

Work Task C25: Imperial Ponds Native Fish Research

FY15 Estimate	FY15 Actual Obligations	Cumulative Expenditures Through FY15	FY16 Approved Estimate	FY17 Proposed Estimate	FY18 Proposed Estimate	FY19 Proposed Estimate
\$200,000	\$184,143.25	\$1,644,441.56	\$200,000	\$200,000	\$200,000	\$0

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Start Date: FY08

Expected Duration: FY18

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

Conservation Measures: RASU2 and BONY2

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

Purpose: To evaluate six ponds created as backwater habitats at the Imperial NWR to assess the efficacy of the ponds for native fish species, specifically bonytail and razorback suckers

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. 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 NWR 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 was evaluated for razorback suckers in Ponds 2, 4, and 6. 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 beds during the nominal spawning season that peaked in late winter/spring.

Bonytail and razorback suckers were implanted with acoustic transmitters to assess distribution. Bonytail were distributed in deep waters along the north, south, and northeast corner during the day and in open water across the length of the pond, avoiding shallow areas during the night. Razorback suckers used deep waters west of the hummocks during the day. Nighttime monitoring results indicated that razorback suckers concentrated on the boat ramps and on or around the spawning beds. Spatial overlap was minimal between the two species.

A 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). A trend analysis from the physicochemical profiles indicated that temperature had increased over time in all six of the ponds; however, it appeared to be increasing at a slightly higher rate in Pond 1. Specific conductivity levels suggested a gradual increase in all ponds over time as well. The pH levels also indicated a trend of increasing values over time, with variation among all ponds. The pH commonly exceeded the management guideline of 9.0 in Ponds 2 through 6 in the summers of 2011 and 2012. The pH levels were lowest in Pond 1. Dissolved oxygen varied in all ponds, and recorded levels did not appear to be a cause for concern in the absence of water management. The results of this study indicate 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 surface water to a groundwater (well) source.

FY15 Accomplishments: Native fish removal efforts from Pond 1 were completed in preparation for the renovation of all six ponds. Eighty-six razorback suckers were captured: 46 had previously been passive integrated transponder (PIT) tagged, and 40 had no tag data. All razorback suckers were stocked into the A-10 backwater near Ehrenberg, Arizona. Any razorback sucker that did not have a tag received one prior to stocking. One-hundred and forty-five bonytail were captured from Pond 1; none were PIT tagged. Bonytail were transported to the Lake Mead Fish Hatchery for later stocking.

The ponds were treated with rotenone to remove all fish species. The ponds were treated at about 4.0 parts per million. Post-renovation sampling has occurred in all ponds. No fish 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. Specific conductivity decreased when the pond elevations were being raised to 185 feet

for the renovations. Once the water was turned off to the ponds, the specific conductivity increased in all ponds.

A water management schedule has been established. Each pond will receive approximately 2.5 million gallons of water from January through June and October through December. They will receive about 5.5 million gallons from July through September. Water additions to the ponds are intended to mitigate pH and specific conductivity. These are the only management recommendations that will be employed until the effectiveness of these actions has been evaluated.

FY16 Activities: In FY16, post-renovation fish monitoring will be reduced to quarterly sampling as indicated in the post-renovation monitoring plan. Water chemistry and water quality data, as well as zooplankton and phytoplankton samples, will be collected on a quarterly basis. Continuous sampling units will be deployed to record water quality parameters at 6-hour intervals, including temperature, pH, dissolved oxygen, and specific conductivity. Downloads of these units will occur monthly. Permanent submersible PIT tag detection antennas will be purchased and installed to support fish stockings.

A draft report will be developed that outlines the successes and lessons learned from the renovation effort at the Imperial ponds. A native fish stocking plan will be drafted in FY16, and it will include a stocking timeline and potential research questions to be addressed for the Imperial ponds.

Mosquitofish were observed in Pond 1 and Pond 5 early in FY16. The presence of mosquitofish was confirmed (fish were captured) in Pond 5. The presence of mosquitofish was not confirmed in Pond 1, and no other observations of mosquitofish have been made in this pond. No other fish species have been detected in any of the Imperial ponds since the renovation.

Proposed FY17 Activities: The native fish stocking plan will be implemented. Native fish research will be implemented and may include investigations such as stocking density and survivorship, avian bioenergetics, and genetic contributions of spawning adults.

Pertinent Reports: The scopes of work are available upon request. Annual reports are posted on the LCR MSCP Web site.