

**SMALL-BODIED FISHES MONITORING
FISCAL YEAR 2017 STATEMENT OF WORK AND PROJECT BUDGET
AGREEMENT NUMBER: SJ2631**

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GOAL

The goal of small-bodied fishes monitoring is to quantitatively assess the effects of management actions on survival of post-larval early life stages of native and nonnative fishes and their recruitment into subsequent life stages and use this information to recommend appropriate modifications to recovery strategies for Colorado Pikeminnow *Ptychocheilus lucius* and Razorback Sucker *Xyrauchen texanus* in the San Juan River (SJRIP 2012).

BACKGROUND

In 1991, a 7-year research period was initiated to gather baseline information on federally endangered Colorado Pikeminnow and Razorback Sucker after both species were re-discovered and documented spawning in the San Juan River. In 1992, a Cooperative Agreement between the U.S. Fish and Wildlife Service, States of Colorado and New Mexico, the Jicarilla Apache Indian Tribe, the Southern Ute Indian Tribe, and the Ute Mountain Ute Indian Tribe was signed to form the San Juan River Basin Recovery Implementation Program (SJRIP). The Navajo Nation later signed the Cooperative Agreement and joined the SJRIP in 1996. The purpose of the SJRIP is to conserve populations of Colorado Pikeminnow and Razorback Sucker in the San Juan River Basin while water development proceeds in the basin in compliance with all federal, state, and tribal laws (SJRIP 2015). The research program was incorporated into the SJRIP when it was formed in 1992.

After the 7-year research period ended, the SJRIP initiated several management actions to aid in endangered species recovery including mechanical control of nonnative species, habitat restoration, population augmentation, and the implementation of flow recommendations. To assess the effects of these management actions on endangered fish recovery and the native fish community as a whole, a long-term monitoring program was initiated in 1998. The goals of this monitoring program were to: (1) track the status and trends of endangered and other fish populations in the San Juan River, (2) track changes in abiotic parameters important to the fish community, and (3) utilize collected data to help assess progress towards recovery of endangered fish species (Propst et al. 2006). The SJRIP Long-Range Plan specifies that monitoring and evaluation of fish in the San Juan River is a necessary element for assessing the progress of the recovery program for Colorado Pikeminnow and Razorback Sucker (Element 4; SJRIP 2015).

Task 4.1.2.2 of the SJRIP's Long-Range Plan specifies the need for juvenile and small-bodied fish monitoring to locate areas and habitats used for rearing and to determine if young fish are surviving and recruiting into adult populations (SJRIP 2015). Data collected during annual small-bodied fish monitoring can be used to assess recovery of Colorado Pikeminnow and Razorback Sucker. In addition to assessing recovery of both endangered fish species, small-bodied monitoring data have also been used to evaluate the influences of SJRIP management actions on the river's fish community as a whole. These

assessments have included evaluating the effects of flow regime management on small-bodied fishes in secondary channels (Propst and Gido 2004; Franssen et al. 2007; Gido and Propst 2012; Gido et al. 2012), assessing the influences of habitat stability on the spatial and temporal trends in small-bodied fish communities in secondary channels (Gido et al. 1997), and determining the effects of habitat heterogeneity on the community structure of small-bodied fishes (Franssen et al. 2015).

MONITORING OBJECTIVES

The specific objectives for small-bodied fishes monitoring include:

1. Annually document occurrence and density of native and nonnative age-0/small-bodied fishes in the San Juan River.
2. Document mesohabitat use by age-0 Colorado Pikeminnow, Razorback Sucker, and Roundtail Chub, as well as other native and nonnative fishes in the primary channel, secondary channels, and backwaters.
3. Obtain data that will aid in the evaluation of the responses of native and nonnative fishes to different flow regimes and other management actions.
4. Track trends in native and nonnative species populations.
5. Characterize patterns of mesohabitat use by native and nonnative small-bodied fishes.

Hypotheses

The specific hypotheses for small-bodied fishes monitoring from the Monitoring Plan and Protocols (SJRIP 2012) include:

1. H_0 : There is no influence of spring discharge quantity and duration on autumn density of age-0 native fishes.
2. H_0 : There is no influence of spring discharge quantity and duration on autumn density of age-0 nonnative fishes.
3. H_0 : Quantity of summer baseflow has no effect on survival of age-0 native fishes, as determined by autumn densities of age-0 specimens.
4. H_0 : Quantity of summer baseflow has no effect on reproductive success/survival of age-0 nonnative fishes, as determined by autumn densities of age-0 specimens.
5. H_0 : Mimicry of the natural flow regime has no effect on native or nonnative fishes.
6. H_0 : Habitat complexity has no influence on densities of native and nonnative fishes.
7. H_0 : Densities of age-0 and small-bodied fishes has no influence on the distribution and density of age-0 to age-3 Colorado Pikeminnow.
8. H_0 : Mechanical removal of nonnative predators has no effect on the density of small-bodied native fishes.

STUDY AREA

The study area for annual small-bodied fishes monitoring extends from River Mile (RM) 180 near the San Juan-Animas rivers confluence downstream to RM 76.4 at San Island, UT. The section of river from RM 76.4 to 2.9 at Clay Hills, UT is only sampled during regular monitoring every fifth year. This section of river was last sampled in 2015 and will be sampled again in 2020.

In addition to sampling the common area from RM 180 to 76.4, two additional sections of the San Juan River and one section of the Animas River will be sampled in FY 2017. The two additional sections on the San Juan River include (1) RM 196.1 near Bloomfield, NM downstream to the San Juan-Animas rivers confluence at RM 180 and (2) RM 76.4 at Sand Island, UT downstream to RM 52.0 at Mexican Hat, UT. The section of the San Juan River from Sand Island to Mexican Hat will only be sampled if funding for the current nonnative removal study is continued. The Animas River will also be sampled

from Aztec, NM downstream to the San Juan-Animas rivers confluence in the spring (March/April) depending on flows and access.

METHODS

Small-bodied fishes monitoring is designed to efficiently and effectively sample those habitats which have the greatest likelihood of supporting age-0 individuals of large-bodied species and all age classes of small-bodied species. Sampling will occur in September in conjunction with sub-adult and adult monitoring. The primary channel will be sampled at designated 3-mile intervals, skipping the miles sampled by sub-adult and adult monitoring crews (SJRIP 2012). All secondary channels (less than 20% of total flow) and large backwaters ($> 50 \text{ m}^2$) will be sampled when encountered, regardless if they occur within a designated 3-mile interval or not. Sample reaches will be approximately 200 m long (measured along the shoreline) at primary channel sample sites and, depending upon the extent of surface water, 100 – 200 m long at secondary channel and large backwater sample sites.

In the fall of 2012, six secondary channels were modified during the Phase I River Ecosystem Restoration Initiative (RERI) habitat restoration efforts through excavation of sediment and removal of nonnative plants. These channels are located at RM 132.2, 132.0, 130.7A, 130.7B, 128.6, and 127.2. An additional channel located at RM 136.5 was restored during Phase II habitat restoration efforts in 2014. These restoration sites will be visited during annual small-bodied fishes monitoring and sampled if flowing following the protocols described below.

River mile, geographic coordinates (UTM NAD83), and water quality parameters (dissolved oxygen, conductivity, and temperature) will be recorded at each sampling site. All mesohabitats (e.g., riffle, run, pool) present within a site (except large backwaters) will be sampled in rough proportion to their availability using a 3.0 x 1.8 m (3.0 mm heavy duty Delta untreated mesh) drag seine. Uncommon mesohabitats (e.g., debris pools and backwaters) are sampled in greater proportion to their availability than common mesohabitats. Seine hauls will be made in at least eight different mesohabitats at each site; however, if habitat is homogeneous, as few as five seine hauls will be made. At least two seine hauls, one across the mouth and one parallel to its long axis will be made at each large backwater unless the backwater mouth is too narrow, in which case at least one seine haul, parallel to the backwaters long axis, will be made.

All captured fishes will be identified to species and measured for total length (mm TL) and standard length (mm SL). All native fishes will be released and nonnative fishes removed from the river. Fishes too small to easily identify in the field will be fixed in 10% formalin and returned to the laboratory. After collection of fish, the sampled width and length of each mesohabitat is measured to the nearest 0.1 m and recorded. The depth and dominant substrate at five generalized locations, and any cover (e.g., boulders, debris piles, large woody debris) associated with the mesohabitat will also recorded. Retained specimens will be identified and measured (TL and SL) in the laboratory to the nearest 0.1 mm and accessioned to the UNM-MSB, Division of Fishes.

DATA ANALYSIS AND REPORTING

Analyses conducted each year will be based on density of individual species, calculated for each individual seine haul as the number of fish captured per square meter (sampled width x sampled length). Annual reports will primarily be a summation of data obtained each year, a synthesis of data across years to document/assess species populations' trends, a summary of mesohabitat associations, and basic characterizations of species demographics. Separate data summaries and analyses will also be conducted for the Phase I RERI secondary channels and any sampling conducted in the Animas River.

All data collected will be recorded on electronic spreadsheets and provided to USFWS Program Office by the principal investigator, along with the annual final report, by June 30 of the year following data collection.

REFERENCES

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- Gido, K.B., D.L. Propst, and M.C. Molles, Jr. 1997. Spatial and temporal variation of fish communities in secondary channels of the San Juan River, New Mexico and Utah. *Environmental Biology of Fishes* 49:417-434.
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- Propst, D.L., and K.B. Gido. 2004. Responses of native and nonnative fishes to natural flow regime mimicry in the San Juan River. *Transactions of the American Fisheries Society* 133:922-931.
- Propst, D.L., S.P. Platania, D.W. Ryden, and R.L. Bliesner. 2006. San Juan River monitoring plan and protocols (revised). San Juan River Basin Recovery Implementation Program. U.S. Fish and Wildlife Service, Albuquerque, New Mexico.
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- SJRIP (San Juan River Basin Recovery Implementation Program). 2015. Long-range plan. San Juan River Basin Recovery Implementation Program, U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

FUNDING HISTORY:

Fiscal Year 2000	\$57,200	Fiscal Year 2010	\$89,479
Fiscal Year 2001	51,700	Fiscal Year 2011	82,929
Fiscal Year 2002	51,700	Fiscal Year 2012	83,417
Fiscal Year 2003	49,775	Fiscal Year 2013	92,353
Fiscal Year 2004	63,545	Fiscal Year 2014	84,307
Fiscal Year 2005	72,645	Fiscal Year 2015	95,054
Fiscal Year 2006	72,885	Fiscal Year 2016	89,345
Fiscal Year 2007	81,246		
Fiscal Year 2008	91,882		
Fiscal Year 2009	89,479		

FY 2017 BUDGET**Sampling Costs****Personnel**

Tasks - Annual monitoring primary channel, secondary channel, and backwater habitats, San Juan River, Bloomfield, NM to Mexican Hat, UT; The Nature Conservancy and upstream sites; 16 field days projected at 12 hours of work per day = 192 hours (project leader 7 days).

Project Leader (1)

56 hrs regular @ \$45.66/hr (\$33.19/hr (base salary) + \$12.47 (benefits))	\$ 2,557
28 hrs overtime @ \$68.49/hr (\$45.66/hr * 1.5 (time-and-a-half))	\$ 1,918

Project Biologist (3)

128 hrs regular @ \$36.58/hr (\$26.59/hr (base salary) + \$9.99 (benefits)) * 3	\$ 14,047
64 hrs overtime @ \$54.87/hr (\$36.58/hr * 1.5 (time-and-a-half)) * 3	\$ 10,535

Sub-total	\$ 29,057
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Per Diem

9 days @ \$85/day (standard NM in-state rate) * 4 biologists	\$ 3,060
7 days @ 115/day (standard NM out-of-state rate) * 4 biologist	\$ 3,220

Sub-total	\$ 6,280
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Vehicles

Round-trip Farmington/Shiprock, NM – 850 miles @ \$0.55/mile	\$ 468
Round-trip to Mexican Hat, Utah – 1,400 miles @ \$0.55/mile	\$ 770

Sub-total	\$ 1,238
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Field Equipment & Supplies

Water quality instrument maintenance 2@\$400	\$ 800
Life Jackets 5@\$40	\$ 200
Raft maintenance	\$ 500
Whirlpacks (500) @ \$50.00/500	\$ 50
Formalin (6 gal) @ \$25/5gal	\$ 150

Sub-total	\$ 1,700
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Sampling Costs Sub-total	\$ 38,275
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Specimen Management**Personnel**

Tasks - Processing (sorting, identification, and data-entry); 15 days of in the laboratory at 8 hours of work per day = 120 hours.

Project Biologists (2)

120 hrs regular @ \$36.58/hr (\$26.59/hr (base salary) + \$9.99 (benefits)) * 2	\$ 8,780
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Specimen Management Sub-total	\$ 8,780
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Data Management/Analysis and Report Preparation**Personnel**

Tasks – Data management and QA/QC, data analysis and synthesis, table and graph preparation, report drafting and revision; Project Leader (120 hrs) and two Project Biologist (200 hrs each).

Project Leader (1)	
120 hrs regular @ 45.66/hr (\$33.19/hr (base salary) + \$12.47 (benefits))	\$ 5,480
Project Biologist (2)	
200 hrs regular @ 36.58/hr (\$26.59/hr (base salary) + \$9.99 (benefits)) * 2	\$ 14,632

Data Management/Analysis & Report Preparation Sub-total \$ 20,112

Reviews & Meetings

Personnel

Tasks – Project Leader: attend 2 Biology Committee meetings per year (@ 28 hrs each) and review reports (40 hrs); Project Biologist: attend 5 Biology Committee meetings per year (@ 28 hrs each) and review reports (60 hrs).

Project Leader (1)	
86 hrs @ \$45.66/hr (\$33.19/hr (base salary) + \$12.47 (benefits))	\$ 3,927
Project Biologists (1)	
200 hrs @ 36.58/hr (\$26.59/hr (base salary) + \$9.99 (benefits))	\$ 7,316

Sub-total \$ 11,243

Per Diem (meetings requiring travel)

Project Leader (1)	
6 days @ \$115.00/day (standard NM out-of-state rate)	\$ 690
Project Biologists (1)	
3 days @ \$85.00/day (standard NM in-state rate)	\$ 255
9 days @ \$115.00/day (standard NM out-of-state rate)	\$ 1,035

Sub-total \$ 1,980

Vehicle

Roundtrip to Farmington, NM (1 meeting) – 400 miles @ \$0.55/mile	\$ 220
Roundtrip to Durango, CO (3 meetings) – 500 miles @ \$0.55/mile * 3	\$ 825

Sub-total \$ 1,045

Reviews & Meetings Sub-total \$ 14,268

Administrative

Personnel

Tasks – Project Leader: administration of agreements, tracking budget expenditures (120 hrs); Project Biologist: purchasing equipment, arranging travel (80 hrs)

Project Leader (1)	
120 hrs @ \$45.66 (\$33.19/hr (base salary) + \$12.47 (benefits))	\$ 5,480

Project Biologist (1)	
80 hrs @ \$36.58/hr (\$26.59/hr (base salary) + \$9.99 (benefits))	\$ 2,927

Administrative Sub-total	\$ 8,407
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FY 2017 Total

Field Work Sub-total	\$ 38,275
Specimen Management Sub-total	\$ 8,780
Data Management/Analysis & Report Preparation	\$ 20,112
Reviews & Meetings	\$ 14,268
Administrative	\$ 8,407

Total	\$ 89,842
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Out-Year Budgets within Current Agreement (Through FY2018)

<u>FY 2018 TOTAL</u>	<u>\$88,936</u>
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Out-Year Budgets Beyond Current Agreement (FY2019 and 2020)

<u>FY 2019 TOTAL</u>	<u>\$91,604</u>
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<u>FY 2020 TOTAL</u>	<u>\$116,337</u>
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