

## Work Task C25: Imperial Ponds Native Fish Research

| FY16<br>Estimate | FY16<br>Actual<br>Obligations | Cumulative<br>Expenditures<br>Through FY16 | FY17<br>Approved<br>Estimate | FY18<br>Proposed<br>Estimate | FY19<br>Proposed<br>Estimate | FY20<br>Proposed<br>Estimate |
|------------------|-------------------------------|--|------------------------------|------------------------------|------------------------------|------------------------------|
| \$200,000        | \$197,068.70                  | \$1,801,003.62                             | \$200,000                    | \$0                          | \$0                          | \$0                          |

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**Start Date:** FY08

**Expected Duration:** FY17

**Long-Term Goal:** Inform management and provide ways to improve created backwaters through species research

**Conservation Measures:** BONY2 and RASU2

**Location:** Reach 5, Imperial National Wildlife Refuge, Arizona

**Purpose:** To evaluate six ponds created as backwater habitats at the Imperial National Wildlife Refuge in order to assess the efficacy of the ponds for native fish species, specifically bonytail (*Gila elegans*) and razorback suckers (*Xyrauchen texanus*)

**Connections with Other Work Tasks (Past and Future):** Bonytail and razorback suckers to be stocked into the ponds are provided through Work Tasks B1–B5, and genetic monitoring in the ponds will be completed under Work Task C40. The ponds were developed under Work Task E14, and additional monitoring support will be provided through Work Task F5. Data are maintained under Work Task G1.

**Project Description:** The development of native fish refugia in six constructed ponds on the Imperial National Wildlife Refuge will be monitored and evaluated. Incorporated into pond construction were design features such as riprap, spawning gravels, hummocks, and increased depth, which were thought to provide suitable habitat for life cycle completion by bonytail and razorback suckers. The role and importance of each of these features toward developing self-sustaining native fish populations will be evaluated.

**Previous Activities:** Habitat use and population monitoring was conducted for both razorback suckers and bonytail through FY13. Populations of each species did persist with varying degrees of success. Habitat use by razorback suckers shifted across seasons, but habitat selection in any given season was different for razorback sucker populations in each pond. There were consistently more

contacts for both species at night than during the day. During summer, deep open water areas were selected by both species, and little activity was detected. Few bonytail were contacted, so habitat associations were unclear. Razorback suckers were associated with gravel spawning beds and boat ramps during the nominal spawning season that peaked in late winter/spring.

A multi-year water management study was completed in May 2013 in order to evaluate and compare water quality in Pond 1 (where regular water management was continued) with Ponds 2 through 6 (without a managed water supply). The results of this study indicated that water quality management could be achieved with respect to survival of native fishes and that the ponds can be managed with much less water than previously thought. Because of these lower demands and the desire for a non-native free water source, the water supply was switched from a surface water to a groundwater (well) source.

Beginning in FY14, native fish removal efforts were initiated in preparation for the renovation of all six ponds. In Pond 1, 86 razorback suckers were captured: 46 had previously been passive integrated transponder (PIT) tagged, and 40 had no tag data. A total of 145 bonytail were captured from Pond 1; none were PIT tagged.

In FY15, the ponds were treated with rotenone to remove all fish species. Post-renovation sampling was initiated in all ponds. No fishes were encountered during sampling of any of the ponds; however, mosquitofish (*Gambusia affinis*) were observed along the shorelines in Pond 5 during the September 2015 sampling. No water was added to the ponds following the renovation in FY15. Temperature, dissolved oxygen, and pH had similar trends.

A water management schedule has been established. Each pond received a target volume of water per month. In total, the ponds received approximately 2.5 million gallons of water from January through June and October through December, and about 5.5 million gallons from July through September. Water additions to the ponds are intended to mitigate pH and specific conductivity.

**FY16 Accomplishments:** Post-renovation fish monitoring was reduced to quarterly sampling as indicated in the post-renovation monitoring plan and concluded at the end of FY16. The 2 years of monitoring included 112 trammel net-nights, 403 hoop net sets, 874 minnow trap sets, and 162 larval light trap sets. Mosquitofish were captured in Pond 5, but no other fish species have been detected in any of the Imperial ponds since the renovation.

Water chemistry and water quality data, as well as zooplankton and phytoplankton samples, were collected on a quarterly basis. Water quality probes were deployed to record water quality parameters at 6-hour intervals, including temperature, pH, dissolved oxygen, and specific conductivity. All water quality

parameters remained within the ranges of acceptability for native fishes. Submersible PIT tag detection antennas were purchased and installed to support fish stockings.

A native fish stocking plan was prepared that includes a stocking timeline and potential research questions to be addressed for the Imperial ponds.

**FY17 Activities:** Native fish stocking and monitoring will resume in FY17. Per the native fish stocking plan, Ponds 1, 3, and 4 will be stocked with adult razorback suckers in December 2016, and adult bonytail will be released into Ponds 2, 5, and 6 in spring 2017. Each species is scheduled to be released a couple of weeks prior to their respective spawning season in an effort to maximize the number of adults available to contribute during the spawn and thus maximize genetic diversity.

Routine fisheries sampling and water quality monitoring will continue at the Imperial ponds (C25) in FY17; however, all plankton monitoring has been discontinued. Adult populations will be monitored using remote PIT scanners, and larval collections will be initiated shortly after the stocking events and persist throughout the spawning seasons. Water quality will continue to be monitored using the permanently deployed probes in each pond. The probes have been scheduled to record two readings per day (sunrise and sunset) and record the standard set of parameters (temperature, pH, dissolved oxygen, and specific conductivity).

These data will also be used to support other ongoing research efforts (C40 and C65) at the Imperial ponds. Water quality monitoring efforts at the ponds will continue in order to monitor the effectiveness of the water delivery schedule (implemented in FY16) in maintaining water quality parameters for native fishes. Work Task C25 will close at the end of FY17, and these regular monitoring efforts will be covered under Work Task F5 in future years.

**Proposed FY18 Activities:** This work task will be closed in FY17.

**Pertinent Reports:** The scopes of work are available upon request. The *Water Management Study, Imperial Ponds May 2011 through May 2013* and *Imperial Ponds Renovation Plan – 2014* reports are posted on the LCR MSCP Web site.