Work Task E5: Cibola Valley Conservation Area

FY05 Estimate	FY05 Actual	Cumulative Accomplishment Through FY05	FY06 Approved Estimate	FY07 Proposed Estimate	FY08 Proposed Estimate	FY09 Proposed Estimate
$120,000	$117,716	$117,716	$1,633,000	$2,656,000	$1,594,000	$1,566,000

Contact: Bill Singleton, (702) 293-8159

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

Long-term Goal: Habitat creation

Conservation Measures: CLRA1, WIFL1, WRBA2, WYBA3, CRCR2, YHCR2, LEBI1, BLRA1, YBCU1, ELOW1, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, SUTA1 and MNSW2

Location: Reach 4, River Miles 99-104, AZ

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

Connections with Other Work Tasks (past and future): This Work Task was previously included in the Draft FY05 Work Tasks as Cibola Valley Conservation Area (E8). Vegetation and species monitoring are being addressed, F1-F4. Native trees are being established using techniques described in E7. Insect populations are being investigated as described in Work Task C5.

Project Description: Mohave County Water Authority (MCWA) owns and manages 1,019 acres of active agricultural lands serviced by the Cibola Valley Irrigation and Drainage District. MCWA has made the lands available for restoration by the LCR MSCP. These lands are referred to as the Cibola Valley Conservation Area (CVCA). Due to the size of the property, and to allow for implementation of the Adaptive Management Program, the property is being developed in annual phases.

Overall development of the property is discussed in a document entitled *Cibola Valley Conservation Area Restoration Development Plan: Overview* which will be posted on the LCR MSCP website in FY06. A specific "Phase Plan" will be developed and posted. These documents will include information discussing the various planting and monitoring concepts utilized.

Additionally, work is underway in conjunction with the University of Arizona, to determine the optimal quantity of irrigation water that should be supplied during native tree establishment. This research is exploring the relationships between soil water supply and tree physiological response and will conclude in February 2009.

In Phases 1-3 (FY06-08), cottonwood-willow land cover type will be established to provide habitat for SWFL, in accordance with the SIA obligations that are being addressed. The remaining lands will be developed as habitat, including buffers, depending on site conditions and water availability. Eighty-six (86) acres were selected for Phase I to establish a 22-acre native plant nursery and create 64 acres of cottonwood-willow habitat to be managed for SWFL. Phase 2, consisting of 76 acres of SWFL habitat, is scheduled for FY07 and is located due south of Phase 1. Phase 3 is scheduled for habitat creation in FY08.

Previous Activities: In anticipation of the implementation of the LCR MSCP, Reclamation evaluated the two primary planting methods utilized on restoration demonstration projects conducted prior to 2001 dormant poles and potted plants. With the exception of the Cibola Nature Trail at Cibola NWR, all demonstration projects were less than seven acres in size. While these methods are effective and result in a high survivability rate, these methods are labor-intensive and do not translate well to large-scale habitat creation. At the scope required to meet LCR MSCP obligations, past methods have proven too costly and labor intensive. The costs and effectiveness of alternative methods are being tested through other Section E Work Tasks and will be evaluated as results become available.

Over the last several years, Reclamation has conducted demonstrations to investigate the feasibility and effectiveness of various methods to achieve dense, rapid-growth plantings of native species; inhibit the establishment and growth of non-native plant species on restoration sites; and evaluate any potential cost benefit of the methods.

FY05 Accomplishments: Planning for development and creation of habitat on CVCA was initiated. Documents for ensuring long-term commitments of all parties and securing interest in land and water began.

Cibola Valley Conservation Area: Restoration Development Plan: Phase 1, which included the planning, design, and engineering for a 22-acre native plant nursery and 64 acres of cottonwood-willow habitat, was drafted.

Environmental compliance activities were completed to allow for planting of Phase 1 and included a class III cultural resources inventory for the entire 1,319 acres owned and managed by MCWA.

FY06 Activities: We are pursuing securing a long-term interest in land and water. A formal LCR MSCP technical workgroup meeting to discuss the *Cibola Valley Conservation Area: Restoration Development Plan: Phase I*, was held in Yuma in December 2006.

Phase 1, an 86-acre parcel, was planted using a vegetable mass transplanter, creating 64 acres of future SWFL habitat. A 22-acre native plant nursery was planted with labor assistance from the Nevada Conservation Corps. The nursery will provide plant material for future restoration activities. A local farmer was contracted to prepare the fields for planting, irrigate as required, and provide repairs as required to the irrigation system infrastructure. Further discussions on land ownership, water issues, and management options are in process.

Reclamation conducted an analysis of the CVCA irrigation system for Phases 1 through 3 (approximately 160 acres) to assess the current status of the irrigation infrastructure, and to recommend alternatives for irrigation rehabilitation/improvement that include itemized cost estimate and irrigation uniformity.

Irrigation research was conducted by the U of A in the Phase 1 location to gather data for future sites. This three-year field experiment will evaluate the response of three native tree species to two different surface irrigation regimes and fertilization. Before the experiment commenced, a local weather station was installed to collect local weather data. Phase 1 fields were thoroughly mapped using electromagnetic induction, which allows for spatial mapping of soil texture and salinity. Following this initial characterization, the fields were planted with an alfalfa cover crop, after which the trees were planted. Tentatively, the irrigation water regimes consisted of "baseline" (6 acre-feet per year) and "excessive" (150% of baseline) application. Soil moisture content, drainage, and tree response are being measured with distance from the irrigation ditch in single plots of each irrigation-treatment tree/species combination. Measurements at varying distances from the irrigation ditch allow for monitoring along gradients of water availability. Additional sub-plots have, and will continue to receive, periodic nitrogen fertilization, and plant response will be measured.

Soil/water content, drainage, and plant response are being measured for three growing seasons. Soil water content and drainage in each irrigation regime will be measured to a depth of 2.5 m by using an array of capacitance sensors. These sensors are equipped with telemetry; thus, the data will be available in near real-time (15 minute intervals). Plant response to the irrigation regimes will be evaluated on whole-plant and leaf bases. Whole plant measurements will be made four times per year and will include plant height, diameter, and leaf area index. During the growing season, leaf water potential and leaf gas exchange will be measured monthly. Plant transpiration (water use) will be monitored continuously by measuring sap flow. Leaf samples will be collected twice per year for analysis of carbon, which is related to water use efficiency.

By measuring soil water content in near real-time, and measuring tree response to irrigation treatments on several temporal scales, the study will determine tree response to irrigation. The research and results will allow estimation of an appropriate irrigation regime for successful habitat restoration.

Cibola Valley Conservation Area: Restoration Development Plan: Phase 2 is being drafted and will be available in FY06. The plan and design for Phase 2 has been developed, with approximately 76 acres being developed and maintained for riparian habitat. The environmental compliance process was initiated for developing the remainder of CVCA.

Proposed FY07 Activities: Provide irrigation and management Phase 1. Research, being conducted by the U of A, which began in FY06, would continue throughout FY08.

Plant and irrigate 76 acres of native plant species as described in the *Cibola Valley Conservation Area Restoration Development Plan: Phase 2*. Planting of Phase 2, combined with trees planted in Phase 1, will form a larger block of native vegetation with the intent of creating an integrated mosaic of habitats. All the acreage will be developed and maintained for riparian habitat

targeting SWFL. The irrigation infrastructure for Phases 1 and 2 will be modified to provide irrigation water for the next 20-30 years. Main access roads will be graveled with type II base to control dust, in accordance with local regulations. Create and post the document entitled *Cibola Valley Conservation Area Restoration Development Plan: Phase 3*, which includes design and planting plan of Phase 3 that would be established in FY08.

Pertinent Reports:

Soil-Plant-Water-Nutrient Relationships of Populus Fremontii, Salix gooddingii, and Salix exigua During Native Habitat Restoration study plan from the Soils Science Department of Soil, Water, and Environmental Science, University of Arizona, is available upon request.
Cibola Valley Conservation Area Draft Report for Phase 1
Cibola Valley Conservation Area Restoration Development Plan: Overview,
Cibola Valley Conservation Area Restoration Development Plan: Phase 1 ,
Cibola Valley Conservation Area Restoration Development Plan: Phase 2 ,
Cibola Valley Conservation Area Restoration Development Plan: Phase 3 will be posted on the LCR MSCP website.

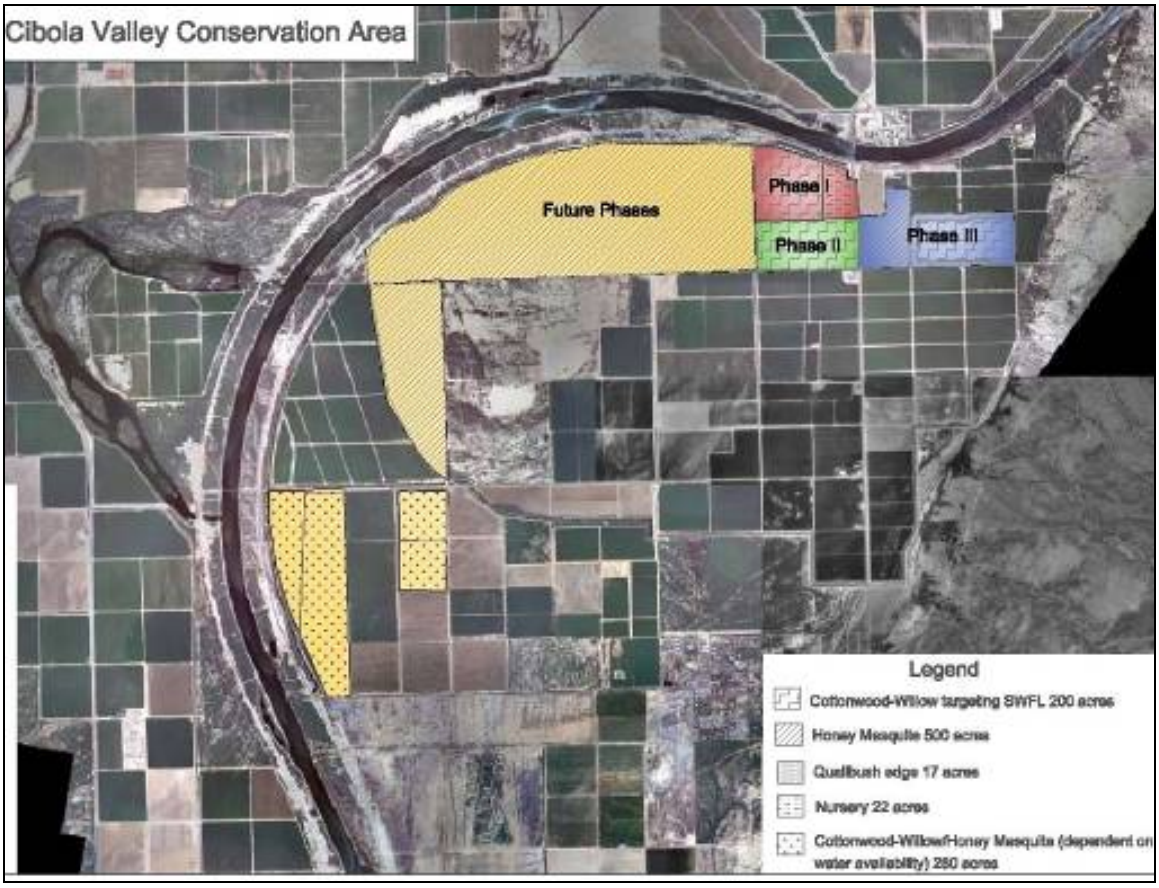

Figure E-5: Potential phasing of habitat creation, beginning with Phase 1 in FY06.