

I. Project Title: **Yampa River northern pike and smallmouth bass removal and translocation**

II. Principal Investigator(s):

John Hawkins *John.Hawkins@ColoState.EDU*
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 and smallmouth bass numbers can be controlled through active removal from a large section of critical habitat in the Yampa River. We sampled the river using two electrofishing boats sampling each shoreline on six different sampling occasions. To evaluate removal success, we calculated the size of the population using a mark-recapture method. All pike were tagged and released on the first sample occasion and the recaptures on the second sample occasion were used to estimate the population size. Northern pike were removed on the second through sixth sample occasions and transported to either Rio Blanco Reservoir or Loudy Simpson Ponds. Only a portion of the study reach was sampled on the last (6th) sample occasion due to low water conditions.

Smallmouth bass were marked and released on the first sample occasion in three study areas. Two of these study sites were in the Juniper reach. One was a 12- mile control reach where smallmouth bass were always marked and released. The other 12-mile study area in Juniper was a treatment area and after the first marking occasion, all smallmouth bass were removed on 9 additional occasions from the treatment site. A third study area was in Lily Park. It was 5 miles long, and after the first marking occasion, smallmouth bass were removed on five additional occasions. Objectives listed below were met and 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.

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

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

- River.
III.A.1.d. Remove and translocate smallmouth bass.

VI. Accomplishment of FY 2004 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Northern pike

The goal is to remove as many pike as possible from critical habitat and estimate the fraction of the population removed.

Objectives

1. Obtain an estimate of the number of northern pike that reside in the 95-mile study reach in the Yampa River using a mark-recapture abundance estimator.
2. Remove a large portion of the estimated population of northern pike from the study reach during five removal passes.
3. Calculate the proportion of northern pike removed based on initial population size.

Smallmouth bass

The goal is to remove as many smallmouth bass as possible from a 12-mile treatment reach and a 5-mile concentration reach and estimate the fraction of the population removed from each reach.

Objectives:

1. Obtain an estimate of the number of smallmouth bass in the control and treatment reaches in Little Yampa Canyon and the 5-mile reach in Lily Park using a mark-recapture abundance estimator.
2. Remove a large portion of the estimated population of smallmouth bass from the 12-mile treatment reach in Little Yampa Canyon and the 5-mile concentration area in Lily Park.
3. Calculate the proportion of smallmouth bass removed from each study area based on initial population size and compare capture rates between control and treatment reaches.
4. Evaluate movement of tagged smallmouth bass from the control reach to ensure that immigration or emigration does not confound comparisons between control and treatment site.

See Appendix for data tables and figures. We were able to achieve our stated objectives to obtain abundance estimates for each species and study group. We are still analyzing movement data for both northern pike and smallmouth bass. Marked fish of both species in 2003 will provide additional data on movement within this study reach and movement to other reaches both up and downstream of this study. Abundance

estimates for smallmouth bass remain to be calculated but will be available by the nonnative workshop on Dec 8th, 2004.

VII. Recommendations:

1. Continue with same study design in 2005.
2. Establish early communication between and within affected agencies.
3. Develop and provide a consistent message for agencies and the affected public.

VIII. Project Status:

The project accomplished an intensive removal program that almost doubled sampling occasions compared to 2003. Low water conditions prevented a final sample in July. The Colorado Division of Wildlife assisted with portions of northern pike removal in Maybell and Lily Park reaches, doing three samples in those two reaches and at least one in Juniper. They also transported fish they captured to receiving waters. This project and several other nonnative fish management projects will be reviewed in a workshop scheduled for Dec 8, 2004 and work will be revised based on those findings and discussions.

IX. FY 2004 Budget Status

- A. Funds Provided: \$241,000
- B. Funds Expended: \$193,000
- C. Difference: \$48,000
- D. Percent of the FY 2004 work completed, and projected costs to complete: 80% completed; cost to complete \$48,000
- E. Recovery Program funds spent for publication charges: \$0

X. Status of Data Submission (Where applicable): Data will be submitted with the final report. Colorado pikeminnow tag data will be submitted to data base manager by the end of calendar year.

XI. Signed: John Hawkins 11/09/04
Principal Investigator Date
Submitted electronically.

Version control:
submitted 11/09/04 by JAH

APPENDIX: Data tables and figures

Table 1— Number and biomass (in parentheses) of targeted species captured in the middle Yampa River, between South Beach boat ramp (RM 134.5) and Little Snake River (RM 51), 2004. NA means data not available at time of reporting, but will be provided.

	Northern Pike	Smallmouth Bass	Colorado Pikeminnow
Number of individual fish handled	819 (950 kg)	3,514 (NA)	27 ^a (47 kg)
Returned to river with mark	155 ^b (198 kg)	NA	25 (47 kg)
Translocated	633 (707 kg)	NA	0
Died	31 (45 kg)	91 ^c	2 (1 kg)

a Of 27 individual Colorado pikeminnow captured 29% (n=8) had evidence of injuries from pike attacks. Six Colorado pikeminnow were captured more than once.

b Northern pike were stocked into Rio Blanco Reservoir and Loudy Simpson Park Ponds. A small number were provided to CDOW Aquatic researcher Pat Martinez for diet and bioenergetics analysis. All pike \geq 200 mm TL were tagged with Floy tags and 103 pike < 200 mm TL were not tagged, even though they were all translocated.

c Sixty-two smallmouth bass died during holding and another 29 bass were provided to a Colorado Division of Wildlife researcher for diet and isotopic analysis.

Table 2— Total miles sampled for northern pike in the middle Yampa River, 2004.

Reach	Sample occasion						Total
	1	2	3	4	5	6	
Juniper Springs	43	54	55	60	48	36	296
Maybell	19	19	18	17	18	0	91
<u>Lily Park</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>3</u>	<u>23</u>
Total	66	77	77	81	70	39	410

Table 3— Boat electrofishing effort (hrs) for northern pike in the middle Yampa River, 2004.

Reach	Sample occasion						Total
	1	2	3	4	5	6	
Juniper	42	59	45	61	48	40	295
Maybell	11	11	13	15	13	0	64
Lily Park	3	5	4	5	7	4	28
Total	56	75	63	81	69	44	388

Table 4— Number of northern pike captured in the middle Yampa River, 2004.

	Sample occasion						Total
	1	2	3	4	5	6	
Juniper	99	159	57	51	57	28	451
Maybell	40	54	33	18	30	--	175
Lily Park	12	7	8	6	21	1	55
Total	151	220	98	75	108	29	681

Table 5— Biomass of northern pike captured in the middle Yampa River, 2004.

	Sample occasion						Total
	1	2	3	4	5	6	
Juniper	114	172	84	57	66	27	521
Maybell	80	106	45	28	48	0	306
Lily Park	21	15	15	16	52	3	123
Total	215	293	144	102	166	30	950

Table 6— Abundance estimate (N-hat) for northern pike ≥ 200 mm TL in the middle Yampa River, 2004.

	N-hat	standard error	95% Confidence Interval	
Lincoln-Petersen ^a (2-pass mark-recapture)	1,513	207	1,107–1,918	
4-pass removal ^b	783	65	684–961	

a Estimate based on 159 pike marked on first sample occasion and 226 pike recaptured on second sample occasion, including 36 recaptures.

b Estimate based on removal of 227, 103, 79, and 117 pike on sample occasions 2–5.

Table 7— Number of smallmouth bass handled in the middle Yampa River, 2004. NA means data not available at time of reporting, but will be provided.

	Juniper	Lily Park	Maybell ^a
Number of Individual Fish handled	2,167 ^b	1,346	4
Returned to river with mark	NA	NA	4
Translocated	NA	NA	0
Died	57 (+24) ^c	38	

a Captures of smallmouth bass in Maybell represent recaptured fish.

b In Juniper, 574 individual bass were handled in the control study site and 1,600 individual smallmouth bass were handled in the treatment study site.

c Twenty-four smallmouth bass provided to Colorado Division of Wildlife researcher for diet and isotopic analysis.