

Work Task E1: Beal Lake Conservation Area

FY11 Estimate*	FY11 Actual Obligations*	Cumulative Expenditures Through FY11*	FY12 Approved Estimate	FY13 Proposed Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate
\$320,000	\$400,976.55	\$3,190,318.59	\$950,000	\$300,000	\$300,000	\$300,000

*Includes E2

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Start Date: FY04

Expected Duration: FY55

Long-term Goal: Habitat creation.

Conservation Measures: WIFL1, WRBA2, WYBA3, YBCU1, ELOW1, GIFL1, GIWO1, VEFL1, BEVI1, YWAR1, FUTA1, MNSW2, CLNB2, PTBB2, MNSW2, BONY2 and RASU2.

Location: Reach 3, Havasu NWR, Arizona, 0.5 miles east of river miles 238 and 239.

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. Monitoring of native fish is being addressed under F5. Portions of restoration research at Beal Lake have been funded under G3.

Project Description: Beal Lake was 225 acres of shallow, low-quality aquatic habitat that was dredged in 2001 to create a functioning backwater dedicated to native fish. The Beal Lake restoration project is a continuation of the commitment to construct habitat for protected native fish under the 1997 Biological Opinion. Continued maintenance and management obligations of Beal Lake, as well as research and development of the backwater as native fish habitat, were assumed under the LCR MSCP in 2005.

The development of the Beal Lake Riparian Area was initiated to research effective ways of using dredge material. The plan called for blending sediment dredged from Beal Lake with adjacent soils and replanting the mixed substrate with native vegetation. The project area, which is divided into fields that can be independently irrigated and managed, was designed to provide a location for testing various riparian restoration methods and techniques for site preparation, planting, irrigation, monitoring, and managing.

After various planting techniques were tested at the site, many of the fields developed into habitat that attracted LCR MSCP covered species. The riparian restoration site currently provides approximately 107 acres of cottonwood, willow, and mesquite habitats, as well as contributes valuable information about restoration techniques and management practices.

As of FY12, annual funding for Beal Lake Riparian (E1) and Beal Lake Native Fish (E2) were folded into a single work task called the Beal Lake Conservation Area (E1).

Previous Activities: Dredge material from Beal Lake (work task E2: Beal Lake Native Fish) was leveled in 2001 to create the substrate for planting adjacent riparian habitat. Post-development habitat and avian monitoring has been conducted since FY04. Monitoring of post-development microclimate, small mammals, and bats has been conducted since FY06.

FY11 Accomplishments:

Maintenance/Restoration/Management.

Riparian Fields. Irrigation, maintenance, and on-site management were conducted on the riparian fields as well as performing basic maintenance duties, such as cleaning the Beal Lake screen system. A combination of Nitrogen, Phosphorous, Potassium, Zinc, and Manganese liquid fertilizers were applied to the fields in two, lower-concentration applications via the fertigation system.

Beal Lake. A gauging station to monitor the water surface elevation was installed on either side of the rock structure. The data collected from this station allowed the project manager to compare elevations of Beal Lake to those of Topock Marsh, determine when the screen system required cleaning, as well as evaluate the effectiveness of the current cleaning/maintenance regime.

Monitoring.

Riparian Fields. Post-development vegetation monitoring was conducted in 17 fields (A, B, C, D, F, G, H, I, Q, K, L, M, N, O, P, FF, and JJ). Thirty-five intensive plots were evaluated for density, vegetation structure, and community composition.

Microclimate stations were established in three fields which measured temperature, relative humidity and photosynthetically active radiation. A study of sulfur content in insects was initiated at Beal Lake. Results may indicate if particular spiders or insects are more nutritious for insectivorous birds by providing more sulfur.

Small mammal monitoring was conducted in field K and three *Sigmodon arizonae* were detected. Acoustic bat surveys were conducted quarterly. All four bat species were detected acoustically: California leaf-nosed bat, Townsend's big-eared bat, western red bat, and western yellow bat.

General avian surveys were conducted using an intensive area search method. Bell's vireo (13 territories), yellow warbler (9 territories) and summer tanager (2 territories) were confirmed breeding. Single species surveys were conducted for the southwestern willow flycatcher and western yellow-billed cuckoo during their respective breeding seasons. Yellow-billed cuckoos were confirmed breeding at Beal with one nest successfully fledging 2 young. The site was surveyed five separate times for willow flycatchers. Two birds were detected before June 16th and were considered migrants; no breeding southwestern willow flycatchers were detected.

Avian mist netting following the Monitoring Avian Productivity and Survivorship protocol was conducted from 1 May to 6 August. Sonoran yellow warblers, Arizona Bell's vireos, and summer tanagers were color banded to better monitor their breeding activities at Beal Lake.

Beal Lake. Beal Lake was stocked with 400 PIT-tagged RASU; these stockings were monitored bi-weekly using remote PIT scanning to detect changes in the population. The population declined over the first three months until it stabilized around 90 individuals. All future stockings were terminated to allow for additional habitat assessment. The annual fall survey resulted in the capture of many non-natives, in addition to 64 RASU (avg. 468 mm TL); 50 of these were released into the main stem river near Needles, California. Larval surveys were conducted in late winter and none were captured. Zooplankton was collected quarterly as part of work task C44 and initial results show lower than average mean zooplankton biomass. Water quality was constantly monitored throughout the backwater via four multi-parameter water quality loggers; low levels of dissolved oxygen and high temperatures were observed locally but not lake wide.

FY12 Activities:

Riparian Fields. After securing the proper permits, implementation of the design to convert 14 acres within the Beal Lake Conservation Area into a combination of willow and marsh land cover types began in November 2011. Site preparation involved clearing, grubbing, removing extremely saline soils from the surface, and contouring the acreage to match the seasonal hydrologic patterns of ground and surface water. Planting is scheduled for March 2012.

Four fields that did not respond well to the original plantings have been cleared and will be used to demonstrate the feasibility of using the soil amendment Lassenite Pozzolan. Two of the fields are currently being used to determine whether the product can increase the irrigation efficiency in sandy soils, as well as increase the retention of soil moisture. These fields will be planted with cottonwood and willow during the same effort as the willow marsh project. The two remaining fields will be used to test whether Lassenite Pozzolan can influence seeding success of Gooding's willow under C42: Experiments and Demonstration of Soil Amendments for Use in Restoration Sites.

Beal Lake. Throughout 2011, the USFWS installed a new water delivery system at the Havasu National Wildlife Refuge. During construction of the new canal the water elevations of Topock Marsh and Beal Lake were much lower than previous years, as water was not being diverted from the river into the marsh. With the new water delivery system complete and now functioning, it was decided that the effect of the new infrastructure on marsh and lake levels should be established before other management activities are undertaken.

Maintenance/Restoration/Management.

Riparian Fields. Irrigation, maintenance, and on-site management are anticipated to be similar to actions taken in FY11.

Beal Lake. The permanent gauging station installed last year continues to be maintained and calibrated. Maintenance on the boat ramp at the south end of Beal Lake was conducted to allow

boat trailers in and out of the launch site. A culvert at the south end of the lake, which was previously covered with gravel, is exposed and will either be permanently filled in or removed.

Monitoring.

Riparian Fields. Temperature, photosynthetically active radiation, and relative humidity will be monitored. Vegetation will continue to be monitored for density, vegetation structure and community composition. Small mammal monitoring will be conducted annually. Acoustic bat surveys will be conducted four to five times a year and acoustic data will be collected from the permanent bat monitoring station. General avian surveys utilizing intensive and rapid area searches will be conducted from mid-April to mid-June. Single species surveys for the southwestern willow flycatcher and yellow-billed cuckoo will be conducted during their respective breeding seasons. A study to determine if using Lassenite Pozzolan will increase germination and survival of seeded Goodding's willow in sandy soils will be initiated.

Beal Lake. The monitoring activities for Beal Lake will continue at a level similar to FY11. Searches for larval fish and other signs of reproduction and recruitment will be conducted. Food resource assessments (zooplankton/phytoplankton) will be increased and results compared with data from C34. Non-native fish abundance will be attempted during the annual fall survey at Beal Lake. The water quality at Beal will continue to be monitored to evaluate the impacts of the new water delivery system for Topock Marsh.

Proposed FY13 Activities:

Maintenance/Restoration/Management.

Riparian Fields. Management through irrigation and fertilization will continue. No new projects are anticipated within the riparian fields of the Beal Lake Conservation Area during FY13.

Beal Lake. In cooperation with the U.S. Fish and Wildlife Service different artificial habitat types will be constructed, deployed, and monitored. This effort attempts to determine if providing cover within Beal Lake increases the survival rate of stocked fish, and whether certain cover types are used more than others.

Monitoring.

Riparian Fields. Temperature, photosynthetically active radiation, and relative humidity will be monitored. Vegetation will continue to be monitored for density, vegetation structure and community composition. Small mammal monitoring will be conducted annually. Acoustic bat surveys will be conducted four to five times a year and acoustic data will be collected from the permanent bat monitoring station.

General avian surveys utilizing intensive and rapid area searches will be conducted from mid-April to mid-June. Single-species surveys for the southwestern willow flycatcher and yellow-billed cuckoo will be conducted during their respective breeding seasons.

A study to determine whether using Lassenite Pozzolan will increase germination and survival of seeded Goodding's willow in sandy soils will continue.

Pertinent Reports: *Beal Lake Riparian Restoration Development and Monitoring Plan* and *2010 Beal Lake Riparian Annual Report* will be posted to the website.