Upper Colorado River Endangered Fish Recovery Program

RECOVERY IMPLEMENTATION PROGRAM
SECTION 7 CONSULTATION, SUFFICIENT PROGRESS,
AND HISTORIC PROJECTS AGREEMENT
October 15, 1993 (Revised March 8, 2000)

AND

RECOVERY IMPLEMENTATION PROGRAM
RECOVERY ACTION PLAN
(RIPRAP)

March 24, 2015

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 is a measure of accomplishment the U.S. Fish and Wildlife Service uses to determine if 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[1] 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

[1] 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)

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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.*), state water and wildlife law, interstate compacts, and authorized purposes of Bureau of Reclamation projects. 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/PLANS

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 (ESA; 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). Once critical habitat was designated, the RIPRAP was reviewed by the Service and modified in coordination with the Management Committee. Final recovery goals for the four endangered fish, which amend and supplement the former recovery plans, were approved in August 2002 (U.S. Fish and Wildlife Service 2002a, 2002b, 2002c, 2002d).

The 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. In a lawsuit by Grand Canyon Trust over the humpback chub recovery goals, U.S. District Court 9th Circuit ruled that review of the substance of Service recovery plans is inappropriate under the Administrative Procedure Act and the ESA, but ordered the goals vacated until time and cost estimates are updated. The Service is in the process of reviewing and updating the species recovery plans.

In the context of the recovery goals/plans, recovery of humpback chub, bonytail, and razorback sucker will occur in 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. Based on the Colorado pikeminnow recovery plan, recovery of Colorado pikeminnow will occur in 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 to achieve recovery in the Upper Basin recovery unit.

Five-year status reviews were completed for Colorado pikeminnow and humpback chub in 2011 (USFWS 2011 a & b) and for bonytail and razorback sucker in 2012 (USFWS 2012 a & b). The reviews found that the species remain "endangered." Progress was indicated on whether a recovery factor criterion was "met", "partially met", or "not met." In light of expanding numbers and distribution of razorback sucker, a species status assessment, which the Service uses to characterize species viability, will be initiated for the razorback sucker in 2015.

In 2012, USFWS convened a Colorado Pikeminnow Recovery Team to revise that species' recovery plan to incorporate new information. The Recovery Team met for the first time November 29 -30, 2012. Based on discussions at that initial meeting, the USFWS decided to expand the Recovery Team to include representatives from Utah, Colorado, and New Mexico due to heightened concern over threats from nonnative fish species. Wyoming chose to participate in plan revision through the stakeholder and public review process. The expanded Recovery Team met several times in 2013. The USFWS provided a draft Colorado pikeminnow recovery plan for internal Service review in October 2014. The next step is stakeholder review (primarily Recovery Programs), followed by public comment (via Federal Register notice). The USFWS is convening a humpback chub Recovery Team and will update that recovery plan next. The Program Director's office has recommended deferring update of the razorback sucker and bonytail recovery plans until new information warrants.

1.3 RECOVERY ACTION PLAN PURPOSE

This Recovery Implementation Program Recovery Action Plan (RIPRAP) has been developed and updated using the best, most current information available on the species' status and the recovery goals for the four endangered fish species. The RIPRAP is intended to provide an operational plan and schedule for implementing recovery actions by the Recovery Program, including development of the Recovery Program's annual work plan and future budget needs. Specifically, the RIPRAP identifies the actions that are necessary to recover the endangered fishes, including schedules and budgets for implementing those actions. Accomplishment of these recovery actions allows 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 water projects in place when the Recovery Program was initiated (January 21, 1988) (historic water projects), except impacts from contaminants,

in accordance with the October 15, 1993 Section 7 Agreement (Revised March 8, 2000). The RIPRAP was incorporated and is considered part of that Agreement.

1.4 ESTIMATED COST OF RECOVERY ACTIONS

The estimated total budget for the Recovery Program from FY 2015–FY 2023 is approximately $106.64 million[1]. Funding for the Recovery Program is expected to come from the following sources:

a. An annual operating budget of approximately $7 million, adjusted annually for inflation. As per passage of PL 112-270, which reauthorized PL 106-392, annual funding will be applied to the full suite of the Recovery Program's actions through FY2019, with the exception of capital projects. The sources of these funds are: hydropower revenues from the Colorado River Storage Project; the U.S. Fish and Wildlife Service; and the States of Colorado, Utah, and Wyoming. Additional annual funding will come from one-time water development depletion fees on new projects (post-January 21, 1988). Under the Recovery Program, proponents of new water projects which undergo Section 7 Endangered Species Act consultation 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, 2014, the fee was $20.54 per acre foot; the rate increases to $20.87 per acre foot as of October 1, 2015. The actual rate of water development has not been projected therefore it is difficult to predict the amount of this funding source on an annual basis. Through FY2014, depletion fees and interest earned on these fees totaled $2,317,293. These funds may be accumulated and are used to fund recovery actions pursuant to decisions made by the Recovery Program on an annual basis.

b. Approximately $38.4 million will be spent between FY 2015 and FY 2023 for remaining capital projects. P.L. 106-392 authorized capital 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. In March 2009, Section 9107 of P.L. 111-11 authorized an additional $15 million in federal funds and extended the capital construction period through 2023.

1.5 MEASURING PROGRESS TOWARD RECOVERY AND SCHEDULING RIPRAP ACTIVITIES

To achieve recovery in the Upper Basin, it is essential to fully implement all of the actions in the RIPRAP. This can be accomplished only through cooperation by all Recovery Program participants. In general, actions will be scheduled such that

[1] Expenditures to date may be found in the pie charts of the most recent *Program Highlights* briefing document.

recovery will be achieved in the most expeditious and cost-effective manner possible. However, the schedule may require some adjustment based on sequence and impacts of water development and management actions 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 avoid jeopardy for projects undergoing Section 7 consultation. These actions are identified by the caret ">" in the Recovery Action Plan. Actions that the Service believes are most important to the Recovery Program serving as a reasonable and prudent alternative to adverse modification of critical habitat are identified by an asterisk (*). These careted and (or) asterisked actions will generally be given highest priority for implementation in scheduling and budgeting.

The Recovery Program continually evaluates the outcome of completed RIPRAP actions to determine their effectiveness in contributing to recovery. Ultimately, success of recovery actions 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. Toward that end, Program participants assess progress and update the RIPRAP annually.

1.6 RECOVERY ACTION PLAN STRUCTURE

The substance of the RIPRAP is in Section 4.0, where the specific recovery actions are listed in the RIPRAP tables. In addition, significant accomplishments and shortcomings of the past year are identified in the RIPRAP tables, developed as part of the Recovery Program's annual assessment and update of the RIPRAP.

The first section of the Recovery Action Plan tables identifies general support activities important to the success of the Recovery Program. The subsequent sections that follow the General Recovery Action Plan are for the Green and Colorado rivers and their subbasins in the Upper Basin. Each subbasin table includes recovery actions arranged by 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 table only); and
VII. Provide program planning and support (in the General Recovery Program Support table only).

Section 4.0 is provided in table format 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.

2.0 DESCRIPTON OF RECOVERY ACTION PLAN ELEMENTS

The Recovery Action Plan tables contain brief descriptions of specific recovery actions in each subbasin. This section provides a general description of each recovery element. Specific recovery actions being carried out in each subbasin are discussed in Section 3.0.

2.1 I. IDENTIFY AND PROTECT INSTREAM FLOWS

Recovery cannot be accomplished without securing, protecting, and managing sufficient flows to provide 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, typically characterized in terms of peak and base flow needs over a range of hydrologic conditions. 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 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. The contribution of tributaries to recovery was ranked by Tyus and Saunders (2001).

Flow recommendations have been approved for reaches of the Colorado (Osmundson and Kaeding 1991; McAda 2003), Yampa (Modde and Smith 1995; Modde et al. 1999), Green (Muth et al. 2000), Gunnison (McAda 2003), and Duchesne (Modde and Keleher 2003) rivers. Flows in the Little Snake and Yampa rivers after estimated future depletions were identified in the Yampa River Management Plan and Environmental Assessment (Roehm 2004). Interim flow recommendations for the White River were completed in 2004 (Irving et al. 2004), and are currently under revision. A White River management plan will be drafted in 2015-16, which will ultimately serve as the basis for

a White River programmatic biological opinion. This management plan will include flow recommendations. Under the Gunnison River Basin Programmatic Biological Opinion and Aspinall Unit Study Plan (2011), the Recovery Program is conducting monitoring to assess how well the operation of the Aspinall Unit contributes to meeting target flows in the Gunnison and Colorado Rivers and to help determine if managed flows from the Gunnison and the Colorado rivers are sufficient for recovery on the Colorado River from the Gunnison River to the confluence of the Green and Colorado rivers. After this monitoring is conducted, the Service will assess if the resulting flows on the Colorado River below its confluence with the Green River are adequate for recovery. Flow recommendations for other rivers or river reaches will be developed as deemed necessary to achieve recovery.

A strategic plan was completed in 2003 that identified geomorphology research priorities to refine the flow recommendations and address the Recovery Goals (LaGory et al. 2003). In 2012, USGS finalized results of a sediment transport study on three rivers in the upper Colorado River basin. Samples were collected on the Colorado River at Cameo, Stateline and Cisco; on the Gunnison River at Grand Junction; and on the Green River at Jensen and the town of Green River (Williams et al. 2013). These results provide a methodology that will help the Recovery Program understand how flow recommendations may be benefitting recovery of the endangered fishes. A team of experts convened in 2013 and 2014 to review the findings and to recommend methodologies to determine whether the current peak flow recommendations are achieving objectives. A matrix of priorities and plan of study have been drafted and are under review.

In 2011 and 2012, the Service and The Nature Conservancy formatted the Recovery Program's flow recommendations and three National Wildlife Refuge water rights for inclusion as non-consumptive water needs in the Colorado River Basin Water Supply and Demand Study (Basin Study) conducted by the Bureau of Reclamation. The study encompasses all seven Colorado River Basin States. It looks at current and future imbalances in water supply and demand in the basin and adjacent areas through 2060 including projected effects associated with climate change and attempts to develop and analyze options and strategies to resolve imbalances. The final report was published in December 2012 (available at: http://www.usbr.gov/lc/region/programs/crbstudy.html); updates of this effort are planned every 5 years. As per recommendation from the Basin Study and under the WaterSMART Grants program a review of alternative decision support platforms and tools for incorporating ecological and recreational flows into water management for the Colorado River Basin was completed in 2013. (Alexander et al. 2013).

In 2014 the Service participated in the workgroup for Environmental and Recreational flows of the Colorado Basin Water Supply. The White River from Kenny Reservoir to the Green River and the Colorado River from the Gunnison River to the confluence of the Green River were chosen as two of the four focus reaches. The next phase will be to Identify scientific uncertainties and opportunities to address those uncertainties,

document mechanisms or programs that have been successful protecting environmental and river-based recreational resources, and explore and document opportunities and potential solutions that might be applied at a scale larger that the focus reaches.

Colorado

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 Colorado Parks and Wildlife (CPW). Then CWCB issues a notice of intent to appropriate, followed by Board approval to appropriate. Finally, the Attorney General must make a water court filing to confirm the appropriation and to establish 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 flow conditions as of that date can be protected. In some cases, the appropriation process has lacked support and thus proven to have limited use in the Recovery Program. Therefore, the Recovery Program adopted alternative means of legally providing and protecting flows in some reaches by combining water project re-operations and contracts for the delivery of storage water (e.g., Grand Valley Water Management Plan and deliveries from the Historic Users Pool at Green Mountain Reservoir), and has put programmatic biological opinions (PBOs) in place to monitor new depletions of existing flows on the Yampa, Little Snake, Gunnison, and Colorado Rivers. Under these PBOs, the Recovery Program and the CWCB will periodically evaluate the need to appropriate new instream flow water rights in Colorado to legally protect such flows. Recovery Program participants anticipate that these methods will prove effective in ensuring instream flows for the endangered fishes. Where flows are provided through the physical alteration of flow conditions by reoperating a reservoir or other component of an existing or new water project, various contracts with reservoir owners may be needed to legally protect the deliveries from storage from re-diversion. Contracts for the delivery and protection of storage releases may be combined with purchase of water rights in Colorado and their physical or legal transfer to supplement storage releases (e.g. Redtop Ditch). Water rights historically used for other purposes may also be purchased or leased in Colorado and temporarily or permanently transferred to instream use to increase and legally protect flows needed for recovery, but his method has not been used to date.

Utah

Utah officials believe that flows to the Lower Colorado River Basin under the Colorado River Compact have and will continue to ensure sufficient quantities of water remain in the Green River to satisfy the recommended flow requirements. Additional methodologies to protect stream flows exist in Utah but are limited. Current approaches include: 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 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 can provide an increased level of protection.

This RIPRAP originally contemplated that the Utah State Engineer would establish, by policy, legal protection for endangered fish recommended flows. In 1994, the State Engineer adopted a policy to subordinate future water right application approvals to required fish flows during the summer and autumn periods from Flaming Gorge Reservoir to the confluence of the Duchesne River. There was little resistance to this initial policy adoption and few policy disputes ensued in subsequent years even though the State Engineer's statutory authority to approve vested instream flow rights is limited to certain entities and circumstances. In 2006, the Utah State Engineer began a public process to extend the policy to protect recommended flows for endangered fish to all seasons and over the entire length of the Green River in Utah, pursuant to RIPRAP objectives. Public concern over the practical distribution implications associated with subordinating to recommended flows led to questions about the State Engineer's authority to establish instream flow water rights. Ultimately, in 2009, the State Engineer concluded that other means to legally protect flows should be explored to avoid a contest over the extent of his statutory authority. The Recovery Program's Water Acquisition Committee formed a task force to develop additional options for protecting fish flows on the Green River. In 2010, Utah identified a legal and technical process and schedule to protect recommended year-round flows for the endangered fishes on the Green River in Utah (Utah Department of Natural Resources 2010). This schedule was updated as follows in 2013 :

1) Identify issues, concerns and timeframe, 2007-2010
2) Prioritize potential methods and criteria for flow protection, 2009-2011
3) Amalgamate technical information needed to model and resolve issues, 2010-2011
4) Develop model for analysis of historic and future scenarios, 2010-2011
5) Analyze model results, 2010-2014
6) Obtain additional authority to protect flows, 2012-2016
7) Implement legal protection, 2014-2017.

To date, the task force is working on Step 5 and has completed a water rights model based on historical data to examine current and future water use. Reclamation has completed their revised Flaming Gorge Model (RiverWare platform; monthly timestep), which provides input to State of Utah ModSim (accounts for depletions; daily timestep).

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 many of the rivers are channelized by levees, dikes, rip-rap, and tamarisk. Fish access to 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 bonytail, and the seasonal timing of razorback sucker reproduction suggests an adaptation for utilizing these habitats. Restoring access to these warm and productive habitats is intended to 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, will benefit bonytail and other native fishes by providing growth and conditioning environments and by restoring ecological processes dependent on periodic river-floodplain connections. Restoration of floodplain habitats is achieved through a combination of increased peak flows, prolonged peak-flow duration, lower bank or levee heights, levee removal, and constructed inlets . Studies have shown that a full benefit of these floodplain habitats has been reduced by the presence of large numbers of predacious and competing nonnative fish (Christopherson et al. 2004; Modde and Haines 2005).. Studies are underway (e.g. projects #164, #165) 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 (periodic draining to eliminate the nonnative fish burden) will be needed to determine if nonnative fish can be reduced or eliminated during low-flow years.

The Recovery Action Plan tables 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 evaluated for restoration potential. Site acquisition began in 1994 and continued through 2003. Since 2003, the Recovery 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 Recovery Program has shifted from restoration/acquisition of additional floodplain sites to better management of sites already acquired or otherwise available. Success will be measured by the response of the endangered fish populations.

The General Recovery Program Support Action Plan table includes 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 (Nelson 1998); Phase 2 determined how to accomplish that restoration and protection (Tetra Tech 2000). 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 in the Upper Basin. 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 Plan tables contain tasks to assess and make recommendations for fish passage at various dams and diversion structures. The need for passage was determined at four sites: Redlands, Grand Valley Irrigation Company (GVIC), Price Stubb, and the Grand Valley Project. Passage has been restored at all four locations. A fish passage was completed in 2012 on the Hartland Diversion on the Gunnison River near Delta by NRCS and local interests that benefits both endangered and native fishes.

Diversion canals have been found to entrain native and endangered fishes. The Recovery Program has constructed fish screens on major diversion on the Colorado and Gunnison rivers. Construction of fish screens was completed at the Grand Valley Project and Redlands Water and Power Company diversion during 2005. Construction of a screen at the Grand Valley Irrigation Company diversion canal was completed in 2002 and additional improvements to this screen are anticipated. The Grand Valley screens on the Colorado and Gunnison rivers are operated as much as feasible through the irrigation season, though debris and other concerns sometimes interrupt operation. Evaluation of potential entrainment of Colorado pikeminnow in diversion structures on the Yampa River began in 2007 (Hawkins 2009), and continued in 2011-2012 (Speas et al. 2014). Only one endangered fish, a Colorado pikeminnow, was detected in 2012. Evaluation of potential entrainment of endangered fishes at the Green River Canal near Green River, Utah was undertaken by Kitcheyan et al in 2001. In 2013 and 2014, stationary PIT antennas were deployed in the canal and high levels of entrainment were documented. Based on these findings, construction of a fish barrier to prevent entrainment of adult and subadult fish is in the planning and design stage for the Green River Canal.

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. Specifically, the Service will identify actions needed to reduce selenium contamination to levels that will not impede recovery and identify existing pipeline river crossings that need to have spill-control devices installed. New petroleum pipelines with a Federal nexus are required by the Service through the Section 7 process to have shutoff valves. Not all pipelines have a Federal nexus; therefore, the Program Director's office discussed concerns with existing and future pipelines with the States' oil and gas divisions. The Service also is working with EPA, BLM, and USDOT to identify existing pipeline crossings that may need shutoff valves. Additionally, the Service and UDWR have worked with EPA on spill response planning.

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

Nonnative aquatic species have flourished in the Upper Basin since the settlement of the western United States. Only 13 of more than 50 fish species that now occur in the Upper Basin are native. Nonnative aquatic species also include all crayfish, as no species of crayfish are native to the Colorado River Basin below Fontenelle Reservoir (Carpenter 2005). Many of the nonnative aquatic species 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), although evidence of direct impacts of introduced species on native fishes can be 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. In addition, northern pike are known to prey on large-bodied native fishes (Martinez 2001, Hawkins et al. 2005, Martin and Wright 2010) including adult Colorado pikeminnow, native roundtail chub (*Gila robusta*), flannelmouth and bluehead suckers, and may feed on humpback chubs in the Yampa River. Colorado has revised a fisheries management plan for the Yampa River basin (CDOW 2010). Smallmouth bass and northern pike in the Yampa River have rapidly increased in abundance and pose a significant predatory and competitive threat to native and endangered fishes (Bestgen et al. 2008, Johnson et al. 2008, and Martinez 2012). Recently, numbers of walleye have increased in the Green and

Colorado rivers and burbot have been discovered in the Green River below Flaming Gorge Dam. Both of these species also pose a significant predatory and competitive threat to native and endangered fishes (Francis and Ryden 2014, Gardunio et al. 2011).

Recovery Program activities related to nonnative fishes initially focused on identifying impacts/interactions and developing nonnative fish stocking procedures. Nonnative fish control strategies were 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 (Tyus and Saunders 1996; Lentsch et al. 1996; Hawkins and Nesler 1991). 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 (Upper Colorado River Endangered Fish Recovery Program 2004). Through 2009, emphasis was focused on the control activities identified in these strategies. Development of a new basinwide strategy for the management of nonnative aquatic species began in 2009, and was finalized in early 2014 (Nonnative Fish *ad hoc* Committee 2014). This strategy emphasizes prevention as a major component in efforts to control existing invasive impacts and to avoid similar impacts arising from existing or new species in additional locations within the Upper Basin. All nonnative fish control activities are being evaluated for effectiveness at an annual workshop and through annual RIPRAP reviews. .

The States and the Service also have developed f procedures for stocking of nonnative fishes in the Upper Basin (USFWS 1996a, 1996b). 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 cooperative agreement has been signed by the States and the Service implementing the Stocking Procedures. The Stocking Procedures were revised in 2009 (USFWS 2009) and the cooperative agreement was updated. In 2013, the Colorado Wildlife Commission updated changes to Colorado's Wildlife Regulations that apply the provisions of the revised Stocking Procedures to the private aquaculture industry, in waters of both the Upper Colorado and San Juan River. The provisions of the revised Stocking Procedures also are part of Utah's stocking policy (including private aquaculture, which can only stock sterile salmonids without specific State review and approval). All private fish stocking in Wyoming also is subject to State review. The Upper Basin States have liberalized bag and possession limits for the 'worst of the worse' predators (northern pike, smallmouth bass, walleye, and burbot). Utah and Wyoming have implemented must kill regulations for these species where appropriate. Colorado is considering a must kill regulation on a pilot project basis or other public outreach strategy that delivers a similar message.

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.

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 to the entire Upper Basin. 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 (Williamson and Wydowski 1994), Genetics Management Plan (Czapla 1999), Coordinated Hatchery Facility Plan (Wydowski 1994), and Integrated Stocking Plan (Nesler, et al. 2003). 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.

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. 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 State of Colorado operates the J. W. Mumma Native Aquatic Species Restoration Facility in Alamosa, Colorado. The State of Utah raises bonytail at the Wahweap State Fish Hatchery in Big Water, Utah. The U.S. Fish and Wildlife Service operates the Ouray National Fish Hatchery with units near Grand Junction, Colorado (Grand Valley Unit) and Vernal, Utah (Randlett Unit).

The Integrated Stocking Plan (Nesler et al. 2003) provided specific annual numbers of fish and their sizes to be produced at Recovery Program hatcheries and stocked into Upper Colorado River Basin river reaches. This plan has been implemented for over 10 years and is being revised based on recent estimates of survival of the stocked fish. The draft revised stocking plan (Integrated Stocking Plan Revision Committee 2015) recommends stocking larger bonytail and razorback suckers and releasing bonytail in floodplain habitats instead of canyon-bound reaches, since new information suggests floodplains may be more suitable habitat. Revisions to augmentation and restoration stocking (primarily for razorback sucker and bonytail) are intended to directly aid in 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.

Humpback chub are not currently being stocked; however, augmentation of existing small populations is being considered and additional brood fish from wild populations are being brought into hatcheries. An ad hoc group reviewed the population and known genetics information from all the humpback populations and concluded that the Recovery Program should: 1) use a decision tree to guide choices in creating a refuge population and potentially stocking fish into the wild; and 2) genetically test, and if appropriate, use humpback chub collected from Westwater Canyon and Black Rocks and potentially Desolation Canyon to develop a refugia for Upper Colorado River Basin genetics. Those populations have been shown to genetically represent most populations in the upper basin (Douglas and Douglas 2007, W. Wilson, Southwestern Native Aquatic Resources & Recovery Center, personal communication).

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 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.

The Recovery Program is updating data management to track individual fish via passive integrated transponder tags implanted in endangered fish handled by Recovery Program hatchery and research personnel. In recent years, tag and re-sight events have greatly increased, primarily from increased number and survival of stocked fish, increased sampling associated with nonnative fish activities, and detections from several remote antennas installed in locations throughout the Upper Basin. Antennas have significantly increased tag detections and researchers have now begun to incorporate these data into demographic analyses. The Recovery Program has contracted with Colorado Natural Heritage Program to design and implement a web-based database that will store and query the large amount of tag data the Recovery Program now manages. The database will allow Recovery Program partners to input data more easily and effectively, and will allow outside researchers and the general public to interact with the data under various permission levels. In 2014, Colorado Natural Heritage Program performed initial design of the database using examples of Recovery Program data. The database is planned for phased implementation beginning in 2015, with full implementation by 2017.

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 projects as warranted;
- 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 and their constituents.

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.

In recent years, the Program has begun to place additional emphasis on educating the public regarding the gravity of illegal stocking. CPW has placed signs warning the public not to transplant fish at various fisheries in western Colorado. Colorado and Wyoming fishing regulation call special attention to the problem of and penalties for illegal stocking. Colorado's Nonnative Fish Management Work Group will consider illicit introductions as a component of a strategy to respond to Service's sufficient progress assessment.

The information and education element continues to develop a number of products including an annual newsletter (print and digital editions); up-to-date fact sheets; interpretive signs and displays; bookmarks; annual *Program Highlights* and other briefing documents; and a website. In addition, the Recovery Program actively seeks news media coverage of its activities. Special educational publications are produced as needed. The Recovery Program also integrates social media into outreach strategies as appropriate.

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, 109-183, 111-11 and 112-270), an annual publication is produced that highlights accomplishments of both recovery programs. The *Program Highlights* publication serves as a briefing document for use by the non-Federal partners' annual visit to Washington, D.C., and is used for numerous other purposes throughout the year.

In addition to the *Program Highlights* document, the *Swimming Upstream* newsletter and freestanding exhibits (in both small and large formats) promote both the Upper Colorado and San Juan recovery programs. Shared outreach efforts help ensure accurate, consistent information about the endangered fish species and efforts to recover them. They have also proved more cost-effective by sharing publication production costs and exhibit fees.

The Upper Colorado and San Juan recovery programs will continue to work with other organizations throughout the Colorado River Basin to ensure that information about the endangered fishes is consistent, current, 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 ACTIONS

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 is found in Section 4.0.

3.1 GREEN RIVER

3.1.1 Importance

The Green River system supports wild populations of humpback chub and Colorado pikeminnow and historically supported populations of bonytail and razorback sucker. Razorback sucker became functionally extirpated in the Green River in the late 1990's, but have been reestablished through augmentation stocking. Spawning aggregations are now found in the middle and lower Green river. Collections of wild produced larval razorback have been on the increase in the Middle Green since 2007; wild produced Age 1+ juveniles were collected in the lower Green River in 2013. The importance of the Green River to the endangered fishes has been established in Recovery Program planning. 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. Until recently, the Green River supported the last known riverine concentration of wild razorback sucker (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, acquiring and restoring floodplain habitats for endangered fish use, and managing populations of

nonnative fish species. Flows in the Green River are influenced by tributary inputs, especially the Yampa River, as well as Flaming Gorge dam releases. 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 was completed (Muth et al. 2000). National Environmental Policy Act (NEPA) compliance on reoperation of Flaming Gorge Dam and a Record of Decision were completed in 2006. A new biological opinion was completed in 2005. A study plan for the implementation and evaluation of flow and temperature recommendations for endangered fishes in the Green River downstream of Flaming Gorge Dam was completed in 2007 (Green River Study Plan ad hoc Committee 2007). Following the 2006 Record of Decision, Reclamation provided peak flows that met or exceeded the Muth et al (2000) recommendations. Reclamation achieved these peak flow magnitudes and durations by timing Flaming Gorge releases to match peak Yampa River flow, thus minimizing releases needed to achieve the targets. A 2011 synthesis by Bestgen et al. showed that after 1993, releases to match the Yampa peak occurred prior to larval razorback sucker drift and suggested that this approach may not be providing for successful razorback sucker recruitment. In response, the Recovery Program proposed that Reclamation use the occurrence of razorback sucker larvae in channel margin habitats (an indication that larval drift is occurring in the river) as the "trigger" to determine when peak releases should occur from Flaming Gorge Dam (rather than trying to match the Yampa peak). A Larval Trigger Study Plan (Larval Trigger Study Plan ad hoc Committee. 2012), consistent with the Muth et al. (2000) flow recommendations, is being implemented for an experimental period of about six years beginning in 2012.

Flow recommendations also have been developed for some tributaries to the Green River, such as the Yampa, White (interim flow recommendations; currently under revision),and Duchesne rivers. In 2012, the PDO developed a position paper on minimum flow management in the Price River (Chart and Mohrman 2012). 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. In 2010, Utah identified a legal and technical process and schedule to protect recommended year-round flows for the endangered fishes on the Green River in Utah, culminating in legal streamflow protection in 2017 (Utah Department of Natural Resources 2010, Mike Styler, UDNR, personal communication).

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 management strategies for the Green River have been implemented. Active management of northern pike (*Esox lucius)* began in 2001. Active management of smallmouth bass began in 2004. Walleye also are emerging as a threat in the Green River and active management began in 2013. White sucker removal also is occurring to reduce hybridization with native suckers (Skorupski et al. 2012). Gizzard shad and burbot are other species of concern, but active management of these species has not been proposed by the Recovery Program.

Increased catches of walleye in the middle Green River are likely linked to escapement of individuals from Starvation Reservoir and an illegally introduced population in Red Fleet Reservoir (Johnson et al. 2014). UDWR is currently planning a rotenone treatment of Red Fleet Reservoir in the fall of 2015 to eliminate this source population. The treatment would be followed by stocking of compatible sport fish under an approved lake management plan. UDWR is also planning an escapement solution for Starvation Reservoir (see Duchesne River). Lake Powell may be a source of walleye in the lower Green River; however, a solution to prevent their escapement has not yet been developed.

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 is being implemented. Stocking of bonytail at Echo Park 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. Stocking sites are being evaluated as part of revising the integrated stocking plan (Integrated Stocking Plan Revision Committee 2015).

Population estimates are conducted in the Green River subbasin for Colorado pikeminnow and humpback chub, but not for bonytail or razorback sucker. Population estimates for Colorado pikeminnow in the entire Green River subbasin began in 2001 (Bestgen et al. 2005). These estimates are conducted on a 3-year on, 2-year off cycle, with the first three-year sampling period having occurred from 2001 to 2003. The second 3-year “on” period was completed during 2006–2008 and showed an increase in the numbers of adult fish in the Green River population (Bestgen et al. 2010). A third 3-year sampling period was completed in 2013. Preliminary analyses of the most recent data indicates that population has declined throughout the sub-basin, especially in the Yampa River basin. Population estimates for humpback chub in Desolation and

Gray canyons were conducted in 2001 and 2002, and expanded in 2003 (Jackson and Hudson 2005). In the mid-2000's, this population appeared to decline with recommendations to secure the genetics by bringing fish into captivity (Badame 2012). Twenty-five adult humpback chub were captured and taken to the Ouray National Fish Hatchery, Randlett Unit; of these 25, 17 remain. UDWR resumed humpback chub population estimation in Desolation and Gray Canyons in 2014; specific site estimates were extrapolated to canyon(s)-wide estimate of 1,863 adult humpback chub (Howard 2014).

Selenium contamination of water and soil in Stewart Lake and Ashley Creek near Jensen, Utah, may adversely affect razorback sucker (USFWS 1998) The U.S. Environmental Protection Agency, Utah Division of Wildlife Resources and U.S. Bureau of Reclamation (Reclamation) (Core Team) are implementing remediation activities in these areas independent of the Recovery Program. The Core Team collects and analyzes soil samples from Stewart Lake to monitor selenium levels to determine if the remediation efforts are effective. Historic selenium levels in bottom sediments exceeded 15 ppm. A slow downward trend in selenium concentrations has been exhibited for the past decade, with sharper declines following high flow years on the Green River. Sediment samples were collected in 2008 and averaged 12 ppm. Samples were collected in 2012 following the high flow year in 2011, and averaged 8 ppm. The Core Team's long term goal for selenium at Stewart Lake is 4 ppm or less (USGS 2003) In addition, UDWR has documented rapid growth of razorback sucker larvae entrained into Stewart Lake in 2012, 2013, and 2014,suggesting it can play an important role in recovery of razorback sucker (Breen and Skorupski 2012, 2013, Schelly et al. 2014). Continued coordination with the selenium remediation team is necessary to maximize secondary benefits (periods of inundation) to endangered fish.

3.2 YAMPA RIVER AND LITTLE SNAKE RIVER

3.2.1 Importance

The Yampa River is the largest remaining substantially 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 endangered fishes for the entire Green River subbasin (Tyus and Karp 1989). A small population of humpback chub historically existed in the Yampa River in Dinosaur National Monument (Tyus and Karp 1989; U.S. Fish and Wildlife Service 1990a, 2002a), but is now believed to be reduced to a few individuals. Historically, spawning aggregations of adult razorback sucker were observed near the mouth of the Yampa

River, and adult razorback sucker were 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 was associated with some of the last captures of wild 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. As discussed earlier, the number of adult Colorado pikeminnow residing in the Yampa River has been greatly reduced, largely because of persistent high densities of nonnative predators, and perhaps also because of extended drought.

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.

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 Recovery 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.

To achieve flow protection objectives, the Recovery Program developed the Yampa River Management Plan with extensive local input. The Plan 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). A cooperative agreement implementing the Yampa River Management Plan and a PBO were completed for the Yampa River in 2005.

The Yampa River Management Plan proposed 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

enlargement for human and endangered fish water supplies is complete and water releases for the endangered fish began in 2007. The Recovery Program funded a 5,000 af pool of permanent storage out of the 12,000 af Elkhead enlargement and has the option to lease up to an additional 2,000 af on an as-needed basis from the Colorado River Water Conservation District.

The Recovery Program and CWCB reevaluate the need for instream-flow filings or other protective mechanisms at least every 5 years and document their findings. The Recovery Program determined in November 2011 that additional permanent protection in the form of instream flow filings was not deemed necessary at that time. As part of the pending Yampa River depletion accounting report, CWCB will make an estimate of current and projected future depletions and will recommend whether or not additional instream flow filings or other flow protection mechanisms should be considered.

Flow contributions from the Little Snake River, as they assist in recovery in the Yampa River, were identified after estimated future depletions were accounted for in the Yampa River Management Plan and Environmental Assessment (Roehm 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. Disturbance of fish habitat related to maintenance of diversion structures was evaluated and found to be minimal based on the limited area and duration of the disturbance. Several diversions were identified as possible barriers to fish migration under certain conditions (Hydrosphere 1995a). 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 (Masslich 1993). 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. Evaluation of entrainment of Colorado pikeminnow in the larger Maybell diversion began in 2007 and continued in 2011 and 2012. Only one endangered fish, a Colorado pikeminnow, was detected in 2012 (Speas et al. 2014). The Service's 2014 Sufficient Progress memo concluded that due to relatively low rates of entrainment, an exclusion device would not be cost effective. The Service recommended that the Recovery Program should strive to offset impacts at the Maybell Canal by completing the Yampa River nonnative fish control actions identified in the RIPRAP addendum included in their 2013 memo.

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 management of channel catfish in Yampa Canyon began in 2001, but the Recovery Program discontinued this work in 2007 (except for incidental removal of very large fish) to focus on the control of smallmouth bass, whose population expanded dramatically in the early 2000s coincident with the abrupt decline in small-bodied and

juvenile native fishes and a rapid increase in virile crayfish (*Orconectes virilis*) (Martinez 2012). Active removal of northern pike downstream of Hayden began in 2003. The Recovery Program now removes smallmouth bass and northern pike at some level of intensity from Steamboat Springs downstream to the confluence with the Green River.

Northern pike distribution in the Yampa River extends from reservoirs in the upper reaches downstream to the Green River, but pike numbers are highest in the cooler upstream reaches. CPW has undertaken remediation projects to reduce northern pike spawning habitat in the upper Yampa River. Active removal of northern pike downstream of Hayden began in 2003. In 2004, the Recovery Program began tagging northern pike in the Yampa River upstream of the Hayden Bridge to determine if it is a significant upstream source of northern pike moving downstream into critical habitat. In 2005, CPW began work to determine sources of northern pike that may gain access to endangered fish critical habitat in the Yampa River. Prior to the 2011 sampling season, the Recovery Program recommended and CPW agreed to discontinuing the pike marking pass in the Yampa River buffer zone between Hayden and Craig. Translocation of pike to off-channel waters was discontinued in 2014. In 2015, Colorado State University completed an investigation of northern pike abundance and population dynamics in the Yampa River during the removal period of 2004 to 2010 (Zelasko et al., 2015). Northern pike abundance was highest in upstream reaches, but survival was highest in downstream reaches. Combined immigration and recruitment from river and reservoir sources were determined to offset northern pike removal rates; therefore northern pike removal rates in the Yampa River were deemed insufficient to reach removal targets without reducing reproduction and escapement.

Northern pike were illegally introduced into Stagecoach Reservoir and subsequently spread downstream into the privately owned Catamount Reservoir. Catamount is known to contribute northern pike downstream into the Yampa River, including in critical habitat (Orabutt 2006; Finney and Haines 2008; Martin and Wright 2010). CPW conducts intensive mechanical removal of northern pike from Catamount Reservoir and is working with the Catamount Ranch and Club (CRC) to restore the trout fishery there. CRC has implemented a must-kill regulation for northern pike in the reservoir. Pike numbers and the size of captured pike have been reduced, but individuals can reinvade the reservoir from Stagecoach Reservoir upstream; however, only one pike confirmed to have escaped from Stagecoach Reservoir has been captured in Catamount Reservoir in the last 5 years.

Unlike northern pike, smallmouth bass densities in the Yampa River are higher in the lower, warmer portions of the river.Active removal 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. The 12-mile treatment was expanded to 24 miles in 2006 in order to geographically include a greater portion of the targeted population. Removal 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. In 2009, smallmouth bass removal was expanded

throughout critical habitat on the Yampa River. Prior to the 2011 sampling season, the Recovery Program recommended and CDOW agreed to cease translocation of adult smallmouth bass from the Yampa River into Elkhead Reservoir due to concerns about the rate of escapement of translocated and resident smallmouth bass from the reservoir and the propagule pressure and proliferative capacity of these escapees within critical habitat. The Recovery Program's multi-year assessment of smallmouth bass escapement from Elkhead Reservoir is complete (Breton et al. 2013) and demonstrated that a solution for nonnative fish escapement is needed. Program partners are in the process of engineering, purchasing, and installing a net across the spillway to eliminate escapement. The net would be supported by in-reservoir actions to disadvantage the existing populations of northern pike and smallmouth bass.

The programmatic synthesis of smallmouth bass (Breton et al. 2014) populations in the upper Colorado River basin is also completed. .. In general, abundant year classes of young smallmouth bass produced in low flow and warm years such as 2007 have potential to overwhelm removal efforts, and the year class persists for one or more years. Nonetheless, it appears that increased electrofishing removal efforts from 2007 to 2011 resulted in sustained reductions in density of smallmouth bass sub-adults and adults throughout the upper basin despite environmental conditions that favored smallmouth bass reproduction in some years (e.g. 2007 and 2009) (Breton et al. 2014).

The Recovery Program's Integrated Stocking Plan (Nesler et al. 2003) outlines plans for stocking bonytail in the middle Green River which includes the confluence of the Yampa River. Stocking bonytail at the confluence of the Yampa and Green rivers was initiated in 2000. The Integrated Stocking Plan is being revised (Integrated Stocking Plan Revision Committee 2015).

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, limited fish surveys have been conducted in the lower 33 miles of the Duchesne River and have documented presence of razorback sucker and bonytail (Groves and Fuller 2009). And most recently, in 2010 one Colorado pikeminnow was surveyed near the town of Randlett by the Ute Indian Tribe (Fuller and Groves 2010).

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 was completed in 2004. The Duchesne Biological Opinion issued in 1998 was updated in 2005. The 2005 update set targets for maintaining 50 cfs of baseflows year-round and 115 cfs of baseflows during periods of fish migration. It also formalized high flow recommendations (recommending maintaining an average of 7,000 cfs-days above 4,000 cfs) based on an evaluation of the high flows that occurred during the 1977-2002 period of record and the response of sediment and other channel characteristics to these flows. Agreements were developed to provide flows in the Duchesne River for the endangered fishes, primarily based on voluntary cooperation between water managers, water users, and government agencies. Since 2005, the local Duchesne River Workgroup has improved water operations and provides baseflows for native fish at increasingly better frequencies (Central Utah Water Conservancy District, 2013).

The Recovery Program participated in rehabilitation of the Myton Townsite Diversion Dam on the Duchesne River (completed in 2009) to help implement the flow recommendations for the endangered fish. More recently, the Ute Tribe, Utah Division of Wildlife Resources, Bureau of Reclamation, and the U.S. Fish and Wildlife Service funded and constructed a selective fish passage structure on this diversion to allow fish passage and to increase available habitat for endangered and other native fishes. In addition, a Candidate Conservation Agreement with Assurances (CCAA) and Safe Harbor Agreement (SHA) were finalized for the portions of the Duchesne River between the Myton and Knight diversions and the Strawberry River below Starvation Reservoir. These agreements between the State of Utah, U.S. Fish and Wildlife Service, and the Associated Water Users of the Strawberry and Duchesne Rivers, formalizes the agreement to allow water from Starvation Reservoir to reach the Myton Diversion without being claimed by irrigators in return for guarantees for no future Endangered Species Act requirements from the Service.

Management of nonnative fishes in the Duchesne was discontinued in 2007 and efforts reallocated to smallmouth bass concentration areas in the Green River. Nonnative fish management resumed in the Duchesne River in 2008 from the Myton Diversion downstream to the confluence with the Green River; recently this work has been conducted primarily outside the Recovery Program and done sporadically depending on Ute Tribe and USFWS Utah Fish and Wildlife Coordination Office available time and funds. A study to determine escapement of nonnative fishes from Starvation Reservoir was begun in 2002; a final report was approved in January 2007. Results suggested that escapement is occurring, but not enough to warrant the installation of screens at that time. In 2011, isotopic analyses indicated that Starvation Reservoir is a source of walleye entering the Green River; therefore, screening or other preventative measures should be re-evaluated. UDWR is working with Program Partners to develop and install

permanent screening solutions for the Starvation Reservoir spillway stilling basin in 2016.

3.4 WHITE RIVER

3.4.1 Importance

Construction of Taylor Draw Dam in 1984 blocked native fish passage in the White River, including Colorado pikeminnow migration. However, 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 are known to spawn in the Green and Yampa rivers. However, in 2011, researchers documented for the first time razorback suckers and Colorado pikeminnow spawning in the White River. 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. A passive integrated antenna array near the Bonanza Bridge (installed September 2012) demonstrated that razorback sucker and Colorado pikeminnow use the Utah portion of the White River in higher numbers than previously thought. The White River within Utah appears to be a stronghold for native fishes and management efforts in this basin should strive to preserve this feature of the river (Breen and Hedrick 2009, 2010). However, a recent expansion of smallmouth bass in the White River is a cause for concern for this native fish stronghold.

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) and a review began in 2009. A White River management plan will be drafted in 2015-16, which will ultimately serve as the basis for a White River programmatic biological opinion. This management plan will include flow recommendations. Instream-flow filings are on hold pending reevaluation of how flows will be legally protected in Colorado. In 2011, researchers reported increasing abundance of smallmouth bass and evidence of reproduction. The Recovery Program began intensive removal of smallmouth bass from the White River in 2012.

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 populations of humpback chub occur at Black Rocks and Westwater canyons near the Utah-

Colorado state line. However, both populations appear to have experienced a decline around the year 2000 and have remained low since that time (Elverud 2012 and Francis and McAda 2011). Population estimates began again in 2011 and the Recovery Program will consider preliminary results and recommendations from reports currently in preparation in deciding what steps need to be taken. A smaller humpback chub population occurs in Cataract Canyon where some of the last wild bonytail in the Colorado River were collected. All life stages of Colorado pikeminnow occur in the section of river from Palisade, Colorado, downstream to Lake Powell. Numbers of adult Colorado pikeminnow have remained stable since 1992 (Osmundson and White 2009). However, the most recent (preliminary) population estimates (collected in 2013 and 2014) indicate the adult population has declined to about 400 individuals, the lowest estimate on record. 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 until recently had been blocked since the early 1900's by three diversion dams near Palisade. Wild razorback sucker populations in the mainstem Colorado River have declined precipitously in the past 20 years. Recapture of stocked razorback sucker has increased in recent years. Wild produced Age 1+ and 2+ juveniles were collected in the lower Colorado River in 2013.

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 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 permanent commitment of 10,825 acre-feet/year from East and West slope water users. East and West slope 10-year 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 (extended through 2013). To replace these interim sources of water and meet their obligations to provide 10,825 af of water to the 15-mile reach on a permanent basis, East and West slope water users cooperatively analyzed a wide range of alternatives, reaching consensus on the "Lake Granby-Ruedi" option. A contract to provide Ruedi Reservoir water by water user agreement to provide a permanent source of water was completed in 2012. The Lake Granby contracts/agreements were completed in 2013. Implementation of the permanent sources occurred during the 2013 irrigation season. However, summer base flow recommendation of 810cfs continues to be difficult to achieve / maintain during dry years. The Program is working to improve the overall strategy for flow augmentation in the 15 mile reach to be considered each spring and adjusted as the year progresses, addressing all possible sources of water, priorities, antecedent conditions, projected flows and supplies, including OMID, Grand Valley Project, CFOPS, etc.

In April 2013, an unprecedented set of circumstances, including below average snowpack, low runoff conditions, and onset of the irrigation season resulted in predictions of flows less than 200 cfs in the 15 Mile Reach. In light of potential extreme low flows in the summer of 2013, consensus was reached to conserve upstream storage for late summer flow augmentation. Subsequently, cold temperatures further curtailed runoff, resulting in flows in the range of 50 cfs or less in the 15 Mile Reach. In the future, water users and the Service will address the potential for this situation to recur as part of the normal HUP calls regarding water management for the 15 Mile Reach and determine what measures if any should be taken based on current conditions. This should avoid a repeat of the extreme low flows in the spring. The Service and water users will formalize and implement more specific recommendations to deal with the situation should it recur in the future.

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. In 1994, Colorado filed for a 300 cubic feet per second instream flow right on the return flows available in the15-mile reach during the same months. Final decrees for both of these water rights were issued in 1997. Colorado filed for junior instream-flow rights on additional base flows and recovery goals in 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. The Recovery Program and CWCB will reevaluate the need for instream-flow filings or other protective mechanisms at least every 5 years and document their findings.

Water is being provided to the 15-mile reach through an MOA with CRWCD for delivery of up to 6,000 acre-feet of water from Wolford Mountain Reservoir. 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 expanded coordinated reservoir operations as recommended in the study report. Earlier coordinated reservoir operations for the 15-mile reach began in 1997. From 1997 to 2014, more than 1,470,368 acre-feet of water has been released from reservoirs in the upper reaches of the mainstem (including Green Mountain, Ruedi, Wolford Mountain Williams Fork, Granby Windy Gap, Willow Creek, and the Palisade Bypass) to enhance spring and summer flows to improve habitat in the 15-mile reach near Grand Junction.

The Service completed their Gunnison River Basin Programmatic Biological Opinion (PBO) in December, 2009. In April 2012, Reclamation signed their Record of Decision

on an EIS to reoperate the Aspinall Unit to provide flows for endangered fish in the Gunnison and Colorado rivers. The Recovery Program will conduct monitoring under the PBO and the Aspinall Unit Study Plan (2011) to assess how well the operation of the Aspinall Unit contributes to meeting target flows in the Gunnison and Colorado rivers and to help determine if managed flows from the Gunnison and the Colorado rivers are sufficient for recovery in the Colorado River from the Gunnison River to the confluence of the Green and Colorado rivers. After this monitoring and assessment are completed, the Service's flow recommendations for the Colorado River at the Utah-Colorado state line (McAda 2003) may be revised, or others may be developed, as necessary.

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 was completed in 2008. The Price-Stubb passage was retrofitted with PIT tag antennas and has detected bonytail, razorback sucker, Colorado pikeminnow and other native fish. Fish passage at these diversion dams benefits all four species of endangered fish (as well as other non-listed, native species) 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. The Recovery Program also salvages fish from these canals when the screens cannot be operated full-time throughout the irrigation season. Salvage has been necessary every year since screens were completed. From 2009-2013, the GVIC screen was operating, on average, 60% of the days during the irrigation seasons. During 2012 and 2013, the GVP screen was operating 77% of the days during the irrigation season.

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

Nonnative fish are also a threat to recovery in the Colorado River drainage. Active removal of smallmouth bass began in 2004, and largemouth bass, northern pike, white sucker, and walleye also are targeted. A CSU/CDOW study to determine the source of centrarchid fishes suggested that floodplain pond contributions to riverine nonnative fish populations fluctuate with the interannual variations in flow regime and river–pond connectivity (Whitledge et al. 2007). Recovery Program concerns about increasing collections of northern pike in the Colorado River near Rifle led to increased removal efforts beginning in 2011 and installation of a fish screen by CPW to prevent nonnative fish escapement from Rifle Gap Reservoir in 2013. Expansion of walleye numbers in the lower reaches observed in 2013 has raised concerns (these fish may be coming from Lake Powell). (Francis and Ryden 2014). Specifically, walleye catches have greatly increased in the lower reaches of the Colorado River, overlapping with nursery habitat for Colorado pikeminnow. Documented predation on juvenile Colorado pikeminnow (~250mm) in this reach demonstrates the potential impact the predatory walleye can have on recruitment of the long-lived pikeminnow.

Operation of the fish barrier net at Highline Reservoir has been ongoing since 1999; the net was replaced in March 2006 and again in March 2014. Annual maintenance at Highline Reservoir to flush sediment requires unscreened releases from the outlet works. These releases are carefully timed in late summer when released waters are anoxic so as to minimize escapement of smallmouth bass and largemouth bass which occur in Highline Reservoir.

Razorback sucker and bonytail are being stocked in the Colorado River in accordance with the draft revised Integrated Stocking Plan (Integrated Stocking Plan Revision Committee 2015).

Razorback sucker spawning activity was documented in the Colorado River inflow of Lake Powell in 2014 (near Trachyte Creek and Castle Butte). Biologists will survey for additional spawning locations further down lake in 2015.

3.6 GUNNISON RIVER

3.6.1 Importance

The Gunnison River is currently occupied by Colorado pikeminnow and is historic habitat for razorback sucker and presumably bonytail. Several adult Colorado pikeminnow were captured in the Gunnison River in fishery surveys conducted in 1992 and 1993. Unrestricted upstream migration of fish had 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 upstream and downstream of the Redlands diversion dam. Kidd (1977) reported that adult razorback sucker were collected frequently by commercial anglers near Delta, Colorado, between 1930 and 1950. Razorback sucker larvae were collected in the Gunnison River (Osmundson and Seal 2009), and the reach near Delta is considered a priority razorback sucker restoration site. The native fish assemblage in the Gunnison River is presently less impacted, compared to other rivers, by nonnative fishes (particularly piscivorous species), CPW management efforts are emphasizing preserving this feature of the river.

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) for bottomland habitat. Construction of a fish ladder at the Redlands diversion dam was completed in 1996 and has provided for passage of all four endangered fishes and other native fishes (as well as allowing exclusion of nonnative fishes). In 2014, 17 Colorado pikeminnow captured in Redlands were transported 39.7 miles upstream to

help encourage retention of these fish in the Gunnison River. In 2010, the first humpback chub (previously captured in Westwater Canyon, Utah) used the ladder, which means all four species of endangered fish have been collected. To prevent entrainment of adult and subadult endangered fish into diversion canals, a fish screen was installed at Redlands in 2005. From 2009 – 2013, the Redlands screen was in operation, on average, 82% of the days during the irrigation season.

A 5-year research plan to evaluate the effects of reoperation 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 flow recommendations in 2003 (McAda 2003). The Service completed their Gunnison River Basin Programmatic Biological Opinion (PBO) in December, 2009. In April 2012, Reclamation signed their Record of Decision on an EIS to reoperate the Aspinall Unit to provide flows for endangered fish in the Gunnison and Colorado rivers. A study plan to evaluate effects of Aspinall Unit operations to benefit habitat and recovery of endangered fishes in the Gunnison and Colorado rivers was completed in 2011 (Aspinall Unit Study Plan *ad hoc* Committee 2011). A Gunnison River fish community monitoring study was initiated in 2011 to evaluate Aspinall reoperation. A team of geomorphology experts convened in 2013 and 2014 to review the findings of the USGS sediment transport study (Williams et al., 2013) and recommend methodologies the Recovery Program should consider to further evaluate the physical habitat expectations of the peak flow recommendations for the Gunnison and Colorado rivers. A draft report of recommendations is being reviewed. The Service's flow recommendations for the Gunnison River (McAda 2003) may be revised and then legal protection of Aspinall releases and State protection of instream flows in the Gunnison River will be addressed.

The 2009 Gunnison Basin PBO included a requirement for Reclamation to "develop and implement a Selenium Management Program (SMP), in cooperation with the State of Colorado and Gunnison River basin water users to reduce adverse effects of selenium on endangered fish species in the Gunnison and Colorado rivers…" An SMP Action Plan was developed and is updated regularly to reduce the existing selenium load from existing sources and prevent, minimize, or mitigate potential new selenium loading from new activities. Muscle plugs have been collected from endangered and surrogate species to determine baseline selenium concentrations and evaluate effectiveness of selenium remediation.

Beginning in 1995, the Service experimentally stocked razorback sucker in the Gunnison River near Delta. The State of Colorado stocking plan for razorback sucker was revised in 2003 to stock fewer but larger fish. Stocking of razorback sucker continues in the Gunnison River, in accordance with the integrated stocking plan.

In 2012, CPW treated Paonia Reservoir to remove a source population of nonnative northern pike. Actions like this are consistent with the Basinwide Strategy. CPW has reported that illegally introduced smallmouth bass in Ridgway Reservoir on the

Uncompahgre River (a tributary to the Gunnison) are increasing and occupying habitats near the spillway. CPW, the reservoir owners, and the Recovery Program are working together to develop short and long-term solutions to prevent these fish from escaping the reservoir.

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 (Valdez et al., 1982).

3.7.2 Recovery Actions

Recovery actions for the Dolores River drainage have been limited to efforts independent of the Recovery Program to try to prevent/limit escapement of nonnative sport fish (e.g., smallmouth bass, yellow perch, and kokanee salmon) from McPhee Reservoir. However, smallmouth bass have become established in the Dolores River and may be an additional source for this invasive species in the Colorado River. Walleye also are in the reservoir, but have not been captured downstream. Therefore, the Recovery Program needs to determine if nonnative fishes in the Dolores River basin pose a threat to endangered fishes and determine appropriate response. In 2013, CPW treated Miramonte Reservoir to remove a source population of nonnative smallmouth bass. Actions like this are consistent with the Basinwide Strategy.

Environmental contaminant clean-up is being pursued by State and Federal agencies independent of the Recovery Program. It is unknown if stocked bonytail are using the Dolores River. Utah conducted surveys on the Dolores in 2005 and 2013 and detected bluehead suckers, roundtail chub, and flannelmouth sucker (no bonytail were captured). The Recovery Program will consider the need for additional recovery actions in the Dolores River as new information becomes available. The Bureau of Reclamation funded the installation of PIT antenna in the lower Dolores River in 2013 and 2014. The Dolores River Working Group is exploring opportunities for improving the viability of native fishes in the Dolores River below McPhee Dam. The Lower Dolores River Monitoring, Implementation & Evaluation Plan contains objectives for nonnative fish monitoring and removal.

In efforts to determine better locations to stock bonytail such as quiet still waters, flooded bottom lands, and tributaries, bonytail were stocked 8 miles above the confluence with the Colorado River in 2014. This stocking location is upstream of the PIT-tag antenna arrays.

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. The caret ">" 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 (See also CPW)
CDOW	Colorado Division of Wildlife (See also CPW)
CPW	Colorado Parks and Wildlife (CDOPR & CDOW merged in 2011)
CRWCD	Colorado River Water Conservation District
CWCB	Colorado Water Conservation Board
FWS	U.S. Fish and Wildlife Service
	-ES Ecological Services
	-FAC Fish and Aquatic Conservation
	-RW Refuges and Wildlife
	-WR Water Resources
LFL	Larval Fish Laboratory
NWCD	Northern Water Conservancy District
PD/PDO	Recovery Program Director
TBD	To be determined
UT	State of Utah
UDWR	Utah Division of Wildlife Resources

UTWR	Utah Division of Water Resources
WAC	Water Acquisition Committee
WYGF	Wyoming Game and Fish Department

GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

	ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
I.	**PROVIDE AND PROTECT INSTREAM FLOWS (HABITAT MANAGEMENT)**									
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 recommendations.						
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	Pending							A panel of geomorphologists met in 2013 to build on/interpret the findings of the Project 85f report and to develop research / management recomendations to assit the Recovery Program in evaluating spring peak flow recommendations. A draft White Paper summarizing their input was submitted to the PD's office in January 2014 and became the Peak Flow Technical Supplement report. The report is being finalized and, once approved, will be incorporated into the RIPRAP. It offers a range of study approaches and prioritizes river reaches to evaluate the peak flow aspects of the Recovery Program's flow recommendations. Its first application may be to supplement the existing study plans for the Green River and Gunnison and Colorado Rivers.
I.A.4.b.	Conduct needed geomorphic research and monitoring. See Williams et al. 2013.	Program	Ongoing	X	X	X	X	X	X	See I.A.4.a (above)
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							

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	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 subbbasin 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.						
	II.	**RESTORE HABITAT (HABITAT DEVELOPMENT AND MAINTENANCE)**									
	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]									Gunnison River pikeminnow were sampled for mercury by collecting mucsle plugs in 2014. UT ES staff consulted with Atlas regarding the Moab tailings site over a concern for ammonia in the backwaters. See also http://www.coloradoriverrecovery.org/documents-publications/work-plan-documents/arpts/2014/hab/2014 Report on Contaminants.pdf
	II.B.1.	Evaluate effects of selenium.	FWS-ES	Ongoing	X	X				X	PDO is undertaking selenium analysis of YOY razorback sucker that resided in Stewart Lake over summer of 2013 and 2014. Samples include larval fish (baseline), juvenile fish (test subjects), and fathead minnow (ecological surrogate). Draft results indicate razorback sucker uptake of selenium in Stewart Lake (with levels exceeding new EPA guidelines), but razorback sucker in Stewart Lake are growing, surviving, and emigrating. Riverine razorback also carry a selenium load).
	II.B.1.a.	Identify actions to reduce selenium contamination to levels that will not impede recovery.	FWS-ES	Ongoing	X	X				X	The Service's environmental contaminants 2014 annual report (available on the Program website) provides updates on selenium remediation activities at Parriette Draw on the Green River and on the Gunnison River. Reclamation and NRCS continue to remediate Se concentrations on the Gunnison River as per the Selenium Management Plan. Reclamation continues to remediate selenium concentrations at Stewart Lake on the Green River as per the Stewart Lake BO (2005).
	II.B.2.	Identify locations of petroleum-product pipelines and assess need for emergency shut-off valves.									See also II.B.
>*	II.B.2.a.	Ensure that all new petroleum product pipelines have emergency shutoff valves.	FWS-ES	Ongoing	X	X	X	X	X	X	USFWS Ecological Services addresses this through Section 7 consultation, although not all pipeline approvals have a federal nexus that results in consultation (see below). USFWS may want to consider requiring applicants to ensure older facilities also have shutoff valves whenever they consult on new projects.

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>*	II.B.2.b.	Identify locations of existing petroleum-product pipelines potentially affecting critical habitat and determine if they have emergency shutoff valves.	FWS-ES, States	Ongoing						X	Met with Wyoming, Utah and Colorado's oil and gas representatives to convey concerns about regulations and spills in priority (spawning) areas. The Program is configuring an updated map of endangered fish spawning sites to assist States in identifying sensitive areas. In reviewing the response to the 2014 Green River oil spill, additional activities of concern have been identified (beyond pipeline crossings).
	II.B.3.	Review and recommend modifications to State and Federal hazardous materials spills emergency response programs.	FWS-ES	Ongoing	X	X	X	X	X	X	EPA and Chevron sponsored classroom/field oil spill response training in Vernal, Utah in August 2014 for industry and local, State, Tribal, and Federal representatives. One of the instructors is helping EPA develop Area Contingency Plans in the Green River Basin. UDWR and FWS-Vernal representatives attended a planning session with industry to identify priority resources and strategies for protection.
	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).						
	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						
	III.	**REDUCE NEGATIVE IMPACTS OF NONNATIVE FISHES AND SPORTFISH MANAGEMENT ACTIVITIES (NONNATIVE AND SPORTFISH MANAGEMENT)**									
	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/UDWR/ CSU	Ongoing	X	X	X	X	X	X	Standardized identification protocol provided to researchers in 2013. Program should incorporate ability to track captures of all combinations of hybrid suckers in STReaMS database (under construction). UDWR & CSU report high white sucker abundance but low hybridization rates. Sucker hybridization is a complex issue that may require a combined genetics and morphological study (to be included in FY16-17 Program Guidance and also should discuss source populations where control should be attempted [e.g. Browns Park]); outside funding sources should be considered as this relates to more than listed fish.
>*	III.A.1.c.(1)	If necessary, implement actions to minimize hybridization between white sucker and razorback sucker.	FWS/UDWR/ CSU	Pending; if needed							See above. White sucker and their hybrids are removed where encountered in Yampa, Green, Colorado, and Gunnison rivers and source population control will be investigated.

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	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. Upper Colorado River Endangered Fish Recovery Program 2004.						
	III.A.2.b.	Review options and develop agreement with appropriate States on strategies and locations for implementing control options. Develop Nonnative Fish Management Policy.	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	***!*** At the December 2014 Nonnative Fish Workshop PI's, managers, and others discussed preliminary results from the 2014 field studies and suggested potential revisions to the 2015 Work Plan. SOW changes will address controlling northern pike with backwater netting, additional walleye passes, enhancing smallmouth surge basinwide, and adding two seasonal employees available to assist with a variety of control activities as needed. ***X*** Persistent declines of Colorado pikeminnow throughout the upper basin are linked to the persistence of nonnative predators. Large-bodied predatory species of concern appear to be expanding in other segments of critical habitat (e.g. walleye in Colorado pikeminnow nursery habitat).
	III.A.2.c.(1)	Project-level synthesis: 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). (YS G-3) See Bestgen et al., 2007 for Yampa River native fish response report (2003-2006) and Skorupski et al 2012 for Middle Green River native fish reponse report (2005-2008).	PI's	On hold						X	Biology Committee has recommended completing long-term syntheses: 1) Yampa River native fish response; and 2) Lodore/Whirlpool Canyon. Funding needed to continue/complete these synthesis reports has not presently available, but this will be included in FY16-17 Program Guidance for consideration. Ongoing analysis of nonnative fish early life history (otolith examination) as affected by environmental conditions also is pending.
	III.A.2.c.(2)	Programmatic synthesis: assimilate project-level data into a basinwide and population scale analyses of effectiveness of nonnative fish management. *(Breton et al. 2013, 2014, Zelasko et al. 2015).* (YS G-3)	PD	Ongoing							CSU's evaluation of the Program's smallmouth bass and northern pike control have been finalized. The Smallmouth Bass Projection Tool is complete and the accompanying report is in final draft. Preliminary results have been helpful in re-directing and intensifying removal efforts around the bass spawning period and have indicated that removal efforts are having a negative, population-level effect on smallmouth bass (though insufficient in themselves to cause recruitment failure). Northern pike synthesis demonstrated recruitment and immigration are offsetting removal efforts; therefore, Program must focus on reducing reproduction and reservoir escapement.
	III.A.2.c.(3)	Develop one or more standardized nonnative fish datasets to facilitate data analyses and information tracking (one dataset will incorporate all tagging data, others may incorporate all movement, mark-recapture, removal data, etc.) *YS G-1.) Relates to item V.A.1., Interagency Data Management.	Program	Ongoing	X	X	X	X	X	X	Ongoing. NNF PI's submit their standardized data sets to CRFP-GJct no later than March 15 each year. Nonnative fish collections are being considered in broader STReaMS database effort.
	III.A.2.c.(4)	Evaluate additional techniques to improve data analysis (e.g., advanced software, exploitation models, ecosystem response models). (YS M-1,2). See, for example, Haines and Modde, 2007.	Program	Ongoing	X	X	X	X	X	X	The programmatic smallmouth bass synthesis, III.A.2.c.(2) provided projection tool software that was made available in spring 2014 with workshop to train Program personnel.

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	III.A.2.c.(5)	Develop a measure of successful suppression of smallmouth bass.	Program		X						Projection tool developed (Breton et al. 2014). Smallmouth bass population dynamics better understood in some reaches, but not well understood in the White and Colorado rivers.
>*	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	Only determined to be an issue on the White River just below Kenney Reservoir. CPW closed angling in this reach, but rescinded at Program's request beginning in 2013 to reduce smallmouth bass.
	III.A.2.e.	Increase law enforcement activity to decrease angling mortality.	STATES	Ongoing	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							Currently only deemed necessary in Green River (see Green River).
>*	III.A.2.g.	Evaluate other methods for controlling nonnative fishes, including manipulation of flow and temperature, use of fish attractants, pathogens, genetic modification, and chemical piscicides. *See Johnson et al. 2014* (YS N-1,2,3,4)	Program	Ongoing	X	X	X	X	X	X	Researchers at LFL continue to investigate relationships between smallmouth bass spawning/recruitment and environmental conditions to serve as the basis for a future flow manipulation study (likely targeting the Green River below Flaming Gorge Dam). CSU study to determine sources of nonnative fish found in the rivers completed early 2014 and application of technique is ongoing (see also III C. below). Lower Basin researchers (Clarkson and Ward) presented novel piscicide development at recent workshops and Biology Committee may be interested in collaborating on development of this technology / application in the Upper Basin. Ways to eliminate access to spawning areas (e.g. LaFarge Pond, Walton Creek) being investigated.
	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							

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>*	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 (to be reviewed in 2019)						X	
	III.B.7.	Increase law enforcement activity to prevent illicit stocking.									
	III.B.7.a.	Develop plan	STATES	Ongoing							Recovery Program continues to recommend that upper basin states squarely addresses the issue of illegal stocking by adopting strict and severe penalties for illegal introdution of nonnative aquatic species and facilitating education, enforcement and incentives to promote compliance and prosecution as needed. This is addressed in the Basinwide strategy (IIID).
>*	III.B.7.b.	Implement plan	STATES	*Ongoing*	X	X	X	X	X	X	Wyoming, Colorado and Utah annual fishing regulations brochure call attention to the problem of and penalties for illegal stocking. Colorado'sNonnative Fish Management Work Group will consider illicit introductions as a component of a strategy to respond to Service's sufficient progress assessment.
	III.B.8.	Evaluate designation of native fish conservation areas	STATES	Ongoing	X	X	X	X	X	X	The White River Work Group group established a goal to create a native fish conservation area in the White River in Colorado and Utah (Utah has discussed with their Wildlife Board and RAC; no new developments in Colorado, though they have an internal management category for reaches managed for native species). Concept still being evaluated at the policy level for other areas of the Basin, however (and is part of basinwide nonnative fish strategy).
	III.C.	Evaluate sources of nonnative fishes into critical habitat using isotope technology. See Johnson et al. 2014.	CSU	Ongoing	X	X	X	X	X	X	CSU investigations have resulted in otolith markers for water chemistry for reservoirs throughout the basin. Final report completed in 2014. Program continues to collect & retain otoliths under specific guidance to assure potential for future analysis, if needed. This technique also has forensic potential for prosecuting cases of illegal fish transport or possession of live fishes in illegal stocking cases.
	III.D.	Finalize the UCR Basin Nonnative and Invasive Aquatic Species Prevention and Control Strategy (Basinwide Strategy), Martinez et al. 2014.	PD	Almost complete							! Management Committee approved February 11, 2014.
	III.E.	Cease translocation of all nonnative predators to any fishery within the UCR.	States / Program	Complete							! All translocation ceased as of FY14.
	III.F.	The States will commit to remove northern pike and / or replace them with a Compatible (compatible with recovery) species (as identified in the Basinwide Strategy) throughout the UCR Basin. Specific waters will be targeted based on risk of escapement, opportunity and available resources.	States / Program	Complete in UT &WY; under review in CO	X	X	X	X	X	X	Colorado considering actions at Elkhead, LaFarge, and Chapman.
	III.F.1.	Implement 'must kill' regulations for northern pike throughout the UCR basin (exceptions may include waters where northern pike are being replaced by tiger muskie).	WY & UT	Complete							

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III.F.2.	Continue discussions concerning "must kill' regulations on northern pike throughout the UCR Basin to develop a proposal supported by law enforcement for regulatory consideration.	CO	Under review	X	X	X	X	X	X	Under discussion by CPW, which has convened working group to investigate pilot projects. CPW has removed all bag and possession limits for problematic nonnative fishes in the warmwater reaches of the Green, Yampa, White, Colorado, and Gunnison rivers on the western slope in Colorado.
III.G.	Remove smallmouth bass and / or replace them with a Compatible species (as identified in the Basinwide Strategy) everywhere they occur throughout the UCRB (exceptions = McPhee Res., Lake Powell Res., and upstream of Flaming Gorge Dam; and 'containment' may prove to be a viable management option for smallmouth bass at Starvation Res.). Specific waters will be targeted based on risk of escapement, opportunity and available resources.	States / Program		X	X	X	X	X	X	Colorado undertakng actions at Elkhead and potentially Ridgway. Utah undertaking actions at Red Fleet and Starvation.
III.G.1.	Implement 'must kill' regulations for smallmouth bass throughout the UCR basin (see exceptions above).	UT	Complete							
III.G.2.	Continue discussions concerning "must kill' regulations on smallmouth bass throughout the UCR Basin to develop a proposal supported by law enforcement for regulatory consideration.	CO	Under review	X	X	X	X	X	X	Under discussion by CPW, which has convened working group to investigate pilot projects.
III.H.	Reduce burbot numbers through all means practicable (including targeted removal) throughout the UCR Basin.	States / USFWS	Complete in UT &WY; under review in CO	X	X	X	X	X	X	Current State management practices (e.g., 'must kill' regulations; fishing derbies at Flaming Gorge) considered adequate.
III.H.1.	Implement 'must kill' regulations for burbot throughout the UCR basin.	WY & UT	Complete							
III.H.2.	Continue discussions concerning "must kill' regulations on burbot (as a preemptive measure) throughout the UCR Basin to develop a proposal supported by law enforcement for regulatory consideration.	CO	Under review	X	X	X	X	X	X	Under discussion by CPW, which has convened working group to investigate pilot projects.
III.I.	*Reduce walleye numbers through all means practicable (including targeted removal) throughout the UCR Basin.*	*States / USFWS*		X	X	X	X	X	X	BC: New walleye removal passes in lower and middle Green and Colorado rivers added in 2014 and 2015.
III.I.	Promote increased production of sterile gamefish (e.g., hybrids, triploids), as Compatible sport fish.	Service / States / Program	Pending	X	X	X	X	X	X	Discussion ongoing among FWS and States; providing sterile gamefish is consistent with new FWS hatchery priorities. >85% of Utah-produced rainbow trout are triploid. Utah is exploring options to share methodologies and fish with neighboring states. CPW believes they can produce walleye that are 99% sterile.
III.J.	Work with State Wildlife agencies and water user groups to increase awareness among States' legislatures and the courts of the ecological and financial ramifications of illicit introductions.	States and PD via Implementation Committee	Ongoing	X	X	X	X	X	X	
IV.	**MANAGE GENETIC INTEGRITY AND AUGMENT OR RESTORE POPULATIONS (STOCKING ENDANGERED FISHES)**									
IV.A.	Genetics Management.									
IV.A.1.	Develop and approve Genetics Management Guidelines.	PD	Complete	Williamson and Wydoski 1994.						
IV.A.2.	Develop and implement Genetics Management Plan for all species and update as needed.	PD	Ongoing (updated 6/99)	X	X	X	X	X	X	In 2011, Ad Hoc group drafted recommendations for humpback chub broodstock development; the group inventoried fin clips collected to date and prioritized analysis. Geneticists at SNARRC completed genotyping of Upper Basin *Gila* in December 2014; results pending. Ad Hoc group will then determine makeup of an Upper Basin broodstock and develop Genetics Management Plan.
IV.A.3.	Conduct genetic diversity studies (includes Gila taxonomy studies) and confirm presumptive genetic stocks based on all available information.									
IV.A.3.a.	Razorback sucker.	BR	Complete	Wydoski 1995, Czapla 1999.						
IV.A.3.b.	Bonytail and humpback chub.									
IV.A.3.b.(1)	Morphological and allozyme analyses. (Draft 4/95)	PD	Complete	Douglas and Douglas 2007. Keeler-Foster 2008.						
IV.A.3.b.(2)	Mitochondrial DNA analysis.	BR	Complete	Douglas and Douglas 2007. Keeler-Foster 2008.						

GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	IV.A.3.c.	Colorado pikeminnow.	PD	Complete	Williamson et al. 1999.						
>	IV.A.4.	Secure and manage the following species in hatcheries (according to the Genetics Management Plan).									
	IV.A.4.a.	Razorback sucker.									
	IV.A.4.a.(1)	Middle Green	FWS-FR	Ongoing	X	X	X	X		X	
	IV.A.4.a.(2)	Upper Colorado River.	FWS-FR	Ongoing	X	X	X	X	X	X	
	IV.A.4.b.	Bonytail	UDWR/CPW	Ongoing	X	X	X	X	X	X	Programs will establish redundant broodstock as backup to SNARRC.
	IV.A.4.c.	Humpback chub.									See IV.A.2. Fin clips continue to be collected from adult humpback chub in case further analysis needed to determine level of genetic introgression (relates to broodstock development).
	IV.A.4.c.(1)	Black Rocks Canyon. (Broodstock currently represented by wild fish in the river.)	FWS-FR	Ongoing	X	X	X	X	X	X	FWS collected 20 juvenile and small adult chub (mostly 150-300mm) from Black Rocks this fall and put them in a pond at Horsethief (the goal is to collect 200 fish). CRFP will see how they overwinter and continue to bring in fish in 2015.
	IV.A.4.c.(2)	Westwater Canyon. (Broodstock currently represented by wild fish in the river.)	UDWR	Ongoing	X	X	X	X	X	X	
	IV.A.4.c.(3)	Cataract Canyon. (Broodstock currently represented by wild fish in the river.)	UDWR	Ongoing	X	X	X	X	X	X	
	IV.A.4.c.(4)	Yampa Canyon. (Broodstock had been considered represented by wild fish in the river; however, population appears to have declined and Recovery Program was unable to establish a refuge stock.)	FWS-FR	Discontinued							Not enough humpback chub remain in Yampa Canyon to establish a broodstock; Program will consider other sources.
	IV.A.4.c.(5)	Desolation/Gray Canyons. (Broodstock currently represented by wild fish in the river; however, population appears to have declined and Recovery Program is establishing a refuge stock.)	UDWR	Ongoing	X	X	X	X	X	X	25 humpback chub from Desolation Canyon were brought into Ouray NFH 2009. Twelve remain at Ouray NFH-Randlett. Program may consider bringing in additional fish in future years. See IV.A.4.c.
	IV.A.4.d.	Colorado pikeminnow.									
	IV.A.4.d.(1)	Upper Colorado River Basin. (Broodstock currently represented at Dexter NFH and by wild fish in the river.)	FWS	Ongoing	X	X	X	X	X	X	
	IV.B.	Conduct annual fish propagation activities.									
	IV.B.1.	Identify species needs for refugia, research, augmentation, and information and education.	PD	Annual	X	X	X	X	X	X	
	IV.B.2.	Implement integrated stocking plan (Nesler et al. 2003).	FWS, UDWR, CPW	Annual	X	X	X	X	X	X	Good production from all 4 facilities. Draft revised integrated stocking plan implementation begun in 2013; final revised plan pending.
	IV.B.3.	Conduct NEPA compliance and develop biological opinion on disposal of excess captive- reared endangered fish.	FWS-ES/FR	Complete	"Disposition of Captive-Reared Endangered CO River Fish," 06/08/95, FONSI. (Note: Contrary to this FONSI, Lake Powell is no longer a suitable "disposal" location for any excess captive-reared endangered fish (due to recent discoveries of razorbacks there.)						
	IV.C.	Operate and maintain facilities.									
	IV.C.1.	Ouray NFH: Randlett Unit.	FWS-FR	Ongoing	X	X	X	X	X	X	Two new wells drilled in 2014. FWS Engineering did not fully agree with contractor's assessment of electrical safety issues. Nets or other control measures needed to control extensive avian predation on half-acre ponds.
	IV.C.2.	Ouray NFH: Grand Valley Unit.	FWS-FR	Ongoing	X	X	X	X	X	X	
	IV.C.3.	Wahweap.	UDWR	Ongoing	X	X	X	X	X	X	
	IV.C.4.	Mumma.	CPW	Ongoing	X	X	X	X	X	X	
	IV.D.	Plan, design, and construct needed facilities.									
	IV.D.1.	Develop Coordinated Hatchery Facility Plan based on revised State stocking plans.	PD	Complete	Wydoski 1994; revised by Czapla May 31, 2001. See also chapter 4 of Nesler et al., 2003.						
	IV.D.2.	Design and construct appropriate facilities.									
	IV.D.2.a.	Ouray NFH: Randlett Unit.	FWS/BR	Complete	Ouray NFH water reuse system completed in 2002; hatchery fully functional & is producing razorback sucker for stocking & floodplain experiments.						
	IV.D.2.b.	Wahweap.	UDWR/BR	Complete							
	IV.D.2.c.	Ouray NFH: Grand Valley Unit.	FWS/BR	Complete	Grand Valley hatchery facility expansion completed in 1999.						

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	ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
IV.D.2.c.(1)	Construct ponds at Grand Valley to maintain secondary bonytail broodstock, humpback chub from Black Rocks, Westwater and Cataract Canyons, and additional rearing space for razorback sucker (leased ponds being discontinued).	FWS/BR	Complete							
IV.D.2.d.	Acquire ponds for growout of endangered fishes.									
IV.D.2.d.(1)	23 acres of growout ponds in the Green River basin.	FWS/STATES	Complete	As a result of operational changes at Ouray NWR, leased ponds are no longer needed.						
IV.D.2.d.(2)	100 acres of growout ponds in the Colorado River basin.	FWS/STATES	Complete	As a result of revised state stocking plans, growout pond acreage in the Colorado River basin was judged sufficient to meet required number & size of fish as of 2003. 2010: most leased ponds being discontinued; see IV.D.2.c.(1), above.						
IV.E.	Conduct monitoring to evaluate effectiveness and continuation of endangered fish stocking.									**!** Razorback adults continue to accumulate in the Green and Colorado sub-basins (including Colorado and San Juan inflows to Lake Powell); larval catch increased considerably in recent years. Spawning activity observed in numerous locations in the Green River, Colorado River and in the White River.
IV.E.1.	Assess the monitoring needed to evaluate the contribution to recovery of endangered fish stocking over relevant reaches, life stages, and generations. Assessment addressed in 2001 and 2004 workshops (Upper Colorado River Endangered Fish Recovery Program 2002, 2006); continued assessment ongoing.	LFL/STATES	Ongoing	X	X	X	X	X	X	
IV.E.2.	Evaluate endangered fish stocking and revise augmentation plans, as needed. Initial evaluation complete: Zelasko et al. 2009, 2011.	FWS/LFL/ States/PD	Ongoing	X	X	X	X	X	X	
IV.E.3	Modify stocking plans to ensure successful stocking.	Program	Ongoing	X	X	X	X	X	X	Draft revised integrated stocking plan implementation begun in 2013; final revised plan pending.
V.	**MONITOR POPULATIONS AND HABITAT AND CONDUCT RESEARCH TO SUPPORT RECOVERY ACTIONS (RESEARCH, MONITORING, AND DATA MANAGEMENT)**									
V.A.	Measure and document population and habitat parameters to determine status and biological response to recovery actions.									**X** Preliminary results from the most recent rotation (2011-2013) of Colorado pikeminnow population estimates indicate adults and sub-adults are in decline throughout the entire Green River sub-basin. Preliminary population estimates from the Colorado River in 2013 was 413 (an earlier prelim. estimate was revised up with 2014 data) and 377 adults in 2014 , the lowest since abundance estimates began in 1992. ***!*** Initial razorback sucker (>400mm TL) population estimates from the Colorado River indicate the population ranged from 656-2,035 from 2005-2010. A total of 661 unique razorbacks were captured in the Colorado River in 2013 and 835 were captured in 2014 during Colorado pikeminnow population estimates.
V.A.1.	Conduct interagency data management program to compile, manage, and maintain all research and monitoring data collected by the Recovery Program.	FWS-FR	Annual	X	X	X	X	X	X	*!* Program selected contractor (Colorado Natural Heritage Program) to develop a program database ("STReaMS"). CNHP provided progress update at 2015 Researchers Meeting and a workshop is scheduled for March.
V.A.1.a.	Develop basinwide razorback monitoring program (implementation to be reflected in sub-basin worksheets). Bestgen et al. 2012.	LFL				X				Colorado River arm of Lake Powell was monitored in 2014 (CRFP and UDWR lead). A total of 241 razorback sucker, 4 bonytail, and 2 Colorado pikeminnow captured.
V.A.1.a.(1)	Standardize light trap sampling		Pending							PI's and/or Biology Committee have not yet discussed/developed an approach to address recommendation by Bestgen et al. 2012 to: 1) conduct additional experimental early life stage sampling programs to assess capture efficiency with light traps, and dispersal and colonization of wetlands by larvae; and 2) use occupancy analyses to aid in determining colonization probabilities of larvae in wetlands, given that detection probabilities of larvae in wetlands may be less than perfect.

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	ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
V.A.1.a.(2)	Investigate improving recapture rates through passive PIT tag monitoring, nets, etc. to improve population abundance estimates.		Ongoing	X	X	X	X	X	X	! PIT antennas have been placed in several locations throughout the basins, increasing PIT detections significantly. Researchers are incorporating these data into demographic analyses. However, not all antenna data suitable for use in population abundance estimates; BC to follow-up on related discussion from 2015 annual researchers meeting.
V.A.2.	Evaluate population estimates.	PD	Ongoing	X	X	X	X	X	X	Program has compiled all humpback chub recapture histories back to 1990 (through 2012) and determined annual estimates of survival and growth relationships for Black Rocks and WestwaterCanyon; Gary White and LFL provided survival, abundance, and transition probabilities. Information reported in Black Rocks annual report and also will be included in the upcoming Black Rocks and Westwater population estimate reports.
V.A.3.	Collect and submit data according to standard protocol (e.g., location, PIT tag #, length, weight, etc.) on endangered fish encountered in all field activities in order to provide annual information on population status outside of formal population estimates.	ALL	Ongoing	X	X	X	X	X	X	Due to razorback abundance (and in some locations, bonytail), it's not possible to record all data with every capture during all field activities (e.g., during some nonnative fish control work). BC agreed at minimum, during abundance estimates for Colorado pikeminnow or humpback chub, data should be taken on every endangered fish encountered. During other field activities (e.g., nonnative fish control), crews should try to take data from as many endangered fish as possible, recognizing that in some cases there may be too many endangered fish to board and record their data (such that it would impede the primary task of nonnative fish control, for example)
V.B.	Conduct research to acquire needed life history information.									
V.B.1.	Identify significant deficiencies in life history information and needed research.	PD	Ongoing	X	X	X	X	X	X	
V.B.1.a.	Develop Research Framework	PD	Complete							
V.B.1.a.(1)	Implement climate change initiative that outlines a strategy for dealing with the effects of drought.									The final report is available at http://www.usbr.gov/lc/region/programs/crbstudy/finalreport.html.) A follow-up modeling effort to the Basin Study to validate the environmental metrics was initiated in 2013. The climate change section of the Colorado pikeminnow recovery plan is currently being updated.
V.B.2.	Conduct appropriate studies to provide needed life history information.	FWS-FR/ STATES	Ongoing	X	X	X	X	X	X	
V.B.2.a.	Evaluate need for imprinting based on reintroduction plans.	FWS-FR	Complete	Reintroduction plans complete; imprinting not called for.						
V.B.2.b.	Investigate age-0 and age-1 humpback chub mortality (especially in Black Rocks/Westwater and Desolation canyons) as recommended in the Research Framework.	TBD	Pending	X	X					***X*** CSU's recent robust population estimate analysis more clearly indicates that declines in the Westwater and and Black Rock humpback chub populations are due to lapses in recruitment, i.e. adult survival rates have remained stable. PI's agree that reinitiating a Age-0 monitoring component is advisable.
V.C.	Develop and enhance scientific techniques required to complete recovery actions.									
V.C.1.	Conduct marking study of young-of-the-year Colorado pikeminnow.	FWS-FR	Complete	Muth and Nesler 1989, Haines and Modde 1996, Haines at al. 1998.						
V.D.	Establish sampling procedures to minimize adverse impacts to endangered fishes.									
V.D.1.	Assess electrofishing injury impacts to endangered fishes.	LFL	Complete	See Snyder 2003.						
V.D.2.	Implement scientific sampling protocols to minimize mortality for all endangered fishes.	FWS-ES/ STATES	Ongoing	X	X	X	X	X	X	Electrofishing training course conducted in August 2014 with 23 participants; data gleaned being summarized in a report.
V.E.	Provide for long-term care, cataloging, and accessibility of preserved specimens.	PROGRAM	Ongoing	X	X	X	X	X	X	***X*** Cyprinid key incomplete (LFL); anticipated in March 2015.
V.F.	Assess relative biological importance of tributaries and their potential contributions to endangered fish recovery.	Contract	Complete	Tyus and Saunders 2001.						

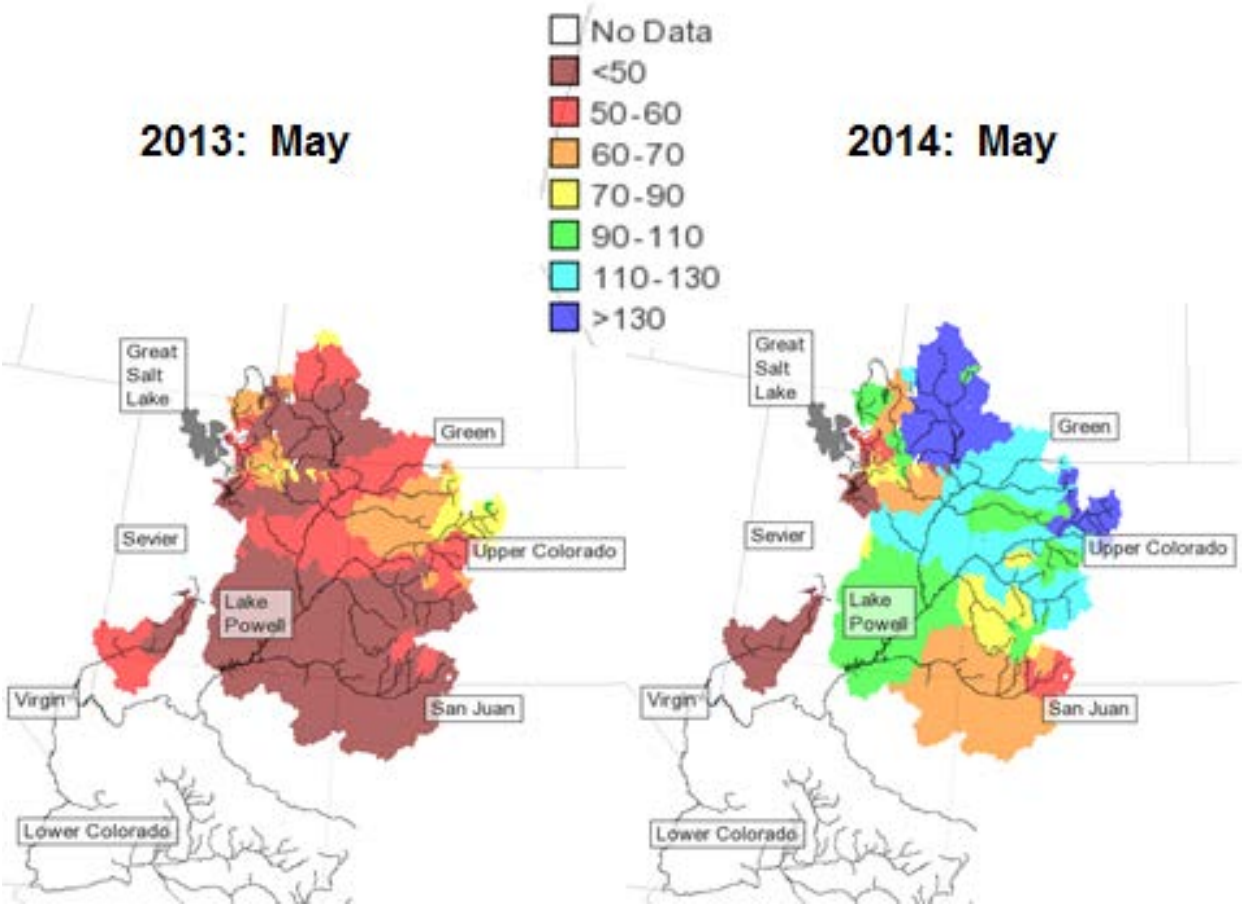
GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

	ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
V.G.	Reevaluate overutilization for commercial, recreational, scientific or educational purposes and identify actions to ensure adequate protection.	FWS-ES	Ongoing	X	X	X	X	X	X	
V.H.	Reevaluate effects of disease and parasites and identify actions to ensure adequate protection.	FWS-ES	Ongoing	X	X	X	X	X	X	
VI.	**INCREASE PUBLIC AWARENESS AND SUPPORT FOR THE ENDANGERED FISHES AND THE RECOVERY PROGRAM.** (Includes integration with San Juan River Recovery Implementation Program.)									
VI.A.	Conduct survey to measure public awareness of and attitudes toward endangered Colorado River fishes and the Recovery Program.	PD	Complete 1995.	Vaske 1995.						
VI.B.	Train Recovery Program managers and researchers in media relations.	PD	Ongoing	X	X	X	X	X	X	
VI.C.	Plan and implement information and education and public involvement activities for all significant Recovery Program actions (e.g. presentations, public meetings, public involvement training, etc.).	PROGRAM	Ongoing	X	X	X	X	X	X	Prepared strategic communications plan for 2014 "sufficient progress" letter. Worked with CPW to plan public involvement related to Elkhead Reservoir nonnative fish management. Provided information packets about recovery activities to sheriffs in counties where Program conducts endangered fish sampling and nonnative fish removal.
VI.D.	Promote technical publication of study results.	PD	Ongoing	X	X	X	X	X	X	
VI.E.	Produce, distribute, and evaluate information and education products (such as newsletter, brochures, public website, social media, etc.); manage media relations, including contacting reporters, producing news releases, fact sheets, etc.	PD	Ongoing	X	X	X	X	X	X	Maintained Recovery Programs' social media sites (Facebook, Twitter, Flickr). Continued expanded, color, digital edition of *Swimming Upstream* newsletter (in addition to print edition) and *Program Highlights* briefing documents with new color photos and linked videos.
VI.F.	Participate in development and circulation of interpretive exhibits about the Recovery Program and the endangered fish.	PD	Ongoing	X	X	X	X	X	X	Promoted Recovery Programs at key outreach events, including: CRWUA Conference, Colorado Water Congress, Utah Water Users Workshop, Colorado Water Workshop, Endangered Species Day at the Denver Aquarium, and Denver's MSU One World One Water event. Designed and procured exhibit table covers, and repaired trade show booth.
VI.G.	Maintain Recovery Program technical library and library web page.	PD	Ongoing	X	X	X	X	X	X	***X*** New reports are posted to Program website, but PD's office still needs to establish protocol to update CWCB Laserfiche library with new reports.
VII.	**PROVIDE PROGRAM PLANNING AND SUPPORT (PROGRAM MANAGEMENT)**									
VII.A.	Determine actions required for recovery.									
VII.A.1	Assure consistency of RIPRAP with currently approved recovery plans.	PD	Ongoing	X	X	X	X	X	X	
VII.A.2.	Recognize the role of the Upper Colorado River Recovery Program in revised recovery plans.	FWS	Ongoing	X	X	X	X	X	X	
VII.A.3.	Update, refine, and prioritize recovery actions (RIPRAP) annually.	PD	Annual	X	X	X	X	X	X	
VII.A.4.	Develop Interim Management Objectives (IMOs) for each species and presumptive stock and an index to population status.	PD	Complete	Lentsch et al. 1998.						
VII.A.4.a.	Public and external peer review of IMOs.	FWS	Complete	1998						
VII.A.4.b.	Implementation Committee review and approval of IMOs.	ALL	Complete	September 10, 1998.						
VII.A.5.	Develop specific recovery goals.									
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.						

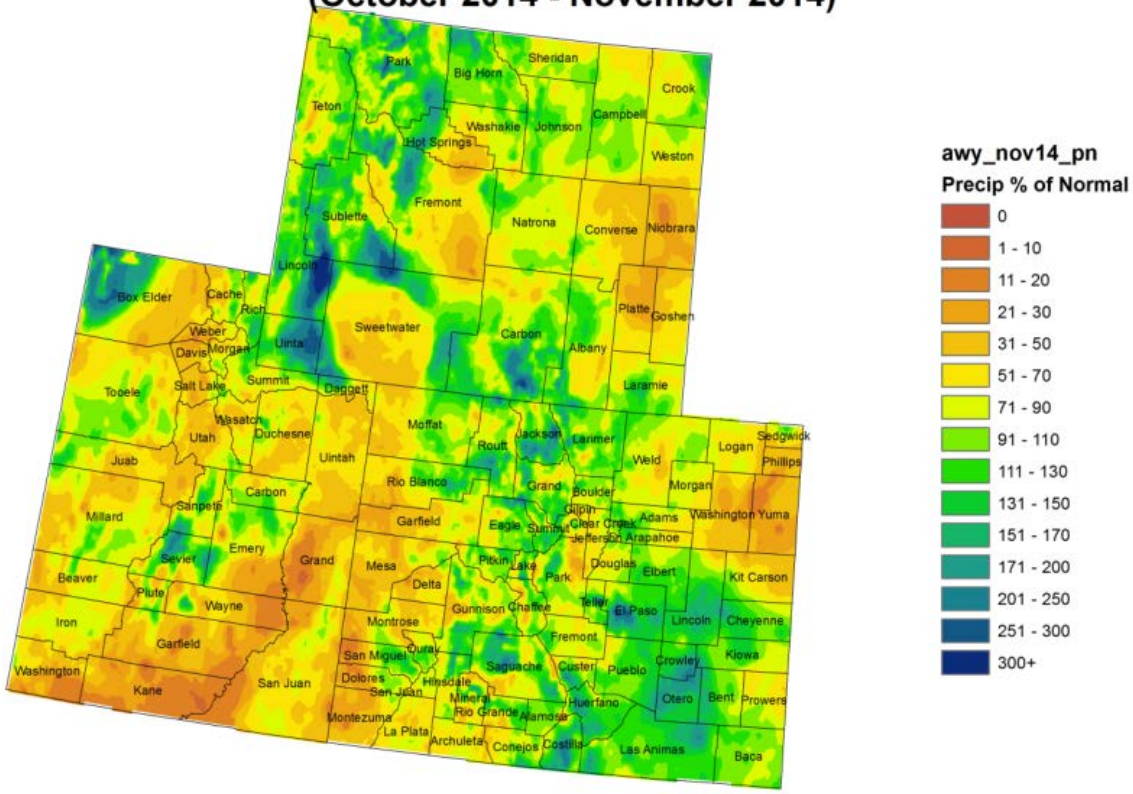
GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	VII.A.5.d.(1)	Update recovery goals and then revise recovery plans.	PD/FWS	In progress	X					X	In progress. Colorado pikeminnow recovery team continued meeting in 2014; their input was incorporated into a draft plan that was shared with the Recovery Programs on December 4, 2014. Programs review is in progress. Terms of Reference document was drafted and shared with prospective humpback chub recovery team members on September 26, 2014. FWS Regional Director recovery team letters of appointment are being drafted. The Service does not recommend revising the bonytail and razorback sucker recovery plans at this time.
	VII.A.5.e.	Conduct species status review every 5 years. See U.S. Fish and Wildlife Service 2011 a&b, 2012 a&b at http://www.coloradoriverrecovery.org/documents-publications/foundational-documents/recovery-goals.html.	FWS/Program	Every 5 years	X	X					MC: Program has committed to a razorback species status assessment, which may be a 12-month effort, beginning in late FY15 and be conducted under contract.
	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	
	VII.A.7.	Monitor and assess Recovery Program accomplishments annually.	PD	Annual	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	
	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	
	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	Complete							
	VII.C.	Manage, direct, and coordinate Recovery Program activities.	PD	Ongoing	X	X	X	X	X	X	Hiring process for new I&E Coordinator underway. Implementation Committee approved new Database Manager position.
	VII.C.1.	Review Information and Education program (Management Committee).	PD	Complete	Management Committee, July 28, 1994.						

Assessment: General – Hydrology & Climate



Colorado, Utah and Wyoming Water Year 2015 Precipitation as a Percentage of Normal (October 2014 - November 2014)



2014 Basin Wide Hydrology Summary (USBR)

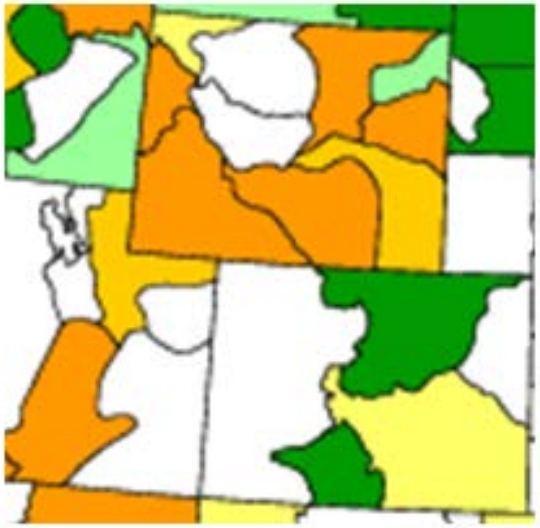
Unregulated Inflow	% Avg
Lake Powell	96%
Flaming Gorge	116%
Blue Mesa	120%
Navajo	65%

Upper CO Basin precipitation was 107% Avg

Basin Snowpack	112% of Avg
Green River	141%
Upper CO River	136%
San Juan River	68%

Drought Severity Index by Division
Weekly Value for Period Ending AUG 31, 2013
Long Term Palmer

Drought Severity Index by Division
Weekly Value for Period Ending AUG 30, 2014
Long Term Palmer



-4.0 or less (Extreme Drought)
-3.0 to -3.9 (Severe Drought)
-2.0 to -2.9 (Moderate Drought)
-1.9 to +1.9 (Near Normal)
+2.0 to +2.9 (Unusual Moist Spell)
+3.0 to +3.9 (Very Moist Spell)
+4.0 and above (Extremely Moist)

2014 peak flows and baseflows vs Recovery Program flow targets (CFS)

Red is a target not met

2014 (snowpack%)	Peak Target	2014 Peak
Yampa R. at Maybell (125%)	N/A	13,100
Green R. at Jensen 141%	Avg 18,600	19,500
Green R. at Green River 141%	Avg 22,000	20,600
White R. at Watson (125%)	Mod Wet 3,700	Draft 3,290
Duchesne R. at Randlett (72%)	N/A	124
Price R. at Woodside (91%)	N/A	45
Colorado R. at Cameo (132%)	23,500	25,300
Gunnison R. at Grand Junction (100%)	Mod Wet 14,350	12,700
Colorado R. at State Line (136%)	Mod Wet 35,000	38,000

2014 (% snowpack)	Base Flow Target	2014 Aug-Oct Avg	% of Avg	2014 Min.
Yampa R. at Maybell (125%)	Wet 200	506	253%	241
Green R. at Jensen	Mod Wet 2,400 - 2,800	3,018		2,550
Green R. at Green River	Mod Wet 2,700 - 4,700	3,487		2,560
White R. at Watson (125%)	Mod Wet 500	508	102%	363
Duchesne R. at Randlett (72%)	Dry 50	147	294%	33
Price R. at Woodside (91%)	Dry 15	144	960%	14
Colorado R. at Palisade (132%)	Wet 1,630	1,852	114%	1,040
Gunnison R. at Grand Junction (100%)	Mod Wet 1,500	1,806	120%	1,370
Colorado R. State Line (132%)	Mod Wet 3,900	5,023	129%	3,810

Assessment: General - Stocking

Fish produced and stocked by facility in 2014				
Facility	**Species**	**Target**	**Stocked**	**Percent**
Grand Valley	Razorback sucker	6,000	6,062	101%
	Bonytail	10,000	9,529	95%
Ouray	Razorback sucker	6,000	6,601	110%
	Bonytail	10,000	15,196	152%
Wahweap[1]	Bonytail	10,660	15,671	147%
Mumma	Bonytail	5,000	5,441	109%
[1]Via additional growth at Ouray				

Razorback sucker stocked by river				
Facility	**River**	**Stocked**	-	-
Grand Valley	Upper Colorado	4,062		
	Gunnison	2,000		
Ouray	Middle Green	6,601		

Bonytail stocked by river				
River	**Grand Valley**	**Ouray**	**Wahweap**	**Mumma**
Middle Green		15,196		3,034
White			5,233	
San Rafael			5,158	
Colorado	6668			2,407
Gunnison	2861			
Dolores			5,280	

Total Numbers of Fish Stocked in the Upper Colorado River Basin Since 1995

Razorback Sucker Stocking in the Upper Colorado River Basin

Year	Stocking Goal	Colorado and Gunnison Rivers # Stocked	Colorado and Gunnison Rivers % Target	Middle Green River # Stocked	Middle Green River % Target	Lower Green River # Stocked	Lower Green River % Target	
1995	Upper Colorado River experimental stocking plan (13,100 in various size ranges)	316	2.4%					
1996	13,100 in various size ranges	1,112	8.5%					
1997	13,100 in various size ranges	2,926	22.3%					
1998	26,200 in various size ranges	606	2.3%	387	No Plan			
1999	58,600 in various size ranges	6,155	10.5%	1,357	No Plan			
2000	104,800 in various size ranges	29,826	28.5%	224	No Plan			
2001	104,800 in various size ranges	6,199	5.9%					
2002	State Stocking Plans (CO = 16,440 300+ mm; UT = 18,500 >300 mm)	11,374	69.2%			274	1.5%	
2003	Integrated Stocking Plan (9,930 per reach)	5,541	55.8%	8,446	85.1%	2,377	23.9%	
2004	Integrated Stocking Plan (9,930 per reach)	6,153	62.0%	9,619	96.9%	5,957	60.0%	
2005	Integrated Stocking Plan (9,930 per reach)	10,284	103.6%	4,850	48.8%	4,231	42.6%	
2006	Integrated Stocking Plan (9,930 per reach)	10,726	108.0%	5,021	50.6%	15,188	153.0%	
2007	Integrated Stocking Plan (9,930 per reach)	10,064	101.3%	7,749	78.0%	8,549	86.1%	
2008	Integrated Stocking Plan (9,930 per reach)	12,949	130.4%	11,677	117.6%	10,161	102.3%	
2009	Integrated Stocking Plan (9,930 per reach)	17,975	181.0%	14,983	150.9%	5,017	50.5%	
2010	Integrated Stocking Plan (9,930 per reach)	9,926	100.0%	10,926	110.0%	10,040	101.1%	
2011	Integrated Stocking Plan (9,930 per reach)	12,019	121.0%	9,036	91.0%	12,496	125.8%	
2012	Integrated Stocking Plan (9,930 per reach)	10,506	105.8%	11,191	112.7%	10,193	102.6%	
		164,657		**95,466**		**84,483**		**344,606**

Facility		Ouray # Stocked	Ouray % Target	Ouray Avg Size	Grand Valley # Stocked	Grand Valley % Target	Grand Valley Avg Size	
2013	Draft Revised Integrated Stocking Plan (6,000 per facility)	10,606	176.8%		10,061	168%		
2014	Draft Revised Integrated Stocking Plan (6,000 per facility)	6,601	110.0%	367.5	6,062	101%	367	
		17,207			**16,123**			**33,330**

Bonytail Stocking in the Upper Colorado River Basin*

Year	Stocking Goal	Colorado and Gunnison Rivers		Middle Green River		Lower Green River		
		# Stocked	% Target	# Stocked	% Target	# Stocked	% Target	
2000	State Stocking Plans (CO = 12,000 200+ mm; UT = 16,280 µ=200 mm)	36,274	223%			69,192	425%	
2001	State Stocking Plans (CO = 12,000 200+ mm; UT = 16,280 µ=200 mm)	37,968	233%	-		45,522	280%	
2002	State Stocking Plans (CO = 12,000 200+ mm; UT = 16,280 µ=200 mm)	16,464	101%	17,713	109%	8,000	49%	
2003	Integrated Stocking Plan (5,330 200+ mm per reach)	6,303	118%	16,927	318%	3,043	57%	
2004	Integrated Stocking Plan (5,330 200+ mm per reach)	3,985	75%	3,500	66%	3,100	58%	
2005	Integrated Stocking Plan (5,330 200+ mm per reach)	6,067	114%	5,980	112%	3,100	58%	
2006	Integrated Stocking Plan (5,330 200+ mm per reach)	5,554	104%	5,045	95%	3,270	61%	
2007	Integrated Stocking Plan (5,330 200+ mm per reach)	5,570	105%	5,409	101%	5,404	101%	
2008	Integrated Stocking Plan (5,330 200+ mm per reach)	5,896	111%	7,641	143%	5,336	100%	
2009	Integrated Stocking Plan (5,330 200+ mm per reach)	5,085	95%	5,347	100%	5,403	101%	
2010	Integrated Stocking Plan (5,330 200+ mm per reach)	2,450	46%	2,813	53%	5,347	100%	
2011	Integrated Stocking Plan (5,330 200+ mm per reach)	5,454	102%	5,526	104%	-	0%	
2012	Integrated Stocking Plan (5,330 200+ mm per reach)	5,452	102%	2,831	53%	2,695	51%	
2013	Integrated Stocking Plan (5,330 200+ mm per reach)	2,934	55%	8,503	160%	0	0%	
		145,456		**87,235**		**159,412**		**392,103**

* Some bonytail may have been stocked prior to 2000, but these numbers not yet included.

Facility		Ouray			Grand Valley			Wahweap			Mumma			
		# Stocked	% Target	Avg Size	# Stocked	% Target	Avg Size	# Stocked	% Target	Avg Size	# Stocked	% Target	Avg Size	
2013	Draft Revised Integrated Stocking Plan (10,000 per facility; Mumma = 5,000)	6,087	61%			0%			0%		5,400	108%		
2014	Draft Revised Integrated Stocking Plan (6,000 per facility)	15,196	152%	280.4	9,529	95%	254	15,671	157%	235.5	5,441	109%	321.9	
	untagged							40,238	CDOT Pond, Debeque, CO					
	untagged							5,923	Rio Mesa Res. Group Camp, Dolores River, Utah					
		21,283			**9,529**			**15,671**			**10,841**			**57,324**

Colorado pikeminnow Stocking in the Upper Colorado River Basin

Year	**Stocking Goal**	**Colorado River**		**Gunnison River**		
		# Stocked	% Target	# Stocked	% Target	
2003	Integrated Stocking Plan (1,125 150+ mm per reach)	2,405	214%	1,051	93%	
2004	Integrated Stocking Plan (1,125 150+ mm per reach)	1,809	161%	1,200	107%	
		4,214		**2,251**		**6,465**

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		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	I.	**PROVIDE AND PROTECT INSTREAM FLOWS (HABITAT MANAGEMENT)**									
	I.A.	Green River above Duchesne River									
	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	Complete							
	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	! The Upper Green River water supply forcast for May - July was 141% of average. It was the third year of the Larval Trigger Study Plan; see I.D.1.b.(4)(a) below. Reclamation operated Flaming Gorge Dam under the ROD and Biological Opinion as an average year to meet or exceed a target of 18,600 cfs at Jensen, there were 4 days above 18,600 cfs. There were 20 days during larval presence when flows were above 14,000 cfs with possible access to these wetlands: Stewart Lake,, Above Brennan, Old Charley Wash, Thunder Ranch, Bonanza Bridge, Johnson Bottom, Stirrup, and Leota 7. Green River at Green River did not meet the average peak flow of 22,000, but peaked at 20,600 due to low snowpacks in the Duchesne and Price River tributatries. Baseflows met average-wet categories for reach 2 and 3.
	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	See I.D.1.b.(4)(a)
	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	
	I.A.4.a.(4)	Evaluate effectiveness of policy.	UT	Ongoing	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	Complete							
	I.A.4.b.(2)	Identify legal and technical process and schedule for streamflow protection.									
	I.A.4.b.(2)(a)	Develop work plan (Utah Department of Natural Resources 2010) and provide annual progress report to Management Committee (mid-November with other Program annual reports).	UT	Ongoing	X						In 2014, Utah's Green River Utah Water Acquisition Team (GRUWAT) completed the combination of the Bureau of Reclamations FG ops Riverware model (monthly timestep) with Utah's MODSIM model (daily timestep). Utah moved Green River flow protection to a policiy committee within the State.

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		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	I.A.4.b.(2)(b)	Identify issues, concerns and timeframe.	UT	Complete							
	I.A.4.b.(2)(c)	Prioritize potential methods and criteria for flow protection.		In progress							
	I.A.4.b.(2)(d)	Amalgamate technical information needed to model and resolve modeling issues.	UT	Complete							
	I.A.4.b.(2)(e)	Develop model to analyze historic and future scenarios	UT	Complete							
	I.A.4.b.(2)(f)	Analyze model results	UT	In progress	X						Complete, but documentation pending.
	I.A.4.b.(2)(g)	As necessary, obtain additional authority to protect flows	UT	Pending	X	X					
>*	I.A.4.b.(3)	Implement legal streamflow protection.	UT	Pending		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	Complete							
	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	Complete							
	I.B.3.b.	See IA4b2-3, above.	UT	Pending							
	I.C.	Price River									Passive PIT-tag antennas installed in Price River for 3-Species work also pick up endangered fish; In 2014 (through October), USU data data showed 33 Colorado pikeminnow, 48 razorback sucker, and 1 bonytail detected (309 total unique fish detected).
	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	Complete	Chart and Mohrman 2012.						
>	I.C.3.	Work with State of Utah and local water users to provide and enhance summer base flow conditions (either increase average daily flows thresholds or increase the frequency that those flows occur) in the lower Price River that are conducive to pikeminnow use. For example, consider securing an emergency pool of water to avoid periods of dewatering in the lower Price River.	PD/UT/Water users		X	X	X	X	X	X	PD coordinating with UDWR to investigate flexibilities in water management at Desert Lake WMA to support flows in the lower Price River.
	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	
	I.D.1.	Develop study plan to evaluate flow recommendations.	FWS/BOR/ WAPA	Complete							
	I.D.1.a.	Evaluate survival of young and movement of subadult razorback suckers from floodplains into the mainstem in response to flows. See Hedrick et al. 2012.	UDWR	Ongoing							See Larval Trigger Study Plan (I.D.1.b.(4)(a)) for discussion of Stewart Lake results.
	I.D.1.b.	Evaluate recent peak flow studies related to floodplain inundation and entrainment of larval razorback suckers.									
	I.D.1.b.(1)	Complete final report on entrainment of larval razorback suckers in floodplains.	UDWR/LFL	Complete							
	I.D.1.b.(2)	Monitor changes in the magnitude, timing, and size distribution of sediment. (Data series summarizing 2005-2008 daily sediment sampling on Gunnison, Green and Duchesne rivers [Williams et al. 2009} and scientific investigations report [Williams et al. 2013] completed.)	USGS	Pending							See General, I.A.4.a

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		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	I.D.1.b.(3)	Synthesize physical and biological data from recent peak flow studies related to floodplain inundation and entrainment of larval razorback suckers.	LFL	Complete							
	I.D.1.b.(4)	Develop a Larval Trigger Study Plan (LTSP) to experiment with timing Flaming Gorge releases to be coincident with the presence of wild produced larval razorback sucker, as recommended in Bestgen et al. 2011.	PD	Complete							
	I.D.1.b.(4)(a)	Implement LTSP			X	X	X	X	X	X	! In 2014, razorback larvae or young-of year were confirmed in all monitored wetlands connected via LTSP releases. In May 2014, UDWR electrofished Stewart Lake upon finding outlet gate open (allowing ~6 acre-feet of water into the wetland along with numerous carp and other non-native fishes). Discovering six spent adult (male and female) northern pike in addition to 50 carp, UDWR treated Stewart with rotenone so that young pike wouldn't be entrained with larval razorbacks upon filling of the wetland under the larval trigger study plan. When Stewart was drained in September, nonative fish made up the majority of biomass (110,299 mostly small-bodied fish) but there were 729 razorback sucker. With three months of inundation+N117, these fish were larger than in 2013 (when entrainment was limited to 2 months), and 20 fish were large enough to PIT tag.
	I.D.1.b.(4)(b)	Integrate and synthesize LTSP reports for evaluation and recommended revision of flow and temperature recommendations.								X	
	I.D.1.c.	Monitor larval razorback suckers in mainstem, and synthesize information on drift as related to flows and other conditions.									Seel.D.1.b.(4)(a) above.
	I.D.1.c.(1)	Conduct annual monitoring of larval razorback suckers and analyze historic monitoring data.	FWS/LFL/UDWR	Ongoing	X	X	X	X	X	X	Work has been expanded to include Larval Trigger Study Plan.
	I.D.1.d.	Determine relationship of backwater development to sediment availability and peak flows in Reach 2. To be combined with I.D.1.e (4)	LFL/Argonne	Ongoing							LFL & Argonne began work on FR-BW SYNTH in late 2009; draft final biological portion in review; habitat analysis portion pending.
	I.D.1.e.	Evaluate effect of base flow variability on backwater maintenance and quality.									
	I.D.1.e.(1)	Conduct annual monitoring of larval Colorado pikeminnow.	LFL	Ongoing	X	X	X	X	X	X	
	I.D.1.e.(2)	Monitor age-0 Colorado pikeminnow in backwaters.	UDWR	Ongoing	X	X	X	X	X	X	45 age-0 pikeminnow captured in 2014 (monsoonal rains affected habitat conditions)
	I.D.1.e.(3)	Evaluate response of native fish to nonnative predator removal	UDWR	Ongoing	X	X	X	X	X	X	
	I.D.1.e.(4)	Integrate biological and physical data on backwaters.	LFL/Argonne	Ongoing							See I.D.1.d for reference to an ongoing, and more comprehensive synthesis of related data.
	I.D.1.f.	Determine influence of flow and temperature recommendations on entire fish community with emphasis on nonnative fish life history in lower Reach 1 and upper Reach 2.	LFL/FWS	Ongoing	X						Project FR-115, "Effects of Flaming Gorge Releases on Lodore/Whirlpool Canyon Fish Community" is providing ongoing evaluation of Flaming Gorge operations. Biology Committee has recommended PI's focus reporting on the effects of environmental conditions on smallmouth bass early life history (otolith examination)(see General, IIIA2c1).

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		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	I.D.1.g.	Determine spillway entrainment of nonnative fish at Flaming Gorge Dam.	UDWR	Ongoing	X	X	X	X	X	X	Program relies on UDWR tailrace surveys coupled with Project FR-115 and other studies conducted farther downstream to monitor escapement (UDWR will provide annual data to nonnative fish coordinator). As called for in recent Flaming Gorge flow request letters, UDWR, NPS, PDO, WAPA were to develop a risk assessment of burbot escapement; draft report will be available in March 2015. N103
	I.D.1.h.	Integrate and synthesize reports for evaluation and recommended revision of flow and temperature recommendations.	PD/FWS	Pending						X	As stated in the Green River Study Plan, ongoing syntheses of historical data sets (FR-FP synth [complete] and FR-BW synth [in review, see ID1d]) will provide critical pieces of information in this evaluation, which should begin in 2015.
	I.E.	Assess need for tributary management plan for San Rafael River.									
	I.E.1.	Estimate future water demands on San Rafael River.	PD/Utah	Complete							
	I.E.2.	Develop tributary management plan for San Rafael River.	State	Pending							BLM was awarded a grant in 2012 to draft a San Rafael management plan; USU (Brian Laub) lead. NEPA for BLM portion anticipated spring 2014. First phase implementation target summer 2014. FWS-UT ES, USBR-Provo, and Cottonwood Creek Irrigation Co. finalized the Blue Cut Water Service EA which will provide year-round flows of 3 cfs in Cottonwood Creek beginning in Water Year 2018 (1 cfs in WY 15-16, 2 cfs in WY 17) which is expected to contribute to flows and improve habitat conditions in the lower San Rafael River.
	I.E.3.	Conduct appropriate Section 7 and NEPA compliance to implement tributary management plan.	PD/FWS	TBD							
	II.	**RESTORE HABITAT (HABITAT DEVELOPMENT AND MAINTENANCE)**									
	II.A.	Restore and manage flooded bottomland habitat.									**!** Vernal-CRFP and PDO proposal for Service's Cooperative Recovery Initiative to improve Johnson bottom floodplain habitat approved for funding; construction to occur in 2015.
	II.A.1.	Conduct site restoration.									
	II.A.1.a.	Old Charlie Wash.									**X** Service - FWS has not been able to renew lease with the Northern Ute Tribe for the southern portion of the Ouray National Wildlife Refuge. Leased land includes Old Charley Wash, an important 'dry year' sampling site identified in the Larval Trigger Study Plan and was therefore unavailable. Lease not expected to be renewed in time for LTSP studies in Spring 2015.
>*	II.A.1.a.(1)	Construct water control structure and fish kettle.	BR	Complete	Inlet and outlet water control structures repaired and a fish-harvest kettle installed in spring 1995. Inlet structure replaced March 1996. Leaks to outlet structure repaired in 1999.						
	II.A.1.a.(2)	Update management plan.	PD	TBD	Need for operational plan TBD pending determination of role of OCW in recovery.						
	II.A.1.a.(3)	Monitor and evaluate success.	FWS-FR/BR	TBD							
	II.A.2.	Acquire interest in high-priority flooded bottomland habitats between Ouray NWR and Jensen to benefit endangered fish.									
	II.A.2.a.	Identify and evaluate sites.	FWS-FR	Complete	Six sites acquired (1008.1 acres total). Floodplain acquisition completed and operation, maintenance and evaluation of sites incorporated into Green River Subbasin Floodplain Management Plan (Valdez and Nelson 2004a) (IIA4).						
	II.A.2.b.	Pre-acquisition planning and identification of acquisition options.	PD	Complete							
	II.A.2.c.	Conduct appraisal/NEPA compliance.	PD	Complete							
>*	II.A.2.d.	Negotiate acquisition and acquire.	PD	Complete							

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		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	II.A.2.e.	Evaluate effectiveness of land acquisition activities and provide recommendations.	PD	Complete							
	II.A.3.	Implement levee removal strategy at high-priority sites.									
	II.A.3.a.	Preconstruction (contaminants screening, floodablility assessments, environmental compliance, design, and engineering).	PD/BR	Complete	Levees breached at 8 sites(accessing 274 acres). Levee removal completed and operation, maintenance and evaluation of sites incorporated into Green River Subbasin Floodplain Management Plan (Valdez and Nelson 2004a) (IIA4). See also Birchell et al. 2002.						
>*	II.A.3.b.	Construction (levee breeching). [NOTE: Subject to review and approval for depression wetlands.]	BR	Complete							
>*	II.A.3.c.	Operate and maintain.	BR/FWS	Complete							
	II.A.3.d.	Evaluation.	FWS	Complete							
	II.A.4.	Develop Green River Subbasin Floodplain Management Plan	Program	Complete							
>*	II.A.4.a.	Implement, validate and refine Green River Subbasin Floodplain Management Plan	Program	Ongoing	X	X	X	X	X	X	Argonne surveyed Green River wetland breech elevations in October 2012 and 2014 (see Green R. Assessment worksheet); report should be available for Program review by spring 2015.
	II.B.	Restore native fish passage at instream barriers.									
	II.B.1.	Assess and make recommendations for fish passage at low flows at Tusher Wash.	FWS-FR/ -WR/BR	Complete	Cavalli 2000.						
	II.B.2.	Screen Tusher Wash diversion to prevent endangered fish entrainment, if warranted.									
	II.B.2.a.	Assess need.	UDWR	Complete	Cavalli 2000, Kitcheyan et al. 2001.						
	II.B.2.b.	Design.	Bureau of Reclamation, NRCS	In progress							The Program is pursuing a vertical weir (similar to Hogback on the San Juan River) in the Green River Canal (not the Raceway) to reduce entrainment at this site (as opposed to the more traditional wedge wire screens used in the Grand Valley). Design is underway with final decisions contingent on continued positive results from the Hogback weir. The Program is coordinating with NRCS who will use Emergency Watershed Protections funds to either repair or rebuild the diversion structure that was damaged during high flows in 2011. NRCS is including upstream and downstream fish passage in the design of the diversion rebuild. ***X*** BOR and FWS installed PIT antennas in the Green River canal in March 2013. Results from 2013 and 2014 have indicated a high level of entrainment by endangered fish (a large number of razorback sucker and Colorado pikeminnow were documented, along with the notable entrainment of one humpback chub). FWS-ES Utah has assumed primary point of contact on this project and has briefed the Biology Committee on numerous ocasssions. BO for Diversion rebuild nearly complete. Construction may begin in fall 2015.
>*	II.B.2.c.	Construct.	Utah	Pending	X	X					See above.
	II.C.	Enhance water temperatures to benefit endangered fishes.									
	II.C.1.	Identify options to release warmer water from Flaming Gorge Reservoir to restore native fish habitat in the Green River.	BR	Complete	USBR 2005.						
	II.C.2.	Meet temperature targets pursuant to Flaming Gorge ROD.	Bureau of Reclamation	Ongoing	X	X	X	X	X	X	Reclamation revised selective withdrawal system operational plan to include operational limitations found in the Flaming Gorge BO (June 2012). Temperature targets have been met since 2006.

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		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	II.D.	Support actions to reduce or eliminate selenium impacts at Ashley Creek and Stewart Drain. [NOTE: selenium remediation (in all reaches) will be conducted independently of and funded outside of the Recovery Program.]	FWS-ES	Ongoing	X	X	X	X	X	X	PDO is undertaking selenium analysis of YOY razorback sucker that resided in Stewart Lake over summer of 2013 and 2014. Samples include larval fish (baseline), juvenile fish (test subjects), and fathead minnow (ecological surrogate). Draft results indicate razorback sucker uptake of selenium in Stewart Lake (with levels exceeding new EPA guidelines), but razorback sucker in Stewart Lake are growing, surviving, and emigrating. Riverine razorback also carry a selenium load). The Service's EC annual report provides updates on Se remediation activities at Parriette Draw on the Green River. The Bureau of Reclamation (in coordination with UDWR) continues to remediate Se concentrations at Stewart Lake as per the Stewart Lake BO (2005).
	III.	**REDUCE IMPACTS OF NONNATIVE FISHES AND SPORTFISH MANAGEMENT ACTIVITIES (NONNATIVE AND SPORTFISH MANAGEMENT)**									
	III.A.	Reduce negative impacts to endangered fishes from sportfish management activities.									
	III.A.1.	Determine relationship between Flaming Gorge test flows and the fish community in Lodore Canyon..	UDWR	Complete	Bestgen 1997, Bestgen and Crist 2000.						
>*	III.A.2.	Control escapement of nonnative fishes from Ouray National Wildlife Refuge originating from Pelican Lake.	FWS-RW	Complete	Construction completed prior to spring 1997 runoff.						
>*	III.A.3.	Identify and control sources of catfish and centrarchids in the middle Green River.	UDWR	Complete	Jackson and Badame 2002.						
	III.A.4.	Develop and implement control programs for nonnative fishes in river reaches occupied by the endangered fishes to identify required levels of control. 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.4.a.	Northern pike in the middle Green River.	UDWR/FWS	Ongoing	X	X	X	X	X	X	In 2014, fewer (114) northern pike were captured in the middle Green River than in 2013 (177), but these numbers continue to fluctuate over time. Still no source population found in Browns Park; densities low but persistent.
	III.A.4.b.	Nonnative cyprinids and centrarchids in nursery habitats.									
>*	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)	Small nonnative cyprinids from backwaters and other low-velocity habitats in the middle Green River.	UDWR/FWS	Ongoing							Project 158 suspended in 2011 due to high flows; 2012 was last field season and project suspended until after final report is completed and reviewed (draft final due January 2016).
>*	III.A.4.b.(3)	Smallmouth bass in middle and lower Green River.	UDWR/FWS	Ongoing	X	X	X	X	X	X	***X*** Strong cohorts produced in 2012 & 2013, resulting in high Age-1 and Age-2 catch rates in the middle Green River in 2014; weak Age-0 cohort in 2014 because of higher flows. UDWR continues to report high densities of juvenile smallmouth bass below the Duchesne River; removal effort in 123b redistributed acccordingly. Catch rates in Desolation and Gray canyons highest in project (123a) history and distribution extended farther downstream.
>*	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.							Utah has had no catch limits for channel catfish in the Green River and its tributaries since 2009.
>*	III.A.4.d.	Direct new (or shift existing) nonnative fish removal efforts to address increasing numbers of walleye.	Program	Ongoing	X	X	X	X	X	X	123a and 123b 2014 SOWs adjusted to add spring passes for walleye removal in lower and middle Green in years with no Colorado pikeminnow population estimates. Fall passes also added in lower Green (123b). These passes successfully targeted walleye and increased catch rates compared to other times of the year. These efforts will be modified and continued in 2015.
	III.A.4.e.	Develop a management strategy to address escapement of walleye (and smallmouth bass) from Starvation Reservoir.	UDWR	In draft							UDWR drafted report in 2014 for screen design and installalation.

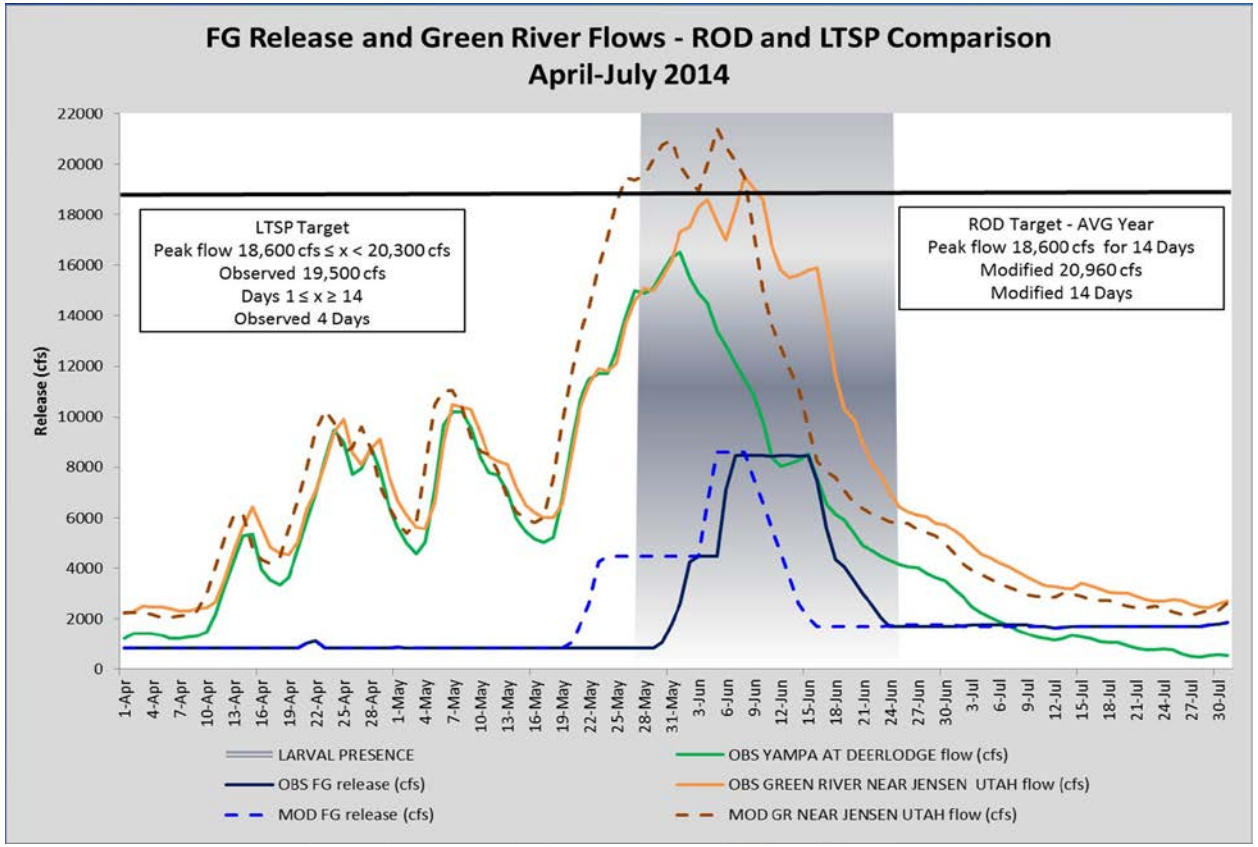
GREEN RIVER ACTION PLAN: MAINSTEM

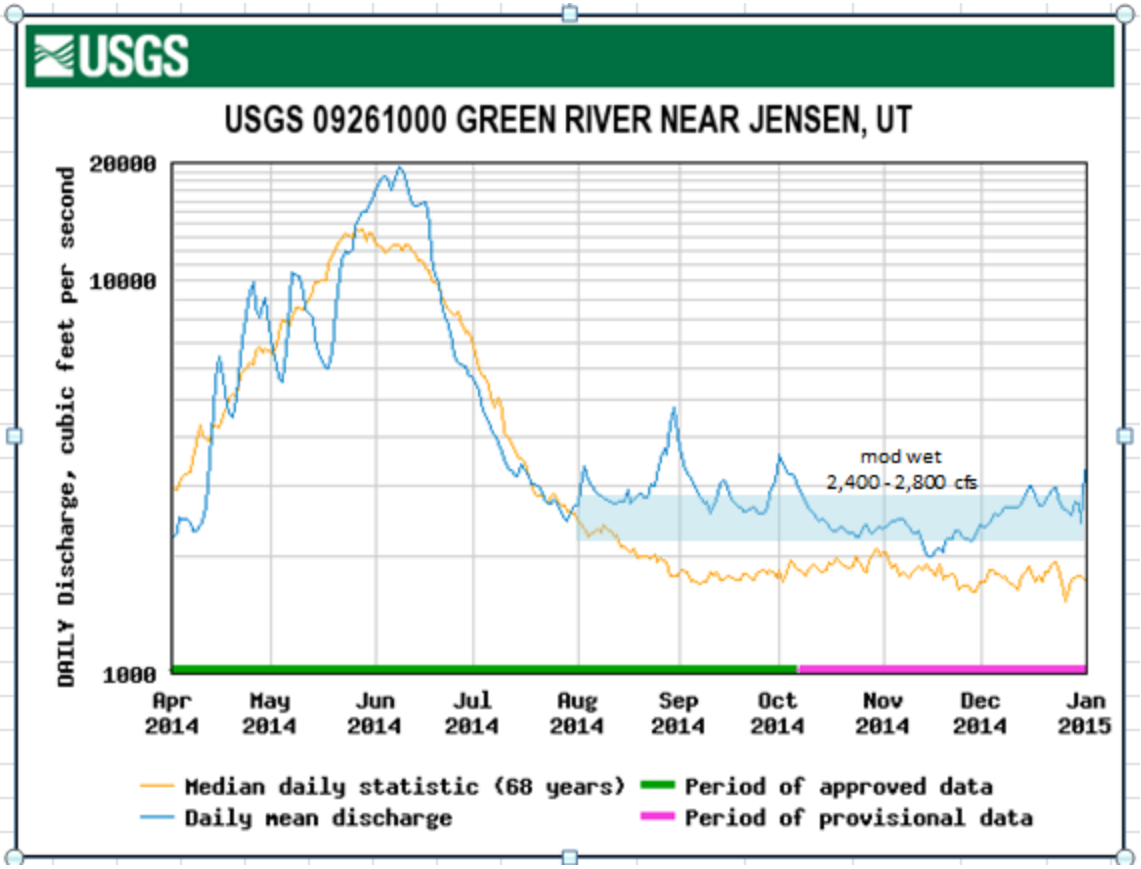
		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
>*	III.A.4.e.(1)	Implement recommendations from the management strategy.	UDWR, CUWCD, USBR, Program	Ongoing	X	X	X	X	X	X	**!** UDWR is working with Program Partners to develop and install permanent screening solutions at the Starvation Reservoir stilling basin in 2016. A temporary barrier was installed in the stilling basin in 2014 demonstrating successful location and orientation, but materials were compromised by muskrats and beaver; a more secure temporary barrier will be used in 2015. Stilling basin was successfully rotenoned in 2014 and this will be an ongoing management action.
>*	III.A.4.f.	Develop lake management plan for Red Fleet Reservoir to address walleye escapement.	UDWR	Ongoing	X	X					**!** UDWR convened a lake management plan working group, is developing a Compatible species list, and is formulating plans to rotenone Red Fleet Reservoir in 2015.
>*	III.A.4.e.	Other emerging nonnative fishes.	UDWR/FWS	Ongoing	X	X	X	X	X	X	**!** UDWR & WYG&F continued "burbot bashes" in Flaming Gorge [winter 2013, 2014, burbot bash cancelled due to unsafe ice conditions in 2015]. No burbot were collected in the Green River below Flaming Gorge Dam in 2014; N55BC: however an angler caught a 511mm burbot by Split Mountain on July 9 (id confirmed by UDWR). **X** Gizzard shad, black crappie, and green sunfish, numbers appear to be increasing in the middle Green River; pumpkinseed documented for first time.
	IV.	**MANAGE GENETIC INTEGRITY AND AUGMENT OR RESTORE POPULATIONS (STOCKING ENDANGERED FISHES)**									
	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 at al. 2003.						
	IV.A.1.b.	Program acceptance.	UDWR	Complete	Nesler at al. 2003.						
>	IV.A.1.c.	Implement plan.	UDWR	Ongoing	X	X	X	X	X	X	See General Action Plan, IV.B.2.
	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	See General Action Plan, IV.B.2.
	V.	**MONITOR POPULATIONS AND HABITAT AND CONDUCT RESEARCH TO SUPPORT RECOVERY ACTIONS (RESEARCH, MONITORING, AND DATA MANAGEMENT)**									
	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, Badame 2012.	UDWR	Ongoing	X	X	X	X	X	X	2014 population estimate was 1,863, CPUE and overall survival appear stable. However, researchers report fewer juveniles and declining capture of first-year adults.
	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 and 2010.	LFL/UDWR/ FWS	Ongoing		X	X	X	X	X	See General V.A. Latest 3-year adult population estimate field work ended in 2013; YOY captures better in 2013 in Middle Green than previous 2 years, but dropped in 2014.
	V.C.2	Lower Green River. See Bestgen et al. 2005 and 2010.	LFL/UDWR/ FWS	Ongoing		X	X	X	X	X	Age-0 captures remained below average in Lower Green in 2014.
	V.D.	Complete monitoring plan in FY 11 (based, in part, on recommendations from evaluation of stocked razorback report). See Bestgen et al., 2012.	LFL/PD	Complete							See General Action Plan, V.A.1.a.

GREEN RIVER ACTION PLAN: MAINSTEM

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	V.D.1.	Implement razorback sucker monitoring plan. See Webber and Beers 2014.	LFL, UDWR, FWS	Ongoing/ pending	X	X	X	X	X	X	**!** All life stages being monitored through projects 22f, 128, 138, 160, 164, and 165. In addition, remote flat-plate PIT tag antennas were deployed during razorback sucker spawning again in 2014 and detected 465 razorback sucker, 8 bonytail, and 1 Colorado pikeminnow (majority of fish detected had not been otherwise captured in active sampling).

Assessment: Green River Flows

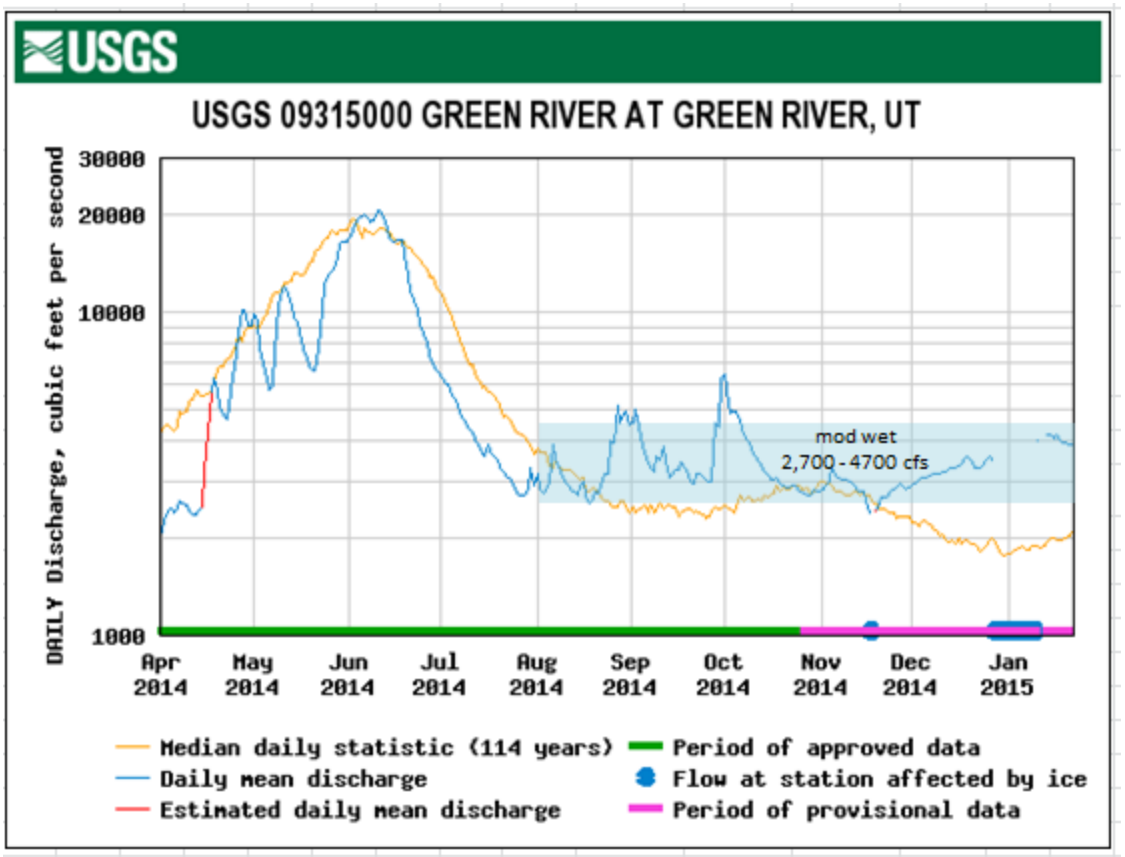


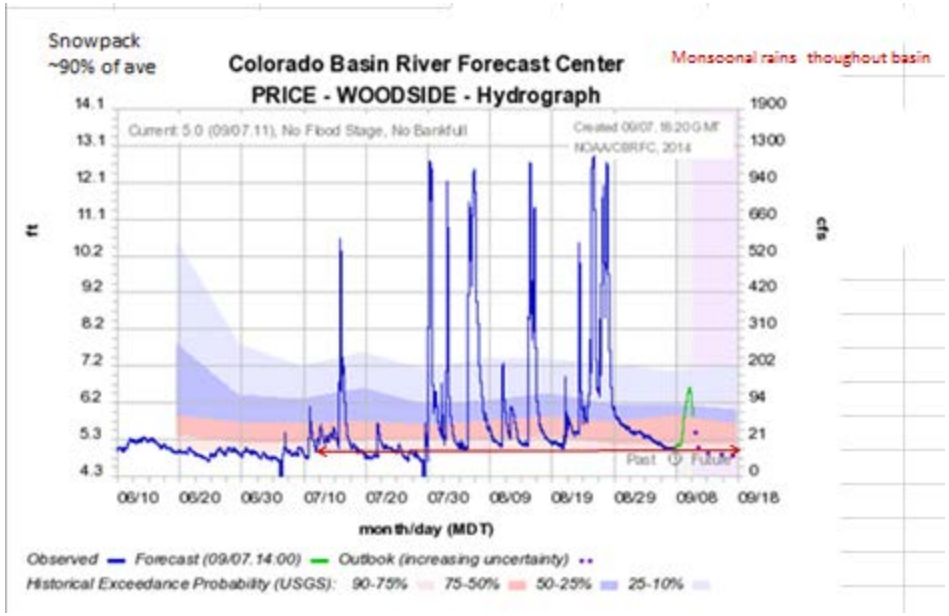

USGS
USGS 09261000 GREEN RIVER NEAR JENSEN, UT
DAILY Discharge, cubic feet per second
20000
10000
1000
mod wet
2,400 - 2,800 cfs
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Median daily statistic (68 years)
Daily mean discharge
Period of approved data
Period of provisional data

2014 (water supply forcast	Peak Target	2014 Peak	
Green R. at Jensen 141%	Avg 18,600	19,500	LTSP 2014 peak target 18,600 to 20,300 cfs between 1 to 14 days as measured at Jensen, Utah, observed >18,600 cfs for 4 days during larval presence. Above 14,000 cfs for 20 days during larval presence
Green R. at Green River 115%	Avg 22,000	20,600	There were 27 days during larval presence when flows were above 14,000 cfs with possible access to these wetlands: Stewart Lake, Above Brennan, Old Charley Wash, Thunder Ranch, Bonanza Bridge, Johnson Bottom, Stirrup, and Leota 7.

Red is a target not met

2014 (% snowpack)	Base Flow Target	2014 Aug-Oct Avg	Annual Min
Green R. at Jensen	Mod Wet 2,400 - 2,800	3,018	2,550
Green R. at Green River	Mod Wet 2,700 - 4,700	3,487	2,560


USGS
USGS 09315000 GREEN RIVER AT GREEN RIVER, UT
DAILY Discharge, cubic feet per second
30000
20000
10000
1000
mod wet
2,700 - 4700 cfs
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Oct 2014
Nov 2014
Dec 2014
Jan 2015
Median daily statistic (114 years)
Daily mean discharge
Estimated daily mean discharge
Period of approved data
Flow at station affected by ice
Period of provisional data


Snowpack
~90% of ave
Colorado Basin River Forecast Center
PRICE - WOODSIDE - Hydrograph
Monsoonal rains thoughout basin
Current: 5.0 (09/07.11), No Flood Stage, No Bankfull
Created 09/07, 18:20 GMT
NOAA/CBRFC, 2014
ft
cfs
14.1
13.1
12.1
11.1
10.2
9.2
8.2
7.2
6.2
5.3
4.3
1900
1300
940
660
520
420
310
202
94
21
0
Past
Future
06/10
06/20
06/30
07/10
07/20
07/30
08/09
08/19
08/29
09/08
09/18
month/day (MDT)
Observed
Forecast (09/07.14:00)
Outlook (increasing uncertainty)
Historical Exceedance Probability (USGS): 90-75% 75-50% 50-25% 25-10%

GREEN RIVER ACTION PLAN: YAMPA AND LITTLE SNAKE RIVERS

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	I.	**PROVIDE AND PROTECT INSTREAM FLOWS (HABITAT MANAGEMENT)**									
	I.A.	Basin-wide activities									
	I.A.1.	Identify fish habitat and flow needs									
	I.A.1.a.	Complete Phase II feasibility study.	CRWCD/ CWCB/BR	Complete	Hydrosphere 1995b.						
	I.A.1.b.	Revise and update estimates of basin water needs.	CRWCD/FWS	Complete	BBC 1998.						
	I.A.1.c.	Evaluate and recommend low flow and passage needs (also relates to restoration of fish passage, if needed -- Recovery Element II).	CDOW/FWS/ CRWCD	Complete	Modde et al. 1999.						
	I.A.1.d.	Provide hydrology support to develop and evaluate flow augmentation alternatives.	CWCB	Complete	CWCB provided CRDSS model runs to evaluate augmentation water supply alternatives in 2003.						
	I.A.1.e.	Report synthesizing the results of water demand, low flow recommendations and hydrologic analyses.	FWS	Complete	Ayres 1999.						
	I.A.1.f.	Install, operate, and/or maintain stream flow monitoring gages.	FWS	Ongoing	X	X	X	X	X	X	
	I.A.1.g.	Install, operate, and/or maintain sediment monitoring gages.		Complete	Final report 1/05.						
	I.A.2.	Develop and implement Yampa River management plan (Roehm 2004).									
	I.A.2.a.	Negotiate a Cooperative agreement to implement the Yampa River management plan.	Program	Complete							
	I.A.2.a.(1)	Develop a biological assessment for the management plan; initiate intra-Service Section 7 consultation based on the Service intent to enter into the Cooperative Agreement.	FWS	Complete							
	I.A.2.a.(1)a	Complete intra-Service consultation, resulting in a programmatic biological opinion (PBO) for the Yampa Basin.	FWS	Complete	January 10, 2005.						
	I.A.2.a.(2)	Fulfill NEPA requirements for the management plan.	FWS	Complete	September 2004.						
	I.A.2.b.	Sign Cooperative Agreement to implement the management plan.	FWS/Program/ Colorado/ CRWCD	Complete	January 2005.						
	I.A.3.	Develop public involvement plan.	FWS/CDOW	Complete	SOW FY 96 and forward.						
	I.A.3.a	Implement public involvement plan.	FWS/CDOW	Complete							
	I.A.4.	Evaluate and revise as needed flow regimes to benefit endangered fish populations.	FWS/Program	Ongoing	X	X	X	X	X	X	NPS is currently funding a synthesis of information (on sediment, riparian resources, and the native fish community) that will be provided for Recovery Program information, and which may support a future peak flow recommendation for the Yampa River by the Recovery Program.
	I.B.	Yampa River above the Little Snake River									
	I.B.1	Initially identify year-round flows needed for recovery.	FWS-FR	Complete	Modde and Smith 1995.						
	I.B.2	Provide augmentation of low flows.									
	I.B.2.a	Identify and acquire water source(s).									
	I.B.2.a.(1)	Steamboat Lake.									
	I.B.2.a.(1)(a)	Change decree.	CDPOR	Complete 5/97	Done in 1997.						
>*	I.B.2.a.(1)(b)	Lease up to 2,000 af. to augment late summer flows.	FWS-WR	Complete	Water is currently available from Elkhead Reservoir and no longer needed from Steamboat Lake.						
	I.B.2.a.(1)(c)	Quantify transit losses.	CWCB	Complete	Done in 2000.						
	I.B.2.a.(2)	Identify and evaluate water supply alternatives for up to 7,000 af of stream flow augmentation.	Program	Complete	Roehm 2003.						
	I.B.2.a.(2)(a)	Complete all necessary administrative, legal, environmental compliance, institutional and financial arrangements needed for development of Elkhead Reservoir enlargement.									
	I.B.2.a.(2)(a)i)	Complete environmental compliance.	CRWCD	Complete							
	I.B.2.a.(2)(a)ii)	Complete funding agreement.	CRWCD/CWCB	Complete							
	I.B.2.a.(2)(a)iii)	Construct	CRWCD	Complete							

GREEN RIVER ACTION PLAN: YAMPA AND LITTLE SNAKE RIVERS

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
>*	I.B.2.a.(2)(b)	Deliver water for endangered fish.	Program	Ongoing	X	X	X	X		X	***!*** Yampa River at Maybell's water supply forcast for May - July was 129% of average. Peak flow at Maybell was 13,100 cfs. Because the average flow from August through October was 506 cfs the only water released was 1,578 af (Jul 20 -23) to facilitate a final sampling trip for nonnative fish removal (939 af of the 1,578 af was purchased water carried over from 2013). Since the 200 cfs target was being met at Maybell, the Recovery Program did not need additional water, so 4,361 af was left in Elkhead for recreation.
	I.B.3.	Evaluate need for instream flow water rights.									
	I.B.3.a	Review scientific basis.	CWCB/CDOW	Complete	Approval of Modde et al. 1999.						
	I.B.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						
	I.B.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.B.3.d.(1)	If necessary, evaluate how identified flows will be legally protected.	CWCB	Pending, if needed						X	
	I.B.3.e.	Revisit the need for instream flow filings or other flow protection mechanisms at least every 5 years.	CWCB/FWS/ WAC			X	X			X	In July and November 2011, the WAC determined that additional permanent protection in the form of instream flow filings was not deemed necessary at that time. By September 30, 2016, per the 5 year period (or earlier should conditions dictate), the WAC will review mechanisms of current flow protection to determine if additional mechanisms or instream flow filings are needed at that time. The determination for additional protection rests with the Program and WAC, but will be recorded within the CWCB depletion reports due every 5 years. It appears unlikely that there have been significant new depletions in the Yampa, but we are still examining our ability to model past depletion trends in the Yampa River accounting (see note for I.B.4, below). If significant new depletions are projected or proposed in excess of those in the Yampa PBO, then flow protection may be warranted even if the current level of depletions has not changed much at all.
	I.B.4.	Provide a depletion accounting report as outlined in the Yampa River PBO; including 1) calculation of past depletions every 5 years as a 10-year moving average as determined by CWCB and reported to FWS & the Program; 2) a back-casted baseline of current depletions that can be used in projecting the impact of significant new depletions; and 3) a recommendation and justification regarding whether or not additional instream flow filings or other flow protection mechanisms should be considered in light of projected future depletions and other factors.	CWCB/FWS	In progress		X	X			X	***X*** Still overdue; however, the irrigated acreage assessment was completed. Another contract was awarded to update the dataset. The models will be updated through at least 2012. Colorado has prioritized the Yampa and Colorado river basins portion of this work.
	I.C.	Little Snake River (Colorado and Wyoming)									
	I.C.1.	Evaluate importance of Little Snake to endangered fishes and develop management action plan. (Determine if habitat exists to protect under Colorado's instream flow program.)	BR/LFL	Complete	Hawkins et al. 2001; Hawkins and O'Brien 2001.						
	I.C.2.	Initially identify year-round flows needed for recovery (needed).									
	I.C.2.a.	Develop work plan.	BR/LFL	Complete	Hawkins et al. 2001; Hawkins and O'Brien 2001.						
	I.C.2.b.	Identify flows.	FWS-WR	Complete	Hawkins et al. 2001; Hawkins and O'Brien 2001.						
	I.C.3.	Evaluate need for instream flow water rights.									
	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						
	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						
	I.C.3.d.	Revisit the need for instream flow filings or other flow protection mechanisms at least every 5 years.	CWCB/FWS/ WAC			X				X	See I.B.3.e.

GREEN RIVER ACTION PLAN: YAMPA AND LITTLE SNAKE RIVERS

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	I.C.3.d.(1)	If necessary, evaluate how identified flows will be legally protected.	CWCB/ Wyoming	Pending						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.	Yampa River below Little Snake River									
	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						
	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						
	I.D.2.d.	Revisit the need for instream flow filings or other flow protection mechanisms at least every 5 years.	CWCB/FWS/ WAC			X				X	See I.B.3.e.
	I.D.2.d.(1)	If necessary, evaluate how identified flows will be legally protected.	CWCB	Pending						X	
	II.	**RESTORE HABITAT (HABITAT DEVELOPMENT AND MAINTENANCE)**									
	II.A.	Yampa River from Dinosaur National Monument to Craig, Colorado									
	II.A.1.	Restore native fish passage at instream barriers and reduce impacts of maintaining diversion structures. Note: disturbance of fish habitat related to maintenance of diversion structures was evaluated and found to be minimal based on the limited area and duration of the disturbance.									
	II.A.1.a.	Inventory potential barriers.	CRWCD	Complete	Hydrosphere 1995a.						
	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. Hawkins 2009*, Speas et al. 2014.*	PD/FWS-ES	Complete							PIT-tag reader was installed in Maybell Ditch to evaluate entrainment in 2011 (no endangered fish detected) and 2012 (one Colorado pikeminnow detected). The Service concluded that due to relatively low rates of entrainment, an exclusion device would not be cost effective. However, the Recovery Program should offset impacts at the Maybell Canal by completing the Yampa River nonnative fish control actions identified in the RIPRAP addendum. PIT antenna and associated electronics were transferred from Maybell for use in the Green River canal (Tusher Diversion) in spring 2013.
>*	II.A.2.b.	Develop and implement remedial measures, as necessary, to reduce or eliminate entrainment.	PD/CPW/ FWS	TBD							
	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.						
	III.	**REDUCE NEGATIVE IMPACTS OF NONNATIVE FISHES AND SPORTFISH MANAGEMENT ACTIVITIES (NONNATIVE AND SPORTFISH MANAGEMENT)**									
	III.A.	Develop guidance documents and revise as needed.									
	III.A.1.	Develop aquatic management plan (Colorado) to reduce nonnative fish impacts while providing sportfishing opportunities.- CDOW 1998, 2010.	CDOW	Complete							
	III.A.2.	Develop Yampa River Nonnative Fish Control Strategy (Program)	Program	Complete							

GREEN RIVER ACTION PLAN: YAMPA AND LITTLE SNAKE RIVERS

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
>*	III.B.	Implement CPW Yampa Basin aquatic wildlife management plan and the Recovery Program's Yampa River Nonnative Fish Control Strategy. Each control activity will be evaluated for effectiveness and then continued as needed. See also III.A.2.c.1.& 2. under General Recovery Program Support Action Plan.	Program/ CPW	Complete							CPW provided assessment of pike management activities in the Yampa River Basin Aquatic Wildlife Management Plan, PD provided comments in May 2013; PDO and CPW agreed to shift focus to implementing Basinwide Strategy and Sufficient Progress RIRRAP addendum actions.
	III.B.1.	Prevent nonnative fish introduction; reduce invasion and recruitment.									
	III.B.1.a.	Identify potential conflicts between present fisheries management in existing Elkhead Reservoir and endangered fishes and formulate Elkhead Lake Management Plan.	CDOW	Complete	CDOW 2007.						
	III.B.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/ CPW	Ongoing	X	X	X	X	X	X	The Programmatic Smallmouth Bass Synthesis report was completed (Breton, et al. 2013). The Elkhead Lake Management Plan is out of date based on information in the escapement report and needs revision; CPW and others discussing ways to establish compatible sportfishery.
>*	III.B.1.a.(2)	Implement control measures as needed to control escapement (during and after Elkhead expansion construction). Post-construction: monitor and maintain Elkhead screens (YS C-1).	Program	Ongoing	X	X	X	X	X	X	
	III.B.1.a.(2)(a)	Establish compatible sportfishery in Elkhead Reservoir									Ongoing. Reservoir reclamation was contemplated, but CPW and PDO recommend screening first (CPW hopes to install net in fall 2015). Colorado will cover $500K toward screen from CWCB Species Conservation Trust Fund; Program has agreed to fund remainder. Colorado also is revising the Elkhead Lake Management Plan.
	III.B.1.a.(2)(a)(i)	Coordinate / schedule drawdown with Colorado River Water Conservation District (CRWCD)	CPW / Program / CRWCD	On hold							Deferred in favor of phased approach, beginning with screening.
	III.B.1.a.(2)(a)(ii)	Revise Lake Management Plan		Ongoing	X						
	III.B.1.a.(2)(a)(iii)	Install screen		Ongoing	X						
	III.B.1.a.(2)(a)(iv)	Develop / Implement Communications Plan	CPW / Program	Ongoing	X						Implementing. Working group met with stakeholders in September, local government in December and held public meeting in February.
	III.B.1.a.(2)(a)(vi)	Complete any necessary environmental compliance	CPW / CRWCD	Pending	X						
	III.B.1.a.(2)(a)(vii)	Identify and secure sources of replacement compatible sport fish.	CPW	Pending	X						
	III.B.1.a.(2)(a)(viii)	Stock compatible sport fish	CPW	Pending		X					
>*	III.B.1.a.(2)(a)(ix)	Evaluate reservoir and associated habitats in the upper Elkhead Creek drainage / treat if necessary	CPW / Program / CRWCD	TBD					X	X	
	III.B.1.b.	Evaluate designation of Yampa River downstream of Craig, CO, as a native fish conservation area (YS B-3)	Program/CPW	Pending	X	X	X	X	X	X	Concept still being evaluated at the policy level. See also General, III.B.8.
	III.B.1.c.	Remove northern pike and smallmouth bass above Craig, CO (YS C-3)	CPW	Ongoing	X	X	X	X	X	X	The Recovery Program recommended increased removal effort upstream of Hayden to provide removal/reconnisance of northern pike densities/habitats to facilitate northern pike suppression and reduce pike density in critical habitat; LFL did reconnaisance in 2014 and will begin removal in this reach in 2015.
	III.B.1.d.	Target spawning areas (YS C-4)									
	III.B.1.d.(1)	Northern pike.	Program	Ongoing						X	CPW has continued work at Catamount Reservoir to reduce northern pike. CPW has plans to eradicate the illegally-established population of northern pike in Chapman Reservoir, as well (see also discussion for Yampa III.B.1.d.(1)(b)). Ice fishing tournament at Stagecoach in February 2014 & 2015 required must-kill for northern pike and walleye caught by tournament participants.
	III.B.1.d.(1)(a)	Identify and evaluate natural and artificial spawning/nursery habitats for northern pike in the Yampa River for exclusion devices.	CDOW	Complete	Hill 2004.						

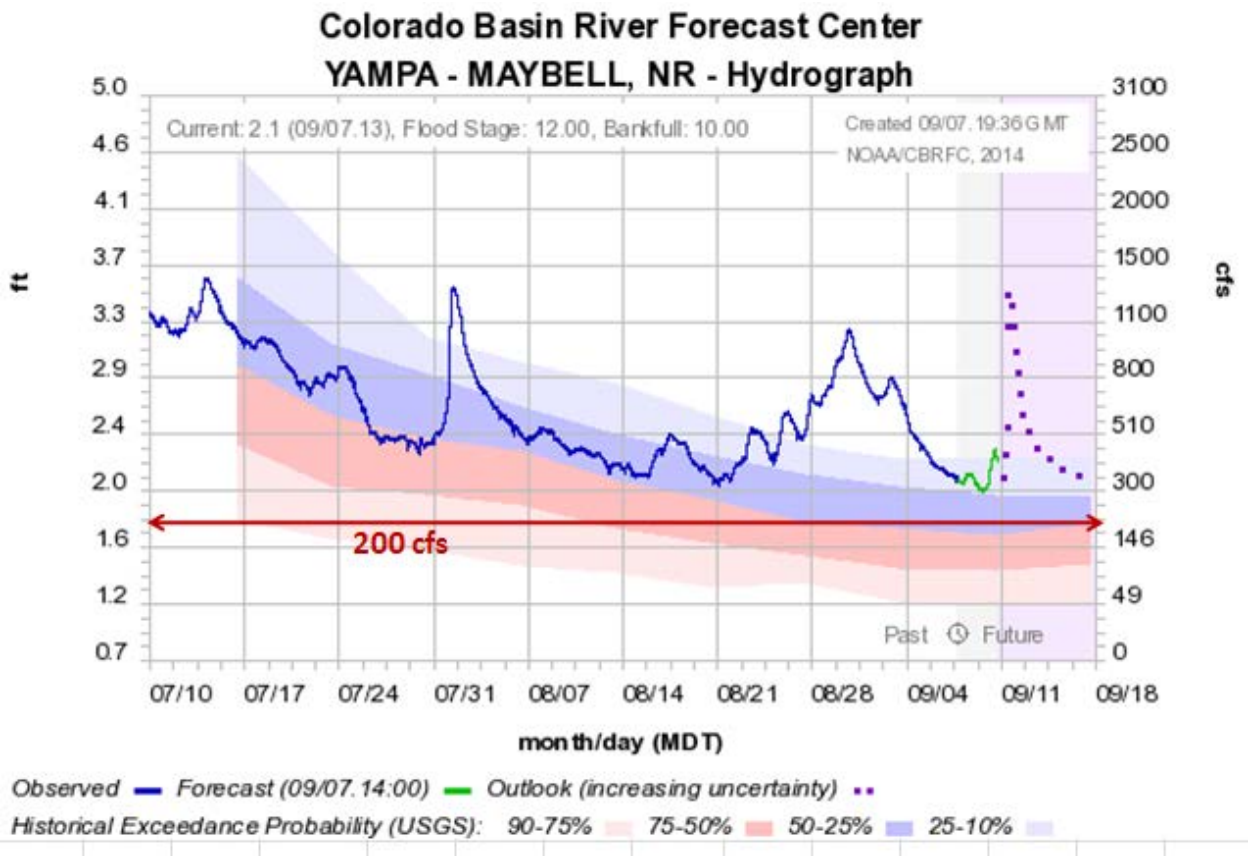
GREEN RIVER ACTION PLAN: YAMPA AND LITTLE SNAKE RIVERS

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
>*	III.B.1.d.(1)(b)	Implement remedial measures to reduce pike reproduction in Yampa River.	Program/CPW	Ongoing	X	X	X	X	X	X	CPW continues to remediate habitats; Service conducting pike removal at RM 151. **!** CPW implemented netting that demonstrated high removal of pre-spawning northern pike in Yampa River backwaters; effort to be expanded in 2015.
	III.B.1.d.(1)(b)(i)	Evaluate feasibility of habitat modification at Walton Creek to eliminate / reduce northern pike spawning habitat.	CPW / Program / USBR		X						Program funding feasibility study with Section 7 funds.
>*	III.B.1.d.(1)(b)(ii)	Modify Walton Creek habitat as indicated through feasibility investigations.	CPW / Program / USBR		X						$500K secured for modification from Species Conservation Trust Fund; but will go to Elkhead screen and replacement funds sought from SCTF for Walton rehab. Funds being requested again in 2015. Program contributed $30K Section 7 funds to feasibility / design.
	III.B.1.d.(1)(c	Review proposed new structures to minimize creation of habitat suitable for pike spawning/nursery.	CPW, FWS	Ongoing	X	X	X	X	X	X	Conflict can occur between desired and proposed wetlands creation/restoration in the upper Yampa River and the high density of nothern pike due to the liklihood that additional wetland habitat would be invaded by northern pike or serve as reproduction/recruitment habitat. FWS & States comment on stream alteration actions.
>*	III.B.1.(d)(2)	Smallmouth bass	Program	Ongoing	X	X	X	X	X	X	**X** Efforts to reduce densities of this species in Little Yampa Canyon and other reaches of the Yampa River appear to be hampered by the immigration of smallmouth bass adults and recruits from adjacent reaches, particularly upstream sources which sustain propagule pressure and the proliferative/invasive capacity of this species. Escapement of adult smallmouth bass from Elkhead Reservoir remains problematic. Population estimates for adult bass in Little Yampa Canyon in 2013 were 5 times that of 2012; estimates in 2014 remained at 2013 levels. Subadult density in this reach was also very high. 2014 -2015 work continues to intensify smallmouth bass removal / nesting disruption further into the spawning period (e.g., sampling schedules being extended to exploit smallmouth bass in post-peak flows on the Yampa). Smallmouth bass produced a strong year class in 2012 and 2013.
>*	III.B.1.f.	Convert and extend the ongoing Stagecoach Reservoir northern pike escapement study to a removal effort (will require an addendum to existing FERC Biological Opinion).	CPW / potentially Program in outyears	Ongoing	X	X	X	X	X	X	Stakeholders agreed to modify tagging study to removal effort. FWS writing FERC to communicate this change, which is acceptable under the existing BO. CPW likely open to removal, but doesn't have resources to implement (removal from Catamount being the higher priority).
	III.B.2.	Control nonnative fishes via mechanical removal									
	III.B.2.a.	Estimate nonnative abundance, status, trends & distribution (YS I-3)	Program	Ongoing	X	X	X	X	X	X	No abundance estimates in 2013 or 2014 except smallmouth bass in Little Yampa Canyon. This will be reconsidered in future years.
	III.B.2.b.	Develop and refine nonnative fish removal criteria (YS K-1)	Program	Ongoing	X	X	X	X	X	X	LFL will add removal of white sucker and common carp to project #125 beginning in 2015.
	III.B.2.c.	Identify and evaluate gear types and methods to control nonnative fishes (YS I-5)	Program	Ongoing	X	X	X	X	X	X	
>*	III.B.2.d.	Remove (formerly "and translocate") northern pike from Yampa River. See Hawkins et al. 2005. (YS J-1)	CPW/FWS	Ongoing	X	X	X	X	X	X	
>*	III.B.2.d.(1)	Increase mechanical removal of northern pike in main channel and floodplain habitats as directed by Colorado Parks and Wildlife.	CPW/Program	Pending	X	X	X	X	X	X	See III.B.1.d.(1)(b).
>*	III.B.2.e.	Remove (formerly "and translocate") smallmouth bass. (YS J-1)	CPW	Ongoing	X	X	X	X	X	X	
	III.B.2.f.	Control channel catfish									
>*	III.B.2.f.(1)	Remove channel catfish in Yampa Canyon. (Discontinued except for removal of very large individuals incidental to smallmouth bass removal)	FWS	Dis-continued							
>*	III.B.2.f.(2)	Remove channel catfish >400mm in-Yampa Canyon.	FWS	Ongoing	X	X	X	X	X	X	Channel catfish >400mm are being removed as part of smallmouth bass removal efforts in Yampa Canyon.
	III.B.2.g.	Develop and refine native fish response criteria (YS K-2)	Program	Complete							

GREEN RIVER ACTION PLAN: YAMPA AND LITTLE SNAKE RIVERS

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	III.B.2.h.	Monitor native and endangered fish response (YS L-2)	Program	Ongoing	*X*	X	X	X	X	X	Compared to early sampling (2003-2004), Project #140 reports that native species richness in Little Yampa Canyon has increased as has abundance of native fishes and their frequency in samples between 2008 and 2011. However, 2012 -2014 numbers dropped precipitously. Comparison of native fish frequency and abundance in a control and treatment reach suggested that both non-native predator removals, as well as environmental effects due mostly to higher water, are responsible for gains, and increase in bass reproduction in 2012 and 2013 are responsible for declines. Native species remain a strong component of the fish community in Lily Park and Yampa Canyon, which would presumably serve as a source to upstream reaches when nonnative predator abundances are reduced.
	III.B.2.i.	Remove bag and possession limits on warmwater nonnative sportfishes within critical habitat in Colorado.	CDOW	Complete	In Colorado fishing regulations.						
	IV.	**MANAGE GENETIC INTEGRITY AND AUGMENT OR RESTORE POPULATIONS (STOCKING ENDANGERED FISHES)**									
	IV.A.	Yampa River in Dinosaur National Monument									
	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/CPW	Ongoing	X	X	X	*X*	X	X	
	IV.A.1.b.	Research the survivability of young-of-year Gila species in transport and hatcheries.	FWS/CDOW	Complete							
	IV.A.1.c	Evaluate stocking success as identified in monitoring plan for stocked fish.	LFL/FWS/ States/PD	Ongoing	X	X	X	X	X	X	
	V.	**MONITOR POPULATIONS AND HABITAT AND CONDUCT RESEARCH TO SUPPORT RECOVERY ACTIONS (RESEARCH, MONITORING, AND DATA MANAGEMENT)**									
	V.A.	Conduct population estimate for humpback chub. (Estimate/trend information will be obtained via CPUE during nonnative fish removal passes.)	FWS	Ongoing	X	X	X	X	X	X	

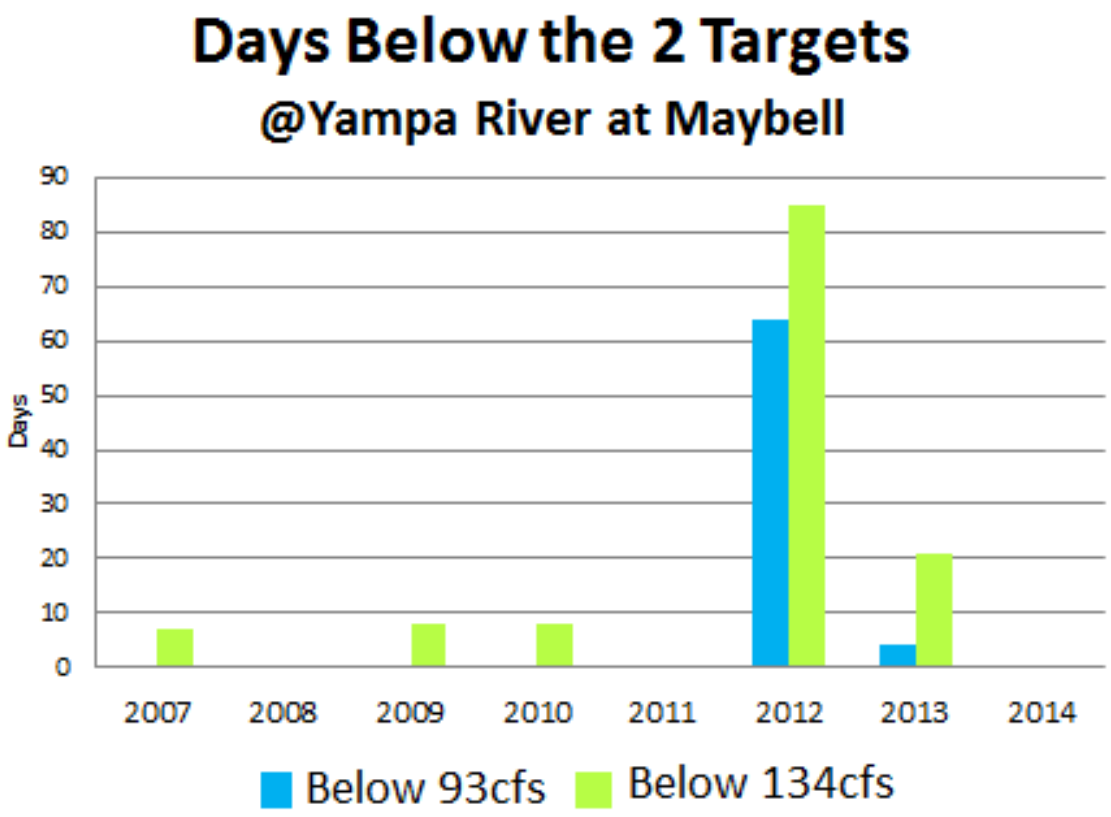
Assessment: Yampa River Flows



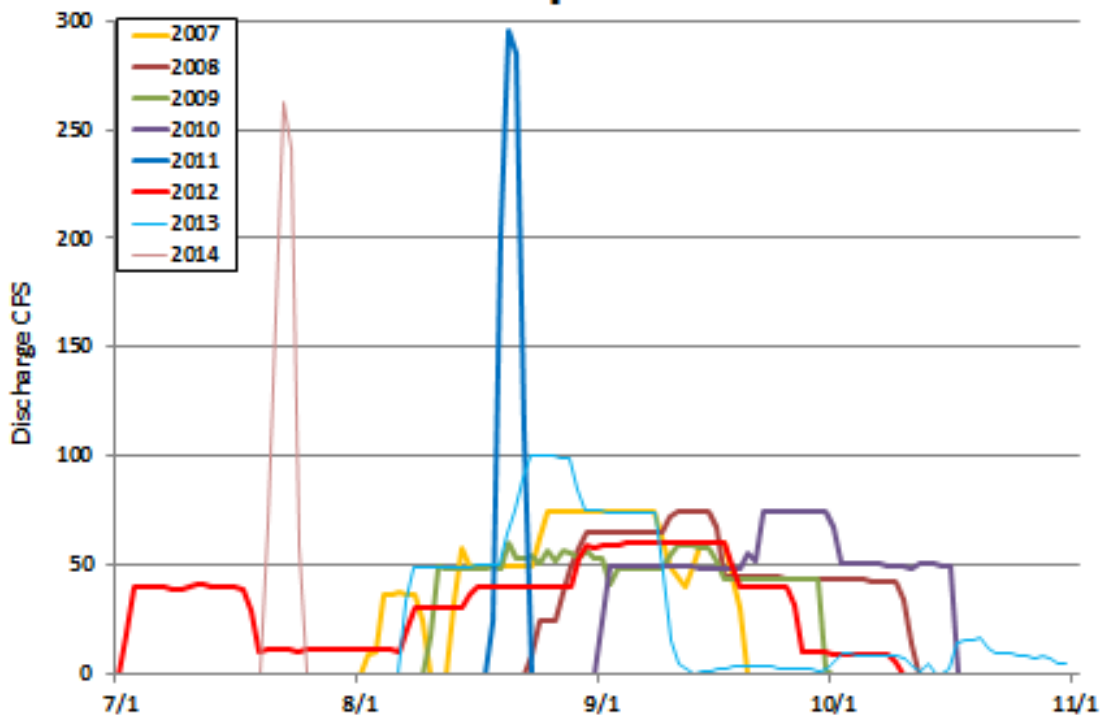
2014 peak flows and baseflows vs Recovery Program flow targets (CFS)

2014 (%snowpack)	Peak Target	2014 Peak
Yampa R. at Maybell (125%)	N/A	13,100 cfs

2014 (%snowpack)	Base Flow Target	2014 Aug-Oct AVG	%	2014 Min.
Yampa R. at Maybell (125%)	Wet 200 cfs	506 cfs	253%	241 cfs


Days Below the 2 Targets
@Yampa River at Maybell
Days
90
80
70
60
50
40
30
20
10
0
2007
2008
2009
2010
2011
2012
2013
2014
Below 93cfs
Below 134cfs

Elkhead Reservoir Fish Releases for the Yampa River



GREEN RIVER ACTION PLAN: DUCHESNE RIVER

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	I.	**PROVIDE AND PROTECT INSTREAM FLOWS (HABITAT MANAGEMENT)**									
	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. See Central Utah Water Conservancy District 2013.	UT, CUWCD, FWS	Ongoing						X	
	I.C.	Legally protect and deliver identified flows.									Predicted water supply at Randlett for May-July was 62% of average. The Program's baseflow minimum target is 50 cfs; however, because of drought, 46 days dropped below that target in 2014. The average flow in August through October was 147 cfs and the minimum was 33 cfs. Monsoonal rains helped the avearge flows and offset a low snowpack.
	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							
	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	TBD							Flows from Daniels being delivered (see table in assessment tab). Once released from Starvation Reservoir, this water is protected by agreement among the parties of the CCAA/SHA (as opposed to Utah State water law). CUWCD must internally manage this water in accordance with Central Utah Project Completion Act (CUPCA) provision (Public Law 102-575), project purposes as given in the congressionally-approved Supplement to the 1988 Definite Plan Report for the Bonneville Unit (DPR), and other CUWCD contracts.
	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	X	X	X	X	Service finalized CCAA/SHA to legally protect flows to the Myton Diversion, but not all the way to the Green River. If the CCAA/SHA is successful, FWS recommends investigating how it might be modified to add water users between Myton and Green River, thus legally protecting flows all the way to the confluence. Flows apparently currently protected in principal, but not legally protected.
>*	I.D.2.a.	Rehabilitate Myton Town diversion.	BR/CUWCD/ UT/Ute Tribe	Complete							
	I.E.	Examine the feasibility of other options for obtaining water.	BR/DOI/PD/ UteTribe	Ongoing	X	X	X	X	X	X	
	I.F.	Determine need and feasibility of additional gaging.	BR/FWS/UT	Complete							
	I.F.1.	Construct additional gages, as needed.	TBD	Complete							
	I.G.	Evaluate and revise as needed, flow regimes to benefit endangered fish populations	FWS/Program	Ongoing	X	X	X	X	X	X	***!*** DOI has 1,500 af of leased water in Big Sand Wash, of which 979 af was used in 2014.

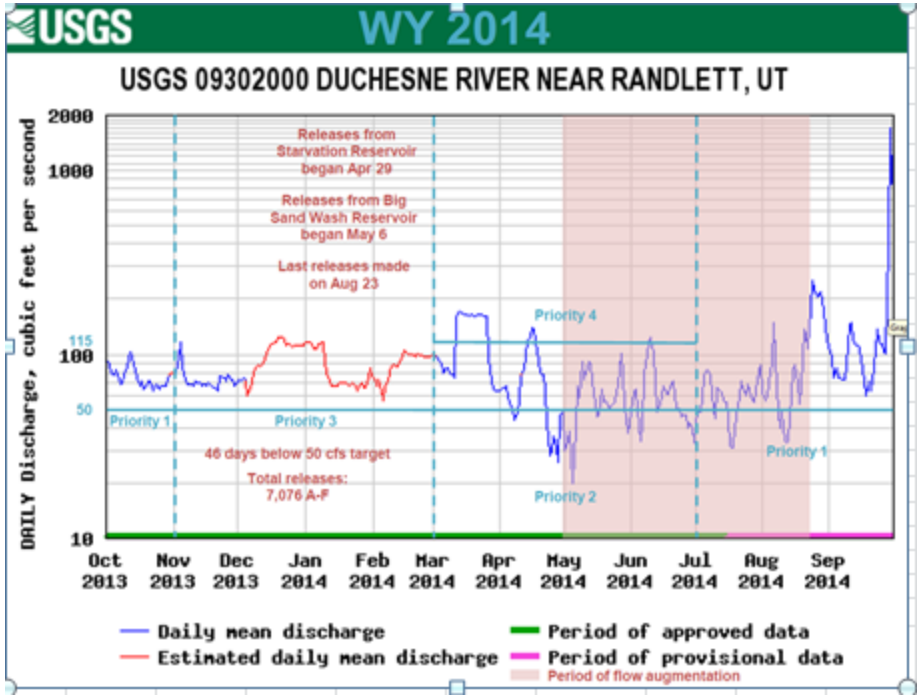
GREEN RIVER ACTION PLAN: DUCHESNE RIVER

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	III.	**REDUCE NEGATIVE IMPACTS OF NONNATIVE FISHES AND SPORTFISH MANAGEMENT ACTIVITIES (NONNATIVE AND SPORTFISH MANAGEMENT)**									
	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. Johnson et al. 2008.						
	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.	UDWR	Complete							See Green River III.A.4.e.
	III.A.3.b.(1)	If feasible and necessary, screen Starvation Reservoir	N/A	May need to be revisited							See Green River III.A.4.e.
>*	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/Ute Tribe	On hold	X	X	X	X	X	X	***X*** Extent of contribution of smallmouth bass or walleye produced in the Duchesne River below Starvation and entering Green River remains unknown. ***X*** Ute Tribe apparently no longer conducting nonnative fish removal activities.

Assessment: Duchesne River Flows

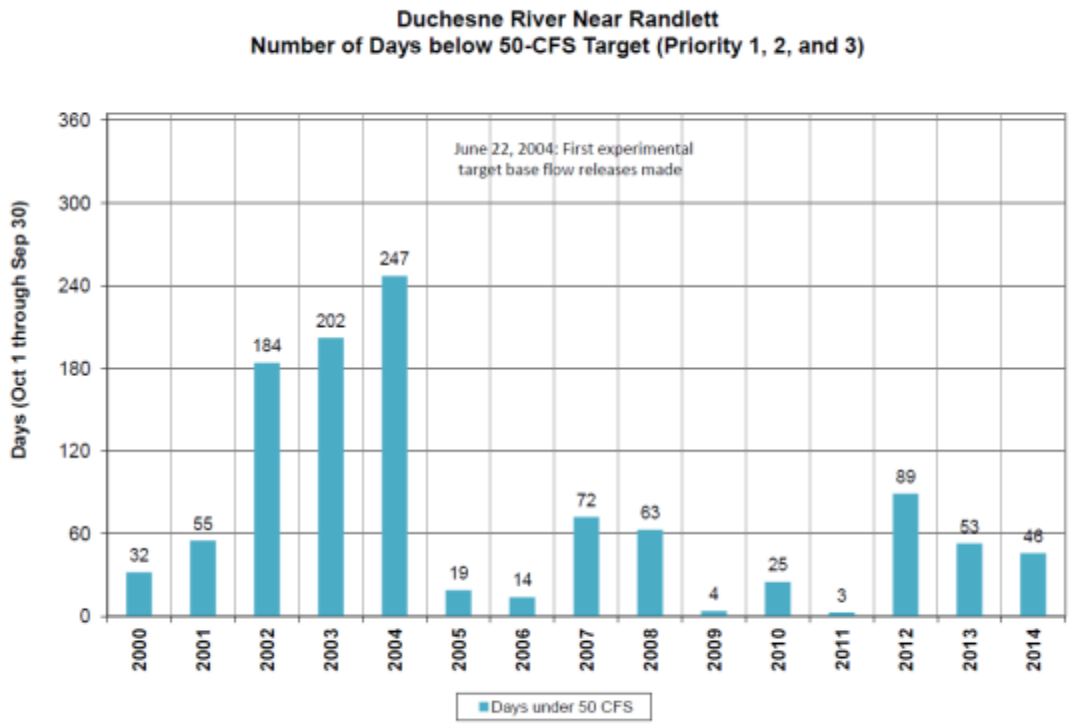
Water Year 2014 Deliveries	Acre-Feet
Daniels Replacement Project (Starvation)	2900
DOI Section 207 (Starvation)	0
Rediverted "44,400" Water (Starvation)	3197
DOI Section 207 (Big Sand Wash)	979
	7076
Remaining DOI Section 207 (Starvation)	1116
Remaining rediverted "44,400" Water (Starvation)	1492

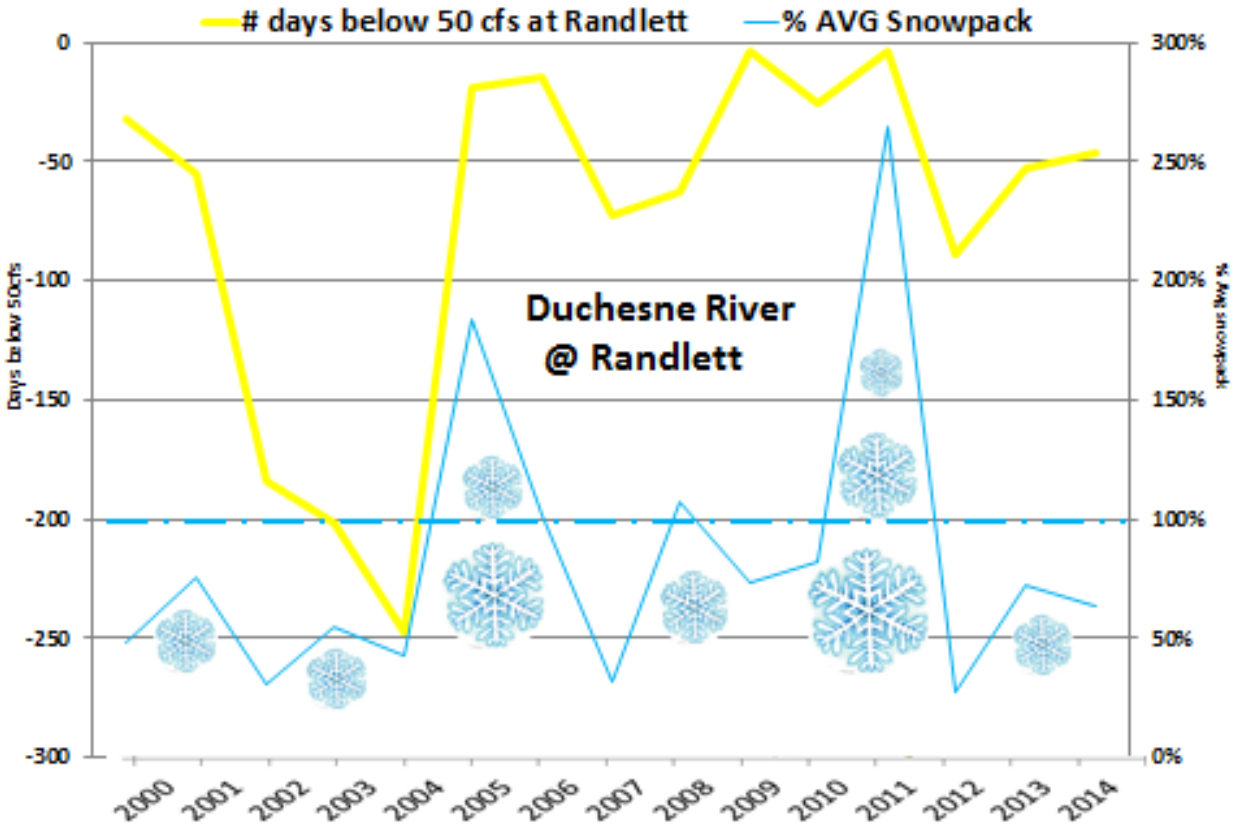
Water Year 2015 Water Supply	Acre-Feet
Daniels Replacement Project (Starvation)	2900
DOI Section 207 (Starvation)	1546
Rediverted "44,400" Water (Starvation)	1492
DOI Section 207 (Big Sand Wash)	1500
	7438


USGS
WY 2014
USGS 09302000 DUCHESNE RIVER NEAR RANDLETT, UT
DAILY Discharge, cubic feet per second
2000
1000
115
100
50
10
Releases from Starvation Reservoir began Apr 29
Releases from Big Sand Wash Reservoir began May 6
Last releases made on Aug 23
Priority 4
Priority 1
Priority 3
46 days below 50 cfs target
Total releases: 7,076 A-F
Priority 2
Priority 1
Oct 2013
Nov 2013
Dec 2013
Jan 2014
Feb 2014
Mar 2014
Apr 2014
May 2014
Jun 2014
Jul 2014
Aug 2014
Sep 2014
Daily mean discharge
Estimated daily mean discharge
Period of approved data
Period of provisional data
Period of flow augmentation

2014 (snowpack%)	Peak Target	2014 Peak
Duchesne R. at Randlett (72%)	N/A	124

2014 (% snowpack)	Base Flow Target	2014 Aug-Oct AVG	% of Avg	2014 Min.
Duchesne R. at Randlett (72%)	Dry 50	147	294%	33


Duchesne River Near Randlett
Number of Days below 50-CFS Target (Priority 1, 2, and 3)
Days (Oct 1 through Sep 30)
360
300
240
180
120
60
0
June 22, 2004: First experimental target base flow releases made
32
55
184
202
247
19
14
72
63
4
25
3
89
53
46
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Days under 50 CFS


days below 50 cfs at Randlett
% AVG Snowpack
Duchesne River
@ Randlett
Days below 50cfs
Previous May %
0
-50
-100
-150
-200
-250
-300
300%
250%
200%
150%
100%
50%
0%
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

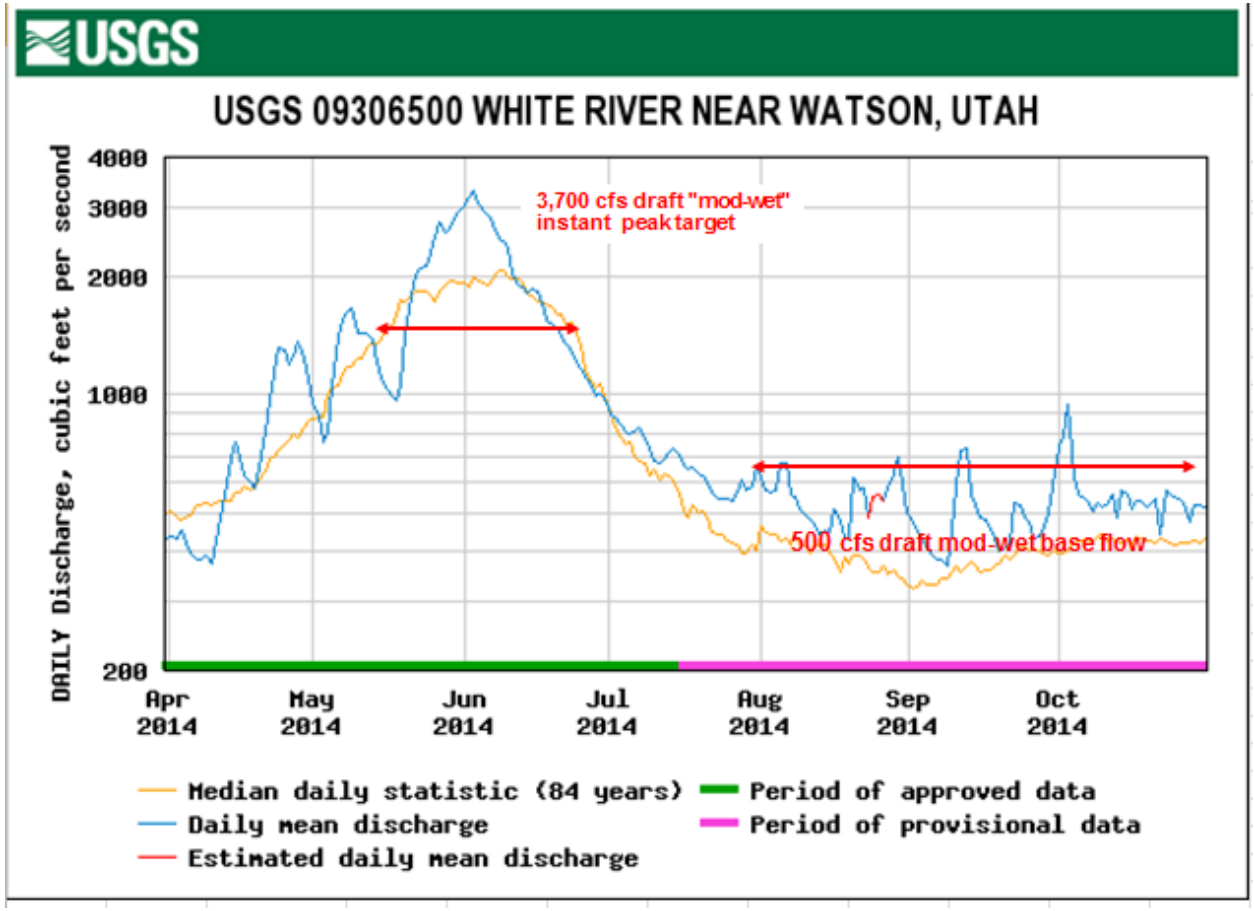
GREEN RIVER ACTION PLAN: WHITE RIVER

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	I.	**PROVIDE AND PROTECT INSTREAM FLOWS (HABITAT MANAGEMENT)**									
	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	Pending							Colorado has been working on this through Roundtables/SWSI and selected AMEC to model water demands for the Basin Implementation Plan (draft plan submitted; final expected Dec 2015). Utah will put the Watson to Green River reach into MODSIM to model current and future demands in the White River in Utah.
	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. Initial report complete (Haines et al. 2004).	FWS-FR	In progress	X						Program Director's staff met with CWCB, Utah, TNC, and water users to discuss draft revised White River flow recommendations in 2012; agreed to develop management plan concurrently with finalizing the draft flow recommendations.
	I.B.3.	Develop and implement a White River management plan	Program	Pending	X						***X*** The SOW for the White River Management Plan was approved by the MC 8/14/13. Management planning process was presented to the public in October of 2013 in Vernal, Craig, and Rangely. CWCB secured $250,000 from their Species Conservation Trust Fund to help with modelling, writing and presentations of the management plan; contract not yet issued.
	I.B.3.a.	Conduct programmatic Section 7 and NEPA compliance on recovery actions and a level of future water demand.	FWS	Pending	X						Service will begin developing a programmatic biological opinion for the White River after development of a management plan gets underway.
	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							The White River is is one of three reaches for which USBR is evaluating robustness of modeling for environmental factors (post Basin Study).
	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 for developing depletion schedules for the White River.						
	I.D.3.	Assess impacts of depletions on Colorado's Compact allocations.	CWCB	Complete	CO completed work on a water availability study for the White River in early 1995 & the work was used as the basis for developing depletion schedules for 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	Complete							
	I.E.2.b.	Identify legal and technical process and schedule for streamflow protection.	UT	Pending							
>*	I.E.2.c.	Implement process for streamflow protection.	UT	Pending	X						
	I.F.	Evaluate and revise as needed flow regimes to benefit endangered fish populations.	FWS/Program	Ongoing	X	X	X	X	X	X	
	II.	**RESTORE HABITAT (HABITAT DEVELOPMENT AND MAINTENANCE)**									
	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.						
	III.	**REDUCE NEGATIVE IMPACTS OF NONNATIVE FISHES AND SPORTFISH MANAGEMENT ACTIVITIES (NONNATIVE AND SPORTFISH MANAGEMENT)**									
	III.A.	Reduce negative interactions between nonnative and endangered fishes.									

GREEN RIVER ACTION PLAN: WHITE RIVER

	ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
III.A.1.	Monitor nonnative fishes in Kenney Reservoir and upstream. Initial assessment complete (Elmblad 1998).	CPW	Ongoing	X	X	X	X	*X*	X	CPW continues to routinely sample above Taylor Draw Dam including Kenney Reservoir to determine status/source/escapement of problematic predatory fishes (e.g. smallmouth bass, northern pike, walleye, none of which have been detected, fortunately).
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.	CDOW	Complete	CDOW 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.	CDOW	Complete	CDOW completed assessment (CDOW 2001).						
III.B.2.	Preclude new nonnative species introductions, translocations or invasions to preserve native species dominance within critical habitat.	Program	Ongoing	X	X	X	X	X	X	
III.B.2.a.	Determine and implement an adequate level of mechanical removal to reduce smallmouth bass.	CPW/Program		X	X	X	X	*X*	X	***X*** Significant increase in smallmouth bass population was first detected in 2011, removal projects began in 2012, and continue through 2015. Bass abundance has increased in the White River because of spawning in 2012 and 2013, primarily within Colorado. 2014 catch rates were lower than previous years, but researchers continue to track the 2012 and 2013 cohorts. Bass densities are highest in the uppermost section below Taylor Draw Dam. Efforts to reduce the abundance of smallmouth bass were as high as possible in the Colorado portion in 2013 and 2014. Catch rates are lower below tributary inputs (Douglas and Evacuation creeks). One walleye was captured in Utah at river mile 35 in 2014 (the first capture, of this species in the White River, although two walleye were observed in the White River in 2013). The Recovery Program continues to support and encourage the multi-agency effort to designate White River as native fish conservation area.
V.	**MONITOR POPULATIONS AND HABITAT AND CONDUCT RESEARCH TO SUPPORT RECOVERY ACTIONS (RESEARCH, MONITORING, AND DATA MANAGEMENT)**									
V.A.	Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions.									UDWR reports that the White River Work Group hasn't met since 2013, but needs to draft a conservation charter for group review (partially completed) and then consider developing a native fish conservation area or similar protective designation.
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.						PIT tag antenna array installed by Bonaza Bridge to monitor PIT tagged endangered and 3-species fish. Data collection is continuous and ongoing. Preliminary data analysis presented at 2015 Researchers Meeting.

Assessment: White River Flows



2014 (snowpack%)	Peak Target	2014 Peak
White R. at Watson (125%)	Mod Wet 3,700	Draft 3,290

2014	Base Flow Target	Aug-Oct AVG	% Avg
White R. at Watson	Mod Wet 500	508	102%

COLORADO RIVER ACTION PLAN: MAINSTEM

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	I.	**PROVIDE AND PROTECT INSTREAM FLOWS (HABITAT MANAGEMENT)**									
	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	
	I.A.3.b.	Develop consumptive use and losses report with CRDSS model to verify level of depletions.	CWCB	Complete							
	I.A.3.c.	Calculate new depletions every 5 years (2006-2010, etc) and record within the depletion report the Program and WAC determination regarding whether or not additional instream flow filings or other flow protection mechanisms should be considered.	CWCB	In progress		X				X	***X*** Still overdue; however, the irrigated acreage assessment was completed. Another contract was awarded to update the dataset. The models will be updated through 2012. Colorado has prioritized the Yampa and Colorado river basins portion of this work.
	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 for developing depletion schedules for the						
	I.A.4.a.(2)	Assess impacts of depletions on Colorado's Compact allocations.	CWCB	Complete	Colorado completed work on a water availability study in early 1995 & the work was used as the basis for developing depletion schedules for the						
	I.A.4.a.(3)	Revisit the need for instream flow filings or other flow protection mechanisms at least every 5 years.	CWCB/FWS			X				X	By September 30, 2016, per the 5 year period as required in the PBO (or earlier should conditions dictate), the WAC will review mechanisms of current flow protection to determine if additional mechanisms or instream flow filings are needed at that time. The determination for additional protection rests with the Program and WAC, but will be recorded within the CWCB depletion reports due every 5 years. The WAC discussed this in July and November 2011 and determined that additional permanent protection in the form of instream flow filings was not deemed necessary at this time. It appears unlikely that there have been significant new depletions in the Colorado River.
	I.A.4.a.(3)(a)	If necessary, evaluate how identified flows will be legally protected.	CWCB	On hold							
	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 for developing depletion schedules for the						
	I.A.4.b.(2)	Assess impacts of depletions on Colorado's Compact allocations.	CWCB	Complete	Colorado completed work on a water availability study in early 1995 & the work was used as the basis for developing depletion schedules for the						
	I.A.4.b.(3)	Revisit the need for instream flow filings or other flow protection mechanisms at least every 5 years.	CWCB/FWS	On hold		X				X	See I.A.4.a.(3), above.
	I.A.4.b.(3)(a)	If necessary, evaluate how identified flows will be legally protected.	CWCB	On hold							
	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						
	I.A.4.c.(2)	Irrigation season return flows legally protected - 300 cfs.		Complete							

COLORADO RIVER ACTION PLAN: MAINSTEM

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	I.A.5.	Provide and legally protect instream flows pursuant to Colorado River PBO.									*!* With a snowpack of 132% of average the peak flow target for 2014 was the wet category in the 15-mile reach. There was a concern for flooding in Grand Junction which cancelled the coordinated reservoir operations for a peak flow. The peak target was 23,500 cfs and the actual peak was 25,300 cfs. The baseflow target was 1,630 cfs and the average flow for August – October was 1,852 cfs. A total of 39,071 af was provided for baseflow augmentation in water year 2014: 15,413 af from Ruedi, 3,000 af from Wolford Mountain Reservoir, 5413 af from Granby, 55,594 af from Green Mountain and 15,245 af from the Palisade Bypass Pipeline (see Assmt-CR worksheets). Green Mountain reservoir HUP Surplus 55,594 af was provided for the 15-Mile Reach. In 2014, a public meeting was held in Basalt in August, and 3 HUP users group meetings were held in March, June and August, and a Grand Valley Water Users meeting was held in December (in addition to weekly conference calls to discuss river conditions throughout the irrigation season).
>*	I.A.5.a.	Pursuant to Ruedi Biological Opinion (and subsequently, the 15-Mile Reach PBO), 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	*See I.A.5., above.*
>*	I.A.5.b.	Execute lease (through 2012) for Reclamation's 10,825 af from Ruedi Reservoir.	BR/FWS/ CWCB	Complete	2012 lease signed June 23, 2003.						Program still struggles to meet flow recommendations in drought years; FWS and Reclamation may explore opportunities (and would include Colorado and the River District in these discussions) to continue delivering this water (or a portion thereof) after 2012. CWCB may consider a lease of water to prevent an 'April Hole' such as seen in 2013. The OMID Canal Automation Project is expected to provide water in most years to replace the 10,825 acre-feet of Ruedi Reservoir water that was lost in 2012. The check structures in the OMID project are complete and the reregulating reservoir is next to be constructed..
>*	I.A.5.b.(1)	Provide water annually pursuant to long-term lease.	BR/CWCB	Ongoing through 2012.							
	I.A.5.c.	East and West slope water users provide 10,825 af pursuant to 15-Mile Reach PBO									
	I.A.5.c.(1)	Provide 10,825 af on an interim basis from Wolford and Williams Fork reservoirs.									
	I.A.5.c.(1)(a)	Execute 10-year agreement for delivery of 5,412.5 af by West Slope water users. Extend agreement through 2013.	CRWCD/FWS	Complete	Pursuant to the 1999 FBO, 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						
>*	I.A.5.c.(1)(a)(i)	Provide and protect water deliveries by West Slope water users.	CRWCD/ CWCB	Complete							See I.A.5.c.(2)(c). The permanent 5412 pool in Ruedi has replaced Wolford's 5412.
	I.A.5.c.(1)(b)	Execute 10-year agreement for delivery of 5,412.5 af by East Slope water users. Extend agreement through 2013.	DWD/FWS	Complete	Pursuant to the 1999 FBO, 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.c.(1)(b)(i)	Provide and protect water deliveries by East Slope water users.	DWD	Complete							See I.A.5.c.(2)(c). The permanent 5412 pool from from Granby and the East slope water users is in place.
	I.A.5.c.(2)	Provide permanent delivery of 10,825 af in late summer/early fall to meet base flow needs.									
	I.A.5.c.(2)(a)	Identify options.	Water Users	Complete	Water Users 2002.						
	I.A.5.c.(2)(b)	Select preferred alternative for delivery.	Water Users	Complete							
	I.A.5.c.(2)(c)	Sign agreement(s) for permanent delivery of 10,825.	Water Users	Complete							Existing 10-year (interim) agreements (see I.A.5.c.&d.) that expired July 1, 2010 were extended in July of 2010 through 2013 (with option for 2 more years until permanent 10825 is finalized). Delivery of permanent 10825 began in summer 2013.
>*	I.A.5.c.(2)(d)	Deliver and legally protect flows.	Water Users	Ongoing	X	X	X	X	X	X	
	I.A.5.d.	Evaluate options for use of uncommitted Ruedi Reservoir water following Round II sales.	BR	Complete	On May 25, 1995, FWS issued final amendment to BO for Round II water sales. Reclamation agreed to implement a 15-year contract for 21,650 af (in addition to the original 5,000 af + 5,000 af four out of five years). USFWS						
	I.A.5.e.	After Ruedi Round II water sales are completed, or commitments to contracts agreed to, resolve the disposition of remaining uncommitted water from Ruedi Reservoir.	BR/CWCB/ FWS	Complete	1999 amendment to 1995 Ruedi BO. USFWS 1999a.						

COLORADO RIVER ACTION PLAN: MAINSTEM

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
>*	I.A.5.f.	Pursuant to Wolford Mountain (Muddy Creek) Biological Opinion, deliver up to 6,000 acre-feet of water.	CRWCD/FWS/ CWCB	Ongoing	X	X	X	X	X	X	See I.A.5., above.
	I.A.5.g.	Coordinated reservoir operations.									
	I.A.5.g.(1)	Evaluate (final report). Implementation plan finalized 2/28/06.	BR	Complete	Identified as complete in 2000 version of RIPRAP.						
>*	I.A.5.g.(2)	If available, deliver additional peak flows, evaluate process & hydrology, and provide annual report.	BR	Ongoing	X	X	X	X	X	X	No CROS in 2014 due to possible flooding in Grand Junction.
	I.A.5.h.	Collbran Project.									
	I.A.5.h.(1)	Evaluate.	BR	Complete	Collbran contract could not be implemented as planned due to a number of water rights issues.						
	I.A.5.h.(2)	Make recommendations	BR	Complete							
	I.A.5.i.	Silt Project.									
	I.A.5.i.(1)	Evaluate.	BR	Complete	Not feasible due to water availability.						
	I.A.5.i.(2)	Make recommendations.	CDOP/BR	Complete							
	I.A.5.j.	Grand Valley Water Management Project.									
	I.A.5.j.(1)	Evaluate.	BR	Complete	1996						
	I.A.5.j.(2)	Complete Draft Grand Valley Water Management Environmental Assessment. The agreement to deliver Green Mountain Reservoir water to the Grand Valley Power Plant, pursuant to the Orchard Mesa Check Settlement, will also be covered in this draft environmental assessment.	BR	Complete	1997						
>*	I.A.5.j.(3)	Design and construct features of the Grand Valley Water Management Project.	BR	Complete							
	I.A.5.j.(4)	Execute agreement for delivery of surplus Green Mountain Reservoir water up to the excess capacity of the Grand Valley Power Plant pursuant to the Orchard Mesa Check Settlement.	BR	Complete	July 1999.						
	I.A.5.j.(5)	Execute agreement (municipal water contract) to deliver additional Orchard Mesa Check Settlement water and Grand Valley Water Management Plan water to benefit endangered fish.	BR/City of Grand Jct.	Complete; renew in 2012.	In 2000, Reclamation entered a 5-year contract to deliver Green Mountain surplus water to the city of Grand Junction for municipal/recreational purposes. Renewed on 8/29/2007 through 12/31/2012.						Reclamation and the municipalities of Grand Junction, Palisade, and Fruita have had municipal-recreation agreements in place since 2001. Reclamation and the municipalities anticipate signing a 40-year agreement in 2015. This agreement would be for up for an unspecified amount, but could accommodate as much as 66,000 af -- the entire Green Mtn HUP pool. Under the previous agreements, Reclamation has delivered as much as 61,000 af/year.
	I.A.5.j.(6)	Assess options and legally protect only additional Orchard Mesa Check Settlement water and Grand Valley Water Management Plan water.	BR	Complete	1999						
	I.A.5.k.	Orchard Mesa Irrigation District (OMID) Canal Automation Project									
	I.A.5.k.(1)	Secure site for re-regulating reservoir	CRWCD	Complete	2009						
	I.A.5.k.(2)	Develop acceptable cost-sharing agreement for escrow account to fund O&M costs.		Complete							
	I.A.5.k.(3)	Conduct environmental assessment									
>*	I.A.5.k.(4)	Design and construct features of the OMID project			X	X					***!*** Thirty-three canal check structures constructed in 2014. OMID canal automation regulating reservoir construction contract couldn't be awarded in 2014; bids will be re-solicited with a target award date of spring 2015, with construction scheduled to be complete in 2016 or 2017.
	I.A.5.l.	Water Division 5 Coordinated Facilities Study (CFOPS).									
	I.A.5.l.(1)	Evaluate options for providing and protecting additional peak flows to the 15-Mile Reach. Phase I completed 2001; Phase II completed 2003 (Brown and Caldwell 2003).	Water Users	Ongoing							***X*** Overdue. Tom Pitts has received input on the April 2014 draft. Revised Draft CFOPS Phase III was most recently due December 31, 2014 (final by March 2015) If substantive additional work is required, water users may recommend hiring assistance. The next draft will identify the Service's "fish pools" and which ones are subject to exchange (base to peak flows) (will require State Engineer legal review).
>*	I.A.5.l.(2)	Deliver additional peak flows as determined feasible in the evaluation.	TBD	Ongoing	X	X	X	X	X	X	

COLORADO RIVER ACTION PLAN: MAINSTEM

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	I.A.6.	Review implementation of RIPRAP items to determine timely compliance with applicable schedules (every 2 yrs. beginning in 2003).	FWS	Ongoing	X		X			X	WAC: Ongoing. The PBO also requires that (page 67) "the status of fish populations will be reviewed prior to new depletions reaching 60,000 acre-feet/year. This review will begin when actual new depletion levels reach 50,000 acre-feet/year or the year 2015, whichever comes first." PDO will inititiate review in 2015.
	I.B.	Colorado River from the Gunnison to the Colorado-Utah State line (Includes the 18-Mile Reach									
	I.B.1.	Initially identify year-round flows needed for recovery.	FWS-FR	Complete	McAda 2003.						
	I.B.2.	Evaluate how identified flows will be legally protected.	CWCB	On hold							
	I.B.3.	State acceptance of initial flow recommendations.									
	I.B.3.a.	Review scientific basis, dependent on development of flow recommendations by FWS.	CWCB/CPW	Pending							
	I.B.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 for developing depletion schedules for the Colorado River.						
	I.B.3.c	Assess impacts of depletions on Colorado's Compact allocations.	CWCB	Complete	Colorado completed work on a water availability study in early 1995 & the work was used as the basis for developing depletion schedules for the Colorado River.						
	I.B.3.d.	CWCB notice of intent to appropriate (in Colorado).	CWCB	On hold							
	I.B.4.	Legally protect identified flows.									
>*	I.B.4.a.	Acquire (see Colorado River above Gunnison and Gunnison River).									
	I.B.4.b.	Appropriate.									
	I.B.4.b.(1)	CWCB approval to appropriate.	CWCB	On hold							
>*	I.B.4.b.(2)	Colorado Attorney Generals Office file date.	CWCB	On hold							
>*	I.B.4.b.(3)	Water court adjudication (litigation dependent).	CWCB	On hold							
	I.B.4.c.	Deliver and legally protect flows from Aspinall (see Colorado River above Gunnison and Gunnison River).									
>*	I.B.4.c.(1)	Operate Aspinall to provide test flows.	BR	Complete	Test flows provided through 1997; synthesis report and flow recommendations report completed in 2003 (McAda 2003).						
>*	I.B.4.c.(2)	Continue annual coordination meetings.	BR	Ongoing	X	X	X	X	X	X	
	I.B.4.c.(3)	Operate Aspinall to provide flows pursuant to biological opinion and record of decision.									Program is monitoring fish community in the Colorado River below the Gunnison (post-Gunnison PBO and Aspinall ROD, see IB5). This reach also is one of three for which USBR is evaluating robustness of modeling for environmental factors (post Basin Study).
	I.B.4.c.(3)(a)	Determine if change in water right and/or contract is needed.	BR	Complete							
	I.B.4.c.(3)(b)	Enter into contract if needed.	BR	Complete							
>*	I.B.4.c.(3)(c)	Deliver flows.	BR	Complete							
	I.B.5.	Develop study plan to evaluate flow recommendations (Aspinall Study Plan)	Program	Complete							
	I.B.5.a.	Monitor Physical Response in the Colorado River to the Proposed Action									
	I.B.5.a.(1)	Collect aerial photography during the peak flows to determine area of floodplain inundation at floodplain sites (Valdez and Nelson 2006)	BR								
	I.B.5.a.(2)	Collect aerial photography during base flows to monitor channel width and complexity and to serve as base maps for habitat mapping.	BR								
	I.B.5.a.(3)	Repeat depth-to-embededness surveys in the 18-mile reach.	TBD		X						
	I.B.5.b.	Monitor Biological Responses in the Colorado River to the Proposed Action									
	I.B.5.b.(1)	Initiate a fish community monitoring study in Colorado River main channel and floodplain habitats (focus on 18-mile reach)	CPW/FWS	Ongoing	X	X	X	X	X	X	
	I.B.5.b.(2)	Assess primary and secondary productivity in cobble bars (runs and riffles)	TBD	Pending	X						
	I.B.5.b.(3)	Continue ongoing fish community monitoring (CPM and HBC pop estimation; CPM Age-0 monitoring)	FWS/UDWR	Ongoing	X	X	X	X	X	X	

COLORADO RIVER ACTION PLAN: MAINSTEM

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	I.B.6.	Integrate and synthesize information to evaluate and recommend necessary revision of the proposed action	Program	New start	X	X					
	I.C.	Colorado River from Colorado-Utah State line to Green River									See also I.B.4.c.(3)
	I.C.1.	Initially identify year-round flows needed for recovery.	FWS-FR	Complete	McAda 2003.						
	I.C.2.	State acceptance of initial flow recommendations.									
	I.C.2.a.	Review scientific basis.	UT	Pending							
	I.C.2.b.	Assess legal and physical availability of water.	UT	Pending							
	I.C.3.	Legally protect identified flows.									
	I.C.3.a.	Hold public meeting to establish future appropriation policy.	UT	Pending							
	I.C.3.b.	Adopt and implement new policy (new appropriations subject to flow criteria).	UT	Pending							
>*	I.C.3.c.	Prepare and execute contracts with water users as required to subordinate diversions associated with approved and/or perfected rights.	UT	Pending							
	I.D.	Colorado River below Green River									
	I.D.1.	Initially identify year-round flows needed for recovery.	FWS	Pending			X				After evaluation of flow recommendations in the Gunnison, Colorado, and Green rivers is completed, the Service needs to determine if combination of Colorado and Green River flows below the confluence are adequate for recovery.
	I.D.2.	Assess adequacy of combined flows from Colorado and Green rivers to provide fish habitat (and meet recovery goals) in the Cataract Canyon reach of the Colorado River.	FWS	Pending			X			X	See comment under 1.D.1, above.
	I.E.	Evaluate and revise as needed flow regimes to benefit endangered fish populations. See also 1.B.5.	FWS/Program	Ongoing	X	X	X	X	X	X	
	II.	**RESTORE HABITAT (HABITAT DEVELOPMENT AND MAINTENANCE)**									
	II.A.	Restore and manage flooded bottomland habitat.									
	II.A.1.	29-5/8 Road Gravel Pit (became part of larger "Hot Spot Complex" in 2003.)									
	II.A.1.a.	Develop and approve management plans.	FWS-FR	Complete	Burdick 1994.						
	II.A.1.b.	Site design/complete environmental compliance.	BR	Complete	Levee initially breached in December 1995. To enhance post-runoff drainability, site topography was re-contoured in March 1998.						
>*	II.A.1.c.	Construct.	BR	Complete							
>*	II.A.1.d.	Operate and maintain.	BR	TBD, revisit as needed	Burdick 2002. Operation, maintenance and evaluation of sites incorporated into Colorado River Subbasin Floodplain Management Plan (Valdez and Nelson 2004b) (IIA6).						
	II.A.1.e.	Monitor and evaluate success; modify as needed.	FWS-FR	TBD, revisit as needed							
	II.A.2.	Adobe Creek.									
	II.A.2.a.	Develop and approve management plans.	FWS-FR	Complete	Earthen dikes and water control structures completed in spring 1995.						
	II.A.2.b.	Site design/complete environmental compliance.	BR	Complete							
>*	II.A.2.c.	Construct.	BR	Complete							
>*	II.A.2.d.	Operate and maintain.	BR	TBD, revisit as needed	Hamilton et al. 1996, 1997, 2003. Operation, maintenance and evaluation of sites incorporated into Colorado River Subbasin Floodplain Management Plan (Valdez and Nelson 2004b) (IIA6).						
	II.A.2.e.	Monitor and evaluate success; modify as needed.	FWS-FR	TBD, revisit as needed							
	II.A.3.	Walter Walker.									
	II.A.3.a.	Develop and approve management plans.	FWS-FR	Complete	1994						
	II.A.3.b.	Site design/complete environmental compliance.	BR	Complete	Initial construction was completed during FY 95.						
>*	II.A.3.c.	Construct.	BR	Complete	75 cfs inlet control structure to flush selenium was completed December 1996 (Hamilton et al. 2003).						
>*	II.A.3.d.	Operate and maintain.	BR/FWS/ CDOW	TBD, revisit as needed	Operation, maintenance and evaluation of sites incorporated into Colorado River Subbasin Floodplain Management Plan (Valdez and Nelson 2004b) (IIA6).						
	II.A.3.e.	Monitor and evaluate success; modify as needed.	FWS-FR	TBD, revisit as needed	Hamilton et al. 1996, 1997, 2003, Scheer 1998.						
	II.A.4.	Develop and implement levee removal strategy at high-priority sites.									
	II.A.4.a.	Preconstruction (contaminants screening, floodability assessments, environmental compliance, design & engineering.	BR/FWS	Complete	Burdick 2002. Levees breached at two sites (19.5 acres total). Levee						

COLORADO RIVER ACTION PLAN: MAINSTEM

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
>*	II.A.4.b.	Construction (levee breaching) [NOTE: Subject to review and approval for depression wetlands.]	BR	Complete	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	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.b.	Pre-acquisition planning and identification of acquisition options.	PD	Complete							
	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 Colorado River Subbasin Floodplain Management Plan	Program	Complete							
>*	II.A.6.a.	Implement, validate and refine Colorado River Subbasin Floodplain Management Plan	Program	Ongoing	X	X	X	X	X	X	Service no longer automatically recommends reconnecting gravel pits (upstream of Grand Valley Project dam) upon completion of mining operations due to nonnative fish concerns. For example, levee breeches at the LaFarge pond need to be backfilled; CPW found northern pike there in 2013 (see III.A.9.). A Geomorphology panel was convened in 2013 to recommend studies to validate spring flow recommendations (e.g., use aerial photography to validate floodplain inundation vs flow throughout the Grand Valley). A draft Strategy to Evaluate Peak Flow Requirements (a Technical Supplement to to the Green and Aspinall Study Plans) is in review.
	II.B.	Restore native fish passage at instream barriers.									A meeting with Grand Valley irrigators was held in August and December 2014. As in all years there was frequent communication during the irrigation season via the weekly HUP calls. Biannual irrigation coordination meetings (Reclamation, Grand Valley Water Users, Irrigation Companies, Service, and Program staff) resumed in 2014. A total of 9,737 native fish were salvaged and relocated from the GVIC and GVP canals following the 2013 irrigation season. The overwhelming majority of these fish were native species (predominantly flannelmouth sucker and roundtail chub). Fourteen endangered fish were also salvaged: (3) razorback sucker and (11) bonytail.
	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	
	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 entrainment, 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	GVIC screen operations were intermittent through the 2014 irrigation season due to high flows and various mechanical issues. The screen was operational 139 days (64%) of the irrigation season; non-operational for 79 days (36%).
	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							

COLORADO RIVER ACTION PLAN: MAINSTEM

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
>*	II.B.2.a.(3)	Construct.	BR	Complete							
>*	II.B.2.a.(4)	Operate and maintain.	BR	Ongoing	X	X	X	X	X	X	
	II.B.2.a.(5)	Monitor and evaluate success.	FWS-FR/BR	Ongoing							CRFP-GJct reported the following endangered and native fish detections at the Price Stubb PITantenna in 2014: (114) bonytail; (3) Colorado pikeminnow; (69) razorback sucker; (29) roundtail chub; and (1) flannelmouth sucker.
	II.B.3.	Restore fish passage at Government Highline (aka Grand Valley Project or 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	Passage operated for 177 days (23 April - 16 October), 128 days longer than in 2013. A total of 24,670 fish used the ladder, the highest total documented for this facility. 69.9% of fish were native species or native hybrids (10 % less than 2013). It was the best year in 8 years of operation for endangered species passage: 25 razorback sucker and 14 bonytail and the first Colorado pikeminnow. White sucker was the predominant non-native species collected.
	II.B.3.a.(4)	Monitor and evaluate success.	FWS-FR/BR	Ongoing							
	II.B.3.b.	Screen Government Highline diversion to prevent endangered fish entrainment.									
	II.B.3.b.(1)	Design.	BR	Complete	2002						
>*	II.B.3.b.(2)	Construct.	BR	Complete	August 2005.						
>*	II.B.3.b.(3)	Operate and maintain.	FWS-FR/BR	Ongoing	X	X	X	X	X	X	The GVWUA screen was operated 93% of the irrigation season (bypassed for one 24-hour period and for a few hours at a time on several other occasions).
	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.]									The Service continues to work with the mosquito control agency in the Grand Valley to prevent mosquitocide exposure of endangered Colorado River fish in backwater and wetland habitat in ~30 miles of the Colorado and Gunnison rivers (total treatment area is ~73 square miles, or 46,720 acres).
	II.C.1.	Support actions to reduce or eliminate comtaminant impacts of selenium in the Grand Valley.	FWS-ES	Ongoing	X	X	X	X	X	X	Reclamation and the Grand Junction EC staff remained involved with both the Gunnison Basin Selenium Task Force and Grand Valley Selenium Task Force.
	II.C.2.	Support remediation of groundwater contamination at the Atlas Mill tailings site.	FWS-ES	Ongoing	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	
	III.	**REDUCE NEGATIVE IMPACTS OF NONNATIVE FISHES AND SPORTFISH MANAGEMENT ACTIVITIES (NONNATIVE AND SPORTFISH MANAGEMENT)**									
	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.						
>*	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 due to higher priorities.						
	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 due to higher priorities.						

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		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	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.	CPW/FWS	Ongoing							See General, III.C.
	III.A.4.b.	Screen Rifle Creek below Rifle Gap Dam (non-Program funds).									
	III.A.4.b.(1)	Design with appropriate peer review	CPW/BOR /FWS	Complete							
>*	III.A.4.b.(2)	Construct screen (2013)	CPW	Complete							
	III.A.4.b.(3)	Finalize lake management plan, per Nonnative Fish Stocking Procedures	CPW	Pending	X						An approved Lake Management Plan is required prior to stocking nonsalmonid fishes; CPW submitted draft to States and FWS for review in 2014, currently still in review.
	III.A.4.b.(4)	Conduct follow-up monitoring prior to and following stocking to determine effectiveness of screen.	CPW	Ongoing	X	X	X	X	X	X	Fish escapement past the screen is being evaluated for five years (see biological opinion). Screen was demonstrated to exclude a broad range of fish sizes (e.g., northern pike smaller than 20mm and larger than 500mm) and no pike were detected below the screen in 2014. The Service and the Program promote the use of sterile hybrid sportfish in the future.
>*	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/CPW	Ongoing	X	X	X	X	X	X	Weak cohort of smallmouth bass produced in 2014. Catch rates for all size classes declined in 2014; highest removal rates of smallmouth bass >325mm were in the reach from Cisco to Dewey Bridge.
>*	III.A.7.	Develop and implement program to identify required level of northern pike control.	FWS/CPW	Ongoing	X	X	X	X	X	X	Twenty northern pike collected from the Colorado River in 2014, all large fish.
>*	III.A.8.	Direct new (or shift existing) nonnative fish removal efforts to address increasing numbers of walleye in the lower river.	Program		X	X	X	X	X	X	***X*** Walleye captures in the Colorado River went from being 'rare' during 2003-2009 to 'common' in 2010, and then increased dramatically by 2013. Distribution within the lower reach in 2010 appeared to be restricted to the lowest 80 miles of the study area (ending at the Green River confluence); however, by 2013, captures extended upstream to RM 112 at the top of the lower reach, indicating an upstream range expansion. Unlike smallmouth and largemouth bass, whose primary distribution is in the upper reach, walleye directly overlap with small size classes of both Colorado pikeminnow and razorback sucker. In 2014, 109 walleye were removed during Colorado pikeminnow population estimates (compared to 268 in 2013) and FWS-GJ added fall passes specifically to remove walleye in lower Colorado reaches (107 walleye removed). All walleye captured were adults.
>*	III.A.9.	Upstream of Grand Valley Project dam: Determine and implement an adequate level of mechanical removal in the main channel. More importantly, use all techniques available to eradicate northern pike (and other nonnative species of concern) from floodplain habitats.	CPW/Program	Ongoing	X	X	X	X	X	X	CPW has implemented significant mechanical removal and is coordinating with USBR and the City of Rifle on sealing the breaches at the LaFarge Ponds.
	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.						

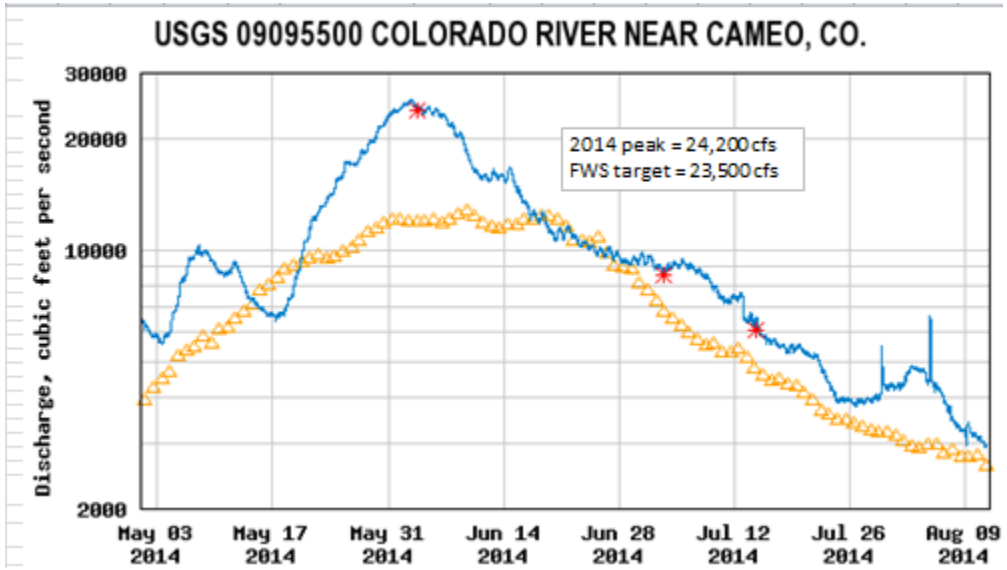
COLORADO RIVER ACTION PLAN: MAINSTEM

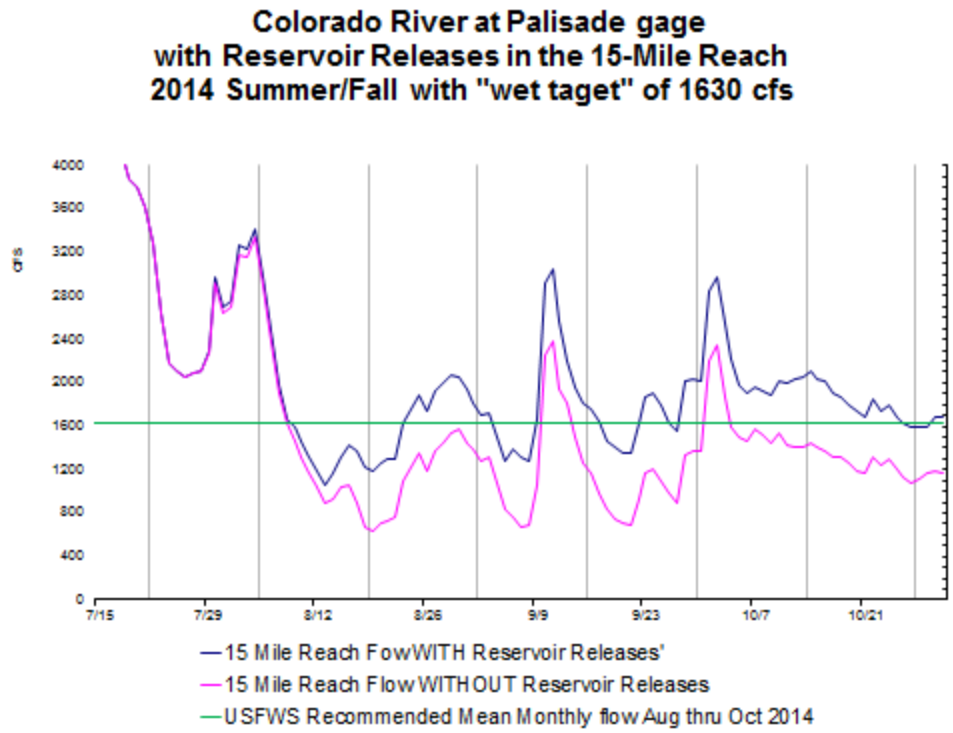
		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	III.B.1.a.	Operate and maintain Highline Reservoir net.	CPW	Ongoing	X	X	X	X	X	X	Highline Lake spillway barrier net (originally installed August 1999 and replaced in March 2006) was replaced in March 2014 (replacement net received in 2011, but couldn't be installed due to lake conditions; major dredging at Highline occured in the fall of 2013 and net installation deferred to early 2014 [prior to refilling the Lake]). 2013 outlet testing resulted in uncontrolled releases; CPW purchased tube nets to be used to prevent fish escapement in future annual outlet testing.
	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.3.	Develop basinwide aquatic management plan to reduce nonnative fish impacts while providing sportfishing opportunities.	CDOW	Complete	CDOW 2003a.						
>*	III.B.3.a.	Implement CPW's Colorado River Aquatic Management Plan.	CPW	Ongoing	X	X	X	X	X	X	
	IV.	**MANAGE GENETIC INTEGRITY AND AUGMENT OR RESTORE POPULATIONS (STOCKING ENDANGERED FISHES)**									
	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	Burrdick 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.	CPW/PD	Ongoing	X	X	X	X	X	X	
	IV.A.3.c.	Evaluate stocking success as identified in monitoring plan for stocked fish. Zelasko et al. 2009, 2011.	Program	Ongoing	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.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/CPW	Ongoing	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	See II.B.2.a.(5) above.
	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	
	IV.A.6.d.	Evaluate stocking success as identified in monitoring plan for stocked fish. Zelasko et al. 2009, 2011.	LFL/FWS/ STATES	Ongoing	X	X	X	X	X	X	
	V.	**MONITOR POPULATIONS AND HABITAT AND CONDUCT RESEARCH TO SUPPORT RECOVERY ACTIONS (RESEARCH, MONITORING, AND DATA MANAGEMENT)**									
	V.A.	Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions.									

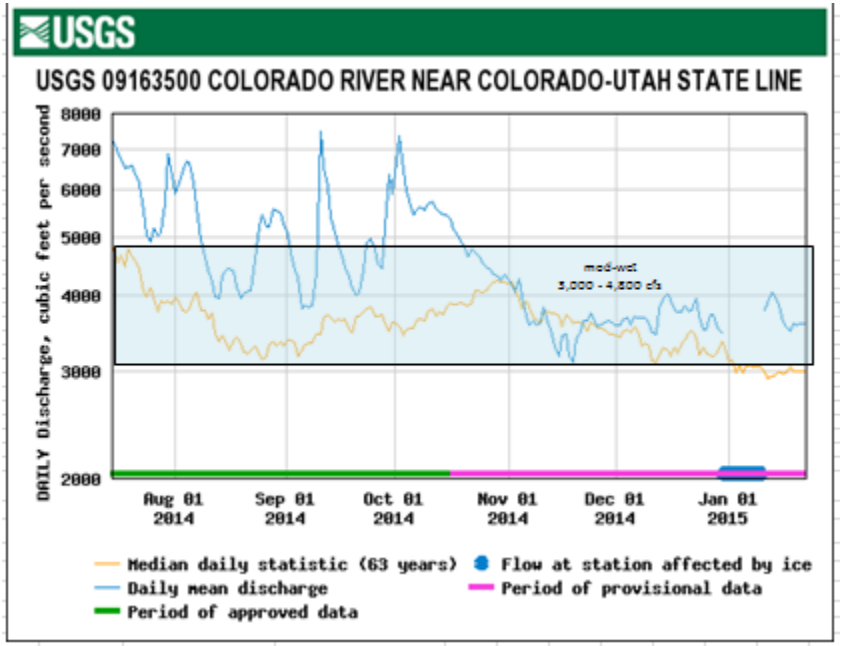
COLORADO RIVER ACTION PLAN: MAINSTEM

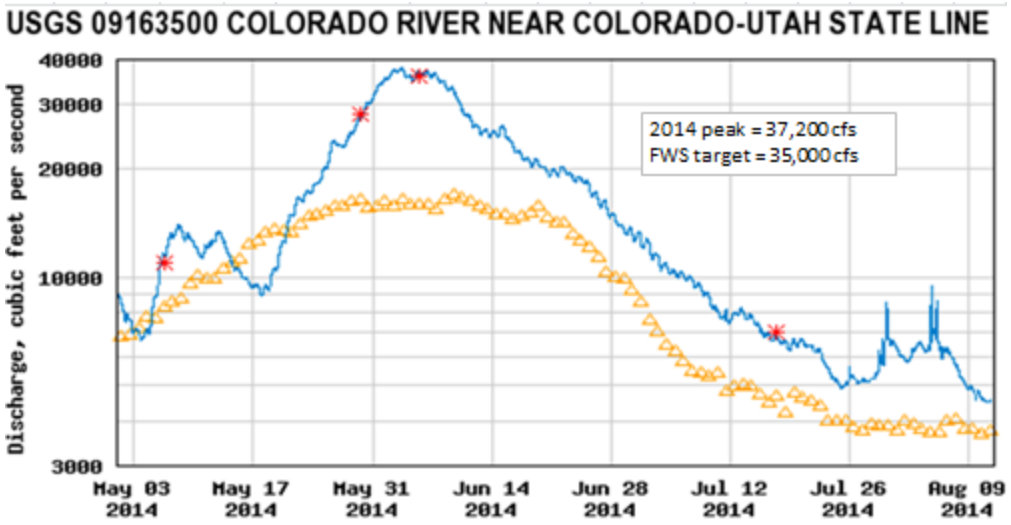
	ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
V.A.1.	Determine Colorado pikeminnow larval drift into Lake Powell.	NPS	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).						
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	
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	
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 structure	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).						
V.B.4.b.	Implement plan to monitor incidental take of endangered fish in diversion structures.	FWS	Ongoing	X	X	X	X	X	X	
V.C.	Estimate humpback chub populations. (Sampling occurs in September and October, overlapping fiscal years.)									
V.C.1.	Black Rocks. See McAda 2002 and Francis and McAda 2011.	FWS	Ongoing						X	Black Rocks humpback chub 2-year population estimate scheduled to begin in 2015 will be deferred to 2016 to match the Westwater estimate. 2015 effort will be directed to walleye control.
V.C.2.	Westwater. See Hudson and Jackson 2003, Elverud 2012.	UDWR	Ongoing						X	Westwater humpback chub 2-year population estimate scheduled to begin in 2015 will be deferred to 2016 to better alternate with Desolation-Gray Canyon population estimate. 2015 effort will be directed to walleye control.
V.C.3.	Cataract Canyon	UDWR	Ongoing	X	X	X	X	X	X	Cataract Canyon monitoring now consists of biennial trips to determine humpback chub CPUE. As lake level drops, UDWR has proposed extending sampling farther downstream and employing a greater variety of gear types.
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). See Osmundson and White 2009 and 2014.	FWS	Ongoing	X	X	X	X	X	X	! Report for 2008-2010 estimates completed.

Assessment: Colorado River Flows – Graphs




Colorado River at Palisade gage
with Reservoir Releases in the 15-Mile Reach
2014 Summer/Fall with "wet taget" of 1630 cfs
cfs
4000
3600
3200
2800
2400
2000
1600
1200
800
400
0
7/15
7/29
8/12
8/26
9/9
9/23
10/7
10/21
15 Mile Reach FowWITH Reservoir Releases'
15 Mile Reach Flow WITHOUT Reservoir Releases
USFWS Recommended Mean Monthly flow Aug thru Oct 2014

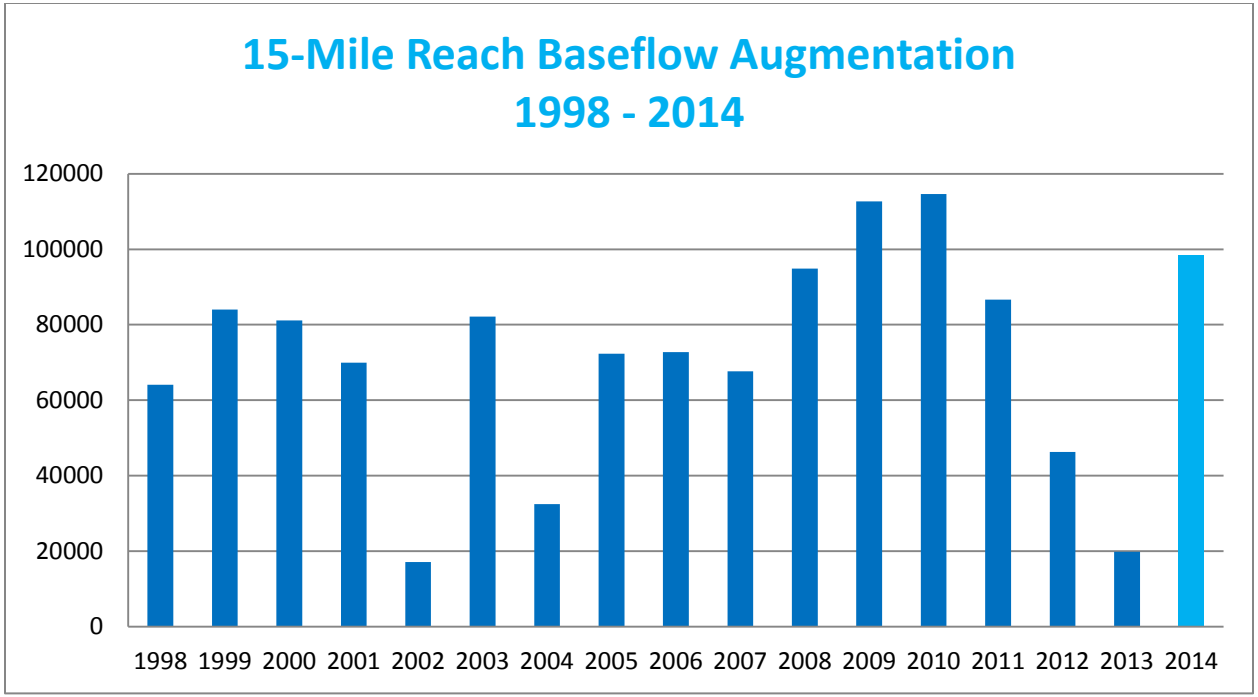

USGS
USGS 09163500 COLORADO RIVER NEAR COLORADO-UTAH STATE LINE
DAILY Discharge, cubic feet per second
8000
7000
6000
5000
4000
3000
2000
mod-wet
3,000 - 4,800 cfs
Aug 01 2014
Sep 01 2014
Oct 01 2014
Nov 01 2014
Dec 01 2014
Jan 01 2015
Median daily statistic (63 years)
Daily mean discharge
Period of approved data
Flow at station affected by ice
Period of provisional data


USGS 09163500 COLORADO RIVER NEAR COLORADO-UTAH STATE LINE
Discharge, cubic feet per second
40000
30000
20000
10000
3000
May 03 2014
May 17 2014
May 31 2014
Jun 14 2014
Jun 28 2014
Jul 12 2014
Jul 26 2014
Aug 09 2014
2014 peak = 37,200 cfs
FWS target = 35,000 cfs

2014 peak flows and baseflows vs Recovery Program flow targets (CFS)

2014 (snowpack%)	Peak Target	2014 Peak
Colorado R. at Cameo (132%)	23,500	25,300
Colorado R. at State Line (136%)	Mod Wet 35,000	38,000

2014 (% snowpack)	Base Flow Target	2014 Aug-Oct AVG	% Avg	2014 Min.
Colorado R. at Palisade (132%)	Wet 1,630	1,852	114%	1,040
Colorado R. State Line (132%)	Mod Wet 3,000 -4,800	5,023	129%	3,810


15-Mile Reach Baseflow Augmentation
1998 - 2014
120000
100000
80000
60000
40000
20000
0
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

Fish Screens Operations in the Grand Valley				
		GVIC	**Redlands**	**GVWUA**
		% Days off	% Days off	% Days off
	2009	19%	12%	
	2010	32%	11%	no reports
	2011	41%	26%	
	2012	68%	23%	32%
	2013	41%	17%	13%
	Avg.	**40%**	**18%**	**23%**

Assessment: Colorado River Flows – Tables

Reservoir	1997	1998	1999	2006	2008	2009	2010	2011	2012	2013	2014	Sum
Granby			8,515					-	-	-	-	8,515
Green Mtn	3,568	12,482	11,010	6,788	2,101	14,113	34,666	-	-	-	-	84,728
Ruedi	693	5,106	3,602	6,297	4,848	5,858	10,050	-	-	-	-	36,454
Williams Fork	946	1,672	1,543	6,625		5,044	19,982	-	-	-	-	35,812
Willow Ck			6,631			2,638		-	-	-	-	9,269
Windy Gap						2,061		-	-	-	-	2,061
Wolford Mtn	10,635	4,431	8,555	9,007		13,069	9,273	-	-	-	-	54,970
Total AF	**15,842**	**23,691**	**39,856**	**28,717**	**6,949**	**42,783**	**73,971**	**-**	**-**	**-**	**-**	**231,809**

Total AF = 231,809

Water Provided for Baseflows for the 15-Mile Reach (HUP) af

Reservoir	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Average	Sum
Granby		26,914									849	3,144	992			5,412	5,413	7,121	42,724
Green Mtn	31,736	29,277	47,187	34,656	-	47,526	119	31,200	25,358	32,745	61,433	56,290	57,813	37,132	-	2,514	55,594	32,387	550,581
Palisade Bybass					2,053	10,161	13,654	19,143	10,812	10,625	15,997	18,302	20,617	20,466	14,616	11,536	15,245	14,094	183,227
Ruedi	20,803	20,418	19,064	21,345	10,975	20,434	15,981	17,163	20,045	14,650	20,423	20,822	20,825	15,251	20,596	10,412	15,413	17,919	304,620
Williams Fork		1,825	3,858	5,369	3,757	3,757	2,678	3,814	5,712	2,624	9,389	5,411	5,113	5,412	5,412			4,581	64,131
Willow Ck		649																649	649
Windy Gap											764		893					829	1,657
Wolford Mtn	11,516	4,939	11,072	8,577	308	286	-	1,000	10,842	7,037		8,747	8,413	8,413	5,320	1,501	3,000	5,686	90,971
Total AF	**64,054**	**84,022**	**81,181**	**69,947**	**17,093**	**82,164**	**32,431**	**72,321**	**72,769**	**67,681**	**108,855**	**112,716**	**114,666**	**86,674**	**45,944**	**31,375**	**94,665**	**72,856**	**1,238,559**

Base Flow Total =
1,238,559 af

COLORADO RIVER ACTION PLAN: GUNNISON RIVER

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	I.	**PROVIDE AND PROTECT INSTREAM FLOWS (HABITAT MANAGEMENT)**									
	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	Complete							
	I.A.1.c.	Complete final technical synthesis report.	FWS	Complete	McAda 2003.						
	I.A.1.d.	Complete final biological assessment.	BR	Complete							
	I.A.1.e.	Complete draft NEPA document .	BR	Complete							
	I.A.1.f	Complete final NEPA document and record of decision.	BR	Complete							
	I.A.1.g	Complete ESA Section 7 consultation resulting in a programmatic biological opinion (PBO) for the Gunnison Basin.	FWS/BR/WAPA	Complete							
	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 for developing depletion schedules for the Colorado River.						
	I.B.3.	Assess impacts of depletions on Colorado's Compact allocations.	CWCB	Complete	Colorado completed work on a water availability study in early 1995 & the work was used as the basis for developing depletion schedules for the Colorado River.						
	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. (Through 2001 only.)	BR	Complete							
	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 meetings.	BR	Ongoing	X	X	X	X	X	X	
	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	

COLORADO RIVER ACTION PLAN: GUNNISON RIVER

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	I.C.3.e.	Flows from Aspinall Unit pursuant to Aspinall Biological Opinion and record of decision..									In 2014 the Gunnison River at Grand Junction water supply forcast for May - July was 111% of average. The Blue Mesa Reservoir water supply forcast for May - July was 120% of average. The runoff target was a (borderline) moderately wet year for 10 days at bankfull (14,350 cfs) and 40 days at half bankfull (8,070 cfs). Because the main tributaries had below average snowpack and complications with potential flooding in the Grand Valley, the achieved peak was 12,700 cfs with 24 days at half bankfull.
	I.C.3.e.(1)	Determine if change in water right and/or contract is needed.	BR	Complete							
	I.C.3.e.(2)	Enter into contract if needed.	BR	Complete							
>*	I.C.3.e.(3)	Deliver flows.	BR	Ongoing	X	X	X	X	X	X	
	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. (Data series summarizing 2005-2008 daily sediment sampling on Gunnison, Green and Duchesne rivers completed [Williams et al. 2009] and scientific investigations report [Williams et al. 2013] completed)	FWS/Program	Ongoing	X	X	X	X	X	X	In 2014, USGS conducted a proof-of-concept study using hydrophones to understand at what flow bedload begins to move (a "surrogate technology" which may replace more traditional bedload sampling, which is very expensive and can be dangerous). See also Peak Flow Technical Supplement discussion under General, I.A.4.a.
	I.D.1.	Develop study plan to evaluate flow recommendations / evaluate Selenium Management Program.	FWS/BOR/WAPA	Complete							
	I.D.1.a.	Monitor Physical Response in the Gunnison River to the Proposed Action.									
	I.D.1.a.(1)	Reinstate sediment monitoring in the Gunnison River as directed by project 85f.	Program	New start							See General I.A.4.a.
	I.D.1.a.(2)	Collect aerial photography during the peak flows to determine area of floodplain inundation at Escalante SWA and other sites.	Program	Pending							See General I.A.4.a.
	I.D.1.a.(3)	Collect aerial photography during base flows to monitor channel width and complexity and to serve as base maps for habitat mapping.	BR	Pending							
	I.D.1.a.(4)	Repeat depth-to-embeddedness (DTE) surveys in the Escalante area.	BR	New start	X						
	I.D.1.a.(5)	Evaluate the effect of operations to meet the Proposed Action on the Gunnison River thermal regime.	BR	New start		X					
	I.D.1.b.	Monitor Biological Responses in the Gunnison River to the Proposed Action.									
	I.D.1.b.(1)	Initiate a fish community monitoring study in Gunnison River main channel and floodplain habitats.	CPW/FWS	Ongoing	X	X	X	X	X	X	Project 163, multi-life stage fish community monitoring on the Gunnison River mainstem and in the 18-mile Reach of the Colorado River continues. This Recovery Program project is complemented by CPW's ongoing 3-Species sampling in the Gunnison River.
	I.D.1.b.(2)	Assess primary and secondary productivity in cobble bars (runs and riffles).	TBD	Pending	X						
	I.D.1.c.	Support Reclamation's Selenium Management Program.									
	I.D.1.c.(1)	Collect tissues from endangered fish (or surrogate species) as directed by FWS (coordinated with fish community monitoring, I.D.1.b.(1)).	CPW/FWS	Ongoing	X	X	X	X	X	X	For contaminants evaluation, muscle plugs collected again in 2014 from endangered fish and surrogate species (evaluation funded outside of Program). Results from this selenium study will be used in the new Selenium Management Program (SMP) to determine baseline selenium concentrations and evaluate effectiveness of selenium remediation efforts. 2014 annual report available at http://www.usbr.gov/uc/wcao/progact/smp/docs/SMP-2014AnnualRep.pdf
	I.D.1.c.(2)	Investigate selenium toxicity in razorback sucker.	Program	New start	X	X	X	X	X	X	Program continues to look to outside funding to investigate selenium toxicity. Selenium being evaluated at Stewart Lake (see Green River, item II.D.).
	I.D.2.	Integrate and synthesize information to evaluate and recommend necessary revision of the proposed action	Program	New start		X					WAC: The 2016 checkpoint may need to be deferred based on limited range of flow conditions we've been able to evaluate.

COLORADO RIVER ACTION PLAN: GUNNISON RIVER

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	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.						
	II.	**RESTORE HABITAT (HABITAT DEVELOPMENT AND MAINTENANCE)**									
	II.A.	Restore and manage flooded bottomland habitat.									
	II.A.1.	Develop management plan for Escalante State Wildlife Area.		Complete 5/94	Burdick 1994.						
	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 ColoradoRiver 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.4.	Develop and implement Colorado River Subbasin Floodplain Management Plan (Valdez and Nelson 2004b).	Program	Ongoing	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.ast						
>*	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	In 2014, the Redlands passageway was operational from 17 April to 17 October - its 19th year of operation. In 2014, 17 Colorado pikeminnow used the passage bringing the 19-yr project total to 141 pikeminnow; two razorback were handled this year bringing the 19-yr project total to 31 razorbacks; and five bonytail, bringing the 19-yr project total to 13. A total of 13,331 fish (all species) used the passage structure in 2014. Of these 68% were native species. 2014 catches of nonnative channel catfish (n=1,029) were the highest on record, but only 2 smallmouth bass were caught. Seventeen Colorado pikeminnow captured in the ladder were translocated 39.7 miles upstream to river mile 42.7 in an attempt to re-establish resident Colorado pikeminnow in the Gunnison River.
	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	
	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	Screen was operable throughout most of the 2014 season.
	II.B.2.	Restore passage at Hartland.									

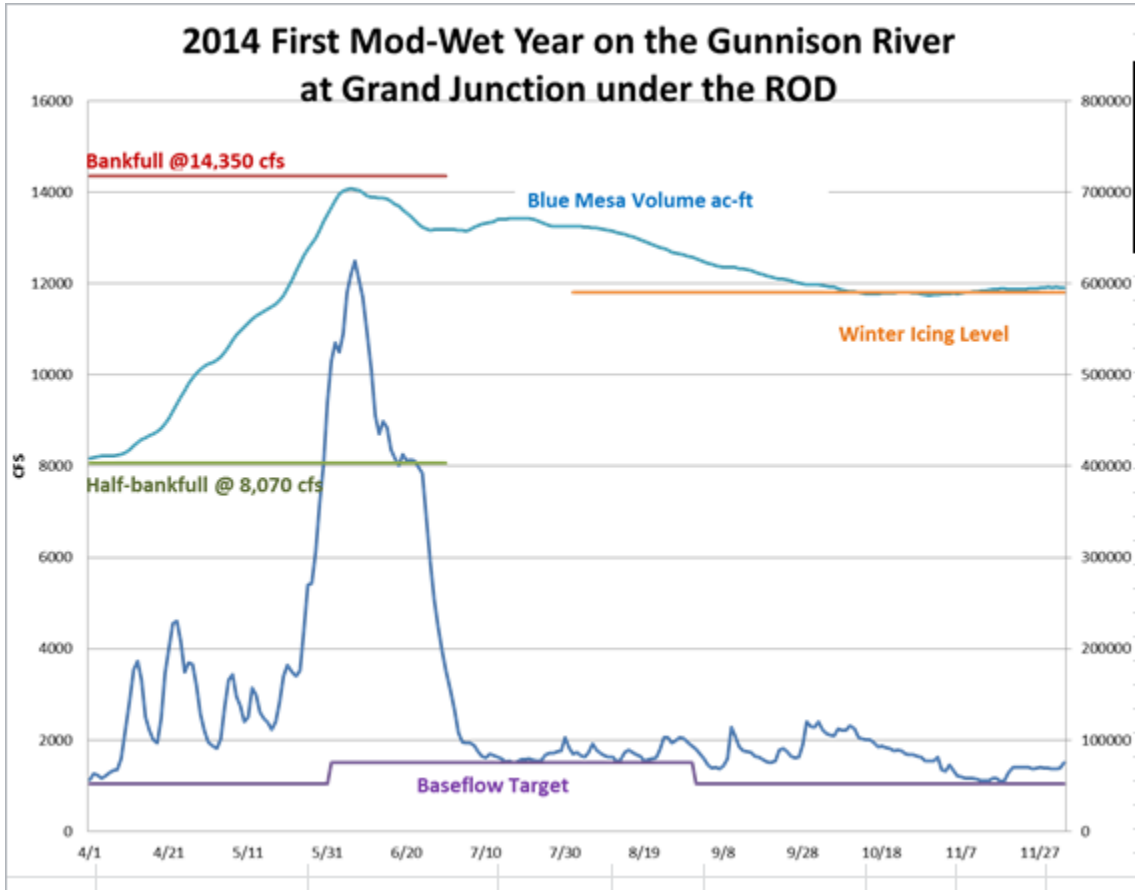
COLORADO RIVER ACTION PLAN: GUNNISON RIVER

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	II.B.2.a.	Assess and make recommendations for fish passage. (Passage at Hartland not identified as necessary for recovery in species' recovery goals).	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 local interests in efforts to pursue removal of the Hartland Diversion dam. [NOTE: These efforts will be conducted independently of and funded outside of the Recovery Program]	BR/FWS/PD	Complete							
	II.B.2.d.	Screen Hartland diversion to prevent endangered fish entrainment, if warranted.		Complete							
	II.B.2.d.(1)	Assess need.	BR/FWS/PD	Complete							
	III.	**REDUCE NEGATIVE IMPACTS OF NONNATIVE FISHES AND SPORTFISH MANAGEMENT ACTIVITIES (NONNATIVE AND SPORTFISH MANAGEMENT)**									
	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 2003b.						
>*	III.A.2.a.	Implement CPW's Gunnison River Aquatic Management Plan.	CPW	Ongoing	X	X	X	X	X	X	
	III.A.3.	Preclude new nonnative species introductions, translocations or invasions to preserve native species dominance within critical habitat.	Program	Ongoing	X	X	X	X	X	X	The high density northern pike source population in Crawford Reservoir remains of extreme concern due to its invasive potential. In 2014, CPW removed ~74% of northern pike in Crawford Reservoir and will continue removal in 2015. Crawford Reservoir does not connect unless it spills. Every effort should be made to ensure that the Gunnison River remains a native fish stronghold. **X** Illegal introduction of smallmouth bass in Ridgway Reservoir was confirmed in 2013. Sampling demonstrated multiple size classes, but low densities of adult fish, indicating the population may be expanding from initial introduction. Densities of SMB near the spillway were high, indicating a high risk of escapment from reservoir spilling. TriCounty Water Conservancy District successfully avoided a spill in 2014 and Program Partners began discussing long-term solutions.
	IV.	**MANAGE GENETIC INTEGRITY AND AUGMENT OR RESTORE POPULATIONS (STOCKING ENDANGERED FISHES)**									
	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 integratedstocking plan for Colorado pikeminnow in the Gunnison River.									
	IV.A.2.a.	Program acceptance.		Complete	Nesler et al 2003.						
>	IV.A.2.b.	Implement Colorado pikeminnow integrated stocking plan.	CPW/FWS	On hold							
	IV.A.2.c.	Evaluate stocking success as identified in monitoring plan for stocked fish.	FWS/CPW	On hold							
	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.	CPW/FWS	Ongoing	X	X	X	X	X	X	
	IV.A.3.c.	Evaluate stocking success as identified in monitoring plan for stocked fish.	LFL/FWS/STATES/PD	Ongoing	X	X	X	X	X	X	All life stages being monitored through project 163. See General, V.A.1.a.
	V.	**MONITOR POPULATIONS AND HABITAT AND CONDUCT RESEARCH TO SUPPORT RECOVERY ACTIONS (RESEARCH, MONITORING, AND DATA MANAGEMENT)**									
	V.A.	Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions.									

COLORADO RIVER ACTION PLAN: GUNNISON RIVER

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	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.	FWS-FR	Ongoing	X	X	X	X	X	X	Gunnison River fish community monitoring ongoing (Project #163).

Assessment: Gunnison River Flows



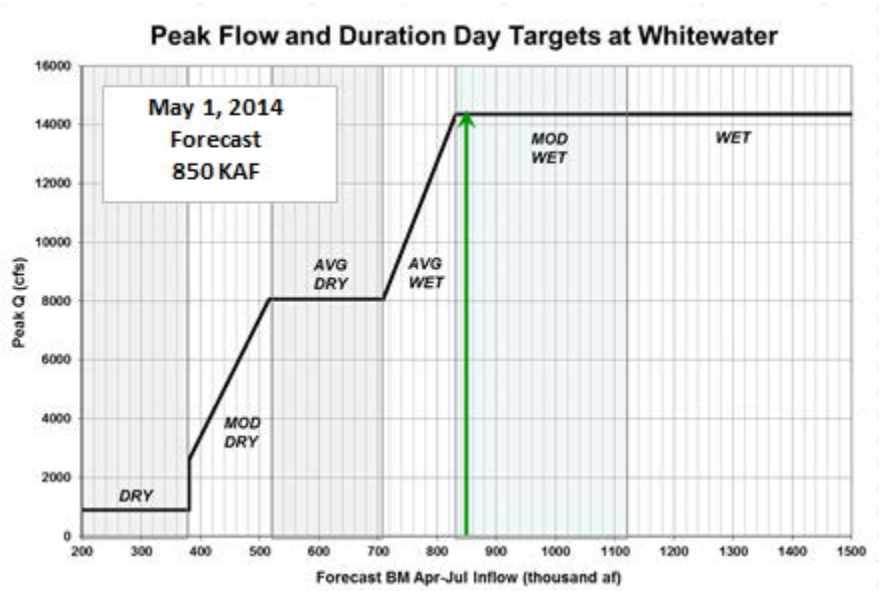
http://www.usbr.gov/uc/wcao/water/rsvrs/mtgs/amcurrnt.html
This link is the Bureau of Reclamation's summary of Aspinall Operations for 2014

2014 peak flows and baseflows vs Recovery Program flow targets (CFS)

Red is a target not met

2014 (% snowpack)	Peak Target	2014 Peak
Gunnison R. at Grand Junction (100%)	Mod Wet 14,350	12,700

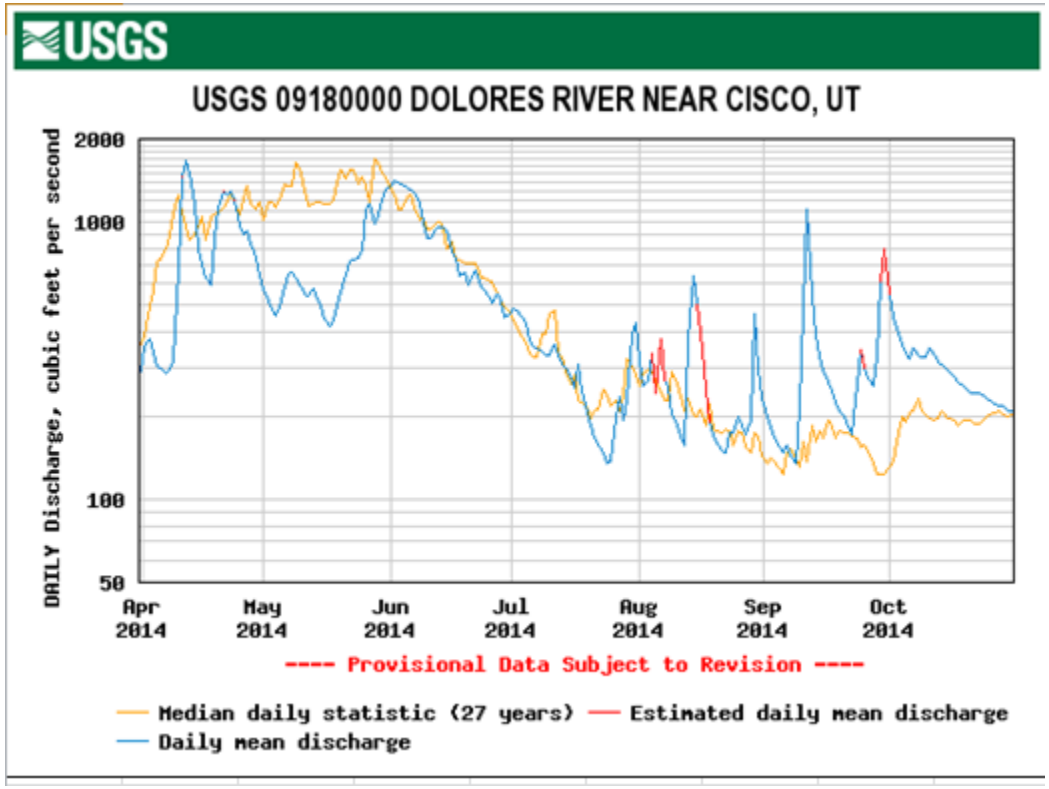
2014 (% snowpack)	Base Flow Target	2014 Aug-Oct AVG	% Avg	2014 Min.
Gunnison R. at Grand Junction (100%)	Mod Wet 1,500	1,806	120%	1,370



COLORADO RIVER ACTION PLAN: DOLORES RIVER

		ACTIVITY	WHO	STATUS	FY 15 10/14-9/15	FY 16 10/15-9/16	FY 17 10/16-9/17	FY 18 10/17-9/18	FY 19 10/18-9/19	OUT YEARS	Assessment of significant accomplishments (!) and shortcomings (X), (Focused on February 1, 2014 - January 31, 2015)
	III.	**REDUCE NEGATIVE IMPACTS OF NONNATIVE FISHES AND SPORTFISH MANAGEMENT ACTIVITIES (NONNATIVE AND SPORTFISH MANAGEMENT)**									
	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.						
	III.B.2.	Recovery Program needs to determine if nonnative fishes in the Dolores River basin pose a threat to endangered fishes and determine appropriate response.	CPW								***X*** Persistence and increasing numbers of smallmouth bass in the upper Dolores River raise concern that the Dolores may become an additional source for this invasive species in the Colorado River. Walleye are in McPhee Reservoir as well, but have not been captured downstream in the Dolores River in more than two decades of sampling. (Catches of walleye in the Colorado River are high near the confluence with the Dolores, but their origin is unknown.) In 2012, response options discussed with CPW, USBR and others to consider posible smallmouth bass removal action in 2012 or beyond (and propose action item(s) to be added to the RIPRAP in 2013). Lower Dolores River Monitoring, Implementation & Evaluation Plan (see http://www.americanwhitewater.org/content/Document/fetch/documentid/1068/.raw) contains objectives for nonnative fish monitoring and removal. Otoliths have been collected for analysis of spawning chronology (to relate to flow manipulation).
>*	III.B.2.a.	Reclaim Miramonte Reservoir.	CPW	Complete 2013							
	V.	**MONITOR POPULATIONS AND HABITAT AND CONDUCT RESEARCH TO SUPPORT RECOVERY ACTIONS (RESEARCH, MONITORING, AND DATA MANAGEMENT)**									
	V.A.	Survey native and nonnative fish in Dolores River (UDWR funding outside of Program).	UDWR/USBR/CPW	Complete							*!* Installation of two PIT antennaes in the Dolores River near Disappointment Creek and upstream of confluence with the Colorado River to monitor native fishes completed in 2014. UDWR completed surveys in 2013: high abundance of 3-species, 1 adult Colorado pikeminnow (observed), and 3 smallmouth bass.

Assessment: Dolores River Flows



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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 <u>both</u> 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. <u>Reduction of Negative Impacts of Nonnative Fishes and Sportfish Management Activities</u>: 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.