

- I. Project Title: Identification and Curation of Larval and Juvenile Fish by Colorado State University Larval Fish Laboratory.
- II. Bureau of Reclamation Agreement Number(s): R09AP40858, Mod 006
- Project/Grant Period: Start date: 12/10/08  
End date: 11/30/13  
Reporting period end date: 09/30/13  
Is this the final report? Yes  No
- III. Principal Investigator(s): Kevin R. Bestgen (Project Manager), Darrel E. Snyder, and Sean C. Seal  
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- IV. Abstract: This ongoing project provides (1) Larval Fish Laboratory (LFL) taxonomic, analytical, and curatorial services for specific Upper Colorado River Endangered Fish Recovery Program (Recovery Program) projects, (2) incidental taxonomic services and consultation, and (3) cataloging of other Upper Colorado River Basin (UCRB) collections and ongoing maintenance and management (curation) of the LFL Collection, including controlled access to and use of collection holdings and data by UCRB and other researchers. These tasks are accomplished as soon as possible after respective sets of collections or requests are received.
- V. Study Schedule: Ongoing project since 1995. Specified project collections are identified and processed annually and the resultant data provided to the principal investigator as soon as logistically possible after the collections are received. These currently include collections for Projects 22F (Task 1a, samples from Yampa, middle Green, and White River for assessing Colorado pikeminnow and razorback sucker larval abundance), 158 (Task 1b, drift and backwater samples from middle Green River for age-0 Colorado pikeminnow), 160 (Task 1c, light-trap and seine sampling in lower Green River for age-0 razorback sucker), 163 (Task 1e, samples for monitoring Gunnison River fish community), FR-164 (Task 1f, samples associated with Green River Larval Trigger Study Plan for monitoring floodplain wetlands), and FR-165 (Task 1g, samples associated with Green River Larval Trigger Study Plan for monitoring Stewart Lake floodplain). General collection maintenance activities (e.g., fluid level and container checks) are conducted annually; other maintenance and management concerns 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, sampling, sample preservation and handling, and taxonomy also 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, 158, 160, 163, FR-164, and FR-165 and otolith analyses for Project 161 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). 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 2013 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1, Taxonomic Services—We processed the following preserved collections for Task 1a (Project 22F): 268 drift-net and 22 fine-mesh seine collections taken in 2012 from the Yampa River in Echo Park (882 lots containing 6,973 specimens and 156 lots containing 16,313 specimens, respectively); 136 drift-net and 7 fine-mesh seine collections taken in 2012 from the Green River in Echo Park (270 lots-524 specimens, and 50 lots-1,391 specimens, respectively), and 145 razorback-sucker light-trap collections taken in 2012 from the Green River (547 lots-14,006 specimens). For Task 1b (Project 158), we processed 46 drift-net collections taken in 2012 from the Green River at Split Mountain (95 lots-159 specimens) and 29 (UDWR) backwater collections from the middle Green River (99 lots-1,049 specimens). For Task 1c (Project 160), we processed 61 light-trap and 17 seine collections taken in 2011 from the lower green River (136 lots-3,090 specimens, and 26 lots-43 specimens, respectively) and 12 light-trap and 12 seine collections taken in 2012 from the lower Green River (82 lots-8,074 specimens, and 50 lots-688 specimens, respectively). And for Task 1g (Project FR-165), we processed 88 light-trap collections taken in 2012 from Stewart Lake (241 lots-12,724 specimens). All processed specimens have been catalogued and shelved as part of the LFL Collection and the collection data forwarded to the responsible principal investigators (PI's) for analysis and reporting.

Shortcomings—2011 and 2012 collections for Task 1e (Project 163) have not yet been processed and work on 2012 CS-YOY backwater collections (FWS/V) for Task 1b (Project 158) is nearing completion. Work on these collections will continue in winter 2013-2014.

Task 2, Ongoing Collection Maintenance and Management—We: (1) added, as of 30 September, a total of 2,653 lots of fish (65,097 specimens) from UCRB collections or

investigations to the catalogued collection (Appendix A), (2) submitted an updated *Access* database version of our catalog records through FY 2013 (selected fields, flat file) to the Interagency Database Management Program (IDMP) archive, (3) made collection holdings and selected data available to UCRB researchers and other interested parties, including specimens used for developmental study of cyprinid larvae for Project 149 and inventory checks requested by the NPS, (4) responded to incidental requests from UCRB researchers for taxonomic assistance or consultation on larval-fish sampling and collection handling matters, (5) corrected incidentally found errors in our catalog database, (6) installed and tested the latest version of our collection database and management program, *Specify 6*, and (7) conducted an annual fluid level and condition check of our holdings. As of 30 September 2013, we maintain and manage 117,508 lots of cataloged fish (3,794,569 specimens) collected from the UCRB or used for UCRB Recovery Program investigations. These holdings represent about 95% of all LFL cataloged lots (96% of catalogued specimens).

No significant progress was made in FY 2013 towards plans for housing the LFL Collection and other natural history collections on campus together as a university natural history museum. The project awaits adequate development-grant funding.

Shortcomings—Cataloging of some backlog collections remains to be done.

- 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, 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 2013 Budget Status
  - A. Funds Provided: \$261,642
  - B. Funds Expended: \$88,906
  - C. Difference: \$172,736

Explanation: Additional work remains to accomplish 2013 tasks; see Section VII. We received FY 13 funding in July 2013, so have a large amount of funding left, but also a large amount of work to be conducted, since those funds are for sample work to be conducted in late 2013 and 2014. We will be requesting re-obligation of those funds back to us from USBR when a new Cooperative Agreement is set up, which is anticipated for early 2014. Funds were de-obligated when no extension was granted after September 20 2013, when our past Cooperative Agreement ended.

  - D. Percent of FY 2013 work completed and projected costs to complete: about 75% of work completed; funds are sufficient to complete tasks.
  - E. Recovery Program funds spent for publication charges: \$0

XII. Status of Data Submission: 2012 collection data for Project 22F (Task 1a) were internally submitted to Kevin Bestgen and that for Projects 158 (Task 1b, in part), 160 (Task 1c), and FR-165 (Task 1g), as well as 2011 collection data for Project 160, were distributed to respective PI's. An updated *Access* database version of our LFL Collection catalog for UCRB holdings (selected fields, flat file) through FY 2013 was submitted to the IDMP archive.

XIII. Signed: Darrel E. Snyder 13 November 2013  
Principal Investigator Date

Signed: Sean C. Seal 13 November 2013  
Principal Investigator Date

Signed: Kevin R. Bestgen 13 November 2013  
Principal Investigator, Date  
Project Manager

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, 2012 through September 30, 2013 (2,653 lots; 65,097 specimens).

Catalog No.	Field Numbers	Description of Sample Sets
107725	FWS/GJ-06GU-393*	06 SN, Gunnison R, RZ Eval
116336-338	(non-UCRB collection)	
117878	LFL-10GR-LW047*	10 SN, Green R, Lodore-Whirlpool, CO, UT
118991	(non-UCRB collection)	
119903-904	LFL-12CAID-GR-11 to 12*	12 Catostomid Identification Workshop--07 and 12 Green R., CO.
121308-314	EPA-92ER-FM52, FM25; EPA-95CC-FM29; EPA-94CC-CO49S; EPA-94RFR-CO47S; EPA-94JC-CO72S **	92-93 Eagle R, 95 Cross Ck, 94 Coal Ck, 94 Roaring Fork R, and 94 Junction Ck, CO
121315-450	UDWR-11LRZ-L204 to L812	11 LT, Lower Green R, RZ Eval, UT
121451-476	UDWR-11LRZ-S022 to S075	11 SN, Lower Green R, RZ Eval, UT
121480-485	FWS/V-12CS-007, 024, 025, 027, and 032***	12 SN, Green R, CS YOY Eval, UT
121490-566	(non-UCRB collection)	
121567-661	FWS/V-12GR-DR01 to DR57	12 Larvae, DR, Green R, Split Mtn, UT
121662-902	UDWR-12GR-SL01 to SL88	12 LT, Green R, Stewart Lake Eval, UT
121903-918	(non-UCRB collection)	
121919-926	TM-95GR-OCW1; TM-96GR-OCW1 to OCW4	95 & 96, Green R, Old Charlie Wash, UT (Collections by Tim Modde)
121927-2008	UDWR-12LRZ-L101 to L215	12 Larvae, Lower RZ LT, Green R, UT
122009-058	UDWR-12LRZ-S001 to S015	12 Larvae, Lower RZ SN, Green R, UT
122059-605	FWS/V-12RZ-006 to 219	12 Larvae, RZ LT, Green R, Vernal, UT
122606-704	UDWR-12BW-71211 to 90402	12 SN, Green R, Backwater Eval, UT
122705-3585	LFL-12YA-5291 to 8143	12 Larvae, DR, Yampa R, Echo Pk, DNM, CO
123586-741	LFL-12YA-712S1 to 809S10	12 Larvae, SN, Yampa R, Echo Pk, DNM, CO

Catalog No.	Field Numbers	Description of Sample Sets
123742	LFL-12YA-7091*	12 Larvae, DR, Yampa R, Echo Pk,DNM,CO
123745-4014	LFL-12GR-6161 to 8143	12 Larvae, DR, Green R, Echo Pk,DNM,CO
124015-064	LFL-12GR-713S1 to 810S9	12 Larvae, SN, Green R, Echo Pk,DNM,CO

\* Separately cataloged portion of previously cataloged set of collections.

\*\* UCRB collections from a non-Recovery Program project.

\*\*\* Catalog numbers reserved for specific specimens from yet-to-be-cataloged lots.