

COLORADO RIVER RECOVERY PROGRAM  
FY 2019 ANNUAL PROJECT REPORT

RECOVERY PROGRAM  
PROJECT NUMBER: 15

- I. Project Title: Identification and Curation of Larval and Juvenile Fish by Colorado State University Larval Fish Laboratory.
- II. Bureau of Reclamation Agreement Number: R19AP00058
- Project/Grant Period: Start date (Mo/Day/Yr): 10/01/18  
End date: (Mo/Day/Yr): 09/30/23  
Reporting period end date: 09/30/19  
Is this the final report? Yes \_\_\_\_\_ No X \_\_\_\_\_
- III. Principal Investigators:  
Kevin R. Bestgen (Project Manager), Sean C. Seal, and Darrel E. Snyder  
Larval Fish Laboratory, Colorado State University, 1474 Campus Delivery, Fort Collins, CO 80523-1474  
Kevin.Bestgen@ColoState.edu, Darrel.Snyder@ColoState.edu, and Sean.Seal@ColoState.edu  
Phone (970) 491-1848 (KRB), 491-5295 (DES), and 491-6412 (SCS)  
Fax (970) 491-5091
- IV. Abstract: This ongoing project supports Larval Fish Laboratory (LFL) taxonomic, analytical, and curatorial services for specific Recovery Program projects, and as time allows, other incidentally requested taxonomic services and consultation (Task 1). It also provides for ongoing curation (maintenance and management) of the LFL Collection, including controlled access to and use of collection holdings and data by UCRB and other researchers (Task 2).
- V. Study Schedule: Ongoing project since 1995. Collections from the following projects are identified, processed, and curated annually with the resultant data provided to the principal investigator as soon as logistically possible after the collections are received:
- Project 22F, LFL—preliminarily identified drift-net and light-trap samples from the lower Yampa, Middle-Green, and White Rivers to assess the larval abundance of Colorado Pikeminnow and Razorback Sucker (Task 1a);
  - Project 138, Utah Division of Wildlife resources, Vernal and Moab offices—Interagency Standardized Monitoring Program sample identification/verification as needed;
  - Project 158, Utah Division of Wildlife Resources (UDWR) and U. S. Fish and Wildlife Service (USFWS), Vernal offices—drift and backwater samples from the Middle-Green River to help assess factors contributing to the decline of age-0 Colorado Pikeminnow and simultaneously collected ISMP samples (Task 1b— backlog);

- Project 160, UDWR, Moab—light-trap samples for age-0 razorback sucker and seine samples from the lower Green River, plus lower Colorado, Matheson wetland, and Lake Powell samples as needed (Task 1c);
- Project 163, USFWS, Grand Junction—samples associated with Gunnison and Colorado River fish community monitoring (Task 1e);
- Project FR-164, USFWS, Vernal—samples associated with Green River Larval Trigger Study Plan monitoring in floodplain wetlands (Task 1f); and
- Project FR-165, UDWR, Vernal— samples associated with Green River Larval Trigger Study Plan monitoring in Stewart Lake floodplain (Task 1g).

Incidental taxonomic services and consultation on early life-stage taxonomy, sampling techniques, and collection handling are addressed as needed and time allows (also Task 1). General collection maintenance activities (e.g., fluid level and container checks) are conducted annually; other maintenance and management concerns, including National Park Service inventory checks of cross-catalogued holdings are addressed as needed and newly deposited and backlog collections are cataloged as time permits (Task 2). Responses to requests for loans, collection use, or information on collection holdings are provided as needed (also Task 2).

VI. Relationship to RIPRAP: This project is related to General Recovery Program Support Action Plan V (monitor populations and habitat and conduct research to support recovery actions—research, monitoring, and data management). Identification and processing of collections for Projects 22F, 138, 158, 160, 163, FR-164, and FR-165 contribute to Tasks V.A (measure and document population and habitat parameters to determine status and biological response to recovery actions) and V.B (conduct research to acquire needed life history information). An additional task added in 2018 was statistical analysis of PIT tag capture-recapture data, mainly for Grand Junction FWS, and was grouped under this project to streamline the process for transferring and receiving funding. The remainder of this project specifically addresses Task V.E (provide for long-term care, cataloging, and accessibility of preserved specimens) and, in that preserved specimens are the ultimate natural history database, contributes to Task V.A.1 (conduct interagency data management program to compile, manage, and maintain all research and monitoring data collected by the Recovery Program).

VII. Accomplishments of FY 2019 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1, Taxonomic Services—The following preserved collections were processed. Most samples are collected in one year and processed in the next year (e.g., 2018 samples collected in summer 2018 but identified in fiscal year 2019), which is why some results may appear dated.

- Project 22F (Task 1a): in 2018, 195 Yampa River drift net samples (417 lots-1,698 specimens) and 24 Green River drift net samples (47 lots-193 specimens) were

processed. Also processed in 2018, 136 razorback sucker light-trap samples (541 lots-6186 specimens) taken from the middle Green River.

- Project 138: no samples were received for FY2018.
- Project 158 (Task 1b): in 2018, 75 Split Mountain drift net samples (190 lots-635 specimens) were processed. Additionally, 121 middle Green River backwater seine samples (being processed) were taken.
- Project 160 (Task 1c): in 2017, 112 light-trap (340 lots-11,323 specimens) and 22 seine (49 lots- 96 specimens) samples were taken in the lower Green River. There were 75 Colorado River light-trap (252 lots-7,489 specimens) and 13 seine (28 lots-69 specimens) samples taken and processed. Additional 10 light-trap (31 lots-293 specimens) and 4 seine (5 lots-7 specimens) samples were taken at the Scott Matheson Wetlands Preserve. Lastly, 29 light-trap (162 lots-7,244 specimens) and 11 seine (27 lots-204 specimens) samples were taken in Lake Powell. (Numbers reported are updated from 2018 report.)

Processed in 2018: 106 light-trap (366 lots-21,040 specimens) and 3 seine (4 lots- 5 specimens) samples were taken in the lower Green River. There were 47 Colorado River light-trap (275 lots-10,261 specimens) and 9 seine (22 lots-192 specimens) samples taken. Additional 2 seine (4 lots-4 specimens) samples were taken at the Scott Matheson Wetlands Preserve. Lastly, 11 light-trap (69 lots-7,118 specimens) and 11 seine (35 lots-640 specimens) samples were taken in Lake Powell.

- Project 163 (Task 1e): in 2018, 155 Colorado River dip net (371 lots-2,029 specimens) and 262 Gunnison River dip net (560 lots-2,333 specimens) samples were processed.
- Project FR-165 (Task 1g): in 2018, 15 light-trap (32 lots-75 specimens) samples were taken in Stewart Lake.
- Task 1h: Statistical analysis assistance of data collected in the conduct of Projects 127, 131, 163, and new northern pike abundance estimation (FY2020 cost \$21,000, budgeted for FY 2020), Yampa River. We are finalizing analysis of humpback chub capture-recapture data from the Colorado River at this time, including populations from Black Rocks and Westwater canyons. Funds for that work received in the past are depleted so are conducted gratis at this time.

All processed specimens have been cataloged and shelved as part of the LFL Collection and the collection data forwarded to the responsible principal investigators (PIs) for analysis and reporting except for Task 1b.

Shortcomings— Project 158 (Task 1b): 2018 middle Green River backwater seine collection is awaiting completion.

Task 2, Ongoing Collection Maintenance and Management—We: (1) added, as of 30 September, a total of 3,982 lots of fish (81,216 specimens) from UCRB collections or investigations to the cataloged collection (Appendix A), (2) made collection holdings and selected data available to UCRB researchers and other interested parties, and inventory checks requested by the NPS, (3) responded to incidental requests from UCRB researchers for taxonomic assistance or consultation on larval-fish sampling and

collection handling matters, (4) corrected incidentally found errors in our catalog database, (5) updated and tested the latest version of our collection database and management program software called *Specify 6*, and (6) conducted an annual fluid level and condition check of our holdings. As of 30 September 2019, we maintain and manage 144,357 lots of cataloged fish (4,511,214 specimens) collected from the UCRB or used for UCRB Recovery Program investigations. These holdings represent almost 96% of all LFL cataloged lots (97% of all cataloged specimens).

No significant progress was made in FY 2019 towards plans for housing the LFL Collection and other natural history collections on campus together as a university natural history museum. The museum facility awaits adequate development-grant funding.

- VIII. Additional noteworthy observations: Reports of such observations are appropriately deferred to the PI's to whom the processed collection data has been submitted.
- IX. Recommendations: We recommend continued annual support of Project 15 with sufficient funds for processing newly preserved collections covered by this project, assistance with capture-recapture statistical analyses, incidental taxonomic services and consultation, and on-going maintenance and management (curation) of all UCRB specimens held by LFL.
- X. Project Status: On-track and ongoing.
- XI. FY 2019 Budget Status
- |                    |           |
|--------------------|-----------|
| A. Funds Provided: | \$238,661 |
| B. Funds Expended: | \$219,632 |
| C. Difference:     | \$19,029  |
- Explanation: Additional work remains to accomplish 2019 tasks; see Section VII.
- D. Percent of FY 2019 work completed and projected costs to complete: about 90% of work completed; funds are sufficient to complete tasks.
- E. Recovery Program funds spent for publication charges: \$0
- XII. Status of Data Submission:
- Project 22F (Task 1a) collection data for 2018 was internally submitted to Kevin Bestgen.
  - Project 158 (Task 1b) collection data for 2018 Split Mountain drift net was submitted was submitted to respective PI's. Collection data for 2018 middle Green River backwater seine will be submitted to respective PI's as soon as it is completed.
  - Project 160 (Task 1c) collection data for 2017 and 2018 was submitted to respective PI's.
  - Project 163 (Task 1e) collection data for 2018 was submitted to respective PI's.
  - Project FR-165 (Task 1g) collection data for 2018 was submitted to respective PI's.
  - Humpback chub abundance and vital rate estimates are nearly completed.

XIII. Signed: Kevin Bestgen  
Principal Investigator Date: 18 November 2019

Signed: Sean C. Seal  
Principal Investigator Date: 9 November 2019

APPENDIX A:

Study-year sets of Upper Colorado River Basin collection-species lots cataloged as part of the Colorado State University Larval Fish Laboratory Collection from October 1, 2018 through September 30, 2019 (3,982 lots; 81,216 specimens).

Catalog No.	Field Numbers	Description of Sample Sets
146713*	LFL-13GR-LW043	13 SN, Green R, Lodore-Whirlpool, CO, UT
146714-7130	LFL-18YA-613A2 to 8123	18 Larvae, DR, Yampa R, Echo Pk,DNM, CO
147131-7177	LFL-18GR-6272 to 8083	18 Larvae, DR, Green R, Echo Pk,DNM, CO
147178-7718	FWS/V-18RZ-001 to 138	18 Larvae, RZ LT, Green R, UT
147719-7907	FWS/V-18GR-DR01 to DR83	18 Larvae, RZ Drift, Green R, UT
147908	FWS/V-18GR-MI01	18 Miscellaneous, Green R, UT
147909-8278	FWS/GJ-18CO-001 to 155	18 Larvae, DN, Colorado R, CO
148279	FWS/GJ-18CO-Y03	18 YOY, SN, Colorado R, CO
148280-8839	FWS/GJ-18GU-001 to 255	18 Larvae, DN, Gunnison R, CO
148840-9179	UDWR-17LRZ-GL002 to GL126	17 Larvae, Lower RZ LT, Green R, UT
149180-9228	UDWR-17LRZ-GS001to GS062	17 Larvae, Lower RZ SN, Green R, UT
149229-9480	UDWR-17LRZ-CL001 to CL082	17 Larvae, Lower RZ LT, Colorado R, UT
149481-9508	UDWR-17LRZ-CS003 to CS115	17 Larvae, Lower RZ SN, Colorado R, UT
149509-9539	UDWR-17LRZ-CML01 to CML15	17 Larvae, Lower RZ LT, Matheson Preserve, Colorado R, UT
149540-9544	UDWR-17LRZ-CMS01 to CML08	17 Larvae, Lower RZ SN, Matheson Preserve, Colorado R, UT
149545-9706	UDWR-17LRZ-LPL01 to LPL30	17 Larvae, Lower RZ LT, Lake Powell, Colorado R, UT
149707-9733	UDWR-17LRZ-LPS01 to LPS16	17 Larvae, Lower RZ SN, Lake Powell, Colorado R, UT
149734	UDWR-17CO-063	18 Miscellaneous, Colorado R, UT

Catalog No.	Field Numbers	Description of Sample Sets
149735-9887	CdV-18GR-0-01 to 6-06	18 LT, Study, Green R, UT
149888-9919	UDWR-18GR-SL001 to SL015	18 LT, Green R, Stewart Lake RZ Eval, UT
149920-50194	UDWR-18LRZ-CL001 to CL049	18 Larvae, Lower RZ LT, Colorado R, UT
150195-0216	UDWR-18LRZ-CS001to CS040	18 Larvae, Lower RZ SN, Colorado R, UT
150217-0582	UDWR-18LRZ-GL001 to GL116	18 Larvae, Lower RZ LT, Green R, UT
150583-0586	UDWR-18LRZ-GS001 to GS004	18 Larvae, Lower RZ SN, Green R, UT
150587-0655	UDWR-18LRZ-LPL01 to LPL11	18 Larvae, Lower RZ LT, Lake Powell, Colorado R, UT
150656-0690	UDWR-18LRZ-LPS02 to LPS13	18 Larvae, Lower RZ SN, Lake Powell, Colorado R, UT
150691-0694	UDWR-18LRZ-CMS01 to CMS02	18 Larvae, Lower RZ SN, Matheson Preserve, Colorado R, UT

\* Different species found and identified from previously cataloged lot.