

Work Task E2: Beal Lake Native Fish

FY07 Estimates	FY07 Actual	Cumulative Accomplishment Through FY07	FY08 Approved Estimate	FY09 Proposed Estimate	FY10 Proposed Estimate	FY11 Proposed Estimate
\$100,000	\$91,325	\$576,737	\$50,000	\$70,000	\$50,000	\$50,000

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Start Date: FY05

Expected Duration: FY55

Long-term Goal: Habitat creation.

Conservation Measures: BONY2 and RASU2.

Location: Reach 3, Arizona, Havasu NWR, one-half mile east of River Mile 237.

Purpose: Reclamation intends to maintain the backwater created for native fishes under the 1997 BO. Reclamation is simultaneously making improvements to the backwater and conducting restoration research at the site. Information from this research will be used to adaptively manage the backwater and increase efficiency and effectiveness in future backwater habitat creation projects.

Connections with Other Work Tasks (past and future): Monitoring of native fish is being addressed under F5. Portions of restoration research at Beal Lake are funded under G3.

Project Description: Beal Lake was approximately 225 acres of shallow, low-quality aquatic habitat that was dredged, beginning 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 BO. Continued maintenance and management of Beal Lake and research and development of the backwater as native fish habitat have been included in LCR MSCP activities.

The restoration research and management of Beal Lake included the installation of a cylindrical wedge wire screen system. Beal Lake was initially isolated from Topock Marsh with a passive rock filtration system. After the filtration system performed poorly for several months (the system was unable to keep up with evaporative losses in Beal Lake), Reclamation decided to test a new technology that would supplement water flow into Beal Lake and would be effective in excluding all life stages of nonnative fishes. A cylindrical wedge-wire screen system was selected because of ease of maintenance and long-term performance. Because cylindrical wedge-wire screen technology had never been used for this application, information was needed to estimate the hydraulic capacity of the system and its true exclusion capabilities. A two-phase investigation, including in situ hydraulic testing and a laboratory exclusion evaluation, was

contracted to provide these data. Results from these studies will provide a clearer picture of the appropriateness of this technology in this situation and for future applications.

To increase efficiency, a number of the existing water control structures at Beal Lake were replaced during the screen system installation. The existing features performed poorly and were not adequately sized to supply the necessary water volume to the irrigation pump or to Beal Lake.

Additional improvements have been made to allow for more effective management of water in Beal Lake. A water management system enabling large-scale water removal, water level control for fisheries management, and large-scale water circulation capabilities has been installed. The system consists of a permanent platform, ramp, and discharge pipe that allows for the intermittent deployment of various pumps, depending on the specific management need. The water management system has been successfully used to assist the irrigation pump in lowering the water level in Beal Lake for lake renovation (this process included pre-treatment fish salvage, chemical treatment of the water to kill remaining nonnative fish, post-detoxification sampling, and restocking with native fish). In addition, the system will be used as a regular management tool to circulate water from the south end of Beal Lake and induce freshening flows into Beal Lake from Topock Marsh to maintain adequate levels of water quality to support native fish.

Previous Activities: The costs of initial backwater creation, including dredging and isolating the backwater with a semi-permeable rock structure were incurred prior to FY05 and implementation of the LCR MSCP.

FY07 Accomplishments: Restoration activities at Beal Lake were limited to coordination with partnering resource agencies to determine future management and maintenance of the existing features at Beal Lake. Fish and water quality monitoring protocols specific to Beal Lake were determined and are covered in Work Task F5. Future management actions at Beal Lake will be guided by information acquired through these monitoring activities. No additional construction activities were pursued during FY07.

Other expenditures included regular cleaning and maintenance of the screen system and control structures. In addition, part of the FY07 funding supported the ongoing research component for this work task. This included continued long-term evaluation of the screen system's hydraulic performance and maintenance requirements. The system's water level sensors were replaced and the Web site for real-time data was upgraded. Results from previous research studies of the screen system at Beal Lake were presented at the Bioengineering Symposium section of the American Fisheries Society's annual national meeting. A manuscript with this research is currently in preparation and is expected to be submitted for peer review and publication in FY08.

FY08 Activities: No major construction projects are anticipated for Beal Lake in FY08. Restoration activities covered under this work task will be limited to continued coordination with USFWS regarding fisheries management and maintenance of the features in place at Beal Lake.

Other expenditures in FY08 will include continuation of the restoration research component at Beal Lake. A portion of funding for restoration research in FY08 will be supported by G3 (Adaptive Management Research Projects). This includes continuation of long-term monitoring

of the screen system at Beal Lake to determine long-term effectiveness and maintenance requirements and costs. In addition, a final third-phase in-situ evaluation of this technology's effectiveness will be conducted to determine exclusion potential and entrainment rates in a real-world application.

Proposed FY09 Activities: Coordination with resource agencies will continue to determine future operations and maintenance of existing features at Beal Lake. Long-term monitoring of the screen system's hydraulic performance will continue using the installed water level sensor system. This work task also covers the routine maintenance of the screen system and water level sensors, including regular flushing and manual cleaning of the screen system and periodic calibration and maintenance of the sensor system.

In FY09 the screens may be removed for inspection, cleaning, replacement of hardware, and cleaning of the screen culvert pipes. The proposed FY09 funding estimate reflects these additional tasks. Water quality and fisheries monitoring activities will be coordinated with USFWS and are covered under F5.

Pertinent Reports: *Evaluation of a Cylindrical Wedge-Wire Screen System at Beal Lake, Arizona, 2005*, and *Evaluation of a Cylindrical Wedge-Wire Screen System at Beal Lake, Arizona, 2006 Phase II Testing* is posted on the LCR MSCP Web site.