

**RECOVERY PROGRAM  
FY 2020-2021 SCOPE OF WORK for:**

Recovery Program Project Number: 15

Identification and Curation of Larval and Juvenile Fish

Reclamation Agreement number *[if applicable & known]*: New agreement pending  
Reclamation Agreement term *[if applicable & known]*: Oct. 1, 2018 – Sep. 30, 2023

Lead agency: Larval Fish Laboratory, Colorado State University

Submitted by: Kevin R. Bestgen, Principal Investigator-Project Manager

Darrel E. Snyder, co-Principal Investigator

Larval Fish Laboratory

Department of Fish, Wildlife, and Conservation Biology

Room 33 Wagar Building

Colorado State University

Fort Collins, Colorado 80523-1474

Phone: (970) 491-5295

Fax: (970) 491-5091

E-mail: Darrel.Snyder@ColoState.edu

Category:

Ongoing project

Ongoing-revised project

Requested new project

Unsolicited proposal

Expected Funding Source:

Annual funds

Capital funds

Other

I. Title of Proposal:

Identification and Curation of Larval and Juvenile Fish by Colorado State University Larval Fish Laboratory.

II. Relationship to RIPRAP:

General Recovery Program Support Action Plan

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

V.A. Measure and document population and habitat parameters to determine status and biological response to recovery actions.

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

V.E. Provide for long-term care, cataloging, and accessibility of preserved specimens.

III. Study Background/Rationale and Hypotheses:

This project supports Larval Fish Laboratory (LFL) taxonomic and analytical services for specific Recovery Program projects (Task 1, Taxonomic Services). Incidental taxonomic services and consultation on larval and juvenile fish taxonomy, sampling techniques, and collection handling are also provided, as needed and time allows, to Upper Colorado River Basin (UCRB) researchers.

The project also provides ongoing curation (maintenance and management) of the growing Upper Colorado River Basin (UCRB) portion of the LFL Collection. LFL currently maintains over 4,300,000 UCRB specimens in about 134,000 taxon-specific lots as voucher for Recovery Program and earlier and related UCRB investigations. These collections are an invaluable, long-term, historical resource for future reference and research. Some collections are over quarter century old, dating back to 1976. New collections are cataloged and added to the LFL Collection as they are received or processed by LFL. As the holdings of the LFL Collection become better known, we expect use of UCRB collections will increase substantially, both within and outside the Recovery Program.

As part of the curatorial effort, we continue to pursue arrangements to help ensure collection permanency. In part through the efforts of the principal investigator, preliminary plans continue to develop for administratively and physically consolidating most of the university's Natural History Research Collections (including the LFL Collection) to provide better long-term recognition, support, and facilities for those collections as a functional unit of Colorado State University.

#### IV. Study Goals, Objectives, End Product(s):

##### Goal—

To provide taxonomic, curatorial, and statistical analysis services for various Recovery Program projects.

##### Objectives—

Support Recovery Program researchers by identifying, processing, cataloging, and curating preserved fish, or analyzing otoliths, in specifically designated sets of collections submitted to LFL under this project (Task 1), currently collections from:

- Project 22F, LFL—samples to assess Yampa and Middle-Green Colorado pikeminnow and razorback sucker larval abundance and samples collected in the White River.
- Project 158, Utah Division of Wildlife Resources and U. S. Fish and Wildlife Service, Vernal, Utah offices—samples associated with middle Green River drift and backwater sampling aimed at understanding factors contributing to the decline of age-0 Colorado pikeminnow (Task 1b) and ISMP samples collected at the same time. **No funding accepted due to study suspension.**
- Project 160, Utah Division of Wildlife Resources, Moab, Utah—samples associated with increased light-trap sampling in the lower Green River for age-0 razorback sucker (Task 1c).
- Project 161, Larval Fish Laboratory—Analyze otoliths of age-0 smallmouth bass from the Colorado River (Task 1d). **Request no funding be sent in the near future**, sample analysis not needed.
- Project 163, USFWS, Grand Junction, Colorado—Samples associated with Gunnison River fish community monitoring. This will include any small chub work from samples collected in Black Rocks.

- Project FR-164, USFWS, Vernal, Utah—Samples associated with Green River Larval Trigger Study Plan monitoring in floodplain wetlands in the Green River Basin.
- Project FR-165, UDWR, Vernal, Utah—Samples associated with Green River Larval Trigger Study Plan monitoring in Stewart Lake floodplain wetland.
- Project 127, 131, 163, and Yampa River pike abundance statistical analysis.

Provide, as needed and time allows, incidental taxonomic services and consultation on taxonomy, collecting techniques, and collection handling to other Recovery Program projects and researchers (Task 1).

Catalog and incorporate in the LFL Collection other preserved UCRB specimens deposited by Recovery Program projects and researchers (Task 2).

Continue curation (maintenance and management) of all cataloged UCRB specimens in the LFL Collection (Task 2).

#### End Products—

Annual project reports.

Collection or analysis data for Project 22F, 160, 163, FR-164, and FR-165 researchers.

Other determinations of specimen identity and data.

Cataloging and incorporation of taxonomic services project collections and other deposited UCRB fish collections in the LFL Collection.

Continued maintenance and management of, and access to, the cataloged collection of preserved fish which serve as voucher for Recovery Program investigations and provide a long-term resource for future Recovery Program and other public reference and research.

#### V. Study Area:

The Recovery Program collections identified, processed, and curated by LFL were or will be collected from cool to warm-water reaches of the UCRB, generally exclusive of the San Juan River subbasin.

#### VI. Study Methods/Approach:

**Taxonomic Services**—We will identify preserved specimens (mostly larvae) or analyze otoliths collected and submitted by other Recovery Program projects specified above and process, catalog, and curate the fish collections as part of the LFL Collection. Limited incidental taxonomic services and related consultation for other Recovery Program projects and researchers also will be provided as needed and time allows.

**Ongoing Curation**—The LFL Collection will continue to serve as the depository for larval and other small fish from preserved Recovery Program collections. Methods for receiving, accessioning, cataloging, maintaining, and managing use of these preserved specimens are provided in our draft "Larval Fish Laboratory Collection Policies and Procedures Manual" (Appendix II, Snyder 1996), as adapted for our SPECIFY Collection Management System. We will respond to internal and external requests for collection information and use of specimens; Recovery Program approval will be required for any destructive use or transfer of endangered or rare species. We will continue our effort to ensure collection permanency, in

part through planned consolidation of Colorado State University Natural History Research Collections.

## VII. Task Description and Schedule:

Task 1: Taxonomic Services—As soon as possible after receipt, collections for Recovery Program projects listed below will be identified and otherwise processed, and as time allows, other incidentally requested taxonomic services and consultations.

1a: Collection identification, processing, and curation for Project 22F, includes final identification of Yampa, middle Green, and White River light trap and drift net samples.

1b: Collection identification, processing, and curation for Project 158, UDWR and USFWS backwater study. Study suspended, no budget requested.

1c: Collection identification, processing, and curation for Project 160, lower Green River light trap and seine samples.

1d: Otolith analyses of age-0 smallmouth bass for Project 161. Study data collection not needed, no budget requested.

1e: Collection identification, processing, and curation for Project 163, Gunnison River monitoring, USFWS, Grand Junction.

1f: Collection identification, processing, and curation for Project FR-164, Larval Trigger Study Plan samples, USFWS, Vernal, Utah.

1g: Collection identification, processing, and curation for Project FR-165, Larval Trigger Study Plan samples, Stewart Lake, UDWR, Vernal, Utah.

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), Yampa River (no funding allocated for this in FY18 scopes).

Task 2: Ongoing Curation—As needed throughout each fiscal year.

## VIII. Deliverables, Due Dates, and Budget by Fiscal Year:

Deliverables and Due Dates:

LFL will record and submit collection data to Project 22F, 160, 163, FR-164, and FR-165 researchers as soon as the collections are processed.

Other taxonomic determinations and related information and suggestions will be conveyed to requesting researchers as time allows.

Annual report—November each year.

In 2020 only, submission of a popular-style article about the northern pike estimates on the Yampa River will be completed. The article would be 300-500 words to be submitted by February 28, 2021. Annual report responsibilities to include submission of 6-12 photos of project components or individuals completing tasks by February 28<sup>th</sup>, which will be needed from field staff. Images can be uploaded to;

<https://www.flickr.com/photos/coloradoriverrecovery/>. Each image will have a number, and an email will be sent to the I&E Coordinator with the number, a brief description of the photo, date, location, and photographer identity.

Travel: Travel costs for up to two meetings include hotel, per diem, and mileage to travel to meetings. These include costs for two people.

Personnel: Salaries include 28.2% fringe rate, an estimate for 2020, plus overhead. Overhead is calculated on all items (including salary plus fringe rate) at 17.5%, per our agreement with BOR.

Supplies: Supplies are used in the conduct of lab analysis of specimens and otoliths. Containers and preservatives are to hold field specimens and to curate specimens in the lab, preservative are formalin and ethanol for preservation of samples. Estimated costs based on current prices procured from various online sources (e.g., Fischer Scientific for preservatives, sample jars, vials).

Budget notes: Costs were formerly reduced to accommodate Program needs. This was accomplished by eliminating Colorado River smallmouth bass otolith analysis, eliminating funding for sample analysis under Project 158 (Green River backwater studies), building in only minimal raises for salary between 2016-2019, and decreasing costs for sample identification and other analyses. Increases in other years needed to support mandated raises for personnel; increased sample costs or new project additions may change budget.

Budget reduced during the FY 2018-2019 period by \$35,702 by reducing Principal Investigator time on this project. FY 2020 Budget modified to include tuition costs for a graduate student involved in this project, for \$25,800. No additional funds are required for tuition; all tasks will be fully completed, and costs for tuition are covered by eliminating Principal Investigator costs in Task 1a. Student will be expected to accomplish that level of work doing sample identification, so costs will be converted to salary if a student is not recruited that year.

## IX. Budget Summary

Summary table for FY 2020-2024.

FY2020-2024 budget	
Year	LFL
FY2020	\$264,200
FY2021	\$255,267
FY2022	\$273,360
FY2023	\$265,561
FY2024	\$270,833
	\$1,329,222

X. Reviewers: (Not applicable—ongoing project)

XI. References:

Snyder, D. E. 1996. Preserved larval and small-fish collections of the Upper Colorado River Basin: maintenance and cataloging of a valuable historical database. Final Report of the Larval Fish Laboratory, Colorado State University, to the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin, U.S. Fish and Wildlife Service, Denver, Colorado. (24 April 1996).

---