

I. Project Title: **Evaluation of entrainment of Colorado pikeminnow into Yampa River canals.**

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III. Project Summary:

The Maybell Canal is a gravity-fed diversion canal in the Yampa River within occupied habitat for adult Colorado pikeminnow (*Ptychocheilus lucius*), a federally listed endangered fish species. The purpose of this study was to determine if Colorado pikeminnow or other fish are entrained in the Maybell Canal. The canal is approximately 12 miles (19 km) long and we sampled the uppermost 1.4 miles (2.2 km) for fish on two days in October, 2007. A total of 3.6 hours of electrofishing current was applied to the water from a canoe-mounted electrofisher. We captured eight species and a total of 702 fish or approximately 500 fish per mile. No Colorado pikeminnow were captured. Four nonnative species comprised 99% of the fish collected including smallmouth bass (88%), white sucker (8%), common carp (2%), and creek chub (1%). Only two native fish, bluehead suckers, were captured. Most fish were less than 5-inches (125-mm) long and only one was over 10 inches (250 mm) long. We recommend sampling in June and July using similar techniques to better determine if Colorado pikeminnow are entrained during their spawning migration downstream past the diversion inlet.

IV. Study Schedule: *Initial year-2006; Final year-undetermined*

V. Relationship to RIPRAP: (March 28, 2004 version @ <http://www.r6.fws.gov/crrip/rip.htm>)

Green River Action Plan: Yampa and Little Snake rivers

II. Restore habitat

II.A.2. Reduce /eliminate entrainment of Colorado pikeminnow at diversion structures.

II.A.2.a. Identify and evaluate existing structures for entrainment of Colorado pikeminnow.

II.A.2.b. Develop and implement remedial measures, as necessary, to reduce or eliminate entrainment.

VI. Accomplishment of FY 2007 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings

The goal is to document if the Maybell Canal entrains Colorado pikeminnow or other native fishes and if so to return them to the river.

Objectives:

- a. Coordinate with Maybell Irrigation District (District) officers to determine the best method for access to the Maybell Canal within BLM land.
- b. Site survey of the Maybell Canal on BLM land to determine whether there are pools that could retain fish.
- c. Sample pools or flowing water on 1-2 days in the Maybell Canal on BLM land after the canal flows are normally reduced in late summer to determine if fish are present.

All objectives were accomplished in 2007.

Our results showed that fish from the river were entrained and apparently survived in the Maybell Ditch during the end of irrigation season. Fish captured in the ditch most likely originated in the river because it is unlikely that fish survive in the canal over winter when ditch flows are shut off. The composition of fish species collected in the ditch was similar to the composition of fish currently found in the river upstream of the canal. Smallmouth bass were the most abundant species in both the ditch and the river and the lack of native fish in the ditch reflects that few native fish currently live in the river due to the abundance of predatory smallmouth bass.

It was interesting that fish captured in the ditch were mostly smaller than 5 inches (125 mm) and did not include larger fish that we would expect to find immediately upstream in the river. The scarcity of fish larger than 5 inches (125 mm) in the area of the ditch sampled in October may be due to larger fish avoiding the inlet, having greater stamina to resist entrainment, or moving out of the sampled reach if entrained.

Although there was no evidence of pikeminnow entrainment by the Maybell Ditch, the data do not exonerate it as a potential problem. Determining whether pikeminnow are entrained at the Maybell Ditch will require sampling when pikeminnow are most likely moving past the ditch during their annual spawning migration in June and July. Three techniques were identified to sample the ditch earlier in the year: electrofishing as we did in October, setting a trap net across the ditch, or establishing a constant PIT tag monitoring station. We suggested the best technique at this time would be electrofishing the same section after reducing flows to safe and efficient levels for short periods in June and July.

Uncertainties not addressed by our sampling:

1. We do not know what fish species or sizes are entrained earlier in the year during higher flows when migrating pikeminnow are moving past the inlet structure, because we did not sample at that time.
2. We did not examine laterals to the main ditch and have no information on whether or not fish are pulled out of the main ditch channel into secondary ditches or fields.
3. We did not examine the entire ditch channel especially the lowest section where unused ditch flows return to the river, so we do not know if the ditch remains deep enough for fish to safely navigate the entire ditch and return to the river.

Conclusions:

1. Colorado pikeminnow were not found in the ditch in October when we sampled.
2. Determining if pikeminnow are entrained during migration will require sampling or

monitoring in June and July.

3. Other fish species were found in the ditch in October and they were entrained from the river.

4. The composition of fish species in the ditch in was similar to the composition of fish species in the river.

5. Fish larger than 125 mm (5 inches) were uncommon in the ditch possibly because they avoided entrainment.

VII. Recommendations

1. Sample the BLM section of the ditch for fish with electrofishing on several occasions in June and July during pikeminnow migration. Flows will need to be lowered for 8-hours during sampling. This will require cooperation and participation with the ditch association to insure no harm to ditch shareholders during irrigation season.

2. Determine whether there are ways to make the ditch more fish friendly so that if fish are entrained in the main ditch channel they can safely return to the river downstream.

A. Examine whether laterals have the potential to entrain large fish.

B. Examine the ditch section below the last lateral to determine if the depth and water volume is sufficient for fish to safely return to the river.

VIII. Project Status: The project objectives for 2007 were accomplished. Predicted future funding needs will depend upon the preferred work plan determined by the Recovery Program.

IX. FY 2007 Budget Status

A. Funds Provided: \$14,000

B. Funds Expended:\$14,000

C. Difference: 0

D. Percent of the FY 2007work completed, and projected costs to complete: 100%.

E. Recovery Program funds spent for publication charges: None

X. Status of Data Submission: A final report was submitted 12/29/07 for peer review.

XI. Signed: John Hawkins 11/29/07
Principal Investigator Date