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Memorandum

To: Implementation/Management Committee, Consultants, and Interested Parties

From: Acting Deputy Regional Director, Mountain-Prairie Region (6), U.S. Fish and Wildlife Service

Subject: 2005—2006 Assessment of "Sufficient Progress" under the Upper Colorado River Endangered Fish Recovery Program in the Upper Colorado River Basin, and of Implementation of Action Items in the January 10, 2005, Yampa River Management Plan Programmatic Biological Opinion

I. "SUFFICIENT PROGRESS"

In accordance with the Section 7, Sufficient Progress, and Historic Projects Agreement, the U.S. Fish and Wildlife Service (Service) has reviewed 2005—2006 and cumulative accomplishments and shortcomings of the Upper Colorado River Endangered Fish Recovery Program (Recovery Program) in the Upper Colorado River Basin. Per that Agreement, the Service used the following criteria to evaluate whether the Recovery Program is making "sufficient progress" toward recovery of the four listed fish species:

- 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;
- status of the fish populations;
- adequacy of flows; and
- magnitude of the impact of projects.

The final April 11, 2006, assessment of recent accomplishments and shortcomings of the Recovery Program under the Recovery Implementation Program Recovery Action Plan (RIPRAP) is attached. Previous years' accomplishments and shortcomings are described in previous "sufficient progress" memoranda and outlined in the RIPRAP itself.

A. Status of the Species

Wild populations of Colorado pikeminnow and humpback chub have been studied since the 1960s, and population dynamics and responses to management actions have been evaluated since the early 1980s. It is anticipated that self-sustaining populations of razorback sucker and bonytail will be reestablished over the next 15 years, during which time population dynamics and responses to management actions will be evaluated. Regions 6 and 2 of the Service are collaborating to ensure a coordinated effort to achieve recovery in both the upper (including the San Juan River) and lower basins.

Significant changes in the status of the four species generally are not detected on a year-to-year basis. Closed-population, multiple mark-recapture estimators are being used (where possible) in the Upper Colorado River Basin to derive population point estimates for Colorado pikeminnow and humpback chub for tracking of population trends. The accuracy and precision of each point estimate is assessed by the Service in cooperation with the Recovery Program and in consultation with investigators developing the point estimates and qualified statisticians and population ecologists. Additionally, an evaluation of stocked razorback sucker and bonytail is ongoing, and an initial draft report was provided in July 2006.

To date, the Service has convened two workshops on population estimates. The first workshop was held in December 2001 to assess sampling protocols and data analyses and to recommend changes in methods to increase the reliability of population point estimates. Another outcome of that workshop was that numeric targets for capture probability and coefficients of variation were recommended to help evaluate confidence in the point estimates.

The second workshop was held in August 2004 to further assess, discuss, and understand the population point estimates and trends in population abundance and structure. An objective of that workshop was to begin discussions on environmental variables and life-history traits influencing population estimates and population dynamics. An *ad hoc* group of species experts reviewed information presented at the workshop and has prepared a draft summary report (with recommendations) that will be used to guide future research and management.

The most current estimates of the mean number of wild adult Colorado pikeminnow and humpback chub are shown in Table 1. These data indicate recent downward trends in the abundance of Colorado pikeminnow in the Green River subbasin and in the abundance of humpback chub in Black Rocks, Westwater Canyon, Desolation/Gray Canyons, Yampa Canyon and Cataract Canyon. These trends may be attributed to sustained drought conditions during 2000 through 2004 (water-year 2002 was the driest in more than 100 years) and increases in the abundance and distribution of certain predatory nonnative fishes. The recovery programs are taking research and management actions to reduce these impacts. Table 1 also provides a general overview of Colorado pikeminnow stocking in unoccupied reaches of the upper Colorado River subbasin, and stocking efforts to reestablish a population in the San Juan River. Table 2 provides a general overview of stocking efforts to reestablish razorback sucker and bonytail populations in the Upper Colorado River Basin (including razorback sucker in the San Juan River).

Table 1.—Summary of Colorado pikeminnow and humpback chub status (includes preliminary data and data in draft reports undergoing peer and Biology Committee review).

SPECIES	RIVER SYSTEM		
	MIDDLE GREEN	LOWER GREEN	UPPER COLORADO
Colorado pikeminnow	Estimates of wild adults ranged from about 2,300 in 2003 to about 3,100 in 2001. Final report on the Green River subbasin population was approved by the Biology Committee in 2005. Catch rates for young Colorado pikeminnow in 2004 were the highest since 1996 in the Green River. It is anticipated that this strong year-class will show up as subadult or adult fish in future estimates.		Estimates of wild adults ranged from about 450 in 1992 to about 870 in 2005. Under the 2003 integrated upper basin stocking plan (Nesler et al. 2003), 5,074 hatchery-produced subadults were stocked in 2003 and 2004 in unoccupied reaches.
	SAN JUAN: An estimate of about 20 wild adults was based on data collected in the early to mid-1990's. Stocking of juvenile fish is ongoing under the 2003 augmentation plan. Over 668,000 juveniles were stocked in 2002–2004, and about 300,000 juveniles were stocked in fall 2005. Survival of stocked fish has been documented.		
Humpback Chub	Yampa Canyon: Population is small, with an estimate of about 400 wild adults in 1998–2000. Sampling during 2003-2004 caught so few fish an estimate could not be made. The Recovery Program is considering bringing individuals caught in Yampa Canyon into captivity (initially as a research activity to determine the best methods for capture, transportation, and holding at two different hatchery facilities).	Desolation/Gray Canyons: Estimates of wild adults vary from about 2,000 in 2001, 2,200 in 2002, and 1,000 in 2003. Sampling in 2001 and 2002 was conducted in summer, whereas sampling in 2003 was conducted in fall. Final report on this population estimate was approved by the Biology Committee in July 2005.	Black Rocks Canyon: Estimates of wild adults vary from about 800 in 1998, 900 in 1999, and 500 in 2000 and 2003. Westwater Canyon: Estimates of wild adults range from about 4,700 in 1998 to 2,500 in 1999, 2000, and 2003. Cataract Canyon: Population is small, with an estimate of about 150 wild adults in 2003 to 66 in 2005.
	LOWER COLORADO, GRAND CANYON: 2,000–4,000 wild adults (not including the mainstem); methods being reviewed to improve estimate.		

Table 2. General overview of stocking efforts to reestablish razorback sucker and bonytail populations in the Upper Colorado River Basin (including the San Juan River for razorback sucker).

SPECIES	RIVER SYSTEM		
	MIDDLE GREEN	LOWER GREEN	UPPER COLORADO
Razorback Sucker	Since 1995, about 107,700 PIT-tagged razorback sucker subadults have been stocked in the Green and upper Colorado River subbasins. Of those, 45,694 were stocked under the 2003 integrated upper basin stocking plan (Nesler et al. 2003). Monitoring and evaluation of fish stocked in 2003–2004 is currently being accomplished through analysis of data collected in sampling conducted for other population estimates and nonnative fish management. Initial draft of the report to evaluate stocked fish was delivered in summer 2006 (and is now being updated to incorporate 2005 data).		
	Data from 1998–1999 suggested that about 100 wild adults remained at that time, with an estimated annual survival rate of about 70%. The population is being augmented through stocking, which has been expanded with excess fish stocked into selected floodplain depressions. Stocked fish in reproductive condition have been captured at spawning sites, and captures of larvae demonstrate that these fish are reproducing. Survival of larvae through the first year is evidenced by captures of juveniles.	Few wild adults have been captured in recent years. The population is being augmented through stocking.	Few wild adults have been captured in recent years. The population is being augmented through stocking. Larvae were collected in the Gunnison River in 2002–2005, demonstrating reproduction by stocked fish. Survival of larvae through the first year is evidenced by captures of juveniles. The detection of larvae is a direct result of spawning razorback sucker that have been stocked in the Gunnison River or have moved into the Gunnison using the Redlands Fish ladder.
	SAN JUAN: No estimate of adults is available. Stocking 1-year-old-plus fish (greater than 300 mm total length) is ongoing under the 2003 augmentation plan. Since 1994, about 12,650 subadults and adults have been stocked. Reproduction by stocked fish at separate locations has been documented through collection of larvae every year since 1998, and juveniles were found in 2002–2005.		
Bonytail	Since 1996, 265,000 tagged bonytail subadults have been stocked in the Green and upper Colorado River subbasins. Of those, 39,512 were stocked under the 2003 integrated upper basin stocking plan. Stocked bonytail have been recaptured at several locations throughout the upper basin. During September–November 2003, 16 stocked bonytail were recaptured in Cataract Canyon after about 1 year post stocking. Monitoring and evaluation of fish stocked in 2003–2004 is currently being accomplished through analysis of data collected in sampling conducted for other population estimates and nonnative fish control. Initial draft of the report to evaluate stocked fish was delivered in summer 2006 (and is now being updated to incorporate 2005 data).		

B. Accomplishments

Recovery Program participants accomplished several important objectives in 2005 and thus far in 2006, including:

- continued success of stocking efforts;
- completion of the Flaming Gorge EIS & ROD;
- research on floodplain habitats;
- continued progress on nonnative fish management;
- substantial progress toward completion of Elkhead Reservoir enlargement;
- continued augmentation of flows in the 15-Mile Reach; and
- completion of fish screens in the Grand Valley Project and Redlands Diversion canals.

Details of these accomplishments by subbasin or river follow.

The Service also recognizes the successful efforts of the non-Federal participants in the Recovery Programs to obtain an additional congressional authorization of $15 million for the Upper Basin capital construction program and a necessary extension of the timeframe for construction to 2010 (P.L.109-183). Although not a direct factor in sufficient progress assessment, this effort will allow completion of the capital projects in an orderly manner, which will be reflected in future assessments.

General (Upper Colorado River and Green River Subbasins)

- The Recovery Program's stocking efforts continue to produce positive results (see Table 2). Razorback sucker stocked in the middle Green River have been recaptured in reproductive condition at spawning sites, and recent captures of larvae suggest that these fish are reproducing. Razorback sucker stocked in the upper Colorado River subbasin also are being recaptured, and reproduction by razorback suckers stocked into the Gunnison River has been documented by the collection of larvae. Stocked bonytail are being recaptured throughout the upper basin; however, few of these recaptures have been at large for more than a year. A Bonytail Ad Hoc Group has been formed to determine if changes in the stocking plan are needed. An initial draft of a report to evaluate fish stocked under the Recovery Program's 2003 integrated upper basin stocking plan was delivered in summer 2006, and 2005 data are now being incorporated.

  Under the 2003 integrated upper basin stocking plan, 2005 stocking targets (numbers) were largely met or exceeded for bonytail (except that more bonytail were stocked in the Colorado River and fewer in the lower Green River than outlined in the plan). The stocking target for razorback sucker was exceeded for the Colorado River population, but high mortality at the Ouray National Fish Hatchery due to cormorant predation resulted in Ouray meeting only 49% of its middle Green River and 0% of its lower Green River razorback stocking goals

(Grand Valley Endangered Fish Facility met 85% of their target in this reach, however). Appropriate steps were taken to minimize future cormorant predation at Ouray, including netting all production ponds.

Green River Subbasin – Green River

- The Flaming Gorge EIS and revised biological opinion were completed in fall 2005 and the ROD was completed in February 2006. Operation of Flaming Gorge Dam to provide flows pursuant to the new biological opinion began in 2006.

- Research was successfully conducted during spring runoff in 2005 and 2006 in the middle Green River downstream of Jensen, Utah, to evaluate larval razorback sucker drift and entrainment into floodplain habitats, physical characteristics of restored floodplain sites, areal extent of floodplain inundation, and sediment deposition over the Escalante razorback sucker spawning bar. The primary purpose of this work is to determine how to entrain sufficient numbers of drifting razorback sucker larvae into suitable floodplain nursery habitats to recover the species in the Green River sub-basin. Factors affecting larval entrainment include mainstem flows and levee-breach parameters (i.e., invert elevation, width, orientation to main channel flows, etc.).

  In 2006, beads were released into the river approximately one mile upstream from each of three flow-through sites (Thunder Ranch, Stewart Lake, and Bonanza Bridge) to simulate larval drift and entrainment over a range of flows. At each Jensen flow, inflows were measured at selected inlets, and drift nets were set to capture beads. With only enough larvae available for release at one site, Thunder Ranch was selected as the highest priority for capturing drifting larvae at three targeted flows. Data analyses are currently underway. Results from 2005 and 2006 (report due in 2007) will help refine the relationship between Jensen flows and site inflows, bead entrainment, and larval entrainment.

  The Service appreciates the assistance of Reclamation and others in spring 2005 and 2006 to release additional water above power plant capacity from Flaming Gorge Dam to support the flow targets needed to conduct important razorback sucker and floodplain research in the middle Green River. Conducting this research clearly demonstrates the cooperation and commitment of Recovery Program partners.

- Northern pike management has proven successful in the Green River, as indicated by a decline in abundance since 2001(n=248; in 2002: 42; 2003: 22; 2004: 29; 2005: 37). Smallmouth bass population estimates could not be calculated for 2005 because of problems with tag retention; bass catch rates, however, were less than half of what they were in 2004 throughout the Green River. During 2005, young northern pike were encountered in the upper Green River near Brown's Park. Sampling is being conducted in the upper Green River in 2006 to determine the extent of this problem and to try to identify the source of these young pike. Any smallmouth bass encountered in this sampling are being removed and euthanized.

Green River Subbasin – Yampa River

- Construction to enlarge Elkhead Reservoir began in early April 2005 and is slated for substantial completion in November 2006 with final completion of minor topsoil and revegetation work in 2007. Installation of the fish screens on the outlet tower allowed screening up to 540 cfs of spring runoff to reduce nonnative fish escapement from the reservoir this year. When Elkhead enlargement is complete, the Recovery Program will have a permanent source of 5,000 af/year to augment base flows in the Yampa River with an option to lease up to 2,000 af/year of additional augmentation water. The fish screens will allow for enhanced recreational opportunities in Elkhead Reservoir (providing an off-stream fishery) and also allow Elkhead to serve as a viable place to translocate nonnative fishes removed from the Yampa River.

- Preliminary results for 2006 nonnative fish management are encouraging for the Hayden to Craig reach of the Yampa River. The northern pike population estimate for 2006 is ~718 (versus 1,748 in 2005 and 1,883 in 2004); 537 of these 718 fish were removed and relocated. The population estimate for smallmouth bass in this section of the river was 1,469 in 2004. Not enough bass were captured in 2005 (n=34) or 2006 (n=69) for population estimates.

  Smallmouth bass removal in the Craig to Dinosaur reach of the Yampa River was expanded from 17 river miles in 2005 to 39 miles in 2006, to help isolate the 12-mile treatment reach. Previously, as bass were removed from the treatment reach, other bass moved in from adjacent sections of river, making it difficult to detect a depletion effect resulting from removal, and making it difficult to elicit a positive response by small-bodied prey-sized fishes within slackwater habitats of the treatment reach. Northern pike captured in this section of the river were smaller than in previous years, suggesting a possible positive removal effect.

  In the Yampa Canyon reach, the population estimate for smallmouth bass in 2005 was ~25,000; for channel catfish ~86,000. To remove more fish from the river, population estimates (i.e., mark and release passes) were temporarily discontinued for 2006. Catch rates (or some other metric) will be used to monitor and evaluate removal efficacy.

Upper Colorado River Subbasin – Colorado River

- A target base flow of 1,240 cfs (average water year) was initially set in late June 2005 for the 15-Mile Reach; however, flows remained well above this target throughout July and the first half of August, making augmentation releases from reservoirs unnecessary until mid-August. The average flow in the 15-Mile Reach during the flow augmentation period of August 17 through November 3 was 1,415 cfs; without augmentation releases, the average flows during this period would have been 1,058 cfs. Daily average flows dropped below the flow target on 30 days during the 79-day flow augmentation period; without the augmentation releases, flows would have been below the target flows on 47 of the 79 days. A total of 53,177 af of water was released to support late-summer target flows in 2005: 31,200 af from Green Mountain (including water saved through the Grand Valley Water Management project);

17,163 af from Ruedi Reservoir; 1,000 af from Wolford Reservoir; and 3,814 af from Williams Fork Reservoir. The Highline Lake pumping station, the last component of the Grand Valley Water Management Project was completed in spring 2006. Reclamation is working on renewing (through 2012) the municipal recreation agreement which protects water released from Green Mountain Reservoir for the endangered fish.

Drought conditions from 2000 – 2005 prevented implementing the Coordinated Reservoir Operations Program (CROPS) or the Coordinated Facilities Operations Program (CFOPS) to enhance spring peak flows in the Colorado River. Although peak flows in 2003 and 2005 exceeded the 12,900 cfs CROPS threshold, other operating criteria were not met. However, in spring 2006, the criteria were met, CROPS was implemented, and approximately 1,800 cfs was added to the 18,000 cfs peak at Cameo. A total of 28,460 acre-feet of water was provided: 6,337 af from Ruedi Reservoir, 6,788 af from Green Mountain Reservoir, 8,989 af from Wolford Mountain Reservoir, and 6,346 af from Williams Fork Reservoir.

- To determine if floodplain habitats function as designed and constructed, the Bureau of Reclamation (Grand Junction Area Project Office) collected data at four sites on the Colorado and Gunnison rivers (Audubon, Walter Walker, Grand Junction Pipe, and Unaweep Charolais). Objectives are to determine inflows as a function of mainstem flows, to characterize post-runoff habitat and levee breach morphology, and to identify any potential problems and make recommendations. Thus far, sites appear to behave as designed, and no major problems have been identified.

- Trial runs of the fish passage on the Grand Valley Project Diversion Dam (completed in July 2004) were conducted in July and September 2005 and continue in 2006. During 2005 test operations, one razorback sucker, three humpback chub, and 2,861 other native fish used the passage. In 2006, the fish ladder is being operated for six 10-day periods between April and October. During the first 10-day period, 2,383 fish used the ladder, 86 percent of which were native fishes; 98 percent of the nonnative fishes were white suckers or sucker hybrids. Trial operations are being used to determine flow thresholds and other operational considerations. The passage will be fully operated after construction of fish passage at the Price-Stubb Diversion Dam (completion anticipated in 2008).

  The fish screen in the Grand Valley Project Diversion Canal was completed in summer 2005; the automation/SCADA system was installed in spring 2006. Reclamation is working to implement lessons learned from the Redlands screen at the Grand Valley Project and to determine minimum operating flows. The screen should be fully operational and automated by the end of 2006.

- The original isotope study to determine origin of largemouth bass in the Colorado River has been expanded and extended to include much of the Upper Basin. Samples of various species (e.g., centrarchids, northern pike, and channel catfish) are being removed and transferred to CDOW for isotope analyses to determine origin. Isotopic signatures are being

- obtained from samples collected from 11 different reservoirs located throughout the Upper Basin to determine if any of these reservoirs are major sources of problematic nonnative fishes into critical habitat.

  A two-pass mark-recapture population estimate of smallmouth bass in the Colorado River began in July 2006.

Upper Colorado River Subbasin – Gunnison River

- The fish screen in the Redlands Diversion Canal, completed and operated manually in 2005, is working well. Redlands has been working out problems/adjustments on the trash rake and trolley system, Reclamation has been working on the automation/SCADA system, and operation of the screen is now fully automated.

- Fish sampling had not been conducted on the Gunnison River for several years, so in conjunction with efforts to identify razorback sucker spawning sites beginning in 2006, the Biology Committee recommended sampling to determine if any nonnative fish problems may be emerging. No major problems were detected during the first sampling pass (26 green sunfish, 1 largemouth bass, 1 grass carp captured). Two additional trips are scheduled for late July and late August, 2006.

C. Concerns

The following concerns were expressed in the Service's memorandum in September 2005 assessing sufficient progress, and are retained here for continued emphasis:

- recent apparent downward trends in some Colorado pikeminnow and humpback chub populations;
- increases in smallmouth bass;
- long-term protection of instream flows;
- declines in Yampa River native fishes;
- operation of the GVIC fish passage and screen; and
- slow substantive progress on the Aspinall EIS.

Details of these concerns are listed below along with recommended action items (where applicable).

General (Upper Colorado River and Green River Subbasins)

- Initial population estimates indicate downward trends in the abundance of Colorado pikeminnow in the Green River subbasin and in the abundance of humpback chub in Black Rocks, Westwater Canyon, Desolation/Gray Canyons, Yampa Canyon, and Cataract Canyon. These populations are viewed as the foundations for recovery of the species.

ACTION ITEM (1): Principal investigators and the Program Director's Office should meet to further scrutinize initial population estimates, techniques, and environmental influences. Results and recommendations of population estimates and information developed by the workshop's *ad hoc* group will be used as guidance to determine the feasibility, efficacy, and implementation of additional data analyses to further understand environmental variables and life-history traits influencing the dynamics of Colorado pikeminnow and humpback chub populations (Research Framework Project #145: Phase I). Phase I of this project has been delayed. Principal investigators provided a status report at the October 3, 2006, Biology Committee meeting. The Phase I report is expected by early January 2007. Phase II has been initiated (Phases I and II overlap considerably). The principal investigators will provide an updated scope of work with current due dates. Results of this initial research will be used to refine hypotheses and direct management actions, and will facilitate work on Phase II in FY07.

- Results of sampling since 2003 indicate dramatic expansions in the distribution and abundance of smallmouth bass. Recovery Program biologists believe that smallmouth bass pose a great threat to native fishes, because they are opportunistic predators and have the potential to prey on and/or compete with different life stages of the four endangered fishes.

  Results of recent sampling indicate precipitous declines in native fishes in the Yampa River, which has long been considered one of the strongholds for native fishes in the Upper Colorado River Basin.

  The Service is encouraged by progress in implementing nonnative fish management actions, but remains very concerned about the impacts of problematic nonnative fishes on the endangered and other native fishes.

  ACTION ITEM (2): The Service will closely follow the effectiveness of nonnative fish management actions and the responses of the endangered and other native fishes. Data should continue to be reported annually, and necessary changes to nonnative fish management actions should be made in a timely fashion. Emphasizing this point, on October 6, 2006, the Implementation Committee issued a directive to thoroughly assess Yampa River nonnative fish control efforts and develop a stronger adaptive management framework to identify nonnative fish management actions of sufficient scale and intensity to achieve measurable native fish population responses in the shortest possible timeframe. Specific items requiring attention in 2006 - 2007 include:

  a. Complete development of criteria to determine the effectiveness of nonnative fish management actions. The Biology Committee is currently reviewing draft criteria for removal of Yampa River northern pike and smallmouth bass. These criteria should be finalized by the end of March 2007. Criteria need to be finalized for other parts of the Upper Basin in FY 07.

  b. Before stocking fish into the completed Elkhead Reservoir, finalize the State of Colorado's lake management plan for Elkhead Reservoir (a condition of the Yampa River

Management Plan PBO). Elkhead Reservoir construction needs to stay on schedule so that spring 2007 releases from reservoir outlets are fully screened. (Note: inflows in excess of the 540 cfs outlet capacity will be released via the spillway and not screened.)

Green River Subbasin – Green River

- The Recovery Program has made significant progress in providing flows for the endangered fish in the Green River through re-operation of Flaming Gorge. Now that the final EIS, ROD, and biological opinion on re-operation of Flaming Gorge Dam have been issued, year-round flows in the Green River need to be permanently protected.

  ACTION ITEM (3): In 1994, the Utah State Engineer established a policy making new water appropriations subject to the summer and fall flow recommendations in the Green River above the Duchesne River. With the completion of the Green River flow and temperature recommendations, biological opinion, environmental assessment and ROD, the next step is to protect flows in the Green River for the remainder of the year (November–June) downstream to Canyonlands National Park. The Service and staff from the Program Director's office met with Utah via conference call on November 14 to discuss the best approach and deadlines.

Upper Colorado River Subbasin – Colorado River

- GVIC fish passage and fish screen operations have occurred less frequently than anticipated. The structure to provide fish passage at GVIC has been in place since the late 1990's, but because of the difficulty of removing the stop logs, the passage has not been open very often. Improvements to the fish screen on the GVIC canal were completed in time for the 2004 irrigation season, but operational problems remained.

  ACTION ITEM (4): The Service is very pleased with the biannual meetings that have been held with Grand Valley irrigators, Reclamation, and Recovery Program staff to discuss operations of Grand Valley fish screens and passages, identify problems and solutions, and document operation expectations and plans (April and October 2005, April 2006). These meetings should continue and focus on ensuring operation of the facilities. Specific items requiring attention in 2006 - 2007 include:

  a. An Obermeyer gate for the fish passage has been delivered to the site, and is being installed (completion scheduled by the end of August 2006). This gate will allow the passage to be opened and closed remotely, and thus be operated on a regular basis. Meanwhile, GVIC has proceeded with installation of the associated hardware for the gate (e.g., compressor, 8'x8' shed, pipeline, electrical).

  b. The GVIC fish screen cannot be operated until retrofits are made to the festoon system (in particular). Reclamation is gaining experience operating the Redlands and Grand Valley Project fish screens in 2006, then will retrofit the GVIC fish screen in 2007. The Service requests that this screen be operational by the beginning of the 2007 irrigation season.

c. Reclamation and GVIC are again asked to provide more details in annual reports on operation and maintenance of the GVIC fish passage and fish screen, including dates of operation (or non-operation), problems encountered (reasons why the facilities were not operated as planned), remedial actions taken, and any recommendations to improve operational efficiency. (This type of information also should be included in the annual reports for other Grand Valley fish screens and passages once they are completed and operational.)

- The Recovery Program has made significant progress in providing flows for the endangered fish in the Grand Valley area, but the following actions still need accomplished:

ACTION ITEM (5): Complete actions to provide water to the 15-Mile Reach, specifically:

a. Complete the River District's requested 5,000 acre-feet (af) contract for water from Ruedi Reservoir as a backup to the Wolford Mountain Reservoir 5,412 af augmentation water so that a contract can be in place by the end of 2006. (Reclamation is currently conducting NEPA compliance on this contract).

b. Maintain improved communication among HUP participants to optimize cooperative management of the water available for the endangered fishes.

c. Secure permanent source(s) of the east and west slope portions of the combined 10,825 af commitment. The Service requests that water users expedite work on securing a permanent water source in order to meet the 2009 deadline in the Colorado River programmatic biological opinion for signing agreements regarding one or more permanent replacement sources of this water.

d. In years when implementation of CROPS is possible, efforts need to be made to expand augmentation of spring peak flows through CFOPS. This was the principal recommendation of the CFOPS Executive Committee. With the assistance of the State Engineer's Office and CWCB, the Service needs to conduct a legal review to identify reservoirs that could participate in CFOPS. The legal review needs to reviewed by reservoir owners for concurrence. Individual MOA's may be needed for participating reservoirs. The amount of water that could be released in the spring under CFOPS would depend on the size of an insurance pool that would be designated by the Service on or about May 5 of each year from existing base flow environmental pools in Ruedi, Wolford Mountain, and Williams Fork reservoirs. In years where augmentation could be expanded through use of CFOPS, the Service will review antecedent conditions, determine if additional augmentation is needed, and level of augmentation based on the size of the "insurance pool", and the terms for the MOAs. The Service believes that implementation of CFOPS in the spring of 2007 is a reasonable goal.

Upper Colorado River Subbasin – Gunnison River

- Re-operating Federal reservoirs to provide appropriate flow regimes for endangered fish is a very important element of the Recovery Program. Environmental compliance for re-operation of Flaming Gorge Reservoir and Navajo Reservoir has been completed. However, progress on environment compliance for re-operation of the Aspinall Unit has been very slow. The Aspinall Unit Operations EIS and section 7 consultation will examine operational changes to assist in meeting the flow recommendations for the endangered fishes. Together with other completed and ongoing RIPRAP activities, this will assist in the recovery of the endangered fishes[1]. We acknowledge that substantive progress on the Aspinall Unit Operations EIS has been time-consuming, in part due to the efforts Reclamation has made to involve the public and stakeholders in every cooperating agency meeting

  ACTION ITEM (6): By January 2007, Reclamation should provide an updated schedule for the Aspinall Unit EIS process. Reclamation should expedite the development of actions alternatives and continue appropriate hydrologic modeling. Key issues should be identified and discussions to resolve those issues initiated early in the process. Concurrent with other activities, Reclamation should develop the baseline environmental data needed to evaluate the impact of alternatives for the EIS early in the EIS process.

  In the interim period until the conclusion of the Aspinall Unit Operations EIS and issuance of the biological opinion, Reclamation, Service, and other cooperators should continue to work together to operate the Unit to assist in providing appropriate flow regimes for endangered fishes.

D. Conclusion ("Sufficient Progress")

Recovery Program participants need to actively pursue resolution of the foregoing concerns. The Service requests that regular progress reports on these items and their effect on meeting RIPRAP schedules be provided to the Management Committee. In order to support appropriate inclusion of recommended activities in annual Program budgets, the Service will make every attempt to provide the sufficient progress assessment in the early spring of each year beginning in 2007.

The Service is confident that with continued cooperation by all Recovery Program participants, the Recovery Program will continue to make significant strides toward recovery of the four endangered fishes. Based on evaluation of the status of the fish, provision of flows during

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[1] Reclamation has agreed to fulfill its obligations under the Recovery Program and under Section 7(a)(1) of the ESA by re-operating its reservoirs (e.g., Flaming Gorge Dam and the Aspinall Unit) to promote recovery of the endangered fishes. The September 29, 1987, framework document for the Recovery Program ("Blue Book") recognized that water resource development projects constructed by the U.S. Bureau of Reclamation may have significantly and adversely affected the endangered fishes and their habitats. Re-operation of major Federal facilities (e.g., Flaming Gorge and Aspinall Unit) to reduce or eliminate adverse impacts and contribute to recovery is a foundational principal of the Recovery Program and therefore tied to the Recovery Program's ability to continue to provide the reasonable and prudent alternatives to avoid jeopardy of historic and new water depletions. Alternatives for reoperation of Federal reservoirs will be examined through NEPA and Section 7 consultations.

drought periods, magnitude of depletion impacts, and cumulative Recovery Program accomplishments and shortcomings, the Service concludes that progress in the Recovery Program is sufficient to continue to provide the reasonable and prudent alternatives which avoid the likelihood of jeopardy resulting from depletion impacts of new projects that have an annual depletion of up to 4,500 acre feet[2].

Despite significant Recovery Program accomplishments, the Service is very concerned about recent downward trends in endangered fish populations. Accordingly, the Service strongly encourages all Recovery Program participants to remain attentive to the impacts of drought conditions and nonnative fishes on recovery of the endangered fishes, and continue to aggressively pursue management actions to alleviate threats to the species, including providing and protecting the necessary flow and habitat conditions (including evaluation of flow recommendations), and reducing the abundance of problematic nonnative fishes so these downward trends are reversed. On October 6, 2006, the Implementation Committee issued a directive to thoroughly assess Yampa River nonnative fish control efforts and develop a stronger adaptive management framework to identify nonnative fish management actions of sufficient scale and intensity to achieve measurable native fish population responses in the shortest possible timeframe.

II. IMPLEMENTATION OF ITEMS IN THE YAMPA RIVER PROGRAMMATIC BIOLOGICAL OPINION

On January 10, 2005, the Service issued a final programmatic biological opinion on the *Management Plan for Endangered Fishes in the Yampa River Basin.* Known as the "Yampa River Programmatic Biological Opinion (PBO)", the PBO determined that implementation of the *Management Plan for Endangered Fishes in the Yampa River Basin* would not likely jeopardize the continued existence of the endangered fishes. The PBO cites action items in the Program's Recovery Action Plan (RIPRAP) and charges the Recovery Program with the responsibility to ensure that these action items are completed and/or implemented. Page 74 of the PBO says: "In 2006 and every 2 years thereafter, for the life of the Recovery Program, the Service and Recovery Program will review implementation of the Recovery Action Plan actions to determine timely compliance with applicable schedules." The Service recently conducted this review (2006) in consultation with Recovery Program partners (see attached status report) and concluded that the Recovery Program is making sufficient progress in accomplishing most of the action items listed in the PBO. Although the schedule for some tasks has slipped, the PBO recognized this might happen. Page 73 of the PBO says: "The Recovery Action Plan is an adaptive management plan because additional information, changing priorities, and the development of the States' entitlement may require modification of the Recovery Action Plan. Therefore, the Recovery Action Plan is reviewed annually and updated and changed when necessary and the required time frames include changes in timing approved by means of the normal procedures of the Recovery

[2] The 15-Mile Reach programmatic biological opinion covers an average depletion of up to 1 million acre-feet per year of existing depletions (through September 30, 1995) and up to 120,000 acre-feet of new depletions (since September 30, 1995) in the Colorado River above the confluence with the Gunnison River. The Yampa River programmatic biological opinion covers an average depletion of up to 168,000 acre-feet per year of existing depletions and up to 53,000 acre-feet per year of new depletions.

Program, as explained in the description of the proposed action." If the circumstances surrounding changes in the Recovery Action Plan impact the listed species in a manner(s) not previously considered, reinitiation of the PBO may be needed.

The PBO review identified the following issues (identified in the attached table of action items), most of which are also discussed under Sufficient Progress (section I of this memo):

Nonnative Fish Management:

- Anchors for a potential spillway net on Elkhead Reservoir have not yet been installed. The Service understands that the spillway inlet channel has been redesigned to generate more clay material for the dam embankment and the potential of installing the anchors in a different configuration in the redesigned spillway channel "in the dry" is being explored and will probably be implemented.

  ACTION ITEM (7): The Service trusts that the anchors will be installed during construction of Elkhead expansion.

- The Colorado Division of Wildlife has drafted a lake management plan for Elkhead Reservoir which needs to be completed and approved.

  ACTION ITEM (8): It is anticipated that CDOW will finalize the Elkhead Lake Management Plan before spring of 2007.

Population Status

- As discussed in section I of this document, the Service is very concerned about recent downward trends in endangered fish populations, and as it relates to the Yampa River, especially the Yampa Canyon humpback chub population and recruitment rates in the Green River subbasin pikeminnow population. The Service's encouragement to continue to aggressively pursue reduction in the abundance of problematic nonnative fishes is particularly applicable in this regard considering the importance of these populations to the species overall status. The Implementation Committee's October 6, 2006, directive regarding Yampa River nonnative fish control efforts further emphasizes and responds to this concern.

Attachments

Finalized April 11, 2006

2005 RIPRAP ASSESSMENT

Significant accomplishments (!) and shortcomings (*X*) are flagged.

PAGE/ITEM #		STATUS ASSESSMENT
GENERAL RECOVERY ACTION PLAN		
22	IA3	Complete. In April 2005, the Biology Committee reviewed Rick Anderson's report, raised numerous questions regarding the application of this methodology to endangered fish flow recommendations, and declined to act on the report. The Service does not support adopting Anderson's methodology as *the* standard methodology for making flow determinations. Although this methodology may be a useful tool, each river reach is different, and the Service supports using the best data available at the time flow recommendations are made. The RIPRAP includes tasks to evaluate flow recommendations, which the Program is undertaking as part of its adaptive management approach. The Program does not currently have any requests for legal protection of instream flows before the Board.
22	IA4a&b	! Draft USGS data retrospective (begun in FY 04) submitted January 2006. This and USGS sediment monitoring at Jensen and Whitewater gages begun in 2005 will be used to guide development of a strategic design for geomorphic research and monitoring. Geomorphological panel met March 2005, reviewed data for USGS retrospective, and endorsed sediment work.
22	IIB1-3	*X* Progress on contaminants activities unknown. A memo will be sent to FWS-ES offices requesting annual reports on all contaminants-related RIPRAP actions.
>*23	IIIA1c&1	Program cannot fully evaluate hybridization between razorback and white suckers until we have more razorback suckers reproducing in the system (especially Yampa and Gunnison rivers).
>*23	IIIA2c	! Results of the 2005 nonnative fish management projects were reviewed at a December 2005 workshop, and appropriate revisions made to the scopes of work for 2006, including: determining nonnative fish presence and abundance in the Gunnison and White rivers; increasing nonnative fish management efforts in the Colorado River and conducting a smallmouth bass population estimate; evaluating the nature and magnitude of the northern pike problem in the Green River upstream of the Yampa; exploring upper basin reservoir operations to determine if they can be managed to minimize nonnative fish escapement; conducting additional isotope analysis to identify targeted nonnative fish sources; and increasing

nonnative fish management efforts in the Yampa River. In addition, the Program is investigating: the use of pheromones to attract northern pike; species-specific toxicants, transgenics as a nonnative fish management tool; gear and techniques to improve efficiency of mechanical removal; and flow management as means to reduce nonnative fishes. Colorado will continue to pursue the possibility of designating native fish conservation areas and also investigate the possibility of using rotenone to remove centrarchids from high concentration habitats such as isolated backwaters and beaver ponds along the Colorado River. To minimize fish injuries/mortalities during nonnative fish capture and translocation efforts, electrofishing boats will be standardized and fish handling protocol developed. Finally, the Program will continue to monitor response of native fishes to nonnative fish management activities.

I&E efforts continue and focus on press releases, communicating with elected officials, and coordinating public outreach with partner agencies.

23 IIIB6 The Program Director's office will submit a letter to the Service and the States recommending that the "Cooperative Agreement for Implementation of Procedures for Stocking of Nonnative Fish Species in the Upper Colorado River Basin" be extended. If any amendments are needed now or in the future, any signatory to the Cooperative Agreement may submit a written request to the other signatories and to the Recovery Program.

24 IVB&C ! *X* Hatchery production under the 2003 integrated stocking plan:

Hatchery	Species	Annual Production Target	Fish Stocked 2004	Fish Stocked 2005
Ouray	Razorback sucker	14,895	14,508	4,878[1]
Grand Valley	Razorback sucker	14,895	7,827[2]	15,876
Wahweap	Bonytail	10,660	9,700	10,574
Mumma	Bonytail	5,330	13,400	5,147
	Colorado pikeminnow	2,250	4,578	1,493[3]

[1] High mortality in hatchery ponds due to cormorant predation. Ponds are being covered with netting to prevent predation.

[2] Survival in leased grow-out ponds was extremely variable.

[3] These fish were stocked in the San Juan River. Until stocked Colorado pikeminnow distributions in unoccupied habitat are investigated by CDOW, stocking Colorado pikeminnow is on hold.

24 IVD2b ! Wahweap hatchery construction complete.

25	IVE1&2	Formal evaluation of data to determine stocking success and fish survival begun in 2005. Analysis of razorback sucker data near completion; limited information exists on bonytail and Colorado pikeminnow; final report in 2006.
25	VA1	Database being migrated to Microsoft Access to accomodate database size and future web access.
25	VB2	Two-phase "Research framework" study begun in 2005 to determine impacts of management actions on each species and life stage and identify any gaps. Phase one will be completed in 2006, and if needed Phase two begun (completion in 2007).
25	VIF	! Established interpretive exhibits with aquariums at Colorado River State Park's visitor center in Fruita, Colorado, the Ute Indian Tribe's headquarters in Fort Duchesne, Utah, and the Carl Hayden Visitor Center at Lake Powell in Page, Arizona. Also installed custom-shaped park benches with Colorado pikeminnow silhouettes at interpretive sites in western Colorado.

GREEN RIVER ACTION PLAN

27	IA2b2 IB2b	Flaming Gorge EIS and revised biological opinion completed in fall 2005 and ROD completed in February 2006; thus, assessment of legal and physical availability of water moved to FY 06 and needs to be a high priority item.
>*27	IA3a	! Flaming Gorge re-operated under the 1992 Biological Opinion through 2005.
27	IA3c	! EIS on reoperation to implement the revised flow recommendations completed in fall 2005; ROD issued in February 2006.
>*27	IA3d	Flaming Gorge EIS and revised biological opinion completed in fall 2005 and ROD completed in February 06, operation of Flaming Gorge Dam to provided flows pursuant to the new opinion to begin in 2006.
>*27	IA4a3&4 IB3c	Flaming Gorge EIS and revised biological opinion completed in fall 2005 and ROD completed in February 2006. Utah can begin to actively prepare and execute contracts with water users as required to subordinate diversions associated with approved and/or perfected rights or to evaluate effectiveness of this policy in 2006-07, and this should be a high priority item.
27	IA4b1&2 IB3a	Public meetings and appropriation policy not done in FY 05 (was awaiting completion of the ROD); should be high priority item for 2006-07.

27	IC2	*X* Price River flow recommendations still pending from UDWR (agency review draft now anticipated 9/06).
27	IE	San Rafael management plan not done; should be "to be determined" until demands known and need/scope for programmatic biological opinion determined. Krissy Wilson will forward Utah's report from the three species plan to George Smith.
>*28	IIA4	! Studies were conducted in the spring of 2005 to quantify razorback sucker larval drift and entrainment into Green River floodplain nursery habitats over a range of flows. Data analyses are underway, but preliminary results indicate that beads (larval surrogates) were entrained at all targeted sites, including a site 54 miles downstream from the razorback spawning area. In addition, inflows to nursery habitats were measured and floodplain connectivity as a function of flow was evaluated (Tetra Tech 2005) and aerial photos taken to quantify area of inundation as a function of flow. Three reports were finalized during FY 2005 (Christopherson et al. 2004, Brunson and Christopherson 2005, and Modde and Haines 2005). Study results in all cases suggest that larval razorback sucker and bonytail can survive in the presence of nonnative fishes in reset floodplain wetland nursery habitats.
28	IIB2b	Tusher Wash fish screen design will continue in 2007 and 2008 and construction will begin in 2008 and be completed in 2009.
>*28	IIIA4a	! Pike control in the Green River continues to be successful. Thirty-seven pike were removed in 2005. Twenty-nine northern pike were removed in 2004, 22 pike were removed in 2003, 42 pike were removed in 2002 and 248 pike were removed in 2001. Pike are beginning to show up in the upper Green River (above the Yampa) and work in 2006 will assess the extent of the problem.
>*28	IIIA4b2	! Except for the upper Green River, reliable estimates could not be derived for smallmouth bass populations in 2005 because of tag loss and insufficient recaptures of tagged fish. Based on catch-rate data, however, abundance of smallmouth bass in the Green River in 2005 appears to be 60 to 70 percent lower than it was in 2004. In the upper Green River, the population estimate in 2005 was 58 percent lower than 2004.

>29 IVA1c ! *X* Stocking under the 2003 integrated stocking plan:

Species	Hatchery	Stocking Location	Location Target	Numbers Stocked
Razorback sucker	Ouray	Middle Green	9,930	4,878
		Lower Green	4,965	0
	Grand Valley	Lower Green	4,965	4,243
Bonytail	Wahweap	Middle Green	2,665	3,400
		Lower Green	5,330	3,100

29 VB1 ! Report on Deso/Gray humpback chub population estimate finalized in 2005.

29 VC ! Report on estimate of Colorado pikeminnow in the Green River 2000-2003 finalized in 2005.

YAMPA/LITTLE SNAKE RIVERS

30 IA1f ! Colorado began operating a gage on the Williams Creek (tributary to the Yampa River), which the Program began cost-sharing in FY 06. This gage provides data to identify water from Elkhead Reservoir vs. natural flows.

>*30 IB2a1b No water was required from Steamboat Lake in 2005.

31 IC3 Little Snake flow recommendations are in draft (not a particularly high priority); need review by Program Director then Water Acquisition Committee.

31 IIA2a Deferred; however Program has solicited a proposal to evaluate entrainment into the Maybell and/or Duffey Tunnel Ditch beginning in late 2006 and continuing in 2007.

31 IIIA *X* Colorado has not yet revised the Yampa River Aquatic Management Plan (to be completed in spring 2006).

31 IIIA1a1 ! Miller report on nonnative fish escapement from Elkhead Reservoir completed (Miller et al. 2005). Future monitoring of escapement will be conducted via Yampa River nonnative fish management activities (through FY 07).

>*31 IIIA1a2 Program agreed to temporary screen on Elkhead spillway during construction and permanent screens on new outlets. Installation of the

temporary fish screen on the spillway of Elkhead Reservoir was completed on April 4. On April 16, the Program was notified that a portion of the screen had failed, and on April 22 received word that the remainder of the screen was clogged and ineffective.

The prearranged contingency plan (in the event of screen failure) for adjustments to nonnative fish management efforts in the Yampa River was implemented.

Elkhead conservation pool was maintained as low as possible through winter; CDOW sampled in November 2005 and may sample again prior to 2006 spring runoff. Tower outlet screens, which will screen 540 cfs (average peak flows are approximately 1,000 cfs), are now in place (in advance of 2006 spring runoff).

>*32 IIIA1b1 ! Northern pike abundance in 2005 was 9 to 28 percent lower than in 2004. During 2005, pike abundance was reduced by 58 percent. Report on Yampa River northern pike studies completed (Hawkins et al. 2005).

>*32 IIIA1c1 Catfish removal continued in Yampa Canyon with smallmouth bass removal; however both species remain very abundant (apparently more abundant than anywhere else in the upper basin).

>*32 IIIA1d Smallmouth bass abundance in targeted reaches was reduced by 8 to 42 percent except for Yampa Canyon where abundance increased by 13 percent from 2004 to 2005. Length-frequency shifted towards smaller fish from 2004 to 2005.

>32 IVA1a1 ! Stocking under the 2003 integrated stocking plan:

Mumma	Bonytail	Stocking Location	Location Target	Numbers Stocked
		Green (DNM)	2,665	2,580

32 VA Report on Yampa humpback chub population estimate in review; completion anticipated early 2006.

DUCHESNE RIVER

>*33 ID2, IE ! Duchesne work group formed and is actively pursuing options for providing water to meet flow recommendations.

33 IF&1 ! New gaging station established at Randlette in FY 05 (need for additional gages will continue to be evaluated). In FY 06, Program began funding Myton gage and replaced the cableway at Randlette gage. (Cableway was destroyed by high flows in 2005 and a heavier cableway needed for

suspended sediment monitoring. USGS provided cost-share).

33 IIIA3b — ! Starvation Reservoir spilled in 2005 and spillway escapement was quantified; draft report due April 2006. Preliminary data indicate escapement is limited.

>*33 IIIA3c — Flows were adequate to allow capture and removal of targeted nonnative fishes from the Duchesne River in 2005 (100 smallmouth bass and 61 channel catfish),

WHITE RIVER ACTION PLAN

34 IA — White River management plan not done; should be "to be determined" until demands known and need/scope for programmatic biological opinion determined.

34 III.B.1.a. — Assessment of management options completed in 2001.

COLORADO RIVER ACTION PLAN

35 IA3a,b — Data collection for depletion accounting report (as outlined in 15-Mile Reach PBO) ongoing by FWS and CWCB; CWCB is contracting to have accounting model updated; computer runs identifying depletion levels to be completed by 12/06.

35 IA4a3&b3 — ! Five-year periodic review of progress under the PBO done in FY as part of RIPRAP and related 2005 15-MR PBO assessment. (Implementation Committee approved Management Committee's recommended approach to defer instream flow filings on the Colorado River, for 5 years, contingent upon implementation of the programmatic biological opinion.)

>*35 IA5 — In water year 2005, snowpack was near normal most of the winter and most reservoirs were expected to just come short of filling. Unexpectedly, the runoff continued to build in the spring and most reservoirs ended up filling and spilling some water. The exception was Wolford Mountain Reservoir which has a south facing drainage area.

! During the late summer, flows in the 15-Mile Reach were monitored on a daily basis and weekly conference calls were held to coordinate releases from Ruedi, and Williams Fork Reservoirs. Because the late spring flows were high and remained high through July, an average-year flow target of 1,240 cfs was established in consultation with Service biologists. The flow target was met for much of the late summer and was only missed as the runoff played out in late August and reservoir releases could not be stepped up in time to offset the decline. The final accounting is yet to be completed, but preliminary estimates are that just more than 17,163 acre-

		feet of water was released from Ruedi, 3,814 acre-feet from Williams Fork reservoirs and 31,200 acre-feet from Green Mountain Reservoir under the municipal lease. No water was available from the Wolford 5,412 acre-foot West slope pool because of shortage criteria, but the River District did make 1,000 acre feet available as a gesture of good will. No water was requested from the 6,000 af fish pool in Wolford because water was being saved to help attain a fill in 2006 and the flow recommendations were being met from other sources.
35	IA5c	For times when 5,412.5 af from Wolford to meet West slope commitment is not available due to shortage criteria, CRWCD and Reclamation are making progress to provide a backup contract 5,000 af. from Ruedi (although this wasn't done by end of 2005 as requested in sufficient progress memo). Contract should be completed before October 2006.
35	IA5e1,2	*X* The September 14, 2005 sufficient progress memo requested that the draft report identifying options for a permanent source(s) of the east and west slope portions of the combined 10,825 af commitment be opened for further review and comment, finalized, and a schedule provided for selecting the preferred alternative(s) by the end of 2005. Water users will submit a plan for developing permanent sources of water by the end of 2006.
36	IA5i1	! Coordinated reservoir operations (CROS) implementation plan completed 2/28/06 in advance of 2006 runoff season.
36	IA5l3	! GVWM substantially completed in 2005.
36	IA6	! Review of RIPRAP and comparison with PBO schedules done in FY 2005 (in concert with RIPRAP assessment).
>*37	IB4c2	Annual coordination of Aspinall operation ongoing.
37	ID1&2	*X* Service still needs to determine if combination of Colorado and Green River flows below the confluence are adequate for recovery.
>*38	IIA6	Habitat restoration that was completed in 2004 (at Butch Craig, Audubon site, etc.) could not be evaluated in 2005 (due to higher-priority evaluation on the Green River); however, evaluation is planned for 2006. Habitat restoration at the Hot Spot Complex on hold pending identification of suitable growout pond alternatives (Hot Spot currently being used very successfully for growout of hatchery-produced razorback sucker).
38	IIB	! A meeting was held in April 2005 with Grand Valley irrigators, Reclamation, and Recovery Program staff to discuss operations of Grand

		Valley fish screens and passages, identify problems and solutions, and document operational expectations and plans. A follow-up meeting was held in November 2005 and another meeting is planned for spring 2006.
>*38	IIB1b3	*X* GVIC screen was not operated in 2005. Native and endangered fish were retrieved from canal by USFWS in November 2005. Modifications to GVIC screen may occur in 2006 (based on GVIC review of improvements incorporated in GVP and Redlands screens).
>*	IIB	*X* Price-Stubb fish passage construction not begun in 2005; anticipate awarding contract in 2006. Completion expected in April 2007.
>*38	IIB3a3&4	! Government Highline passage was successfully tested in June and September 2005; will be partially operated for further testing and evaluation in 2006 and fully operated after completion of Price-Stubb passage downstream in 2007. During 2005 test operations, 1 razorback sucker, 3 humpback chubs, and 2,861 other native fish used the passage.
>*38	IIB3b2	! Government Highline screen completed in August 2005. Operation anticipated beginning with 2006 irrigation season.
39	IIIA4a	! Preliminary results indicate that most younger centrarchids (age-0 to age-3) were produced in main channel habitats, as opposed to having escaped from floodplain ponds. However, almost 50 percent of age-4+ centrarchids escaped from ponds, likely during years when higher flows connected the ponds with the river. Draft report due in FY 2006. Additional isotope studies4 to determine if basin reservoirs are sources of problematic nonnative fishes will be conducted through FY 09.
>*39	IIIA6	Both catch and catch rates increased significantly for all targeted centrarchids in 2005, possibly because of increased capture efficiency and/or increases in species' abundance. Increased effort planned beginning in FY 06.
>*39	IIIB1a	! The fish barrier net installed in Highline Reservoir in August 1999 continues to operate successfully and is scheduled for replacement in FY 2006.

>39 IVA3&4b, IVA5b&6c ! Stocking under the 2003 integrated stocking plan:

Species	Hatchery	Stocking Location	Location Target	Numbers Stocked
Razorback sucker	Grand Valley	Upper Colorado	6,620	10,353
Bonytail	Wahweap	Lower Colorado	2,665	3,500
	Mumma	Upper Colorado	2,665	2,567
Colorado pikeminnow[1]	Mumma	Upper Colorado	1,250	0

[1] These fish were stocked to the San Juan River. Until stocked Colorado pikeminnow distributions in unoccupied habitat are investigated by CDOW, stocking Colorado pikeminnow is on hold.

39 VB1a,2&2a Population indices are contained in recovery goals; population monitoring is ongoing.

40 VC1 *X* Black Rocks population report is behind schedule, anticipate to Program Director's Office by May 31, 2006.

GUNNISON RIVER ACTION PLAN

41 IE ! Report completed evaluating feasibility of modifying Aspinall releases to increase water temperatures (Boyer and Cutler 2004).

>*42 IIA3 Evaluation of habitat restoration at Butch-Craig property planned for 2006.

>*42 IIB1c ! Redlands fish ladder is working for Colorado pikeminnow and native fishes. In 10 years of operation, 71 pikeminnow, 15 stocked razorback sucker, 1 stocked bonytail, and 70,800 other native fishes have used the passageway. Native and endangered fish comprise 84% of the total number of fish that have used the ladder. Nonnative fish are not passed above the diversion.

>*42 IIB1g2 ! Construction of Redlands screen completed in August 2005; currently being manually operated. Automation anticipated in 2006.

42 IIB2 Recovery Program will support NRCS interest and efforts to pursue removal of the Hartland Diversion "dam."

>43 IVA2&3b ! Stocking under the 2003 integrated stocking plan:

Species	Hatchery	Stocking Location	Location Target	Numbers Stocked
Razorback sucker [1]	Grand Valley	Gunnison	3,310	1,280
Colorado pikeminnow [2]	Mumma	Gunnison	1,250	0

[1] Numbers were reduced since the fish screen was not yet in place at Redlands Diversion; a limited number of fish were stocked into Butch Craig.
[2] These fish were stocked to the San Juan River. Until stocked Colorado pikeminnow distributions in unoccupied habitat are investigated by CDOW, stocking Colorado pikeminnow is on hold.

Recovery Actions in Yampa Mgmt. Plan PBO	RIPRAP Item #	Status	PBO Page #
LEGEND: Items in red are part of the Terms & Conditions in the PBO. RPM = Reasonable and prudent measure; CM = Conservation measure; T&C = Terms & conditions.			
The Recovery Program will provide an annual assessment of Yampa River recovery actions.	General: VIIA7	Done annually as part of RIPRAP assessment	RPM: 68
The Recovery Program shall provide an annual report on the status of recovery actions in the Green and Yampa River Basins. This will include a report on nonnative fish removal, its impact on the status of the four listed fish and plans for future management. Based on these annual reports, the Recovery Program will continue native fish monitoring in accordance with Colorado's Aquatic Management Plan and determine a native fish response. Non-endangered native fishes serve as a surrogate for endangered fishes as an indicator of aquatic ecosystem health.	General: VIIA7, IIIA2c; Yampa: IIIA1	The Recovery Program's annual report of recovery actions takes the form of the annual RIPRAP assessment, which feeds into the Service's review of sufficient progress. Nonnative fish removal is reviewed annually in a December workshop and then the next season's nonnative fish management actions are modified, as needed. SOW #140 to evaluate response of native fishes is ongoing through 2007.	T&C 7: 70
Provide and Protect Instream Flows			
Implement a base-flow augmentation plan on the Yampa River. (Implement augmentation protocol to meet flow recommendations through 5,000 af "Permanent Water Supply," and 2,000 af lease ["Shortterm Water Supply"] from enlarged Elkhead Reservoir).	Yampa: IB2a(2)(b)	Enlargement to be completed in 2006/2007, with water available in 2007.	CM: 8
The Service will notify CRWCD of its intent to lease water in accordance with a three-tiered schedule	Yampa: IB2a(2)(b)	This will begin when water is available 2007.	CM: 10
The Recovery Program will monitor all new water depletion projects over 100 AF/year to determine impacts to peak flows on the Yampa River.	See next row.	See next row.	RPM: 68
The Recovery Program will use the CRDSS hydrologic model to track and analyze all new water depletion projects over 100 AF/year to determine impacts to peak flows on the Yampa River in critical habitat. The Recovery Program will provide the results of the analysis to the Service.	Yampa: IB3d	First 5-year periodic review scheduled for FY 09-10.	T&C 1: 69
Manage Nonnative Fish Populations			
The Recovery Program will continue efforts to minimize the impacts of nonnative fishes on the four listed fish species.	See below.	See below.	RPM: 68
Implement the Nonnative Fish Stocking Procedures	Yampa: IIIB2	Ongoing.	CM: 12
The Recovery Program will screen Elkhead Reservoir to minimize escapement of nonnative fishes.	Yampa: IIIA1a(2)	Screens have been constructed on the outlet towers. A portion of the 2006 runoff was screened.	CM: 12
Prior to construction drawdown, screen existing outlet to prevent escapement of nonnatives through the outlet during draw-downs following spring runoff in 2005 and 2006. Divers will install rigid, wedge-wire screens with ¼-inch openings on the existing outlet prior to drawing down the reservoir.	Yampa: IIIA1a(2)	Done.	CM: 14
Prior to 2005 spring runoff, the existing spillway will be partially removed, effectively lowering the spillway crest elevation by about 19 feet. To prevent escapement of adult and subadult nonnative fishes, an 8-foot high, 85-foot long, ¼-inch mesh screen will be installed in the excavated channel leading to the spillway notch.	Yampa: IIIA1a(2)	A screen was installed in 2005, but it failed; nonnative fish removal was expanded in 2006 to compensate.	CM: 14
Following construction, operate controlled outlets in a manner which minimizes releases over the spillway. Up to 540 cfs will be discharged through the tower (450cfs) outlet and service outlet (90 cfs) during spring runoff. Flows over the spillway will occur only when inflows exceed 540 cfs.	Yampa: IIIA1a(2)	Installation of fish screens on the outlet tower allowed screening up to 540 cfs of spring runoff to reduce nonnative fish escapement from the reservoir in 2006.	CM: 14

Recovery Actions in Yampa Mgmt. Plan PBO	RIPRAP Item #	Status	PBO Page #
The Recovery Program will continue to monitor the escapement of fish from the spillway. The Biology Committee will develop criteria for an escapement threshold that would trigger a decision to screen the spillway and/or curtail stocking into Elkhead Reservoir.	Yampa: IIIA1a(1)	Criteria need to be developed after Elkhead enlargement Is complete (i.e., in 2007).	CM: 14
All controlled releases of water will be screened. This will include installation of ¼-inch wedge-wire screens on all three of the tower intakes and the service intake.	Yampa: IIIA1a(2)	The enlarged Elkhead Reservoir and screens should be fully operational by spring runoff 2007.	CM: 14
Anchors for a spillway net will be installed while the reservoir is drawn down for construction. Future installation of a spillway net will be considered based on results of spillway escapement monitoring and nonnative fish control efforts in the Yampa River.	Yampa: IIIA1a(2)	Anchors have not yet been installed. The anchors are in the current contract, but attempts to install them through the ice during winter 2006 were frustrated by the nature of the substrate. The spillway inlet channel has been redesigned to generate more clay material for the dam embankment and the potential of installing the anchors in a different configuration in the redesigned spillway channel "in the dry" is being explored and will probably be implemented.	CM: 14
New water storage projects that have a sport fisheries component will comply with the NNSP (e.g., screening to prevent escapement and/or stocking restrictions) in the project design and specifications, if these measures are warranted based upon location and connectivity with the river.	General: IIIB2	No new water storage projects currently proposed.	CM: 12
The Colorado Wildlife Commission approved removing bag and possession limits for northern pike statewide, and channel catfish , black bullhead (Ameiurus melas), walleye (Stizostedion vitreum), smallmouth bass, largemouth bass (Micropterus salmoides), green sunfish (Lepomis cyanellus), bluegill (L. macrochirus) and black crappie (Pomoxis nigromaculatus) in the Yampa and Green rivers in Colorado.	Yampa: IIIA1e	Complete	CM: 12
Remove and translocate northern pike and smallmouth bass	Yampa: IIIA1b&d	Ongoing (work expanded in 2006). Preliminary results for 2006 nonnative fish management are encouraging for the Hayden to Craig reach of the Yampa River. Smallmouth bass removal in the Craig to Dinosaur reach of the Yampa River was expanded from 17 river miles in 2005 to 39 miles in 2006, to help isolate the 12-mile treatment reach where fish response to bass removal is being evaluated. Northern pike captured in this section of the river were smaller than in previous years, suggesting a possible removal effect. Synthesis report due in FY 07.	CM: 13-15
Lethal removal of channel catfish and smallmouth bass from Yampa Canyon	Yampa: IIIA1c(1)&d	Ongoing. The population estimate for smallmouth bass in 2005 was ~25,000; for channel catfish ~86,000. To remove more fish from the river, population estimates (i.e., mark and release passes) were temporarily discontinued for 2006. Catch rates (or some other metric) will be used to monitor and evaluate removal efficacy. Synthesis report due in FY 07.	CM: 13-15
The Recovery Program will continue to coordinate a targeted public outreach program to inform local stakeholders of the nonnative fish management activities and to educate anglers.	See below	See below	RPM: 68

Recovery Actions in Yampa Mgmt. Plan PBO	RIPRAP Item #	Status	PBO Page #
The Recovery Program will strategically place and maintain signs and implement public outreach on the following: how to identify the endangered fishes; proper handling prior to and during release back to the river; and the legal ramifications for failing to exercise due caution and care with respect to these species. The Recovery Program will maintain an active public outreach program to inform local stakeholders of Recovery Program activities in the Yampa River basin.	General: VIC	Signs targeting anglers posted at key locations along the Yampa River include drawings of the fish & info. about returning them to the river alive. 05-06 outreach activities included continued communication with YRBP members and working with TNC's Carpenter Ranch to support educational programs related to the Yampa ecosystem. Program continued to proactively seek news media coverage, produced & distributed news releases, fact sheets, and Q&A's on nonnative fish efforts in the Yampa Basin. In 2005, the Program produced an info. card on endangered fish research that occurs in the Yampa River. Field crews distributed this card to boaters they met in the course of their work. Also in 2005, the Program helped update an exhibit at the Yampa SP visitor center about endangered and nonnative fish. In 2006, the Program continued proactive outreach efforts as described above and also hosted a community update on recovery activities in the Yampa River Basin, including Elkhead Reservoir expansion and nonnative management.	T&C 5: 70
Within one year of the issuance of this biological opinion (that is, by Jan. 10, 2006), the Recovery Program will develop criteria to determine positive or negative population responses for Colorado pikeminnow. When population estimates for wild humpback chub are finalized, they will be used to determine population response. These two species will serve as surrogates for bonytail and razorback sucker until population estimates for those species are possible.	Green: VC1&2; Green: VB1; Yampa: VA;Green: IVA1d; Yampa: IVA1b	The Biology Committee is reviewing draft criteria for removal of Yampa River northern pike and smallmouth bass. Currently, Yampa Canyon humpback population is very small: sampling during 2003-2004 caught so few fish that a population estimate could not be made. PD's office working with CSU to draft population response criteria for Colorado pikeminnow.	RPM: 68
The Yampa River has seen recent declines in populations of all native fish species. In 2006, the Recovery Program will examine the results of the ongoing native fish population response study and determine if there has been an increase or decrease in native fish populations in the Yampa River associated with ongoing nonnative fish control actions.	General: IIIA2c	Evaluation of effects of nonnative predator removal on native fishes in the Yampa River ongoing; final report due in 2007.	T&C 6.b: 70
The Recovery Program is conducting pikeminnow population estimates for 2000–2003 for the Green River subbasin. This includes population estimates for the Lower Green, Middle Green, White and Yampa rivers. These estimates will be used to determine existing conditions for the purposes of a population response. The Program is also conducting estimates of the Desolation-Gray and Yampa Canyon populations of humpback in the Green River subbasin. The next estimate will be conducted for the years 2006–2008. The population response criteria will use these population estimates to determine a positive response or a significant decline. Evaluations of stocked razorback and bonytail will be used to develop population criteria for these species.	Green: VC1&2; Green: VB1; Yampa: VA;Green: IVA1d; Yampa: IVA1b	Final report on the Green River subbasin Colorado pikeminnow population approved by the Biology Committee in 2005 (Bestgen et al): estimates of wild adults ranged from ~2,300 in 2003 to ~3,100 in 2001. However, catch rates for young pikeminnow in 2004 were the highest since 1996 in the Green River. It is anticipated that this strong year-class will show up as subadult or adult fish in future estimates. Sampling for the next estimate began in 2006. First draft of stocked razorback evaluation submitted to Biology Committee in July 2006; additional data analysis pending.	T&C 6.c: 70

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The Yampa River contains one of two major spawning areas for the Colorado pikeminnow documented by collection of larval fish. Any indication that reproduction has ceased to occur or has been significantly diminished in the Yampa River would be a factor in determining population response.	Green: VC1&2	Larval reproduction has been documented every year and sampling continues.	T&C 6.d: 70
Recruitment to the adult population is an important factor in determining population trends. Therefore, recruitment rates will be incorporated into the population response criteria.	Green: VC1&2	Bestgen et al (2005) suggested recruitment rates in the Green River subbasin pikeminnow population may not be sufficient to offset mortality rates of adults and that reduced abundance of recruit-sized Colorado pikeminnow may be due to weak year-classes of age-0 pikeminnow produced in nursery areas of the middle and lower Green River. However, catch rates for young pikeminnow in 2004 were the highest since 1996 in the Green River. PD's office working with CSU to draft population response criteria for Colorado pikeminnow.	T&C 6.e: 70
In addition, the status of nonnative fish populations will be used to assess the effectiveness of nonnative fish control activities in reducing the abundance of nonnative fishes, and the status of native fish populations will be used to assess any response of the native fish community to reductions in the abundance of nonnative fishes.	See below.	On October 6, 2006, the Implementation Committee issued a directive to thoroughly assess Yampa River nonnative fish control efforts and develop a stronger adaptive management framework to identify nonnative fish management actions of sufficient scale and intensity to achieve measurable native fish population responses in the shortest possible timeframe. See also below.	RPM: 68
One major element of the proposed action is to implement nonnative fish control measures in the Yampa River. Therefore the Service is anticipating a significant reduction in the nonnative fishes in the Yampa River, especially small mouth bass and northern pike. Data from the nonnative control program will be examined annually with the first data synthesis expected in 2006 to determine if there has been a depletive effect in nonnative fish populations in the Yampa River.	General: IIA2c1&2	Data reviewed annually in nonnative fish workshop. First data synthesis now expected in 2007. Preliminary 2006 results encouraging for the Hayden to Craig reach: 2006 northern pike population estimate is ~718 (vs. 1,748 in 2005 and 1,883 in 2004) (537 of the 718 removed and relocated). Smallmouth population estimate was 1,469 in 2004. Not enough bass captured in 2005 (n=34) or 2006 (n=69) for population estimates. Smallmouth removal in the Craig to Dinosaur reach expanded from 17 river miles in 2005 to 39 miles in 2006, to help isolate the 12-mile treatment reach where fish response to bass removal is being evaluated. Northern pike captured in this section were smaller than in previous years, suggesting a possible removal effect. In Yampa Canyon, smallmouth population estimate in 2005 was ~25,000; for channel catfish ~86,000. To remove more fish, population estimates (i.e., mark and release passes) were temporarily discontinued for 2006. Catch rates (or some other metric) will be used to monitor and evaluate removal efficacy. Synthesis report due in 2007.	T&C 6.a: 70

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CDOW is in the process of developing a Lake Management Plan for Elkhead Reservoir. The Recovery Program will ensure completion of a Final Lake Management Plan for Elkhead Reservoir, that has been approved by the Service, prior to stocking fish in the reservoir.	NA	Plan expected by the end of 2006.	T&C 4: 69
Restore Habitat			
Acquire and enhance floodplain habitats along the Green River		Ongoing.	CM: 15
Restore/maintain native fish passage at diversion structures		No remedial action is required to facilitate fish passage at any existing diversion structures, as currently constructed and operated.	CM: 16
Recovery Program will provide written guidelines for construction of any new/modified diversions and other structures in critical habitat on the Yampa River to facilitate fish passage and to minimize impacts inherent to their routine maintenance. Guidelines will describe specific parameters for fish passage, such as minimum depth and maximum slope/rise and velocity. The incremental construction cost, if any, will be borne by the Recovery Program if structures were in service on or before January 22, 1988, regardless of whether such modifications allow diversion of more water than they had historically. If structures were placed into service after January 22, 1988, the incremental costs of passage would have to be borne by the project proponents.	NA	Service needs to develop guidelines (using thresholds for passage as identified in Yampa Management Plan). Currently, no new/modified diversions proposed.	CM: 16
Evaluate/remediate entrainment of endangered fishes by diversion structures	See below.	See below.	CM: 16
CM: Develop plan to evaluate CPM entrainment in existing diversion canals. Plan will evaluate & minimize potential incidental take due to entrainment. RPM: Program will eval. level of incidental take due to entrainment of CPM by diversion canals within critical habitat on the Yampa. T&C: Program will develop plan to monitor the amount of take by 12/31/05, and add it to the RIPRAP. Specific implementation elements and timing will be determined in the plan. At minimum, and as an initial effort, assessment will involve survey of Maybell Canal, after the end of the irrigation season. Survey will evaluate take and, if any endangered fishes found, salvage surviving individuals and returning them to the river alive. Because endangered fishes are rare upstream from Yampa Canyon, other native species >300 mm in length may serve as surrogates. Rate of entrainment would be determined based on the number of individuals of endangered or surrogate species recovered from the canal versus an estimate of population densities in the river. Evaluation of take will include recommendations for minimizing	Yampa: IIA2a	Survey of Maybell Ditch scheduled to begin in fall 2006.	CM: 16; RPM: 68; T&C 2: 69
CM: If native fish are found to enter irrigation canals or other diversion structures, the Recovery Program initially will salvage any native fish found alive and return them to the river. Unless initial investigations establish that endangered fish do not enter the canals or enter only with very low frequency, the Program will develop a plan to remediate this potential problem, which could include annual fish salvage operations or installation of fish preclusion devices on the problem structure(s). RPM: If found appropriate in the evaluation, the Recovery Program will implement measures to reduce take at diversion canals within critical habitat on the Yampa River. T&C: If found appropriate in the evaluation and after approval by the Service, the Recovery Program will implement one or both of the following: i. Design and construct fish preclusion devices to prevent or reduce adult and subadult fish (>300 mm TL) from entering diversion canal(s).ii. Undertake annual fish salvage activities to recover any endangered fish that may be trapped in diversion canals and return these fish to the river alive.	Yampa: IIA2b	Pending results of evaluation.	CM: 16; RPM: 68; T&C 3: 69

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Manage genetic diversity/augment or restore populations			
CDOW developed a plan to stock bonytail in the Yampa and Green rivers in Colorado. This stocking plan was revised in 2001 (CDOW 2001). Restoring bonytail through stocking above Lodore Canyon on the Green River and within the lower reaches of the Yampa is a high priority for the CDOW. Stocking began in 2000, with a total of 23,000 juvenile bonytail stocked to date in the Green River near Brown's Park, Colorado, and in the Yampa River near its confluence with the Green River at Echo Park. Both sites are within Dinosaur National Monument (DNM), and stocking is carried out by the CDOW with the cooperation of the National Park Service (NPS).	Yampa: IVA1a1; Green: IVA1c	Since 1996, 265,000 tagged bonytail subadults have been stocked in the Green and upper Colorado River subbasins. Of those, 39,512 were stocked under the 2003 integrated upper basin stocking plan. Under the 2003 integrated upper basin stocking plan, 2005 stocking targets (numbers) were largely met or exceeded for bonytail (except that more bonytail were stocked in the Colorado River and fewer in the lower Green River than outlined in the plan). Stocked bonytail are being recaptured throughout the upper basin; however, few of these recaptures have been at large for more than a year. A Bonytail Ad Hoc Group has been formed to determine if changes in the stocking plan are needed.	CM: 17
The State of Utah stocks razorback sucker to the Green River below Split Mountain to supplement the Middle Green/Yampa population. This activity also is a high priority for the Recovery Program.	Green: IVA1c	Since 1995, about 107,700 PIT-tagged razorback sucker subadults have been stocked in the Green and upper Colorado River subbasins. Of those, 45,694 were stocked under the 2003 integrated upper basin stocking plan (Nesler et al. 2003). High mortality at the Ouray National Fish Hatchery due to cormorant predation resulted in Ouray meeting only 49% of its middle Green River and 0% of its lower Green River razorback stocking goals (Grand Valley Endangered Fish Facility met 85% of their target in this reach, however). Razorback sucker stocked in the middle Green River have been recaptured in reproductive condition at spawning sites, and recent captures of larvae suggest that these fish are reproducing.	CM: 17
Monitor Populations and Habitat			
The Recovery Program will monitor adult pikeminnow, razorback and humpback populations to ascertain the status of these populations (e.g., numerical abundance, age-class structure, evidence of recruitment), using standardized protocols. Larval sampling will determine whether and to what extent these populations are spawning. Survival of stocked fish also will be assessed. Endangered fish population data will be collected fortuitously during nonnative fish management activities; conversely, the status of nonnative fish populations also can be monitored in conjunction with endangered fish population surveys to make the most efficient use of the Recovery Program's limited resources.	See above.	See monitoring under nonnative fish management, in rows 28-29, above.	CM: 17

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A substantial decline in numbers of nonnatives fishes is presumptive evidence of a benefit to the endangered fishes; however, to confirm that nonnative fish management has, in fact, achieved the desired benefits for native species, it will be necessary to examine populations of the endangered fishes, and/or surrogate native species, such as roundtail chub and flannelmouth sucker, which suffer similar impacts due to competition and predation by nonnatives. An increase in their overall abundance, especially younger, smaller life stages, would be indicative of reproduction, larval survival, and potential recruitment into the adult populations, thereby allowing the endangered fish populations to become self-sustaining.	See above.	See monitoring activities discussed under nonnative fish management, in rows 27-29, above.	CM: 17-18
The Recovery Program will coordinate with the U.S. Geological Survey (USGS) to review and compile past data at the priority sites and begin collection of suspended sediment data at USGS stream flow gages on the Green River at Jensen, Utah, and on the Gunnison River at Whitewater, Colorado. Other sediment sampling stations will be added as additional funding becomes available. Based on the results of the USGS data the Recovery Program will design and implement a long-term basinwide habitat monitoring program.	General: IA4b; Green: ID	Sediment monitoring work began in 2005. A retrospective analysis of historic data was done for key sites on the Colorado, Gunnison, and Green River near Green River. Automated suspended-sediment samplers have been installed at the Whitewater gage on the Gunnison River and at the Green River near Jensen. In FY 06, USGS began developing a topological dataset and water-level elevation dataset sufficient for input into the Surface Water Modeling System (SWMS). USGS will complete a preliminary model analysis to demonstrate utility of SWMS and will create a sediment mobility model solution to help FWS evaluate flow recommendations for Flaming Gorge.	CM: 18