FY-2002-2003 PROPOSED SCOPE OF WORK for: **Project #:** 110

Development of a channel catfish control program
in the lower Yampa River

Lead Agency: U.S. Fish and Wildlife Service

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Category:
x Ongoing project
__ Ongoing-revised project
__ Requested new projects
__ Unsolicited proposals

Expected Funding Source:
x Annual funds
__ Capital funds
__ Other (explain)

I. Title of Proposal: Development of a channel catfish control program 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. Control channel catfish.
III.A.1.c.(1) Channel catfish 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 have been implicated as contributing 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). Tyus and Saunders (1996) identified nonnative channel catfish (*Ictalurus punctatus*) as the principal predator and competitor affecting humpback chub populations in the upper Colorado River basin, and Tyus (1998) suggested that negative interactions with channel catfish were major factors in the decline of humpback chub in Yampa Canyon. Channel catfish control was included in recommended strategies/options to manage nonnative fishes in the Yampa River to reduce their impacts on endangered

and other native fishes (CDOW 1998).

The channel catfish was first introduced into the upper Colorado River basin in 1892 (Tyus and Nikirk 1988) and is now considered common or abundant throughout much of the upper basin (Tyus et al. 1982; Nelson et al. 1995). It is one of the most prolific predators in the upper Colorado River basin and, among the nonnative fishes, is thought to have the greatest adverse effect on the endangered fishes (Hawkins and Nesler 1991; Lentsch et al. 1996; Tyus and Saunders 1996). 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 20–24ºC. 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). It has been demonstrated that spawning adults often migrate long distances in search of suitable spawning sites (Smith 1988; Gerhardt 1989; Smith and Hubert 1989; Gerhardt and Hubert 1990). However, recent radio-telemetry studies of channel catfish in the Yampa River have shown that these fish often remain in the same river reaches throughout the year (Irving and Karp 1995; Modde et al. 1999). Apparently, suitable spawning habitat is available locally in Yampa Canyon.

IV. Study Goals, Objectives, End Product:

A study to assess capture methods for channel catfish in Yampa Canyon was initiated in 1998 (Recovery Program project number 88; M. Fuller and T. Modde, U.S. Fish and Wildlife Service, Principal Investigators). The final report on that study is due in FY2000. The purpose of this proposed study is to build on results of project number 88 to develop an effective control program for adult channel catfish in Yampa Canyon. The goal of channel catfish removal in Yampa Canyon is to sufficiently reduce the abundance of adult channel catfish such that predatory and competitive impacts on growth, recruitment, and survival of resident humpback chub are minimized. We propose to monitor population response by 1) sampling the fish community in selected reaches and 2) estimate for the Yampa Canyon the humpback chub population in 2000, and another estimate is scheduled by the Recovery Program in 2003. This would coincide with the end of the proposed channel catfish removal effort and will provide an opportunity to assess responses in the humpback chub population. The study objectives are:

1. Reduce the abundance of adult channel catfish in Yampa Canyon by capture and remove (lethal).

2. Determine the fish community responses to reductions in channel catfish population size, including channel catfish reproduction and recruitment.

V. Study Area:

The lower Yampa River in Yampa Canyon (from Deerlodge Park [river mile 46] downstream to the Green River confluence [river mile 0]). This section of the Yampa River is within the boundary of Dinosaur National Monument and subject to National Park Service operating regulations.

VI. Study Methods/Approach:

To allow for statistical comparisons of removal efficiency and better focus future removal efforts, the lower 46 miles of the Yampa River will be stratified into 10 contiguous reaches of approximately equal length. Stratification will be based on differences in geomorphic characteristics and logistic considerations. Channel catfish collection methods will include raft electrofishing during late-spring and early summer descending flows and angling during mid/late-summer base flows. A comparison among several collecting methods, including passive and active gear types, demonstrated that angling during August–September (using 10 to 20 anglers per trip) was the most effective means of removing channel catfish from Yampa Canyon (project number 88; M. Fuller and T. Modde, unpublished data). However, electrofishing to remove channel catfish from the San Juan River has been effective in reducing the abundance of large fish (Brooks et al. 2000), and electrofishing in Yampa Canyon during June 2000 at flows of about 5,000 cfs effectively captured channel catfish (T. Modde, personal observation). Channel catfish will be removed over a total of five passes through each reach (at least three electrofishing and up to two angling passes) during June–September in 2002, and 2003.

Electrofishing will be conducted at flows between about 6,000 and 1,000 cfs. Two electrofishing rafts (one per shoreline) will shock the entire length of river on at least three 5–7-day trips (passes), commencing when flows reach approximately 6,000 cfs and ending when flows approach about 1,000 cfs. Each electrofishing raft will be equipped with Smith-Root electrofishing control units.

The fish community will be monitored to determine responses to catfish removal. Five-one mile monitoring reaches will be selected in Yampa Canyon. During electrofishing trips (at least three trips each year), all fish will be collected within the monitoring reaches and identified to species, counted, weighed, and measured. Catch per hour electrofishing will be recorded. An effort will be made to monitor young channel catfish.

Angling using live bait will be used after flows decline below about 1,000 cfs. Groups of between 10 and 20 volunteers per trip (depending on availability) will remove channel catfish from five reaches per each 5–7-day trip. Therefore, two trips will be required to remove catfish from all 10 reaches; four separate angling trips will be necessary to accomplish two complete passes. Specific reaches sampled per trip will be determined randomly so that trip-specific effects will be distributed randomly. The importance of accurate and consistent data recording will be emphasized to volunteers during pre-trip meetings, and U.S. Fish and Wildlife Service staff will collect and review data sheets daily to ensure that all data are entered. Pre-trip meetings will consist of an orientation to

the purpose of the removal effort, description of the sampling protocol (i.e., work expectations, review of data sheet, need to throughly sample each designated area, need to keep accurate data, etc.). Each volunteer group will be supervised by U.S. Fish and Wildlife Service staff who will direct location of angling activity and provide logistic support to the anglers (e.g., bait, raft transportation, meals, and camp logistics). Angler activity will be directed to specific reaches allowing complete coverage within and among reaches. Each angler will be provided data sheets. Time and location angled, and numbers and length of fish removed will be recorded by each angler. U.S. Fish and Wildlife Service staff will collect angler data sheets daily.

All nonnative fishes collected will be disposed of according to specifications dictated by Dinosaur National Monument. All endangered fish will be PIT tagged and immediately returned to the river. Total numbers of channel catfish collected and catch per unit of effort will be determined for each reach per trip and each gear type. Length and weight data will be used to determine the size structure of channel catfish removed and to determine fish community changes in the five monitoring reaches. The experimental unit will consist of the average number of channel catfish captured per trip. A maximum likelihood depletion estimator (CAPTURE) will be used to calculate channel catfish population size for each reach per year of the study to track the effectiveness of removal efforts. Changes in length frequency distribution of channel catfish removed will be analyzed statistically. Estimates of weight, together with size and removal numbers, will be used to calculated total biomass of channel catfish removed. The final report will summarize the biomass estimates and numbers of channel catfish removed from the Yampa River, determine if differences occurred between numbers and sizes removed among reaches, track the abundance of channel catfish for three consecutive years (plus compare removal efforts with those in 1998-99; project number 88), determine any changes in size structure of channel catfish and all other fish in monitored reaches associated with removal, determine the percent of channel catfish removed, compare and evaluate any changes noted in population estimates for humpback chub and identify the means and level of channel catfish control necessary to reduce the threat of predation/competition on the humpback chub population to a level that will allow continued survival in Yampa Canyon.

VII. Task Description and Schedule:

Task 1: Capture and remove channel catfish from the lower Yampa River within Yampa Canyon using electrofishing and angling during June–September, 2002–2003. In 5-one mile monitoring reaches during electrofishing, collect all species, count, weigh, and measure; make a special effort to monitor catfish reproduction and recruitment.

Task 2: Analyze data and determine the rate of channel catfish removal and the responses of other fishes to the reduced catfish population following the FY2002, and FY2003 removal efforts. Contact and recruit angling volunteers and organize trips for upcoming field season . Estimate population size of channel catfish in the lower Yampa River and track population changes in channel catfish in 10 river reaches.

Task 3: Prepare final report that identifies the means and level of channel catfish control (removal) necessary to minimize the threat of predation/competition on the humpback chub population in Yampa Canyon. Peer review draft April 30, 2004; to BC June 30; final Sept 15.

VIII. FY2002:

Budget:

Task 1

Permanent Labor	$27,918

-GS 11, 7, 7 for 7 trips, 105 man days, and 7 maintenance days; administrative personnel for 22 days

Seasonal Labor	$25,435

-GS 5, 5, 5 for 7 trips, 105 man days, 14 maintenance days

Equipment and Supplies	$22,345

-Meals/EL trip 6 people $750 x 3 trips = $2250
-Meals/Angling trip 18 people $2250 x 3 trips = $9000
-Replaceable equipment $4300 (rafting straps, life preservers, throw bags, camp stoves, ropes, etc)
-Canoes $750 x 7 = $5180
-Boating accessories $1615 (raft frame, oars, canoe floats, etc.)

Travel	$4,032
Subtotal	$79,730

Task 2

Labor	$20,618

-GS13 for 15 days, GS 7 for 67.5 days

Equipment and Supplies	$735
Travel	$672
Subtotal	$22,025

TOTAL	$101,755

FY2003:

Deliverables/Due Dates: Annual Report December 15, 2002.

Budget:

Task 1

Permanent Labor	$27,918

-GS 11, 7, 7 for 7 trips, 105 man days, and 7 maintenance days; administrative personnel for 22 days

Seasonal Labor	$25,435

-GS 5, 5, 5 for 7 trips, 105 man days, 14 maintenance days

Equipment and Supplies	$22,345

-Meals/EL trip 6 people $825 x 3 trips = $2475
-Meals/Angling trip 18 people $2475 x 3 trips = $9900
-Replaceable equipment $2300 (rafting straps, life preservers, throw bags, camp stoves, ropes, etc)
-Raft $6000
-Boating accessories $1670 (raft frame, oars, canoe floats, etc.)

Travel	$4,032
Subtotal	$79,730

Task 2

Labor	$20,618

-GS13 for 15 days, GS 7 for 67.5 days

Equipment and Supplies	$735
Travel	$672
Subtotal	$22,025

TOTAL	$101,755

FY2004:

Deliverables/Due Dates: Annual Report December 15, 2003.
Peer review draft April 30, 2004; to BC June 30; final Sept 15.

Budget:

Task 3

Permanent Labor	$15,000
Equipment and Supplies	$2,000
Travel	$3,000
TOTAL	$20,000

IX. Budget Summary (Does not include overhead):

FY 2002 $101,755
FY 2003 $101,755
FY 2004 $20,000

X. Reviewers:

T. Nesler, R. Valdez, K. Christopherson

XI. References:

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