

I. Project Title: **Yampa River nonnative fish evaluation: Northern pike removal**

II. Principal Investigator(s):

John Hawkins	<i>John.Hawkins@ColoState.EDU</i>
Larval Fish Laboratory	(970) 491-2777
Dept. Fishery and Wildlife Biology	(970) 491-5091 fax
1474 Campus Mail	
Colorado State University	
Ft Collins, CO 80523	
Assistants: Cameron Walford and Tasha Sorensen	

III. Project Summary:

This study was an evaluation of whether northern pike numbers can be controlled through active removal from two 8-mile study sites in the Yampa River. We also tagged northern pike river-wide to 1) determine if study-site length was adequate and 2) to obtain an abundance estimate for northern pike that reside in the river reach classified as Critical Habitat for Colorado pikeminnow. Although few fish were removed this year, mark-recapture data provided valuable information about the abundance and movements of northern pike. This project is scheduled to continue until 2006.

IV. Study Schedule:

Initial Year: 1999
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 (nonnative and sportfish management).

III.A.1. Implement Yampa Basin aquatic wildlife management plan.

III.A.1.b.(1) Remove and translocate northern pike and other sportfishes from the Yampa River.

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 two, 8-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 northern pike in the treatment areas would have a depletive effect on their population in that reach.

Objectives

1. Obtain an abundance estimate of northern pike within the critical habitat reach of the middle Yampa River.

We tagged 298 individual northern pike during five sampling trips and had 78 recapture events. From these data we estimated there were between 483–679 northern pike that reside in the 70 miles sampled between Milk Creek and Dinosaur National Monument. Due to delays in State collecting permit approval to tag nonnative gamefish, we missed an opportunity to tag an additional 168 northern pike that were observed on the first sampling trip. The addition of these tagged fish would have improved the estimate and its confidence interval.

2. Remove juvenile and adult northern pike from two, 8-mile treatment sites in critical habitat reaches of the Yampa River.

The upper study site was located in Little Yampa Canyon which is between Round Bottom and Morgan Gulch and the lower site was between Sunbeam and Cross Mountain Canyon. The lower study area was removed as a northern pike removal area to prevent confounding flow research being conducting by Rick Anderson (CDOW researcher) in that area and to adapt to last minute changes by focusing removal at the upper site.

3. Relocate northern pike to isolated ponds or reservoirs in or near to the Yampa Valley that conform to Nonnative Fish Stocking Procedures and are accessible to anglers.

Because of delays in locating suitable receiving waters we did not remove northern pike from the treatment reach until the last two of five sampling trips. We moved 38 pike to the Yampa State Wildlife Area ponds and had no mortalities.

4. Determine effectiveness of removal in terms of number and size of northern pike removed by comparing control and treatment areas.

Based on estimated density of northern pike in the treatment reach and because only a few northern pike were removed, it is likely that too few pike were removed to have a meaningful treatment effect.

Of extreme significance was the capture of a 756 mm total length (TL) northern pike that had eaten a Colorado pikeminnow that was approximately 505 mm TL. This pike was captured about 1/2 mile upstream of Dinosaur National Monument. Since this pikeminnow was about 70% of the length of the pike we are extremely concerned that adult Colorado pikeminnow of average size (500–550 mm TL) are vulnerable to predation by large pike. Young Colorado pikeminnow (450–500-mm TL) that recruit into the Yampa River are vulnerable to predation by pike as small as 600 mm TL. Pike concentrations are greatest just below canyons (Juniper and Cross Mountain) and young Colorado pikeminnow and returning spawners resting in pools and eddies below these canyons will run a predator-rich gauntlet as they ascend the Yampa River.

VII. Recommendations:

1. Establish early communication between and within affected agencies.
2. Provide a consistent message for agencies and the affected public.
3. Consider more intensive removal sampling in order to obtain a removal affect.
4. Focus removal studies in concentration areas that include Little Yampa Canyon and downstream of Juniper Canyon and Cross Mountain canyon.

VIII. Project Status:

There were significant changes in the SOW just prior to sampling. 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 findings and discussions.

IX. FY 2003 Budget Status

- A. Funds Provided: \$73,000
- B. Funds Expended: \$73,000
- C. Difference: \$ 0
- D. Percent of the FY 2003 work completed, and projected costs to complete: 100%
- E. Recovery Program funds spent for publication charges: \$0

X. Status of Data Submission (Where applicable): Data will be submitted with the final report.

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

APPENDIX: Yampa River 2003 Northern pike sampling

Introduction

In the Yampa River, northern pike were rare until the late 1970's when they apparently entered the river from Elkhead Reservoir. Since then their numbers have increased and their distribution has expanded downstream to the Green River. Their numbers also appeared to drastically increase in the early 1990's when they apparently washed into the river during a rapid draw-down of Elkhead Reservoir for dam maintenance. In recent sampling for Colorado pikeminnow, we have noticed an increase in the number of failed predation attempts on Colorado pikeminnow, as evidenced by bite marks and severe lacerations and scars. Pike and pikeminnow occupy the same habitats, and in locations where pikeminnow were once abundant they have been displaced or eaten by northern pike. In the spring, some backwater habitats that previously held several Colorado pikeminnow now hold exclusively pike, often in large numbers. The Recovery Program, through the Yampa Basin Aquatic Management Plan developed by the Colorado Division of Wildlife, has directed that northern pike are species targeted for removal in the Critical Habitat areas of the Yampa River. In previous years, during spring electrofishing of the Yampa River for Colorado pikeminnow abundance estimates, we have removed northern pike and the final report for this work is in draft. The emphasis in this study was to determine whether or not removal efforts in small-localized study sites would result in a measurable reduction of northern pike. To determine the effectiveness of removal on northern pike, it would benefit to know the abundance of pike prior to removal. This estimate of the population size would provide a standard to gage numbers of fish removed. Effective evaluation within a localized site also requires knowledge of pike movements and whether they are moving in or out of the study site thus confounding results.

Methods

We established two potential study areas for northern pike. 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 8-mile treatment area where northern pike would be removed and an adjoining 8-mile control site where pike would be captured and tagged and returned to the river. An assumption of this control/treatment design was that pike remain within each study site. Large numbers of pike moving in or out of a site would confound results. At the upper area we had another combination of 8-mile treatment and control sites totaling 16 miles.

We also originally planned to obtain abundance estimates for the entire 70 miles of river-wide sampling conducted concurrently with Colorado pikeminnow abundance sampling. We sampled the entire 70 miles on four occasions; but delays in collecting permit approval to tag gamefish prevented tagging pike on the first sampling occasion. We observed 168 northern pike on the that first occasion. Tagging these fish would have improved the estimate and its confidence interval.

Results

The lower study area was dropped as a northern pike removal area to prevent confounding flow research being conducting by Rick Anderson (CDOW researcher) in that area.

We sampled and marked pike in the 70 miles of river-wide sampling, including the two upper, 8-mile treatment and control sites. Sampling occurred on four occasions between April 23rd and July 3rd. We caught a total of 298 northern pike and had 78 recapture events on subsequent sampling occasions. We are still evaluating data on movements of pike in the Control and Treatment reaches. For the entire 70 miles of river sampled between Milk Creek and Dinosaur National Monument, we calculated a population size of 565 (likelihood interval 483–679) northern pike based on Model M(0) from program MARK. Capture probability was about 21%. This means that we capture about 21% of the northern pike on any given occasion.