

**COLORADO RIVER RECOVERY PROGRAM
FY 2012-13 PROPOSED SCOPE OF WORK for:**

Project No.: 138

Annual fall monitoring of YOY Colorado pikeminnow and small-bodied native fishes

Lead Agency: Utah Division of Wildlife Resources

Principal Investigators:

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Date: April 14, 2011, revised August 8, 2011

Category:

- Ongoing project
- Ongoing-revised project
- Requested new project
- Unsolicited proposal

Expected Funding Sources:

- Annual funds
- Capital funds
- Other (explain)

I. Title of Proposal:

Annual fall monitoring of YOY Colorado pikeminnow and small-bodied native fishes

II. Relationship to RIPRAP:

GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

- V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).
- V.A. Measure and document population and habitat parameters to determine status and biological response to recovery actions.
- V.B.2. Conduct appropriate studies to provide needed life history information.

GREEN RIVER ACTION PLAN: MAINSTEM

- V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).
- V.A. Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions..

COLORADO RIVER ACTION PLAN: MAINSTEM

- V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).
- V.A. Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions

III. Study Background/Rationale and Hypotheses:

Larval Colorado pikeminnow monitoring is an ongoing effort to evaluate spawning success. Monitoring of juvenile Colorado pikeminnow (*Ptychocheilus lucius*) occurs in conjunction with adult population estimates in the Green and Colorado rivers. However, survival of young-of-year (YOY) can vary greatly between years independent of spawning success and can have an impact on the juvenile component of Colorado pikeminnow populations. For example, biotic and abiotic factors such as flow variation, backwater temperatures, competition and predation by nonnative fish (e.g., gamefish and small-bodied cyprinids), and over-winter mortality can hinder spawning success (i.e., high mortality of YOY fish) resulting in a smaller number of juvenile Colorado pikeminnow available for recruitment into the adult population (Bestgen et al. 2006). Recruitment of other native species such as bluehead sucker (*Catostomus discobolus*), flannelmouth sucker (*Catostomus latipinnis*), roundtail chub (*Gila robusta*), and speckled dace (*Rhinichthys osculus*) is affected similarly.

As a result of decreased recruitment, control actions targeting nonnative gamefish species, primarily smallmouth bass (*Micropterus dolomieu*) and northern pike (*Esox lucius*), are being evaluated across the upper Colorado River Basin to determine the level of reduction necessary to minimize the threat to the recovery of Colorado pikeminnow and other endangered Colorado River fishes. Successful implementation of nonnative fish removal will likely be measured by the response of endangered fish and other native species (i.e., increased abundance). However, nonnative fish removal efforts are preliminary, thus the first observed response will likely be evident in early life-stages of the native fish community (Bestgen et al. 2007a). An adult response to nonnative removal may not be detectable initially for a number of reasons, one of which is the large home range of adults (UDWR 2006). Furthermore, a positive response by adult endangered species may be difficult to measure statistically without extensive observations due to generation times of endangered fish populations (e.g. Bestgen et al. 2007b).

Data necessary to evaluate the recovery status of native fishes will be generated by current and future YOY sampling in conjunction with nonnative fish removal efforts. For instance, documenting size and relative abundance of YOY Colorado pikeminnow and other native species may provide valuable information about the probable survival of any particular year class. Together with existing YOY data compiled from the Interagency Standardized Monitoring Program (ISMP; 1987 - present), results from this project should provide the basis for monitoring distribution and recruitment rates of YOY Colorado pikeminnow. Efforts to control nonnatives will likely have the greatest affect on YOY fish (i.e., decreased predation and increased survival). Therefore, monitoring this component of the Colorado pikeminnow population will provide information toward evaluating nonnative control projects. Additionally, this project ensures continuation of existing, standardized data series (ISMP) that document trends in abundance of early-life stage Colorado pikeminnow (USFWS 1987). Finally, response of early life-stages of native and small-bodied fish to removal of nonnative predators will serve as indicators of the response that would be experienced by endangered fish species occupying the same habitats.

NOTE: Utah Division of Wildlife Resources (UDWR) has been responsible for monitoring YOY Colorado pikeminnow abundance since 1986. In 2004, this project was expanded to explore linkages between trends in YOY abundance (collected in this study), with abundances of larval (current Project No. 22f) and juvenile pikeminnow (old ISMP data set; and current Project No. 128). Also, beginning in 2004, there was reference to the use of predictive modeling to correlate trends in these multiple life stages with environmental variables. Those analyses were not completed. In late 2008, in conjunction with uncertainties identified in the *Green River Study Plan*, the Recovery Program decided to conduct a separate comprehensive synthesis of the effect of changes in physical habitat (as a function of flow and flow variability) and other environmental conditions on the small-bodied fish community (emphasis on Colorado pikeminnow). That comprehensive synthesis was initiated in 2009, entitled *Historical assessment of factors affecting young Colorado pikeminnow abundance and physical habitat availability in the Green River, Utah*. UDWR's analysis under Project 138 will once again focus on long term trends in YOY pikeminnow / small-bodied fishes abundance and correlations with flow and temperature. Lastly, response of early life-stages of native and small-bodied fish to removal of nonnative predators in the middle Green River was originally assessed under Project 144. Due to overlapping similarities in field sampling and biotic/abiotic variables affecting YOY community response, the Project 144 scope of work was consumed by Project 138 in 2009. However, recent findings potentially suggest an inability to detect a response from current sampling protocols (Monroe et al., In Prep.), thus initiating a reconsideration of the previous study objective "Estimate the response of small-bodied and YOY native fish to removal of northern pike and smallmouth bass". Specifically, habitat overlap between YOY native fishes and early life-stages of nonnative predators in the the middle Green River (alluvial reach) is likely a limited factor in comparison to other reaches in the upper Colorado River basin where native fish response is being assessed (e.g., Yampa River; Bestgen et al. 2007a). Thus, implementation of a new study objective for this portion of Project 138 is warranted.

IV. Study Goals, Objectives, End Product:

1. Determine size and relative abundance of YOY Colorado pikeminnow at the end of their first growing season to complement larval and juvenile sampling data.
2. Determine whether use of this data set is feasible for evaluation of small-bodied and YOY native fish response to nonnative predator control measures.
3. Determine relationships between YOY Colorado pikeminnow CPUE abundance estimates with respect to flow and temperature.

V. Study Area

The study area for this project includes identified Colorado pikeminnow nursery habitat area in the Green and Colorado rivers in Utah (Valdez et al. 1982; Archer et al. 1985; Tyus and Haines 1991). Specifically, Split Mountain to Sand Wash (RM 319 – RM 215) on the middle Green River, Green River State Park to the confluence with the Colorado River (RM 120 – RM 0) on the lower Green River, and Cisco to the confluence with the Green River (RM 111 – RM 0) on the Colorado River.

VI. Study Methods/Approach

Objectives 1-2:

Annual YOY Colorado pikeminnow and native fish sampling will be conducted in late summer/early fall between the second week of September and the third week of October.

The first two backwater/low velocity habitats encountered every five river-miles will be sampled dependent upon availability of suitable habitats within each subreach. One additional backwater/low velocity habitat will be sampled every five miles in the middle Green River to collect information to evaluate response of small-bodied and YOY native fish to nonnative predator removal. Field sampling will be conducted using the ISMP protocol (USFWS 1987) so that long-term trends can be maintained. However, habitat selection criteria will be relaxed for additional habitats (i.e., third backwater).

Backwater/low velocity habitats will be sampled using a 1.2 m x 4 m seine with 3 mm mesh. At least two non-overlapping seine hauls will be conducted in each habitat sampled. Seine hauls will be parallel to one another and perpendicular to the axis of the backwater. However, if water depth is too great seine hauls will be completed along one shoreline. The first two seine hauls in each five mile reach will be taken at $\frac{1}{3}$ and $\frac{2}{3}$ the distance from the mouth of the backwater. Additional seine hauls may be completed in any portion of the backwater including the mouth or shallow tail end. Length of each seine haul, maximum depth, and average depth will be recorded for each sample. All endangered and native fish will be enumerated, identified, measured (total length in mm), and returned alive to the habitat. Fin ray counts will be completed for all chubs (*Gila* spp.) captured. All nonnative fishes will be enumerated (first seine haul only) and removed. In subsequent seine hauls, common (i.e., highly abundant) nonnative species

will be ignored and other less common nonnative species will be enumerated.

In addition, physical habitat measurements to be collected at each site include habitat type, habitat length, habitat width, backwater temperature, main channel temperature, backwater turbidity, and main channel turbidity. Location of each habitat will be recorded as the approximate river mile and in UTM coordinates using GPS technology.

To assess the feasibility of data collected from this project for evaluating native fish response to nonnative predator removal, analyses will focus on presence/absence of nonnative predators in backwater habitats to evaluate levels of habitat overlap with small-bodied and YOY native fishes.

Objective 3:

Data from past and present efforts monitoring YOY Colorado pikeminnow will be analyzed with respect to CPUE estimates, size, flow and temperature. Data from YOY Colorado pikeminnow monitoring through fall 2011 in the middle Green, lower Green and Colorado rivers will be included in the final analysis of the data.

VII. Task Description and Schedule:

Task 1- 3: Seine backwater/low velocity habitats to collect data for endangered, native and nonnative fish. Collect physical habitat data.

- Task 1. Middle Green River – Fall 2012-13
- Task 2. Lower Green River – Fall 2012-13
- Task 3. Colorado River – Fall 2012-13
- Task 4. Data entry – Fall 2012-13
- Task 5. Data Analysis and Report Preparation

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

Annual Reports November 2012-13

Work FY 2012

FY 2012 Costs:

Task 1 - Seining Middle Green	UDWR Vernal	UDWR Moab	Total
Labor			
Proj. leader (8 days @ Vernal @ \$354/day)	\$2,832	\$0	\$2,832
Biologist (8 days @ Vernal @ \$342/day)	\$2,736	\$0	\$2,736
Technician (16 days @ Vernal @ \$195/day)	\$3,120	\$0	\$3,120
Technician II (16 days @ Vernal @ \$271/day)	\$4,336		\$4,336
Shuttle Drivers (2 people@8 days@3 hrs/day ave@\$14.86/hr)	\$714	\$0	\$714
Food and Transport			
Vehicle ^a (#11204; 15% of annual usage)	\$1020	\$0	\$1020

Shuttle vehicle (#12995; 10% of annual usage)	\$644		\$644
Food (8 days/ 4 people @ \$11 per day)	\$352	\$0	\$352
Equipment (maintenance and repair)	\$2,996	\$0	\$2,996
<i>Task 1 subtotal</i>	<u>\$18,750</u>	<u>\$0</u>	<u>\$18,750</u>

^a The State of Utah switched to Automotive Resources Inc. for motor pool operations. We now pay substantially more in vehicle costs. It is now easier to calculate the percent of total annual usage that each project requires and multiple that percent by the total annual cost. This will be the new method we use to allocate vehicle costs to each project.

^b Includes repair or replacement of outboard motor lower units, and net repair and replacement.

Task 2 - Seining Lower Green	UDWR Vernal	UDWR Moab	Total
Labor			
Proj. leader (6 days @ Moab @ \$438/day)	\$0	\$2,628	\$2,628
Biologist (6 days @ Moab @ \$340/day)	\$0	\$2,040	\$2,040
Technicians (16 days @ Moab @ \$195/day)	\$0	\$3,120	\$3,120
Food and Transport			
Vehicle ^a (2 trucks for 3% of annual fleet costs)	\$0	\$1,020	\$1,020
Food (4 days/ 4 people @ \$25 per day)	\$0	\$400	\$400
Equipment (maintenance and repair)	\$0	\$1,000	\$1,000
<i>Task 2 subtotal</i>	<u>\$0</u>	<u>\$10,208</u>	<u>\$10,208</u>

^a Calculated as the total percentage of annual fleet costs based on the number of trucks, days used, and total miles driven. Moab fleet vehicles are not assigned to specific projects; instead they are rotated through all projects in the UCRRP & SJRRP.

Task 3 - Seining Lower Colorado	UDWR Vernal	UDWR Moab	Total
Labor			
Biologist (12 days @ Moab @ \$340/day)	\$0	\$4,080	\$4,080
Technicians (16 days @ Moab @ \$195/day)	\$0	\$3,120	\$3,120
Travel			
Vehicle ^a (2 trucks for 3% of annual fleet costs)	\$0	\$1,020	\$1,020
Per diem (4 days/ 4 people @ \$25 per day)	\$0	\$400	\$400
Equipment (maintenance and repair)	\$0	\$1,000	\$1,000
<i>Task 3 subtotal</i>	<u>\$0</u>	<u>\$9,620</u>	<u>\$9,620</u>

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Task 4 - Data Entry	UDWR Vernal	UDWR Moab	Total
Labor			
Technician II (6 days @ Vernal @ 271/day)	\$1,626	\$0	\$1,626
Biologist (5 days Moab @ \$340/day)	\$0	\$1,700	\$1,700
Technicians (5 days @ \$195/day)	\$0	\$975	\$975
<i>Task 4 subtotal</i>	<u>\$1,626</u>	<u>\$2,675</u>	<u>\$4,301</u>

Task 5 - Data Analysis and Reporting	UDWR Vernal	UDWR Moab	Total
Labor			
Proj. leader (5 days in Moab @ \$438/day)	\$0	\$2,190	\$2,190
Proj. leader (5 days Vernal @ \$354/day)	\$1,770	\$0	\$1,770
Biologist (10 days @ Moab & Vernal)	\$3,420	\$3,400	\$6,820
<i>Task 5 subtotal</i>	<u>\$5,190</u>	<u>\$5,590</u>	<u>\$10,780</u>
FY 2012 TOTAL	\$25,566	\$28,093	\$53,659

Work FY 2013

FY 2013 Costs:

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Labor			
Proj. leader (8 days @ Vernal @ \$354/day)	\$2,832	\$0	\$2,832
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Task 5 - Data Analysis and Reporting	UDWR Vernal	UDWR Moab	Total
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FY 2013 TOTAL	\$25,566	\$28,093	\$53,659

IX. Program Budget Summary

	<u>UDWR Vernal</u>	<u>UDWR Moab</u>	<u>Total</u>
FY2012	\$25,566	\$28,093	\$53,659
FY2013	<u>\$25,566</u>	<u>\$28,093</u>	<u>\$53,659</u>
Total	\$51,132	\$56,186	\$107,318

X. Reviewers

XI. References

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