

**COLORADO RIVER RECOVERY PROGRAM
FY-2006-2008 PROPOSED SCOPE OF WORK for:
Annual YOY Colorado Pikeminnow Fall Monitoring**

Project No.: 138

Lead Agency: Utah Division of Wildlife Resources
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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 YOY Colorado Pikeminnow Fall Monitoring

II. Relationship to RIPRAP:

Green River Action Plan: Mainstem

- 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.

Colorado River Action Plan: Mainstem

- 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.

III. Study Background/Rationale and Hypotheses:

Larval Colorado pikeminnow monitoring is ongoing in an effort to evaluate spawning success. Monitoring of juvenile Colorado pikeminnow is occurring in conjunction with adult population estimates in the Green and Colorado rivers. However, survival of YOY can vary greatly between years independent of spawning success and can have an impact on the juvenile component of Colorado pikeminnow populations. This is thought to be due to varied flows, backwater temperatures, competition and predation by non-native fish, and over-winter mortality. Spawning success means very little to recovery if conditions create high mortality of YOY fish resulting in a smaller number of juvenile Colorado pikeminnow available for recruitment into the adult population.

Documenting size and relative abundance of YOY Colorado pikeminnow may provide valuable information about the probable survival of any particular year class. Together with existing YOY data from the Interagency Standardized Monitoring Program (ISMP; 1986 - present), results from this project should provide the basis for a predictive model to help identify recruitment rates required to sustain wild populations of Colorado pikeminnow. Continued monitoring of this size class of Colorado pikeminnow will provide information toward refinement of the model and an indication of population health prior to detection by adult Colorado pikeminnow population estimates.

In addition, efforts to control non-natives may likely have the greatest affect on YOY fish. Monitoring this component of the Colorado pikeminnow will provide information toward evaluation of nonnative control projects. This project ensures continuation of existing, standardized data series (ISMP) that document trends in abundance of early-life stage Colorado pikeminnow (USFWS 1987).

IV. Study Goals, Objectives, End Product:

1. Determine size and relative numbers of YOY Colorado pikeminnow at the end of their first growing season to complement larval and juvenile sampling data.

2. Using new and existing data, determine relationship between larval and YOY Colorado pikeminnow CPE abundance estimates with respect to flow and temperature.
3. Using new and existing data, develop predictive model that relates larval and YOY Colorado pikeminnow abundance.
4. Using new and existing data, determine relationship between YOY and juvenile Colorado pikeminnow CPE abundance estimates with respect to YOY size, flow, and temperature.
5. Using new and existing data, develop predictive model that relates YOY and juvenile Colorado pikeminnow abundance.

V. Study Area

The study area for this project includes identified Colorado pikeminnow nursery habitat area in the Green and Colorado rivers in Utah (Archer et al. 1985, Tyus and Haines 1991, Valdez et al. 1982). Specifically, Split Mountain to Sand Wash (RM 320 – RM 217) 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

Objective 1:

Annual YOY Colorado pikeminnow sampling will be conducted in late summer/early fall between the second week of September and the third week of October. On average, at least two backwater/low velocity habitats will be sampled every five river-miles. Field sampling will be conducted using the old ISMP protocol so that the long-term trend line can be maintained. Extra data sampled above the ISMP protocol will be used to increase the statistical power of the sample, and to compare with the ISMP trend.

Backwater/low velocity habitats will be sampled using a 1.2 m x 4 m seine with 3 mm mesh. Two non-overlapping seine hauls will be conducted in each habitat sampled. Preferably the two seine hauls will be parallel to one another and perpendicular to the axis of the backwater. However, if water depth is too great a haul can be completed along one shoreline. Seine hauls may be completed in any portion of the habitat including the mouth or shallow tail of a backwater. Length of the seine haul, maximum depth, and average depth will be determined for each sample. All endangered and native fish will be identified, total length measured (mm), and returned alive to the habitat. Ray counts will be completed for all chubs captured. All endangered fish will be identified and enumerated. In the middle Green River reach, all fish will be returned alive to the backwater habitat to allow evaluation of native and small-bodied fish response to nonnative predator removal being conducted under a separate scope of work. In the

lower Green and Colorado Rivers, nonnative fish collected in samples will be removed from backwater habitats.

In addition, physical habitat measurements to be collected include habitat type, habitat length, habitat width, habitat temperature, main channel temperature, habitat turbidity, and main channel turbidity. Location of each habitat will be recorded in UTM coordinates using GPS technology.

Objectives 2-5:

Data from past and present efforts toward monitoring larval, YOY, and juvenile Colorado pikeminnow will be analyzed with respect to CPE abundance estimates, size, flow and temperature. Larval drift net data from the Yampa River, lower Green River and Colorado River will be incorporated into the analysis as well as information from McAda and Ryel (1999). Data from YOY Colorado pikeminnow monitoring through fall 2004 in the middle Green, lower Green and Colorado rivers will be included in the final analysis of the data. Juvenile Colorado pikeminnow data collected from adult ISMP sampling and adult population estimates in the Green and Colorado rivers will also be used.

Data analysis will determine the annual relationships between larval and YOY Colorado pikeminnow and multi-year relationships between YOY and juvenile Colorado pikeminnow with respect to all variables. Uncertainties such as ages at length will be addressed during the predictive model development process. Adequacy of spatial sampling scope will be addressed either through separate data analyses or during model development. Appropriate statistical analyses to determine relationships and develop a predictive model will be determined through statistical consultation with Dr. Kevin Bestgen (Colorado State University).

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 2006-2007

Task 2. Lower Green River – Fall 2006-2007

Task 3. Colorado River – Fall 2006-2007

Task 4: Analyze past and current data to determine relationships between larval and YOY Colorado pikeminnow CPE abundance estimates and YOY and juvenile Colorado pikeminnow abundance estimates.

Database development and management – Fall 2006-2007

Data analysis – Fall/Winter 2006-2007

Task 5: Develop and refine predictive models.

Model development – Winter 2006-2007

Model refinement – Winter 2006-2007

Task 6: Report Preparation

Annual Report November 2006 - 2007

Draft report to recovery program coordinator – May 31, 2008

Draft final report to peer reviewers and Biology Committee – June 30, 2008

Final report to Biology Committee – August 15, 2008

VIII. FY2006 Work

1. Deliverables/due dates: Annual Report November 2006

2. Budget:

Task 1: Middle Green River field data collection (UDWR-Vernal). *This task overlaps with proposed 2006 field work to be done by UDWR - Vernal to evaluate native fish response to northern pike and smallmouth bass removal in the middle Green River (Tasks 1 and 2).*

FY06 Task 1		
Labor-	Work days	Cost
Project Leader (438/day)	4	1,752
Biologist (340/day)	8	2,720
Technician (195/day)	16	3,120
Travel		
Vehicle (\$36/day; mileage and rent) ^a	10	360
Equipment (maintenance or replacement) ^b		1,000
FY06 Task 1 Subtotal		\$8,952

^a Calculated as average miles traveled per day * cost per mile + daily rental fee = 75 * \$0.41 + \$5 = \$35.75/day

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

Task 2: Lower Green River field data collection (UDWR-Moab).

Labor-	Work days	Cost
Project Leader (438/day)	4	1,752
Biologist (340/day)	8	2,720
Technician (195/day)	16	3,120
Travel		
Vehicle (\$46/day * 2 trucks; mileage and rent) ^a	2	184
Equipment (maintenance or replacement) ^b		1,000
FY06 Task 2 Subtotal		\$8,776

^a Calculated as average miles traveled per day * cost per mile + daily rental fee = 100 * \$0.41 + \$5 = \$46/truck/day.

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

Task 3: Lower Colorado River field data collection (UDWR-Moab).

Labor-	Work days	Cost
Project Leader (438/day)	4	1,752
Biologist (340/day)	8	2,720
Technician (195/day)	16	3,120
Travel		
Vehicle (\$67/day * 2 trucks; mileage and rent) ^a	2	268
Equipment (maintenance or replacement) ^b		1,000
FY06 Task 3 Subtotal		\$8,860

^a Calculated as average miles traveled per day * cost per mile + daily rental fee = 150 * \$0.41 + \$5 = \$66.50/truck/day.

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

Task 4: Analyze past and current data.

Labor-	Work days	Cost
Project Leader (438/day)	5	2,190
Biologist (340/day)	16	5,440
Technician (195/day)	6	1,170
FY06 Task 4 Subtotal		\$8,800

Task 5: Develop and refine predictive models.

Labor-	Work days	UDWR	LFL
Project Leader (438/day)	10	4,380	
Statistician (412/day)	25		10,300
FY06 Task 5 Subtotal		\$4,380	\$10,300

Task 6: Report Preparation.

Labor-	Work days	UDWR	LFL
Project Leader (438/day)	10	4,380	
Statistician (412/day)	5		2,060
FY06 Task 5 Subtotal		\$4,380	\$2,060

FY 2006 Total

Task	UDWR-Vernal	UDWR-Moab	LFL	Total	
1	8,952			8,952	
2		8,776		8,776	
3		8,860		8,860	
4	3,520	2,640	2,640	8,800	
5	4,380		10,300	14,680	
6	2,190	2,190	2,060	6,440	
		\$19,042	\$22,466	\$15,000	\$56,508

FY 2007 Work

1. Deliverables and due dates: Annual Report December 2007
2. Budget:

Task 1: Middle Green River field data collection (UDWR-Vernal). *This task overlaps with proposed 2006 field work to be done by UDWR - Vernal to evaluate native fish response to northern pike and smallmouth bass removal in the middle Green River (Tasks 1 and 2).*

Labor-	Work days	Cost
Project Leader (451/day)	4	1,804
Biologist (350/day)	8	2,800
Technician (201/day)	16	3,216
Travel		
Vehicle (\$36/day; mileage and rent) ^a	10	360
Equipment (maintenance or replacement) ^b		1,000
FY07 Task 1 Subtotal		\$9,180

^a Calculated as average miles traveled per day * cost per mile + daily rental fee = 75 * \$0.41 + \$5 = \$35.75/day

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

Task 2: Lower Green River field data collection (UDWR-Moab).

Labor-	Work days	Cost
Project Leader (451/day)	4	1,804
Biologist (350/day)	8	2,800
Technician (201/day)	16	3,216
Travel		
Vehicle (\$46/day * 2 trucks; mileage and rent) ^a	2	184
Equipment (maintenance or replacement) ^b		1,000
FY07 Task 2 Subtotal		\$9,004

^a Calculated as average miles traveled per day * cost per mile + daily rental fee = 100 * \$0.41 + \$5 = \$46/truck/day.

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

Task 3: Lower Colorado River field data collection (UDWR-Moab).

Labor-	Work days	Cost
Project Leader (451/day)	4	1,804
Biologist (350/day)	8	2,800
Technician (201/day)	16	3,216
Travel		
Vehicle (\$67/day * 2 trucks; mileage and rent) ^a	2	268
Equipment (maintenance or replacement) ^b		1,000
FY07 Task 3 Subtotal		\$9,088

^a Calculated as average miles traveled per day * cost per mile + daily rental fee = 150 * \$0.41 + \$5 = \$66.50/truck/day.

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

Task 4: Analyze past and current data.

Labor-	Work days	Cost
Project Leader (451/day)	5	2,255
Biologist (350/day)	16	5,600
Technician (201/day)	6	1,206
FY07 Task 4 Subtotal		\$9,061

Task 5: Develop and refine predictive models.

Labor-	Work days	UDWR	LFL
Project Leader (451/day)	20	9,020	
Statistician (424/day)	25		10,600
FY07 Task 5 Subtotal		\$9,020	\$10,600

Task 6: Report Preparation.

Labor-	Work days	UDWR	LFL
Project Leader (451/day)	10	4,510	
Statistician (424/day)	5		2,120
FY07 Task 6 Subtotal		\$4,510	\$2,120

FY 2007 Total

Task	UDWR-Vernal	UDWR-Moab	LFL	Total
1	9,180			9,180
2		9,004		9,004
3		9,088		9,088
4	3,624	2,718	2,718	9,061
5	9,020		10,600	19,620
6	2,255	2,255	2,120	6,630
	\$24,079	\$23,065	\$15,438	\$62,583

FY 2008 Work

- Deliverables and due dates:
 - Draft report to recovery program coordinator – May 31, 2008
 - Draft final report to peer reviewers and Biology Committee – June 30, 2008
 - Final report to Biology Committee – August 15, 2008
- Budget: \$30,000

IX. Program Budget Summary

	UDWR-Vernal	UDWR-Moab	LFL	Total
FY 2006	19,042	22,466	15,000	\$56,508
FY 2007	24,079	23,065	15,438	\$62,583
FY 2008	10,000	10,000	10,000	\$30,000
Total	53,121	55,531	40,438	\$149,091

X. Reviewers

XI. References

Archer, D.L., L.R. Kaeding, B.D. Burdick, and C.W. McAda. 1985. A study of the endangered fishes of the upper Colorado River. Final Report. U.S. Fish and Wildlife Service, Colorado River Fishery Project. Grand Junction, Colorado.

McAda, C.W., and R.J. Ryel. 1999. Distribution, relative abundance, and environmental correlates for age-0 Colorado pikeminnow and sympatric fishes in the Colorado River. U.S. Fish and Wildlife Service, Colorado River Fishery Project. Grand Junction, Colorado.

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Valdez, R., P. Mangan, R. Smith, and B. Nilson. 1982. Upper Colorado River Investigation (Rifle, Colorado to Lake Powell, Utah). Pages 101-279 in W.H. Miller et al., editors. Colorado River Fishery Project Final Report; Part Two, Field Studies. U.S. Fish and Wildlife Service and Bureau of Reclamation. Salt Lake City, Utah.

USFWS. 1987. Interagency standardized monitoring protocol handbook. U.S. Fish and Wildlife Service. Grand Junction, CO.