

**RECOVERY PROGRAM**  
**FY 2020-2021 SCOPE OF WORK for:**  
**Smallmouth bass control in the lower Yampa River**

Recovery Program Project Number: 110

Reclamation Agreement number: TBA  
Reclamation Agreement term:

Note: Recovery Program FY20-21 scopes of work are drafted in May 2019. 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.

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Date Last Modified: 6/9/2019 10:06:00 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.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.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 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 of the most productive 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 likely pose the greatest threat to endangered and native fishes in the lower Yampa River. 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 native fishes 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-bodied 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 (RM 46) to Echo Park and the Green River confluence.

#### 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 (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 for total length (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-2020

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:

Annual report will be submitted in November and data will be submitted to the database coordinator by January.

IX. Budget Summary:

FY2020: \$124,323  
 FY2021: \$109,761  
 FY2022: \$111,956  
 FY2023: \$114,196  
 FY2024: \$126,849

X. Reviewers:

XI. References:

Breton, A. R, D. L. Winkelman, J. A. Hawkins, and K. R. Bestgen. 2014. Population trends of smallmouth bass in the upper Colorado River basin with an evaluation of removal effects. Final report to the Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado. Larval Fish Laboratory Contribution 169.

Zelasko, K. A., K. R. Bestgen, J. A. Hawkins, G. C. White. 2014. Abundance and population dynamics of invasive northern pike *Esox lucius*, Yampa River, Colorado, 2004–2010. Final Project # 123a-SMB Echo-Split/Desolation-Gray FY 2018-2019 SOW, Page 20  
Report to the Upper Colorado River Endangered Fish Recovery Program, Project 161b, Denver. Larval Fish Laboratory Contribution 185.