

**Rearing Endangered Fish at the
Horsethief Canyon Native Fish Facility Ponds
for Stocking into the San Juan River
Draft Fiscal Year FY-2019 Project Proposal
Updated: 4 June 2018**

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Introduction

Along with the workplan entitled, “Razorback Sucker Augmentation/NAPI Pond Management,” this workplan is intended to supply the San Juan River Basin Recovery Implementation Program (SJRBRIP) with a reliable source of endangered Razorback Sucker (*Xyrauchen texanus*) with which to help restore a self-sustaining population via annual fall stocking events.

The Ouray National Fish Hatchery – Grand Valley Unit (NFH-GVU) consists of several distinct facilities located in and around Grand Junction, CO. One of these facilities is the Horsethief Canyon Native Fish Facility (HCNFF) pond complex (about 7½ miles west of the main hatchery building) near Fruita, CO. The other facility used for this workplan is the 24-Road Hatchery, an intensive water reuse hatchery building, utilizing a municipal water source, thus insuring good water quality, clarity, and freedom from parasites.

The HCNFF consists of 22 ponds, ranging in size from 0.1 to 0.5 surface acres, with a total surface acreage for the entire facility of 6.2 acres. Each pond is 5-6 feet deep and is equipped with a fabric liner to prevent seepage. Each pond also has a concrete kettle and drain structure to facilitate draining and concentrating of fish for ease of harvest. This facility is a multi-species broodstock, production, and rearing facility dedicated to rearing the three endangered Colorado River fishes: Razorback Sucker, Humpback Chub (*Gila cypha*), and Bonytail (*Gila elegans*).

Until 2012, the operation and maintenance (O&M) of the entire Ouray NFH-GVU complex (Project 29a: Operation and Maintenance of Ouray National Fish Hatchery – Grand Valley Unit) was funded by Upper Colorado River Endangered Fish Recovery Program (UCREFRP). On 25 March 2010, the Coordination Committee of the SJRBRIP voted to cost-share 1/6 of the operation and maintenance costs for the HCNFF pond complex. This equates to a total of one surface acre of pond rearing and production space (either two 0.5 acre ponds, or four 0.25 acre ponds).

Methods

Currently, the one surface acre of grow-out ponds allotted to the SJRBRIP is being used to rear Razorback Sucker that are progeny of 15-20 paired matings of appropriate genetic lineage, produced annually from Razorback Sucker broodstock being held at HCNFF. Spawning takes place at the HCNFF each spring around mid-April, depending upon

ambient water temperatures. After spawning, fertilized eggs are transported to the 24-Road Hatchery building where they are reared in flow-through egg jars until they hatch into larvae. Several weeks after spawning, larval Razorback Sucker are then stocked back out into grow-out ponds at HCNFF for the remainder of their age-0 growing season. At the end of their age-0 growing season, the Razorback Sucker grow-out ponds are drained and the young fish are transported back into the 24-Road hatchery building where they continue to be fed and reared in a warm, climate-controlled, indoor environment overwinter, thus allowing fish to continue grow even during the coldest months of the year.

Several months after they have been brought back into the hatchery, young Razorback Sucker are implanted with PIT tags. This usually happens at 100-200 mm TL (usually in late January or early February). PIT-tagging young Razorback Sucker several months after they are transferred to the hatchery building (i.e., after they have settled down from being moved into the hatchery building from the HCNFF grow-out ponds) helps reduce stress on these animals and allows them to have abundant time to heal in the hatchery building after being PIT-tagged, but prior to being stocked back into the HCNFF grow-out ponds for their age-1 growing season (which usually happens in late March). Prior to being PIT-tagged, fish are taken off of feed for at least 48 hours and aren't fed again for at least 24 hours after PIT-tagging. This helps reduce stress as well as allowing the fish's intestinal tract to empty and retract, thus reducing the possibility of accidentally puncturing an intestine during implantation of a PIT tag. After PIT-tagging, fish are monitored in circular hatchery tanks for both PIT tag loss and delayed mortality (both tag loss and mortality due to PIT-tagging are very low; < 0.5% annually).

During the spring of their age-1 year these Razorback Sucker, now about 200 mm TL, are released back into the grow-out ponds. They are not handled again until the fall of that same year. When ponds are harvested, every individual Razorback Sucker is measured (a subset are also weighed) and scanned for a PIT tag. This happens at the end of the age-1 growing season (October/November), just prior to stocking. Harvest operations consist of taking fish off of feed 48 hours before harvest, draining grow-out ponds and passively gathering fish into the concrete kettles as the pond drains, anesthetizing fish (using MS-222), measuring fish (all fish), weigh fish (a subset of fish from each pond; minimum of 50 fish per pond), and checking fish for PIT tags. If a PIT tag is found to be missing at this point (which is very rare), then a new PIT tag is implanted prior to the fish being loaded for transport and stocking into the San Juan River. Fish are lifted from grow-out ponds to the stocking truck using a Palfinger brand knuckle boom crane with an attached fish basket. They are then transported to the appropriate stocking site, tempered following appropriate USFWS protocols, and stocked as either a hard- or soft-release, as per directions from the SJRBRIP and the U. S. Fish and Wildlife Service's New Mexico Fish and Wildlife Conservation Office (NMFWCO).

Daily operation and maintenance (O&M) of the HCNFF ponds and the 24-Road hatchery includes regularly checking and making appropriate adjustments to water quality (dissolved oxygen, pH, nitrates/nitrites, etc.), maintenance, cleaning, and replacement of air distribution systems (air stones, air pads, oxygen cylinders), calculating proper feed ratios and distributing proper types and sizes of feed based on fish life stage, size, and pond/tank densities, cleaning of fish ponds/tanks, checking fish for diseases and applying appropriate treatments for sick/infected fish when necessary, maintenance of pumps, filters (e.g., fluidized sand, drum, UV), and air distribution systems, maintenance of vehicles, equipment and grounds, scheduling and performing USFWS and state-

mandated annual fish health inspections and Aquatic Invasive Species inspections, applying for and obtaining state fish importation permits, collection and QA/QC of PIT tag database files, submission of data files to the SJRBRIP, preparation of annual reports, etc.

Products/Deliverables

PIT tag files will include all Razorback Sucker handled and scanned at time of pond harvest (including all fish that were re-tagged), immediately prior to stocking. Following QA/QC of the data, this file is submitted to the SJRBRIP and the NMFWCO. The SJRBRIP has eliminated stocking any Razorback Sucker that are < 300 mm TL. However, the SJRBRIP is actually getting age-1 fish (i.e., after 2 full growing seasons) from HCNFF that are meeting the Upper Colorado River Basin's minimum size requirements of ≥ 350 mm TL. The stocking size of most Razorback Sucker sent to the San Juan River from HCNFF is considerably larger than the minimum 300 mm TL target.

It is anticipated that 2,000-4,000 Razorback Sucker (all ≥ 300 mm TL) can be reared in the one surface acre of ponds allotted to the SJRBRIP. Razorback Sucker of the appropriate target stocking size will be made available to the SJRBRIP in October/November of each calendar year for stocking (after the annual fall fish community monitoring studies are completed). All stockings of Razorback Sucker will be coordinated with personnel from the SJRBRIP office and the NMFWCO.

In fall 2017, a total of 4,120 Razorback Sucker from the HCNFF were stocked into the San Juan River. Their mean total length at stocking was 353 mm. There have now been four years (representing the fall 2013-2016 stockings) during which Razorback Sucker stocked from the HCNFF have been available for recapture during the annual fall Sub-Adult and Adult Large-Bodied Fish Community Monitoring ("Adult Monitoring") study. During the fall 2017 Adult Monitoring study, Razorback Sucker from HCNFF accounted for 47% of all Razorback Sucker collected.

Changes in Future Management Strategies for HCNFF

The SJRBRIP will have the option to change the management approach and species being reared in their one surface acre of pond space as they see fit, but will need to coordinate such changes with Ouray NFH-GVU hatchery staff, allowing enough lead time to prepare for changes in importation/exportation permitting, purchasing of feed proper for the sizes and species of fish being reared, etc. Changes in numbers or sizes of fish desired, species being reared, etc. may lead to adjustments in future years' budgets. For instance, if the SJRBRIP decides to rear Colorado Pikeminnow (a species not currently being held on station at Ouray NFH-GVU), appropriate lead time will be needed to arrange attaining young fish from another facility.

Cost Share with Upper Colorado River Endangered Fish Recovery Program

The SJRBRIP's Coordination Committee voted to cost-share 1/6 of the O&M costs for the HCNFF pond complex. However, the O&M of the HCNFF ponds is in reality part of a much larger picture of the overall O&M of the Ouray NFH-GVU itself. So, the following staffing breakdowns were used to determine the overall O&M of the entire Ouray NFH-GVU:

- 1) 24-Road Hatchery building will require 100% staffing for 6 months of the year
- 2) 24-Road Hatchery building will require 50% staffing for the other 6 months of the year
- 3) Peter's ponds complex, Horsethief SWA ponds & lease-free grow-out ponds will require 10 % staffing for 6 months of the year
- 4) The HCNFF ponds will require 40% staffing for 6 months of the year
 - a. One-sixth of the O&M of the HCNFF ponds will be paid for by the SJRBRIP

So, for areas where there are shared costs at the HCNFF ponds, an example of a \$100 cost/year to the UCREFRP, would cost the SJRBRIP:

- \$100 (full year cost) X .50 (the ½ year that the HCNFF ponds operate) = \$50
- \$50 (the ½ year that the HCNFF ponds operate) X .40 (40% staffing) = \$20
- \$20 (1/2 year at 40% staffing) X 0.167 (1/6 cost to SJRBRIP) = \$3.34

So, the dollar cost to SJRBRIP is \$3.34 per \$100 (3.34%) of UCREFRP Project 29a. In other words, take the actual dollar cost to UCREFRP of Project 29a X 0.0334 for all shared costs.

NOTE: There are also costs included in the budget that are unique to the SJRBRIP alone. These costs will not be prorated, but charged at 100% rate to the SJRBRIP (see budget for details).

Possible Outyear Cost Adjustments

If the SJRBRIP decides to change stocking strategies (species, sizes, times of year at which fish are being stocked, etc.) outyear budgets may need to be adjusted to account for this. The costs presented in this workplan represent the best estimates we can develop, based on the species, numbers, and timing of fish to be stocked from our facility to the San Juan River.

FY-2019 Budget:

(Based on an anticipated FY-2019 costs)

Costs Shared by UCREFRP and SJRBRIP (i.e. O&M Costs)**Personnel/Labor Costs (Federal Salary + Benefits)**

	UCREFRP Project 29a	SJRBRIP Cost
Principal Biologists (GS-11) – 1,960 hours @ \$53.84/hr X 2 people (approx. 130 total hours covered by SJRBRIP or approx. 65 hr/person)	211,053	7,049
Biological Technician (GS-7) – 1,960 hours @ \$32.46/hr (approx. 65 total hours covered by SJRBRIP)	63,622	2,125
Biological Technicians (GS-5) – 1,960 hours @ \$23.40/hr (approx. 65 total hours covered by SJRBRIP)	45,864	1,531
Overtime:		
Biological Technician (GS-7) – 120 hours overtime @ \$48.69/hr (approx. 4 total hours of overtime hours covered by SJRBRIP)	5,843	195
Biological Technician (GS-5) – 120 hours @ \$35.10/hr (approx. 4 total hours of overtime covered by SJRBRIP)	4,212	140
Subtotal	330,594	11,040

**Permitting; Coordination; Data Input, Analysis, Management & Presentation;
Report Writing; Office & Administrative Support (Federal Salary + Benefits)**

Project Leader (GS-14) – 320 hours @ \$82.57/hr (approx. 10.7 total hours covered by SJRBRIP)	26,422	882
Administrative Officer (GS-9) – 320 hours @ \$42.98/hr (approx. 10.7 total hours covered by SJRBRIP)	13,754	459
Subtotal	40,176	1,341

**Operations (Fish Food, Chemicals and Fertilizer, Hatchery
Supplies, Vehicles and Fuel, Electricity)**

Fish Food (based on a quote from Rangen, Inc., dated 8 March 2018)

Actual costs = 4 orders of fish food per year (1 order per fiscal quarter) at \$19,620 each = \$78,480. The line items below represent four total orders to be placed in 2019. Fish food order will last us ~90 days. We have several different sizes of fish on station, thus the different sizes of food in each order.

Rangen # 0 Starter:	1,000 lbs @ \$1.28 per lb = \$ 1,280	
Rangen # 1 Starter:	2,000 lbs @ \$1.28 per lb = \$ 2,560	
Rangen # 2 Starter:	3,000 lbs @ \$1.28 per lb = \$ 3,840	
Razorback Diet (1.2 mm):	8,000 lbs @ \$1.11 per lb = \$ 8,880	
Razorback Diet (2.0 mm):	16,000 lbs @ \$1.02 per lb = \$16,320	
Razorback Diet (3.0 mm):	48,000 lbs @ \$0.95 per lb = \$45,600	
Fish Food Subtotal	\$78,480	2,621

Chemicals and Fertilizer

Exact use of the money in this line item will vary from year to year depending on specific chemical/fertilizer/herbicide needs in a particular year. It will also depend on if there are outbreaks of pathogens that need to be treated (e.g., "Ich") in a given year. Funds for a "typical" field season for one study would likely include the following:

Sodium Bicarbonate (pH increaser) = \$5,600

Eighty 50-lb bags @ \$70 per bag annually

Copper Sulfate = \$4,825

Ten 50-lb bags (pellets) @ \$95 each = \$950

50 gallons 10% solution @ \$77.50/gallon
= \$3,875

Spartan Sparquat 256 Germicidal Cleaner = \$300

10 gallons @ \$30 per gallon

Chloram-X (dechloriator) = \$1,440

Sixteen 10 lb buckets (4/case, 4 cases/year)
@ \$90/bucket

Finquel brand MS-222 anesthetic = \$900

Two 1 kg bottles @ \$450/bottle

Chloramine-T = \$880

Two 55-lb containers @ \$440 per container

Formalin (10% fixative) = \$2,100

Four 55-gallon drums @ \$275 each

Specialized Haz-Mat shipping @ \$1,000

Denatured ethyl alcohol = \$760

Eight 5-gallon jugs @ \$95 per jug

Distilled water = \$300

Ten 2-gallon jugs @ \$30 per jug

Stress Coat (slime coat replacement) = \$290

Two 5-gallon containers @ \$145 each

No-Foam De-Foamer = \$210

6 gallons @ \$35/gallon

Weed killer (2,4-D and Roundup) = \$3,200

2,4-D 40 quarts of concentrate @ \$35 each

Roundup 10 gallons concentrate @ \$180 each

Aquashade (water colorant) = \$3,000

50 gallons @ \$60 per gallon

Dimilin 25W (for anchor worm control) = \$5,000

Twenty 5 lb boxes @ \$250 per 5 lb box

Chemicals and Fertilizer Subtotal	28,805	962
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Hatchery Supplies and Equipment Repair and Replacement

Exact use of the money in this line item will vary from year to year depending on specific equipment repair, replacement, or upgrade needs in a particular year. Funds for a "typical" field season for one study would likely include the following:

Egg hatching jars – Model J30 = \$425

5 @ \$85/each

24-hr belt feeder = \$2,700

Repair/replace 10 annually @ \$270 each

Waders = \$225		
Replace 3 pair annually @ \$75 each		
Duraframe dip nets = \$1,500		
Replace 5 annually @ \$300 each		
Digital scale repair, replace battery, recalibration = \$1,500		
(3 scales per year @ \$500 per service per scale)		
YSI brand water chemistry meters = \$2,000		
(dissolved oxygen, pH, salinity) – repair, replace, recalibrate annually		
HVAC service = \$1,200		
Done annually		
Service fish food cooler refrigeration unit = \$750		
Done annually		
Service the backup generator = \$700		
Done annually		
Pump & motor maintenance/service = \$5,700		
Labor & parts to rebuild:		
One portable water pump/year = \$1,700		
One hatchery motor/pump set/year = \$4,000		
Fluorescent hatchery lights = \$2,200		
Replace ½ of all hatchery lights annually		
Tank Cleaning Supplies = \$235		
Scotch-Brite pads, scrubbing handles		
Maintenance tool replacement = \$400		
Screwdrivers, crescent wrenches, monkey wrenches, vise grips, hammers, rubber mallets, ratchets & sockets, drills & drill bits, chop saw blades		
Plumbing supplies = \$2,000		
PVC pipe, couplers, primer & glue		
Refill compressed oxygen bottles = \$2,500		
50 per year @ \$50 each		
Air stones, tubing couplers, hose clamps = \$1,500		
0.4” air stones – 20 @ \$50 each = \$1,000		
Tubing, couplers, hose clamps = \$500		
Screens and pond boards = \$3,700		
10 screens @ \$300/screen		
PVC lumber for making screen frames		
Metal mesh for making screens		
Redwood pond boards		
100 boards (2” X 8” X 6’) @ \$7 each = \$700		
Koch rings = \$500		
For aerating water in packed columns		
Sand = \$2,000		
For sand filters - 1 pallet = twenty 80 lb bags		
	Hatchery Supplies Subtotal	
	31,735	1,060

Office Supplies

Staples, copier paper, pencils/pens, paperclips,
note pads, cleaning supplies, toilet paper, paper
towels, etc.

Office Supplies Subtotal 1,500 50

Vehicles (maintenance & repair) and fuel

Vehicles: GSA-lease rate (based on FY-2018 4X4 category
56R @ \$365/month lease = \$12.17 per day based on 30
days in an "average" month + \$0.42/mile)

Hatchery pickup truck = \$11,279

24-Road Hatchery Building to Horsethief Canyon Native
Fish Facility ponds (45 mile round trip X 1 vehicle X
365 days per year = 16,425 total miles per year)

Fuel

Diesel fuel = \$350

For Kubota tractor – one 55-gallon drum of diesel @
\$250 (includes fuel, barrel & delivery)

For back-up generator at hatchery – 25 gallons @
\$4.00/gallon

Repair/replace shocks, struts, brakes = \$800

Vehicles and Fuel Subtotal 12,429 415

Electricity = \$6,800

For pump and spawning shed at the Horsethief State
Wildlife Area brood ponds

8 months operation at \$850/month

Electricity Subtotal 6,800 227

Operations Subtotal 159,749 5,335

Subtotal for All Shared Costs 530,519 17,716

Costs Unique to SJRBRIP (Harvest, PIT-Tagging & Stocking Costs)**Personnel/Labor Costs (Federal Salary + Benefits)****SJRBRIP
Cost****Pond Harvest, PIT-Tagging, Stocking and Database Management**

Principal Biologist (GS-11) – 80 hours @ \$53.84/hr 4,307

(2 days X 2 people/day for fish harvest)

(6 days X 1 person/day for PIT-tagging)

Biological Technician (GS-7) – 136 hours @ \$32.46/hr 4,415

(2 days for fish harvest)

(6 days for PIT-tagging)

(5 days for database and records management)

(2 stocking trips X 2 days each X 1 person)

Biological Technician (GS-5) – 320 hours @ \$23.40/hr 7,488

(2 days X 3 people/day for fish harvest)

(6 days X 5 people/day for PIT-tagging)

(2 stocking trips X 2 days each X 1 person)

Subtotal 16,210

Lodging and Per Diem (Based on Published FY-2018 GSA Per Diem Rates)

Lodging		
5 nights lodging in Cortez, CO X 2 people at \$115.00/night =		1,150
Per Diem		
10 days hotel rate (Cortez, CO X 2 people at \$59/day =		<u>1,180</u>
	Subtotal	2,330

Fuel

Stocking truck (gets ~8 miles per gallon) from Grand Junction, CO to Farmington, NM (660 miles round trip X 5 trips = 3,300 total miles) = 413 gallons of gas at \$4.00/gallon		1,652
Water pump for tempering fish (4 gallons X 5 trips) = 20 gallons gas at \$4.00/gallon		<u>80</u>
	Subtotal	1,732

Subtotal for Costs Unique to SJRBRIP 20,272

Total of All Costs Incurred by SJRBRIP:

USFWS-CRFP (Grand Junction, CO) Total	37,988
USFWS Region 6 Administrative Overhead (3.00%)	<u>1,140</u>
USFWS Region 6 Total	39,128

Cost/Fish Comparison:

Workplan total cost in FY-2019 = \$39,128

Estimated production in FY-2019 = 2,000-4,000 fish

For 2,000 Razorback Sucker produced, the cost/fish = \$19.56

For 3,000 Razorback Sucker produced, the cost/fish = \$13.04

For 4,000 Razorback Sucker produced, the cost/fish = \$ 9.78

Appendix 1. Responses to Biology Committee comments of the initial draft of this workplan.

Review of FY19 draft Scopes of Work

27 April 2018

	Scope #	Project	PI(s)
	7	(7) Horsethief Canyon Ponds O&M at Ouray NFH	
PO	<p><i>How can the technical aspects of this SOW be improved?</i> No comment.</p> <p><i>What is this SOW's contribution to recovery?</i> Until self-sustaining wild-recruitment is occurring, stocking of hatchery-reared fish, at least at some level, will likely be necessary to sustain populations of Razorback Sucker in the San Juan River. In order to distinguish between wild-spawned and hatchery-reared juvenile Razorback Sucker in the San Juan River, no individuals < 300 mm TL should be stocked.</p> <p style="background-color: yellow;">PI Reply: Beginning with fall 2017 stockings of razorback sucker, no fish < 300 mm TL from Horsethief Canyon Native Fish Facility were stocked into the San Juan River, specifically to address the concern as stated above.</p>		
Hubert (PR)	<p><i>How can the technical aspects of this SOW be improved?</i> Discussion has taken place at BC meetings regarding the possible need to modify stocking programs for both Colorado Pikeminnow and Razorback Sucker. Regarding Colorado Pikeminnow, concerns have been stated about the continued stocking of 400,000 age-0 fish annually without consideration of competition with wild-spawned fish or habitat availability related to flows in the San Juan River. Regarding Razorback Sucker, concerns have been stated about the biomass of fish > 300 mm TL in the river and carrying capacity of the river for these large fish. These concerns are not addressed to any extent in the four SOWs. Indecision is indicated by the apparent lack of an augmentation plan for Razorback Sucker beyond FY 2016. It is probably time for serious discussion regarding future stocking strategies for both species utilizing available data on their status and survival in the San Juan River.</p> <p>It is recommended that two facilitated workshops be held (one for each species) to assess available data and develop stocking plans for the future. Stocking plans should consider not only objectives for numbers and sizes of fish to be stocked annually, but also objectives for densities of various life stages of the species in the river. Protocols for making decisions on modifications of annual stocking rates based on anticipated flows, densities of juveniles and adults in the river, and other factors affecting the life histories should become part of the rearing and augmentation plans. A comprehensive and</p>		

integrated approach involving culture facilities, management entities, the Program Office, and BC is needed.

PI Reply: This is a program level comment regarding the overall razorback sucker stocking program. Therefore, the PI didn't feel that a specific response to this comment was necessary.

What is this SOW's contribution to recovery?

It is obvious that the stocking programs have contributed to recovery of the species. However, it is probably time to assess the programs and how they will contribute into the future.

PI Reply: This is a program level comment regarding the overall razorback sucker stocking program. Therefore, the PI didn't feel that a specific response to this comment was necessary.