

**COLORADO RIVER RECOVERY PROGRAM
FY-2013 SCOPE OF WORK**

Project No.: 127

Colorado pikeminnow population estimates - Colorado River

Lead Agency: Fish and Wildlife Service
Colorado River Fishery Project

Submitted by: Dale Ryden, Acting Project Manager
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<u>Category:</u>	<u>Expected Funding</u>
<u>Source:</u>	
<input checked="" type="checkbox"/> Ongoing	<input checked="" type="checkbox"/> Annual funds
<input type="checkbox"/> Ongoing-revised project	<input type="checkbox"/> Capital funds
<input type="checkbox"/> Requested new project	<input type="checkbox"/> Other (explain)
<input type="checkbox"/> Unsolicited proposal	

I. Title of Proposal: Monitoring the Colorado pikeminnow population in the mainstem Colorado River via periodic population estimates.

II. Relationship to RIPRAP:

Colorado River Action Plan: Colorado River Mainstem,

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

III. Study Background/Rationale and Hypotheses:

The new standard for monitoring populations of Colorado River endangered fishes is to periodically develop population estimates using closed-model capture-recapture methods. Such estimates provide information on population status (abundance), and when repeated periodically over an extended period can also provide information on population trends. Such estimates have been made for the Colorado River population of Colorado pikeminnow for nine years: 1992-1994, 1998-2000, and 2003-2005 (see Osmundson and Burnham 1998, Osmundson 2002). Sampling has also been completed for 2008, 2009, and 2010 and abundance estimates for these years are currently being developed. Recovery goals for Colorado pikeminnow require that three annual population estimates be conducted from 2013-2015 (Program Director's Office 2002). During the first two 3-year efforts, time, manpower and funding

limitations allowed only a minimal sampling regime in the Colorado River. This consisted of three passes, or capture efforts, through the upper reach (upstream of Westwater Canyon) and two through the lower reach (downstream of Westwater Canyon) each year. This was largely accomplished with one 2-person crew. In addition, data from annual ISMP electrofishing surveys were also included which provided part of one of the passes in each reach. Without this help, the two-person crew would not have been able to complete the sampling regime. Even with this assistance, estimates have been considered generally inadequate based on wide confidence intervals, low probability of capture (p), and high coefficients of variation (CV). Pollock et al. (1982) suggests a good 'rule-of-thumb' is to achieve a CV of 20% or less. During 1991-1994 and 1998-2000, annual CV for pikeminnow ≥ 450 mm TL ranged from 15.4% to 45.5% in the upper study reach, and from 39.2% to 64.4% in the lower study reach. Annual ISMP electrofishing surveys have since been discontinued; hence, future efforts will need to be much greater to make estimates more precise and make up for the shortfall left from discontinuing ISMP. To improve estimates, a minimum of four complete passes are recommended for the Colorado River. An equal number of passes in the two reaches also allows development of one length frequency histogram for the whole study area. In addition, increased effort per pass also improves precision of estimates. In the past, trammel-netting backwaters yielded many more pikeminnow per day of effort than did electrofishing shorelines. However, at any one time, there may be many pikeminnow that are not in the backwaters; hence, an improved capture strategy should include a combination of electrofishing shorelines and trammel-netting backwaters. Hence, with expanded effort, capture probabilities should increase and coefficients of variation should decrease resulting in greater precision of the point estimates. This newer sampling regimen was employed during 2003-2005 and 2008-2010. Low runoff conditions in 2003 prevented an improvement in capture probabilities and CV was 47%. However, in 2004 CV improved to 24%, and in 2005, CV was 13%, the best since sampling began in 1991. Analysis of data for the 2008-2010 period has not yet been completed. The current regimen of increased effort and number of annual passes will be continued in 2013-2015.

IV. Study Goals, Objectives, End Product:

Goal

Our goal is to provide three annual whole-river estimates of population abundance for Colorado pikeminnow ≥ 250 mm TL and for Colorado pikeminnow ≥ 450 mm TL in the Colorado River mainstem, with coefficients of variation of 20% or less.

Objectives

1. Capture and mark subadult and adult Colorado pikeminnow from throughout the river for a three-year period making four complete passes through the upper reach (upstream of Westwater Canyon) and four through the lower reach (downstream of Westwater Canyon) each year.
2. Develop a population estimate from mark-recapture data.

3. Assess recruitment trends by analyzing length-frequency histograms and estimating abundance of individuals 400-450 mm TL.
4. Also, reduce centrarchid abundance in the study area by removing those encountered during field sampling so as to help meet objectives of Project 126 (bass removal).
5. Capture stocked razorback sucker and bonytail opportunistically for assessment of their populations. Development of abundance estimates for razorback sucker using mark-recapture data collected here will be covered under a separate scope of work.

End Product

Provide a final report on study findings. A draft report will be ready for peer review on August 30, 2016. A draft final report will be ready for approval consideration October 31, 2016. Report to be finalized December 31, 2016.

V. Study Area:

The Colorado River will be sampled from Price Stub Dam (rm 188.3) downstream to the confluence with the Green River (rm 0.0), excluding Westwater Canyon (12 miles: rm 112-124), from early-April to late-June, 2013-2015. In addition, the lower 2.3 miles of the Gunnison River downstream of Redlands Diversion Dam will also be sampled, as fish utilizing this reach are generally part of the Colorado River population. Hence, a total of 179 miles will be sampled. The rationale for omitting Westwater Canyon is that sampling there requires specialized whitewater expertise, is time consuming, and, based on past experience, will yield very few pikeminnow (captures have averaged about one per year over nine years despite intensive sampling associated with other studies [unpublished Recovery Program database data]).

VI. Study Methods/Approach:

Sub-adult and adult Colorado pikeminnow will be captured from throughout the Colorado River study area. In each of two sub-reaches (upstream and downstream of Westwater Canyon), there will be two crews working concurrently: one 2-person crew will electrofish shorelines while another two-person crew will trammel-net flooded backwaters. There will therefore be a total of four 2-person crews working simultaneously at any one time (eight individuals). Additional individuals will be required to run shuttles, clean nets and maintain equipment. An additional person will also be needed to pilot a baggage boat when sampling in Canyonlands is conducted. In some reaches, where backwaters are scarce, both shorelines will be electrofished, either concurrently or on separate days. In reaches where shoreline electrofishing supplements backwater netting, the electrofishing crew will sample both shorelines, targeting what the driver believes to be the best habitats. No electrofishing will occur in backwaters; and electrofishing boats that get out ahead of netting crews will steer

clear of backwater mouths to avoid scaring fish from these areas. Concurrent crews working in the same reach will embark at the same location but will be prepared to operate and work up fish independently. The technique, or combination of techniques, that most effectively samples the pikeminnow population varies by reach, and some flexibility will be required to modify sampling protocols as reach and flow conditions vary. All fish will be measured for total length (mm), weighed with an electronic balance (nearest gram) and checked for the presence of a PIT-tag. If a PIT tag is not present the fish will be marked with one.

For concurrent bass removal efforts, all centrarchids will be measured and removed from the river as well as other non-native predators that may be encountered such as northern pike and walleye. These will be frozen, and either transferred to the Colorado Division of Wildlife or deposited in the county landfill. Data will be turned over to the Principle Investigator for Project 126 (centrarchid removal).

The Principal Investigator will train crew members, act as overall crew leader and actively participate in data collection efforts. One higher-grade technician, certified for electrofishing, will be present in each reach, and will function as a sub-reach crew leader. Although the duration of the annual data collection effort is anticipated to be 11-12 weeks, additional time will be required prior to field sampling to ready equipment and train new crew members in motor boat operation and field techniques specific to this project.

The Principal Investigator will work closely with a biostatistician familiar with running program MARK or other appropriate mark-recapture programs that develop estimates of population abundance and rates of survival. Size structure of the population will be analyzed and compared against earlier data (1991-1994, 1998-2000, 2003-2005, 2008-2010) to determine recent trends in recruitment frequency, identification of strong year-classes, etc. Average body condition will also be monitored as a means to assess fish health.

Develop three annual estimates of population size.

VII. Task Description and Schedule

Description

Task 1. Capture and PIT tag Colorado pikeminnow (early April-late June)

Task 2. Input and analyze data

Task 3. Write annual reports

Task 4. Prepare final report

Schedule

Task 1, 2 & 3: 2013

Task 1, 2 & 3: 2014

Task 1, 2 & 3: 2015

Task 2, 3 and 4: 2016

VIII. **FY-2013 Work (first year of multi-year study)**

Deliverables/Due Dates:
Annual Report due 12/2013

Budget

Task 1.

1. Labor (salary and benefits)		
Fishery Biologist GS-12 (1)	520 hrs @ 59.65	31,018
Comp-time - assume 80 hrs.		4,772
Fishery Technician GS-6 (1)	560 hrs @ 26.17	14,655
Overtime - assume 80 hrs.		2,205
Seasonal Technicians GS-5 (7)	480 hrs @ 17.95	60,312
Overtime - assume 80 hrs.	@ 23.18	12,981
2. Travel		
field (motel plus per diem & camp)		8,080
3. Equipment		
maintenance		5,000
boat gas <u>409@4.00/gal.</u>		2,171
misc.		3,000
4. Vehicles		
7 @ \$334 each/mo plus \$0.30/mile		<u>8,435</u>
Task total		\$ 152,630

Task 2 & 3.

1. Labor (salary and benefits)		
Fishery Biologist GS-12 (1)	320 hrs @ 59.65	19,088
2. Bio-statistician	8 hrs @ 125	<u>2,000</u>
Task total		\$21,088

Overhead

Project Leader at GS-14 (1)	97 hrs @ 76.34	7,405
Assistant PL at GS-13 (1)	229 hrs @ 65.05	14,896
Administrative Officer at GS-9 (1)	309 hrs @ 40.78	<u>12,601</u>
Overhead total		\$ 34,902

Subtotals for tasks

Task 1	152,630
Task 2	21,088
Overhead	<u>34,902</u>
FY 2013 Total	\$ 208,620

Subtotal for labor:		
Fishery Biologist GS-12	840 hrs @ 57.96	50,106
Comp time	80 hrs @ 57.96	4,772
Fishery technician GS-6	560 hrs @ 26.17	14,655
Overtime	80 hrs @ 27.56	2,205
Seasonal Technician GS-5	480 hrs @ 17.95	60,312
Overtime	80 hrs @ 23.18	12,981
Project Leader GS-14	97 hrs @ 76.34	7,405
Assistant Project Leader GS-13	229 hrs @ 65.05	14,896
Administrative Officer GS-9	309 hrs @ 40.78	<u>12,601</u>
Subtotal for labor		\$ 179,933
Subtotal for travel:		
Lodging, per diem		<u>8,080</u>
Subtotal for Travel		\$ 8,080
Subtotal for equipment:		
Maintenance		5,000
Boat gas 409 gals @ 4.00/gal		2,171
Misc.		3,000
Vehicles 7 @\$334 each/mo plus \$0.30/mile		<u>8,435</u>
Subtotal for Equipment		\$ 18,606
Subtotal for contract work		
(statistician) at 8 hrs @ \$125/hr		<u>\$ 2,000</u>
FY 2013 Total		\$ 208,620

IX. FY-2014 Work (second year of multi-year study)

Deliverables/Due Dates:

Annual Report due 12/2014

Budget

Task 1.

1. Labor (salary and benefits)		
Fishery Biologist GS-12 (1)	520 hrs @ 59.65	31,018
Comp-time - assume 80 hrs.		4,772
Fishery Technician GS-6 (1)	560 hrs @ 26.17	14,655
Overtime - assume 80 hrs.		2,205
Seasonal Technicians GS-5 (7)	480 hrs @ 17.95	60,312
Overtime - assume 80 hrs.	@ 23.18	12,981
2. Travel		
field (motel plus per diem & camp)		8,080
3. Equipment		
maintenance		5,000
boat gas <u>409@4.00/gal.</u>		2,171
misc.		3,000
4. Vehicles		
7 @ \$334 each/mo plus \$0.30/mile		<u>8,435</u>
Task total		\$ 152,630

Task 2 & 3.

1. Labor (salary and benefits)		
Fishery Biologist GS-12 (1)	320 hrs @ 59.65	19,088
2. Bio-statistician	8 hrs @ 125	<u>2,000</u>
Task total		\$21,088

Overhead

Project Leader at GS-14 (1)	97 hrs @ 76.34	7,405
Assistant PL at GS-13 (1)	229 hrs @ 65.05	14,896
Administrative Officer at GS-9 (1)	309 hrs @ 40.78	<u>12,601</u>
Overhead total		\$ 34,902

Subtotals for tasks:

Task 1	152,630
Task 2	21,088
Overhead	<u>34,902</u>
FY 2014 Total	\$ 208,620

Subtotal for labor:

Fishery Biologist GS-12	840 hrs @ 57.96	50,106
Comp time	80 hrs @ 57.96	4,772
Fishery technician GS-6	560 hrs @ 26.17	14,655
Overtime	80 hrs @ 27.56	2,205
Seasonal Technician GS-5	480 hrs @ 17.95	60,312
Overtime	80 hrs @ 23.18	12,981
Project Leader GS-14	97 hrs @ 76.34	7,405
Assistant Project Leader GS-13	229 hrs @ 65.05	14,896
Administrative Officer GS-9	309 hrs @ 40.78	<u>12,601</u>
Subtotal for labor		\$ 179,933

Subtotal for travel:

Lodging, per diem	<u>8,080</u>
Subtotal for Travel	\$ 8,080

Subtotal for equipment:

Maintenance	5,000
Boat gas 409 gals @ 4.00/gal	2,171
Misc.	3,000
Vehicles 7 @\$334 each/mo plus \$0.30/mile	<u>8,435</u>
Subtotal for Equipment	\$ 18,606

Subtotal for contract work

(statistician) at 8 hrs @ \$125/hr	<u>\$ 2,000</u>
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FY 2014 Total	\$ 208,620
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X. **FY-2015 Work (third year of multi-year study)**

Deliverables/Due Dates:
Annual Report due 12/2015

Budget

Task 1.

1. Labor (salary and benefits)		
Fishery Biologist GS-12 (1)	520 hrs @ 59.65	31,018
Comp-time - assume 80 hrs.		4,772
Fishery Technician GS-6 (1)	560 hrs @ 26.17	14,655
Overtime - assume 80 hrs.		2,205
Seasonal Technicians GS-5 (7)	480 hrs @ 17.95	60,312
Overtime - assume 80 hrs.	@ 23.18	12,981
2. Travel		
field (motel plus per diem & camp)		8,080
3. Equipment		
maintenance		5,000
boat gas <u>409@4.00/gal.</u>		2,171
misc.		3,000
4. Vehicles		
7 @ \$334 each/mo plus \$0.30/mile		<u>8,435</u>

Task total **\$ 152,630**

Task 2 & 3.

1. Labor (salary and benefits)		
Fishery Biologist GS-12 (1)	320 hrs @ 59.65	19,088
2. Bio-statistician	8 hrs @ 125	<u>2,000</u>

Task total **\$21,088**

Overhead

Project Leader at GS-14 (1)	97 hrs @ 76.34	7,405
Assistant PL at GS-13 (1)	229 hrs @ 65.05	14,896
Administrative Officer at GS-9 (1)	309 hrs @ 40.78	<u>12,601</u>

Overhead total **\$ 34,902**

Subtotals for tasks

Task 1		152,630
Task 2		21,088
Overhead		<u>34,902</u>

FY 2013 Total **\$ 208,620**

Subtotal for labor:

Fishery Biologist GS-12	840 hrs @ 57.96	50,106
Comp time	80 hrs @ 57.96	4,772
Fishery technician GS-6	560 hrs @ 26.17	14,655
Overtime	80 hrs @ 27.56	2,205
Seasonal Technician GS-5	480 hrs @ 17.95	60,312
Overtime	80 hrs @ 23.18	12,981
Project Leader GS-14	97 hrs @ 76.34	7,405

Assistant Project Leader GS-13	229 hrs @ 65.05	14,896
Administrative Officer GS-9	309 hrs @ 40.78	<u>12,601</u>
Subtotal for labor		\$ 179,933
Subtotal for travel:		
Lodging, per diem		<u>8,080</u>
Subtotal for Travel		\$ 8,080
Subtotal for equipment:		
Maintenance		5,000
Boat gas 409 gals @ 4.00/gal		2,171
Misc.		3,000
Vehicles 7 @\$334 each/mo plus \$0.30/mile		<u>8,435</u>
Subtotal for Equipment		\$ 18,606
Subtotal for contract work		
(statistician) at 8 hrs @ \$125/hr		<u>\$ 2,000</u>
FY 2015 Total		\$ 208,620

XI. FY-2016 Work (second year of multi-year study)

Deliverables/Due Dates:

Annual report due 12/2016

Draft final report for peer review due 08/30/2016

Draft final report for Biology Committee approval 10/31/2016

Draft finalized 12/31/2016

Budget

Task 2, 3 & 4.

1. Labor (salary and benefits)		
Fishery Biologist at GS-12 (1)	800 hrs @ 59.65/hr	47,720
Project Leader at GS-14 (1)	33 hrs @ 76.34/hr	2,519
Assistant Project Leader GS-13 (1)	78 hrs @ 65.05/hr	5,074
Admin assistant at GS-9 (1)	105 hrs @ 40.78/hr	<u>4,282</u>
Subtotal for Labor		\$ 5,9595
2. Travel		
meetings		300
3. Equipment		
office (misc.)		300
Report printing and mailing costs		500
4. Bio-statistician (1) 5 days at 1000/day		<u>5,000</u>
Subtotal for 2,3, and 4 costs		\$6,100
FY 2016 Total		\$ 65,695

XII. Budget summary

2013	\$ 208,620
2014	\$ 208,620
2015	\$ 208,620
2016	<u>\$ 65,695</u>
Project Total	\$ 691,555

XIII. Reviewers: Biology Committee

XIV. References

Osmundson, D. B. 2002. Population dynamics of Colorado pikeminnow in the upper Colorado River. Final Report. U. S. Fish and Wildlife Service, Grand Junction, Colorado.

Osmundson, D. B. 2009. Population status and trends of Colorado pikeminnow of the upper Colorado River, 1991-2005. Final Report. U. S. Fish and Wildlife Service, Grand Junction, Colorado.

Osmundson, D. B., and K. P. Burnham. 1998. Status and trends of the endangered Colorado squawfish in the upper Colorado River. Transactions of the American Fisheries Society 127:957-970.

Pollock, K. H., J. D. Nichols, C. Brownie, and J. E. Hines. 1990. Statistical inference for capture-recapture experiments. Wildlife Monographs 107.

Program Director's Office. 2002. Protocols for Colorado pikeminnow and humpback chub estimates. Draft Report. Upper Colorado River Endangered Fish Recovery Program, Lakewood, Colorado.