

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

FY 2023 ANNUAL REPORT

PROJECT: 129

Project Title

Humpback Chub population estimates for Desolation/Gray Canyons, Green River Utah.

Bureau of Reclamation Agreement Number:

R19AP00059

Project/Grant Period:

Start date: 10/01/2018

End date: 09/30/2024

Reporting period end date: 09/30/2023

Is this the final report? Yes No

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Abstract:

Achievement of recovery goals (2002 amended recovery plan) for Humpback Chub requires monitoring six self-sustaining populations in the upper and lower Colorado River basins. Desolation and Gray Canyon is the sole extant population in the Green River subbasin. Humpback Chub were sampled at four sites in Desolation and Gray Canyons with trammel nets, baited hoop nets, and submersible PIT antennas during September and October of 2023 to monitor the population. All four sites were long-term sampling sites and were as follows: Cedar Ridge, Log Cabin, Cow Swim, and Coal Creek. Only four sites were sampled as opposed to more in previous years so greater effort could be applied to the selected sites. Three-pass mark and recapture techniques were used to collect data for future calculations of population estimates for each individual site. Mean catch per unit effort (CPUE) for Humpback Chub captured via trammel nets at all sites sampled was 0.04 fish per net hour and ranged from 0.01 to 0.09 fish per net hour. The 2023 mean CPUE was the lowest since sampling began in the fall of 2001. A total of 79 total Humpback Chub were captured, 54 of which were unique captures (individual fish, not counting recaptures): 49 adults (≥ 200 mm TL), 1 subadult (150-200 mm TL), and 4 juveniles (< 150 mm TL).

Study Schedule:

2023-Ongoing

Relationship to RIPRAP:

GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

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- V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).
- V.A. Measure and document population and habitat parameters to determine status and biological response to recovery actions.

GREEN RIVER ACTION PLAN: MAINSTEM

- V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).
- V.A. Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions.
- V.B. Conduct population estimate for Humpback Chub.
- V.B.1. Desolation/Gray

Accomplishment of FY 2023 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1: Complete three sampling trips in Desolation/Gray Canyon from September to October 2023

Three sampling passes were completed through Desolation and Gray Canyons on 9/20–9/27/23, 10/05–10/12/23, and 10/20–10/27/23. Mean daily flows during sampling ranged from 2528 – 3188 cubic feet per second (USGS gauge #09315000, Green River at Green River). Average water temperatures measured on site during each pass were 17° C, 15° C, and 12° C respectively.

Sampling sites included four long-term trend sites (Cedar Ridge, Log Cabin, Cow Swim, Coal Creek). Specific site locations were at river miles 185.0 (Cedar Ridge), 174.5 (Log Cabin), 160.0 (Cow Swim), and 145.5 (Coal Creek). All sites were sampled with trammel nets (8 per site), baited hoop nets (up to 30 per site), and submersible PIT antennas (2 per site). Eight PIT tag antennas were deployed eight days prior to the first sampling pass and retrieved during the third pass. In an effort to meet reliable population estimate criteria, Log Cabin and Cow Swim were sampled for five days total whereas Cedar Ridge and Coal Creek were sampled four days total during all three passes.

Task 2: Data entry, analysis, and reporting:

The 2023 compiled and quality checked data will be transferred to the UCREFRP database manager by January 12, 2024.

Total effort included 1,867 trammel net hours, 8,696 hoop net hours, and 8,447 antenna set hours over three passes (Table 1). Humpback Chub were captured at all locations, but only two of the four sites met reliable population estimate criteria of at least 15 unique captures and 2 recaptures (Table 2). Thus, a larger amount of effort may be necessary at each sampling site to obtain accurate site estimates in the future. Population estimates will be calculated for the two sites that met criteria for reliable population estimates. This report will then be revised upon completion of the population estimation. Trammel and hoop nets resulted in the capture of 79 total Humpback Chub, 54 of which were unique captures: 49 adults (≥ 200 mm TL), 1 subadult (150-200 mm TL), and 4 juveniles (< 150 mm TL). (Table 3). The 79 total captures in 2023 were the lowest since 2011 (55) (Table 1). Antennas detected a total of three Humpback Chub, one of which was unique. The average total length of unique chubs captured was 278

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mm TL and ranged from 61 to 397 mm TL (Figure 1). All four juvenile Humpback Chubs were captured with hoop nets, and the single subadult was captured in a trammel net. Mean catch per unit effort (CPUE) for trammel nets at all sites was 0.04 fish per net hour and ranged from 0.01 to 0.09 (Table 4; Figure 2). Mean CPUE at all sites was lower than all previous fall sampling years (Figure 2). The low 2023 CPUE may also be due to the 2022 broodstock collection efforts that removed 22 Humpback Chub from three of the four sites in which we sampled. The only site not sampled during the 2022 broodstock efforts was Log Cabin which had the highest total and unique captures in 2023.

Task 3: Final Report

A final report will be prepared in 2025 detailing the sampling that occurred in 2023 and 2024.

Additional noteworthy observations:

We also captured three Colorado Pikeminnow, two of which had not been previously PIT tagged. Similarly, we caught one untagged Razorback Sucker and one previously tagged Bonetail. All endangered and native species encountered during sampling are summarized in Table 5. Non-native species encountered during sampling are summarized in Table 6.

We were also fortunate this year to attain landowner access from the Ute Tribe to camp on river left at Cedar Ridge and Log Cabin. This allowed for the first sampling of Log Cabin since 2018 as the 2019 population estimate and 2022 broodstock trips did not sample here. This may explain why Log Cabin was our best site with 26 total captures and 7 recaptures. We are hoping that we will once again be able to attain landowner access to these sites in 2024.

Recommendations:

- Trammel nets, however stressful to fish, continue to account for the majority of adult Humpback Chub captures and therefore should continue to be used in sampling. Continue to schedule sampling passes to avoid water temperatures above 20° C.
- The large hoop net sampling effort in 2023 did not result in the quantity of juveniles and young-of-the-year that it did in 2018. However, four juveniles were captured in 2023 providing evidence of some reproduction. The large hoop net effort should continue so reproduction and recruitment can be monitored and to supplement adult trammel net captures.
- To meet the criteria for reliable population estimates, increased effort may be needed for all sites being sampled with priority given to the long-term historic sites, so that we may continue assess long term trends and patterns in the future.
- Given the difficulty to meet criteria for reliable site-population estimates and therefore obtain a reasonable reach-wide population estimate, it may be beneficial to:
 - Increase effort for all sites being sampled with priority given to the long-term historic sites so that we may continue to assess long term trends and patterns in the future.
 - Explore new modeling techniques that may aid in attaining more reliable and consistent population estimates for individual sites.
 - Change recovery goals (i.e., demographic criteria) for this specific population to metrics that are more feasible to monitor such as reproduction, recruitment, survival, CPUE, and population estimates specific to individual sites.

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Project Status:

On track and ongoing.

FY2023 Budget Status

Funds Provided: \$150,000

Funds Expended: \$150,000

Difference: -\$0-

Percent of the FY 2023 work completed, and projected costs to complete: 100%

Status of Data Submission

The 2023 compiled and quality checked data will be transferred to the STReaMS database manager by January 12, 2024

Signed:

Blake Hansen

Principal Investigator

11/08/2023

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Table 1. Effort for each gear type, total number of captures and/or encounters of identified Humpback Chub, and unidentifiable juvenile chub (*Gila sp.*) in Desolation and Gray Canyons, 2001 – 2023. All captures and encounters from all sampled sites are included except antenna detections; only the total number of individuals detected is reported.

Year	Month (passes)	# Sites sampled	Trammel nets		Submersible Antennas		Hoop net/minnow trap		Electofishing	
			Hours	HBC	Hours	HBC	Hours	HBC (<i>Gila sp.</i>)	Hours	HBC
2001	6-7 (3)	12	2803	214	-	-	-	-	8	3
2002	6-7 (3)	12	2008	239	-	-	1440	6 (1)*	22.5	38
2003	9-10	12	3042	236	-	-	1946	4 (1)*	11	1
2006	9-10	12	3289	119	-	-	729	9	16.4	12
2007	9-10	12	2727	130	-	-	988	6	-	-
2010	9-10	5	1163	68	-	-	-	-	7	5
2011	9-10	6	1013	55	-	-	-	-	6.4	8
2014	9-10	6	1276	99	471	11	346	15 (1)	9.3	6
2015	9-10	6	1596	85	1567	20	1825**	10 (7)	-	-
2018	9-10	6	1883	105	6402	27	4658	24 (4)	-	-
2019	9-10	4	1543	105	4977	20	4700	22	-	-
2023	9-10	4	1867	62	8447	3***	8696	17	-	-

*Includes minnow trap capture and effort

**Hoop net effort from trip 1 not included in total due to incorrect setup

*** Incomplete antenna data

Table 2. Total number of all Humpback Chub captured with hoop nets and trammel nets and the total number of recaptures by site in Desolation and Gray Canyons, 2023.

Site	Individuals Captured	Recaptures
Cedar Ridge*	10	1
Log Cabin	26	7
Cow Swim*	21	7
Coal Creek	22	5

*Did not meet reliable estimate criteria of at least 15 unique captures and two recaptures

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Table 3. Number of Unique Humpback Chub captured by size class (Juvenile <150 mm TL, Subadult 150-199 mm TL, Adult >200 mm TL) during Desolation and Gray Canyons Humpback Chub sampling with trammel nets and hoop nets, 2023.

Gear Type	Juvenile	Subadult	Adult
Trammel nets	0	1	42
Hoop nets	4	0	7
Total	4	1	49

Table 4. Catch per unit effort (fish per net hour) with standard error of Humpback Chub by site and pass from trammel net sampling in Desolation and Gray Canyons, 2023.

Pass	Site	CPUE	Standard Error
1	Cedar Ridge	0.02	0.01
	Coal Creek	0.05	0.02
	Cow Swim	0.06	0.04
	Log Cabin	0.02	0.01
2	Cedar Ridge	0.02	0.01
	Coal Creek	0.03	0.02
	Cow Swim	0.04	0.02
	Log Cabin	0.09	0.04
3	Cedar Ridge	0.03	0.02
	Coal Creek	0.07	0.03
	Cow Swim	0.01	0.01
	Log Cabin	0.04	0.01

Table 5. Non-target endangered and native species encountered during Desolation and Gray Canyons Humpback Chub sampling with trammel nets and hoop nets, 2023.

Gear Type	Bonytail	Colorado Pikeminnow	Razorback Sucker	Bluehead Sucker	Flannelmouth Sucker
Trammel nets	1	3	93	71	369
Hoop nets	0	0	0	1	26
Total	1	3	93	72	395

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Table 6. Non-native species encountered during Desolation and Gray Canyons Humpback Chub sampling with trammel and hoop nets, 2023.

	Black Bullhead	Black Crappie	Channel Catfish	Common Carp	Green Sunfish	Smallmouth Bass	Walleye
Trammel nets	6	87	604	99	4	28	2
Hoop nets	5	12	993	58	0	4	0
Total	11*	99*	1597	157	4*	32*	2*

*Removed

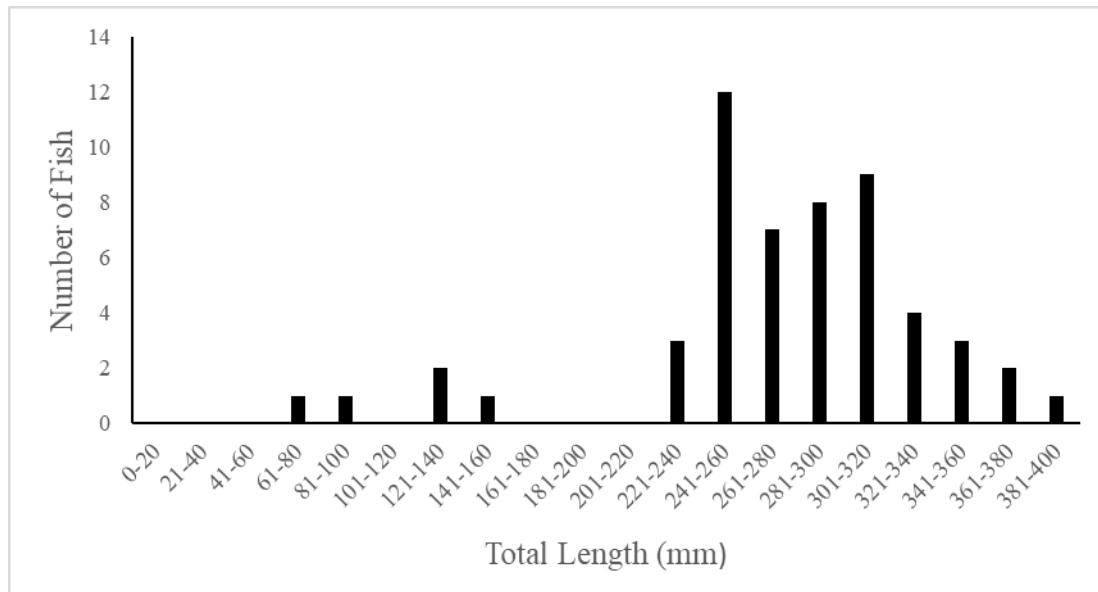


Figure 1. Length frequencies of Humpback Chub captured by trammel and hoop nets in Desolation and Gray Canyons, 2023.

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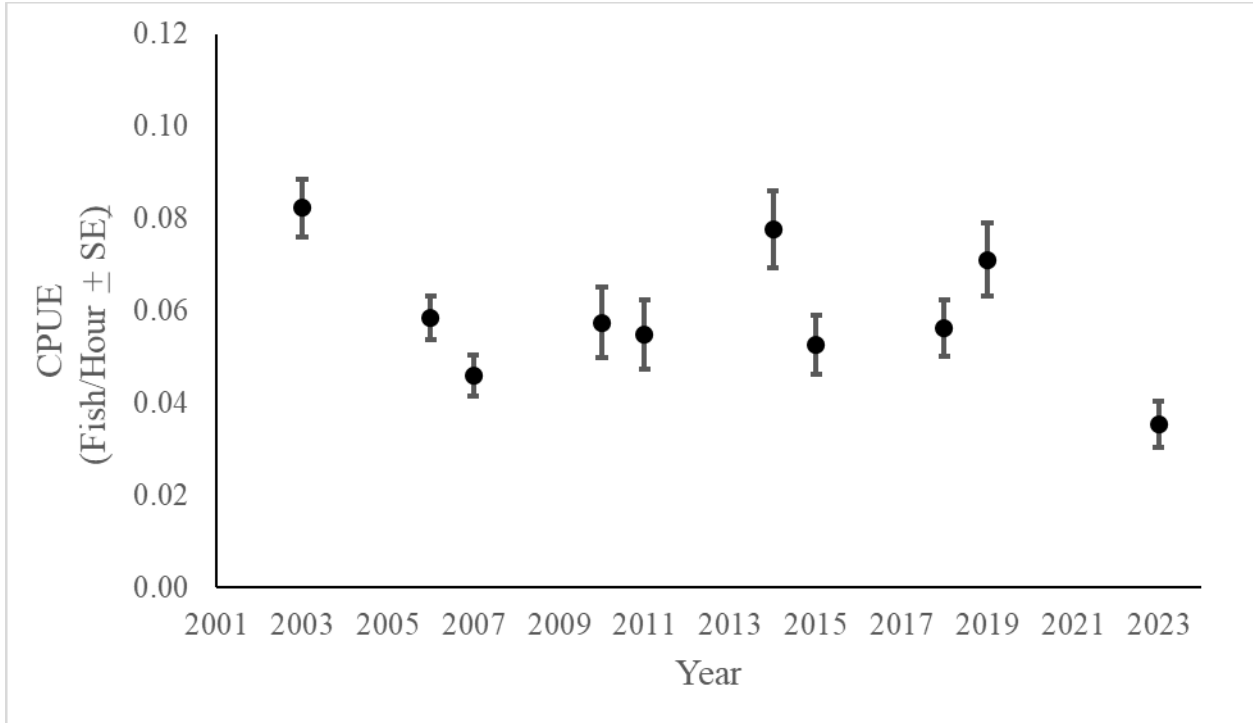


Figure 2. Mean trammel net catch per unit effort of Humpback Chub in Desolation and Gray Canyons of all sites sampled during years when sampling occurred in fall, 2003-2023.