

# Lower Colorado River Multi-Species Conservation Program



*Balancing Resource Use and Conservation*

## Palo Verde Ecological Reserve Restoration Development and Monitoring Plan: Phase 8



May 2012

# Lower Colorado River Multi-Species Conservation Program

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National Park Service  
Bureau of Land Management  
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Western Area Power Administration

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Lower Colorado River RC&D Area, Inc.  
The Nature Conservancy



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Multi-Species Conservation Program Office  
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# Contents

Background .....	1
1.0 Purpose.....	4
2.0 Design and Planting Plan .....	4
2.1 Check Size and Infrastructure.....	5
2.2 Weed Management .....	7
2.3 Grading/Contouring .....	7
2.4 Irrigation .....	7
3.0 Monitoring .....	9
3.1 Pre-development Monitoring.....	9
3.2 Post-development Monitoring .....	9
3.2.1 Implementation Monitoring.....	9
3.2.2 Response Monitoring (Species Monitoring).....	10
3.3 Vegetation Classification .....	12
4.0 Adaptive Management .....	13
4.1 Role .....	13
4.2 Monitoring Analysis and Evaluation .....	13
Literature Cited .....	15

## Figures

Figure 1. Proposed Phasing Map .....	2
Figure 2. Typical Mesquite and Alkali Sacaton Planting .....	5
Figure 3. Phase 8 Pre-Development Design .....	6

## Tables

Table 1. Phase 1-8 Managed Acres.....	3
Table 2. Phase 8 Native Plant Species List.....	4
Table 3. Phase 8 Check Planting Percentage Rates and Spacing .....	7
Table 4. Phase 8 Irrigation Schedule: First Year Planting, Mesquite, Native Grasses and/or Quailbush.....	8
Table 5. Phase 8 Irrigation Schedule: Year 2 and Beyond, Mesquite, Native Grasses and/or Quailbush.....	8
Table 6. Vegetation Communities, Criteria, and Types.....	12
Table 7. Vegetation Classification.....	12

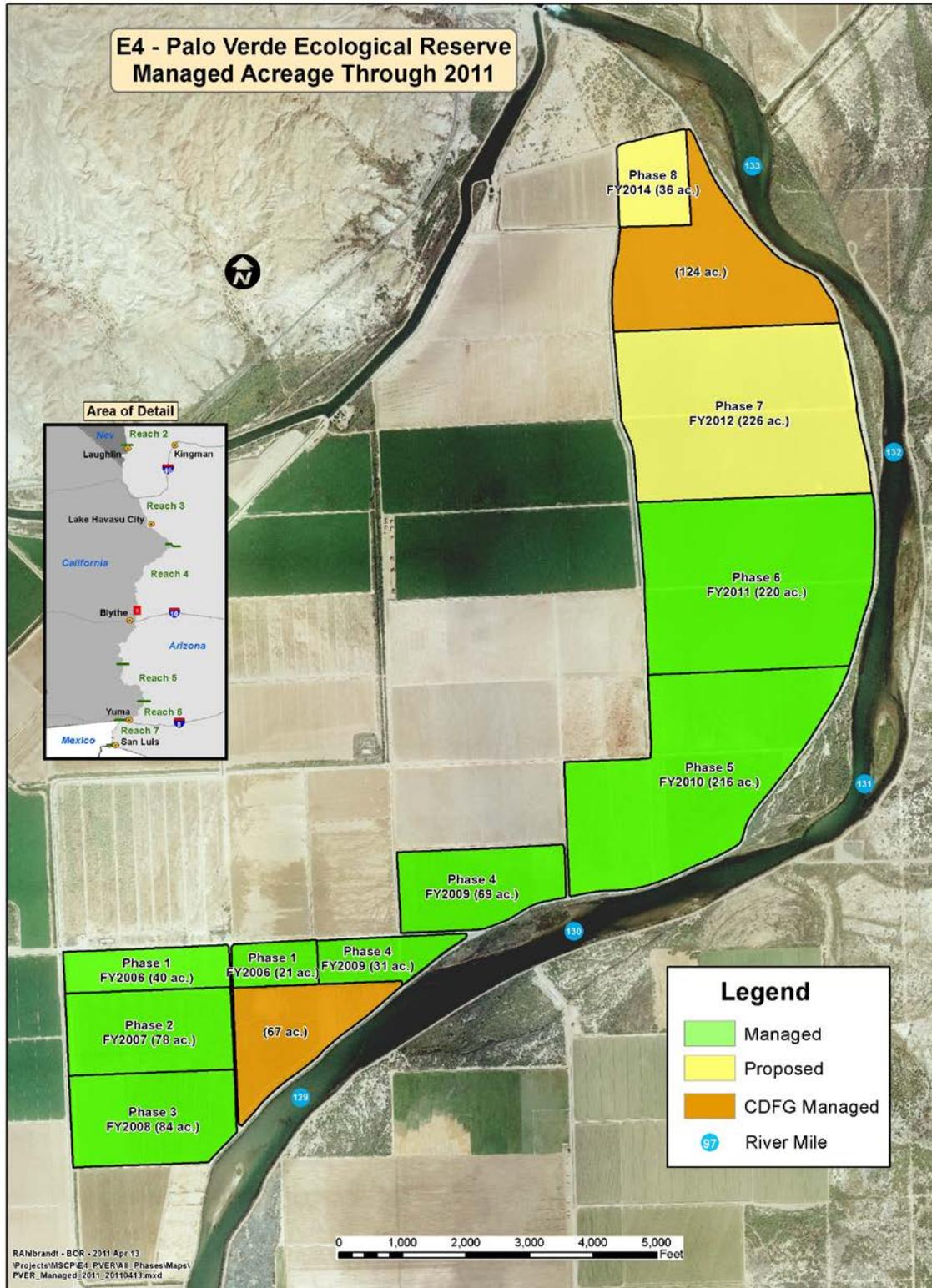
# Background

An important requirement of the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) is to create habitat (as defined by Anderson and Ohmart vegetation classification) and fulfill conservation measures for covered species. The Palo Verde Ecological Reserve (PVER) encompasses 1,352 acres of the historical floodplain of the Colorado River near Blythe, California, and is intended to help fulfill this requirement. 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 a minimum of 1,100 acres of active agricultural lands on this property for habitat restoration under the LCR MSCP.

The California Department of Fish and Game (CDFG) and the LCR MSCP are jointly planning the conversion of portions of 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 proposed development of the property is shown in Figure 1. Additional site information can be found on the LCR MSCP website ([www.lcrmscp.gov](http://www.lcrmscp.gov)) in the report, *Palo Verde Ecological Reserve Restoration Development Plan: Overview*.

Figure 1. Proposed Phasing Map



In Phase 1, during Fiscal Year 2006 (FY06), 61 acres of riparian nursery (to include cottonwood-willow and mesquite) were established (Table 1). In Phase 2 (FY07), 78 acres were established. In Phase 3, 45 acres were established in FY08 and 39 acres were established in FY09. In Phase 4 (FY09), 100 acres were established, in Phase 5 (FY10), 216 acres were established, and in Phase 6 (FY11), 216 acres were established. In Phase 7 (FY12), 226 acres will be planted.

Additional information on the design, planting, and monitoring of phases 1-7 can be found in the reports: *Palo Verde Ecological Reserve Restoration Development Plan: Phase 1*; *Palo Verde Ecological Reserve Restoration Development Plan: Phase 2*; *Palo Verde Ecological Reserve Restoration Development Plan: Phase 3*; *Palo Verde Ecological Reserve Restoration Development Plan: Phase 4*; *Palo Verde Ecological Reserve Restoration Development Plan: Phase 5*; *Palo Verde Ecological Reserve Restoration Development Plan: Phase 6*; and *Palo Verde Ecological Reserve Restoration Development Plan: Phase 7*. These reports are available on the LCR MSCP website.

**Table 1. Phase 1-8 Managed Acres**

Phase	Fiscal Year	Acres Planted	Land Cover Type	Cumulative Total
1	2006	61	CW	61
2	2007	78	CW	139
3	2008	84	CW	223
4	2009	100	CW	323
5	2010	216	CW	539
6	2011	220	CW	759
7*	2012	*226	CW	985
8	2013	38	Mesquite	1023

\*acres to be planted in 2012

# 1.0 Purpose

The objective of Phase 8 is to create, develop, and maintain approximately 38 acres of honey mesquite seral stage III. Each phase builds upon previously created habitat mosaics within the site, with the eventual goal of creating approximately 1,100 acres of riparian habitat.

Phase 8 will directly benefit species such as vermilion flycatcher, elf owl, and Bell’s vireo. As part of the larger mosaic of habitat at PVER, it will add to abundance and diversity of insects used as food by the southwestern flycatcher (SWFL), yellow-billed cuckoo (YBCU), and other covered bird and bat species. Mesquite habitat with Atriplex interspersed is also an important component of habitat for the MacNeill’s sootywing skipper (LCR MSCP 2004).

# 2.0 Design and Planting Plan

In Phase 8 of PVER development, 38 acres of honey mesquite will be developed with the intent of creating habitat using hand planting techniques. The design incorporates honey mesquite and open areas of native grasses (Table 2). The acreage will be divided into five checks (areas between borders) for water management. After the initial growing season, it is anticipated that irrigation schedules for vegetation species with higher water requirements, such as cottonwood and willow, will be kept on the same schedule, whereas vegetation with lower water requirements, such as mesquite and quailbush, will be placed on a reduced schedule.

**Table 2. Phase 8 Native Plant Species List**

Scientific Name	Common Name	Type
<i>Prosopis glandulosa</i> var. <i>torreyana</i>	Honey mesquite	Tree
<i>Sporobolus airoides</i>	Alkali sacaton	Grass

The entire acreage will be disked and prepared for planting using standard farming techniques. Fertilizer will be applied prior to planting. Borders will be disked and placed, separating the fields into five checks (Figure 2). Prior to tree planting, a cover crop of alkali sacaton will be seeded in all checks. Cover crops planted in previous restoration sites have proven effective for reducing the amount of invasive weeds. Atriplex may be added at a later date for more structural diversity and for sootywing skipper habitat.

**Figure 2. Typical Mesquite and Alkali Sacaton Planting**

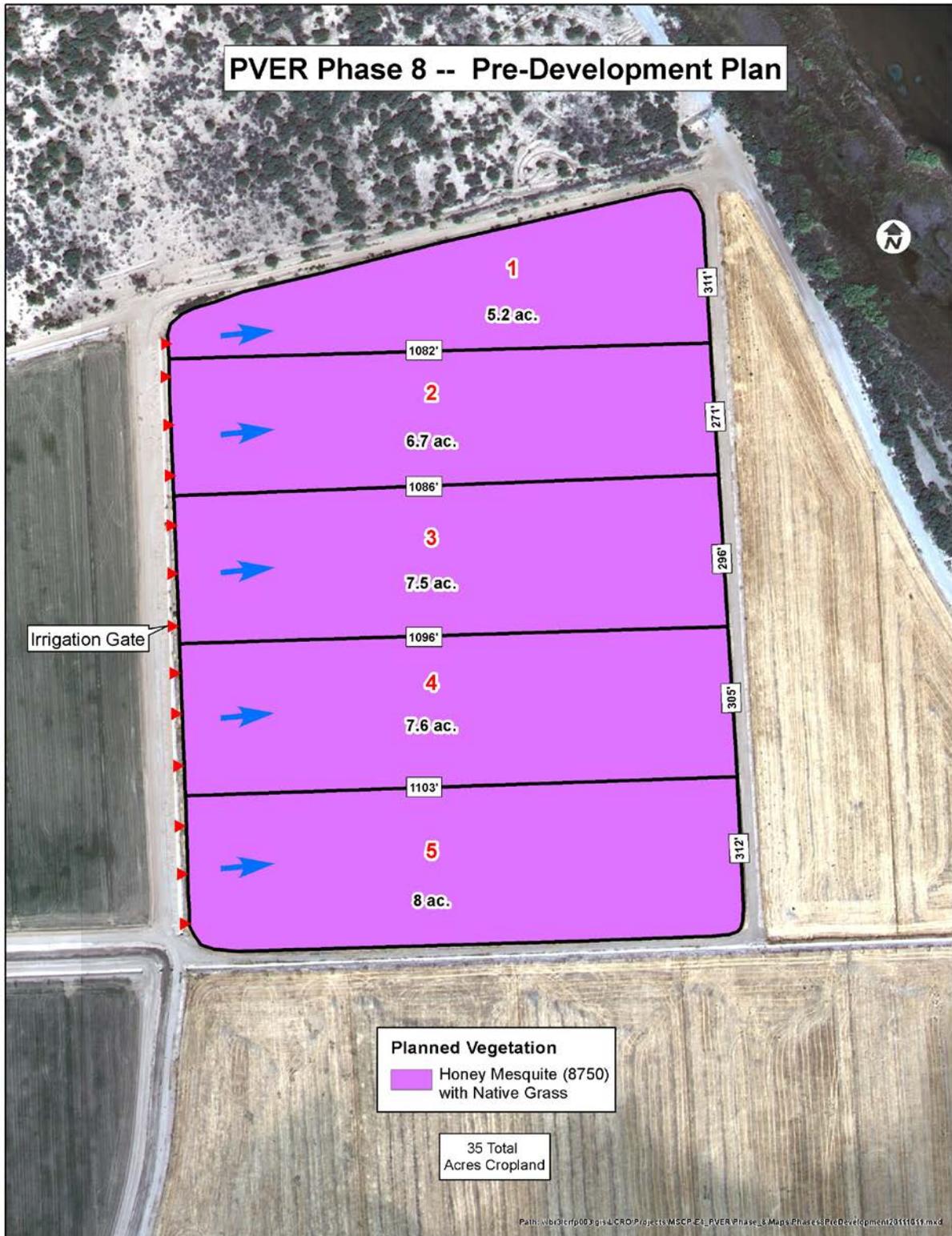


Mesquite trees are hand planted; typically sacaton seed is drilled.

## **2.1 Check Size and Infrastructure**

Checks 1-5 vary from 295 feet to 307 feet wide and 1,096 feet long (Figure 3). All checks will be planted with mesquite trees 13 feet on-center (Table 3). Alkali sacaton grass will be seeded at the same time.

Figure 3. Phase 8 Pre-Development Design



**Table 3. Phase 8 Check Planting Percentage Rates and Spacing**

Check	Honey Mesquite	Native Grass Seed and Plants	13-ft on Center	Total Plants
1	1275	X	X	1275
2	1675	X	X	1675
3	1875	X	X	1875
4	1900	X	X	1900
5	1950	X	X	1950

## **2.2 Weed Management**

If necessary, invasive weeds such as morning-glory, pigweed, and dodder will be managed by a Certified Pesticide Applicator or controlled by manual hand picking.

## **2.3 Grading/Contouring**

The fields will be laser-leveled to ensure efficient flood irrigation and drainage. No grading or contouring is expected on Phase 8. Borders will be reworked for efficient water control and delivery.

## **2.4 Irrigation**

The anticipated irrigation schedule for the first calendar year is shown in Table 4 for mesquite and in Table 5 for Year 2 and beyond. Irrigation regimes may be modified due to climatic conditions such as rain, wind, and high temperatures, or to ensure vegetation moisture requirements are met during the first five years.

Irrigation water will be delivered by two canals. Checks 1-5 will be irrigated with flows of water from west to east.

**Table 4. Phase 8 Irrigation Schedule: First Year Planting, Mesquite, Native Grasses and/or Quailbush**

<b>Day/Week/Month</b>	<b>Frequency</b>	<b>Comments</b>
Planting day	Immediately post-planting	
Week 1-4: April, May	Once every 3 weeks	Or less if plants show signs of overwatering
June, July, August	Once per month	Or less if plants show signs of overwatering
September	No water	
October	Once	Immediately after planting mesquite
November	Once	
December	No water	

**Table 5. Phase 8 Irrigation Schedule: Year 2 and Beyond, Mesquite, Native Grasses and/or Quailbush**

<b>Day/Week/Month</b>	<b>Frequency</b>	<b>Comments</b>
Spring	Once per month	Or less if plants show signs of overwatering
Summer	Once per month	Or less if plants show signs of overwatering
Fall	Once per month	Or less if plants show signs of overwatering

## 3.0 Monitoring

Conservation area monitoring plans are based on elements described in the LCR MSCP Habitat Conservation Plan (LCR MSCP 2004) and Final Science Strategy (LCR MSCP 2007).

Monitoring results will be used as part of the adaptive management process as discussed in Section 4.0. Monitoring at PVER is structured into two main categories:

- Pre-development Monitoring
- Post-development Monitoring
  - Implementation Monitoring
  - Response Monitoring (Species Monitoring)

### 3.1 Pre-development Monitoring

Pre-development surveys and monitoring at former agricultural sites including PVER Phase 8 will be limited to initiation of photo-point monitoring.

Photo-point monitoring will be initiated at PVER Phase 8 beginning in 2013. Initially, photos will be taken after the field has been plowed (before planting), immediately after planting, and six months after planting.

### 3.2 Post-development Monitoring

Post-development monitoring will be implemented to assess the effectiveness of each habitat creation site and management activities in achieving the goals of the HCP. Post-development monitoring includes implementation monitoring and response monitoring components that allow each habitat creation site to achieve the target goals of the HCP through an adaptive management process (LCR MSCP Science Strategy 2007).

#### 3.2.1 Implementation Monitoring

Implementation monitoring includes evaluating habitat characteristics and documenting success of habitat creation techniques. Implementation monitoring includes biotic and abiotic components. Habitat characteristics including soils, plant community composition, and structure will be evaluated at PVER Phase 8.

##### 3.2.1.1 *Habitat Monitoring*

Habitat monitoring was designed to determine whether habitat creation sites are providing the habitat requirements (as defined by performance standards) needed for the targeted covered species. Monitoring protocols have been developed and will document vegetation. A three-tiered approach to habitat monitoring will be implemented at all developed phases. The three tiers are:

- Status Monitoring: Assess the current conditions of each phase.

- Trend Monitoring and Causal Analysis: Determine change over time and potential causes of that change by evaluating specific habitat parameters.
- Effectiveness Monitoring: Determine whether management actions are having the intended impact to LCR MSCP covered species; test the effectiveness of various experiments designed to assist the LCR MSCP in achieving conservation goals.

Objectives for Tier 1 and Tier 2 at PVER Phase 8 include:

- Biotic Monitoring
  - Determine the current density of target tree species, mesquite (*Prosopis glandulosa*) at PVER Phase 8.
  - Assess change in density, species richness, vegetation structure, and frequency of native and non-native plant species occurring at PVER Phase 8.
- Abiotic Monitoring
  - Assess the abiotic factors that may include distance to nearest irrigation inlet, distance to nearest open space ( $\geq 3 \text{ m}^2$ ), and soil texture, nutrients, and moisture that may influence the density of target tree species and the overall vegetation community composition/structure at PVER Phase 8.

### **3.2.1.2 Vegetation Sampling**

Vegetation data collection will begin in September and continue through November. Phase 8 will be monitored annually for three years and then every other year in subsequent years. Detailed methods can be found in the LCR MSCP Habitat Monitoring Protocols.

Rapid plots will be conducted to assess the goal of establishing honey mesquite III land cover type. The rapid plots will be used for quick density assessments of target tree species. Intensive plots will be conducted to address trends in density, species richness, vegetation structure, and microclimate, if applicable. The number of plots per phase is dependent on the size of the phase being monitored. Intensive plots will be evaluated for overstory trees, intermediate story trees and shrubs, crown closure, foliage height diversity, and ground cover/herbaceous layer.

### **3.2.1.3 Microclimate Sampling**

Where appropriate, HOBO data loggers will be placed at a subset of vegetation plots to record temperature, relative humidity, and photosynthetically active radiation (PAR). Data will be offloaded approximately every six months.

Soil moisture or plant available water may be monitored at a subset of the intensive monitoring plots and at additional random points if habitat becomes suitable for sootywing.

## **3.2.2 Response Monitoring (Species Monitoring)**

Species monitoring is designed to determine whether Phase 8 is providing the habitat requirements (as defined by performance standards) needed for the targeted covered species. Species monitoring will also document whether any other species are using the created habitat.

Monitoring protocols have been developed for documenting species response to created land cover types:

- MacNeill's Sootywing Skipper
  - If quailbush develops on the site and is providing suitable habitat for MacNeill's sootywing, then sootywing surveys will commence. The entire quailbush areas will be examined for adult sootywings twice during April-August, and randomly selected plants will be sampled for sootywing eggs and larvae.
- Neotropical Birds
  - A standardized, double-sampling, rapid-intensive, area search survey will be employed. Surveys will be conducted annually during the breeding season (April-June) beginning the second week of April after planting Phase 8.
  - If covered species are observed, nest searches, and mistnetting/banding may be conducted.
- Cavity Nesting Birds
  - Elf owl presence/absence surveys will be conducted once appropriate habitat is present. Because elf owls are secondary cavity nesters, the habitat will need to mature and cavities or nest boxes will need to be present prior to elf owl occupation. The habitat will be observed during neotropical bird surveys for the presence of cavities and primary cavity nesters (woodpeckers). If nest boxes are installed, they will be monitored during the breeding season. If elf owls are detected during the breeding season, nest searches and mistnetting/banding may be conducted.
  - Gilded flickers and Gila woodpeckers will be surveyed as part of the system-wide neotropical bird monitoring effort. Once suitable nesting habitat (snags and cavities) develops on the site, more directed presence/absence surveys may be necessary for gilded flicker. If detected during breeding season, nest searches and mistnetting/banding may be conducted.
- Small Mammals
  - Post-development monitoring will be conducted for presence of cotton rats. Trapping will occur at night and will be concentrated in areas where native grasses are being planted. The number of traps will be determined by how much of the native grass successfully develops in dense enough patches that a cotton rat population can be sustained.
- Bats
  - A long-term acoustic station has been operating at PVER since the spring of 2010 in other phases similar to Phase 8 and serves as a surrogate for other phases. An additional long-term station may be installed at a later date.

### 3.3 Vegetation Classification

The LCR MSCP Habitat Conservation Plan (LCR MSCP 2004) outlines the specific habitat acreage to be created. The Anderson and Ohmart vegetation classification system (Anderson and Ohmart 1976, 1984) will be used to track the total land covered type managed by the program annually. To map the vegetation at PVER, Reclamation will annually obtain aerial imagery of the site. Each phase will be classified using the Anderson and Ohmart system (Tables 6 and 7).

**Table 6. Vegetation Communities, Criteria, and Types**

Community Type	Criteria	Vegetation Structural Type
Cottonwood-willow (CW)	<i>P. fremontii</i> and/or <i>S. gooddingii</i> constituting at least 10% of total trees	I, II, III, IV, V, VI
Saltcedar (SC)	<i>Tamarix</i> spp. constituting 80-100% of total trees	I, II, III, IV, V, VI
Saltcedar-Honey mesquite (SH)	<i>P. glandulosa</i> constituting at least 10% of total trees	I, II, III, IV, V, VI
Saltcedar-Screwbean mesquite (SM)	<i>P. pubescens</i> constituting at least 20% of total trees	I, II, III, IV, V, VI
Honey mesquite (HM)	<i>P. glandulosa</i> constituting at least 90% of total trees	I, II, III, IV, V, VI
Arrowweed (AW)	<i>Tessaria sericea</i> constituting at least 90-100% of total vegetation area	I, II, III, IV, V, VI
<i>Atriplex</i> spp. (ATX)	<i>A. lentiformis</i> , <i>A. canescens</i> , and/or <i>A. polycarpa</i> constituting 90-100% of total vegetation in area	I, II, III, IV, V, VI

(From Anderson and Ohmart 1984)

**Table 7. Vegetation Classification**

Structure Type	Characteristics
I	Mature stand with distinctive overstory greater than 15 feet high, intermediate class from 2 to 15 feet tall, and understory from 0 to 2 feet high
II	Stand with overstory (>15 feet) constituting greater than 50% of the trees with little or no intermediate class present
III	Stand with largest proportion of trees between 10 and 20 feet high with few trees above 20 feet or below 5 feet
IV	Few trees above 15 feet present; 50% of the vegetation is 5 to 15 feet tall with the other 50% between 0 and 2 feet high
V	60-70% of the vegetation present is between 0 and 2 feet tall with the remainder in the 5 to 15 foot class
VI	75-100% of the vegetation is from 0 to 2 feet high

(From Anderson and Ohmart 1984)

## **4.0 Adaptive Management**

### **4.1 Role**

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 (LCR MSCP, 2007). The Adaptive Management Program's role is to ensure habitat creation sites are biologically effective and fulfill the conservation measures outlined in the HCP for 26 covered species, and potentially benefit five evaluation species. Post-development monitoring and species research results will be used to adaptively manage habitat creation sites after initial implementation.

If it is determined through the monitoring results that additional information is needed to better define covered species habitat requirements, these data will be collected using the procedures outlined in the LCR MSCP Science Strategy (LCR MSCP, 2007). The Science Strategy provides for an adaptive management process for improving the effectiveness of HCP implementation and identification of monitoring and research priorities. Alterations or changes to habitat creation sites can be accomplished through management activities; these activities will be initiated through the adaptive management process. Habitat creation sites may be manipulated and/or maintained for covered species using the best available science throughout the term of the HCP.

Another role of the Adaptive Management Program is to determine whether the site is meeting the management guidelines for each targeted species. This is accomplished through analysis of all monitoring data, and comparison with other relevant studies. Annual reports will summarize each created habitat land cover type, acreage, and any adaptive management activities conducted on the site.

### **4.2 Monitoring Analysis and Evaluation**

The LCR MSCP has determined the process for covered species conservation measure accomplishment, including the identification of species-specific management guidelines. Species-specific conservation measure accomplishment will be reported annually in the LCR MSCP Implementation, Work Plan and Budget, and Accomplishment Report, or as appropriate in the PVER annual reports.

Species-specific management guidelines will be used to manage the site to meet the targeted species conservation measure goals. All relevant data, including species, vegetation, and abiotic monitoring, will be used to determine whether the site is meeting the management guidelines as appropriate. Species-specific management guidelines may be updated through the adaptive management process, and then revised in the conservation area management plans.

If monitoring activities document the presence of covered species before management guidelines are met, the management guidelines will be evaluated and updated as appropriate.

If it is determined that the site does not meet any of the management guidelines, recommendations for site modifications may be made by the following means:

- Comparison of monitoring results with management guidelines to identify those guidelines not being met that can be remedied by site manipulations (plant removal, additional plantings, site contouring, etc.) or changes to the watering regime.
- Comparison of Phase 8 results with previous successful and unsuccessful habitat restoration projects to assess differences in site characteristics, baseline conditions, planting design, plant and animal species composition, watering regimes, and abiotic conditions that may help explain why the site has not met the management guidelines.
- Review of other studies that may provide insight into additional covered species habitat requirements or different restoration techniques to achieve the desired conditions.

These recommendations on how to move toward achieving species-specific management guidelines will be included in the annual report, as appropriate. These recommendations will also be used to improve future project designs, where appropriate.

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