

I. Project Title: **Annual Operation and Maintenance of the Fish Passage Structure at the Redlands Diversion Dam on the Gunnison River**

II. Bureau of Reclamation Agreement Number(s): R15PG00083

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

III. Principal Investigator(s): Travis Francis, Fish Biologist  
Dale Ryden, 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  
dale\_ryden@fws.gov

IV. Abstract:  
The purpose of this project is to collect and summarize annual data on the number of large-bodied fish, different fish species, and seasonal distribution of fish that use the fish passageway at the Redlands Water and Power diversion dam on the Gunnison River. In 2016, the Redlands fish passageway was operational from 25 April to 14 October. This is the twenty first year that the Redlands fish passageway has been operated since it was completed in late-June 1996.

V. Study Schedule: 1996-Ongoing

VI. 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.

VII. Accomplishment of FY 2016 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Fish Passage

1. An annual record of 33 Colorado pikeminnow (*Ptychocheilus lucius*) were captured in the Redlands fish passage during 2016 (Appendix; Table 1 & 2).

These 33 fish had total lengths that ranged from 423 to 616 mm with a mean of 506 mm. Twenty were new fish that had 134 khz PIT tags implanted at the Redlands fish passage. The other thirteen were recaptures from previous studies. One Colorado pikeminnow was tagged in 2013 near Moab and was most recently recaptured in 2015 near Fish Ford, three were tagged in 2014 in Canyonlands, one was tagged at Redlands Fish Ladder in 2014, another was tagged in 2015 near Moab and was most recently recaptured in 2016 near Moab, two others were tagged in 2015 near the Dolores River confluence, another was tagged in 2015 near Loma, three were tagged in 2016 near Moab, one was tagged in 2016 in Ruby Horsethief Canyon, and the final one's tag was recorded missing a digit and couldn't be reconciled. All 33 Colorado pikeminnow were translocated to Escalante at river mile (RMI) 42.7 on the Gunnison River. The total number of Colorado pikeminnow capture events recorded at the Redlands fish passage from 1996 through 2016 is 180 (Appendix; Table 3).

2. One razorback sucker (*Xyrauchen texanus*) was captured in the Redlands fish passage during 2016 (Appendix; Table 1 & 2). The total length of this fish was 410 mm. This fish was stocked near Delta, Colorado at Gunnison RMI 57.1 in 2014 and was recaptured at Redlands Fish Passage in 2015. The total number of razorback sucker capture events recorded at the Redlands fish passage from 1996 through 2016 is 35 (Appendix; Table 3). This fish was translocated to Escalante at river mile (RMI) 42.7 on the Gunnison River.
3. Thirty three bonytail (*Gila elegans*) were captured in the Redlands fish passage during 2016 (Appendix; Table 1 & 2), the second highest total of any year of operation. The total lengths of these fish ranged from 289 to 352 mm, with a mean of 316 mm. Thirty two of these fish were stocked by Ouray National Fish Hatchery Grand Valley Unit, in 2016, at various parts of the Grand Valley river access points. One of these fish had a 134 khz PIT tag implanted at the Redlands passage in 2016. Seventeen of these fish were translocated to Escalante at river mile (RMI) 42.7 on the Gunnison River.
4. A total of 10,347 fish of all species were handled at the Redlands fish passage between 25 April and 14 October 2016. Native fishes composed 72% of the total catch in 2016 (the third lowest relative percentage of native fishes ever observed; Appendix; Table 4). The total number of all fishes collected in the 20-year operation of the fish trap is 184,428. Overall, native fish account for about 82% of all fish processed during this 21-year period.

The three species that comprised most of our catch include bluehead sucker (31.9%), flannelmouth sucker (20.7%) and roundtail chub (17.4%). White sucker and white sucker hybrids combined made up 21.3% of our total catch (Appendix; Table 1).

Channel catfish numbers in 2016 were 253. The three most abundant years for this species were 2006 (432), 2013 (995), and 2014 (1,029). Only one

smallmouth bass was collected and euthanized at the Redlands fish passage in 2016.

4. Eight adult gizzard shad ( $\geq 180$  mm TL) were collected and euthanized in 2016, the two most abundant years for this species were 2012 (22) and 2007 (43). By way of comparison, during the 2016 non-native fish removal study, 46 adult gizzard shad were collected in the Grand Valley reaches of the Colorado and Lower Gunnison rivers, compared to 2007 (135), 2008 (18), 2009 (36), 2010 (48), 2011 (0), 2012 (73), 2013 (54), 2014 (116), and 2015 (279). Many age zero and juvenile gizzard shad were also removed from the Grand Valley during the 2016 non-native fish removal effort.
6. All fish found in the fish trap were counted and sorted by species. All native fish, as well as nonnative rainbow trout and brown trout, 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 plus hybrid suckers were euthanized and disposed of according to protocols specified in our state collecting permit.

#### Operation and Maintenance

##### Redlands Fish Passage:

1. Some manual effort (shovels and high pressure hose) and closing the attraction flow head gate (for a rather long period of time) was necessary to remove sediment and debris in the upstream fore bay of the Redlands fish passage. In some years, during mid-June immediately following runoff, sediment removal is necessary with the assistance of the Redlands Water and Power Companies backhoe.
2. Annual weed control was continued throughout 2016.

##### Price-Stubb Fish Passage:

1. In mid-July 2016, three USFWS personnel cleaned all of the debris out of the Price-Stubb fish ladder on the Colorado River at river mile 188.3.
2. Multiple trips were made to Price-Stubb to clean and maintain the MUX that operates the antenna installed in the fore bay of the fish ladder

#### VIII. Additional noteworthy observations:

As stated earlier in this report, for the last few years all Colorado pikeminnow collected at the Redlands fish passage have been translocated 39.8 miles upstream to Escalante Canyon then released into the Gunnison River. Unfortunately the Gunnison River fish community monitoring efforts (Project 163) have, as yet, been unable to recapture any of these translocated fish. Therefore the fate of these fish following translocation was previously unknown. However, in 2016 two Colorado pikeminnow that had been translocated from the Redlands fish passage were contacted. The first was a Colorado pikeminnow that had been implanted with a PIT tag at the fish passage on 2 September 2014 (403 mm TL when PIT-tagged). It was contacted by Kevin Thompson of CPW on a submersible PIT tag antenna in Roubideau Creek (near Delta, CO) five different times - twice on 13 August 2016 and three times on 18 August 2016. This fish had remained in

the Gunnison River almost two full years between translocation and being detected via PIA.

The second was a Colorado pikeminnow (481 mm TL) that was collected in the Redlands fish passage, implanted with a PIT tag, and translocated upstream on 1 August 2016. This fish was recaptured in the Colorado River on 16 August 2016 at river mile 181.5, near Palisade, CO during a nonnative fish removal trip. This fish had come down the Gunnison River 42.7 miles and then made a right-hand turn and gone 10.5 miles up the Colorado River, traveling 53.2 miles in 15 days between translocation and recapture via electrofishing.

IX. Recommendations:

- A. Biological: Continue to collect information on the number of fish, by species, in the fish trap of the Redlands Dam fish passageway in 2017 starting about 15 April and running through mid-October. Consider FLOY-tagging some of the native three species of concern (roundtail chub, flannelmouth sucker, and bluehead sucker) to determine the number of fish that are re-using the ladder per annum and are being counted more than once in the annual tally.

Continue translocation of Colorado pikeminnow 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.

- B. Operation and Maintenance: Continue with annual grounds and facility maintenance in 2017.

X. Project Status: "On track and ongoing".

XI. FY 2016 Budget Status

- A. Funds Provided: \$79,939  
B. Funds Expended: \$79,939  
C. Difference: -0-  
D. Percent of the FY 2016 work completed, and projected costs to complete: 100%  
E. Recovery Program funds spent for publication charges: -0-

XII. Status of Data Submission (Where applicable): Will be submitted to UCRRP database by January 2017.

XIII. Signed: Travis Francis 11/01/2016  
Principal Investigator Date

APPENDIX:

**Table 1.** Total number of juvenile and adult fish captured in the fish trap of the passageway at the Redlands Diversion Dam from 25 April to 14 October 2016.

<u>Common Name</u>	<u>Number of Fish</u>	<u>Percent of Total Fish</u>
<b>NATIVE FISH</b>		
bluehead sucker	3,301	31.90
bonytail	33	0.32
Colorado pikeminnow	33	0.32
Colorado cutthroat	0	0.00
flannelmouth sucker	2,145	20.73
mountain whitefish	5	0.05
razorback sucker	1	0.01
roundtail chub	1,800	17.40
speckled dace	157	1.52
<b>TOTAL</b>	<b>7,475</b>	<b>72.24</b>
<b>NONNATIVE FISH</b>		
black bullhead	110	1.06
black crappie	0	0.00
blue gill	3	0.03
brook trout	0	0.00
brown trout	56	0.54
channel catfish	253	2.45
common carp	69	0.67
fathead minnow	2	0.02
green sunfish	127	1.23
gizzard shad	8	0.08
largemouth bass	1	0.01
longnose sucker	19	0.18
northern pike	0	0.00
rainbow trout	1	0.01
red shiner	2	0.02
smallmouth bass	1	0.01
sand shiner	1	0.01
splake	0	0.00
white sucker	1,049	10.14
yellow bullhead	1	0.01
<b>TOTAL</b>	<b>1703</b>	<b>16.46</b>
<b>HYBRID FISHES</b>		
<u>Native X Native Hybrids:</u>		
razorback X flannelmouth sucker	0	0.00
bluehead X flannelmouth sucker	11	0.11
<u>Native X Nonnative Hybrids:</u>		
bluehead X white sucker	354	3.42
flannelmouth X white sucker	804	7.77
bluehead X longnose sucker	0	0.00
flannelmouth X longnose sucker	0	0.00
white X longnose sucker	0	0.00
<b>ALL TOTALS</b>	<b>10,347</b>	<b>100.00</b>

**Table 2. 2016 PIT tagged fish histories.**

Month of Passage	Species	PIT Tag Histories
Jul-16	Bonytail ( <i>Gila elegans</i> ) N=1	N=1 stocked 6/30/2016 near Palisade at CO RMI 183.6
	Colorado Pikeminnow ( <i>Ptychocheilus lucius</i> ) N=10	N=6 tagged at Redlands passage 2016 N=1 pit tag was missing a digit N=1 tagged by FWS GJ at CO RMI 153 near Loma on 4/24/2015 N=1 tagged by FWS GJ at CO RMI 53.2 near Moab on 4/13/2016 N=1 tagged by FWS GJ at CO RMI 141.6 in Ruby Horsethief Canyon on 7/21/2016
Aug-16	Bonytail ( <i>Gila elegans</i> ) N=21	N=13 stocked 6/23/2016 at Fruita State Park at CO RMI 157.1, one of these fish were recaptured by FWS GJ at GU RMI 2 on 8/10/2016 N=3 stocked 6/28/2016 at Fruita State Park at CO RMI 157.1 N=2 stocked 6/30/2016 at Riverbend Park in Palisade at CO RMI 183.6 N=2 stocked 7/6/2016 at Riverbend Park in Palisade at CO RMI 183.6 N=1 stocked 7/7/2016 at Riverbend Park in Palisade at CO RMI 183.6
	Colorado Pikeminnow ( <i>Ptychocheilus lucius</i> ) N=23	N=13 tagged at Redlands passage in 2016 N=1 tagged by FWS GJ at CO RMI 63.5 near Moab on 6/12/2013, recaptured by FWS GJ at CO RMI 55 on 6/13/2013, recaptured again by FWS GJ at CO RMI 105.1 near Fish Ford on 6/1/2015 N=1 tagged by FWS GJ at CO RMI 23.5 in Canyonlands on 4/8/2014 N=1 tagged by FWS GJ at CO RMI 34 in Canyonlands on 5/13/2014 N=1 tagged by FWS GJ at CO RMI 20.2 in Canyonlands on 6/18/2014 N=1 tagged by FWS GJ at GU RMI 3 at Redlands Fish Passage on 9/2/2014 N=1 tagged by FWS GJ at CO RMI 60.2 near Moab on 4/9/2015, recapture by FWS GJ at CO RMI 59 near Moab on 4/12/2016 N=1 tagged by FWS GJ at CO RMI 98 near Dolores River confluence on 6/2/2015 N=1 tagged by FWS GJ at CO RMI 88.7 near Dolores River confluence on 10/6/2015 N=1 tagged by FWS GJ at CO RMI 59.9 near Moab on 6/22/2016 N=1 tagged by FWS GJ at CO RMI 51.5 near Moab on 6/23/2016
	Razorback sucker ( <i>Xyrauchen texanus</i> ) N=1	N=1 stocked 10/22/2014 near Delta at GU RMI 57.1
Sep-16	Bonytail ( <i>Gila elegans</i> ) N=11	N=1 tagged at Redlands passage in 2016 N=4 stocked 6/23/2016 at Fruita State Park at CO RMI 157.1 N=2 stocked 6/28/2016 or 6/29/2016 at Fruita State Park at CO RMI 157.1 N=1 stocked 6/30/2016 at Riverbend Park in Palisade at CO RMI 183.6 N=4 stocked 7/6/2016 or 7/7/2016 at Riverbend Park in Palisade at CO RMI 183.6

**Table 3.** Number of Colorado pikeminnow, razorback sucker, and bonytail capture events in the fish trap of the Redlands passageway between 1996 and 2016.

Year	Colorado pikeminnow	Razorback sucker	Bonytail <sup>a</sup>	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 <sup>b</sup>
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
Totals	180	35	90	1

<sup>a</sup> all bonytail captured in the fish trap were from fish originally stocked in the Colorado and Gunnison rivers.

<sup>b</sup> wild fish originally PIT tagged at the head end of Westwater Canyon on the Colorado River (river mile 123.4), 10/07/2008 by Utah DWR.

**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 2016.

<u>Year</u>	<u>Total Number of Fish</u>	<u>Total Native</u>	<u>Total Nonnative</u>	<u>Percent Composition</u>	
				<u>Native Fishes</u>	<u>Nonnative Fishes</u>
1996	8,375	7,885	490	93.9	6.1
1997	12,233	11,547	686	94.4	5.6
1998	7,589	7,060	529	92.8	7.2
1999	8,264	7,654	610	92.6	7.4
2000	6,662	6,157	505	92.3	7.7
2001	6,317	5,221	1,096	82.6	17.4
2002	4,454	2,956	1,498	66.3	33.7
2003	7,259	4,909	2,350	67.6	32.4
2004	11,720	9,011	2,709	76.9	23.1
2005	11,403	8,414	2,989	73.8	26.2
2006	11,095	9,384	1,711	84.5	15.5
2007	6,963	5,801	1,162	83.4	16.6
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	81.1	18.9
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	67.8	32.2
2015	7,467	5,429	2,038	72.7	27.3
2016	10,347	7,486	2,861	72.4	27.6
<b>Totals</b>	184,428	150,795	33,633	81.8	18.2