

RECOVERY PROGRAM
FY 2016-2017 SCOPE OF WORK for:
Smallmouth bass control in the lower Yampa River

Recovery Program Project Number: 110

Reclamation Agreement number: R13PG40020
Reclamation Agreement term: 10/1/2012- 9/30/2015

Note: Recovery Program FY16-17 scopes of work are drafted in May 2015. 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: USFWS

Submitted by: M. Tildon Jones, U.S. Fish & Wildlife Service

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Date Last Modified: 6/14/2015 11:49:00 AM

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.e. Remove smallmouth bass
 - III.B.2.f. Control channel catfish
 - III.B.2.f.(2) Remove channel catfish >400mm in Yampa Canyon
 - III.B.2.h. 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 2013). 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 (Colorado Division of Wildlife NDIS 2014) 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:

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 will be selected within the ten contiguous reaches 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 by capture and removal.
2. Compare the catch rates of smallmouth bass to determine the efficacy of removal efforts.
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. However, recent synthesis reports investigating effectiveness of in-river removal efforts for northern pike and smallmouth bass determined that reducing in-river populations of these two species would not be successful unless in-river reproduction and reservoir escapement were 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 and to 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.

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 suckers, 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 a database in the U.S. Fish and Wildlife Service CRFP Grand Junction office.

Study Approach: Two rafts equipped with Smith-Root GPP 5.0 electrofishing units will be used to shock 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 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. [June – September].

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.

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

FY 2016: Annual report due November 2016.

Task Activity	Rate \$/h	Hours	Cost
Task 1 - Removal passes for smallmouth bass			
Labor			
GS-12 Biologist	\$55.14	390	\$21,505
4 GS-5 Tech/ WG-5 Boat Operator	\$24.96	960	\$23,962
Overtime for GS-5 technicians	\$37.44	192	\$7,188
Subtotal			\$52,655
Travel			
Shuttle (3 trucks/trip x \$180/truck x 6 trips) Deerlodge to Echo Park			\$3,240
Per diem (5 people/day x \$30/person x 4 days/trip x 6 trips)			\$3,600
Subtotal			\$6,840
Equipment			
(3 trucks/trip x 275 mi/truck x \$0.31/mi x 6 trips) Vernal to Deerlodge to Echo, round trip			\$1,535
(12 gal gas/boat x 2 boats/trip x \$4.00/gal x 6 trips)			\$576
GSA truck (rate/mo x # truck-months)	\$313	6	\$1,878
GS-8 Fish Tech maintenance work	\$38.72	196	\$7,589
Maintenance/replacement of rafting gear (oars, repair kit supplies, raft repairs or patching, motor maintenance), sampling nets, electrofishing gear (generator maintenance, electrode replacement), safety equipment (life jackets, control pedals or mats), camping equipment (based on average annual expenses from prior years).			\$2,338
Honda 9.9hp 4 stroke motor replacement (2016 only)	\$2,351	1	\$2,351
Subtotal			\$16,267
TASK 1 TOTAL			\$75,762
Task 2- Data Analysis, Annual Report			
Labor			
GS-12 Supervisory Fish Biologist	\$55.14	384	\$21,174
GS-9 Admin Assist.	\$39.19	80	\$3,135
Subtotal			\$24,309
Travel			
Per diem (1 person x \$129/day x 3 days) Vernal to Grand Junction			\$387
Travel to give presentations at workshops and meetings (1 truck/trip x 288 mi/truck x \$0.31/mi x 1 trip)			\$89
Subtotal			\$476
TASK 2 TOTAL			\$24,785
SOW TOTAL			\$100,547

FY 2017: Annual report due November 2017.

Task Activity	Rate \$/h	Hours	Cost
Task 1			
Labor			
GS-12 Biologist	\$56.25	390	\$21,938
4 GS-5 Tech/ WG-5 Boat Operator	\$25.70	960	\$24,672
Overtime for GS-5 technicians	\$38.55	192	\$7,402
Subtotal			\$54,011
Travel			
Shuttle (3 trucks/trip x \$180/truck x 6 trips) Deerlodge to Echo Park			\$3,240
Per diem (5 people/day x \$30/person x 4 days/trip x 6 trips)			\$3,600
Subtotal			\$6,840
Equipment			
(3 trucks/trip x 275 mi/truck x \$0.32/mi x 6 trips) Vernal to Deerlodge to Echo, round trip			\$1,584
(12 gal gas/boat x 2 boats/trip x \$4.00/gal x 6 trips)			\$576
GSA truck (rate/mo x # truck-months)	\$320	6	\$1,920
GS-8 Fish Tech maintenance work	\$39.74	196	\$7,789
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			\$14,207
TASK 1 TOTAL			\$75,058
Task 2- Data Analysis, Annual Report			
Labor			
GS-12 Supervisory Fish Biologist	\$56.25	384	\$21,600
GS-9 Admin Assist.	\$39.98	80	\$3,198
Subtotal			\$24,799
Travel			
Per diem (1 person x \$137/day x 3 days) Vernal to Grand Junction			\$411
Travel to give presentations at workshops and meetings (1 truck/trip x 288 mi/truck x \$0.32/mi x 1 trip)			\$92
Subtotal			\$503
TASK 2 TOTAL			\$25,302
SOW TOTAL			\$100,360

FY 2018: Annual report due November 2018.

Task Activity	Rate \$/h	Hours	Cost
Task 1			
Labor			
GS-12 Biologist	\$57.38	390	\$22,378
4 GS-5 Tech/ WG-5 Boat Operator	\$26.48	960	\$25,421
Overtime for GS-5 technicians	\$39.72	192	\$7,626
Subtotal			\$55,425
Travel			
Shuttle (3 trucks/trip x \$184/truck x 6 trips) Deerlodge to Echo Park			\$3,312
Per diem (5 people/day x \$30/person x 4 days/trip x 6 trips)			\$3,600
Subtotal			\$6,912
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)	\$325	6	\$1,950
GS-8 Fish Tech maintenance work	\$40.53	196	\$7,944
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			\$14,442
TASK 1 TOTAL			\$76,779
Task 2- Data Analysis, Annual Report			
Labor			
GS-12 Supervisory Fish Biologist	\$57.38	384	\$22,034
GS-9 Admin Assist.	\$40.78	80	\$3,262
Subtotal			\$25,296
Travel			
Per diem (1 person x \$137/day x 3 days) Vernal to Grand Junction			\$411
Travel to give presentations at workshops and meetings (1 truck/trip x 288 mi/truck x \$0.33/mi x 1 trip)			\$95
Subtotal			\$506
TASK 2 TOTAL			\$25,802
SOW TOTAL			\$102,581

FY 2019: Annual report due November 2019.

Task Activity	Rate \$/h	Hours	Cost
Task 1			
Labor			
GS-12 Biologist	\$58.52	390	\$22,823
4 GS-5 Tech/ WG-5 Boat Operator	\$27.27	960	\$26,179
Overtime for GS-5 technicians	\$40.91	192	\$7,855
Subtotal			\$56,857
Travel			
Shuttle (3 trucks/trip x \$187/truck x 6 trips) Deerlodge to Echo Park			\$3,366
Per diem (5 people/day x \$30/person x 4 days/trip x 6 trips)			\$3,600
Subtotal			\$6,966
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)	\$332	6	\$1,992
GS-8 Fish Tech maintenance work	\$41.35	261	\$10,792
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			\$17,381
TASK 1 TOTAL			\$81,204
Task 2- Data Analysis, Annual Report			
Labor			
GS-12 Supervisory Fish Biologist	\$58.52	384	\$22,472
GS-9 Admin Assist.	\$41.60	116	\$4,826
Subtotal			\$27,297
Travel			
Per diem (1 person x \$137/day x 3 days) Vernal to Grand Junction			\$411
Travel to give presentations at workshops and meetings (1 truck/trip x 288 mi/truck x \$0.34/mi x 1 trip)			\$98
Subtotal			\$509
TASK 2 TOTAL			\$27,806
SOW TOTAL			\$109,010

FY 2020: Annual report due November 2020

Task Activity	Rate \$/h	Hours	Cost
Task 1			
Labor			
GS-12 Biologist	\$59.69	390	\$23,279
4 GS-5 Tech/ WG-5 Boat Operator	\$28.09	960	\$26,966
Overtime for GS-5 technicians	\$42.14	192	\$8,091
Subtotal			\$58,336
Travel			
Shuttle (3 trucks/trip x \$191/truck x 6 trips) Deerlodge to Echo Park			\$3,438
Per diem (5 people/day x \$30/person x 4 days/trip x 6 trips)			\$3,600
Subtotal			\$7,038
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)	\$332	6	\$1,992
GS-8 Fish Tech maintenance work	\$42.17	261	\$11,006
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			\$17,645
TASK 1 TOTAL			\$83,020
Task 2- Data Analysis, Annual Report			
Labor			
GS-12 Supervisory Fish Biologist	\$59.69	384	\$22,921
GS-9 Admin Assist.	\$42.43	116	\$4,922
Subtotal			\$27,842
Travel			
Per diem (1 person x \$137/day x 3 days) Vernal to Grand Junction			\$411
Travel to give presentations at workshops and meetings (1 truck/trip x 288 mi/truck x \$0.35/mi x 1 trip)			\$101
Subtotal			\$512
TASK 2 TOTAL			\$28,354
SOW TOTAL			\$111,374

IX. Budget Summary:

FY 2016: \$100,547
FY 2017: \$100,360
FY 2018: \$102,581
FY 2019: \$109,010
FY 2020: \$111,374

X. Reviewers: **Kevin McAbee, June 2015;**

XI. References:

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- Valdez, R.A. and S.W. Carothers. 1998. The aquatic ecosystem of the Colorado River in Grand Canyon. Report prepared for the Bureau of Reclamation by SWCA Inc.