

Work Task B7: Lake-side Rearing Ponds

FY08 Estimates	FY08 Actual	Cumulative Accomplishment Through FY08	FY09 Approved Estimate	FY10 Proposed Estimate	FY11 Proposed Estimate	FY12 Proposed Estimate
\$175,000	\$173,950.09	\$745,591.09	\$175,000	\$150,000	\$150,000	\$150,000

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Start Date: FY05

Expected Duration: FY16 decision point

Long-term Goal: Maintain fish-rearing capability, provide RASU and BONY for the LCR MSCP Fish Augmentation Program, and accomplish species research.

Conservation Measures: RASU3, RASU4, RASU5, RASU6, BONY3, BONY4, and BONY5.

Location: Reach 2, Lake Mohave, Arizona/Nevada.

Purpose: Operate and maintain fish grow-out areas along the Lake Mohave shoreline to contribute to RASU brood stock development.

Connections with Other Work Tasks (past and future): Activities are related to B2 and B4, as fish for grow-out ponds will come from Willow Beach NFH, Dexter NFH, and Bubbling Ponds FH. In addition, some of the fish-rearing research activities outlined in C10 and C11 may be conducted at these ponds.

Project Description: Lake Mohave is operated by Reclamation as a re-regulation reservoir. It operates annually within a 15-foot vertical elevation range, filling to an elevation of 645.5 feet msl by mid-May and lowering to an elevation of 630.5 feet msl in October. Desert washes, which flow into the reservoir, deposit sediment and create wash fans. Wave actions have redistributed and shaped these sediment deposits into sandbars and in some areas these sandbars isolate the lower portions of the washes from the lake proper. There are at least 10 such sandbars that have ponds behind them when the lake is full. Reclamation and its partners in the Lake Mohave Native Fish Work Group have been using these lakeside ponds since 1993 as rearing and grow-out areas for RASU and BONY. The ponds are stocked with juvenile fish as the reservoir fills in the spring (typically stocked in March). Reclamation staff monitor the fish throughout the growing season. This includes periodic fertilization with alfalfa pellets and ammonium nitrates to sustain algae blooms and plankton production, removal of weeds and debris, installing and maintaining floating windmills or solar well pumps to mix the water and provide sufficient oxygen levels, and routine monitoring of physical, chemical, and biological parameters. The ponds are normally harvested in the fall as the lake elevation declines. The fish from these ponds are then released into Lake Mohave.

Previous Activities: These ponds have been in use since 1993 and more than 29,000 RASU have been reared and repatriated to Lake Mohave. In an effort to expedite development of RASU brood stock, the target size for repatriation was increased to 500 mm TL during 2007. Few of the fish harvested that year grew to that size, and there were approximately 913 young-of-year RASU harvested from four ponds. Volunteer spawning in the ponds may have impeded maximum growth of the RASU.

FY08 Accomplishments: In 2008 eight lakeside ponds received 1,229 large RASU (295-460 mm TL) in February, March, and June. The amount and types of fish stocked varied from pond to pond in order to test various hypotheses.

First, it was believed that during 2007, reproduction in the pond hampered optimum growth. One way to test this was to put only males or only females into the pond. During 2008, Willow Cove and North Nine Mile each received 42 RASU males from Bubbling Ponds SFH. These fish averaged 360 mm. At the end of the summer, Willow Cove yielded 21 fish which averaged 450 mm and North Nine Mile yielded only 4 fish which averaged 410 mm. In each case, the fish did not reach the target size of 500 mm TL, despite there being no reproduction and despite the fact that densities were very low. It is possible that heat stress or poor oxygen levels impacted both growth and survival.

For the second test, two ponds were selected to receive BONY as well as RASU to see if the BONY would crop off any young-of-year RASU. Arizona Juvenile (AJ) and Dandy (DD) backwaters each received about 200 RASU and 50 BONY (the RASU averaged 365 mm and the BONY averaged 200 mm). Survival of the stocked RASU was fairly good in both ponds, nearly 75%. There was natural reproduction of RASU in AJ, but the BONY did not appear to have suppressed this, as 911 YOY RASU were collected from the pond. In DD there did not appear to be natural reproduction but we cannot truly be sure. There were six fish harvested, which were less than 400 mm TL (these fish were transferred to Davis Cove). It could not be discerned whether these were volunteer spawners or were just undersized fish that were in the group of fish originally stocked. Two facts were common to both of these ponds: 1) BONY spawned in each pond and hundreds of young-of-year fish were collected, 2) in neither pond did RASU growth reach the target size of 500 mm TL. Also, for each pond, survival of the BONY stocked was 50% and growth increased from 200 mm at stocking to about 290 mm at harvest (all BONY were released to Lake Mohave).

North Chemehueve (NC) and Nevada Larvae (NL) were the two best producers during 2008. Each pond received RASU from Willow Beach NFH in the 365 mm size range. Both ponds saw survival of more than 90% and both yielded some fish over 500 mm TL. In addition, six fish were captured from each pond that measured less than 400 mm TL. These fish were PIT tagged and stocked into Davis Cove. The six fish from NL may have been volunteer spawned because they were considerably less than the size of fish stocked in the spring. For NC, these six fish were larger and could have been part of the original stock.

Yuma Cove received the greatest number of fish (461) and yielded the largest individuals. However, it is not possible to determine a survival rate for Yuma Cove as 1) the pond already had fish in it from last year, and 2) the pond was not completely harvested in 2008. Only a subset of fish was removed, and these were selected as research subjects for an ongoing survival study

in the lake. Large fish were intentionally left in the pond. It is hoped that these fish will spawn in spring 2009 and provide a backup source of larvae, if needed. In addition, about 600 of the volunteer-spawned RASU from AJ were transferred to this site during the fall harvest.

South Sidewinder backwater pond was a complete failure in 2008. None of the 30 RASU appeared to survive the summer. Nevada Egg was not used in 2008 because the berm that isolates it from the lake had been breached by a flash flood due to a local thunderstorm.

Table 1. 2008 RASU and BONY Repatriated to Lake Mohave

Ponds RASU	# Stocked	Mean Length @Stocking	# Harvested	Mean Length @Harvest	% Harvested
Yuma*	461	332	108	519	23
Nine Mile	42	362	4	410	10
Willow	42	355	21	452	50
Nevada Egg	0	0	0	0	0
Dandy	204	365	159	438	78
Arizona Juvenile	200	365	143	426	72
Nevada Larvae	50	365	47	458	94
N. Chemehueve	200	365	181	451	91
S. Sidewinder	30	365	0	0	0
Total	1,229	345	663	454	52
Ponds BONY					
Dandy	50	200	25	298	50
Arizona Juvenile	50	200	25	288	50
Total	100	200	50	293	50

*Represents fish that were stocked and does not include volunteer spawn fish

FY09 Activities: Lakeside ponds will continue to be used for RASU brood stock maintenance and development.

Proposed FY10 Activities: Lakeside ponds will continue to be used for RASU brood stock maintenance and development.

Pertinent Reports: The *2008 Fish Augmentation Summary* is under development and will be posted to the LCR MSCP Web site.