COLORADO RIVER RECOVERY PROGRAM
FY-2009 SCOPE OF WORK

Title of Proposal:

Colorado pikeminnow population estimates - Colorado River

Lead Agency: Fish and Wildlife Service
Colorado River Fishery Project

Submitted by: Michelle Morgan, Acting Project Manager
Doug Osmundson, Principal Investigator (Lead)

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Category: XX Ongoing

Expected Funding Source:
XX Annual funds
___ Ongoing-revised project
___ Capital funds
___ Requested new project
___ Other (explain)
___ 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
t   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
   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 are recommended. An
equal number of passes in both reaches will also allow one length frequency for the whole
study area. 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. No data have yet been analyzed for 2008,
the first year of the new three-year effort.

IV. Study Goals, Objectives, End Product:

Goal

Our goal is to provide three annual whole-river estimates for population
abundance of Colorado pikeminnow \( \geq 250 \) mm TL and for Colorado pikeminnow \( \geq 450 \) 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).

5. Capture stocked razorback sucker and bonytail opportunistically for late assessment
of their populations.

End Product


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 will be measured and removed from the river. They will be 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 MARK 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.

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-2010 Work (third year of multi-year study)

Deliverables/Due Dates: Annual Report due 12/2010

Budget

Task 1.

1. Labor (salary and benefits)
   Fishery Biologist at GS-12 (1) 17 wks 37,451
   Comp-time - assume 80 hrs. 4,406
   Seasonal technicians
   GS-9 (1) 14 wks 19,656
   Overtime - assume 80 hrs. 4,212
GS-5 (7)  12 wks  58,548  
Overtime - assume 80 hrs.  14,637  
Project Leader at GS-14 (1)  2 wks  6,128  
Admin assistant at GS-9 (1)  2 wks  2,876  

2. Travel  
field (motel plus per diem & camp)  10,418  

3. Equipment  
maintenance  5,000  
misc.  3,000  
Smith-Route generator  8,000  

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)  9 wks  19,827  
2. Bio-statistician  1,000  

Total  $ 207,219  

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. Labor (salary and benefits)  
Fishery Biologist at GS-12 (1)  20 wks  48,580  
Project Leader at GS-14 (1)  1 wk  3,202  
Admin assistant at GS-9 (1)  1 wk  1,539  

2. Travel  
meetings  300  

3. Equipment  
office (misc.)  500  

4. Bio-statistician (1) 10 days at 1000/day  10,000  

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XII. Budget summary

<table>
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<tr>
<th>Year</th>
<th>Amount</th>
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<td>2010</td>
<td>$207,219</td>
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<td>2011</td>
<td>$ 64,121</td>
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Total $261,564

XIII. Reviewers: Not yet known

XIV. References


