

- I. Project Title: Operation and Maintenance of Ouray National Fish Hatchery Randlett
- II. Principal Investigator(s): Karl Schnoor, Project Leader
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- III. Project Summary: Ouray National Fish Hatchery (ONFH) Randlett, was established in May 1996 as a fish refuge and technology development facility to assist in the recovery of the four listed Colorado River fish: razorback sucker, Colorado pikeminnow, bonytail, and humpback chub. This year the ONFH Randlett has expanded the propagation program to include not only razorback sucker but also bonytail. The hatchery will continue to maintain humpback chubs collected from Desolation Canyon in 2009 as a refuge population and potentially as a source of future broodstock.

The stocking goal established by the Upper Colorado River Endangered Fish Recovery Program (Recovery Program) for 2013 included the rearing of 6,000 razorback sucker averaging 350 mm and 10,000 bonytail averaging 250 mm to be stocked into the middle and lower Green River in Utah.

ONFH Randlett is located 57 kilometers (km) southwest of Vernal, Utah, on the Ouray National Wildlife Refuge (ONWR). The facility consists of an 114,000 liter (l) indoor recirculation hatchery with 27, 2.4 meter (m) circular fiberglass tanks and 30, 1.2 m circular fiberglass tanks. The isolation room consists of nineteen 0.75 m circular fiberglass tanks that can be operated as single pass cold water tanks or as a separate re-use system.

There are also 24, 0.1 hectare (ha) ponds covered by bird netting, and 12, 0.2 ha ponds and 0.5 ha Conditioning Reservoir (Con Res) which currently have no bird netting. For a second year the 0.5 ha Con Res was utilized as a production pond increasing the total surface area of production ponds from 4.8 to 5.3 ha at ONFH Randlett. The water source consists of seven shallow wells (15m deep) located near the Green River approximately 0.8 km from the hatchery. The hatchery has its administrative office located in a fisheries complex shared with the Colorado River Fisheries Project (CRFP), Utah Fish and Wildlife Conservation Office (UFWCO), and Jones Hole National Fish Hatchery in Vernal, Utah.

The primary goal for the facility is to preserve a genetically sound captive razorback sucker broodstock of approximately 500 adults and maintain a propagation program adequate to produce ample larvae needed for floodplain wetland studies as well as hatchery production. However the primary goals for 2013 were modified to include production of bonytail. The bonytail are spawned at Dexter NFH and shipped to ONFH Randlett as swim-up fry.

IV. Study Schedule: 1996 - Ongoing

V. Relationship to RIPRAP:

General Recovery Program Support Action Plan

IV. Manage genetic integrity and augment or restore populations.

IV.A. Genetics management.

IV.A.4 Secure and manage genetic stocks in refugia.

IV.A.4.a. Razorback sucker

IV.A.4.c Humpback chub

IV.A.4.a.(1) Middle and Lower Green River.

IV.C. Operate and maintain facilities.

IV.C.1. Ouray National Fish Hatchery.

Green River Action Plan: Main Stem.

IV.A. Augment or restore populations as needed.

IV.A.1. Develop State stocking plan for the four endangered fishes in the Green River.

V.A.1.c. Implement plan.

VI. Accomplishment of FY 2013 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Production and Stocking

The Randlett Unit of the ONFH had a very busy and productive year in 2013. On September 12, 2013 the Yampa humpback (25) were returned to the Green River near Rainbow Park in Dinosaur National Monument. Randlett again exceeding the Recovery Program's stocking goal both in size and numbers for razorback sucker stocking 10,606 razorbacks into the Green River (6,326 kilograms) averaging 596.3 grams (g) and 371.6 mm per fish. As requested by the Recovery Program fish less than 300 mm are not stocked.

The Middle Green River at the ONFH boat ramp was stocked five times with a total of 6,391 razorback sucker during the fall of 2013. The Lower Green River (at the town of Green River, Utah) was stocked four times with a total of 3,150 razorback sucker. A third stocking site was added this year when 1,065 razorbacks were stocked into the Green River at Rainbow Park in the Dinosaur National Monument.

Wahweap Hatchery provided 13,000 bonytail young of year (YOY) averaging 7 gram (g) each to ONFH Randlett during November of 2012. These fish were reared in the recirculation system at Randlett and stocked into 0.1 ha rearing ponds at densities of 1000 fish per pond during May 2013. As a consequence of the Government partial shutdown only six of the bonytail ponds were harvested during the fall of 2013 and in response of the rapidly decreasing water temperatures only 4,801 bonytail averaging 281.1 mm (206.4 g per fish) were stocked. Of the fish stocked 1,973 were stocked at Rainbow Park in Dinosaur National Monument, 989 at the Bonanza Bridge on the White River, 989 into Escalante wetland and 850 at Red Wash boat ramp near Jensen, Utah. The remaining 2012 bonytail are being overwintered in seven 0.1 ha covered ponds to be stocked in the spring/summer of 2014 depending on temperature, habitat and water conditions.

During the winter of 2012-2013 Randlett attempted to overwinter 5,966 production size (250 mm) bonytail for Wahweap Hatchery because the water temperatures were low in the Green River at the time they were to be stocked. This spring the Con Res was seined and 3,150 fish averaging 253.9 mm were stocked into the Green River. Of the fish stocked 1,236 was stocked at the ONFH Randlett boat ramp, 856 at the Ouray Bridge and 1058 at the Red Wash boat ramp near Jensen. There are a few of this cohort remaining at the hatchery because the Con Res could not be drained until late in October.

The overwinter survival rate was 53.3% in the Con Res for production size bonytail from Wahweap hatchery. The fish hauled well, went back on feed after placed in the Con Res and less than 10 mortalities were documented before the pond iced over. Two game cameras were set up on the pond and only three instances of blue heron sightings were documented before ice over. A recording oxygen meter was installed in pond and the oxygen level did not decline below 5 mg/l from December through February. At ice off very few mortalities were documented but upon the northern avian migration several flocks of mergansers were documented persistently hitting the pond. Efforts to haze them were ineffective but after they became conditioned to avoiding white hatchery trucks one was parked on the pond levee which seemed to detour the larger flocks of 20–40 birds. Cormorants also frequented the pond as did blue herons before the fish were stocked in June 2013. There is not irrefutable evidence that the majority of mortalities were due to avian predation but there are strong indications that bird predation was the major factor.

As Randlett adapts to integrate bonytail production with existing razorback production, hatchery dynamics and pond utilization scenarios become ever more crucial. After enduring bird predation on production size bonytail in the Con Res the decision was made that if at all possible bonytail overwintered at Randlett will be in covered ponds or in the hatchery recirculation system. However, because of an abundance of 2013 bonytail approximately 5,000 YOY will be overwintered in an uncovered 0.2 ha pond with hopes of harvesting them in the spring before avian predation occurs.

The Con Res was utilized again this year as a production pond and successfully produced razorback suckers as well as bonytails. Challenges of harvesting fish from this pond as

well as bird predation and cleaning difficulties remain but with the can do attitude and resourcefulness of the Randlett crew the benefits outweigh the hardships.

During 2013, the Randlett Unit of the ONFH continued to make a concerted effort to increase the size of the razorback suckers produced. Three factors that led to the initiation of these efforts were: 1) the study on survival rates of stocked razorback suckers by Zelasko, et al. 2011; and 2) efforts to determine the maximum growth potential for razorback sucker in a hatchery environment; and 3) the Recovery Program's request for larger fish. The Zelasko et al. 2011 study concluded that survival rates increased as the length of the razorback sucker at stocking increased. In an attempt to increase survival rates in the wild, Randlett began increasing the size of fish stocked as well as increasing the numbers stocked. To achieve these goals loading densities at the hatchery were adjusted to maximize growth while attempting to maintain sufficient numbers and meet the requested stocking schedule.

Reduced stocking densities, increased pond fertilization and monitoring of phytoplankton and zooplankton blooms have increased survival rates as well as fish size harvested from the fry to fingerling ponds. Meticulous stocking procedures for larvae into nursery ponds are critical for good survival. The larvae are now tempered not only to water temperature but also pH. The larvae are not subjected to more than a 0.3 point of change in pH over a 20 minute period. In an attempt to reduce stress on the fish stocked, after PIT tagging the fish are held for approximately three days and treated with 0.5 % salt solution allowing them to recover from stresses associated with PIT tagging operations before being stocked into receiving waters. Also initial PIT tagging mortalities can be determined before stocking.

This year only 7,500 YOY razorbacks are being overwintered in the hatchery providing much needed space and warmer temperatures required by the 12,000 YOY bonytail harvested from the fry to fingerling ponds. The balance of the razorback sucker and bonytail are being overwintered in ponds. Overwintering YOY at Randlett has been problematic in the past but with modifications in protocol overwintering small fish in the ponds appears to be less of a challenge.

Razorback Sucker Spawning

On May 3, 2013 ONFH spawned 15 unique crosses (lots) of razorback sucker captive brood stock, producing 1,026,000 eggs with a 49% hatch. Tannic acid was used again this year with better results. The combination of tannic acid and gravity flow water to the hatching jars increased the hatching rate from 20% during 2012 to 49% in 2013.

Brood stock is brought in when pond water temperatures warm to 12–13°C. As last year the brood fish were warmed to 16°C a day before the initial injections and held at these temperatures for the duration of the spawning period. The recirculation system in the isolation room (iso-room) was fed ammonium chloride and inoculated with nitrifying bacteria two weeks prior to spawn and as last year formalin used to treat fungus on eggs

was eliminated from the system after treatments were completed.

A total of 26,000 razorback sucker larvae from 15 lots were proportionally stocked after swim-up into three 0.2 ha nurse ponds. Similar stocking densities, pond fertilization, zooplankton inoculation and tempering techniques utilized during 2011- 2012 seasons which returned 90% and 82 % respectively while similar techniques utilized during the 2013 season yielded an 85 - 90% return.

An additional 12,000 larvae from the 15 lots were stocked on top of production fish in 24 (0.1 ha) grow-out ponds in an attempt to develop replacement brood stock without impacting overall production. These returned in sufficient numbers to develop replacement brood stock populations from the 2013 spawn. Twelve of the grow-out ponds contained razorback and 12 contained bonytail. While returns of future brooders from grow-out ponds tend to be unpredictable, future brooders were returned from all ponds demonstrating that the bonytail did not completely cannibalize the larvae.

Randlett currently maintains 363 individuals from 25 lots of genetically sound Green River razorback sucker brood stock and approximately 1,000 future brooders from year classes 2011, 2012 and 2013.

Humpback Chub

Randlett staff and others collected approximately 200 Yampa Canyon *Gila* spp. in October of 2007, in an effort to begin building a potential captive broodstock of Yampa River humpback chub. The Yampa Canyon humpback chubs (25) were stocked back to the Green River near Rainbow Park in Dinosaur National Park on 9/12/2013.

A population estimate conducted by Julie Jackson in 2005, and a more recent estimate done by Paul Badame (pers. comm., UDWR, Moab), have shown a dramatic decline in the number of humpback chub in the Green River, in Desolation/Gray Canyons and that they hover near and perhaps have fallen below the minimum viable population estimated in the 2002 humpback chub recovery goals. As a result it has been decided to begin taking them into captivity to preserve as much of a diverse gene pool as possible. ONFH Randlett and the UDWR captured 25 adult humpback chubs from Desolation/Gray Canyon and brought them into captivity on October 22, 2009. Of the original 25 humpback chub, 17 remain on station. It is anticipated that the collection of humpback chub from Desolation/Gray Canyon will continue in the foreseeable future, and the wild fish will be transferred to the Randlett unit of the ONFH and kept as a refuge until or if a propagation program is initiated.

Bonytail Chub

The 2013 Integrated Stocking Plan for ONFH Randlett requests an annual production of 10,000 bonytail averaging 250 mm total length. Beginning in 2013 bonytail for Randlett will be spawned at Dexter NFH and shipped to Randlett as swim-up fry. In an attempt to get a jump start on the bonytail request Randlett received 13,000 YOY bonytail at 7.0 g

per fish from Wahweap Hatchery on 11/29/2012. These fish were held in isolation for three weeks at which time due limited space and limited ability to heat water they were placed on the hatchery's primary recirculation system with razorback suckers being reared for the 2013 production season.

On 10/11/2012 Randlett received 5,966 bonytail averaging 142 g/fish from Wahweap hatchery and held in the 0.5 ha Con Res. Because of the low water year and rapid cooling of the river, Randlett voluntarily hold overwinter the bonytail originally destined to be stocked that fall into wetlands (currently dry) along the Green River. The Con Res was seined in June 14, 2013 and 3,150 bonytail were stock to the Green River.

Fish Health

The Randlett Unit of ONFH was given a clean bill of health from the Bozeman Fish Health Center in 2013.

Public Outreach/ Visitors

The Randlett staff conducted tours of the facility for various groups and individuals in 2013. The hatchery also participated in the annual ONWR open house on May 11, 2013. The public was able to see adult razorback broodstock, one year old razorback sucker, bonytail and razorback sucker larvae. Due to the sequestration outreach efforts were limited and approximately 300 individuals toured the facilities in 2013.

Staff

The staffing remains consistent with Karl Schnoor as Project Leader over the Vernal CRFP and ONFH Randlett, Dolores Manning as AO, Matt Fry as Fish Biologist at ONFH Randlett, Trenton Thompson as Maintenance Mech and Jay "Chewie" Doering as Bio-Sci Tech.

Station Cyclical Maintenance/ Construction

Accomplishments this year include the installation of the new and larger bank of BIRM filters, the installation of an oxygen injection system which increased production potential of the recirculation system, the procurement of two storage units and a wheel crane to assist in pond harvesting. The new larger bank of BIRM filters appear to be working well but more work is required to refurbish the older existing set of filters before both can work in concert as they were designed. The 4,000 foot of chain link fence has prevented otters from predated on the razorback brood stock. The mold remediation project in the office and lab areas of the hatchery was completed and is working well. Installation of 7 new fish tanks in the iso-room and a gravity flow water system to the hatching jars has improved the egg and fry survival.

The entire crew Matt, Trenton, Jay "Chewie" and Dave worked diligently in the iso-room to install new tanks and set up a gravity flow system to the hatching jars but Chewie did an exceptional job of plumbing in the new tanks making the system very user friendly as well as aesthetically pleasing. The renovated iso-room is now very efficient and

improved hatching and survival rates. Trenton designed and built a push broom for the side by side cart which allows ponds to be cleaned immediately post-harvest saving much time and labor. Matt accomplished the fish biologist duties superbly and increasingly works more independently as the hatchery manager's time must be apportioned between Randlett and the Vernal CRFP. Matt also acquired his crane operator's certification which greatly improved pond harvest by reducing stress on both the fish and the crew!

Accolades are also given to the BOR for going the extra mile and expending an additional \$1,500 this year to complete the annual well maintenance/cleaning at the hatchery. Bob Norman and Jason Schaefer from the contracting firm retained by the BOR continue to supply input on the well field, heated water system and continue to scrutinize the water treatment system at Randlett. Water flow from the well field is dwindling it is likely that new wells need to be drilled.

Nets covering the 0.2 ha ponds have been removed because the local wind and weather are proving to be insurmountable forces for the current netting structure/design. The nets over the smaller 0.1 ha ponds are faring much better but will need to be replace soon. Separation of the concrete around the pond chimneys and kettles remain a yearly repair endeavor.

I want to extend a special thanks to Matt, Trenton and Chewie for their dedication, hard work and ingenuity which made this another productive and successful year at Randlett. Also appreciation is extended to the ONWR, Dan Schaad and the refuge crew for their continued assistance and support of the hatchery especially the assistance given in fixing a broken water supply line and the transport of the wheel crane from Ft. Sill Oklahoma to the hatchery.

Dan manipulated the work schedules for Jeremy Jones and Tucker Bruffy allowing time for them to repair a broken water supply line at the hatchery saving not only valuable time but also approximately \$10,000 over hiring and outside construction firm. Dan also allowed his crew to travel to Ft. Sill OK and transport a wheel crane back to ONWR saving the hatchery thousands of dollars.

Future Outlook

The future remains bright at ONFH-Randlett with a great crew and great support from the Recovery Program. Optimism looms toward the modified stocking schedule which includes increased stocking size for razorback sucker as well as the additional bonytail requests and the broodstock replacement program now has representatives from 2011, 2012 and 2013 year classes.

Experiments continue with double cropping production ponds, increasing YOY growth with fertilization, zooplankton inoculations and incorporating bonytail production. Modified formalin-treatments used to control fungus on razorback sucker eggs appear successful and implementing an improved nitrification cycle continues to shorten the

biofilter response time in the isolation room. Oxygen injection increases production in the recirculation system and progress on water quality issues facing the hatchery continue to improve.

The crew at Randlett is planning to install an electric water heating system, continue jetting out water supply lines, modify the degassing chamber and perhaps reestablish the liquid oxygen system to improve BIRM filter efficiency.

VIII. Project Status: Project in ongoing and on track

IX. FY 2012 Budget Status

- A. Funds Provided: \$500,559.74
- B. Funds Expended: \$500,559.74
- C. Difference: \$0
- D. Percent of the FY 2013 work completed, and projected costs to complete: 100%
- E. Recovery Program funds spent for publication charges: \$0

Other Funds:

The BOR allocated \$6,050.00 for well cleaning
Additional 1,450.00 this year
Total 7,500.00

Drum filter repair: \$15,602.60 SAMMS

X. Status of Data Submission: PIT tag data submitted November 2013.

XI. Signed: Karl Schnoor, Project Leader

Literature Cited.

Zelasko, K.A., K.R. Bestgen and G.C. White. 2011. Survival rate estimation of hatchery-reared razorback suckers *Xyrauchen texanus* stocked in the Upper Colorado River Basin, Utah and Colorado, 2004–2007. Final Report of Colorado State University Larval Fish Laboratory, Department of Fish, Wildlife, and Conservation Biology to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.