

COLORADO RIVER RECOVERY PROGRAM  
FY 2015 ANNUAL PROJECT REPORT

RECOVERY PROGRAM  
PROJECT NUMBER: 22f

I. Project Title: INTERAGENCY STANDARDIZED MONITORING PROGRAM (ISMP)  
ASSESSMENT OF ENDANGERED FISH REPRODUCTION IN RELATION TO FLAMING  
GORGE OPERATIONS IN THE MIDDLE GREEN AND LOWER YAMPA RIVERS-Yampa  
and middle Green River assessment of Colorado pikeminnow and razorback sucker larvae

II. Bureau of Reclamation Agreement Number(s): R14AP00001

Project/Grant Period: Start date (Mo/Day/Yr): 1 Oct. 2014  
End date: (Mo/Day/Yr): 30 Sept. 2018  
Reporting period end date: 30 Sept. 2015  
Is this the final report? Yes      No   X  

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IV. Abstract: The goal of Flaming Gorge flow and temperature recommendations (Muth et al., 2000) that were implemented in 2006 was to improve the status and prospects for recovery of endangered fish populations in the Green River. A major emphasis of those recommendations was to enhance the reproductive and recruitment success of endangered fishes in the middle Green River, in particular razorback sucker and Colorado pikeminnow. Larvae of razorback sucker *Xyrauchen texanus* and Colorado pikeminnow *Ptychocheilus lucius* were captured in the Green River basin in spring and summer 2015. Razorback sucker sampling was conducted with light traps primarily in the Green River between Jensen and Ouray and Colorado pikeminnow sampling was with drift nets in the lower Yampa River. Sampling was designed to provide a measure of timing of reproduction and a measure of annual reproductive success of each species. Diel variation in abundance of Colorado pikeminnow larvae in the drift was also assessed. This data will be used to assess effects of flow and temperature regimes on reproduction by razorback sucker and Colorado pikeminnow and to correlate abundance of larvae to abundance of juveniles in autumn.

V. Study Schedule: Ongoing in a new agreement began in 2014, similar sampling has been conducted since 1990, in most years. Anticipate continued annual sampling.

VI. Relationship to RIPRAP: Relationship to specific RIPRAP items:

Green River Action Plan: Mainstem

- I. Provide and protect instream flows--habitat management.
- I.A. Green River above Duchesne River.
- I.A.1. Initially identify year-round flows needed for recovery while providing experimental flows.
- I.A.2.a. Summer/fall flow recommendations.
- I.A.3. Deliver identified flows.
- I.A.3.a. Operate Flaming Gorge pursuant to the Biological Opinion to provide summer and fall flows.
- I.A.3.d. Operate Flaming Gorge Dam to provide winter and spring flows and revised summer/fall flows, if necessary.
- I.B. Green River below the Duchesne River.
- I.B.1. Initially identify year-round flows needed for recovery while providing experimental flows.
- I.B.2. State acceptance of initial flow recommendations.
- I.B.2.a. Review scientific basis.
- II. Restore habitat--habitat development and maintenance.
- II.A. Restore and manage flooded bottomland habitat.
- II.A.1. Conduct site restoration.
- II.A.1.a. Old Charlie Wash.
- II.A.1.a.(3) Monitor and evaluate success.
- II.C. Enhance water temperatures to benefit endangered fishes.
- II.C.1. Identify options to release warmer water from Flaming Gorge Reservoir to restore native fish habitat in the Green River.
- V. Monitor populations and habitat and conduct research to support recovery actions--research, monitoring, and data management.
- V.A. Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions.

Green River Action Plan: Yampa and Little Snake Rivers

- I. Provide and protect instream flows--habitat management.
- I.D. Yampa River below Little Snake River.
- I.D.1. Initially identify year-round flows needed for recovery.
- I.D.2. Evaluate need for instream flow water rights.
- I.D.2.a. Review scientific basis.

Green River Action Plan: Yampa and Little Snake Rivers

- V.A.1. Conduct standardized monitoring.
- V.B.2. Conduct appropriate studies to provide needed life history information.

VII. Accomplishment of FY 2015 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings: Project Objectives

- 1). Determine timing and duration of spawning by razorback suckers and presence and abundance of larvae in the system as measured by capture of larvae in light traps. Sampling was extended to the White River this year. Additional sampling was also conducted in flood plain wetlands in early summer and autumn under this project.
- 2). Determine timing and duration of spawning by Colorado pikeminnow and presence and abundance of larvae in the system as measured by capture of larvae downstream of spawning areas in the lower Yampa River.

**Task Description (FY 2015)**

- I). Collect light trap samples for razorback sucker. The CRFP office in Vernal was be responsible for this task.
- II). Collect drift net samples for Colorado pikeminnow. The Larval Fish Laboratory was responsible for this task.
- III). Identify light trap and drift net samples. Preliminary identifications will be conducted by the responsible sampling entity, with assistance from the LFL, as samples are collected to provide real-time data. Final specimen identification and curation will be conducted by the LFL.
- IV). Summarize specimen data collection in an annual report.

Accomplishments by Task.

- I). Collect light trap samples for razorback suckers. Light trap samples were collected during May and June, 2015 by the Vernal CRFP. Additional sampling near Green River flood plain wetlands was also conducted in summer 2015.
- II). Collect drift net samples for Colorado pikeminnow. Drift net samples were collected during June to August 2015 by the Larval Fish Laboratory.
- III). Identify light trap and drift net samples.

**Middle Green River light trap samples, 2015.** The 2015 samples were delivered to the Larval Fish Laboratory and are nearly finished being identified. The duration of the sampling season was 5 May until 12 June, 2015. First razorback sucker larvae of the season were captured on 7 May at Cliff Creek, the earliest date ever recorded since this sampling program began in 1992. That date of first appearance was in contrast to 2014, where first larvae appearance was 28 May, a relatively average date of first appearance, and to 2011 when the first larvae were detected late on 24 June. Flows in 2011 were extremely high and cold, which delayed reproduction by razorback sucker; flows were moderately high in 2014, and in 2015, were low in early May and warm, but frequent and heavy rains increased river levels through May and into June. Dates of first appearance of razorback sucker larvae have been successfully used to make decisions regarding

Flaming Gorge Dam water management in spring for several years.

We also prepared samples of razorback sucker captured for selenium analysis in 2014 and are in discussion with Recovery Program staff (McAbee) for additional specimens in 2015.

**Middle Green River light trap samples, 2014.** Samples sent to the Larval Fish Laboratory were identified and measured. Razorback suckers were captured from 28 May-19 June. A total of 365 razorback sucker larvae were captured in 2014, a dramatic decline from the 2013 total of 7,376 razorback larvae; 2014 larvae were 9-17 mm TL (Figure 1). The large decline was likely due to higher water levels in 2014 and subsequent lower density of larvae, although a decline of that magnitude is difficult to explain just based on that single variable.

Seasonal distribution of razorback sucker larvae captured in 2014 in light trap samples indicated an abrupt rise in abundance after first capture on 28 May to a peak on 6 and 10 June (Figure 2). The relatively large specimens captured on the last few sampling days (10.8-16 mm TL) indicated that spawning may have finished some time before the last sampling date.

**Lower Yampa River drift net sampling, 2015.** Samples were collected in the Yampa River about 0.2 to 0.8 km upstream from the Green River (n = 246 total samples collected in 2015), the same site that samples were collected from in 1990 to 1996 (Bestgen et al. 1998) and in 1998 to 2014. Sampling commenced on 17 June and extended through 11 August. The first Colorado pikeminnow larva was collected on 27 June, a relatively average date for first capture of larvae and not unexpected given the warm (but high levels) water temperatures early in summer.

**Lower Yampa River drift net sampling, 2014.** Samples were collected in the lower Yampa River about 0.2 to 0.8 km upstream from the Green River (n = 213 total samples, 2014), the same site that samples were collected from in 1990 to 1996 (Bestgen et al. 1998) and in 1998 to 2013. Sampling began on 26 June and ended on 18 August. A total of 2,515 Colorado pikeminnow larvae was captured in 2014 (Figure 3). This was the second largest number of Colorado pikeminnow larvae captured since sampling began in 1990, with the largest number captured the prior year, 2013.

First Colorado pikeminnow larvae were detected on 11 July, a later than average time of first capture over the period of sampling (Figure 4, Bestgen and Hill 2014). The last Colorado pikeminnow captured was on 9 August (9 mm TL), and represents a typical to slightly later last capture date for this species.

Most sampling data collected in this program (1990-2012, none in 1997) was recently incorporated into a report entitled "Reproduction, abundance, and recruitment dynamics of young Colorado pikeminnow in the Green River Basin, Utah and Colorado, 1979–2012. That report has been reviewed by the Biology Committee of the Upper Colorado River Endangered Fish Recovery program, and comments are being incorporated into a

final report.

- VIII. Additional noteworthy observations: A total of 15 razorback sucker larvae (9-17 mm TL) were captured in drift nets at the drift net sampling site in 2013. Capture dates ranged from 13-18 June. In comparison, none were captured in 2014 and 2015 samples are still being identified.
- IX. Recommendations: Continue sampling as planned in 2016. Continue to integrate this work into recruitment patterns noted for juveniles.
- X. Project Status: Ongoing and on-track.
- XI. FY 2015 Budget Status
  - A. Funds Provided: \$ 172,133
  - B. Funds Expended: \$ 132,864
  - C. Difference: \$ 39,269 remaining funds for sample analysis that remains.
  - D. Percent of the FY 2015 work completed, and projected costs to complete: About 77% complete.
  - E. Recovery Program funds spent for publication charges: None.
- XII. Status of Data Submission (Where applicable): Data were made available to investigators.
- XIII. Signed: Kevin R. Bestgen                      13 November 2015  
Principal Investigator                      Date

APPENDIX: Major recent products based on these data include:

- Bestgen, K. R., G. B. Haines, and A. A. Hill. 2011. Synthesis of flood plain wetland information: Timing of razorback sucker reproduction in the Green River, Utah, related to stream flow, water temperature, and flood plain wetland availability. Final report to the Recovery Implementation Program for Endangered Fishes in the Upper Colorado River Basin. U. S. Fish and Wildlife Service, Denver, CO. Larval Fish Laboratory Contribution 163.
- Bestgen, K. R., K. A. Zelasko, and G. C. White. 2012. Monitoring reproduction, recruitment, and population status of razorback suckers in the Upper Colorado River Basin. Final Report to the Upper Colorado River Endangered Fish Recovery Program, U. S. Fish and Wildlife Service, Denver. Larval Fish Laboratory Contribution 170.
- Bestgen, K. R. 2014. Aspects of the Yampa River flow regime essential for maintenance of native fishes. Final Report submitted to the National Park Service, Fort Collins, CO, The Nature Conservancy, Boulder, CO, and Western Resource Advocates, Boulder, CO. Department of Fish, Wildlife, and Conservation Biology, Colorado State University, Fort Collins. Larval Fish Laboratory Contribution 181.
- Bestgen, K. R., and A. A. Hill. 2014. Reproduction, abundance, and recruitment dynamics of young

Colorado pikeminnow in the Green River Basin, Utah and Colorado, 1979-2012. Final report to the Upper Colorado River Endangered Fish Recovery Program, Project FW BW-Synth, Denver, CO. Department of Fish, Wildlife, and Conservation Biology, Colorado State University, Fort Collins. Larval Fish Laboratory Contribution 183.

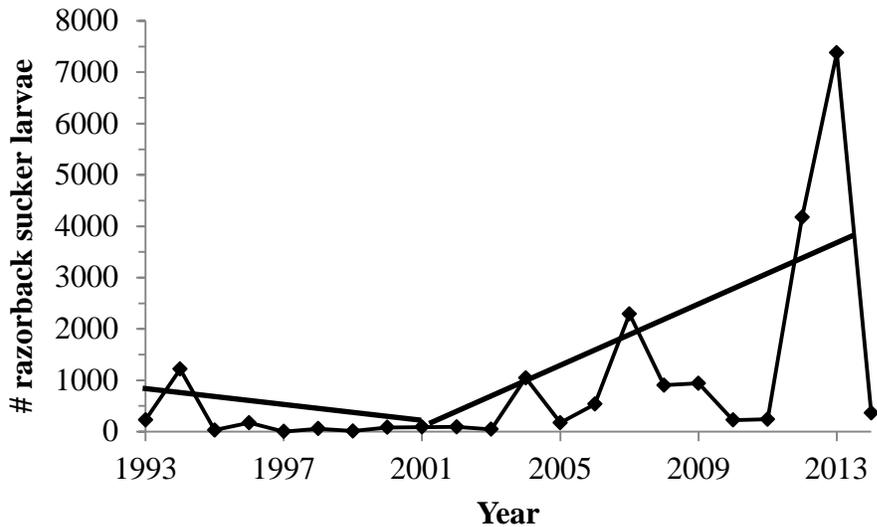


Figure 1. Number of razorback sucker larvae captured from 1993 to 2014 in the middle Green River, Utah, in light traps (all fish including those of questionable taxonomic identity included; 2015 sample identification is underway).

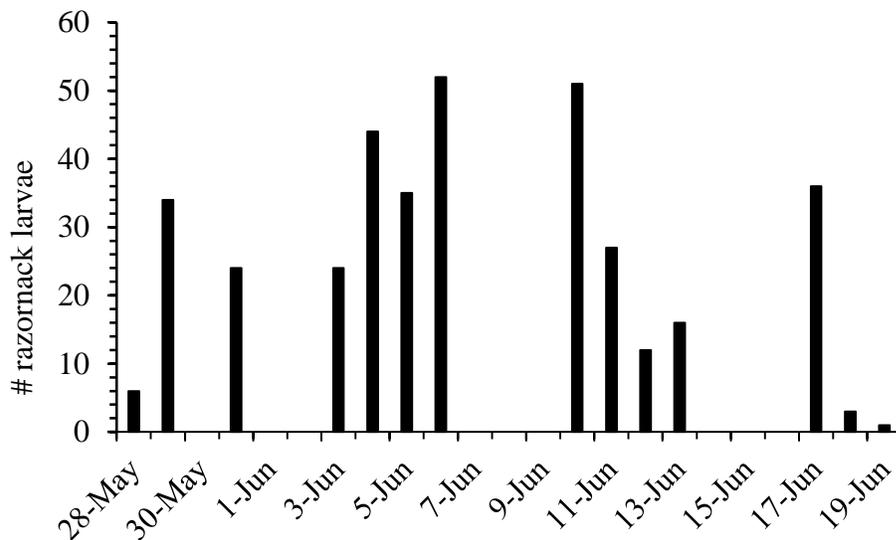


Figure 2. Seasonal distribution of razorback sucker larvae captured in 2014 in middle Green River, Utah, in light trap samples (all fish including those identified as “razorback sucker ?” were included; 2015 sample identification is underway). Sampling began on 13 May and ended on 20 June. All samples from all locations were combined for each day. Gaps in captures after the first capture of razorback sucker larvae was made indicate lack of sampling rather than absence of the species.

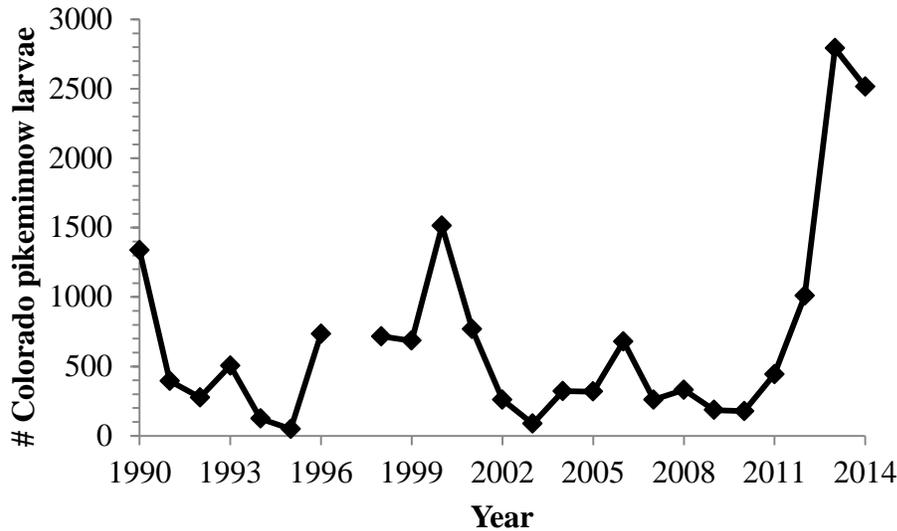


Figure 3. Number of Colorado pikeminnow larvae captured from 1990 to 2014 (no sampling in 1997, includes specimens from all diel samples, 2015 sample identification is underway) in the lower Yampa River, Colorado, during summer in drift nets.

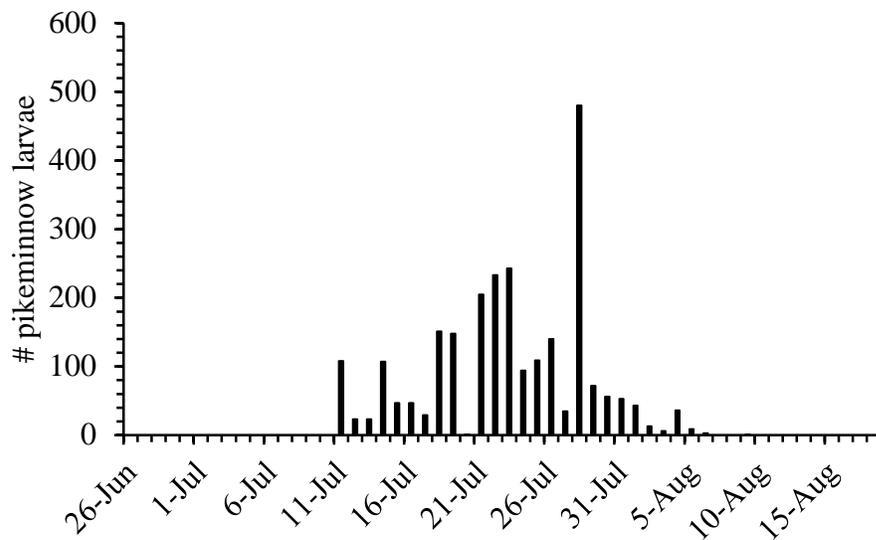


Figure 4. Seasonal distribution of Colorado pikeminnow larvae captured in 2014 drift net samples from the lower Yampa River, Colorado. Sampling began on 26 June and ended 18 August. Several of the largest capture dates were diel sampling occasions (12 samples total each day).

*For projects where more than one agency/entity receives funds from the Bureau of Reclamation, append one PPR from each agency/entity. Otherwise, delete.*

## **ANNUAL PERFORMANCE PROGRESS REPORT (PPR)**

BUREAU OF RECLAMATION AGREEMENT NUMBER:   R14AP00001  

UPPER COLORADO RIVER RECOVERY PROGRAM PROJECT NUMBER:   22f  

Project Title: INTERAGENCY STANDARDIZED MONITORING PROGRAM (ISMP)  
ASSESSMENT OF ENDANGERED FISH REPRODUCTION IN RELATION  
TO FLAMING GORGE OPERATIONS IN THE MIDDLE GREEN AND  
LOWER YAMPA RIVERS.

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Project/Grant Period: Start date (Mo/Day/Yr): 1 Oct. 2014  
End date: (Mo/Day/Yr): 30 Sept. 2018  
Reporting period end date: 30 Sept. 2015  
Is this the final report? Yes \_\_\_\_\_ No   X  

Performance: The goal of this project is to document timing and intensity of reproduction by razorback suckers and Colorado pikeminnow in the lower Yampa and middle green rivers. In 2015, we collected 246 drift net samples and additional seine samples in the lower Yampa River. In addition, we identified samples collected by the U. S. Fish and Wildlife Service in 2014 and began sample identification for 2015 samples. Another objective of this project is to summarize data collections. This was done in the attached report.

## ANNUAL PERFORMANCE PROGRESS REPORT (PPR)

BUREAU OF RECLAMATION AGREEMENT NUMBER: R13PG40020

UPPER COLORADO RIVER RECOVERY PROGRAM PROJECT NUMBER: 22-F

Project Title: INTERAGENCY STANDARDIZED MONITORING PROGRAM (ISMP) ASSESSMENT OF ENDANGERED FISH REPRODUCTION IN RELATION TO FLAMING GORGE OPERATIONS IN THE MIDDLE GREEN AND LOWER YAMPA RIVERS.

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Project/Grant Period:           Start date (Mo/Day/Yr): 10/01/2014  
  End date: (Mo/Day/Yr): 9/30/2015  
  Reporting period end date (Mo/Day/Yr): 09/30/2015  
  Is this the final report? Yes \_\_\_\_\_ No   X  

Performance: USFWS completed task 1, collecting larval fish samples from several sites in the middle Green River from 5 May 2015 to 12 June 2015. Preliminary identification led to the successful initiation of flood flows from Flaming Gorge and the entrainment of larval razorback sucker into key wetland habitats. Fish samples were delivered to the CSU Larval Fish Laboratory for identification as outlined in the scope of work.