

I. Project Title: **Annual Operation and Maintenance (O&M) 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 2009, the Redlands passageway was operational from 17 April to 15 October. This is the fourteenth year that the fish passageway at Redlands has been operated since it was completed in late-June 1996. In these 14 years, 104 sub-adult and adult Colorado pikeminnow, 26 razorback sucker, and one bonytail have ascended the fish passageway. During 2009, two Colorado pikeminnow and one adult razorback sucker were found in the fish trap; only 1 razorback sucker was found in the fish trap in 2008. Three thousand five hundred eighty fish were collected in the fish trap during 2009, the lowest total number in 14 years of operation; 83% were native. Three thousand six hundred ninety nine fish were collected in the fish trap during 2008. Native fishes comprised about 92% of this total for each of the first 5 years. However, in 2002 and again in 2003, the percentage of native fish declined to about 66 and 68%, respectively. However, in 2004, 2005, 2006, and 2007 this trend was reversed. In 2008, the rate of native fishes declined to 76% from 2006 and 2007. Bluehead sucker comprised 49% of the total fish in the fish trap in 2009 followed by flannemouth sucker (24%). White sucker were the most numerous nonnative fish collected (4% of the total) followed by channel catfish (2%) and white sucker X flannemouth sucker hybrids (3%). White sucker numbers remained almost static from 2008 (153) to 2009 (156). However, channel catfish numbers dropped drastically from 355 in 2008 to only 70 in 2009. Three gizzard shad were collected during 2009. And, while the number of smallmouth bass reached a high of 21 in 2005, none were captured in 2006 or in 2007, 4 were collected during 2008, and only one smallmouth bass was collected during 2009. All channel catfish captured in the fish trap were returned alive downstream from the dam in 2009. All other nonnative fish, except

salmonid species, were removed. Since its completion in 1996, 109,613 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 2009 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

A. FY-2009 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 (2009 Highlights)

Fish Passage

1. Two adult Colorado pikeminnow and one adult razorback sucker were collected in the fish trap of the fish passageway at the Redlands Diversion Dam during 2009 (Appendix; Table 1). To date, 26 razorback sucker have been captured in the fish trap at the passageway of the Redlands Dam (Appendix; Table 2). The total number of Colorado pikeminnow that have been captured in the fish trap at the passageway of the Redlands Dam from 1996 through 2009 is 104 (Appendix; Table 2).
2. Three thousand five hundred eighty fish were counted in the trap of the Redlands Diversion Dam fishway between 17 April and 15 October 2009.

This annual total is the lowest in 14 years of operation. Native fishes comprised 86% of the total number of fishes collected in 2009, 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, and 76% in 2008. 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 14-year operation of the fish trap is 109,613. Overall, native fish still continue to comprise about 84% of all fish processed.

Bluehead sucker comprised 49% of the catch and flannelmouth sucker 24% during 2009. 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 2009 (156) were similar to 2008. Channel catfish numbers declined in 2009 (70) from 2008 (355), 2007 (501), and 2006 (432). The number of green sunfish in 2009 (14) was similar to 2008 (17) and were markedly lower than 2003 (330) and 2002 (256). One smallmouth bass was collected in 2009. Four smallmouth bass were collected during 2008 whereas no smallmouth bass were collected in 2006 nor 2007 compared to the highest ever recorded in the fish trap during 2005 (21).

4. Three adult gizzard shad were collected in the fish trap 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 2009 smallmouth bass marking and removal study, 3 juvenile and 33 adult gizzard shad were collected in the Grand Valley reaches of the Colorado and Lower Gunnison rivers, compared to 135 during 2007 and 18 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 were removed.

Operation and Maintenance

1. Maintenance to remove sediment and debris in the forebay portion of the fishway deposited by the 2009 runoff flows in the Gunnison River was performed during mid-June immediately following runoff. Following runoff

FWS personnel again had to free up and remove sediment that had become compacted at the head end of the fish ladder and attraction flow intake. Three-inch water transfer pumps were used to deliver a high pressure and medium volume stream of water through a 2-inch discharge hose and a 1-inch diameter brass nozzle to accomplish this work. A backhoe owned and operated by Redlands Water and Power Company personnel also was used in conjunction with the high volume/pressure water discharge to free debris and sediment in the forebay area of the fish ladder. Gravel was spread to replace gravel that had been washed away from the entrance area of the fish ladder during runoff. In 2009, a considerable amount of river-borne debris had to be manually removed from the downstream entrance of the fish passageway. Again this year as in 2005, the two layers of diffuser grating in the floor of the entrance of the fish ladder had to be manually removed to facilitate removal of debris and sediment that had become lodged there during spring runoff flows from the Gunnison River.

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 2010 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 2009 Budget Status

A. Funds Provided: \$ 60,349
B. Funds Expended: \$ 60,349
C. Difference: \$ -0-
D. Percent of the FY 2009 work completed, and projected costs to complete: 100%.
Recovery Program funds spent for publication charges: \$ -0-

X. Status of Data Submission: The two adult Colorado pikeminnow and one adult razorback sucker captured in the fish trap of the passageway at the Redlands Diversion Dam during 2009 were checked for a PIT tag. One of the two adult Colorado pikeminnow had not been previously PIT tagged. This fish was inserted with a 134 khz PIT tag prior to release.

The following data were collected from the three endangered fish prior to their release: 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 Redlands 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 11/11/2009
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, 11/11/2009
2009-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 17 April to 15 October 2009.

<u>Common Name</u>	<u>Number of Fish</u>	<u>Percent of Total Fish</u>
NATIVE FISH		
bluehead sucker	1,763	49.2
flannelmouth sucker	1,285	23.6
razorback sucker	1	< 0.1
roundtail chub	431	12.0
Colorado pikeminnow	2	< 0.1
bonytail	0	- - -
TOTAL	3,057	85.4
NONNATIVE FISH		
black bullhead	34	0.9
brown trout	52	1.5
channel catfish	70	2.0
common carp	31	0.9
gizzard shad	3	< 0.1
green sunfish	14	0.4
smallmouth bass	1	< 0.1
rainbow trout	5	0.1
white sucker	156	4.4
TOTAL	367	10.3
HYBRID FISHES		
bluehead sucker X flannelmouth sucker	9	0.2
bluehead sucker X white sucker	68	1.9
flannelmouth sucker X white sucker	79	2.2
TOTAL	147	1.9

ALL TOTALS	3,580	100.0

APPENDIX (cont.)

Table 2. Number of Colorado pikeminnow, razorback sucker, and bonytail captured in the fish trap of the Redlands passageway between 1996 and 2009.

<u>Year</u>	<u>No. of Colorado pikeminnow</u>	<u>No. of Razorback sucker^a</u>	<u>No. of Bonytail^a</u>
1996	1	0	0
1997	18	0	0
1998	23	0	0
1999	5	0	0
2000	4	0	0
2001	1	5	0
2002	7	1	0
2003	3	0	1
2004	5	3	0
2005	4	6	0
2006	10	5	0
2007	21	4	0
2008	0	1	0
2009	2	1	0
Totals	104	26	1

^a all razorback sucker and bonytail 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 Redlands passageway between 1996 and 2009.

<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
Totals	109,613	91,883	17,730	83.8	16.2