

Horseshoe and Bartlett Reservoirs Habitat Conservation Plan Annual Report 2014



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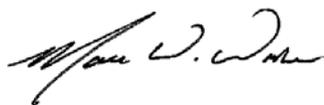
APPENDICES

Appendix A. Southwestern willow flycatcher and yellow-billed cuckoo surveys at the Fort Thomas Preserve, Arizona, 2014.¹

¹Locations of endangered species are sensitive data considered confidential by U.S. Fish and Wildlife Service.

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 23, 2015

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1. Introduction

On May 30, 2008, 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*), razorback sucker (*Xyrauchen texanus*), Colorado pikeminnow (*Ptychocheilus lucius*), Gila topminnow (*Peociliopsis occidentalis occidentalis*), spikedace (*Meda fulgida*), loach minnow (*Tiaroga cobitis*), roundtail chub (*Gila robusta*), longfin dace (*Agosia chrysogaster*), Sonora sucker (*Catostomus insignis*), desert sucker (*Catostomus clarki*), speckled dace (*Rhinichthys osculus*), lowland leopard frog (*Lithobates yavapaiensis*), northern Mexican gartersnake (*Thamnophis eques megalops*), and narrow-headed gartersnake (*Thamnophis rufipunctatus*). The activity covered by the ITP is the continued operation by SRP of Horseshoe and Bartlett dams and reservoirs. The ITP is conditioned upon SRP’s implementation of the Horseshoe and Bartlett Reservoirs Habitat Conservation Plan (“H-B HCP”) (Salt River Project 2008).

The H-B HCP provides measures to minimize and mitigate incidental take of the 16 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 2008). Flycatcher and cuckoo (covered bird) mitigation efforts include operation of Horseshoe Reservoir to support tall dense vegetation at the upper end of the reservoir and off-site acquisition and management of suitable nesting habitat. Minimization and mitigation efforts for covered native fish, frog, and gartersnake (aquatic species) includes operation of Horseshoe Reservoir to minimize non-native fish production, stocking of covered native fish, and supporting stream and water supply protection projects in the Verde River watershed.

2. Annual Reporting Requirements

Obligation: SRP is required to submit an annual report to the FWS, City of Phoenix, Arizona Game and Fish Department (AGFD), and U.S. Forest Service (USFS) describing all H-B 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 1 of the following year.

Actions: SRP submits this report to the FWS, City of Phoenix, AGFD, and USFS to fulfill the annual reporting requirement. The report covers all activities relating to the H-B HCP from November 1, 2013 through October 31, 2014, including a summary of reservoir operations, management activities, monitoring results, status reports, and planned future activities.

3. Horseshoe Lake Operation ITP Compliance

a. Horseshoe and Bartlett Operation Summary

Obligation: SRP is required in this annual report to provide a summary of reservoir operations.

Action: Below is a summary of reservoir operations from SRP hydrologists for the 2014 water year (October 2013–September 2014).

Summary: The continuing drought had the greatest influence on the reservoirs in water year 2014. El Niño and La Niña conditions can have the greatest influence on the yearly winter weather in Arizona. El Niño conditions (warmer than normal sea surface temperatures in the equatorial eastern Pacific Ocean) tend towards wetter weather patterns and La Niña conditions

(cooler than normal sea surface temperatures in the equatorial eastern Pacific Ocean) tend towards dryer weather patterns. Sea surface temperatures in the equatorial Pacific were in a neutral El Niño Southern Oscillation (ENSO) state during the water year which gives little indication to whether there will be wet or dry conditions across the watershed. Unfortunately, this past season was the fourth consecutive winter producing below median runoff. The runoff this winter was just 28% of median. The precipitation this monsoon season on the Salt and Verde watersheds was 158% of normal but runoff volumes from the monsoon season typically do not impact reservoir levels. Overall, the watershed received an average of 16.41 inches (90% of normal) during Water Year 2014.

Precipitation: Salt and Verde watershed precipitation for Water Year 2014 was quite variable with extremes occurring on both ends of the precipitation spectrum. The majority of precipitation over the SRP Watershed occurs during two wet seasons, winter and summer. Very dry conditions were observed in the winter of 2014 while wet conditions occurred in the summer.

Two key atmospheric and oceanic features were generally responsible for the extreme dryness this past winter. First, ocean surface temperatures in the equatorial eastern Pacific Ocean were slightly below normal. This positioned the winter 2014 in a borderline La Niña event (La Niña typically corresponds to dry winters over the southwest United States). Second, cold arctic air outbreaks occurred frequently during the winter months over the Plains and eastern United States, with anomalous warm, dry high pressure centered over the western United States. These two phenomena limited the potential for moist low-pressure systems to pass near enough to produce significant precipitation. In fact, the winter of 2014 was made up of only two events, the first during the middle of November and the second occurring early in March (Figure 1).

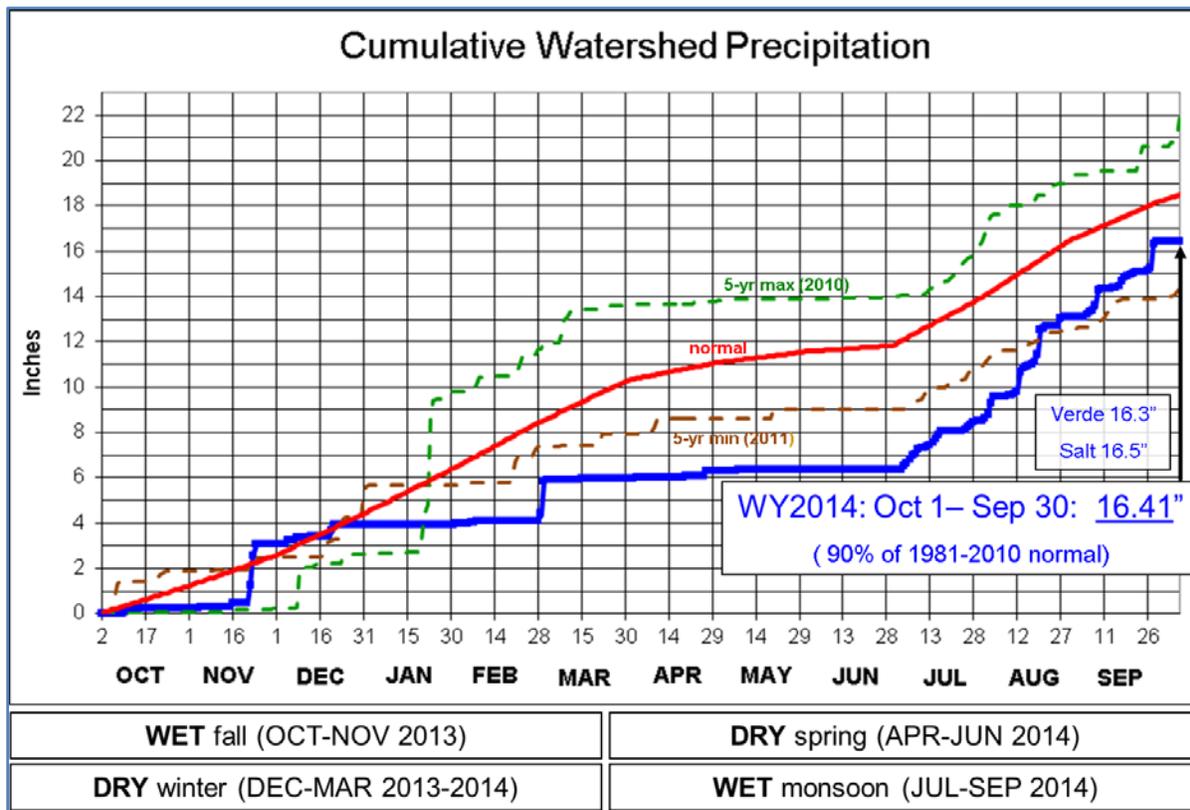


Figure 1: Water Year 2014 Precipitation Graph for the Salt-Verde Watershed.

In comparison, the summer monsoon was just the opposite of winter with respect to precipitation. Monsoon 2014 was well above average for precipitation (Table 1) and ranks as the 6th wettest monsoon for the 114 years of watershed precipitation records. A significant portion of the precipitation can be attributed to the latter half of the season where tropical systems off the Mexican coast fed anomalous amounts of moisture into Arizona. The result was numerous wet thunderstorms through much of September.

Table 1: Average Salt and Verde Seasonal Watershed Precipitation in inches and percent of the 1981-2010 normal.

	OCT-NOV 2013	DEC-MAR 2013-14	APR-JUN 2014	JUL-SEP 2014
Salt and Verde	3.10	2.87	0.40	10.04
<i>% of normal</i>	119%	38%	26%	158%
Normal, 1981-2010	2.61	7.64	1.52	6.36
Verde only	2.71	2.87	0.45	9.77
Salt only	3.49	2.87	0.34	10.30

Water Year 2014: Water year 2014 began favorably with precipitation levels at 119% of normal. Precipitation during December through March was only 38% of normal. These are typically key precipitation months for triggering a productive runoff season. A dry spring (26% of normal precipitation) added to the water year deficit that could not be offset by the wet summer (158% of normal rainfall). In all, water year 2014 precipitation of 16.41 inches was 90 percent of normal. This is 0.96” less than the 17.37 inches that fell during water year 2013.

Reservoir Status: Arizona depends on wet winters to reverse drought conditions but this winter continued the dry streak. The 2014 winter precipitation (December-March) ranked as the 12th driest. The 2014 winter produced 148,000 acre-feet from January through May which is 28% of median. This winter represents the fourth consecutive winter with below median runoff. The 2011, 2012, 2013, and 2014 winter seasons were the 24th, 17th, 40th, and 8th lowest winter runoff seasons respectively and rank as the second driest four water year period on record. Runoff from the monsoon (July–September) produced about 117,000 acre-feet. While the precipitation and runoff from this monsoon was above normal, it had little impact on SRP’s total storage.

In spite of the consecutive dry years, groundwater production will be decreased from 300,000 acre-feet for calendar year 2014 to 275,000 acre-feet in calendar year 2015. The reduction in pumping was possible due to conservative planning and decreasing demand. The reservoir system total storage capacity decreased 7% from 56% to 49% during water year 2014. Total runoff for water year 2014 was approximately 371,000 acre-feet (Figure 2) which is 320,000 acre-feet less than the 691,000 acre-feet received during water year 2013.

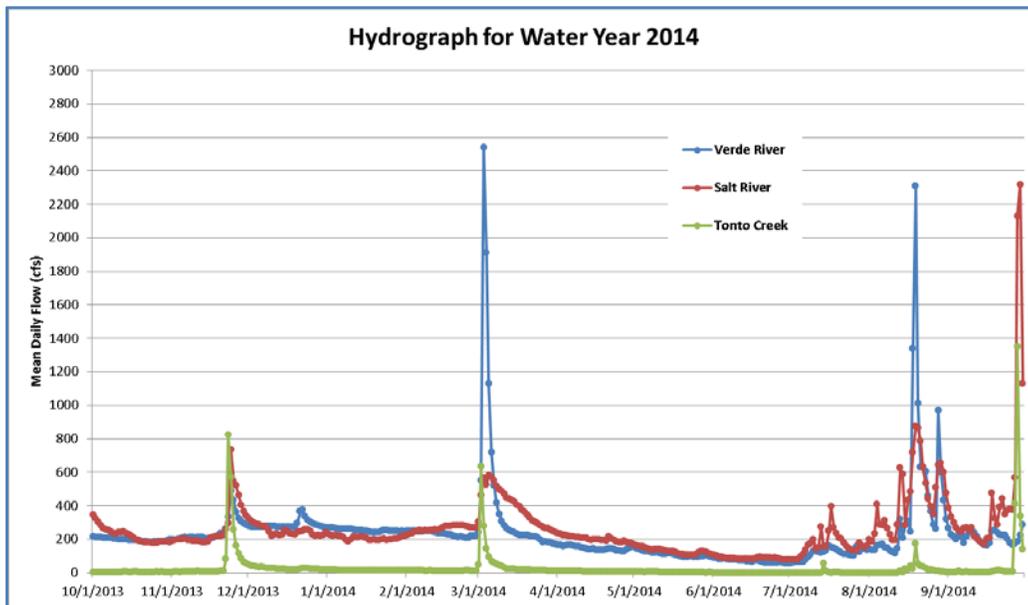


Figure 2: Verde River, Salt River, and Tonto Creek 2014 Water Year Hydrograph. Data from USGS and are preliminary.

Reservoir Operations: Continued dry weather and maintenance projects had the greatest influence on reservoir operations this water year.

Verde Operations: Typical operations call for the water order to be switched from the Verde system to the Salt system in May leaving Bartlett releases at a minimum. Water stored behind Horseshoe Dam is also typically moved as soon as possible downstream to Bartlett Reservoir to reduce the amount of loss from seepage and evaporation and to meet H-B HCP objectives. The water order may be switched sooner depending on the winter runoff.

The transition to the Verde system was completed on October 15, 2013, when the Stewart Mountain Dam release was returned to minimum (8 cubic feet per second). The winter runoff produced approximately 70,000 acre feet which is 40% of median. Verde River flows were stored in Horseshoe Reservoir due to maintenance work at Bartlett and Horseshoe dams. The maintenance at Bartlett Dam required reservoir levels below elevation 1,746 feet to accommodate the work being completed by divers. The work at Horseshoe Dam required that there was no flow through the drum valve. The dive portion of the work at Bartlett was completed in late April, 2014. Water levels in Horseshoe Reservoir were nearing elevation 2010 feet so releases were made on April 28, 2014, using the spillway to move water downstream. Horseshoe Lake elevation reached the spillway crest (elevation 2,000 feet) on May 10, 2014. Horseshoe Reservoir was emptied on June 21, 2014. Bartlett Dam releases were reduced to minimum on April 14, 2014. The water order switched back to the Verde system on October 9, 2014. The lake levels for Horseshoe and Bartlett reservoirs are shown below (Figure 3 and 4 respectively).

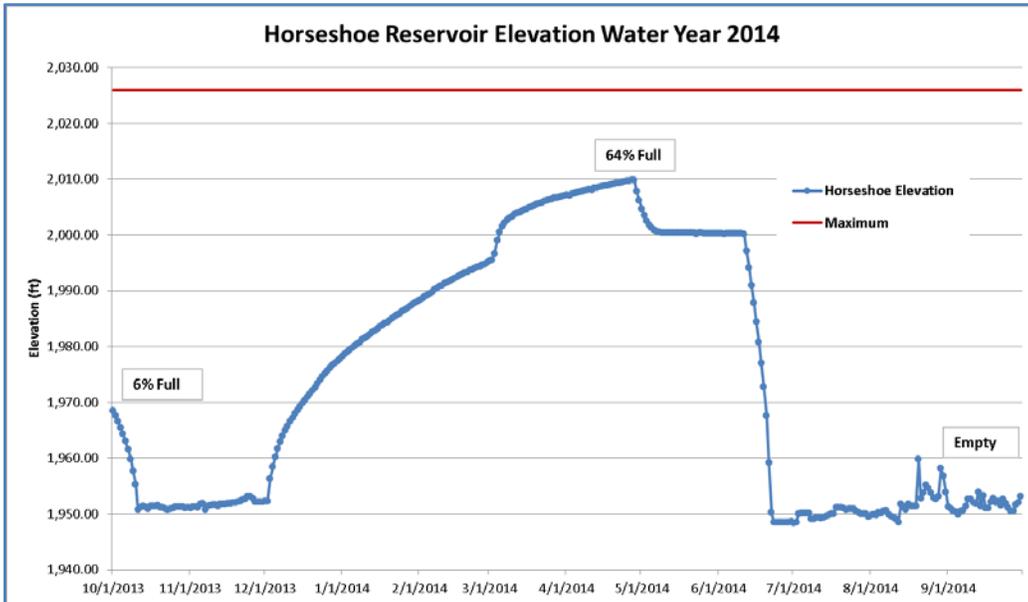


Figure 3: Horseshoe Reservoir Elevation for Water Year 2014.

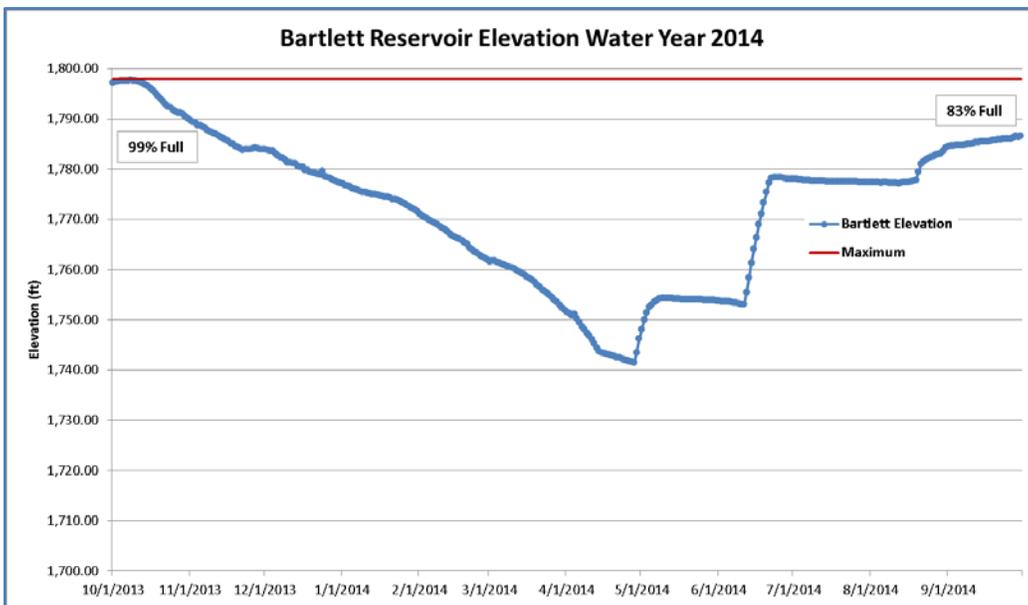


Figure 4: Bartlett Reservoir Elevation for Water Year 2014.

Roosevelt Operations: Roosevelt Lake began the season with just over 751,000 acre-feet of stored water which is 45% of capacity (Figure 5). The winter of 2014 produced only 78,000 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. On April 14, 2014, the water order transitioned back to the Salt system. Reservoir levels began to decline as water orders increased in the late spring and into the summer. Roosevelt storage on September 30, 2014 was 632,000 acre-feet which is 38% of capacity. The water order was switched back to the Verde system on October 9, 2014.

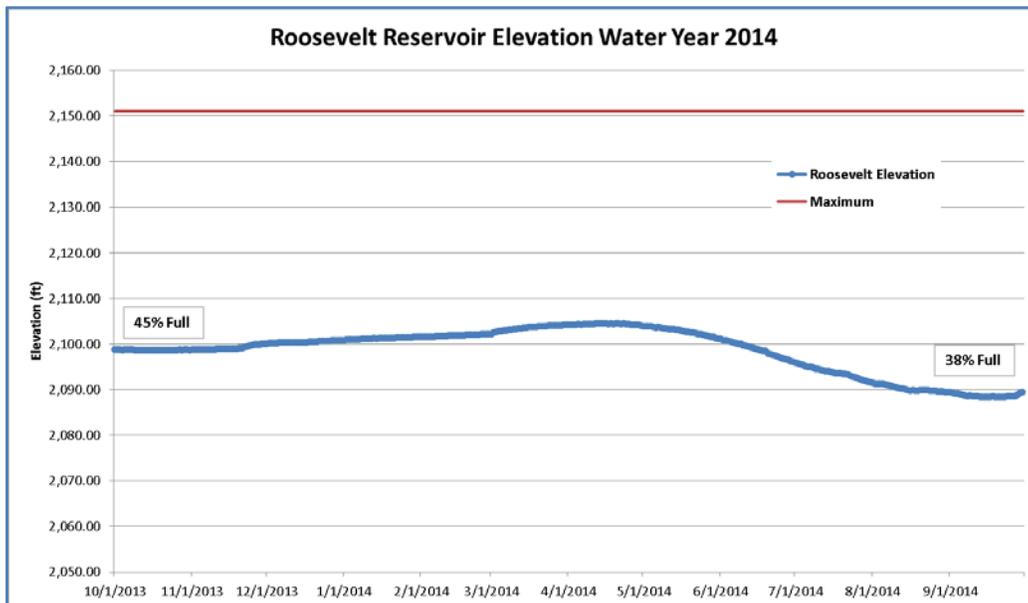


Figure 5: Roosevelt Reservoir Elevation for Water Year 2014.

b. Flycatcher and Cuckoo Operation Objective

Obligation: SRP will manage water levels at Horseshoe, conditional on other operation goals, to make riparian habitat available earlier in the nesting season and to maintain riparian vegetation at upper end of the reservoir. After two successive years of low water levels due to drought, Horseshoe will be filled ahead of Bartlett, if feasible, to provide water to tall dense vegetation at upper end of Horseshoe.

Action: Horseshoe storage reached a maximum of 64% full (elevation 2010') the last week of April 2014 and was empty by June 21, 2014. Though Horseshoe Reservoir remained at 60% on May 1 (elevation 2005) nesting habitat remained available within the reservoir bottom and upper reaches (Figures 6 and 7)

2015 Action: The reservoir's spring drawdown will occur as usual in 2015 with a target empty date of May 1.



Figure 6. Photo of upper-middle Horseshoe Reservoir taken on May 2, 2014



Figure 7. Photo of upper Horseshoe Reservoir taken on May 2, 2014

c. Covered Aquatic Species Operation Objective

Obligation: SRP will manage water levels at Horseshoe, conditional on other operation goals, to minimize the reproduction, recruitment, and survival of nonnative fish by rapidly drawing down the reservoir and minimizing carry-over storage. In years when the reservoir is held high for flycatchers, this will provide opportunities for razorback sucker reproduction and recruitment.

Action: Horseshoe Reservoir was drawn down as in previous years but reached empty later in 2014. This occurred to accommodate necessary maintenance work on the Bartlett Dam outlet works and spillway.

2015 Action: Horseshoe Reservoir will be operated normally and is scheduled to be empty by May 1.

d. Covered Bird Monitoring

i. Vegetation Monitoring

Obligation: SRP will use vegetation monitoring at Horseshoe to identify trends in the amount and height of tall dense vegetation to assist in the evaluation of whether adaptive management thresholds or ITP limits may be exceeded. Vegetation will be monitored once every three years.

Action: Previously, SRP ran the multi-scaled Southwestern willow flycatcher habitat model (Hatten and Paradzick 2003) using Landsat 5 satellite images. This model was developed using the band wavelength thresholds of the Landsat 5. 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 which collect the same band wavelength thresholds as Landsat 5. 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 appeared somewhat underestimated due to this difference between Landsat 5 and Landsat 8. SRP’s GIS department coordinated with Jim Hatten (USGS) to modify the model to incorporate the wavelength differences between Landsat 5 and 8. Following field verification of 2014 model results, the model appears to be working as it did with data from Landsat 5.

Model results (Figure 8) from this year estimate that of the 133 acres of potentially suitable flycatcher breeding habitat (GIS model classes 3-5) that occurred in the reservoir in 2014, 107 acres would have been unavailable on May 1, 2014 (Table 2). The average amount of potentially suitable habitat that was unavailable at the beginning of the 2009–2014 breeding seasons equates to 39 acres, which is below the 200 acre average long-term permit threshold.

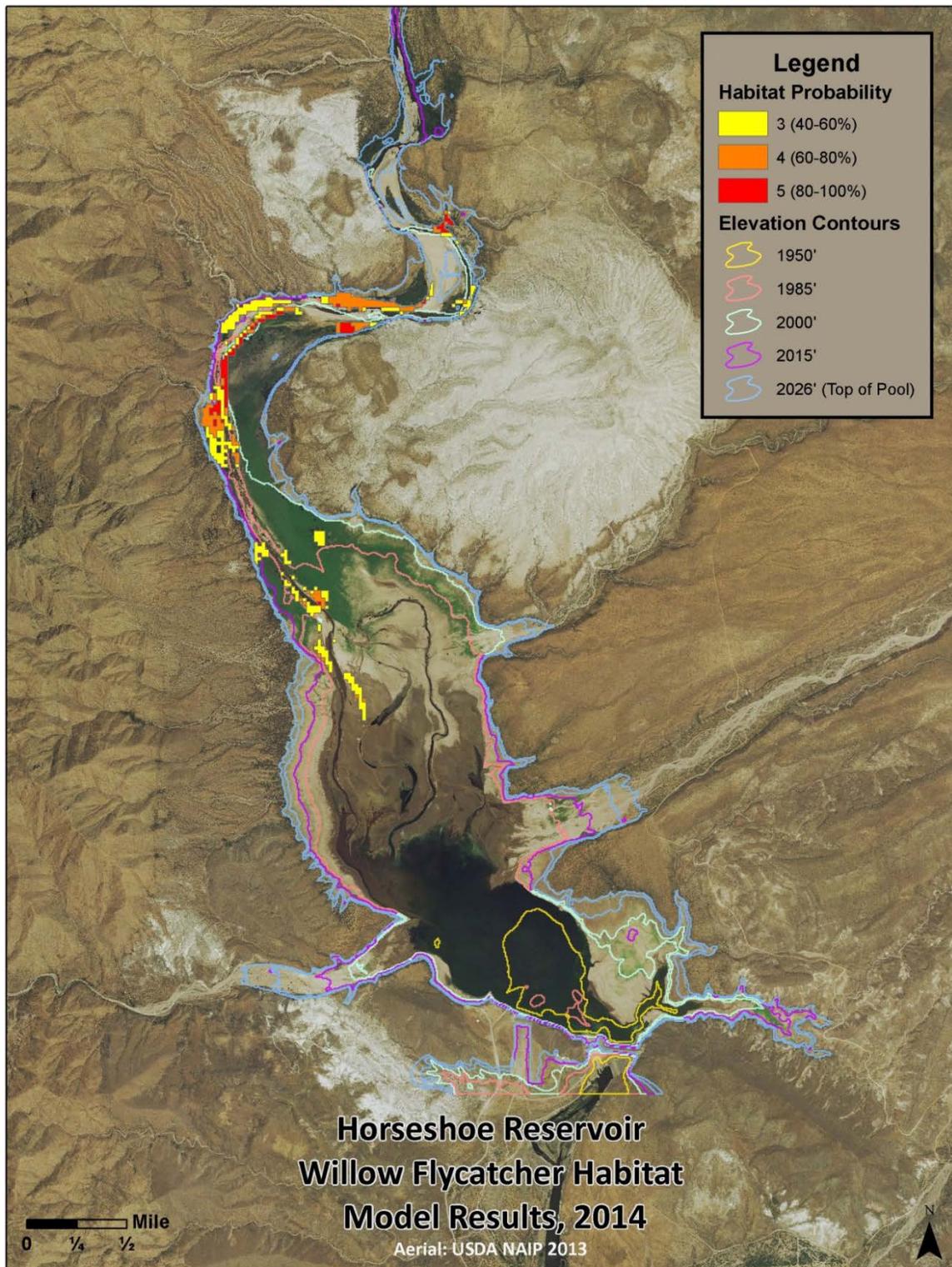


Figure 8. Willow flycatcher potential breeding habitat in Horseshoe Reservoir based on GIS satellite model results using June 27, 2013 imagery. [note: model grid code scale: 3–5 breeding probability based on Hatten and Paradzick (2003); sediment contour interval 1950'≈0% storage; 1985'≈25% storage; 2000'≈50% storage; 2015'≈75% storage; 2025'≈98% storage.]

Table 2. Acres of occupied and predicted flycatcher habitat based on GIS breeding habitat model in Horseshoe Reservoir, 2008–2014

Year	May 1 Reservoir Elevation (feet)	Occupied Habitat (acres)		Predicted Habitat Probability class 3-5 (acres)	
		Occupied Habitat ¹	Occupied Habitat Unavailable May 1	Total within Reservoir	Estimated Habitat Unavailable May 1 ³
2008	-	52	-	95	-
2009	2000	-	0	141	42
2010	2026	-	52	28	87
2011	1981	80	0	82	0
2012	1950	-	0	76	0
2013	1987	-	0	147	0
2014	2005	-	6.4 ²	133	107
Annual Avg.	-	-	-	100	39
2015 predicted ⁴					26

¹Flycatcher surveys performed every three years within the reservoir (see Section 3.d.ii).

²The lowest elevation of occupied habitat in 2011 (the most recent year occupancy data available prior to May 1, 2014) was 1985 ft. Water level on May 1, 2014 was 2005 ft.

³Estimated amount of habitat unavailable on May 1 is based on the elevation of classes 3-5 of the previous year's model results, the reservoir elevation on May 1, and the assumption that the vegetation is 25 ft. tall. If less than 15 ft. of vegetation was not above water on May 1 the habitat was considered unavailable (see assumptions outlined in the H-B HCP page 109).

⁴Assumes reservoir at full pool on May 1; habitat assumed unavailable if located at elevations $\leq 2015'$ (see assumptions in note #3 above and the H-B HCP page 109).

2015 Action: For 2015, SRP will be utilizing results of the 2015 flycatcher surveys at Horseshoe Reservoir to update the occupied habitat data used in the flycatcher habitat prediction model.

ii. Flycatcher Monitoring

Obligation: SRP will monitor the flycatcher population to assist in the evaluation of ITP compliance relative to thresholds for adaptive management and the cap on harm of occupied habitat. The method used to determine occupied habitat is explained in Section IV.B.1.B of the H-B HCP. The adaptive management threshold is an annual average of 200 acres of potentially impacted occupied habitat and the cap is 400 acres. Flycatcher surveys will be conducted every three years.

Action: Flycatcher surveys were not conducted at Horseshoe in 2014. LiDAR data collection will be repeated in 2015 in conjunction with flycatcher surveys to determine occupied habitat within the reservoir. The intent of this exercise will be to verify habitat model prediction accuracy.

2015 Action: Flycatcher surveys and LiDAR data collection will be conducted at Horseshoe in 2015.

iii. Yellow-billed Cuckoo Monitoring

Obligation: SRP will monitor cuckoos at Horseshoe to identify the long-term trend in the population. The reservoir will be surveyed every three years.

Action: Cuckoo surveys were not conducted at Horseshoe in 2014.

2015 Action: Cuckoo surveys will be conducted at Horseshoe in 2015.

iv. Bald Eagle Monitoring and Emergency Rescue Protocol

Obligation: SRP will develop a coordinated plan with FWS and AGFD to identify when rescue actions would be required and the process to rescue bald eagle, bald eagle eggs, or nestlings; at Horseshoe or Bartlett. The plan will include triggers for winter monitoring at appropriate effort and frequency to determine if a nest has been built in the conservation space of the reservoir and the likelihood that the nest could be impacted by spring runoff. The plan will be completed within one year of permit issuance, and the implementation will begin within two years of ITP issuance.

Action: In 2009, SRP completed the Monitoring and Rescue Plan (see 2009 H-B HCP annual report). Eagles did not nest within the reservoir pool during the 2014 nesting season.

2015 Action: SRP will continue to implement the monitoring and rescue plan in 2015.

e. Covered Aquatic Species Monitoring

Obligation: SRP will monitor covered aquatic species populations and the effectiveness of minimization and mitigation measures. Periodic surveys in Horseshoe and several other locations in the Verde River will be conducted. Native fish composition and age class information will be recorded, and fish will be tagged in Horseshoe to assess movements from the reservoirs. In the first five years of implementation surveys will be focused near Horseshoe Reservoir.

Action: No aquatic species monitoring occurred in 2014.

2015 Action: SRP will be contracting with the AGFD to conduct a robust and definitive evaluation of fish disposition following rapid drawdown of Horseshoe Reservoir. In past evaluations, AGFD has used Floy tags (a small dorsally inserted tag much like those used to attach tags to clothing) and fin clips to mark fish captured in Horseshoe Reservoir. Following draw down, AGFD has utilized multiple capture techniques attempting to locate marked fish both above and below Horseshoe Dam. These attempts have been unsuccessful in locating a single tagged or marked fish. In 2015, AGFD, with funding from SRP, will be implanting fish captured in Horseshoe Reservoir with a passive integrated transponder or 'PIT' tag. These PIT tags contain no battery and therefore are detectable for the life of the fish. Each PIT tag has a unique signal such that the species of fish it was placed in may be recorded by the PIT tag receiver. PIT tag receivers will be located both upstream of Horseshoe Reservoir in the Verde River and at the outlet of Horseshoe Dam. The intent is to definitively describe where fish go following draw down to better understand perceived impacts on native aquatic organisms.

4. Status of Mitigation Property Acquisitions

Obligation: SRP must acquire and manage in perpetuity 200 acres of riparian habitat by fee title or conservation easements. Within one year of the permit issuance date, at least 150 acres of mitigation will be in place, and within ten years an additional 50 acres will be protected.

Action: On August 11, 2009, SRP and Freeport McMoRan executed a conservation agreement to secure the protection of the 150 acre preserve near Fort Thomas (SRPCE4). No additional action is needed until 2023 when the property will be purchased in fee.

SRP completed the purchase of the 55 acre Indian Springs parcel in December of 2011. The Fort Thomas baseline inventory report and management plans were updated to include both the 150 SRPCE4 parcel and the 55 acre Indian Springs parcel.

2015 Action: SRP has developed a fire management plan for the entire Fort Thomas Preserve and it is anticipated to be finalized after receiving comments from the Bureau of Reclamation (USBR).

5. Mitigation Property Monitoring and Management

a. Fort Thomas H-B Preserve (SRPCE4 and SRP2)

i. Flycatcher and Cuckoo Monitoring

Obligation: SRP will conduct flycatcher and cuckoo surveys the first spring and summer following land acquisition. If flycatchers are found, SRP will conduct a second year of surveys to establish a baseline. Once baseline surveys are complete, SRP will survey for flycatchers and cuckoos every other year on average but not less than every third year.

Action: Flycatcher and cuckoo surveys were conducted on the Fort Thomas H-B Preserve in 2014 (Table 3).

Table 3. Southwestern willow flycatcher and yellow-billed cuckoo survey results for the Fort Thomas H-B Preserve, 2008–2014.

Year	Willow flycatcher				Yellow-billed cuckoo	
	Resident Adults	Territories	Pairs	Nests	Detections	Incidental
2008	10	6	4	0	2	0
2009	14	8	6	5	0	0
2010	No Surveys					
2011	No Surveys					
2012	12	10	9	4	2	1
2013	No Surveys					
2014	30	16	14	1	3	0

2015 Action: Flycatcher and cuckoo surveys will not be conducted at Fort Thomas Preserve in 2015. The next scheduled surveys will take place in 2016.

ii. Vegetation and Habitat Monitoring

Obligation: SRP will conduct field observations assessment of habitat type, structure, and density of riparian and other vegetation. On-the-ground photo documentation from fixed points will be collected during the bird surveys.

Action: Patrols and site visits to the property indicated that no significant vegetation changes occurred in 2014.

2015 Action: Photo points will be repeated in 2015. Photo points will be established in SRPCE4.

iii. Management Obligations

Obligation: SRP's primary goal for management of these properties is to provide ecological and conservation benefits to the flycatcher and cuckoo. Management activities are focused primarily on minimizing or eliminating identified threats to riparian habitat, such as wildfire, groundwater pumping, surface water depletion, trespass livestock grazing, cowbird parasitism and vandalism. Actions to enhance the quality of habitat on a property or reverse past damage may also be conducted.

General management activities required for each property are listed below:

1. SRP will identify a manager for all acquired properties.
2. A management plan will be developed for each property within two years of acquisition in coordination with FWS and will be updated annually.
3. Management activities identified in the management plan will be implemented.
4. Cowbird management will occur on properties that are agreed to by SRP and FWS during the annual H-B HCP meeting.
5. Conservation easements shall be placed on all appropriate mitigation lands and will be held by an agency or organization acceptable to FWS.

Actions: SRP completed the following major management actions on the Fort Thomas H-B Preserve in 2014:

- The Nature Conservancy (TNC) conducted patrols (which included inspection and maintenance of access and signage, work and coordination with adjacent landowners and local law enforcement officials, and assistance with biological monitoring).
- SRP contractors continued to monitor vegetation conditions following the 2011 and 2013 fires at the Fort Thomas Preserve.

Clay Fire.

Following the Clay Fire, vegetation in the area of the Clay Fire continues to rebound, with saltbushes (*Atriplex* sp.) and willows (*Salix* spp.) making a surprisingly strong showing (Figure 9). Tamarisk (*Tamarix* sp.) regrowth has been somewhat hampered by the activity of leafhoppers (Family Cicadellidae) and weevils (Superfamily Curculionoidea), giving other species like *Datura* sp., *Helianthus* sp. and *Baccharis* sp. an opportunity to become established.



Figure 9: Regrowth following the Clay Fire. Saltbush and Goodding's willow (*S. gooddingii*) are visible among the Tamarisk. Photo: August 2014.

2015 Actions: SRP plans to conduct the following management actions in 2015 on the Fort Thomas Preserve:

- Finalize the fire management plan.
- Continue to monitor both the tamarisk and native plant colonization in the burned areas.
- Finalize the Fort Thomas Post-Fire Restoration report.
- Continue to coordinate with Bureau of Land Management regarding fencing of the riparian area.
- Continue on-the-ground management activities in coordination with the Roosevelt HCP project manager.
- Continue to actively participate in the Gila Watershed Partnership and coordinate with the Stillwater Sciences and Walton Family Foundation staff on potential restoration projects.

b. Special Water Supply Protection Projects

Obligation: SRP will use its best efforts to protect future water supplies for mitigation lands.

Action: SRP provided funding to the U.S. Geological Survey (USGS) to conduct field work related to a 2-year Ecoflows project, which is a partnership among the USGS (Arizona and Utah offices), AZ Department of Water Resources, and TNC, to investigate the connection between stream flow in the Verde River and habitat along the riparian corridor. The USGS is working toward completing the report of the two-year Phase 1 project.

The original agreement between the USGS and TNC did not include funds to support additional field work in Phase 1. The additional support from SRP provided crucial support for field efforts, macroinvertebrate identification, data analysis, and geospatial interpretation of habitat characteristics. The results obtained with the SRP funding are included in the Phase 1 report which is in draft form and being peer reviewed.

In addition to completing the first phase, USGS installed a Continuous Slope Area (CSA) gage below the low flow SRP gage at Campbell Ranch (AGFD issued a permit for the installation).

The gage installation was supported by the USGS WaterSMART program. During the first phase of the Ecoflows project, a biotic sampling site was established at Campbell Ranch. The CSA gage, which consists of three recording stage sensors from which discharge can be computed, is intended to complement the SRP gage by allowing for the estimation of discharges higher than the rating curve at the low-flow gage. The combined low-flow and CSA discharges should provide complete discharge records at Campbell Ranch.

2015 Action: After completion of the final Ecoflows Phase 1 report, the USGS will begin planning Phase 2.

6. Aquatic Species Mitigation

The overall goal of the minimization and mitigation measures for covered aquatic species is to offset the direct impacts caused from stranding and passage through the outlet works, and the indirect impacts (predation and competition) caused by the increase of nonnative fish produced in the reservoirs. Minimization and mitigation obligations under the H-B HCP include: rapid draw down of Horseshoe Reservoir; stocking adult and sub-adult razorback sucker in Horseshoe or elsewhere; installation of a fish barrier on Lime Creek; funding and supporting improvements to Bubbling Ponds Hatchery (BPH); stocking covered native fish in the Verde watershed; and watershed management activities that conserve in-stream flow, species, and habitats. The following implementation actions were taken:

a. Rapid Draw Down of Horseshoe Reservoir

Obligation: See Section 3.c.

Action: See Section 3.c.

2014 Action: See Section 3.c.

b. Stocking of Razorback Sucker at Horseshoe and Other Covered Species in Verde River.

Obligation: SRP will provide support for AGFD to stock razorback sucker during Horseshoe fills when conditions may be favorable. Other river segments may be stocked with razorback sucker upon mutual agreement among AGFD, FWS, and SRP. SRP will provide support to increase stocking of other covered native fish species in the Verde watershed.

Action: SRP continued funding AGFD Operation and Management (O&M) and stocking actions at BPH under the collection agreement. As of November 26, 2013, a total of 20,012 native fish were stocked into the Verde River watershed (Table 4). SRP coordinated a meeting between AGFD and the USBR to discuss upcoming fish production activities and stocking efforts for the coming year.

Table 4. Native fish stocked by AGFD in support of H-B HCP through November 26, 2013.

Stocking Date	Species	Number stocked	Pounds stocked	Location
9/3/2013	Roundtail chub	200	48	Meads Tank (Verde)
	Roundtail chub	169	41	Oak Creek-Crescent Moon
	Roundtail chub	6441	59	Oak Creek-Crescent Moon
	Roundtail chub	500	5	Raymond Ranch
	Roundtail chub	13,029	125	Verde River at Perkinsville
	Total	20,012	278	

2015 Action: SRP will again coordinate a meeting among the cooperators in the spring of 2015 to discuss the status of implementation, changes to the species priorities or locations, and plans for future culture and stocking effort. SRP will continue to fund BPH O&M and stocking activities and will coordinate to develop a culture and stocking plan to be implemented over the following year.

c. Bubbling Ponds Hatchery Improvements

Obligation: SRP will provide \$500,000 in funding or in-kind support for planning, design, engineering, and fund raising to improve and expand AGFD's BPH.

Action: SRP met with AGFD and Reclamation to discuss the BPH remodel plan. The AGFD shared that they were in the process of purchasing property with water rights adjacent to BPH. The intent is to expand the hatchery and create more physical separation between native and non-native fish rearing. As their plans develop, there will likely be future discussion regarding the use of SRP funds to increase native fish rearing capabilities as part of the BPH expansion.

2015 Actions: Continue to support AGFD BPH upgrade plan development, planning and implementation.

d. Installation of a Fish Barrier in Lime Creek

Obligation: SRP will construct and maintain a fish barrier in Lime Creek to benefit resident, covered aquatic species such as Gila topminnow, longfin dace, and lowland leopard frogs.

Action: The barrier was completed on November 4, 2010. The construction of the barrier was described in detail in the 2010 H-B HCP annual report. SRP visited and inspected the barrier during a May 2012 site visit. The barrier was structurally sound and functional, and, as anticipated, sediment had filled in most of the pool above the barrier. There was no inspection conducted in 2014.

2015 Actions: SRP will visually inspect barrier condition and conduct maintenance if necessary. SRP, in coordination with AGFD and USFS, may also monitor the fish populations in Lime Creek.

e. Watershed Management Efforts

Obligation: SRP will continue, and expand where feasible; its substantial watershed management efforts to maintain and/or improve stream flows, which benefit all main-stem species.

Actions: SRP took the following actions in 2014 to protect watershed in-stream flow:

- Public outreach and education
- Funding research and monitoring
- Administrative and legal efforts to protect in-stream flows

A detailed list of Watershed Management and Protection projects that occurred in 2014 is provided in Table 5.

2015 Action: SRP will continue supporting watershed protection efforts in 2015.

Table 5. SRP watershed protection efforts accomplished in 2014.

Project Name	Date Initiated	Date Completed	SRP Contribution	Description and Comments	In-kind	Cash
Public Presentations	Ongoing	Ongoing	NA	9 public presentations were given to community groups and various agencies (e.g., Boeing, Western Audubon Rivers, Verde River Basin Partnership, and others).	x	
Agreement in Principle re: Big Chino Groundwater withdrawals	Ongoing	Ongoing	\$250,000	Year 1 of Comprehensive Agreement #1 between SRP, the City of Prescott, and the Town of Prescott Valley to implement monitoring and modeling of groundwater conditions in the Big Chino sub-basin to ensure appropriate protections against impacts to the Upper Verde River. Includes long-term funding commitment.		x
Legal efforts to curtail illegal groundwater pumping and surface water diversions–Verde Valley	Ongoing	Ongoing	NA	SRP continued its litigation against several groundwater pumpers in the Verde Valley who appear to be illegally diverting surface water.	x	
NAU Watershed Research and Education program (WREP)	May 2014	May 2015	\$50,000	Program and Project specific funding for NAU WREP program. Two research projects funded (Conservation of Northern Mexican Gartersnake Through Ecological Research and Citizen Science at Dead Horse Ranch State Park, Arizona, Local-scale micro-pollutant effects on aquatic vertebrate populations).		x
USGS/SRP cost share of stream gage maintenance	Jan 2013	Ongoing	~\$130,000	SRP's contribution to the USGS Joint Funding Agreement for the operation and maintenance of stream and reservoir gages in the Verde watershed (amount does not include reservoir gage operations).		x
WatershedMonitor.com	Sep 2007	Ongoing	NA	Maintain the website (www.watershedmonitor.com) which displays real time data for river flows and precipitation across the Salt and Verde Watersheds.	x	

Table 5. SRP watershed protection efforts accomplished in 2014.

Project Name	Date Initiated	Date Completed	SRP Contribution	Description and Comments	In-kind	Cash
Verde River Runoff	Mar 2014	Mar 2015	\$2,000	Corporate sponsor of the Verde River Runoff.		x
Low Flow gages (Black Bridge, Verde Falls, Campbell Ranch, Bubbling Ponds Hatchery, Sterling Springs)	2005+	Ongoing	\$57,477	2013 O&M and telemetry support for gages.	x	
Installation of Low Flow gage East Verde @ Crackerjack	March 2012	ongoing	\$35,000	Capital cost and initial O&M for installation of gage.		x
Verde River Days	Sep 2014	Sep 2014	\$500	SRP sponsorship for event. SRP was also an Exhibitor.		x
Yavapai College Foundation	Oct 2014	Oct 2014	\$5,000	SRP Donation/Table sponsorship for event. Theme re: Working Together for Sustainable Communities and Healthy Forests.		x
The Verde Valley Regional Economic Organization (VVREO)	Mar 2014	Mar 2015	\$1,500	Membership to VVREO and corporate sponsorship for 'speakers series' featuring prominent educators and Industry representatives from the Verde Valley discussing Education and Workforce Planning.	x	x
Arizona Water Story	Jan 2010	Ongoing-Offered 2-4 times per year	In-Kind	SRP offers this 4 hour workshop to teachers throughout the Valley. Teachers receive a water education video as part of the Arizona Water Story to assist 4 th grade teachers throughout the state in teaching water science and Arizona history to their students.	x	
Water Education Grants	Oct 2007	Ongoing	\$4,750	SRP collaborated with the towns of Prescott and Prescott Valley as well as the Yavapai County Water Advisory Committee and Arizona Department of Water Resources to provide Water Education Grants to outstanding water education programs taking place in Yavapai County.		x

Table 5. SRP watershed protection efforts accomplished in 2014.

Project Name	Date Initiated	Date Completed	SRP Contribution	Description and Comments	In-kind	Cash
Water Chemistry/Quality Kits	Ongoing	Ongoing-Offered 2-4 times per year	In-Kind	Water Chemistry/Quality kit building and instruction to teachers through Sci4Kids EIG.	x	
Yavapai County Cooperative Extension Office /Project WET	Aug 2008	Ongoing	\$15,000	SRP supported Edessa Carr with programming related to water education in Yavapai County. She has conducted numerous trainings on the Arizona Conserve Water curriculum guide, and worked with teachers from Prescott, Prescott Valley, Chino Valley, and Verde Valley towns.		x
Verde Valley Youth Outreach Committee	Aug 2011	Ongoing	In-Kind leadership support	SRP serves on this committee to share and leverage partnerships in the Verde Valley related to youth education. Other partners on the committee include the parks, forest service, AZ Project WET, and V-Bar-V.	x	
Four Forest Restoration Initiative and Research Study Agreement with NAU/Ecological Restoration Institute	Jan 2012	Ongoing	\$120,000	SRP is supporting landscape level efforts to restore ponderosa pine forests, which includes the Salt and Verde watersheds to allow for increased ecologic function and decrease risk of catastrophic wildfire. We are also partnering with NAU to evaluate hydrologic effects of various forest treatment types. This study includes the design of a Paired Watershed Study that will evaluate impacts of forest restoration on variables such as run-off, groundwater infiltration, sedimentation, soil moisture, etc.	x	x

Table 5. SRP watershed protection efforts accomplished in 2014.

Project Name	Date Initiated	Date Completed	SRP Contribution	Description and Comments	In-kind	Cash
Yellow Belly Ponderosa Project—portions of this program (along with forest restoration messaging) have been incorporated into the AZ Water Story Teacher Workshops	Aug 2012	Ongoing	\$12,000 and In Kind Planning, Including SRP Sponsored Website	The Yellow Belly Ponderosa outreach program combines culture, arts and science to teach 4 th and 5 th graders (and others) about forest health and restoration, stewardship of natural resources, the value of science, wildfire mitigation and safety, and flash flood safety. A video of their stage production and complete lesson plans are available to teachers online. A video and powerpoint on Forest Restoration is also available and presented as part of the Arizona Water Story workshop. www.srpnet.com/yellowbelly	x	x
SRPs Forest Health Initiative Video and narrated PowerPoint	January 2014	Ongoing	\$20,000	Outreach materials for engaging customers, stakeholders, investors.	X	X
Northern Arizona Forest Fund	January 2014	Ongoing	~\$100,000 (this has yet to be donated but was committed by CASI funds from Kelly Barr)	On the ground forest treatment sites that will be funded by SRP and corporate and private partners.	X	X
Cragin Watershed MOU	March 2014	Ongoing		Partnership between SRP, FS, NFF, Town of Payson and USBR to accelerate restoration objectives in Cragin Watershed.	X	
Healthy Forests, Vibrant Economy Watersheds Conference	May 2014	October 16 th and 17 th , 2014	Roughly \$40,000 and In Kind Planning, Audio/Visual, Printed Materials, etc.	This conference highlighted the importance of healthy forests to tourism/recreation, water supplies, long-term planning with a focus on public-private partnership, economics, and policy; engaging business, local decision-makers, state legislators, land managers, federal representatives and forest specialists. www.srpnet.com/forest	x	x

7. Funding Methods and Assurances for HCP Implementation

Obligation: No later than five years after the Permit is issued, SRP shall insure that permanent funding is available to meet continuing obligations under the H-B HCP.

Action: Completed.

On March 24, 2009, SRP provided a letter to FWS indicating that we were proposing to establish an irrevocable trust to fund the H-B HCP. On November 2, 2009, the SRP Board approved an amendment to the Roosevelt Lake HCP trust, which allows for the creation and funding of a subaccount to meet the obligation of the H-B HCP. The subaccounts allow for each HCP trust fund to be managed (and reported) independently under a larger umbrella trust agreement. The H-B HCP subaccount was funded in January 2011 with approximately \$6.0M to support the estimated \$300,000 on average annual expenditures over the life of the permit and *in perpetuity* costs for some of the mitigation obligations.

8. HCP Implementation, Survey, and Monitoring 10-year Schedule

Table 6. HCP Implementation, Survey, and Monitoring 10-year Schedule.

Obligation	Completed /Ongoing	Year									
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017+
Horseshoe Reservoir											
Flycatcher and Cuckoo Reservoir Ops	Ongoing	RD ¹	RD	RD	RD	RD	Hold ²	X	X	X	X
Aquatic Species Reservoir Ops	Ongoing	RD	RD	RD	RD	RD	Hold	X	X	X	X
Vegetation Monitoring	Ongoing	X	X	X			X	X			X
Flycatcher and Cuckoo Surveys	Ongoing	X			X				X		X
Bald Eagle Monitoring and Rescue Plan	Completed	X	X								
Bald Eagle Monitoring	Ongoing			X	X	X	X	X	X	X	X
Fish Surveys:	Ongoing		X	X	X	X	X		X	X	X
Horseshoe			X	X	X ⁴	SRP ⁵	X		X		X
Verde (upstream Horseshoe)				X	X	X	-		X	X	?
Verde (downstream Bartlett)							-		X	?	?
Lime Creek		X	X	X	X	X			?	X	
Frog and Garter Snake Survey	Ongoing					X	X				X
Horseshoe/Verde River Aquatic Species Mitigation											
Bubbling Ponds Hatchery (BPH) Improvements		X	X	X	X	X	X	X			
BPH O&M	Ongoing	-	X	X	X	X	X	X	X	X	X
Stocking razorback sucker & other covered native fish	Ongoing	-	-	X	X	X	X	X	X	X	X
Lime Creek Barrier Construction	Completed	X	X	X							
Watershed Protection Projects	Ongoing	X	X	X	X	X	X	X	X	X	X

Table 6. HCP Implementation, Survey, and Monitoring 10-year Schedule.

Obligation	Completed /Ongoing	Year									
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017+
Fort Thomas Mitigation Property (150 acres)											
Execute Conservation Easement	Completed	X	X								
Management	Ongoing		X	X	X	X	X	X	X	X	X
Purchase											
Flycatcher and Cuckoo Monitoring ³	Ongoing	X	X			X		X			X
Habitat Monitoring	Ongoing	X	X			X		X			X
Indian Springs Ranch–Fort Thomas Preserve (55 acres)											
Identify suitable property	Completed	X	X	X	X						
Secure protection and manage	Ongoing					X	X	X	X	X	X
Special water supply protection projects	Ongoing	X	X	X	X	X	X	X	X	X	X

¹Rapid drawdown and minimize pool

²Hold reservoir high if two successive years of low storage.

³Monitoring frequency dependent upon management needs and cowbird parasitism rate.

⁴Sampling for tagged fish also conducted downstream of Horseshoe dam

⁵SRP will, as feasible, investigate fish stranding in Horseshoe during and after rapid drawdown.

9. Literature Cited

Fish and Wildlife Service. 2008. Final environmental impact statement for the incidental take permit for operations of Horseshoe and Bartlett Reservoirs. March 2008. Arizona Ecological Services Office, Phoenix, Arizona.

Hatten, J. R. and C. E. Paradzick. 2003. A multiscaled model of southwestern willow flycatcher breeding habitat. *Journal of Wildlife Management* 67(4): 774-778.

Salt River Project. 2008. Habitat Conservation Plan Horseshoe and Bartlett Reservoirs. Submitted to the U.S. Fish and Wildlife Service Pursuant to Section 10(A)(1)(B) of the Endangered Species Act. Salt River Project, Tempe Arizona.

APPENDIX A

SOUTHWESTERN WILLOW FLYCATCHER AND YELLOW-BILLED CUCKOO SURVEYS ON THE FORT THOMAS PRESERVE, GILA RIVER STUDY AREA, ARIZONA, 2014

EcoPlan Associates, Inc.

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 version was sent to the USFWS Ecological Field Services Office in Phoenix, AZ.

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