

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

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III. Project Summary:

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 on the Upper Colorado River in Debeque Canyon. In 2008, the fish trap was operated continuously between 2 May and 15 October. This is the first year that the fish passageway at Government Highline has been operated continuously since being completed in August 2004. The fish trap was operated for only 12 days in 2005, and 41 days in 2006. The fish trap was not operated during 2007. During 2008, only one adult razorback sucker was found in the fish trap in August. To date, two adult razorback sucker and three humpback chub have used the fishway. Ten thousand seven hundred eighty eight fish were processed in the fish trap during 2008. Flannelmouth sucker and bluehead sucker comprised 50% and 24% of the native fishes in the fish trap, respectively, and white sucker and white sucker X flannelmouth sucker hybrids comprised 6% and 2% of the nonnative fish in the trap. Native fishes comprised 90% of the total fish during 2008.

IV. Study Schedule:

Government Highline Fish Passageway

- a. initial year: 2004
- b. final year: Ongoing

V. Relationship to RIPRAP:

- A. 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.

VI. Accomplishment of FY 2008 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

A. FY-2008 Tasks and Deliverables:

Task 1. Routine O & M of the fish ladder and fish trap which includes monitoring, sorting, enumerating all fish in addition to cleaning trash and debris from trash racks, bar screens, fish trap, and fishway entrance.

Task completed.

Task 2. Compile, computerize, and summarize fish use data; prepare annual progress report.

Task completed.

B. Findings (2008 Highlights)

Fish Passage

1. In 2007, fish use was not documented and therefore no biological data were collected from the fish trap. Between May 24 and June 29, 2007, which coincided with the height and descending limb of spring runoff on the Upper Colorado River, the fish passage was continuously operated to flush built up sediment through the fish ladder. Gates for both the fish ladder and attraction flow were opened and river water used to flush sediment.
2. Only one endangered fish, a 445 mm TL adult razorback sucker, was collected in the fish trap of the fish passageway at the Government Highline Diversion Dam during 2008 (Appendix; Table 1). To date, 2 razorback sucker and 3 humpback chub have been captured in the fish trap (Appendix; Table 2). One other adult razorback sucker was collected in the fish trap during 2005. The three humpback chub were collected in 2005.
3. Ten thousand seven hundred eighty eight fish were counted in the trap of the Government Highline Diversion Dam fishway between 2 May and 15 October 2008. Native fishes comprised 90% of the total number of fishes collected in 2008 (Appendix; Table 3). Since this is the first full year of operation and the fish trap was operated only on a trail basis during 2005 for 12 days and for 41 days during 2006, annual use comparison is not exactly relevant.

Bluehead sucker comprised 50% of the catch and flannelmouth sucker 24% during 2008 (Appendix; Table 1). Roundtail chub comprised 15% of the total catch. The most prevalent nonnative fish found in the fish trap during 2008 was white sucker (650, 6%) followed by white sucker X flannelmouth sucker hybrids (244, 2.3%) and white sucker X bluehead sucker hybrids (113, 1%). Channel

catfish, formerly not found between Government Highline and Price Stubb dams prior to completion of fish passage at Price Stubb Dam in April 2008, were collected during 2008 in the fish trap (n=37). It is not certain if these channel catfish migrated upstream past Price Stubb Dam by using the newly constructed fish passage at this site or simply moved upstream over the former Price Stubb Dam following runoff by skirting the margins of the dam.

4. No gizzard shad were collected in 2008.
5. All fish found in the fish trap were counted and sorted by species. All native fish including rainbow and brown trout were released upstream of Redlands Diversion Dam. All channel catfish were returned alive immediately downstream from the dam. All other nonnative fish plus hybrid suckers, except salmonid species, were removed.

Operation and Maintenance

1. Problems with the gate operator for the attraction flow gate were temporarily rectified with the installation of a new gate operator with a 6:1 gear ratio prior to the opening of the passageway in early-May. With increased use of the gate throughout the year, the friction on the gate appeared to lessen. However, in mid-August, the gate became increasingly difficult to operate and in late-September the gate could not be lifted either manually or electrically. The gate could be lowered, however. Bureau of Reclamation design engineers were apprised of the situation. New parts were installed to correct the problem on November 14, 2008. Because the river roller gates were up to allow sediment behind the dam to be flushed by river flows on this date, the gate will need to be tested when river water exerts water pressure against it. Raising and lowering this gate is critical to adjusting the flow rate which is used to attract fish downstream of the dam into the fish passageway. Additionally, being able to raise and lower the gate more frequently allows workers to adjust and maximize water velocities into the attraction flow chamber which increases the capability of dislodging sediment on the river side which routinely becomes compacted.

VII. 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 2009 starting about 15 April and running through mid-October.

B. Operation and Maintenance:

1. To maintain optimum performance of the fish passageway, sediment maintenance should be performed annually to remove sediment and debris from the forebay of the fishway and attraction flow intakes to prevent buildup and compaction of

sediment. Use of compressed air has proven to be a useful tool in alleviating build-up of sediment and small debris. However, at Redlands fishway this has provided only a short-term solution.

2. A large vegetated sediment bar has accrued in front of the intakes of the attraction flow grates and upstream to the inflow of the fishway itself. In the spring of 2009 prior to operation of the fish passageway, this sediment should be removed. A track hoe and dump truck may be needed to perform this work effectively. Sediment could be hauled to an upland terrestrial site within the fishway project area for sediment disposal and/or storage.

VIII. Project Status:

- A. "On track and ongoing".

IX. FY 2008 Budget Status

- A. Funds Provided: \$ 43,754
- B. Funds Expended: \$ 43,754
- C. Difference: \$ -0-
- D. Percent of the FY 2008 work completed, and projected costs to complete: 100%.
Recovery Program funds spent for publication charges: \$ -0-

- X. Status of Data Submission (Where applicable): The single razorback sucker (TL 445 mm) captured in the fish trap of the passageway at the Government Highline Diversion Dam during 2008 was checked for a PIT tag.

The following data were collected from the single T & E fish prior to it being released: total length (mm), reproductive condition, and date and location of capture. These data have been computerized. The total number of fishes that were collected in the fish trap at Government Highline fish passageway was also computerized. These completed, computerized data will be provided to the UCRB database coordinator upon his request.

- XI. Signed: Bob D. Burdick 11/14/2008
Principal Investigator Date

APPENDIX:

- A. More comprehensive/final project reports. If distributed previously, simply reference the document or report.
- B. Appendix: 3 tables attached.

APPENDIX

Table 1. Total number of juvenile and adult fish captured in the fish trap of the passageway at the Government Highline Diversion Dam from 2 May to 15 October 2008.

<u>Common Name</u>	<u>Number of Fish</u>	<u>Percent of Total Fish</u>
NATIVE FISH		
bluehead sucker	5,418	50.2
flannemouth sucker	2,587	24.0
razorback sucker	1	< 0.1
roundtail chub	1,641	15.2
Colorado pikeminnow	0	---
bonytail	0	---
mountain whitefish	2	< 0.1
speckled dace	1	< 0.1
TOTAL	9,650	89.5
NONNATIVE FISH		
black bullhead	2	< 0.1
brown trout	31	0.3
channel catfish	37	0.3
common carp	27	0.3
green sunfish	2	< 0.1
smallmouth bass	3	< 0.1
rainbow trout	10	< 0.1
white sucker	650	6.0
TOTAL	768	7.1
HYBRID FISHES		
bluehead sucker X flannemouth sucker	13	0.1
bluehead sucker X white sucker	113	1.0
flannemouth sucker X white sucker	244	2.3
TOTAL	370	3.4
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ALL TOTALS	10,788	100.0
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Table 2. 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 2008.

<u>Year</u>	<u>No. of Colorado pikeminnow</u>	<u>No. of Razorback sucker^a</u>	<u>No. of Bonytail</u>	<u>No. of Humpback Chub</u>
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
Totals	0	2	0	3

^a all razorback sucker captured in the fish trap were from fish originally stocked in the Colorado and Gunnison rivers.

Table 3. 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 2008.

<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>
2005	4,638 ^a	2,867	1,771	61.8	38.2
2006	11,978 ^b	10,747	1,231	89.7	10.3
2007	fish passageway run for sediment maintenance only (fish trap not run)				
2008	10,788 ^c	9,663	1,125	89.6	10.4
Totals	27,404	23,277	4,127	84.9	15.1

^a Fish trap operated for 12 days (June and September).

^b Fish trap operated for 41 days (five, 2-week periods).

^c Fish trap operated continuously between May 2 and October 15.