

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

FY 2023 ANNUAL REPORT

PROJECT: C-4bRED

Project Title

Annual Operation and Maintenance of the Fish Passage Structure at the Redlands Diversion Dam on the Gunnison River

Bureau of Reclamation Agreement Number:

R20PG00024

Project/Grant Period:

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Reporting period end date: 09/30/2023

Is this the final report? Yes No

Principal Investigator:

Travis Francis, Deputy Project Leader

U.S. Fish and Wildlife Service

Grand Junction FWCO

445 West Gunnison Ave., Suite 140

Grand Junction, Colorado 81501

Phone: (970) 628-7204

Fax: (970) 628-7217

Email: travis_francis@fws.gov

Abstract:

The purpose of this project is to collect and summarize annual data on the overall number of large-bodied fish, number of different fish species, and seasonal distribution of fish use at the fish passageway at the Redlands Water and Power diversion dam on the Gunnison River. In 2023, the Redlands fish passageway was operational from 20 April to 01 May, and again from 14 June to 18 October. From 02 May to 13 June the facility was flooded and inoperable. This is the twenty-eighth year that the Redlands fish passageway has been operated since it was completed in late June of 1996.

Study Schedule:

1996-Ongoing

Relationship to RIPRAP:

Colorado River Action Plan

Gunnison River

II.B.1.c. Operate and maintain fish ladder.

II.B.1.d. Monitor and evaluate success.

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

Fish Passage

For reference, the Colorado River confluence with the Gunnison River is found at Colorado river mile (RMI) 170.9.

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Twenty-nine Colorado pikeminnow (*Ptychocheilus lucius*) were captured at Redlands fish passage in 2023 (Tables 1 & 2). The total lengths of these fish ranged from 285 to 677 mm with a mean total length of 511 mm. Nineteen were new fish implanted with 134 khz PIT tags at the Redlands fish passage in 2023. The remaining ten were tagged during a previous encounter. One fish was tagged in 2003 in Black Rocks, Colorado at Colorado RMI 136; this fish was recaptured and detected in Black Rocks in 2004 and 2020; it was recaptured near Cisco (RMI 99.8), Utah in 2008; and made passage at Redlands Diversion in 2006 at Gunnison RMI 3.0. One fish was tagged in 2015 near Moab, Utah at Colorado RMI 62.3; this fish also made passage at Redlands Diversion in 2018. Another fish was tagged in 2015 near Fruita, Colorado at Colorado RMI 153; this fish also made passage at Redlands Diversion in 2016. One fish was tagged in 2016 while making passage at Redlands Diversion. Four fish were tagged in 2020 while making passage at Redlands Diversion; one of these fish made passage again in 2022; and unfortunately, after making passage again in July 2023 one was later found dead in September on the upstream trash grates at Redlands Fish Passage. Two fish's initial encounter isn't in STReaMS. Twenty-seven of the Colorado pikeminnow captured in 2023 were translocated to the Gunnison River at Escalante at river mile (RMI) 42.7, and two were translocated to the Gunnison River at Whitewater RMI 15.3. The total number of Colorado pikeminnow capture events recorded at the Redlands fish passage from 1996 through 2023 is 292 (Table 3). These data (eight of ten fish that were previously tagged) make it apparent that once a Colorado pikeminnow makes an initial passage at Redlands Diversion, if it leaves the Gunnison River, there is a reasonable probability that it will return. A majority of the Colorado pikeminnow transitions upstream in the Gunnison occur in the post spawning window of July through the end of August.

An annual record of 67 razorback sucker (*Xyrauchen texanus*) were captured in the Redlands fish passage during 2023 (Tables 1 & 2). The total lengths of these fish ranged from 385 to 553 mm with a mean total length of 462 mm. One of these fish was stocked in 2012 into Butch Craig Wetland at Gunnison RMI 12.7. Fifty-nine of these fish were stocked near Delta, Colorado at Gunnison RMI 57.1 from 2014 through 2022; three of these fish were later encountered in Butch Craig Wetland. One of these fish were stocked in 2019 into the Green River at RMI 261.8. One of these fish was stocked in 2020 near Rifle, Colorado at RMI 240.7. One of these fish was stocked in 2023 near Clifton, Colorado at Colorado RMI 174.9. The remaining four were fish newly implanted with 134 khz PIT tags at the Redlands fish passage in 2023. Twenty-six of the razorback sucker were translocated to the Gunnison River at Escalante at river mile (RMI) 42.7 (n=18), or were translocated to the Gunnison River at Whitewater RMI 15.3 (n=8). The total number of razorback sucker capture events recorded at the Redlands fish passage from 1996 through 2023 is 114 (Table 3). These data make it apparent that once a razorback sucker is stocked into the Gunnison River, if it leaves, there is a reasonable probability that it will return. The dual high spring hydrologic peaks that occurred in the Gunnison River, in 2023, connected Butch Craig Wetland and may have been swift enough that several razorback sucker were swept downstream over the dam only to later return when they could safely navigate the flows (56 made passage in August and September during base flow conditions).

Twenty-nine bonytail (*Gila elegans*) were captured in the Redlands fish passage during 2023 (Tables 1 & 2). The total lengths of these fish ranged from 237 to 351 mm with a mean total length of 297 mm. All these fish were likely stocked this year as their stocking data has not yet been uploaded into STReaMS; all but one of these tags were distributed to Ouray National Fish Hatchery Grand Valley Unit. Ten of the bonytail were translocated to the Gunnison River at Escalante at river mile (RMI) 42.7

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(n=4) or were translocated to the Gunnison River at Whitewater RMI 15.3 (n=6). The total number of bonytail capture events recorded at the Redlands fish passage from 1996 through 2023 is 105 (Table 3).

No humpback chub (*Gila cypha*) were captured in the Redlands fish passage during 2023. The total number of humpback chub capture events recorded at the Redlands fish passage from 1996 through 2023 is four (Table 3).

Nine roundtail chub (*Gila robusta*; of the 692 collected in the fish trap) were recaptured (four previously PIT tagged in 2020) from Black Rocks (Colorado RMI 136; N=2) and Westwater (N=2) at Colorado RMI 136, 124.5 and 120.7, respectively. Two roundtail chub were salvaged from Grand Valley canals and returned to the Colorado River in 2021. One roundtail chub was tagged in the Grand Valley during Colorado Parks and Wildlife 3-species monitoring in 2021. One roundtail chub was tagged in 2021 in Black Rocks. One roundtail chub was recaptured that did not have their initial tagging encounter uploaded into STReAMS (Table 2).

A total of 3,581 fish of all species were handled at the Redlands fish passage between 20 April and 01 May, and again from 14 June to 18 October 2023. Native fishes composed 60.46% of the total catch in 2023 (Table 4). The total number of all fishes collected in the 28-year operation of the fish trap is 222,239. Overall, native fish account for about 80% of all fish processed during this 28-year period.

The three species that composed most of our catch were bluehead sucker (*Catostomus discobolus*; 19.9%), flannelmouth sucker (*Catostomus latipinnis*; 17%) and roundtail chub (19.3%). White sucker (*Catostomus commersonii*) and white sucker hybrids combined made up 11.8% of our total catch (Table 1).

The number of channel catfish (*Ictalurus punctatus*) collected in 2023 was 583, the fourth most abundant year in Redlands catch history. The two most abundant years for this species were 2013 (n=995), and 2014 (n=1,029).

Five smallmouth bass (*Micropterus dolomieu*) were collected and euthanized at the Redlands fish passage in 2023. Their total lengths ranged from 199 to 316 mm with a mean total length of 246 mm (Table 1).

Twenty-one gizzard shad (*Dorosoma cepedianum*) were collected in 2023. Their total lengths ranged from 319 to 460 mm with a mean total length of 395 mm (Table 1). The most abundant catch year for this species was 2007 (n=43).

All fish found in the fish trap were counted and sorted by species. All native fish, as well as nonnative rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*), were released upstream of Redlands Diversion Dam. All channel catfish were returned alive to the river immediately downstream from the dam. All other nonnative fish including native X nonnative sucker hybrids were euthanized, and disposed of according to protocols specified in our state collecting permit.

Operation and Maintenance

In some years, during mid-June immediately following runoff, sediment removal is necessary either manually or with the assistance of the Redlands Water and Power Company's backhoe. In 2023, the

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facility was flooded by a second spring hydrologic peak. A significant amount of silt and debris was deposited on the site, and significant undercutting occurred under the concrete apron on the most downstream portion of the ladder. Redlands Water and Power hired a contractor and removed the sediment bar near the fish return tube and forebay of the fish passage on 19 July 2023. They also removed silt and debris from the grounds, spread new gravel, and filled in the scoured-out portions of fish ladder. The gearbox that lifts and lowers the headgate of the fish passage broke in 2021. Low base flows, in 2021 and 2022, allowed us to take the gearbox from the attraction flow headgate and replace the fish passage headgate because there was not enough water in the river to necessitate additional fish attraction flows at the downstream terminus of the fish passage. Bob Norman (retired BOR) helped us find another option for purchasing gearboxes for this facility. A new gearbox was ordered and was installed on the attraction flow headgate in July 2023.

Annual weed control was continued throughout 2023.

Additional noteworthy observations:

NA

Recommendations:

Biological:

Continue to collect information on the number of fish, by species, in the fish trap of the Redlands Dam fish passageway starting about 15 April and running through mid-October, if funding allows.

Continue translocation of Colorado pikeminnow and other listed fishes collected in the Redlands fish passage to release points farther upstream in the Gunnison River, in an effort to encourage long-term retention of these fish in the main stem Gunnison River.

Operation and Maintenance:

Continue with annual grounds and facility maintenance in 2023.

Project Status:

On track and ongoing.

FY2023 Budget Status

Funds Provided: \$80,461

Funds Expended: \$80,461

Difference: -0-

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

Status of Data Submission

Uploaded into STReaMS 10/23/2023.

Signed:

Travis Francis

Principal Investigator

11/03/2023

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Table 1.

Total number of juvenile and adult fish captured in the fish trap of the passageway at the Redlands Diversion Dam from 20 April to 18 October 2023.

<u>Common Name</u>	<u>Number of Fish</u>	<u>Percent of Total Fish</u>
NATIVE FISH		
bluehead sucker	714	19.94
bonytail	29	0.81
Colorado pikeminnow	29	0.81
flannelmouth sucker	608	16.98
<i>Gila</i> both roundtail and humpback traits	0	0.00
Young of year <i>Gila</i>	0	0.00
humpback chub	0	0.00
mountain whitefish	0	0.00
razorback sucker	67	1.87
roundtail chub	692	19.32
speckled dace	12	0.34
TOTAL	2,151	60.07
NONNATIVE FISH		
black bullhead	166	4.64
bluegill	10	0.28
brown trout	8	0.22
channel catfish	583	16.28
common carp	99	2.76
fathead minnow	0	0.00
green sunfish	84	2.35
gizzard shad	21	0.59
largemouth bass	4	0.11
longnose sucker	3	0.08
northern pike	0	0.00
rainbow trout	2	0.06
red shiner	9	0.25
sand shiner	0	0.00
smallmouth bass	5	0.14
white sucker	220	6.14
TOTAL	1,214	33.90
HYBRID FISHES		
<u>Native X Native Hybrids:</u>		
flannelmouth X bluehead sucker	14	0.39
<u>Native X Nonnative Hybrids:</u>		
bluehead X white sucker	36	1.01
flannelmouth X white sucker	166	4.64
ALL TOTALS	3,581	100.00

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Table 2.
2023 PIT-tagged fish histories

Month of Passage	Species	PIT Tag Histories
Apr-23	roundtail chub N=1	N=1 initial tagging event not in STReaMS, not a program tag
Jun-23	Colorado pikeminnow N=2	N=1 tagged March 2015 at CO RMI 62.3, recaptured October 2015 at CO RMI 58.6, recaptured July 2018 at Redlands Fish Passage and translocated to GU RMI 42.7 N=1 tagged on this capture occasion
	roundtail chub N=2	N=1 tagged October 2020 at Westwater (CO RMI 120.8) N=1 tagged November 2021 after salvage from GVIC and translocated to CO RMI 179.1
	razorback sucker N=2	N=2 stocked October 2015 near Delta (GU RMI 57.1)
Jul-23	bonytail N=1	N=1 missing tagging encounter in STReaMS
	Colorado pikeminnow N=7	N=1 tagged April 2015 at CO RMI 153, recaptured July 2016 at Redlands Fish Passage and translocated to GU RMI 42.7 N=1 tagged July 2016 at Redlands Fish Passage and translocated to GU RMI 42.7 N=1 tagged July 2020 at Redlands Fish Passage and translocated to GU RMI 42.7 N=1 missing initial tagging encounter in STReaMS N=3 tagged on this capture occasion
	roundtail chub N=1	N=1 tagged October 2021 near Grand Junction at CO RMI 169.3
	razorback sucker N=9	N=1 stocked September 2012 in Butch Craig Wetland (GU RMI 12.7) N=7 stocked September 2014, 2015, 2016, 2017, 2020 or 2021 near Delta (GU RMI 57.1) N=1 tagged on this capture occasion
Aug-23	Bonytail N=13	N=13 missing tagging encounter in STReaMS
	Colorado pikeminnow N=19	N=1 tagged October 2003 at CO RMI 136, recaptured September 2004 at CO RMI 136, recaptured August 2006 at Redlands Ladder, recaptured May 2008 at CO RMI 99.8, recaptured May 2009 at CO RMI 135.1, recaptured May 2013 at CO RMI 134, detected September and October 2020 at CO RMI 136 N=3 tagged July or August 2020 at Redlands Ladder, one recaptured July 2022 at Redlands Fish Passage and translocated to GU RMI 42.7 N=1 missing tagging encounter in STReaMS N=14 tagged on this capture occasion
	roundtail chub N=2	N=1 tagged October 2020 at Westwater (CO RMI 124.5) N=1 tagged October 2020 at Black Rocks (CO RMI 136)
	razorback sucker N=31	N=30 stocked August through October 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, or 2022 near Delta (GU RMI 57.1) N=1 stocked April 2023 near Clifton (CO RMI 174.9)

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Month of Passage	Species	PIT Tag Histories
Sep-23	bonytail N=13	N=13 missing tagging encounter in STReaMS
	Colorado pikeminnow N=1	N=1 tagged on this capture occasion
	roundtail chub N=2	N=2 tagged October 2020 or 2021 at Black Rocks (CO RMI 136)
	razorback sucker N=25	N=20 stocked August through October 2014, 2015, 2016, 2019, or 2020 near Delta (GU RMI 57.1) N=1 stocked September 2019 at Green RMI 261.8 N=1 stocked near Rifle (CO RMI 240.7) N=3 tagged on this capture occasion
Oct-23	bonytail N=2	N=2 missing tagging encounter in STReaMS
	roundtail chub N=1	N=1 tagged November 2021 after salvage from GVIC and translocated to CO RMI 174

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Table 3.

Number of Colorado pikeminnow, razorback sucker, bonytail, and humpback chub capture events (not individuals) in the fish trap of the Redlands passageway between 1996 and 2023.

Year	Colorado pikeminnow	razorback sucker	bonytail	humpback chub
1996	1	0	0	0
1997	18	0	0	0
1998	23	0	0	0
1999	5	0	0	0
2000	4	0	0	0
2001	1	5	0	0
2002	7	1	0	0
2003	3	0	1	0
2004	5	3	0	0
2005	4	6	0	0
2006	10	5	0	0
2007	21	4	0	0
2008	0	1	0	0
2009	2	1	0	0
2010	4	1	0	1
2011	2	1	7	0
2012	12	0	0	0
2013	2	1	0	0
2014	17	2	5	0
2015	6	3	44	0
2016	33	1	33	0
2017	7	1	2	2
2018	39	2	8	0
2019	0	6	8	0
2020	32	1	5	1
2021	2	2	4	0
2022	9	3	3	0
2023	29	67	29	0
Totals	292	114	105	4

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Table 4.

Comparison of the total number of fish, total native vs. nonnative fishes, and percent composition of native and nonnative fish captured in the fish trap of the Redlands passageway between 1996 and 2021.

Year	Total Number of Fish	Total Native Fishes	Total Nonnative Fishes	Percent Composition	
				Native Fishes	Nonnative Fishes
1996	8,375	7,885	490	94.1	5.9
1997	12,233	11,547	686	94.4	5.6
1998	7,589	7,060	529	93.0	7.0
1999	8,264	7,654	610	92.6	7.4
2000	6,662	6,157	505	92.4	7.6
2001	6,317	5,221	1,096	82.6	17.4
2002	4,454	2,956	1,498	66.4	33.6
2003	7,259	4,909	2,350	67.6	32.4
2004	11,270	9,011	2,259	80.0	20.0
2005	11,403	8,414	2,989	73.8	26.2
2006	11,095	9,384	1,711	84.6	15.4
2007	6,963	5,801	1,162	83.3	16.7
2008	3,699	2,818	881	76.2	23.8
2009	3,580	3,066	514	85.6	14.4
2010	6,708	5,805	903	86.5	13.5
2011	8,705	7,087	1,618	81.4	18.6
2012	11,570	10,249	1,321	88.6	11.4
2013	16,687	13,810	2,877	82.8	17.2
2014	13,331	9,046	4,285	67.9	32.1
2015	7,467	5,429	2,038	72.7	27.3
2016	10,347	7,486	2,861	72.3	27.7
2017	7,342	5,251	2,091	71.5	28.5
2018	6,635	5,492	1,143	82.8	17.2
2019	3,438	2,018	1,420	58.7	41.3
2020	5,241	4,410	831	84.1	15.9
2021	4,599	3,047	1,552	66.3	33.7
2022	7,425	4,726	2,699	63.6	36.4
2023	3,581	2,165	1,416	60.5	39.5
Totals	222,239	177,904	44,335	80.05	19.95