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INTRODUCTION

This is the guidance for development of the Recovery Program's FY 2000 Work Plan. The Program Director's office, technical committees, Management Committee, and Implementation Committee developed this guidance on the basis of the Recovery Program's Recovery Action Plan (RIPRAP) and input from Program participants. The RIPRAP identifies all the activities currently believed necessary and feasible to recover the endangered fish in the Upper Basin. Thus, annual Program guidance is closely tied to the RIPRAP.

Like the RIPRAP, the guidance is organized by recovery element. Within each recovery element, guidance is provided for ongoing, ongoing-revised, and new projects. Ongoing projects are those previously approved for out-year funding for which goals/objectives, methods, cost, and expected outcome have not changed significantly. Scopes of work for these projects should require only minor updates. Ongoing-revised projects are those previously approved for out-year funding for which goals, objectives, methods, cost, or expected outcome have changed significantly (as outlined in the guidance), thus their scopes of work may require more changes. New projects are those not previously approved for out-year funding and completely new scopes of work will be developed for these.

This FY 2000 guidance requests proposals for FY 2000 activities; proposed scopes of work are requested for each of the projects listed in this guidance. Scopes of work should be prepared according to the format in Appendix B. Please review this format carefully, especially the explanatory text printed in italics. Scopes of work which do not contain the information requested will be returned to the principal investigator for revision. This could prevent the scope from receiving FY 2000 funding consideration because of the tight work plan development schedule. The format is available electronically by request to angela_kantola@fws.gov.

To allow time for outside peer review, scopes of work for new projects were due to Program coordinators in WordPerfect 5 or 6 format by electronic mail or on disk by March 19, 1999 (unless otherwise noted due to a late addition). New projects are:

- Evaluation of Colorado pikeminnow overwinter survival (proposed SOW's due April 13)
- GVIC fish screening (construction -- does not require peer review)
- Razorback sucker survival to recruitment in floodplain depressions with nonnative fishes.
- Highline Reservoir screening and evaluation
- Nonnative fishes monitoring to evaluate Colorado stocking regulations
- Translocation of Colorado pikeminnow
- Assessment of ISMP objectives and methodology
- Develop habitat monitoring program

For your information, the evaluation form that will be used by the Recovery Program in evaluating new scopes of work is shown in Appendix C. Also included for your information are: Appendix D - the evaluation form used by the Recovery Program in reviewing and commenting on final draft project reports; Appendix E - the proper format for final draft reports that are submitted to the Biology Committee for review and approval; and Appendix F - the Biology Committee review process for final draft reports.

Scopes of work for ongoing and ongoing-revised biological and water acquisition projects (under recovery elements I-V) are due NO LATER THAN April 23, 1999 (this includes scopes of work for capital-funded projects). Submit new, ongoing-revised, and ongoing scopes of work for these projects to the appropriate Program coordinator (see list at end of this page) in WordPerfect 5.1/5.2 or 6/7/8 format by electronic mail or on disk. IN ADDITION, submit a courtesy electronic or hard copy of new and ongoing-revised biological scopes of work to each member of the Biology Committee (list attached) and water acquisition scopes of work to each member of the Water Acquisition Committee. (These committees do not need to see ongoing

scopes of work until later in the work plan review process, and these will be sent to them by the Program Director's office.)

Scopes of work for information & education projects (under recovery element VI) also are due April 24, 1999, and should be submitted in WordPerfect 5.1/5.2 or 6/7/8 format to Angela Kantola (angela_kantola@fws.gov).

Program management scopes of work (under recovery element VII) are due by July 1, 1999 (in WordPerfect 5.1/5.2 or 6/7/8 format by electronic mail to angela_kantola@fws.gov or on disk).

Upon receipt of the proposed scopes of work, the Program Director's office will begin working (with technical advisory panels and principal investigators) to review and refine the scopes of work and develop a recommended technical annual work plan. This recommended work plan and refined scopes of work will be submitted by the Program Director to the technical committees for review on June 21. Technical committee comments are then due to the Program Director and the Management Committee by July 23. The recommended Program management work plan also is due from the Program Director to the Management Committee at this time. The Management Committee will meet in early August to discuss the recommended work plans and approve projects for the Draft FY 2000 Work Plan. The Draft Work Plan will be submitted to the Implementation Committee for review by August 17. The Implementation Committee will meet August 31, and the final FY 2000 Work Plan and final scopes of work will be distributed in the first quarter of FY 2000.

If you have any questions about this guidance or the FY 2000 work plan development process, please contact Angela Kantola at 303/236-2985, ext 221, or the appropriate coordinator:

Instream flow protection and nonnative fish control - Bob Muth 303/236-2985 ext. 268
robert_muth@fws.gov

Habitat restoration - Pat Nelson 303/236-2985 ext. 226, pat_nelson@fws.gov

Genetics and propagation, monitoring/research/life history - Tom Czapla 303/236-2985 ext. 228,
tom_czapla@fws.gov

Information, education, and public involvement - This position is currently vacant. In the interim, scopes of work should be sent to Angela Kantola 303/236-2985 ext. 221,
angela_kantola@fws.gov

Program management - Angela Kantola 303/236-2985 ext. 221, angela_kantola@fws.gov

I. INSTREAM FLOW IDENTIFICATION AND PROTECTION:

Instream flow activities in FY 2000 will be directed towards: 1) coordinated reservoir operations to enhance flows; and 2) providing and legally protecting flows in important river reaches.

<u>NUMBER</u>	<u>TITLE</u>	<u>PROJECTED FY 00 BUDGET</u>
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ONGOING PROJECTS

8	RECOVERY PROGRAM GAGE O&M No major changes to project scope or budget expected. All long-term gage operation and maintenance has been rolled into this scope of work, including: #8, 15-Mile Reach gage (4.7K) #96, Duchesne River gages (11.5K) #CAP-4C, Gage below Redlands Diversion (9.2K)	25.4
9	WATER RIGHT ACQ. CONSULTANT \$10K moved to peer review of geomorphology studies (#86).	10.0
19H	WATER ACQ. HYDROLOGY SUPPORT	47.5
67	STEAMBOAT LAKE WATER LEASE	32.0
71	COLO. RIVER DECISION SUPP. SYSTEM Colorado needs to update the scope of work to reflect 2000 and outyear activities and budget.	TBD
CAP14	COORDINATED RESERVOIR OP.	50.0
CAP25	FACILITIES MGMT. OPTIONS, DIV. 5 No major changes expected after FY 99 SOW is finalized (which should include FY 2000 and 2001 costs).	TBD
19B	BIOLOGY HYDROLOGY SUPPORT	48.0
85	15-MILE REACH CHANNEL MONITORING	23.9
86	PEER REVIEW OF GEOMORPH. STUDIES No major changes scope expected; additional review work expected in FY 00, so \$10K moved from water right acquisition consultant project (#9)	20.0

ONGOING PROJECTS NEEDING REVISION

70	CO. INSTREAM FLOW PROTECTION Colorado needs to update the scope of work to reflect 2000 and outyear activities and budget.	TBD
CAP11	GRAND VALLEY WATER MANAGEMENT This project has experienced significant delays. Time lines and cost estimates in this scope of work need to be updated.	2,564.8
CAP 24	DUCHESNE COORDINATED RESV. OP. SOW should be revised to reflect actual work plan and budget for FY 2000 and outyears.	35.0

17	BASIN WIDE CHANNEL MONITORING	35.0
Each year a revised scope of work is submitted to reflect Recovery Program priorities and basin hydrology conditions. A monitoring program is then designed to achieve these goals. The channel monitoring program for FY 2000 will include gathering cross-section data to support the FLO2D modeling and the 15-Mile Reach embeddedness monitoring.		
84	DUCHESNE RIVER BIOLOGICAL STUDIES	150.0
This scope of work generally undergoes extensive updating each year; this year it will be submitted in the regular scope of work review cycle.		
CAP9	YAMPA MANAGEMENT PLAN	400.0
Should be revised pending Management Committee decision to continue funding this project. Accurate budget for FY 2000 to be determined.		
99NEW	RUEDI RESERVOIR LEASE	65.0
FY 99 SOW pending.		

NEW PROJECTS

TITLE: FLUCTUATING FLOW EFFECTS ON OVERWINTERING PIKEMINNOW

RIPRAP Item Number:

General Project Title: Evaluation of Age-0 Colorado Pikeminnow Overwinter Survival, Movement, and Habitat Characteristics in the Middle Green River, Utah, to Further Assess the Effects of Flaming Gorge Dam Winter Operations.

Rationale/Problem Statement: Comparisons between fall and spring population estimates of age-0 Colorado pikeminnow in selected backwaters of the middle Green River indicate that overwinter losses are above 50% for this age class. Four hypotheses have been offered to explain the lower number of fish in the spring: (1) fish remain in their respective reaches, but move to main channel habitats that are not sampled; (2) fish disperse into flooded vegetation on islands and shorelines making them more difficult to sample; (3) fish are redistributed by spring runoff to downstream reaches; and (4) fish die during the winter or during spring runoff (Haines et al. 1998). Obtaining accurate estimates of overwinter survival of age-0 pikeminnow is critical to understanding the life history of the species, modeling population dynamics, determining the factors affecting survival, and managing winter dam operations to protect the species and its habitat.

Haines et al. (1998) recommended that capture-recapture population estimates of age-0 Colorado pikeminnow be made on a regular basis to estimate overwinter survival. Such estimates are needed to determine age-class strength at the end of the winter period and to determine the environmental factors that influence overwinter survival. In addition, Haines et al. (1998) indicated that studies were needed to describe local and long-term movement of young Colorado pikeminnow during winter and to determine how these movements affect survival estimates. This information would expand our understanding of winter flow requirements for Colorado pikeminnow.

Flows in the Green River, in the primary nursery habitat reach from the Jensen bridge downstream to Ouray, Utah, are dominated by releases from Flaming Gorge Dam, except during high spring flows from the Yampa River or during local rainstorm events. The effects of daily dam operations and stage changes during winter on physical conditions, such as backwater area, depth, and temperature and on the use of other low-velocity habitats by juvenile Colorado pikeminnow have not been adequately defined. Although adult Colorado pikeminnow are

known to use backwater habitats in the winter (Valdez and Masslich, 1989), the habitat preferences of age-0 fish has not been determined.

A properly designed study will test the validity of the assumptions used in estimating overwinter survival of age-0 Colorado pikeminnow, refine overwinter survival estimates, identify winter habitat use, and examine physical changes in these habitats as they relate to Flaming Gorge Dam releases. These results will allow refinement of release patterns at Flaming Gorge Dam during the winter.

Project Goals and Objectives:

Goal: Validate overwinter survival estimates of age-0 Colorado pikeminnow and determine the effect of Flaming Gorge Dam winter operations on habitat use, movements, and distribution of these fish.

Objectives:

1. Test the assumptions of overwinter survival estimates and specifically determine if Colorado pikeminnow movements affect these estimates.
2. Determine if low-velocity habitats are physically affected by fluctuating releases from Flaming Gorge Dam during the winter.
3. Determine effective methods for collecting age-0 Colorado pikeminnow in low-velocity habitats during the winter.
4. Determine presence or absence of age-0 Colorado pikeminnow in selected low-velocity winter habitats.
5. Determine if winter movements are related to fluctuating releases from Flaming Gorge Dam.

Recommended Approach/Methods: Persistent low-velocity habitats should be selected for study in the Green River, Utah, below Jensen. Previously, a 20 mile reach of river was sampled, but this area may need to be expanded to determine if marked fish are transported further downstream. Validation of overwinter survival estimates should follow or consider the approach of Haines et al. (1998). Selected sites should be sampled with gears and techniques effective for winter sampling of age-0 fish, including the collection of fish under ice covers (e.g., minnow traps, small mesh hoopnets, underwater surveillance – video or still photo). Effective methods for sampling fish under ice covers would need to be determined during the first year of study. Once methods are established, fish distribution should be monitored to determine habitat use, distribution, and movement during the winter period. Movements of age-0 Colorado pikeminnow could be determined by marking individual fish. Physical conditions in selected low-velocity habitats should be monitored throughout the winter period including intensive sampling over several 24 hr. periods to define the range of seasonal and daily changes resulting from various flow regimes.

Schedule: FY-00 Design and conduct studies to test assumptions of overwinter survival estimates and determine appropriate methods for sampling age-0 fish in the winter.
FY-01 Study effects of fluctuating flows on physical conditions within habitats used by age-0 fish and the relationship of these changes to fish movements.
FY-02 Replicate study of previous year.
End of FY-02 Report on accuracy of population estimates, overwinter survival rates, fish movements, and the effect of fluctuating flows on physical habitat conditions.

Cost Range: \$60 to 100K/year

Literature:

Valdez, R.A. and W.J. Masslich. 1989. Winter habitat study of endangered fish – Green River. Wintertime movement and habitat of adult Colorado squawfish and razorback suckers. Prepared for the Bureau of Reclamation, Salt Lake City, Utah. Contract No. 6-CS-40-04490. BIO/WEST Report No. 136-2. 184pp.

Haines, G.B., D.W. Beyers, and T. Modde. 1998. Estimation of winter survival, movement and dispersal of young Colorado squawfish in the Green River, Utah. Recovery Program Project 36. Final Report. Contribution 96 of the Larval Fish Laboratory, Department of Fishery and Wildlife Biology, Colorado State University, Fort Collins, CO. 46pp.

II. HABITAT RESTORATION:

The goal of Habitat Restoration is to provide and protect habitat necessary to both achieve and sustain endangered fish recovery. Currently there are two major thrusts under this element of the Recovery Program.

1. Re-open access to historically-occupied river sections by restoring fish passage at the following migration barriers:
 - a. Redlands Diversion Dam (completed 6/96)
 - b. Hartland Diversion Dam
 - c. Grand Valley Irrigation Company Diversion (completed 1/98)
 - d. Price-Stubb Diversion Dam
 - e. Grand Valley Project Diversion Dam
 - f. Tusher Wash Diversion Dam, if warranted
 - g. Yampa River diversion structures, if warranted

2. Restore or enhance natural floodplain functions that support endangered fish recovery.

<u>NUMBER</u>	<u>TITLE</u>	PROJECTED FY 00 BUDGET
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ONGOING PROJECTS

CAP4b	REDLANDS FISH PASSAGE	64.8
Continued operation, evaluation, and maintenance of passage structure. Evaluation will be completed in 12/00.		
CAP5	PRICE-STUBB FISH PASSAGE	1.3M
CAP23	GRAND VALLEY PROJECT FISH PASSAGE	1.58M
CAP26	HARTLAND FISH PASSAGE	300.0
95	SELENIUM EFFECT ON LARVAL RAZORBACKS: FIELD VERIFICATION OF LAB RESULTS	14.9
97	SELENIUM INTERSPECIFIC SENSITIVITY	16.3
75	FLOODPLAIN PROTECTION	0.0
Ongoing; decisions will be made in FY 00 regarding future funding needs.		

ONGOING PROJECTS NEEDING REVISION

CAP6 FLOODPLAIN RESTORATION PROGRAM

Following are the Program activities:

- Screen sites for contaminants (84.3K)
 - a. Pre-acquisition and/or pre-restoration assessments
 - b. Post-restoration assessments
- Conduct floodability assessments (150.0K)
 - a. Pre-acquisition and/or pre-restoration assessments
 - b. Development of design options for restoration
 - c. Construction oversight
 - d. Post-restoration monitoring and evaluation
- Conduct environmental compliance (NEPA, Section 7, 404, etc.)
- Old Charlie Wash
- Land acquisition activities
- Levee removal
- Evaluation of levee removal
- Gravel pit evaluation
- Public involvement plan
- Weed management plan

The Floodplain Habitat Restoration Program SOW will be revised based on input received during the SOW review process. One upcoming addition to the revised draft SOW will be a proposal to breach levees at selected high-priority “safe” sites. Sites that are considered “safe” at this point are floodplain terraces that are both floodable and drainable, allowing use by native and endangered fishes during spring runoff but not allowing overwinter survival and buildup of nonnative fishes. Recovery Program approval will be required prior to breaching any levees.

Another proposed addition to the draft SOW, recommended by the Levee Removal Evaluation Group, will be to experimentally lower levees on the upstream end of one or more sites along the Green River. It is expected that sites configured in this manner will entrain drifting razorback larvae during spring runoff much more efficiently than sites where levees have been breached at the downstream end.

All proposed additions and modifications to the Floodplain Habitat Restoration Program SOW will be subject to review and approval by the Recovery Program. Additions/modifications that are approved will also be contingent upon availability of funding. Some of these recommendations will be costly to implement, and could only be done in the event that 1) unobligated funds become available, and 2) the Recovery Program considers them to be higher priority than other contingency projects.

NEW PROJECTS

TITLE: DEMONSTRATION OF LARVAL AND JUVENILE RAZORBACK SUCKER SURVIVAL TO RECRUITMENT IN FLOODPLAIN DEPRESSIONS WITH NONNATIVE FISHES.

RIPRAP Item Number: Green River Action Plan: Mainstem
II.A.3. Implement levee removal strategy at high-priority sites.
II.A.3.c. Evaluation.

General Project Title: Demonstration of larval and juvenile razorback sucker survival to recruitment in floodplain depressions in the presence of nonnative fishes.

Rationale/Problem Statement:

It is well known that razorbacks can be reared successfully in predator-free environments. However, assuming that it will not be possible to eradicate nonnative fish predators from the Upper Basin, and that native fishes will ultimately need to coexist with nonnatives, then the secret to razorback recovery may lie in finding the habitat configuration that will support razorback survival and growth in the presence of nonnatives.

By some, Old Charley Wash was considered “successful” when, during 1995, 12 adult razorbacks, 28 juvenile razorbacks, and 7 juvenile squawfish were collected along with 631,798 fish (15 species) weighing 22,321 pounds (adult carp 77% by weight; fathead minnows 71% by number); and during 1996, 45 juvenile razorbacks and 6 juvenile squawfish were collected along with 549,032 fish (16 species) weighing 12,578 pounds (adult carp 75% by weight; fathead minnow 49% by number).

By others, Old Charley was not considered “successful.” The juvenile razorbacks harvested from Old Charley in October 1995 ranged from 3 to 5 inches in length; those harvested in August 1996 ranged from 2 to 3 inches. Recruitment to adulthood was not demonstrated.

The purpose of this work is to demonstrate that, in floodplain depressions, razorback larvae can survive and grow to adult size in the presence of nonnative fishes. Hatchery-produced razorback larvae and juveniles will be stocked into floodplain depressions. It is expected that two growing seasons will be required for razorbacks to reach adult size (i.e., greater than 10 inches in length).

Project Goals and Objectives:

To determine if razorback suckers will survive and grow in floodplain depressions to a size in which they can recruit into the adult riverine population.

Expected Product:

Definitive evidence that, in permanent floodplain depressions and in the presence of nonnative fishes, (some) larval and age-1 razorback suckers can survive to recruit into the adult population.

Recommended Approach/Methods:

Stock razorback larvae and juveniles into floodplain depressions; harvest survivors at the end of the second growing season.

Why stock?

There are not enough razorbacks left in the river to evaluate habitat restoration activities. Stocking is needed to detect a species' response.

Why not stock razorbacks into the river?

Some believe there is little or no larval razorback survival to recruitment in riverine habitats (e.g., backwaters), because of high densities of nonnative fish predators, no predator-avoidance cover, and slower growth rates because of less food and lower water temperatures. Some believe that the likelihood of larval/young razorback survival in off-channel habitats (e.g., floodplain depressions, wetlands, gravel pits) is greater than in main channel habitats because of vegetative cover and faster growth due to more food and warmer water. Unfortunately, it would be difficult (maybe impossible) to compare relative survivability of razorback larvae in main channel habitats versus off-channel floodplain habitats.

Why not use floodplain terraces?

Floodplain terraces are only inundated for a few days to a few weeks each year, not long enough for larval razorbacks to grow to adult size. Some of the deeper floodplain depressions can hold enough water to sustain fishes year-round.

How will survival be quantified?

Site(s) with outlet structures: will be drained and all fish harvested at the end of the second growing season (October).

Site(s) without structures: during spring runoff, either trap nets will be set at inlets/outlets, to capture any razorbacks that may be trying to access the river, or the outlet will be blocked or screened to prevent escapement. Towards the end of the second growing season, either attempts will be made to capture razorbacks from the site using sampling gear, or the site(s) will be drained with gator pumps and all fishes harvested.

Where?

Green River floodplain depressions. Candidate sites include The Stirrup, Baeser Bend, Above Brennan, Old Charley Wash, Johnson Bottom, Leota Bottom.

How many sites?

Two to four sites.

How many fish will need to be stocked in each site?

In the wild, most fishes have Type IV survivorship curves, where mortality is concentrated in the young. Up to 99% or greater mortality can be expected to occur during first year of life. The percentage may be higher for larval razorbacks because of large numbers of nonnative fishes. Once they have reached adult size, many fishes become Type III (i.e., a constant fraction dies each year). Therefore, several thousand larvae would need to be stocked into each site to expect a detectable level of survival. Regardless how many razorbacks survive, it is doubtful that all the survivors will be accounted for during harvest.

Schedule: FY 99-00 or FY 00-01

Razorback larvae and juveniles would be stocked into each site at the beginning of the growing season in year 1. All fish and surviving razorbacks would be harvested from each of the sites at the end of the second growing season (year 2).

Cost Range: ~\$50-60K

Includes transport and stocking of razorbacks; pumping if needed; and harvest of fishes.

TITLE: GVIC FISH SCREENING

RIPRAP Item Number: Colorado River Action Plan: Mainstem
II.B.1.b. Screen GVIC diversion to prevent endangered fish entrainment.
II.B.1.b.(1) Design
II.B.1.b.(2) Construct

General Project Title: Screen Grand Valley Irrigation Company diversion canal to prevent endangered fish entrainment.

Rationale/Problem Statement: The Recovery Program constructed a fish ladder at GVIC diversion on the Colorado River near Palisade, Colorado in 1998. Listed and other native fishes have been documented traversing this reach of river and are often found upstream of the diversion structure which can take a sizable portion of the flow in the river. Although entertainment has not been documented, research at other locations (Tusher Wash on the Green River in Utah) suggests screening of the GVIC diversion to prevent entrainment is prudent.

Project Goals and Objectives: Design and construct a fish screen for the GVIC diversion that will exclude, without harm, adult fish of approximately 300 mm in length. (The habitat above the GVIC diversion is presumed to be mainly suitable for and occupied by adults, thus, the Recovery Program has determined that a screen sufficient to exclude adult fish of approximately 300 mm in length.)

Expected Product: Fully functional fish screen on the GVIC diversion canal that will exclude adult fish of approximately 300 mm in length and continue to pass the historically diverted GVIC flow demands.

Recommended Approach/Methods:

This diversion exclusion device must pass the historically divertable GVIC flow demands under the entire range of river operating conditions, without reducing the divertable amount of water and fit within the available space. Operation and maintenance consideration must be given to potential solutions. All potential solutions must be reviewed with and approved by the RIP Management Committee and the GVIC.

The project will include all coordination required; development, for review and approval, of a design strategy and design memo; design of the proposed facility; development of construction contract documents; execution of a construction contract; construction; and, hydraulic and biological performance testing.

Schedule: FY 00-01 (complete construction by 4/01).

Cost Range: FY 00 approximately \$700,000; FY 01 approximately \$1,150,000

III. REDUCE NONNATIVE FISH AND SPORTFISH IMPACTS:

The goal for nonnative fish control or management in the upper Colorado River Basin is to reduce the adverse impacts of nonnative fishes on the endangered fishes. It is not likely that nonnative fishes that have become established in the Upper Colorado river Basin can be eliminated. Therefore, the objectives of this recovery element are to: 1) implement preventive measures and 2) develop an active control program.

<u>NUMBER</u>	<u>TITLE</u>	<u>PROJECTED FY 00 BUDGET</u>
<i>ONGOING PROJECTS</i>		
87	SMALL NONNATIVE CYPRINID REMOVAL: UTAH (87A) AND COLORADO (87B)	145.8
87a	Cyprinid Removal in the Lower Colorado and Green Rivers, Utah (91.8K)	
87b	Removal of Nonnative Fishes from Backwater Habitats in the Colorado and Gunnison Rivers, Colorado (54.0K)	
89	COLORADO R. CENTRARCHID REMOVAL	52.0
98	YAMPA R. NONNATIVE FISH CONTROL	100.0

ONGOING PROJECTS NEEDING REVISION

CAP18/19 COLO. RIVER POND RECLAMATION	272.0
Revise based on Management Committee recommendations.	

NEW PROJECTS

TITLE: HIGHLINE SCREENING

RIPRAP Item Number: Colorado River Action Plan: Mainstem
 III.A. Reduce negative impacts to endangered fishes from sport fish management activities.

General Project Title: Highline Lake Fish Barrier and Evaluation

Rationale/Problem Statement: Screening the Highline Reservoir outflow is recommended to reduce or eliminate continuous introduction of nonnative fishes into the Colorado River mainstem from this source. A net-type fish barrier is under construction in the spillway approach of Highline Lake, near Fruita, Colorado. The net consists of 1/4" nominal opening polyester mesh. The net is being installed as an experiment to evaluate the effectiveness of constructing and operating such fish barriers. To establish the effectiveness and potential acceptability of such fish barriers, the Highline Lake barrier net must be evaluated for: 1) ability to prevent escapement of all life stages of target species to be contained in the reservoir; 2) ease of maintenance and routine cleaning; 3) ease of removal and re-installation for protection from ice damage; 4) potential to leave in place during ice cover on lake. 5) longevity and annual operational costs.

Project Goals & Objectives: Evaluate the effectiveness of a net-type barrier to reduce or eliminate escapement of nonnative fishes from a reservoir.

Expected Product: Final report on the effectiveness and feasibility of this type of net barrier to reduce or eliminate nonnative fish escapement.

Recommended Approach/Methods: The State of Colorado, Division of Parks and Outdoor Recreation operate Highline Reservoir. The State proposes to operate the fish barrier for FY 99 - 00 (7/1/99-6/30/00) on an experimental basis. The evaluation of the effectiveness and acceptability of the Highline net should determine: 1) ability to prevent escapement of all life stages of target species to be contained in the reservoir (sampling will need to occur prior to and during bypass flows); 2) ease of maintenance and routine cleaning; 3) ease of removal and re-installation for protection from ice damage; 4) potential to leave in place during ice cover on lake. 5) longevity and annual operational costs.

Schedule: Conduct evaluation in FY 2000; provide final report by 12/00.

Cost Range: Engineer's estimates of annual operation and maintenance costs range from \$8,400 to \$34,000 per year depending on the algae clogging, tumble weed problems and damage to the net necessitating repairs. The estimated cost includes the annual removal and inspection and reinstallation. In FY 2000, the evaluation and maintenance may be funded up to \$10,000 by the State of Colorado and up to \$40,000 by the Recovery Program (capital funds), for a total of \$50,000.

TITLE: **MONITORING OF NONNATIVE FISHES TO EVALUATE EFFECTIVENESS OF COLORADO STOCKING REGULATIONS.**

RIPRAP Item Number:

General Recovery Program Support Action Plan

III.A.4.a.1. Evaluate effectiveness of Colorado's stocking regulation

General Project Title: Nonnative fish monitoring demonstrating the effect of Colorado Stocking regulations.

Rationale/Problem Statement: In January 1999, the Colorado Wildlife Commission modified regulations to limit the stocking of nonnative fishes in floodable areas along the river, including ponds which are connected to the river and are within the 100 year flood plain. The Commission accepted these modifications with the expectation of evidence demonstrating the regulation is having an effect on reducing the numbers of nonnative fishes in the river main channel. The Commission will give the regulation up to 3 years, at that time they will reassess the regulation based on evidence demonstrating that the enforced regulation is indeed reducing the numbers of nonnative fishes from stocked ponds in order to keep the regulation as law.

Project Goals and Objectives:

Goal: Demonstrate the effect of the nonnative fish stocking regulation.

Objective: To compare the enforcement of the nonnative fish stocking regulation to data prior to the regulation and/or where nonnatives already exist and/or the effectiveness of various methods to stop the escape of nonnative fishes from stocked ponds to the river.

Recommended Approach/Methods: Monitor abundance of nonnative fishes (catfish, largemouth bass, sunfish, fatheads) commonly stocked into private ponds. Areas to be monitored could include the drainage mouths from ponds, above and in critical habitat, and backwaters. Baseline information may be available from existing data base (ISMP), anderson, and Burdick. The area of interest would be from Rifle to Stateline on the Colorado River and Delta to Grand Junction on the Gunnison River.

Schedule: Monitor up to 2 years 2000-2001
Evaluate data, final written report by 6/2002
(Long-term monitoring beyond 2001 to become part of ISMP)

Cost Range:

FY00	~\$30K
FY01	~\$30K
FY02	~\$15K

Anderson, R.M. 1997. An Evaluation of Fish Community Structure and Habitat Potential for Colorado Squawfish and Razorback Sucker in the Unoccupied Reach (Palisade to Rifle) of the Colorado River, 1993-1995. Colorado Division of Wildlife, FA Proj. SE-3, 56 p. + appendices.

Burdick, R. 1995. Ichthyofaunal Studies Of The Gunnison River, Colorado, 1992-1994. U.S. Fish and Wildlife Service, Colorado River Fishery Project, 60 p. + appendices

IV. PROPAGATION & GENETICS MANAGEMENT:

The goals of Propagation and Genetics management are to maintain endangered fishes in refugia (hatcheries) and produce broodstock with the least amount of inbreeding. The objective is to utilize broodstock in the production of genetically sound offspring for augmentation of river stocks.

<u>NUMBER</u>	<u>TITLE</u>	PROJECTED FY 00 <u>BUDGET</u>
<i>ONGOING PROJECTS</i>		
25	BONYTAIL INTRODUCTION	92.0

ONGOING PROJECTS NEEDING REVISION

29	OPERATION AND MAINTENANCE OF PROPAGATION FACILITIES FOR CAPTIVE-REARING OF ENDANGERED COLORADO RIVER FISHES	703.2
29a	Grand Valley Endangered Fish Facility	220.0
29b	Wahweap State Fish Hatchery	87.2
29c	Ouray National Fish Hatchery	376.0
		*(\$297.7 - \$376.0 FWS)
29d	Collection of broodstock	20.0

* NOTE: \$297.7K is in the President's budget request for the Fish and Wildlife Service; Program participants have asked their delegation to request \$376K. Therefore, it is anticipated that from \$0 - \$78.3K will be needed from Recovery Program funds.

Scope of work should address: 1) increased O&M costs as a result of expansion of Grand Valley facility; and 2) plan for razorback and bonytail broodstock development.

CAP-7 EXPANSION OF PROPAGATION FACILITIES TBD

Green River Subbasin Growout Ponds
 Grand Valley Growout Ponds
 Other facility needs
 Tagging equipment for broodstock and augmentation fish

Budget to be determined based on facilities needs document (draft available in May).

NEW PROJECTS

**TITLE: TITLE: EVALUATION OF COLORADO PIKEMINNOW
TRANSLOCATION IN THE PALISADE TO RIFLE REACH OF THE
COLORADO RIVER**

RIPRAP Item Number: Colorado River Action Plan: Mainstem, IV.A.1.b.(3) Monitor and evaluate results; make recommendations regarding further augmentation.

General Project Title: Evaluation of Colorado pikeminnow translocation in the Palisade to Rifle reach of the Colorado River.

Rationale/Problem Statement: The Palisade to Rifle reach has been determined to be appropriate habitat for Colorado pikeminnow (Anderson 1997). This reach is currently unoccupied habitat for the Colorado pikeminnow due to the two barriers near Palisade. Translocation of Colorado pikeminnow into this reach will help to establish adult fish in critical habitat they once occupied. The State of Colorado has proposed an aggressive 5-year stocking plan throughout state waters which includes recommendations to stock Colorado pikeminnow into the Palisade to Rifle reach (Nesler 1998). The goal of Colorado's stocking plan is to achieve 10 adult Colorado pikeminnow/river mile and comprising less than one percent of the biomass. Translocation of juvenile and/or young adult Colorado squawfish should be part of this stocking effort, and should include a complete evaluation of the success/failure of the translocation.

Project Goals and Objectives: Determine the appropriate number and size of Colorado pikeminnow to translocate from the population occurring in the Grand Valley. Appropriately tag and monitor movements/behaviors of fish translocated over the diversion structure into the Palisade to Rifle reach of the Colorado River. Use a quantifiable approach to determine the success/failure of translocating Colorado pikeminnow. Determine impacts of displacing other native species to attain the 1% replacement of the biomass with this endangered species.

Recommended Approach/Methods: The state proposal identifies the Interagency Standardized Monitoring Program as a means to determine the number of fish/mile (goals of the stocking effort). Short term (2-3 years), more intense evaluations should be made to determine aspects outlined in Anderson's (1997) recommendations.

Schedule: FY-00 Translocate and evaluate Colorado pikeminnow
FY-01 Translocate and evaluate Colorado pikeminnow
FY-02 Translocate and evaluate Colorado pikeminnow

Cost Range: \$30 to 45K/year

Literature:

Anderson, R. 1997. An evaluation of fish community structure and habitat potential for Colorado squawfish and razorback sucker in the unoccupied reach (palisade to Rifle) of the Colorado River, 1993-1995. Final Report. Colorado Division of Wildlife, Fort Collins, CO. 73 pp.

Burdick, B.D. 1992. A plan to evaluate stocking to augment or restore razorback suckers in the upper Colorado River. U.S. Fish and Wildlife Service, Colorado River Recovery Project, Grand Junction, CO. 56pp.

Nesler, T.P. 1997(draft). Fiver -year stocking plan for endangered Colorado River fish species in Colorado. Draft Report (June 4, 1997). Colorado Division of Wildlife, Denver, CO. 25 pp.

V. RESEARCH, MONITORING, & DATA MANAGEMENT:

The goals of Research, Monitoring and Data Management are to provide the necessary information in life histories of endangered fishes to aid in the implementation of other Program activities, to determine the status and trends of the natural stocks, and to actively maintain the data in a useable format for researchers. The objective is to use this information in deciding the course of other Program management actions to recover the endangered fish.

<u>NUMBER</u>	<u>TITLE</u>	<u>PROJECTED FY 00 BUDGET</u>
<i><u>ONGOING PROJECTS</u></i>		
15	IDENTIFICATION AND CURATION OF LARVAL FISHES BY COLORADO STATE UNIVERSITY, LARVAL FISH LABORATORY	53.8
16	DATABASE MANAGEMENT	35.9
22	INTERAGENCY STANDARDIZED MONITORING PROGRAM	
22A1	ISMP coordination and reporting (FWS)	33.0
22A2	Colorado pikeminnow pop. monitoring (FWS)	45.0
22A3	Black Rocks humpback pop. estimate. (FWS)	22.0
22B	Colorado ISMP (CDOW)	36.4
22C	Utah ISMP (UDWR)	221.1
22D	Basinwide razorback sucker monitoring	220.0
50	RAZORBACK SUCKER STOCKING	49.0

ONGOING PROJECTS NEEDING REVISION

22	INTERAGENCY STANDARDIZED MONITORING PROGRAM	
22A4	Yampa humpback pop. estimate (FWS)	21.0
	Revise SOW to consider developing an index of juvenile humpback chub numbers in FY 2000 if adult sampling in 1999 is insufficient to develop population estimate.	
22F	Colorado pikeminnow larval abundance	100.0
	Expand SOW to include Gunnison River in FY 2000 and outyears.	

NEW PROJECTS

TITLE: ASSESSMENT OF ISMP OBJECTIVES AND METHODOLOGY

RIPRAP Item Number: General Recovery Program Support Action Plan
V.A.1.a. Conduct standardized monitoring program: evaluate and refine procedures periodically, as appropriate.

General Project Title: Outside peer assessment of Interagency Standardized Monitoring Program objectives and methodology.

Rationale/Problem Statement: The Recovery Program is currently spending over \$700,000 per year on the Interagency Standardized Monitoring Program. The program has a number of different objectives with respect to monitoring various populations of the existing three endangered species in the Upper Colorado River Basin, and providing trend information on those populations. In 1998 the Recovery Program began developing actual populations estimates from ISMP data. With interim management objectives for the various fish populations, it is necessary

to monitor progress towards achieving those objectives in more than 800 miles of critical habitat in the Upper Colorado River Basin. ISMP will be a critical tool in determining whether or not Recovery Program actions and expenditures of more than \$160 million through 2003 are achieving the intended objectives. The Recovery Program can expect increased scrutiny from participating organizations and outside agencies, including Congress, with respect to expenditures versus achievements in the future. It is critical, both in evaluating the effectiveness of alternative measures to achieve recovery and in satisfying participating outside organizations, to have an effective ISMP that monitors trends and provides population estimates within reasonable confidence intervals. Furthermore, it is important that Recovery Program funds for monitoring be expended in the most cost effective manner. There are many valid concerns and questions regarding the ability of the current program to meet objectives with respect to both trends and population estimates of the various endangered fish populations.

Project Goals and Objectives: Assess the ability of the ISMP methodologies to achieve objectives, identify shortcomings, and identify modifications needed to achieve objectives.

Recommended Approach/Methods: ISMP objectives will be established by the Biology and Management committees of the Recovery Program. (These objectives also should address nonnative fish populations to evaluate effectiveness of the Program's nonnative fish removal activities.) Evaluation will determine if the ISMP is meeting the objectives for population monitoring developed by the Biology and Management committees. This evaluation will either require a biostatistician as a co-lead or as the principle investigator. Experience in long-term monitoring of rare species and biostatistics are required. This study will require: a) a review of the objectives of the ISMP with respect to the Program and various populations; b) a review of the database and methodologies for monitoring; c) comparison of current ISMP data with established objectives; d) determination of the ability of the monitoring program to meet objectives; e) identification of shortcomings; and f) making recommendations for improving the monitoring program, including methodologies, sampling methods, data collection quantities and frequencies, etc., necessary to meet objectives. The findings and recommendations of this evaluation will, in addition to normal peer review, be peer-reviewed outside of the Recovery Program.

It is anticipated that the Recovery Program will then review the recommendations and determine the feasibility and cost of establishing the recommended program that would achieve the ISMP objectives.

Schedule: Conduct study in FY00

Cost Range: \$20,000-30,000

TITLE: DEVELOP HABITAT MONITORING PROGRAM

RIPRAP Item Number:

Colorado River Action Plan: Mainstem

V.B. Monitor habitat features associated with 15 mile reach Biological Opinion

V.B.1. Develop plan.

General Project Title: Development of Habitat Monitoring Program for the Colorado River.

Rationale/Problem Statement: In the draft 15-Mile Reach Biological Opinion habitat, factors are identified as being monitored or evaluated to determine their influence/progress toward an increase in fish populations. Such habitat features might be area of annual floodable habitat available to early life stages, water temperatures at critical periods, amount of suitable spawning gravel or embeddedness, quantity/quality of food available at particular life stages, type and quantity of nonnatives, or mapping of significant habitat features and their annual changes.

Project Goals and Objectives:

Goal: A plan/methodology for monitoring essential habitat feature(s) which lead to an increase in endangered fish populations.

Objective: Identify essential habitat features and method of monitoring over success years.

Recommended Approach/Methods: Develop a program which would monitor essential habitat features that can be used as indicators leading to a natural increase in endangered fishes of the Colorado River. The habitat feature(s) should be linked to the success/failure of an increase of the fish population. Such features may be the number of acres of backwater habitat available for larval Colorado pikeminnow or the amount of high quality gravel substrate available during spawning of Colorado pikeminnow. Although the Colorado pikeminnow is currently the most common of the endangered fishes, habitat feature(s) essential to razorback sucker, humpback chub and bonytail would also be useful and pertinent in the long term.

Schedule: FY00 (report 9/2000)

Cost Range: \$15,000

VI. INFORMATION, EDUCATION, & PUBLIC INVOLVEMENT:

The objectives of information and education and public involvement are to provide information to the various publics interested in and affected by the Recovery Program and to involve key publics in program decisions. In FY 1999, ongoing public information/education projects will be maintained and emphasis will continue to be placed on coordination of public involvement efforts across all Recovery Program participants. The Information and Education Committee may make recommendations to re-structure the public involvement plans, based on an ongoing coordinated public involvement effort.

<u>NUMBER</u>	<u>TITLE</u>	PROJECTED FY 00 BUDGET
<i>ONGOING PROJECTS</i>		
12	GENERAL INFORMATION AND EDUCATION	45.0
PROJECT-SPECIFIC PUBLIC INVOLVEMENT		
PIP-3	Yampa River Plan (includes nonnative fish management) Lead: Fish and Wildlife Service and Colorado Division of Wildlife.	1.0
PIP-4	Capital improvement projects in the Grand Valley Lead: Bureau of Reclamation	30.0
PIP-5	Coordinated reservoir operations Lead: Bureau of Reclamation	4.2
PIP-6	Ruedi Reservoir water allocation Lead: Bureau of Reclamation, Loveland office.	10.0
PIP-7	Flaming Gorge Dam releases Lead: Bureau of Reclamation, Provo Office.	28.0
PIP-8	Floodplain restoration Lead: Recovery Program, flooded bottom land coordinator.	16.9
PIP-10	Pond Reclamation Lead: Colorado Division of Wildlife.	10.0
PIP-12/13	Utah combined public involvement Lead: Utah Department of Natural Resources	.2

VII. PROGRAM MANAGEMENT:

Program management activities for FY 2000 focus on continued planning and coordination of Program activities by the Program Director and staff and by Utah, Colorado, Wyoming, and the Bureau of Reclamation.

<u>NUMBER</u>	<u>TITLE</u>	<u>PROJECTED FY 00 BUDGET</u>
<i>ONGOING PROJECTS</i>		
1	UTAH PROGRAM MANAGEMENT	75.3
2	B. RECLAMATION PROGRAM MGMT.	150.0
3	SERVICE PROGRAM MANAGEMENT	760.0
4	COLORADO PROGRAM MANAGEMENT	110.0
5	WYOMING PROGRAM MANAGEMENT	12.3
CAP21	CAPITAL PROJECTS COORDINATION	400.0