

I. Project Title:

Removal and control of nonnative fishes in Colorado and Gunnison River floodplain source ponds.

II. Principal Investigator:

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III. Project Summary:

The purpose of this project is to significantly reduce the number of chronic sources contributing nonnative fishes to riverine habitats. Access for sampling and potential reclamation of ponds on 13 private, three public, and one municipal properties was successfully negotiated. Negotiations are similarly underway with the Colorado Department of Transportation and the City of Delta to access an additional nine ponds. Sixty-five ponds, that are directly connected to the Colorado or Gunnison rivers and/or lei within the 100 year floodplain, were surveyed to: 1) determine the presence or absence of threatened and endangered fish species, 2) identify nonnative fish species composition, 3) examine basic water chemistry, and 4) evaluate the pond's potential as a source for nonnative fish entering the Colorado or Gunnison rivers. Fifteen ponds were reclaimed and another 11 were void of fish. Training was obtained by the principal investigator and associated personnel in the: 1) identification of Southwest Willow Flycatchers and their breeding and nesting habitat, 2) uses and types of screens available in the pacific northwest, and 3) application and safe use of pesticides. Information was provided to the public by mailing two Listening Logs to approximately 450 PAI's concerning nonnative fish control. Finally an incentive package to facilitate landowner cooperation and participation in this program was initiated.

IV. Study Schedule:

- a. Initial year: 1997
- b. Final year: 2002

V. Relationship to RIPRAP:

General Recovery Program Support Action Plan

- III. Reduce negative impacts of nonnative fishes and sportfish management activities.
- III.A. Reduce negative interactions between nonnative and endangered fishes.
- III.A.2. Identify and implement viable control measures.
- III.A.2.c. Implement and evaluate the effectiveness of viable active control measures.
- III.B. Reduce negative impacts to endangered fish from sport fish management activities.

VI. Accomplishment of FY 99 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

- \* Began negotiating with two landowners to screen outlets on several ponds.
- \* Reported chemicals stored on site to the local fire department, Local Emergency Planning Committee, and State Emergency Response Commission according to SARA Title III (Emergency Planning and Community Right to Know) mandate.
- \* Contributed to Nonnative Fish Control I&E efforts by: mailing two editions of a "Listening Log" (as recommended by Hans Bleiker) to approximately 450 PAI's.
- \* Training was obtained by the principal investigator and associated personnel in the: identification of Southwest Willow Flycatchers and their breeding and nesting habitat; uses and types of screens available in the pacific northwest; and application and safe use of pesticides.
- \* An incentive package, approved by CDOW management, was used to facilitate landowner cooperation and participation in controlling nonnative fishes via reclamation, screening, or water management in their ponds.
- \* Clarified and aided implementation of the Nonnative Fish Stocking Regulation. As a result of this new regulation 11 landowners were required, through the warmwater fish stocking process, to screen their outlets with at least 1/4" mesh screen prior to stocking warmwater fish.
- \* Collected physical and biological data from 65 ponds which have direct connectedness to the Colorado or Gunnison rivers or were located within the 100 year floodplain. Of the 65 ponds 34 contained only nonnative fish species, and nine contained both native and nonnative fishes. A total of 2,791 nonnative fish and only 51 native fish were collected in the 43 ponds that supported fish. Of the remaining 22 ponds 11 were void of fish, six were ephemeral, and five were taken over by the river since the Mitchell report (1995).
- \* Chemically reclaimed fifteen ponds totaling 38.2 surface acres.
- \* Monitored fish escapement and movement from Highline Lake into Mack Wash and Salt Creek, prior to installation of the Highline Lake fish screen and participated in initial public relation endeavors surrounding the installation of this screen.

Completion of a landowner incentives package has facilitated access to private property and expedited nonnative fish reclamation efforts. Several landowners choose to participate in

the nonnative fish control program after they considered how they would personally benefit through the incentives package. Incentive money was paid to seven private landowners as an access fee. An additional two private landowners were provided a set of aerial photographs in lieu of a cash payment. Finalizing the nonnative fish stocking regulations on the western slope has also encouraged a few landowners to participate in the landowner incentives package and therefore created nonnative fish reclamation opportunities. Continued consent building through the Listening Log and word of mouth is necessary to gain further access to private properties. Examination and installation of prototype screens and determination of viable screen options will compliment nonnative fish control activities by preventing reinvasion of reclaimed ponds and isolating nonnative sport fisheries from riverine access. Monitoring nonnative fish control projects for reinvasion of reclaimed ponds, winterkill in depth-reduced ponds, and total mortality in ponds managed annually through filling and drying will provide an evaluation of current nonnative fish control techniques.

Powdered rotenone, though less expensive, can not be used in every situation. Ponds with restricted or poor access can be more easily and effectively reclaimed with liquid rotenone due to the excessive weight and the need for a pump and vehicle/boat to administer the powder. Also, application of powdered rotenone is less effective on windy days because it tends to concentrate in windrows on shore. In contrast, liquid rotenone can be administered in ponds with poor access, from a portable one-person cataraft and it does not windrow on windy days. Various pond reclamation scenarios require the availability, and therefore purchase and storing, of both rotenone formulations.

Some confusion occurred regarding reporting dates for annual reports. I mistakenly reported the calendar year in the FY98 Annual Project Report. To correct this error work accomplished through June 30, 1999 is included in this FY99 Annual Project Report and future annual reports will encompass the Colorado Division of Wildlife fiscal year, July 1 through June 30. The following table summarizes work reported in each fiscal report and reports each accomplishment only once.

RIP Report	Ponds Sampled	Ponds Reclaimed	Reduced Depth in Ponds	Seasonal Drying	Ponds Screened	Landowner Contacts	Listening Log
1998	3						
	36	4	1	5		8	2
1999	65	15				17	2
					beginning FY99/00		

VII. Recommendations:

Project should continue in 1999 as described in the scope of work. Microsoft Access will be used to address mail for the Listening Log and facilitate retrieval of the matrix (Martinez 1997), fish sampling and PAI data. The database will be revised as on-the-ground inventories identify ephemeral ponds, standing water mistakenly identified as ponds on aerial photographs, newly excavated ponds, and ponds created and engulfed by hydrological repositioning of the rivers. The lake survey protocol was effective in determining species composition and will be conducted prior to all reclamation projects.

VIII. Project Status: Project is on track and ongoing.

IX. FY 99 Budget Status:

- A. Funds Provided: \$80,850
- B. Funds Expended: \$112,054 (as of June 30, 1999). As cited in Part 3 of 3 (this report)  
VIII. Project Status: Funds not expended will be used for nonnative fish reclamation activities in floodplain ponds.
- C. Difference: -\$31,204 Screen installation/evaluation funds were spent on nonnative fish control activities/equipment. The remainder of the screen installation/evaluation funds, \$13,796, were expended in the months following the end of the state fiscal year and prior to the end of the federal fiscal year. (See B above and Part 3 of 3, IX this report).
- D. Percent of the FY 99 work completed, and projected costs to complete: 100% of work was completed.
- E. Recovery Program funds spent for publication charges: None

X. Status of Data Submission: Not applicable.

XI. Signed: Anita Martinez      Dec. 13, 1999  
Principal Investigator      Date

APPENDIX:

U.S. Fish and Wildlife Service. 1998. Intra-Service Consultation on Control of Nonnative Fishes in Floodplain Ponds. ES/GJ-6-CO-98-F-004. Denver, Colorado. 13pp.

Martinez, A. 1997. Matrix for evaluating and estimating treatment costs for removing fish populations from ponds in the Gunnison and Colorado River flood plains in Colorado. Draft report. 38pp.

Mitchell, M. J. 1995. Impact of the procedures for stocking nonnative fish species in the Upper Colorado River Basin on private landowners and the commercial aquaculture industry. Inventory of public and private ponds along the upper Colorado and lower Gunnison Rivers in Colorado. Colorado Department of Agriculture 95-0021. Queen of the River Fish Company, Inc., Longmont, Colorado. 38pp. Plus appendices.

I. Project Title: Evaluation of the Interagency Standardized Monitoring Program

II. Principal Investigators:

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III. Project Summary:

The purpose of this project was to assess the accuracy and precision of the Interagency Standardized Monitoring Program (ISMP) to estimate abundance and size structure of the centrarchid fishes in backwaters of the Colorado River near Grand Junction, Colorado. The density of fishes in backwaters will be estimated by the ISMP methodology and compared with density estimates based on three-pass removal or capture-recapture population estimates. Results of this study will be used to guide decisions regarding sport fish management and control of non-native fishes in the Colorado River and its floodplain in the Grand Valley.

IV. Study Schedule:

- a. Initial year: 1997
- b. Final year: 1999 (The year in which the State of Colorado begins its fiscal year, so 1999 is actually the federal fiscal year 2000).

V. Relationship to RIPRAP:

General Recovery Program  
III. Reduce negative impacts of non-native fishes and sport fish management activities.  
III.A. Reduce negative interactions between non-native and endangered fishes.  
III.A..2. and III.A.2.c. Identify, implement, evaluate viable active control measures.

## Colorado River Mainstem

III. Reduce negative impacts of non-native fishes and sport fish management activities.

III.A.3.a. Evaluate and make recommendations.

III.A.4. Remove small non-native cyprinids from backwaters and other low-velocity habitats.

## VI. Accomplishment of FY 98 (federal fiscal year 1999) Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Backwaters were sampled in the Grand Valley reach of the Colorado River in autumn 1998. Backwaters were located in the 15-mile reach as well as the reach from the confluence of the Gunnison and Colorado rivers to downstream of the Loma boat ramp. Nearly all of the backwaters in this reach were sampled; logistics, extremely large size and access prevented us from sampling a few backwaters. The total number of backwaters was within the target range of 20-30 backwaters as specified in the research proposal and statement of work. We met all the goals of the 1998 sampling.

In autumn 1998, 24 different backwaters were sampled in the Colorado River; one of those was sampled twice for a total of 25 sampling occasions. On 22 occasions, abundance of fishes backwaters was estimated using depletion techniques. On the remaining three occasions, fish abundance was estimated using capture-recapture. Sampling effort included 530 seine hauls and 1097 minutes of electrofishing. Sampling detected a total of five native and 13 introduced fishes and a total of 70,642 fish were captured. Native fishes comprised 2.0 % of the total catch. The most abundant native species was speckled dace (0.7%; n = 560). One Colorado squawfish was captured (approx 35 mm total length, TL) in Reach 3 several kilometers downstream of the confluence with the Gunnison River. Nonnative species represented 98 % of all fishes captured and sand shiners (41 %), red shiners (26 %) and fathead minnows (21 %) were the most abundant taxa. Centrarchids were 5.1 % of the total number of fish captured; those were mainly green sunfish (3.0 %) and largemouth bass (1.9 %). In all, 2,176 green sunfish (16 to 174 mm TL) and 1,366 largemouth bass (45 to 245 mm TL) were removed from 24 backwaters sampled in the Colorado River in autumn 1998.

Size structure of centrarchids varied among backwaters and reaches. Most green sunfish captured were 20 to 80 mm TL. The largest fish occurred in Reach 4; smaller green sunfish occurred throughout reaches 1 to 3. Size structure of largemouth bass was dominated by individuals 40 to 120 mm TL and 98.3 % (n = 1387) were  $\leq$  150 mm TL. Presence of small individuals suggested late reproduction for both green sunfish and largemouth bass. Twenty-three largemouth bass were  $>$  150 mm TL, and most (19) were found in reaches 1 and 4.

When results of removal and capture-recapture techniques were considered, green sunfish were found in 22 of 25 backwaters sampled and largemouth bass were found in 16 of 25 backwaters. The ISMP protocol detected the presence of green sunfish in 12 of the 22 backwaters (55%). The ISMP protocol detected the presence of largemouth bass in 5 of the 16 backwaters (31%).

Abundance estimates for each species in each backwater were calculated using computer programs 2Capture and CAPTURE (White et al. 1982). Fish densities in each backwater were calculated by dividing abundance estimates by backwater area. The ISMP density estimate was derived by dividing the number of fish captured of each species by the area seined. All estimated fish densities were multiplied by 10, to be comparable with other ISMP fish density estimates.

Preliminary comparisons showed that ISMP abundance estimates were biased low when compared with those derived from depletion or capture-recapture sampling. For example, 82% of the ISMP estimates for green sunfish and largemouth bass fell below abundance estimates derived from depletion and mark-recapture sampling. More extensive study results can be found in the 1998 progress report submitted by the principal investigators to the Colorado Division of Wildlife (appended).

VII. Recommendations:

Analyze data and write the final report. The contract for the final segment of work from CDOW to CSU was finalized in November 1999.

VIII. Project Status: Project is on track and ongoing.

IV. FY 99 Budget Status (state fiscal year 1998):

- A. Funds Provided: \$43,450
- B. Funds Expended: \$43,450
- C. Difference: \$0.0
- D. Percent of FY 98 work completed, and projected costs to complete: 100% completed, no additional FY 98 funds needed.
- E. Recovery Program funds spent for publication charges: None

X. Status of Data Submission:

Not applicable as study is ongoing, expect data will be submitted following completion of final report in summer 2000.

XI. Signed: Kevin R. Bestgen                      30 November 1999  
Principal Investigator                              Date

Appendix: See appended report detailing FY 98 results.

I. Project Title:

Installation and evaluation of fish control devices in outlets of gravel pit ponds - Colorado River.

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III. Project Summary:

The purpose of this project is to investigate existing technology which minimize reinvasion and escapement of fishes from treated ponds and ponds outside the treatment area by screening or other anti-escapement devices. The principal investigator participated in discussions with Highline Advisory Workgroup for installation of a fish barrier net.

IV. Study Schedule:

- a. Initial year: 1997
- b. Final year: 2002

V. Relationship to RIPRAP:

General Recovery Program Support Action Plan

- III. Reduce negative impacts of nonnative fishes and sport fish management activities.
- III.A.2. Identify and implement viable control measures.
- III.B. Reduce negative impacts to endangered fish from sport fish management activities.

VI. Accomplishment of FY 99 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Pat Martinez participated in discussions with Highline Advisory Workgroup for installation of fish barrier net.

VII. Recommendations:

Installation, monitoring and evaluation of selected screen configurations/apertures for prevention of fish escapement, fouling and maintenance. Increased agency coordination in identification and application of existing standards to facilitate compliance with intent of Stocking Procedures until development of screen guidelines and establishment of monitoring protocols are completed.

VIII. Project Status:

To be implemented. Funds not expended will be used for nonnative fish reclamation activities in floodplain ponds.

IX. FY 99 Budget Status:

- A. Funds Provided: \$45,000
- B. Funds Expended:\$0 (See IX. FY 98 Funds, Part 2 of 3, this report)
- C. Difference: \$45,000
- D. Percent of the FY 99 work completed, and projected costs to complete: 0%
- E. Recovery Program funds spent for publication charges: None

X. Status of Data Submission: Not applicable.

XI. Signed: Patrick J. Martinez      Dec. 13, 1999  
Principal Investigator                      Date