

COLORADO RIVER RECOVERY PROGRAM
FY 2016 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. 2016
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 (2016-2018) 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, 2006-2008, and 2011-2013 in the same area (Bestgen et al. 2005, Bestgen et al. 2010). Sampling during the most recent three-year period began in spring 2016, and will continue through 2018, with Colorado Parks and Wildlife and the Larval Fish Laboratory responsible for sampling the Yampa River, the U. S. Fish and Wildlife Service, Vernal, Utah, responsible for the reach of the Green River from the White River downstream to Tusher Diversion and the White River downstream of Kenney Reservoir, 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 also provides 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 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 2011-2013 data was submitted to the Recovery Program and is in review; a summary of data collected was provided in previous reports and comprehensive estimates of pikeminnow abundance and survival will be completed in 2017. 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 2016 Tasks and Deliverables, Discussion of Initial Findings and

Shortcomings:

A main objective in FY 2016 was to finalize reporting of results from the 2011-2013 estimation period and also to begin sampling for the next round of estimates. We have developed estimates which were provided to the Recovery Program office in earlier years and we are anticipating receiving reviews so the final report can be prepared. 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, and some crews are experimenting with electronic data input during field sampling.

We also coordinated a conference call with team members and field crews prior to 2016 field sampling 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. All other reaches were sampled three times. 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).

We are presently assembling data collected during 2016. Not all field offices have provided data as of yet.

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. We to 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 though 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.

To date, we have acquired 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. We have completed preliminary estimates of those parameters and are in the process of preparing a report on those data. Low numbers of recaptured fish were evident, which limits the precision of estimates.

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 will look at feasibility of this after we complete the report described above.

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				
	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
WH	1	1	45	0	47	0	1	1	0	2	0	9	102	0	111
DGR	129	152	167	81	529	153	462	148	127	890	129	208	150	37	524
LGR	341	318	323	0	982	256	267	192	0	715	48	86	158	0	292
total	504	596	615	85	1800	486	772	382	212	1852	209	444	619	163	1435

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 mid-year 2017.

VIII. Additional noteworthy observations:

- VIII. Recommendations: 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 2017.
- IX. Project Status: On track and ongoing.
- X. FY 2016 Budget Status
 - A. Funds Provided: \$527,260
 - B. Funds Expended: \$455,256
 - C. Difference: \$72,004
 - D. Work completed: 70%, reporting work remains.
 - E. Recovery Program funds spent for publication charges: None

XI. Status of Data Submission (Where applicable): Each agency submits data independently and to the Larval Fish Laboratory, for analysis. This has occurred for most sampling reaches.

XII. Signed: Kevin Bestgen 13 November 2016
Principal Investigator Date
(Just put name and date here, since you will be submitting the report electronically)

ANNUAL PERFORMANCE PROGRESS REPORT (PPR)

BUREAU OF RECLAMATION AGREEMENT NUMBER: R14AP00001

UPPER COLORADO RIVER RECOVERY PROGRAM PROJECT NUMBER: 128

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

Principal Investigator: Kevin Bestgen (Lead)/ John Hawkins/ Gary White/Cameron Walford
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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. 2016
Is this the final report? Yes _____ No X

Performance: Sampling passes were completed in the Yampa River portion of the Green River Basin study area by the Larval Fish Laboratory. We tagged and released Colorado pikeminnow in accordance with specified protocols which will contribute to abundance estimates for pikeminnow of three life stages in the Green River Basin from 2016-2018. We also summarized data from the four other entities that contributed capture information for this sampling effort (see attached report).

ANNUAL PERFORMANCE PROGRESS REPORT (PPR)

BUREAU OF RECLAMATION AGREEMENT NUMBER: R14AP00007

UPPER COLORADO RIVER RECOVERY PROGRAM PROJECT NUMBER: 128

Project Title: Abundance Estimates of Colorado pikeminnow in the Green River Basin, Utah and Colorado

Principal Investigator: *Julie Howard and Katherine Creighton*
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Project/Grant Period: Start date: 05/01/2014
 End date: 09/30/2018
 Reporting period end date: 10/30/2016
 Is this the final report? Yes _____ No X

Performance: Four sampling passes were successfully completed (4/18-4/27/16, 5/5-5/14/16, 5/22-5/31/16, 6/8-6/15/16) on the lower Green River section from Green River, UT (RM 120.0) to the confluence with the Colorado River (RM 0.0). Tasks 1-3 were completed. During this effort crews captured 166 Colorado pikeminnow, 1,447 razorback sucker and 12 bonytail. All endangered fish were PIT tagged when necessary. Additionally, crews captured and removed two brown trout, eight grass carp, 14 green sunfish, four gizzard shad, one rainbow trout, two smallmouth bass, 78 walleye, one white sucker and one yellow bullhead. Data were formatted and sent to the PI in July of 2016.

ANNUAL PERFORMANCE PROGRESS REPORT (PPR)

BUREAU OF RECLAMATION AGREEMENT NUMBER: R14AP00007

UPPER COLORADO RIVER RECOVERY PROGRAM PROJECT NUMBER: 128

Project Title:

Abundance Estimates of Colorado pikeminnow in the Green River Basin, Utah and Colorado

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Project/Grant Period: Start date: 05/01/2014
End date: 09/13/2018
Reporting period end date: 10/30/2016
Is this the final report? Yes _____ No X

Performance:

Three sampling passes were successfully completed (4/18/16-4/25/16, 5/9/16-5/14/16, and 5/19/16-5/26/16) on the middle Green River from the lower end of Whirlpool Canyon (RM 334.0) to the confluence with the White River (RM 246.1). Additionally, funds from nonnative removal (Project 123b) were redirected to complete a fourth pass from the White River confluence to Sand Wash (RM 215.3) in conjunction with FWS Vernal CRFP's fourth pass conducted in Desolation and Gray canyons. Tasks 1-3 were completed. A total of 58 Colorado pikeminnow were captured and PIT-tagged when necessary. Colorado pikeminnow total length averaged 512 mm; range from 151–775 mm. Data were formatted and will be sent to the lead PI (Colorado State University) by December 2016.

ANNUAL PERFORMANCE PROGRESS REPORT (PPR)

BUREAU OF RECLAMATION AGREEMENT NUMBER: R15PG00083

UPPER COLORADO RIVER RECOVERY PROGRAM PROJECT NUMBER: 128

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

Principal Investigator: M. Tildon Jones
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Project/Grant Period: Start date (Mo/Day/Yr): 10/01/2014
End date: (Mo/Day/Yr): 09/30/2019
Reporting period end date (Mo/Day/Yr): 9/30/2016
Is this the final report? Yes _____ No X

Performance: USFWS completed portions of tasks 1-4 assigned to the Vernal office for both the White and Green Rivers. For the Green River estimate, we completed 4 passes from Ouray to Green River, UT between 19 April and 10 June 2016. For the White River, we completed 3 passes from Taylor Draw dam to the Green River confluence between 19 April and 3 June 2016. All pikeminnow captured were scanned for PIT tags and a new PIT tag implanted, if needed. We were also able to capture other endangered species, including humpback chub and razorback sucker, during sampling, and these fish were processed similar to pikeminnow. In addition, nonnative species of concern (i.e., smallmouth bass, walleye) were removed when encountered. All data have been compiled and sent to CSU-LFL for analysis.