

I. Project Title: Assessment of Native Fish Losses in the Tusher Wash Diversion Canal and Adult/Sub-adult Fish Passage at Tusher Wash Diversion Dam

II. Principal Investigators:

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III. Project Summary:

Tusher Wash Diversion Dam is located on the Green River near the town of Green River, Utah. Research was conducted in 1998 and 1999 to determine 1) if the dam prevents upstream movement of subadult native fish; 2) if the canal entrains native fish; and, 3) if the dam needs to be modified to better accommodate native fish. The study was designed to include two full field seasons, but funding was cut after the first field season. All of the objectives could not be sufficiently addressed due to higher than average discharge and lower than average larval drift rates observed in 1998. All data have been collected, and a draft-final report has been written and peer reviewed.

IV. Study Schedule:

- a. Initial year: FY 98
- b. Final year: FY 99

Note: This study was originally scheduled to include two years of data collection. A final report was to be written during the following year. However, during its meeting on August 12-13, 1998, the Management Committee decided to eliminate funding for the second year of data collection. Therefore, very little data were collected in FY 99, and a draft final report was written. This report has gone through the peer review process, but still needs to be reviewed by the Biology Committee.

V. Relationship to RIPRAP:

Green River Action Plan: Mainstem

II. Restore Habitat (Habitat Development and Maintenance).

II.B. Restore native fish passage at instream barriers.

II.B.1. Assess and make recommendations for fish passage at low flows at Tusher Wash.

VI. Accomplishment of FY 99 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1a

Tagging: Electrofishing was used from 7/30-10/22, 1998 to collect juvenile and adult fish. Fish were collected between Swasey's Rapid (River Mile 132.0) and River Mile 124.8, tagged with a Floy tag or a PIT tag, and released in the area below Tusher Diversion (River Miles 128.6 to 124.8). Electrofishing produced two marked bluehead suckers and one marked flannelmouth sucker above the diversion, while one marked channel catfish and four marked flannelmouth suckers were captured below the diversion. In addition, an angler reported catching one marked channel catfish above the diversion. This marking and recapture effort was intended to determine whether juvenile native fish could negotiate Tusher Diversion during low flows. However, the low flow recorded in 1998 was much higher than normal, so it is still not clear whether juvenile native fish can pass the diversion structure during average low flow conditions.

Task 1b

Radio Telemetry: Radio tags were implanted in 7 Colorado pikeminnow, 9 flannelmouth suckers, and 5 bluehead suckers. No radio tags were implanted in roundtail chubs, since all of the roundtails captured were too small to tag. Many of the fish that were radio tagged moved downstream immediately. One pikeminnow was never found after being tagged, and several others moved long distances downstream (one pikeminnow moved 58.7 miles in 17 days, while another moved 39.6 miles in 11 days). The radio-tagged suckers tended to move less than the pikeminnow, but three flannelmouth suckers did move upstream past the diversion structure. The exact dates that these fish passed the structure is not known, since remote data logging radio receivers were not used. However, two of these fish are known to have moved past the diversion within two weeks of being implanted with a radio tag.

Task 2a

Larval Fish Entrainment: Drift nets were set in the diversion inlet (raceway), Green River Canal, and in the Green River during May and July, 1998. The May samples were intended to target the period when larval suckers would be drifting. However, the river was carrying a large volume of debris at that time, so the drift nets rapidly clogged, and few fish were captured. The July sample was intended to coincide with the period when larval Colorado pikeminnow would be drifting. The volume of debris was reduced by that time, so more fish were collected. Larval Colorado pikeminnow were found in the Green River Canal, but no razorback sucker larvae were captured.

Task 2b

Sub-adult and adult entrainment: No subadult Colorado pikeminnow were captured in the canal system, but one hatchery-reared razorback sucker was found dead on a trash rack at the power plant. Other native species found in the canal system included

flannelmouth sucker, bluehead sucker, speckled dace, and *Gila* species. All life stages of several non-native species were also found in the canal system.

VII. Recommendations:

This study was initially designed to include two field seasons. Funding for data collection was eliminated after the first field season, so the objectives of the study were not sufficiently addressed. The tagging and radio telemetry portions of the study were intended to determine the effects of Tusher Diversion on native fish movement during low flow periods. However, flows stayed fairly high throughout the sampling period. Evaluation of larval fish entrainment in the canal system was fairly effective during the later portion of the larval drift period, but sampling during the early portion of the drift period was ineffective due to the large amount of debris in the water at that time. Evaluation of sub-adult and adult entrainment in the canal system was only evaluated on two days, since the Green River Canal was only drained twice in 1998. No effort was made to determine if fish are killed as they pass through the power plant. This was not possible since the high water levels would have made sampling efforts futile. Funding for at least one additional year of data collection will be necessary in order to properly evaluate the many potential effects of the Tusher Diversion system on native fishes.

Based on the data collected, it appears that modifications to the canal system are needed to reduce the mortality rate of native fish species. Improvements to Tusher Wash Diversion Dam and its associated canal systems will be expensive to develop and maintain, so other options, such as reducing the amount of water that enters the canal system, should be considered as potential ways to reduce native fish mortality and improve fish passage.

VIII. Project Status: Draft-final report has been written and ready to be reviewed by the Biology Committee.

IX. FY 99 Budget Status:

A. Funds budgeted: \$15,000  
B. Funds expended/obligated: \$15,000  
C. Difference: \$ -0-  
D. Percent FY 99 work completed: 100%  
E. Recovery Program funds spent for publication charges: \$0.00

X. Status of Data Submission:

Trip summaries were submitted as scheduled, and PIT tag information has been submitted to the data base manager. The remainder of the data will be submitted when the project completion report is approved by the Biology Committee.

XI. Signed: Matthew Andersen, December 7, 1999

Matthew Andersen