Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Palo Verde Ecological Reserve

2012 Annual Report

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

January 2012

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Lower Colorado River Multi-Species Conservation Program

Palo Verde Ecological Reserve

2012 Annual Report

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ACRONYMS AND ABBREVIATIONS

CDFG	California Department of Fish and Game
CEM	conceptual ecological model
CW	cottonwood-willow land cover type
FY	fiscal year
HCP	Habitat Conservation Plan
kg	kilogram(s)
lb	pound(s)
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
PVER	Palo Verde Ecological Reserve
PVID	Palo Verde Irrigation District
Reclamation	Bureau of Reclamation

Symbols

%	percent

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EXECUTIVE SUMMARY

The purpose of this annual report is to summarize all activities, including planning, designing, constructing, planting, monitoring, and adaptive management, that have occurred at the Palo Verde Ecological Reserve (PVER) from October 1, 2011, through September 30, 2012. This document also contains sections describing the general background of the site, land and water ownership, current agreements, and constructed habitat areas as well as the past management of established land cover types. In addition, projected activities for fiscal year 2013, in terms of future development, management, and monitoring, will also be identified in this report. Adaptive management is expected to be a larger part of subsequent annual reports for this conservation area as more data regarding the effectiveness of management techniques and performance of the habitat become available.

Background

The PVER encompasses 1,352 acres of the historical flood plain of the Colorado River near Blythe, California. Formerly, the property was known as the Riverview Ranch and was owned by the Travis family. The ranch was acquired by the Trust for Public Lands in 2004 to offset degradation of wildlife habitat along the lower Colorado River. On September 3, 2004, the property was conveyed to the State of California. California has identified up to 1,300 acres of active agricultural lands on this property for habitat restoration under the Lower Colorado River Multi-Species Conservation Program (LCR MSCP), a 50-year multi-partner program administered by the Bureau of Reclamation.

The California Department of Fish and Game (CDFG) and the LCR MSCP are jointly planning the conversion of portions of the PVER from agricultural crops to a mix of native plant species. After planting is complete, the created habitats will be managed for species covered under the LCR MSCP throughout the 50-year life of the program.

The project is being developed using a phased approach over an 8-year period, with an estimated completion date of 2013. An overview restoration development plan for the entire site was completed in 2006. In July 2009, the CDFG exchanged land at the PVER that involved the fields located to the west and north of Phase 5 for land identified as Phase 8 and the eastern part of Phase 9. This exchange was determined to benefit both parties, as it resulted in a contiguous riparian land area. This exchange affected the phase schedule by increasing the acres developed in Phase 5 and decreasing the acres in Phase 8. In 2006, Phase 1, a 30-acre riparian nursery, was planted. In 2007, 2008, 2009, 2010, and 2011, 700 acres of cottonwood-willow land cover type were planted during Phases 2, 3, and 4.

1.0 CONSERVATION AREA INFORMATION

1.1 Purpose

This annual report will provide information pertaining to the development and maintenance of riparian habitat and summarized monitoring reports/results that would influence the Adaptive Management Plan. The intent is to eventually convert approximately 1,100 acres to riparian habitat that will be managed for the southwestern willow flycatcher and other Lower Colorado River Multi-Species Conservation Program (LCR MSCP) covered species that utilize cottonwood-willow land cover type.

1.2 Location

The Palo Verde Ecological Reserve (PVER) lies within the historic flood plain of the Colorado River in southeastern Riverside County, California, at Townships 5 and 6 South and Ranges 23 and 24 East. The PVER is one of the northernmost parcels of agricultural land within the Palo Verde Valley, which is approximately 5 miles north of Blythe, California.

Existing infrastructure consists primarily of an irrigation system comprised of 9.2 miles of lined and unlined irrigation ditches and associated slide gates, a 100-horsepower electric pump, and approximately 14 miles of access roads. All the acreage has been in agricultural crops – grain, small melons, and alfalfa – since the late 1930s. Currently, the land not restored is leased and farmed with crops of alfalfa and grain.

1.3 Landownership

The PVER is owned by the California Department of Fish and Game (CDFG). They lease unrestored acreage to a local farmer who raises alfalfa and small grains. The CDFG intends to continue the agricultural lease until the entire property comes under development by the Bureau of Reclamation (Reclamation).

1.4 Water

The Palo Verde Irrigation District (PVID) has an entitlement to Colorado River water for use on up to 104,500 acres of land within the PVID pursuant to a

contract between the United States and the PVID dated February 7, 1933. The CDFG, as a landowner within the PVID, has the right to order Colorado River water from the PVID for pumping through the PVID canal system to its fields. The CDFG will make Colorado River water available for irrigation of the native plants.

1.5 Agreements

Reclamation and the CDFG have signed an agreement to ensure that the land and water resources will be available for the 50-year term of the LCR MSCP.

1.6 Public Use

The CDFG has the authority, and is the lead, to regulate hunting and recreation uses pursuant to the CDFG statutes, regulations, and policies at the PVER. In cooperation with Reclamation, the CDFG coordinates its public use and related activities so they are consistent with and do not adversely affect restoration activities at the PVER.

1.7 Law Enforcement

The CDFG is responsible for law enforcement at the PVER. Reclamation continues to work with the CDFG to ensure these activities do not conflict with the LCR MSCP Habitat Conservation Plan (HCP).

1.8 Wildfire Management

A LCR MSCP Conservation Area Specific Fire Management and Law Enforcement Strategy has been finalized for the PVER and is posted on our Web site. The LCR MSCP will continue to work with local State and Federal fire agencies to reduce the risk of wildland fires and maintain clear lines of communication among agencies.

2.0 HABITAT DEVELOPMENT AND MANAGEMENT

2.1 Planting

Approximately 226 acres (91.45 hectares) of cottonwood-willow land cover type were planted in the spring of 2012 (figure 1).

In an initial irrigation cycle, a fertilizer application of 10-34-0 (nitrogen-phosphate-potassium) was added.

The field was prepared and leveled using standard farming practices. The field was then divided into 29 checks (divisions of the acreage bordered by earthen mounds in which irrigation water can be controlled). A cover crop of 25 pounds (lb) (13.6 kilograms [kg]) of alfalfa seed and 5 lb (2.3 kg) of rye grass seed per acre were planted in checks 2–13 and 16–28 (figure 2). Generally speaking, the purpose of planting the dense cover crop includes the following added benefits:

- Suppresses weeds without the use of herbicide
- Protects valuable topsoil from wind and water erosion
- Reduces compaction caused by frequent mowing
- Increases organic matter, earthworms, and beneficial micro-organisms
- Increases the soil's available nitrogen and moisture retention
- Brings deep minerals to the surface and break up hardpans
- Provides habitat, nectar, and pollen for beneficial insects and reduces the population of pests

Checks 1, 14, 15, and 29 were drill seeded with the following native species: blue grama grass (2.0 lb) and alkali sacaton seeds (0.75 lb) per acre were mixed with rice hulls so that the distribution of seed by weight was equal. The application rate for the seed mixture was 6.75 lb (3.06 kg) per acre (figure 2).

In March 2012, trees and shrubs were planted in Phase 7 with 40-inch rows and 6-foot in-line spacing in checks 2–13 and 16–28, utilizing mass transplanting techniques (figure 3). Over 417,000 trees and shrubs were planted within a 13-day period. Phase 7 was planted with the following averaged percentages (%): 31.9% cottonwood, 3.5% baccharis, 41.6% Goodding's willow, 21.8% coyote willow, 0.2% atriplex, and 0.9% mesquite (figure 4). The average number of plants was 1,922 per acre in the riparian fields and 4,600 shrubs and trees in the mesquite fields (table 1).

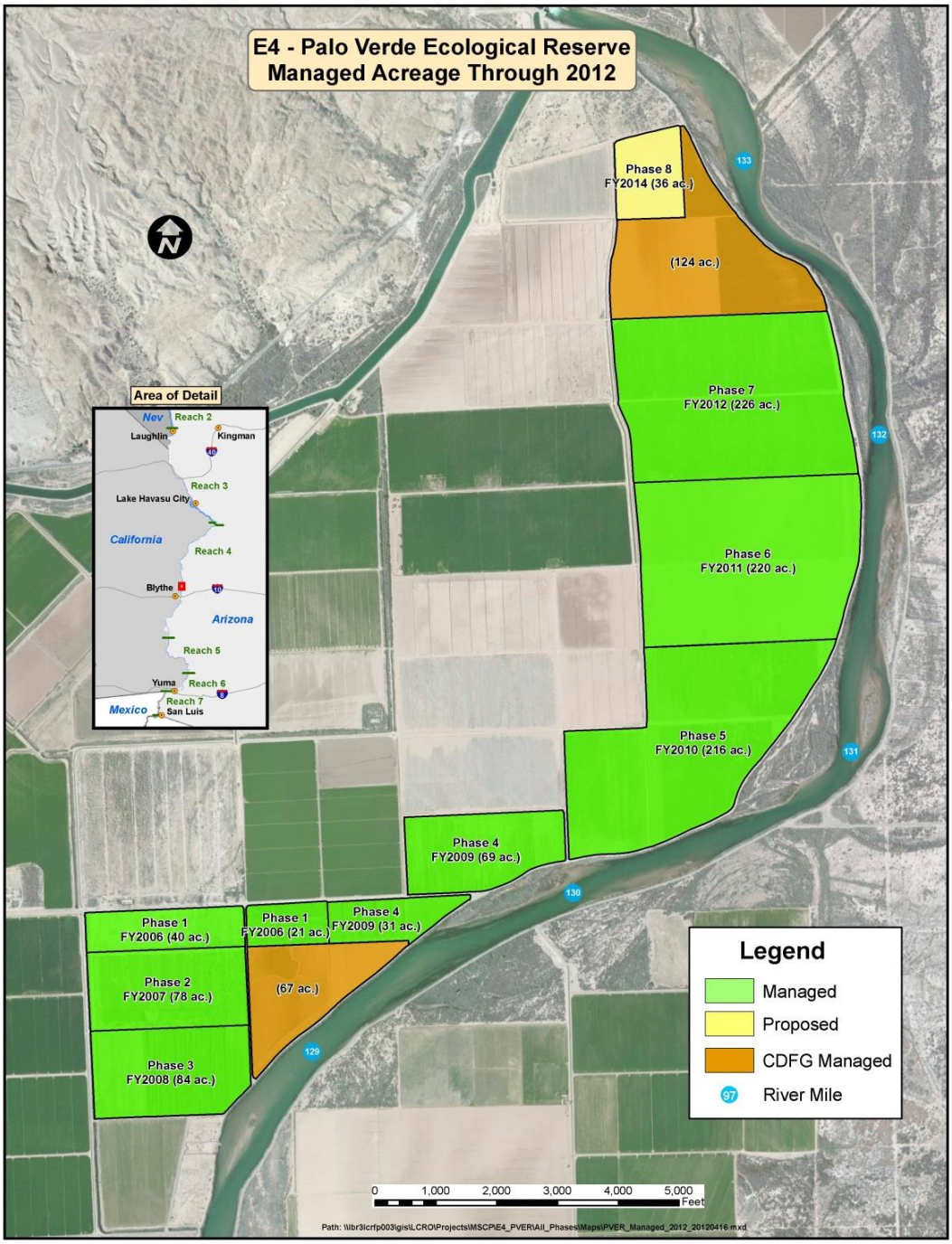

Figure 1.—PVER managed acreage through 2012.

Figure 2.—Cover crop, blue grama grass (*Bouteloua gracilis*), planted with mesquite.

Figure 3.—Mass transplanting.

Figure 4.—Phase 7 – as-built.

Table 1.—Number of plants, shrubs, and trees planted in Phase 5 – spring of 2010

Check	Acres	*Baccharis sarothroides*	*Baccharis salicifolia*	Cotton-wood	Goodding's willow	Coyote willow	Honey mesquite	Atriplex
1	7.2	0	0	0	0	0	1,080	0
2	7.0	400	471	7,623	4,574	2,178	0	0
3	7.7	400	471	5,009	8,495	2,614	0	0
4	7.9	0	0	1,743	6,970	8,712	0	0
5	7.7	400	471	8,712	5,009	2,614	0	0
6	8.1	400	471	2,614	8,712	2,614	0	0
7	8.0	0	0	1,743	8,712	6,970	0	0
8	7.5	400	471	8,277	5,009	2,396	0	0
9	7.6	400	471	5,009	8,277	2,396	0	0
10	8.1	0	0	1,743	8,712	2,614	0	0
11	7.9	400	471	8,712	2,614	2,614	0	0
12	7.6	400	471	1,743	8,495	6,534	0	0
13	7.7	0	0	1,743	8,495	6,534	0	0
14	6.9	0	0	0	0	0	1,035	0
15	1.1	0	0	0	0	0	165	0
16	8.1	400	471	8,712	2,614	2,614	0	0
17	7.6	400	471	5,006	8,277	2,396	0	0
18	8.0	0	0	1,743	8,712	6,970	0	0
19	7.9	400	471	8,712	2,614	2,614	0	0
20	9.3	400	471	5,445	9,147	6,970	0	0
21	7.9	0	0	1,743	8,712	6,970	0	0
22	7.6	400	471	8,277	5,009	2,396	0	0
23	7.7	400	471	5,009	8,712	2,614	0	0
24	8.2	0	0	1,743	8,930	6,970	0	0
25	7.8	400	471	8,495	8,277	2,396	0	0
26	7.6	400	471	5,009	8,277	2,396	0	0
27	7.8	0	0	1,743	8,495	6,752	0	0
28	8.1	400	471	8,712	2,614	2,614	0	0
29	5.0	0	0	0	0	0	730	0
	Total	6,800	8,007	125,020	174,464	103,462	3,010	0

2.1.1 Phases 1-8

In Phase 1, during fiscal year 2006 (FY06), 61 acres of riparian/mesquite were planted; in Phase 2 (FY07), 78 acres; in Phase 3 (FY08), 45 acres; in Phase 3 (FY09), 39 acres; in Phase 4 (FY09), 100 acres; in Phase 5 (FY10), 216 acres; in Phase 6 (FY11) 220 acres; and in Phase 7 (FY12), 226 acres of cottonwood-willow land cover type were planted (table 2). In Phase 8 (FY13), 38 acres of mesquite will be planted. Additional information on the design, planting, and monitoring of Phases 1–8 can be found on the LCR MSCP Web site.

Table 2.—Planted acres in Phases 1–8

Phase	Fiscal year	Acres planted	Land cover type	Cumulative total
1	2006	61	CW[1]	61
2	2007	78	CW	139
3	2008	45	CW	184
3	2009	39	CW	223
4	2009	100	CW	323
5	2010	216	CW	539
6	2011	220	CW	759
7	2012	226	CW	985
*8	2012	38	Mesquite	1,023

Note: Phase 8 to be planted in the spring of 2013.
[1] CW = cottonwood willow.

2.2 Irrigation

The fields at the PVER are flood irrigated; table 3 indicates the amount of irrigation water applied through September 2012. Irrigation water applied (acre-feet) is calculated on the assumption that the irrigation delivery ditch is running at full capacity (25 cubic feet per second or 0.707 cubic meter per second) (Pair et al. 1975). The estimated average irrigation water applied in 2012 was 10.8 acre-feet over the entire site per acre.

Table 3.—Irrigation water applied through September 2012

Phase	Total hours of Irrigation water applied	Amount of irrigation water applied[1] (acre-feet)
Phase 1 – Cottonwood-willow nursery: 20 acres	162	16.87
Phase 1 – Mesquite nursery: 10 acres	33	6.87
Phase 2 – Cottonwood-willow habitat: 78 acres	506	13.51
Phase 3 – Cottonwood-willow habitat: 84 acres	785	19.46
Phase 4 – Cottonwood-willow habitat: 100 acres	714	14.87
Phase 5 – Cottonwood-willow habitat: 216 acres	790	7.61
Phase 6 – Cottonwood-willow habitat: 220 acres	993	9.40
Phase 7 – Cottonwood-willow habitat: 226 acres	999	9.20
Total: 954 acres	4,982	97.79

[1] Amount of water applied does not reflect consumptive use or unmeasured return.

2.2.1 Irrigation Management

The 100-horsepower variable pump failed in November 2012; because of the pump's age, it cannot be repaired and will be replaced with two new 30- horsepower fixed-speed pumps, which are currently on order and will be installed in early 2013.

2.3 Site Maintenance

Normal road maintenance such as grading and gravel road base replacement was done as needed.

2.4 Management of Existing Land Cover Types and Habitat

2.4.1 Weed Management

Invasive weeds and plant material were removed adjacent to the irrigation ditches to protect their integrity. Disking was done quarterly along the levee road. The disking extended 50 feet into the fields to protect the integrity of the levee road.

2.4.2 Pest Management

No pest management was needed this year.

2.4.3 Nursery Management

Plant material will be collected from the nursery in December 2012. The plant material will be used for Cibola National Wildlife Refuge Upper Hippie planting in March 2013.

3.0 MONITORING

3.1 Avian Monitoring

Single species surveys were conducted for the southwestern willow flycatcher and yellow-billed cuckoo. General avian surveys were conducted for six LCR MSCP avian covered species and all non-covered avian species.

3.1.1 Southwestern Willow Flycatcher Surveys

Phases 2 and 3 were surveyed five times during 2012, totaling 18.7 observer hours. No breeding or resident southwestern willow flycatcher were detected. All other birds detected before June 15 were considered to be migrants and not the covered southwestern (*extimus*) subspecies.

- Phase 2 – Four willow flycatchers were detected on May 24, and one was detected on June 12, 2012.

- Phase 3 – Five migrant willow flycatchers were detected on May 24, 2012.

The habitats in Phases 4 and 5 are developing into suitable habitat for southwestern willow flycatcher and will be added to the schedule in 2013.

3.1.2 Yellow-billed Cuckoo Surveys

Five surveys for yellow-billed cuckoos were conducted using the tape-playback method in each of Phases 1–5 between June 17 and August 24, 2012. Cuckoos nested in all five areas (figure 5). Capture and banding results will be detailed in the 2012 yellow-billed cuckoo report.

3.1.3 General Avian Surveys

General avian surveys of habitat creation sites with more than 2 years' growth were conducted between April 15 – June 15. Rapid area search methods (two surveys) were conducted on all plots. Intensive area searches (eight surveys) were conducted on four randomly selected plots. Five Sonoran yellow warbler (*Dendroica petechia sonorana*) pairs were confirmed breeding in Phases 4 and 5,

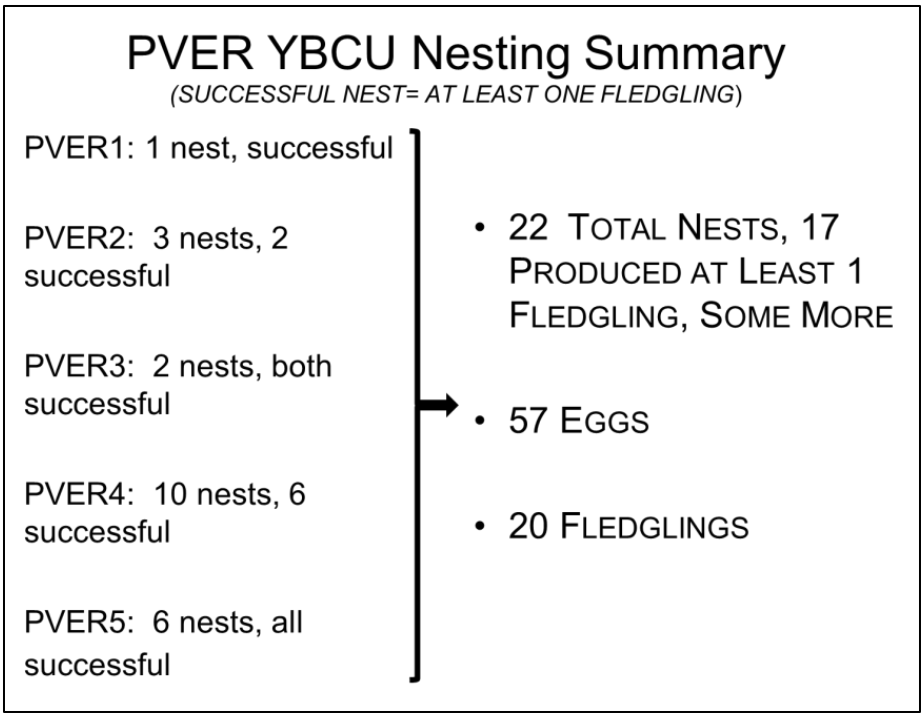

Figure 5.—Yellow-billed cuckoo nesting summary.

and Arizona Bell's vireos were detected but not confirmed breeding. The PVER had a total of 322 confirmed breeding pairs comprised of 22 territorial species (MSCP and non-MSCP species combined).

3.2 Small Mammal Monitoring

3.2.1 Bat Monitoring

Acoustic and capture survey methods were used to monitor and document the presence of bat species within the PVER and to determine the age, sex, and reproductive status of the bats that could be captured.

3.2.1.1 Capture Surveys

Bats were mist netted at the PVER once per month from May – September. Ten western yellow bats, six western red bats, and one California leaf-nosed bat (table 4) were captured, making 2012 the third consecutive year western yellow and red bats have been captured there. Pregnant, juvenile, and reproductive male yellow bats were captured as well as reproductive male red bats and pregnant female red bats, indicating the PVER is being used as a maternity site for both species.

Table 4.—Total bats captured at the PVER in 2010–12
(LCR MSCP species in bold)

Species	2010	2011	2012	Totals
Big brown bat	154	75	70	299
California leaf-nosed bat	**0**	**5**	**1**	**6**
California myotis	3	2	1	6
Cave myotis	31	10	14	55
Mexican free-tailed bat	2	2	5	9
Pallid bat	7	23	10	40
Pocketed free-tailed bat	4	0	0	4
Western mastiff bat	0	1	0	1
Western red bat	**3**	**5**	**6**	**14**
Western yellow bat	**12**	**9**	**10**	**31**
Yuma myotis	16	4	7	27
Totals	232	136	124	492

3.2.2 Rodent Monitoring

Colorado River cotton rats were captured in Phase 4 and Phase 5 in FY12. The accretion land within the river also continues to support a population of this species.

3.3 MacNeill's Sootywing Skipper Monitoring

MacNeill's Sootywing in Phases 4 and 5 were surveyed once per month between April and August. In Phase 4, nine sootywing were observed in April, zero in May, one in June, three in July, and zero in August. No sootywings were detected in Phase 5.

4.0 HABITAT CREATION AND CONSERVATION MEASURE ACCOMPLISHMENT

4.1 Vegetation Monitoring

Vegetation data were collected within several parameters to evaluate the vegetation structure from the ground layer to the upper canopy layer. The parameters included tree and shrub density, tree heights, and canopy closure.

The tree density in cottonwood-willow (cottonwood, Goodding's willow, and coyote willow) habitat was 18–20,915 trees per acre. The shrub (quailbush, willow baccharis, desert broom, and saltcedar) density was 0–121 shrubs per acre. Cottonwood, Goodding's willow, and mesquite tree height average ranges were from over 37 to 55 feet. The average canopy closure ranged from 70–95%.

4.2 Abiotic Monitoring

A soil moisture pilot study was initiated to determine the appropriate instrumentation for data collection. Instrumentation was installed at the PVER in June, and soil sampling was conducted at each sensor location. Since June, data on irrigation and soil moisture gradients from the irrigation gates to the end of each irrigation check, the effects of soil texture on moisture, and overall irrigation distribution have been recorded with the monitoring instrumentation.

4.3 Evaluation of the Palo Verde Ecological Reserve

The Final Habitat Creation Conservation Measure Accomplishment Tracking Process was finalized in October 2011 (Reclamation 2011). All areas within the PVER were designed to benefit covered species at the landscape level.

To meet species habitat creation requirements, the HCP provides goals for habitat creation based on land cover types. These land cover types are described using the Anderson and Ohmart vegetation classification system (Anderson et al. 1976, 1984a, 1984 b). In 2012, the PVER supported 283 acres of cottonwood-willow structure type I, 216 acres of cottonwood-willow structure type II, 220 acres of cottonwood-willow structure type IV, 226 acres of cottonwood-willow structure type V, and 40 acres of honey mesquite structure type III. Table 5 shows how much habitat has been created for each of the targeted covered species at the PVER. Ten species with habitat creation goals have creditable acres, with four additional species being added this year at the PVER. These species (including their corresponding conservation measure acronym) are: western red bat (WRBA2), yellow-billed cuckoo (YBCU1), elf owl (ELOW1), gilded flicker (GIFL1), Gila woodpecker (GIWO1), vermilion flycatcher (VEFL1), Arizona Bell's vireo (BEVI1), Sonoran yellow warbler (YWAR1), summer tanager (SUTA1) and the MacNeil's sootywing (MNSW2).

Table 5.—Species-specific habitat creation conservation measure creditable total acres for 2012

Species-specific habitat creation conservation measure	WIFL1[1]	WRBA2	WYBA3[2]	CRCR2[3]	YBCU1	ELOW1	GIFL1	GIWO1	VEFL1	BEVI1	YWAR1	SUTA1	MNSW2
Creditable acres in 2012	0	216	0	0	216	216	216	436	436	260	436	216	40
Total, including previous years	0	499	0	0	499	499	499	935	935	476	935	499	40

[1] Although the PVER provides the appropriate structure type (cottonwood-willow I–IV) as defined in WIFL1 of the HCP, Reclamation is in the process of gathering the appropriate hydrologic data to determine saturated soils, moist soils, or slow-moving water. Once this has been determined, the PVER will be evaluated.

[2] Reclamation is in the process of determining foraging and roosting habitat for the western yellow bat. Once this has been determined, the PVER will be evaluated.

[3] The preliminary data suggest the Colorado River cotton rat uses both cottonwood-willow and fringe marsh habitats. Reclamation is in the process of evaluating data collected to determine marsh and cottonwood-willow habitat uses by this species.

In 2011, it was reported that management guidelines had been established and data would be collected with the guidelines in mind. However, after a thorough evaluation of each targeted species management guideline, it was determined that there was a need to capture all the species habitat requirements in a dynamic model so that multiple species habitat requirements could be evaluated together. The LCR MSCP decided to develop conceptual ecological models (CEMs) for each species with habitat creation goals and then combine the targeted species CEMs for evaluation of the PVER. Once these CEMs have been developed and tested at the PVER, modified management guidelines will be established and reported as appropriate.

5.0 ADAPTIVE MANAGEMENT RECOMMENDATIONS

Adaptive management relies on the initial receipt of new information, the analysis of that information, and the incorporation of the new information into the design and/or direction of future project work (Reclamation 2007). Under the Adaptive Management Program, habitat creation sites will be assessed for biological effectiveness and whether they fulfill the conservation measures outlined in the Habitat Conservation Plan for 26 covered species and potentially benefit 5 evaluation species. Post-development monitoring and species research results will be used to adaptively manage habitat creation sites after initial implementation. Once monitoring data are collected over a few years, and then

analyzed for the PVER, recommendations may be made through the adaptive management process for site improvements in the future. At this time, there are no adaptive management recommendations for the site.

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