

I. Project Title: Evaluation of effects of stage fluctuations induced by hydropower operations on overwinter survival of young Colorado pikeminnow.

II. Principal Investigators:

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III. Project Summary:

This project is designed to estimate over-winter survival and movement of age-0 Colorado pikeminnow in the Green River, using mark-recapture procedures, and relate these observed responses to stage fluctuations induced by hydropower operations at Flaming Gorge Dam. A cause-and-effect relationship is difficult to demonstrate in such a large-scale environmental study, because we were unable to apply the experimental treatment (fluctuating hydrograph) to multiple experimental treatments, thereby placing special demand on the argument for cause and effect. This approach will integrate correlative evidence from the field investigation, as well as experimental evidence from laboratory studies.

FY2001 was the second field season for this project. During the winter of 2000-2001, no young-of-year (YOY) Colorado pikeminnow were captured in the backwaters sampled during the monitoring phase of this project. Primarily non-native fishes (i.e. red shiners, fathead minnows, and sand shiners) were captured in these two backwaters. Originally, YOY pikeminnow were captured in these two backwaters as the population estimate was being conducted.

IV. Study Schedule: 2000-2002

V. Relationship to RIPRAP: General Recovery Program Action Plan:
V.B.2. Conduct appropriate studies to provide needed life history information.

VI. Accomplishment of FY01 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1. Call for a flow release pattern from Flaming Gorge Dam

b) Year 2001 - 5-day releases of daily fluctuating flows followed by 9-day stable flows to accomplish the following stage changes at Jensen, Utah:

0.10 m (23-27 October 2000)

0.20 m (13-17 November 2000)

Non-fluctuating flow (18 November-3 December 2000)

0.30 m (4-8 December 2000)

Because of national energy emergency during the winter of 2000-2001, the Bureau of Reclamation requested that we not call for these releases. Moreover, we saw no benefit in making these releases in FY 2002. The SOW was so modified 25 April 2001.

Task 2. Estimate population size in a 40-mile reach of nursery habitat in autumn and spring, using capture-recapture methods.

- a) Make three sample passes through each reach.
- b) Give a unique mark to fish captured in each 5-mile subreach using syringe-injected elastomer and combinations of color (four) and location (four).
- c) Sample backwaters, embayments, side channels and other seinable habitats and record locations, main channel and habitat temperatures, size, and depth, and number of marked and unmarked fish captured.
- d) Record locations of each recapture.
- e) Measure total length and weight of a sample of 100 age-0 Colorado pikeminnow.

In spring of 2001, we sampled a 40-mile reach from Bonanza Bridge to Ouray Bridge. We made two passes through the reach. During the first pass we captured, marked, and released 27 fish; during the second pass we captured 2 fish that had been marked during the first pass and 21 unmarked fish that were subsequently marked and released.

In autumn of 2001, again we sampled the 40-mile reach from Bonanza Bridge to Ouray Bridge. We made three passes through the reach. During the first pass we captured, marked, and released 52 fish. On the second pass, we captured 2 fish that had been marked on the first pass and 30 unmarked fish that were subsequently marked and released. On the third pass, we captured 16 unmarked fish. In addition, we captured two marked juvenile razorback suckers (~95mm TL), one in a backwater near the Ouray National Fish Hatchery and the other at river mile 288. The right pelvic fin of each had been fin-clipped, indicating that Ouray NFH personnel had previously stocked these fish prior to the initiation of our population study. The total number of YOY Colorado pikeminnow captured decreased during each pass.

Task 3. Monitor selected habitats (backwaters, embayments, eddies, main-channel shorelines) for changes in physical characteristics and fish use during flow fluctuations produced by Task 1.

- a) Select a backwater complex consisting of approximately eight backwaters with a range of characteristics (e.g. deep and permanent, or shallow and ephemeral) and containing age-0 Colorado pikeminnow.
- b) Map the complex in autumn, using GPS. Install temperature loggers and staff gages in selected habitats.
- c) During the period of daily fluctuating flows, conduct daily sampling of physical habitat characteristics (e.g. backwater area, depth, ice cover and thickness, and dissolved oxygen, and describe connectivity) and otherwise characterize habitat changes.
- d) Also on each visit, sample fish with seines, small fyke nets, and minnow traps to determine if young Colorado pikeminnow are present.

Three backwaters were selected for the winter monitoring along a 7-mile reach (RM 255-248) of the Green River within Ouray NWR. This reach was selected because it was accessible by road during the winter. YOY Colorado pikeminnow previously were captured in these two backwaters as the population estimate was conducted (Spring 2001, Task 2). By January 2001, the ice was thick enough on the backwaters that we could sample under the ice. The backwaters were mapped with GPS, and temperature loggers and staff gages were installed. Temperature loggers were retrieved and the data downloaded. We visited these backwaters approximately biweekly. We sampled with seines, minnow traps, clover traps, fyke nets. Approximately 2-3 seine hauls were performed underneath the ice. In addition, a light source was attached to the minnow traps and clover traps to determine if YOY Colorado pikeminnow would be attracted the light and enter the traps. No YOY pikeminnow were captured; only nonnative red shiners, sand shiners, and fathead minnows were captured in the seine hauls, clover traps, and minnow traps.

Task 4. Conduct laboratory studies to construct a bioenergetics model for YOY Colorado pikeminnow and compare model predictions with field observations. Assess model sensitivity to environmental factors and fish characteristics.

Construction of a bioenergetics model for age-0 Colorado pikeminnow in winter conditions is proceeding on schedule at the Larval Fish Laboratory, Colorado State University. Data have been collected to describe routine metabolic rates for various fish sizes (0.1-10 g) and maximum food consumption rates (0.1-1.0 g/day) as a function of water temperature (0-15 °C).

VII. Recommendations:

1. Monitor habitat characteristics and fish daily during the winter.

VIII. Project Status:

The project is on track and ongoing.

IX. FY 01 Budget Status:

A. Funds provided: \$97.8K

B. Funds expended: 97.8K

C. Difference: -0-

D. Percent of the FY 2001 work completed: 100

E. Recovery Program funds spent for publication charges: -0-

X. Status of Data Submission:

Data will be sent to database manager upon completion of the project in 2002. Data are currently being entered on Microsoft Excel spreadsheets.

XI. Signed: Chris Kitcheyan
Principle Investigator

10 December 2001
Date