

Work Task E2: Beal Lake Native Fish

FY08 Estimates	FY08 Actual	Cumulative Accomplishment Through FY08	FY09 Approved Estimate	FY10 Proposed Estimate	FY11 Proposed Estimate	FY12 Proposed Estimate
\$50,000	\$26,446.69	\$603,183.69	\$70,000	\$50,000	\$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 as well as 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 let enough water pass through the structure to compensate for the evaporative losses in Beal Lake), Reclamation decided to test a new technology that would supplement water flow into Beal Lake and effectively exclude 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 were 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 was 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.

FY08 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. No construction activities were pursued during FY08.

Other expenditures included regular cleaning and maintenance of the screen system and control structures. Part of the FY08 funding also 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. Regular maintenance and calibration was also performed on the system and continuous, real-time data on the water levels at Beal Lake were made available throughout the year. Preliminary data suggests that the screen system may have restricted flow, potentially from sediment accumulation in the pipes, screen clogging, or a combination of these factors. The water level sensors also detected elevated water levels in Beal Lake immediately following irrigation cycles at the adjacent riparian fields. This suggests a subsurface recharge of water into Beal Lake and may lend insight into the hydrology of the site and potentially, future management implications. A final report is expected to be completed in January 2009. In addition, a submitted research paper was accepted by the American Fisheries Society (AFS) and is in queue for review and publication in the proceedings of the AFS's Bioengineering Symposium.

An additional in-situ evaluation of the screen system at Imperial National Wildlife was scheduled for FY08 (partially funded under work task G3). This was part of the evaluations of

the application of these types of screen systems in terms of effectiveness for excluding non-native fish from backwaters. However, there were delays in the completion of infrastructure necessary to complete these tests within the seasonal window when larval fishes were present. These evaluations have been rescheduled for Spring FY09.

The budget expenditures for FY08 reflect the limited activities for work tasks associated with Beal Lake. Of the \$50,000 approved estimate, only about \$25,000 was spent.

Fish and water quality monitoring specific to Beal Lake are covered in Work Task F5. Future management actions at Beal Lake will continue to be guided by information acquired through monitoring activities.

FY09 Activities: As projected and based on feedback from monitoring information, maintenance activities, and observations, an intensive inspection, cleaning, and evaluation of the screen system at Beal Lake are planned for FY09 if resources and scheduling permit. This will entail complete removal of the screens, inspection of the pipes, valves, screens and the rock structure. The screens, pipes and valves will be thoroughly cleaned and evaluated to determine if they are functioning properly. If appropriate, parts may be replaced, or portions of the system may be upgraded to allow for more efficient maintenance and/or function of the system. The integrity of the rock structure will also be evaluated and projections will be made for the continued long-term functionality of the system, which may also include recommendations for improvements in features or design.

Other expenditures in FY09 will include continuation of the restoration research component at Beal Lake. Funding for restoration research in FY09 will be supported by G3 (Adaptive Management Research Projects). This includes the final evaluation of long-term effectiveness and maintenance requirements of the screen system at Beal Lake as discussed above. In addition, an in-situ evaluation of this technology's effectiveness will be conducted to determine exclusion potential and entrainment rates in a real-world application. These entrainment tests will occur in spring of FY09 at the Imperial Ponds on Imperial NWR.

Proposed FY10 Activities: A report detailing the results of wildlife and vegetation monitoring, evaluation of habitat potential, recommendations for existing land cover modifications or management approach, and anticipated credit towards species-specific conservation measures is anticipated to be presented to the SC with the FY11 Workplan in April of 2010. The report will also discuss commitments of the land use agreement and the process for suggesting and implementing adaptive management actions.

If resources or scheduling do not allow for the physical inspection and evaluation of the screen system and rock structure in FY09 (as discussed above), these activities may be delayed till FY10. Should this be necessary, the FY10 estimate may not be adequate to cover these activities, however, substantially less would be spent in the FY09 budget. The proposed FY10 funding estimate does not reflect these additional tasks.

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.

Water quality and fisheries monitoring activities will be coordinated with USFWS and are covered under F5. Coordination with resource agencies will continue to determine future operations and maintenance of existing features at Beal Lake. If directed by adaptive management recommendations, a complete rehabilitation of the rock structure/screen system may be necessary or a new system may be constructed based on improved design features if the current system is deemed inadequate. These major construction activities would not be anticipated until FY12 and would require comprehensive designs and appropriate permitting before an estimated could be developed.

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.