

I. Project Title: Chemically Fingerprinting Nonnative Fishes in Reservoirs

II. Principal Investigator(s):

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III. Project Summary:

This project addresses movement of nonnative fishes (including northern pike, smallmouth bass, largemouth bass, black crappie, and walleye) into river reaches of critical habitat from reservoirs. These species are believed to pose a significant predatory threat to endangered and other native fishes (Tyus and Saunders 1996; Martinez et al. 2001; Johnson et al. 2005). However, it is uncertain to what extent the presence of nonnative species in critical habitat is the result of escapement or illicit transfers from reservoirs. This study will provide the means to assess the proportion of nonnative fishes in these rivers that originate from reservoirs and thereby guide management efforts to reduce this influx of nonnative fishes. Funding for the study arrived late in the fiscal year and thus, processing of available samples was delayed. However, we are still on track to complete the study in FY09.

IV. Study Schedule: FY06-FY09

V. Relationship to RIPRAP:

General Recovery Program Support Action Plan:

- III. Reduce negative impacts of nonnative fishes and sport fish management activities.
- III.A.2. Identify and implement viable control measures.

Colorado River Action Plan: Main stem

- III. Reduce negative impacts of nonnative fishes and sport fish management activities.
- III.A.4.a. Evaluate sources of nonnative fishes and make recommendations.

VI. Accomplishment of FY 2006 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Tasks proposed for FY06 were accomplished to the degree possible, given the delay in funding for the study.

Task 1. Field Collections

Brett Johnson prepared the Animal Care and Use Committee protocol for the project, and the protocol was approved by the CSU Office of Regulatory Compliance (protocol no. 06-220A-01).

Pat Martinez and his field technicians led field collection efforts within Colorado. Preliminary reservoir sampling was conducted during June-September 2006. Pat Martinez also coordinated the sampling program with the respective states and crews operating in the target reservoirs and river reaches. A total of 1,129 fish were collected by the end of September, 2006 (Table 1). The greatest numbers of species and samples were obtained from the Colorado and Yampa rivers. The specimens collected to date will provide a base from which to subsample to achieve acceptable limits of statistical certainty in classification of fish origins, and provide insights into additional sampling required in FY07. We also received 370 samples of six other nonnative fish species (Table 2) that may also be subsampled for analysis should information on their provenance become a management concern.

Table 1. Number of nonnative fish of primary species collected for microchemical analysis of otoliths through September, 2006. Species codes are: BCR = black crappie, LMB = largemouth bass, NPK = northern pike, SMB = smallmouth bass, WAE = walleye.

Water body	BCR	LMB	NPK	SMB	WAE	Sum
Colorado River	1	259	0	205	1	466
Rifle Gap Reservoir	0	0	24	22	6	52
Rifle Gap Spillway	0	0	0	0	3	3
McPhee Reservoir	0	0	0	11	0	11
Duchesne River	0	0	0	16	0	16
Green River	6	0	3	54	11	74
Gunnison River	0	3	0	48	0	51
Yampa River	102	0	141	169	1	413
Elkhead Reservoir	16	11	0	16	0	43
Sum	125	273	168	541	22	1,129

Table 2. Number of “incidental” nonnative fishes collected for microchemical analysis of otoliths through September, 2006. These specimens may be analyzed later. Species codes are: SNF = sunfish, BBH = black bullhead, GSD = gizzard shad, BGL = bluegill, CCF = channel catfish, YPE = yellow perch.

Water body	SNF	BBH	GSD	BGL	CCF	YPE	Sum
Colorado River	0	0	0	21	0	0	21
Rifle Gap Reservoir	0	0	0	0	0	0	0
Rifle Gap Spillway	0	0	0	0	0	5	5
McPhee Reservoir	0	0	0	0	0	0	0
Duchesne River	0	0	0	0	0	0	0
Green River	17	0	0	1	20	0	38
Gunnison River	214	7	4	3	0	0	228
Yampa River	0	0	0	78	0	0	78
Elkhead Reservoir	0	0	0	0	0	0	0
Sum	231	7	4	103	20	5	370

Task 2. Microchemical Analysis of Otoliths

Brett Johnson conducted a nation-wide search and recruited an outstanding graduate research associate for the project. The student, Phillip Brinkley, worked in Dr. Keith Gido’s laboratory at Kansas State University. Phil will be primarily responsible for performing analyses on otolith samples and interpreting the data. He will also be assisting with future field collections, beginning in spring 2007.

VII. Recommendations:

Continue the project as outlined in the Scope of Work. Pat Martinez and field technicians should lead field collection efforts in cooperation with the graduate research associate. Full scale reservoir and river sampling should be conducted during May through August 2007, with emphasis on waters sampled with less intensity in FY06. Pat Martinez should continue to coordinate sample acquisition with the respective states and crews operating in the target reservoirs and river reaches.

Task 2. Microchemical Analysis of Otoliths.

The graduate student should begin work in early January, 2007. The graduate student should spend several days working in Pat Martinez’s lab to become familiar with otolith extraction, mounting, and sectioning techniques, before the spring 2007 semester begins.

VIII. Project Status:

This project will continue through FY 2007 and beyond and it should be considered on track and ongoing. There have been no significant changes in project direction, probability of success, or alignment with RIPRAP objectives and deadlines.

IX. FY 2006 Budget Status

- A. Funds Provided: \$20,557.00
- B. Funds Expended: \$ 8,386.65
- C. Difference: \$12,170.35

Funds were not fully expended because we received our first increment of funding late in FY06, and because we could not hire a graduate research associate until funding for FY07 was confirmed. These unused funds will be expended during FY07.

- D. Percent of the FY 2006 work completed, and projected costs to complete: 40% completed, \$12,170.35 will be required to accomplish all objectives of the FY06 work plan.
- E. Recovery Program funds spent for publication charges: \$0

X. Status of Data Submission (Where applicable): N/A

- XI. Signed:**
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| <u>Patrick J. Martinez</u> | <u>11/09/06</u> |
| Principal Investigator | Date |
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| <u>Brett M. Johnson</u> | <u>11/09/06</u> |
| Principal Investigator | Date |

XII. References:

Johnson, B. M., G. Whitley, M. Sullivan, and D. Gibson-Reinemer. 2005. Stable isotopes and statistics. Progress report, Colorado Division of Wildlife, Grand Junction, Colorado, 22 pages.

Martinez, P. J., B. M. Johnson, and J. D. Hobgood. 2001. Stable isotope signatures of native and nonnative fishes in Upper Colorado River backwaters and ponds. The Southwestern Naturalist 46: 311-322.

Tyus, H. M., and J. F. Saunders, III. 1996. Nonnative fishes in natural ecosystems and a strategic plan for control of nonnatives in the Upper Colorado River basin. Recovery Implementation Program DRAFT REPORT. Cooperative Agreement No. 14-48-006-95-923. U.S. Fish and Wildlife Service, Denver, Colorado.