

I. Project Title: **Annual Operation and Maintenance of the Fish Passage Structure at the Redlands Diversion Dam on the Gunnison 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 Redlands Diversion Dam on the Gunnison River. In 2011, the Redlands passageway was operational from 19 April to 14 October. This is the sixteenth year that the fish passageway at Redlands has been operated since it was completed in late-June 1996. In these 16 years, 110 sub-adult and adult Colorado pikeminnow, 28 razorback sucker, and eight bonytail have ascended the fish passageway. During 2010, the first wild humpback chub was collected in the fish trap. During 2011, two Colorado pikeminnow, one adult razorback sucker, and seven bonytail were found in the fish trap. Eight thousand seven hundred five fish were collected in the fish trap during 2011, the highest total in the last four years; 81% were native. Bluehead sucker comprised 48% of the total fish in the fish trap in 2011 followed by flannelmouth sucker (24%). White sucker were the most common nonnative fish collected (593; 7%) followed by channel catfish (2.4%). White sucker numbers have remained almost static over the past three years--2008 (153), 2009 (156), and 2010 (162), but increased in 2011. Channel catfish numbers dropped drastically from 355 in 2008 to only 70 in 2009. Their numbers in 2011 were similar to that in 2010 (216). Five gizzard shad were collected during 2010 but none were collected during 2011. And, while the number of smallmouth bass reached a high of 21 in 2005, none were captured in 2011, 2006 or in 2007; 4 were collected during 2008, only one smallmouth bass during 2009, and three in 2010. All channel catfish captured in the fish trap were returned alive downstream from the dam in 2011. All other nonnative fish, except salmonid species, were removed. Since its completion in 1996, 125,026 fish have used the fishway.

IV. Study Schedule:

- A. initial year: 1996
- b. final year: Ongoing

V. Relationship to RIPRAP:

- A. Colorado River Action Plan: Gunnison River
 - II.B.1.c. Operate and maintain fish ladder.
 - II.B.1.d. Monitor and evaluate success.

VI. Accomplishment of FY 2011 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

A. FY-2011 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 (2011 Highlights)

Fish Passage

1. Two adult Colorado pikeminnow, one adult razorback sucker, and seven bonytail were captured in the fish trap of the fish passageway at the Redlands Diversion Dam during 2011 (Appendix; Table 1). The first ever wild humpback chub were collected in the fish trap of the fish passageway at the Redlands Diversion Dam during 2010 (Appendix; Table 1). To date, 28 razorback suckers have been captured in the fish trap at the passageway of the Redlands Dam (Appendix; Table 2). The total number of Colorado pikeminnow capture events recorded in the fish trap at the passageway of the Redlands Dam from 1996 through 2011 is 110 (Appendix; Table 2).
2. Eight thousand seven hundred five fish were counted in the trap of the Redlands Diversion Dam fishway between 19 April and 14 October 2011.

This annual total is the highest in the last four years of operation. Native fishes comprised 81% of the total number of fishes collected in 2011, compared to 94% in 1996 and 1997, 93% in 1998 and 1999, 92% in 2000, 83% in 2001, 66% in 2002, 68% in 2003, 77% in 2004, 74% in 2005, 85% in 2006, 83% in 2007, 76% in 2008, 86% in 2009, and 87% in 2010. From 2001–2003, there was a significant downward trend in the relative percentage of native fishes compared to the first 5 years that the ladder was operated and monitored when the relative percentage of native fishes was somewhat constant at about 92% per year (Appendix; Table 3). The relative percentage of native fish has continued to steadily increase since 2003, but declined for the first time during 2008 since 2006. The total number of all fishes collected in the 16-year operation of the fish trap is 125,026. Overall, native fish still continue to comprise about 84% of all fish processed during this 16-year period.

Bluehead sucker comprised 48% of the catch and flannelmouth sucker 24% during 2011. The numbers of white sucker (631) that used the fish ladder in 2006 declined by about 58% from 2005 (1,520) and further declined in 2007 (168) and again in 2008 (153). White sucker numbers in 2010 (162) were similar to 2009 (156) and 2008. However, white sucker numbers increased for the first time in 2011 (n=593) since 2005. Channel catfish numbers remained almost the same in 2011 (n=205) from 2010 (n=216), but were less than 2008 (355), 2007 (501), and 2006 (432). The number of green sunfish in 2011 (17) declined from 2010 (45) but were similar to those collected in 2009 (14) and 2008 (17). No smallmouth bass were collected in 2011 compared to only one in 2009 and three in 2010. Four smallmouth bass were collected during 2008 whereas no smallmouth bass were collected in 2006 or 2007 compared to the highest ever recorded in the fish trap during 2005 (21). One adult northern pike (680 mm) was collected in 2011.

3. No adult gizzard shad were collected in the fish trap during 2011. Five adult gizzard shad were collected in the fish trap during 2010 and three gizzard shad were collected during 2009. No gizzard shad were collected in 2008. The number of adult gizzard shad in the fish trap was considerably higher in 2007 (43) from that of 2006 (3). During the 2010 smallmouth bass marking and removal study, 48 adult gizzard shad were collected in the Grand Valley reaches of the Colorado and Lower Gunnison rivers, compared to 135 during 2007, 18 in 2008, and 36 in 2009.
4. The number of nonnative longnose sucker (n=30) collected in the fish trap in 2011 continued to increase. In 2010, this species was collected for the first time (n=6) in the fish trap at Redlands.

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 were removed.

Operation and Maintenance

1. Maintenance to remove sediment and debris in the forebay and entrance portions of the fishway deposited by the 2011 runoff flows in the Gunnison River was performed during mid-June immediately following runoff as in earlier years with the assistance of the Redlands Water and Power Company.

VII. 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 2012 starting about 15 April and running through mid-October.

B. Operation and Maintenance:

1. To maintain optimum performance of the fish passageway, sediment maintenance is an on-ongoing, annual task.

VIII. Project Status:

A. "On track and ongoing".

IX. FY 2011 Budget Status

- A. Funds Provided: \$ 66,612
B. Funds Expended: \$ 66,612
C. Difference: \$ -0-
D. Percent of the FY 2011 work completed, and projected costs to complete: 100%.
Recovery Program funds spent for publication charges: \$ -0-

X. Status of Data Submission (Where applicable): The two adult Colorado pikeminnow, one adult razorback sucker, and seven bonytail captured in the fish trap of the passageway at the Redlands Diversion Dam during 2011 were checked for a PIT tag. All fish were recaptures as they had been previously PIT tagged.

The following data were collected from the ten T & E fish prior to their release: total length (mm), reproductive condition, date, location of capture, and PIT tag ID. These data have been computerized. The total number of fishes that were collected in the fish

trap at Redlands fish passageway has also been computerized. These completed, computerized data will be provided to the UCRB database coordinator upon his request.

XI. Signed: Bob D. Burdick 11/13/2011
Principal Investigator Date

APPENDIX:

- A. More comprehensive/final project reports. If distributed previously, simply reference the document or report.

Burdick, B. D. 2001. Five-year evaluation of fish passage at the Redlands Diversion Dam on the Gunnison River near Grand Junction, Colorado: 1996-2000. Recovery Program Project Number CAP-4b. Final Report prepared for the Recovery Implementation Program for Endangered Fishes in the Upper Colorado River Basin. U. S. Fish and Wildlife Service, Colorado River Fishery Project, Grand Junction, Colorado. 57 pp. + appendices.

- B. Appendix: 3 tables attached.

Prepared and compiled by Bob D. Burdick, 11/13/2011
2011-redlands-0&M-rpt.doc

APPENDIX

Table 1. Total number of juvenile and adult fish captured in the fish trap of the passageway at the Redlands Diversion Dam from 19 April to 14 October 2011.

<u>Common Name</u>	<u>Number of Fish</u>	<u>Percent of Total Fish</u>
NATIVE FISH		
bluehead sucker	4,199	48.2
flannelmouth sucker	2,049	23.5
razorback sucker	1	< 0.1
roundtail chub	817	9.4
Colorado pikeminnow	2	< 0.1
humpback chub	0	< 0.1
bonytail	7	< 0.1
TOTAL	7,075	81.2
NONNATIVE FISH		
black bullhead	106	1.2
bluegill	1	< 0.1
brown trout	133	1.5
channel catfish	205	2.4
common carp	93	1.0
gizzard shad	0	---
green sunfish	17	0.2
largemouth bass	0	---
longnose sucker	30	0.3
smallmouth bass	0	---
northern pike	1	< 0.1
rainbow trout	11	0.1
white sucker	593	6.8
TOTAL	1,172	13.5
HYBRID FISHES		
bluehead sucker X flannelmouth sucker	12	0.1
bluehead sucker X white sucker	183	2.1
flannelmouth sucker X white sucker	263	3.0
TOTAL	458	5.3
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ALL TOTALS	8,705	100.0

APPENDIX (cont.)

Table 2. Number of Colorado pikeminnow, razorback sucker, and bonytail capture events in the fish trap of the Redlands passageway between 1996 and 2011.

<u>Year</u>	<u>No. of Colorado pikeminnow</u>	<u>No. of Razorback sucker^a</u>	<u>No. of Bonytail^a</u>	<u>No. of Humpback Chub</u>
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 ^b
2011	2	1	7	0
Totals	110	28	8	1

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

^b 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 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 Redlands passageway between 1996 and 2011.

<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
Totals	125,026	104,775	20,251	83.8	16.2