

I. Project Title: Operation and Maintenance of Ouray National Fish Hatchery

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III. Project Summary: Ouray National Fish Hatchery (ONFH) 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. Currently, the primary focus of ONFH is the propagation of the razorback sucker, but as of 2007, the Upper Colorado River Endangered Fish Recovery Program (Recovery Program) has been bringing humpback chub into captivity. The humpback chub captured in 2007 and 2009 were transferred to ONFH where they are maintained as a refuge population and potentially as a source of future broodstock.

The stocking goal established by the Recovery Program for 2012 was to rear 14,895, 300+ millimeter (mm) total length (TL) razorback sucker to be stocked into the middle and lower Green River in Utah. The Integrated Stocking Plan for 2013 will request an increased stocking size for razorback sucker from a minimum of 300 mm TL to an average of 350 mm TL and a reduction in annual numbers to be stocked from 14,895 to 10,000. Also beginning in 2013 the Integrated Stocking Plan will initiate an annual request for 10,000 bonytail chub minimum of 250 mm TL to be produced and stocked.

ONFH 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 twelve 0.9 m<sup>2</sup> 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, which currently have no bird netting. For the first time the 0.5 ha clarification reservoir was utilized as a production pond effectively increasing the total surface area of ponds space available for fish production at ONFH. 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 will be modified to include bonytail. The bonytail will be spawned at Dexter NFH and shipped to ONFH 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 2011 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

**Production and Stocking**

The Randlett Unit of the ONFH had a very busy year in 2012, exceeding the Recovery Program's stocking goal both in size and numbers for razorback sucker. In total 16,168 razorbacks totaling 9,946 kilograms at 615.21 grams (g) per fish and averaging 374 mm TL were PIT tagged and stocked into the Green River. As requested by the Recovery Program fish less than 300 mm were not stocked.

The Middle Green River was stocked with 11,191 razorback sucker averaging 369 mm during the fall of 2012 at the ONWR boat ramp. The Lower Green River (at the town of Green River, Utah) was stocked four times with a total of 4,977 razorback sucker averaging 387 mm.

As a trial run for the 2013 request of 10,000 razorback sucker averaging 350 mm, 24 (0.1 ha) ponds were stocked at 420 fish/pond totaling 10,080. Upon harvest these fish

averaged 387 mm and weighed 672 g/fish. Understanding that the 24 smaller ponds can produce 10,000 razorback sucker averaging 350 mm now allows five of the 0.2 ha ponds and the conditioning reservoir (0.5 ha) to be utilized for bonytail production.

The conditioning reservoir was utilized for the first time this year as a production pond and successfully produced 350 mm TL razorback sucker. The major challenge was harvesting fish from this pond as it was not designed nor constructed as a production pond. A 200 foot seine and a lifting crane equipped with a specially designed loading net did the trick. The can do attitude and resourcefulness of the ONFH crew has essentially increased the total production capability of the hatchery by 0.5 ha with minimal additional cost! The 200 foot seine was also used to harvest the 0.2 ha ponds, greatly reducing stress on the fish as well as strain on the crew.

In 2012, the Randlett Unit of the ONFH continued to make a concerted effort to increase the size of the razorback sucker produced. Three factors that led to the initiation of these efforts were: 1) the study on survival rates of stocked razorback sucker 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, ONFH 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 nurse 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 8,500 YOY razorbacks are being overwintered in the hatchery providing much needed space and warmer temperatures required by the 13,000 bonytail (7.0 g fish) transferred from Wahweap. The balance of the razorback sucker needed for the 2013 production cycle, approximately 3,290 from year class 2011 are being over wintered in two 0.2 ha ponds. For the first time last year ONFH successfully overwintered YOY

razorback sucker as well as fish from the 2010 year class in production ponds and hope to repeat the success again this year.

Other accomplishments this year include the appointment of a contracting firm by the Bureau of Reclamation to evaluate manganese and iron problems in the supply water of the ONFH, the re-plumbing of the water treatment building, the purchase and installation of a second bank of BIRM filters, the rebuilding and modification of the degassing chamber, the jetting out (cleaning) of the main supply line from the well field to the water treatment building, initiating a mold remediation project in the office and lab areas of the hatchery and the installation of 4,000 foot of chain link around the production ponds to keep marauding otters at bay. To the great benefit of the hatchery, Matt Fry was promoted to Fish Biologist and Jay Doering was hired as the Biological Science Technician for the ONFH. It is wonderful to have full staff again and a great team!

### **Razorback Sucker Spawning**

On April 27, 2012 ONFH spawned 14 female and 16 male (6 lots) razorback sucker captive brood stock, producing 450,000 eggs with a 21% hatch. Tannic acid was used for the first time to remove the adhesiveness of the eggs. However it appeared that the tannic acid was not maintained in solution properly and became increasingly toxic to the eggs, presumably resulting in a lower hatch rate than last year. On May 18, 2012 18 females 13 males (6 lots) were spawned producing 440,000 eggs with a 19 % hatch rate. Tannic acid was not used during the second spawn. The lower hatch rate for the second spawn may be attributed to holding the brooders an extra three weeks in the hatchery before spawning. The overall hatching rate of 20 % resulted in approximately 178,000 larvae produced.

The brood stock was brought in when the pond water temperatures warmed to 12–13°C. Historically human chorionic gonadotropin (HCG) injections were administered at these temperatures and then the brooders were warmed to 16°C. As last year the brood fish were warmed to 16°C the day before the initial injections and held at these temperatures for the duration of the spawning period. The recirculation system in the isolation room was fed ammonium chloride and inoculated with nitrifying bacteria two weeks prior to spawn and as last year the formalin used to treat fungus on eggs was eliminated from the system after treatments were completed. The hatch rates were lower this year than last and more in line with the traditional rates for the hatchery but more than enough larvae were produced to fulfill all requests and requirements.

A total of 21,000 razorback sucker larvae from 12 different crosses were proportionally stocked immediately after swim-up into three 0.2 ha nurse ponds. Although ONFH duplicated similar stocking densities, pond fertilization, zooplankton inoculation and tempering techniques which were practiced during 2011 the return rate of 82 % for 2012 was slightly lower than the 90 % return achieved in 2011.

An additional 6,000 larvae from the 12 individual crosses were stocked on top of production fish in 12 (0.1 ha) grow-out ponds in an attempt to develop replacement brood stock without impacting overall production. These larvae had a lower survival rate than

did the ones stocked last year but returned in sufficient numbers to develop a replacement brood stock population from the 2012 spawn, making the project a success.

ONFH is currently maintaining approximately 500 (25 lots) genetically sound Green River razorback sucker brood stock. A comprehensive inventory will be conducted this spring to determine numbers of individuals and lots remaining. Otters were attacking, killing and wounding razorback sucker brood stock last winter and the loss remains to be seen.

### **Humpback Chub**

ONFH staff and others collected approximately 200 Yampa Canyon *Gila* spp. in October of 2007, in an effort to begin building a potential captive brood stock of Yampa River humpback chub. Of the original 200 chubs 30 of them were suspected to be humpback chub, and 170 were thought to be roundtail chub. Of the original 30 humpback chub, 18 remain alive on station. The remaining 137 roundtail chub were stocked back into the Green River in Dinosaur National Monument October 27, 2010. On August 5, 2011 ten humpback chub were imported from J.W. Mumma fish hatchery. Of these, 6 remain alive for a total of 24 Yampa River humpback chub on station in 2011. There are no plans to collect any additional chubs from the Yampa River until an ad hoc group determines which populations of humpback chub are needed as refuge.

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 and the UDWR captured 25 adult humpback chub from Desolation/Gray Canyon and brought them into captivity on October 22, 2009. Of the original 25 humpback chub, 17 were alive on station in 2012. 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.

In an attempt to escalate growth of the humpback chub on station and to allow them to forage in a more natural environment, they were stocked in the 0.1 ha pond nearest to the hatchery. But before the otter problem became apparent the otters consumed five humpback chub and damaged one which latter died. As of 2012 the ONFH now has a total of 35 humpback chub on hand and they will not be moved out of the hatchery again unless they are returned to the wild.

### **Bonytail Chub**

The 2013 Integrated stocking Plan for ONFH, Randlett Unit will request the annual production of 10,000 bonytail 250+ mm total length. Beginning in 2013 the bonytail for

Randlett will be spawned at Dexter NFH and shipped to ONFH as swim-up fry. In an attempt to get a jump start on the bonytail request, ONFH at 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 to limited space and limited ability to heat the water they were placed on the hatchery's primary recirculation system with razorback sucker being reared for the 2013 production season. Both species are currently doing well and scheduled to be graded in January.

On 10/11/2012 the ONFH received 5,966 bonytail averaging 142 g/fish from Wahweap hatchery and placed them in the 0.5 ha conditioning reservoir. Because of the low water year and the coolness of the river, ONFH volunteered to over winter the bonytail originally scheduled to be stocked in the fall of 2012 into the wetlands (currently dry) along the Green River. The plan is to stock these fish into the appropriate receiving waters in the spring of 2013 before the conditioning reservoir is needed for hatchery production.

### **Fish Health**

The Randlett Unit of ONFH was given a clean bill of health from the Bozeman Fish Health Center in 2012.

### **Public Outreach/ Visitors**

The ONFH staff conducted many tours of the facility for various groups and individuals in 2012. The hatchery also participated in the annual ONWR open house on May 14, 2012. The public was able to see adult razorback sucker broodstock, one year old razorback sucker, and razorback sucker larvae. Due to continued outreach efforts, total of 503 individuals toured the facilities in 2012.

### **Staff**

During 2012 the Western Colorado/Utah Fisheries Complex was dissolved. Dale Ryden is now the Project Leader over the Grand Junction Colorado River Fishery Project (CRFP) and the ONFH Grand Valley Unit and Karl Schnoor is now Project Leader over the Vernal CRFP and the ONFH Randlett Unit. Matt Fry was promoted to Fish Biologist at ONFH, Randlett Unit, Dolores Manning continues to serve as the hatchery's administrative officer, Trenton Thompson remains as Maintenance Mechanic and Jay Doering was hired as the Biological Science Technician.

### **Station Cyclical Maintenance/ Construction**

In March and July of 2012, the large Burgess Iron Removal Media (BIRM) filters became clogged with manganese. These filters were bypassed while they were cleaned and rebuilt. The fact that they had clogged after being rebuilt just five months earlier indicates that they are not able to handle the large amount of iron and manganese in the well water. Tests have confirmed that just doubling the amount of filtration without increasing filtration efficiency will not solve the problem. The hatchery staff continues to work with other experts to resolve the situation. Currently a consulting service is being

retained by the BOR to diagnose the water quality issues at ONFH-Randlett Unit and is making recommendations to improve the water quality. The water treatment building has been re-plumbed to make the BIRM filters more efficient, the degassing chamber is being modified and rebuilt, the main water supply line has been jetted out and a second set of BIRM filters are being installed all of which should improve the quality of water at the hatchery.

The mold remediation project is under way and should be completed in January 2013. The 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. It appears that installing 4,000 foot of chain link fence has successfully protected our brood stock from otter Armageddon.

I want to extend a special thanks to Matt, Trenton and Chewie for their dedication, hard work and ingenuity which made this a productive and successful year at the ONFH. Also appreciation is extended to the ONWR, Dan Schaad and the refuge's extended crew for their assistance and support of the hatchery.

### **Future Outlook**

The future remains bright at ONFH-Randlett Unit 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 request and the brood stock replacement program now has representatives from both 2011 and 2012 year classes.

Experiments with double cropping production ponds and increasing YOY growth with fertilization and zooplankton inoculations appear successful. 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. Progress on the water quality issues facing the hatchery continue to improve.

The crew at Randlett is planning to reconstruct the isolation/incubation facility to improve hatching rates, 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.

ONFH-Randlett Unit also has humpback chub on station from two wild locations and is being considered as a refuge location and potentially as a production unit for this species and other species which now include bonytail.

VIII. Project Status: Project is ongoing and on track.

IX. FY 2012 Budget Status

- A. Funds Provided: \$511,424.44
- B. Funds Expended: \$511,424.44
- C. Difference: \$0
- D. Percent of the FY 2011 work completed, and projected costs to complete: 100%
- E. Recovery Program funds spent for publication charges: \$0

Other Funds:

The Bureau of Reclamation allocated \$26,989.00 for ONFH Manganese Project

Mold remediation:	\$60,000.00	FY12 Directors Deferred Maintenance funds
	\$12,887.04	FY12 Regional Deferred Maintenance funds
Total	\$72,887.04	

X. Status of Data Submission: PIT tag data submitted on Dec. 5, 2012.

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.