

- I. Project Title: Floodplain Inundation and Entrainment Studies- Upper Colorado Recovery Implementation Program
- II. Principal Investigator(s): Kevin R. Bestgen
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- III. Project Summary: Flood plain wetlands are presumed important habitat for early life stages of razorback sucker in the middle Green River, Utah, because they are warm, food-rich, and may promote higher survival of larvae and recruitment to juvenile and adult life stages. Flow recommendations were developed to provide for river flows needed for entrainment of early life stages of razorback sucker from the main stem Green River in spring into flood plain wetlands. However, it is not precisely known if flood plain connectivity and flow timing, magnitude, and duration, as outlined in flow recommendations, is adequate for entrainment of razorback sucker larvae into target wetlands. Information to guide management of Green River flood plain wetlands for razorback sucker is extensive but a single synthesis of that information does not exist. A synthesis would be useful to integrate biological and physical information that will assist managers in efforts to increase recruitment of early life history stages of razorback sucker and, ultimately, recover the species. This project proposal is designed to fill those information needs.
- IV. Study Schedule: Project was funded in mid-June 2008, end date was to be one year after funding began. The final product is close to completion; a draft was submitted for program and peer-review (including Biology Committee) in April and June 2010, respectively. Peer reviews were completed and submitted to the author in October 2010 (R. Muth, K. Lagory, and M. Trammell were peer reviewers, additional comments received from Utah Division of Wildlife Resources). The draft final report will be resubmitted in the next few days.
- V. Relationship to RIPRAP: Reproduction and recruitment of early life stages are critical components of the life history of endangered razorback sucker. Understanding trends in reproductive success, and the timing of their appearance related to flood plain wetland availability, may help evaluate flow recommendations for the Green River downstream of Flaming Gorge Dam. Such information may also help define status of razorback sucker in specific river reaches in the Colorado River Basin and should play a role in determining when recovery has been achieved.

Relationship to specific RIPRAP items:

FR-FP Syn, Floodplain synthesis, FY 2010

Green River Action Plan: Mainstem

- I. Provide and protect instream flows--habitat management.
- I.B. Green River above Duchesne River.
 - Initially identify year-round flows needed for recovery while providing experimental flows.
 - 1.1.2 Restore Habitat (Habitat Development and Maintenance)
- II.A. Restore and manage flooded bottomland habitat.
 - II.A.3. Implement levee removal strategy at high priority sites.
 - II.A.3.d. Evaluation.

VI. Accomplishment of FY 2009-2010 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

The proposal and study design listed eight information needs which were addressed during this study.

- Information need 1.** Flow and stage at which floodplains with levee breaches become sufficiently inundated to provide nursery habitat for razorback suckers.
- Information need 2.** Frequency of flood plain inundation relative to the hydrologic cycle.
- Information need 3.** Area, depth, volume, and persistence of floodplain depression habitat after peak flows recede and relationship with peak flow magnitude.
- Information need 4.** Rates of sediment deposition and erosion in breaches and floodplains.
- Information need 5.** Entrainment and retention of larvae in floodplain nursery habitats as a function of physical characteristics and timing of drift.
- Information need 6.** Temporal relationships between drifting larvae and hydrology during the runoff period with a focus on the peak flow characteristics needed to entrain larvae.
- Information need 7.** The area of terrace and depression floodplains inundated at different flows.
- Information need 8.** What is the optimal combination of flow magnitude and duration to maximize entrainment of razorback sucker larvae.

The proposal presented a plan to fill those information needs. Information was gathered and synthesized from available peer-reviewed literature and technical reports, and original data was gathered from the sources needed. Original data analyses included simulations to assess entrainment rates of larvae into flood plain wetlands under different hydrologic regimes, focusing on flow frequency, magnitude, and duration in relation to timing of reproduction of razorback suckers. The report contains a synthesis of available information on flood plain connection and inundation related to flow frequency, magnitude, and duration, with a goal of maximizing entrainment of early life stages of razorback sucker larvae. The report results will be useful to evaluate effectiveness of existing flow and temperature recommendations in the middle Green River, and will identify possible strategies to enhance of those recommendations for flood plain wetland habitat management and for conservation and recovery of razorback sucker.

Task Description (FY 2010)

Accomplishments by Information need: all tasks are completed except for final report review and approval. I will try to report results of this large report at the 2011 Researchers Meeting.

VII. Recommendations: Finish and submit report.

VIII. Project Status: On track and ongoing.

IX. FY 2009/2010 Budget Status

- A. Funds Provided: \$50,000
- B. Funds Expended: \$ 50,000
- C. Difference: 0 remaining funds to complete the study; this study required much more than the original budget to complete.
- D. Percent of the FY 2009/2010 work completed, and projected costs to complete: About 98% complete.
- E. Recovery Program funds spent for publication charges: None.

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

XI. Signed: Kevin R. Bestgen 14 Nov. 2010
Principal Investigator Date

(Just put name and date here, since you will be submitting the report electronically)

APPENDIX: [More comprehensive/final project reports (NOT to be used in place of a complete annual report.). If distributed previously, simply reference the document or report.]