

Work Task E4: Palo Verde Ecological Reserve

| FY05 Estimate | FY05 Actual | Cumulative Accomplishment Through FY05 | FY06 Approved Estimate | FY07 Proposed Estimate | FY08 Proposed Estimate | FY09 Proposed Estimate |
|---------------|-------------|----------------------------------------|------------------------|------------------------|------------------------|------------------------|
| \$0 | \$66,745 | \$66,745 | \$310,000 | \$976,000 | \$770,000 | \$1,405,000 |

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Start Date: FY05 **Expected Duration:** FY55

Long-term Goal: Habitat creation

Conservation Measures: CLRA1, WIFL1, WRBA2, WYBA3, CRCR2, YHCR2, LEBI1, YBCU1, ELOW1, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, SUTA1, and MNSW2

Location: Reach 4, CDFG, River Miles 129-133, CA

Purpose: Create and manage a mosaic of native land cover types for LCR MSCP covered species.

Connections with Other Work Tasks (past and future): Vegetation and species monitoring are being addressed under Work Tasks F1-F4. Insect populations evaluated under C5 and C6.

Project Description: The Palo Verde Ecological Reserve (PVER) encompasses over 1,300 acres. This property (formerly known as the Travis Ranch) has been made available to the LCR MSCP for habitat restoration activities by CDFG.

The eastern boundary of the property (over four miles) is adjacent to the Colorado River; the western boundary is adjacent to active agricultural fields. PVER has an extensive infrastructure consisting of miles of lined irrigation ditches, roads, and a pump. Currently, the acreage is leased to a contract farmer and is planted with crops of alfalfa and wheat. Each year a portion of the active crop acreage will be taken out of production in order to develop the next phase of native habitat (Figure E4a). The intent is to create as much riparian habitat as practical. Phase 2 is targeted for SWFL, YBCU, and other covered species.

To date, standard farming practices are an efficient and effective way to convert agricultural cropland to habitat. Costs for development and maintenance of the habitat include such farming methods as land leveling, disking, irrigation of crops, repair and maintenance of the irrigation system, fertilizer, and herbicide. Palo Verde Irrigation District provides water to PVER. The costs associated with irrigation, electricity and water are proportional to the amount of acreage that has been converted to habitat.

The mass transplanting technique has shown to be a cost effective method for planting riparian trees and shrubs. This method includes the collection of plant material, propagation, and planting of native species.

It is essential to have a mosaic of habitats which consist of areas of riparian species (including mesquite), and ground covers or open areas. Ground cover is an effective method of controlling non-native species and provides another layer of vegetation for habitat. Ground covers are planted with transplants or by seed; costs vary by methods of planting used. Mesquite trees are generally planted by the use of a tree planter or auger. Typically, mesquite costs are based on a one-gallon planted tree.

Agricultural areas have irrigation systems in place which are conducive for water management of riparian species. However, standing or saturated soil areas for covered species may need to be created or amended, and managed throughout the term of the program.

FY05 Accomplishments: Discussions were initiated with CDFG to define future restoration actions at PVER. An environmental assessment for compliance was completed, as well as cultural resources compliance for the entire 1,438 acres (approximately 1,300 irrigable acres). A preliminary phase schedule for conversion of agricultural crops to native habitat was developed (Figure E4a).

FY06 Activities: The phase schedule has been developed and is being reviewed with CDFG. The schedule was made available to the contract farmer, so that each year a known amount of acreage will come out of agricultural production and be made available for habitat restoration. Party responsibilities and securing an interest in the land and water for the LCR MSCP is being documented in a restoration agreement between Reclamation and CDFG, which is currently under development.

The plan and design for Phase 1 development of a native plant nursery was drafted and posted on the website early in FY06. In Phase 1, a native nursery was planned, designed, and planted. This nursery will provide plant material for future restoration activities. A total of 31 acres consisting of 2,200 riparian trees and shrubs (Figures E4b and E4c), along with a ground cover of salt grass were planted in the spring. The trees and shrubs were planted on 20-foot on center allowing easy access for future collection of seeds, poles, whips, and leaf material.

The *Palo Verde Ecological Reserve Restoration Development Plan: Overview*, a general document describing the entire project including an adaptive management plan and a monitoring plan, has been drafted and is expected to be available in FY06. In Phases 2-3 (FY06-08), cottonwood-willow land cover type will be established to provide habitat for SWFL, in accordance with the 2001 SIA obligations being accomplished by the LCR MSCP. The plan and design for Phase 2 (80 acres) has been developed and will be posted on the LCR MSCP website. Phase 2 includes three components: (1) habitat creation with a research component, (2) demonstrations of soil amendments and pond liner products, and (3) mass planting of trees and shrubs in a design that will integrate proximity of irrigation source with water requirements of native plants.

Section 1 – Restoration of Riparian Habitat on the LCR: Implications of genetic and vegetation density factors on habitat properties of the Southwestern Willow Flycatcher

The following habitat creation project includes a part of the research and development component identified in the FY06 PVER work plan and in Phase II of the *Palo Verde Ecological Reserve Development Plan*. This project is intended to serve as a research-based approach to habitat creation. As in other individual projects identified for Phase II at PVER, this project is specifically targeted as habitat creation for SWFL to fulfill part of the acreage designated by the SIA for the LCR MSCP. The project will be located on an approximately 17-acre field at PVER. Vegetation species composition, density, structure, and moisture regime will be established and managed for SWFL. In addition, research will be conducted on this acreage to provide information specific to increasing our knowledge in how to effectively create habitat for SWFL. This information will be used to increase our effectiveness in future habitat creation projects.

As Reclamation moves forward into implementation of the LCR MSCP, is it essential to establish repeatable methods for habitat creation early-on. Unlike a purely scientific experiment, this project blends habitat creation with an organized, systematic approach to filling some of our knowledge gaps. There are advantages to this approach as well as tradeoffs. The most notable advantage is achieving part of the acreage goals for our SIA commitment; the most obvious tradeoff is the limitation of treatments and control due to high potential variability. Overall we believe that the project is a practical blend of habitat creation and scientific research that moves us closer to achieving program goals.

In essence, the research part of this project focuses on two treatments: riparian species composition/density and specific/combined genotype effects and how they influence the suite of physical habitat parameters and prey base for SWFL. In this way, we will gain insight into how altering riparian species density and composition (a habitat establishment technique) can improve habitat creation effectiveness for SWFL. Previous research has implicated genetic diversity in dominant riparian vegetation as important for the survival of associated rare and endangered species and has gone on to suggest that specific genotype effects can be vital for supporting particular species due to the trophic interactions that they permit. This study will allow us to determine if these effects are present in co-evolved riparian communities that influence LCR ecosystems and how important they are for SWFL in the context of practical habitat creation approaches. In addition, we will be including high genetic diversity within this created habitat for the added benefits of potential resistance to disease and insect outbreaks, and insight into specific genotype growth and survival performance in this setting.

Reclamation has entered into a 3 year cooperative agreement with NAU. NAU's contribution to this agreement includes: genetic screening of 3 riparian tree species at 51 sites across drainages with historical genetic influence to the LCR; collection, propagation, and establishment of an experimental garden (~ 20,000 trees) with replicated habitat mosaic treatment blocks and; three years of monitoring SWFL prey base (arthropod diversity and

abundance), monitoring of individual tree growth and performance, and measurement of physical habitat parameters per treatment block including tree density, percent canopy cover, and microclimate (soil moisture, relative humidity, etc.). NAU will provide annual reporting and management recommendations as the site develops. Reclamation's contribution to this agreement includes agreement administration, assistance with establishment of the experimental garden (site prep, cover crop, planting equipment), and site irrigation and maintenance costs.

Section 2 – Demonstration of Ponding Techniques: A 5-acre area near the irrigation gates will be used to demonstrate ponding techniques. This study will evaluate soil amendments and containers to promote areas of moist soil and standing water. Soil amendments and/or products will be placed in small areas (approximately 25 feet by 50 feet). Each treatment will be duplicated once. The containers and amendments will be shallow enough to allow flood irrigation to fill and move any residual salts out of the area (6-18"). The wet areas (amendments or containers) will range from small to medium in size and be arranged in clusters, to create large pockets of standing or saturated soil areas. This will create areas of humidity and for insect production needed for a food source for the Southwestern willow flycatcher and other covered species.

Section 3 – Mass Transplanting Riparian Trees and Shrubs: The remaining 55 acres will be planted using the mass transplanting technique. The preferred habitat parameters of the SWFL are incorporated into the design, including the maximization of the Goodding's willow/coyote willow edge relationship within the mosaic of riparian vegetation. Water intensive trees and shrubs are located closest to the irrigation gates to utilize the higher amount of water around the irrigation gates. Plants with the least water requirement (*Atriplex* and mesquite) will be planted farthest away from the gates.

A one-year contract with four optional years was awarded for the collection, propagation, and mass transplanting of native trees and shrubs. The contract will provide plantings of trees and shrubs for up to 1,100 acres of future habitat restoration sites over the next 5 years.

Proposed FY07 Activities: Site preparation for mass transplanting of riparian trees and shrubs on approximately 80 acres will be performed. Ponding techniques and NAU research will begin in spring 2007. Cottonwood-willow planting will begin in March. The mesquite trees will be planted in fall 2007, after one growing season at the nursery. The soil amendments and water retention products will be in place in the spring. Monthly observations of the demonstration products will be recorded through the year. The plan and design for Phase 3 is being developed.

Pertinent Reports:

Palo Verde Ecological Reserve Development Plan: Overview will be posted to the LCR MSCP website.

Palo Verde Ecological Reserve Development Plan: Phase 1 has been posted to the LCR MSCP website.

Palo Verde Ecological Reserve Development Plan: Phase 2 will be posted to the LCR MSCP website and a study plan is available upon request.

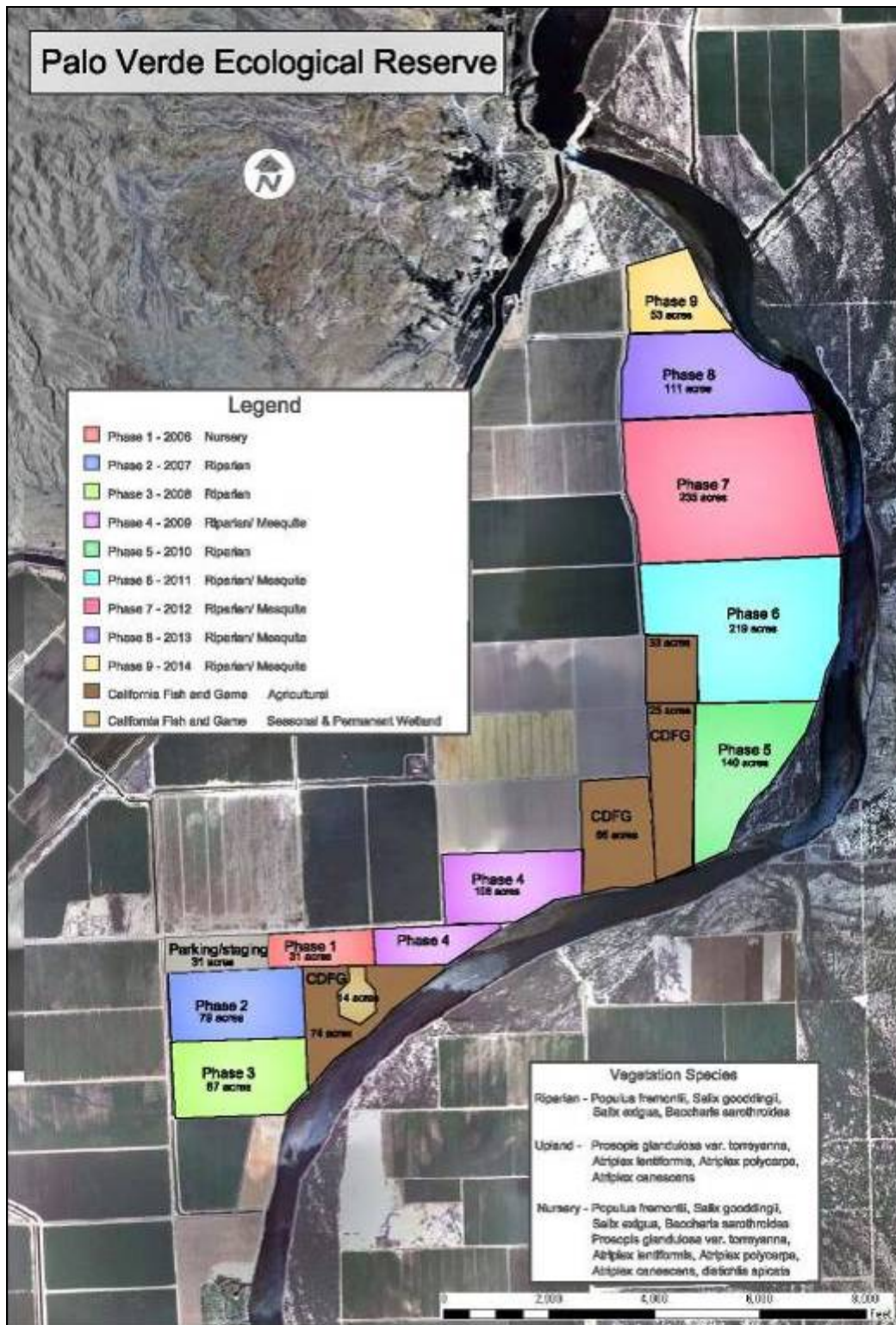


Figure E-4a: Proposed phasing schedule of agricultural crops to riparian habitat.



Figure E4b: Willow trees, with alfalfa as a cover crop, in the native plant nursery.



Figure E4c: Hand planting *Atriplex lentiformis* in the nursery.