I. Project Title: Identification and Curation of Larval and Juvenile Fish by Colorado State University Larval Fish Laboratory.

II Principal Investigator(s): Kevin R. Bestgen (Project Manager), Darrel E. Snyder, and Sean C. Seal

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III. Project Summary: This ongoing project provides for: (1) final identification and cataloging of preserved fish collections for Project 22F (Yampa and Middle-Green Colorado Pikeminnow and Razorback Sucker Larval Abundance), (2) incidental taxonomic services and consultation, and (3) cataloging 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. Additional tasks, added in spring 2009, include sample identification for Projects 158 and 160 and otolith analysis for additional smallmouth bass samples collected in the Colorado River in support of Project 161.

IV. 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), 158 (Task 1b, sampling middle Green River drift and backwaters for Age-0 Colorado pikeminnow), and 160 (Task 1c, light-trap and seine sampling in lower Green River for age-0 razorback sucker), and otolith analyses in support of Project 161 (Task 1d, age-0 smallmouth bass from the Colorado River). 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.

V. 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 Project 22F, 158, and 160 collections 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 the 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).

VI. Accomplishments of FY 2011 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1, Taxonomic Services—For Task 1a, Project 22F, we processed 280 preserved 2010 drift-net collections from the Yampa and Green Rivers in Echo Park (744 lots, 5,300 specimens, and 91 lots, 184 specimens respectfully) and 69 preserved 2010 razorback sucker light-trap collections from the Green River (163 lots, 1,136 specimens). For Task 1b, we processed 40 preserved 2010 drift-net collections from the middle Green River at Split Mountain (74 lots, 122 specimens), and 84 preserved 2010 backwater collections also from the middle Green River (161 lots, 20,727 specimens). For Task 1c, we processed 102 preserved 2010 light-trap and seine collections from the lower Green River (218 lots, 1,994 specimens). Regarding Task 1d, otolith analyses are underway having received specimens from investigators working in the Colorado River. There is a considerable backlog of samples, but we are working through the specimens systematically. Results of specimen identifications have been forwarded to the responsible investigators for analysis and reporting and all processed specimens have been catalogued and shelved as part of the LFL Collection except middle Green River backwater collections for which we await associated field data to be resolved for catalog records.

Shortcomings—Middle Green River backwater collections have not yet been properly cataloged and shelved as part of Task 1b. The requisite field data for those catalog records has not yet been verified by Project 160 researchers. Work on Task 1d will continue in winter 2011-2012.

Task 2, Ongoing Collection Maintenance and Management—As of September 30th, we have: (1) added a total of 3,225 lots of fish (105,404 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 2010 (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 2011, we maintain and manage 111,991 lots of cataloged fish (3,659,385 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 2011 towards plans for housing the LFL Collection and other natural history collections on campus together as a university natural history museum. The project still awaits approval and adequate development-grant funding.

Shortcomings—Resolution of some data entry problems and cataloging of some backlog collections have been deferred to FY 2012.

VII. 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.

VIII. Project Status: On-track and ongoing.

IX. FY 2011 Budget Status

A. Funds Provided: $219,269 ($116,679 for FY 2011 plus $82,590 carried over from FY 2010)

B. Funds Expended: $ 170,258

C. Difference: $49,011
Explanation: See task shortcomings in Section VI.

D. Percent of FY 2011 work completed and projected costs to complete: 78% of work completed; $57,342 to complete.

E. Recovery Program funds spent for publication charges: $0

X. Status of Data Submission (Where applicable): Data for Project 22F 2010 collections were internally submitted to Kevin Bestgen, and data for projects 158, 160, and 161 were distributed to PI's. An updated *Access* database version of our catalog for UCRB holdings (selected fields, flat file) through FY 2010 was submitted to the IDMP archive on November 17, 2010.

XI. Signed: Darrel E. Snyder — 11 November 2011
Principal Investigator — Date

Signed: Sean C. Seal — 11 November 2011
Principal Investigator — Date

Signed: Kevin R. Bestgen — 11 November 2011
Principal Investigator, Project Manager — Date

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, 2010 through September 30, 2011 (3,225 lots; 105,404 specimens).

Catalog No.	Field Numbers	Description of Sample Sets
41279-280	CDOW-10ESC-002	10 DN & Minnow Trap, East Salt Creek, CO
58426	UDWR-99YA-6301*	99 Larvae, DR, Yampa R, Echo Pk,DNM,CO
88157	LFL-02GR-LW029*	02 SN, Green R, Lodore-Whirlpool, CO, UT
106033	FWS/GJ-06GU-112*	06 SN, Gunnison R, RZ Eval, CO
107725	FWS/GJ-06CO-184*	06 SN, Colorado R, RZ Eval, CO
108686-687	UDWR-09LRZ-L055, L057*	09 Larvae, Lower RZ LT, Green R, UT
112298	LFL-09YA-SBF104*	09 Small-bodied fish, EL/SN, Yampa R, CO
114778-781	FWS/V-09RZ-087, 115,&117*	09 Larvae, RZ LT, Green R., Vernal, UT
114782-966	UDWR-10LRZ-L001 to L441	10 Larvae, Lower RZ LT, Green R, UT
114967-996	UDWR-10LRZ-S041 to S796	10 Larvae, Lower RZ SN, Green R, UT
114997-999	UDWR-10LRZ-N001 to N003	10 Larvae, Lower RZ DN, Green R, UT
115000-175	LFL-10YA-SBF101 to SBF633	10 Small-bodied fish, EL/SN, Yampa R, CO
115176-185	UDWR-09GR-SL01 to SL05	09 LT, Green R, Stewart Lake Eval, UT
115186-319	UDWR-09GR-BW01 to BW62	09 SN, Green R, Backwater Eval, UT
115320-498	FWS/V-09GR-BW01 to BW36	09 SN, Green R, Backwater Eval, UT
115499-6242	LFL-10YA-6021 to 8163	10 Larvae, DR, Yampa R, Echo Pk,DNM,CO
116243-333	LFL-10GR-7201 to 8163	10 Larvae, DR, Green R, Echo Pk,DNM,CO
116339-412	FWS/V-10GR-DR01 to DR40	10 Larvae, DR, Green R, Split Mtn, UT
116413-575	FWS/V-10RZ-052 to 184	10 Larvae, RZ LT, Green R., Vernal, UT
116576-580	UDWR-10CS-001 to 004	10 SN, Green R, CS Eval, UT
116587-665	LFL-10BS1-608B1 to 7163**	10 Larvae, NF eval, DR, Big Sandy R, WY
116666-694	LFL-10BS2-6232 to 7233**	10 Larvae, NF eval, DR, Big Sandy R, WY
116695-737	LFL-10BS3-6243 to 7281**	10 Larvae, NF eval, DR, Big Sandy R, WY
116738-862	LFL-10BSS-7071 to 10123**	10 Larvae, NF eval, SN, Big Sandy R, WY
116921-8062	LFL-10GR-LW001 to LW059	10 SN, Green R, Lodore-Whirlpool, CO, UT

* Separately cataloged portion of previously cataloged set of collections.
** Catalogued under the non-Recovery Program project for which the specimens were collected.