

COLORADO RIVER RECOVERY PROGRAM  
FY 2015 ANNUAL PROJECT REPORT

RECOVERY PROGRAM  
PROJECT NUMBER: 128

I. Project Title: Abundance Estimates for Colorado pikeminnow in the Green River Basin, Utah and Colorado

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

Project/Grant Period: Start date (Mo/Day/Yr): 1 October 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: Sampling conducted during this project is designed to obtain capture-recapture data needed to estimate abundance and vital rates of Colorado pikeminnow *Ptychocheilus lucius* in the lower Yampa (exclusive of Yampa Canyon) and lower White rivers and the Green River downstream of Whirlpool Canyon (Whirlpool and Split Mountain canyons excluded). Abundance estimates of endangered Colorado pikeminnow are needed to better monitor population status and provide benchmarks against which progress toward recovery can be measured. This project was designed to have three years (2011-2013) of sampling followed by a year of data analysis and report writing. The design is essentially the same as that employed for sampling conducted from 2000-2003 and 2006-2008 in the same area (Bestgen et al. 2005, Bestgen et al. 2010). Sampling during this study began in spring 2011, and continued through 2013, with the Colorado Division of Wildlife and the Larval Fish Laboratory responsible for sampling the Yampa River, the U. S. Fish and Wildlife Service, Vernal, Utah, and Grand Junction, Colorado, responsible for the reach of the Green River from the White River downstream to Tusher Diversion and the lower White River, and the Utah Division of Wildlife Resources responsible for the Green River reaches from lower Whirlpool Canyon to the White River confluence and from Tusher Diversion downstream to the Colorado River. The Larval Fish Laboratory provided coordination, data checking, and data analysis. Our primary goal was to capture, mark, and recapture as many Colorado pikeminnow as possible on at least three different sampling occasions in each river reach. Sampling occurred during spring runoff and mostly ended before Colorado pikeminnow spawning migration. Electrofishing was the primary sampling gear. Captured Colorado pikeminnow were scanned for the presence of a PIT tag, unmarked fish were marked, and all were released near the point of capture. These data were used to obtain abundance estimates for each river reach. A report detailing results of sampling and parameter estimation for 2006-2008 data was submitted and approved in April 2010; a summary of data collected was provided in previous reports and comprehensive estimates of Colorado pikeminnow abundance and survival will be completed in 2015. Preliminary estimates have already been provided to the Program Office.

V. Study Schedule: Initial Year 2014  
Final year 2018

VI. Relationship to RIPRAP:

Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management)

V.B. Conduct research to acquire needed life history information

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:

A main objective in FY 2015 was data analysis and report preparation. We have developed preliminary estimates which were provided to the Recovery Program office in 2014 and are actively working on the data summary for a final report. We retain the material below so the reader has an understanding of the other tasks involved in this sampling and analysis program.

We developed and used a Standard Operating Procedure for field personnel for use during the sampling season to ensure a consistent sampling approach and timely completion of tasks. This reduced project and sampling complexity due to the short duration of the sampling design each year, and increased consistency among the five relatively autonomous units used to complete this work. We also developed spreadsheets for data entry that should streamline that process somewhat. We also had a conference call with team members and field crews to discuss issues and problems as well as several other calls to individual investigators through the field season. This also provided an opportunity for each group to report on progress in completing preparations for field sampling. The Larval Fish Laboratory will be responsible for routine coordination of the study.

We completed a minimum of three sampling passes through the five Green River Basin reaches listed below to capture sub-adult and adult Colorado pikeminnow:

- a) Green River between the confluence of the White River upstream to the lower end of Whirlpool Canyon (i.e., upper Rainbow Park, but not Split Mtn. Canyon).
- b) White River between the confluence with the Green River upstream to Taylor Draw Dam,
- c) Yampa River between Deerlodge Park and Craig, excluding Cross Mountain Canyon,
- d) Green River from the White River confluence downstream to near Green River, Utah, and,
- e) Green River from downstream of Green River, Utah, to the confluence with the Colorado River.

The LFL and CDOW attempted up to eight sampling passes in portions of the Yampa River, in part associated with bass and northern pike removal projects, in order to obtain a more precise and accurate Colorado pikeminnow abundance estimate and the USFWS completed four sampling passes in the Desolation-Grey Canyon reach of the Green River. Data were grouped under three passes for all reaches to accommodate the need for symmetrical capture histories among reaches. Specific responsibilities and reaches are outlined below (Table 1).

One significant challenge that was not overcome in spring 2012 was a permit to sample the lower White River. We were allowed to sample in 2013 but only late

in the sampling season, which somewhat compromised our ability to obtain data on separate passes that were relatively closely linked in time.

Preliminary analysis of 2011 Colorado pikeminnow capture data suggested fewer fish captured and recaptured than in the past. A total of 774 fish were captured and recaptured during 2011, which included Colorado pikeminnow of all sizes that were tagged. Length frequency histograms for Colorado pikeminnow captured in 2011 (Figure 1) suggested that some smaller Colorado pikeminnow occurred in the study area, particularly the lower Green River. It is postulated that those relatively small fish recruited from year-classes produced in 2009 and 2010.

Even lower numbers of Colorado pikeminnow were captured in 2012, compared to 2011, when only 425 Colorado pikeminnow of all sizes were captured or recaptured. Captures were particularly low in the Yampa River, where only six Colorado pikeminnow were captured, in spite of high effort associated with northern pike and smallmouth bass removal sampling, as well as regular Colorado pikeminnow sampling passes (up to eight sampling passes). No Colorado pikeminnow were recaptured among the sampling passes completed this year for either the Yampa River or middle Green River. Relatively low water levels in all study reaches were thought to limit access to flooded shorelines and tributary mouths by sampling crews, which may have limited capture numbers. Sampling results in 2013 showed continued decline of numbers of adult Colorado pikeminnow captured. For example, only eight adult Colorado pikeminnow were captured in the Yampa River. A shortcoming in 2013 was faulty electrofishing gear used when sampling the lower Green River, which limited capture efficiency.

**New task (Task 6 in scope of work, for FY 2016).** Razorback sucker abundance and survival estimation, Green River Basin.

The Recovery Program requested an analysis of razorback sucker data collected during Colorado pikeminnow abundance estimation from 2011-2013 to estimate their abundance and survival in the Green River Basin. For the funding proposed we will provide razorback sucker abundance estimates for the three Green River segments and the White River; we will examine Yampa River data but are assuming right now that the few captures recaptures will preclude any useful abundance estimation. Analyses will be completed essentially as for Colorado pikeminnow data described above. We will also conduct survival rate analysis, updating older analyses that were complete through 2008 and portions through 2011 (Zelasko et al. 2011, Bestgen et al. 2012). We are targeting survival estimates by Green River reach, middle Green River, Desolation-Grey canyons, and lower Green River, so that survival rates can be understood for those sections. Recall that Monitoring Plan report (Bestgen et al. 2012) analyses showed Desolation-Grey Canyon fish were never seen again so survival rates were very low. If there is sufficient funding, we will look into use of RZB PIT tag antenna array data including for the White River and Tusher Wash (which

may fit well into the Deso-Grey survival question) but that may be beyond the scope of this project.

We report in FY 2015 on this task because even though it is only funded beginning in 2016, we accomplished some tasks already. These included acquisition of razorback sucker capture-recapture data from the database manager, Mr. Travis Francis, USFWS, Grand Junction, CO, after which we began the needed and long-term process of perusing the data and sorting out missing and incomplete records. To date, we have assembled 4,814 captured records for 4,548 individual razorback suckers, data that was collected from 2011-2013 during Colorado pikeminnow abundance estimation sampling (Table 1). Of those, capture records, 259 were from fish captured twice in one year, and seven were from fish captured three times in a year. Additional records were available from non-native fish removal sampling (85 razorback suckers in 2011, 212 in 2012, and 163 in 2013) but since those records were over a longer capture period (potentially April-September) which may violate assumptions of closed-capture abundance estimation techniques, we chose not to include them.

It is not yet clear what utility the White River records will have for abundance estimation. Minimally, razorback sucker may be moving into the White River during later sampling passes, as evidenced by higher abundance during pass 3 sampling in 2011 and 2013. Because lower White River sampling has been suspended in some years due to permitting issues, we will use that information to assess utility of those records. All capture records should be useful for survival estimation. A draft report for abundance estimation efforts is expected by the end of 2016.

#### VIII. Additional noteworthy observations:

An associated task under Project 128 (but not funded by this project) was contributions to a study of fish entrainment into Maybell Ditch, in the Yampa River (citation below). LFL personnel compiled historical records for Colorado pikeminnow in the Yampa River to understand entrainment rates in the context of numbers of fish in the river. This task involved data organization and analysis, participation in conference calls, report writing and review, and responses to reviewer comments.

Citation: Speas, D. W., J. A. Hawkins, P. D. MacKinnon, K. R. Bestgen, and C. W. Walford. 2014. Entrainment of Native Fish in the Maybell Ditch, 2011 – 2012. Final report to the Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado. Larval Fish Laboratory Contribution 184.

Table 1. Capture records for razorback sucker obtained during Colorado pikeminnow abundance estimation sampling, 2011-2013, in four river reaches of the Green River basin. MGR = Middle Green River, WH = White River, DGR = Desolation-Gray Canyon reach of the Green River, and LGR = lower Green River. No razorback suckers were captured during sampling in the Yampa River. Sampling passes are indicated by numerals 1, 2 or 3, and nnf refers to razorback suckers captured during non-native fish removal sampling.

reach	2011					2012					2013					Grand Total
	pass					pass					pass					
	1	2	3	nnf	total	1	2	3	nnf	total	1	2	3	nnf	total	
MGR	33	125	80	4	242	77	42	41	85	245	32	141	209	126	508	995
WH	1	1	45	0	47	0	1	1	0	2	0	9	102	0	111	160
DGR	129	152	167	81	529	153	462	148	127	890	129	208	150	37	524	1943
LGR	341	318	323	0	982	256	267	192	0	715	48	86	158	0	292	1989
total	504	596	615	85	1800	486	772	382	212	1852	209	444	619	163	1435	5087

We similarly contributed to a risk assessment of Colorado pikeminnow in the lower Green River relative to entrainment into Tusher Diversion. That work was started in 2010, and has been ongoing since, relative to evaluating screen design, assessment of injury and mortality rates of fishes in intake structures or diversion canals, and most recently, collection and interpretation of tag detections from PIT tag arrays placed in Tusher Wash. Results of that analysis entitled “Use of a passive interrogation array to evaluate entrainment of endangered fish in an irrigation canal” were presented at the Desert Fishes Council meeting, November 2014, by David Speas, with several other upper basin biologists including LFL staff.

- IX. Recommendations: Analyze data and complete Colorado pikeminnow and razorback sucker abundance estimation reports as soon as possible so that further management can be implemented to attempt to bolster populations. Implement additional abundance estimation sampling in 2016.
  
- X. Project Status: On track and ongoing.
  
- XI. FY 2015 Budget Status
  - A. Funds Provided: \$0
  - B. Funds Expended: \$0
  - C. Difference: \$0
  - D. Work completed: NA.
  - E. Recovery Program funds spent for publication charges: None
  
- XII. Status of Data Submission (Where applicable): Each agency submits data independently and to the Larval Fish Laboratory, for analysis. This has occurred.
  
- XII. Signed: Kevin Bestgen 13 November 2015  
Principal Investigator Date