

## Work Task E5: Cibola Valley Conservation Area

FY06 Estimates	FY06 Actual	Cumulative Accomplishment Through FY06	FY07 Approved Estimate	FY08 Proposed Estimate	FY09 Proposed Estimate	FY10 Proposed Estimate
\$1,633,000	*\$1,292,929	\$1,410,645	\$2,656,000	\$1,703,000	\$1,800,000	\$1,950,000

\*FY06 actual reflects the advance purchase, propagation, and planting of trees and shrubs in FY07 as Phase 3. Future estimates reflect this advance purchase strategy.

**Contact:** Bill Singleton, (702) 293-8159, wsingleton@lc.usbr.gov

**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):** Vegetation and species monitoring are being addressed under F1-F4. Insect populations are being investigated as described in C5.

**Project Description:** Mohave County Water Authority (MCWA) owns and manages 1,309 acres of land in Cibola Valley, of which 1,019 acres are active agricultural lands serviced by the Cibola Valley Irrigation and Drainage District. The MCWA has made the lands available for restoration by the LCR MSCP. These lands are referred to as the Cibola Valley Conservation Area (CVCA).

Cibola Valley Conservation Area is located in southwestern La Paz County, Arizona, about 15 miles south of Blythe, California. The valley encompasses the land inside an engineered bend of the lower Colorado River and a remnant oxbow on the west side of the river (Palo Verde Oxbow). It is farmed primarily for cotton and alfalfa. It is bordered to the south by Cibola NWR and on the east by unimproved land under the jurisdiction of BLM. The river forms the north and west boundaries, except for the Palo Verde Oxbow, from river miles 98.8 to 104.9.

Reclamation has an option to secure up to 1,381 ac-ft per year from the MCWA and up to 1,500 ac-ft per year from the Hopi Tribe. The one-time fee to secure this fourth-priority Colorado River Water is \$1,400 per ac-ft adjusted for inflation. In addition, Reclamation already maintains a fourth-priority entitlement of 118.94 ac-ft per year at CVCA.

Work is underway in conjunction with U of A 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.

**Previous Activities:** Environmental compliance activities were completed to allow for planting of Phase 1 and included a class III cultural resources inventory for the entire 1,309 acres owned and managed by MCWA.

**FY06 Accomplishments:** The *Cibola Valley Conservation Area Restoration Development Plan: Overview, Phase 1, Phase 2, and Phase 3* were completed and will be posted on the LCR MSCP Web site in FY07. Planning for development and creation of habitat on CVCA continued. Documents for ensuring long-term commitments of all parties and securing interest in land and water were initiated. Further discussions on land ownership, water issues, and management options are ongoing.

Environmental compliance was initiated, signed, and approved for the 1,309 acres owned and managed by MCWA. This allows for further development activities throughout the entire Cibola Valley Conservation Area.

In March 2006, more than 150,000 coyote willow, Goodding's willow, and Fremont cottonwood were mass transplanted on 59 acres in less than 5 days in accordance with the Phase 1 restoration development plan. Initial survivorship (30 days) was greater than 95%. By June 2006, survivorship was still extremely high and many of the trees had already reached 6 feet in height. In response to an invasion of morning glory, a farm advisory board meeting was held. The advisory board was formed to address farming issues, tap into local resources, and provide information to the local communities. Control measures for morning glory were researched and discussed by the group. Unfortunately, the invasion was too widespread to use herbicide without damaging the existing tree crop. The decision was made to conduct a review of control approaches and available herbicides, monitor the site, mow areas with heavy infestation for future redevelopment, and formulate a morning glory control plan for management of Phase 1 and development of future phases. It is not uncommon for native trees established to have to compete with other invasive plant species, and the prognosis for controlling the outbreak is positive.

Phase 1, an 86-acre parcel, was planted using a vegetable mass transplanter, creating 64 acres of future SWFL habitat. Field B-2 (4.8 acres) was not planted due to a shortage of Goodding's willow stock and was left as alfalfa. All the fields were planted with an alfalfa cover crop, after which the trees were planted. A 22-acre native plant nursery was planted. 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.

Ivyleaf morning-glory invaded the fields beginning in May. This aggressive plant can establish a strong foothold and will smother whatever plants it can climb; if nothing is available to climb, it simply covers the ground in a dense mat. By June, more than half of the fields were covered, and

by late summer, the alfalfa cover crop was unsuccessful in keeping out the morning glory and was threatening the growing native trees. Some fields were invaded with morning glory to a much lesser extent. Approximately 17 acres were mowed in an attempt to stop the invasive morning glory. Plans are currently ongoing to combat the invasive morning glory next season both mechanically and with herbicides.

Irrigation regime research was conducted in Phase 1 to gather soil moisture and irrigation data for future sites. This 3-year field experiment will evaluate the response of three native tree species to two different surface irrigation regimes and fertilization. Phase 1 fields were thoroughly mapped using electromagnetic induction, which allows for spatial mapping of soil texture and salinity. Whole plant measurements were made including plant height, diameter, and leaf area index. During the growing season, leaf water potential and leaf gas exchange was measured monthly. Unfortunately, the invasive morning glory affected the data gathering for all the intended sites, limiting scientific conclusions that could be drawn.

Reclamation conducted an analysis of the CVCA irrigation system for Phases 1 through 3 to assess the current status of the irrigation infrastructure, and to recommend alternatives for irrigation rehabilitation/improvement. As a result, contract negotiations were initiated for concrete lining of approximately 6,000 feet of irrigation canals.

The opportunity to pre-purchase the collection, propagation, and planting of trees for Phase 3 arose and was completed in FY06. Costs estimated to secure land and water for long-term program use were not completed during the fiscal year. The overall results of these two actions was a reduction in FY06 actual costs.

Pre- and post-development monitoring was conducted at Phase 1, Phase 2, Phase 3, and the control site on CVCA. Soil samples were obtained, and all nutrients and salinity were within normal parameters. Vegetation survivorship data was collected on Phase 1 two weeks after planting and was collected again in October 2006. Survival varied between and within fields. After one growing season, estimated percent survival for all species planted ranged from 31% for Field A to 43% for Field C. Within-field transects ranged from zero to 71% survival. Survivorship was influenced by the morning glory infestation, either through direct mortality or as a result of methods initiated to control the infestation (mowing sections of Fields A, B, and D). In areas heavily infested with morning glory, survivorship was difficult to measure. More accurate survivorship data will be available after FY07 monitoring has been completed. The nursery was not monitored for percent survival.

Avian point counts were conducted on Phase 1, Phase 2, and at the control site. Approximately 24 species were observed at all sites, with the control site having the greatest species diversity and richness. Small mammal trapping occurred on Phase 1 and at the control site. Only four field mice were caught at both sites. Acoustic bat surveys were conducted utilizing Anabats in April 2006 and October 2006. In April, 13 bat passes, accounting for 5 bat species/bat groups, were recorded on Phase 1, while 9 bat passes, accounting for 5 bat species/bat groups, were recorded on the control site. Data has not been analyzed for the October visit, and will be presented with 2007 data analysis.

**FY07 Activities:** Phase 2, originally scheduled for planting in FY07, will be postponed due to morning glory concerns. However, Phase 2 fields will be mechanically disked and treated with herbicides in an attempt to control morning glory propagation prior to planting in FY08. Phase 2 fields are scheduled for planting in FY08. Phase 3 will be planted, converting approximately 105 acres of active agricultural fields to cottonwood-willow land cover type, which is designed to eventually duplicate the native vegetation mosaic documented in occupied SWFL habitat. Automated mass planting techniques will be employed to plant the trees within all the fields. The fields will be prepared for planting and irrigated as required, and repairs will be provided as needed to the irrigation system infrastructure. A crop consultant may be utilized to recommend schedules for water and fertilizer applications. During the growing season, the crop consultant may sample and analyze plant tissue for nitrogen levels and other nutrients as necessary.

Phase 1 will be replanted as required as a result of morning glory infestation and the shortage of native plants in Field B-2 (approximately 4.8 acres). Additionally, portions of the 17 acres that were mowed will be replanted with native plant species. 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.

Irrigation research conducted by the U of A will continue in the Phase 1 location to gather data for future sites. Soil moisture content, drainage, and tree response will be 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 will receive periodic nitrogen fertilization, and plant response will be measured. Tentatively, two water regimes (6 acre-feet per year and 9 acre-feet per year) will be applied. 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. Soil/water content, drainage, and plant response are being measured for three growing seasons. The research and results will allow estimation of an appropriate irrigation regime for successful habitat restoration.

Pre- and post-development monitoring will continue on phases 1-4 and the control site at CVCA. Habitat, avian, small mammal, and bat monitoring will continue.

**Proposed FY08 Activities:** Planting and field preparation of Phase 2, designed to create 76 acres of SWFL habitat, is located south of Phase 1, and is scheduled for FY08. 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. Research being conducted by the University of Arizona, which began in FY06, would continue throughout FY08. Irrigation and management of 86 acres of native plant species in Phase 1 and 105 acres in Phase 3, as described in the *Cibola Valley Conservation Area Restoration Development Plan: Overview* will be conducted. A document titled, *Cibola Valley Conservation Area Restoration Development Plan: Phase 4*, will be created that includes design and planting plan of Phase 4 that would be established in FY09. Approximately 64 acres of honey mesquite will be planted. Pre- and post-development monitoring will continue on completed and anticipated phases and the control site at CVCA. Habitat monitoring and monitoring for covered species will continue.

**Pertinent Reports:** *Soil-Plant-Water-Nutrient Relationships of Populus Fremontii, Salix gooddingii, and Salix exigua During Native Habitat Restoration*, the study plan from the 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; and Cibola Valley Conservation Area Annual Report, 2006* will be posted on the LCR MSCP Web site.