

**Augmentation of
Age-0 Colorado Pikeminnow and
Age-1+ Razorback Sucker
in the San Juan River:
Fiscal Year 2019 Project Proposal**

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Background

Colorado Pikeminnow (*Ptychocheilus lucius*) and Razorback Sucker (*Xyrauchen texanus*) are federally-listed endangered fishes found in the San Juan River. The San Juan River Recovery Implementation Program (SJRIP) was initiated in 1992 to protect and recover populations of both species in the San Juan River Basin (Basin) while water development proceeds in compliance with all applicable federal, state, and tribal laws (SJRIP 2014). Delisting of Colorado Pikeminnow, as described in the recovery goals, is dependent on the maintenance of a wild population of at least 2,600 adults in the Green River subbasin and at least 700 adults in the Upper Colorado River subbasin, as well as a target of 1,000 age 5+ (>300 mm TL) in the San Juan River subbasin. Delisting criteria include a self-sustaining population that either exceeds 1,000 adults in the Upper Colorado River subbasin or a self-sustaining population of at least 700 adults in the Upper Colorado River subbasin and one of at least 800 adults in the San Juan River subbasin. Razorback Sucker recovery criteria are dependent on the establishment of four self-sustaining populations of 5,800 adult fish each; two populations in the Upper Colorado River Basin (one population in the Green River subbasin, the other in either the Colorado River or San Juan River subbasins) and two populations in the Lower Colorado River Basin (SJRIP 2014).

Fish community monitoring during the SJRIP's seven-year research period, 1991-1997, identified few wild Colorado Pikeminnows inhabiting the San Juan River. This prompted investigations into the feasibility of augmenting the population with hatchery-reared fish. Based on results from these investigations, an experimental stocking of Colorado Pikeminnows was conducted by the Utah Department of Wildlife Resources in 1996 with the purposes of evaluating dispersal and retention of stocked Colorado Pikeminnows and determining the availability, use, and selection of habitats by their early life stages (Ryden 2008). This experimental stocking, along with subsequent stockings of larval, sub-adult, and adult fish, resulted in the subsequent recapture of hatchery-reared fish suggesting that Colorado Pikeminnows could survive in the San Juan River. In 2003, *An Augmentation Plan for Colorado Pikeminnow in the San Juan River* was finalized (Ryden 2003). This plan, and later amendments, called for the annual stocking of $\geq 300,000$ age-0 and $\geq 3,000$ age 1+ fish in the San Juan River until 2009. In early 2010 a revised plan, *Augmentation of Colorado Pikeminnow (*Ptychocheilus lucius*) in the San Juan River: Phase II, 2010-2020* (Furr 2010), was developed to direct the continuation of stockings through 2020. The Phase II augmentation plan reflected changes requested by the SJRIP Biology Committee that discontinued the stocking of Passive Integrated Transponder (PIT) tagged age-1+ Colorado Pikeminnows in exchange for stocking increased numbers of age-0 fish ($n \geq 400,000$).

Similarly, after the failure to collect any wild Razorback Suckers in the San Juan River during three years of intensive studies (1991-1993), the SJRIP Biology Committee initiated an experimental stocking program for Razorback Sucker in the San Juan River (Ryden and Pfeifer 1994). Experimental stocking was implemented to provide needed insight into the recovery potential and habitat suitability for Razorback Suckers between river mile (RM) 158.6 at the Hogback Diversion structure near Waterflow, NM and RM 3.0 in Lake Powell near Clay Hills, UT (Maddux et al. 1993). Subsequently, Critical Habitat for Razorback Sucker and Colorado Pikeminnow was designated as between the Hogback Diversion structure (RM 158.6) downstream to Neskahai Canyon (RM -35.0) in Lake Powell; approximately 35 river miles below the waterfall which demarcates RM 0.0 on the San Juan River (USFWS 1994). Between March 1994 and October 1996, 942 Razorback Suckers were stocked at four stocking sites (RMs 158.6, 136.6, 117.5, and 79.6). Data gathered on these fish identified habitat types being used year-round by Razorback Suckers, and provided information on movements, survival, and growth rates. Based on the successes of the experimental stocking study, a full-scale augmentation effort for Razorback Sucker was initiated in 1997 following the *Five-Year augmentation plan for razorback sucker in the San Juan River* (Ryden 1997). In February 2003, the SJRIP Biology Committee extended the augmentation effort for

Razorback Sucker with *An augmentation plan for razorback sucker in the San Juan River: An addendum to the five-year augmentation plan for razorback sucker in the San Juan River* (Ryden 2003). However, due to changes in augmentation protocols and difficulties in producing requested numbers of fish, initiation of the eight-year addendum to the original plan was delayed until 2009. That augmentation plan, in effect from 2009-2016, called for the stocking of 91,200 Razorback Suckers over an eight-year period, or $\geq 11,400$ fish per year, from a combination of sources including the Ouray National Fish Hatchery – Grand Valley Unit (Ouray NFH-GVU), the Southwestern Native Aquatic Resources and Recovery Center (Southwestern Native ARRC) and grow-out ponds on Navajo Agricultural Products Industry (NAPI) land stocked with fish from Southwestern Native ARRC. A revised *Augmentation Plan for Razorback Sucker in the San Juan River Basin* (Furr 2016, draft) was submitted to the SJRIP Biology Committee in February 2016 for review and is being finalized. It has been recommended that the Program continue to stock all available Razorback Suckers into the San Juan River and its tributaries with a goal of stocking $\geq 6,500$ fish (≥ 300 mm TL) annually.

The augmentation programs for the Colorado Pikeminnow and Razorback Sucker populations in the San Juan River are specifically addressed in the following Elements, Goals, Actions, and Tasks of the *DRAFT 2017 SJRIP Long Range Plan (LRP)*.

Element 1. Management and Augmentation of Populations of Colorado Pikeminnow and Razorback Sucker

Goal 1.1 Establish a Genetically and Demographically Viable, Self-Sustaining CPM and RBS Populations.

Action 1.1.1 Develop plans for rearing and stocking for CPM and RBS.

Action 1.1.2 Produce, rear, and stock sufficient numbers of CPM to meet stocking goals of augmentation plan.

Action 1.1.3 Produce, rear, and stock sufficient numbers of RBS to meet stocking goals of augmentation plan.

Goal 1.2 Identify and Implement Strategies for Improving the RBS and CPM Augmentation Program and Genetic Integrity.

Action 1.2.1 Implement methods to evaluate status and success of stocked RBS and CPM.

The stocking of fish reared at U.S. Fish and Wildlife Service (Service) hatcheries in the Southwest Region (Region 2; New Mexico, Arizona, Texas and Oklahoma) are subject to *Regional Policy No. 03-06, Stocking of fish and other aquatic species*. This policy applies to production, transport, and stocking for Service hatchery production and incorporates guidance and requirements from the *Service's Fish Health Policy (713 FWM 1-5)*, *Policy for Controlled Propagation of Species Listed under the Endangered Species Act* (Federal Register 65:183), and goals and objectives of the *Strategic Plan for the U.S. Fish and Wildlife Service Fish and Aquatic Conservation Program: FY2016-2020*. The Service's Fish and Wildlife Conservation Offices are the primary conduit for satisfying Policy requirements and ensuring compliance with needs relative to fish health, stocking requests and priorities, deviation from approved stocking requests, pre-stocking treatments (e.g., nonnative fish removal from stocking sites,

acclimating to water quality and flow), and applicable environmental compliance. The New Mexico Fish and Wildlife Conservation Office (NMFWCO) is now the lead field office for processing SJRIP stocking requests under this policy. The Grand Junction Fish and Wildlife Conservation Office was the previous lead for these requests.

Objectives for Fiscal Year 2018

1. Annually stock ~400,000* age-0 Colorado Pikeminnows, and investigate methods for batch-marking hatchery released fish for verifiable in-field identification.
2. Stock all available Razorback Suckers (≥ 300 mm TL), with the intent to stock $\geq 6,500$ * fish per year until the population becomes self-sustaining. (No RBS < 300 mm TL will be stocked to help identify wild recruiting juvenile fish)
3. Collect and analyze data to facilitate modifying/updating plans for both Razorback Sucker and Colorado Pikeminnow as needed.

*The target number of Colorado Pikeminnows and Razorback Suckers to be stocked will be adjusted (increased or decreased as appropriate) in response to known population changes (e.g., a known level of recruitment, observed changes to apparent survival, increased retention and distribution, etc.) determined to have occurred in any given year.

Methods and Approach

- Objective 1. Coordinate with Southwestern Native ARRC, to procure and stock Colorado Pikeminnows according to guidelines set forth in *Augmentation of Colorado Pikeminnow (Ptychocheilus lucius) in the San Juan River: Phase II, 2010-2020* (Furr 2010).
 - Age-0 Colorado Pikeminnows will be annually reared and harvested by Southwestern Native ARRC and delivered via standard distribution unit to the San Juan River. Fish will be stocked in the fall of each year, post irrigation season, to reduce the risk of fish entrainment in irrigation canals. A proportion of stocked age-0 Colorado Pikeminnow may be acclimatized to a variety of conditions (i.e., flow, temperature, physical/environmental characteristic, etc.) and monitored for stocking-related, stress-induced mortality within an *in situ* enclosure (aka, soft release) for up to 72 hours prior to release into the San Juan River. A concurrent study is being conducted to determine the feasibility and efficacy of batch-marking all hatchery-produced Colorado Pikeminnow with Calcein. If a reliable batch-marking method is identified, either using Calcein or some other method, then future stockings will incorporate this technology to assist in detecting and verifying, wild-produced and recruiting fish. Any opportunistically-acquired Colorado Pikeminnow available to the SJRIP will be stocked on a case-by-case basis.
- Objective 2. Coordinate with Southwestern Native ARRC, Navajo Nation Department of Fish and Wildlife (NNDFW), and Ouray NFH-GVU to procure and stock Razorback Suckers according to guidelines set forth in *Augmentation Plan for Razorback Sucker in the San Juan River Basin* (Furr 2016, draft).
 - Southwestern Native ARRC will stock approximately 10,500 Razorback Suckers (150-250 mm TL) into three NAPI ponds (3,500 fish/pond). Grow-out, harvesting, and stocking via standard distribution unit into the San Juan River will be conducted by NNDFW annually

with assistance from NMFWCO. Razorback Suckers reared at Southwestern Native ARRC that have already reached >250 mm TL prior to the NAPI stockings will continue to be reared at that facility until they achieve ≥ 300 mm TL. Those fish will then be stocked into the San Juan River by Service personnel, or used for other purposes. The Ouray NFH-GVU will provide the SJRIP Augmentation Program with ~2,000-4,000 Razorback Suckers (≥ 300 mm TL) annually. Razorback Suckers will be stocked at specified sites to eliminate the risk of fish entrainment in irrigation canals. Stocking sites may be adjusted under an adaptive management approach to maximize apparent survival (e.g., retention) or to more equally distribute the population longitudinally. It is anticipated that, beginning in 2018, passively harvested fish from the NAPI ponds will be acclimated to flow in an on-site recirculating holding tank prior to stocking into the San Juan River. The details of this treatment are still being finalized. Furthermore, actively-harvested NAPI fish ≤ 299 mm TL may also be held in this holding tank until they reach ≥ 300 mm TL, and then stocked into the San Juan River, or used for other purposes. Therefore, only ≥ 300 mm TL PIT tagged Razorback Suckers will be stocked into the San Juan River. This will help distinguish wild recruiting Razorback Suckers as any untagged fish captured that is <300 mm TL. Any opportunistically-acquired Razorback Suckers available to the SJRIP will be stocked on a case-by-case basis.

- Objective 3. The New Mexico FWCO, in conjunction with the SJRIP Office, will analyze all pertinent stocking information including, but not limited to: timing, location, environmental conditions, size of fish, numbers stocked, and subsequent apparent survival from various stockings; and population estimates, age-class structure, longitudinal distribution, and reach specific densities resulting from stocked fish. These data will then be incorporated into the augmentation efforts and written plans for both Colorado Pikeminnow and Razorback Sucker.

In support of these objectives, the New Mexico FWCO will continue to conduct field excursions to identify suitable stocking sites throughout the basin (e.g., tributaries, secondary channels, etc.). Site selection for Colorado Pikeminnow stockings will continue following the *Stocking plan and protocol for the augmentation of Colorado Pikeminnow (Ptychocheilus lucius) in the San Juan River* (Furr and Davis 2009) and stocking locations and protocols for Razorback Sucker will be outlined in *Augmentation Plan for Razorback Sucker in the San Juan River Basin* (Furr 2016, draft). Modifications to protocols and plans will be made to reflect new data as it becomes available.

Products/Schedule

An electronic data file will be provided for inclusion in the centralized database by 31 December 2019. A draft summary report detailing findings will be submitted to the SJRIP Biology Committee, by 31 March 2020. Revisions will be completed and a final annual report will be submitted by 1 June 2020.

Literature Cited

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FY 2019							
Razorback Sucker and Colorado Pikeminnow Augmentation							
Labor Cost							
Position	Grade/Step	Hourly Rate	Fringe	Salary w/benefits	Hours/Day	Total Days	Sub-Total
Fish Biologist	GS 9/7	\$29.19	26.41%	\$36.90	9	10	\$3,320.92
Fish Biologist	GS 11/7	\$35.32	25.54%	\$44.34	9	40	\$15,962.66
Supervisory Fish Biologist	GS 13/7	\$50.34	28.28%	\$64.58	9	5	\$2,905.93
Supervisory Fish Biologist	GS 14/9	\$62.79	26.93%	\$79.70	9	4	\$2,869.18
Administrative Officer	GS 9/9	\$30.81	26.12%	\$38.86	9	5	\$1,748.59
						Total Labor	\$26,807.27
Travel and Per Diem	Days	Rate					
Hotel Costs	20	\$91.00					\$1,820.00
Per Diem (Travel Day)	18	\$38.25					\$688.50
Per Diem (Full Day)	16	\$51.00					\$816.00
						Total Travel/Per Diem	\$3,324.50
Equipment	Miles/Day	Total Miles	Rate				
Vehicle Fuel							
1 truck X 6 Trips - ABQ to Farminton, NM 366mi RT and 150mi/trip commute	516	3,096	\$0.54				\$1,671.84
						Total Equipment	\$1,671.84
						Sub-total for Augmentation - NMFWCO	\$31,803.61
						USFWS Administrative Overhead (3%)	\$954.11
						Total for Augmentation - NMFWCO	\$32,757.72