

Work Task E5: Cibola Valley Conservation Area

FY07 Estimates	FY07 Actual	Cumulative Accomplishment Through FY07	FY08 Approved Estimate	FY09 Proposed Estimate	FY10 Proposed Estimate	FY11 Proposed Estimate
\$2,656,000	\$3,397,386	\$4,808,031	\$1,703,000	\$1,000,000	\$1,100,000	\$1,200,000

*Actual expenditures include securing all 1,309 acres of land and 1,300 acre-feet of water.

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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 may be investigated as described in C5.

Project Description: In 2007, Reclamation secured 1,309.1 acres of land serviced by the Cibola Valley Irrigation and Drainage District and established the Cibola Valley Conservation Area (CVCA). The Arizona Game and Fish Department (ADFG) acquired the CVCA in September 2007 through a multi-organization agreement involving the ADFG, Reclamation, the Mohave County Water Authority, and The Conservation Fund.

Through the agreement, the ADFG acquired the fee title to the property subject to an existing long-term lease of the land and water rights to Reclamation, expiring April 5, 2055, as part of the Lower Colorado River Multi-Species Conservation Program. Short-term leases of the land to farmers for crop production also exist on portions of the acquired land. The primary purpose of the LCR MSCP at the CVCA is to replace existing agricultural fields with native riparian cottonwood, willow, and mesquite land cover types that would be managed as habitats for LCR MSCP covered species.

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 LCR 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 exercised their option to secure up to 1,300 acre feet per year from the MCWA and up to 1,500 acre feet per year from the Hopi Tribe. The one-time fee to secure this fourth-priority Colorado River Water is \$1,690 per acre feet adjusted for inflation. In addition, Reclamation already maintains a fourth-priority entitlement of 118.94 acre feet per year at CVCA.

Research is continuing with the University of Arizona exploring the relationships between soil water supply and tree physiological response. The project will conclude in February 2009.

Previous Activities: CVCA is being developed in phases over a number of fiscal year. Through FY06, Phase 1 has been planted. Phase 1 consisted of a 22-acre native plant nursery and approximately 64 acres of cottonwood-willow land cover. This nursery was established initially as an on-site native plant nursery for future plant stock collection and may be managed for habitat after other nurseries have been developed for the LCR MSCP. Additional information, including restoration development and monitoring plans are available online.

FY07 Accomplishments: The *Cibola Valley Conservation Area Restoration Development Plan: Overview, Phase 1, Phase 2, and Phase 3* were completed and posted on the LCR MSCP Web site. Planning for development and creation of habitat on CVCA continued.

Ivyleaf morning-glory once again invaded the fields in both Phase 1 and to a smaller degree, in Phase 3. The invasion was not as widespread as in the previous year. Several herbicides, such as Caparol and Roundup, were tried unsuccessfully in control areas to control this aggressive plant. The decision was made to utilize a 36-inch DR® field and brush mower to help remove the morning-glory by cutting it without damaging the existing tree crop.

A chemical drift problem (2,4-D amine) was detected this summer in the CVCA area. The State of Arizona investigated chemical drift complaints that were affecting the health of these trees and other farmers' crops. The source of the chemical was never determined; however, some areas in Phase 1 were affected.

Phase 1 had a total of 15.1 acres of cottonwood and willow trees replanted in March 2007. This area was previously mowed/swathed due to damage caused by morning glory in 2006. Additionally, Field B-2 consisting of 4.8 acres was planted due to an original plant shortage in 2006.

The University of Arizona continued to conduct irrigation regime research 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.

Acting on advice from the local farm advisory board and the contract farmer, Phase 2 was left fallow during 2007 in an attempt to reduce the morning glory seed bank in the soil. The advisory board was formed to address farming issues, tap into local resources, and provide information to

the local communities. The acreage was irrigated monthly to encourage morning-glory propagation, then was disked to remove morning-glory plants.

Phase 3, a 105-acre parcel, was planted in March 2007 in accordance with the Phase 3 restoration development plan with approximately 217,000 coyote willow, Goodding's willow, and Fremont cottonwood. A cover crop was not planted in this phase. Instead, a preemergent, Prowl®, was applied prior to planting, to control invasives. This created 92.3 acres of cottonwood-willow land cover.

In October 2007, approximately 800 honey mesquites and 4,300 *Atriplex* were planted in check 3-9 of Phase 3 (7.6 acres). The mesquite trees were hand planted in holes initially augered by Bobcat loader. The *Atriplex* was hand planted using dibble bars.

Habitat Monitoring: Pre- and post-development habitat monitoring was conducted at Phase 1, Phase 2, Phase 3, and at the control site on CVCA. Soil samples were analyzed. Most nutrients and salinity levels were within normal parameters. Nitrogen was low on Phase 3 and fertilizer was added. Vegetation data was collected at Phase 1 and Phase 3. Both of these locations were typed as cottonwood-willow vegetation types. However, the structural types are different, as related to stand age. Phase 1 was classified as CWII and Phase 3 was classified as a CWIII/CWIV structural type. Average total overstory tree height for Phase 1 Field C was 19.3 ft. Stem density was estimated at 1,717 stems/ac. Canopy closure was estimated by spherical densiometer at 84.5%. Both Goodding's willow and Fremont cottonwood were measured in Phase 3. Stem density was estimated at 2,679 stems/ac. Average overstory tree height was 13 ft. Cottonwood trees averaged 15.7 ft tall and 1.0 in DBH. Goodding's willow averaged 10.8 ft tall and 0.6 in DBH. Canopy closure was estimated at 68.6%.

Avian Monitoring: Avian monitoring was conducted on Phase 1, Phase 2, Phase 3, and the control site. Approximately 24 species were observed at all the sites with the control site having greatest species diversity, but Phase 3 having greatest species richness. There were no LCR MSCP covered species detected at CVCA in 2007. The most abundant species detected were the red-winged blackbird (*Agelaius phoeniceus*), cliff swallow (*Petrochelidon pyrrhonota*), horned lark (*Eremophila alpestris*), and the brown-headed cowbird (*Molothrus ater*).

Small Mammal Monitoring: Small mammal trapping was conducted on Phase 1, Phase, 3 and the control site. In February-March, no small mammals were captured on Phase 1; 1 deer mouse (*Peromyscus maniculatus*) was captured on Phase 3; and 2 deer mice and 1 Merriam's kangaroo rat (*Dipodomys merriami*) were captured at the control site. In November, 31 small mammals were captured on Phase 1, 4 on Phase 3, and 0 on the control site.

Bat Monitoring: Acoustic bat surveys were conducted using Anabat II bat detectors coupled to zero-crossing analysis interface modules (ZCAIMs). A total of 42 detector nights were completed for six CVCA sites. A total of 3,052 call files were obtained, edited, and identified to species or species group. Three LCR MSCP covered and evaluation species were detected at CVCA, including western red bat, Townsend's big-eared bat, and California leaf-nosed bat.

Expenditures in FY07 were greater than estimated due to the opportunity for the one-time purchase of all 1,300 acre feet of water from MCWA. The estimated FY07 budget reflected only a portion of the purchase of 1,300 ac-ft of water secured.

FY08 Activities: Phase 2 (80 acres), originally scheduled for planting in FY07, was postponed due to morning-glory concerns and will be planted in FY08. The agricultural fields will be mechanically disked, laser leveled, and plowed as needed to prepare the ground for mass transplanting the trees and shrubs. The irrigation infrastructure for phases 1 and 2 will be repaired as needed to provide irrigation water. Main access roads will be graveled with Type-II base to control dust, in accordance with local regulations.

The plants will be planted in furrows with a plant in-line spacing of 5 feet and a furrow row spacing of 40 inches. The site will be divided into 10 checks, with 9 of the checks planted with cottonwood-willow land cover types. One check will be planted with mesquite and *Atriplex*. Mass transplanting approximately 80 acres of riparian species (approximately 177,000 of cottonwood, willows, *Atriplex*, and *Baccharis*) will occur in March. The approximately 220 mesquite will be hand planted in the fall, due to the length of time it takes to grow 1-gallon plants.

Weeds will be controlled with the application of preemergents and by mechanically cultivating the furrows during the first year of growth. Specific herbicides may be used as necessary to target certain locations. A cover crop will not be applied as done in Phase 1. The cover crop, usually alfalfa, was used to create a dense mat, hindering the growth of invasive nuisance plants. Utilizing a cultivator should keep the furrows weed free. After the first growing season, when the trees are too tall for a tractor and cultivator to clear, a cover crop may be applied to create this dense ground mat.

A consultant may be utilized to take soil samples, and recommend irrigation schedules and fertilizer applications. During the growing season, the consultant may track plant vigor by sampling and analyzing plant tissue for nitrogen levels and other nutrients as necessary.

Irrigation research conducted by the University of Arizona 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. 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.

A document titled, *Cibola Valley Conservation Area Restoration Development Plan: Phase 4*, will be drafted 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 phases 1-4 and the control site at CVCA. Habitat, avian, small mammal, and bat monitoring will continue.

Proposed FY09 Activities: Planting and field preparation of Phase 4 is scheduled for FY09, and is designed to create 64 acres of honey mesquite land cover type located north of Phase 3. All the previous phases will be developed, maintained, monitored, and adaptively managed created riparian habitat for targeted species.

Upon receipt of 1,500 ac-ft of fourth-priority water from the Hopi Tribe, stabilization of buffer areas within CVCA will be initiated.

A document titled, *Cibola Valley Conservation Area Restoration Development Plan: Phase 5*, will be drafted that includes design and planting plan of Phase 5 that would be established in FY10. Approximately 72 acres of honey mesquite will be planted.

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 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; Cibola Valley Conservation Area Draft Report for Phase 4; Cibola Valley Conservation Area Annual Report, 2006; and Cibola Valley Conservation Area Annual Report, 2007* will be available on the LCR MSCP Web site.