

COLORADO RIVER RECOVERY PROGRAM
FY 2013 ANNUAL PROJECT REPORT

RECOVERY PROGRAM
PROJECT NUMBER: 161b

I. Project Title: Population abundance and dynamics of introduced northern pike, Yampa River, Colorado

II. Bureau of Reclamation Agreement Number(s): R11AP40060

Project/Grant Period: Start date (Mo/Day/Yr): 8 August 2011
End date: (Mo/Day/Yr): 30 Sept. 2016
Reporting period end date: 30 Sept. 2013
Is this the final report? Yes _____ No X

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IV. Abstract: Research to better understand abundance and population dynamics of northern pike in the Upper Colorado River Basin is needed for managers to proceed with effective control strategies. Our basic approach will be to conduct comprehensive abundance estimates at appropriate geographic scales, which when coupled with movement data, should allow for a more comprehensive understanding of abundance dynamics of pike populations in the Yampa River. This understanding will allow managers to assess the role of the buffer removal area in the vicinity of Hayden, Colorado, on pike populations in downstream critical habitat and will also aid assessment of immigration from sources upstream of there, and explore more effective means to achieve recovery of native fishes. Influence of important environmental factors on northern pike abundance dynamics, such as stream flow levels and subsequent reproductive effort, will allow simultaneous assessment of trajectories of pike populations under different levels of removal effort. This information should increase the ability of managers to understand effectiveness of removal programs and formulate a comprehensive control strategy that will effectively reduce populations of northern pike and enhance prospects for recovery of native fish populations.

V. Study Schedule: Initial Year 2011
Final year 2014

VI. Relationship to RIPRAP: Green River Action Plan: Yampa and Little Snake Rivers
III.A.1. Implement Yampa Basin aquatic wildlife management plan to develop nonnative fish control programs in reaches of the Yampa River occupied by endangered fishes. Each control activity will be evaluated for

effectiveness and then continued as needed.

Green River Action Plan: Mainstem

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

III.A.2.c Evaluate the effectiveness (e.g., nonnative and native fish response) and develop and implement an integrated, viable active control program.

VII. Accomplishment of FY 2013 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings: Data acquisition, clean-up, and compilation were completed. The final set of records were organized into 7 years of sampling (2004-2010), 4 sampling passes per year (1 marking, 3 removal), and 3 capture regions (Hayden to Craig, RM 171.0–134.2; South Beach-Little Yampa Canyon-Juniper, RM 134.2–91.0; Maybell-Sunbeam, RM 88.7–60.6). Data from Lily Park was too sparse to be included. Lily Park records and data from up- and downstream reaches (upstream of Hayden, reservoirs, Yampa Canyon) will be incorporated into a separate movement description/discussion.

The input dataset consisted of 8,929 records of unique northern pike handled in the above regions and years (5,266 in Hayden to Craig, 2,783 in South Beach-Little Yampa Canyon-Juniper, and 880 in Maybell-Sunbeam). Of the 8,929 unique northern pike, 7,877 were encountered once (tagged and never seen again), 1,015 were encountered twice, and 37 were encountered three times. Most were removed upon subsequent encounter, unless they were recaptured during another marking pass. Mean length of northern pike in the dataset was 465 mm (484 mm in Hayden to Craig, 411 mm in South Beach-Little Yampa Canyon-Juniper, and 519 mm in Maybell-Sunbeam).

Robust design was employed in Program MARK, which makes use of both closed population modeling to estimate capture/recapture probabilities (p, c) and open population modeling to estimate survival (S) and temporary emigration (γ). The Huggins' closed captures data type was chosen in order to include an individual covariate (northern pike length). Estimates of population abundance, N , are derived rather than estimated directly. There were too few between-year movements among regions to employ a multi-state (transition) analysis, but movements among regions will be described and discussed separately. We developed models that allowed all parameters to vary by region, year, and/or pass (both additively and as interactions), as well as simpler designs. We investigated several scenarios of temporary emigration (γ): Markovian, random, and no movement. We allowed recapture probabilities (c) to equal and differ from initial capture probabilities (p).

We are currently compiling results of parameter estimation and will present our findings at the upcoming non-native fish workshop, December 2013. We plan to continue investigations into northern pike movement throughout the Yampa River basin and discuss those findings, as well.

VIII. Recommendations: Complete report and implement recommendations.

IX. Project Status: On track and ongoing.

X. FY 2013 Budget Status

- A. Funds Provided: \$130,000 (total for three years)
- B. Funds Expended: \$92,562
- C. Difference: \$37,438
- D. Percent of the FY 2013 work completed, and projected costs to complete: 65% expended.
- E. Recovery Program funds spent for publication charges: 0

XI. Status of Data Submission (Where applicable): NA

XII. Signed: Koreen Zelasko and Kevin R. Bestgen 12 November 2013
Principal Investigator Date