

Work Task E13: McAllister Lake

FY05 Estimate	FY05 Actual	Cumulative Accomplishment Through FY05	FY06 Approved Estimate	FY07 Proposed Estimate	FY08 Projected Estimate	FY09 Projected Estimate
\$40,000	\$71,051	\$71,051	\$75,000	\$50,000	\$40,000	\$52,000

Contact: Nathan Lenon, (702) 293-8015

Start Date: FY05 **Expected Duration:** FY07 decision point

Long Term Goal: Habitat creation

Conservation Measures: BONY2, RASU2, and LEBI1

Location: Reach 5, Imperial National Wildlife Refuge, River Mile 61, AZ

Purpose: Evaluate a method of water quality improvement by dewatering the lake and inducing groundwater recharge to dilute the lake's existing high salt concentrations.

Connections with Other Work Tasks (past and future): Species monitoring is being addressed under Work Tasks F2 and F4.

Project Description: Located on Imperial NWR, McAllister Lake is a shallow 32-acre isolated floodplain lake with no known surface connection to the LCR. The lack of freshwater flushing had caused the lake to become highly saline, to the extent that it provides limited fish and wildlife value. Because backwaters are expected to be the most expensive land cover type to create under the LCR MSCP, Reclamation has been, through the restoration of existing backwaters, developing the technology to more effectively create sustainable backwater habitat. The purpose of this ongoing investigation is to determine whether this experimental method of pumping water out of the lake, followed by induced groundwater recharge from the river aquifer may be a sustainable method of improving water quality in isolated backwaters with high salinity levels on the LCR. Potentially, this method provides a high degree of safety against intrusion by non-native fish species by eliminating the need for engineered fish barriers.

Previous Activities: Reclamation initiated a series of experimental pump-tests during FY03 and FY04, which dewatered the lake to about one-fourth of its normal volume. Before, during, and after these tests, a variety of environmental data were collected to measure the lake's response to the pumping, as well as the consistency of the groundwater supply through the river aquifer. This monitoring includes groundwater and surface water levels, and water quality measurements of the river and lake. These pump tests were conducted from December 2002 through March 2004, during the fall and winter months only, to avoid potential impacts to Yuma clapper rails.

FY05 Accomplishments: The lake was left unmanaged during FY05. Monitoring was continued to determine how quickly the lake's water quality would degrade, if pumping is stopped, so that Reclamation may decide whether the lake can be maintained in a manner that is cost-effective.

To assist in making a better-informed decision on potential restoration alternatives, a cooperative agreement was executed with the U of A, to initiate limnological investigations at McAllister Lake. This agreement is funded for one year with an option for a second year. This effort will evaluate the sustainability of maintaining McAllister Lake as a backwater for native fish, and provide recommendations to Reclamation as to how best to manage the site.

Reclamation postponed the completion of the final report documenting the methodology and results of the pump-tests, so the scope of analysis could be expanded to include the entire project period up through the end of FY05, and to eliminate data gaps between reports. The expanded report is near completion, and will be posted to the LCR MSCP website once finalized. The expanded report will document all five pump-tests between FY03 and FY04, as well as the degradation of water quality which occurred during FY05 while the site was left unmanaged. The costs incurred during FY05 were slightly higher than anticipated to allow for the additional sampling effort; however, mobilization costs were decreased by monitoring both Butler and McAllister Lake simultaneously with one contractor.

FY06 Activities: U of A is working cooperatively with Reclamation to evaluate the long-term sustainability of McAllister Lake. During FY06, Reclamation re-initiated experimental lake management by pumping the lake three times. U of A has completed the first two quarterly sampling events, in concert with the lake management, and has provided a preliminary report of their initial impressions. They will complete their first full year of monitoring.

Proposed FY07 Activities: A final report from U of A is due in FY07, with recommendations on management practices for long-term management of the lake for native fish. After a review of the final report, Reclamation will decide, in consultation with the landowner, on whether to continue to manage McAllister Lake for native fish.

Should this project be continued during FY07, Reclamation plans to design a permanent pumping system to maintain water quality, along with any other treatments necessary to maintain the lake. The final design will be selected in consultation with Imperial NWR.

The earliest date planned for construction of the pumping system would be FY08. This is needed to allow for adequate time to prepare a final design and cost estimate, solicit input from the LCR MSCP Steering Committee, complete any required environmental compliance, and draft the restoration plan and land use agreement.

Pertinent Reports: *Experimental Design Plan for McAllister Lake Study*, *Hydrologic Characterization of McAllister Lake, Arizona*, and study plan are available upon request.

These figures illustrate the changes in water quality and clarity observed at McAllister Lake during the study period.



Figure E13a: December 2002, prior to any pump-tests



Figure E13b: March 2003 following and 1 pump-test.



Figure E13c: September 2004, following 2 seasons of pumping (5 pump-tests).



Figure E13d: September 2005. After an 18 month gap between pumping events. The brownish-pink color is believed to be caused by a die-off of cyanobacteria, “blue green algae”.