

Work Task E13: McAllister Lake

FY15 Estimate	FY15 Actual Obligations	Cumulative Expenditures Through FY15	FY16 Approved Estimate	FY17 Proposed Estimate	FY18 Proposed Estimate	FY19 Proposed Estimate
\$0	\$0	\$127,336.82	\$0	\$50,000	\$400,000	\$400,000

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Start Date: FY05 (closed in FY07; reopened in FY17)

Expected Duration: FY55

Long-Term Goal: Habitat creation

Conservation Measures: BONY2, RASU2, and LEBI1

Location: Reach 5, Imperial National Wildlife Refuge (Imperial NWR)

Purpose: To evaluate a method of water quality improvement and maintenance by dewatering McAllister Lake and inducing groundwater recharge to manage salinity

Connections with Other Work Tasks (Past and Future): Monitoring of native fishes is being addressed under Work Task F5.

Project Description: McAllister Lake is a shallow, approximately 40-acre isolated flood plain lake located on the Imperial NWR. Management of the lake is a continuation of the commitment to construct habitat for native fishes under the 1997 Biological and Conference Opinion (1997 BO). Continued maintenance and management obligations of McAllister Lake, as well as research and development of the backwater as native fish habitat, were subsumed under the LCR MSCP in 2005.

McAllister Lake was identified under Reasonable and Prudent Alternative Number 3 in the 1997 BO as a backwater to be developed and managed for native fishes. The intent is to make improvements to the backwater and design and implement a pumping system to circulate water capable of allowing management of salinity and other water quality parameters at levels suitable for supporting native fishes.

The concept for restoration and development of McAllister Lake would include the implementation of substantial measures to improve infrastructure and better manage water quality and would involve the creation of a permanent or

semipermanent pumping station on a constructed berm between McAllister Lake proper and the western lobe of the lake. The creation of this dyke would protect the lake proper section of McAllister Lake from potential river flooding events. By using borrowed material from both McAllister Lake proper and the western lobe, an additional benefit of the construction of this dyke would be localized deepening in these pump-out areas. These deeper areas may, in turn, provide thermal refuge for native fishes. They could also potentially increase the subsurface hydraulic connection to the adjacent Colorado River, which could help to enhance water quality and water exchange efficiency. The excavation of these areas may also remove sediments with high biological oxygen demand, as identified by previous research, further improving water quality in both sections of the lake. The water exchange provided by the periodic operation of the pumping system may potentially dampen accumulation rates of selenium within the lake. It is recognized that implementation a pumping system at this remote location will likely require installation of either a solar- or diesel-powered pumping system. Implementation and operation of such a system has both esthetic and technical issues to overcome, and there are tradeoffs for each.

If the system is installed, operations and maintenance will continue under Work Task E13. If the proposed development is not implemented and the system is not installed due to incompatibilities with Imperial NWR missions, discussions with the U.S. Fish and Wildlife Service (USFWS), the Imperial NWR, and Refuge Complex Managers, as well as the USFWS Ecological Services Field Office, will commence. If, based on the outcome of these discussions, it is decided that the work task should be closed, all commitments to McAllister Lake under the 1997 BO will have been satisfied. Likewise, if long-term development and management efforts at McAllister Lake prove to be ineffective in providing adequate conditions for supporting native fish populations, or result in regular management actions that are not sustainable or consistent with Imperial NWR missions, discussions may commence with the USFWS, the Imperial NWR, and Refuge Complex Managers, as well as the USFWS Ecological Services Field Office. Again, if the work task is closed, based on the decisions from these discussions, all commitments to McAllister Lake under the 1997 BO will have been satisfied.

Previous Activities: The LCR MSCP's restoration group 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 and the consistency of the groundwater supply through the river aquifer. This monitoring included that for groundwater and surface water levels as well as 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. The lake was left unmanaged during FY05. Monitoring was continued to assess how quickly the lake's water quality would degrade if pumping was stopped; the level of

degradation would indicate the required pumping frequency needed to maintain sufficient water quality to support native fishes. After an approximately 18-month period with no pumping, salinity levels (measured as specific conductance) increased from approximately 4,000 to approximately 10,000 microsiemens per centimeter.

Results from these investigations suggested that salinity levels could be reduced through pumping and subsequent induced subsurface recharge but that regular water management (flushing) of the lake would be necessary to maintain desired salinity ranges. Some additional concerns were raised regarding managing McAllister Lake for native fishes, including the detection of heavy metals (arsenic and mercury) and seasonal low levels of dissolved oxygen. In FY07, all development and research activities at the lake were suspended in order to assess newly initiated research pertaining to water quality thresholds for native fishes and to decide the value of additional proposed limnologic research investigations. It also allowed time to develop a conceptual approach for the lake that would allow for potential mitigation of the challenges previously identified and to provide sustainable management options to benefit native fishes.

In FY15, followup sampling for arsenic, mercury, and selenium was conducted under Work Task C59. Samples of water, substrate, and biota were collected and analyzed to provide better resolution in suggesting the potential of bioaccumulation for native fishes stocked into McAllister Lake. The results were interpreted by the USFWS's Environmental Contaminants Office. Levels of selenium were elevated in mosquito fish tissue and will likely require a plan for long-term selenium monitoring. Concentrations of arsenic, mercury, and selenium in water and substrate were well below the Arizona Water Quality Standards threshold for concern. Concentrations of arsenic and mercury in tissue samples were also well below the Arizona Water Quality Standards threshold for concern.

The LCR MSCP and the USFWS Ecological Services Field Offices agreed that efforts to implement the proposed plan for restoration and management of McAllister Lake should move forward and that Work Task E13 should be reopened. Development will occur in a stepwise fashion in order to adequately consider the potential challenges of this site.

FY15 Accomplishments: This is a new start in FY17.

FY16 Activities: This is a new start in FY17. Preliminary information gathering and pre-design coordination may occur under Work Task E16 in FY16.

Proposed FY17 Activities: A detailed conceptual design for a dewatering system for both solar- and diesel-driven systems will be developed. The options would address both a permanently installed continuous pumping system and a seasonal, removable pumping system. The continuous pumping system would

remove water at a lower rate over a longer period of time, whereas the seasonal pumping system would pump at a higher rate for a shorter period of time. The outcome of discussions with the USFWS, the Imperial NWR, and Refuge Complex Managers, as well as the USFWS Ecological Services Field Office, will inform future actions.

Pertinent Reports: N/A