

**COLORADO RIVER RECOVERY PROGRAM  
FY-2006-2007 PROPOSED SCOPE OF WORK**

Project No.: 110

Smallmouth bass and channel catfish control in the lower Yampa River

Lead Agency: U.S. Fish and Wildlife Service

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Revised 2/14/06 by Mark Fuller (2/15/06 by Pat Nelson)

<u>Category:</u>	<u>Expected Funding Source:</u>
<input type="checkbox"/> Ongoing project	<input checked="" type="checkbox"/> Annual funds
<input checked="" type="checkbox"/> Ongoing-revised project	<input type="checkbox"/> Capital funds
<input type="checkbox"/> Requested new projects	<input type="checkbox"/> Other (explain)
<input type="checkbox"/> Unsolicited proposals	

- I. Title of Proposal: Smallmouth bass and channel catfish control in the lower Yampa River within Yampa Canyon.
- II. Relationship to RIPRAP: Green River Action Plan: Yampa and Little Snake Rivers  
III.A.1.c.(1) Nonnative fish removal in Yampa Canyon.
- 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.

One of the five extant wild populations of humpback chub in the upper Colorado River basin occurs in Yampa Canyon on the lower Yampa River, Colorado (Valdez and Carothers 1998). Here, nonnative fishes adversely affect the native and endangered fishes in some fashion. Tyus and Saunders (1996) identified warmwater gamefish to have the greatest adverse effect on endangered native fishes. “This is consistent with the ANSTF (1994) report that listed ictalurids and centrarchids as frequent contributors to the demise of native fishes nationwide”.

Nonnative channel catfish *Ictalurus punctatus* have been recognized as the principal predator and competitor affecting humpback chub populations in the upper Colorado River basin, however, a highly prolific and migratory population of smallmouth bass *Micropterus dolomieu* is the cause of even greater concern in Yampa Canyon. Electrofishing catch rates of Smallmouth bass have dramatically increased in the Yampa and Green Rivers since 2002 (Anderson and Fuller, 2002 and 2003). It is our opinion that this increase in smallmouth bass abundance will exacerbate the negative impacts that nonnatives have on the Yampa’s already distressed native fauna. Concerns for humpback chub and Colorado pikeminnow susceptibility to smallmouth bass predation mounted at the RIP’s nonnative fish control workshops in 2003–2005. Smallmouth bass were implicated to pose the greatest threat to endangered and native fishes in the lower Yampa River, and the primary nonnative species to control shifted from channel catfish to smallmouth bass.

The smallmouth bass was first introduced into Colorado in 1951 (Colorado Division of Wildlife [CDOW] wildlife report, 2001) and is increasing in abundance throughout much of the upper Colorado River basin. Smallmouth bass are opportunistic predators, eating whatever prey is available. The bulk of their diet consists of crustaceans and aquatic insects during the first stages of life and then prey on small fish as they grow larger (Moyle 1976). By the time fingerling smallmouth bass are 38 mm length, insects and small fish comprise the bulk of the diet. Smallmouth bass prefer cool, flowing streams, and large, clear lakes over rocky substrates. It commonly avoids sluggish or muddy water but is commonly encountered in clear to slightly turbid, shallow water, over substrates including sand, gravel, rubble, and boulders.

The optimum temperature for bass egg deposition is 16.1-18.3 °C (Scott and Crossman 1973). Eggs are demersal and adhesive, and attach to rocky surfaces in the nest. The male guards the nest during incubation, and after hatching until juvenile fish reach about 25 mm TL (Emig 1966). Maturity is reached during their third or fourth year (Moyle 1976); others have reported that the fish mature mostly at age 2 (Emig 1966; Webster 1954).

The channel catfish was first introduced into the upper Colorado River basin in 1892 (Tyus and Nikirk 1988) and is now common or abundant throughout much of the upper basin (Tyus et al. 1982; Nelson et al. 1995). Channel catfish are found in low- to moderate-gradient rivers with sand, gravel, or boulder substrates (McMahan and Terrell

1982). Most adult channel catfish are found in large, deep pools and runs during daylight, but move to riffles or shallow pools at night to feed. Young channel catfish congregate in riffles or shallow pools (Aadland 1993). In Yampa Canyon, channel catfish were most abundant in turbulent areas associated with large substrates (Tyus and Nikirk 1988). Channel catfish spawn in late spring through early summer when water temperatures reach about 20–24°C. Adults seek dark secluded areas associated with cavities or cover to build their nests and spawn (Sigler and Miller 1963; McClane 1965; Pflieger 1975; Simpson and Wallace 1978).

Both species will be targeted for mechanical removal to determine a level of effort required to reduce their negative impacts to endangered and native fishes and to result in a positive endangered and native fish response.

#### IV. Study Goals, Objectives, End Product:

The purpose of this study is to develop an effective control program for smallmouth bass and channel catfish in Yampa Canyon. The goal is to sufficiently reduce the abundance of smallmouth bass and channel catfish such that predatory and competitive impacts on growth, recruitment, and survival of resident humpback chub and Colorado pikeminnow are minimized. The study specific objectives are:

1. Reduce the abundance of smallmouth bass and channel catfish in Yampa Canyon by capture and removal (lethal).
2. Compare the catch rates of smallmouth bass and channel catfish to determine the efficacy of removal efforts.

End Products: Annual reports to the upper Colorado River Endangered Fishes Recovery Program (RIP) for each year of the study beginning 11/04 and as required throughout duration of the project. Synthesis report due by May 2007.

#### V. Study Area:

The lower Yampa River in Yampa Canyon (from Deerlodge Park [river mile 46] downstream to the Green River confluence [river mile zero]). This section of the Yampa River is within the boundary of Dinosaur National Monument and subject to U.S. National Park Service operating regulations.

#### VI. Study Methods/Approach:

Hudson (2002) demonstrated that electrofishing was the most effective method for capturing centrarchids in the nearby middle Green River, and found that smallmouth bass catch rates were highest during September and October. Modde and Fuller (2000)

experienced catch rates to be greatest for channel catfish during July and August, but, because opportunities to access the canyon can be restricted as early as July, sampling time will be based on flows and canyon access. Sampling will continue until flows recede to about 300 cfs.

Two rafts equipped with Smith-Root electrofishing units (one per shoreline) will shock the entire length of river on up to seven 5-day trips. In years when population estimates are to be developed, all smallmouth bass and channel catfish captured during the first pass of each year will be marked, measured (TL), weighed and returned to the river alive. Thereafter, all marked and re-captured smallmouth bass and channel catfish will be identified, measured and weighed, and removed from the river. In other years (i.e., 2006 and 2007), there will be no marking passes. All passes will be removal passes, and effectiveness of removal will be determined using catch per unit effort.

To allow for statistical 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. Stratification will be based on differences in geomorphic characteristics and logistic considerations.

Total numbers of smallmouth bass and channel catfish collected and catch per unit of effort will be recorded for each reach per trip and each gear type. Length and weight data will be used to determine the size structure of smallmouth bass and channel catfish removed. Estimates of weight, together with size and removal numbers, will be used to calculate total biomass of smallmouth bass and channel catfish removed. The experimental unit will consist of the average number of target species captured per hour. A maximum likelihood depletion estimator (CAPTURE) will be used to calculate population sizes in years that population estimates using mark-recapture are used to track the effectiveness of removal efforts. Changes in length frequency distribution of smallmouth bass and channel catfish removed will be analyzed statistically. Year end analysis will summarize the biomass estimates and numbers of smallmouth bass and channel catfish removed from the Yampa River, determine if differences occurred between numbers and sizes removed among reaches, determine any changes in size structure of smallmouth bass and channel catfish associated with removal, and determine the percent of nonnative fishes removed.

Channel catfish and smallmouth bass collected during the last day of each electrofishing trip will be available to CDOW personnel. These fish will be either relocated or retained for sportfish supplementation and/or research purposes (otoliths, gut content, etc.). This effort will be closely coordinated with CDOW personnel who will be responsible for tagging, hauling and releasing these fish into approved waters or for processing and disposal of specimens retained for research development.

To be effective and to maintain public understanding and support, it will be critical to initiate an active public relations campaign. We will assist the RIP staff, CDOW, and the National Park Service in their research and I&E efforts on nonnative removal projects.

VII. Task Description and Schedule:

Task 1: Capture and remove smallmouth bass and channel catfish from the lower Yampa River within Yampa Canyon using electrofishing during June–September.

Task 2: Analyze data and determine the smallmouth bass and channel catfish rates of removal. Estimate catch rates of smallmouth bass and channel catfish, and track in the ten river reaches of the lower Yampa River. Prepare annual reports (and synthesis report in 2007) that identify the means and level of bass and channel catfish control (removal) achieved and present results in annual meetings.

IX. FY2006 and FY2007:

Deliverables/Due Dates: Annual Reports November 2005, 2006, 2007; synthesis report by May 2007.

Budget: FY2006

Task 1

Labor	Cost
GS-14 Project Leader (\$59.82/hr x 8 hrs/day x 5 days/trip x 2 trips)	\$4,786
GS-11 Biologist (\$36.67/hr x 8 hrs/day x 5 days/trip x 7 trips)	\$10,268
GS-11 Biologist trip prep (\$36.67/hr x 8 hrs/day x 2 days/trip x 7 trips)	\$4,107
6 GS-5 Tech (\$20.56/hr x 8 hrs/day x 5 days/trip x 7 trips) + (\$30.84/hr x 2 hrs OT/day x 5 days/trip x 7 trips)	\$47,494
4 GS-5 Technicians trip prep (\$20.56/hr x 8 hrs/day * 3 days/trip x 7 trips)	\$13,816

Subtotal	\$80,471
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Travel, Per Diem, Equipment	Cost
(5 trucks/trip x 100 mi/truck x \$0.405/mi x 7 trips) Vernal to Deerlodge	\$1,418
(5 trucks/trip x 100 mi/truck x \$0.405/mi x 7 trips) Deerlodge to Eco Park	\$1,418
(1 truck/trip x 75 mi/truck x \$0.405/mi x 7 trips) Eco Park to Vernal	\$213
(4 trucks/trip x 75 mi/truck x \$0.405/mi x 7 trips) Eco Park to Vernal	\$851
Shuttle Drivers (5 drivers/trip x \$105/driver x 7 trips)	\$3,675
Shuttle Driver Organizer (1 driver/trip x \$15/driver x 7 trips) for trip organization	\$105
Per diem (8 people/day x \$25/person x 5 days/trip x 7 trips)	\$7,000
Equipment (catarafts accessories, maintenance, repair, boat motor, etc.)	\$2,400

Subtotal	\$17,080
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Task 2

Data Analysis	Cost
GS-11 Biologist (\$36.67/hr x 8 hrs/day x 45 days)	\$13,201
GS-5 Technicians (\$20.56/hr x 8 hrs/day x 15 days)	\$2,467
GS-9 Admin Assist. (\$32.20/hr x 8 hrs/day x 5 days)	\$1,288
Supplies (Copies, disks, paper, etc.)	\$300
Per diem (1 person/day x \$101/person x 2 days/trip x 2 trips) Vernal to Grand Junction	\$404
Travel to give presentations and workshops and meetings (1 truck/trip x 275 mi/truck x \$0.405/mi x 2 trips)	\$223

Subtotal	\$17,883
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Total	115,434
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**Budget: FY 2007**

Task Activity	Cost
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Task 1

Labor	
GS-14 Project Leader (\$61.61/hr x 8 hrs/day x 5 days/trip x 2 trips)	\$4,929
GS-11 Biologist (\$37.77/hr x 8 hrs/day x 5 days/trip x 7 trips)	\$10,576
GS-11 Biologist trip prep (\$37.77/hr x 8 hrs/day x 2 days/trip x 7 trips)	\$4,230
6 GS-5 Tech (\$21.18/hr x 8 hrs/day x 5 days/trip x 7 trips) + (\$31.77/hr x 2 hrs OT/day x 5 days/trip x 7 trips)	\$48,925
4 GS-5 Technicians trip prep (\$21.18/hr x 8 hrs/day * 3 days/trip x 7 trips)	\$14,233

Subtotal	\$82,893
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Travel, Per Diem, Equipment	
(5 trucks/trip x 100 mi/truck x \$0.417/mi x 7 trips) Vernal to Deerlodge	\$1,460
(5 trucks/trip x 100 mi/truck x \$0.417/mi x 7 trips) Deerlodge to Eco Park	\$1,460
(1 truck/trip x 75 mi/truck x \$0.417/mi x 7 trips) Eco Park to Vernal	\$219
(4 trucks/trip x 75 mi/truck x \$0.417/mi x 7 trips) Eco Park to Vernal	\$876
Shuttle Drivers (5 drivers/trip x \$108/driver x 7 trips)	\$3,780
Shuttle Driver Organizer (1 driver/trip x \$16/driver x 7 trips) for trip organization	\$112
Per diem ( 8 people/day x \$26/person x 5 days/trip x 7 trips)	\$7,280
Equipment (catarafts accessories, maintenance, repair, boat motor, etc.)	\$3,090

Subtotal	\$18,277
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Task 2

Data Analysis, Annual Report, Synthesis Report	
GS-14 Project Leader (\$61.61/hr x 8 hrs/day x 5 days)	\$2,464
GS-11 Biologist (\$37.77/hr x 8 hrs/day x 65 days)	\$19,640
GS-5 Technicians (\$21.18/hr x 8 hrs/day x 15 days)	\$2,542

GS-9 Admin Assist. (\$33.17/hr x 8 hrs/day x 5 days)	\$1,288
Supplies (Copies, disks, paper, etc.)	\$309
Per diem (1 person/day x \$104/person x 2 days/trip x 2 trips) Vernal to Grand Junction	\$416
Travel to give presentations and workshops and meetings (1 truck/trip x 275 mi/truck x \$0.417/mi x 2 trips)	\$229
Subtotal	\$26,888
Total	\$128,058

IX. Budget Summary (Does not include overhead):

FY 2006 \$115,434  
FY 2007 \$128,058

X. Reviewers: T. Nesler, R. Valdez, K. Christopherson

XI. References:

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