

I. Project Title: **Middle Yampa smallmouth bass and channel catfish studies.**

II. Principal Investigator(s):

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III. Project Summary:

This study was an evaluation of whether smallmouth bass numbers could be controlled through active removal from three, 3-mile study sites in the Yampa River. We also studied movements of tagged smallmouth bass and channel catfish to determine 1) if study-site length was adequate for smallmouth bass and 2) whether channel catfish in the middle Yampa River move to downstream areas (specifically Yampa Canyon) where they pose a greater potential threat to endangered fishes. Although few fish were removed this year, mark-recapture data provided valuable information about the abundance and movements of both species. This project is scheduled to continue until 2006.

IV. Study Schedule: Initial Year: 2003
 Final Year: 2006

V. Relationship to RIPRAP:

Green River Action Plan: Yampa and Little Snake Rivers.

III. Reduce negative impacts of nonnative fishes and sportfish management activities.

III.A.1. Implement Yampa Basin Aquatic Wildlife Management Plan.

II.A.1.d. Remove and translocate smallmouth bass.

VI. Accomplishment of FY 2003 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

The original SOW approved by the Recovery Program was modified by the PI as requested by the Colorado Division of Wildlife and the Program Coordinator to reduce the area of removal to 3-mile study sites and to evaluate removal with a control and treatment design. The goal of the study was to evaluate whether or not removal of smallmouth bass will have a depletive effect on their population in the critical habitat reach of the Yampa River.

Objectives:

1. Obtain abundance estimates for smallmouth bass in two reaches (treatment and control) of the Yampa River.

Because a large percentage (45–55%) of tagged smallmouth bass moved out of each 3-mile study site during spring sampling, an abundance estimate could not be reasonably calculated for each site. We did calculate an abundance estimate for bass in the 12-mile study area.

2. Relocate smallmouth bass collected from 3-mile treatment sites in the Yampa River to Elkhead reservoir or other suitable sites identified by the Colorado Division of Wildlife.

Because of delays in obtaining a state collecting permit to conduct the study, and additional delays in locating suitable receiving waters, we did not remove smallmouth bass from the treatment reach until the last two of six sampling trips. We were very successful in moving a total of 294 smallmouth bass to Elkhead Reservoir, and mortality was very low (1%; 3 fish).

3. Identify movement of tagged smallmouth bass and channel catfish in the middle Yampa River.

We did not have State permission on our collecting permit to tag smallmouth bass and channel catfish until our second sampling trip; however, we did tag and recapture both species on four other occasions. We tagged a total of 1,407 smallmouth bass in the 12-mile study area and 364 channel catfish in 70 miles of the Yampa River. There were 185 recapture events in subsequent sampling trips of smallmouth bass and only 7 recapture events of channel catfish. We compiled summary tables of movements of the two species.

4. Coordinate sampling with Colorado Division of Wildlife Researchers to provide them with samples necessary for bioenergetics research of smallmouth bass.

We coordinated with Pat Martinez (CDOW, Grand Junction) and provided him with 58 smallmouth bass for use in bioenergetics studies.

5. Evaluate effectiveness of removal of smallmouth bass by comparing reference (control) sites with treatment sites.

Effectiveness of removal was not evaluated because movement data for smallmouth bass indicated that fish moved in and out of control and treatment sites and because delays in getting approval to remove fish precluded an adequate removal. Movement of smallmouth bass out of study sites indicates the need to increase the size of the study sites or consider alternatives to the experimental design.

All of the following tasks are on schedule or completed, although delays described above

reduced the occasions and number of smallmouth bass removed.

- Task 1: (Jan - Mar) Prepare and rig fish hauling boat and transport truck. Train technicians.
- Task 2: (Apr) Conduct 3-pass abundance estimates for smallmouth bass in control and treatment study sites in Little Yampa Canyon.
- Task 3: (Apr- Jul) Capture and tag smallmouth bass and channel catfish from the Yampa River on three, 12 to 15 day sampling trips. Remove and translocate smallmouth bass from treatment study sites.
- Task 4: (Aug- Sep) Data analysis and Annual Report. Final Report due in third year.
- Task 5: (Apr-Sep) Interaction and data sharing with CDOW researchers and preliminary sampling.

VII. Recommendations:

1. Establish early communication between and within affected agencies.
2. Provide a consistent message for agencies and affected publics.
3. Consider more intensive removal sampling in order to obtain a removal effect.
4. Consider using a before-after evaluation instead of a control-treatment comparison.

VIII. Project Status:

There were significant revisions in the SOW just prior to sampling. Results of this project and several other nonnative fish management projects will be reviewed in a workshop scheduled for December 2003, and 2004 work will be revised based on those finding and discussions.

IX. FY 2003 Budget Status

- A. Funds Provided: \$48,300
- B. Funds Expended: \$48,300
- C. Difference: \$ 0
- D. Percent of the FY 2003 work completed, and projected costs to complete: 95%
- E. Recovery Program funds spent for publication charges: \$0

X. Status of Data Submission (Where applicable):

Capture data for smallmouth bass and channel catfish will be submitted to the database manager with the final report.

- XI. Signed: John Hawkins 11/14/03
Principal Investigator Date

APPENDIX: Yampa River 2003 Smallmouth bass and Channel catfish sampling

Introduction

In the Yampa River, smallmouth bass were extremely rare until the early 1990's when they apparently washed into the river from the tributary Elkhead River during a rapid draw-down of Elkhead Reservoir for dam maintenance. Since then their numbers have increased rapidly and their distribution has expanded downstream to the Green River. Native fish previously abundant and widespread are now rare. The Recovery Program through the Colorado Division of Wildlife (CDOW) Yampa Basin Aquatic Management Plan directed that smallmouth bass and channel catfish were species targeted for removal in the Critical Habitat areas of the Yampa River. The emphasis in this study was to determine whether or not removal efforts would result in a measurable reduction of smallmouth bass. Sampling in the spring was practical for a variety of reasons. In previous years, during spring electrofishing of the Yampa River for Colorado pikeminnow abundance estimates, we observed an abundance of smallmouth bass; so, it seemed logical to coordinate smallmouth bass sampling with spring sampling for pikeminnow. Spring sampling was also practical because low water and air temperatures in the spring reduce transport stress and increase survival. To determine the effectiveness of removal of smallmouth bass it would benefit to know abundance of bass in the target area prior to removal. This estimate of the population size would provide a baseline to gauge numbers of fish removed. Effective evaluation will also require knowledge of bass movements and whether bass are moving in or out of the study site and potentially confounding results.

Channel catfish have been widespread and common throughout the middle and lower Yampa River probably since the turn of the century, but their life history is largely unknown. Their numbers are extremely high in Yampa Canyon in Dinosaur National Monument and catfish are typically smaller in Yampa Canyon compared to the middle Yampa River. The relationship of catfish inhabiting these areas is unknown. The goal of this study was to mark channel catfish with Floy tags during our river-wide sampling for Colorado pikeminnow and from the recapture of marked fish: 1) obtain an abundance estimate and 2) understand their movements or migrations. Movements of catfish from the middle Yampa River into Yampa Canyon would be detected by the U.S. Fish and Wildlife Service at their sampling stations in Deerlodge Park and in Yampa Canyon. In our study area, from Milk Creek to Dinosaur National Monument, there were no plans to remove channel catfish.

Methods

We established two potential study areas for smallmouth bass. The upper area was located in Little Yampa Canyon which is between Round Bottom and Morgan Gulch, and the lower area was between Sunbeam and Cross Mountain Canyon. In the lower study area there was one 3-mile long treatment area where smallmouth bass would be removed and an adjoining 3-mile long control site where bass would be captured, tagged and returned to the river. At the upper area we had two 3-mile treatment and two, 3-mile control sites. At the upper area, the two treatment sites were connected and the two control sites were connected. Treatment and control were adjacent. An assumption of the evaluation was that bass must remain within their original tagging site for a valid comparison of control and treatment sites. If large numbers of bass moved out of their original 3-mile site, the design gave us the ability to collapse the 3-mile study sites to form larger 6-mile study sites for comparison. To compare 6-mile treatment vs control sites also required little movement out of the 6-mile site.

We originally planned to obtain abundance estimates at the upper study site during one week of intensive sampling in April, prior to any removal, but permission to tag gamefish was delayed with state Collecting Permit approval and prevented this approach. Instead, we tagged and returned bass in both treatment and control reaches on later sampling occasions for the purpose of studying movement and calculating an abundance estimate.

Results

The lower study area was removed for the design to prevent confounding flow research in that area by CDOW researcher Rick Anderson, and because few bass ($n=7$) were captured in the 6-mile reach on the first sampling occasion. We sampled and marked smallmouth bass in the 12-mile study area in Little Yampa Canyon on five different occasions between April 23rd and July 3rd. We caught a total of 1,407 smallmouth bass and had 185 recapture events on subsequent sampling occasions. Recaptures of fish originally marked in each 3-mile (control or treatment) study site showed that during the sampling period 45-55% of the fish tagged in any 3-mile site eventually moved out of that study site. This invalidated comparisons between 3-mile treatment and control sites due to immigration and emigration. Unfortunately, when we examined movement data for all fish tagged in each 6-mile treatment or control about 30% of recaptured bass moved outside of their original 6-mile study reach, again invalidating comparison. To evaluate the level of movement out of the 12-mile study area, we combined all treatment and control reaches and found about 10% of recaptured fish moved out of the 12-mile upper study area.