

RECOVERY PROGRAM
FY 2018-2019 SCOPE OF WORK for:
Smallmouth bass control in the lower Yampa River

Recovery Program Project Number: 110

Reclamation Agreement number: R15PG00083
Reclamation Agreement term: 10/1/2014-9/30/2019

Note: Recovery Program FY18-19 scopes of work are drafted in May 2017. They often are revised before final Program approval and may subsequently be revised again in response to changing Program needs. Program participants also recognize the need and allow for some flexibility in scopes of work to accommodate new information (especially in nonnative fish management projects) and changing hydrological conditions.

Lead agency: U.S. Fish & Wildlife Service

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Category:

Ongoing project

Ongoing-revised project

Requested new project

Unsolicited proposal

Expected Funding Source:

Annual funds

Capital funds

Other *[explain]*

- I. Title of Proposal: Smallmouth bass control in the lower Yampa River within Yampa Canyon, Dinosaur National Monument
- II. Relationship to RIPRAP:
Yampa River Action Plan
 - III.B.2. Control nonnative fishes via mechanical removal
 - III.B.2.a. Estimate nonnative abundance, status, trends, and distribution
 - III.B.2.d. Remove northern pike from Yampa River designated critical habitat
 - III.B.2.e. Remove smallmouth bass
 - III.B.2.f. Control channel catfish in Yampa Canyon by removing fish >400mm
 - III.B.2. Monitor native and endangered fish response
- III. Study Background/Rationale and Hypotheses:
Nonnative fishes have become established in rivers of the upper Colorado River basin, and certain species contribute to reductions in the distribution and abundance of native fishes primarily through predation and competition (e.g., Hawkins and Nesler 1991; Lentsch et al. 1996; Tyus and Saunders 1996). Controlling problematic nonnative fishes is necessary for recovery of endangered humpback chub *Gila cypha*, bonytail *G. elegans*, Colorado pikeminnow *Ptychocheilus lucius*, and razorback sucker *Xyrauchen texanus* in the upper Colorado River basin (UCREFRP 2017). One of five wild populations of humpback chub in the upper Colorado River basin historically occurred in Yampa Canyon on the lower Yampa River, Colorado (Valdez and Carothers 1998), and one of two known pikeminnow spawning sites in the Green River basin occurs in the canyon. Razorback sucker have also historically spawned in the lower canyon near Echo Park, and recent captures there suggest this site is

being recolonized (Jones 2013). Introduced ictalurids and centrarchids are implicated in the demise of native and endangered fishes (Tyus and Saunder 1996; USFWS 2002).

The nonnative smallmouth bass *Micropterus dolomieu* was first introduced into Colorado in 1951 and has increased in abundance and range throughout much of the upper Colorado River basin. Smallmouth bass have been ranked as the greatest predatory threat to fishes in this river reach (Johnson et al. 2008). Electrofishing catch rates of smallmouth bass dramatically increased in the Yampa River in 2004 (Fuller 2004). It is our opinion that the increase in smallmouth bass abundance will exacerbate the impacts that nonnative fishes have on the already distressed native fauna in the Yampa River. Smallmouth bass may now pose the greatest threat to endangered and native fishes in the lower Yampa River, and dry hydrology of 2012 and 2013 resulted in the survival and recruitment of large year-classes of smallmouth bass (Jones 2012, 2013). Unlike previous years with high recruitment, bass appear to be expanding their densities further downstream into the canyon (Jones 2013, 2014). Large catfish (<400 mm TL) will also be removed since studies have found an increased incidence of piscivory in channel catfish greater than 400mm total length (Tyus and Nikirk 1990).

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

The purpose of this study is to develop a control program for smallmouth bass in Yampa Canyon, and to sufficiently reduce the abundance of smallmouth bass such that predatory and competitive impacts on growth, recruitment, and survival of resident humpback chub and Colorado pikeminnow are minimized. We will evaluate reductions in bass density by comparing catch rates from this study across previous years. Additionally, five one-mile sub-reaches have been established to monitor large fish composition and determine whether there has been a native fish response to control. The study specific objectives are:

1. To reduce the abundance of smallmouth bass in Yampa Canyon through mechanical removal.
2. Compare the catch rates and size structure of smallmouth bass to determine the distribution and status of this species in this reach of river.
3. Determine annual sub-adult and adult native and nonnative fish composition.

End Products: Annual reports to the upper Colorado River Endangered Fishes Recovery Program (RIP) for each year of the study and as required throughout the duration of the project. Data describing combined catch rates, catch rates per reach, and length frequencies will be presented for all years of study within each annual report.

V. Study Area: Yampa River within Dinosaur National Monument from Deerlodge Park (RMI 46) to the Green River confluence and Echo Park, May-July

VI. Study Methods/Approach:

Temporarily reducing riverine smallmouth bass and northern pike populations appears viable under certain environmental conditions, but both species can easily reverse these reductions in population abundance and return to pre-removal abundances under favorable environmental conditions (Breton et al. 2014; Zelasko et al. 2015). Therefore, mechanical removal efforts will attempt to reach eradication of nonnative fish populations in the river. Recent synthesis reports investigating effectiveness of in-river removal efforts for northern pike and smallmouth bass, however, have determined that reducing in-river populations of these two species will not be

successful unless in-river reproduction and reservoir escapement are controlled (Breton et al. 2014; Zelasko et al. 2015). Therefore, mechanical removal efforts will continue to temporarily suppress riverine populations, and will focus on reducing in-river reproduction when feasible. Simultaneously, Program partners will work on other means to reduce in-river reproduction and reservoir escapement, in order to make mechanical removal more effective in an attempt to reach complete eradication of riverine populations.

We will conduct six removal passes following peak runoff flows, which usually occurs June-July. Sampling occasions will be implemented strategically to match optimal sampling conditions, particularly when environmental and biological cues are known to improve catch rates, for instance after the onset of 16°C when bass are likely spawning (Breton et al. 2015).

Smallmouth bass spawning/nesting periods and locations will be determined, if possible. Spawning habitats will be identified when nests, pairing, and other spawning behaviors are observed. All adult bass will be examined for spawning status (e.g. expression of gametes), and location of spawning bass congregations will then be targeted to remove adult bass guarding nests. Temperatures will be taken to correlate with spawning activity. Other capture methodologies and techniques will be implemented on an experimental basis (e.g. electric seines to collect YOY bass, fish traps, etc).

Fish handling and disposal: Nonnative fish captures incidental to smallmouth bass including centrarchids (green sunfish, bluegill, and black crappie), northern pike, channel catfish >400 mm, white sucker, and walleye will be removed and reported. Other less common nonnative species encountered (e.g. grass carp, gizzard shad, or burbot) will be removed and reported to the appropriate state agency. During removal passes all nonnative fish taken from the river will be identified, measured and weighed, and deposited off-shore along river banks. Deposition of fish will not occur in high use areas. High use areas include designated campgrounds, picnic areas and points of interest frequented by commercial and private river runners. Any endangered fish captured will be scanned for a PIT tag, tagged if needed, weighed (g), measured TL (mm), and released alive. Endangered fish data will be reported and stored in the STReaMS database (STReaMS 2017).

Study Approach: Two rafts equipped with ETS electrofishing units will be used to electrofish the entire length of study area (one per shoreline) for six 4-day trips. All reaches will be sampled by two people per raft, an operator and one netter. To allow for comparisons of removal efficiency and fish movement, the lower 46 miles of the Yampa River will be stratified into ten contiguous reaches of approximately equal length (4-5 river miles). Five one-mile sub-reaches will be selected within the ten contiguous reaches to monitor large-bodied fish composition and to identify the native fish response to control efforts. In these smaller sub-reaches all fish (native and nonnative) will be captured measured and weighed; the natives will be returned to the river and all targeted nonnatives removed.

Sampling will begin as river discharge permits, most likely in June. As identified in the December 2009 Nonnative Fish Workshop, sampling will center on removing adult bass during the spawning and nesting period (typically water temperatures >16°C). Total numbers of smallmouth bass and other nonnative fish collected and catch per unit of effort will be available for each reach per trip. Length data will be used to determine the size structure of

smallmouth bass removed.

VII. Task Description and Schedule:

Task 1: Conduct six removal passes for smallmouth bass after spring runoff. Monitor fish community (all species with boat based electrofishing) in five, one-mile long sub-reaches throughout Yampa Canyon.

Task 2: Analyze data and determine the smallmouth bass rates of removal. Track smallmouth bass density in the ten river reaches and species composition in the five sub-reaches.

Schedule: FY-2018

Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
1					X	X	X					
2										X	X	X

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

USFWS personnel costs are based on FY2017 GS and WG tables, with current benefit rates included for each position. Future rates were determined assuming a 2% inflation and cost of living increase. Vehicle and travel costs are based on current GSA rates, again assuming a 2% rate of inflation in future years.

FY 2018

Deliverables: Annual report in November. Data submitted to database manager.

Budget

Task Activity	Rate \$/h	Hours	Cost
Task 1			
Labor (6 trips)			
GS-12 Biologist	\$60.84	390	\$23,728
4 GS-5 Tech/ WG-5 Boat Operator	\$23.16	960	\$22,234
Overtime for GS-5 technicians	\$34.75	192	\$6,672
Subtotal			\$52,633
Travel			
Shuttle (3 trucks/trip x \$195/truck x 6 trips) Deerlodge to Echo Park			\$3,510
Per diem (5 people/day x \$30/person x 4 days/trip x 6 trips)			\$3,600
Subtotal			\$7,110
Equipment			
(3 trucks/trip x 275 mi/truck x \$0.33/mi x 6 trips) Vernal to Deerlodge to Echo, round trip			\$1,634
(12 gal gas/boat x 2 boats/trip x \$4.00/gal x 6 trips)			\$576
GSA truck (rate/mo x # truck-months)	\$250	6	\$1,500
GS-8 Fish Tech maintenance work	\$43.43	196	\$8,512
Maintenance/replacement of rafting gear (oars, repair kit supplies, raft repairs/patching, motor maintenance), sampling nets, electrofishing gear (generator maintenance, electrode replacement), safety equipment (life jackets, control pedals/mats), camping equipment (based on average annual expenses from prior years).			\$2,338
Honda 9.9hp 4 stroke motor replacement (2018 only)	\$2,351	1	\$2,351
Subtotal			\$16,911
TASK 1 TOTAL			\$76,654
Task 2- Data Analysis, Annual Report			
Labor			
GS-12 Supervisory Fish Biologist	\$60.84	384	\$23,363
GS-9 Admin Assist.	\$41.57	88	\$3,658
Subtotal			\$27,021
Travel			
Lodging (1 person x \$93/day x 2 days) Vernal to Grand Junction			\$186
Meals and IE (1 person x \$52/day x 3 days) Vernal to Grand Junction			\$156
Travel to give presentations at workshops and meetings (1 truck/trip x 288 mi/truck x \$0.33/mi x 1 trip)			\$95
Subtotal			\$437
TASK 2 TOTAL			\$27,458
SOW TOTAL			\$104,112

FY 2019

Deliverables: Annual report in November. Data submitted to database manager.

Budget

Task Activity	Rate \$/h	Hours	Cost
Task 1			
Labor (6 trips)			
GS-12 Biologist	\$62.05	390	\$24,200
4 GS-5 Tech/ WG-5 Boat Operator	\$23.63	960	\$22,685
Overtime for GS-5 technicians	\$35.44	192	\$6,804
Subtotal			\$53,689
Travel			
Shuttle (3 trucks/trip x \$199/truck x 6 trips) Deerlodge to Echo Park			\$3,582
Per diem (5 people/day x \$30/person x 4 days/trip x 6 trips)			\$3,600
Subtotal			\$7,182
Equipment			
(3 trucks/trip x 275 mi/truck x \$0.34/mi x 6 trips) Vernal to Deerlodge to Echo, round trip			\$1,683
(12 gal gas/boat x 2 boats/trip x \$4.00/gal x 6 trips)			\$576
GSA truck (rate/mo x # truck-months)	\$255	6	\$1,530
GS-8 Fish Tech maintenance work	\$44.29	273	\$12,091
Maintenance/replacement of rafting gear (oars, repair kit supplies, raft repairs/patching, motor maintenance), sampling nets, electrofishing gear (generator maintenance, electrode replacement), safety equipment (life jackets, control pedals/mats), camping equipment (based on average annual expenses from prior years).			\$2,338
Subtotal			\$18,218
TASK 1 TOTAL			\$79,089
Task 2- Data Analysis, Annual Report			
Labor			
GS-12 Supervisory Fish Biologist	\$62.05	384	\$23,827
GS-9 Admin Assist.	\$42.69	132	\$5,635
Subtotal			\$29,462
Travel			
Lodging (1 person x \$94/day x 2 days) Vernal to Grand Junction			\$188
Meals and IE (1 person x \$54/day x 3 days) Vernal to Grand Junction			\$162
Travel to give presentations at workshops and meetings (1 truck/trip x 288 mi/truck x \$0.34/mi x 1 trip)			\$98
Subtotal			\$448
TASK 2 TOTAL			\$29,910
SOW TOTAL			\$108,999

FY 2020

Deliverables: Annual report in November. Data submitted to database manager.

Budget

Task Activity	Rate \$/h	Hours	Cost
Task 1			
Labor (6 trips)			
GS-12 Biologist	\$63.30	390	\$24,687
4 GS-5 Tech/ WG-5 Boat Operator	\$24.10	960	\$23,136
Overtime for GS-5 technicians	\$36.15	192	\$6,941
Subtotal			\$54,764
Travel			
Shuttle (3 trucks/trip x \$203/truck x 6 trips) Deerlodge to Echo Park			\$3,654
Per diem (5 people/day x \$30/person x 4 days/trip x 6 trips)			\$3,600
Subtotal			\$7,254
Equipment			
(3 trucks/trip x 275 mi/truck x \$0.34/mi x 6 trips) Vernal to Deerlodge to Echo, round trip			\$1,683
(12 gal gas/boat x 2 boats/trip x \$4.00/gal x 6 trips)			\$576
GSA truck (rate/mo x # truck-months)	\$260	6	\$1,560
GS-8 Fish Tech maintenance work	\$46.34	273	\$12,651
Maintenance/replacement of rafting gear (oars, repair kit supplies, raft repairs/patching, motor maintenance), sampling nets, electrofishing gear (generator maintenance, electrode replacement), safety equipment (life jackets, control pedals/mats), camping equipment (based on average annual expenses from prior years).			\$2,338
Subtotal			\$18,808
TASK 1 TOTAL			\$80,826
Task 2- Data Analysis, Annual Report			
Labor			
GS-12 Supervisory Fish Biologist	\$63.30	384	\$24,307
GS-9 Admin Assist.	\$44.42	192	\$8,529
Subtotal			\$32,836
Travel			
Lodging (1 person x \$96/day x 2 days) Vernal to Grand Junction			\$192
Meals and IE (1 person x \$55/day x 3 days) Vernal to Grand Junction			\$165
Travel to give presentations at workshops and meetings (1 truck/trip x 288 mi/truck x \$0.34/mi x 1 trip)			\$98
Subtotal			\$455
TASK 2 TOTAL			\$33,291
SOW TOTAL			\$114,116

FY 2021

Deliverables: Annual report in November. Data submitted to database manager.

Budget

Task Activity	Rate \$/h	Hours	Cost
Task 1			
Labor (6 trips)			
GS-12 Biologist	\$66.37	390	\$25,884
4 GS-5 Tech/ WG-5 Boat Operator	\$24.58	960	\$23,597
Overtime for GS-5 technicians	\$36.87	192	\$7,079
Subtotal			\$56,560
Travel			
Shuttle (3 trucks/trip x \$207/truck x 6 trips) Deerlodge to Echo Park			\$3,726
Per diem (5 people/day x \$30/person x 4 days/trip x 6 trips)			\$3,600
Subtotal			\$7,326
Equipment			
(3 trucks/trip x 275 mi/truck x \$0.35/mi x 6 trips) Vernal to Deerlodge to Echo, round trip			\$1,733
(12 gal gas/boat x 2 boats/trip x \$4.00/gal x 6 trips)			\$576
GSA truck (rate/mo x # truck-months)	\$265	6	\$1,590
GS-8 Fish Tech maintenance work	\$47.26	196	\$9,263
Maintenance/replacement of rafting gear (oars, repair kit supplies, raft repairs/patching, motor maintenance), sampling nets, electrofishing gear (generator maintenance, electrode replacement), safety equipment (life jackets, control pedals/mats), camping equipment (based on average annual expenses from prior years).			\$2,338
Subtotal			\$15,499
TASK 1 TOTAL			\$79,386
Task 2- Data Analysis, Annual Report			
Labor			
GS-12 Supervisory Fish Biologist	\$66.37	384	\$25,486
GS-9 Admin Assist.	\$45.61	80	\$3,649
Subtotal			\$29,135
Travel			
Lodging (1 person x \$97/day x 2 days) Vernal to Grand Junction			\$194
Meals and IE (1 person x \$57/day x 3 days) Vernal to Grand Junction			\$171
Travel to give presentations at workshops and meetings (1 truck/trip x 288 mi/truck x \$0.35/mi x 1 trip)			\$101
Subtotal			\$466
TASK 2 TOTAL			\$29,601
SOW TOTAL			\$108,986

FY 2022

Deliverables: Annual report in November. Data submitted to database manager.

Budget

Task Activity	Rate \$/h	Hours	Cost
Task 1			
Labor (6 trips)			
GS-12 Biologist	\$67.70	390	\$26,403
4 GS-5 Tech/ WG-5 Boat Operator	\$25.07	960	\$24,067
Overtime for GS-5 technicians	\$37.61	192	\$7,221
Subtotal			\$57,691
Travel			
Shuttle (3 trucks/trip x \$211/truck x 6 trips) Deerlodge to Echo Park			\$3,798
Per diem (5 people/day x \$30/person x 4 days/trip x 6 trips)			\$3,600
Subtotal			\$7,398
Equipment			
(3 trucks/trip x 275 mi/truck x \$0.36/mi x 6 trips) Vernal to Deerlodge to Echo, round trip			\$1,782
(12 gal gas/boat x 2 boats/trip x \$4.00/gal x 6 trips)			\$576
GSA truck (rate/mo x # truck-months)	\$271	6	\$1,626
GS-8 Fish Tech maintenance work	\$48.21	196	\$9,449
Maintenance/replacement of rafting gear (oars, repair kit supplies, raft repairs/patching, motor maintenance), sampling nets, electrofishing gear (generator maintenance, electrode replacement), safety equipment (life jackets, control pedals/mats), camping equipment (based on average annual expenses from prior years).			\$2,338
Subtotal			\$15,771
TASK 1 TOTAL			\$80,860
Task 2- Data Analysis, Annual Report			
Labor			
GS-12 Supervisory Fish Biologist	\$67.70	384	\$25,997
GS-9 Admin Assist.	\$46.53	80	\$3,722
Subtotal			\$29,719
Travel			
Lodging (1 person x \$99/day x 2 days) Vernal to Grand Junction			\$198
Meals and IE (1 person x \$58/day x 3 days) Vernal to Grand Junction			\$174
Travel to give presentations at workshops and meetings (1 truck/trip x 288 mi/truck x \$0.36/mi x 1 trip)			\$104
Subtotal			\$476
TASK 2 TOTAL			\$30,195
SOW TOTAL			\$111,055

IX. Budget Summary:

Total budget to USFWS Vernal by fiscal year:

FY2018: \$104,112

FY2019: \$108,999

FY2020: \$114,116

FY2021: \$108,986

FY2022: \$111,055

X. Reviewers: Recovery Program Director's Office – May 2017; Biology Committee – July 2017

XI. References:

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