



**FISCAL YEAR 1993
WORK PLAN**

**RECOVERY IMPLEMENTATION PROGRAM
FOR ENDANGERED FISH SPECIES
IN THE UPPER COLORADO RIVER BASIN**



**United States Department of the Interior
Fish and Wildlife Service
Region 6, Denver, Colorado**



AUGUST 1992

ERRATA

FY 93 WORK PLAN

PAGE

- 3 Footnote #3 should read: "The total for this column is \$4,400 less than the total funding available in FY 93. The Management Committee will consult with the technical committees to determine how to allocate remaining funds."
- 5 The first sentence under item h. should read: "Utah will develop a reintroduction plan and begin studies to determine how to most effectively reintroduce bonytail chub in the upper basin."
- B-5 The total outyear cost for #17 should read: "\$258,000 or less, depending upon how much is spent in FY 93."
- B-7 The total cost for #19, Aspinall Unit Studies is \$292,400. The cost for Study B, Flow Effects on Larval Squawfish Production is \$78,000.
- B-12 The total outyear cost for #30 should read: "\$149,500 or less, depending on what studies are continued or begun after reintroduction plan is completed in FY 93."

PREFACE

This document describes the work plan and budget of the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program) for Fiscal Year (FY) 1993, which begins October 1, 1992. The Colorado River Implementation Committee approved this work plan on August 25, 1992. Members of the Implementation Committee are:

Ralph Morgenweck, Regional Director, Fish and Wildlife Service, Denver, Colorado

Roland Robison, Regional Director, Bureau of Reclamation, Salt Lake City, Utah

Ken Salazar, Executive Director, Colorado Department of Natural Resources

Dee Hansen, Executive Director, Utah Department of Natural Resources

Jeff Fassett, State Engineer, Wyoming

Lloyd Greiner, Area Manager, Western Area Power Administration, Salt Lake City, Utah

Dan Luecke, Representative, Environmental Groups

Tom Pitts, Representative, Upper Basin Water Users

Clifford Barrett, Executive Director, Colorado River Energy Distributor's Association (nonvoting)

John Hamill, Colorado River Recovery Program Director, Fish and Wildlife Service, Denver (nonvoting)

The principal credit for developing the work plan belongs to the technical and Management committees of the Implementation Committee. These groups were responsible for assessing the status of ongoing activities, evaluating roughly 45 project proposals submitted for consideration for funding in FY 93, and developing a draft work plan for Implementation Committee consideration.

Lead agencies will implement activities identified in the work plan over the next several months. The goal is to have contracts issued and funds allocated for all identified activities by the end of the first quarter (December) of FY 93.

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1. BACKGROUND

A primary responsibility of the Colorado River Recovery Implementation Committee is to develop and recommend priorities for the annual use of funds under the Recovery Program. The Recovery Program's recommended budget in FY 93 is nearly \$2.76 million. This is a 4.2 percent increase (based on the 1990 Consumer Price Index) over the \$2.64 million FY 92 budget. Additional funding from: the Fish and Wildlife Service (Service), the Bureau of Reclamation (Reclamation), and water users (Section 7 funds) brings the total FY 93 budget to just over \$2.9 million. Funds come from the following sources:

	FY 93 Established <u>Contribution</u>	FY 93 Actual <u>Contribution</u>
Fish and Wildlife Service	\$718,300	\$820,000
Bureau of Reclamation	\$1,797,300	\$1,810,100 ¹
State of Colorado	\$124,600	\$127,500
State of Utah	\$87,500	\$87,500
State of Wyoming	\$27,700	\$27,700
Water Users		
Section 7 Funds	<u>0</u>	<u>\$53,500</u>
Total	\$2,755,400	\$2,926,300 ²

2. WORK PLAN DEVELOPMENT PROCESS

Table 1 on the following page outlines the schedule for developing and implementing the FY 93 Annual Work Plan. Appendix A contains a list of priority recovery activities prepared by the Management Committee as guidance for FY 93 project proposals.

As requested by the Implementation Committee in August 1989, a draft Long Range Plan has been developed which identifies goals, objectives, and priority activities for recovery of the endangered fishes in the Upper Basin³. The Biology Committee used the Long Range Plan in providing recommendations for the Management Committee's guidance for FY 93 project proposals. This technical plan eventually will become a step-down of a management-level strategic plan identifying milestones for recovery of the endangered fishes.

¹ Reclamation is providing an additional \$12,800 in carry-over funds not spent on a Colorado Division of Wildlife project on Kenney Reservoir in FY 91.

² In addition to this amount, the Bureau of Reclamation, the Service, and the Colorado River Water Conservation Board and the State of Colorado are contributing an \$818,000 to begin work on capital projects described in Section 5, Capital Funds.

³ Long Range Plan for the Recovery Implementation Program, Rare and Endangered Fishes of the Upper Colorado River Basin. October 3, 1991.

Table 1. Process and schedule for development of the FY 93 Recovery Program Work Plan

<u>Date</u>	<u>Activity</u>
December 1991 - January 1992	Researchers summarize FY 91 work accomplishments for technical committees. Committees develop guidance for FY 93 priority research/recovery activities.
February 1992	<p>Researchers present FY 91 study results and recommend future research/recovery activities at annual researcher's meeting.</p> <p>Implementation Committee approves FY 93 program guidance; request for FY 93 study proposals sent to researchers and interested parties.</p>
March 1992	Researchers and interested parties submit proposals for FY 93 new starts and modified ongoing projects to Chair of the Management Committee.
April 1992	Biology Committee subcommittees conduct technical review of proposals for FY 93 new starts and modified ongoing projects.
May 1992	<p>Biology Committee reviews proposals for new starts and modified ongoing projects.</p> <p>Researchers and interested parties submit proposals for FY 93 ongoing, on-track projects to Chair of the Management Committee.</p>
June 1992	<p>Biology Committee evaluates all FY 93 project proposals and develops recommended work plan.</p> <p>Water Acquisition and Information and Education Committees review proposals and develop recommended work plans.</p>
July 1992	Management Committee develops draft FY 93 Work Plan for Implementation Committee review and final approval.
August 1992	Recovery Implementation Committee reviews, changes as needed, and approves FY 93 Work Plan.
October 1992	Cooperators begin developing requests for proposals and contracts and implementing projects identified in the approved FY 93 Work Plan.
December 1992	Annual reports for FY 92 projects submitted to the technical committees for review. Process repeated for FY 94 Work Plan.

3. FY 93 BUDGET AND WORK PLAN

Table 2 on page 10 summarizes the Implementation Committee's recommended budget and work plan for FY 93. Appendix B provides a brief narrative description of each project.

The Recovery Program recommends a general guide for the distribution of funds among the five recovery elements and program management. The actual and recommended distribution are shown below.

<u>Recovery Element</u>	<u>FY 93 Amount</u>	<u>FY 93 % of Total</u>	<u>Original Recovery Program Recommended % Of Total</u>
Program Management	\$ 535,600	18.4	4.3
Habitat Management	1,156,300 ¹	39.7	43.5
Habitat Development	69,600	2.4	17.4
Stocking Native Fishes	420,000	14.4	10.6
Nonnative Fish/Sportfish ²	125,100	4.3	4.6
Research, Monitoring, Data Mgmt.	605,300	20.8	19.6
TOTAL	\$2,911,900³	100.0%	100.0%

Major areas of emphasis in the FY 93 Work Plan are:

a. Water rights acquisition:

Acquiring water rights and protecting instream flows in key river reaches continue to be high priorities in the Recovery Program, although they have proven difficult to achieve. A senior scientist was hired in FY 92 to review technical issues related to the Service's instream flow methodology and recommendations, and to develop an action plan and recommendations for resolving those issues by May 1993. Facilitated meetings were held in FY 92 among Recovery Program participants to identify and evaluate legal, policy, and institutional impediments to acquiring water in Colorado. A report and recommended course of action for addressing these impediments will be available in early FY 93.

A more proactive approach to acquiring water rights will be undertaken in FY 93. A water rights consultant will evaluate existing large water rights in light of Recovery Program criteria for acquisition, and the Recovery Program will then approach owners of rights which could be beneficial to the fish.

¹ Includes \$53,500 in Section 7 funds.

² Includes Recovery Program's information and education activities.

³ The total for this column is \$14,400 less than the total funding available in FY 93. The Management Committee will consult with the technical committees to determine how to allocate remaining funds.

b. Continuation of investigations on the operation of Flaming Gorge Dam:

Studies conducted on the operation of Flaming Gorge Dam on the Green River through FY 90 provided the basis for flow recommendations for spring, summer/fall, and winter periods. The follow up research period enters its third year in FY 93. Studies are being conducted using a cooperative, systems-oriented approach to test hypotheses and refine flow recommendations for the Green River, especially for the spring and winter periods, and to address potential effects of the recommended flows on nonnative fishes.

c. Investigations on the operation of the Aspinall Unit:

A 5-year, coordinated program to provide data for a biological opinion on operating the Aspinall Units on the Gunnison River for the benefit of the endangered fishes. The program enters its second year in FY 93. Test flows will be released from the Aspinall Units during the study to more closely mimic a natural hydrograph, allowing investigators to monitor fish and habitat response. A biological opinion will be issued in 1998 following completion of the studies.

d. Endangered fishes propagation and rearing and facility operation and development.

Implementation of the propagation and genetics management plan will continue in FY 93. Activities include continued development and maintenance of: refugia facilities and captive and back-up refugia populations of the endangered fishes. Genetics analysis of Colorado squawfish and razorback sucker also will be continued (sampling ended in FY 92 and final analyses are to be completed in FY 94). The Recovery Program also will evaluate the results of Colorado's hatchery feasibility study to determine the need for a major propagation and research facility in the Upper Colorado River Basin.

e. Flooded bottomland habitat surveys in the Upper Colorado River Basin.

The Service will conduct a study to identify important flooded bottomland habitats in the Upper Basin. Bottomland habitat adjacent to the Green and Colorado Rivers will be surveyed and prioritized for potential acquisition according to its perceived value for razorback sucker recovery.

f. Nonnative fish control.

Utah will conduct a study at the junction of the Duchesne and Green Rivers to document importance of nonnative fish predation and determine potential management strategies that could be used to enhance survival of native fishes. Nonnative predator species and size will be evaluated, as well as locations and times when predation is most prevalent. Mesh cages will be evaluated for their effectiveness in minimizing predation mortality.

g. Determination of sampling effects.

The effects of electrofishing and other sampling techniques on the endangered fishes are largely unknown. Studies of salmonid fishes have shown some negative effects from certain types of electrofishing. The Service will examine past collection records from the Upper Colorado River Basin to determine any differences in survival or growth of fishes initially caught via electrofishing versus those initially captured with other techniques.

h. Development of a bonytail chub reintroduction plan.

Utah will conduct studies to determine how to most effectively reintroduce bonytail chub in the upper basin and then will develop a reintroduction plan. Studies will evaluate the optimum size for stocking, the role of interactions between bonytails and nonnative fishes, and extensive culture of bonytails in raceways.

The FY 93 Work Plan also will emphasize completion or continuation of a variety of ongoing activities, most notably:

- a. The standardized monitoring and data management programs.
- b. An information and education program designed to increase the public's awareness and understanding of the rare fishes and the Recovery Program.
- c. Studies of migration, imprinting, olfaction, and chemoreception in Colorado squawfish and razorback suckers to determine reproductive strategies required for propagation and genetics management.
- d. Studies to clarify the taxonomy of species in the genus Gila (bonytail, humpback, and roundtail chubs). FY 93 efforts focus on genetic analyses of samples collected in previous years.
- e. A study of historical, but now unoccupied endangered fish habitat in the Colorado River between Palisade and Rifle, Colorado, which will yield data prerequisite to potential reintroduction of Colorado squawfish in this river reach.
- f. A study of status and population structure of Colorado squawfish (including those stocked in the early 1980's) in the Colorado River from its confluence with the Green River to Palisade, Colorado, and the Gunnison River from its confluence with the Colorado River to Delta, Colorado.
- g. A study of distribution and movements of Colorado squawfish in the White River in Colorado and Utah. Ultimately, a work plan will be developed summarizing the available ecological information on the White River and providing a biological assessment of its importance to endangered fishes.

- h. Evaluation and integration of results of activities related to identifying, quantifying, and refining recovery goals for the endangered fishes. (Funded outside the Recovery Program.)

4. WATER USER (SECTION 7) FUNDS

From 1981 until the signing of the Recovery Program in January 1988, the Service issued nearly 60 biological opinions on water-related projects under Section 7 of the Endangered Species Act. These opinions required project sponsors to pay into a conservation fund for the rare Colorado River fishes. This is collectively called the Section 7 fund.

Under the Recovery Program, water project proponents in the Upper Colorado River Basin who enter Section 7 consultation with the Service make a one-time contribution of \$10/acre-foot (adjusted annually for inflation) of a project's average annual depletion (see Section 5.3.4 of the Recovery Program). In FY 93 the depletion charge will be \$11.98/acre-foot. Under a June 1989 Cooperative Agreement, new Section 7 funds are contributed by project proponents directly to the National Fish and Wildlife Foundation (Foundation), a nonprofit group which holds the funds in an interest bearing account. The Foundation uses the funds, at the direction of the Service, to accomplish research and recovery activities for the endangered fishes in accordance with priorities recommended by the Implementation Committee.

In August 1989, the Implementation Committee adopted the position that Section 7 funds gained under the Recovery Program should be reserved for water rights acquisition and directly related activities (for example, yield analyses, appraisals, but specifically excluding development of flow recommendations). They also recommended that the Service reserve to the maximum extent possible existing Section 7 funds and new funds from pre-Recovery Program Section 7 consultations for water rights acquisition and related activities. The Implementation Committee's position was designed to generate the maximum amount of "private" revenues for matching congressional appropriations for water rights acquisition.

4.1. Funds status

From FY 81 to date, \$952,300 of Section 7 funds has been spent for Colorado River fishes recovery activities (\$718,000 was expended prior to July 1985). The estimated amount of Section 7 funds available as of October 1, 1992, is \$482,800. Of this amount, approximately \$137,300 is in the Foundation's interest bearing account, and the balance (\$345,500) is administered by the Service. Projected FY 93 expenditures (\$53,500) will result in an overall balance of \$429,300 in Section 7 funds.

4.2. Projects funded with Water User (Section 7) funds

Four projects totaling \$53,500 will be funded with Colorado River Section 7 funds in FY 93. These are:

- a. Services of a consultant to evaluate water rights offered to or sought by the Recovery Program (up to \$40,000).
- b. Operation and maintenance of the gage in the 15-Mile Reach (\$3,500).
- c. Identification and analysis of policy, legal, and institutional issues related to acquiring water and water rights for the endangered fishes (up to \$10,000).
- d. Senior scientist review of the Service's instream flow methodologies and flow recommendations (\$120,800, funded in FY 92).

5. CAPITAL FUNDS

The Recovery Program calls for a minimum of \$10 million to purchase water rights to establish instream flows for the endangered fishes and \$5 million for capital construction projects such as fish passage and hatcheries. In 1988, Congress appropriated \$1 million to Reclamation for acquiring water rights. These funds were subsequently transferred to the Service to administer. To date, \$10,000 was assessed for Service overhead, and \$29,500 has been spent to lease flows from Steamboat Lake for the Yampa River in 1991 and 1992.

The Recovery Program has recently approved several capital and water acquisition projects to facilitate recovery of the fish. Detailed work plans for these projects are being developed by the technical and Management committees. Funding to begin work on high priority projects in FY 93 will come from the Congressionally-appropriated Recovery Program water acquisition funds (\$200,000), Reclamation (\$418,000), the State of Colorado (\$100,000) and the Colorado River Water Conservation District (\$100,000). A time and cost schedule for capital funding projects is shown in Appendix C. Activities to be funded in FY 93 include:

a. Fish passage at Redlands Diversion Dam.

The Redlands Diversion Dam has prevented upstream fish passage on the Gunnison River since near the turn of the century. In FY 93, the Service and Reclamation will review designs and plan a fish ladder for the dam and work to resolve any problems a ladder might create for Redlands operation.

b. Fish passage at Price/Stubb Diversion Dam.

This 15-foot high dam, about 3 miles upstream of the upper end of the 15-Mile Reach, also has been a barrier to upstream fish passage since near the turn of the century. Although its function has been replaced by

the Government Highline Canal, Price/Stubb has been kept in place as a backup system. However, after 80 years of no use, it would not be practical to bring the dam back on-line. In FY 93, Reclamation will work with the owners of the dam to negotiate terms for passage and will analyze the effects of removing or modifying the dam.

c. Yampa River instream flow protection and water development.

As part of a proposal to transfer a portion of the Colorado River Water Conservation District's Juniper and Cross Mountain water rights to instream flow rights to benefit the endangered fishes, the potential enlargement of Elkhead Reservoir and rehabilitation of diversion structures on the Yampa and Little Snake Rivers are being evaluated. In FY 93, an analysis of the proposed enlargement will be conducted to refine project hydrology, reservoir sizing, geotechnical conditions, and to develop designs. Rehabilitation of Yampa River agricultural diversion structures to provide for fish passage will be included as part of the planning, NEPA, and design for the Elkhead enlargement. In FY 93, these structures will be inventoried, preliminary negotiations with landowners will begin, and appraisal-level cost estimates will be made.

d. Grand Valley water management.

Reclamation will quantify the amount of water used for canal administration in the Grand Valley and, through canal modeling, approximate the amount of water which could be conserved through canal automation and management to increase flows in the 15-Mile Reach.

e. Owens Creek.

Reclamation will conduct a study on development of a small reservoir on Owens Creek to provide water for the endangered fish in the 15-Mile Reach, domestic water supplies to West Divide and Ute Water Conservancy Districts, supplemental irrigation water to Battlement Mesa and West Divide Water Conservancy Districts, and other fish and wildlife benefits.

f. Silt operations.

Reclamation will study operations at Rifle Gap Reservoir to determine ways of maintaining higher pool levels during the summer recreation season. After Labor Day, the water could be sold to irrigators, used as augmentation water for the City of Rifle, or delivered to the 15-Mile Reach.

g. Habitat enhancement.

This project will include restoration of flooded bottomlands and backwaters, tamarisk control, and evaluation of the importance of tributary streams to endangered fishes. Potential sites to be enhanced will be screened in FY 93, culminating in eight recommended sites for restoration.

6. RECOMMENDATIONS

In approving the FY 93 Work Plan, the Implementation Committee made the following recommendations at its August 25, 1991, meeting:

- a. Costs for the Flaming Gorge and Aspinall "umbrella" studies should be contained, and not continue to increase beyond inflation each year.
- b. Acquiring additional funds for hatchery/refugia operation and maintenance must be made a very high priority, as the annual Recovery Program budget was never intended to support this activity, and the cost is increasing significantly each year. Members of the Recovery Program will work with Congress to obtain funds necessary to operate and maintain existing facilities.
- c. Section 7 funds should be used to initiate work to provide fish passage at Redlands (planning, design, and NEPA compliance).
- d. The Management and Biology Committees should develop a plan for providing facilities needed to implement the Recovery Program's Propagation and Genetics Management Plan by January 1993. The facility plan also should address the disposition of surplus hatchery fish.

TABLE 2. REVISED FY 93 WORK PLAN FOR THE COLORADO RIVER RECOVERY PROGRAM (\$ x 1000)

December 4, 1992

NUMBER	BIOL. COMM. NO.	COOPERATORS	TITLE	FY93 TOTAL	FUNDING TARGET					FUNDING SOURCE							FY 94 EST.	FY 95 EST.	FY 96 EST.		
					FWS	FWSOH	BR	CO	UT	FWS	S6CO	S6UT	BR	CO	UT	WY				H2O	
1	PMG/88--	M-1	UT	UTAH PROGRAM MANAGEMENT	55.1					55.1								55.1	55.1	55.1	
2	PMG/88--	M-2	BR	BUREAU PROGRAM MANAGEMENT	110.0			110.0					110.0					110.0	110.0	110.0	
3	PMG/88--	M-3	FWS	SERVICE PROGRAM MANAGEMENT	250.9	250.9					250.9							250.0	260.5	271.0	
4	PMG/88--	M-4	CO	COLORADO PROGRAM MANAGEMENT	119.6			119.6						119.6				124.3	129.3	134.5	
5	NNA/8995	E-1	CO/UT	INFORMATION & EDUCATION	89.6			88.4	1.2				60.7		1.2	27.7		100.0	100.0		
6	HMG/91--	S7-1	FWS	WATER RIGHTS ACQUISITION CONSULTANT	40.0	40.0											40.0	40.0			
7	HMG/90--	S7-2	FWS>CO	OP. & MAINT. OF 15-MILE REACH GAGE	3.5	3.5											3.5	3.5			
8	HMG/9293	S7-3	FWS	NONTECHNICAL INSTREAM FLOW ISSUES	10.0	10.0											10.0				
9	HMG/9293	S7-4	FWS	INSTREAM FLOW SENIOR SCIENTIST	0.0 ¹																
10	HMG/85--	H-1	FWS	GENERAL HYDROLOGY SUPPORT	90.6	77.0	13.6						90.6					77.0	77.0	77.0	
11	HMG/9295	O-1	CO	UPPER CR HABITAT SUITABILITY & DEV.	40.2			40.2			36.2			4.0				40.6			
12	HMG/8694	O-2	BR	SQUAWFISH YOY BACKWATER HABITAT	177.0			177.0					177.0					177.0			
13	HMG/8893	O-3	FWS/BR	COLORADO RIVER FLOW RECOMMENDATIONS	9.4	8.0	1.4						9.4								
14	HMG/9294	O-4	FWS/UT	SQUAWFISH IN THE WHITE RIVER	51.2	29.9	5.3		16.0				35.2		16.0			9.9			
15	RMD/89--	O-5	BR>LFL	LARVAL FISHES IDENTIFICATION	86.8			86.8					86.8					81.0			
16	RMD/9294	O-6	BR>LFL	LARVAL FISH COLLECTION MAINTENANCE	25.0			25.0					25.0					25.0			
17	RMD/8994	O-7	FWS	GILA TAXONOMY	263.0	72.0		191.0			72.0		191.0					258.0			
18	HMG/8696	OR-1	FWS/BR/LFL	5-YR FLAMING GORGE FLOW RECS.	410.6	91.0	16.1	116.0	187.5				410.6					410.3	426.7	443.8	
19	HMG/9296	OR-2	FWS	ASPINALL STUDIES	316.1	134.1	23.7	33.0	125.3		20.7	88.4	194.0	2.3	10.7			500.0	500.0	500.0	
20	HMG/90--	OR-3	FWS	GREEN & YAMPA CHANNEL MONITORING	17.7	15.0	2.7						17.7					25.0	25.0	25.0	
21	RMD/85--	OR-5	FWS/CO/UT	STANDARDIZED MONITORING PROGRAM	100.4	33.7	5.9	15.8	45.0		14.2	40.8	39.6	1.6	4.5			100.0	105.1	110.0	
22	RMD/85--	OR-6	FWS	DATABASE MANAGEMENT PROGRAM	32.9	28.0	4.9						32.9					30.8	33.0	33.0	
23	STK/89--	OR-7	FWS/BR	GENETICS MANAGEMENT	156.4	107.4	13.0	36.0			33.5		122.9					105.0			
24	STK/91--	OR-8	FWS	PROPAGATION & FACILITIES DEV.	219.0	219.0					219.0							380.4			
25	RMD/9100	OR-9	FWS/EMU/CSU	CHEMORECEPTION	86.4	41.8	7.4	37.2					86.4					93.7	93.7		
26	STK/9194	OR-10	FWS	ANAL. OF PREV. STOCKED CSF IN UCR	44.6	44.6					44.6							20.0			
27	HMD/9395	RNS-1	FWS	BOTTOMLAND SURVEY	69.6	59.2	10.4						69.6					98.4			
28	NNA/9395	RNS-2	UT	GR/DUCHESNE NONNATIVE CONTROL	20.5				20.5				20.5					40.0	40.0		
29	RMD/9395	RNS-3	FWS	EFFECTS OF ELECTROFISHING	10.8	1.5	0.3	9.0					10.8								
30	NNA/9394	U-3	UT	BTC REINTRO PLAN/NNA INTERACTIONS	15.0				15.0				15.0					99.5	50.0		
31	RMD/9293	FO-1	FWS	RECOVERY GOAL SYNTHESIS	0.0																
32	RMD/9294	NONE	BC	INTERIM RECOVERY OBJECTIVES DEV.	0.0																
					2921.9 ²	1266.6	104.7	788.0	297.0	465.6	620.0	71.1	128.9	1805.7	127.5	87.5	27.7	53.5	3254.5	2003.2	1759.4
----- CAPITAL FUNDING PROJECTS -----																					
33	CAP/9395	NONE	BR	REDLANDS FISH PASSAGE	64.0								64.0					128.0	928.0	0.0	
34	CAP/9397	NONE	BR	PRICE/STUBB FISH PASSAGE	24.0								24.0					0.0	0.0	48.0	
35	CAP/9300	NONE	CO	YAMPA FLOW PROTECTION & WATER DEV.	230.0								30.0	100.0		100.0		100.0	1550.0	1840.0	
36	CAP/9300	NONE	BR	GRAND VALLEY WATER MANAGEMENT	200.0						200.0							200.0	350.0	0.0	
37	CAP/9303	NONE	BR	OWENS CREEK	50.0								50.0					450.0	2250.0	1000.0	
38	CAP/9394	NONE	BR	SILT OPERATIONS	50.0								50.0					110.0	0.0	0.0	
39	CAP/9399	NONE	BR	HABITAT ENHANCEMENT	200.0								200.0					800.0	1300.0	2000.0	
					818.0						200.0		418.0	100.0		100.0		1788.0	6378.0	4888.0	

¹ FUNDING WAS ALLOCATED IN THE FY 92 BUDGET FOR FY 93 WORK ON THIS PROJECT.

² THE TOTAL FOR THIS COLUMN IS \$4,400 LESS THAN THE TOTAL FUNDING AVAILABLE IN FY 93. THE MANAGEMENT COMMITTEE WILL CONSULT WITH THE TECHNICAL COMMITTEES TO DETERMINE HOW TO ALLOCATE REMAINING FUNDS.

Explanation of Table 2

Column Title

Number: Reference number assigned to each project, and:

- general category (recovery element) of project from Table 5-1 of the Recovery Program:

PMG Program Management
HMG Habitat Management (defining and acquiring flows)
HMD Habitat Development (jetties, fish passage, etc.)
STK Stocking Native Fishes
NNA Nonnative Fish Control and Sportfishing Control
RMD Research, Monitoring, Data Management
CAP Capital funding projects

- beginning and ending years of the project.

Review

No.: Number assigned to proposal during review process.

Coop.: Agencies participating in the study. The agency with the lead in implementing/overseeing the project is listed first.

Title: Summary title of the project.

FY 93

Total: Total cost of the project for all funding sources. The total for this column at the bottom of Table 2 is \$14,400 less than the total funding available in FY 93. The Management Committee will consult with the technical committees to determine how to allocate remaining funds.

Funding Target: FY 93 cost of project, itemized by funding recipient. "FWSOH" is the 17.65 percent overhead charge applied to Reclamation funds transferred to the Service.

Funding Source: FY 93 cost to carry out the project itemized by proposed funding source. Section 7 funds and water user contributions are listed under "H20."

Following is the guidance issued by the Management Committee in February 1992, identifying high priority recovery activities for the FY 93 Work Plan.

TABLE 1. COLORADO RIVER FY 93 WORK PLAN GUIDANCE:
BIOLOGY-RELATED NEW STARTS

We are soliciting detailed proposals to conduct the following new activities in FY 93: (1) survey/evaluate/restore flooded bottomlands; (2) control nonnative fishes; and (3) minimize impacts of sampling on endangered fishes. These activities have been identified by managers and researchers as the areas of new emphasis most likely to provide opportunity for directly improving the status of one or more of the endangered fish in the upper basin. Proposed scopes-of-work relating to these projects are due to the Management Committee Chair (John Hamill) no later than March 31, 1992.

Detailed Descriptions

1. Survey/evaluate/restore flooded bottomlands

Historically, floodplains throughout the upper basin were inundated each year by spring runoff, but today much of the river is channelized by levees, dikes, rip-rap, and tamarisk. Numerous studies have suggested the importance of flooding to lotic systems and their associated fauna. Inundated floodplains may provide food, space, and cover; feeding, resting, and nursery areas; nutrients and increased productivity; warm, calm water; and refuge from predators and competitors. Restoration of flooded bottomland habitat is thought to be particularly important for razorback suckers.

A reconnaissance-level survey or inventory (primarily a review of existing information) is needed to determine the location of bottomlands along the Colorado, Yampa, lower Green, and Gunnison Rivers. Potential sites would be screened based on the feasibility of acquiring and restoring them and their ability to aid in recovering the endangered fishes. The final product would be a list of the most promising bottomland sites and specific recommendations for acquiring, restoring, and managing them.

2. Control nonnative fishes

Forty-two of the 55 fish species in the upper basin are nonnative. Several studies have been conducted to evaluate impacts of these nonnatives on the endangered fishes. Nonnative fishes (game and nongame species) are thought to compete with the native fishes for food and space, and to prey on their eggs and young. Colorado is expected to implement liberal catch limits this year to reduce northern pike numbers in the Yampa River. Additional active management is needed to control or eliminate nonnative fishes in areas of their greatest impact. A pilot study should be conducted to determine if nonnative fishes (especially those which may be limiting endangered fish recruitment) can be

————— APPENDIX A: FY 93 PROGRAM GUIDANCE —————

effectively controlled via flow, habitat manipulation, selected chemical control, and/or minimizing escapement of nonnatives from ponds and reservoirs in close proximity to occupied habitat.

3. Minimize impacts of sampling on endangered fishes

Concern is growing regarding the overall impact of sampling on the endangered fishes. A review of the literature related to the impacts of electrofishing is in progress and results should be available soon. Also, the Habitat and Life History Subcommittee is assessing the impacts of various sampling programs. A proposal is needed to develop and implement a program which will minimize sampling mortality and injury without sacrificing high-priority data collection.

TABLE 2. COLORADO RIVER FY 93 WORK PLAN GUIDANCE:
BIOLOGY-RELATED ONGOING PROJECTS THAT NEED TO BE RE-SCOPED FOR FY 93

The following projects are considered ongoing, but need to be re-scoped for FY 93. Revised scopes-of-work for these projects are due to the Management Committee Chair (John Hamill) no later than March 31, 1992.

Flaming Gorge Cooperative Studies (FWS/BR)
Aspinall Cooperative Studies (FWS)
Green and Yampa River Channel Monitoring (FWS)
Humpback Chub Surveys in Desolation and Gray Canyons (UT)
Interagency Standardized Monitoring Program (FWS)
Database Management (FWS)
Propagation/Genetics Management (FWS)
Colorado Squawfish Genetics (FWS)
Razorback Sucker Genetics (FWS)
Chemoreception (FWS)
Horsethief Operation and Maintenance (FWS)

**TABLE 3. COLORADO RIVER FY 93 WORK PLAN GUIDANCE:
BIOLOGY-RELATED ONGOING PROJECTS THAT ARE UNCHANGED AND ON TRACK**

The following ongoing projects appear on track and basically unchanged from last year. One-page summaries of these projects¹ are due to the Biology Committee Chair (Bob Williams) by March 31, 1992. Updated FY 93 scopes-of-work for these projects are due to the Management Committee Chair (John Hamill) no later than May 15, 1992.

Upper Colorado River Habitat Suitability (CO)
Colorado Squawfish Young-of-Year Backwater Habitat Mapping (BR)
Colorado River Flow Recommendations (FWS)
Hydrology Support (FWS)
Previously Stocked Colorado Squawfish in the Upper Colorado River (FWS)
Colorado Squawfish in the White River (UT/CO)
Larval Fish Identification (BR/LFL)
Larval Fish Collection Maintenance (BR/LFL)
Ouray Experimental Hatchery Operation and Maintenance (FWS)
Gila Taxonomy (FWS/Smithsonian)

**TABLE 4. COLORADO RIVER FY 93 WORK PLAN GUIDANCE:
WATER ACQUISITION, INFORMATION AND EDUCATION, AND PROGRAM MANAGEMENT PROJECTS**

Updated FY 93 scopes-of-work for the following projects are due to the Management Committee Chair (John Hamill) no later than May 15, 1992.

Maintenance of Flow Gages in the 15-Mile Reach
Water Rights Consultant Contract
Information and Education
Utah Program Management
Colorado Program Management
Reclamation Program Management
Service Program Management

Other projects related to water acquisition which may be conducted in FY 93 include:

Legal, Policy, and Institutional Issues Regarding Water Rights Acquisition
(May be continued in FY 93)
Yampa Basin Preferred Alternative Reservoir Site Feasibility Study (Funded outside the Recovery Program budget)
Investigation of Water Sources for the 15-Mile Reach (Expected to be funded outside the Recovery Program budget by Reclamation)
Analysis of Water Rights Associated with Passage on Gunnison River

¹ If not already submitted.

----- APPENDIX B: FY-93 PROJECT DESCRIPTIONS -----

Descriptions of the projects contained in the FY 93 Work Plan follow. Lead agency and total estimated cost of the project are shown in parentheses. A project's total "outyear cost" is shown after the project description. Outyear cost is the estimated funding needed from FY 94 through project completion. For Program Management and other ongoing projects, outyear cost represents annual cost.

More detailed descriptions of each project can be found in the Revised Scopes of Work for FY 93 Work Plan Activities available from the U.S. Fish and Wildlife Service, Colorado River Recovery Program, P.O. Box 25486, DFC, Denver, Colorado, 80225 (or contact Angela Kantola at 303/236-2985).

A. PROGRAM MANAGEMENT:

Program management supports the vital day-to-day involvement in the Program by the Service, Reclamation, Colorado, and Utah. Each has one or more full-time staff members coordinating Recovery Program activities within their agency (or agencies) and with other Program participants. Wyoming has chosen not to seek credit for program management. In FY 92, the Implementation Committee decided that future program management costs should be limited to 15 percent of the annual Recovery Program budget. As shown on page 2, program management totals 18.4 percent of the overall budget this year. However, much of Reclamation, Utah, and Colorado program management costs include technical supervision of individual projects. Since these costs cannot easily be separated out, they artificially inflate the cost program management. In light of above, the Implementation Committee accepted the FY 93 program management costs.

1. PMG88--: Utah Program Management (UT, \$55,100)

Costs associated with Utah's participation in technical committees and administration and oversight of studies sponsored/conducted by the State of Utah. Total outyear cost: \$55,100/year.

2. PMG88--: Bureau of Reclamation Program Management (BR, \$110,000)

Costs associated with administration and oversight of studies sponsored/conducted by the Bureau of Reclamation. Total outyear cost: \$110,000/year.

3. PMG88--: Fish and Wildlife Service Program Management (FWS, \$250,900)

Salary, travel, benefits, administrative support, and miscellaneous expenses of the Service Program Director and Assistant Program Director, and costs associated with Service participation in technical committees and administration of studies sponsored or conducted by the Service. Total outyear cost: \$250,000+/year.

----- APPENDIX B: FY-93 PROJECT DESCRIPTIONS -----

4. PMG88--: Colorado Program Management (CO, \$119,600)

Costs associated with administration and oversight of technical studies sponsored/conducted by the State of Colorado and Colorado's participation in technical Committees. Total outyear cost: \$119,600+/year.

B. INFORMATION AND EDUCATION:

5. NNA8995: Information and Education Program (CO, \$89,600¹)

A multi-faceted program to educate the public on the endangered fishes and the Recovery Program, increase public understanding and support for recovery, and promote communication and cooperation among Program participants. Emphasis in FY 93 will be placed on continuation and increased distribution of existing publications. Total outyear cost: \$100,000/year.

C. WATER ACQUISITION:

6. HMG91--: Water Acquisition Consultant (FWS, \$40,000)

Services of a consultant (used on an as-needed basis) for water rights appraisals and yield analyses of water rights offered to the Recovery Implementation Program. A 2-phase approach is used, consisting of: a) a reconnaissance-level evaluation of basic information about the right, its benefit to the Program, and a recommendation as to whether the Program should try to acquire the right; and b) upon Management Committee approval, an appraisal and detailed information necessary to pursue the conversion of the right to instream flows. Total outyear cost: up to \$40,000/year.

7. HMG90--: Operation and Maintenance of 15-Mile Reach gage (CO, \$3,500)

The U.S. Geologic Survey operates a gage to monitor flows in the 15-Mile Reach of the Colorado River between the Grand Valley diversions and the confluence of the Gunnison River. This gage is used to assure delivery and protection of water acquired for use in the 15-Mile Reach and to support additional studies to develop and refine instream flow recommendations. Total outyear cost: \$3,500/year.

¹ Actual cost may be lower if the Information and Education Coordinator position is not transferred to the Service to be full-time on the Recovery Program.

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8. HMG/9293: Nontechnical Instream Flow Issues (FWS, \$10,000)

Identification; evaluation; and resolution of policy, legal, and institutional issues related to acquiring water and water rights for the endangered fishes in Colorado. This project began in FY 92, and through a series of facilitated meetings, a number of issues have been identified and evaluated to some degree. Efforts to resolve these issues will continue in FY 93. Total outyear cost: \$0.

D. BIOLOGY:

9. HMG/9293: Instream Flow Senior Scientist (FWS, funded in FY 92)

A "senior scientist" has been hired to: review activities, methods, and knowledge related to quantifying instream flows for endangered fishes; identify technical issues related to instream flow activities and the Service's instream flow recommendations; and develop an action plan and recommendations for resolving the issues. Total outyear cost: \$0.

10. HMG/85--: General Hydrology Support (FWS, \$77,000)

Provides funding for hydrology support to the Program. Under this activity, the Service: collects and analyzes temperature data, maintains the stream network temperatures model and the HYDROSS hydrology model, assesses flow scenarios at sensitive habitat areas (including potentially flooded bottomlands) in the Upper Basin, and works with the Colorado Water Conservation Board on the delivery of Ruedi Reservoir releases and other water rights acquisition projects. Total outyear cost: \$77,000/year.

11. HMG/9295: Upper Colorado River Habitat Suitability and Development (CO, \$40,200).

A study of historical, but now unoccupied endangered fish habitat in the Colorado River between Palisade and Rifle, Colorado. Objectives are to: 1) quantify and assess habitat availability for all life stages of Colorado squawfish and razorback sucker (assess seasonally available habitat, characterize existing fish community, locate potentially suitable spawning sites); 2) assess results of Service's genetic analyses with regard to potential reintroduction and augmentation in this river reach; and 3) develop draft plan for reintroduction and augmentation. Total outyear cost: \$110,900.

12. HMG/8694: Colorado Squawfish Young-of-the-Year Backwater Habitat Availability Investigation (BR, \$177,000)

Study to assess the availability of critical habitats at different flows and locations (Colorado, Gunnison, and Green Rivers) in the Upper

————— APPENDIX B: FY-93 PROJECT DESCRIPTIONS —————

Colorado River Basin using video imagery and the Map Image Processing System (MIPS). Information is correlated with biological collections and used in making flow recommendations and serves as historical database of annual river conditions. Total outyear cost: depends on continuation of video collection for ISMP.

13. HMG/8893: Colorado River Flow Recommendations and Quantification (FWS \$8,000)

Final year to complete analysis and write report on a study to develop and refine empirical, incremental relationships between the quantity of Colorado squawfish habitat and stream flow in the Grand Valley section of the Colorado River (year-round). Habitat versus flow relationships will be developed using video imagery and other habitat measurements. Results will be synthesized with previous flow recommendations and habitat requirements data. Total outyear cost: \$0.

14. HMG/9294: Assessment of Colorado Squawfish in the White River (FWS, \$45,900)

Study of distribution and movements of Colorado squawfish and their seasonal habitat use in the White River in Colorado and Utah to determine: a) presence, abundance, growth, and habitat use of hatchery-reared squawfish previously stocked into Kenney Reservoir that migrated downstream into the White River; b) annual abundance, composition, movements, and home range of adult squawfish congregating below Kenney Reservoir; c) seasonal availability and use of squawfish habitat; and d) changes in composition, relative abundance, and distribution of native and nonnative fishes below Kenney Reservoir. Utah will develop a work plan summarizing the available ecological information on the White River, providing a biological assessment of its importance to endangered fishes and outlining research needs. Total outyear cost: \$9,900.

15. RMD/89--: Larval Fishes Identification (BR, \$86,800)

Contract issued to the Larval Fishes Laboratory in Fort Collins, Colorado, to identify larval fishes collected as part of the interagency standardized monitoring program and Aspinall studies. Total outyear cost: dependent on larval fish collected in other studies, but probably \$86,800 in FY 94.

16. RMD/9294: Larval Fish Collection Maintenance (BR, \$25,000)

Catalog, reorganize, and upgrade maintenance of Upper Colorado River Basin larval and small fish collections to establish the holdings as a long-term collection. Total outyear cost: \$25,000.

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17. RMD/8994: Gila Taxonomy Study (FWS, \$263,000)

Recovery of the humpback chub (Gila cypha) and bonytail chub (Gila elegans) has been confounded by uncertainty about the taxonomy of species in the genus Gila (bonytail, humpback, and roundtail chubs). In FY 89, the Smithsonian Institution was contracted to review existing information and activities related to Gila, develop a data collection and sampling protocol and a detailed work plan of study needs. FY 93 efforts focus genetic analyses of wild Gila samples and completion of Mexico sampling. Total outyear cost: \$258,000.

18. HMG8696: 5-Year Flaming Gorge Flow Recommendations (BR/FWS, \$394,500).
Total outyear cost: \$1,280,800

Studies conducted on the operation of Flaming Gorge Dam on the Green River through FY 90 provided the basis for flow recommendations for spring, summer/fall, and winter, and a subsequent Biological Opinion. Follow-up research was begun in FY 91 as a cooperative, systems-oriented approach to test hypotheses and refine flow recommendations (especially for the spring and winter periods), and to address potential effects of the recommended flows on the nonnative fish community. Specific studies are:

1. Squawfish Reproduction and Larval Abundance UT/LFL \$ 70,000

Annual assessment of squawfish reproduction and larval abundance in the lower Yampa River and the lower Green River. Timing and duration of spawning to be documented as measured by capture of drifting larvae. Objectives are to determine peaks in abundance of drifting larvae and relative abundance of larvae transported from two spawning locations and into downstream nursery areas.

2. Squawfish Nursery Habitat Availability UT \$ 72,000

Intensive sampling of two reaches in ISMP sampling areas in the upper and lower Green River to determine relationship between: a) squawfish nursery habitat availability and formation and the recommended flow releases and b) nursery habitat availability and habitat use. Nursery areas will be seined and biological and physical (geomorphological features, temperature, etc.) habitat characteristics measured. Data will be compared to ISMP data to assess ways of refining ISMP and making better use of ISMP data. Utility of videoimagery as predictor of squawfish year class strength will be tested.

3. Razorback Egg and Larval Production FWS/LFL \$ 25,000

Eggs and larvae will be collected on suspected spawning bars in lower Yampa River and Green River to determine if razorback suckers

APPENDIX B: FY-93 PROJECT DESCRIPTIONS

lay eggs and if larvae are produced there. Continuation of study will be evaluated on a year-by-year basis.

4. Methods to Determine Squawfish Recruitment FWS \$ 13,000

Test innovative marking techniques for age-0 and age-1 Colorado squawfish and conduct field experiments to determine effectiveness of mark/recapture techniques for estimating populations of young squawfish.

5. Overwinter Survival UT \$ 26,500

Spring sampling as follow-up to fall ISMP sampling to evaluate squawfish overwinter survival and movement and assess year class strength. Methods may change if new marking techniques become available as a result of Study #4.

6. Analysis of Past Collections LFL \$ 5,000

Identification of young razorback suckers and humpback chub in past collections of young fishes from Green River systems (using recently acquired diagnostic techniques) to allow comparison of reproductive/recruitment success and environmental conditions.

7. Use/Availability of Spring Habitats FWS \$ 37,000

Determination of relationships among habitat availability and habitat accessibility and use by fish in seasonally flooded bottomlands in the Upper Green River.

8. Nonnative Fish Management UT/LFL \$ 54,000

Identification of factors limiting distribution and abundance of nonsalmonid, nonnative fishes, evaluation of potential impact of northern pike on young squawfish in Utah, and identification of potential nonnative fish management strategies.

9. Early Biology Studies LFL \$ 68,000

Field and laboratory investigation of effects of flow, temperature, and other environmental variables on the early life biology.

10. Fish Predation in Backwaters FWS \$ 4,000

Completion of study to determine if competitive interactions between native and introduced fishes is a significant factor contributing to the decline of endangered fishes. Examines fish competition by examining fish predation on benthic and planktonic organisms in Colorado squawfish nursery habitats.

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11. Wetland Restoration/Demonstration Project FWS \$ 20,000

Completion of report evaluating design and operation of Old Charley Wash flooded bottomland project and recommending future operation and opportunities for study.

19. HMG/9296: Aspinall Unit Studies (FWS, \$282,400)

A 5-year, cooperative, systems-oriented approach to provide data for a biological opinion on the operations of the Aspinall Unit dams on the Gunnison River for the benefit of the endangered fishes. Studies are intended to evaluate the biological and physical responses of the Gunnison and Colorado River ecosystems to seasonal test flows from the Aspinall Units. Specific studies include:

A. Gunnison River Ichthyofaunal Survey FWS \$ 47,600

A survey of the Gunnison River between Delta, Colorado, and the Redlands Diversion Dam (using techniques that allow comparison with previous studies). Survival of age-0, hatchery-reared Colorado squawfish stocked in the Gunnison River in 1984 will be assessed. Any squawfish collected (up to 10) will be radio-tagged.

B. Flow Effects on Larval Squawfish Production UT/CO \$ 68,000

Assessment of Colorado squawfish reproduction using drift-net sampling at six sites in the Colorado River to document spawning, determine peaks in relative abundance of drifting larvae, and determine relative abundance of larvae transported into nursery habitats. Larval squawfish numbers also will be compared with ISMP data to assess survival of young Colorado squawfish.

C. Flow Effects on Nursery Habitat Availability UT/FWS \$ 60,000

Evaluation of effect of Gunnison River flow manipulation on availability and quality of nursery habitat for Colorado squawfish in the Colorado River. Two sites within ISMP study sections will be intensively sampled in July and September. Physical and biological habitat characteristics will be measured at each backwater. Quality and quantity of backwaters will be related to streamflow characteristics.

D. Flow Effects on Young-of-the-Year Squawfish FWS/UT \$ 49,800

Evaluation of the relationship between flows and the relative abundance of young Colorado squawfish and sympatric species having important negative effects on Colorado squawfish.

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E. Humpback Chub in Westwater Canyon UT \$ 37,000

Monitoring of young humpback chub to assess recruitment and its relation to river hydrology and temperature.

F. Gunnison River Habitat Quantification FWS/BR \$ 20,000

Aerial videography and ground-truthing will be used to describe available habitats in the Gunnison River and their relationship to streamflow (particularly the relationship of flooded, quiet water areas to peak discharge). Areas which may be appropriate for habitat improvement projects will be identified.

20. HMG/90--: Channel Monitoring (FWS, \$15,000)

Implementation of long-term channel monitoring program following a 3-year pilot study. Program will monitor long-term channel change (river depth, shape, number of backwaters, etc.) brought on by altered flow and sediment regimes. Tasks for FY 93 include: 1) establishment of a channel monitoring site at Razorback Bar on the Green River; 2) review of data from old files and photographs; and 3) recommendations for a library and archiving system. Total outyear cost: \$25,000/year.

21. RMD003/85--: Standardized Monitoring Program (FWS, \$94,500)

Populations of the endangered fishes are monitored to determine their status and trends and to develop population indices necessary to determine the efficacy of management programs and progress toward species recovery. Available backwater habitat also is monitored during fall using aerial video. Total outyear cost: \$100,000/year.

22. RMD/85--: Database Management (FWS, \$28,000)

Recovery and delisting of the endangered Colorado River fishes require a thorough understanding of the interrelationships of the fishes and their environments. Those relationships can be understood through extensive analyses of data. Data are maintained in computerized form, to facilitate analysis. Specific tasks include: maintaining database, summarizing data, providing annual listing of files, and providing annual listing of all PIT-tagged fish. Total outyear cost: \$30,800/year.

23. STK/89--: Genetics Management (FWS, \$143,400)

Development, revision, and coordination of the Recovery Program's Propagation/Genetics Management Plan. Analysis of razorback sucker and Colorado squawfish genetic samples (preliminary analysis complete in FY 93, final analysis and report to be completed in FY 94). Total outyear cost: \$105,000/year.

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24. STK/91--: Propagation and Facilities Development (FWS, \$219,000)

(Budget cut significantly, Service hopes to provide additional funds necessary to operate facilities.) Development of facilities, personnel, technology, techniques, and equipment needed to implement the genetics management plan and artificial propagation activities for upper basin recovery efforts. Operation and management of propagation facilities, including:

- a. Ouray endangered fish hatchery/research facility (development, staffing, operation)
 - 1) Refuge populations (wild adults)
 - Razorback sucker, San Juan River arm of Lake Powell (maintain 8 [5♂, 3♀] 1990 & 91 adults, capture additional adults if ponds ready)
 - Razorback sucker, Colorado River arm of Lake Powell (maintain 6 [4♂, 2♀] 1990 & 91 adults, capture additional adults if ponds ready)
 - Razorback sucker, Echo Park on the Yampa River (maintain 1 1992 adult, capture additional adults if ponds ready)
 - Razorback sucker, Razorback Bar on the Green River (capture additional adults if ponds ready [previously captured adults have been returned to the wild])
 - 2) Back-up refuge populations (hatch, rear, and maintain first generation offspring from wild adults)
 - Razorback sucker, San Juan River arm of Lake Powell (maintain representative sample from paired matings [currently 11 lots containing about 4,500 fish total])
 - Razorback sucker, Colorado River arm of Lake Powell (maintain representative sample from paired matings [currently 4 lots containing about 1,000 fish total])
 - Razorback sucker, Echo Park on the Yampa River (hatch and rear if additional ripe adults caught and spawned)
 - Razorback sucker, Razorback Bar on the Green River (maintain about 1,500 F1's from wild-caught, streamside spawned adults)
 - 3) Broodstock (first generation offspring from wild adults, may be the same fish as back-up refuge populations, depending on intent for their use)
 - Razorback sucker, Colorado River arm of Lake Powell (Potentially move fish (preferably PIT or batch-tagged) from each paired mating at Ouray to Horsethief ponds. Rear to radiotag size at Horsethief and experimentally stock into upper mainstem Colorado River according to augmentation plan.)

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- b. Horsethief State Wildlife Area endangered fish ponds. Development, staffing, operation, and monitoring water quality, measuring effects of different stocking rates on growth and survival, comparing performance of fish reared on forage versus artificial diets, and evaluating problems associated with pumping nontarget fish from the river into holding ponds.
- 1) Colorado squawfish - first generation offspring of wild adults from upper mainstem Colorado River which were spawned at Dexter and hatched and reared at Bellvue. PIT-tag and stock in Horsethief ponds.
 - 2) Razorback sucker - first generation offspring of wild adults from upper mainstem Colorado River (only 3 remaining, more will need to be captured, if possible, and spawned at Dexter or Wray). These would be PIT or batch-tagged and reared in Horsethief refuge ponds. Potentially, could take F1 Colorado River arm of Lake Powell razorback suckers (PIT or batch-tagged) from each paired mating at Ouray to Horsethief ponds. Rear some to radiotag size at Horsethief and experimentally stock into upper mainstem Colorado River according to augmentation plan.
 - 3) Humpback chub - first generation offspring from upper mainstem Colorado River adults and spawned at Dexter or elsewhere. PIT-tag and transport to Horsethief.
 - 4) Bonytail chub - from wild Lake Mohave adults. PIT-tag and transport from Arizona to Horsethief.

Some of these activities may have to be cut or delayed due to budget cuts. Total outyear cost: \$380,000/year.

25. RMD/9100: Colorado Squawfish and Razorback Sucker Chemoreception, Imprinting, and Propagation (FWS, \$79,000)

A study of migration, imprinting, olfaction, and chemoreception in Colorado squawfish and razorback sucker to determine reproductive strategies required for propagation and genetics management. Goals are to: a) determine how these fishes find suitable spawning areas and to determine the role of olfaction in habitat selection; b) identify the roles of imprinting, learning, and genetic control on reproductive cycles; and c) explore how new populations of squawfish may be established using innate behavioral mechanisms. Proposed FY 93 activities include: a) continue to rear experimental fish (control and imprinted to synthetic chemicals) at Ouray (3 groups of razorback suckers) and Dexter (3 groups of Lake Mojave razorback suckers and 2 groups of Colorado squawfish); b) conduct controlled field study of 1991 razorbacks at Ouray to determine if they are imprinted to synthetic chemicals, construct experimental channels at Ouray site

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(Leota Ponds); and c) incubate razorback sucker eggs at a selected site in the upper Colorado River drainage, at swim-up transfer fry to Dexter for rearing. However, some of these activities may have to be delayed, as the proposed budget was cut from \$110,000 to \$79,000. Total outyear cost: \$94,000/year in FY 94 and 95; no budget projections made beyond FY 95.

26. STK/9194: Analysis of Previously Stocked Colorado Squawfish in the Upper Colorado River (FWS, \$44,600)

Study to determine the status and population structure of Colorado squawfish (including those stocked in the early 1980's) in the Colorado River from its confluence with the Green River to Palisade, Colorado, and the Gunnison River from its confluence with the Colorado River to Delta, Colorado. An additional year of data is being collected in order to develop a population size estimate of adult squawfish in the upper Colorado River using state of the art open-population mark and recapture techniques. These methodologies will be evaluated for possible incorporation into the ISMP. Total outyear cost: \$20,000.

27. HMD/9395: UCRB Bottomland Survey (FWS, \$59,200)

Study to identify, categorize, and prioritize Upper Colorado River Basin flooded bottomland habitats. Objectives include: a) identify bottomlands adjacent to UCRB mainstem rivers representing potential razorback sucker habitat; b) classify bottomlands according to potential value for razorback sucker recovery; and c) rank mainstem bottomlands by their perceived value to razorback sucker recovery. Total outyear cost: \$98,400.

28. NNA/9395: Green/Duchesne River Nonnative Fish Control (UT, \$20,500)

Study to document importance and possible management strategies that might be used to enhance survivorship of native fishes (particularly juvenile squawfish). Study will evaluate species and sizes of most important predators (e.g. smallmouth bass, channel catfish, and green sunfish) and areas and times where predation by nonnative fishes is most important. Predator excluder devices (mesh cages) will be evaluated for their effectiveness in minimizing predation mortality. Total outyear cost: \$80,000.

29. RMD/9393: Effects of Electrofishing (FWS, \$10,500)

Examination of past collection records to determine if endangered fish initially captured via electrofishing are recaptured at a significantly lower rate than those initially captured with other techniques or if these fish have a reduced growth rate compared with other fishes. Total outyear cost: \$0.

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30. NNA/9394: Bonytail Reintroduction Plan/Nonnative Interactions (UT, \$15,000)

Determine how to best address reintroduction of bonytail chub into Upper Colorado River. Objectives include: a) develop reintroduction plan; b) determine optimum size for stocking; c) evaluate role of nonnative/bonytail interactions on successful bonytail stocking; and d) evaluate role of bonytail chub extensively cultured in raceways in successful stocking program. Total outyear cost: \$149,500.

31. RMD/9293: Synthesis of Results of Recovery Goals Activities (FWS, outside funding)

Evaluation and integration of results of activities related to identification, quantification, and refinement of recovery goals. Recovery goals activities/products to be evaluated include: recovery plans, critical habitat definitions, Long Range Plan, population viability analysis, interim recovery (management) objectives, genetics studies, ISMP, and status and trends. A status report will be provided at each Biology Committee meeting.

32. RMD/9294: Interim Recovery Objectives Development (Biology Committee)

The Biology Committee will expand and refine the interim recovery objectives drafted by Colorado. The objectives will specifically reflect desired biological responses (in terms of population parameters) to recovery efforts. (The Management Committee's Recovery Milestones will outline how the Recovery Program plans to achieve those responses.) The Committee will gather, analyze, and incorporate the additional biological data necessary to develop desired population parameters for each presumptive population of the four endangered fishes.

E. CAPITAL FUNDING INITIATIVES:

33. CAP/9395: Fish passage at Redlands Diversion Dam (BR, \$64,000)

The Redlands Diversion Dam has prevented upstream fish passage on the Gunnison River since near the turn of the century. In FY 93, the Service and Reclamation will review designs and plan a fish ladder for the dam and work to resolve any problems a ladder might create for Redlands operation. Total outyear cost: \$1,056,000.

34. CAP/9397: Fish passage at Price/Stubb Diversion Dam (BR, \$24,000)

This 15-foot high dam, about 3 miles upstream of the upper end of the 15-Mile Reach, also has been a barrier to upstream fish passage since near the turn of the century. It was originally used to divert water to a hydraulic pumping plant to pump irrigation water to the Palisade

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and Mesa County Irrigation Districts. That water is now delivered through the Government Highline Canal, but Price/Stubb has been kept in place as a backup system. However, after 80 years of no use, the hydraulic pumps have been removed and the intake canal filled, so it would not be practical to bring the dam back on-line. In FY 93, Reclamation will work with the owners of the dam to negotiate terms for passage and will analyze the effects of removing or modifying the dam. Total outyear cost: \$396,000.

35. CAP/9300: Yampa River Instream Flow Protection and Water Development (CO, CRWCD, \$200,000)

As part of a proposal to transfer a portion of the Colorado River Water Conservation District's Juniper and Cross Mountain water rights to instream flow rights to benefit the endangered fishes, the potential enlargement of Elkhead Reservoir and rehabilitation of diversion structures on the Yampa and Little Snake Rivers are being evaluated. In FY 93, an analysis of the proposed enlargement will be conducted to refine project hydrology, reservoir sizing, geotechnical conditions, and to develop designs. Rehabilitation of Yampa River agricultural diversion structures to provide for fish passage will be included as part of the planning, NEPA, and design for the Elkhead enlargement. In FY 93, the diversion structures will be inventoried, preliminary negotiations with landowners will begin, and appraisal-level cost estimates will be made. FY 93 costs for these projects will be borne by the Colorado River Water Conservation District and the State of Colorado. Other Recovery Program participants will need to take a position on Elkhead enlargement before Recovery Program funds will be spent on that project. Total outyear cost: \$25,765,000.

36. CAP/9300: Grand Valley Water Management (BR, \$200,000)

Reclamation will quantify the amount of water used for canal administration in the Grand Valley and, through canal modeling, approximate the amount of water which could be conserved through canal automation and management to increase flows in the 15-Mile Reach. A portion of the water which can be conserved through canal management can be delivered to the 15-Mile Reach within existing water rights and under existing Colorado water law. Legal barriers do exist which would prevent maximizing the use of water conserved through management for delivery to the 15-Mile Reach. Total outyear cost: \$6,800,000.

37. CAP/9303: Owens Creek (BR, \$50,000)

Reclamation will conduct a study on development of a small reservoir on Owens Creek to provide water for the endangered fish in the 15-Mile Reach, domestic water supplies to West Divide and Ute Water Conservancy Districts, supplemental irrigation water to Battlement Mesa and West Divide Water Conservancy Districts, and other fish and wildlife benefits. Up to 7,000 af of the 25,000 af reservoir would be assigned

----- APPENDIX B: FY-93 PROJECT DESCRIPTIONS -----

to the Recovery Program and possibly more could be allocated to the Recovery Program over a short term. Total outyear cost: \$37,450,000.

38. CAP/9394: Silt Operations (BR, \$50,000)

Reclamation will study operations at Rifle Gap Reservoir to determine ways of maintaining higher pool levels during the summer recreation season. The study concept is to reduce or delay releases from Rifle Gap by providing water to irrigated lands by pumping from the Colorado River. This water could be diverted under existing water rights, existing contract deliveries from Green Mountain Reservoir, or by purchasing water from Ruedi Reservoir. After Labor Day, the water could be sold to irrigators, used as augmentation water for the City of Rifle, or delivered to the 15-Mile Reach. Total outyear cost: \$110,000.

39. CAP/9399: Habitat Enhancement (BR, \$230,000)

This project will include restoration of flooded bottomlands and backwaters, tamarisk control, and evaluation of the importance of tributary streams to endangered fishes. Potential sites to be enhanced will be screened in FY 93, culminating in 8 recommended sites for restoration. Total outyear cost: \$11,020,000

02-Oct-92 Improvement	1993			1994			1995			Balance to complete	1996	1997	1998	1999	2000	2001	2002	2003
	USBR GI	FIP	Others	USBR GI	FIP	Others	USBR GI	FIP	Others									
1. Restoration of fish passage to historical habitat in the Gunnison and Colorado Rivers.																		
a. Redlands Passage - Gunnison River near Grand Junction																		
Noncontract	(320,000)																	
Plan/Feasibility	64,000	64,000		64,000														
NEPA/Permitting	80,000	80,000					80,000											
Design	48,000	48,000					48,000											
CES	128,000	128,000							128,000									
Construct	800,000	800,000							800,000									
Total	1,120,000																	
b. Price/Stubbs Passage - Colorado River near Palsade																		
Noncontract	(120,000)																	
Plan/Feasibility	24,000	24,000		24,000														
NEPA/Permitting	30,000	30,000								30,000	30,000							
Design	18,000	18,000								18,000	18,000							
CES	48,000	48,000								48,000	48,000	48,000						
Construct	300,000	300,000								300,000	300,000	300,000						
Total	420,000																	
c. Cameo Passage - Colorado River near Debeque																		
Noncontract	(400,000)																	
Plan/Feasibility	80,000	80,000								80,000	40,000	40,000						
NEPA/Permitting	100,000	100,000								100,000	60,000	60,000	40,000					
Design	60,000	60,000								60,000	60,000	60,000	60,000					
CES	160,000	160,000								160,000				160,000				
Construct	1,000,000	1,000,000								1,000,000				1,000,000				
Total	1,400,000																	
2. Yampa River instream flow protection and water development																		
a. Elkhead Enlargement																		
Noncontract	(5,865,000)																	
Plan/Feasibility	340,000	340,000		170,000	85,000			85,000										
NEPA/Permitting	2,000,000	2,000,000						1,100,000		900,000	900,000							
Design	1,125,000	1,125,000						150,000		975,000	500,000	475,000						
CES	2,400,000	2,400,000								2,400,000			800,000	800,000	800,000			
Construct	15,000,000	15,000,000								15,000,000			5,000,000	5,000,000	5,000,000			
Environmental mitiga	1,500,000	1,500,000								1,500,000				1,000,000	500,000			
Total	22,365,000																	
b. Yampa River Structures - passage along the Yampa from Hayden to Dinosaur																		
Noncontract	(1,350,000)																	
Plan/Feasibility	300,000	300,000		30,000	15,000			15,000	150,000	90,000	90,000							
NEPA/Permitting	200,000	200,000							50,000	150,000	150,000							
Design	400,000	400,000								400,000	200,000	200,000						
CES	450,000	450,000								450,000			140,000	170,000	140,000			
Construct	2,250,000	2,250,000								2,250,000			700,000	850,000	700,000			
Total	3,600,000																	
3. Water Acquisition and development for the 15-Mile Reach																		
a. Grand Valley Water Management																		
Noncontract	(2,000,000)																	
Plan/Feasibility	400,000	400,000		200,000	200,000													
NEPA/Permitting	500,000	500,000						350,000		150,000	150,000							
Design	300,000	300,000								300,000	100,000	200,000						
CES	800,000	800,000								800,000			400,000	400,000				
Construct	5,000,000	5,000,000								5,000,000			2,500,000	2,500,000				
Total	7,000,000																	

02-Oct-02 Improvement	1993			1994			1995			Balance to complete	1996	1997	1998	1999	2000	2001	2002	2003
	USBR GI	FIP	Others	USBR GI	FIP	Others	USBR GI	FIP	Others									
b. Owens Creek																		
Noncontract	(10,000,000)																	
Plan/Feasibility	2,000,000	2,000,000	50,000		450,000			1,500,000										
NEPA/Permitting	2,500,000	2,500,000						750,000		1,750,000	1,000,000	750,000						
Design	1,500,000	1,500,000								1,500,000		750,000	750,000					
CES	4,000,000	4,000,000								4,000,000				800,000	800,000	800,000	800,000	800,000
Construct	25,000,000	25,000,000								25,000,000				5,000,000	5,000,000	5,000,000	5,000,000	5,000,000
Wildlife mitigation	2,500,000	2,500,000								2,500,000					625,000	625,000	625,000	625,000
Total	37,500,000																	
c. Collbran Operations																		
Noncontract																		
Plan	30,000	30,000			30,000													
NEPA/Permitting	10,000	10,000						10,000										
O&M Contract	100,000	100,000								100,000	100,000							
Operate																		
d. Silt Operations																		
Noncontract																		
Plan	50,000	50,000	50,000															
NEPA/Permitting	35,000	35,000			35,000													
O&M Contract	75,000	75,000			75,000													
Operate																		
Total	180,000																	
4. Habitat Restoration																		
Identification and restoration																		
Noncontract																		
Plan/NEPA	1,750,000	1,750,000	230,000		400,000			500,000		620,000	500,000	120,000						
Contract																		
Restoration	9,500,000	9,500,000			400,000			800,000		8,300,000	1,500,000	2,300,000	2,250,000	2,250,000				
Total	11,250,000																	
5. Endangered Fish Hatchery																		
Noncontract	(3,400,000)																	
Plan/Feasibility	200,000	200,000			200,000													
NEPA/Permitting	1,000,000	1,000,000						1,000,000										
Design	600,000	600,000								600,000	600,000							
CES	1,600,000	1,600,000								1,600,000		800,000	800,000					
Construct	10,000,000	10,000,000								10,000,000		5,000,000	5,000,000					
Total	13,400,000																	
CONTRACT	72,850,000	72,850,000			400,000			1,600,000		70,850,000	1,500,000	7,600,000	12,950,000	17,800,000	14,325,000	5,625,000	5,625,000	5,625,000
NONCONTRACT	25,505,000	25,505,000	618,000	200,000	100,000	1,518,000		100,000	5,688,000	17,281,000	4,128,000	3,493,000	2,790,000	2,330,000	2,140,000	800,000	800,000	800,000
TOTAL	98,355,000	98,355,000	618,000	200,000	100,000	1,918,000		100,000	7,288,000	88,036,000	5,628,000	11,093,000	15,740,000	19,930,000	16,465,000	6,425,000	6,425,000	6,425,000