

COLORADO RIVER RECOVERY PROGRAM  
FY 2015 ANNUAL PROJECT REPORT

RECOVERY PROGRAM  
PROJECT NUMBER: C4b-GVP

I. Project Title: **Annual Operation and Maintenance of the Fish Passage Structure at the Government Highline Diversion Dam on the Upper Colorado River**

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

Project/Grant Period: Start date (Mo/Day/Yr): 10/1/2014  
End date: (Mo/Day/Yr): 9/30/2019  
Reporting period end date: 9/30/2015  
Is this the final report? Yes \_\_\_\_\_ No X

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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 Government Highline diversion dam (aka Grand Valley Water User's [GVWU] dam) on the upper Colorado River in Debeque Canyon. This fish passage structure has been operated during 9 of the last 12 years (construction was completed in August 2004).

A total of 14,248 fish used this fish passage, over a 140-day period, in 2015. This is the third highest total ever documented for this fish passage facility. Fifty two endangered razorback sucker (*Xyrauchen texanus* {the highest number ever documented at this facility}) and ten bonytail (*Gila elegans*) were collected in 2015, along with the second ever Colorado pikeminnow (*Ptychocheilus lucius*).

V. Study Schedule: 2004-Ongoing

VI. Relationship to RIPRAP:  
Colorado River Action Plan  
Colorado River

II.B.3.a (4). Operate, monitor, and evaluate the success of fish passage at Government Highline Diversion Dam.

VII. Accomplishment of FY 2015 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

## Fish Passage

1. In 2015, a record setting 52 razorback sucker (two of which made passage twice in 2015) were collected in the Government Highline fish trap (Appendix; Tables 1, 2 and 3). These fish ranged in total length from 340 to 511 mm with a mean of 410 mm.
2. Ten bonytail made passage in 2015 (Appendix; Tables 1, 2 and 3). These fish ranged in total length from 230 to 367 mm with a mean of 331 mm.
3. The second ever Colorado pikeminnow made passage at Government Highline Dam in 2015 (Appendix; Tables 1, 2 and 3). This fish had a total length of 574 mm and was originally PIT tagged in 2014 on the Colorado River twenty miles upstream of the Green River confluence in Canyonlands National Park.
4. A total of 14,248 fish were collected in the trap of the Government Highline Diversion Dam fish passage from 1 May through the 16 October 2015. This is the third highest total ever collected at this fish passage; the highest total in the trap was in 2014 (24,670) and the second highest total was in 2010{(18,390) (Appendix; Table 4)}. This is the ninth year of operation since the structure was completed. This facility has been operated for different lengths of time during various times of year, since 2004, and we would suggest that making specific year-to-year comparisons about yearly catch totals and species composition should be discouraged.

Native fishes (and their hybrid forms) accounted for 84.9% (12,094) of the total catch in 2015 (Appendix; Table 4). Nonnative fishes (and their hybrid forms) accounted for 15.1% (2,154) of the total catch in 2015. Bluehead sucker accounted for 44.5% (6,344) of the total catch and flannelmouth sucker accounted for 26% (3,705) of the total catch during 2015 (Appendix; Table 1). These two native species dominated the total catch since the ladder began operation. Roundtail chub accounted for 12.8% (n = 1,827) of the total catch during 2015. The most prevalent nonnative fish found in the fish trap from 2013 to 2015 was white sucker (7.5% of total catch, n=1,075 in 2015; 22.9% of total catch, n = 5,637 in 2014; 14.9% of total catch, n=1,999 in 2013). Channel catfish, which were not found between Government Highline and Price-Stubb dams prior to completion of fish passage at Price-Stubb dam in April 2008, were again collected in the Government Highline fish passage during 2015.

3. Seven gizzard shad, 17 largemouth bass, and 14 smallmouth bass were also collected in 2015.
4. All fish found in the fish trap were counted and sorted by species. All native fish, as well as nonnative rainbow and brown trout were released upstream of Government Highline diversion dam. All channel catfish were returned alive immediately downstream from the dam. All other nonnative fish, including native X nonnative hybrid suckers were removed.

## Operation and Maintenance

1. Prior to opening the ladder, BOR and GVWU employees used a trackhoe to remove a portion of the sediment bar deposited in front of the upstream fish ladder opening and fish return tube. However, a prolonged spring runoff combined with multiple spring rainstorm spikes re-deposited large amounts of sediment and the upstream sediment bar returned, causing the fish return tube to become unusable during low summer flow periods, due to fish stranding and or impingement issues. Therefore, our employee's moved common native fishes (in a stocking truck) approximately 30 yards downstream, releasing them near the opening for the attraction flow gate (downstream of the terminal end of the sediment bar, but closer to the roller dam) for safe release back to the river for most of the 2015 field season. However, endangered fishes were transported upstream several hundred yards (again in a stocking truck) where they were released upstream of the sediment bar. This required transferring endangered fish from the stocking truck to the river in hand-held nets through fairly thick vegetation, one at a time, to the river's edge where they could be safely released.
2. Weeds were sprayed and removed from the property throughout 2015.
3. Accumulated debris and trash were manually removed from the Price-Stubb non-selective fish passage facility 5 miles downstream of the Government Highline Fish Passage in early July 2015.

VIII. Additional noteworthy observations: See above.

IX. Recommendations:

A. Biological:

1. Continue to collect information on the number of fish, by species, in the fish trap of the Government Highline fish passageway in 2016 starting about 15 April and running through mid-October. These tentative dates may need to be adjusted, based upon the ability of the adjacent Grand Valley Water Users canal, as well as the ability of downstream diversions structures to get sufficient quantities of water to fill their canals.

B. Operation and Maintenance:

1. In past years it has been stated in this section of our annual report that "to maintain optimum performance of the fish passageway, sediment maintenance should be performed on as needed basis to remove sediment and debris from the forebay of the fishway and attraction flow intakes to prevent buildup and compaction of sediment."

It is our opinion that the large, heavily-vegetated portion of the riverbank on river left immediately upstream of and adjacent to the upstream fish ladder openings should be further removed (a larger section than 2015's removal effort) during winter 2015-2016. This heavily-vegetated portion of the river bank now redirects a significant

amount of the river flow away from the upstream fish ladder openings and leads to heavy sedimentation in front of the upstream portions of this structure. The upstream fish return tube (a 12-inch pipe, immediately adjacent to the forebay of the fish ladder) has become almost impossible to use (even after trackhoe removal in 2015) due to the large sediment peninsula that is rebuilding in front of it.

During low flow periods in 2015, native and endangered fish being returned upstream had to be loaded by hand from the concrete fish sorting tanks at the fish ladder into a stock tank in the back of a pickup truck, then driven downstream (to the attraction flow head gate) in order to prevent the fish stranding and/or impingement resulting in probable death that would have resulted had the fish return tube been used on those occasions. Unfortunately, this release site is ~30 yards closer to the dam, increasing the likelihood of fish being swept back downstream. This was stressful on both the fish and the biologists, especially on several days when total numbers of fish being handled in the ladder exceeded 1,000 individuals.

On-site examination and discussions of this issue with Kevin Conrad of GVWU have led us to believe that the removal of this portion of the heavily-vegetated riverbank could be done from the river left shoreline using a long-reach trackhoe. It's our opinion that such a maintenance activity would help assuage the sediment problems which occur annually in front of the upstream fish passage opening, fish return tube, and attraction flow opening. Unfortunately, even if this maintenance action is done, the vegetated bank on river left will eventually reform (as it did in one year), as the fish ladder is located on the inside bend of the river, across the river from the GVWU canal headgates, which means that this location will naturally sediment in over time.

The other possible (though likely partial) solution would be to have GVWU open the roller immediately adjacent to the fish passage facility during periods of higher river flow. This was done during spring 2014 and the river was able to sluice a huge amount of sediment away from the front of the fish passage facility in a period of approximately 2-3 weeks. However, Kevin Conrad of GVWU was hesitant to do this for us again in 2015, since he concerned about causing potential damage to the river left bank (to the rip-rap and overall bank stabilization) which abuts the west-bound lanes of I-70. We would suggest that BoR personnel along with personnel from GVWU examine this feasibility of using this sluicing action in future years, as it was able to move more sediment more quickly and much more efficiently than any mechanical solution (trackhoe or shovels) could. The downside of even this action is that because of where the fish passage is located in relation to the river channel and the roller dam, the sediment bar will continue to reform (though not as quickly if

the upstream, vegetated bank is further removed, as suggested above) due to the hydrologic dynamics in the river.

X. Project Status: On track and ongoing

XI. FY 2015 Budget Status

A. Funds Provided: \$54,734

B. Funds Expended: \$54,734

C. Difference: -0-

D. Percent of the FY 2015 work completed, and projected costs to complete: 100%

E. Recovery Program funds spent for publication charges: -0-

XII. Status of Data Submission (Where applicable): Data will be submitted to UCRRP database manager January 2016.

XIII. Signed: Travis Francis 10/28/2015  
Principal Investigator Date

APPENDIX:

**Table 1.** Total number of juvenile and adult fish captured in the fish trap of the passageway at the Government Highline Diversion Dam during 2015.

<u>Common Name</u>	<u>Number of Fish</u>	<u>Percent of Total Fish</u>
<b>NATIVE FISH</b>		
bluehead sucker	6,344	44.53
bonytail	10	0.07
Colorado pikeminnow	1	0.01
Colorado cutthroat	3	0.02
flannelmouth sucker	3,705	26.00
mountain whitefish	112	0.79
razorback sucker	52	0.36
roundtail chub	1,827	12.82
speckled dace	0	0.00
<b>TOTAL</b>	<b>12,054</b>	<b>84.60</b>
<b>NONNATIVE FISH</b>		
black bullhead	17	0.12
black crappie	0	0.00
blue gill	13	0.09
brook trout	1	0.01
brown trout	48	0.34
channel catfish	107	0.75
common carp	52	0.36
green sunfish	16	0.11
gizzard shad	7	0.05
largemouth bass	17	0.12
longnose sucker	75	0.53
northern pike	0	0.00
rainbow trout	14	0.10
smallmouth bass	14	0.10
splake	0	0.00
white sucker	1,075	7.54
<b>TOTAL</b>	<b>1456</b>	<b>10.22</b>
<b>HYBRID FISHES</b>		
<u>Native X Native Hybrids:</u>		
razorback X flannelmouth sucker	0	0.00
bluehead X flannelmouth sucker	40	0.28
<u>Native X Nonnative Hybrids:</u>		
bluehead X white sucker	262	1.84
flannelmouth X white sucker	433	3.04
bluehead X longnose sucker	2	0.01
flannelmouth X longnose sucker	1	0.01
<b>ALL TOTALS</b>	<b>14,248</b>	<b>100.00</b>

**Table 2.** 2015 PIT tagged fish histories.

Month of Passage	Species	PIT Tag Histories
May-15	Razorback sucker ( <i>Xyrauchen texanus</i> ) N=8	N=1 stocked 4/28/2015 near Rifle at CO RMI 240.7 N=4 stocked 10/16/2014 near Rifle at CO RMI 240.7 N=1 stocked 9/10/2012 near Rifle at CO RMI 240.7 N=1 stocked 10/18/2011 near Battlement Mesa at CO RMI 227.6, recaptured at GVWU passage 8/4/2014 N=1 stocked 10/21/2010 near Battlement Mesa at CO RMI 227.6
Jun-15	Razorback sucker ( <i>Xyrauchen texanus</i> ) N=4	N=2 stocked 10/16/2014 near Rifle at CO RMI 240.7 N=2 stocked 9/12/2013 near Rifle at CO RMI 240.7
Jul-15	Razorback sucker ( <i>Xyrauchen texanus</i> ) N=16	N=2 tagged at GVWU passage 2015 N=2 stocked 4/28/2015 near Rifle at CO RMI 240.7 N=9 stocked 10/16/2014 near Rifle at CO RMI 240.7 N=1 stocked 9/11/2013 near Rifle at CO RMI 240.7 N=1 stocked 9/12/2013 near Rifle at CO RMI 240.7, recaptured by CPW at CO RMI 197.5 on 7/22/2014 N=1 stocked 8/29/2013 near Battlement Mesa at CO RMI 227.6, recaptured at GVWU passage on 7/14/2014 N=1 stocked 10/18/2011 near Battlement Mesa at CO RMI 227.6, recaptured at GVWU passage on 8/04/2014 and again on 5/15/2015 N=1 stocked 9/24/2009 near Palisade at CO RMI 185.1, recaptured by FWS GJ at CO RMI 173.4 on 9/16/2011, resight at Price Stubb antenna 5/13/2013 and 9/1/2014 at CO RMI 188.3, recaptured by FWS GJ at CO RMI 180.0 on 5/22/2014
	Roundtail chub ( <i>Gila robusta</i> ) N=1	N=1 tagged by CPW at CO RMI 175.3 on 10/16/2014
Aug-15	Razorback sucker ( <i>Xyrauchen texanus</i> ) N=17	N=1 tagged at GVWU passage 2015 N=1 tag distributed to ONFH Randlett, data still incoming N=2 stocked 4/28/2015 near Rifle at CO RMI 240.7 N=1 stocked 7/10/2015 near CDOT Pond at CO RMI 204.5 N=1 stocked 4/15/2015 at Redlands Pkwy at CO RMI 166.7 N=6 stocked 10/16/2014 near Rifle at CO RMI 240.7 N=2 stocked 9/10/2012 near Battlement Mesa at CO RMI 227.6, one was recaptured at GVWU passage on 7/08/2014 N=1 tag distributed to ONFH GJ 7/31/2012, no stock data reported, was recaptured at GVWU passage on 8/12/2014 N=1 stocked 10/18/2011 near Battlement Mesa at CO RMI 227.6 N=1 stocked 10/11/2011 near Rifle at CO RMI 240.7
	Colorado pikeminnow ( <i>Ptychocheilus lucius</i> ) N=1	N=1 tagged by FWS GJ at CO RMI 20 on 6/18/2014
	Bonytail ( <i>Gila elegans</i> ) N=2	N=1 stocked 7/23/2015 near Fruita at CO RMI 157 N=1 stocked 7/8/2015 near Palisade at CO RMI 184
Sep-15	Razorback sucker ( <i>Xyrauchen texanus</i> ) N=7	N=1 PIT Tag reader malfunction no PIT data N=5 stocked 10/16/2014 near Rifle at CO RMI 240.7 N=1 stocked 10/2/2012 near Rifle at CO RMI 240.7
	Bonytail ( <i>Gila elegans</i> ) N=8	N=1 tagged at GVWU passage 2015 N=4 stocked 7/23/2015 near Fruita at CO RMI 157 N=3 stocked 7/7/2015 near Palisade at CO RMI 184

**Table 3.** Number of Colorado pikeminnow, razorback sucker, bonytail and humpback chub captured in the fish trap of the Grand Valley Water User’s passageway between 2005 and 2015.

<b>Year</b>	<b>No. of Colorado pikeminnow</b>	<b>No. of Razorback sucker</b>	<b>No. of Bonytail</b>	<b>No. of Humpback Chub</b>
2004	fish passageway & fish trap not run due to insufficient flows			
2005	0	1	0	3
2006	0	0	0	0
2007	fish passageway run for sediment maintenance only (fish trap not run)			
2008	0	1	0	0
2009	0	0	0	0
2010	0	0	0	0
2011	0	0	22	3
2012	fish passageway & fish trap not run due to insufficient flows			
2013	0	2	0	0
2014	1	25	14	0
2015	1	52	10	0
<b>Totals</b>	<b>2</b>	<b>81</b>	<b>46</b>	<b>6</b>

**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 Grand Valley Water User’s passageway between 2005 and 2015.

Year	Total Number of Fish	Total Native	Total Nonnative	Percent Composition	
				Native Fishes	Nonnative Fishes
2004	fish passageway & fish trap not run due to insufficient flows				
2005	4,638 <sup>a</sup>	2,867	1,771	61.8	38.2
2006	11,978 <sup>b</sup>	10,747	1,231	89.7	10.3
2007	fish passageway run for sediment maintenance only (fish trap not run)				
2008	10,788 <sup>c</sup>	9,663	1,125	89.6	10.4
2009	12,402 <sup>d</sup>	11,286	1,116	91.0	9.0
2010	18,390 <sup>e</sup>	16,358	2,032	89.0	11.0
2011	8,875 <sup>f</sup>	6,870	2,005	77.4	22.6
2012	fish passageway & fish trap not run due to insufficient flows				
2013	13,401 <sup>g</sup>	10,702	2,699	79.9	20.1
2014	24,670 <sup>h</sup>	17,253	7,417	69.9	30.1
2015	14,248 <sup>i</sup>	12,094	2,154	84.9	15.1
<b>Totals</b>	<b>119,390</b>	<b>97,840</b>	<b>21,550</b>	<b>81.9</b>	<b>18.1</b>

<sup>a</sup> Fish trap operated for 12 days (June and September).

<sup>b</sup> Fish trap operated for 41 days (five, 2-week periods).

<sup>c</sup> Fish trap operated continuously from 2 May to 15 October.

<sup>d</sup> Fish trap operated continuously from 20 April to 15 October.

<sup>e</sup> Fish trap operated continuously from 16 April to 15 October.

<sup>f</sup> Fish trap operated continuously from 19 April 19 to 14 October.

<sup>g</sup> Fish trap operated for 49 days (continuously from 17 May to 5 July).

<sup>h</sup> Fish trap operated for 177 days (continuously from 22 April to 16 October).

<sup>i</sup> Fish Trap operated 140 days (continuously from 1 May to 12 August, and again from 9 September to 16 October)