

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

FY 2022 ANNUAL REPORT

PROJECT: 164

**Project Title**

Middle Green River Floodplain Sampling and Management

**Bureau of Reclamation Agreement Number:**

R20PG00024

**Project/Grant Period:**

Start date: 10/01/2019

End date: 09/30/2024

Reporting period end date: 11/08/2022

Is this the final report? Yes \_\_\_\_\_ No X

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**Abstract:**

Unlike in 2021, spring runoff and releases from Flaming Gorge Dam provided sufficient flows in the middle Green River to inundate the Johnson Bottom and Old Charley Wash floodplain wetlands in 2022. Draining of both wetlands began in mid-September when water control structure gates were opened. Immediately thereafter, a record number of wild, young-of-the-year Razorback Sucker (RZB) were collected from Old Charley Wash and Johnson Bottom, with respective totals of 615 and 117 individuals. While the Old Charley Wash wetland was effectively dry by mid-October, Johnson Bottom continues to drain at a very slow rate and will not reset prior to the 2023 runoff season.

**Study Schedule:**

2012-Ongoing

**Relationship to RIPRAP:**

Green River Action Plan: Mainstem

II.A.5. Manage and/or modify priority floodplain sites for nursery habitat for endangered fish

II.A.5.b. Johnson Bottom

II.A.5.c. Old Charley Wash

II.A.5.d. Sheppard Bottom

II.A.5.f. Other sites

V.D.1. Implement razorback sucker monitoring plan

**Accomplishment of FY 2022 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:**

Larval Trigger and Spring Peak Flow Hydrology

U.S. Fish and Wildlife Service monitors larval Razorback Sucker *Xyrauchen texanus* (RZB) drift with light traps, starting each spring in May or as water temperatures indicate spawning is imminent. The first detection of RZB larvae was on 21 May at Cliff Creek just north of Jensen, Utah, when mean daily flow was 12,400 cfs and mean water temperature was 11.2°C (USGS gauge 9261000 located near Jensen, UT). The U.S. Bureau of Reclamation (USBR) increased Flaming Gorge Dam releases to 8,600 cfs on 26 May in response to increasing RZB larval captures in light traps and maintained bypass flows through 4 June (USGS gauge 9234500 located near Greendale, UT). During this time, the Green River near Jensen peaked at 17,000 cfs on 1 June. In comparison, discharge at Jensen peaked at 9,830 cfs in 2021 which precluded filling these managed wetlands yet allowed for a complete reset prior to connection in 2022, contributing to the record number of young-of-the-year (YOY) RZB caught this year. Details of spring larval sampling can be found in the annual report for Project 22f, but much of the larval identification and final data are still pending laboratory verification.

Johnson Bottom Wetland Management and Sampling Results

*Water Management*

The Johnson Bottom water control structure gates were opened on 24 May in response to increasing larval RZB captures at Cliff Creek and the Stewart Lake drain, and in anticipation of Larval Trigger releases. Large-bodied fishes were excluded from wetland entry by screens in the water control structure until 29 May when the Green River near Ouray exceeded approximately 13,000 cfs, and the river connected to the wetland through the large unscreened downstream breach. Supplemental water was added by pumping from the Green River into the fish kettle between 8-18 August. This pumping strategy appeared to increase wetland depth more effectively than pumping into the downstream segment of Johnson Bottom as we have done in previous years. Wetland draining began on 28 September, when water depth at the fish kettle measured 2.6 feet. Similar to 2019 (Smith and Beers 2019), depth during draining decreased only 0.24 feet from 4 October to 8 November. Draining continues to date at a very slow rate. Also like in 2019, we ceased managing Johnson Bottom in November, and the wetland will not reset prior to the next year's runoff season because the wetland will remain deep enough to allow overwinter survival. Next spring, GRB FWCO will seine Johnson Bottom with the intent of determining if fish are present in the wetland prior to filling.

*Fish Sampling*

Fish sampling began when the water control structure gates were opened to drain the wetland on 14 September and continued periodically until 8 November. Sampling entails seining in the fish kettle, which is isolated between two water control gates. The downstream gate (during wetland draining) is screened with 6 mm x 75 mm slots to hold fish in the kettle. To date, we have captured 117 YOY RZB, which is more than any year since 2015 when Johnson Bottom was first managed as RZB nursery habitat. Using a tagging threshold of 120 mm, PIT tags were inserted in 12 of these fish (10.3%). Compared to Old Charley, RZB harvested in Johnson Bottom were generally smaller (Figure 1). Prior to release from the wetland, fin clips were collected from 20 RZB captured in Johnson Bottom to

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determine if hybridization with Catostomids had occurred within the subsample. All RZB were then transferred to the Green River near the unscreened breach. Bonytail *Gila elegans* were not captured in Johnson Bottom this year, nor were any other native fish species.

The majority of fish captured at Johnson Bottom in autumn were nonnative species consisting of Common Carp *Cyprinus carpio*, Fathead Minnow *Pimephales promelas*, Green Sunfish *Lepomis cyanellus*, Red Shiner *Cyprinella lutrensis*, White Sucker *Catostomus commersonii*, and Sand Shiner *Notropis stramineus*. The combined mass of all nonnative fishes removed totaled 973.5 kg. In comparison, RZB total mass amounted to 644 g. Few RZB were weighed on 14 September, so the total mass reported here includes 71 individuals from which weight was derived from an Old Charley-Johnson Bottom length-weight relationship (Figure 2). Other nonnative fishes that have been captured in this wetland in past years such as Black Bullhead *Ameiurus melas*, Black Crappie *Pomoxis nigromaculatus*, Channel Catfish *Ictalurus punctatus*, Yellow Perch *Perca flavescens*, and Walleye *Sander vitreus* were not caught in 2022.

### Old Charley Wash Wetland Management and Sampling Results

#### *Water Management*

This was the third year Old Charley Wash (aka Woods Bottom) has been managed as RZB nursery habitat. Wetland filling was initiated on 24 May, and the water control structure was closed on 2 June. Unlike Johnson Bottom in 2022 and years with higher peak runoff, all water entering Old Charley during the filling period this year passed through the screens, thereby excluding large-bodied nonnative fishes. Supplemental water was added over 22 days in July and August because of rapidly declining water depth in mid-summer. A pressure transducer with remote data retrieval capabilities was installed on the interior fish kettle wall in March which allowed us to determine the efficacy of pumping (Figure 3). Wetland draining began on 15 September and was complete by early October, and unlike Johnson Bottom, Old Charley Wash will be dry prior to potential filling in 2023.

#### *Fish Sampling*

Razorback Sucker presence was first confirmed in Old Charley when three were captured in the fish kettle with a dip net in early August. These fish were immediately returned to the wetland. Fish collection in earnest began on 15 September when the water control structure gates were opened, commenced on September 22, and entailed seine hauls in the fish kettle and inside canal. In comparison, the 2019 draining period lasted 28 days (Smith and Beers 2019). In total, 615 individuals (range = 62-169 mm TL; Figure 1) were captured during the draining period which represents the most RZB captured at Old Charley Wash since it was first managed as nursery habitat. We PIT-tagged 361 of these RZB using a tagging threshold of 120 mm TL, and all were released into the Green River near the outlet canal mouth. Prior to release from the wetland, fin clips were collected from 30 RZB captured in Old Charley to determine if hybridization with Catostomids had occurred within the subsample. Other native fishes, such as Bonytail, were not captured in Old Charley Wash this year.

As with Johnson Bottom in 2022, nonnative fishes comprised the majority of captures at Old Charley Wash. Nonnative fish species caught and removed included Fathead Minnow, Red Shiner, Green Sunfish, Sand Shiner, Common Carp, Black Bullhead, and White Sucker. Estimated mass of nonnative

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fishes was 233.4 kg and 13 kg for the 615 RZB. Please note that combined nonnative mass was not recorded on two days, so the total reported here was based on the combined RZB to nonnative mass for all other days.

### Sampling Results for Other Wetlands

#### *Leota Bottom*

Fish sampling was not conducted in Leota Bottom in 2022 because flows were insufficient to connect the wetland to the Green River.

#### *Above Brennan*

Fish Sampling was not conducted in the Above Brennan wetland in 2022, primarily the result of GRB FWCO being short staffed throughout the field season.

#### *Stirrup*

U.S. Bureau of Reclamation completed the construction of a water control structure in the Stirrup wetland prior to spring runoff in 2022. In addition, the Bureau of Land Management began managing this wetland for RZB this year. Green River Basin FWCO provided LED light traps, an irrigation pump, and occasionally personnel, to assist with RZB and wetland management. For more information regarding 2022 results, please see the Project 178 Annual Report.

#### *Sheppard Bottom*

Fish sampling was not conducted in Sheppard Bottom this year because the wetland did not fill.

### Shortcomings

When discharge at the USGS Green River near Ouray reaches and exceeds approximately 13,000 cfs, the large, unscreened downstream breach at Johnson Bottom allows free passage of all fishes between the Green River and the wetland. Field crews noted that young-of-year Common Carp were by far the most numerous nonnative fish species while draining the wetland this year, yet no adult carp were captured.

Although not directly observed, it appears likely that adult carp entered Johnson Bottom through this breach and spawned in the wetland and/or carp larvae were entrained from the Green River. In addition, this breach places a limit on water depth since after peak flow, the wetland will lose water into the Green River until the breach is no longer connected.

Dense willows have become established in the Johnson Bottom filling/drainage canal since 2020 which likely contributed to increased sedimentation which reduced the gradient in the canal. In addition, multiple large trees have fallen across the canal. It also appears that sedimentation in the interior canal has reduced gradient inside the wetland. These gradient reductions have decreased drainage rates to the point where the decision was made to abandon our efforts in mid-November despite the wetland being

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far from drained. In its current state, draining at Johnson Bottom to the point where RZB are forced to move into the fish kettle cannot be achieved.

### **Additional noteworthy observations:**

Most Johnson Bottom RZB captures (n = 91) occurred during the first two days of sampling. These fish may have been attracted to the kettle when oxygenated Green River water was pumped in August and remained there.

For a variety of reasons, the Green River Basin FWCO was short-staffed throughout the entire 2022 field season. As a result, the fulfillment of our obligations was only possible with an immense amount of assistance from Recovery Program staff and partners, volunteers, or contractors. The Utah Division of Wildlife Resources Vernal also experienced staffing shortages during the fall of 2022. Acknowledging the potential workload requirements of wetland draining, netting, handling, PIT-tagging, processing, and transferring wild RZB captured therein, the aforementioned offices joined forces and implemented the Technical Wetland Interagency System Team (TWIST). This interagency approach allowed the staffing and flexibility required to respond to the record number of RZB harvested in all managed wetlands, but particularly Old Charley Wash, in 2022. In addition, TWIST drew upon and further developed the strength of a longstanding cooperative relationship between these two offices and allowed for among both agency's Principal Investigators and field technicians increased discussion of wetland and RZB management, field methods, and future improvements.

The species composition in the wetlands sampled includes fish species less commonly observed in the main channel. Wetlands can serve as preferred habitat where these species will reproduce and persist in the basin. They can also become a source to reintroduce these species back into main channel habitats where they might otherwise not occur.

### **Recommendations:**

- (1) Excavate and re-grade the Johnson Bottom Canal before it fills next spring. The Johnson Bottom canal has not been excavated since 2015. Noticeable sediment deposition has occurred since then and is the most likely culprit of the slow drainage rates observed in 2022.
- (2) Investigate using detection and capture methods beyond light traps and seining at Johnson-Bottom and Old Charley. For example, environmental DNA (eDNA) could determine if RZB and/or nonnative fishes were present throughout the growing season and would not require fish capture or handling.
- (3) Attempt to increase RZB captures at Johnson Bottom by attracting fish to the fish kettle. This might be achieved by pumping river water into the fish kettle or adding artificial structure or cover.
- (4) Consider filling breaches that allow nonnative fishes to enter Johnson Bottom and Old Charley Wash wetlands and decrease water depth potential.

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- (5) Investigate techniques to control or eliminate nonnative fish populations that might overwinter in wetlands in order to reduce their numbers before river connection, including chemical methods.

### **Project Status:**

Ongoing.

### **FY2022 Budget Status**

Funds Provided: \$59,622

Funds Expended: \$59,622

Difference: \$0

Percent of the FY 2022 work completed, and projected costs to complete: 100%

Recovery Program funds spent for publication charges: -X-

**Status of Data Submission:** Data will be uploaded into STReaMS by the end of November 2022.

### **Signed:**

Christian Smith

Principal Investigator

10 November 2022

Dave Beers

Principal Investigator

10 November 2022

### **Science/Technical Reviewer:**

Andrew A. Schultz Ph.D., USFWS, Utah FAC Complex Manager / Project Leader

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**Table 1. Summary of 2022 fish sampling and total captures.**

Wetland	RZB larvae	RZB juvenile (n)	RZB adult (n)	BT adult (n)
Johnson Bottom	NA	117	0	0
Old Charley	NA	615	0	0
Stirrup**	NA	NA	NA	NA
Total	0	732	0	0

\*NA indicates sampling was not conducted.

\*\*Please refer to the Project 178 Annual Report for Stirrup results starting in 2022.

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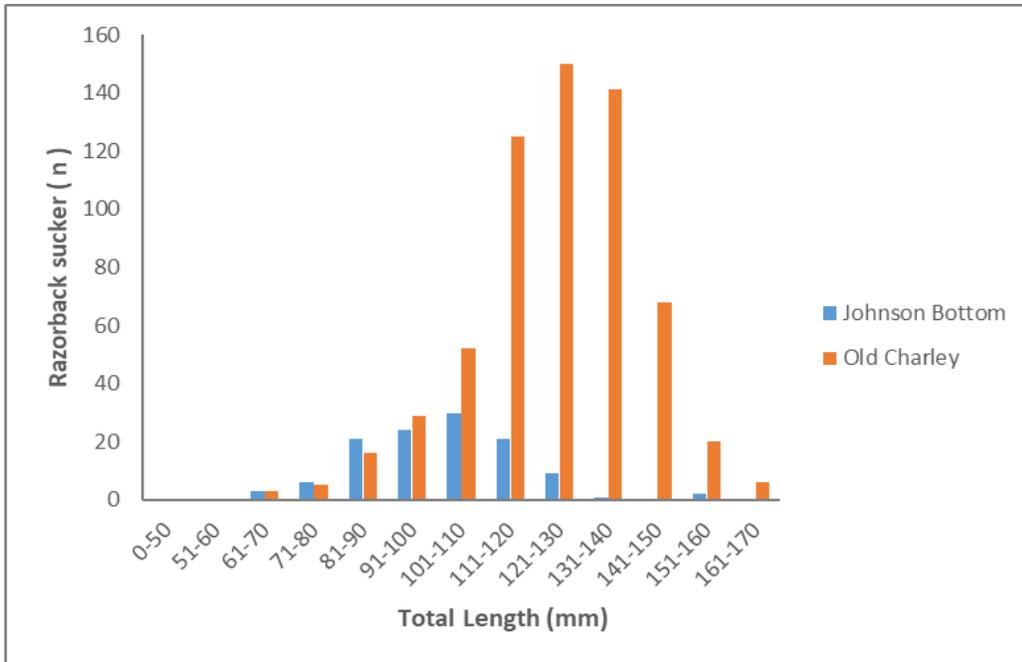


Figure 1. Size distribution of Razorback Sucker caught in the Johnson Bottom and Old Charley Wash wetlands in September and October 2022.

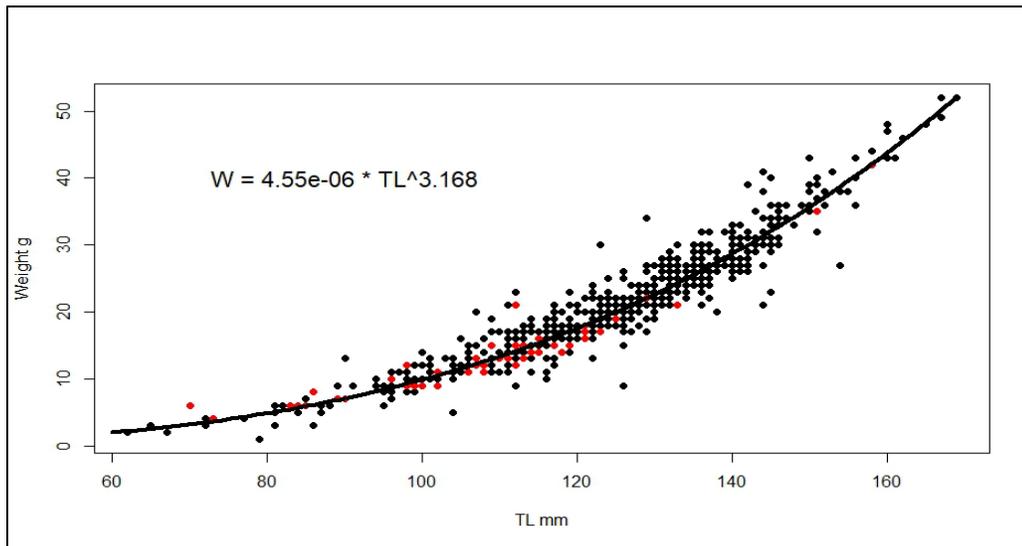
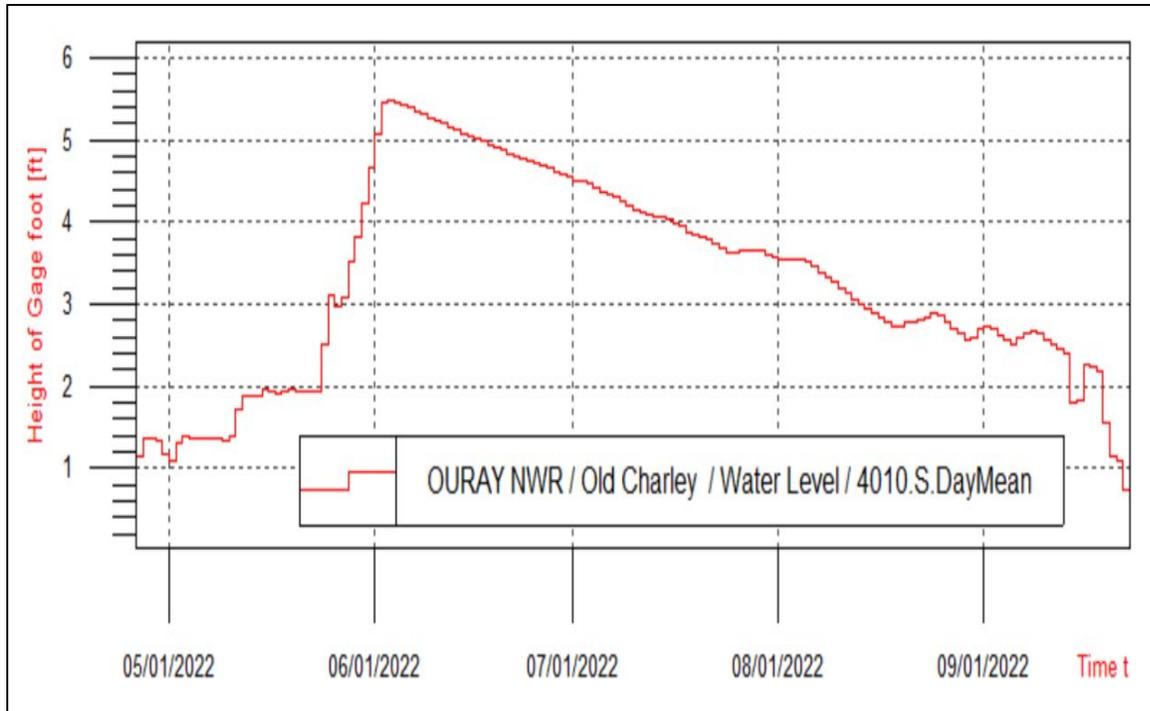


Figure 2. Razorback Sucker young-of-year length-weight relation for Johnson Bottom (red) and Old Charley Wash (black) in autumn 2022. Figure by G. Bruce Haines.

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**Figure 3. Water level in the Old Charley Wash wetland as recorded by a pressure transducer from 26 April-22 September 2022. Displayed water level values are consistent with a staff gage and were corrected with periodic staff gage readings. Figure by Brian Newman.**