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

II. Principal Investigator(s): Chuck McAda, Project Leader
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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 both the fish passageways at the Redlands Diversion Dam on the Gunnison River and the Government Highline Diversion Dam on the Upper Colorado River in Debeque Canyon.

Redlands. In 2006, the Redlands passageway was operational from 21 April to 11 October. This is the eleventh year that the fish passageway at Redlands has been operated since it was completed in late-June 1996. In these 11 years, 81 sub-adult and adult Colorado pikeminnow, 20 razorback sucker, and one bonytail have ascended the fish passageway. Ten adult Colorado pikeminnow and five previously stocked razorback sucker used the fish passageway in 2006. Eleven thousand ninety five fish were collected in the fish trap during 2006; 85% were native fish. 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, and 2006 this trend was reversed. Flannelmouth sucker comprised 59% of the total fish in the fish trap in 2006 followed by bluehead sucker (19%). White sucker were the most numerous nonnative fish collected (6% of the total) followed by channel catfish (4%), although both these fishes declined from 2005. In 2006, the number of green sunfish (< 0.1%; 6 fish) declined for the third time in four years. And, while the number of smallmouth reached a high of 21 in 2005, none were captured in 2006. From the opening of the fish ladder until July 14, all nonnative fish, except salmonid species, were removed. Following July 14, all nonnative fish were returned alive downstream of the Redlands Diversion Dam. Since its completion in 1996, 95,371 fish have used the fishway.

Government Highline. Government Highline Diversion Dam continued to be operated on a trial basis for 5 different periods of approximately 2 weeks each from late-April to late-September. No endangered fish were caught during 2006 in the fish trap. A total of 11,978 fish were processed in the fish trap; 90% of these were native fishes.

IV. Study Schedule:
Redlands Fish Passageway
a. initial year: 1996
b. final year: Ongoing

Government Highline Fish Passageway
a. initial year: 2004
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.
B. 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 2006 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

A. FY-2006 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 at Redlands and Government Highline fish passageways.

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

Task completed for Redlands and Government Highline fish passageways.

B. Findings (2006 Highlights)

Fish Passage

Redlands Diversion Dam

1. Ten adult Colorado pikeminnow were collected in the fish trap of the fish passageway at the Redlands Diversion Dam during 2006 (Appendix; Table 1). The brings the total number of Colorado pikeminnow that have been captured in the fish trap at the passageway of the Redlands Dam to 81 from 1996 through 2006 (Appendix; Table 2). Six pikeminnow used the fishway in July, three other pikeminnow used the fishway in August, and one in late-September.

2. Five razorback sucker were found in the fish trap during 2006. One razorback sucker used the fishway in June, one in July, and three during August. To date, 20 razorback sucker have been captured in the fish trap at the passageway of the Redlands Dam (Appendix; Table 2).

3. Eleven thousand ninety five fish were counted in the trap of the Redlands Diversion Dam fishway between 21 April and 11 October 2006. This averaged to about 100 fish per day that were processed in the fish trap. Native fishes comprised 85% of the total number of fishes collected in 2006, 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, and 74% in 2005. 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.

   Flannelmouth sucker comprised 59% of the catch and bluehead sucker 19% during 2006. The numbers of white sucker (631) that used the fish ladder in 2006 (631) declined by about 58% from 2005 (1,520). Channel catfish numbers in 2006 (432) continued to decline once again from 2005 (630) and 2004 (994). The number of green sunfish (6) in 2006 also continued to decline from 2005 (35) compared to 61 in 2004, 330 in 2003 and 256 in 2002. And surprisingly, no smallmouth bass were collected in 2006 compared to the highest ever recorded in the fish trap during 2005 (21)(Appendix; Table 4, Figure 1).

4. A noteworthy inclusion in this years catch in the fish trap were three adult gizzard shad. Twelve other gizzard shad were captured during the 2006 smallmouth bass marking and removal study. One of those 12 shad were captured in the plunge pool of the Redlands Diversion Dam. This is believed to be the first sightings of gizzard shad in the Grand Valley area of the Upper Colorado River.

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 other nonnative species plus hybrid suckers found in the trap were removed up to July 14. After July 14, all nonnative fish were returned alive to the river downstream from the Redlands Diversion Dam.

Government Highline Diversion Dam

1. The fishway was opened and closed on five separate occasions (i.e., runs) during the spring and summer of 2006. Each occasion was for about 2 weeks. No endangered fish were found in the fish trap during 2006. Eleven thousand nine hundred seventy eight fish were processed from these five occasions. Native fish comprised 90% of the total. Bluehead sucker comprised 33%, roundtail chub 32%, and flannelmouth sucker 25% of the total number of fish processed. White sucker was the most numerous nonnative fish encountered (7%) followed by white sucker X flannelmouth sucker hybrid (1%)(Appendix; Table 5). The average number of fish caught in the fish trap per day was about 292.

2. The number of fish processed during each of the five runs were graphed to determine if there was a pattern of successive decay or depletion over time in the number of fish in the fish trap. For three of the five runs (runs 1, 3, and 4), catches in the fish trap tended to be greatest initially and subsequently steadily tapered off over the remaining 5–9-day period (Appendix: Table 6, Figure 2). However, for runs 2 and 5, just the opposite occurred: fish use was greatest near the end of the run.

3. 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 the fish passage. All other nonnative species plus hybrid suckers found in the trap were removed.

Operation and Maintenance

Redlands Diversion Dam

1. Maintenance to remove sediment and debris in the forebay area of the fishway delivered by the 2006 runoff flows in the Gunnison River was performed during mid-June following runoff. A diesel-powered air compressor furnished by the Bureau of Reclamation was used to accomplish this work.

Government Highline Dam

1. No sediment maintenance was performed.

2. A re-built gate operator was installed for the attraction flow gate.

3. The grating (3/4-inch spacing) within the attraction flow chamber was removed and attached to the larger spaced (4-inch) river trash grating to prevent entrainment of juvenile and adult large-bodied fishes into the attraction flow chamber. Prior to this, large bodied fish were being entrained into the attraction flow chamber and fish could not return to the river. Subsequently, fish were dying due to the high turbulence within this chamber.

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 2006 starting about 15 April and running through mid-October. At Government Highline Diversion Dam, at this time it is uncertain when and the duration the fish passageway will be operated during 2007. If the fishway is operated, information will continue to be collected on the number of fish by species.

B. Operation and Maintenance:

Redlands

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 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. With the cooperation and coordination of Redlands Water and Power Company, sluice the sediment in the pond behind the dam by dropping about 15-20 of the dam flash boards on the fish passage side of the river in the spring and fall when Redlands is conducting canal maintenance and repair.

Government Highline

1. In the spring prior to operation of the fish passageway, sediment from the fish passageway should be sluiced. This could be accomplished by alternating flows between the fish ladder and attraction flow chamber for 2 to 3 days each to optimize sediment removal. Coordination with Grand Valley Water Users' Association officials will be required for this and other fish passage operations.

2. When the fish passage is operated, attempt different attraction flows to determine which attraction flows at different river stages optimize fish catches in the trap.

VIII. Project Status:

A. "On track and ongoing".

IX. FY 2006 Budget Status

| | Redlands | Government Highline |
|---|---|---|
| A. Funds Provided: | $ 44,743 | $ 22,986 |
| B. Funds Expended: | $ 44,743 | $ 22,986 |
| C. Difference: | $ –0– | $ –0– |

D. Percent of the FY 2006 work completed, and projected costs to complete: 100%. Recovery Program funds spent for publication charges: $ –0–

X. Status of Data Submission (Where applicable): The ten Colorado pikeminnow and five razorback sucker captured in the fish trap of the passageway at the Redlands Diversion Dam during 2006 were checked for a PIT tag. Three Colorado pikeminnow and two razorback sucker had been previously PIT-tagged. Seven Colorado pikeminnow were PIT tagged prior to their release. The following data were collected from all T & E fish prior to their being released: total length (mm), weight (g), reproductive condition, and date and location of capture. These data have been computerized. The total number of fishes that were collected in the fish traps at both Redlands and Government Highline fish passageways were also computerized. These completed, computerized data will be provided to the UCRB database coordinator upon his request.

XI. Signed: *Bob D. Burdick* 10/25/2006
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: 6 tables and 2 figures attached.

Prepared and compiled by Bob D. Burdick, 10/25/2006
2006-redlands-0&M-rpt.wpd

APPENDIX

Table 1. Total number of juvenile and adult fish captured in the fish trap of the passageway at the Redlands Diversion Dam from 21 April to 11 October 2006.

| Common Name | Number of Fish | Percent of Total Fish |
|---|---|---|
| NATIVE FISH | | |
| bluehead sucker | 2,136 | 19.3 |
| flannelmouth sucker | 6,552 | 59.1 |
| razorback sucker | 5 | < 0.1 |
| roundtail chub | 672 | 6.1 |
| Colorado pikeminnow | 10 | < 0.1 |
| bonytail | 0 | 0 |
| speckled dace | 3 | < 0.1 |
| TOTAL | 9,378 | 84.5 |
| NONNATIVE FISH | | |
| black bullhead | 45 | 0.4 |
| brown trout | 25 | 0.2 |
| channel catfish | 432 | 3.9 |
| common carp | 117 | 1.1 |
| gizzard shad | 3 | < 0.1 |
| green sunfish | 6 | < 0.1 |
| largemouth bass | 1 | < 0.1 |
| rainbow trout | 2 | < 0.1 |
| white sucker | 631 | 5.7 |
| TOTAL | 1,262 | 11.4 |
| HYBRID FISHES | | |
| bluehead sucker X flannelmouth sucker | 6 | < 0.1 |
| bluehead sucker X white sucker | 213 | 1.8 |
| flannelmouth sucker X white sucker | 236 | 2.1 |
| TOTAL | 455 | 4.1 |
| ALL TOTALS | 11,095 | 100.0 |

Table 2. Number of Colorado pikeminnow, razorback sucker, and bonytail captured in the fish trap of the Redlands passageway between 1996 and 2006.

| Year | No. of Colorado pikeminnow | No. of Razorback sucker [a] | No. of Bonytail [a] |
|---|---|---|---|
| 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 |
| Totals | 81 | 20 | 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 2006.

| Year | Total Number of Fish | Total Native | Total Nonnative | Percent Composition | |
|---|---|---|---|---|---|
| | | | | Native Fishes | Nonnative Fishes |
| 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 |
| Totals | 95,371 | 80,198 | 15,173 | 84.1 | 15.9 |

Table 4. Number of smallmouth bass collected in the fish trap of the Redlands fish passageway, 1996–2006. See Figure 1 below.

| Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| '96 | '97 | '98 | '99 | '00 | '01 | '02 | '03 | '04 | '05 | '06 |
| 1 | 0 | 0 | 0 | 0 | 0 | 13 | 6 | 9 | 21 | 0 |

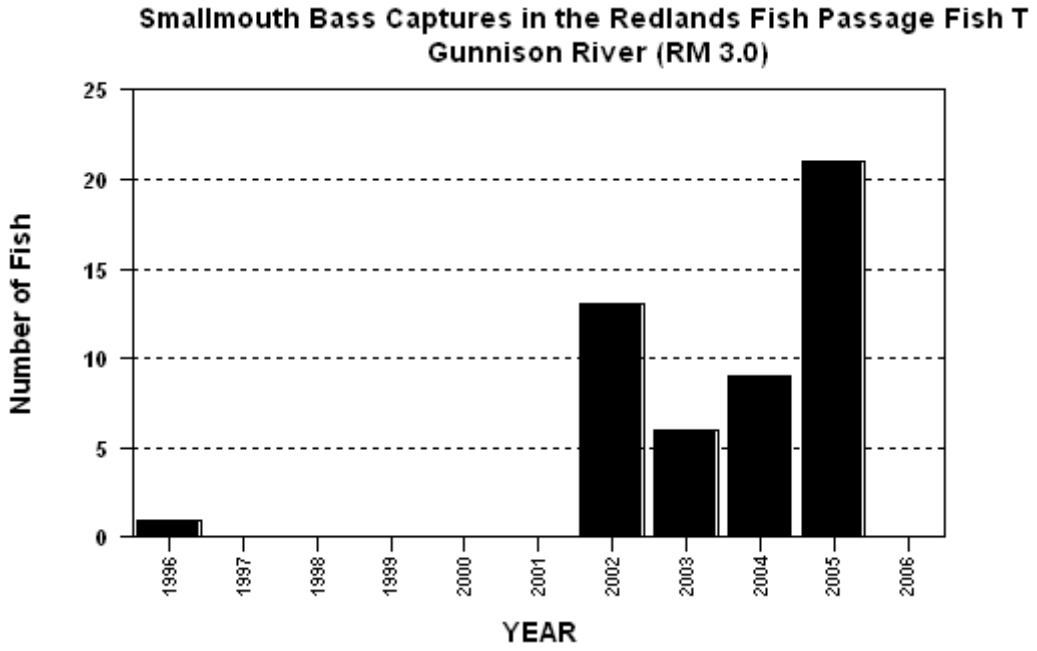


Figure 1. Number of smallmouth bass collected in the fish trap of the Redlands fish passageway, 1996–2006.

Table 5. Total number of juvenile and adult fish captured in the fish trap of the passageway at the Government Highline Diversion Dam on five different occasions for 2 week periods each from late-April to late-September 2006.

| Common Name | Number of Fish | Percent of Total Fish |
|---|---|---|
| NATIVE FISH | | |
| bluehead sucker | 3,890 | 32.5 |
| flannelmouth sucker | 3,040 | 25.4 |
| razorback sucker | 0 | - - |
| roundtail chub | 3,808 | 31.8 |
| mountain whitefish | 6 | < 0.1 |
| humpback chub | 0 | - - |
| TOTAL | 10,744 | 89.7 |
| NONNATIVE FISH | | |
| black bullhead | 9 | < 0.1 |
| black crappie | 2 | < 0.1 |
| bluegill | 1 | < 0.1 |
| smallmouth bass | 1 | < 0.1 |
| common carp | 78 | 0.6 |
| rainbow trout | 9 | < 0.1 |
| brown trout | 11 | < 0.1 |
| brook trout | 1 | < 0.1 |
| white sucker | 854 | 7.1 |
| TOTAL | 966 | 8.0 |
| HYBRID FISHES | | |
| bluehead sucker X flannelmouth sucker | 3 | < 0.1 |
| bluehead sucker X white sucker | 97 | < 0.8 |
| flannelmouth sucker X white sucker | 168 | < 1.4 |
| TOTAL | 268 | < 2.2 |
| ALL TOTALS | 11,978 | 100 |

% Native fish: 10,747/11,978=90%
% Nonnative fish: 1,231/11,978=10%

Table 6. Number of fish processed each day for each of the five different 2-week occasions (a.k.a. runs) in the Grand Valley Water User's fish trap, April to September 2006. See Figure 2 below.

| | Run Number | | | | |
|---|---|---|---|---|---|
| Day | 1 | 2 | 3 | 4 | 5 |
| 1 | 731 | 90 | 1,863 | 501 | 469 |
| 2 | 251 | 3 | 391 | 203 | 552 |
| 3 | 144 | 20 | 202 | 273 | 254 |
| 4 | 126 | 36 | 117 | 126 | 51 |
| 5 | 171 | 0 | 180 | 41 | 202 |
| 6 | 111 | 25 | 105 | 51 | 905 |
| 7 | 417 | 123 | 103 | 72 | 937 |
| 8 | 341 | 289 | n/r | 65 | 743 |
| 9 | 91 | [a] n/r | n/r | n/r | 604 |

[a] n/r=fish trap not run.

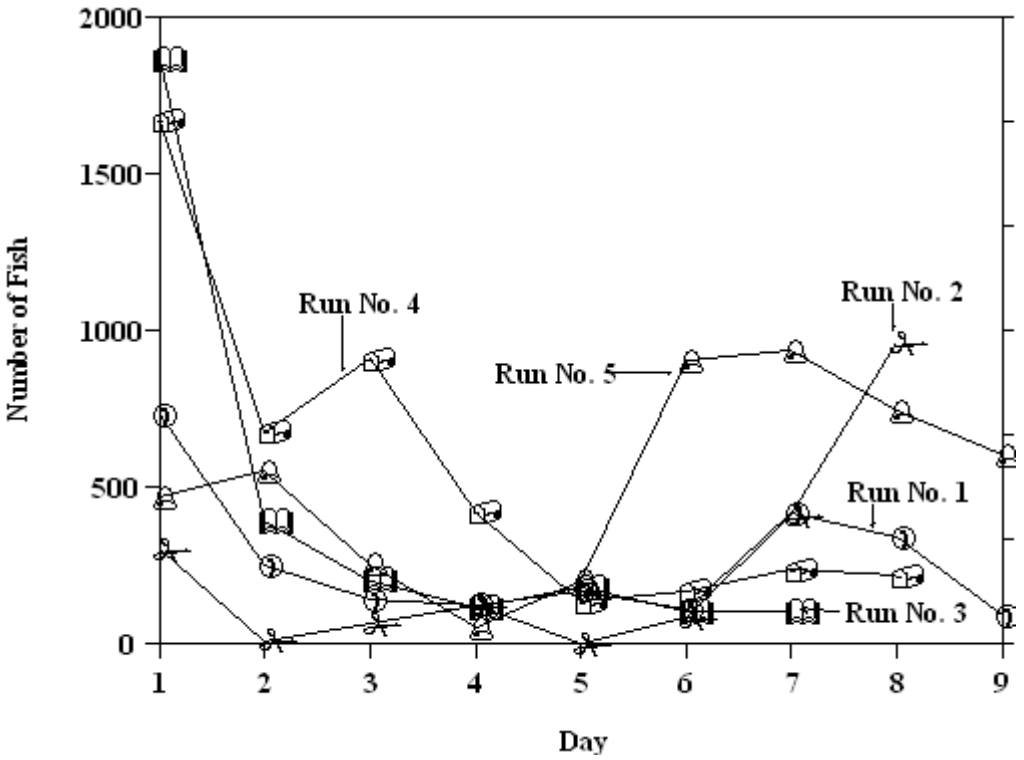


Figure 2. Fish trap catches by successive day for five different 2-week runs in the Grand Valley Water Users fish passageway during 2006.

Table 7. Total number of fish processed in the fish trap per day vs. hydrology characteristics of the fish ladder at Government Highline Diversion Dam and flows in the Upper Colorado River, during five different time periods from 24 April 2006 to 29 September 2006.

| Date | Day | Total No. of Fish In the Fish Trap | Ladder Flow (cfs) Attraction | Fish Ladder | River Flows (cfs) [a] Min | Max |
|---|---|---|---|---|---|---|
| Run # 1 | | | | | | |
| April | | | | | | |
| 24th | 0 | - - | 40–45 | 28–30 | 5,760 | 6,790 |
| 25th | 1 | 731 | 40–45 | 28–30 | 6,370 | 6,820 |
| 26th | 2 | 251 | 40–45 | 28–30 | 5,760 | 6,400 |
| 27th | 3 | 144 | 40–45 | 28–30 | 5,680 | 6,310 |
| 28th | 4 | 126 | ~ 12 [b] | 28–30 | 6,140 | 6,790 |
| 29th | *Weekend* | *Not Run* | ~ 12 [b] | 28–30 | 6,400 | 6,970 |
| 30th | *Weekend* | *Not Run* | ~ 12 [b] | 28–30 | 6,080 | 6,490 |
| May | | | | | | |
| 1st | 5 | 171 | ~ 12 [b] | 28–30 | 6,080 | 6,310 |
| 2nd | 6 | 111 | ~ 12 [b] | 28–30 | 5,990 | 6,460 |
| 3rd | 7 | 417 | ~ 12 [b] | 28–30 | 5,990 | 7,220 |
| 4th | 8 | 341 | ~ 12 [b] | 28–30 | 6,850 | 7,450 |
| 5th | 9 | 91 | ~ 12 [b] | 28–30 | 7,140 | 7,880 |
| Run # 2 | | | | | | |
| May | | | | | | |
| 23rd | 0 | 90 | Not Run [c] | 28–30 | 14,900 | 17,700 |
| 24th | 1 | 3 | Not Run [c] | 28–30 | 14,900 | 17,500 |
| 25th | 2 | 20 | Not Run [c] | 28–30 | 14,500 | 15,200 |
| 26th | 3 | 36 | Not Run [c] | 28–30 | 14,400 | 15,100 |
| 27th | *Weekend* | *Not Run* | Not Run [c] | 28–30 | 14,500 | 15,200 |
| 28th | *Weekend* | *Not Run* | Not Run [c] | 28–30 | 13,200 | 14,700 |
| 29th | *Holiday* | *Not Run* | Not Run [c] | 28–30 | 11,200 | 13,200 |
| 30th | 4 | 0 | Not Run [c] | 28–30 | 9,450 | 11,200 |
| 31st | 5 | 25 | Not Run [c] | 28–30 | 8,990 | 9,450 |
| June | | | | | | |
| 1st | 6 | 123 | Not Run [c] | 28–30 | 8,710 | 9,260 |
| 2nd | 7 | 289 | Not Run [c] | 28–30 | 8,930 | 9,830 |

[a] as measured at the USGS Cameo gaging station, 6.1 miles upstream from the Government Highline Diversion Dam.

[b] attraction flow was maintained at this level due to failure of the gate operator on the attraction flow gate that resulted in the inability to open or close the gate and adjust attraction flows.

[c] attraction flows were not run due to an inoperative gate.

Table 7. (cont'd).

| Date | Day | Total No. of Fish In the Fish Trap | Ladder Flow (cfs) Attraction | Ladder Flow (cfs) Fish Ladder | River Flows (cfs) [a] Min | River Flows (cfs) [a] Max |
|---|---|---|---|---|---|---|
| Run # 3 | | | | | | |
| June | | | | | | |
| 27th | 1 | 1,863 | Not Run [d] | 28–30 | 4,380 | 4,760 |
| 28th | 2 | 391 | Not Run [d] | 28–30 | 4,080 | 4,380 |
| 29th | 3 | 202 | Not Run [d] | 28–30 | 3,960 | 4,280 |
| 30th | 4 | 117 | Not Run [d] | 28–30 | 3,840 | 4,060 |
| July | | | | | | |
| 1st | *Weekend* | *Not Run* | Not Run [d] | 28–30 | 3,890 | 4,060 |
| 2nd | *Weekend* | *Not Run* | Not Run [d] | 28–30 | 3,910 | 4,060 |
| 3rd | 5 | *Not Run* | Not Run [d] | 28–30 | 3,910 | 4,060 |
| 4th | *Holiday* | *Not Run* | Not Run [d] | 28–30 | N/R [d] | N/R [d] |
| 5th | 6 | 180 | Not Run [d] | 28–30 | 3,890 | 4,130 |
| 6th | 7 | 105 | Not Run [d] | 28–30 | 3,870 | 4,250 |
| 7th | 8 | 103 | Not Run [d] | 28–30 | 4,030 | 4,350 |
| Run # 4 | | | | | | |
| August | | | | | | |
| 15th | 1 | 501 | 30–35 | 28–30 | 2,540 | 2,700 |
| 16th | 2 | 203 | 30–35 | 28–30 | 2,580 | 2,660 |
| 17th | | *Not Run* | 30–35 | 28–30 | 2,560 | 2,660 |
| 18th | 3 | 273 | 30–35 | 28–30 | 2,520 | 2,580 |
| 19th | *Weekend* | *Not Run* | 30–35 | 28–30 | 2,480 | 2,680 |
| 20th | *Weekend* | *Not Run* | 30–35 | 28–30 | 2,500 | 2,720 |
| 21st | 4 | 126 | 30–35 | 28–30 | 2,560 | 2,700 |
| 22nd | 5 | 41 | 30–35 | 28–30 | 2,600 | 2,700 |
| 23rd | 6 | 51 | 30–35 | 28–30 | 2,520 | 2,740 |
| 24th | 7 | 72 | 30–35 | 28–30 | 2,540 | 2,640 |
| 25th | 8 | 65 | 30–35 | 28–30 | 2,540 | 2,660 |
| Run # 5 | | | | | | |
| September | | | | | | |
| 19th | 1 | 469 | 30 | 28–30 | 2,740 | 2,860 |
| 20th | 2 | 552 | 30 | 28–30 | 2,600 | 2,760 |
| 21st | 3 | 254 | 30 | 28–30 | 2,640 | 2,780 |
| 22nd | 4 | 51 | 30 | 28–30 | N/R [e] | N/R [e] |
| 23rd | *Weekend* | *Not Run* | 30 | 28–30 | N/R [e] | N/R [e] |
| 24th | *Weekend* | *Not Run* | 30 | 28–30 | N/R [e] | N/R [e] |
| 25th | 5 | 202 | 30 | 28–30 | 2,500 | 2,540 |
| 26th | 6 | 905 | 30 | 28–30 | 2,440 | 2,540 |
| 27th | 7 | 937 | 30 | 28–30 | 2,380 | 2,500 |
| 28th | 8 | 743 | 30 | 28–30 | 2,320 | 2,500 |
| 29th | 9 | 604 | 30 | 28–30 | 2,230 | 2,420 |

[d] attraction flows were not run due to the 3/4-inch grating being relocated.
[e] N/R: no discharge reading for this date.