

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 uses mark-recapture procedures to estimate over-winter survival, movement of age-0 Colorado pikeminnow, and relates the observed responses to stage fluctuations in the Green River induced by the 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 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 investigations, as well as experimental evidence from laboratory studies.

FY2002 was final field season for this project. During the winter of 2001–2002, no Young-of-year (YOY) Colorado pikeminnow were captured under the ice at Johnson Bottom or Greasewood Corral backwaters. Red shiners and fathead minnow were the dominant fish captured in these two backwaters. An Aqua-View® underwater viewing system connected to a video cassette recorder revealed fish utilizing these backwaters but YOY pikeminnow were not observed. In the spring after ice-out, we captured, marked, and released 74 YOY Colorado pikeminnow. On the second pass we captured 10 fish that were previously marked on the first pass and 206 unmarked fish that were subsequently marked and released. Ninety-two juvenile razorback suckers were also captured.

Construction and evaluation of a bioenergetics model for age-0 Colorado pikeminnow in winter conditions is proceeding. A working bioenergetics simulation model has been constructed and is currently being evaluated. All field work for the project has been completed. Completion and distribution of the final report should be 28 February 2003.

IV. Study Schedule:

A. Initial Year: 1999

B. Final Year: 2003

V. Relationship to RIPRAP:

General Recovery Program Support Action Plan:

V.B.2 Conduct appropriate studies to provide needed life history information.

Green River Action Plan: Mainstem

I.A. Green River above Duchesne River

I.A.1 Initially identify year-round flows needed for recovery while providing experimental flows.

I.A.1.b Winter/spring.

I.A.3 Deliver identified flows.

I.A.3.b Operate Flaming Gorge to supply winter and spring test flows for research.

VI. Accomplishment of FY 2002 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

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

Flow releases requested from Flaming Gorge Dam for Year 2002 were contingent on flow events; fish response and dispersal data from 2001. However, because of national energy emergency during winter of 2000–2001, obtaining these flows could not be fulfilled. In addition, flows in Year 2002 were much lower compared to the last two years (2000, 2001).

Task 2. Estimate population size of age-0 Colorado pikeminnow in a 40-mile reach of nursery habitat in autumn and spring, using capture-recapture methods.

In spring of 2002, we made two sampling passes from Bonanza Bridge to Ouray Bridge, 40-mile reach. On the first pass, we captured, marked, and released 74 YOY Colorado pikeminnow. On the second pass we captured 10 fish that had been marked during the first pass and 206 unmarked fish that were subsequently marked and released. One adult pikeminnow was captured at RM 281.8 and was a recapture.

In addition, 92 juvenile razorback suckers were also captured. The average size was 96.5 mm

TL. Eight-five percent of these fish were recaptures. The right pelvic fin on each fish had been fin-clipped, indicating Ouray National Fish Hatchery personnel had previously stocked these fish in October 2001. The juvenile suckers were captured between RM 281.6 and RM 250.8. Most razorback suckers were captured in three backwaters upstream of Ouray National Fish Hatchery . Twenty-nine were captured at RM 265. Seventeen were captured at RM 265.4. Sixteen were captured at RM 266.8.

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.

Four backwaters were selected for wintering monitoring along a 7-mile reach (RM 255–248) on the Green River within Ouray National Wildlife Refuge. This reach was selected because it was accessible by road during the winter and contained at least two backwaters that held YOY Colorado pikeminnow. Two backwaters were mapped using a global positioning system (GPS) unit, but temperature loggers and staff gages were placed in all four backwaters. In addition, one temperature logger was placed in the main channel and another above the shoreline.

By January 2002, the ice cover was thick enough on the backwaters to allow us to sample under the ice. Temperature loggers were retrieved and data downloaded biweekly. The ice thickness ranged from 44 to 75 cm. We sampled two backwaters with minnow traps, fyke nets, and minnow traps. A fluorescent light was also attached to minnow traps and fyke nets to determine if YOY Colorado pikeminnow would be attracted to the light and enter traps. Although no YOY pikeminnow were captured, other fish were caught. Red shiners and fathead minnow were the dominate fish captured (Table 1).

An Aqua-Vu® underwater viewing system was connected to a video cassette recorder (VCR) and placed at various locations within the backwater to monitor fish movement in and out. The VCR recorded information for 8 to 14 hours per day. Recording time was started at 16:00 and ended at 7:00. This setup was placed at the mouth of the backwater, middle of the backwater, and near the fyke net entrance. Preliminary results indicate no YOY pikeminnow were observed but other fish and aquatic organisms were seen such as red shiners, flannelmouth sucker, and water boatmen.

Table 1. Total number of fish captured in Johnson Bottom backwater and Greasewood Corral backwater, 2002 with minnow traps, fyke nets, and clover traps.

|                   | Green sunfish | Red shiner | Sand shiner | Fathead minnow | Black bullhead catfish | Channel catfish | Flannelmouth sucker |
|-------------------|---------------|------------|-------------|----------------|------------------------|-----------------|---------------------|
| Greasewood Corral | 6             | 508        | 21          | 40             | 1                      | 2               | 2                   |

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|                   | Green<br>sunfish | Red<br>shiner | Sand<br>shiner | Fathead<br>minnow | Black bullhead<br>catfish | Channel<br>catfish | Flannelmouth<br>sucker |
|-------------------|------------------|---------------|----------------|-------------------|---------------------------|--------------------|------------------------|
| Johnson<br>Bottom | 0                | 605           | 33             | 380               | 0                         | 0                  | 0                      |

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