FY-2001 PROPOSED SCOPE OF WORK for: **Project #:** 109

Multi-Species Monitoring and Nonnative Fish Removal in the Middle Green River

Lead Agency: Utah Division of Wildlife Resources

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Category:	Expected Funding Sources:
_Ongoing project	xAnnual funds
_Ongoing-revised project	_Capital funds
_Requested new project	_Other (explain)
xUnsolicited proposal	

I. Title of Proposal:

Razorback Sucker Monitoring and Northern Pike Removal in the Middle Green River.

II. Relationship to RIPRAP:

General Recovery Program Support Action Plan

III. Reduce negative impacts of nonnative fishes and sportfish management activities (nonnative and sportfish management).

III.A. Reduce negative interactions between nonnative and endangered fishes.

III.A.2. Identify and implement viable active control measures.

IV. Manage genetic integrity and augment or restore populations (stocking endangered fishes).

IV.F. Conduct monitoring to evaluate effectiveness and continuation of endangered fish stocking.

IV.F.4. Evaluate effectiveness and continuation of endangered fish stocking.

V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).

III. Study Background/Rationale and Hypotheses:

The federally endangered razorback sucker (*Xyrauchen texanus*) was once widespread and common throughout large rivers of the Colorado River basin, but only disjunct populations and scattered individuals exist today (Bestgen 1990; Minckley et al. 1991). The largest extant riverine population occurs in the middle Green River system of northeastern Utah and northwestern Colorado, but numbers of adults are low and recruitment is minimal (Tyus 1987; Lanigan and Tyus 1989; and USFWS 1991). Using capture-recapture data collected during 1980 - 1988, Lanigan and Tyus (1989) estimated the razorback sucker population in the upper sections of the middle Green River (RMI, 346.8-176.3) at 948 fish (95% confidence interval, 758 - 1,138). Modde et al. (1996) reported a mean population size between 300 and 600 fish during 1980 - 1992 for adult razorback sucker in the middle Green River. However, it has recently been suggested that with minimal recruitment into the population, the adult population of "wild" razorback sucker may be closer to 175 (1999 Colorado River Researchers Meeting). Furthermore, with the recent onset of razorback sucker stocking activities, the total number of adult razorback sucker in the system has likely increased. However, the level of success is not fully known.

Long-term monitoring of rare fishes is needed to provide baseline data on species' status and allow for future assessment of fish populations and their habitats (Williams et al. 1989). Restoration of razorback sucker in the middle Green River system has focused on restoring and managing floodplain habitats to benefit razorback sucker and stocking hatchery produced razorback sucker into the system. Monitoring of stocked razorback sucker will increase understanding of life-history requirements. A monitoring program is needed that will continue tracking the status of razorback sucker in the upper Colorado river basin and evaluate response of all fish populations to restoration activities. Sampling efforts (472 fyke and trammel net samples) of UDWR - Vernal during 1999 Monitoring Program for Razorback sucker in the Green and upper Colorado River Systems (Basin-wide Monitoring) resulted in the collection of five native species including; bluehead sucker (*Catostomus discobolus*; n = 6), Colorado pikeminnow *(Ptychocheilus lucius*; n = 94), flannelmouth sucker *(C. latipinnis*; n = 166), razorback sucker (n = 32), and roundtail chub *(Gila robusta*; n = 2; Table 1). Nonnative species collected included common carp *(Cyprinus carpio)*, northern pike *(Esox lucius)*, channel catfish *(Ictalurus punctatus)*, white sucker *(C. commersoni)*, black bullhead catfish *(I. melas)*, green sunfish *(Lepomis cyanellus)*, rainbow trout *(Oncorhynchus mykiss)*, brown trout *(Salmo trutta)*, bluegill sunfish *(L. machrochirus)*, and mountain whitefish *(Prosopium williamsoni)*. Sampling of these areas during 1999 Basin-wide razorback sucker monitoring using primarily fyke nets resulted in the capture of 33 razorback sucker. This included 27 that were marked in previous years. Twenty-one of these marked fish originated from an October 1998 stocking at the Split mountain boat ramp (GR RMI 319.4). Stocked fish were caught in the Escalante, Jensen, and Ouray reaches, indicating downstream dispersal. Other significant captures included 104 Colorado pikeminnow, 216 northern pike, and six walleye. In addition, northern pike were captured in large groups (n=10) in spawning condition near the mouth of Ashley on two occasions and at Stewart Lake Drain on one occasion. This project will serve as an effective means to monitor subadult/adult razorback sucker in the middle Green River.

The Recovery Program has determined that control of nonnative fishes is necessary for recovery of the endangered fishes of the Upper Basin. Northern pike have been rated as one of the six nonnative species of greatest concern by experts in the Upper Colorado River Basin (Hawkins and Nesler 1991).

Northern pike became established in the Yampa River in the early 1980's. Originally introduced as game fish in Elkhead Reservoir in 1977, the species escaped and invaded the Yampa River. Since then, northern pike have established a reproducing population in the upper Yampa River and have expanded their number and range within the Yampa and Green rivers. Many large pike move downstream from this reach into occupied critical habitat of the Green River where they pose a competitive and predatory threat to the endangered fishes. There is also evidence of successful spawning in Stewart Lake near Jensen and in Old Charlie Wash on the Ouray National Wildlife Refuge. Northern pike occupy the same habitat niche as Colorado pikeminnow. Based on catch rates previous years sampling activities, the northern pike population is rapidly increasing. Capture rates of northern pike indicate a rapid increase in the population. Capture of northern pike during Basin-wide Monitoring has increase from 48 collected in 1997 to 202 collected in 1999 (Table 1). This increase in the pike population is likely displacing Colorado pikeminnow from their preferred habitats. In addition, northern pike are also a significant predatory threat to other "at risk" native species such as roundtail chub, flannelmouth sucker *(Catostomus latipinnus)*, and bluehead sucker *(C. discobolus)*. This project will serve to remove northern pike from critical habitats of the middle Green River.

Table 1. Northern pike captured during Basin Wide netting 1996-1999.

YEAR	NO. CAPTURED	NO. RECAPTURED
1996	52	-
1997	48	7
1998	92	17
1999	202	68

Table 2. Most Common species collected by UDWR-Vernal using fyke and trammel nets during Basin-wide Razorback Sucker Monitoring activities on the middle Green River: 1999. Most fish were collected with fyke nets (approx. 200 net days)

Native	Species	Total
	flannelmouth sucker	166
	Colorado pikeminnow	94
	razorback sucker	32
	bluehead sucker	6
	roundtail chub	2
	flannelmouth x razorback sucker	2
	chub (Gila spp.)	1
Nonnative	carp	1809
	northern pike	218
	channel catfish	171
	white sucker	43
	black bullhead catfish	42
	walleye	9

IV. Study Goals, Objectives, End Product:

The goal of this project is to reinstate Basis Wide Razorback sucker monitoring and start active northern pike control in the middle Green River.

Objectives -

1. Reinstate Basin Wide razorback monitoring for adult and sub adult razorback sucker in the middle Green River to assess population responses to restoration activities. This will include, a mark/recapture population estimate, document dispersal, habitat use, and relative condition of stocked and wild razorback suckers.

2. Reduce northern pike and other nonnative fish populations to minimize negative impacts to endangered and native fish in the middle Green River.

FY-2001 Objectives –

1. Monitor adult and sub-adult razorback sucker in the middle Green River and estimate population of wild and stocked populations. Evaluate growth, survival, dispersal and relative condition of stocked razorback suckers and bonytail chub.

2. Control nonnative fishes, targeting northern pike

End Product -

The end products are continuation of razorback sucker population trend data with population estimates; an assessment of razorback sucker stocking success; reduction of northern pike.

Report on 2001 results, and revise monitoring plan base on these results Dec. 2001

1. Razorback sucker capture results (wild and stocked) with population estimate. Assessment of survival and persistence of stocked razorback suckers.
2. Evaluation of the effectiveness of northern pike removal.
3. A list of PIT tagged fish will be submitted to the database manager at the end of each year.

V. Study Area:

The study area will include sections of the Green River from Island Park (RMI 335) to the confluence of the White River (RMI 246). Selected reaches of this section will be sampled dependent on time of year, and available habitat.

VI. Study Methods/Approach:

Adult razorback sucker aggregate for spawning during April-June (approximately 93% of all recorded captures in the upper basin occurred during April-June; 25% in April 54% in May, and 14% in June). Greatest concentrations occur between mouth of the Yampa River, and mouth of the Duchesne River (GR RMI 344.8 to about 248.0). Areas of concentration include: mouth of Ashley Creek (GR RMI 294.0; pre-spawning staging area, possibly post-spawning recovery area), Old Charley Wash (GR RMI 249.6-249.4; pre-spawning staging area, possibly post-spawning recovery area), and mouth of Duchesne River (pre-spawning staging area, possibly spawning area, possibly post-spawning recovery area). These areas will be targeted for monitoring weekly during late April-June. The sampling period will be adjusted based on timing and duration of spring flows. Adult northern pike also aggregate in the mouth and likely move up these tributaries to spawn. Areas of concentration include: mouth of Brush Creek (GR RMI 304.5), Cliff Creek (GR RMI 302.9), Stewart Lake Drain (GR RMI 300.0), Ashley Creek (GR RMI 299.0) and Sportsman Drain (GR RMI 296.6). Methods used in this project will be efficient and very effective in collecting and monitoring these species.

Table 3. Gear types, number of samples and description of sampling effort for razorback sucker monitoring and northern pike removal.

Gear Type	Number of Samples	Description
Fyke Nets	200	24 to 48 hour sets three times per week in low velocity habitats
Trammel Nets	40	1 hour sets in suitable low flow habitats and used for "block and Shock / Scare and Snare"
Electrofishing	at least three trips	electrofish concentration areas of northern pike, razorback sucker and Colorado pikeminnow

Sample methods will employ a combination of fyke nets, trammel nets and electrofishing. (Table 2). Standardized protocols and basic sampling methods established previously for Basin-wide Monitoring of razorback sucker will be followed and additionally shock and block techniques will be used to target northern pike. All fish collected will be counted, weighed, measured, their "condition" assessed, and native fish returned alive to the site of capture. Endangered fish species will be scanned for a PIT tag, tagged if needed, then released near the area of capture. In addition, a combination of fyke netting and electrofishing utilizing the "block and shock" method will be used to capture northern pike in flooded tributary mouths.

Sampling will begin near the end of April as river flows begin to increase. This is the general time period when northern pike become active and move into the flooded tributaries (Ashley Creek, Stewart Lake Drain, Brush Creek, Cliff Creek and Sportsmans Drain) and razorback sucker move into pre-spawn staging areas. Selected reaches will be sampled two to three times weekly through the end of June using fyke and trammel nets.

The razorback sucker population will be estimated with mark/recapture techniques. All other species will be reported as CPUE data. Northern pike control will be evaluated with trends in CPUE and trends in the number of previously tagged fish removed.

VII. Task Description and Schedule:

Task 1. April - June	Sampling of subadult/adult razorback sucker in the middle Green River.
Task 2. April - May	Capture and remove northern pike and other non-native fishes.
Task 3. July - September	Data entry and analysis of field data. Equipment maintenance.
Task 4. December	Prepare Recovery Program annual progress report.

VIII. FY-2001 Work:

- Deliverables/Due Dates

Recovery Program annual progress report: 12/01

- Budget (Non-Capital) by task:

Task	UDWR
Tasks 1 & 2	27,000
Task 3	6,000
Task 4	2,000
	35,000

- Capital Expenses Budget:

Equipment	UDWR
Fyke nets*	2,000
Jon boat**	3,000
	5,000

* Currently have fyke nets to begin project but need replacements for damaged nets.

** An additional Jon boat is needed to enable two crews of three and gear to be safely transported during sampling activities.

Total Budget: (2001): $ 40,000

*NOTE: The original budget was $53,000. Because of budget constraints in the FY2001 Work Plan recommended by the PD's office, effort will be reduced to accomodate an annual budget of $40,000. If additional funds become available, recommend reinstating the orginally proposed full level of effort and budget.

FY-2002 Work (for multi-year study):

- Deliverables/Due dates

Dec 2002: Annual Report

- Budget estimate: $ 40,000 (originally $50,000)

FY-2003 etc. (for multi-year study):

- Budget estimate: $ 50,000 (orginally $40,000)

IX. Budget Summary:

FY-2001	$ 40,000
FY-2002	$ 40,000
FY-2003	$ 40,000
Total:	$ 120,000

X. Reviewers:

T. Modde, C. McAda, and 2 anonymous reviewers.

XI. References:

Bestgen, K. R. 1990. Status review of the razorback sucker, Xyrauchen texanus. Final report of Colorado State University Larval Fish Laboratory to U.S. Department of Interior Bureau of Reclamation, Salt Lake City, Utah.

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Minckley, W. L., P. C. Marsh, J. E. Brooks, J. E. Johnson, and B. L. Jensen. 1991 Management toward recovery of the razorback sucker. Pages 303 - 357 in W. L. Minckley and J. E. Deacon, editors. Battle against extinction: native fish management in the American West. University of Arizona Press, Tucson.

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USFWS (U.S. Fish and Wildlife Service). 1991. Endangered and threatened wildlife and plants; the razorback sucker (Xyrauchen texanus) determined to be an endangered species. Final rule. Federal Register 56 (23 October 1991):54957-54967.

Williams, J. E., and seven coauthors. 1989. Fishes of North America endangered, threatened, or of special concern: 1989. Fisheries (Bethesda) 14(6):2-20.