

Stocking Razorback Sucker in Lake Powell

Fiscal Year 2022 Scope of Work

Submitted to
Bureau of Reclamation

From

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Contract or Agreement number:
R17PG00084 for USFWS – Grand Junction, CO

1 October 2021 to 30 September 2022

Razorback sucker (*Xyrauchen texanus*) were historically found in the San Juan River but virtually disappeared in the San Juan River Basin by 1995 (USFWS 1991; (Buntjer et al. 1993, 1994, Lashmett 1993, 1994, Ryden and Pfeifer 1993, 1994b, Gido and Propst 1994)). Extremely small numbers of wild razorback sucker and the long-term lack of recruitment led to this species being listed as endangered under the Endangered Species Act on 22 November 1991 (USFWS 1991). Critical Habitat in the San Juan River was designated in 1993 (Maddux et al. 1993) as the area from the Hogback irrigation diversion in New Mexico downstream to Neskahi Canyon in Lake Powell (USFWS 1994), which is currently approximately 10 miles from the San Juan River inflow area.

The San Juan River Basin Recovery Implementation Program (SJRIP) undertook a propagation and stocking program for razorback suckers in the late 1990's and they have been stocked in the San Juan River in varying numbers since 1994, but only since 2005 have numbers > 5,000 been stocked (Ryden and Pfeifer 1994a). Current stocking goals include stocking 10,000+ razorback suckers each year that are > 300mm in length (Furr 2012). Stocking the larger size class is hypothesized to improve initial survival by stocking fish that have nutrient reserves that can carry them through winter and spring, and also larger fish will not be as susceptible to predation.

While the obvious intention of stocking razorback sucker into the San Juan River is to have these fish retain, survive, recruit and reproduce in the riverine portion of the San Juan River, it has long been known that some unknown number of stocked razorback sucker have been moving downstream out of the San Juan River and into the San Juan River arm of Lake Powell. Cathcart et al. (2018) estimated a population of 750 fish using the area just downstream of the Piute Farms Waterfall during a two-week period in 2017. However, Pennock et al. (in press) also identified a sizeable proportion of the population (~50%) that likely never leaves the reservoir and also estimated the population in the Lake Powell at approximately 750 fish. Critical Habitat for razorback sucker in the San Juan River basin extends downstream into Lake Powell as far as Neskahi Canyon. Therefore, any razorback sucker occupying this section of the San Juan River arm of Lake Powell are part of the San Juan River razorback sucker population and contribute towards the demographic recovery criteria. Furthermore, fish stocked in the River or the Lake contribute toward the recovery criteria when and if natural recruitment occurs.

Captures of fish in the San Juan Arm have varied since the first sampling event in 2011, but in some years it has been considerable (Francis et al. 2013; Table 1). Additionally, larval fish have been captured in most years. A large proportion (10-40%) of fish captured each year at the Piute Farms Waterfall and in Lake Powell have been untagged fish. These untagged fish could be explained by accumulated tag loss from fish that travel past the waterfall and are not available for capture in the river, or through recruitment of larvae in the River or Lake and their inability to travel upstream past the waterfall. Although the number of untagged fish declines every year with tagging we hypothesize that a certain level of recruitment is occurring in the River and Lake downstream of the waterfall. Efforts to capture younger age-class fish in the River and Lake have not been successful, although Albrecht et al. (2010, 2018) have also had difficulty capturing juvenile fish in areas where natural recruitment is occurring. The lack of captures could be due to timing of sampling, number of larvae and juveniles present, sampling techniques, differential habitat use, or other unknown factors.

Table 1. Total number of unique adult razorback suckers detected or captured in 2011-2012, and 2017-2019.

Year	Total Captured	Total Detected	Captured & Detected	Total Unique
2011	75			75
2012	72			72
2017	149	179	22	306
2018	57	30	6	81
2019	31			31

The SJRIP has identified a “recruitment bottleneck” as the most likely factor limiting recruitment of larvae to adult life stages. Many ideas have been suggested for this bottleneck including predation of smaller fish and larvae, drift and passage past the waterfall, unsuitable or lack of habitat, reduced water temperatures, contaminants, or other factors. We propose taking a different approach to looking at a potential bottleneck by stocking a smaller size class (i.e., 200mm) of PIT-tagged razorback sucker (100mm smaller than the minimum size class being stocked in the river) at the inflow of Lake Powell and using existing and ongoing sampling/detection methods to determine if fish of that size class are able to recruit into adult size class fish in the lake or section of river below the waterfall.

Study Area:

The study area for the Lake Powell razorback sucker survey in 2021-2024 would be in the San Juan River arm of Lake Powell downstream to confluence of the San Juan and Colorado River arms upstream to the waterfall. Our ability to actually sample (or deploy remote PIT tag readers in) any given area in Lake Powell (in either arm) will depend upon lake levels and inflow. The PIT tag antenna being used to detect eventual survival is located approximately 20 miles upstream of the inflow area is at the Piute Farms Waterfall.

Goal

The goal of this project is to test post-stocking survival of Razorback Sucker stocked at approximately 200mm total length in Lake Powell. By stocking fish ~200mm size fish we can test for potential recruitment in Lake Powell and possibly answer certain questions about a hypothesized recruitment bottleneck. For example, if fish from this stocking event do survive in appreciable numbers we could possibly stock 100mm fish to test survival of that size class in the future.

Objectives:

In FY 2021 and 2022:

- 1) Stock excess fish from Ouray Nation Fish Hatchery Grand Valley Unit (ONFH-GVU) approximately 4,000 (or whatever is available) that are less than 300mm (ideally 200mm or less) PIT-tagged Razorback Sucker at the San Juan River inflow area of Lake Powell. Note: This is the only portion of the work that the SJRIP would be responsible for funding.

- 2) Link 2022-2024 sampling funded by BOR for Lake Powell Razorback Sucker work with this stocking effort to determine success, survival, growth and habitat use of fish stocked during 2021 and 2022. The sampling goals and objectives for the monitoring are provided further down in this proposal and are separated from the actual stocking SOW.

Methods

Fish will be reared at the ONFH-GVU rearing facility and transported to Bullfrog Bay boat ramp on Lake Powell after they have attained a suitable size. Fish will be PIT tagged at the hatchery approximately 1-2 months prior to transport and will be checked for PIT tags prior to being transported to the Lake. At the boat ramp fish will be kept in a hatchery truck until they are transferred to a large boat for the 75 mi trip to the inflow area on the San Juan Arm. Fish will be hauled in groups of 1,000 to 2,000 fish depending on size of stocking tank and crowding. Once at the stocking location, fish will be tempered using lake water and any mortalities will be removed and documented prior to stocking.

Evaluation

The success of this stocking event will be evaluated using two different methods. The first method is to use PIT Tag detections at the Piute Farms Waterfall antenna. Past research by Cathcart et al. (2018) demonstrated that detection probabilities at this location are ~ 90%, which provides a high likelihood that any fish that recruit to an adult size and move upstream to this location will be detected. Further, Pennock et al. (in press) showed that between 40 and 60 percent of razorback suckers in Lake Powell moved upstream during the year and eventually contacted the PIT antenna at Piute Farms Waterfall, suggesting that if fish survive to an adult size class that they may travel upstream and contact that antenna. If these fish recruited to larger size classes, and behaved similarly to other fish, there is a high likelihood that we would detect their survival at this antenna. The second opportunity to detect recruitment will come in spring of 2023 when a project being conducted in Lake Powell to find spawning adult razorback suckers will move from the Colorado Arm of Lake Powell back over to the San Juan Arm. In the past, this project has successfully captured and detected hundreds of fish at the inflow area (Table 1) and if these smaller stocked fish did recruit to an adult size there is a chance that they would be detected by portable PIT antennas or captured with trammel nets and electrofishing.

Successful recruitment of this smaller size class of fish could yield important information on recruitment bottlenecks and answer questions about the suitability of the lake and inflow for recruitment of razorback suckers. Success of these fish could be used to suggest stocking even smaller fish (100mm) in this area to provide further information on recruitment limitations.

Budget for USFWS—Grand Junction

Fiscal Year 2022 Estimated Budget

Personnel/Labor Costs (Projected Federal Salary + Benefits)
 (Salaries based on projected FY-2020 amounts.)

Salaries

	Rate/Hr	People	Total
Biologist GS-11/7			
Transport: Hatchery to lake boat launch	\$53.84	2	\$2,745.84
Transport: lake boat launch to lake stocking site	\$53.84	4	\$5,330.16
PIT-tagging fish prior to transport	\$53.84	4	\$1,722.88
		Personel total	\$9,798.88

Travel and Per Diem

<u>Lodging</u>	Rate	People	Total
Defiance House Lodge	\$96.00	2	\$384.00
<u>Meals & Incidentals</u>	Rate	People	Total
Hotel	\$55.00	2	\$330.00
Hatchery	\$55.00	2	\$330.00
		Travel Total	\$1,044.00

Equipment and Supples

<u>Vehicle Maintenance and Gas</u>			
	Mileage	Mileage Rate	Total
Vehicle Mileage			
Lake Crew	550	\$0.43	\$473.00
Hatchery Crew	550	\$0.43	\$709.50
<u>Vehicle Lease</u>	Days	Lease/day	Total
Lake Crew	3	\$12.35	\$74.10
Hatchery Crew	3	\$12.35	\$37.05
<u>Gasoline</u>	\$\$/Gal	Trips	Total
Boat	\$4.25	2	\$1,105.00
Lake Crew	\$2.50	1	\$250.00
Hatchery Crew	\$2.50	3	\$412.50

<u>Misc supplies</u>		Price per unit	
Oxygen bottles (3 per trip X 3 trips)	120 Ft ³ Bottle	\$25.50	\$229.50
		Equip. and Sup. Total	\$3,290.65
		Sub Total	\$14,133.53
		Region overhead (3%)	\$424.01
		Grand Total	\$14,557.54

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Comments for 43: Stocking Razorback Sucker in Lake Powell

How can the technical aspects of this SOW be improved?

Zeigler (NMDGF): Line 109: I am not sure that the goals of this project are appropriately outlined. “By stocking fish ~200mm size fish we can test for potential recruitment in Lake Powell and possibly answer questions about a hypothesized recruitment bottleneck.” This statement is confusing because I do not know of any identified recruitment bottleneck for 200 mm Razorback Suckers. Even moving to 100 mm Razorback Suckers does not address the identified recruitment bottleneck from larvae to juvenile Razorback Suckers. This project is testing whether or not you can effectively stock 200 mm Razorback Sucker in Lake Powell. If that is the goal, then this project will potentially answer that question.

The BC has stated and hypothesized that there is a RBS recruitment bottleneck somewhere between the larval stage and ~ 300 mm (which is the size that we have stocked in the past and gotten decent survival). Survival of fish smaller than 300 mm in the SJR is virtually 0 based on return rates from past stockings. This project is testing two ideas—1) Can Lake Powell provide habitat for juvenile RBS to recruit to larger sizes and 2) Will ~200 mm RBS recruit to adults at the inflow. Sampling being conducted in the Lake and at the Waterfall will help test those ideas since captures and PIT Tag detections will occur as part of sampling in these two locations. If we can detect/capture these fish in future Lake Powell work then we can continue to decrease the stocking size (next size might be 100mm) to find a point at which survival is either zero or the fish are too small to detect.