

**COLORADO RIVER RECOVERY PROGRAM
FY-2008 SCOPE OF WORK**

Project No.: 127

Colorado pikeminnow population estimates - Colorado River

Lead Agency: Fish and Wildlife Service
Colorado River Fishery Project

Submitted by: Chuck McAda, Project Manager
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Category:

- Ongoing
 Ongoing-revised project
 Requested new project
 Unsolicited proposal

Expected Funding Source:

- Annual funds
 Capital funds
 Other (explain)

- 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). Recovery goals for Colorado pikeminnow require that three annual population estimates be conducted from 2008-2010 (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 the 1991-1994 and 1998-2000 efforts, the annual CV for pikeminnow >450 mm TL ranged from 15.4 to 45.5 in the upper reach and from 39.2 to 64.4 in the lower 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, four complete passes is recommended. An equal number of passes in both reaches will also allow one estimate for the whole study area rather than having to sum two separate estimates for the upper and lower reach as was necessary in the past (see Osmundson and Burnham 1998). In addition, effort per pass must also be increased. In the past, trammel-netting backwaters has yielded many more pikeminnow per day of effort than has 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 will decrease resulting in much greater precision of the point estimates. This newer sampling regimen was employed during 2003-2005. 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.

IV. Study Goals, Objectives, End Product:

Goal

Our goal is to provide three annual whole-river estimates for population abundance of 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.

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).

End Product

Provide final report on study findings. Draft report ready for peer review on August 30, 2011. Draft final report ready for approval consideration October 31, 2011. Report finalized December 31, 2011.

V. Study Area:

Sample Colorado River 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, 2008-2010. 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:

Capture sub-adult and adult Colorado pikeminnow 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 thus be a total of four 2-person crews working simultaneously at any one time (eight individuals). Additional individuals will be required to run shuttles and clean nets. 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 attempt to sample each shoreline on separate days; if there is insufficient time to do this, then the most productive looking shoreline will be sampled as the boat moves downriver. 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 ≥ 100 mm TL will be measured, marked on the first pass with a caudal-fin hole punch, and returned to the river. In subsequent

passes, all bass captured will be measured, checked for a mark, removed, stored 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.

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 CAPTURE or other appropriate mark-recapture programs. Size structure of the population will be analyzed and compared against earlier data (1991-1994, 1998-2000 and 2003-2005) 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. **Note: Funds for biostatistician deleted from this SOW. For FY 08, those funds are in SOW #128 for FY 08; funds also will be needed in FY 09 and beyond.**

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. Analyze data

Task 3. Write annual reports

Task 4. Prepare final report

Schedule

Task 1, 2 & 3: 2008

Task 1, 2 & 3: 2009

Task 1, 2 & 3: 2010

Task 2, 3 and 4: 2011

VIII. FY-2008 Work (first year of multi-year study)

Deliverables/Due Dates:

Annual Report due to Coordinator 12/10/2008

Budget

Task 1.

1. Labor (salary and benefits)		
Fishery Biologist at GS-12 (1)	12 wks	24,300
Comp-time - assume 80 hrs.		4,049
Seasonal technicians		
GS-7 (2)	12 wks	26,592
Overtime - assume 80 hrs.		6,648
GS-5 (5)	12 wks	37,920
Overtime - assume 80 hrs.		7,584
Project Leader (1)	2 wks	4,490
Admin assistant (1)	2 wks	2,781
2. Travel		
field (motel plus per diem & camp)		9,895
3. Equipment		
new motor (1)		6,000
maintenance		5,000
misc.		3,000
4. Vehicles		
3 GSA at \$600 each/mo for 3 months		5,400
4 FWS at \$555 each/mo for 3 months		6,660

Task 2 & 3.

1. Labor (salary and benefits)		
Fishery Biologist GS-12 (1)	8 wks	16,200

Total \$ 166,519

IX. FY-2009 Work (second year of multi-year study)

Deliverables/Due Dates: Annual Report due 12/10/2009

Budget

Task 1.

1. Labor (salary and benefits)		
Fishery Biologist at GS-12 (1)	12 wks	25,272
Comp-time - assume 80 hrs.		4,211
Seasonal technicians		
GS-7 (2)	12 wks	27,656
Overtime - assume 80 hrs.		6,914
GS-5 (5)	12 wks	39,437
Overtime - assume 80 hrs.		7,887
Project Leader (1)	2 wks	4,670
Admin assistant (1)	2 wks	2,892

4 FWS at \$555 each/mo for 3 months 7,203

Task 2 & 3.

- 1. Labor (salary and benefits)
 - Fishery Biologist GS-12 (1) 8 wks 17,522
- 2. Bio-statistician **TBD**

Total \$ 173,616

XI. FY-2011 Work (fourth year of multi-year study)

Deliverables/Due Dates:

Annual report due 12/2011
Draft final report for peer review due 08/30/2011
Draft final report for Biology Committee approval 10/31/2011
Draft finalized 12/31/2011

Budget

Task 2, 3 & 4

- 1. Labor (salary and benefits)
 - Fishery Biologist (1) 20 wks 45,557
 - Project Leader (1) 1 wk 2,525
 - Admin assistant (1) 1 wk 1,565
- 2. Travel
 - meetings 300
- 3. Equipment
 - office (misc.) 500
- 4. Bio-statistician **TBD**

Total \$ 50,447

XII. Budget summary

2008	\$ 166,519
2009	\$ 166,850
2010	\$ 173,616
2011	\$ 50,447
Total	\$ 557,432

XIII. Reviewers: Not yet known

XIV. References

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

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

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.