

**San Juan River Nonnative Species Monitoring and Control  
from Shiprock, New Mexico to Mexican Hat, Utah**

**Fiscal Year 2017 Project Proposal**

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Cooperative Agreement #'s:

USFWS – NMFWCO	R13PG40051
USFWS – CRFP	R13PG40052
UDWR – Moab	R13AC40007
NMDGF – Santa Fe	
NNDFW	

Period of Performance: 9/20/2013 to 9/30/2017

## **Goal**

Continue to quantify effects of nonnative fish removal by raft-mounted electrofishing on native and nonnative fishes in the San Juan River and to inform the San Juan River Basin Recovery Implementation Program's Biology Committee on the utility and practicality of the nonnative fish removal program.

## **Overview**

Since implementation of annual intensive nonnative fish removal in 2000, the structure of the fish community in the San Juan River has changed substantially (Franssen et al. 2014a). On an annual basis, Colorado Pikeminnow and Razorback Sucker densities (i.e., CPUE) have increased over time, nonnative Common Carp densities have decreased, and Channel Catfish densities have decreased but only in upper reaches of the river (Franssen et al. 2014a, Franssen et al. 2014b). However, the relative contribution of nonnative fish removal via electrofishing, other management actions and environmental factors in driving these changes is unclear. For example, establishing a causal linkage between nonnative fish removal or other management actions (e.g., flow manipulation, habitat restoration) and changes in endangered fish densities is difficult due to the heavily augmented nature of these populations. Conversely, temporal variation (or the lack of) in the densities of nonnative fishes following removal efforts are potentially more directly related, but this variation is also not exempt from other environmental factors (e.g., flow variation and reduced immigration). Given the spatial and temporal inconsistencies of the current nonnative fish removal program as well as the multiple biotic and abiotic factors contributing to temporal variation in densities of fishes, it is not surprising effects of this management action have been difficult to elucidate.

Based on annual population estimates of Channel Catfish (Duran 2015 and Hines 2015), it is readily apparent the level of nonnative fish removal effort previously put forth will likely not suppress recruitment enough to induce system-wide population decline of this species. Nonetheless, removing individual Channel Catfish from the river by definition lowers their densities, which has the potential to directly impact endangered fishes through reduced competition or predation as well as indirectly through deleterious effects of electrofishing on native fishes. Yet, these potential direct (or indirect) effects of the San Juan River's nonnative fish removal program has been difficult to assess due to the complications mentioned above. Therefore, in FY16 we proposed to redesign the nonnative fish removal efforts to evaluate by what factor and for how long Channel Catfish densities were lowered and the responses of native fish densities to electrofishing and nonnative fish removal. Continued implementation and evaluation of a more structured nonnative fish removal design should provide the San Juan River Basin Recovery and Implementation Program with a clearer scientific evaluation of the effects of the nonnative removal program on native and nonnative fishes in the San Juan River.

## **Objectives**

1. Spatially demarcate removal and control reaches on the San Juan River in order to statistically evaluate responses of fishes to nonnative fish removal via electrofishing.
2. Assess Channel Catfish CPUE and size distributions within removal reaches over time using nonnative fish removal data.
3. Compare Channel Catfish, Razorback Sucker, and Colorado Pikeminnow CPUE between control and treatment reaches using sub-adult and adult fish community monitoring, and nonnative fish removal data.

4. Compare Channel Catfish size distributions between control and removal reaches using sub-adult and adult fish community monitoring, and nonnative fish removal data.
6. Quantify movement of tagged Channel Catfish among treatment and control reaches over the summer.

### **Link to Long Rang Plan**

Reducing the impacts of nonnative fishes has been identified as a critical Program Element in the San Juan River Basin Recovery Implementation Program's Long Range Plan (2015). Goals, Actions, and Tasks associated with this Element and encompassed within this scope of work include:

#### Goal 3.1—Control Problematic Nonnative Fishes

Action 3.1.1 Develop, implement, and evaluate the most effective strategies for reducing problematic nonnative fish.

Task 3.1.1.1 Mechanically remove nonnative fish to achieve objectives.

Task 3.1.1.3 Remove nonnative fish during Program research and monitoring activities.

Task 3.1.1.4 Conduct annual review of the success of the nonnative fish control strategy.

Task 3.1.1.7 Evaluate and implement effective alternative nonnative fish reduction methods.

Secondarily, nonnative fish removal crews collect both spatial and temporal data on rare fish encountered during sampling efforts. These data have been used in assessing progress towards recovery and to evaluate the augmentation programs for both Colorado pikeminnow and razorback sucker. Additional Long Range Plan Actions and Tasks associated with this task include, but are not limited, to the following:

#### Goal—4.1 Monitor Fish Populations of the San Juan River Basin

Action 4.1.3 Collect data on the endangered native and nonnative fish communities during other Program management activities, when possible.

Task 4.1.3.1 Collect data on the endangered fish and native fish community during nonnative fish control activities to aid in tracking the presence, status and trends of endangered fish populations.

### **Methods**

#### *Study design*

The study design for FY17 will follow the same protocol as FY 2016. The river between Shiprock, NM and Mexican Hat, UT will be stratified by geomorphic reach to help control for natural longitudinal variation in fish densities (Figure 1). Within each geomorphic reach, the

river will be further divided into treatment and control reaches (i.e., geomorphic reach 3 will contain two removal and control reaches). Because of the different agencies involved with nonnative removal, reaches in the upper parts of the river will undergo 20 passes (each pass is two electrofishing rafts on each shore) of removal effort and at least eight passes in the lower reach (i.e., NMFWCO upper section and Utah Department of Wildlife Resources (UDWR) lower section; Figure 1) each year. The disparate removal efforts between the upper and lower reaches will necessitate analyzing these reaches separately. Lengths of treatment and control sub-reaches within each geomorphic reach will be demarcated to maximize the sample size of collections used for comparisons to increase statistical power (mean sample size = 6.4, range = 4-11). No electrofishing will take place in control reaches (except for the initial marking pass, see below). While not electrofishing control reaches and returning Channel Catfish to the river will confound effects of electrofishing and removal of Channel Catfish in this study design, the exact mechanisms (i.e., electrofishing or removing Channel Catfish) behind the potential effects observed are not particularly important for guiding management actions at this time (i.e., we don't have other feasible mechanisms for removing large numbers of Channel Catfish at the scale proposed). Moreover, we will likely gain more insight into the effects of electrofishing on endangered fishes by not electrofishing control reaches.

#### *Removal and tagging protocol*

All nonnative fish removal efforts will occur between March and September before annual sub-adult and adult fish community monitoring (i.e., fall monitoring) and efforts will be made to limit the amount of electrofishing during spawning periods of Colorado Pikeminnow (Table 1). The first pass of the year will occur between Shiprock, NM to Mexican Hat, UT and be used to tag Channel Catfish ( $\geq 200$ mm TL) and quantify densities (CPUE; fish/hr of electrofishing), and sizes of Channel Catfish, Colorado Pikeminnow, and Razorback Sucker in each river mile. The subsequent passes will recapture and remove Channel Catfish at every three river miles and quantify size structure of Channel Catfish in each reach (all fish will be measured from samples until at least 150 individuals are measured in each reach). Other endangered fishes will be collected and PIT tagged if untagged.

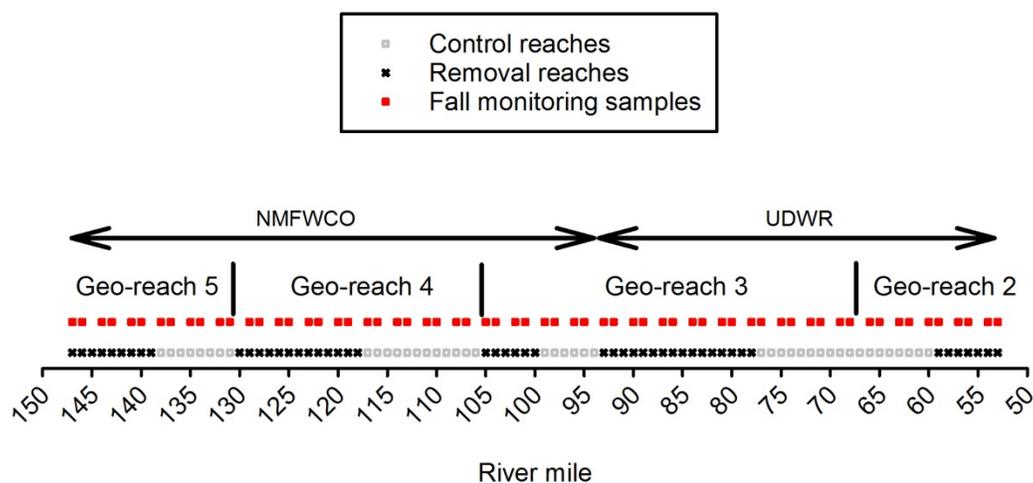


Figure 1. Proposed study area from Shiprock Bridge, NM (RM 147.9) to Mexican Hat, UT (RM 52), detailing treatment (black) and control (grey) sub-reach river miles by geomorphic reach.

The red squares identify river miles that will be sampled by large-bodied monitoring in fall 2017 and used in statistical analyses. The proposed spatial effort extended by each agency is denoted.

Table 1. Timing of the proposed tagging and removal trips. Removal trips are denoted with "X".

	March	April	May	June	July	August	September
Week							
1		X	X				X
2		X					X
3	Tagging	X				X	
4	X	X				X	

### Data Analysis

The proposed nonnative fish removal design will be used to address questions about the ability of electrofishing to affect CPUE and size structures of Channel Catfish, and alter the densities of endangered fishes.

Due to the disparate removal efforts between the upper and lower sections of the river (i.e., 20 vs 8 passes respectively), we will analyze the two reaches separately. Below we include the primary questions we will address, data sets needed for analyses, and the general structure of statistical analyses that will be applied to the upper and lower reaches. Other potential covariates that may affect sampling efficiency can be included if deemed necessary (e.g., secchi depth, stream discharge at sampling, etc.).

In all models, non-significant ( $\alpha=0.10$ ) interactions will be sequentially removed until all/any remaining interactions are significant. If any models have significant terms, post hoc tests can be conducted to determine which factor levels differ.

#### 1) Does the CPUE of Channel Catfish vary over time in removal reaches?

**H<sub>0</sub>: Nonnative fish removal does not alter the CPUE of Channel Catfish over time.**

**Prediction: The CPUE of Channel Catfish will decrease over time in removal reaches.**

-Calculate the mean CPUE of Channel Catfish in each removal reach during each removal period (n = 11 upper reach, n = 9 lower reach).

-Construct a general linear model:

$$\text{Channel Catfish CPUE} = \text{Georeach} \times \text{Treatment reach} \times \text{Date}$$

-A significant Date  $\times$  Treatment reach term would indicate the slope of at least one reach differed from the other reaches.

-A significant Date term would indicate the slope between date and CPUE of Channel Catfish was different than zero.

## 2) Does the size structure of Channel Catfish vary over time in removal reaches?

**H<sub>0</sub>: Nonnative fish removal does not alter the size structure of Channel Catfish over time.**

**Prediction: Nonnative fish removal will decrease the size structure of Channel Catfish in removal reaches.**

-Calculate the median Total Length (TL) of Channel Catfish in each removal reach during each removal period (n = 10 upper reach, n = 8 lower reach).

-Construct a general linear model:

$$\text{Channel Catfish TL} = \text{Georeach} \times \text{Treatment} \times \text{Date}$$

-A significant Date  $\times$  Treatment term would indicate the slope of at least one reach differed from the other reaches.

-A significant Date term would indicate the slope between date and CPUE of Channel Catfish was different than zero.

## 3) Does nonnative fish removal alter the density of Channel Catfish in removal reaches relative to control reaches?

**H<sub>0</sub>: Nonnative fish removal does not alter the CPUE of Channel Catfish in removal reaches compared to control reaches (after controlling for initial CPUE).**

**Prediction: The CPUE of Channel Catfish will be lower in removal reaches compared to control reaches (after controlling for initial CPUE).**

-The initial CPUE of Channel Catfish from the first pass of nonnative removal will serve as a covariate.

-CPUE of Channel Catfish from fall monitoring will be the response variable.

-Construct a general linear model (the follow notation indicates all main effects and interaction terms):

$$\text{Channel Catfish CPUE} = \text{Georeach} \times \text{Treatment} \times \text{Initial CPUE}$$

-A significant Initial CPUE term would indicate the initial CPUE of Channel Catfish predicted the final Channel Catfish CPUE.

-A significant Treatment term would indicate the CPUE of Channel Catfish differed between control and removal reaches.

**4) Does nonnative fish removal alter the size structure of Channel Catfish in removal reaches relative to control reaches?**

**$H_0$ : Nonnative fish removal does not alter the size structure of Channel Catfish in removal reaches.**

**Prediction: The mean length of Channel Catfish will be smaller in removal reaches compared to control reaches.**

-The TL of all Channel Catfish in control and removal reaches from fall monitoring will be the response variable.

-Construct a general linear model:

$$\text{Channel Catfish TL} = \text{Georeach} \times \text{Treatment}$$

-A significant Treatment term would indicate the TL of Channel Catfish differed between control and removal reaches.

**5) Does nonnative fish removal affect the density of endangered fishes (i.e., Colorado Pikeminnow and Razorback Sucker) in removal reaches compared to control reaches?**

**$H_0$ : Nonnative fish removal does not alter the CPUE of Colorado Pikeminnow and Razorback Sucker Catfish in removal reaches.**

**Prediction: The CPUE of Colorado Pikeminnow and Razorback Sucker will be higher in removal reaches compared to control reaches (after controlling for initial CPUE).**

-The initial CPUE of Colorado Pikeminnow/Razorback Sucker from the first pass of nonnative removal will serve as covariates.

-CPUE of Colorado Pikeminnow/Razorback Sucker from fall monitoring will be the response variable.

-Construct general linear models (the follow notation indicates all main effects and interaction terms):

$$\text{Colorado Pikeminnow/Razorback Sucker CPUE} = \text{Georeach} \times \text{Treatment} \times \text{Initial CPUE}$$

-A significant Initial CPUE term would indicate the initial CPUE of Colorado Pikeminnow/Razorback Sucker predicted the final Colorado Pikeminnow/Razorback Sucker CPUE.

-A significant Treatment term would indicate the CPUE of Channel Catfish differed between control and removal reaches.

**6) What is the rate of Channel Catfish migration into treatment reaches?**

**H<sub>0</sub>:Channel Catfish do not move among reaches.**

**Prediction: Channel Catfish will move among reaches with more movement upstream compared to downstream.**

-Calculate the proportion of resident versus immigrants (i.e., fish tagged in the same reach versus tagged in another reach) in each treatment reach versus control reaches from all sampling events.

-Construct a general linear model:

$$\text{Proportion of immigrants} = \text{Georeach} \times \text{Treatment reach} \times \text{Date}$$

-A significant Date × Treatment reach term would indicate the slope of at least one reach differed from the other reaches.

-A significant Date term would indicate the slope between date and proportion of immigrant Channel Catfish was different than zero.

**Summary**

Management decisions regarding the nonnative fish removal program on the San Juan River have been hindered by the lack of a rigorous study design that impedes our ability to assess the usefulness of the program. A more structured removal design will allow for a thorough assessment of the level the program can reduce densities of Channel Catfish as well as the potential subsequent response of endangered fishes. While having control reaches may seem counterproductive to reducing densities of nonnative fishes, we think it is necessary to provide a scientifically sound test of the efficacy of the program and provide useful information on the effects of electrofishing on endangered fishes. However, effort will be increased in removal sub-reaches, the overall numbers of Channel Catfish removed will likely remain similar or be increased relative to previous annual removal efforts.

Although this study design is substantially altered compared to previous nonnative fish removal protocols (i.e. prior to FY2016), similar data analyses that have been conducted in previous years will still be available with this design (e.g., Channel Catfish population estimates, exploitation rates).

As illustrated in the FY16 scope of work, the effects of nonnative fish removal likely will not manifest after the first year of study (i.e. 2016) and will likely need several years to come forth. The FY17 scope of work, if funded, would be the second year under the revised study design.

**Outyear Budgets:**

**FY 17            \$550,263\*\*    Funding included for nonnative removal across all Agencies and Agreement Numbers**

                  \$362,215            Shiprock to Montezuma Creek (20 passes)  
                   \$188,509            Montezuma Creek to Mexican Hat (9 passes)

FY18            \$566,771            (if needed and approved)

FY19            \$583,474        (if needed and approved)

**\*\* The following budget reflects the cost associated with all FY 2017 tagging and nonnative fish removal efforts from Shiprock, New Mexico downstream to Mexican Hat, Utah. Two budgets submitted by Utah Department of Wildlife Resources include 1) assisting FWS-NMFWCO with removal from Shiprock, NM to Montezuma Creek, UT (Appendix 1) and 2) UDWR-Moab's leads efforts from Montezuma Creek to Mexican Hat, UT (Appendix 2). Disbursement of funds will be under agency specific agreements with the Bureau of Reclamation – Salt Lake City, UT.**

### **Literature Cited**

Duran, B.R. 2015. Endangered fish monitoring and nonnative species monitoring and control in the upper/middle San Juan River: 2014. Final report to the San Juan River Basin Recovery Implementation Program. Albuquerque, New Mexico.

Franssen, N.R., S.L. Durst, K.B. Gido, D.W. Ryden, V. Lamarra, and D.L. Propst. 2014a. Long-term dynamics of large-bodied fishes assessed from spatially intensive monitoring of a managed desert river. *River Research and Applications* doi: 10.1002/rra.2855

Franssen, N.R., J.E. Davis, D. Ryden and K.B. Gido. 2014b. Fish community responses to mechanical removal of nonnative fishes in a large southwestern river. *Fisheries* 39:352–363.

Hines, B. 2015. Endangered fish monitoring and nonnative fish control in the lower San Juan River 2014. Final report to the San Juan River Basin Recovery Implementation Program. Albuquerque, New Mexico.

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.

# APPENDIX 1

## **PARTICIPATING AGENCIES BUDGETS FOR FY 17 NONNATIVE SPECIES MONITORING AND CONTROL FROM SHIPROCK, NM TO MONTEZUMA CREEK, UT**

**Lead Agency:**

- U.S. Fish and Wildlife Service, New Mexico Fish and Wildlife Conservation Office, Albuquerque, NM

**Participating Agencies:**

- U.S. Fish and Wildlife Service, Colorado River Project – Grand Junction, CO
- Utah Division of Wildlife Resources, Moab Field Station, UT
- American Southwest Ichthyological Researchers, LLC – Albuquerque, NM
- New Mexico Department of Game and Fish – Santa Fe. NM
- Navajo Nation Department of Fish and Wildlife



Under the heading "Funding for participation of other agencies." Cost for participation of U.S. Fish and Wildlife Service, Colorado River Project – Grand Junction, CO in FY-2017 nonnative removal activities (Shiprock, New Mexico to Mexican Hat, Utah).

**Endangered Fish Monitoring and Non-native species  
Monitoring and Control in the *Upper/Middle*  
San Juan River  
Fiscal Year 2017 Project Proposal  
Updated: 31 March 2016**

Budget for Participation by U.S. Fish Wildlife Service,  
Colorado River Fishery Project (USFWS-CRFP)

Developed by:

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Contract or Agreement number(s):  
R13PG40052 for USFWS – Grand Junction, CO

Reporting Dates: 10/1/2016 through 9/30/2017

## **Fiscal Year 2017 Estimated Budget:**

**Costs for participation of the U.S. Fish Wildlife Service, Colorado River Fishery Project (USFWS-CRFP) office, Grand Junction, CO.**

(Based on projected FY-2017 costs)

**Note:** The FY-17 and outyear costs have been adjusted for the GS-5 Bio Tech line items to reflect new guidance from Office of Personnel Management (OPM) to the USFWS requiring the USFWS to provide health insurance to all federal employees, regardless of grade level or appointment type, if they work for the federal government longer than 60 days (480 total hours).

### **Personnel/Labor Costs (Federal Salary + Benefits)**

Principal Biologist (GS-11) – 144 hours @ \$50.84/hr (1 person X 6 days/trip X 3 camping trips)	\$ 7,321.00
Bio. Tech. Crew Leader (GS-7) – 144 hours @ \$34.71/hr (1 person X 6 days/trip X 3 camping trips) (+ 20 hours overtime/per trip X 3 trips = 60 total hours of overtime at \$52.06/hr = \$3,124.00)	\$ 8,122.00
Bio. Tech. Crew Leader (GS-6) – 144 hours @ \$33.74/hr (1 person X 6 days/trip X 3 camping trips) (+ 20 hours overtime/per trip X 3 trips = 60 total hours of overtime at \$50.61/hr = \$3,037.00)	\$ 7,896.00
Biological Technicians (GS-5) – 960 hours @ \$24.96/hr (1 people X 6 days/trip X 3 camping trips) (2 people X 6 days/trip X 7 camping trips) (+ 20 hours overtime/per trip X 10 trips X 2 people = 400 total hrs of overtime at \$38.56/hr = \$15,424.00)	\$ 39,386.00
<b>Sub Total</b>	<u>\$ 62,725.00</u>

### **Administrative Support (Federal Salary + Benefits)**

Administrative Officer (GS-9) – 60 hours @ \$46.06/hr	\$ 2,764.00
Project Leader (GS-14) – 60 hours @ \$85.92/hr	\$ 5,155.00
<b>Sub Total</b>	<u>\$ 7,919.00</u>

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

Hotel – 1 night in Cortez, CO @ 4 people/trip X 3 trips (12 nights @ \$114/night – single occupancy = \$1,368)	\$ 1,368.00
Hotel – 1 night in Cortez, CO @ 2 people/trip X 7 trips (14 nights @ \$114/night – single occupancy = \$1,596)	\$ 1,596.00
Per Diem (Hotel Rate) – 1 day in Cortez, CO X 4 people per trip X 3 trips (12 days @ \$59/day)	\$ 708.00
Per Diem (Hotel Rate) – 1 day in Cortez, CO X 2 people per trip X 7 trips (14 days @ \$59/day)	\$ 826.00
Per Diem (Camp Rate) – 5 days X 4 people/trip X 3 trips (60 days @ \$28/day)	\$ 1,680.00
Per Diem (Camp Rate) – 5 days X 2 people/trip X 7 trips (70 days @ \$28/day)	<u>\$ 1,960.00</u>
<b>Sub Total</b>	<u>\$ 8,138.00</u>

### **Equipment**

Vehicle Maintenance & Gasoline (@ \$365/month lease = \$12.17

per day based on 30 days in an “average” month + \$0.33/mile)	
3 trips from Grand Junction, CO to Cortez, CO to Shiprock, NM to Montezuma Creek, UT (park trucks at Bluff, UT) and back to Grand Junction, CO X 2 trucks X 6 days per trip (600 miles/trip X 3 trips X 2 trucks = 3,600 miles X \$0.33/mile) = \$1,188 (2 trucks X 6 days/trip X 3 trips = 36 days X \$12.17/day) = \$438	\$ 1,626.00
7 trips from Grand Junction, CO to Cortez, CO to Shiprock, NM to Montezuma Creek, UT (park trucks at Bluff, UT) and back to Grand Junction, CO X 2 trucks X 6 days per trip X 1 truck X 6 days per trip (600 miles/trip X 7 trips X 1 truck = 4,200 miles X \$0.33/mile) = \$1,386 (1 truck X 6 days/trip X 7 trips = 42 days X \$12.17/day) = \$511	\$ 1,897.00
Generator Gasoline (25 gallons/trip X 10 trips @ \$4.00/gallon) 5 days @ 5 gallons/day X 1 raft X 10 trips	\$ 1,000.00
Equipment Maintenance, Repair, & Replacement Exact use of the money in this line item will vary from year to year depending on what equipment needs to be maintained, repaired, or replaced, but use of these funds for a “typical” field season for one study would include the following: Annual trailer maintenance & safety inspection = \$175 Replace/repair trailer suspension, trailer lights, winch handle/straps/gears, trailer jack stand wheel bearings Replace trailer tires – 2 per year @ \$100 each = \$200 Synthetic oil for generators - 5 quarts at \$7 each = \$35 Generator repair/tune-up - 5 hrs @ \$75/hr = \$375 Hip boots – 2 pair at \$50/pair = \$100 Breathable chest waders - 2 pair @ \$125/pair = \$250 Stearns Type III life jackets – 3 @ \$70 each = \$210 Electrical Gloves - 3 pairs @ \$65/pair = \$195 Repair raft frame Aluminum welding – 3 hours @ \$150/hr = \$450 Raft repair kits Raft glue (urethane/hypalon) – Four 4-oz. cans @ \$22.50/can = \$90 NRS raft patch material – 5 feet @ \$37/ft = \$185 Acetone – 1 gallons @ \$17.50/gallon = \$17.50 Toluene – 1 gallon @ \$17.50/gallon = \$17.50 Replace any missing NRS HD-brand tie-down straps, each boat needs: Ten 2-ft straps @ \$4.20 each = \$42 Five 3-ft straps @ \$4.30 each = \$21.50 Ten 4-ft straps @ \$4.70 each = \$47 Five 6-ft straps @ \$5.05 each = \$25.25 Five 9-ft straps @ \$5.7 each = \$28.50 Five 12-ft straps @ \$6.15 each = \$30.75 Replace any missing D-style carabiners, each boat needs: 10 @ \$7.50 each = \$75 Mesh rig bag – 1 @ \$50 each = \$50	\$ 1,245.00

## Rafting oars, oar blades, and oar rowing sleeves

Carlisle 10-foot oar shafts – 2 @ \$90 each = \$180

Carlisle Oars blades – 4 @ \$65 each = \$260

Oar sleeves – 4 @ \$12 each = \$48

5-gallon plastic gasoline jerry cans – 5 @ \$20 each = \$100

## River bags

NRS 3.8 heavy-duty Bill's Bag – 1 @ \$100 each = \$100

Clavey (green 7 X 17) dry bag – 3 @ \$22 each = \$66

Clavey (blue 10 X 24) dry bag) – 4 @ \$26 each = \$104

20 lb. propane tanks – 3 @ \$20 each = \$60

## Pesola brand spring scales

# 20010 Micro-Line 10 gram – 1 @ \$50 = \$50

# 20060 Micro-Line 60 gram – 1 @ \$46 = \$46

# 20100 Micro-Line 100 gram – 1 @ \$46 = \$46

# 40300 Medio-Line 300 gram – 1 @ \$54 = \$54

# 40600 Medio-Line 600 gram – 1 @ \$54 = \$54

# 42500 Medio-Line 2,500 gram – 2 @ \$56 = \$112

# 41002 Medio-Line 1,000 gram – 3 @ \$54 = \$108

# 80005 Macro-Line 5 kg – 1 @ \$107 = \$107

# 80010 Macro-Line 10 kg – 1 @ \$109 = \$109

Other potential uses for these same funds could include replacing hand tools (ratchet and sockets, screw drivers, vise grips, pliers, Allen wrenches, crescent wrenches, hammer, etc.), WD-40, bailing wire, duct tape, electrical supplies (spark plugs, 12 and 14 gage wire for the boats, junction boxes, extra male & female plugs, wire nuts, fuses, Ohm meter, electrical tape), batteries (C, AA and AAA), camp stoves, lanterns, lantern mantles, small "pony" propane bottles for lanterns, Gott 5-gallon water jugs, shovels, 5-gallon buckets, cargo nets, fix chips or cracks in vehicle windshields, bulbs, lenses, and wiring to fix trailer lights and pigtales, new electrofishing spheres, wire rope for replacing electrofishing "witches brooms," Yeti 125-quart coolers, Dura-Frame electrofishing dip nets, 2-man dome tents, NRS Canyon Box for dry storage, Rite-In-The-Rain data sheets, data books, pencils, repair/replace river maps, etc.

<b>Sub Total</b>	\$ 5,768.00
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<b>USFWS-CRFP (Grand Junction) Total</b>	\$ 84,550.00
<b>USFWS Region 6 Regional Office Administrative Overhead (3.00%)</b>	<u>\$ 2,537.00</u>
<b>USFWS Region 6 Total</b>	<u>\$ 87,087.00</u>

**Under the heading "Funding for participation of other agencies." Cost for participation of Utah Division of Wildlife Resources, Moab Field Station in FY-2017 nonnative removal activities (Shiprock, New Mexico to Mexican Hat, Utah).**

**Participation in Nonnative Species Monitoring and Control from Shiprock, New Mexico to Mexican Hat, Utah  
San Juan River**

**Fiscal Year 2017 Budget**

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BOR Agreement #: R13AC40007

<b>FY 2017 Costs for UDWR- Moab</b>			
<b>Participation in Middle San Juan River (Shiprock to Montezuma Creek) Nonnative Control (2 people X 5 days X 6 trips)</b>			
<u>Labor: salary + benefits + applicable overtime (personnel services)</u>			
	<b>Rate</b>	<b>Hours</b>	<b>Cost</b>
Project Leader	\$34.79	80	\$2,783
Biologist	\$33.92	250	\$8,480
Technician	\$17.13	560	\$9,592
		<b>subtotal</b>	<b>\$20,856</b>
<u>Food and Transport (current expense)</u>			
	<b>Rate</b>	<b>Quantity</b>	<b>Cost</b>
Fleet Costs (2 trucks for 3% of total fleet costs)	\$40,800.00	0.030	\$1,224
In-state per-diem (2 people, 4 days, 6 passes)	\$40.00	48	\$1,920
Camping reimbursement	\$25.00	48	\$1,200
		<b>subtotal</b>	<b>\$4,344</b>
<u>Equipment (current expense)</u>			
	<b>Rate</b>	<b>Quantity</b>	<b>Cost</b>
Camping gear repair/replacement:			\$450
Sampling gear repair/replacement:			\$450
Boating gear repair/replacement:			\$450
Fuel for generators	\$4.00	90	\$360
		<b>subtotal</b>	<b>\$1,710</b>
<b>Total Expenses</b>			<b>\$26,910</b>
<b>Administrative Overhead (17% on all personnel services)</b>			<b>\$3,545</b>
<b>UDWR-Moab Total FY 2017</b>			<b>\$30,455</b>

<sup>a</sup> 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.

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

<sup>c</sup> Includes, but is not limited to dip nets, tags, tagging equipment, electrofishing units, electrofishing wiring, anodes, cathodes, generators, data loggers, etc...

<sup>d</sup> Includes, but is not limited to, raft repair/replacement, oars, oar hardware, raft frame repair, dry boxes, straps, etc...

<sup>b,c,d</sup> Estimated costs are based on actual costs from previous years plus an estimated 3% cost of living increase each year following.

**Under the heading "Funding for participation of other agencies." Cost for participation of American Southwest Ichthyological Researchers, LLC – Albuquerque, NM in FY-2017 nonnative removal activities**

**2017 BUDGET: SAN JUAN RIVER NON-NATIVE FISH REMOVAL**

Based on eight sampling trips per year: Shiprock to Mexican Hat

**Personnel**

Field Data Collection

*Shiprock to Mexican Hat - RM 148.0 - 53.3*

Fisheries Biologist I (2 staff x 8 trips x 5 days x 8 hrs/day at \$ 55.52/hr):..... \$ 35,533

Project Oversight

Senior Fisheries Biologist I (1 staff x 4 days x 8 hrs/day at \$ 93.95/hr): ..... \$ 3,006

Tasks: Project coordination and management.

**Personnel: ..... Total \$ 38,539**

**Materials and Supplies**

Rafts and associated sampling gear supplied by USFWS

Personal camping gear (we will use gear from SJR larval fish project)

**Materials and Supplies: ..... Total \$ 0**

**Travel and Per Diem**

Travel

Travel - (1 vehicle x 8 trips x 625 miles x \$ 0.54/mile): .....\$ 2,700  
(roundtrip Albuquerque to Montezuma Creek, shuttle to Mexican Hat and return) <sup>1</sup>

Travel - (1 vehicle x 8 commercial shuttles x 180/per shuttle): .....\$ 1,440

Per Diem

Per Diem - 1 hotel day per trip x 8 trips x 2 staff (\$ 89/night GSA lodging rate): .....\$ 1,424

Per Diem - 5 field days per trip x 8 trips x 2 staff (\$ 51/day GSA M&IE rate): .....\$ 4,080

**Travel and Per Diem: ..... Total \$ 9,644**

**2017 Project Totals**

**Personnel: ..... Total \$ 38,539**

**Materials and Supplies: ..... Total \$ 0**

**Travel and Per Diem: ..... Total \$ 9,644**

**2017 Scope of Work: ..... GRAND TOTAL \$ 48,183**

**Under the heading "Funding for participation of other agencies." Cost for participation of New Mexico Department of Game and Fish in FY-2017 nonnative removal activities (Shiprock, NM to Montezuma Creek, UT).**

**Personnel/Labor Costs (State Salary + Benefits)**

Biologists – 20 days @ \$366/day	
(1 persons x 5 days/trip x 4 trips)	
	<u>\$ 7,320.00</u>
	\$ 7,320.00

**Travel and Per Diem (State Per Diem Rates)**

Per Diem – 4 trips @ \$465/trip	
(3 days in-state @ \$85/day + 2 days out-state @ \$105/day	
X 4 trips)	
	<u>\$ 1,860.00</u>
	\$ 1,860.00

**Equipment**

Vehicle Maintenance and Gasoline (@ \$0.55/mile)	
(2,780 miles for 4 trips from Santa Fe to Shiprock and	
associated shuttling of vehicles)	
	<u>\$ 1,529.00</u>
	\$ 1,529.00

<b>NMDGF – Santa Fe</b>	<b>Total</b>	<b>\$ 10,709.00</b>
<b>Administrative Overhead (10%)</b>		<b>\$ 1,071.00</b>
<b>NMDGF – Santa Fe – Total Budget</b>		<b>\$ 11,780.00</b>

**Under the heading "Funding for participation of other agencies." Cost for participation of the Navajo Nation Department of Fish and Wildlife in FY-2017 nonnative removal activities (Shiprock, NM to Montezuma Creek, UT).**

**Personnel/Labor Costs (Salary + Benefits)**

Fish Biologist – 10 days @ \$163.54/day (1 person x 5 days x 2 trips)	\$ 1635.40
Biological Technician – 10 days @ \$89.54/day (1 person x 5 days x 2 trips)	\$ 895.40
Sub-Total	<u>\$1530.80</u>
Fringe Benefits X 42.48%	\$ 1075.08
<b>Total Personnel/Labor</b>	<b><u>\$ 2,605.88</u></b>

**Travel (Vehicle shuttling)**

Vehicle Lease/Maintenance & Gasoline \$15.13/day X 12 days = \$181.56 + 2 X 36miles X .30/mile=\$21.60 (36 miles round trip from Fruitland, NM to Shiprock x 6 trips)	\$ 203.16
<b>Total Travel/Per Diem</b>	<b><u>\$ 203.16</u></b>
Sub-total with 3% added for inflation	\$ 209.25

**Equipment**

Equipment Maintenance, Repair, & Replacement (e.g., life jackets, hip boots, generator repair, rubber gloves, dip nets, aluminum welding, raft repair, etc.)	\$ 1,000
<b>Total Equipment</b>	<b><u>\$ 1,000</u></b>
Sub-total with 3% added for inflation	\$ 1,030

<b>Navajo Nation Fish and Wildlife Total</b>	<b>\$3,845.13</b>
<b>Navajo Fish and Wildlife Administrative Overhead (18.05%)</b>	<b>\$ 694.04</b>
<b>Navajo Nation Total</b>	<b>\$4,539.18</b>

## APPENDIX 2

### **PARTICIPATING AGENCIES BUDGETS FOR FY 17 NONNATIVE MONITORING AND CONTROL FROM MONTEZUMA CREEK TO MEXICAN HAT, UT**

**Lead Agency:**

- Utah Division of Wildlife Resources, Moab Field Station, UT

**Participating Agencies:**

- U.S. Fish and Wildlife Service, Colorado River Project – Grand Junction, CO
- New Mexico Department of Game and Fish – Santa Fe, NM
- Navajo Nation Department of Fish and Wildlife

**Nonnative Species Monitoring and Control from Shiprock, New Mexico to Mexican Hat, Utah  
San Juan River**

**(Montezuma Creek to Mexican Hat)**

**Estimated Budget for 2016-2020  
BOR Cooperative Agreement #R13AC40007**

Principal Investigator: Brian Hines  
Prepared by: Katie Creighton and Brian Hines  
Utah Division of Wildlife Resources, Moab Field Station  
1165 S. Hwy 191- Suite 4, Moab, Utah 84532  
(435) 259-3782, (435) 259-3780  
bhines@utah.gov, katherinereighton@utah.gov

<b>FY 2017 Costs for UDWR- Moab</b>
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**San Juan River Nonnative Removal and Monitoring (Montezuma Creek-Mexican Hat: 9 passes)**

Personnel Costs (salary + fringe costs)

	<b>Rate</b>	<b>Hours</b>	<b>Cost</b>
Project Leader	\$33.71	250	\$8,427
Biologist	\$30.76	1400	\$43,063
Technician	\$16.77	2800	\$46,956
		<b>subtotal</b>	<b>\$98,446</b>

Food and Travel

	<b>Rate</b>	<b>Quantity</b>	<b>Cost</b>
Fleet Costs <sup>a</sup> (3 trucks for 25% of total fleet costs)	\$40,800.00	0.25	\$10,200
Food (6 people, 4 days, 9 passes)	\$30.00	216	\$6,480
Shuttle (3 trucks, 9 passes)	\$100.00	27	\$2,700
Out-of-state per diem (Biologist and Project Leader)	\$47.00	12	\$564
Hotel- Durango (Biologist and Project Leader)	\$95.00	8	\$760
		<b>subtotal</b>	<b>\$20,704</b>

Equipment

	<b>Rate</b>	<b>Quantity</b>	<b>Cost</b>
Camping gear repair/replacement <sup>b</sup> :			\$3,667
Sampling gear repair/replacement <sup>c</sup> :			\$4,828
Boating gear repair/replacement <sup>d</sup> :			\$2,750
NRS 16' Expedition Raft	\$5,000.00	1	\$5,000
Fuel for generators (20 gallons/pass)	\$4.00	180	\$720
		<b>subtotal</b>	<b>\$16,965</b>

<b>Total Expenses</b>	<b>\$136,115</b>
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<b>Administrative Overhead (17% on all personnel services)</b>	<b>\$16,736</b>
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<b>UDWR Grand Total FY 2017</b>	<b>\$152,851</b>
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<sup>a</sup> 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.

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

<sup>c</sup> Includes, but is not limited to dip nets, tags, tagging equipment, electrofishing wiring, anodes, cathodes, generator repair, data loggers, etc...

<sup>d</sup> Includes, but is not limited to, raft repair/replacement, oars, oar hardware, raft frame repair, dry boxes, straps, etc...

<sup>b,c,d</sup> Estimated costs are based on actual costs from previous years plus an estimated 3% cost of living increase each year following.

<b>FY 17 Budget Nonnative Monitoring and Control from Montezuma Creek To Mexican Hat, UT</b>	
<b>Funding for lead agency:</b>	
UDWR- Moab	\$ 152,851
<b>Funding for cooperators:</b>	
NNDFW	\$ 9,398
NMDGF-Santa Fe	\$ 6,864
USFWS-CRFP	\$ 19,396
<b>Grand Total</b>	<b>\$ 188,509</b>

**Under the heading "Funding for Participating Agencies." Estimated costs for participation of the Navajo Nation Department of Fish and Wildlife, in FY-2017 (Montezuma Creek to Mexican Hat, UT). BOR Cooperative Agreement Number with Navajo Nation: R11AP40089**

<b>FY 2017 Costs for Navajo Nation</b>			
<u>Personnel/Labor Costs (Salary+Benefits)</u>	Rate	Quantity	
Fish Biologist	\$158.78	14	\$2,223
Bio Tech	\$86.93	14	\$1,217
Fringe Benefits (Labor Costs* 42.48%)	\$43.75		\$1,461
Subtotal			\$4,901
 <u>Travel and Per Diem</u>			
Hotel- (4 nights)	\$72.10	4	\$288
Camping Rate-(20 nights)	\$29.87	20	\$597
Vehicle Lease/Maintenance	\$467.62	1	\$468
Gasoline-(260 miles)	\$0.62	260	\$161
Subtotal			\$1,515
 <u>Equipment</u>			
Maintenance, Repair, Replacement	\$1,545.00	1	\$1,545
Subtotal			\$1,545
Total Expenses			\$7,961
Navajo Nation Administration Fees (18.05%)			\$1,437
<b>Navajo Nation FY16 Total</b>			<b>\$9,398</b>

**Under the heading "Funding for Participating Agencies." Costs for participation of the New Mexico Game and Fish in FY 2017 (Montezuma Creek to Mexican Hat, UT). BOR Cooperative Agreement Number with New Mexico Department of Fish and Game: 07FG402630**

<b>FY 2017 Costs for New Mexico Game and Fish</b>			
<u>Personnel/Labor Costs (Salary+Benefits)</u>	Rate	Quantity	
Fish Biologist	\$412.00	12	\$4,944
Subtotal			\$4,944
<u>Travel and Per Diem</u>			
Per Diem	\$115.00	10	\$1,150
Gasoline-(260 miles)	\$0.55	1400	\$770
Subtotal			\$1,920
<b>New Mexico Dept. Game and Fish FY17 Total</b>			<b>\$6,864</b>

**U.S. Fish Wildlife Service, Colorado River Fishery Project (USFWS-CRFP)  
 Budget for Participation in  
 Non-native Species Control in the *Lower* San Juan River  
 Fiscal Year 2017 Project Proposal  
 (Montezuma Creek to Mexican Hat, UT)  
 Updated: 31 March 2015 (by Ben Schleicher and Dale Ryden)**

Principal Investigator(s):  
 Brian Hines and Katherine Creighton  
 Utah Division of Wildlife Resources, Moab Field Station  
 1165 S. Hwy 191- Suite 4, Moab, Utah 84532  
 (435) 259-3782

## **Fiscal Year 2017 Estimated Budget:**

**Costs for participation of the U.S. Fish Wildlife Service, Colorado River Fishery Project (USFWS-CRFP) office, Grand Junction, CO.**

(Based on projected FY-2017 costs)

**Note:** The FY-16 and outyear costs have been adjusted for the GS-5 Bio Tech line items to reflect new guidance from Office of Personnel Management (OPM) to the USFWS requiring the USFWS to provide health insurance to all federal employees, regardless of grade level or appointment type, if they work for the federal government longer than 60 days (480 total hours).

### **Personnel/Labor Costs (Federal Salary + Benefits)**

Principal Biologist (GS-11) – 80 hours @ \$50.84/hr (1 person X 5 days/trip X 2 trips)	\$ 4,067.00
Principal Biologist (GS-7) - 80 hours @ \$34.71/hr (1 people X 5 days/trip X 2 trips) (+ 30 hours overtime at \$52.06/hr = \$1,562)	\$ 4,338.00
Biological Technician (GS-5) – 80 hours @ \$24.96/hr (1 people X 5 days/trip X 2 trips) (+ 30 hours overtime each at \$38.56/hr = \$1,157)	\$ 3,154.00
<b>Sub Total</b>	<u>\$ 11,559.00</u>

### **Administrative Support (Federal Salary + Benefits)**

Administrative Officer (GS-9) – 23 hours @ \$46.06/hr	\$ 1,059.00
Project Leader (GS-14) -- 15 hours @ \$85.92/hr	<u>\$ 1,289.00</u>
<b>Sub Total</b>	\$ 2,348.00

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

Hotel Costs	
2 nights X 3 people X \$89/night (standard hotel rate)	\$ 534.00
Per Diem (Hotel Rate)	
2 days X 3 people X \$51/day (standard hotel rate)	\$ 306.00
Per Diem (Camping Rate)	
10 days X 3 people X \$28/day	<u>\$ 840.00</u>
<b>Sub Total</b>	\$ 1,680.00

### **Equipment**

Vehicle Maintenance & Gasoline (GSA lease @ \$365 = \$12.17 per day based on 30 days in an “average” month + \$0.33/mile)	
2 trips from Grand Junction, CO to Clay Hills boat take-out in Utah X 1 truck X 5 days per trip (camping) (350 miles 1-way = 700 miles round trip X	\$ 584.00

2 trips) = \$462	
(1 truck X 5 days/trip X 2 trips X \$12.17/day) = \$122	
Generator Gasoline for Electrofishing (20 gallons/trip X 2 trips @ \$4.00/gallon)	\$ 160.00
Equipment Maintenance, Repair, & Replacement	\$ 2,500.00
Exact use of the money in this line item will vary from year to year depending on what equipment needs to be maintained, repaired, or replaced, but probable uses for this incurred cost include the following:	
Annual trailer maintenance & safety inspection = \$175	
Replace/repair trailer suspension, trailer lights, winch handle/straps/gears, trailer jack stand, wheel bearings	
Replace trailer tires – 2 per year @ \$100 each = \$200	
Spark plugs for generators - 5 @ \$7.50 each = \$37.50	
Synthetic oil for generators - 5 quarts at \$7.50 each = \$37.50	
Generator repair/tune-up - 3 hrs @ \$75/hr = \$225	
Hip boots – 3 pair at \$50/pair = \$150	
Breathable chest waders - 4 pair @ \$125/pair = \$500	
Dura-Frame electrofishing dip nets – 3 @ \$300 each = \$900	
Stearns Type II life jackets – 3 @ \$70 each = \$210	
Electrical Gloves - 3 pairs @ \$65/pair = \$195	
Repair raft frame	
Aluminum welding – 3 hours @ \$150/hr = \$450	
Restock raft repair kits	
Raft glue (urethane/hypalon) – Two 4-oz. cans @ \$22.50/can = \$55	
NRS raft patch material – 5 feet @ \$37/ft = \$185	
Acetone – 1 gallon @ \$17/gallon = \$17	
Replace any missing NRS HD-brand tie-down straps, each boat needs:	
Ten 2-ft straps @ \$4.20 each = \$42	
Five 3-ft straps @ \$4.30 each = \$21.50	
Ten 4-ft straps @ \$4.70 each = \$47	
Five 6-ft straps @ \$5.05 each = \$25.25	
Five 9-ft straps @ \$5.7 each = \$28.50	
Five 12-ft straps @ \$6.15 each = \$30.75	
Replace any missing D-style carabiners, each boat needs: 10 @ \$7.50 each = \$75	
<b>Sub Total</b>	<u>\$ 3,244.00</u>
<b>USFWS-CRFP (Grand Junction, CO) Total</b>	\$ 18,831.00
<b>USFWS Region 6 Administrative Overhead (3.00%)</b>	<u>\$ 565.00</u>
<b>USFWS Region 6 Total</b>	<u>\$ 19,396.00</u>