Museum of Southwestern Biology
Curation of Lower Colorado River Basin Larval Fish Collections and Digital Files

Fiscal Year 2022 Scope of Work

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Award R18AC00015
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Background

Collections Curation and Data Archives – Since 1991, the MSB Division of Fishes has been the permanent repository for large numbers of voucher specimens and associated data collected by San Juan River Restoration Implementation Program (SJRRIP) researchers. The numbers of specimens and field notes processed each year have varied depending on the availability of specimen/field data after the field season, collecting techniques, and annual variability of sampling conditions.

Given the variability in number of fishes to process, the San Juan River Biology Committee has recommended that the annual budget for the San Juan River specimen curation and larval fish identification reflect an "average" year of sample processing. The SJRRIP Biology Committee recognizes that some years would require more effort from MSB staff than budgeted, while other years may not require the same high level of activity. A relatively stable budget would allow for uninterrupted processing of new collections and yet be sufficient to cover the ongoing work of processing backlogged SJRRIP collections due to circumstances previously discussed.

As of March 2021, over 57,500 lots (over 2,400,000 fish specimens) have been collected (1987-2020) by the San Juan River research group and these specimens have been processed, cataloged, and archived at the Museum of Southwestern Biology, Division of Fishes. A total of 20,991 San Juan River collection sites have been entered into the MSB database and georeferenced; all locality and habitat information has been captured using original field notes and data sheets. Over 25,000 pages of original San Juan River field notes and data sheets have been digitally captured, cleaned, and saved in both TIFF and PDF formats for the MSB Division of Fishes electronic archives; the original field notes and data sheets arepermanently stored in acid-free document boxes for long-term conservation.

Incoming specimen collections are removed from WhirlPaks®, cleaned of debris, placed in known concentrations of fixative (either 5% buffered formalin, 10 % buffered formalin, or 95% ethanol), and organized on the accession shelves by MSB staff. Collections are later sorted and identified by principal SJRRIP investigators. Specimen collections are assigned an accession number (tracking number) and all associated documentation, like permits and field notes, are filed under that same number. Processing collections of fish specimens (adults and larvae)

requires fluid transfers from formalin fixative to ethanol preservative (typically), sending out specimens for species verification as required, counting the number of individuals in each collection, recording the standard lengths for the largest and smallest specimen in each collection, entering all locality and specimen data into an electronic catalog, digital capture of field notes and data sheets, and labeling and filing vials and jars of cataloged San Juan River specimens into the permanent MSB collections. The basic principles for accessioning specimens of fishes in the MSB are standard for most museums of natural history (e.g., Smithsonian Institution, Carnegie Museum, and University of Michigan Museum of Zoology). Species identifications and locality/collection data are verified as necessary prior to incorporation into the MSB catalog. Verification is important to prevent incorrect or misleading information from incorporation into subsequent reports on San Juan River fish species. This is particularly important for studies of larval Colorado Pikeminnow (*Ptychocheilus lucius*) and Razorback Sucker (*Xyrauchen texanus*). For purposes of permitting, the MSB provides the Program with field and species data in museum report format. This information includes species identification, catalog number (MSB number), number of specimens and size range per lot.

Study Area

The objective of this project is to process and organize specimens of fishes, tissues for genetic study, collection data, and field notes taken under the San Juan River Recovery Implementation Program (San Juan River and Upper Colorado River Basin). Field data are captured in an electronic catalog and SJRRIP collections are organized in a phylogenetic system within the museum archives for easy access. All activities take place in the Division of Fishes, Museum of Southwestern Biology on the University of New Mexico campus in Albuquerque, NM. Synthesis, analysis, and integration of relevant elements of thislarge database is done in collaboration with the USFWS SJRRIP Program Office in Albuquerque and is presented at SJRRIP researchers' meetings held in the Four Corners area, Colorado or New Mexico.

The MSB Division of Fishes has three offices with a total of six computer workstations for data entry, data management, and data analysis; a fully equipped laboratory for preparation of fish specimens, andapproximately 1,858 linear meters of compacted shelving for storage of cataloged collections. On average, four UNM student positions and one staff position (three undergraduate, one graduate student, and Collections Manager) process, curate, and maintain SJRRIP collections.

Curation and Collections Care Objectives

1. Provide a secure and organized physical and digital repository for San Juan River fish collections, fieldnotes, and associated data thereby facilitating access to these resources by SJRRIP researchers.
2. Ensure that all SJRRIP species identifications and associated data are verified and correctly represented in the MSB electronic catalog. Report discrepancies to SJRRIP principal investigators.
3. Georeference collection sites for SJRRIP collections, maintain a license for ArcView, and make collection data available to SJRRIP researchers in georeferenced format as required.

Curation and Collections Care Methods

Tasks to be completed under this project are processing and curation of fish specimens and all data from the San Juan River Basin Recovery Implementation Program synthesized and integrated in the form of reports to the committee and peer review publications. Specimen collections are deposited with the MSB Division of Fishes by SJRRIP principal investigators.

Upon receipt of newly collected San Juan River specimens, MSB staff transfer collections from formalin fixative into stages of 35%, 50%, and 70% concentrations of ethanol. Exceptions to this protocol are made per request of PI, as in the case of using 95% ethanol for genetic and/or otolith studies. Some tissue archives include a dry-storage system that employs Whatman filter paper. Tissues taken in the field are attached to the filter paper and allowed to dry. Once deposited, Whatman tissue samples are placed in plastic sleeves with the air removed and catalogued into the permanent collections. Preservation histories for all incoming SJRRIP collections are recorded on accession cover sheets and this information is stored in accession files.

Whole fish specimens are removed from field containers and cleaned (debris removed) and placed into museum quality jars during the fluid transfers. SJRRIP principle investigators sort, identify, count and measure each lot (discrete collection) once the collections are transferred to ethanol. MSB staff catalog, label, and file the specimens once the principle investigators have completed their work. SJRRIP collections are organized in the permanent archives by drainage (San Juan River) and taxa. These archives are in a room that is controlled for temperature (18° Celsius) and light (complete darkness to low light levels). All data associated with the specimens are entered and organized in the electronic MSB Division of Fishes database (MS Access 2010) and georeferenced (GeoLocate Ver. 3). All original field notes and data sheets are digitally captured and archived in acid-free document boxes for permanent storage.

Deliverables 2022

SJRRIP and Upper Colorado River Basin fishes and associated data will be curated in the Division of Fishes, Museum of Southwestern Biology (MSB), at the University of New Mexico (UNM). Collection sites will be georeferenced and made available in the Arctos (https://arctos.database.museum/) database. Original field notes will be digitized and archived by the MSB Division of Fishes and collection data electronically stored in a permanent MSB database program. San Juan River digital files (data and field notes) are backed up in four distinct storage media: one server in MSB Division of Fishes, another server located in UNM Department of Biology, the Arctos database that resides at The Texas Advanced Computing Center (TACC) in Austin, TX, and one external hard drive. Species verifications, corrections, and digital copies (PDF) of field notes will be made available to SJRRIP principle investigators upon request. A draft report of the 2021 San Juan River and upper Colorado River Basin specimen curation, larval fish sampling and identification activities will be prepared and distributed by 31 March 2022 to the San Juan River Biology Committee for review. Upon receipt of written comments, that report will be finalized and disseminated to members of the San Juan River Biology Committee by 1 June 2022.

Manuscripts, suitable for peer reviewed publication, will be prepared in collaboration with appropriate program personnel, the biology committee, and researchers for each common agreed upon investigation.

Budget Fiscal Year 2022 1 October 2021 to 30 September 2022

Budget Fiscal Year 2022			1 October 2021 to 30 September 2022			
BUDGET ITEM DESCRIPTION	COMPUTATION		RECIPIENT FUNDING	OTHER FUNDING	RECLAMATION FUNDING	TOTAL COST
	$/Unit	Quantity				
SALARIES AND WAGES --Position title x hourly wage/salary x est. hours for assisted activity. Describe this information for each						
UNM Student Assistants(2)	10.82/HR	1760			$19,043.20	$19,043.20
UNM Student Assistants(2)	11.33/HR	1760			$19,940.80	$19,940.80
FRINGE BENEFITS – Explain the type of fringe benefits and how applied to various categories of personnel.						
Undergraduate student UNM rate	1% per salary	4			$389.84	$389.84
TRAVEL—dates; location of travel; method of travel x estimated cost; who will travel						
EQUIPMENT—Leased Equipment use rate + hourly wage/salary x est. hours for assisted activity—Describe equipment to be purchased, unit price, # of units, for all equipment to be purchased or leased for assisted activity; Do not list contractor supplied						
SUPPLIES/MATERIALS--Describe all major types of supplies/materials, unit price, # of units, etc., to be used on this assisted activity						
Chemical Preservatives-EtOH 95%	$2.84/Liter	200			$568.00	$568.00
Labeling-paper and print film	$2.44/each	100			$244.00	$244.00
Specimen containers-3 liter jars	$9.26/each	30			$277.80	$277.80
Specimen containers-8oz jars	$1.05/each	50			$52.50	$52.50
Specimen containers-8 dr vials	$1.28/each	1200			$1,536.00	$1,536.00
Specimen containers-1 dr vials	$0.50/each	300			$150.00	$150.00
Closures-cotton plugs	$0.01/each	4000			$40.00	$40.00
Closures-gaskets	$3.40/each	30			$102.00	$102.00
Closures-caps	$0.35/each	45			$15.75	$15.75
CONTRACTUAL/ CONSTRUCTION—Explain any contracts or sub-Agreements that will be awarded, why needed. Explain contractor qualifications and how the contractor will be selected						
OTHER –List any other cost elements necessary for your project; such as extra reporting, or contingencies in a construction contract.						
TOTAL DIRECT COSTS–					$42,359.89	$42,359.89
INDIRECT COSTS – **17.5%**						
					$7,412.98	$7,412.98
TOTAL PROJECT/ACTIVITY COSTS FY22					$49,772.87	**$49,772.87**

FY 2022 Budget Summary

2022 Grand Total
Curation of SJRRIP Specimen, Data, and Field Note Collections

$49,772.87

Indirect Costs Statement: A 17.5% (of Modified Total Direct Costs) Facilities and Administration Cost is applied to annual budgets in accordance with the Colorado Plateau Cooperative Ecosystem Study Unit (CPCESU) agreement. The US Bureau of Reclamation and the University of New Mexico are co-signatories on the agreement.

CESUs are cooperative networks that transcend political and institutional boundaries. Instead, their boundaries are based primarily on biogeographical considerations. The goal of the CESUs is create innovative opportunities for research, education, and technical assistance in support of the management and stewardship of natural and cultural resources on federal lands. More information on the CPCESU can be found at https://in.nau.edu/cpcesu/.

References

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Walsh, S.J. and M.R. Meador. 1998. Guidelines for quality assurance and quality control of fishtaxonomic data collected as part of the national water-quality assessment program. U.S. Geological Survey Water-Resources Investigations Report 98-4239.

2008. Scientific Collections: Mission-Critical Infrastructure for Federal Science Agencies. A Report of the Interagency Working Group on Scientific Collections (IWGSC) ISBN 978-0-9819500-0-6 http://www.whitehouse.gov/sites/default/files/sci-collections-report-2009-rev2.pdf

Attachment A

Museum of Southwestern Biology
Curation of Specimens, Data, and Field Notes
San Juan River Restoration Implementation Program

FY 2023-2025

THE FOLLOWING BUDGETS ARE ESTIMATES ONLY (3% INCREASES)
AND MAY NOT REPRESENT ACTUAL COSTS

Budget Fiscal Year 2023 1 October 2022 to 30 September 2023

Budget Fiscal Year 2023			1 October 2022 to 30 September 2023			
BUDGET ITEM DESCRIPTION	COMPUTATION		RECIPIENT FUNDING	OTHER FUNDING	RECLAMATION FUNDING	TOTAL COST
	$/Unit	Quantity				
SALARIES AND WAGES --Position title x hourly wage/salary x est. hours for assisted activity. Describe this information for each						
UNM Student Assistants(2)	11.14/HR	1760			$19,606.40	$19,606.40
UNM Student Assistants(2)	11.67/HR	1760			$20,539.20	$20,539.20
FRINGE BENEFITS – Explain the type of fringe benefits and how applied to various categories of personnel.						
Undergraduate student UNM rate	1% per salary	4			$401.46	$401.46
TRAVEL—dates; location of travel; method of travel x estimated cost; who will travel						
EQUIPMENT—Leased Equipment use rate + hourly wage/salary x est. hours for assisted activity—Describe equipment to be purchased, unit price, # of units, for all equipment to be purchased or leased for assisted activity; Do not list contractor supplied						
SUPPLIES/MATERIALS--Describe all major types of supplies/materials, unit price, # of units, etc., to be used on this assisted activity						
Chemical Preservatives-EtOH 95%	$2.93/Liter	200			$586.00	$586.00
Labeling-paper and print film	$2.51/each	100			$251.00	$251.00
Specimen containers-3 liter jars	$9.54/each	30			$286.20	$286.20
Specimen containers-8oz jars	$1.08/each	50			$54.00	$54.00
Specimen containers-8 dr vials	$1.32/each	1200			$1,584.00	$1,584.00
Specimen containers-1 dr vials	$0.52/each	300			$156.00	$156.00
Closures-cotton plugs	$0.01/each	4000			$40.00	$40.00
Closures-gaskets	$3.50/each	30			$105.00	$105.00
Closures-caps	$0.36/each	45			$16.20	$16.20
CONTRACTUAL/ CONSTRUCTION—Explain any contracts or sub-Agreements that will be awarded, why needed. Explain contractor qualifications and how the contractor will be selected						
OTHER –List any other cost elements necessary for your project; such as extra reporting, or contingencies in a construction contract.						
TOTAL DIRECT COSTS–					$43,625.46	$43,625.46
INDIRECT COSTS – **17.5%**						
					$7,634.45	$7,634.45
TOTAL PROJECT/ACTIVITY COSTS FY23					$51,259.91	**$51,259.91**

Budget Fiscal Year 2024 1 October 2023 to 30 October 2024

Budget Fiscal Year 2024			1 October 2023 to 30 September 2024			
BUDGET ITEM DESCRIPTION	COMPUTATION		RECIPIENT FUNDING	OTHER FUNDING	RECLAMATION FUNDING	TOTAL COST
	$/Unit	Quantity				
SALARIES AND WAGES --Position title x hourly wage/salary x est. hours for assisted activity. Describe this information for each p						
UNM Student Assistants(2)	11.47/HR	1760			$20,187.20	$20,187.20
UNM Student Assistants(2)	12.02/HR	1760			$21,155.20	$21,155.20
FRINGE BENEFITS – Explain the type of fringe benefits and how applied to various categories of personnel.						
Undergraduate student UNM rate	1% per salary	4			$413.42	$413.42
TRAVEL—dates; location of travel; method of travel x estimated cost; who will travel						
EQUIPMENT—Leased Equipment use rate + hourly wage/salary x est. hours for assisted activity—Describe equipment to be purchased, unit price, # of units for all equipment to be purchased or leased for assisted activity. Do not list contractor supplied						
SUPPLIES/MATERIALS--Describe all major types of supplies/materials, unit price, # of units, etc., to be used on this assisted activity						
Chemical Preservatives-EtOH 95%	$3.02/Liter	200			$604.00	$604.00
Labeling-paper and print film	$2.59/each	100			$259.00	$259.00
Specimen containers-3 liter jars	$9.83/each	30			$294.90	$294.90
Specimen containers-8oz jars	$1.11/each	50			$55.50	$55.50
Specimen containers-8 dr vials	$1.36/each	1200			$1,632.00	$1,632.00
Specimen containers-1 dr vials	$0.54/each	300			$162.00	$162.00
Closures-cotton plugs	$0.01/each	4000			$40.00	$40.00
Closures-gaskets	$3.61/each	30			$108.30	$108.30
Closures-caps	$0.37/each	45			$16.65	$16.65
CONTRACTUAL/ CONSTRUCTION—Explain any contracts or sub-Agreements that will be awarded, why needed. Explain contractor qualifications and how the contractor will be selected						
OTHER –List any other cost elements necessary for your project; such as extra reporting, or contingencies in a construction contract.						
TOTAL DIRECT COSTS–					$44,928.17	$44,928.17
INDIRECT COSTS – **17.5%**						
					$7,862.43	$7,862.43
TOTAL PROJECT/ACTIVITY COSTS FY24					$52,790.60	**$52,790.60**

Budget Fiscal Year 2025 1 October 2024 to 30 September 2025

Budget Fiscal Year 2025			1 October 2024 to 30 September 2025			
BUDGET ITEM DESCRIPTION	COMPUTATION		RECIPIENT FUNDING	OTHER FUNDING	RECLAMATION FUNDING	TOTAL COST
	$/Unit	Quantity				
SALARIES AND WAGES --Position title x hourly wage/salary x est. hours for assisted activity. Describe this information for each						
UNM Student Assistants(2)	11.81/HR	1760			$20,785.60	$20,785.60
UNM Student Assistants(2)	12.38/HR	1760			$21,788.80	$21,788.80
FRINGE BENEFITS – Explain the type of fringe benefits and how applied to various categories of personnel.						
Undergraduate student UNM rate	1% per salary	4			$425.74	$425.74
TRAVEL—dates; location of travel; method of travel x estimated cost; who will travel						
EQUIPMENT—Leased Equipment use rate + hourly wage/salary x est. hours for assisted activity—Describe equipment to be purchased, unit price, # of units, for all equipment to be purchased or leased for assisted activity; Do not list contractor supplied						
SUPPLIES/MATERIALS--Describe all major types of supplies/materials, unit price, # of units, etc., to be used on this assisted activity						
Chemical Preservatives-EtOH 95%	$3.11/Liter	200			$622.00	$622.00
Labeling-paper and print film	$2.67/each	100			$267.00	$267.00
Specimen containers-3 liter jars	$10.12/each	30			$303.60	$303.60
Specimen containers-8oz jars	$1.14/each	50			$57.00	$57.00
Specimen containers-8 dr vials	$1.40/each	1200			$1,680.00	$1,680.00
Specimen containers-1 dr vials	$0.57/each	300			$171.00	$171.00
Closures-cotton plugs	$0.01/each	4000			$40.00	$40.00
Closures-gaskets	$3.72/each	30			$111.60	$111.60
Closures-caps	$0.38/each	45			$17.10	$17.10
CONTRACTUAL/ CONSTRUCTION—Explain any contracts or sub-Agreements that will be awarded, why needed. Explain contractor qualifications and how the contractor will be selected						
OTHER –List any other cost elements necessary for your project; such as extra reporting, or contingencies in a construction contract.						
TOTAL DIRECT COSTS–					$46,269.44	$46,269.44
INDIRECT COSTS – **17.5%**						
					$8,097.15	$8,097.15
TOTAL PROJECT/ACTIVITY COSTS FY25					$54,366.60	**$54,366.60**