was maintained throughout the Bermuda Flat and Horse Pasture shoreline camping area, which informs visitors that it is illegal to cut any dead standing wood. Bald and golden eagles, ospreys, and many other raptors use these dead trees for perches throughout the year. At least twenty abandoned campfires were extinguished by the FPO this summer that were left by forest users.

A total of 26 citations were issued this past year; 21 of those were issued to forest users within the Upper Salt River Recreation area for having active fires during a fire restriction period, one

citation was issued to a group that left a campfire smoldering unattended, two citations were issued to individuals discharging firearms during fire restrictions, and two tickets were given to individuals for littering.

Bald Eagles:

Two new Breeding Areas (BA), Campaign Bay and Bachelor Cove were identified this past year. The FPO worked closely with the AGFD contracted Nestwatchers to ensure protection of the bald eagle nest closure areas. Below is a summary of nest observations in the vicinity of Roosevelt Lake.

Tonto Nest: The Tonto breeding pair occupied the same tree as they have since 1992. At some point over the winter, nest #2 had fallen and a new nest was constructed at a lower location of the same tree. Two eagles were regularly seen throughout the late winter and spring in the breeding area conducting nest maintenance, but never appeared to incubate. It is believed that the previous female, born in 1987, was likely replaced this year by what appeared to be a four year old bird.

Pinto Nest: After two years of failed nesting attempts, it appeared that the Pinto pair had a successful year. Bald eagle Nestwatchers were assigned to both the new Campaign Bay BA and the Pinto BA. After getting a late start incubating, it is believed that the two chicks fledged between June 2nd and 4th, but was not verified by the Nestwatchers. There were little to no public contacts made by the Nestwatchers at the Pinto Nest this year. The area under the nest is choked with dead trees, and young living salt cedars and mesquites. Signs were placed along the river's edge to prohibit public access from the river's edge.

Campaign Bay: This was one of two new BAs at Roosevelt Lake this year. Last year the Pinto Bald Eagle Nest watchers had observed a new pair of bald eagles occupying the Campaign Bay area, east of Schoolhouse Point. In the middle of December 2012 a new nest was located. They began incubating the middle of January, but ended up abandoning the nest by February 27th, about the time the eggs should have hatched. It is unknown why they failed. Their nesting location was quite unusual, located in a grove of medium sized, dead willow trees and not more than 20 feet off the ground. After closer inspection following the nest failure it appeared that one side of the nest was slumping off. Nestwatchers diligently monitored the new breeding area until it failed, at which point they focused their attention on the Pinto BA.

Bachelor Cove: This new BA was reported by a Forest Service volunteer who had walked up the small canyon where this new nest was located, and was scolded by the bald eagle pair that occupied one of the large cottonwoods. The nest was first reported in the beginning of February and by the time the Nestwatchers arrived on February 9th one chick was verified in the nest. The chick successfully fledged on April 24th. Two signs were placed at the base of the canyon leading up to the nest. The pair was very tolerant of vehicles driving on the Forest road adjacent to the nest tree. A pair of zone-tailed hawks probably caused the greatest disturbance to the bald eagle pair. They nested in a large cottonwood a short distance further up the canyon, and were not at all shy about harassing the adult bald eagles.

Outreach activities:

Outreach activities include teaching curriculum from Project WET, Project WILD and Focus: Wild Arizona (AGFD) as well as a variety of other novel resources to approximately 120 third graders at Dr. Charles A. Bejarano Elementary School in Miami, Arizona.

The FPO also assisted the AGFD contracted Nestwatchers in conducting a program during April at the Windy Hill Campground Amphitheater along with six other programs, focusing on local plants and animals on weekends during times of high visitation. Three of the programs were

hands on, using sight, sound, smell, and touch to identify plants and animals of the Roosevelt Lake area. Two of the programs were focused on “Desert Night Dwellers” and highlighted the more secretive creatures of the night at Roosevelt Lake. Approximately 140 people attended campground activities this year.

In addition to the programs at the Windy Hill Campground, three programs were also conducted at the Grapevine group camping area. The FPO spoke with a group of Boy Scouts, a Fellowship group, and a group of retired RVers. Approximately 80 people were encountered at the Grapevine group area this year.

Other Activities:

One non-protocol flycatcher survey was conducted in the immediate area of Eads Wash. Flycatchers were frequently heard in this area while contacting forest users.

Activities also included hundreds of campsite visits on the Upper Salt River throughout the year. These contacts allow the opportunity to educate people about local wildlife. It also offers the opportunity to remind people to properly dispose of their trash and fully extinguish their fires when not in attendance.

D. Rockhouse Riparian Demonstration Project

Obligation: Develop a pilot project to establish and manage approximately 20 acres of riparian vegetation suitable for the listed and candidate species encompassed by the Roosevelt HCP on the Salt arm of Roosevelt Lake.

*Actions: C*ompleted installation. Site operation and maintenance continues.

2013 Actions:

Operations and Maintenance: SRP continued to contract with Tim Wheeler (Maratimo Construction) to conduct irrigation and site maintenance. Irrigation intervals varied depending on rain events, soil moisture levels, and temperature, but were performed according to the following general schedule: Regular flood irrigation of the site began at the end of April and continued every 10 to 18 days through the end of September, after which irrigation intervals were reduced to monthly.

Ditch cleaning activities performed during September 2011 were sufficient to prevent substantial weed growth through 2012 and 2013. Weed growth will be evaluated in 2014 and control activities will be implemented if deemed necessary.

2013 Bird Surveys: No protocol based surveys were conducted at Rockhouse in 2013. However, both flycatchers and cuckoos were incidentally detected (no play-back) during multiple site visits in 2013. On June 6, 2013, approximately 15 territories, 8 pairs, 2 more probable pairs, and 4-5 lone males, totaling 25 flycatchers, were documented at the site. For the first time flycatchers utilized Field 2 and were documented flying back and forth to the South Wet Basin. No cuckoos were detected during this visit. On a second visit to the site, July 7, 2013, 4 cuckoo vocalizations were detected and we suspect 2 separate birds were at the site. Flycatchers were still vocalizing and abundant during the July visit. A final visit was made on August 8, 2013. No cuckoos or flycatchers were heard but several quiet flycatchers were seen foraging in areas that were previously occupied.

Outreach & Education: SRP gave a presentation about the site at the Society for Ecological Restoration World Conference in October 2013.

2014 Actions:

Operations and Maintenance: SRP will continue with the same general irrigation schedule. General monitoring of tree health will continue. Regular maintenance of the irrigation system will be conducted. Vegetation will be removed, both mechanically and chemically, from the ditch areas as necessary.

Summary Document: A report summarizing the history of project construction and monitoring was drafted in 2010. Flycatcher and cuckoo survey results and usage of the site will be added to the report in addition to vegetation data collected around 6 flycatcher nests on the site. We hope to finalize this report in 2014.

Outreach & Education: SRP will be giving a presentation on the development of the site at the Tamarisk Coalition meeting in Grand Junction, CO in February 2014.

Figure 11. Rockhouse Project, looking north across the property.
Photograph taken August 13, 2013.

IV. STATUS OF MITIGATION COMPLIANCE

Obligation: Acquire 2,250 acre-credits by February 2006 including acquisition and management of at least 1,500 acres of riparian habitat by fee title or conservation easement, as well as 750 acre-credits of “other” habitat conservation measures.

Actions: Completed. Table 3 includes background information on the mitigation properties.

SRP has accrued 2,591 acre-credits, as follows.

- 1,842 acres of riparian habitat
- 429 acre-credits for buffer lands and water rights
- 20 acres of created habitat
- 300 acre-credits for Tonto FPO

Table 3. Mitigation property information.

Mitigation Property Name	River System	County	Size (acres)	Mitigation Credits	Ownership	Management
Camp Verde Riparian Preserve	Verde	Yavapai	124	124	Owned by SRP	SRP
Fort Thomas Preserve	Upper Gila	Graham	1,054	1,054	250 acres–Conservation Easement w/Freeport McMoRan 308 acres–Owned by SRP 496 acres–Owned by USBR	SRP
Adobe Preserve	San Pedro	Pinal	154	131	Owned by SRP	SRP
Black Farm Preserve	San Pedro	Pinal	137	95	Owned by SRP	SRP
Stillinger Preserve	San Pedro	Pinal	40	40	Owned by SRP	SRP
Spirit Hollow Preserve	San Pedro	Pinal	204	204	154 acres–Owned by SRP w/USBR conservation easement 50 acres–Owned by USBR	SRP
San Pedro River Preserve	San Pedro	Pinal	623	623	TNC w/USBR conservation easement	TNC w/USBR endowment
Arlington Wetland/Cell 4	Lower Gila	Maricopa	5	5	Owned by AGFD	AGFD under contract to SRP
Rockhouse Demonstration Project	Salt	Gila	20	15	Owned by USBR; leased to SRP	SRP

TNC = The Nature Conservancy; USBR = Bureau of Reclamation; AGFD = Arizona Game & Fish Department.

V. MITIGATION PROPERTIES–Monitoring and Management

A. Monitoring

SRP monitors both the bird species of interest as well as habitat condition on each of the mitigation properties. Monitoring obligations for each property are detailed in the Roosevelt HCP document and are summarized briefly below.

Obligation: Flycatcher, cuckoo, and clapper rail populations will be surveyed in the first two years following acquisition of the mitigation site for purposes of establishing a baseline. After that, trend surveys will be conducted every other year on average, but not less than every third year (Tables 4, 5, and 6). The specific frequency of survey for each site is to be determined during the annual meeting.

2013 Actions:

Flycatcher and cuckoo surveys were conducted on the San Pedro River conservation properties in 2013 by EcoPlan Associates under contract to SRP. Surveys will be repeated in 2015.

Yuma clapper rail surveys were conducted at the Arlington Wetland in 2013. Surveys will be repeated in 2015.

No flycatcher and cuckoo protocol surveys were conducted on the Fort Thomas Preserve property, Camp Verde Riparian Preserve property, and Rockhouse Demonstration property in 2013.

2014 Actions:

Flycatcher and cuckoo surveys will be conducted on the Fort Thomas Preserve Properties in 2014, as well as the Camp Verde Riparian Preserve property and Rockhouse Demonstration property.

Tables 4 through 6 provide a summary of the past six years when bird surveys were conducted on Roosevelt HCP mitigation properties, along with projections for 2014.

Table 4. Southwestern willow flycatcher survey schedule.

	Purchase Date	2008	2009	2010	2011	2012	2013	2014
SAN PEDRO								
Adobe	Sep 2002	SRP			SRP		SRP	
Stillinger	Jun 2004	SRP			SRP		SRP	
Spirit Hollow	Jul 2004	SRP			SRP		SRP	
Spirit Hollow Annex	Dec 2006	SRP*			SRP		SRP	
VERDE								
Camp Verde	Jan 2004		SRP			SRP		SRP
GILA								
McEuen	Aug 2004		SRP			SRP		SRP
PD CE	Feb 2005		SRP			SRP		SRP
BR/Hancock	Oct 2005		SRP			SRP		SRP
BR/Bellman	Dec 2006	SRP*	SRP			SRP		SRP
ROCKHOUSE	n/a	Evaluate	SRP	SRP		SRP		SRP
ROOSEVELT	n/a	TNF	TNF	TNF	TNF	TNF		

* Denotes baseline survey. BR = Bureau of Reclamation; TNF = Tonto National Forest

Table 5. Yellow-billed cuckoo survey schedule.

	Purchase Date	2008	2009	2010	2011	2012	2013	2014
SAN PEDRO								
Adobe	Sep 2002	SRP			SRP		SRP	
Stillinger	Jun 2004	SRP			SRP		SRP	
Spirit Hollow	Jul 2004	SRP			SRP		SRP	
Spirit Hollow Annex	Dec 2006	SRP*			SRP		SRP	
VERDE								
Camp Verde	Jan 2004		SRP			SRP		SRP
GILA								
McEuen	Aug 2004		SRP			SRP		SRP
PD CE	Feb 2005		SRP			SRP		SRP
BR/Hancock	Oct 2005		SRP			SRP		SRP
BR/Bellman	Dec 2006	SRP*	SRP			SRP		SRP
ROCKHOUSE	n/a	Evaluate	SRP	SRP		SRP		SRP
ROOSEVELT	n/a							

* Denotes baseline survey.

Table 6. Yuma clapper rail survey schedule.

	Creation Date	2009	2010	2011	2012	2013	2014
Arlington WMA	Feb 2006	SRP/AGFD*		SRP/AGFD		SRP	
Roosevelt	n/a				SRP**	SRP**	SRP**

AGFD = Arizona Game and Fish Department
* Denotes baseline survey.
** Surveys will be conducted only if cattail habitat exceeds threshold amount.

Obligation: Habitat conditions on mitigation properties will be monitored using the following means.

Baseline Inventories. Complete a baseline inventory for each property within one year of acquisition.

Photo points. Permanent photo points will be established and retaken periodically to monitor habitat condition.

Aerial Photography. Acquire aerial photography to establish a vegetation/habitat baseline and retake every 5 years or when vegetation is altered by a catastrophic event.

Documentation of Habitat Condition. Document habitat conditions in occupied flycatcher, cuckoo, and clapper rail habitat when bird surveys are conducted.

2013 Actions:

Documentation of Habitat Conditions. Habitat conditions were evaluated and photo documented during 2013 flycatcher and cuckoo surveys on the San Pedro River conservation properties. New aerial photos were acquired for the San Pedro River from the Narrows to the confluence with the Gila River. See Appendix A for newly acquired aerial photos of the San Pedro conservation properties. See Appendix C (2013 Avian Survey Report) and Appendix D (2013 San Pedro Photo Points) for habitat photos. Habitat conditions at mitigation sites are described in section C of this report.

2014 Actions:

Table 7 contains a summary of habitat monitoring activities scheduled for 2014 along with past activities.

Permanent Photo points. Fixed point photos will be repeated for the Camp Verde Preserve, Fort Thomas Preserve, and Rockhouse Site in 2014 as well as if there is a need to document a significant event or change in conditions on one or more of the other properties.

Aerial Photos. Aerial photography will be repeated for the Camp Verde Preserve or updated to 2014 from an online source.

Documentation of Habitat Conditions. Documentation of habitat conditions typically coincides with bird surveys. See Tables 4 through 6 for time schedules.

Table 7. Habitat monitoring schedule

	2008	2009	2010	2011	2012	2013	2014
SAN PEDRO							
Adobe Baseline Inventory	Completed				Updated		
Photo points	X	X		X		X	
Aerial photos	X					X*	
Stillinger Baseline Inventory					Updated		
Photo points	X	X		X		X	
Aerial photos	X					X*	
Spirit Hollow Baseline Inventory	Completed				Updated		
Photo points	X	X		X		X	
Aerial photos	X					X*	
VERDE							
Camp Verde Baseline Inventory	Completed				Updated		
Photo points	X	X		X			X
Aerial photos		X					X
GILA							
Fort Thomas Baseline Inventory	Completed		Completed		Updated		
Photo points	X	X		X			X
Aerial photos				X			
ROCKHOUSE							
Project Summary		Drafted					X
Photo points	X	X		X			X
Vegetation monitoring	Evaluation	X		X			
ARLINGTON							
Photo points	X	X		X			
Aerial photos					X		

*Appendix A includes the updated aerial photography for the San Pedro River Properties

B. Monitoring Results

In 2013, SRP contracted with EcoPlan Associates, Inc. to conduct protocol surveys for flycatchers and cuckoos on all San Pedro River properties. SRP staff documented incidental detections at the Camp Verde Preserve, Fort Thomas properties, and the Rockhouse Demonstration Project. The results of the protocol surveys are summarized below. The full survey report can be found in Appendix C. Clapper rail surveys were conducted by SRP

biologists at the Arlington Wetland site in 2013. The results of the survey are summarized below.

1. Southwestern Willow Flycatcher Surveys

San Pedro River Properties

A total of 22 resident adult flycatchers (9 pairs and 4 unpaired males) were detected at 13 territories (Figure 12). No nonresident flycatchers were detected. No banded birds were detected during the 2013 field season.

Nest searching was conducted on these properties to determine the impact of brown-headed cowbird (*Molothrus ater*) parasitism on flycatchers (SRP 2005). Nests of surrogate species were also checked if researchers were unable to locate an adequate number of flycatcher nests. A total of 61 nests were checked for brown-headed cowbird parasitism. Of the 61 nests located, 3 were flycatcher nests and 58 were surrogates. Of these 61 nests, parasitism was documented in 13 (though no flycatcher nests were parasitized). The parasitism rate (i.e., the number of nests parasitized divided by the total number of nests monitored) was 21.3%. Parasitism was spread out fairly evenly across the 4 preserves and was not concentrated in any specific area.

Figure 12. Interior view of suitable, occupied flycatcher native-dominated habitat near a territory at the Adobe Preserve.

Adobe Preserve

A total of 8 flycatchers (3 pairs, 5 territories, and 1 nest) were observed at the Adobe Preserve in 2013 (Table 8), compared to 12 flycatchers (7 territories and 2 nests) in 2011. The results of the 2013 surveys can be found in Appendix C.

Stillinger Preserve
A total of 10 flycatchers (4 pairs, 6 territories, and 1 nest) were observed at the Stillinger Preserve in 2013 (Table 8), compared to 8 flycatchers (7 territories, and 0 nests) in 2011. The survey results can be found in Appendix C.

Spirit Hollow Preserve and Spirit Hollow Annex
A total of 4 flycatchers, 2 pairs, 2 territories, and 1 nest were observed at the Spirit Hollow Preserve and Annex in 2013 (Table 8), compared to 4 flycatchers, 2 territories, and 2 nests in 2011. The survey results can be found in Appendix C.

Table 8. Summary of flycatcher territories by property 2013.

Preserve	Residents	Pairs	Territories	Nests	Non-residents
Adobe Preserve	8	3	5	1	0
Stillinger Preserve	10	4	6	1	0
Spirit Hollow Preserve and Annex	4	2	2	1	0
Total	**22**	**9**	**13**	**3**	**0**

2. Western Yellow-billed Cuckoo Surveys

San Pedro River Properties

Forty-one total cuckoo detections (Table 9), including 7 incidental detections, were recorded for the San Pedro River properties during 5 protocol surveys of the area (Figure 13). Based on an examination of the cuckoo detection records made during surveys in 2013, potential repeat detections during separate surveys, incidental detections recorded throughout the summer, behavioral observations, and the geographical spread of detections throughout the study area, an estimated 9 pairs were present in the study area (Appendix C).

Figure 13. Interior view of suitable, occupied YBCU native–dominated habitat on the Spirit Hollow Preserve.

Adobe Preserve

There were a total of 12 detections (an estimated 2 pairs) made during the survey season. This was consistent with surveys conducted in 2011 where there were 8 detections and an estimated 3 pairs.

Stillinger Preserve

There were a total of 2 detections (an estimated 1 pair) made during the survey season. This was consistent with surveys conducted in 2011 where there were 2 detections and an estimated 1 pair.

Spirit Hollow Preserve and Spirit Hollow Annex

There were a total of 27 detections (an estimated 6 pairs) made during the survey season. This was a much higher detection rate compared with surveys conducted in 2011 where there were 8 detections and an estimated 3 pairs.

Table 9. Summary of cuckoo detections by property, 2013.

Parcel	Incidental	Survey 1	Survey 2	Survey 3	Survey 4	Survey 5	Total
Adobe Preserve	2	1	3	2	2	2	12
Stillinger Preserve	0	0	1	1	0	0	2
Spirit Hollow Preserve and Annex	5	0	4	5	6	7	27
Total	**7**	**1**	**8**	**8**	**8**	**9**	**41**

3. Yuma Clapper Rail Surveys

Arlington Wetlands, Arlington Wildlife Area (AWA).

SRP biologists surveyed the Arlington Wetlands on April 10, May 3, and May 31, 2013 using the Standardized North American Marsh Bird Monitoring Protocol (Conway 2008) for the central Arizona region. The central Arizona protocol uses a multi-species surveying approach for black rail (*Laterallus jamaicensis*), least bittern (*Ixobrychus exilis*), sora (*Porzana carolina*), Virginia rail (*Rallus limicola*), and Yuma clapper rail. Surveyors are also asked to record data for pied-billed grebes (*Podilymbus podiceps*), American bittern (*Botaurus lentiginosus*), common moorhen (*Gallinula chloropus*), and American coot (*Fulica americana*).

SRP surveys were conducted on all 3 ponds at the Arlington site using 5 stops. The April survey found 1 least bittern, 4 Yuma clapper rails, 9 common moorhen, and 7 American coots (Table 10). The May 3 survey found 1 least bittern, 2 Virginia rails, 4 Yuma clapper rails, 10 common moorhens, and 15 American coots. The May 31 survey found 4 Yuma clapper rails, 7 common moorhens, and 5 American coots. Two pairs of clapper rails were documented during each of the surveys. Yuma clapper rails, common moorhens, and American coots were detected in the SRP basin.

Table 10. Summary species detected during clapper rail surveys, 2013.

Species Surveyed For	Survey Data and Detections		
	April 10	May 3	May 31
Yuma clapper rails	**4**	**4**	**4**
Black rails			
Least bitterns	1	1	
Sora			
Virginia rails		2	
Pied-billed grebes			
American bittern			
Common moorhen	9	10	7
American coot	7	15	5

C. Management Obligations

The primary goal for management of these properties is to provide ecological and conservation benefits to the flycatcher, cuckoo, clapper rail, and bald eagle. SRP focuses management activities on minimizing or eliminating identified threats to riparian habitat, such as wildfire, groundwater pumping, surface water depletion, trespass livestock grazing, cowbird parasitism, and vandalism. We also take actions to enhance the quality of habitat on a property or reverse past damage, where warranted.

General management activities required for each property are listed below:

- SRP will identify a manager for all acquired properties.
- A management plan will be developed for each property within one year of acquisition in coordination with FWS and will be updated annually.

- Management activities identified in the management plan will be implemented, including construction and maintenance of boundary fencing and development of wildfire abatement plans.
- Cowbird management will occur on properties that are agreed to by SRP and FWS during the annual Roosevelt HCP meeting.
- Conservation easements will be placed on all riparian habitats and other land used for mitigation to ensure permanent protection, management and monitoring of these lands consistent with the provisions of the Roosevelt HCP.

Table 11. Status of management obligations for mitigation properties.

Mitigation Area	Site Manager	Mgmt Plan	Fire Plan Status	Fencing	Water Rights	Conservation Easement
Adobe	TNC	C	Update contacts	C	In process	
Black Farm	TNC	C	Update contacts	C	In process	
Spirit Hollow	TNC	C	Updated	C	NR	Completed, USBR
Spirit Hollow Annex	TNC	C	Updated	C	NR	n/a, USBR land
Stillinger	TNC	C	Update contacts	C	NR	
Camp Verde Riparian	SRP contractor	C	Update contacts	C	NR	
Fort Thomas	TNC	C	Draft complete	C	NR	Partial
Rockhouse	SRP contractor			C	C	n/a USBR land
Arlington Wetland	AGFD	AGFD	AGFD	C	C	n/a AGFD land
San Pedro Preserve	TNC	C	C	C	In Process	Completed w/USBR

TNC = The Nature Conservancy; AGFD = Arizona Game and Fish Department; C = Completed; NR = Not required; n/a = Not applicable to the HCP

1. Management Actions–Common to All Properties

2013 Actions:

SRP staff attended the Tamarisk Coalition annual meeting in March, 2013, which was held in Grand Junction, Colorado. The 2013 meeting focused on bringing together land owners, resources managers, and riparian researchers. We attended to stay abreast of current topics related to tamarisk, tamarisk treatments and removals, and riparian restoration techniques post-treatment; as well as to follow the current status of the tamarisk beetle distribution.

Site Management. All mitigation properties are being managed by SRP, except for the Arlington wetland site, which is operated by AGFD, and the San Pedro River Preserve, which is owned and managed by The Nature Conservancy (TNC).

Management Plans. All management plans have been drafted and are revisited annually. SRP has revised maps in several of the documents. See Appendix B for updated management

activity implementation matrices. Fixed point photography was repeated for the San Pedro River properties in 2013 and can be found in Appendix D.

General Site Maintenance. There have been no changes in SRP's contracts for site maintenance and field management. SRP contracts with the following entities:

Contractor	Property
Tim Wheeler, Maratimo Construction	Rockhouse Project
Dick Hauser, Hauser & Hauser Farms	Camp Verde Riparian Preserve
Dan Wolgast, The Nature Conservancy	San Pedro & Gila River properties
Arizona Game & Fish Department	Arlington Wetland

The following management and maintenance activities were conducted on each property over the past year:

- Properties are patrolled regularly to deter trespass by people, vehicles, and livestock; to identify and eliminate fire hazards; to identify any management issues that may need to be addressed; and to monitor general habitat conditions and stream flow.
- Fences and gates are patrolled and repaired when necessary to maintain a secure boundary.
- If trespass livestock are present, we work to get them removed from the property and we attempt to find where they entered the property and repair any fence line breach.
- Weed management and control are on-going activities. We use both chemical and mechanical methods to minimize the problem. Use of mowers and brush cutters is preferred, but application of herbicides and pre-emergents is sometimes necessary.
- Site managers identify and eliminate potential fire hazards on a regular basis. Much of this is accomplished with weed management efforts. All contractors and SRP employees working on the properties are familiarized with fire abatement and response protocols.

Cowbird Management. All cowbird management activities remain at the Tier 1 level, as described in SRP's cowbird management plan (SRP 2005). Tier 1 activities include:

- Fencing riparian areas to exclude livestock to prevent the formation of trails and to eliminate grazing pressure on riparian habitat.
- Re-planting or allowing natural recovery of trails and livestock or human-disturbed areas.
- Minimizing human activity on mitigation properties and limiting activities to small areas away from riparian zones.

Conservation Easements. No additional conservation easements were placed on mitigation properties this past year.

2014 Actions:

Site Management: We anticipate all management arrangements will remain unchanged in 2014.

Site Maintenance: Regular patrols of properties and fences will continue weekly, on average. All other activities listed in 2013 actions will continue through 2014.

Cowbird Management. Based on results of cowbird parasitism estimates, all cowbird management activities remain at the Tier 1 level, as described in SRP's cowbird management plan (SRP 2005).

2. Management Actions by Property

The following sections address actions taken to meet management objectives as described in the management plan for each Preserve. A brief description of current habitat conditions on each property is presented, followed by a summary of specific management actions accomplished in 2013 and a discussion of proposed actions for 2014.

San Pedro River

General Watershed Activities

Fencing. The San Pedro Working Group, a group of conservation landowners and managers on the lower San Pedro River, broached the subject of evaluating everyone's cross-river fencing to see whether there is a better way to approach the protection of conservation lands on the river. Once AGFD has decided what they would like to do with the ASARCO transferred lands, we can have this discussion. In the meantime, SRP provided updated land ownership maps to allow managers to draw in their fence lines so we can assess where and how many cross-river fences exist and are planned. Collaborative management/maintenance will be considered. SRP is awaiting confirmation on fencing locations.

Piezometer Installations. SRP installed 10 piezometers on our properties in January 2011. We still need to install two more on the Spirit Hollow Preserve. We are trying to coordinate installation timing with Resolution Copper's planned installation of piezometers on the 7B Ranch property so that we can share mobilization costs. We will continue to work with them. Our target for installation is 2014.

TNC Meeting w/New Management. Josh Avey is the new supervisor over the Lower San Pedro Program. Bob Rogers was hired to manage the Lower San Pedro Program along with other responsibilities.

In December of 2013, the agreement SRP has with TNC for the management of the San Pedro and Gila River conservation properties will expire. SRP is working with TNC to renew the agreement for another 5-year term.

Lower San Pedro Working Group. SRP staff attended the April 2013 working group meeting at TNC's San Pedro River Preserve. Major topics of discussion included land management, partnering opportunities, data collection and monitoring activities, other watershed activities, and external activities.

Lower San Pedro Watershed Alliance. SRP staff gave a presentation on the San Pedro River Mitigation Properties to the group at their September 2013 meeting. The Lower San Pedro Watershed Alliance is a newly formed group focusing on uniting conservation-minded individuals, groups, and agencies in the lower San Pedro region to protect the riparian area and watershed.

Christmas Bird Count. On January 5, 2013, Dan Wolgast, SRP's Preserve Manager ("Preserve Manager"), participated in the Dudleyville Christmas Bird Count (at Black Farm and Adobe), accompanied by a volunteer from Tucson. Thirty-one species were tallied, with a total of approximately196 individuals. Species of note were a juvenile dark-morph Red-tailed hawk (*Buteo jamaicensis*) and a juvenile Peregrine falcon (*Falco peregrinus*). Sparrows, in general, were even less numerous on this year's count than on last year's, with 7 Savannah sparrows (*Passerculus sandwichensis*) and 1 Lark sparrow (*Chondestes grammacus*). Compare this with 2010's flock of 100+ Lark sparrows.

Lower San Pedro Nature Festival. On April 13, 2013, SRP biologists assisted in the community sponsored Nature Festival by leading a guided tour to the Adobe Preserve. Audubon Arizona

and the Copper Corridor Economic Development group will be cooperatively working on the nature festival for 2014. SRP has committed to assist with planning and, possibly, providing funds.

North American Migration Count. On May 11, 2013, the Preserve Manager participated in the Migration Count. On the Adobe Preserve 42 species were encountered, with 25 Bell's vireo (*Vireo bellii*), 53 yellow warblers (*Dendroica petechia*), 15 yellow-breasted chats (*Icteria virens*), and 16 song sparrows (*Melospiza melodia*) being the most numerous. At Black Farm, 21 species were observed, mostly in the vicinity of the farm house.

TNC's Annual Wet/Dry Mapping Effort. SRP participates in the wet/dry mapping on the San Pedro River by allowing the conservation properties to be mapped and included on the maps. Aravaipa Creek, adjacent to Black Farm Preserve and the San Pedro River through Spirit Hollow Preserve were mapped on June 14, 2013 and found to be dry. The reach of the San Pedro River that runs through the Adobe Preserve was mapped on June 15. The river was flowing at the south boundary, but went dry just below a large beaver dam, leaving the north boundary dry.

a. Adobe Preserve, San Pedro River, Pinal County

Habitat Conditions: This reach of the river still supports a diverse Fremont cottonwood (*Populus fremontii*)-Goodding's willow (*Salix gooddingii*) riparian forest community exhibiting an array of habitat types from open patches of sandy/cobbly alluvium to well-developed gallery forests. The gallery forest is dominated by a nearly even-aged stand of Goodding's willows and Fremont cottonwood, representing a few major recruitment events that occurred in the early to mid-1990s. The gallery trees have matured past the optimum size and density preferred by flycatchers and the steady decrease in territory numbers reflects this. Mid-and understory development is increasing in patches where the canopy has opened as a result of tree mortality, largely from trees falling over due to the force of flood waters or high winds during storm events (Figure 14). However, in the extant gallery forest the dense canopy essentially shades out most potential mid- and understory growth.

Following the monsoon storms and associated increased flows (mid-July 2013), a large section of the bank in the downstream portion of the property was cut farther back from the low-flow channel, felling some live trees and widening the channel bottom. This area may provide space for willow or cottonwood recruitment in the future. Upstream of this, the main channel has become more incised.

The seep area along the eastern side of the channel remains dominated by a diverse and dense native riparian forest supporting extensive mid- and understory vegetation. Patches of tamarisk (*Tamarix* spp.) and mesquite (*Prosopis* spp.) persist on drier channel bars throughout the flood plain interspersed with sandy areas.

The northern beaver dam built in the river at Adobe after the 2012 monsoon season increased in size during the spring of 2013, from about one foot high at the beginning of January to over three feet high at the end of March (Figure 15). The absence of large spring flows in the river had allowed the beaver(s) building it to continue unhindered. However the flow event mentioned above which cut the banks also removed the dam and, as of the middle of October, there was no sign of a new dam. The dam was constructed mainly of cottonwood and tamarisk branches, with a minor component of Goodding's willow and seep willow (*Baccharis salicifolia*), and with boulders and pats of mud on the upstream side.

During the spring a second, smaller beaver dam was discovered approximately 100 meters upstream from the larger dam. This second dam was about 14 inches high by the end of June (Figure 16). This beaver dam was also destroyed during the monsoon flows on the river.

Figure 14. New incised reach of the river with significant downfall and limited canopy remaining. Photograph taken July 24, 2013.

Figure 15. Northern beaver dam at Adobe, approximately 3 feet high. Photograph taken March 28, 2013.

Figure 16. Mid-property beaver dam at Adobe, approximately 14 inches high. Photograph taken June 12, 2013.

2013 Actions:

Trespass Livestock. Trespass by cattle and horses occurred during the winter of 2012. Both the horses and cows were successfully removed from the property by December 2012. It appears that some cattle have passed through the property while the fences were down during the summer monsoon season, but all were off the property when the fences were repaired following the monsoons. No further instances of trespass livestock were identified on the property.

Fencing. Due to the four-strand cross-river fence being repeatedly damaged during times of high flows the Preserver Manager has begun to experiment with constructing log-jams along the fence alignment. This involves the repositioning of certain key pieces of driftwood already washed into the area. To date, it seems to be effective in excluding cattle and horses, while mimicking natural process and allowing normal hydrologic processes to continue unimpeded, without continuing to put large amounts of steel in the form of posts and wire into the river bottom.

The large Goodding's willow that had been laying across the pipe-rail fence east of the cattle trap was removed on February 13 and 14. AmeriCorps volunteers assisted with the removal and chipping of slash.

Invasive Weed Control. Weed control took the form of clearing and mowing around the house, maintaining a fire lane between the Adobe Preserve and the neighboring Cook's Lake property, and between the upland terrace and the riparian area within the Adobe Preserve.

Native Plantings. In early June, 40 assorted grasses in 1-gallon pots were planted along the east edge of the southern-most pasture. Species planted include spike pappusgrass (*Pappophorum mucronulatum*), alkali sacaton (*Sporobolus airoides*), giant sacaton (*Sporobolus*

wrightii), feather fingergrass (*Trichloris mendocina*), and tanglehead (*Heteropogon contortus*). Plants were initially irrigated using a 275-gallon tote with 75 feet of ½" poly pipe and 1gph emitters. Irrigation was discontinued after the monsoon season.

Restoration Activities. SRP will be implementing a program of establishing native grasses and shrubs in the abandoned pastures without the use of supplemental water. The Preserve Manager has started planting grasses in swales as a test to see if establishment will occur using these methods. SRP will develop a restoration plan for the area for U.S. Fish and Wildlife Service to review prior to initiation of any broad-scale activities.

2014 Actions:

Trespass/Vandalism/Livestock. SRP will continue to work cooperatively with USBR, TNC, AGFD, and other conservation landowners along the river to reduce occurrences of trespass livestock grazing. SRP will also continue to notify and work with neighboring ranchers to promptly remove their livestock. Fortification and maintenance of fences is an on-going activity. We will continue to explore options with our neighbors to reduce the amount of fencing in the river. SRP has met several times with AGFD and they have indicated that they are willing to work with us on management and fencing issues.

Invasive Weed Control. Mowing and manual clearing of roads, areas around infrastructure and abandoned pastures will continue on an as needed basis.

Restoration Activities. SRP and TNC will continue to develop a plan to introduce demonstration plantings and get more native grasses established on the eastern terrace.

Monitoring. Depth-to-water measurements at each of the three piezometers and stream flow measurements at the established station will be recorded on a monthly basis.

b. Black Farm Preserve, Aravaipa Creek, Pinal County

Habitat Conditions: This is the seventh year that native grasses have received no supplemental water. Despite predictions of a wet monsoon season, total rainfall accumulation was 5.01" (measured at Black Farm; normal is between 5.0" and 6.0"). Nevertheless, the grasses in the fields responded with abundant new growth and prolific seed. Some of this seed will be harvested and stored for future seeding efforts.

Snow fell in the valley bottom on February 20 and 21, with an overnight snow accumulation of roughly one inch (Figure 17). This storm brought a total of 0.38" of precipitation.

An early monsoon storm, on June 15 affected the middle San Pedro and east Aravaipa portions of the watershed, with over 2" reported from both Benson and the Cobra Ranch (headquarters of TNC's Aravaipa Canyon Preserve). Any run-off in Aravaipa Creek was absorbed before it reached the fish barriers five miles upstream from Black Farm. Aravaipa Creek started to flow at Black Farm on July 16 and flow has continued uninterrupted through at least October 16, 2013.

Figure 17 Black Farm, looking south from the farm house.
Photograph taken February 21, 2013.

2013 Actions:

Invasive Weed Control. Weed management in the native grass fields requires a constant effort. Large patches of Russian thistle (*Salsola* spp.) were mowed or cut with a brushcutter in 2013. At the same time, some of the Russian thistle that had been mowed earlier in the year had minimal re-growth (less than 8 inches) and was left to provide some structure and food for over-wintering sparrows. Weed growth into the spring was much less in 2013 than in previous years. Growth of Russian thistle was restricted to field edges, specifically the east edges of the north, south and east fields. These have been treated mechanically (manual removal, some mowing), and very few remain property-wide going into winter.

2014 Actions:

Native Grasses. In an attempt to increase native grass coverage in sparsely covered areas, we will be implementing, for the first time, a technique that is typically used on pasturelands. Grasses will be mowed and baled in the south field where native grasses are vigorous. Bales will be spread in the east field and other sparsely covered field edges. This will bring desirable native seed to the very sparsely vegetated areas of the Farm, while also adding a mulch layer to increase moisture retention and provide organic material. We hope to also increase grass species diversity in these areas.

Invasive Weed Control. SRP will continue to monitor fields for presence of tamarisk, Russian thistle, mesquite, and other unwanted plants. We will use mechanical or chemical removal methods as necessary. Specifically, we will continue mowing and removing Russian thistle, goosefoot (*Chenopodium* sp.), and amaranth (*Amaranthus* sp.). Tree of heaven (*Ailanthus altissima*) treatment will be continued near the house as needed to treat re-sprout.

Monitoring. Depth-to-water measurements will be recorded monthly at all piezometers. We will record time periods when Aravaipa Creek has surface flow and take occasional stream flow measurements when there is enough surface flow to allow for this.

c. Stillinger Preserve, San Pedro River, Pinal County

Habitat Conditions. Several high flows progressively reshaped the sediment wedge at Putnam Wash. This wedge had been holding back river-flow, causing the Stillinger stretch of the river to remain high and slow. The water now flows relatively unimpeded past this now-truncated wedge, dropping the level of the river at the north end of Stillinger. This remains a perennial reach of the San Pedro. High flows which occurred several times in the late summer and have reshaped the channels on the other preserves and removed the wedge of sediment at Putnam Wash, don't seem to have affected the channel on Stillinger. This channel retains the course it has had for the last several years and remains incised with a deep sediment load on the bottom.

The habitat along the banks of the channel consists of a thin stringer of mixed native and non-native trees (Figure 18) whose structure remains suitable for flycatchers and cuckoos. There appears to be some slight drying and die-off of trees, especially near the northern, downstream end of the preserve in the areas beyond the immediate bank-side vegetation. Beaver activity was apparent with both willows and tamarisk showing signs of beaver chew.

Figure 18. View along the main channel on the Stillinger Preserve. Photograph taken May 23, 2013.

2013 Actions:

Fencing. Due to the current condition of the channel at the north water gap (i.e. channel bottom too muddy), keeping the gap closed has proven difficult. All other portions of the fence line are in excellent condition. The north gap remains open, though the water is too deep and the

channel bottom too muddy to allow passage of cattle or horses. The neighbor to the east, John-Henry Gaona, has also been extremely helpful in monitoring the status of the SRP boundary fence nearest his property, and in repairing breaks along the east side of the property, including the south river gap.

Trespass Livestock. Cattle and horses get in occasionally, but neighbors have been responsive, even proactive in retrieving their animals and assisting in fence repair.

2014 Actions:

Trespass Livestock Grazing. We will continue to work cooperatively with neighboring ranchers to minimize impacts from trespass livestock in this river corridor.

Monitoring. Monitoring depth to groundwater will continue on a monthly basis.

d. Spirit Hollow Preserve and Annex, San Pedro River, Pinal County

Habitat Conditions. This reach of the river continues an apparent drying trend with surface flows only occurring as run-off after upstream precipitation events (Figure 19). Many larger trees, both willows and cottonwoods, appear to be moisture-stressed; some are dying and starting to fall. The main channel remains in the middle of the river, with multiple overflow channels persisting across the floodplain. Although the main channel is scoured of vegetation, many of the secondary and tertiary channel bottoms are covered with a dense growth of grasses and forbs. Scouring flood flows occurred following a late summer storm deepening parts of the main channel to over 5 feet and creating several new pools where water persisted for several days after the flow event.

Figure 19. Views upstream along the main channel on the Spirit Hollow Preserve from the northern property boundary. The photograph on the left is the typically dry channel (May 18, 2013) while the photograph on the right is during a high flow event (July 6, 2013).

2013 Actions:

Trespass Livestock. Subsequent to completion of fence repairs in the late fall, trespass cattle were removed from the property by way of the one-way gate at the southeast corner of the USBR Annex. Cattle were lured to exit through the gate by weekly placement of hay and water on the outside of the gate. The last remaining cattle left the property in December 2012. Due to the extremely dry conditions this spring and early summer, cattle from the grazing lands to the south of Spirit Hollow have been repeatedly entering the property to reach the slightly better quality forage that is available on the Preserve. As of October 2013, all but one animal has been removed from the property. The land manager is working to raise silted-in sections of the fence

and repair the access road along the southern boundary of the Annex. Once completed hay and water will be placed by the one-way gate at the southeast corner of the Annex to encourage exiting of the property. The land manager coordinates with the neighboring ranchers throughout the year to actively remove remaining cattle.

Fencing. High river flows during the 2012 monsoon season knocked down or buried nearly 700 feet of cross-river fencing, most of which had to be replaced with new materials. Access across neighbor Tom Hendrikson's property was granted, which greatly facilitated repair to sections on the east side of the river. In the spring, the river gap fence between the Spirit Hollow property and the Reed property upstream was restored to prevent further trespass by ATVs. During the spring and summer, cattle from the grazing lands to the south were relentless in knocking down fences to reach available forage. In addition, the storm of June 15, 2013 knocked down both north and south river gap fences, however these were quickly repaired. July and August monsoon rains silted in some of the fence lines along the southern USBR Annex. As of October these fences are being raised and repaired.

Baseline Inventory. Baseline inventory has been updated to include acreage acquired by USBR and an additional 10 acres of upland acquired from the Skeens.

2014 Actions:

Wildfire Abatement. SRP will work with USBR on updating the fire management plan for this Preserve. The USBR has completed federal wildfire response agreements for all their lands, including the Annex parcel.

Monitoring. SRP is proposing to install additional piezometers at this location to monitor groundwater levels. Depth-to-water at the existing piezometer will be measured on a monthly basis and presence or absence of surface flows and standing water in the river channel will be noted.

Verde River

General Watershed Activities

SRP has been actively participating in the Verde Watershed Restoration Coalition, a citizen's group engaged in the implementation of a Comprehensive Invasive Plant Management Plan for the Verde River. SRP sits on the Steering Committee, the Planning & Implementation Subcommittee, and co-chairs the Research & Monitoring Subcommittee. SRP's participation with the group will continue in 2014.

SRP has been involved in initial discussions with the Town of Camp Verde regarding a pedestrian trail along the north bank of the Verde River from the Interstate 17 (I-17) Bridge downstream to Black Bridge. Town engineers are assessing access points on property owned by the Town of Camp Verde that lies upstream and adjacent to SRP's Camp Verde Riparian Preserve.

During these same meetings, SRP had the opportunity to meet with the new Town Marshall, Nancy Gardner, and initiate a discussion regarding trespass activities along the northwest corner of the Preserve property adjacent to the I-17 Bridge.

e. Camp Verde Riparian Preserve, Verde River, Yavapai County

Habitat Conditions: The condition of riparian habitat has remained unchanged on this property. Only moderate flood flows were experienced over the past year, with none large enough to cause any changes in channel morphology. Slow water and pools persist along the channel, especially at the downstream end of the property, resulting in pooling and marshy conditions. These are the areas where flycatchers have been observed.

New stands of willows are becoming established on the downstream portion of the property adjacent to the flycatcher territories that were identified in 2012 and 2013.

2013 Actions:

Bird Surveys. No protocol based surveys were conducted at Camp Verde in 2013. However, both flycatchers and yellow-billed cuckoos were incidentally detected during site visits to the Preserve. On May 28, 2013, three flycatchers (1 pair and 1 lone male) were documented along the river in a young stand of willows at the downstream end of the property. During a second visit on June 25, 2013, a new pair and a suspected lone male were documented in the same general area as the other flycatchers; a cuckoo was heard later in the morning. On a third visit, July 31, 2013, a single lone male was heard singing but no cuckoos were detected.

Trespass/Vandalism. The area near the I-17 Bridge continues to attract unwanted activity. During meetings with the Town of Camp Verde's Economic Development Director (Steve Ayers) and engineers, both short-term and long-term solutions to this problem were discussed. In addition, the new Town Marshal, Nancy Gardner has been notified of the issues and she is looking into the area and will work with us in the future to determine possible actions.

Invasive Weed Control/ Wildfire Abatement. Areas adjacent to I-17 were mowed several times to reduce fire potential. On the north terrace (left bank), glyphosate (Roundup) was used to control Kochia (*Bassia* spp.) and to keep a wide trail open through these dense weeds.

Coordination with Neighbors and Community. SRP remains active in supporting river conservation, research and educational efforts in the Verde Valley. Some of the activities we participated in this past year include the following:

- SRP participated in the Verde Valley Birding and Nature Festival (VVBNF). SRP led a birding field trip to Arizona State Park's Rockin' River Ranch.
- SRP was a corporate sponsor of the Verde River Runoff
- SRP was a sponsor for and had an educational booth at Verde River Days.
- SRP's property manager, Dick Hauser, maintains regular contact with neighbors and community members. He is able to resolve most issues at this level.

2014 Actions:

Trespass/Vandalism. We will continue to patrol the property and work with the community to minimize instances of malicious trespass and vandalism. We will set-up a meeting with the Town Marshall and will continue to work with the Town of Camp Verde to address vehicle access issues under the I-17 Bridge on to SRP property.

Invasive Weed Control/Wildfire Abatement: Mowing adjacent to I-17 will be continued, as necessary, and the property will be patrolled regularly to identify and minimize fire hazards. We will continue to use a combination of mowing and herbicide application on the north (left) terrace to minimize weed growth.

Future Pedestrian Trail. SRP will continue to work with the Town of Camp Verde on their planning and implementation for a potential pedestrian path along the north bank of the Verde River from the I-17 Bridge downstream to Black Bridge.

Coordination with Neighbors and Community: SRP will continue to coordinate with local community leaders and citizens' groups, Arizona State Parks, AGFD, Prescott National Forest, TNC, and neighbors to ensure that the ecological goals for the property are met. We plan to participate again in the Verde Valley Birding and Nature Festival, the Verde Canoe and Kayak Challenge, and at Verde River Days. SRP will continue our participation in the invasive weed

management planning efforts and other planning efforts that will assist in protecting the riparian ecosystem.

Upper Gila River

General Watershed Activities

SRP staff regularly attended the Gila Watershed Partnership (GWP) meetings in 2013. In addition, SRP staff has been invited to sit on the GWP Restoration Steering Committee and have been working closely with the GWP as they move forward on potential restoration projects. SRP has been coordinating with the GWP, Stillwater Sciences, and the Walton Family Foundation to work on restoration of the upper Gila River through the Safford Valley prior to invasion by tamarisk beetle (*Diorhabda* spp.), which is expected in the next few years. SRP staff has given tours of the Fort Thomas Preserve to GWP staff, Walton Family Foundation staff, and researchers from Stillwater Sciences to discuss restoration efforts on the property. SRP has put in place a data sharing agreement with the GWP and the Stillwater Science team for the sharing of survey data, aerial photographs, baseline inventories, and management plans. SRP intends to continue participation with this group and focus on Walton Family Foundation funded restoration efforts in the watershed. This will entail taking part in meetings and working on committees, being actively involved in restoration decisions that might affect our lands and flycatcher population in the area, possibly involving our lands in a restoration demo project, and keeping abreast of what is going on with the beetle and with other restoration projects in the Safford Valley.

f. Fort Thomas Preserve, Gila River, Graham County

Habitat Conditions. Vegetation on this Preserve is comprised of a patchwork of dense tamarisk stands and mixed native and exotic riparian vegetation (Fremont cottonwood, Goodding's willow, coyote willow [*Salix exigua*], tamarisk, seep willow). Several large stands of Fremont cottonwood-Goodding's willow gallery forest occur on this Preserve. Large patches of coyote willow occur along edges between dense vegetation and open riparian strand. The river flows continuously in this reach except for short periods during the growing season when water is diverted to agricultural fields. When that occurs, channel pools still contain water but riffles are dry.

Following the wildfire that burned unoccupied habitat at the Fort Thomas Preserve in 2011, SRP and the TNC began an experiment controlling re-sprouting tamarisk and native plantings. The experiment established four test plots utilizing prescriptive treatments including tamarisk cutting, herbicide treatment, and native woody plant re-establishment.

2013 Actions:

Bird Surveys. No protocol based surveys were conducted at Fort Thomas in 2013. However, both flycatchers and yellow-billed cuckoos were incidentally detected (no play-back) during a site visit on June 13, 2013. The Preserve was visited to document flycatcher territories and cuckoo detections adjacent to the most recent fire (see *Clay Fire* below). While walking to the river, 2 cuckoos were heard vocalizing in a dense stand of tamarisk that was not burned in the 2013 or 2011 fire. These 2 cuckoos were approximately 350 meters south of the 2013 burn boundary. Flycatchers were active in the area just south of the burn with a lone male singing adjacent (within 30 meters) to burned tamarisk stumps. Five territories (9 individuals) were documented along the river's edge in the area occupied in 2012. Two additional territories were suspected in the same general area. A final flycatcher territory was located downstream, on the

north side of the river, where a male was singing periodically across the river from burned tamarisk.

Fort Thomas Post-Fire Restoration Report. SRP initiated a review of the post-fire treatments that have occurred to date at the Fort Thomas Preserve following the February 2011, Rivers 3 and 4 fires and the March 2011 Hancock II fire. This report documents the tamarisk treatment activities and native plantings at the Fort Thomas Preserve from February 2011 to present. Included in the report are detailed descriptions of the tamarisk treatment actions and the subsequent results, as well as the location and species lists for all native plant plantings and the success of those plantings. Also included is a lessons learned section detailing what has worked and what has not worked in regards to these post fire activities, as well as recommendations for future restoration activities.

Tamarisk Treatment Test Plot Monitoring. In the winter of 2012, final applications of herbicide were applied to the test plots. All plots were monitored for re-sprout through 2013. Of the three treatments used (cut-stump, cut-stub, and basal bark), the cut-stub method seems to be the most effective. Despite several retreatments, the cut-stump individuals continue to re-sprout vigorously. The basal bark individuals have all either re-leafed from older growth or re-sprouted from the base, or both. While the cut-stub individuals show some re-sprout, on the whole the treatment appears to have killed the most individual plants.

*Native Planting Test Plot Monitoring. S*eeded areas are seeing mixed results. Some areas have experienced little if any success from the seed mix, while other areas (planted on the same schedule) are becoming crowded with salt bush (*Atriplex* spp.). Salt bush species have shown the greatest success of all seed mix species.

Clay Fire. On Friday March 29, 2013, a human caused fire started north of the Fort Thomas Preserve properties but came south burning across much of SRPCE4 (the northernmost conservation easement property associated with the Horseshoe-Bartlett HCP) and into the northern third of SRPCE1 (Roosevelt HCP conservation easement). This fire eventually burned approximately 450 acres of mostly tamarisk monoculture but also including some stands of saltbush, cottonwood, and Goodding's and coyote willow (Figure 20). Fort Thomas Fire Department and Bureau of Land Management responded within an hour of ignition and worked through the weekend at attaining full suppression.

Substantial stands of native vegetation were left unburned, and some patches of coyote willow that were singed by nearby fire were seen to be re-sprouting within 2 weeks. Additionally, opportunistic species such as jimsonweed (*Datura* sp.), burrobrush (*Hymenoclea* sp.), and seep willow were also beginning to re-sprout after only 2 weeks.

In early June, 2 bags of seed mix (80 lbs. total), leftover from the 2011 fire restoration, were applied to an area of approximately 4 acres along the southwestern edge of the 2013 Clay Fire. One bag was spread using a hand seeder, the other using the ATV-pulled unit. The whole area seeded was raked using a 6 ft. chain-harrows, pulled by an ATV.

The area that burned included habitat that had been occupied by both flycatchers and cuckoos in 2012. Habitat for approximately 6 flycatcher territories and 2 cuckoo detection locations were lost in the fire. The area just to the south of the fire (Figure 21) was visited mid-June to document flycatcher activity adjacent to the burn (see *Bird Surveys* above). Burned tamarisk re-growth at the time of the visit was approximately 4 feet (3 ½ months post fire).

Trespass Incidents. While conducting a site visit to document flycatchers at the north end of the Preserve, adjacent to the burn area, a fishing-hole was discovered along the River's edge just upstream of the burn. A substantial amount of work had been done clearing a trail through the tamarisk, including whole trees cut down and saw markings on uncut trunks. The camp has

been scattered, trash hauled out, and “No Trespass” signs placed at the camp and at the beginning of the trail. This site will be monitored for future trespass.

Figure 20. Clay Fire looking downstream toward the northwest across SRPCE1 and SRPCE4. Photograph taken May 1, 2013.

Figure 21, Clay Fire looking at the southeastern extent of the burn area adjacent to the upstream occupied habitat. Photograph taken May 1, 2013.

2014 Actions:

SRP plans to conduct the following management actions in 2014 on the Fort Thomas Preserve:

- Finalize the fire management plan after USBR review.
- Continue to monitor both the tamarisk and native planting test plots, documenting the results of both activities.
- Finalize the Fort Thomas Post-Fire Restoration report.
- Continue to coordinate with BLM regarding fencing of the riparian area.
- Continue on-the-ground management activities.
- Continue to actively participate in the GWP and work closely with the Stillwater Sciences and Walton Family Foundation staff on potential restoration projects.

g. Created Wetlands, Arlington Wildlife Area

Habitat Conditions: This is the sixth year that AGFD has managed SRP's wetland at the Arlington Wildlife Management Area. The wetland cell has remained completely grown in with riparian emergent vegetation, primarily cattail (*Typha* sp.), with only a little giant bulrush (*Schoenoplectus californicus*) and sedges growing primarily along the east margin of the cell.

In March of 2012, a fire swept through the tamarisk bosque at Arlington and across the SRP cell (cell 4). The emergent vegetation regrew vigorously and by the end of April 2012 was again covering essentially the entire floor of the cell. By the spring of 2013, a thick stand of cattails covered the entire cell (Figure 22).

Figure 22. Arlington Wildlife Area Fire, looking north across the SRP cell. Photograph taken May 2, 2013.

2013 Actions:

Surveys. Marshbird surveys were conducted by SRP staff on April 10, May 3, and May 31, 2013. Two Yuma clapper rails were vocalizing unsolicited from the SRP cell on May 31. Survey results are included above in Section V. B. Monitoring Results.

Operations:

SRP has initiated a number of activities to improve water supply reliability and decrease the number of man hours required to operate the groundwater well pump motor. The existing diesel motor that operates the pump was overhauled and the fuel capacity increased. The metal cage around the motor that serves to secure the motor from theft or vandalism rendered it nearly impossible to service. This cage was modified by installing a hinged locking door to provide maintenance access. The motor has operated without a muffler since it was put into service. This made bird surveys at the site difficult at best if the motor was running. A muffler has since been added to decrease noise.

Until now, operation of the pump consisted of AGFD personnel filling the fuel tank and running the motor until the fuel was depleted. This resulted in highly fluctuating water levels in SRP's wetland cell. AGFD personnel needed to visit the site several times per week to refuel and restart the pump. SRP has now installed a new control panel on the motor that will start and stop the motor on a pre-programmed schedule – reducing the number of personnel visits and maintaining more consistent water levels. To develop the run schedule to be programmed into the new controls, SRP's Water Measurement Services staff conducted flow tests in SRP's wetland cell to evaluate both pumping rates and water retention in the wetland. These data will be used to develop a new operations manual for the pump that will be provided to AGFD.

As in previous reports a variety of maintenance activities occurred on the Wildlife Area in 2012-2013 with some relating directly to the SRP cell.

- Department staff routinely watered the levee roadways to maintain packed conditions, prevent erosion and hold down dust.
- Weed control was conducted with grading equipment, a brush mower and some hand labor from the temp services laborer. Encroaching tamarisk was cut and the stumps treated with herbicide to prevent re-sprouting.
- Continued work to repair or retard erosion around the water control structures was conducted. Erosive damage due to small mammal holes was also averted or repaired.
- SRP funded the repair of the access road between the SRP cell and the AGFD cell that was washed out during a flood event.

2014 Actions:

Develop a new operations plan that includes the new pump motor operations schedule that will take into account flow testing and retention rates. A contractor will also be hired to conduct routine motor maintenance throughout the year. Continued management and maintenance activities as needed to be completed by AGFD.

VI. MANAGEMENT AND COORDINATION

Obligation: SRP will establish a full-time staff position in its Environmental Services Department to manage and coordinate implementation of the Roosevelt HCP.

Actions: Completed.

VII. PERMANENT NON-WASTING FUND

Obligation: No later than 5 years after the ITP is issued, SRP will ensure that permanent funding is available to meet its continued obligations under the Roosevelt HCP.

Actions: Completed. Irrevocable grantor trust was funded in May 2008.

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APPENDIX A

AERIAL PHOTOGRAPHS
OF
MITIGATION PROPERTIES

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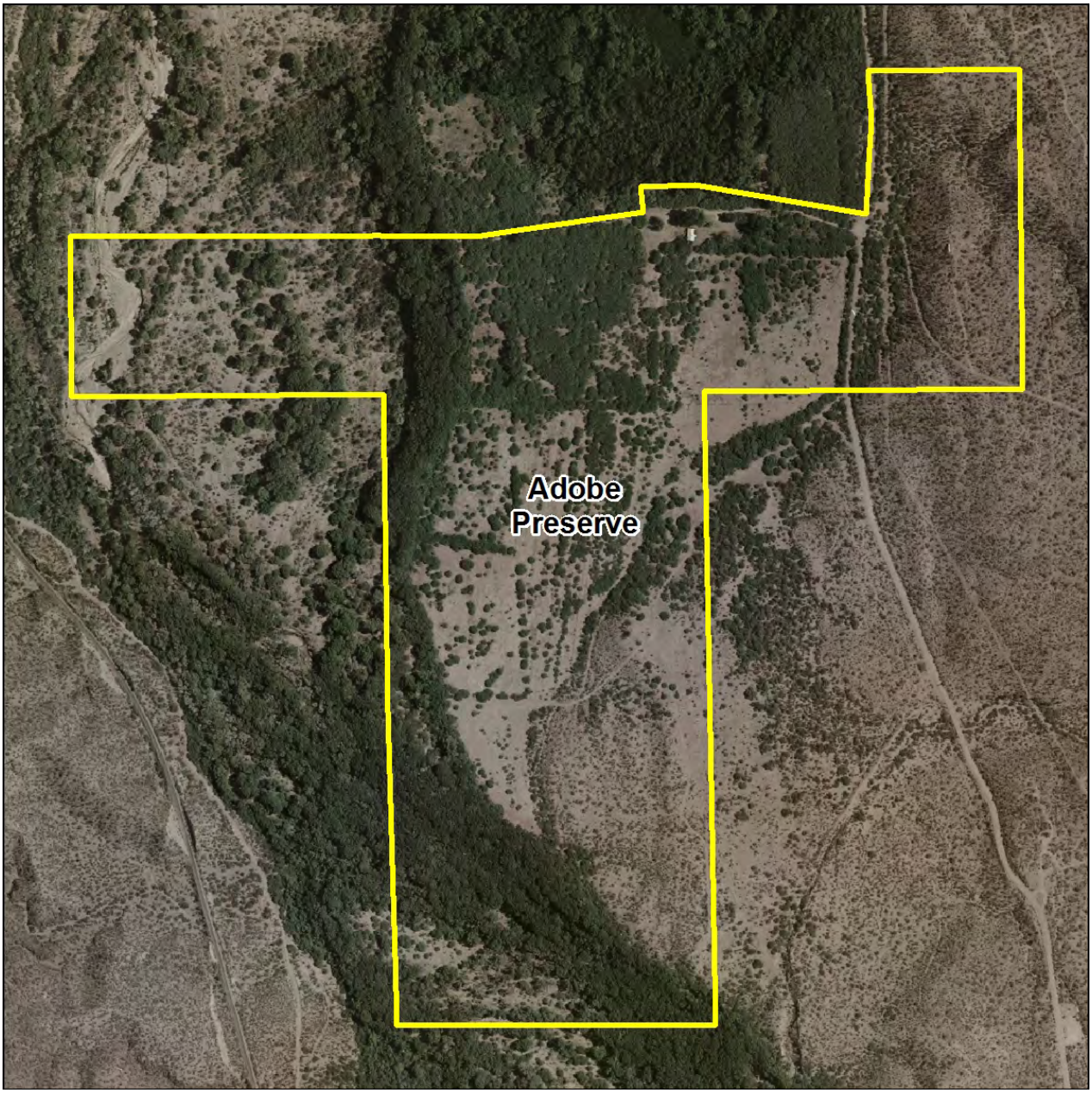
ADOBE PRESERVE, SAN PEDRO RIVER, PINAL COUNTY, AZ

153 ACRES

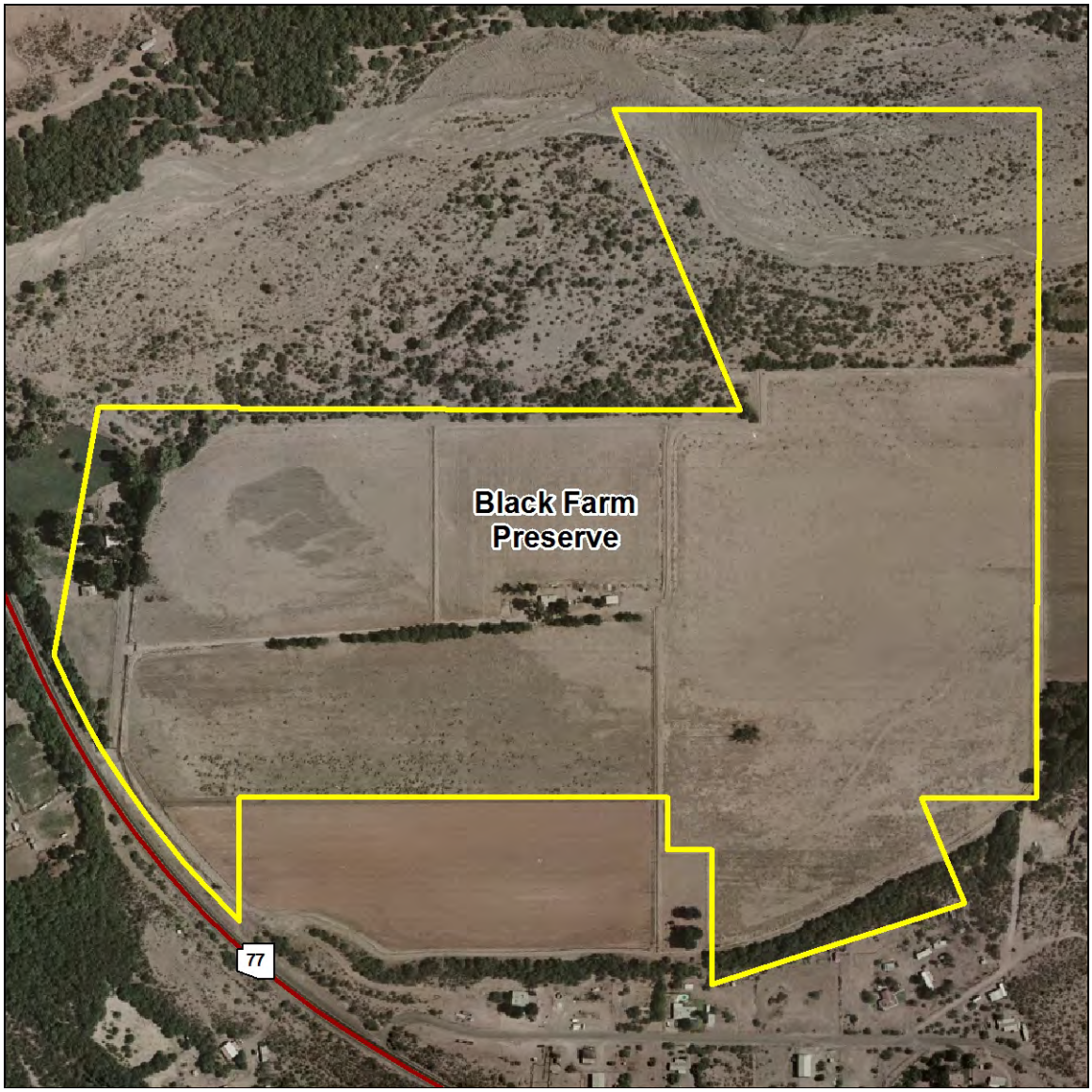


Aerial photo taken May 2013

Property boundaries overlaid on aerial photographs are approximate due to slight distortions on the aerial photography

BLACK FARM PRESERVE, ARAVAIPA CREEK, PINAL COUNTY, AZ

137 ACRES

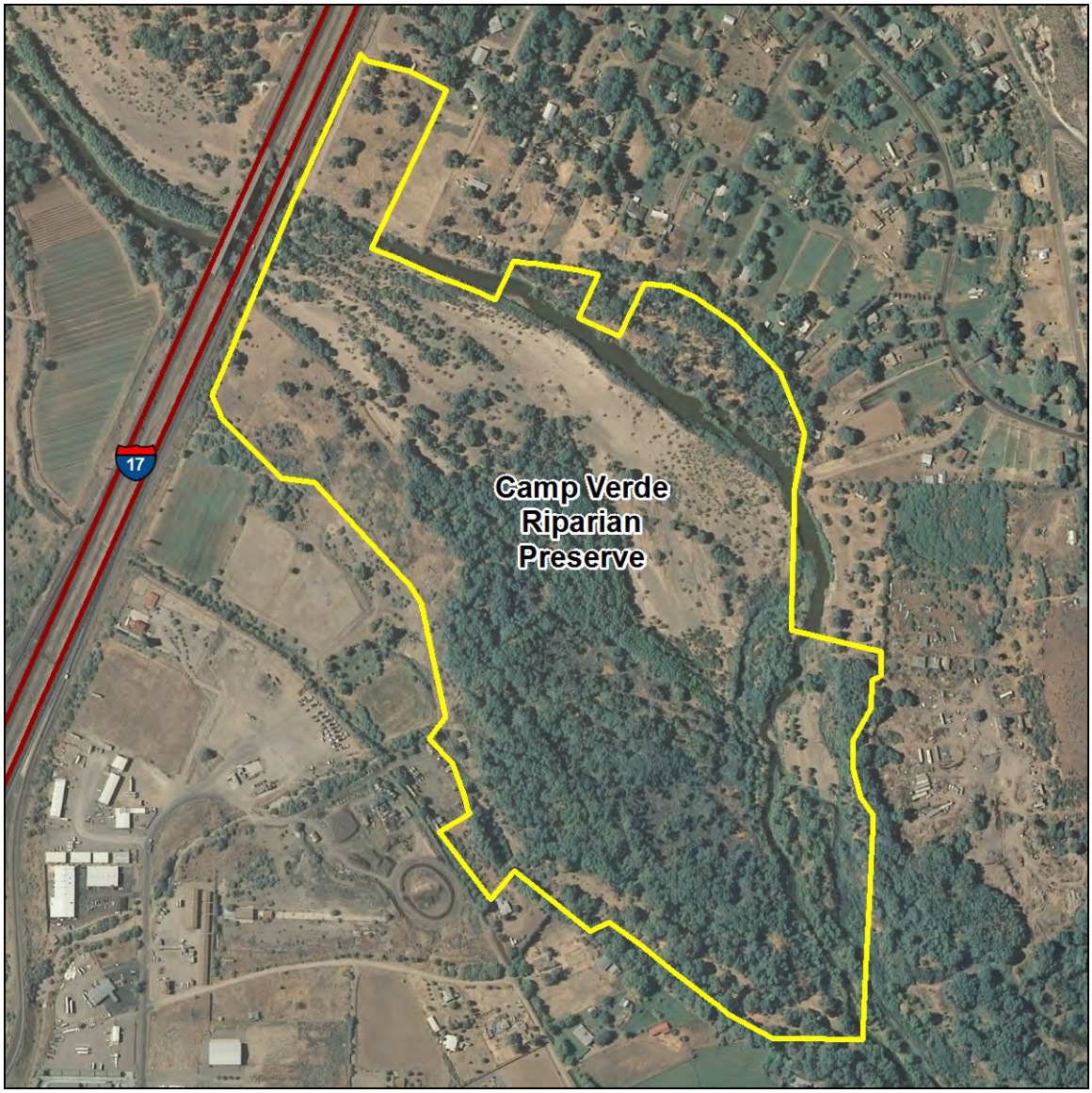


Aerial photo taken May 2013

Property boundaries overlaid on aerial photographs are approximate due to slight distortions on the aerial photography

CAMP VERDE RIPARIAN PRESERVE, VERDE RIVER, YAVAPAI COUNTY, AZ

124 ACRES

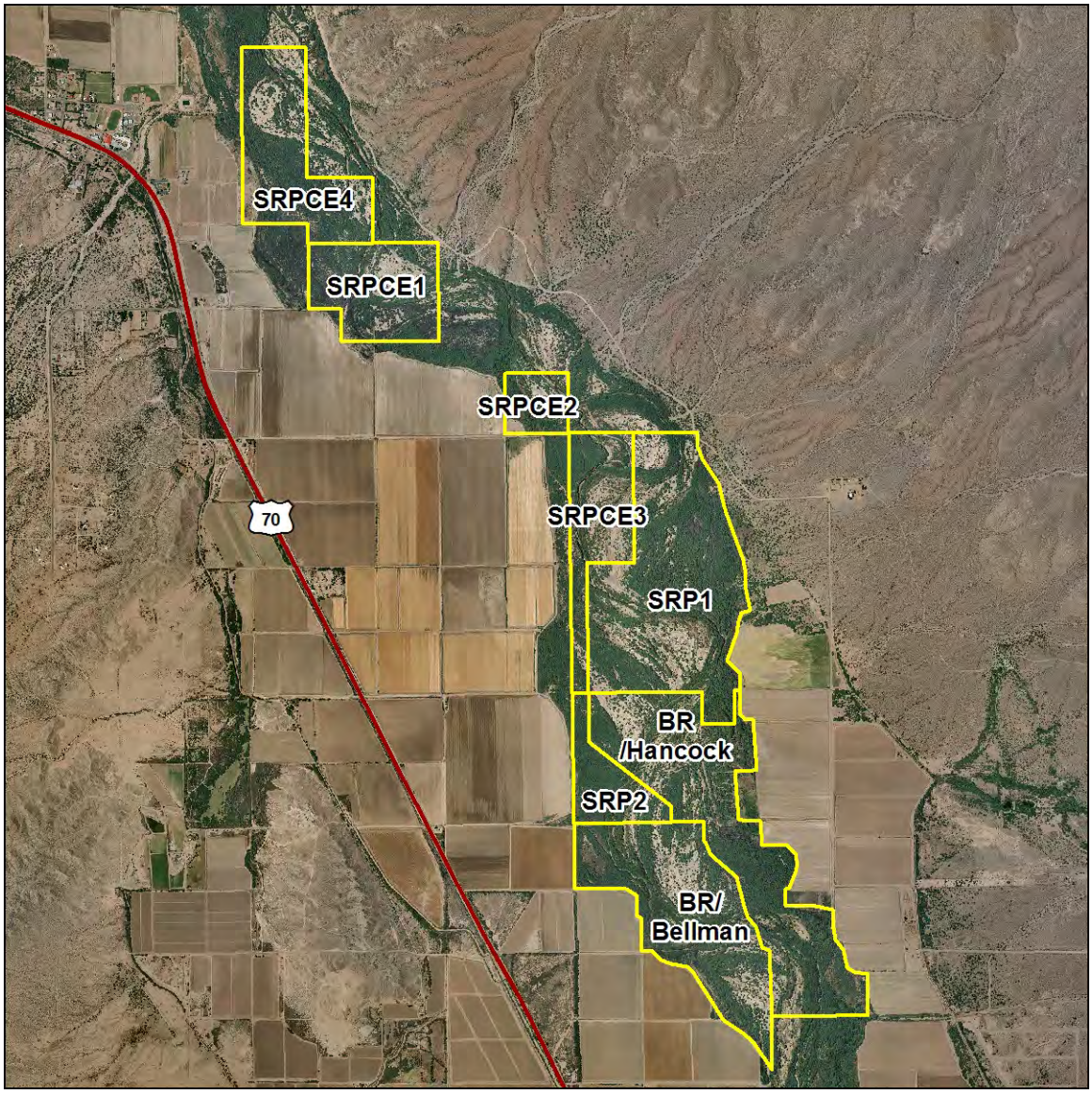


Aerial photo taken October 2009

Property boundaries overlaid on aerial photographs are approximate due to slight distortions on the aerial photography

FORT THOMAS PRESERVE
GILA RIVER, GRAHAM COUNTY, AZ

1,054 ACRES

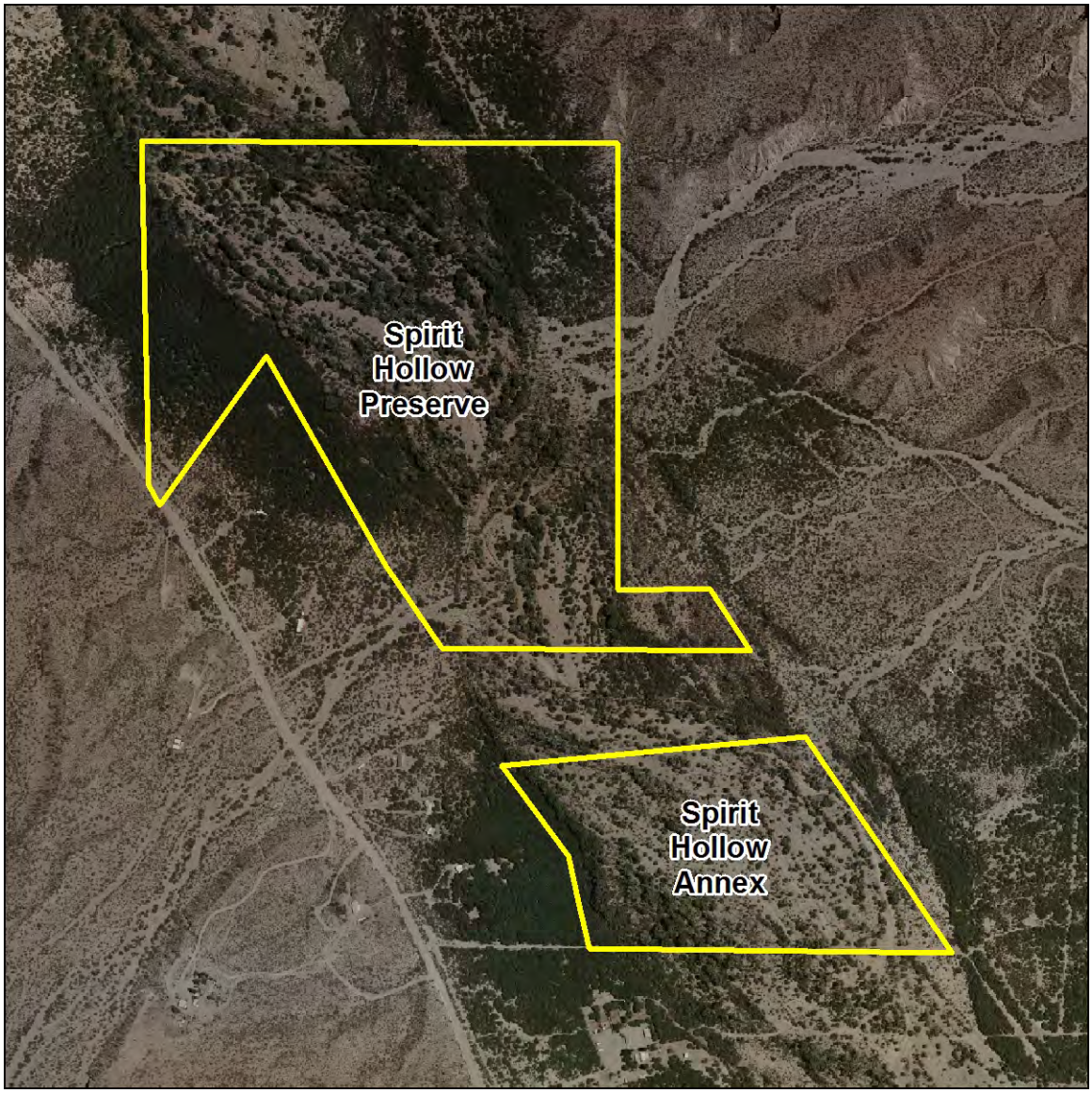


Aerial photo taken June 2011

Property boundaries overlaid on aerial photographs are approximate due to slight distortions on the aerial photography

SPIRIT HOLLOW PRESERVE and ANNEX, SAN PEDRO RIVER, PINAL COUNTY, AZ

154 ACRES

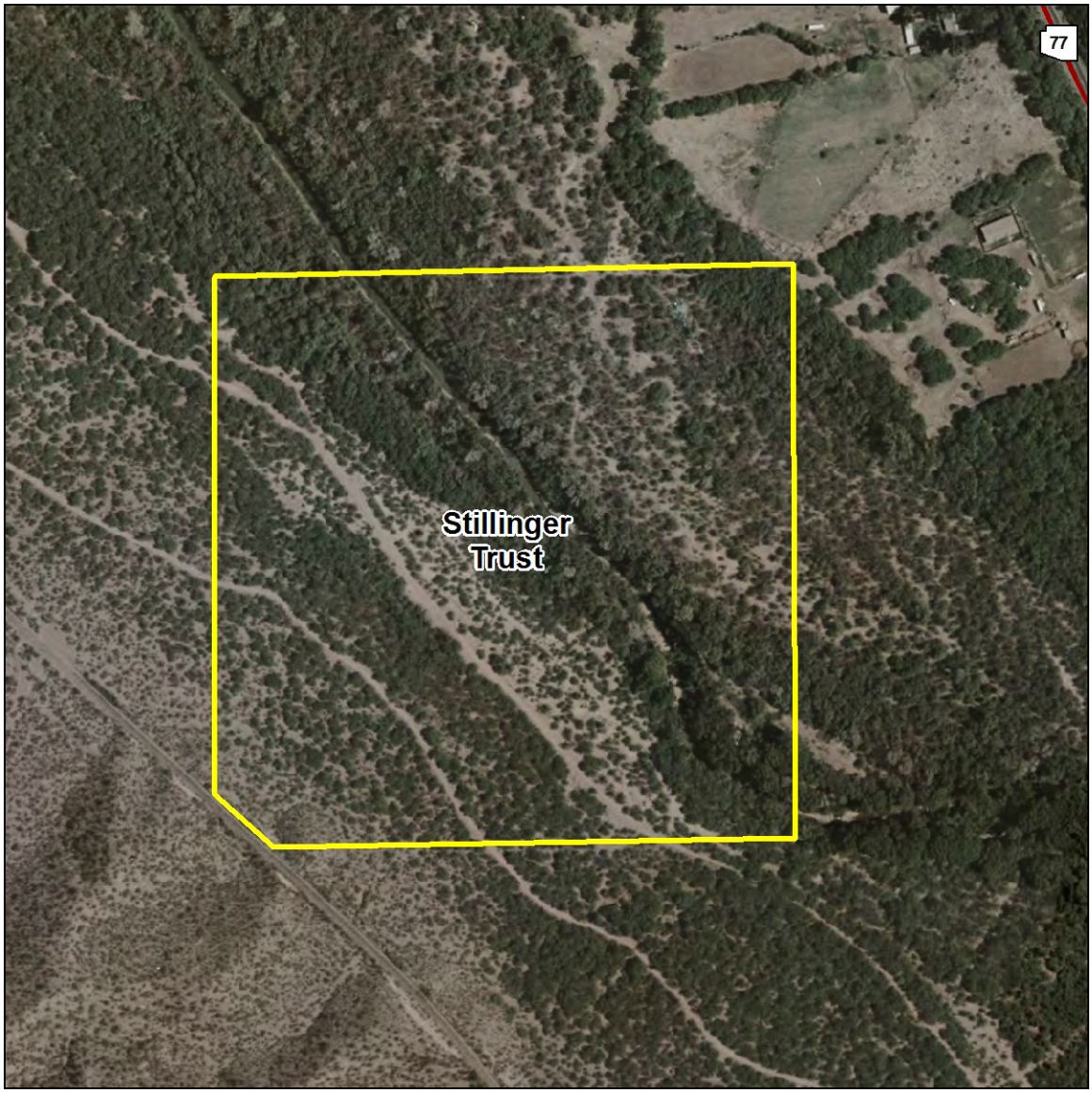


Aerial photo taken May 2013

Property boundaries overlaid on aerial photographs are approximate due to slight distortions on the aerial photography

STILLINGER PRESERVE, SAN PEDRO RIVER, PINAL COUNTY, AZ

40 ACRES



Aerial photo taken May 2013

Property boundaries overlaid on aerial photographs are approximate due to slight distortions on the aerial photography

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APPENDIX B

MANAGEMENT ACTIVITY IMPLEMENTATION MATRICES

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ADOBE PRESERVE–Management Activity Implementation Matrix

MANAGEMENT ACTIONS	STATUS	TARGET DATE	DEPARTMENT
Baseline Inventory and Management Plan:			
Baseline Inventory	Completed		SRP Env. Svc.
Management Plan	Completed		SRP Env. Svc.
Water Rights and Use:			
Submit water rights claim form to ADWR	Completed		SRP Water Rights
Complete the transfer of water rights on property, except for domestic use	In process	SRP is addressing objections to filing	SRP Water Rights
Install piezometers	Completed	January 2011	SRP
Monitor piezometers and stream flow	Ongoing	Monthly	SRP Contractor
Cowbird Management:			
Apply nest searching protocol concurrently with flycatcher surveys	On-going	On-going	SRP Env. Svc., Cooperators
Livestock grazing and recreational disturbance:			
Remove all trespass livestock	On-going	On-going	SRP Contractor Livestock owner(s)
Wildfire Abatement:			
Develop a fire management plan in coordination with fire management agencies	Completed	October 2004	SRP Env. Svc., Contractors
Patrol site regularly to identify and eliminate potential fire hazards; clearing, mowing, etc.	On-going	Conducted weekly, on average	SRP Contractor
Make initial contact & maintain coordination w/wildfire	Pending	April 2014	SRP Env. Svc.,

MANAGEMENT ACTIONS	STATUS	TARGET DATE	DEPARTMENT
response agencies, update local contact info			SRP Contractor
Fencing:			
Conduct regular fence patrol to check for breaches. Inspect fence line after every flood event.	On-going	Conducted weekly, on average	SRP Contractor
Maintain and repair existing fences and gates	On-going	As needed	SRP Contractor
On-Site Management:			
Hire a property maintenance technician	Completed		SRP Env. Svc.
Maintain and repair existing fences and roads	On-going	As needed	SRP Contractor
Conduct general maintenance	On-going	As needed	SRP Contractor
Invasive Plant Control:			
Survey the property to determine presence and extent of invasive elements	Completed	October 2008	SRP Env. Svc., Contractor
Develop plan to minimize or eliminate problem species	In process	See "Restoration of upland fields"	SRP Env. Svc., SRP Contractor
Conservation Easement:			
Locate an entity to hold the conservation easement	On hold	TBD	SRP Env. Svc., SRP Land
Community Support:			
Contact neighbors, maintain working relationships	On-going	On-going	SRP Env. Svc., SRP Contractor
Restoration of Upland Fields:			
Develop a plan to begin restoration of upland fields	In process	1st quarter of 2014	SRP Env. Svc.,

ADOBE PRESERVE (cont'd.)

MANAGEMENT ACTIONS	STATUS	TARGET DATE	DEPARTMENT
			SRP Contractor
Develop a shrub and grasses restoration plan for Adobe	In Process	1st quarter of 2014	SRP Env. Svc.
Facilities Management:			
Implement actions for domestic well	On hold	TBD	SRP Env. Svc., Contractor

BLACK FARM PRESERVE–Management Activity Implementation Matrix

MANAGEMENT ACTIONS	STATUS	TARGET DATE	DEPARTMENT
Baseline Inventory and Management Plan:			
Baseline Inventory	Completed		SRP Env. Svc.
Management Plan	Completed		SRP Env. Svc.
Water Rights and Use:			
Submit water rights claim form to ADWR	Completed		SRP Water Rights
Complete the transfer of water rights on property, except for domestic use	In process	Pending ADWR action	SRP Water Rights
Cease irrigation of fields	Completed	March 2007	SRP
Install piezometers	Completed	January 2011	SRP
Monitor piezometers and stream flow	Ongoing	Monthly	SRP Contractor
Wildfire Abatement:			
Develop a fire management plan in coordination with fire management agencies	Completed	October 2004	SRP Env. Svc., Contractor
Patrol site regularly to identify and eliminate potential fire hazards; clearing, mowing, etc.	On-going	Conducted weekly, on average	SRP Contractor
Make initial contact & maintain coordination w/ wildfire response agencies, update local contact info	Pending	April 2014	SRP Env. Svc., SRP Contractor
Familiarize SRP employees with protocols	On-going	As necessary	SRP Env. Svc.
On-Site Management:			
Hire a property maintenance technician	Completed		SRP Env. Svc.
Patrol property and fence lines	On-going	Weekly, on average	SRP Contractor
Conduct general maintenance	On-going	As necessary	SRP Contractor

MANAGEMENT ACTIONS	STATUS	TARGET DATE	DEPARTMENT
Invasive Plant Control:			
Conduct mechanical removal of weeds from agricultural fields seeded with native grasses; contact SRP to coordinate need for herbicide spraying	On-going	As necessary	SRP Env. Svc., SRP Groundwater, SRP Contractor
Community Support:			
Coordinate activities with adjacent landowners	On-going	On-going	SRP Env. Svc. SRP Contractor
Restoration of Upland Fields:			
Plant native grasses and forbs on 101 acres of agricultural fields	Completed	September 2005	Agric. Contractor SRP Contractor
Seed 5 acres at southeast corner of property	Completed	September 2010	SRP Contractor

SPIRIT HOLLOW PRESERVE–Management Activity Implementation Matrix

MANAGEMENT ACTIONS	STATUS	TARGET DATE	DEPARTMENT
Baseline Inventory and Management Plan:			
Baseline Inventory–add new properties	Completed	Spring 2013	SRP Env. Svc.
Management Plan–add new properties	In-process	Spring 2014	SRP Env. Svc.
Monitoring:			
Install piezometers	Completed	January 2011	SRP
Monitor piezometers	On-going	Monthly	SRP Contractor
Cowbird Management:			
Apply nest searching protocol concurrently with flycatcher surveys	On-going	On-going	SRP Env. Svc., Cooperators
Livestock grazing and recreational disturbance:			
Remove all trespass livestock	On-going	On-going	SRP Contractor Livestock owner(s)
Wildfire Abatement:			
Develop a fire management plan in coordination with fire management agencies	Completed	October 2004	SRP Env. Svc., Contractors
Patrol site regularly to identify and eliminate potential fire hazards; clearing, mowing, etc.	On-going	Conducted weekly, on average	SRP Contractor
Make initial contact & maintain coordination w/wildfire response agencies, update local contact info	Pending	April 2014	SRP Env. Svc., SRP Contractor
Update fire plan to include USBR lands and protocols	In-process	October 2014	SRP Env. Svc., USBR

MANAGEMENT ACTIONS	STATUS	TARGET DATE	DEPARTMENT
Fencing:			
Conduct regular fence patrol to check for breaches; Inspect fence line after every flood event.	On-going	Conducted weekly, on average	SRP Contractor
Maintain and repair existing fences and gates	On-going	As needed	SRP Contractor
On-Site Management:			
Hire a property maintenance technician	Completed		SRP Env. Svc.
Maintain and repair existing fences and roads	On-going	As needed	SRP Contractor
Conduct general maintenance	On-going	As needed	SRP Contractor
Invasive Plant Control:			
Survey the property to determine presence and extent of invasive elements	Completed	September 2008	SRP Env. Svc., Contractor
Conservation Easement:			
Complete conservation easement	Completed	October 2006	SRP Env. Svc.
Community Support:			
Contact neighbors, maintain working relationships	On-going	On-going	SRP Env. Svc., SRP Contractor

STILLINGER PRESERVE–Management Activity Implementation Matrix

MANAGEMENT ACTIONS	STATUS	TARGET DATE	DEPARTMENT
Baseline Inventory and Management Plan:			
Baseline Inventory	Completed	September 2005	SRP Env. Svc.
Management Plan	Completed	September 2005	SRP Env. Svc.
Monitoring:			
Install piezometers	Completed	January 2011	SRP
Monitor piezometers	On-going	Monthly	SRP Contractor
Cowbird Management:			
Apply nest searching protocol concurrently with flycatcher surveys	On-going	On-going	SRP Env. Svc., Cooperators
Livestock grazing and recreational disturbance:			
Remove trespass livestock	On-going	On-going	SRP Contractor Livestock owner(s)
Wildfire Abatement:			
Develop a fire management plan in coordination with fire management agencies	Completed	October 2004	SRP Env. Svc., Contractors
Patrol site regularly to identify and eliminate potential fire hazards; clearing, mowing, etc.	On-going	Conducted weekly, on average	SRP Contractor
Make initial contact and maintain close coordination with wildfire response agencies, update local contact info	Pending	April 2014	SRP Env. Svc., SRP Contractor

MANAGEMENT ACTIONS	STATUS	TARGET DATE	DEPARTMENT
Fencing:			
Conduct regular fence patrol to check for breaches; Inspect fence line after every flood event.	On-going	Conducted weekly, on average	SRP Contractor
Maintain and repair existing fences and gates	On-going	As needed	SRP Contractor
Construct fences along property boundary; repair fences on left bank.	Completed	May 2011	SRP Contractor
On-Site Management:			
Hire a property maintenance technician	Completed		SRP Env. Svc.
Maintain and repair existing fences and roads	On-going	As needed	SRP Contractor
Conduct general maintenance	On-going	As needed	SRP Contractor
Invasive Plant Control:			
Survey the property to determine presence and extent of invasive elements	Not necessary at this time		SRP Env. Svc., Contractor
Develop plan to minimize or eliminate problem species	Not necessary at this time		SRP Env. Svc., SRP Contractor
Conservation Easement:			
Locate an entity to hold the conservation easement	On hold	TBD	SRP Env. Svc., SRP Land
Community Support:			
Contact neighbors, maintain working relationships	On-going	On-going	SRP Env. Svc., SRP Contractor

CAMP VERDE RIPARIAN PRESERVE–Management Activity Implementation Matrix

MANAGEMENT ACTIONS	STATUS	TARGET DATE	DEPARTMENT
Baseline Inventory and Management Plan:			
Baseline Inventory	Completed	September 2005	SRP Env. Svc., Contractor
Management Plan	Completed	September 2005	SRP Env. Svc., Contractor
Cowbird Management:			
Apply nest searching protocol concurrently with flycatcher surveys	On-going	On-going	SRP Env. Svc., Cooperators
Livestock grazing and recreational disturbance:			
Minimize human, vehicular, and livestock trespass	On-going	On-going	SRP Contractor Livestock owner(s)
Wildfire Abatement:			
Develop a fire management plan in coordination with fire management agencies	Completed	December 2004	SRP Env. Svc., Contractors
Patrol site regularly to identify and eliminate potential fire hazards; clearing, mowing, etc.	On-going	Conducted weekly, on average	SRP Contractor
Make initial contact and maintain close coordination with wildfire response agencies, send plan	Pending	April 2014	SRP Env. Svc., SRP Contractor
Mow vegetation to create fire break along I-17 boundary	On-going	After each winter and monsoon rainy season, as necessary	SRP Contractor

MANAGEMENT ACTIONS	STATUS	TARGET DATE	DEPARTMENT
Boundary Issues / Fencing:			
Conduct regular fence patrol to check for breaches; Inspect fence line after every flood event.	On-going	Conducted weekly, on average	SRP Contractor
Install wildlife friendly barbed wire fencing along the southern boundary of property	Completed	December 2004	Contractor
Install signage at I-17 bridge and along fence lines	Completed	July 2005	SRP Env. Svc.
Install 'no hunting' signs	Completed	October 2011	SRP Env. Svc.
On-Site Management:			
Hire a property maintenance technician	Completed		SRP Env. Svc.
Maintain and repair existing fences and roads	On-going	As needed	SRP Env. Svc., SRP contractors
Conduct general maintenance	On-going	As needed	SRP Env. Svc., SRP Contractors
Invasive Plant Control:			
Map invasive woody plants of concern	In-process	Spring 2014	SRP Env. Svc., Contractor
Conservation Easement:			
Locate an entity to hold the conservation easement	On hold	TBD	SRP Env. Svc., SRP Land

MANAGEMENT ACTIONS	STATUS	TARGET DATE	DEPARTMENT
Community Support:			
Contact neighbors, maintain working relationships	On-going	On-going	SRP Env. Svc.
Verde River Planning w/ TNC, ASPB, FVG, USFS, and others	On-going	On-going	SRP Env. Svc.
Support Verde Watershed Restoration Coalition	On-going	On-going	SRP Env. Svc.

FORT THOMAS PRESERVE-Management Activity Implementation Matrix

MANAGEMENT ACTIONS	STATUS	TARGET DATE	DEPARTMENT
Baseline Inventory and Management Plan:			
Baseline Inventory	Completed	February 2009	SRP Env. Svc., Contractor
Management Plan	Completed	November 2008	SRP Env. Svc., Contractor
Cowbird Management:			
Test nest searching protocol	Completed	2006 and 2007 breeding season	SRP Env. Svc., Contractor
Apply nest searching protocol concurrently with flycatcher surveys	On-going	On-going	SRP Env. Svc., Cooperators
Livestock grazing and recreational disturbance:			
Install signage to deter human and vehicular trespass	Completed	September 2008	SRP Env. Svc.
Wildfire Abatement:			
Develop a fire management plan in coordination with fire management agencies and USBR	On-going	October 2014	SRP Env. Svc., USBR
Patrol site regularly to identify and eliminate potential fire hazards; clearing, mowing, etc.	On-going	Conducted weekly, on average	SRP Contractor
Make initial contact and maintain close coordination with wildfire response agencies	Pending	April 2014	SRP Env. Svc., SRP Contractor
Send copies of fire management plan to fire management agencies	Initiated	After completion of plan, maps have been sent	SRP Env. Svc.
Post-fire restoration plan development and implementation	Initiated	Spring 2014	SRP Env. Svc.

MANAGEMENT ACTIONS	STATUS	TARGET DATE	DEPARTMENT
Boundary Issues / Fencing:			
Conduct regular fence patrol to check for breaches; Inspect fence line after every flood event.	On-going	Conducted weekly, on average	SRP Contractor
Evaluate the property to determine fencing, signage and access needs	Completed	June 2007	SRP
Install fencing, signage on Hancock, Bellman boundary	Completed	February 2011	SRP
On-Site Management:			
Hire a property maintenance technician	Completed	March 2004	SRP Env. Svc.,
Maintain and repair existing fences and roads	On-going	As needed	SRP Contractor
Conduct general maintenance	On-going	As needed	SRP Env. Svc., SRP Contractor
Conservation Easement:			
Locate an entity to hold the conservation easement	On hold	TBD	SRP Env. Svc., SRP Land
Community Support:			
Contact neighbors, maintain working relationships	On-going	On-going	SRP Env. Svc.

ARLINGTON WILDLIFE AREA-Management Activity Implementation Matrix

MANAGEMENT ACTIONS	STATUS	TARGET DATE	DEPARTMENT
Operations:			
Operations Plan	Initiated	February 2014	SRP Env. Svc.
Diesel motor maintenance	On-going		SRP Contractor
Diesel motor upgrades	Completed	Fall 2013	SRP Contractor
Wildfire Abatement:			
Patrol site regularly to identify and eliminate potential fire hazards; clearing, mowing, etc.	On-going	Conducted weekly, on average	AGFD
On-Site Management:			
Hire a property maintenance technician	Completed	March 2007	AGFD
Maintain and repair existing roads	On-going	As needed	AGFD
Conduct general maintenance	On-going	As needed	AGFD

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APPENDIX C

SOUTHWESTERN WILLOW FLYCATCHER AND YELLOW-BILLED CUCKOO SURVEYS ALONG THE SAN PEDRO RIVER PROPERTIES, ARIZONA: 2013 SUMMARY REPORT

This report contains sensitive data, which is considered confidential by the U.S. Fish and Wildlife Service. Therefore, it has been removed from this version of the report. The full survey report was sent to the USFWS Ecological Field Services Office in Phoenix, AZ.

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APPENDIX D

PHOTO POINTS OF CONSERVATION PROPERTIES UPDATED 2013

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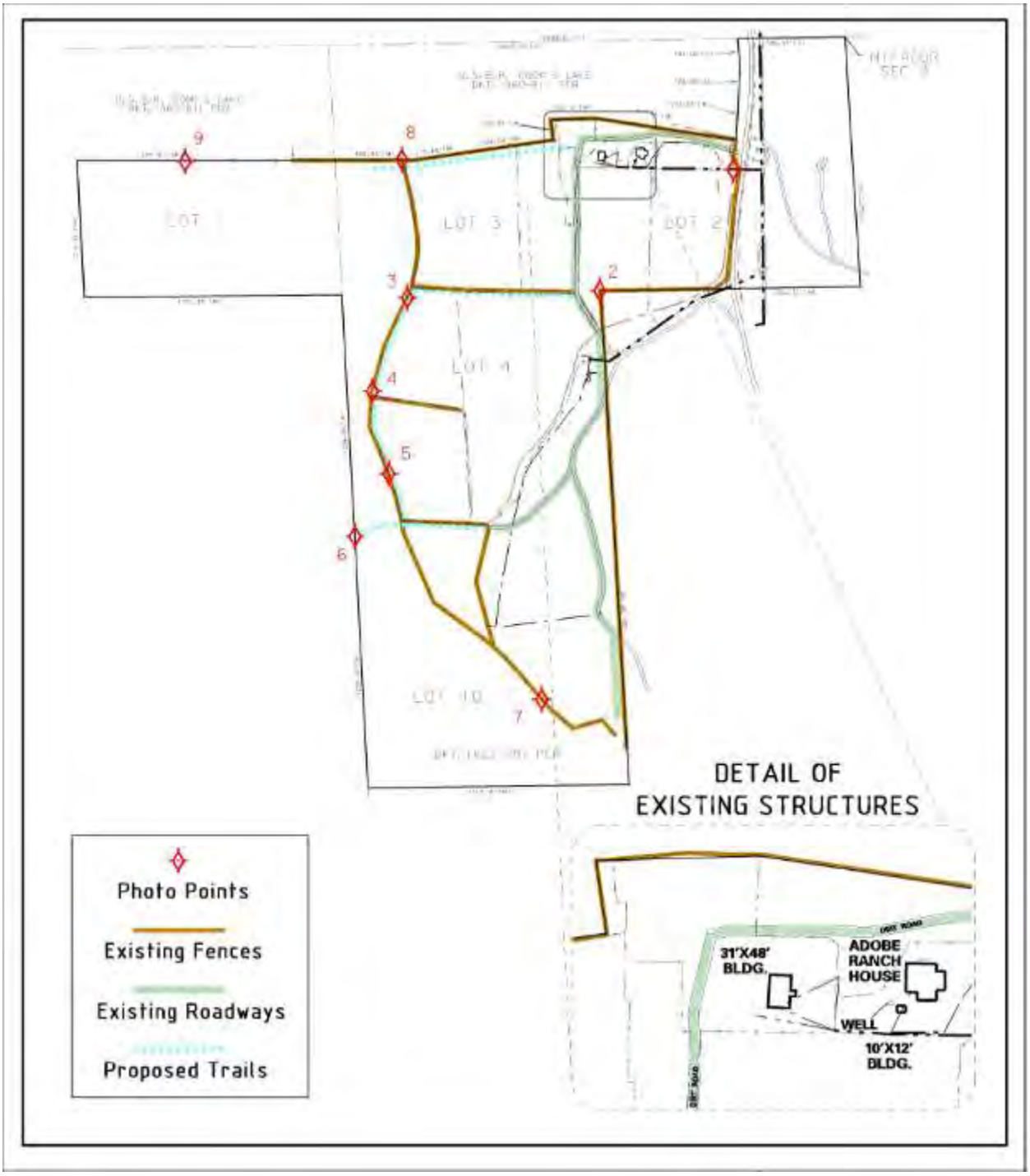
PHOTO POINT MONITORING RESULTS

ADOBE PRESERVE

Photo Point Locations
Adobe Preserve



Adobe Preserve Photo Point Record
Photo Point 1- View 1

October 9, 2003

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 1- View 2

October 9, 2003

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 2- View 1

October 9, 2003

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 2- View 2

October 9, 2003

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 3- View 1

October 9, 2003

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 3- View 2

October 9, 2003

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 3- View 3

October 9, 2003

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 4- View 1

October 9, 2003

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 4- View 2

October 9, 2003

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 5- View 1

October 9, 2003

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 6- View 1

October 9, 2003

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 6- View 2

October 9, 2003

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 7- View 1

October 9, 2003

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 8- View 1

October 20, 2004

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 8- View 2

October 20, 2004

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 8- View 3

October 6, 2005

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 9- View 1

October 20, 2004

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 9- View 2

October 20, 2004

October 7, 2013

Adobe Preserve Photo Point Record
Photo Point 9- View 3

October 20, 2004

October 7, 2013

PHOTO POINT MONITORING RESULTS

BLACK FARM PRESERVE

Photo Point Locations
Black Farm Preserve

Black Farm Preserve Photo Point Record
Photo Point 1- View 1

June 17, 2004

October 1, 2013

Black Farm Preserve Photo Point Record
Photo Point 1- View 2

June 17, 2004

October 1, 2013

Black Farm Preserve Photo Point Record
Photo Point 2- View 1

June 17, 2004

October 1, 2013

Black Farm Preserve Photo Point Record
Photo Point 2- View 2

June 17, 2004

October 1, 2013

Black Farm Preserve Photo Point Record
Photo Point 3- View 1

June 17, 2004

October 1, 2013

Black Farm Preserve Photo Point Record
Photo Point 3- View 2

June 17, 2004

October 1, 2013

Black Farm Preserve Photo Point Record
Photo Point 3- View 3

June 17, 2004

October 1, 2013

Black Farm Preserve Photo Point Record
Photo Point 4- View 1

June 17, 2004

October 1, 2013

Black Farm Preserve Photo Point Record
Photo Point 4- View 2

June 17, 2004

October 1, 2013

Black Farm Preserve Photo Point Record
Photo Point 5- View 1

June 17, 2004

October 1, 2013

Black Farm Preserve Photo Point Record
Photo Point 5- View 2

June 17, 2004

October 1, 2013

Black Farm Preserve Photo Point Record
Photo Point 5- View 3

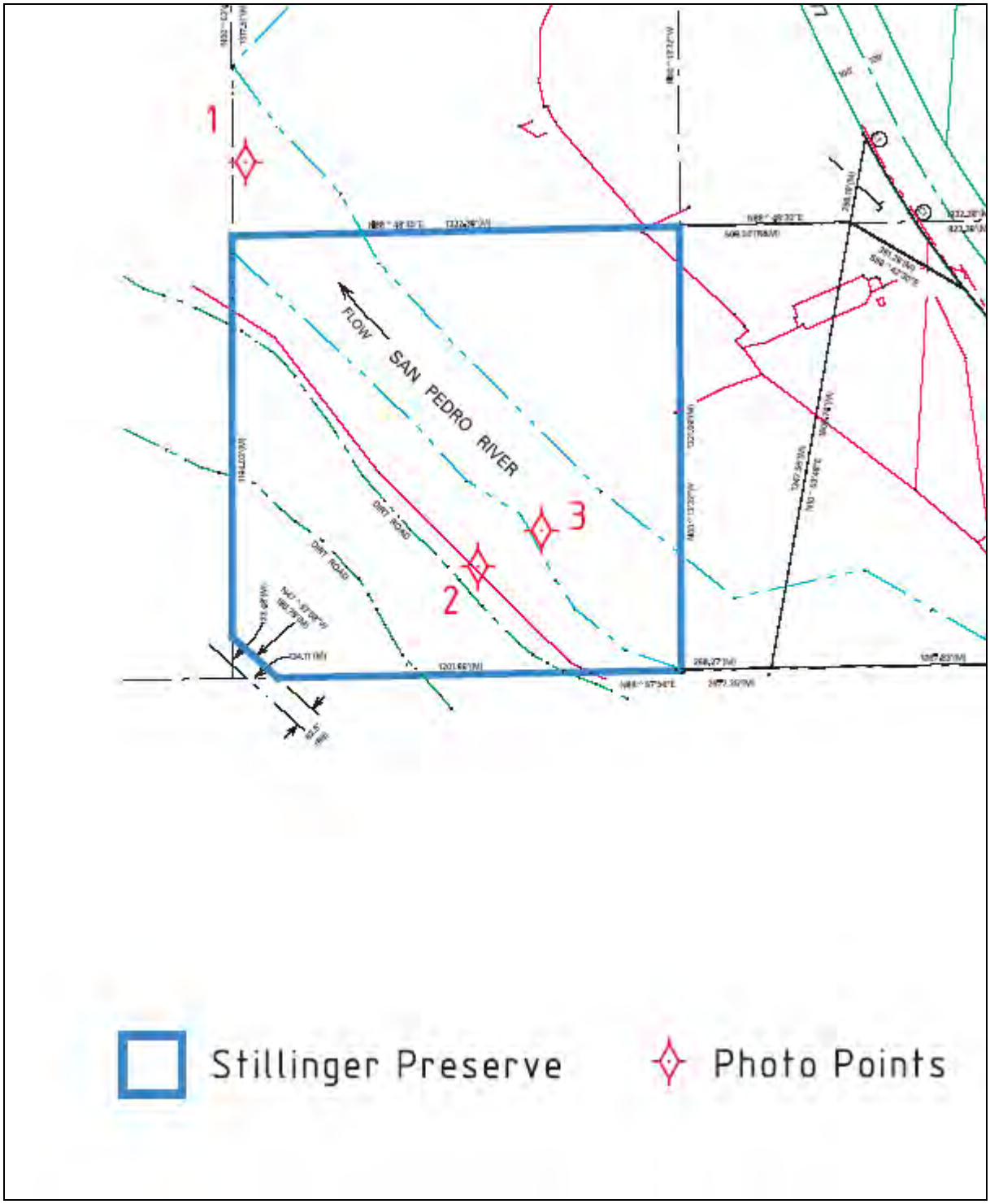
June 17, 2004

October 1, 2013

PHOTO POINT MONITORING RESULTS

STILLINGER PRESERVE

Photo Point Locations
Stillinger Preserve



Stillinger Property Photo Point Record
Photo Point 1- View 1

June 21, 2005 *** Located off property; near edge of active channel***

October 4, 2013

Stillinger Property Photo Point Record
Photo Point 1- View 2

June 21, 2005

October 4, 2013

Stillinger Property Photo Point Record
Photo Point 1- View 3

June 21, 2005

October 4, 2013

Stillinger Property Photo Point Record

Photo Point Established in 2006

Photo Point 1B-1

October 19, 2006 *** Located on property corner ***

October 1, 2009 NO PHOTO TAKEN IN 2013

Stillinger Property Photo Point Record

Photo Point Established in 2006

Photo Point 1B-2

October 18, 2006

October 1, 2009 NO PHOTO TAKEN IN 2013

Stillinger Property Photo Point Record

Photo Point Established in 2006

Photo Point 1B-3

October 19, 2006

October 1, 2009 NO PHOTO TAKEN IN 2013

Stillinger Property Photo Point Record
Photo Point 2- View 1

June 21, 2005

October 4, 2013

Stillinger Property Photo Point Record
Photo Point 2- View 2

June 21, 2005

October 4, 2013

Stillinger Property Photo Point Record
Photo Point 3- View 1

June 21, 2005

October 4, 2013

Stillinger Property Photo Point Record
Photo Point 3- View 2

June 21, 2005

October 4, 2013

Stillinger Property Photo Point Record
Photo Point 3- View 3

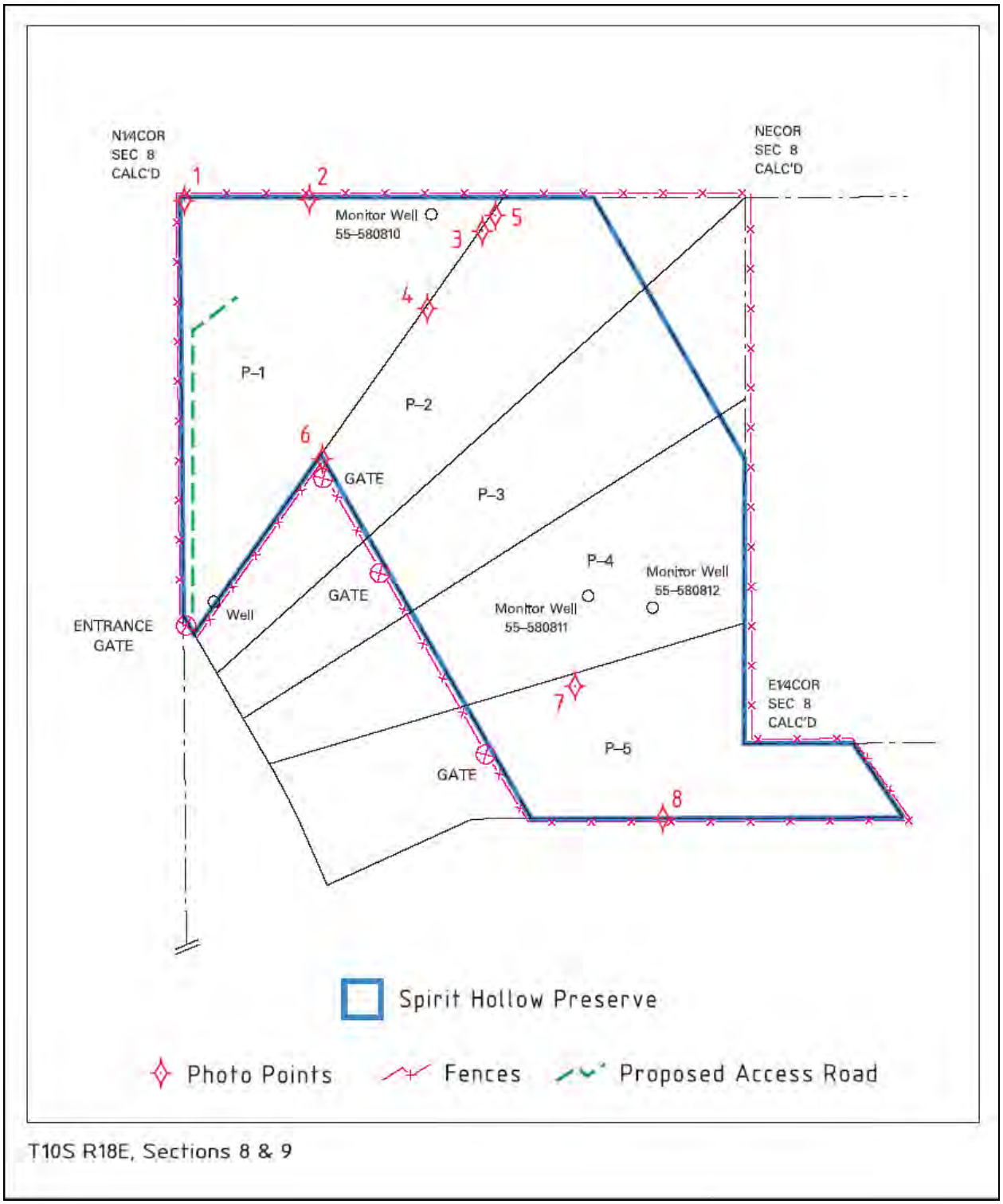
June 21, 2005

October 4, 2013

PHOTO POINT MONITORING RESULTS

SPIRIT HOLLOW PRESERVE

Photo Point Locations
Spirit Hollow Preserve



Spirit Hollow Preserve Photo Point Record
Photo Point 1- View 1

September 21, 20

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 1- View 2

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 2- View 1

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 2- View 2

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 2- View 3

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 2- View 4

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 2- View 5

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 3- View 1

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 3- View 2

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 3- View 3

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 3- View 4

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 3- View 5

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 3- View 6

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 4- View 1

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 4- View 2

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 4- View 3

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 4- View 4

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 5- View 1

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 5- View 2

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 5- View 3

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 5- View 4

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 6- View 1

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 6- View 2

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 6- View 3

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 7- View 1

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 7- View 2

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 8- View 1

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 8- View 2

September 21, 2005

October 4, 2013

Spirit Hollow Preserve Photo Point Record
Photo Point 8- View 3

September 21, 2005

October 4, 2013