

## **PREFACE**

This document was originally finalized on October 15, 1993. Part One received a minor revision on March 8, 2000, to accommodate programmatic biological opinions. Part Two has been revised to accommodate annual updates, designation of critical habitat for the endangered fishes, and development of specific recovery goals for each of the species.

**PART ONE:** Section 7 Consultation, Sufficient Progress, and Historic Projects Agreement

Sections 4.1.5, 4.1.6, and 5.3.4 of the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program) outline procedures for consultation pursuant to Section 7 of the Endangered Species Act on water projects in the Upper Colorado River Basin. The Section 7 Agreement (including Section 7 Consultation, Sufficient Progress, and Historic Projects Agreement) was developed by Recovery Program participants to clarify how Section 7 consultations will be conducted on water depletion impacts related to new projects and impacts associated with historic projects (existing projects requiring a new Federal action) in the Upper Basin.

**PART TWO:** Recovery Implementation Program Recovery Action Plan

The Recovery Implementation Program Recovery Action Plan (RIPRAP) was developed by the Recovery Program participants in support of the Section 7 Agreement using the best, most current information available and the recovery goals for the four endangered fish species. It identifies specific actions and time frames currently believed to be required to recover the endangered fishes in the most expeditious manner in the Upper Basin. The RIPRAP is the Recovery Program's long range plan. It contains dates for accomplishing specific actions over the next 5 years and beyond. The RIPRAP will serve as a measure of accomplishment so that the Recovery Program can continue to serve as a reasonable and prudent alternative for projects undergoing Section 7 consultation to avoid the likelihood of jeopardy to the continued existence of the endangered fishes as well as to avoid the likely destruction or adverse modification of critical habitat.

PART ONE:

RECOVERY IMPLEMENTATION PROGRAM  
SECTION 7 CONSULTATION, SUFFICIENT PROGRESS,  
AND HISTORIC PROJECTS AGREEMENT

## Agreement

### Section 7 Consultation, Sufficient Progress, and Historic Projects

#### Recovery Implementation Program for the Endangered Fish Species in the Upper Colorado River Basin

October 15, 1993

*Revised March 8, 2000*

#### I. Background

The Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (RIP) is intended to go considerably beyond offsetting water depletion impacts by providing for the full recovery of the four endangered fishes. The RIP participants recognize that timely progress toward recovery in accordance with a well-defined action plan is essential to the purposes of the RIP, including both the recovery of the endangered fishes and providing for water development to proceed in compliance with State law, Interstate Compacts, and the Endangered Species Act (ESA). Recovery activities which result in significant protection and improvement of the endangered fish populations and their habitat need to receive high priority in future planning, budgeting, and decision making. The RIP participants accept that certain positive population responses to RIP initiatives are not likely to be measurable for many years due to the time required for the endangered fishes to reach reproductive maturity, limited knowledge about their life history and habitat requirements, sampling difficulties and limitations, and other factors. The RIP participants also recognize that further degradation of endangered fish habitats and populations will make recovery increasingly difficult.

#### II. RIP Recovery Action Plan (RIPRAP)

The Recovery Action Plan (RIPRAP) identifies actions currently believed to be required to recover the endangered fishes in the most expeditious manner possible in the upper basin. It has been developed using the best information available and the recovery goals established for the four endangered fish species. By reference, the RIPRAP is incorporated and considered part of this agreement. The RIPRAP will be an adaptive management plan because additional information, changing priorities, and the development of the States' entitlement may require modifications to the RIPRAP. The RIPRAP will be reviewed annually and modified or updated, if necessary, by September 30 of each year or prior to adoption of the annual work plan, whichever comes first. The RIPRAP will serve as a guide for all future planning, research, and recovery efforts, including the annual work-planning and budget decision process.

The RIP is intended to provide the reasonable and prudent alternatives for projects undergoing Section 7 consultation in the upper basin. While some recovery actions in the RIPRAP are expected to have more direct or immediate benefits for the endangered fishes than others, all are considered necessary to accomplish the objectives of the RIP. Recovery actions which protect or improve habitat conditions and result in more immediate, positive population responses will be most important in determining the extent to which the RIP provides the reasonable and prudent alternatives for projects undergoing Section 7 consultation. In general, these actions will be given highest priority in the RIPRAP.

The Fish and Wildlife Service (FWS) will determine whether progress by the RIP provides a reasonable and prudent alternative based on the following factors:

- a. Actions which result in a measurable population response, a measurable improvement in habitat for the fishes, legal protection of flows needed for recovery, or a reduction in the threat of immediate extinction.
- b. Status of fish population.
- c. Adequacy of flows.
- d. Magnitude of the impact of projects.

Therefore, these factors were considered in the development and prioritization of the recovery actions in the RIPRAP.

### III. Framework for Agreement

The following describes the agreement among RIP participants on a framework for conducting Section 7 consultations on depletion impacts related to new projects (as defined in Section 4.1.5 a. of the RIP) and impacts<sup>1</sup> associated with historic projects in the Upper Colorado River Basin. This agreement is meant to supplement and clarify the process outlined in Sections 4.1.5, 4.1.6 and 5.3.4 of the RIP. This agreement applies only to the four Colorado River endangered fishes in the Upper Colorado River Basin, excluding the San Juan River, and is not a precedent for other endangered species or locations.

1. Activities and accomplishments under the RIP are intended to provide the reasonable and prudent alternatives which avoid the likelihood of jeopardy to the continued existence of the endangered Colorado River fishes (hereinafter the "reasonable and prudent alternative") resulting from depletion impacts of new projects and all existing or past impacts related to historic projects with the exception of the discharge by historic projects of pollutants such as trace elements, heavy metals, and pesticides. However, where a programmatic biological opinion applies, the appropriate provisions of such an opinion will apply to future individual consultations.

The RIP participants intend the RIP also to provide the reasonable and prudent alternatives which avoid the likely destruction or adverse modification of critical habitat, to the same extent as it does to avoid the likelihood of jeopardy. Once critical habitat for the endangered fishes is formally designated, the RIP participants will make any necessary amendments to the RIPRAP to fulfill such intent.

2. The RIP is intended to offset both the direct and depletion impacts of historic projects occurring prior to January 22, 1988 (the date when the Cooperative Agreement for the RIP was executed) if such offsets are needed to recover the fishes. Under certain circumstances, historic projects may be subject to consultation under Section 7 of the ESA. An increase in depletions from a historic project occurring after January 22, 1988, will be subject to the depletion charge. Except for the circumstances described in item 11 below, depletion charges or other measures will

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<sup>1</sup> All impacts except the discharge of pollutants such as trace elements, heavy metals, and pesticides.

not be required from historic projects which undergo Section 7 consultation in the future.

3. The Bureau of Reclamation (BR) and the Western Area Power Administration will operate projects authorized and funded pursuant to Federal reclamation law consistent with its responsibilities under Section 7 of the ESA and with any existing contracts. No depletion charge will be required on depletions from BR projects as long as BR continues its contributions to the RIP's annual budget.
4. The FWS will assess the impacts of projects that require Section 7 consultation and determine if progress toward recovery has been sufficient for the RIP to serve as a reasonable and prudent alternative. The FWS will use accomplishments under the RIP as its measure of sufficient progress. The FWS will also consider whether the probable success of the RIP is compromised as a result of a specific depletion or the cumulative effect of depletions. Support activities (funding, research, information and education, etc.) in the RIP contribute to sufficient progress to the extent that they help achieve a measurable population response, a measurable improvement in habitat for the fishes, legal protection of flows needed for recovery, or a reduction in the threat of immediate extinction. Generally, sufficient progress will be evaluated separately for the Colorado and Green River subbasins (but not individual tributaries within each subbasin). However, the FWS will give due consideration to progress throughout the upper basin in evaluating sufficient progress.
5. If sufficient progress is being achieved, biological opinions will identify the activities and accomplishments of the RIP that support it serving as a reasonable and prudent alternative.
6. If sufficient progress is not being achieved, biological opinions for new and historic projects will be written to identify which action(s) in the RIPRAP must be completed to avoid jeopardy. Specific recovery actions will be implemented according to the schedule identified in the RIPRAP. The FWS will confer with the Management Committee on the identification of these actions within established timeframes for the Section 7 consultation. For historic projects, these actions will serve as the reasonable and prudent alternative as long as they are completed according to the schedule identified in the RIPRAP. For new projects, these actions will serve as a reasonable and prudent alternative so long as they are completed before the impact of the project occurs. The FWS has ultimate authority and responsibility for determining whether progress is sufficient to enable it to rely upon the RIP as a reasonable and prudent alternative and identifying actions necessary to avoid jeopardy.
7. Certain situations may result in the FWS determining that the recovery action in previously rendered biological opinions are no longer serving as a reasonable and prudent alternative. These situations may include, but are not limited, to:
  - a. Critical deadlines for specified recovery actions are missed;
  - b. Specified recovery actions are determined to be infeasible; and
  - c. Significant new information about the needs or population status of the fishes becomes available;
8. The FWS will notify the Implementation and Management Committees when a situation may result in the RIP not serving as a reasonable and prudent alternative.

The Management Committee will work with the FWS to evaluate the situation and develop the most appropriate response to restore the RIP as a reasonable and prudent alternative (such as adjusting a recovery action so it can be achieved, developing a supplemental recovery action, shortening the timeframe on other recovery actions, etc.).

9. The RIP is responsible for providing flows which the FWS determines are essential to recovery of the endangered fishes. Whether or not a Section 7 review is required, the RIP will work cooperatively with the owners/operators of historic projects on a voluntary basis to implement recovery actions needed to recover the endangered fishes.
10. The responsibility for the efficiency and effectiveness of the RIP, and for its viability as a reasonable and prudent alternative, rests upon RIP participants, not with individual project proponents. RIP participants fully share that responsibility.
11. If the RIP cannot be restored to provide the reasonable and prudent alternative per item 8, above, as a last resort the FWS will develop a reasonable and prudent alternative, if available, with the lead Federal Agency and the project proponent. (RIP participants recognize that such actions would be inconsistent with the intended operation of the RIP). The option of requesting a depletion charge on historic projects or other measures on new or historic projects will only be used in the event that the RIPRAP does not or can not be amended to serve as a reasonable and prudent alternative. In this situation, the reasonable and prudent alternative will be consistent with the intended purpose of the action, within the Federal Agency's legal authority and jurisdiction to implement, and will be economically and technologically feasible.
12. This agreement becomes effective upon adoption of the RIPRAP by the Implementation Committee. Until the RIPRAP is adopted, the FWS will use the procedures in this agreement and the January 1993, draft RIPRAP as the basis for identifying reasonable and prudent alternatives.
13. Experience may dictate a need to modify this agreement in the future. This agreement may be modified or amended by consensus of all the RIP participants. A review of the agreement may be initiated by any voting member of the Implementation Committee.

PART TWO:

RECOVERY IMPLEMENTATION PROGRAM  
RECOVERY ACTION PLAN  
(RIPRAP)

**RECOVERY IMPLEMENTATION PROGRAM  
RECOVERY ACTION PLAN  
(RIPRAP)**

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## 1.0 INTRODUCTION

### 1.1 RECOVERY PROGRAM PURPOSE

The purpose of the Recovery Implementation Program for Endangered Fishes in the Upper Colorado River Basin (Recovery Program) is to recover the humpback chub (*Gila cypha*), bonytail (*G. elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), and razorback sucker (*Xyrauchen texanus*) while existing and new water development proceeds in the Upper Basin (i.e., Upper Colorado River Basin upstream of Glen Canyon Dam, excluding the San Juan River; Cooperative Agreement, 1988) in compliance with the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*). Further, the Recovery Program is intended to serve as a reasonable and prudent alternative to avoid the likelihood of jeopardy to the continued existence of the endangered fishes and to avoid the likely destruction or adverse modification of critical habitat in Section 7 consultations on depletion impacts related to new projects and all impacts (except the discharge of pollutants such as trace elements, heavy metals, and pesticides) associated with historic water projects in the Upper Basin.

### 1.2 SPECIES RECOVERY GOALS

The overall goal for recovery of the four endangered fishes is to achieve naturally self-sustaining populations and to protect the habitat on which those populations depend. Recovery plans for these species have been developed under Section 4(f) of the Endangered Species Act (U.S. Fish and Wildlife Service 1990a, 1990b, 1991, 1998), and the final rule determining critical habitat was published in the *Federal Register* on March 21, 1994 (59 FR 13374; Appendix). The recovery plans provide a biological and research-oriented approach to recovery and include a recommendation for detailed management and site-specific implementation plans. They refer to species recovery in both the Upper and Lower basins, but fail to include specific demographic criteria for self-sustaining, viable populations and site-specific management actions/tasks to minimize or remove threats.

On August 1, 2002, the U.S. Fish and Wildlife Service (Service) approved final recovery goals for the endangered fishes to serve as amendments and supplements to the existing recovery plans (U.S. Fish and Wildlife Service 2002a, 2002b, 2002c, 2002d). According to Section 4(f)(1) of the Endangered Species Act, these recovery goals describe what is necessary for downlisting and delisting each of the species by identifying site-specific management actions/tasks necessary to minimize or remove threats; establishing objective, measurable criteria that consider demographic and genetic needs for self-sustaining, viable populations; and providing estimates of the time to achieve recovery. The Service will begin the process of reviewing and updating the species recovery goals in 2007.

In the context of the recovery goals, recovery of humpback chub, bonytail, and razorback sucker is considered across the Upper and Lower basins (each basin is treated as a "recovery unit"), with separate recovery criteria developed for each of the two recovery units. Recovery of Colorado pikeminnow is considered necessary only for

the Upper Colorado River Basin (including the San Juan River subbasin). The Recovery Program and the San Juan River Basin Recovery Implementation Program provide for the coordinated implementation of management actions/tasks that contribute to recovery in the Upper Basin recovery unit.

### 1.3 RECOVERY ACTION PLAN PURPOSE

This Recovery Implementation Program Recovery Action Plan (RIPRAP) has been developed using the best, most current information available and the recovery goals for the four endangered fish species. The RIPRAP is intended to provide an operational plan for implementing the Recovery Program, including development of the Recovery Program's annual work plan and future budget needs. Specifically, the RIPRAP identifies the feasible actions that are necessary to recover the endangered fishes, including schedules and budgets for implementing those actions. The RIPRAP also identifies the specific recovery actions that must be accomplished in order for the Recovery Program to serve as a reasonable and prudent alternative to avoid the likelihood of jeopardy to the continued existence of the endangered fishes and to avoid the likely destruction or adverse modification of critical habitat in Section 7 consultations for depletion impacts of new projects and all existing or past impacts related to historic water projects (except impacts from contaminants) in the Upper Basin, in accordance with the October 15, 1993 Section 7 Agreement (Revised March 8, 2000). The RIPRAP was developed in support of that Agreement.

### 1.4 ESTIMATED COST OF RECOVERY ACTIONS

The estimated total budget for the Recovery Program from FY 2006–FY 2010 is approximately \$59.2 million. Funding for the Recovery Program is expected to come from the following sources:

- a. An annual operating budget of approximately \$5.9 million, totaling roughly \$31.1 million from FY 2006–FY 2010 as it is adjusted annually for inflation. The source of these funds will be: Western Area Power Administration and the U.S. Bureau of Reclamation (hydropower revenues); the U.S. Fish and Wildlife Service; and the States of Colorado, Utah, and Wyoming. Additional annual funding will come from water development depletion fees. Under the Recovery Program, proponents of new water projects which undergo Section 7 Endangered Species Act consultation have agreed to pay a one-time depletion fee based on a project's average annual depletion. The rate is adjusted annually for inflation: as of October 1, 2005 it was \$16.67 per acre foot; the rate increases to \$17.24 per acre foot as of October 1, 2006. The actual rate of water development has not been projected.
- b. Approximately \$79.2 million will be spent between FY 1999 and FY 2010 for capital projects, including: acquisition of water and water rights to implement and maintain adequate instream flows for the fish; building fish passages and hatcheries; and restoring flooded bottomlands. P.L. 106-392 authorized this funding in October 2000; P.L. 107-375 extended construction authority

from 2005 to 2008; and P.L. 109-183 authorized Federal appropriations through 2010, increased authorized Federal appropriations from \$46 million to \$61 million, and increased the capital funding total from \$62 million to \$77 million plus adjustments for inflation to the Federal portion. The actual cost of any one capital project will depend on final planning, design and budgeting. Costs for individual projects will be modified to more accurately reflect expected costs as the work plans are updated annually.

#### 1.5 MEASURING PROGRESS TOWARD RECOVERY AND SCHEDULING RIPRAP ACTIVITIES

To achieve recovery in the Upper Basin, it will be essential to fully implement all of the actions in the RIPRAP; this will be accomplished only through cooperation by all Program participants. In general, actions will be scheduled such that recovery will be achieved in the most expeditious and cost-effective manner possible. However, decisions associated with ongoing Section 7 consultations may require some adjustment in the schedule to ensure recovery of the endangered fishes while water development continues.

Recovery actions likely to result in a measurable population response, a measurable improvement in habitat for the fishes, legal protection of flows needed for recovery, or a reduction in the threat of immediate extinction have been determined by the Service to be most important in determining the extent to which the Recovery Program provides the reasonable and prudent alternatives to jeopardy for projects undergoing Section 7 consultation. These actions are identified by the carat ">" in the Action Plans. Actions that the Service believes will contribute to the RIPRAP serving as a reasonable and prudent alternative to adverse modification of critical habitat are identified by an asterisk (\*). These carated and (or) asterisked actions will generally be given highest priority.

The Recovery Program continually evaluates the outcome of completed RIPRAP actions to determine their effectiveness in helping to achieve recovery. Ultimately, success of recovery efforts will be measured by species response (change in population size, distribution, composition, etc.). However, it may be many years before such responses are evident. In the interim, the Recovery Program also will gage its progress towards recovery by accomplishment of the actions identified in the RIPRAP.

#### 1.6 RECOVERY ACTION PLAN STRUCTURE

The substance of the RIPRAP is in Section 4.0, the Recovery Action Plans. It is here that the specific recovery actions are listed. The first Recovery Action Plan identifies general recovery program support activities important to the success of the Recovery Program. The following two Recovery Action Plans are for the Green and Colorado rivers and their subbasins in the Upper Basin. Each action plan is arranged by specific activities to be accomplished within the "recovery elements" listed below:

- I. Identify and protect instream flows;
- II. Restore and protect habitat;
- III. Reduce negative impacts of nonnative fishes and sportfish management activities;
- IV. Conserve genetic integrity and augment or restore populations;
- V. Monitor populations and habitat and conduct research to support recovery actions;
- VI. Increase public awareness and support for the endangered fishes and the Recovery Program(in the General Recovery Program Support Action Plan only); and
- VII. Provide program planning and support (in the General Recovery Program Support Action Plan only).

The Recovery Action Plans (Section 4.0) have been formatted as tables for ease of scheduling and tracking activities. A general discussion of activities under each recovery element and of recovery priorities in each subbasin is found in Sections 2.0 and 3.0, respectively. Projected budgets are broken out in Section 5.0.

## **2.0 DISCUSSION OF RECOVERY ACTION PLAN ELEMENTS**

The Recovery Action Plan tables contain only very brief descriptions of recovery actions planned in each subbasin. In this section, recovery activities are explained in more detail, as they apply Upper Basin wide.

### **2.1 I. IDENTIFY AND PROTECT INSTREAM FLOWS**

Recovery cannot be accomplished without securing, protecting, and managing sufficient habitat to support self-sustaining populations of the endangered fishes. Identification and protection of instream flows are key elements in this process. The first step in instream-flow protection is to identify flow regimes needed by the fish. In the Recovery Program, determining flow needs is primarily the responsibility of the Service (in cooperation with other participants). Factors considered in determining flow needs include: flow effects on reproduction and recruitment; flow effects on food supplies and nonnative fishes; and interrelationships between flow and other habitat parameters believed to be important for the fish, such as channel structure, sediment transport, substrate characteristics, vegetative encroachment, and water temperature. Flow recommendations (for all or certain seasons) have been or are being developed for most river reaches targeted for recovery in the Upper Basin. Flow recommendations often are made in stages, with initial flow recommendations based on the best available scientific information, historic conditions, and extrapolation from similar reaches. Recommendations then are refined following additional field research. Flow recommendations have been approved for the Green, Colorado, Gunnison, Yampa and Duchesne rivers. An initial flow report was completed for the White River; however, due to shortcomings in the study design, additional research may be necessary in the future to develop meaningful flow recommendations. In 2006, flow recommendations will be completed for the Little Snake River and the Colorado River below the Green River. A

strategic plan has been developed to identify geomorphic research needed to refine the flow recommendations and address the Recovery Goals.

## Colorado

Flow protection mechanisms are organized according to their initial or dominant attribute. If a change in the ownership of a water right (by purchase, lease, etc.) is central to flow protection, then flow protection is placed under "Acquire." A change in water right ownership to protect flows will usually be accompanied by a legal proceeding to change the nature or use of the water right, but this proceeding is still considered to be part of the "acquisition" of flow protection. Except for acquisition of conditional water rights in Colorado, such water rights acquisition also will result in physical alteration of flow conditions and will not just protect existing conditions.

Where flow protection involves filing for a new water right, it is placed under "Appropriate." With this mechanism, the ownership of the water right is established in the first instance, rather than being conveyed to a subsequent owner. In Colorado, the appropriation of an instream water right follows a structured process developed by the Colorado Water Conservation Board (CWCB) in 1997. The process begins with a Service flow recommendation, which is reviewed by CWCB and the Colorado Division of Wildlife (CDOW). Then CWCB issues a notice of intent to appropriate, followed by their approval to appropriate. Finally, the Attorney General must make a water court filing to confirm the appropriation and to avoid postponement of the appropriation's priority date. It may take 3 to 4 years from the notice of intent to appropriate to obtain a decree from the water court, depending on the nature of any litigation over the filing. In appropriation, the water right will have a relatively junior priority date (the date CWCB issued the notice of intent to appropriate), and only existing flow conditions can be protected. In most cases, this process has lacked support and thus proven to have limited use in the Recovery Program. Therefore, the Recovery Program adopted a programmatic biological opinion (PBO) approach on the Colorado and Yampa rivers and will apply a similar approach to the Gunnison River. Recovery Program participants anticipate that this process will prove effective in protecting instream flows for the endangered fishes. The Recovery Program and CWCB will reevaluate the need for instream-flow filings 5 years after each PBO is in place.

Flows also may be protected through the physical alteration of flow conditions by reoperating a reservoir or other component of an existing or new water project. This kind of flow protection is placed under "Deliver" in the Recovery Action Plans and will usually involve both a change of water right ownership, including the lease of storage water, and a change in the legal nature of the water rights. (A management agreement between Federal agencies also may be involved, as in the case of the Aspinall Unit, and compensation will be required where storage water is already under contract.)

## Utah

Legal protection of flows in Utah will be achieved differently than in Colorado. Several approaches can be taken under Utah water law to protect instream flows, including:

1) acquiring existing water rights and filing change applications to provide for instream flow purposes; 2) withdrawing unappropriated waters by governor's proclamation; 3) approving presently filed and future applications subject to minimum flow levels; and 4) with proper compensation, preparing and executing contracts and subordinating diversions associated with approved and perfected rights. Although current Utah water law may not fully provide for all aspects of instream-flow protection, Utah does believe they can provide an adequate level of protection.

Utah examined available flow protection approaches and determined that the strategy they will use most commonly will be to condition the approval of presently filed and new applications, making them subject to predetermined streamflow levels. To accomplish this, the State Engineer adds a condition of approval to water-right applications (within the area) filed after the policy is adopted. The condition states that whenever the flow of the Green River (or other streams) drops below the predetermined streamflow level, then diversions associated with water rights approved after the condition is imposed are prohibited. Based on past legal challenges to the State's authority to impose conditions associated with new approvals, it was determined that this is within the authority of the State Engineer. This approach does not specifically recognize an instream-flow right; however, it does protect the flows from being diverted and used by subsequently approved water rights. This approach was adopted as policy by the State Engineer. The policy requires that presently filed and new applications to be approved are subject to the summer and fall flow recommendations. As flow recommendations are finalized and accepted, the policy will be applied to address those flows as well. This strategy of conditioning the approval of presently filed and new applications also may be combined with the others listed above and with appropriately contracted reservoir reoperations.

## 2.2 II. RESTORE AND PROTECT HABITAT

Important elements of habitat protection include restoring and managing in-channel habitat and historically flooded bottomland areas, restoring passage to historically occupied river reaches, preventing fish entrainment at diversion structures (if warranted), enhancing water temperatures, and reducing or eliminating the impacts of contaminants.

Historically, Upper Colorado River Basin floodplains were frequently inundated by spring runoff, but today much of the river is channelized by levees, dikes, rip-rap, and tamarisk. Fish access to these flooded bottomlands has been further reduced by decreased peak spring flows due to upstream impoundments. Numerous studies have suggested the importance of seasonal flooding to river productivity, and flooded bottomlands have been shown to contain large numbers of zooplankton and benthic organisms. Floodplain areas inundated and temporarily connected to the main channel by spring flows appear to be important habitats for all life stages of razorback sucker, and the seasonal timing of razorback sucker reproduction suggests an adaptation for utilizing these habitats. Restoring access to these warm and productive habitats would provide the growth and conditioning environments that appear crucial for recovery of self-sustaining razorback sucker populations. In addition, Colorado pikeminnow also use these areas for feeding prior to migrating to spawning areas. Inundation of

floodplain habitats, although most important for razorback sucker, would benefit other native fishes by providing growth and conditioning environments and by restoring ecological processes dependent on periodic river-floodplain connections. Restoration of floodplain habitats could be achieved through a combination of increased peak flows, prolonged peak-flow duration, lower bank or levee heights, and constructed inlets. Studies have shown that full utilization of these floodplain habitats has been hampered by the presence of large numbers of predacious and competing nonnative fish. Studies are underway to determine how this interaction may be reduced to enhance use of these habitats by endangered fish. For example, additional evaluation of the floodplain reset theory will be needed to determine if nonnative fish can be reduced or eliminated during low-flow years.

The Recovery Action Plans contain tasks to identify and restore important flooded bottomland habitats. During 1994, the Recovery Program completed an inventory of floodplain habitats for 870 miles of the Colorado, Green, Gunnison, Yampa, and White rivers. From the list of inventoried habitats, high-priority sites were screened for restoration potential. Site acquisition began in 1994 and continued through 2003. Since 2003, the Program has completed the razorback sucker floodplain habitat model and floodplain management plans for the Green and Colorado River sub-basins (subject to revision as new information is gathered). Based on the model and these management plans, the Program has shifted from screening additional floodplain sites for potential restoration/acquisition to focusing on sites already acquired or otherwise available for management. Success will be measured by the response of the endangered fish populations.

The General Recovery Program Support Action Plan contains tasks to develop an issue paper on floodplain restoration and protection. This paper identified legal, institutional, and political strategies to enhance and protect floodplain habitats for the endangered fishes and ameliorate the effects of levees, diking, rip-rap, gravel mining, and other forms of floodplain development. Phase 1 of the issue paper identified what floodplain restoration and protection is needed for the endangered fishes; Phase 2 determined how to accomplish that restoration and protection. The issue paper evaluated responsibilities of the Recovery Program, Recovery Program participants, and other agencies involved in floodplain development, regulation, and management, and their roles and responsibilities with respect to endangered species.

Passage barriers have fragmented endangered fish populations and their habitats, resulting in confinement of the fishes to 20 percent of their former range. Blockage of Colorado pikeminnow movement by dams and water-diversion structures has been suggested as an important cause of the decline of this species in the Upper Basin (Tyus 1984; U.S. Fish and Wildlife Service 1991). Restoring access to historically occupied habitats via fish passage ways was identified in the Colorado Squawfish [Pikeminnow] Recovery Plan (U.S. Fish and Wildlife Service 1991) and in the recovery goals (U.S. Fish and Wildlife Service 2002c) as one of several means to aid in Colorado pikeminnow recovery.



The Recovery Action Plans contain tasks to assess and make recommendations for fish passage at various dams and diversion structures. The need for passage already has been determined at four sites: Redlands, Grand Valley Irrigation Company (GVIC), Price Stubb, and the Grand Valley Project. Passage has been restored at the Redlands Diversion Dam on the Gunnison River and at the GVIC and GVP diversions on the mainstem Colorado River near Palisade, Colorado. Activities are underway to restore passage at Price-Stubb.

Diversion canals have been found to entrain native and endangered fishes. Construction of fish screens to prevent entrainment of adult and subadult fish is in the planning and design stage at Tusher Wash and construction was completed at the Grand Valley Project and Redlands during 2005. Construction of a screen at the GVIC diversion canal was completed in 2002, but additional improvements to this screen are anticipated. Potential entrainment of Colorado pikeminnow in diversion structures on the Yampa River will be evaluated beginning in 2006.

A number of potentially harmful contaminants (including selenium, petroleum derivatives, heavy metals, ammonia, and uranium) and suspected contaminant "hot spots" have been identified in the Upper Basin. It is the intent of the Recovery Program to support and encourage the activities of entities outside the Recovery Program that are working to identify problem sites, evaluate contaminant impacts, and reduce or eliminate those impacts.

### 2.3 III. REDUCE NEGATIVE IMPACTS OF NONNATIVE FISHES AND SPORTFISH MANAGEMENT ACTIVITIES

Fifty-two fish species occur in the Upper Basin, but only 13 of those are native species. Many of the nonnative fishes have been successful due to changes in the river system that favor their survival over that of native fishes. Competition with and predation by nonnative species is widely assumed to have played a role in the decline of the endangered fishes (Tyus and Saunders 1996). However, evidence of direct impacts of introduced species on native fishes is difficult to obtain (Schoenherr 1981) and often is masked by human-caused habitat alterations (Moyle 1976).

In studies on the Green River, researchers documented that young Colorado pikeminnow constituted 5% of the diet of northern pike, even though young Colorado pikeminnow made up a much smaller portion of the available food base in the river (Crowl and Lentsch 1996). Researchers estimated that a single northern pike could consume 100 or more young Colorado pikeminnow per year. Also, northern pike are known to prey on adult Colorado pikeminnow, native roundtail chub (*Gila robusta*), flannelmouth and bluehead suckers, and may also feed on humpback chubs in the Yampa River. Colorado has completed a fisheries management plan for the Yampa River basin (a revision is pending). Smallmouth bass in the Yampa River have rapidly increased in abundance and pose a significant predatory and competitive threat to the endangered fishes.

Recovery Program activities related to nonnative fishes initially focused on identifying impacts/interactions and developing nonnative fish stocking procedures. A nonnative fish control strategy has been developed to identify and prioritize options for controlling or removing nonnative fishes from river reaches occupied by the endangered fishes as well as other reaches that serve as production areas for nonnatives that subsequently disperse into occupied habitat. In February 2004, the Recovery Program adopted a nonnative fish management policy that addresses the process of identifying and implementing nonnative fish management actions needed to recover the endangered fishes. Through 2006, emphasis will be focused on the control activities identified in the strategy. All nonnative fish control activities will be evaluated for effectiveness and continued as appropriate.

The States and the Service also have developed final procedures for stocking of nonnative fishes in the Upper Basin. The procedures are designed to reduce the impact on native fishes due to stocking of nonnative fishes in the Upper Basin and clarify the role of the States, the Service, and others in the review of stocking proposals. A memorandum of understanding has been signed by the States and the Service implementing the Stocking Procedures.

#### 2.4 IV. CONSERVE GENETIC INTEGRITY AND AUGMENT OR RESTORE POPULATIONS

Species recovery depends on protecting and managing species genetic resources. This is a complex activity that includes: determining the genetic diversity of the endangered fishes; protecting species in refugia; planning, developing, and operating propagation facilities; propagating fish for augmentation or restoration, research, and information and education; and planning, implementing, and evaluating augmentation or restoration of species. Stocking is only an interim tool in the Recovery Program because recovery, by definition, implies that the populations will be self-sustaining in the wild. The success of augmentation and restoration stocking is dependent on prior or concurrent implementation of other recovery actions such as flow protection, habitat restoration, and management of nonnative fishes. This dependency is reflected in the schedule of subbasin-specific actions in Section 4.0.

The Recovery Program has recognized the need to increase augmentation and restoration stocking (primarily for razorback sucker and bonytail), both for recovery of the species and to establish fish in the system to be able to demonstrate that habitat and instream flow activities are having an effect on endangered fish recovery. Early stocking efforts concentrated on razorback sucker and bonytail. The Recovery Program now is concentrating on implementing an integrated stocking plan developed for bonytail, Colorado pikeminnow, and razorback sucker. The Recovery Program continues to evaluate the need for implementing an integrated stocking plan for humpback chub especially for restoring specific stocks thought to be too low for adequate natural recruitment. Humpback chub is not currently being stocked; however, augmentation of existing small populations may become necessary.

Studies to confirm genetic diversity have been vital to genetics management of the endangered fishes. Species are being protected in refugia to develop broodstocks and guard against catastrophe. Representatives of species thought to be in immediate danger of extinction are brought into refugia immediately. Refugia populations of species are developed using paired breeding matrices to maximize genetic variability and maintain genetic integrity.

Most of this work is included under the General Recovery Program Support Action Plan because it applies Upper Basin wide. Subbasin-specific activities of augmenting or restoring species are placed under the subbasin Action Plans. Augmentation or restoration plans are being implemented, fish produced, and river reaches restored and augmented with those fish. The effects of these augmentation efforts need to be monitored and evaluated.

Four basic documents are used to plan, implement, and coordinate genetics management and artificial propagation for the endangered fishes. These are the Genetics Management Guidelines, Genetics Management Plan, Integrated Stocking Plan, and Coordinated Hatchery Facility Plan (Facility Plan). All four of these plans have been developed and will be revised or updated as needed.

The Genetics Management Guidelines document provides the rationale, genetics concepts, and genetic risks to be considered in genetics-management planning and implementation. For example, it indicates that a fish population is the fundamental unit of genetics management and that its definition and characterization, relative to other populations, are important. Genetic surveys have been part of the identification and characterization process. Further, the prioritization and genetics management required for each population is determined by its relative population status, demographic trends, and genetics data derived from the surveys.

The Genetics Management Plan is the operational document. It tells the "what, who, when, where" of implementation. It identifies specific objectives, tasks, activities, and type of facilities necessary to accomplish Recovery Program goals, i.e., protect population genetic integrity or restore a self-sustaining population in the wild. It is the action plan developed for implementation, directed by the Recovery Program goals, and structured along the format presented in the Genetics Management Planning Guidelines document.

Genetics management requires a great deal of operational activity. Refugia and propagation facilities have been planned, built, and are now operated in a coordinated fashion. The Integrated Stocking Plan (Nesler et al. 2003) provides specific annual numbers of fish and their sizes to be produced at Program hatcheries and stocked into Upper Colorado River Basin river reaches.

Facilities are required to meet long-term (5 years or more) augmentation and restoration stocking needs. The plans for these facilities are the Coordinated Hatchery Facility Plan and the Facilities Plan. These plans, in accordance with the Genetics Management Plan, define facilities required to meet propagation needs, identify fish

needs that can be met by existing facilities, and recommend expansion or modification of existing facilities.

## 2.5 V. MONITOR POPULATIONS AND HABITAT AND CONDUCT RESEARCH TO SUPPORT RECOVERY ACTIONS

This category consists primarily of research and monitoring activities that have application to more than one of the foregoing elements. In the General Recovery Program Support Action Plan, this element includes: monitoring populations and habitat and annually assessing changes in habitat and population parameters (i.e., population estimates); determining gaps in existing life-history information and recommending and conducting research to fill those gaps; and improving scientific research and sampling techniques. Research activities are identified for each subbasin only to the extent that such activities are related to another recovery action in that subbasin. Such identification now, however, does not preclude further research in that subbasin that may be identified later or that is identified in the General Recovery Program Support Action Plan.2.6

## VI. INCREASE PUBLIC AWARENESS AND SUPPORT FOR THE ENDANGERED FISHES AND THE RECOVERY PROGRAM

Public information and education is crucial to the Recovery Program's success. A strategic, multi-faceted information and education program is being implemented to: develop public involvement strategies at the beginning of any and all projects; educate target audiences (including media, the public and elected officials) about endangered fish and increase their understanding of and support for the recovery of these fish at local, state and national levels; provide opportunities for the public to participate in activities that support recovery; and improve communication and cooperation among members of the Recovery Program.

Numerous site-specific activities are undertaken to promote understanding of, and support for, Recovery Program actions and to involve the public in decisions which may impact specific locations in the Upper Basin. These include public meetings, presentations, communications (e-mails, newsletters, etc.), exhibits and distribution of Recovery Program publications.

The information and education program continues to develop a number of products including an annual newsletter; up-to-date fact sheets; educational video(s); interpretive signs and displays; bookmarks; Congressional briefing documents; and a public website. In addition, the Recovery Program actively seeks news media coverage of its activities. Special educational publications are produced as needed.

Because funding for capital construction and ongoing operation and maintenance (O&M) for the Upper Colorado River and San Juan River Basin Recovery Programs is tied together in Federal legislation (public laws 106-392, 107-375 and 109-183) through 2008 for capital projects and 2011 for O&M, an annual publication is produced that highlights accomplishments of both programs. The *Program Highlights* publication

serves as a briefing document for the partners' annual visit to Washington, D.C., and is used for numerous other purposes throughout the year.

In 2005, leaders of both Recovery Programs agreed to work more closely in the future to coordinate communication and outreach efforts. This will help ensure that shared audiences receive accurate, consistent information about the endangered fish species and efforts to recover them. It will also be more cost-effective by sharing publication production costs and exhibit fees.

The Recovery Programs will continue to work with other organizations throughout the Colorado River Basin to ensure that information about the endangered fishes is consistent and accurate.

## 2.7 VII. PROVIDE PROGRAM PLANNING AND SUPPORT

This work also is placed entirely under the General Recovery Program Support Action Plan. Recovery Program planning and support includes planning and tracking recovery activities, participation in Recovery Program committees, and managing, directing, and coordinating the overall Recovery Program. Another important program support activity involves securing the funding necessary to implement the Recovery Program.

### **3.0 DISCUSSION OF SUBBASIN RECOVERY PRIORITIES**

Following is a summary of the importance of the various subbasins in the Upper Colorado River Basin to the endangered fishes and a brief discussion of the major actions directed at recovering the endangered fishes in these subbasins. A more detailed accounting of the activities, including funding requirements and schedules is found in Sections 4.0 and 5.0.

#### 3.1 GREEN RIVER

##### 3.1.1 Importance

The Green River system supports populations of humpback chub, Colorado pikeminnow, and razorback sucker, and it historically supported bonytail. The importance of the Green River to the endangered fishes has been established by the Recovery Program and recognized by many biologists. The Colorado Squawfish [Pikeminnow] Recovery Plan (U.S. Fish and Wildlife Service 1991) listed the Green River as the highest priority area for recovery of the species, and the recovery goals (U.S. Fish and Wildlife Service 2002c) consider the Green River subbasin as the center of the Upper Basin Colorado pikeminnow metapopulation. Habitat in Desolation and Gray canyons supports a self-sustaining humpback chub population, and the last known riverine concentration of wild bonytail was in the Green River within Dinosaur National Monument (U.S. Fish and Wildlife Service 1990a, 1990b, 2002a, 2002b). Recovery plans for humpback chub (U.S. Fish and Wildlife Service 1990a) and bonytail (U.S. Fish and Wildlife Service 1990b) identified the Green River in Desolation and Gray canyons

and in Dinosaur National Monument as important to recovery. The Green River supports the largest known wild population of razorback sucker in their natural riverine habitat (Lanigan and Tyus 1989; U.S. Fish and Wildlife Service 1998, 2002d).

### 3.1.2 Recovery Actions

Recovery actions in the Green River have focused on refining the operation of Flaming Gorge dam to enhance habitat conditions for the endangered fishes. A biological opinion was issued on the operation of Flaming Gorge Dam in 1992. This opinion contained seasonal flow recommendations for the Green River at Jensen, Utah, and called for additional research under a specific set of research flows to collect information needed to refine the flow recommendations (particularly flow recommendations for spring and winter) and to develop flow recommendations for other areas of the Green River. The effects of the test flows on the endangered fishes and their habitat were evaluated through a variety of studies through 1997, and a final report including revised flow recommendations has been completed (Muth et al. 2000). National Environmental Policy Act (NEPA) compliance on reoperation of Flaming Gorge Dam was completed in 2006 with a Record of Decision executed in February. A new biological opinion was completed in 2005.

Flow recommendations also have been developed for some tributaries to the Green River, such as the Yampa, White (interim flow recommendations), and Duchesne rivers. Tributary and mainstem flow recommendations will be carefully coordinated to address recovery needs from an Upper Basin wide perspective.

An element of the 1992 Flaming Gorge Dam biological opinion identified the need to protect dam releases from possible diversion in the occupied habitat of the endangered fishes. The initial focus of this effort was to legally protect Flaming Gorge releases in the Green River down to the confluence of the Duchesne River for the months of July through October. Flow protection for the remainder of the year (November–June) and downstream to Canyonlands National Park will be addressed by Utah now that the final Environmental Impact Statement, Record of Decision, and biological opinion on reoperation of Flaming Gorge Dam have been issued.

Other Green River activities involve restoration of bottomlands adjacent to the Green River that flood in the spring and provide important habitat for razorback sucker and Colorado pikeminnow. Levees have been breached to restore 9 sites (574 acres) and perpetual easements have been acquired on six properties (1008 acres).

Projects to identify nonnative fish control strategies for the Green River have been implemented. Active control of northern pike (*Esox lucius*) began in 2001. Active control of smallmouth bass began in 2004.

Refuge (captive) populations of razorback sucker collected from the Green River are being maintained at the Ouray National Fish Hatchery, Ouray, Utah, with backup broodstock being maintained at Wahweap State Fish hatchery, Big Water, Utah. A plan for augmenting razorback sucker in the Green River using hatchery propagated fish was

developed and is currently being implemented. Stocking of bonytail in Lodore Canyon was initiated in 2000 in accordance with a stocking plan developed by the State of Colorado. The integrated stocking plan requires stocking of bonytail and razorback sucker in the Green River near Jensen and Green River, Utah.

Population estimates began in 2001 for Colorado pikeminnow in the entire Green River subbasin (Bestgen et al. 2005). Population estimates for humpback chub in Desolation and Gray canyons were conducted in 2001 and 2002, and expanded in 2003 (Jackson and Hudson 2005).

Contamination of water in Stewart Lake and Ashley Creek near Jensen, Utah, with selenium may adversely affect razorback sucker. The Service, U.S. Environmental Protection Agency, and U.S. Bureau of Reclamation (Reclamation) are actively pursuing clean-up activities in these areas independent of the Recovery Program.

## 3.2 YAMPA RIVER AND LITTLE SNAKE RIVER

### 3.2.1 Importance

The Yampa River is the largest remaining essentially unregulated river in the Upper Colorado River Basin, and its inflow into the Green River, 65 miles downstream of Flaming Gorge Dam, ameliorates some effects of dam operation on river flow, sediment load, and temperature (Muth et al. 2000). Holden (1980) concluded that flows from the Yampa River, especially spring peak flows, were crucial to the maintenance of the Green River's "large-river" characteristics and, therefore, very important to maintaining suitable conditions in the Green River downstream of the confluence. The Yampa River supports resident subadult and adult Colorado pikeminnow, contains one of the primary Colorado pikeminnow spawning areas in the Upper Basin and is a major producer of fish for the entire Green River subbasin (Tyus and Karp 1989). A small population of humpback chub exists in the Yampa River in Dinosaur National Monument (Tyus and Karp 1989; U.S. Fish and Wildlife Service 1990a, 2002a). Spawning aggregations of adult razorback sucker have been observed near the mouth of the Yampa River, and adult razorback sucker have been captured upstream to the mouth of the Little Snake River (Tyus and Karp 1989). The lower portion of the Yampa River was part of the historic range of bonytail and is associated with some of the most recent captures of this very rare fish. The Bonytail Recovery Plan (U.S. Fish and Wildlife Service 1990b) identified the Yampa River within Dinosaur National Monument as a high priority recovery and/or restoration site.

The Little Snake River provides approximately 28% of the Yampa River's flow and 60% of the Yampa River's sediment supply. The sediment supply of the Little Snake River is believed to be important to the maintenance of backwater nursery areas utilized by young Colorado pikeminnow in the Green River (Smith and Green 1991). Adult Colorado pikeminnow have been captured in the Little Snake River upstream to near Baggs, Wyoming, and humpback chub have been captured in the lower 10 miles of the Little Snake River (U.S. Fish and Wildlife Service 2002a, 2002c).

### 3.2.2 Recovery Actions

Recovery actions in the Yampa River are focused on control of nonnative fishes and maintaining and legally protecting the flow regime required to recover the endangered fishes. To achieve these objectives, the Recovery Program developed the Yampa River Management Plan which identifies management actions necessary to provide and protect the needs of the endangered fishes while existing depletions for human use continue and water resources are developed to serve foreseeable future human needs in the Yampa River basin (Roehm 2004). The plan proposes to augment Yampa River base flows in accordance with the Yampa River flow recommendations (Modde et al. 1999). Of thirteen alternatives identified and evaluated in the Plan, enlargement of Elkhead Reservoir provided the most reliable water supply at a moderate cost. Construction of the enlargement is underway. The Program intends to fund a 5,000 af pool of permanent storage out of the 12,000 af Elkhead enlargement and lease up to an additional 2,000 af on an as-needed basis.

Colorado filed for a junior instream-flow water right for the Yampa River between the confluences of the Williams Fork and Little Snake rivers in December 1995. Forty-eight statements of opposition were filed against these filings in State water court.

As a result of concerns expressed by the Service and other Program participants, CWCB withdrew the baseflow and recovery flow instream-flow filings on the Yampa and Colorado rivers. With the approval of the PBO for the upper Colorado River upstream of the Gunnison River confluence, CDOW staff was instructed by CWCB to develop new methodologies and flow recommendations.

A Management Plan and PBO were completed for the Yampa River in 2005. In 2009, the Recovery Program and CWCB will review CDOW's flow recommendation methodology and progress of performance under the Yampa PBO. During 2008 (the fourth year of the first 5-year period after completion of the PBO), the Recovery Program and CWCB will develop a process for assessing the need for further instream-flow protection for the endangered fishes in the Yampa River. On completion of this review, a determination will be made regarding the need for additional instream-flow protection for the endangered fishes.

Flow recommendations for the Little Snake River were developed in 2004.

The Recovery Program has evaluated several low-head agricultural-water diversion dams on the Yampa River for Colorado pikeminnow passage. A variety of existing diversions between Craig, Colorado, and Dinosaur National Monument were inventoried in 1994–1995. Several diversions were identified as possible barriers to fish migration under certain conditions. However, due to uncertainties about whether these diversions were in fact barriers to Colorado pikeminnow movement during the migration period, a study was conducted to determine threshold flows for adult Colorado pikeminnow passage on the Yampa River between Craig and Dinosaur National Monument. It was determined that these barriers present little if any problem to fish movement during the periods when Colorado pikeminnow migrate to and from spawning habitats



downstream. Entrainment of Colorado pikeminnow in larger diversions will be evaluated beginning in 2006.

The Recovery Program began removing nonnative sportfish from certain reaches of the Yampa River and, where feasible, relocating them to more acceptable waters in 1999. Active control of channel catfish in Yampa Canyon began in 2001. In 2004, the Program began tagging northern pike in the Yampa River upstream of the Hayden Bridge to determine if it is a significant source of northern pike moving downstream into critical habitat. Active control of northern pike downstream of Hayden began in 2003. In 2005, CDOW began undertaking work to determine sources of northern pike that may gain access to endangered fish critical habitat in the Yampa River. Active control of smallmouth bass in a 12-mile treatment reach in Little Yampa Canyon, a 5-mile treatment reach in Lily Park, and in the lower Yampa River in Yampa Canyon began in 2004. In 2005, a temporary fish screen was installed on the Elkhead Reservoir spillway to control escapement of nonnative fishes during construction; however, the net failed part way into the runoff period. A previously established contingency plan was implemented to help mitigate the escapement. The 12-mile treatment was expanded to 24 miles in 2006 in order to geographically include the targeted population. Control was also expanded in 2006 to include the South Beach reach immediately upstream of the Little Yampa Canyon treatment reach in order to focus control on concentration areas.

The Program's integrated stocking plan (Nesler et al. 2003) outlines plans for stocking bonytail in the middle Green and Yampa rivers. Stocking bonytail in the Yampa River was initiated in 2000.

### 3.3 DUCHESNE RIVER

#### 3.3.1 Importance

Colorado pikeminnow and razorback sucker regularly utilize the mouth of the Duchesne River especially during spring runoff. Fishery surveys conducted in 1993 documented the use of the lower 15 miles of the Duchesne River by Colorado pikeminnow and razorback sucker. More recently, fish surveys have been conducted in the lower 33 miles of the Duchesne River and have documented seasonal use by Colorado pikeminnow and razorback sucker.

#### 3.3.2 Recovery Actions

Initial flow recommendations were developed for the Duchesne River in 1995 to address immediate concerns of several proposed water projects being considered in the Duchesne River basin. A follow-up study to evaluate and refine these flow recommendations began in 1997 and was completed in 2003 (Modde and Keleher 2003). A water availability study was completed that identified sources of water to meet the flow recommendations. A coordinated reservoir operations study is nearing completion. The Duchesne Biological Opinion issued in 1998 was updated in 2005. Agreements will be developed to provide flows in the Duchesne River for the endangered fishes.

Control of nonnative fishes in the Duchesne will continue in 2006. A study to determine escapement of nonnative fishes from Starvation Reservoir was begun in 2002, with a draft report due April 2006. Preliminary data indicate escapement is limited.

### 3.4 WHITE RIVER

#### 3.4.1 Importance

Adult Colorado pikeminnow occupy the White River downstream of Taylor Draw Dam near Rangely, Colorado, in relatively high numbers. Adult Colorado pikeminnow resident to the White River spawn in the Green and Yampa rivers. Juvenile and subadult Colorado pikeminnow also utilize the White River on a year-round basis. Incidental captures of razorback sucker have been recorded in the lower White River. Construction of Taylor Draw Dam in 1984 blocked Colorado pikeminnow migration to upper portions of the White River.

#### 3.4.2 Recovery Actions

A work plan for the White River was developed to synthesize current information about the endangered fish and provide recommendations for specific recovery actions, including the merits of providing fish passage at Taylor Draw Dam. Interim flow recommendations for the White River were completed in 2004 (Irving et al. 2004). Due to shortcomings in the study design, however, additional research may be necessary in the future to develop meaningful flow recommendations. Instream-flow filings are on hold pending reevaluation of how flows will be legally protected in Colorado.

### 3.5 COLORADO RIVER

#### 3.5.1 Importance

The mainstem Colorado River from Rifle, Colorado, to Lake Powell, Utah, supports populations of humpback chub and Colorado pikeminnow, and is recognized as important to the recovery of all four endangered fishes (U.S. Fish and Wildlife Service 1990a, 1990b, 1991, 1998, 2002a, 2002b, 2002c, 2002d). Relatively large and healthy humpback chub populations occur at Black Rocks and Westwater Canyon near the Utah-Colorado state line. A smaller humpback chub population occurs in Cataract Canyon, and some of the last wild bonytail were collected in this river reach. All life stages of Colorado pikeminnow occur in the section of river from Palisade, Colorado, downstream to Lake Powell. Colorado pikeminnow have been translocated and stocked into the upper reach of the Colorado River between Palisade and Rifle, Colorado; natural access to this historic-habitat reach has been blocked since the early 1900's by three diversion dams near Palisade. Razorback sucker populations in the mainstem Colorado River have declined precipitously in the past 20 years. In 1993, 67 adult razorback sucker were collected from isolated ponds adjacent to the Colorado River near Debeque, Colorado. Only a few wild adult razorback sucker have been captured from the river in the past 5 years, and there is no evidence of successful reproduction in the Colorado River. A few (less than 10) suspected wild bonytail have been captured

from the Colorado River in the Black Rocks area, near Moab, Utah, and in Cataract Canyon over the past decade. However, this represents the highest catch rate of bonytail anywhere in the Upper Basin.

### 3.5.2 Recovery Actions

A variety of recovery actions are planned, ongoing, or completed for the Colorado River. Numerous approaches are being taken to restore flows in the 15-mile reach immediately upstream of from the confluence of the Gunnison River to levels recommended by the Service. Reclamation has made available 5,000 acre-feet of water annually plus an additional 5,000 acre-feet in four of every five years from Ruedi Reservoir to augment flows in the 15-mile reach during July, August, and September. In addition, water is available from the lease of 10,825 acre-feet/year of water from Ruedi Reservoir and permanent commitment of 10,825 acre-feet/year from East and West slope water users. The East and West slope commitments were secured in 2000 by Memoranda of Agreement (MOA) with the Colorado River Water Conservation District (CRWCD) and Denver Water for delivery of 5,412 acre-feet of water from Wolford Mountain Reservoir and 5,412 acre-feet from Williams Fork Reservoir, respectively. By 2009, CRWCD and Denver Water will have a plan in place to permanently replace the water now being delivered by Wolford and Williams Fork reservoirs. Additional water is being provided through an MOA with CRWCD for delivery of up to 6,000 acre-feet of water from Wolford Mountain Reservoir.

In 1992, Colorado filed an application in State water court for a 581 cubic feet per second (cfs) instream-flow right in the 15-mile reach for the months of July, August, and September. A final decree was issued in 1997. Colorado filed for a junior instream-flow right for the 15-Mile Reach in December 1995, which was opposed in State water court.

As a result of concerns expressed by the Service and other Recovery Program participants, CWCB withdrew the baseflow and recovery flow instream-flow filings on the Colorado and Yampa rivers. With the approval of the PBO for the upper Colorado River upstream of the Gunnison River confluence, CDOW staff was instructed by CWCB to develop new methodologies and flow recommendations. Based upon these developments, the Recovery Program's Management Committee agreed that the need for further instream-flow filings will be evaluated every 5 years.

Beginning in 2005, the Recovery Program and CWCB will review CDOW's new flow recommendations and the performance progress of the PBO. On completion of this review, a determination will be made regarding the instream-flow protection needs for the endangered fishes. The Recovery Program and CWCB also will develop a process for assessing the need for further instream-flow protection for the endangered fishes.

Flow protection for the Colorado River downstream from the confluence of the Gunnison River will be addressed following completion of the Biological Opinion on reoperation of the Aspinall Unit.

Other sources of water for the 15-mile reach include construction of the Grand Valley Water Management Project and operation of Federal and private projects. A study of options for providing additional water primarily to augment spring peak flows was completed in 2003. Water users are exploring ways to increase participation in the expanded coordinated reservoir operations (CROS) as recommended in the study report and completed a CROS implementation plan in February 2006.

Reclamation has constructed fish passage at the GVIC and GVP diversion dams on the upper Colorado River. Construction of passage at the Price-Stubb diversion dam is scheduled for FY 2007-2008. Successfully providing fish passage at these diversion dams would benefit both Colorado pikeminnow and razorback sucker by providing access to approximately 50 miles of the river that was used historically by these fishes. To prevent entrainment of endangered fishes into diversion canals, fish screens have been constructed at GVIC and at the Grand Valley Project.

To restore floodplain habitats, levees have been breached to at 3 sites (46 acres) and ten properties acquired in perpetual easement or fee title to restore 394 acres.

Active control of smallmouth bass began in 2004. Operation of the fish barrier net at Highline Reservoir has been ongoing since 1999. CDOW began a study to determine the source of centrarchid fishes in 2003.

Razorback sucker, bonytail, and Colorado pikeminnow are being stocked in the Colorado River in accordance with the integrated stocking plan (Nesler et al. 2003).

### 3.6 GUNNISON RIVER

#### 3.6.1 Importance

The Gunnison River is currently occupied by wild Colorado pikeminnow and is historic habitat for razorback sucker and bonytail. Several adult Colorado pikeminnow were captured in the Gunnison River in fishery surveys conducted in 1992 and 1993. Unrestricted migration of fish has been limited by the 10-foot high Redlands diversion dam located 2 miles upstream from the mouth of the Gunnison River. Several Colorado pikeminnow larvae have been collected in the Gunnison River immediately downstream from the Redlands diversion dam. Kidd (1977) reported that adult razorback sucker were collected frequently by commercial fishermen near Delta, Colorado, between 1930 and 1950. Wild razorback sucker have not been collected in the Gunnison River in recent times, although the reach near Delta is considered a priority razorback sucker restoration site.

#### 3.6.2 Recovery Actions

Recovery activities on the Gunnison River are focused on operating and evaluating a fish ladder at the Redlands diversion dam, reoperating the Aspinall Unit to improve flow/habitat conditions in the Gunnison River, and restoring flooded bottomland habitats near Delta. Perpetual easements have been acquired on three properties (198 acres).

Construction of a fish ladder at the Redlands diversion dam was completed in 1996 and has provided for passage of Colorado pikeminnow, razorback sucker, and other native fishes (as well as allowing exclusion of nonnative fishes). To prevent entrainment of adult and subadult endangered fish into diversion canals, a fish screen was installed at Redlands in 2005.

A 5-year research plan to evaluate the effects of the Aspinall Unit on the endangered fishes and their habitat was completed in 1997. During this research period, Reclamation and Western Area Power Administration provided test flows. The research culminated with the Service's final flow recommendations in 2003 (McAda 2003). Reclamation has begun the NEPA process and the Service will issue a biological opinion following completion of the EIS. Legal protection of Aspinall releases and State protection of instream flows in the Gunnison River will be addressed as the biological opinion on the Aspinall Unit is developed.

Beginning in 1995, the Service experimentally stocked razorback sucker in the Gunnison River near Delta. Nine razorback sucker have used the Redlands fish ladder since summer 2001 (one of which was stocked in 1996). The State of Colorado stocking plan for razorback sucker was revised in 2001 to stock fewer but larger fish. Larval razorback sucker were collected in the Gunnison River (8 in 2002, 7 in 2003, and 2 in 2005), indicating that stocked fish are reproducing. Stocking of razorback sucker continues in the Gunnison River, in accordance with the integrated stocking plan.

### 3.7 DOLORES RIVER

#### 3.7.1 Importance

The Dolores River is historic habitat for Colorado pikeminnow; both adult and young-of-the-year fish were captured in the 1950's and 1960's. Valdez et al. (1991) documented the use of the lower 1 mile of river by Colorado pikeminnow. Uranium processing facilities operated during the late 1940's through the 1960's severely impacted the river and may have contributed to the decline of Colorado pikeminnow in the Dolores River drainage. Since 1996, bonytail have been stocked in the Colorado River near the confluence of the Dolores.

#### 3.7.2 Recovery Actions

Recovery actions for the Dolores River drainage have been limited to preventing escapement of nonnative sport fish (e.g., smallmouth bass, yellow perch, and kokanee salmon) from McPhee Reservoir. Environmental contaminant clean-up is being pursued by State and Federal agencies independent of the Recovery Program. Inflows from the Dolores River that may be identified in the future as necessary to recover the endangered fishes on the mainstem of the Colorado River will need to be legally protected. It is unknown if stocked bonytail are using the Dolores River. Use of the Dolores River by endangered fish, particularly stocked bonytail, will be evaluated by Utah.

## 4.0 RECOVERY ACTION PLANS

The tasks in these Recovery Action Plans are prioritized by their schedules. Schedules are shown where they have been identified (if all the year columns for an activity are blank, then the activity has not yet been scheduled). If a completion date has been identified, it is shown under the appropriate fiscal year. Where specific dates have not been identified, but an action is ongoing, beginning, or ending in a year, an "X" appears in that year's column. The "who" column identifies the lead responsible agency (listed first) and any cooperating agencies. The status column is used where additional narrative is needed to explain the duration, status, etc. of an activity. Once again, the carat ">" identifies those recovery actions which are expected to result in a measurable population response, a measurable improvement in habitat for the fishes, legal protection of flows needed for recovery, or a reduction in the threat of immediate extinction. An asterisk (\*) identifies those activities which will contribute to the RIPRAP serving as a reasonable and prudent alternative to the likely destruction or adverse modification of critical habitat.

The Recovery Action Plans are formatted in stepdown-outline tables. This is reflected in the numbering system and indenting. Some actions which assess options or the feasibility of a recovery action are followed by a subsequent implementation step, and others are not, depending on how feasible the implementation step is considered to be at this time.

The following abbreviations are used to identify lead/cooperating agencies:

BR	U.S. Bureau of Reclamation
CO	State of Colorado
CDA	Colorado Department of Agriculture
CDOPR	Colorado Division of Parks and Outdoor Recreation
CDOW	Colorado Division of Wildlife
CRWCD	Colorado River Water Conservation District
CWCB	Colorado Water Conservation Board
FWS	U.S. Fish and Wildlife Service
	-ES Ecological Services
	-FR Fishery Resources
	-RW Refuges and Wildlife
	-WR Water Resources
LFL	Larval Fish Laboratory
NWCD	Northern Water Conservancy District
PD	Recovery Program Director
TBD	To be determined
UT	State of Utah
UDWR	Utah Division of Wildlife Resources
UTWR	Utah Division of Water Resources
WYGF	Wyoming Game and Fish Department

## GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

	ACTIVITY	WHO	STATUS	FY 06 10/05 9/06	FY 07 10/06 9/07	FY 08 10/07 9/08	FY 09 10/08 9/09	FY 10 10/09 9/10	FY 11 10/10 9/11	OUT YEARS
<b>I.</b>	<b>PROVIDE AND PROTECT INSTREAM FLOWS (HABITAT MANAGEMENT)</b>									
I.A.	Evaluate methods for defining habitat-flow needs and select methods most appropriate to specific stream reaches.									
I.A.1.	Review instream flow methodologies and assess the technical adequacy of current flow recommendations.	PD	Complete	"Guru II." Center for Public-Private Sector Cooperation, 1993.						
I.A.2.	Develop recommendations for integrating geomorphology and food web studies into Recovery Program.	PD	Complete	Andrews, et al, 1996.						
I.A.3.	Evaluate CDOW's instream flow methodologies and flow recommendations for warmwater native fishes (Anderson) as they relate to flows needed for endangered fish recovery.	FWS/PD	Complete	The Biology Committee reviewed Rick Anderson's report in April 2005, raised numerous questions regarding the application of this methodology to endangered fish flow recommendations, and declined to act on the report. The Service does not support adopting Anderson's methodology as the standard methodology for making flow determinations.						
I.A.4.	Develop strategic plan for geomorphic research and monitoring.	Program	Complete	LaGory et al., 2003.						
I.A.4.a.	Develop strategy and design for studies to address geomorphic research priorities.	Geo. Work Group	Ongoing	X	X	X				
I.A.4.b.	Conduct needed geomorphic research and monitoring.	Program	Ongoing	X	X	X	X	X	X	X
I.B.	Develop and select methods for modifiable protection of instream flows in Colorado.									
I.B.1.	Develop, evaluate and select, as appropriate, options for interim protection of instream flows until uncertainty concerning habitat needs and water availability can be resolved.									
I.B.1.a.	Colorado Attorney General review.	CO	Complete	CWCB adopted the Statement of Policy and Procedure Regarding the Appropriation of Instream Flows for the Recovery of Endangered Fishes of the Upper Colorado River Basin on March 9, 1994 and S.B. 96- 064 concerning instream flow appropriations of the CWCB was passed in May '96.						
I.B.1.b.	CWCB approval/recommended action.	CWCB	Complete							
I.B.1.c.	Adopt legislation or regulation, if necessary.	CWCB	Complete							
I.B.2.	Evaluate options for allocating Colorado's compact entitlement among the five subbasins, the implications for water available to recover the endangered fishes, and implications of full protection of recovery flow recommendations on development of Colorado's compact entitlement.	CWCB	Complete	CWCB completed work on water availability study in 1995 after convening subbasin work groups. Scenarios for future development and estimates for future water use were outlined for each basin.						
I.B.3.	Assess need for retirement of senior conditional water rights.	CWCB/FWS	Dropped	Colorado law prohibits conversion of conditional water rights to instream flow water rights.						
I.C.	Develop an enforcement agreement between the Service and appropriate State agencies to protect instream flows acquired under the Recovery Program for the endangered fishes.									
>*	I.C.1. Colorado.	FWS/CWCB	Complete	Agreement with FWS concerning the enforcement and protection of fish recovery flow water rights adopted by CWCB on September 21,1993.						
I.D.	Develop tributary management plans (based in part on the tributary report, see V.F., pg. 23).									
I.D.1.	Assess need for tributary management plans on a site specific basis.	PD	Complete	2004: PD's office determined most tributaries covered by biological opinions (except White and San Rafael rivers), so this item was moved to Green River Action Plan.						
<b>II.</b>	<b>RESTORE HABITAT (HABITAT DEVELOPMENT AND MAINTENANCE)</b>									
II.A.	Restore flooded bottomland habitats.									
II.A.1.	Conduct inventory of flooded bottomland habitat for potential restoration.	FWS-FR	Complete	Inventory completed (see Irving & Burdick, 1995 as primary reference)						
II.A.2.	Screen high-priority sites for potential restoration/acquisition.	PD	Complete	Future acquisition of sites to be determined.						
II.B.	Support actions to reduce or eliminate contaminant impacts. [NOTE: Contaminants remediation (in all reaches) will be conducted independently of and funded outside of the Recovery Program]									
II.B.1.	Evaluate effects of selenium.	FWS-ES	Ongoing	X	X	X	X	X	X	X
II.B.1.a.	If needed for recovery, identify actions to reduce deleterious levels of selenium contamination.	FWS-ES	Ongoing	X	X	X	X	X	X	X
II.B.2.	Identify locations of petroleum-product pipelines and assess need for emergency shut-off valves.	FWS-ES	Ongoing	X	X					
>*	II.B.2.a. Ensure that all new petroleum product pipelines have emergency shutoff valves.	FWS-ES	Ongoing	X	X	X	X	X	X	X
II.B.3.	Review and recommend modifications to State and Federal hazardous materials spills emergency response programs.	FWS-ES	Ongoing	X	X					
II.C.	Develop an issue paper on the desirability and practicality of restoring and protecting certain portions of the floodplain for endangered fishes and evaluate the floodplain restoration program.									
II.C.1.	Identify what restoration and protection are needed by addressing: 1) biological merits of restoring the floodplain with emphasis on endangered fish recovery; 2) priority geographic areas; and 3) integration of a broader floodplain restoration initiative into the current Recovery Program floodplain restoration program.	PROGRAM	Complete	Phase 1 floodplain protection issue paper approved by Mgmt. Comm. 1/98 (Nelson 1998). Phase II (Tetra Tech 2000) and synthesis reports left in draft and highest priority work moved into Green and Colorado River floodplain management plans (Valdez and Nelson 2004a,b).						
II.C.2.	Identify how to conduct restoration and protection by addressing: 1) restoration and protection tools/approaches; 2) institutional options for floodplain restoration; 3) costs/funding strategy; and 4) implementation steps and schedule.	PD/CO/UT	Complete	Final draft floodplain issues report given to Mgmt. Comm. 2/00. Phase II (Tetra Tech 2000) and synthesis reports left in draft and highest priority work moved into Green and Colorado River floodplain management plans (Valdez and Nelson 2004a,b).						

## GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

	ACTIVITY	WHO	STATUS	FY 06 10/05 9/06	FY 07 10/06 9/07	FY 08 10/07 9/08	FY 09 10/08 9/09	FY 10 10/09 9/10	FY 11 10/10 9/11	OUT YEARS	
II.C.3.	Identify viable options and develop specific restoration strategies for selected geographic areas (e.g., Grand Valley, Green River).	PD	Complete	Final draft floodplain issues report given to Mgmt. Comm. 2/00. Phase II and synthesis reports left in draft and highest priority work moved into Green and Colorado River floodplain management plans (Valdez and Nelson 2004 a,b).							
III.	<b>REDUCE NEGATIVE IMPACTS OF NONNATIVE FISHES AND SPORTFISH MANAGEMENT ACTIVITIES (NONNATIVE AND SPORTFISH MANAGEMENT)</b>										
III.A.	Reduce negative interactions between nonnative and endangered fishes.										
III.A.1.	Where not already generally known, identify negative impacts (e.g., predation, competition, hybridization) of problem species.										
III.A.1.a.	Determine role of nonnative fishes as potential competitors with bonytails and determine size-specific vulnerability of bonytails to nonnative fish predators.	UDWR	Complete	Adler and Crowl 1995, Bissonette and Crowl 1995, Lentsch et al. 1996a.							
III.A.1.b.	Assess impact of northern pike predation on Colorado pikeminnow in the Green River.	UDWR	Complete	Crowl and Lentsch 1996.							
III.A.1.c.	Re-evaluate levels of hybridization with white sucker and assess effects on razorback sucker populations. (Program will monitor for evidence of hybridization as razorbacks increase in the system.)	FWS/STATES	TBD								
>*	III.A.1.c.(1) If necessary, implement actions to minimize hybridization between white sucker and razorback sucker	FWS/STATES	TBD								
III.A.2.	Identify and implement viable active control measures.										
III.A.2.a.	Identify options (including selective removal) to reduce negative impacts of problem species and assess regulations and options (including harvest) to reduce negative impacts on native fishes from nonnative sportfish.	PD	Complete	Hawkins and Nesler 1991; Lentsch et al. 1996b; Tyus and Saunders 1996.							
III.A.2.b.	Review options and develop agreement with appropriate States on strategies and locations for implementing control options.	FWS/STATES	Complete								
>*	III.A.2.c. Evaluate the effectiveness (e.g., nonnative and native fish response) and develop and implement an integrated, viable active control program.	PD/FWS/STATES	Ongoing	X	X	X	X	X	X	X	
III.A.2.c.(1)	Synthesize data on each species/river nonnative fish control effort and concomitant native fish response (e.g., smallmouth bass in the Yampa River and native fish response in the Yampa River) (completed by PI's and identified as a task in individual scopes of work).	PI's	Ongoing		X			X		X	
III.A.2.c.(2)	Produce umbrella summary of nonnative fish control projects and native fish response on a subbasin and river level every three years.	PD	Ongoing		X			X		X	
>*	III.A.2.d. Close river reaches to angling where and when angling mortality is determined to be significant. (See specific river reaches.)	STATES	Ongoing, as needed	X	X	X	X	X	X	X	
III.A.2.e.	Increase law enforcement activity to decrease angling mortality.	STATES	Ongoing	X	X	X	X	X	X	X	
>*	III.A.2.f. Develop control program for removal of small nonnative cyprinids in backwaters and other low velocity habitats. (Trammell et al. 2002 and 2005 complete, but development and implementation of a control program is on hold.)	STATES	On hold								
III.B.	Reduce negative impacts to endangered fishes from sportfish management activities.										
III.B.1.	Implementation Committee approval of Interim Nonnative Fish Stocking Procedures	PD	Complete	IC gave proxy in January 1994; States & Service approved in spring of 1994.							
III.B.2.	Implement Interim Nonnative Fish Stocking Procedures.										
III.B.2.a.	Develop scope of work for evaluation of Interim Procedures.	PD	Complete	FY 95 SOW #62 (FWS, CO, UT, WY)							
III.B.2.b.	Evaluate and revise Interim Procedures.	PD	Complete	Procedures for Stocking Nonnative Fish Species in the Upper Colorado River Basin, USFWS 1996.							
III.B.3.	Finalize revised Nonnative Fish Stocking Procedures.										
III.B.3.a.	Complete Biological Opinion/NEPA compliance.	FWS-ES/FR	Complete	FONSI, USFWS 1996.							
III.B.3.b.	Implementation Committee approval of revised Nonnative Fish Stocking Procedures.	PD	Complete	Implementation Committee approval October 2, 1996.							
III.B.3.c.	State wildlife commissions approval, as necessary.	STATES	Complete								
III.B.3.d.	Execute memoranda of agreement between Service and States.	FWS/STATES	Complete	Cooperative agreement for implementation of procedures for stocking of nonnative fish species in the Upper Colorado River Basin. Agreement in 1996 Stocking Procedures.							
III.B.4.	Incorporate final Procedures into State aquaculture permitting process.										
>*	III.B.4.a. Colorado.	CDA/CDOW	Complete	January 1999.							
III.B.4.a.(1)	Evaluate effectiveness of Colorado's stocking regulation.	CDOW	Complete	Martinez & Nibbelink 2004.							
>*	III.B.4.b. Utah.	UDWR	Complete								
>*	III.B.4.c. Wyoming.	WYGF	Complete								
III.B.5.	Explore options for tribal acceptance of Nonnative Fish Stocking Procedures.	FWS-FR	Complete	Tribe verbally accepted Procedures (per memo from Dave Irving to Bob Muth, 2003).							
III.B.6.	Review, evaluate, and revise as needed, the Nonnative Fish Stocking Procedures.	PD/FWS/STATES	As needed								







## GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

	ACTIVITY	WHO	STATUS	FY 06 10/05 9/06	FY 07 10/06 9/07	FY 08 10/07 9/08	FY 09 10/08 9/09	FY 10 10/09 9/10	FY 11 10/10 9/11	OUT YEARS	
VII.A.5.a.	Convene Recovery Team.	FWS	Complete	1999							
VII.A.5.b.	Develop recommended recovery goals.	PD/Contract	Complete	2000							
VII.A.5.c.	Biology Committee review of recommended recovery goals.	Program	Complete	2000							
VII.A.5.d.	Finalize recovery goals.	FWS/PD	Complete	U.S. Fish and Wildlife Service 2002a, 2002b, 2002c, 2002d.							
VII.A.5.e.	Conduct species status review and update recovery goals at least every 5 years.	FWS/Program	Every 5 years		X					X	
VII.A.6.	Identify elements of conservation plans to ensure long-term management and protection following delisting.	Program	Ongoing	X	X	X	X	X	X	X	
VII.A.7.	Monitor and assess Recovery Program accomplishments annually.	PD	Annual	X	X	X	X	X	X	X	
VII.A.8.	Develop biennial work plan to address priority needs.	PD	Annual	X	X	X	X	X	X	X	
VII.B.	Actively participate in Recovery Program committees and secure funding for annual work plan and larger projects (e.g., water acquisition, capital construction, and long term operation and maintenance) in accordance with the recovery actions and milestones (Utah, Colorado, Wyoming, Bureau of Reclamation, Fish and Wildlife Service, Western Area Power Administration, Water Users, Environmental Groups, Colorado River Energy Distributors Association) and the National Park Service.	PD	Ongoing	X	X	X	X	X	X	X	
VII.B.1.	As defined in PL 106-392, prepare joint report with San Juan River RIP on the utilization of power revenues for base funding, including recommendations regarding the need for continued base funding after 2011 that may be required to fulfill the goals of the Recovery Programs. Report is due to the committees of the U.S. Senate and House of Representatives 9/30/08.	Program	Pending			X	X	X	X		
VII.C.	Manage, direct, and coordinate Recovery Program activities.	PD	Ongoing	X	X	X	X	X	X	X	
VII.C.1.	Review Information and Education program (Management Committee).	PD	Complete	Management Committee, July 28, 1994.							

## GREEN RIVER ACTION PLAN: MAINSTEM

	ACTIVITY	WHO	STATUS	FY 06 10/05 9/06	FY 07 10/06 9/07	FY 08 10/07 9/08	FY 09 10/08 9/09	FY 10 10/09 9/10	FY 11 10/10 9/11	OUT- YEARS
<b>I.</b>	<b>PROVIDE AND PROTECT INSTREAM FLOWS (HABITAT MANAGEMENT)</b>									
I.A.	Green River above Duchesne River (Utah only; flows not threatened in Colorado because river is entirely within a National Wildlife Refuge and National Monument.)									
I.A.1.	Initially identify year-round flows needed for recovery while providing experimental flows.									
I.A.1.a.	Summer/fall.	FWS-ES	Complete	USFWS 1992.						
I.A.1.b.	Winter/spring.	FWS-ES	Complete	Muth, et al. 2000.						
I.A.1.c.	Review summer/fall flow recommendation.	FWS-ES	Complete							
I.A.2.	State acceptance of initial flow recommendations.									
I.A.2.a.	Summer/Fall.	UT	Complete	USFWS 1992 and revised in Muth et al. 2000.						
I.A.2.b.	Winter/Spring.									
I.A.2.b.(1)	Review scientific basis.	UT	Complete	Muth et al. 2000.						
I.A.2.b.(2)	Assess legal and physical availability of water.	UT	Pending	X						
I.A.3.	Deliver identified flows.									
>*	I.A.3.a. Operate Flaming Gorge pursuant to the 1992 Biological Opinion to provide summer and fall flows.	BR	Complete							
>*	I.A.3.b. Operate Flaming Gorge to supply winter and spring test flows for research.	BR	Complete	Muth et al. 2000.						
	I.A.3.c. Complete NEPA on reoperation of Flaming Gorge pursuant to Biological Opinion and Record of Decision.	BR	Complete	ROD issued February 16, 2006; U.S. Bureau of Reclamation 2006.						
>*	I.A.3.d. Operate Flaming Gorge Dam to provide winter and spring flows and revised summer/fall flows, pursuant to the new Biological Opinion and Record of Decision.	BR	Ongoing	X	X	X	X	X	X	X
	I.A.3.d.1. Conduct real-time larval razorback and Colorado pikeminnow sampling to guide Flaming Gorge operations.	LFL/FWS	Ongoing	X	X	X	X	X	X	X
I.A.4.	Legally protect identified flows.									
I.A.4.a.	Protect Summer/Fall flows.									
	I.A.4.a.(1) Hold public meeting to establish future appropriation policy.	UT	Complete 10/94	Utah Division of Water Rights. 1994 (public meetings October 1994; policy November 1994).						
	I.A.4.a.(2) Adopt and implement new policy (new appropriations subject to flow criteria).	UT	Complete 11/94							
>*	I.A.4.a.(3) Prepare and execute contracts with water users as required to subordinate diversions associated with approved and/or perfected rights.	UT	Ongoing	X	X	X	X	X	X	X
	I.A.4.a.(4) Evaluate effectiveness of policy.	UT	Ongoing	X	X	X	X	X	X	X
I.A.4.b.	Protect Winter/Spring flows.									
I.A.4.b.(1)	Hold public meeting to establish future appropriation policy.	UT	Pending	X	X					
	I.A.4.b.(2) Review policy, and, if needed Adopt and implement new policy (new appropriations subject to flow criteria).	UT	Pending	X	X					
>*	I.A.4.b.(3) Prepare and execute contracts with water users as required to subordinate diversions associated with approved and/or perfected rights.	UT	Ongoing	X	X	X	X	X	X	X
I.B.	Green River below the Duchesne River									
I.B.1.	Initially identify year-round flows needed for recovery while providing experimental flows.	FWS-ES	Complete	Muth et al. 2000.						
I.B.2.	State acceptance of initial flow recommendations (dependent on development of initial flow recommendations).									
I.B.2.a.	Review scientific basis.	UT	Complete	Muth et al. 2000.						
I.B.2.b.	Assess legal and physical availability of water from Green River and tributaries.	UT	Pending	X	X					
I.B.3.	Legally protect identified flows (dependent on development of initial flow recommendations).									
I.B.3.a.	Hold public meeting to establish future appropriation policy.	UT	Pending	X	X					
	I.B.3.b. Review policy, and, if needed adopt and implement new policy (new appropriations subject to flow criteria).	UT	Pending	X	X					
>*	I.B.3.c. Prepare and execute contracts with water users as required to subordinate diversions associated with approved and/or perfected rights.	UT	Ongoing	X	X	X	X	X	X	X
I.C.	Price River									
I.C.1.	Determine endangered fish spring through autumn use of the Price River.	UT	Complete	Cavalli 1999.						
I.C.2.	Determine winter use and seasonal flow needs for Colorado pikeminnow in the Price River.	UT/FWS	Pending	X						
I.D.	Evaluate and revise as needed, flow regimes to benefit endangered fish populations. See Kitcheyan and Montagne 2005, Bestgen et al. 2006.	FWS/Program	Ongoing	X	X	X	X	X	X	X
I.D.1.	Develop study plan to evaluate flow recommendations.	FWS/BOR/WAPA	Pending	X						



## GREEN RIVER ACTION PLAN: MAINSTEM

	ACTIVITY	WHO	STATUS	FY 06 10/05 9/06	FY 07 10/06 9/07	FY 08 10/07 9/08	FY 09 10/08 9/09	FY 10 10/09 9/10	FY 11 10/10 9/11	OUT- YEARS	
>*	III.A.4.b.(1) Small nonnative cyprinids from backwaters and other low-velocity habitats in the lower Green River.	UDWR	On hold	Trammell et al. 2005 report complete; development and implementation of control program on hold.							
>*	III.A.4.b.(2) Smallmouth bass in middle and lower Green River.	UDWR	Ongoing	X	X						
>*	III.A.4.c. Channel catfish (e.g. Deso./Gray Canyons) to protect humpback chub populations, and in the middle Green River to protect razorback sucker and Colorado pikeminnow. On hold pending development of more efficient techniques.	FWS/UDWR	On hold								
<b>IV.</b>	<b>MANAGE GENETIC INTEGRITY AND AUGMENT OR RESTORE POPULATIONS (STOCKING ENDANGERED FISHES)</b>										
IV.A.	Augment or restore populations as needed, and as guided by the Genetics Management Plan.										
IV.A.1.	Develop integrated stocking plan for the four endangered fishes in the Green River.										
IV.A.1.a.	Prepare plan.	UDWR	Complete	Nesler et al. 2003.							
IV.A.1.b.	Program acceptance.	UDWR	Complete	Nesler et al. 2003.							
>	IV.A.1.c. Implement plan.	UDWR	Ongoing	X	X	X	X	X	X	X	
	IV.A.1.c.(1) Conduct high-priority lab/field studies identified in bonytail reintroduction plan.	UDWR	Draft not accepted; dropped.	Crowl and Rivera 2000.							
	IV.A.1.d. Evaluate stocking success as identified in monitoring plan for stocked fish.	LFL/FWS/ STATES/PD	Ongoing	X	X	X	X	X	X	X	
<b>V.</b>	<b>MONITOR POPULATIONS AND HABITAT AND CONDUCT RESEARCH TO SUPPORT RECOVERY ACTIONS (RESEARCH, MONITORING, AND DATA MANAGEMENT)</b>										
V.A.	Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions.										
V.A.1.	Verify additional Colorado pikeminnow spawning areas in lower Green.	UT	Complete	Chart et al. 1999.							
V.A.2.	Identify additional razorback sucker spawning areas in lower Green.	UT	Complete	Chart et al. 1999, Muth et al. 1998.							
V.B.	Conduct population estimate for humpback chub.										
V.B.1.	Desolation/Gray. (Sampling occurs in September and October, overlapping fiscal years. Sampling is conducted for 2 years, followed by no sampling for 2 years, with report write-up in the first year following sampling, then sampling resumes in September of the second year). See Jackson and Hudson 2005.	UDWR	Ongoing	X	X			X	X	X	
V.C.	Conduct population estimate for Colorado pikeminnow. Sampling is conducted for 3 years, followed by no sampling for 2 years.										
V.C.1.	Middle Green River (including Yampa and White rivers). See Bestgen et al. 2005.	LFL/UDWR/ FWS	Ongoing	X	X	X			X	X	
V.C.2.	Lower Green River. See Bestgen et al. 2005.	LFL/UDWR/ FWS	Ongoing	X	X	X			X	X	
V.D.	Conduct population estimate for razorback sucker. Could begin in 06 in conjunction with pikeminnow estimate.		Pending			X	X	X	X	X	



## GREEN RIVER ACTION PLAN: YAMPA AND LITTLE SNAKE RIVERS

	ACTIVITY	WHO	STATUS	FY 06 10/05-9/06	FY 07 10/06-9/07	FY 08 10/07-9/08	FY 09 10/08-9/09	FY 10 10/09-9/10	FY 11 10/10-9/11	OUT- YEARS
I.C.3.a.	Review scientific basis.	CWCB/CDOW	Complete							
I.C.3.b.	Assess legal and physical availability of water.	CWCB	Complete	Colorado completed work on a water availability study in early 1995 & the work was used as the basis of the allocation of compact water between the five subbasins.						
I.C.3.c.	Assess compact considerations.	CWCB	Complete	Colorado completed work on a water availability study in early 1995 & the work was used as the basis of the allocation of compact water between the five subbasins.						
I.C.3.d.	Five-year periodic review of progress under the PBO to determine if instream flow filings are necessary.	CWCB/FWS Wyoming	Pending				X	X		X
I.C.3.d.(1)	If necessary, evaluate how identified flows will be legally protected.	CWCB/ Wyoming	Pending				X	X		X
I.C.4.	Assess Wyoming's current and future water needs.	Wyoming	Complete	Assessment of Wyoming's future water needs is completed (see 2001 RIPRAP assessment)						
I.D.	<u>Yampa River below Little Snake River</u>									
I.D.1.	Initially identify year-round flows needed for recovery.	FWS-FR	Complete	Modde and Smith 1995.						
I.D.1.a.	Modify based on revisions to environmental baseline.	FWS-WR	Complete	Modde and Smith 1995.						
I.D.1.b.	Update flow recommendations to include flows from the Little Snake River.	FWS	Complete	Roehm 2004.						
I.D.2.	Evaluate need for instream flow water rights.									
I.D.2.a.	Review scientific basis.	CWCB/CDOW	Complete							
I.D.2.b.	Assess legal and physical availability of water.	CWCB	Complete	Colorado completed work on a water availability study in early 1995 & the work was used as the basis of the allocation of compact water between the five subbasins						
I.D.2.c.	Assess compact considerations.	CWCB	Complete	Colorado completed work on a water availability study in early 1995 & the work was used as the basis of the allocation of compact water between the five subbasins.						
I.D.2.d.	Five-year periodic review of progress under the PBO to determine if instream flow filings are necessary.	CWCB/FWS	Pending				X	X		X
I.D.2.d.(1)	If necessary, evaluate how identified flows will be legally protected.	CWCB	Pending				X	X		X
II.	<b>RESTORE HABITAT (HABITAT DEVELOPMENT AND MAINTENANCE)</b>									
II.A.	<u>Yampa River from Dinosaur National Monument to Craig, Colorado</u>									
II.A.1.	Restore native fish passage at instream barriers and reduce impacts of maintaining diversion structures.									
II.A.1.a.	Inventory potential barriers.	CRWCD	Complete	Hydrosphere 1995.						
II.A.1.b.	Determine threshold (passage) flows between Craig and Dinosaur National Monument (low- flow dependent).	CDOW/FWS	Complete	Modde et al. 1999.						
II.A.1.c.	Develop guidelines to facilitate fish passage at new diversion structures.	PD/FWS-ES	Complete	Roehm 2003.						
II.A.2.	Reduce/eliminate entrainment of Colorado pikeminnow at diversion structures.									
II.A.2.a.	Identify and evaluate existing diversion structures for entrainment of Colorado pikeminnow	PD/FWS-ES	Ongoing	X	X	X	X	X	X	X
>* II.A.2.b.	Develop and implement remedial measures, as necessary, to reduce or eliminate entrainment.	PD/CDOW/ FWS	Ongoing			X	X	X	X	X
II.A.2.c.	Develop guidelines to reduce or eliminate entrainment at new diversion structures, if necessary.	PD/CDOW/ FWS	Complete	Roehm 2003.						
II.A.3.	Review NPS/USGS report to assess potential for negative impacts of elevated pH to endangered fish.	Program	Complete	PD's office reviewed Chafin 2002 and agreed elevated pH is a sampling artifact.						
II.B.	<u>Green River from Ouray to Jensen, Utah</u> (see Green River Action Plan)									
II.B.1	Acquire interest in high-priority flooded bottomland habitats between Ouray NWR and Jensen to benefit endangered fish (see Green River Action Plan : Mainstem II.A.2.)									
II.B.2.	Implement levee removal strategy at high-priority sites (see Green River Action Plan : Mainstem II.A.3.)									
III.	<b>REDUCE NEGATIVE IMPACTS OF NONNATIVE FISHES AND SPORTFISH MANAGEMENT ACTIVITIES (NONNATIVE AND SPORTFISH MANAGEMENT)</b>									
III.A.	Develop aquatic management plan (Colorado) to reduce nonnative fish impacts while providing sportfishing opportunities (also relates to nonnative fish management/control -- Recovery Element III). CDOW 1998.	CDOW	Complete; due for revision	X						
>* III.A.1.	Implement Yampa Basin aquatic wildlife management plan to develop nonnative fish control programs in reaches of the Yampa River occupied by the endangered fishes. Each control activity will be evaluated for effectiveness and then continued as needed. See III.A.2.c.1.& 2. under General Recovery Program Support Action Plan.	CDOW	Ongoing	X	X	X	X	X	X	X
III.A.1.a.	Identify potential conflicts between present fisheries management in existing Elkhead Reservoir and endangered fishes and formulate alternative management plan.	CDOW	Complete	CDOW 2003a.						
III.A.1.a.(1)	Evaluate nonnative fish escapement and control options at Elkhead Reservoir (during and after Elkhead expansion construction). See Miller et al. 2005.	FWS-FR/ CDOW	Ongoing	X	X					
>* III.A.1.a.(2)	Implement control measures as needed to control escapement (during and after Elkhead expansion construction).	Program	Ongoing	X	X	X	X	X	X	X
III.A.1.b.	Control northern pike									
>* III.A.1.b.(1)	Remove and translocate northern pike from Yampa River. See Hawkins et al. 2005.	CDOW/FWS	Ongoing	X	X					



## GREEN RIVER ACTION PLAN: YAMPA AND LITTLE SNAKE RIVERS

	ACTIVITY	WHO	STATUS	FY 06 10/05-9/06	FY 07 10/06-9/07	FY 08 10/07-9/08	FY 09 10/08-9/09	FY 10 10/09-9/10	FY 11 10/10-9/11	OUT- YEARS
	III.A.1.b.(2) Reduce northern pike reproduction in the Yampa River.									
	III.A.1.b.(2)(a) Identify and evaluate natural and artificial spawning/nursery habitats for northern pike in the Yampa River for exclusion devices.	CDOW	Complete	Hill 2004.						
>*	III.A.1.b.(2)(b) Implement remedial measures to reduce pike reproduction in Yampa River.	CDOW	On hold							
	III.A.1.b.(2)(c) Develop guidelines for new structures to minimize creation of habitat suitable for pike spawning/nursery.	CDOW	On hold							
	III.A.1.b.(3) Identify sources of northern pike and implement remedial measures as needed.	CDOW	Ongoing	X	X					
	III.A.1.c. Control channel catfish									
>*	III.A.1.c.(1) Remove channel catfish in Yampa Canyon.	FWS	Ongoing	X	X					
>*	III.A.1.c.(2) Remove and translocate channel catfish above Yampa Canyon.	CDOW	On hold							
>*	III.A.1.d. Remove and translocate smallmouth bass.	CDOW	Ongoing	X	X					
	III.A.1.e. Remove bag and possession limits on warmwater nonnative sportfishes within critical habitat in Colorado.	CDOW	Complete	In Colorado fishing regulations.						
	<b>IV. MANAGE GENETIC INTEGRITY AND AUGMENT OR RESTORE POPULATIONS (STOCKING ENDANGERED FISHES)</b>									
	IV.A. <u>Yampa River in Dinosaur National Monument</u>									
	IV.A.1. Augment or restore populations as needed, and as guided by the Genetics Mgmt. Plan.									
	IV.A.1.a. Develop integrated stocking plan for bonytail in the Yampa River.	CDOW	Complete	Nesler et al. 2003						
>	IV.A.1.a.(1) Implement stocking plan.	FWS/CDOW	Ongoing	X	X	X	X	X	X	X
	IV.A.1.b. Evaluate stocking success as identified in monitoring plan for stocked fish.	LFL/FWS/ States/PD	Ongoing	X	X	X	X	X	X	X
	<b>V. MONITOR POPULATIONS AND HABITAT AND CONDUCT RESEARCH TO SUPPORT RECOVERY ACTIONS (RESEARCH, MONITORING, AND DATA MANAGEMENT)</b>									
	V.A. Conduct population estimate for humpback chub. (Sampling occurs in September and October, overlapping fiscal years. Report due 12/05, sampling may begin again in the fall of 2007.)	FWS	Ongoing		X	X			X	X

## GREEN RIVER ACTION PLAN: DUCHESNE RIVER

	ACTIVITY	WHO	STATUS	FY 06 10/05 9/06	FY 07 10/06 9/07	FY 08 10/07 9/08	FY 09 10/08 9/09	FY 10 10/09 9/10	FY 11 10/10 9/11	OUT- YEARS
<b>I.</b>	<b>PROVIDE AND PROTECT INSTREAM FLOWS (HABITAT MANAGEMENT)</b>									
I.A.	Identify initial year-round flows needed for recovery.	FWS-ES	Complete	Initial year-round flow needs for recovery were identified & summarized in a letter to Program Director on 03/09/95 and included in 1998 biological opinion.						
I.A.1.	Conduct hydrology/water availability study.	UT	Complete	CH2MHill 1997.						
I.A.2.	Conduct follow-up study to evaluate and refine flow recommendations.	FWS/UT	Complete	Modde and Keleher 2003.						
I.B.	State acceptance of initial flow recommendations (dependent on development of initial flow recommendations).									
I.B.1.	Review scientific basis.	UT	Complete	Acceptance of Modde and Keleher 2003.						
I.B.2.	Assess legal and physical availability of water.	UT	Pending			12/07				
I.C.	Legally protect and deliver identified flows.									
I.C.1.	Strawberry Valley Project.									
I.C.1.a.	Determine amount of water available from the Strawberry Valley Project for fish use. (BR/CUWCD completed coordinated reservoir operations model in 2003. Task completion part of I.D.1) (This is part of the coordinated reservoir operation in I.D.)	USBR/DOI/PD/ Strawberry Water Users	Ongoing			12/07				
I.C.2.	Management of Daniels Transbasin Diversion.									
I.C.2.a.	Determine the amount of water available from the Daniels Diversion for endangered fish use and pattern and location for delivery. (BR/CUWCD completed coordinated reservoir operations model in 2003. Task completion part of I.D.1)	DOI/IBAT/FWS/ Mitig. Comm./ CUWCD/ UteTribe	Complete							
>* I.C.2.b.	Develop agreements if feasible to deliver and protect water available from the Daniels Diversion.	UT/IBAT /FWS/DOI/ Mitig.Comm./ CUWCD	Ongoing			12/07				
I.D.	Coordinate reservoir operation.									
I.D.1.	Determine feasibility and benefits of coordinated reservoir operation.	BR/CUWCD/ DOI	Complete	Hansen 2004.						
>* I.D.2.	Develop agreements if feasible to coordinate reservoir operations and protect flows to the Green River.	BR/CUWCD/ UT/Ute Tribe	Ongoing	X	X	12/07				
>* I.D.2.a.	Rehabilitate Myton Town diversion.	BR/CUWCD/ UT/Ute Tribe	Pending	X	X					
I.E.	Examine the feasibility of other options for obtaining water.	BR/DOI/PD/ UteTribe	Ongoing	X	X	X	X	X	X	X
I.F.	Determine need and feasibility of additional gaging.	BR/FWS/UT	Complete	X						
I.F.1.	Construct additional gages, as needed.	TBD	Complete	X						
I.G.	Evaluate and revise as needed, flow regimes to benefit endangered fish populations	FWS/Program	Ongoing	X	X	X	X	X	X	X
<b>III.</b>	<b>REDUCE NEGATIVE IMPACTS OF NONNATIVE FISHES AND SPORTFISH MANAGEMENT ACTIVITIES (NONNATIVE AND SPORTFISH MANAGEMENT)</b>									
III.A.	Reduce negative interactions between nonnative and endangered fishes.									
III.A.1.	Identify most damaging nonnative fishes.	UDWR	Complete	Hawkins and Nesler 1991, Lentsch et al. 1996b, Tyus and Saunders 1996.						
III.A.2.	Assess options to control negative interactions from nonnative fishes from the Duchesne River to benefit Colorado pikeminnow and razorback sucker young-of-the-year.	UDWR	Complete	Tyus and Saunders 1996.						
III.A.3.	Implement and evaluate the effects of viable measures to control negative interactions from nonnative fishes. (See III.A.3. under Green River Mainstem Action Plan.)									
III.A.3.a.	Evaluate feasibility of screen on Bottle Hollow Reservoir to control nonnative fish escapement and explore alternative funding sources.	FWS-FAO/Ute Tribe/BOR	Complete	USFWS 2001.						
>* III.A.3.a.(1)	If feasible and necessary, screen Bottle Hollow Reservoir	Ute Tribe	Complete	Elder's Pond screen (downstream of Bottle Hollow) completed in 2002 (Irving and Montoya 2002).						
III.A.3.b.	Evaluate escapement of nonnative fishes from Starvation Reservoir and the feasibility of screening. Draft report due 4/06.	UDWR	Ongoing	X						
>* III.A.3.b.(1)	If feasible and necessary, screen Starvation Reservoir	TBD	TBD							
>* III.A.3.c.	Remove nonnative fish (smallmouth bass, channel catfish and northern pike). See III.A.2.c.1. & 2. under General Recovery Program Support Action Plan.	FWS-FR	Ongoing	X	X					

## GREEN RIVER ACTION PLAN: WHITE RIVER

	ACTIVITY	WHO	STATUS	FY 06 10/05 9/06	FY 07 10/06 9/07	FY 08 10/07 9/08	FY 09 10/08 9/09	FY 10 10/09 9/10	FY 11 10/10 9/11	OUT- YEARS
<b>I.</b>	<b>PROVIDE AND PROTECT INSTREAM FLOWS (HABITAT MANAGEMENT)</b>									
I.A.	Assess need for tributary management plan for the White River.	PD	TBD							
I.A.1.	Estimate future water demands on the White River.	TBD	TBD							
I.A.2.	Develop tributary management plan.	PD	TBD							
I.A.3.	Conduct appropriate Section 7 and NEPA compliance to implement tributary management plan.	PD/FWS	TBD							
I.B.	Initially identify year-round flows needed for recovery.									
I.B.1.	Develop work plan.	FWS-FR	Complete	Lentsch et al. 2000.						
I.B.2.	Identify flows.	FWS-FR	TBD	Initial report complete (Irving et al. 2004), but may need further refinement after demand study completed.						
I.C.	Evaluate how identified flows will be legally protected.	CWCB	Pending							
I.D.	State acceptance of initial flow recommendations (dependent on development of initial flow recommendations).									
I.D.1.	Review scientific basis, dependent on development of flow recommendations by FWS.	UT/CO	Pending							
I.D.2.	Assess legal and physical availability of water.	UT/CO	Complete	No work has been done in Utah on water availability. CO completed work on a water availability study for the White River in early 1995 & the work was used as the basis of the allocation of Compact waters to the White River.						
I.D.3.	Assess compact considerations (in Colorado).	CWCB	Complete	CO completed work on a water availability study for the White River in early 1995 & the work was used as the basis of the allocation of Compact waters to the White River.						
I.D.4.	CWCB notice of intent to appropriate (in Colorado).	CWCB	On hold							
I.E.	Legally protect identified flows (dependent on development of initial flow recommendations).									
I.E.1.	Protect flows in Colorado.									
I.E.1.a	Appropriate.									
I.E.1.a.(1)	CWCB approval to appropriate.	CWCB	On hold							
>* I.E.1.a.(2)	Colorado Attorney Generals Office file date.	CWCB	On hold							
>* I.E.1.a.(3)	Water court adjudication (litigation dependent).	CWCB	On hold							
I.E.2.	Protect flows in Utah.									
I.E.2.a.	Hold public meeting to establish future appropriation policy.	UT	TBD							
I.E.2.b.	Adopt and implement new policy (new appropriations subject to flow criteria).	UT	TBD							
>* I.E.2.c.	Prepare and execute contracts with water users as required to subordinate diversions associated with approved and/or perfected rights.	UT	TBD, as required							
I.F.	Evaluate and revise as needed flow regimes to benefit endangered fish populations.	FWS/Program	Ongoing	X	X	X	X	X	X	X
<b>II.</b>	<b>RESTORE HABITAT (HABITAT DEVELOPMENT AND MAINTENANCE)</b>									
II.A.	Restore native fish passage at instream barriers.									
II.A.1.	Assess and make recommendations for fish passage at Taylor Draw.	PD	Complete	Taylor Draw fish passage recommendations completed in 1997 when Program determined costs exceeded benefits. Irving 1997.						
<b>III.</b>	<b>REDUCE NEGATIVE IMPACTS OF NONNATIVE FISHES AND SPORTFISH MANAGEMENT ACTIVITIES (NONNATIVE AND SPORTFISH MANAGEMENT)</b>									
III.A.	Reduce negative interactions between nonnative and endangered fishes.									
III.A.1.	Monitor escapement of nonnative fishes from Kenney Reservoir (especially black crappie and channel catfish).	CDO	TBD	Initial assessment completed. If fish stocked in the future, escapement will need to be monitored. Elmblad 1998.						
III.B.	Reduce negative impacts to endangered fishes from sportfish management activities.									
III.B.1.	Assess adequacy of current regulations and options (including harvest) to reduce negative impacts on native fishes from nonnative sportfish and options to reduce angling mortality on native fishes below Kenney Reservoir.	CDO	Complete	CDO completed sportfish regulation/angling regulation changes in 1997 (See Colorado fishing regulations).						
III.B.1.a.	If necessary, assess management options to reduce escapement of black crappie from Kenney Reservoir.	CDO	Complete	CDO completed assessment (CDO 2001).						
<b>V.</b>	<b>MONITOR POPULATIONS AND HABITAT AND CONDUCT RESEARCH TO SUPPORT RECOVERY ACTIONS (RESEARCH, MONITORING, AND DATA MANAGEMENT)</b>									
V.A.	Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions.									
V.A.1.	Determine relative abundance and fate of Colorado pikeminnow congregation below Kenney Reservoir.	FWS-FR	Complete	Elmblad 1997.						
V.A.2.	Monitor the White River fish community downstream of Kenney Reservoir to determine long-term effects of mainstream impoundment on the White River.	FWS-FR	Complete	Elmblad 1997.						

# COLORADO RIVER ACTION PLAN: MAINSTEM

	ACTIVITY	WHO	STATUS	FY 06 10/05 9/06	FY 07 10/06 9/07	FY 08 10/07 9/08	FY 09 10/08 9/09	FY 10 10/09 9/10	FY 11 10/10 9/11	OUT- YEARS
I.	<b>PROVIDE AND PROTECT INSTREAM FLOWS (HABITAT MANAGEMENT)</b>									
I.A.	Colorado River above Gunnison River									
>*	I.A.1. Develop, issue and implement PBO.	FWS	Complete	USFWS 1999b.						
	I.A.2. Initially identify year-round flows needed for recovery.									
	I.A.2.a. Rifle to Roller Dam.	FWS-FR	Complete	Osmundson 2001.						
	I.A.2.b. Roller Dam to 15-Mile Reach.	FWS-FR	Complete	Osmundson 2001.						
	I.A.2.c. 15-Mile Reach.	FWS-FR	Complete	Osmundson and Kaeding 1991.						
	I.A.3. Provide a depletion accounting report as outlined in the 15-Mile Reach PBO.									
	I.A.3.a. Collect data.	CWCB/FWS-ES/BR	Ongoing	X	X	X	X	X	X	X
	I.A.3.b. Develop consumptive use and losses report with CRDSS model to verify level of depletions.	CWCB	Pending	X	12/31/2006			X		12/31/2011
	I.A.3.c. Calculate new depletions every 5 years (2016, etc).	CWCB	Pending							X
	I.A.4. Evaluate need for instream flow water rights.									
	I.A.4.a. Rifle to Roller Dam (Dependent on initial flow recommendations).									
	I.A.4.a.(1) Assess legal and physical availability of water.	CWCB	Complete	Colorado completed work on a water availability study in early 1995 & the work was used as the basis of the allocation of compact water between the five subbasins.						
	I.A.4.a.(2) Assess compact considerations.	CWCB	Complete	Colorado completed work on a water availability study in early 1995 & the work was used as the basis of the allocation of compact water between the five subbasins						
	I.A.4.a.(3) Five-year periodic review of progress under the PBO to determine if instream flow filings are necessary.	CWCB/FWS	Ongoing	X	12/06				X	X
	I.A.4.a.(3)(a) If necessary, evaluate how identified flows will be legally protected.	CWCB	Ongoing	X	12/06				X	X
	I.A.4.b. Roller Dam to 15-Mile Reach (Dependent on initial flow recommendations).									
	I.A.4.b.(1) Assess legal and physical availability of water.	CWCB	Complete	Colorado completed work on a water availability study in early 1995 & the work was used as the basis of the allocation of compact water between the five subbasins.						
	I.A.4.b.(2) Assess compact considerations.	CWCB	Complete	Colorado completed work on a water availability study in early 1995 & the work was used as the basis of the allocation of compact water between the five subbasins.						
	I.A.4.b.(3) Five-year periodic review of progress under the PBO to determine if instream flow filings are necessary.	CWCB/FWS	Ongoing	X	12/06				X	X
	I.A.4.b.(3)(a) If necessary, evaluate how identified flows will be legally protected.	CWCB	Ongoing	X	12/06				X	X
	I.A.4.c. 15-Mile Reach.									
	I.A.4.c.(1) Instream flow water right secured - 581 cfs (July - September).		Complete	On September 2, 1997, instream flow water rights were decreed for 581 and 300 cfs to benefit endangered fishes in the 15-Mile Reach. These water rights have a priority date of the date file which is December 1992 and December 1994 respectively.						
	I.A.4.c.(2) Irrigation season return flows legally protected - 300 cfs.		Complete							
	I.A.5. Provide and legally protect instream flows pursuant to Colorado River PBO.									
>*	I.A.5.a. Pursuant to Ruedi Biological Opinion, deliver 5,000af annually & an additional 5,000af 4 out of 5 years (ongoing and protect by short-term agreement).	BR/CWCB	Ongoing	X	X	X	X	X	X	X
>*	I.A.5.b. Execute long-term lease for 10,825 af from Ruedi Reservoir.	BR/FWS/CWCB	Complete	2012 lease signed June 23, 2003.						
>*	I.A.5.b.(1) Provide water annually pursuant to long-term lease.	BR/CWCB	Ongoing	X	X	X	X	X	X	X
	I.A.5.c. Execute 10-year agreement for delivery of 5,412.5 af by West Slope water users.	CRWCD/FWS	Complete	Pursuant to the 1999 PBO, in 2000, the Service signed a 10-year agreement with the CRWCD for delivery of 5,412 acre-feet of West Slope water from Wolford Mountain Reservoir (in addition to the original commitment of 6,000 acre-feet).						
>*	I.A.5.c.(1) Provide and protect water deliveries by West Slope water users. To provide water when not available from Wolford due to shortage criteria, Reclamation will provide a backup contract for 5,000 af. from Ruedi Reservoir (by 10/06)	CRWCD/CWCB	Ongoing	X	10/06	X	X	X	X	X
	I.A.5.d. Execute 10-year agreement for delivery of 5,412.5 af by East Slope water users.	DWD/FWS	Complete	Pursuant to the 1999 PBO, in 2000, the Service signed a 10-year agreement with Denver Water to deliver of 5,412 acre-feet of East Slope water from Williams Fork Reservoir.						
>*	I.A.5.d.(1) Provide and protect water deliveries by East Slope water users.	DWD/CWCB	Ongoing	X	X	X	X	X	X	X
	I.A.5.e. Permanent delivery of 10,825 af of water in late summer/early fall to meet base flow needs.									
	I.A.5.e.(1) Identify options.	CRWCD/NWCD/ Denver Water	Draft	Denver Water and Colorado River Water Conservation District 2002.						
	I.A.5.e.(2) Select preferred alternative for delivery.	CRWCD/NWCD/ Denver Water	Ongoing	X						





## COLORADO RIVER ACTION PLAN: MAINSTEM

	ACTIVITY	WHO	STATUS	FY 06 10/05 9/06	FY 07 10/06 9/07	FY 08 10/07 9/08	FY 09 10/08 9/09	FY 10 10/09 9/10	FY 11 10/10 9/11	OUT- YEARS
II.A.4.a.	Preconstruction (contaminants screening, floodability assessments, environmental compliance, design & engineering.	BR/FWS	Complete							
>*	II.A.4.b. Construction (levee breaching ) [NOTE: Subject to review and approval for depression wetlands.]	BR	Complete	Burdick 2002. Levees breached at two sites (19.5 acres total). Levee removal completed and operation, maintenance and evaluation of sites incorporated into ColoradoRiver Subbasin Floodplain Management Plan (Valdez and Nelson 2004b) (IIA6).						
>*	II.A.4.c. Operate and maintain.	BR/FWS	Complete							
	II.A.4.d. Evaluation	FWS	Complete							
	II.A.5. Acquire interest in high-priority flooded bottomland habitats.									
	II.A.5.a. Identify and evaluate sites.	FWS	Complete							
	II.A.5.b. Pre-acquisition planning and identification of acquisition options.	PD	Complete	Acquired 10 sites (394 acres total). Operation, maintenance and evaluation of sites incorporated into Colorado River Subbasin Floodplain Management Plan (Valdez and Nelson 2004b) (IIA6).						
	II.A.5.c. Conduct appraisal/NEPA compliance.	PD	Complete							
>*	II.A.5.d. Negotiate and acquire.	PD	Complete							
	II.A.5.e. Evaluate effectiveness of land acquisition activities and provide recommendations	PD	Complete							
>*	II.A.6. Develop and implement Colorado River Subbasin Floodplain Management Plan (Valdez and Nelson 2004b).	Program	Ongoing	X	X	X	X	X	X	X
	II.A.6.a. Validate and refine Colorado River Subbasin Floodplain Management Plan	Program	Ongoing	X	X	X	X	X	X	X
II.B.	Restore native fish passage at instream barriers.									
II.B.1.	Restore passage at Grand Valley Irrigation Co. Diversion Dam (Palisade)									
	II.B.1.a. Evaluate and implement viable options to restore fish passage.	BR/FWS	Complete	1997						
	II.B.1.a.(1) Obtain landowner consent/agreement.	BR	Complete	Preconstruction activities complete 1997.						
	II.B.1.a.(2) Site design/environmental compliance.	BR	Complete	Preconstruction activities complete 1997.						
>*	II.B.1.a.(3) Construct.	BR	Complete	GVIC passage construction completed in 01/98.						
>*	II.B.1.a.(4) Operate and maintain.	FWS-FR/BR	Ongoing	X	X	X	X	X	X	X
	II.B.1.a.(5) Monitor and evaluate success.	FWS-FR/BR	Complete	Burdick 1999.						
	II.B.1.b. Screen GVIC diversion to prevent endangered fish entrapment, if warranted.									
	II.B.1.b.(1) Design.	BR	Complete	1999						
>*	II.B.1.b.(2) Construct.	BR	Complete	GVIC diversion canal fish screen completed in 05/02, modifications completed March 2004.						
>*	II.B.1.b(3) Operate and maintain.	FWS-FR/BR	Ongoing	X	X	X	X	X	X	X
II.B.2.	Restore fish passage at Price Stubb.									
II.B.2.a.	Evaluate and implement viable options.									
	II.B.2.a.(1) Obtain landowner consent/agreement.	BR	Complete							
	II.B.2.a.(2) Site design/environmental compliance.	BR	Complete							
>*	II.B.2.a.(3) Construct.	BR	Pending		X	X				
>*	II.B.2.a.(4) Operate and maintain.	TBD	Pending		X	X	X	X	X	X
	II.B.2.a.(5) Monitor and evaluate success.	FWS-FR/BR	Pending		X					
II.B.3.	Restore fish passage at Government Highline (Roller Dam).									
II.B.3.a.	Evaluate and implement viable options.									
	II.B.3.a.(1) Site design/environmental compliance.	BR	Complete	2003						
>*	II.B.3.a.(2) Construct.	BR	Complete							
>*	II.B.3.a.(3) Operate and maintain.	BR	Ongoing	X	X	X	X	X	X	X
	II.B.3.a.(4) Monitor and evaluate success.	FWS-FR/BR	Ongoing	X	X					
	II.B.3.b. Screen Government Highline diversion to prevent endangered fish entrapment									
	II.B.3.b.(1) Design.	BR	Complete	2002						
>*	II.B.3.b.(2) Construct.	BR	Complete	August 2005.						
	II.B.3.b.(3) Evaluate screening.	FWS-FR/BR	Ongoing	X						
II.C.	Support actions to reduce or eliminate contaminant impacts. [NOTE: Contaminants remediation (in all reaches) will be conducted independently of and funded outside of the Recovery Program.]									
II.C.1.	Support actions to reduce or eliminate contaminant impacts of selenium in the Grand Valley.	FWS-ES	Ongoing	X	X	X	X	X	X	X
II.C.2.	Support remediation of groundwater contamination at the Atlas Mill tailings site.	FWS-ES	Ongoing	X	X	X	X	X	X	X
II.C.3.	Identify measures to minimize risk of hazardous materials spills in Black Rocks and Westwater Canyon from transport along the adjacent railway to protect humpback chub populations.	FWS-ES	Ongoing	X	X	X	X	X	X	X
III.	<b>REDUCE NEGATIVE IMPACTS OF NONNATIVE FISHES AND SPORTFISH MANAGEMENT ACTIVITIES (NONNATIVE AND SPORTFISH MANAGEMENT)</b>									
III.A.	Develop and implement control programs in reaches of the Colorado River occupied by endangered fishes. Each control activity will be evaluated for effectiveness and then continued as needed. See III.A.2.c.1.& 2. under General Recovery Program Support Action Plan.									
III.A.1.	Determine relationship between Aspinall test flows and nonnative fish abundance.	UDWR/ FWS-FR	Complete	McAda & Ryel 1999.						

## COLORADO RIVER ACTION PLAN: MAINSTEM

	ACTIVITY	WHO	STATUS	FY 06 10/05 9/06	FY 07 10/06 9/07	FY 08 10/07 9/08	FY 09 10/08 9/09	FY 10 10/09 9/10	FY 11 10/10 9/11	OUT- YEARS	
>*	III.A.2. Reclaim ponds in critical habitat.	CDOW	Complete	Martinez 2004.							
	III.A.2.a. Evaluate and make recommendations.	CDOW	Complete								
	III.A.3. Nonnative cyprinids and centrarchids in nursery habitats.										
	III.A.3.a. Remove small nonnative cyprinids from backwaters and other low velocity habitats.	CDOW/UDWR	Complete	Trammell et al. 2002. Report completed; development and implementation of control program on hold.							
	III.A.3.b. Remove nonnative centrarchids from backwaters and other low velocity habitats.	FWS	Complete	Osmundson 2003. Report completed; development and implementation of control program on hold.							
	III.A.4. Preclude escapement from ponds in critical habitat as needed and feasible.										
	III.A.4.a. Evaluate sources of nonnative fishes and make recommendations.	CDOW/FWS	Ongoing	X							
>*	III.A.5. Develop and implement program to identify required level of channel catfish control.	FWS	On hold	Smallmouth bass considered higher priority (2004).							
>*	III.A.6. Develop and implement program to identify required level of smallmouth bass control.	FWS	Ongoing	X	X						
	III.B. Reduce negative impacts to endangered fishes from sportfish management activities.										
>*	III.B.1. Evaluate control options and implement measures to control nonnative fish escapement from Highline Reservoir.	CDOW/ CRWCD	Complete	Fish barrier net installed in Highline Reservoir 8/99; replaced in 2005.							
	III.B.1.a. Operate and maintain Highline Reservoir net.	CDOPR	Ongoing	X	X	X	X	X	X	X	
	III.B.1.b. Evaluate Highline Reservoir net.	CDOW	Complete	Martinez 2002.							
	III.B.2. Remove bag and possession limits on warmwater nonnative sportfishes within critical habitat in Colorado.	CDOW	Complete	See Colorado fishing regulations.							
	III.B.4. Develop basinwide aquatic management plan to reduce nonnative fish impacts while providing sportfishing opportunities.	CDOW	Complete	CDOW 2003b.							
>*	III.B.4.a. Implement CDOW's Colorado River Aquatic Management Plan.	CDOW	Ongoing	X	X	X	X	X	X	X	
	<b>IV. MANAGE GENETIC INTEGRITY AND AUGMENT OR RESTORE POPULATIONS (STOCKING ENDANGERED FISHES)</b>										
	IV.A. Augment or restore populations as needed, and as guided by the Genetics Management Plan.										
	IV.A.1. Razorback sucker.										
	IV.A.1.a. Develop experimental augmentation plan and seek Program acceptance.	FWS-FR	Complete	Burdick et al. 1995.							
	IV.A.1.b. Implement experimental augmentation plan.										
>	IV.A.1.b.(1) Stock fish.	FWS-FR	Complete	Burdick 2003.							
	IV.A.1.b.(2) Monitor and evaluate results; make recommendations regarding further augmentation.	FWS-FR	Complete	Burdick 2003.							
	IV.A.2. Monitor the fish community in the upper Colorado River (above Palisade) and develop management action plan, including recommendations for Colorado pikeminnow and razorback sucker augmentation.	CDOW	Complete	Anderson 1997.							
	IV.A.3. Develop integrated stocking plan for razorbacks in the Colorado River in Colorado.	CDOW/PD	Complete	Nesler et al. 2003.							
	IV.A.3.a. Program acceptance.	CDOW/PD	Complete	Nesler et al. 2003.							
>	IV.A.3.b. Implement razorback sucker integrated stocking plan.	CDOW/PD	Ongoing	X	X	X	X	X	X	X	
	IV.A.3.b. Evaluate stocking success as identified in monitoring plan for stocked fish.	Program	Ongoing	X	X	X	X	X	X	X	
	IV.A.4. Develop integrated stocking plan for Colorado pikeminnow in the Colorado River in Colorado	CDOW/PD	Complete	Nesler et al. 2003.							
	IV.A.4.a. Program acceptance.	CDOW/PD	Complete	Nesler et al. 2003.							
>	IV.A.4.b. Implement Colorado pikeminnow integrated stocking plan.	CDOW/PD	On hold	X	X	X	X	X	X	X	
	IV.A.4.c. Evaluate stocking success as identified in monitoring plan for stocked fish.	Program	Ongoing	X	X	X	X	X	X	X	
	IV.A.5. Develop integrated stocking plan for bonytail in the Colorado River from Palisade to Loma	CDOW	Complete	Nesler et al. 2003.							
	IV.A.5.a. Program acceptance.	CDOW/PD	Complete	Nesler et al. 2003.							
>	IV.A.5.b. Implement bonytail integrated stocking plan.	FWS/CDOW	Ongoing	X	X	X	X	X	X	X	
	IV.A.5.c. Evaluate stocking success as identified in monitoring plan for stocked fish.	Program	Ongoing	X	X	X	X	X	X	X	
	IV.A.6. Develop integrated stocking plan for the four endangered fish in the Colorado River in Utah.										
	IV.A.6.a. Prepare plan.	UDWR	Complete	Nesler et al. 2003.							
	IV.A.6.b. Program acceptance.	UDWR	Complete	Nesler et al. 2003.							
>	IV.A.6.c. Implement plan.	UDWR	Ongoing	X	X	X	X	X	X	X	
	IV.A.6.d. Evaluate stocking success as identified in monitoring plan for stocked fish.	LFL/FWS/ STATES	Ongoing	X	X	X	X	X	X	X	
	<b>V. MONITOR POPULATIONS AND HABITAT AND CONDUCT RESEARCH TO SUPPORT RECOVERY ACTIONS (RESEARCH, MONITORING, AND DATA MANAGEMENT)</b>										
	V.A. Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions.										
	V.A.1. Determine Colorado pikeminnow larval drift into Lake Powell.	NPS	Complete	Muth and Wick 1996, 1997.							
	V.B. Monitor populations per requirements in the 15-Mile Reach PBO.										
	V.B.1. Determine initial baselines and indices for Colorado pikeminnow and humpback chub.	PD	Complete	Appendix to biological opinion (USFWS 1999a) and recovery goals (USFWS 2002a, 2002c).							



## COLORADO RIVER ACTION PLAN: MAINSTEM

	ACTIVITY	WHO	STATUS	FY 06 10/05 9/06	FY 07 10/06 9/07	FY 08 10/07 9/08	FY 09 10/08 9/09	FY 10 10/09 9/10	FY 11 10/10 9/11	OUT- YEARS
V.B.1.a.	Evaluate population response, per 15-Mile Reach PBO (every 5 years beginning in FY 05).	FWS	Ongoing	X	X	X	X	X	X	X
V.B.2.	Determine initial baselines and indices for razorback sucker and bonytail.	PD	Complete	See recovery goals, USFWS 2002b, 2002d.						
V.B.2.a.	Evaluate population response, per 15-Mile Reach PBO (every 5 years beginning in FY 05).	FWS	Ongoing	X	X	X	X	X	X	X
V.B.3.	Revise population indices to conform to recovery goals.	FWS	Complete	2003 PBO evaluation (in concert with 2003 RIPRAP assessment).						
V.B.4.	Monitor incidental take.									
V.B.4.a.	Develop plan to monitor incidental take of endangered fishes in diversion structures.	FWS	Complete	"Plan" completed in that fish are being retrieved from canals until the canals are screened and screens are fully functional (anticipated in FY 05). Screens will prevent entrainment of adult, subadult, and juvenile fish (preventing entrainment of adult and subadult fish required is by recovery goals) because they are 3/32 mesh.						
V.B.4.b.	Implement plan to monitor incidental take of endangered fish in diversion structures.	FWS	Ongoing							
V.C.	Estimate humpback chub populations. (Sampling occurs in September and October, overlapping fiscal years.)									
V.C.1.	Black Rocks. See McAda 2002.	FWS	Ongoing		X	X			X	X
V.C.2.	Westwater. See Hudson and Jackson 2003.	UDWR	Ongoing		X	X			X	X
V.C.3.	Cataract Canyon	UDWR/Valdez	Ongoing		X	X			X	X
V.D.	Estimate pikeminnow populations in the upper Colorado River (including Gunnison River). Three years sampling (e.g., FY 03, 04, 05) followed by two years no sampling; data analysis and report write-up in first year of no sampling (e.g., FY 06).	FWS	Ongoing			X	X	X		X

## COLORADO RIVER ACTION PLAN: GUNNISON RIVER

	ACTIVITY	WHO	STATUS	FY 06 10/05 9/06	FY 07 10/06 9/07	FY 08 10/07 9/08	FY 09 10/08 9/09	FY 10 10/09 9/10	FY 11 10/10 9/11	OUT- YEARS
<b>I.</b>	<b>PROVIDE AND PROTECT INSTREAM FLOWS (HABITAT MANAGEMENT)</b>									
I.A.	Identify fish habitat and flow needs.									
I.A.1.	Initially identify year-round flows needed for recovery (Flow recommendations will be provided upon completion of Aspinall Unit studies.)									
I.A.1.a.	Complete draft technical synthesis report.	FWS	Complete	McAda 2000.						
I.A.1.b.	Complete draft biological assessment.	BR	Pending			X				
I.A.1.c.	Complete final technical synthesis report.	FWS	Complete	McAda 2003.						
I.A.1.d.	Complete final biological assessment.	BR	Pending			X				
I.A.1.e.	Complete draft biological opinion.	FWS	Pending				X			
I.A.1.f.	Complete draft NEPA document .	BR	Pending			X				
I.A.1.g.	Complete final biological opinion (FWS) and NEPA document (BR).	FWS/BR	Pending				X			
I.A.1.h.	Complete ESA Section 7 consultation resulting in a programmatic biological opinion (PBO) for the Gunnison Basin.	FWS/BR/WAPA	Pending							X
I.B.	State acceptance of initial flow recommendations (Flow recommendations will be provided upon completion of Aspinall Unit studies.)									
I.B.1.	Review scientific basis, dependent on development of flow recommendations by FWS.	CWCB/CDOW	Complete	Complete with acceptance of McAda 2003.						
I.B.2.	Assess legal and physical availability of water.	CWCB	Complete	Colorado completed work on a water availability study in early 1995 & the work was used as the basis of the allocation of compact water between the five subbasins.						
I.B.3.	Assess compact considerations.	CWCB	Complete	Colorado completed work on a water availability study in early 1995 & the work was used as the basis of the allocation of compact water between the five subbasins.						
I.B.4.	CWCB notice of intent to appropriate (in Colorado).	CWCB	On hold							
I.C.	Legally protect identified flows.									
I.C.1.	Acquire (flow recommendations will be provided upon completion of Aspinall Unit studies.)									
I.C.1.a.	Assess, acquire and convert water rights to instream flows.	CWCB	On hold							
I.C.2.	Appropriate (flow recommendations will be provided upon completion of Aspinall Unit studies.)									
I.C.2.a.	CWCB approval to appropriate.	CWCB	On hold							
>* I.C.2.b.	Colorado Attorney General's Office file date.	CWCB	On hold							
>* I.C.2.c.	Water court adjudication (litigation dependent).	CWCB	On hold							
I.C.3.	Deliver.									
>* I.C.3.a.	Aspinall Unit supplemental releases to maintain 2,000 cfs minimum flow at Colorado-Utah state line 9 out of 10 years. Provide annual report.	BR	Through 01							
I.C.3.b.	Flows from Aspinall Unit for research studies.									
>* I.C.3.b.(1)	Deliver flows.	BR	Complete							
>* I.C.3.b.(2)	Protect research flows.	FWS/BR/ CWCB	Complete	An interim contact is in place between Reclamation, Service & CWCB. Long term legal protection of Gunnison River flows will occur after completion of Aspinall biological opinion (BR 04/95-FY96).						
>* I.C.3.c.	Continue annual coordination (meeting 3 times/year) of Aspinall operation until biological opinion complete.	BR	Ongoing							
I.C.3.d.	Flows from Paonia Reservoir in accordance with FWS Horsethief Biological Opinion.									
>* I.C.3.d.(1)	Deliver flows.	BR	Ongoing	X	X	X	X	X	X	X
I.C.3.e.	Flows from Aspinall Unit pursuant to Aspinall Biological Opinion.									
I.C.3.e.(1)	Determine if change in water right and/or contract is needed.	BR	Pending							
I.C.3.e.(2)	Enter into contract if needed.	BR	Pending							
>* I.C.3.e.(3)	Deliver flows.	BR	Pending							
I.C.3.e.(3)(a)	Study Gunnison River return flows to determine consumptive use to be charged against flow deliveries.	USGS	Complete	Kuhn and Williams 2004.						
I.D.	Evaluate and revise as needed flow regimes to benefit endangered fish populations.	FWS/Program	Ongoing	X	X	X	X	X		X
I.E.	Initiate investigations of the feasibility of modifying releases from Aspinall Unit dams to increase water temperatures that would allow for upstream expansion of Colorado pikeminnow in the Gunnison River.	BR/Contract	Complete	Boyer and Cutler 2004.						
<b>II.</b>	<b>RESTORE HABITAT (HABITAT DEVELOPMENT AND MAINTENANCE)</b>									
II.A.	Restore and manage flooded bottomland habitat.									
II.A.1.	Develop management plan for Escalante State Wildlife Area.		Complete 5/94	Burdick 1994.						

## COLORADO RIVER ACTION PLAN: GUNNISON RIVER

	ACTIVITY	WHO	STATUS	FY 06 10/05 9/06	FY 07 10/06 9/07	FY 08 10/07 9/08	FY 09 10/08 9/09	FY 10 10/09 9/10	FY 11 10/10 9/11	OUT- YEARS
II.A.2.	Develop and implement levee removal strategy at high-priority sites.									
II.A.2.a.	Preconstruction (contaminants screening, floodability assessments, environmental compliance, design & engineering).	BR	Complete	Construction completed at Escalante State Wildlife Area (200 acres) in January 2001; Butch Craig's (Unaweep Charolais Ranch) (98.7) was completed October 2003. Levee removal completed and operation, maintenance and evaluation of sites incorporated into Colorado River Subbasin Floodplain Management Plan (Valdez and Nelson 2004b) (IIA4).						
>* II.A.2.b.	Construction (levee removal)	BR	Complete							
II.A.2.c.	Operate and maintain.	BR/FWS	Complete							
II.A.2.d.	Evaluation.	FWS	Complete							
II.A.3.	Acquire interest in high-priority flooded bottomland habitats.									
II.A.3.a.	Identify and evaluate sites.	FWS	Complete	Three sites acquired (198 acres total). Floodplain acquisition completed and operation, maintenance and evaluation of sites incorporated into Colorado River Subbasin Floodplain Management Plan (Valdez and Nelson 2004b) (IIA4).						
II.A.3.b.	Pre-acquisition planning and identification of acquisition options.	PD	Complete							
II.A.3.c.	Conduct appraisal/NEPA compliance.	PD	Complete							
>* II.A.3.d.	Negotiate & acquire.	PD	Complete							
II.A.3.e.	Evaluate effectiveness of land acquisition activities and provide recommendations.	PD	Complete							
>* II.A.3.	Develop and implement Colorado River Subbasin Floodplain Management Plan (Valdez and Nelson 2004b).	Program	Ongoing	X	X	X	X	X	X	X
II.B.	Restore native fish passage at instream barriers.									
II.B.1.	Restore passage at Redlands.									
II.B.1.a.	Assess and make recommendations for fish passage.	FWS	Complete	Burdick and Kaeding 1990.						
II.B.1.b.	Implement viable options to restore fish passage.									
II.B.1.b.(1)	Design passage, conduct NEPA compliance.	BR	Complete	1996 RR; Passage under construction as of 11/20/95, to be completed by 04/96, 96status.as						
>* II.B.1.b.(2)	Construct fish ladder.	BR	Complete	Construction completed in June 1996 (Burdick 2001).						
>* II.B.1.c.	Operate and maintain fish ladder.	FWS-FR/BR	Ongoing	X	X	X	X	X	X	X
II.B.1.d.	Monitor and evaluate success.	FWS-FR/BR	Complete	Burdick 2001.						
II.B.1.e.	Identify minimum flows below Redlands Diversion Dam.	FWS-FR	Complete	Burdick 1997.						
>* II.B.1.f.	Deliver flows below Redlands.	BR	Ongoing	X	X	X	X	X	X	X
II.B.1.g.	Screen Redlands diversion structure to prevent endangered fish entrainment									
II.B.1.g.(1)	Design.	BR	Complete	2003						
>* II.B.1.g.(2)	Construct.	BR	Complete	August 2005.						
>* II.B.1.h.	Operate and maintain fish screen.	Redlands	Ongoing	X	X	X	X	X	X	X
II.B.2.	Restore passage at Hartland.									
II.B.2.a.	Assess and make recommendations for fish passage.	FWS-FR	Complete	Burdick and Pfeifer 1996.						
II.B.2.b.	Evaluate viable options to restore fish passage.	BR	Complete	Burdick and Pfeifer 1996. Tetra Tech 2000 (evaluated 3 design options for passage and 3 options for screens).						
II.B.2.c.	Support NRCS interest and efforts to pursue removal of the Hartland Diversion dam.	BR/FWS/PD	Ongoing							
II.B.2.d.	Screen Hartland diversion to prevent endangered fish entrainment, if warranted.									
II.B.2.d.(1)	Assess need.	BR/FWS/PD	Complete							
III.	<b>REDUCE NEGATIVE IMPACTS OF NONNATIVE FISHES AND SPORTFISH MANAGEMENT ACTIVITIES (NONNATIVE AND SPORTFISH MANAGEMENT)</b>									
III.A.	Reduce negative interactions between nonnative and endangered fishes.									
>* III.A.1.	Reclaim ponds in critical habitat	CDOW	Complete	Martinez 2004.						
III.A.1.a.	Evaluate and make recommendations.	CDOW	Complete							
III.A.2.	Develop basinwide aquatic management plan to reduce nonnative fish impacts while providing sportfishing opportunities.	CDOW	Complete	CDOW 2003c.						
>* III.A.2.a.	Implement CDOW's Gunnison River Aquatic Management Plan.	CDOW	Ongoing	X	X	X	X	X	X	X
IV.	<b>MANAGE GENETIC INTEGRITY AND AUGMENT OR RESTORE POPULATIONS (STOCKING ENDANGERED FISHES)</b>									
IV.A.	Augment or restore populations as needed and as guided by the Genetics Management Plan.									
IV.A.1.	Razorback sucker.									
IV.A.1.a.	Develop experimental augmentation plan and seek Program acceptance.	FWS-FR	Complete	Burdick et al 1995.						
IV.A.1.b.	Implement experimental augmentation plan. (Goal: 10 adults/river mile.)									
> IV.A.1.b.(1)	Stock fish.	FWS-FR	Complete	Burdick 2003.						
IV.A.1.b.(2)	Monitor and evaluate results; make recommendations regarding further augmentation	FWS-FR	Complete	Burdick 2003.						
IV.A.2.	Develop integrated stocking plan for Colorado pikeminnow in the Gunnison River.									
IV.A.2.a.	Program acceptance.		Complete	Nesler et al 2003.						

## COLORADO RIVER ACTION PLAN: GUNNISON RIVER

	ACTIVITY	WHO	STATUS	FY 06 10/05 9/06	FY 07 10/06 9/07	FY 08 10/07 9/08	FY 09 10/08 9/09	FY 10 10/09 9/10	FY 11 10/10 9/11	OUT- YEARS
>	IV.A.2.b. Implement Colorado pikeminnow integrated stocking plan.	CDO/FWS	On hold	X	X	X	X	X	X	X
	IV.A.2.c. Evaluate stocking success as identified in monitoring plan for stocked fish.	FWS/CDO		X	X	X	X	X	X	X
	IV.A.3. Develop integrated stocking plan for razorback sucker in the Gunnison River.									
	IV.A.3.a. Program acceptance.		Complete	Nesler et al 2003.						
>	IV.A.3.b. Implement razorback sucker integrated stocking plan.	CDO/FWS	Ongoing	X	X	X	X	X	X	X
	IV.A.3.c. Evaluate stocking success as identified in monitoring plan for stocked fish.	LFL/FWS/STATE S/PD	Ongoing	X	X	X	X	X	X	X
V.	<b>MONITOR POPULATIONS AND HABITAT AND CONDUCT RESEARCH TO SUPPORT RECOVERY ACTIONS (RESEARCH, MONITORING, AND DATA MANAGEMENT)</b>									
	V.A. Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions.									
	V.A.1. Conduct Colorado pikeminnow and razorback sucker inventory in Gunnison River above Redlands.	FWS-FR	Complete	Burdick 1995.						
	V.A.2. Identify additional spawning sites of endangered fishes on the Gunnison River. Initial report on larval sampling due 8/06.	FWS-FR	Ongoing	X	X	X				
	V.A.3. Conduct survey for endangered fish	FWS-FR	Ongoing	X	X	X				

## COLORADO RIVER ACTION PLAN: DOLORES RIVER

	ACTIVITY	WHO	STATUS	FY 06 10/05 9/06	FY 07 10/06 9/07	FY 08 10/07 9/08	FY 09 10/08 9/09	FY 10 10/09 9/10	FY 11 10/10 9/11	OUT- YEARS
<b>III.</b>	<b>REDUCE NEGATIVE IMPACTS OF NONNATIVE FISHES AND SPORTFISH MANAGEMENT ACTIVITIES (NONNATIVE AND SPORTFISH MANAGEMENT)</b>									
III.A.	Reduce negative interactions between nonnative and endangered fishes.									
III.A.1.	Assess need and options to control nonnative fish escapement from McPhee Reservoir.	BR	Complete	McPhee Reservoir management plan was prepared by CDOW & accepted by the Service on 05/25/95.						
III.B.	Reduce negative impacts to endangered fishes from sportfish management activities.									
III.B.1.	Identify potential conflicts between present fish management practices in McPhee Reservoir and endangered fishes and formulate an alternative management plan.	CDOW	Complete	McPhee Reservoir management plan was prepared by CDOW & accepted by the Service on 05/25/95.						
<b>V.</b>	<b>MONITOR POPULATIONS AND HABITAT AND CONDUCT RESEARCH TO SUPPORT RECOVERY ACTIONS (RESEARCH, MONITORING, AND DATA MANAGEMENT)</b>									
V.A.	Survey native and nonnative fish in Dolores River (UDWR funding outside of Program).	UDWR	Pending		X	X				

<b>ANNUAL OPERATING COSTS &amp; FACILITY O&amp;M: Total</b>		<b>FY06</b>	<b>FY07</b>	<b>FY08</b>	<b>FY09</b>	<b>FY10</b>							
Estimated Annual Operating Costs and Facility Operation & Maintenance		5,927	6,075	6,227	6,383	6,542							
<b>CAPITAL FUNDING (estimates):</b>													
	<b>Total</b>	<b>FY99</b>	<b>FY00</b>	<b>FY01</b>	<b>FY02</b>	<b>FY03</b>	<b>FY04</b>	<b>FY05</b>	<b>FY06</b>	<b>FY07</b>	<b>FY08</b>	<b>FY09</b>	<b>FY10</b>
Yampa River Management Plan	11,450	113	92		65		11	400	0	1,729	2,350	3,350	3,340
Grand Valley Water Management	7,542	97	3,427	1,275	266	281	1,429	404	363				
Coordinated Reservoir Operations	346	245	101										
Ruedi Water and Steamboat sales	235	126	109										
Acquire New Water to Enhance Flows	222	42	40	92	29	15	4						
Bottomlands Restoration	8,487	2,847	2,069	1,055	264	535	1,433	284					
Hartland Fish Passage	58	57		1									
GVIC Fish Passage	23	28			10	4	-19						
Price/Stubbs Fish Passage	6,323	175	200	240	74	49	111	197	3,000	2,277			
Gov't Highline (Roller Dam) Passage	6,039	52	75	114	212	1,473	3,814	35	264				
Redlands Screening	6,959	6	7		63	464	465	5,237	717				
Hartland Fish Screening	0												
GVIC Fish Screening	3,650	2	198	410	2,108	121	561	1			250		
Gov't Highline (Roller Dam) Screening	9,825			22	284	434	749	7,437	898				
Tusher Wash Screening	7,935	31	5	44	37	3	18	26	2,800	4,970			
Endangered Fish Hatchery Facilities	4,304	2,077	898	704	191	145	10	279					
Nonnative Fish Control	1,050	172	192	272	414								
Highline Reservoir Screening	260	255	5										
Capital Program Management	4,207	405	400	310	216	376	400	400	400	400	400	250	250
Public Involvement Plans	259	79	44	31	35	21	9	10	10	10	10	0	0
<b>Total</b>	<b>79,175</b>	<b>6,809</b>	<b>7,862</b>	<b>4,570</b>	<b>4,268</b>	<b>3,922</b>	<b>8,995</b>	<b>14,710</b>	<b>8,452</b>	<b>9,386</b>	<b>3,010</b>	<b>3,600</b>	<b>3,590</b>

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## **APPENDIX: CRITICAL HABITAT ANALYSIS**

**September 8, 1994**

### **BACKGROUND**

The final rule determining critical habitat for the four endangered fishes was published in the Federal Register on March 21, 1994, and the final designation became effective on April 20, 1994. As stated in the Section 7 Agreement and in the RIPRAP, the Recovery Program is intended to serve as the reasonable and prudent alternative to avoid the likely destruction or adverse modification of critical habitat, as well as to avoid the likelihood of jeopardy to the continued existence of the endangered fishes resulting from depletion impacts of new projects and all existing or past impacts related to historic water projects with the exception of the discharge by historic projects of pollutants such as trace elements, heavy metals, and pesticides. Once critical habitat was designated, the Service reviewed the RIPRAP, and in coordination with the Recovery Program's Management Committee, developed modifications to fulfill this intent.

The Service's review concluded that many of the actions in the existing RIPRAP would not only contribute to allowing the Recovery Program to continue to serve as the reasonable and prudent alternative to avoid the likelihood of jeopardy to the continued existence of the endangered fishes, but also would avoid the likely destruction or adverse modification of critical habitat for the endangered fishes. Specifically, the RIPRAP already included several of the following kinds of habitat-related actions for each subbasin (except the Dolores River): instream-flow acquisition, legal protection, and delivery from modified reservoir operations; fish passage restoration; and flooded bottomland restoration. Thus, the critical habitat modifications to the RIPRAP were not extensive. They were primarily intended to provide further definition to recovery actions already in the RIPRAP and to provide increased certainty that the Recovery Program can continue to serve as the reasonable and prudent alternative for projects subject to Section 7 consultations. Since many historic projects will be required to reinitiate Section 7 consultation with the Service due to the critical habitat designation, the Service encouraged Recovery Program participants to complete these RIPRAP actions as quickly as possible to facilitate fish recovery.

Destruction or adverse modification of critical habitat is defined at 50 CFR 402.02 as a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Section 7 consultation is initiated by a Federal agency when its action may affect critical habitat by impacting any of the primary constituent elements or reducing the potential of critical habitat to develop those elements. The primary constituent elements defined in the final rule as necessary for survival and recovery of the four Colorado River endangered fishes include, but are not limited to, 1) water (quantity and quality), 2) physical habitat (areas inhabited or potentially habitable, including river channel, bottom lands, side channels, secondary channels, oxbows, backwaters, and other areas); and 3) biological environment (food supply, predation, and competition). The Service reviewed the RIPRAP to determine if it addressed these constituent elements and to identify existing and new actions that will contribute to the RIPRAP serving as a reasonable and prudent alternative to the likely destruction or adverse modification of critical habitat. Then, in coordination with the Management Committee, the Service recommended additions needed to address all of

the constituent elements, to better define the expected result of the recovery action, and to increase the certainty that the constituent elements of critical habitat would be protected.

## MODIFICATIONS

1. Instream Flow Protection: Modifications were made under this recovery element to protect the water quantity constituent element.
  - a. Adjudication of the instream-flow appropriations to be filed by the Colorado Water Conservation Board (on the Yampa, Little Snake, White, Colorado, and Gunnison rivers) was added since these instream-flow appropriation filings will not be legally protected until they are adjudicated in water court. Adjudication may take up to three years after filing, depending on the amount of litigation.
  - b. To provide more immediate habitat improvements in the Grand Valley area via instream flows, a modification was made under water acquisition for the 15-mile reach to enter into an interim agreement for uncommitted water remaining in Ruedi Reservoir after Round II water sales are completed or commitments to contracts are agreed to. If flow recommendations for the 15-mile reach are met from other sources during this interim agreement (thereby causing the additional water from Ruedi to exceed the flow recommendations), Ruedi would be relieved of this additional obligation. At the end of the interim agreement (whether the flow recommendations have been met or not), Reclamation may pursue additional water sales; however, these sales would be subject to review under Section 7 of the Endangered Species Act.
2. Habitat Restoration: Modifications were made under this recovery element to protect the physical habitat constituent element.
  - a. Access to historically inundated floodplain habitats is believed to be very important to recovery of the razorback sucker and Colorado pikeminnow. Although the Recovery Program has begun a program to evaluate and restore flooded bottomland areas, the fish's riverine habitat has been and continues to be so channelized by levees, dikes, rip-rap, and tamarisk, that broader floodplain restoration and protection (e.g., through mechanisms such as landowner incentives, conservation easements, and perhaps zoning) is needed. Recovery Program participants were not sure exactly how such mechanisms might be implemented, so an issue paper on restoration and protection of the floodplain has been developed. The issue paper first addressed what restoration and protection measures are needed and then how they might be accomplished. After completion of the issue paper, viable options were identified and a restoration strategy developed for selected geographic areas (e.g. Grand Valley and Ashley Valley). Floodplain restoration activities may be implemented by the Recovery

Program or by Recovery Program participants individually. Responsibilities of other agencies were identified in the issue paper, and actions were implemented consistent with authorities outside the Recovery Program.

- b. The Recovery Program has been evaluating agricultural diversion structures in the Yampa River and has discovered that although not all of these structures impede Colorado pikeminnow passage, annual bulldozing in critical habitat in the river required to maintain many of these structures may destroy or adversely modify fish habitat. Upgrading these structures so that they are more secure would eliminate the need for annual bulldozing and consequent adverse modification of critical habitat.
  - c. Fish passage structures are planned for a number of diversion dams in the Upper Basin in the current RIPRAP. However, without screens or "entrainment preclusion structures," adult fish, especially razorback sucker, may go into the diversion canals. To keep fish in the more secure river habitat, a modification was made to include an entrainment preclusion structure on the proposed passage structure at the Grand Valley Project diversion (Roller Dam). Also, the need for an entrainment preclusion structure at Redlands diversion dam will be evaluated after construction of the fish ladder there.
3. Reduction of Negative Impacts of Nonnative Fishes and Sportfish Management Activities: Modifications were made under this recovery element to protect the constituent element of the fishes biological environment.
- a. Competition with and predation by introduced species is widely assumed to have played a role in the decline of the endangered fishes. The Recovery Program has been and continues to assess options to reduce negative impacts of problematic nonnative species, sportfish management, and angling mortality. Although we cannot yet fully predict the results of implementing some of these management options, we need to begin to implement the most viable ones. Therefore, actions have been added to implement (in cooperation with the States) viable measures which will decrease negative impacts of certain nonnative fishes, sportfish management, and angling mortality. Specific actions were added to selectively remove northern pike from the Yampa River and northern pike and centrarchids from the Gunnison River and possibly Paonia Reservoir.