

**COLORADO RIVER RECOVERY PROGRAM
FY 2014-15 PROPOSED SCOPE OF WORK for:**

Project No.: 138

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

Reclamation Agreement number: R09AP40847

Reclamation Agreement term: November 13, 2008 – April 30, 2015

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 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 (*C. 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*. 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 incorporated into Project 138 in 2009. However, recent findings potentially suggest an inability to detect a response from current sampling protocols (Skorupski et al.

2012), 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 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:

Goal: Monitor YOY Colorado pikeminnow to assess long-term trends in annual fall recruitment.

Objectives:

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.

End Products: continuation of long-term data set for YOY pikeminnow and associated habitat information and annual Recovery Program reports.

V. Study Area

The study area for this project includes identified Colorado pikeminnow nursery habitat areas 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

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 (middle Green River only). 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.

VII. Task Description and Schedule:

Task 1-2: Seine backwater/low velocity habitats to collect data for endangered, native and nonnative fish. Collect physical habitat data.

Task 1. Seining the middle Green River

Task 2. Seining the lower Green River and the Colorado River

Task 3. Data entry, analysis, and report preparation

Schedule: FY 2014-2018

Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
1									X	X		
2									X			
3 (Vernal)										X	X	
3 (Moab)										X	X	

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

Work FY 2014

Task 1. Seining the middle Green River (UDWR–Vernal).

	Hourly Rate	Hours	Cost
Labor			
Project Leader	31.63	80	2530.40
Biologist II	32.38	80	2590.40
Journeyman Maintenance / Construction Specialist	25.67	160	4107.20
Technician I	15.76	160	2521.60
Shuttle Drivers	16.10	80	1288.00
Travel^a			
1 truck @ 15% of annual use; 1 truck @ 10% annual use			1700.00
Per diem (\$38/person/day x 4 people x 2 days + \$13/person/day x 4 people x 6 days)			692.00
Equipment			
Boat gas (12 gal gas/boat x \$4.00/gal x 1 boat/day x 8 days)			384.00
Oil (3 qts./motor x \$11 qt. x 1 motor x 1 oil change)			66.00
Boat/motor repair and maintenance			948.10
Sampling equipment			1450.00
Camping supplies			500.00
		Total	18777.70

^a The State of Utah uses Automotive Resources Inc. for motor pool operations. Rental is approximately \$6,800/year/vehicle (includes fleet rental, mileage, and gas), which is based on the average annual cost for all trucks used in our program.

Task 2. Seining the lower Green River and the Colorado River (UDWR–Moab).

Labor: salary + benefits + applicable overtime (personnel services)

	Rate	Hours	Cost
Project Leader	\$29.71	90	\$2,674
Biologist	\$26.83	230	\$6,170
Technician	\$16.97	370	\$6,278
		subtotal	\$15,122

Food and Transport (current expense)

	Rate	Quantity	Cost
Fleet Costs (5 trucks for 6% of total fleet costs)	\$40,800.00	0.06	\$2,448
Food (8 people, 4 days)	\$30.00	32	\$960
		subtotal	\$3,408

Equipment (current expense)

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$114
Sampling gear repair/replacement:			\$765
Boating gear repair/replacement:			\$525
Fuel for motors (75 gallon)	\$4.00	75	\$300

subtotal **\$1,704**

Task 2 subtotal **\$20,234**

Task 3. Data entry, analysis, and report preparation (UDWR–Vernal).

	Hourly Rate	Hours	Cost
Labor			
Project Leader	31.63	50	1581.50
Biologist II	32.38	120	3885.60
Technician II	22.02	60	1321.20
		Total	6788.30

Task 3. Data entry, analysis, and report preparation (UDWR–Moab).

Labor: salary + benefits + applicable overtime (personnel services)

	Rate	Hours	Cost
Project Leader	\$29.71	80	\$2,377
Biologist	\$26.83	200	\$5,365
Technician	\$16.97	40	\$679
		subtotal	\$8,421

	UDWR - Vernal	UDWR - Moab
FY 2014		
Total	\$25,566	\$28,655

Work FY 2015

Task 1. Seining the middle Green River (UDWR–Vernal).

	Hourly Rate	Hours	Cost
Labor			
Project Leader	32.26	80	2581.01
Biologist II	33.03	80	2642.21
Journeyman Maintenance / Construction Specialist	26.18	160	4189.34
Technician I	16.08	160	2572.03
Shuttle Drivers	16.42	80	1313.76
Travel ^a			
1 truck @ 15% of annual use; 1 truck @ 10% annual use			1700.00
Per diem (\$38/person/day x 4 people x 2 days + \$13/person/day x 4 people x 6 days)			692.00
Equipment			
Boat gas (12 gal gas/boat x \$4.00/gal x 1 boat/day x 8 days)			384.00
Oil (3 qts./motor x \$11 qt. x 1 motor x 1 oil change)			66.00
Boat/motor repair and maintenance			948.10
Sampling equipment			1450.00
Camping supplies			500.00
		Total	19038.45

^a The State of Utah uses Automotive Resources Inc. for motor pool operations. Rental is approximately \$6,800/year/vehicle (includes fleet rental, mileage, and gas), which is based on the average annual cost for all trucks used in our program.

Task 2. Seining the lower Green River and the Colorado River (UDWR–Moab).

Labor: salary + benefits + applicable overtime (personnel services)

	Rate	Hours	Cost
Project Leader	\$30.30	90	\$2,727
Biologist	\$27.36	230	\$6,294
Technician	\$17.31	370	\$6,404
		subtotal	\$15,425

Food and Transport (current expense)

	Rate	Quantity	Cost
Fleet Costs (5 trucks for 6% of total fleet costs)	\$41,616.00	0.06	\$2,497
Food (8 people, 4 days)	\$30.60	32	\$979
		subtotal	\$3,476

Equipment (current expense)

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$116
Sampling gear repair/replacement:	\$0.00		\$780
Boating gear repair/replacement:	\$0.00		\$536
Fuel for motors (75 gallon)	\$4.08	75	\$306
		subtotal	\$1,738

Task 2 subtotal **\$20,639**

Task 3. Data entry, analysis, and report preparation (UDWR–Vernal).

	Hourly Rate	Hours	Cost
Labor			
Project Leader	32.26	50	1613.13
Biologist II	33.03	120	3963.31
Technician II	22.46	60	1347.62
		Total	6924.07

Task 3. Data entry, analysis, and report preparation (UDWR–Moab).

Labor: salary + benefits + applicable overtime (personnel services)

	Rate	Hours	Cost
Project Leader	\$30.30	80	\$2,424
Biologist	\$27.36	200	\$5,473
Technician	\$17.31	40	\$692
		subtotal	\$8,589

	UDWR - Vernal	UDWR - Moab
FY 2015		
Total	\$25,962.52	\$29,228

Work FY 2016

Task 1. Seining the middle Green River (UDWR–Vernal).

	Hourly Rate	Hours	Cost
Labor			
Project Leader	32.91	80	2632.63
Biologist II	33.69	80	2695.05
Journeyman Maintenance / Construction Specialist	26.71	160	4273.13
Technician I	16.40	160	2623.47
Shuttle Drivers	16.75	80	1340.04
Travel ^a			
1 truck @ 15% of annual use; 1 truck @ 10% annual use			1700.00
Per diem (\$38/person/day x 4 people x 2 days + \$13/person/day x 4 people x 6 days)			692.00
Equipment			
Boat gas (12 gal gas/boat x \$4.00/gal x 1 boat/day x 8 days)			384.00
Oil (3 qts./motor x \$11 qt. x 1 motor x 1 oil change)			66.00
Boat/motor repair and maintenance			948.10
Sampling equipment			1450.00
Camping supplies			500.00
		Total	19304.42

^a The State of Utah uses Automotive Resources Inc. for motor pool operations. Rental is approximately \$6,800/year/vehicle (includes fleet rental, mileage, and gas), which is based on the average annual cost for all trucks used in our program.

Task 2. Seining the lower Green River and the Colorado River (UDWR–Moab).

Labor: salary + benefits + applicable overtime (personnel services)

	Rate	Hours	Cost
Project Leader	\$30.91	90	\$2,782
Biologist	\$27.91	230	\$6,420
Technician	\$17.65	370	\$6,532
		subtotal	\$15,733

Food and Transport (current expense)

	Rate	Quantity	Cost
Fleet Costs (5 trucks for 6% of total fleet costs)	\$42,448.32	0.06	\$2,547
Food (8 people, 4 days)	\$31.21	32	\$999
		subtotal	\$3,546

Equipment (current expense)

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$118
Sampling gear repair/replacement:	\$0.00		\$796
Boating gear repair/replacement:	\$0.00		\$546
Fuel for motors (75 gallon)	\$4.16	75	\$312
		subtotal	\$1,773

Task 2 subtotal **\$21,051**

Task 3. Data entry, analysis, and report preparation (UDWR–Vernal).

	Hourly Rate	Hours	Cost
Labor			
Project Leader	32.91	50	1645.39
Biologist II	33.69	120	4042.58
Technician II	22.91	60	1374.58
		Total	7062.55

Task 3. Data entry, analysis, and report preparation (UDWR–Moab).

Labor: salary + benefits + applicable overtime (personnel services)

	Rate	Hours	Cost
Project Leader	\$30.91	80	\$2,473
Biologist	\$27.91	200	\$5,582
Technician	\$17.65	40	\$706
		subtotal	\$8,761

	UDWR - Vernal	UDWR - Moab
FY 2016		
Total	\$26,366.97	\$29,812

Work FY 2017

Task 1. Seining the middle Green River (UDWR–Vernal).

	Hourly Rate	Hours	Cost
Labor			
Project Leader	33.57	80	2685.28
Biologist II	34.36	80	2748.95
Journeyman Maintenance / Construction Specialist	27.24	160	4358.59
Technician I	16.72	160	2675.94
Shuttle Drivers	17.09	80	1366.84
Travel^a			
1 truck @ 15% of annual use; 1 truck @ 10% annual use			1700.00
Per diem (\$38/person/day x 4 people x 2 days + \$13/person/day x 4 people x 6 days)			692.00
Equipment			
Boat gas (12 gal gas/boat x \$4.00/gal x 1 boat/day x 8 days)			384.00
Oil (3 qts./motor x \$11 qt. x 1 motor x 1 oil change)			66.00
Boat/motor repair and maintenance			948.10
Sampling equipment			1450.00
Camping supplies			500.00
		Total	19575.71

^a The State of Utah uses Automotive Resources Inc. for motor pool operations. Rental is approximately \$6,800/year/vehicle (includes fleet rental, mileage, and gas), which is based on the average annual cost for all trucks used in our program.

Task 2. Seining the lower Green River and the Colorado River (UDWR–Moab).

Labor: salary + benefits + applicable overtime (personnel services)

	Rate	Hours	Cost
Project Leader	\$31.53	90	\$2,837
Biologist	\$28.47	230	\$6,548
Technician	\$18.01	370	\$6,662
		subtotal	\$16,048

Food and Transport (current expense)

	Rate	Quantity	Cost
Fleet Costs (5 trucks for 6% of total fleet costs)	\$43,297.29	0.06	\$2,598
Food (8 people, 4 days)	\$31.84	32	\$1,019
		subtotal	\$3,617

Equipment (current expense)

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$121

Sampling gear repair/replacement:	\$0.00		\$812
Boating gear repair/replacement:	\$0.00		\$557
Fuel for motors (75 gallon)	\$4.24	75	\$318
	subtotal		\$1,808

Task 2 subtotal **\$21,472**

Task 3. Data entry, analysis, and report preparation (UDWR–Vernal).

	Hourly Rate	Hours	Cost
Labor			
Project Leader	33.57	50	1678.30
Biologist II	34.36	120	4123.43
Technician II	23.37	60	1402.07
	Total		7203.80

Task 3. Data entry, analysis, and report preparation (UDWR–Moab).

Labor: salary + benefits + applicable overtime (personnel services)

	Rate	Hours	Cost
Project Leader	\$31.53	80	\$2,522
Biologist	\$28.47	200	\$5,694
Technician	\$18.01	40	\$720
	subtotal		\$8,936

	UDWR - Vernal	UDWR - Moab
FY 2017		
Total	\$26,779.50	\$30,409

Work FY 2018

Task 1. Seining the middle Green River (UDWR–Vernal).

	Hourly Rate	Hours	Cost
Labor			
Project Leader	34.24	80	2738.99
Biologist II	35.05	80	2803.93
Journeyman Maintenance / Construction Specialist	27.79	160	4445.77
Technician I	17.06	160	2729.46
Shuttle Drivers	17.43	80	1394.17
Travel ^a			
1 truck @ 15% of annual use; 1 truck @ 10% annual use			1700.00
Per diem (\$38/person/day x 4 people x 2 days + \$13/person/day x 4 people x 6 days)			692.00
Equipment			
Boat gas (12 gal gas/boat x \$4.00/gal x 1 boat/day x 8 days)			384.00
Oil (3 qts./motor x \$11 qt. x 1 motor x 1 oil change)			66.00
Boat/motor repair and maintenance			948.10
Sampling equipment			1450.00
Camping supplies			500.00
	Total		19852.42

^a The State of Utah uses Automotive Resources Inc. for motor pool operations. Rental is approximately \$6,800/year/vehicle (includes fleet rental, mileage, and gas), which is based on the average annual cost for all trucks used in our program.

Task 2. Seining the lower Green River and the Colorado River (UDWR–Moab).

Labor: salary + benefits + applicable overtime (personnel services)

	Rate	Hours	Cost
Project Leader	\$32.16	90	\$2,894
Biologist	\$29.04	230	\$6,679
Technician	\$18.37	370	\$6,796
		subtotal	\$16,369

Food and Transport (current expense)

	Rate	Quantity	Cost
Fleet Costs (5 trucks for 6% of total fleet costs)	\$44,163.23	0.06	\$2,650
Food (8 people, 4 days)	\$32.47	32	\$1,039
		subtotal	\$3,689

Equipment (current expense)

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$123
Sampling gear repair/replacement:	\$0.00		\$828
Boating gear repair/replacement:	\$0.00		\$568
Fuel for motors (75 gallon)	\$4.33	75	\$325
		subtotal	\$1,844

Task 2 subtotal **\$21,902**

Task 3. Data entry, analysis, and report preparation (UDWR–Vernal).

	Hourly Rate	Hours	Cost
Labor			
Project Leader	34.24	50	1711.87
Biologist II	35.05	120	4205.90
Technician II	23.84	60	1430.11
		Total	7347.87

Task 3. Data entry, analysis, and report preparation (UDWR–Moab).

Labor: salary + benefits + applicable overtime (personnel services)

	Rate	Hours	Cost
Project Leader	\$32.16	80	\$2,573
Biologist	\$29.04	200	\$5,808
Technician	\$18.37	40	\$735
		subtotal	\$9,115

	UDWR - Vernal	UDWR - Moab
FY 2018		
Total	\$27,200.29	\$31,017

IX. Program Budget Summary

	UDWR Vernal	UDWR Moab	Total
FY2014	\$25,566	\$28,655	\$54,221
FY2015	\$25,963	\$29,228	\$55,191
FY2016	\$26,367	\$29,812	\$56,179
FY2017	\$26,780	\$30,409	\$57,189
FY2018	\$27,200	\$31,017	\$58,217
Subtotal	\$131,876	\$149,121	\$280,997

X. Reviewers

XI. References

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