Sub-Adult and Adult Large-Bodied Fish Community Monitoring Fiscal Year 2018 Project Proposal 4 May 2017

Principal Investigator:
Ben Schleicher and Dale Ryden
U. S. Fish and Wildlife Service
Colorado River Fishery Project
445 West Gunnison Ave, Suite 140
Grand Junction, Colorado 81501
(970) 628-7205
benjamin_schleicher@fws.gov dale_ryden@fws.gov

Contract or Agreement number(s):
R13PG40052 for USFWS – Grand Junction, CO
R13PG40051 for USFWS – Albuquerque, NM
R13AC40007 for UDWR – Moab, UT

Reporting Dates: 10/1/2017 through 9/30/2018

Sub-Adult & Adult Large-Bodied Fish Community Monitoring
(a.k.a. Adult Monitoring)
Fiscal Year 2018 Project Proposal
1 March 2017

Principal Investigator:
Benjamin Schleicher and Dale Ryden
U. S. Fish and Wildlife Service
Grand Junction Fish and Wildlife Conservation Office
445 West Gunnison Ave, Suite 140
Grand Junction, Colorado 81501
(970) 628-7205
benjamin_schleicher@fws.gov dale_ryden@fws.gov

Background:

Studies performed before 1991 documented a native San Juan River fish fauna of eight species, including Colorado Pikeminnow *ptychocheilus lucius,* Razorback Sucker *xyrauchen texanus*, and Roundtail Chub *gila robusta* and provided baseline information on distribution and abundance of native and introduced fish species in the San Juan River. These studies indicated that at least one of the two endangered fish species (i.e., Colorado Pikeminnow) was still a viable member of the San Juan River fish community.

Between 1991 and 1998, the Main Channel Fish Community Monitoring study (called "Adult Monitoring" for short), greatly refined our understanding of the San Juan River fish community. The main sampling technique employed during the 1991-1998 Adult Monitoring study was raft-borne electrofishing, although radio telemetry was also heavily employed. Data collected during the 1991-1998 Adult Monitoring study provided information on specific habitat usage by rare fish species. In addition, data gathered during the 1991-1998 Adult Monitoring study aided in the selection of specific sites for detailed hydrologic measurements and larval drift sampling. Integration of 1991-1998 Adult Monitoring data along with data from Colorado Pikeminnow macrohabitat studies, Razorback Sucker experimental stocking studies, tributary and secondary channel studies, fish health studies, contaminants studies, habitat mapping studies, and non-native species interaction studies, helped provide a logical framework upon which to make flow recommendations for the reoperation of Navajo Reservoir that would benefit the San Juan River's endangered fishes (as well as other members of the native fish community).

The Sub-Adult & Adult Large-Bodied Fish Community Monitoring study (also referred to as Adult Monitoring), which began in 1999, is a direct offshoot of the 1991-1998 Adult Monitoring study. This study is one of a suite of long-term monitoring efforts detailed in the San Juan River Basin Recovery Implementation Program's (SJRBRIP) Monitoring Plan and Protocols (SJRBRIP 2012) that are designed to help evaluate progress of the two endangered fish species towards recovery under the SJRBRIP's Long Range Plan (SJRBRIP 2014). The current Adult Monitoring study incorporates essentially the same monitoring protocols as did its 1991-1998 precursor study (e.g., sampling via raft-borne electrofishing). This allows for data collected during the current Adult Monitoring study to be validly combined with and compared to the older 1991-1998 Adult Monitoring data. The combination of these two data sets provides statistically-powerful, long-term trend data through which the SJRBRIP's Biology Committee can view changes in the San Juan River's large-bodied fish community over time. This long-term trend data allows the

SJRBRIP Biology Committee to evaluate whether various management actions being implemented are having the desired effects on the San Juan River fish community. In addition, Adult Monitoring has proven to be an effective tool for monitoring populations of both stocked Razorback Sucker and Colorado Pikeminnow.

Relationship to the Recovery Program:

Adult Monitoring provides data for or makes possible (at least in part) the following Tasks under element numbers 1-5 of the Long Range Plan (SJRBRIP 2016): 1.2.1.1, 1.2.1.2, 2.3.1.5, 2.3.1.6, 2.3.1.7, 2.3.2.1, 2.3.2.2, 2.3.2.3, 2.6.1.1, 2.6.1.2, 2.6.1.3, 3.1.1.1, 3.1.1.3, 3.1.1.4, 3.1.1.5, 3.1.1.6, 3.1.1.7, 3.2.3.1, 3.2.3.2, 3.2.3.3, 3.2.3.4, 3.2.3.5, 4.1.1.1, 4.1.1.2, 4.1.1.3, 4.1.2.3, 4.1.2.4, 4.1.2.6, 4.1.3.1, 4.1.4.2, 4.1.4.3, 4.1.5.1, 4.1.6.1, 4.1.6.2, 4.1.6.3, 4.1.7.1, 4.1.7.2, 4.2.4.2, 4.2.4.3, 4.4.1.1, 4.4.2.1, 4.4.2.2, 4.4.2.3, 4.4.3.1, 4.4.3.2, 4.4.3.3, 4.5.2.3, 5.2.2.2, 5.2.2.3, 5.2.2.4, and 5.2.2.5. The monitoring protocols discussed in the Methods section of this report reflect those that are currently included in the latest version of the revised SJRBRIP Monitoring Plan and Protocols (SJRBRIP 2012).

Description of Study Area:

The study area for Adult Monitoring extends from river mile (RM) 180.0 (just downstream of the Animas River confluence in Farmington, NM), downstream to RM 53.0 (just upstream of the Mexican Hat boat launch in Mexican Hat, UT). The river section from RM 53.0 downstream to RM 2.9 (Clay Hills boat launch, just upstream of Lake Powell in UT) is scheduled to be sampled every fifth year. The last such sampling occurring in 2015, so that section of river should be sampled again in 2020.

In addition to sampling from the Animas River confluence to Mexican Hat boat launch, two additional river sections in NM will be sampled (5 total days of sampling). These two river sections would include: 1) the San Juan River from the Bloomfield Riverside Landing (RM 196.0) downstream to the Animas River confluence (RM 180.6) – three days of sampling; and, 2) the Animas River from Riverside Park in Aztec, NM downstream to the San Juan River confluence – two days of sampling. Because extremely low water levels in the Animas River preclude sampling this river section in the fall, Animas River sampling will be done in the spring (March/April) of each year.

Objectives:

1) Annually, during autumn, document aspects of the fish community structure such as species abundance (presented as catch/hour, CPUE) and distribution, and size structure among populations of both native and nonnative large-bodied fishes in San Juan River. Specific emphasis shall be placed upon monitoring the population parameters among the rare San Juan River fish species -- Colorado Pikeminnow, Razorback Sucker, and Roundtail Chub (both wild and stocked fish).

2) Obtain data that will aid in the evaluation of the responses (e.g., year-to-year survival, reproduction, recruitment, growth, and condition factor) of both native and nonnative large-bodied fishes to management actions.

3) Continue to perform activities that support other studies and recovery actions being

implemented by the SJRBRIP. These may include the following:

a. Remove nonnative fish species which prey upon and may compete with native fish species in the San Juan River.
b. Collect location (river miles) of habitats where endangered Colorado Pikeminnow and Razorback Sucker are collected.
c. Collect tissue samples from various fish species for stable isotope, genetics, and contaminants studies.

Through the handling of large numbers of fish for other study objectives and because of its long-term dataset, Adult Monitoring provides chances to opportunistically observe and monitor other information on the San Juan River's large-bodied fish community. This includes, but is not limited to: 1) the incidence of disease and abnormalities among fish populations; 2) the distribution and abundance of nonnative white sucker and the rate of hybridization between this species and native sucker species; 3) hybridization rates among native sucker species, specifically the endangered Razorback Sucker and Flannelmouth Sucker; 4) negative interactions between Channel Catfish and native fish species, specifically endangered Colorado Pikeminnow and Razorback Sucker; and, 5) documenting episodic events, such as the invasion of the San Juan River by fish species from Lake Powell or collecting rare, but potentially important fish species, such as Grass Carp.

Hypotheses:

Hypotheses for Adult Monitoring from the SJRBRIP Monitoring Plan and Protocols are listed as the following:

1. Mimicry of a natural hydrograph increases reproductive success among native fishes, resulting in increased abundance of wild sub-adult and adult fishes over time.
2. Mimicry of a natural hydrograph decreases reproductive success among nonnative fishes, resulting in decreased abundance of wild sub-adult and adult fishes over time.
3. Mechanical removal of nonnative fishes leads to an increase in abundance and/or distribution among native fishes.
4. Mechanical removal of nonnative fishes leads to a decrease in their abundance and/or distribution.
5. Modification or removal of instream dispersal impediments results in an increase in distribution (i.e., wider range) among endangered fishes (stocked or wild).
6. Modification or removal of instream dispersal impediments results in an increase in distribution (i.e., wider range) among common fishes.
7. Augmentation of endangered fishes results in the establishment of a multiple year-class population that is self-sustaining.
8. Augmentation of endangered fishes results in significant changes among common native and nonnative fishes (i.e., abundance or distribution) over time.

Methods:

Objectives 1-3: Two Adult Monitoring trips will take place in the fall of 2018 and one in the spring. The first will sample the lower Animas River from Riverside Park in Aztec, NM downstream to the Animas-San Juan River confluence. These two days of sampling will occur sometime between late March and late April. The second sampling trip will sample from RM 196.0 (Bloomfield Riverside Landing) downstream to Shiprock bridge near Shiprock, NM RM 148.0. Sampling will take place in one of the first to second week of September. The third trip

will take place the week following the second and will begin at Shiprock bridge and proceed downstream to Mexican Hat boat launch, RM 53.0, and will be concluded by end of September. Raft-borne electrofishing will be the primary sampling technique for all three sampling efforts.

Electrofishing will follow the methods set forth above and in the SJRBRIP Monitoring Plan and Protocols (SJRBRIP 2012). Two oar-powered rafts, with one netter each, will electrofish in a continuous downstream fashion, with one raft on each shoreline. Depending upon water levels in the lower Animas River in the spring, only one electrofishing raft may be used in the lower Animas River (instead of two) at the Principal Investigator's discretion. Netters will net all stunned fish that can possibly be collected, regardless of species or body size. Trailing or "chase" rafts will not be used to collect fish. No outboard motors will be used. Sampling crews will consist of approximately 2-4 people for spring and the first fall sampling trips (2 per electrofishing raft) and 6 people for the final fall sampling (4 for electrofishing rafts and 2 for baggage rafts). Electrofishing will be used to sample two out of every three miles when sampling above Shiprock bridge, every mile will be sampled below Shiprock bridge. All fish collected will be enumerated by species and life stage at the end of every sampled mile. Every fourth sampled mile (known as a "designated mile" or DM), all fish collected will be weighed and measured. All native fish collected will be returned alive to the river. All nonnative fish collected will be removed from the river. All nonnative predatory fishes (e.g. - Walleye, Striped Bass, Largemouth Bass, Smallmouth Bass) collected will be weighed and measured, and may have stomach samples taken, before being removed from the river. Tag numbers, total length, and weight will be recorded on all recaptured, FLOY-tagged fish (both native and nonnative), as well as any rare fish collected. Colorado Pikeminnow, Razorback Sucker, and Roundtail Chub greater than 150 mm TL will be implanted with 134 kHz PIT (Passive Integrated Transponder) tags. Notes will be kept on any parasites and/or abnormalities observed on collected fishes.

The U.S. Fish and Wildlife Service (USFWS) will assume the lead responsibility for Adult Monitoring trips and other cooperating agencies will provide personnel and equipment as needed. Costs for cooperating agencies are included in this budget.

Analysis:

Data collected within a given year will be used to compare catch per unit effort (CPUE) expressed as fish per hour of shocking for each species. This data will compared to past CPUE of each species in reference to combined life stages, separated life stages, and longitudinally by river mile or river mile increments. Additional analyses such as frequency of occurrence, length frequencies, and percent of total catch will be compared to past years. Adult monitoring sampling has changed spatially in recent years, data will only be compared to similar river miles sampled in past years.

Products:

An interim progress report for Adult Monitoring data collected during 2018 is scheduled to be available by 31 March 2019. The final version of this interim progress report which incorporates comments received is scheduled to be completed by 1 June 2019. Data files containing PIT tag information on the federally-listed endangered fish species (Colorado Pikeminnow and Razorback Sucker) collected during this Adult Monitoring trip will be submitted for inclusion in the STReaMS integrated database by 31 December 2018. Data files containing the remainder of the information (e.g., data on common fish species) collected during this Adult Monitoring trip will be submitted for inclusion in the STReaMS integrated database by 31 March 2019.

Projected Duration Of Project:

The Adult Monitoring study began in 1991 (see Introduction for details). It has continued, annually, with a consistent sampling regime every year since that time. This has allowed for the compilation of one of the longest-running and most statistically powerful fisheries databases available to the SJRBRIP. The Adult Monitoring study was modified with just very slight changes (e.g., a reduction in sampling frequency from every RM to two out of every three RM's) when it was incorporated as an integral part of the long-term San Juan River Monitoring Plan and Protocols (Propst et al. 2000) and a second time (to sample only RM 180.0-77.0) with the development of the SJRBRIP's Monitoring Plan and Protocols (SJRBRIP 2012). The suite of long-term monitoring studies are scheduled to run through the termination of the San Juan River Recovery Implementation Program.

Literature Cited:

San Juan River Basin Recovery Implementation Program. 2012. San Juan River Basin Recovery Implementation Program Monitoring Plan and Protocols. San Juan River Basin Recovery Implementation Program, U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

San Juan River Basin Recovery Implementation Program. 2016. Long-Range Plan. San Juan River Basin Recovery Implementation Program, U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

Fiscal Year 2018 Estimated Budget:

Costs for participation of the U.S. Fish Wildlife Service, Grand Junction Fish and Wildlife Conservation Office (USFWS-GJFWCO), Grand Junction, CO.

(Based on an anticipated 3% increase from the FY-2017 budget)

Personnel/Labor Costs (Federal Salary + Benefits)

Principal Biologist (GS-11) – 224 hours @ $52.37/hr (1 person X 10 days planning & organization) Animas River sampling - spring: (1 person X 3 days/trip X 1 trip – work from hotel) San Juan River sampling - fall: (1 person X 5 days/trip X 1 trip – work from hotel) (1 person X 10 days/trip X 1 trip – camping)	$ 11,731.00
Bio. Tech. Crew Leader (GS-7) - 120 hours @ $35.75/hr San Juan River sampling - fall: (1 person X 5 days/trip X 1 trip – work from hotel) (1 person X 10 days/trip X 1 trip – camping) (+ 50 hours overtime at $53.62/hr = $2,681.00)	$ 6,971.00
Bio. Tech. Crew Leader (GS-6) - 120 hours @ $34.76/hr San Juan River sampling - fall: (1 person X 5 days/trip X 1 trip – work from hotel) (1 person X 10 days/trip X 1 trip – camping) (+ 50 hours overtime at $52.13/hr = $2,607.00)	$ 6,778.00
Biological Technicians (GS-5) – 312 hours @ $25.71/hr Animas River sampling - spring: (3 person X 3 days/trip X 1 trip – work from hotel) (+ 9 hours overtime each at $39.72/hr = $1,072.00) San Juan River sampling – fall: (2 person X 5 days/trip X 1 trip – work from hotel) (2 person X 10 days/trip X 1 trip – camping) (+ 52 hours overtime each at $39.72/hr = $4,131.00)	$ 13,225.00
Sub Total	$ 38,705.00

Permitting; Coordination; Data Input, Analysis, Management & Presentation; Report Writing; Office & Administrative Support (Federal Salary + Benefits)

Administrative Officer (GS-9) – 200 hours @ $47.44/hr	$ 9,488.00
Principal Biologist (GS-11) – 400 hours @ $52.37/hr	$ 20,948.00
Project Leader (GS-14) – 320 hours @ $88.50/hr	$ 28,320.00
Sub Total	$ 58,756.00

Travel and Per Diem (Based on Published FY-2016 Federal Per Diem Rates)

*** see FY-2017 budget for line item breakdowns

FY-2017 Budget Cost	$ 6,730.00
Sub Total with 3% added for inflation	$ 6,932.00

Equipment and Supplies

*** see FY-2017 budget for line item breakdowns

FY-2017 Budget Cost	$ 7,584.00
Sub Total with 3% added for inflation	$ 7,812.00

USFWS-CRFP (Grand Junction, CO) Total $112,205.00

USFWS Region 6 Administrative Overhead (3.00%)	$ 3,366.00
USFWS Region 6 Total	$115,571.00

Funding for Participation by Other Agencies: (These figures are submitted to USFWS-CRFP by the listed cooperating agencies)

USFWS-NMFWCO - Albuquerque, NM (Region 2)	
See Attached Budget for Line Item Breakdowns	$ 14,035.00
Utah Division of Wildlife Resources - Moab, UT	
See Attached Budget for Line Item Breakdowns	$ 5,973.00
	$ 20,008.00

FY-2018 ESTIMATED WORKPLAN TOTAL	**$135,579.00**

Under the heading "Funding for participation of other agencies." Cost for participation of the U.S. Fish and Wildlife Service, New Mexico Fish and Wildlife Conservation Office, NM in FY-2018.

Labor Cost

Position	Grade/Step	Hourly Rate	Fringe	Salary w/ Benefits	Hours/Day	Total Days	Sub-total
Fish Biologist Supervisory	GS 9/7	$29.41	26.41%	$37.18	9	17	$5,688.11
Fish Biologist Bio. Science	GS 13/6	$49.30	28.28%	$63.24	9	2	$1,138.36
Technician** Adminstrative	GS 5/1	$16.17	20.00%	$19.40	9	17	$2,968.81
Officer	GS 9/8	$30.23	26.12%	$38.13	9	2	$686.27
					Total Labor		**$10,481.55**

Travel and Per Diem	Days	Rate	Sub-total
Hotel Costs	12	$91.00	$1,092.00
Per Diem (Travel Day)	10	$38.25	$382.50
Per Diem (Full Day)	10	$51.00	$510.00
		Total Travel/Per Diem	**$1,984.50**

Equipment	Miles/Qty	Total Miles	Rate	Sub-total
Vehicle Fuel 1 truck x 4 trips - 1 trip ABQ to Bluff, UT - 574mi RT and 3 trips from ABQ to Farmington, NM - 366mi RT + 150mi/trip local commute		2,122	$0.54	$1,145.88
			Equipment	**$1,145.88**

Sub-total for Adult Monitoring - NMFWCO only	**$13,611.93**
Adminstrative Overhead (3%)	**$408.36**
Total - USFWS - NMFWCO	**$14,020.29**

FY 2018 Costs for UDWR- Moab

Participation in San Juan River Large-Bodied Fish Community Monitoring (1person X 10 days)

Labor: salary + benefits + applicable overtime (personnel services)

	Rate	Hours	Cost
Project Leader	$35.31	0	$0
Biologist	$32.57	70	$2,280
Technician	$17.11	80	$1,369
		subtotal	**$3,649**

Food and Transport (current expense)

	Rate	Quantity	Cost
Fleet Costs (2 trucks for 1% of total fleet costs)	$40,800.00	0.015	$612
In-state per diem (1 person, 10 days, 1 pass)	$41.00	10	$410
Out-of-state Per Diem (travel day)	$46.00	1	$46
Hotel (Cortez, CO)	$89.00	1	$89
		subtotal	**$1,157**

Equipment (current expense)

	Rate	Quantity	Cost
Camping gear repair/replacement:			$100
Sampling gear repair/replacement:			$130
Boating gear repair/replacement:			$130
Fuel for generator	$4.00	25	$100
		subtotal	**$460**

Total Expenses	**$5,266**
Administrative Overhead (17% on all personnel services)	**$620**
UDWR-Moab Total FY 2018	**$5,886**

[a] The State of Utah motorpool vehicles cost approximately $6,800/year/vehicle (includes fleet rental, mileage, and gas), which is based on the average annual cost for all trucks used in our program.

[b] Includes, but is not limited to, tents, sleeping pads, toilet system, cookware, stoves, propane, charcoal, satellite phone and service, drybags, coolers, first aid supplies.

[c] Includes, but is not limited to dip nets, tags, tagging equipment, electrofishing units, electrofishing wiring, anodes, cathodes, generators, data loggers, etc…

[d] Includes, but is not limited to, raft repair/replacement, oars, oar hardware, raft frame repair, dry boxes, straps, etc…

[b,c,d] Estimated costs are based on actual costs from previous years plus an estimated 1.5% increase each year following.