

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

FY 2023 ANNUAL REPORT

PROJECT: 29c

Project Title

Wahweap State Fish Hatchery Operation and Maintenance

Bureau of Reclamation Agreement Number:

R19AP00059

Project/Grant Period:

Start date: 10/01/2018

End date: 09/30/2023

Reporting period end date: 09/30/2023

Is this the final report? No

Principal Investigator:

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Abstract:

Wahweap State Fish Hatchery, located in Big Water, Utah, rears bonytail (*Gila elegans*) for stocking in the upper Colorado River basin for the Upper Colorado River Endangered Fish Recovery Program (Recovery Program). Wahweap also maintains a refuge population of razorback sucker brood stock for the Recovery Program.

Study Schedule:

Ongoing

Relationship to RIPRAP:

General Recovery Program Support Action Plan

IV Manage genetic integrity and augment or restore populations (stocking endangered fishes)

IV.A. Genetic management

IV.A.4. Secure and manage the following species in hatcheries (according to the Genetics Management Plan)

IV.A.4.a. Razorback sucker

IV.A.4.b. Bonytail

IV.B. Conduct annual fish propagation activities

IV.B.2. Implement revised integrated stocking plan (Integrated Stocking Plan Revision Committee 2015); supersedes all earlier stocking plans, including species-specific and individual basin plans.

IV.C. Operate and maintain facilities

IV.C.3. Wahweap

Accomplishment of FY 2023 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1. Rear, PIT tag, and stock bonytail, and report tag and stocking data.

Husbandry Overview: Fish reared at the Wahweap Installation are reared in ponds. Pond culture is one of the most economical ways to rear fish, and typically yields fish with a high degree of fitness. The major drawback with pond culture in the mountain west is that six months of the year, late fall, winter and early spring, yield pond temperatures that are not conducive for constant growth. The result being that it takes roughly three years to produce fish large enough for tagging and stocking.

When a new year class of fish is needed, they have been recruited in two ways: 1) larval fish transferred from Southwestern Native Aquatic Resources and Recovery Center (SNARRC) and 2) young of year from voluntary spawning of a SNARRC lot. Larval fish are reared in circular hatchery production troughs and fed live artemia eight times per day until they grow large enough to be weaned from the artemia and fed the manufactured diet. Prior to stocking in ponds, ponds are fertilized, algal and zooplankton blooms are monitored. Once the pond is ready, the bonytails are then stocked in the pond. Fish are fed several times a day and water quality is closely monitored to ensure maximum growth of age 0 bonytails. As these fish grow, feed pellet size increases, and can be fed three times a day in the summer.

Once the fish are large enough to stock, fish are seined, manually harvested, and PIT tagged. The harvest and PIT tagging happens in the fall, prior to the spring stocking. Fish are removed from the pond, graded into raceways, to ensure fish are large enough to meet stocking requirements. The fish are then treated for Asian tapeworm. Following harvest and treatment, all fish to be stocked are then measured and PIT tagged and returned to culture ponds to await the following springs stock.

Following UCRP stocking directives, fish are loaded into stocking trucks and driven to the prescribed stocking location. Prior to release, water chemistry (dissolved oxygen, temperature, pH, hardness, and alkalinity) are taken to ensure conditions are conducive to survival. Prior to the stock, in waters with a history of water quality problems, Regional- Biologists, Special Project Biologists or Conservation officers should inform fish culture personnel of water quality conditions at stocking site prior to them leaving the hatchery with a load of fish.

- Wahweap stocked 11,281 PIT-tagged bonytail in April 2023 (Table 1).
- Fish Health/Condition Profile (HCP)s were performed prior to stocking. Results show fish to be stocked had a mesentery fat score of 2.6 out of 4. The ranking of mesenteric fat was developed for Rainbow Trout and has since been applied to other fishes. During necropsy, fish are ranked 0 to 4 based on the amount of fat deposited around the pyloric ceca, 0) representing no fat deposits on the pyloric cecum or in the visceral cavity; 1) less than 50% cecum coverage; 2) 50% coverage; 3) more than 50% coverage; 4) complete coverage of cecum with large amounts of fat deposited in the visceral cavity. The mean condition factor of sampled Bonytail was 0.0002425. The number is similar to what is observed at other hatcheries that raise Bonytail. Thus, it is assumed that mesenteric fat index of 2.6 is indicative that the Bonytail produced were healthy. A 60% male to 40% female sex ratio was recorded, and all sampled fish exhibited 100% normal livers, and no observed congenital deformities. Sampled fish, averaged 238 mm in length and

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90.5 g in weight. Results have been submitted to Wade Cavender (State of Utah Fish Pathologist) and sent to the Recovery Program.

- All fish stocked were treated for Asian tapeworm (*Bothriocephalus acheilognathi*) with Praziquantel @ 2.5 mg/L for a 24-hour static bath and no worms were observed during any treatments.
- Wahweap submitted 120 bonytail progeny from the 2016, 2019 & 2020 lots, for the yearly Fish Health Inspection. During this year's inspection, Asian tapeworm was detected; this pathogen had previously been detected at this location. Infection across the hatchery is very low or unseen and Wahweap is working closely with Wade Cavender (State of Utah Fish Pathologist) to eradicate this parasite from hatchery ponds. Until the eradication, Wahweap has been instructed to treat each individual pond as a different rearing unit. Wahweap will treat prophylactically, with Praziquantel, all fish being stocked or transferred. Fish were given the Fish Health Approval number DWR 22-068 and DWR 22-069.
- In early 2023, it was deemed that no additional larval fish were needed from SNARRC this year. Table 2 shows that there were sufficient numbers of bonytail to meet stocking quotas through 2027. However, management objectives have changed; see *Shortcomings*, below.
- 48,700 bonytail remain on station in the fall of 2023 (Table 2).

Task 2. Maintain backup razorback sucker brood.

- All razorback sucker were maintained in one on-site pond (Table 2).

Additional activities and accomplishments not included in the FY 2023 scope of work

Outreach and Education

- Information, still images and video footage was provided to UDWR for the Wildlife Blog, a public outreach and information tool.
- Wahweap provided two tours to local elementary schools.

Research and Support

- No research projects in 2023.

Facility Maintenance and Construction

- With the Bipartisan Infrastructure Law (BIL) funding now available, there are two major projects scheduled for Wahweap:
 - Electrical upgrades providing power to all rearing ponds for aeration. As of November 1, 2023, construction bids have been received.
 - Pond 1–9 rebuild (a common drain above bedload, reconstructed kettles, pond liners and gate valve replacement). A design for the pond rebuild will be pursued with FY2024 BIL funding, and construction will follow in subsequent year.
- In the fall of 2022, while we were setting up for the annual bonytail PIT tagging, we learned that the new Biomark tag readers, our Windows 2007 operating system, and the P4 tag program were incompatible. In 2023, three tablets, accompanying Bluetooth keyboards and mice, and Biomark DCM licenses were procured. The technology worked extremely well and all three of the tagging stations for fall 2023 tagging recorded lengths for each PIT tagged fish. One of the three stations also recorded weight data. Of the 13,048 tagged fish 2,950 weights were recorded (22.6%).

Fish Mortality Event

No large fish mortalities in 2023 outside of normal hatchery operations.

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Shortcomings

- Confusion arose in 2023 over provenance of voluntarily-spawned YOY and their permitted uses (e.g., untagged YOY stocking; rearing, tagging, and stocking to meet annual targets). A young bonytail (presumably one stocked by Wahweap into lower Lake Powell in March 2023; Table 1) was found downstream of Glen Canyon Dam. There are concerns over hybridization with Grand Canyon humpback chub, as well as general questions of genetic integrity.
- The SNARRC-sourced year classes (2016, 2019) currently on station for future stocking fall well outside the recommended 2-year production cycle and likely have progeny mixed in.
- The 2020 year class for future stocking was derived from voluntarily-spawned progeny of other on-site year classes, due to pandemic restrictions at the time SNARRC larvae would normally have been acquired.

These issues led to a Biology Committee-approved cessation of 1) stocking untagged, voluntarily-spawned YOY and 2) transfer of voluntarily-spawned YOY to other hatcheries for rearing, tagging, and stocking. Furthermore, the propagation workgroup recommended that all 2016, 2019, and 2020 bonytail at Wahweap be stocked out in 2024. Recognizing that Wahweap (and ONFH-R, which would not receive requested YOY to rear) would not meet 2025 and 2026 stocking targets, as written, the committee approved a request to diverge from stocking size and number targets for the foreseeable future. In light of the above issues and lack of encounters after a year post-stocking, the propagation workgroup has prioritized experimentation, innovation, and planning for bonytail rearing and stocking at their upcoming meetings.

Questions and ideas:

- Fall Stocking
 - Less Predation
 - i. Previous studies of Pikeminnow show large amounts of PIT tagged fish consumed by avian predators. (I believe the number was 300 PIT tags under one tree).
 - ii. Bass and Walleye metabolism low.
 - Months of time for stocked bonytail to acclimate prior to spring flows and bird and fish predation.
- Smaller size
 - Willow Beach stocks bonytail at a larger 350 mm with no success.
 - Bonytail reproduce at relatively small sizes.
 - Does a smaller sexually viable bonytail have a tributary/wetland size advantage?

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Recommendations:

- Subject to propagation workgroup guidance:
 - In 2024, stock out remaining bonytail at the Wahweap Warmwater Installation.
 - In 2024, receive fry from Southwestern Native Aquatic Resources and Recovery Center.
 - In 2025, continue to annually, receive yearly cohorts of fry from SNARRC.
 - Yearly inventory and thin year one cohort to eliminate future numbers of surplus fish.
- Contribute to development of experimental bonytail rearing and stocking protocols.
- Work on the eradication of Asian tapeworm from the Wahweap Hatchery rearing facility.
- Maintain razorback back-up brood stock and add 200 to 300 additional fish to maintain backup brood numbers.
- Continue HCP for all fish prior to stocking or transfer.
- Investigate and implement methods to optimize tagging operations, fish health, and enhance data collection.
 - Database populating length and weight tools/dongles.
 - Tagging and measurement setup logistics.
 - During handling improve fish holding/water conditioning equipment and treatments.
 - i. Salt, oxygen injection, timing.
- Evaluate, and maintain, BIL infrastructure improvement construction projects.
 - With the installed electrical infrastructure there are several types of aerators and aerator management systems that can be utilized. Research, procure and test various aerators and aeration management systems, prior to large scale purchase.
 - Implement Best Management Practices to ensure new infrastructure achieves maximum usable life.
- With newly procured tablets, incorporate cloud services to streamline regular daily, monthly, yearly data collection.

Project Status:

On track, ongoing, complete, etc.

FY 2023 Budget Status

Funds Provided: \$252,563.98

Funds Expended: \$252,563.98

Difference: \$0

Percent of FY 2023 work completed, and projected costs to complete: 100%

Status of Data Submission

PIT-tagged data for FY 2023 has been submitted to the Recovery Program and uploaded to STReaMS

Signed:

Jared Smith

Principal Investigator

November 1st, 2023

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Table 1.

Dates, locations, and numbers of Upper Colorado River Recovery Program bonytail stocked or transferred in 2023 by Wahweap State Fish Hatchery.

Stock Date	Contact Name	Lot Number	Lake/River	Stocking Location	Number Stocked	Average Length (mm)	Max Length (mm)	Min Length (mm)	Tagged
3/31/2023	Smith	220501CBBTWW01	Lake Powell	Stateline Boat Ramp	30,163	68*	95*	45*	No
4/17/2023	Bunting - Tyler	160509CBBTDX01	Price River	Woodside	3,776	270*	370*	215*	Yes
4/18/2023	Bunting - Tyler	160509CBBTWW01	San Rafael	Highway Bridge	3,775	267*	370*	210*	Yes
4/19/2023	Smith	160509CBBTWW01	CDOT Pond	Boat Launch	3,730	268*	380*	220*	Yes
Total Tagged:					11,281				
Total:					41,444				

*- Average derived from subset

Table 2.

Upper Colorado River Recovery Program fish remaining at Wahweap State Fish Hatchery as of fall 2023.

Species	Year Class	Number	Average Size (mm)	Number of Ponds	Projected Year Stocked
Bonytail-Tagged	2016	10,691	248	3	2024
Bonytail-Tagged	2019	2,357	263	1	2024
Bonytail	2019	10,812	263	3	2024
Bonytail	2020	24,840	218	4	2024
Pikeminnow	2017	11	351	1	-
Razorback	Brood	296	466	1	-
Bonytail	Total:	48,700	Total Tagged:	13,048	
Pikeminnow	Total:	11			
Razorback	Total:	296			