

I. Project Title: Tributary Basin Management Plans

II. Principal Investigator:

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III. Project Summary: This project is intended to address the contribution of other major tributaries (e.g., White, Dolores, Duchesne, Price, San Rafael) to recovery of the endangered fishes, to what extent these tributaries are covered by existing biological opinions, or whether and what additional management of these tributaries is needed in furtherance of recovery. If necessary, tributary basin management plan(s) would be developed to maintain and recover the endangered fishes of the Upper Colorado River Basin and protect other native fish and wildlife resources in the tributaries of the Colorado and Green river subbasins while water development continues to serve existing and foreseeable future human needs. A separate, ongoing planning process will be completed on the Yampa River in FY 2003, whereas a decision as to the Gunnison River will be made in FY 2003.

IV. Study Schedule:

Initial year: 2002
Final year: 2005

V. Relationship to RIPRAP:

General Recovery Program Support Action Plan
I.D. Develop tributary management plans

VI. Accomplishment of FY 2000 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

In June 2002, the Biology Committee requested that an issue paper be prepared to summarize biological, management and scheduling issues with regard to major tributaries of the Upper Colorado River Basin. The following responds to that request by providing an assessment of the potential contribution of major tributaries toward recovering the endangered fishes.

Tyus and Saunders (2001) rated a number of tributaries to the Colorado and Green rivers with respect to the tributaries' contributions to recovery (Table 1). They rated both their direct contributions (i.e., providing instream habitat for and/or supporting populations of the endangered fishes) and indirect contributions (i.e., providing flows and/or sediment to maintain occupied or potentially occupied habitats downstream from these tributaries). Tributaries were assigned values from 1 to 5 points for their direct contributions based on the number and abundance of endangered species' life stages. For indirect contributions, 1 to 3 points were assigned for each of five attributes (natural flow, annual flow, base flow, peak flow, and sediment), for a total of 5 to 15 possible points. Therefore, indirect values are not comparable to direct values, but direct and indirect values each are comparable across the different tributaries. Each tributary was ranked separately for its direct and indirect contributions, the first number being its overall, basin-wide rank, and the second its subbasin rank (Table 1). Although indirect values are always greater than direct values, direct contributions are considered to be more important to recovery than indirect contributions.

Table 1. Evaluation of tributaries' potential roles in recovering endangered fishes

	<u>Direct</u> ^d		<u>Indirect</u> ^e		Comments
	Value	Rank ^f	Value	Rank ^f	
Green River subbasin					
Yampa River	5	1 (1)	14	1 (1)	PBO imminent/flow recs;
Little Snake River	3	5 (3)	11	5 (3)	LSR flow recs pending
Tributary Green River ^{a,b}	4	2 (2)	6	7 (4)	Covered by Flaming Gorge BO
Duchesne River ^a	3	5 (3)	6	7 (4)	CRO proposed/flow recs
White River	3	5 (3)	12	4 (2)	PBO proposed/flow recs pending
Price River ^a	2	9 (7)	5	10 (6)	Covered by Narrows Project
San Rafael River	3	5 (3)	5	10 (6)	
Colorado River subbasin					
Tributary Colorado R. ^{a,c}	4	2 (1)	14	1 (1)	Covered by existing "15-mile
Plateau Creek	1	10 (3)	6	7 (4)	reach" PBO
Gunnison River	4	2 (1)	13	3 (2)	PBO proposed/flow recs pending
Dolores River ^a	1	10 (3)	9	6 (3)	Covered by Dolores Project BO?

^a Tributaries for which there are existing biological opinions

^b From Yampa River confluence upstream to Flaming Gorge Dam

^c Upstream from Gunnison River confluence

^d Based on number and abundance of species/life stages currently present

^e Points (1–3) assigned to each of five attributes (Tyus and Saunders 2001)

^f First number = overall rank; second number (in parentheses) = rank within its subbasin.

Several “tributaries” exhibit relatively high ratings for both direct and indirect potential contributions, notably the Yampa, “tributary” Colorado, and Gunnison. In addition to its direct contributions, the Yampa is largely responsible for the magnitude and natural shape of the spring hydrograph in the Middle Green River, as well. The combined flows of the Gunnison and Colorado mainstem upstream from the Gunnison maintain habitats in the Colorado River downstream to and beyond the confluence of the Green River, including the 18-mile reach, Westwater/Black Rocks, Professor Valley/Moab reach and Cataract Canyon. Their contributions to recovery have long been recognized, and these tributaries were assigned the highest priorities for development of programmatic biological opinions (PBO).

A PBO for the Colorado River was completed in December 1999, and a PBO for the Yampa is anticipated in 2003. The latter PBO will be responsive to a management plan for the Yampa River Basin that covers an increment of future depletions from the basin and provides a framework for recovery actions considered necessary and appropriate to offset depletion impacts. Base-flow recommendations have been adopted for the Yampa (Modde et al. 1999), which were used to quantify base-flow augmentation requirements in the Yampa management plan. Although numerical peak-flow recommendations were not developed for the Yampa River, the PBO will consider impacts of current and future depletions on the spring hydrograph to determine if proposed management actions sufficiently offset depletion impacts. Flow recommendations for the Little Snake River, the largest tributary to the Yampa, also are anticipated early in 2003. Although it provides only 28% of the average annual discharge of the Yampa River, the Little Snake River contributes 60% of the sediment to the Yampa River downstream from their confluence. This sediment helps create and maintain flood plain features (e.g., backwaters, oxbows, and flood plain depressions) in the Middle Green River that provide important nursery habitat for Colorado pikeminnow and razorback sucker.

The “tributary” Green River supports adult Colorado pikeminnow and razorback sucker and also has been recognized for its potential to provide habitat for bonytail and humpback chub (Tyus and Saunders 2001). The Colorado Division of Wildlife recently stocked bonytail in the Lodore Canyon reach of the Green River, as well as the lower Yampa (Echo Park) where they potentially could disperse into the Green. The tributary Green River also contributes volume to the spring hydrograph downstream from the Yampa River, especially significant in drier years, although the Yampa shapes the hydrograph in all but the driest years and provides greater peak volume in wetter years. Although Flaming Gorge Dam attenuates peak flows in the Green River, it can provide a higher level of base flows in late summer or during drier years when Yampa River flows typically are extremely low. Flow recommendations have been adopted for the Green River below Flaming Gorge Dam (Greendale) and at Jensen, Utah (Muth et al. 2000). The U.S. Bureau of Reclamation (USBR) is preparing an environmental impact statement (EIS) for Flaming Gorge Dam reoperation to meet these flow recommendations and currently operates the dam under a 1992 biological opinion (BO).

In 2002, the USBR began modeling Fish and Wildlife Service (FWS) draft flow recommendations for the Gunnison River, which we expect to culminate in an EIS/BO for reoperation of Aspinall Unit

dams (ca. 2005?). A PBO also has been proposed to address all depletions from the Gunnison River Basin. However, its development has been deferred, pending adoption of flow recommendations for the Gunnison and Colorado rivers, resolution of a 1933 reserve water right claim by the National Park Service for the Black Canyon of the Gunnison National Park, and quantification by the State of Colorado of an increment of future depletions from the Gunnison River Basin that would be the basis for the PBO consultation.

There had been a proposal to address depletions from the White and Dolores rivers in a single “tributary” PBO, following completion of the Gunnison PBO. Delays in the Gunnison PBO process prompted a request to accelerate the tributary PBO process to run concurrently with, or ahead of, the Gunnison process. However, it was agreed to defer completion of a tributary PBO until after a decision has been made as to the Gunnison, although some work (e.g., tributary demand estimates) could be completed concurrently with development of a Gunnison PBO. Moreover, the Program Director recommended that the Dolores River, tributary to the Colorado River, be considered with the Gunnison, rather than with the White as previously proposed, because it is geographically isolated from the White, and the Dolores Project BO requires the USBR to release water from the Aspinall Unit to offset Dolores Project depletions from the Colorado River.

The White River is the most significant tributary to the Green River downstream from the Yampa. Its average annual discharge at the Colorado-Utah state line (595,000 acre-feet) is less than half that of the Yampa but, like the Yampa, its hydrograph is relatively unchanged by large storage projects. Although depletions consume roughly one-third of the annual yield, storage capacity in the basin is only 3% of the annual discharge, resulting in greater impacts on smaller magnitude, high-frequency (>1 year in 5) floods and lesser impacts on larger magnitude, low-frequency (<1 year in 10) events (Schmidt and Orchard 2002). Its indirect contribution to recovery is significant, second only to the Yampa in the Green River subbasin. Its direct contribution is limited by Taylor Draw Dam near rivermile 100, which prevents access by Colorado pikeminnow to more than 30 additional miles of potential habitat; whereas razorback sucker are found only in the lower 20 miles of the river (Tyus and Saunders 2001). Flow recommendations for the White River have been submitted for peer and Biology Committee review (Irving et al. 2002). These recommendations could provide a basis for a management plan and subsequent PBO. For the purposes of a PBO, it may be worthwhile to consider including the Duchesne River with the White, given their geographic juxtaposition within the Green River subbasin. Proposed coordinated reservoir operations and recently completed draft flow recommendations for the Duchesne (Modde et al. 2002) could serve as a basis for a PBO.

The Price and San Rafael rivers rank last among the larger tributaries in terms of their indirect contributions to recovery. The Price River ranks next to last for its direct contribution, whereas the San Raphael is tied with the Little Snake, White and Duchesne for fifth basin-wide, third in the Green River subbasin. The question at this point is whether a PBO for the White and Duchesne should also address the Price and San Rafael, or whether one or both of these tributaries should be excluded from further consideration or deferred for consideration at a later time.

VII. Recommendations

1. Initiate a PBO process for the White River once the Gunnison PBO process is well underway. Include the Dolores River with the Gunnison River consultation (Project 113).
2. Revisit existing biological opinions (BO's) for Duchesne and Price to determine if they are adequately covered by these BO's.
 - a. An existing BO for the Duchesne River will be revised following completion of flow recommendations currently in draft. Therefore, inclusion of the Duchesne River in a tributary PBO may not be warranted.
 - b. The Price River also is the subject of a previous BO (Narrows Project). Therefore, it may already be covered and may not warrant inclusion in a tributary PBO.
3. Complete White/Duchesne flow recommendations reports (FWS).
4. Develop depletion estimates for White and Duchesne rivers (Colorado and Utah).
5. Incorporate the comprehensive, integrated approach to geomorphological research/habitat monitoring into PBO development for tributaries in the context of recovery.
6. Identify other tributaries whose contributions to recovery warrants development of management plans and/or PBO's. Consider inclusion of San Rafael and possibly the Duchesne and Price rivers in the same PBO with the White River, if warranted.

VIII. Project Status:

On hold, pending completion of Yampa River PBO and resolution of Gunnison River issues. Depletions estimates expected in 2004. Management plan(s), if needed, expected completion in 2005. Activities under any tributary management plan(s) would continue indefinitely, unless and until the Recovery Program elects to terminate them, the endangered fish are delisted, or the Recovery Program itself is terminated.

IX. FY 2001 Budget Status:

- A. Funds Provided: \$ 20,000 (placeholder for depletion estimates)
- B. Funds Expended: \$ 0
- C. Difference: \$ 20,000
- D. Percent of the FY 2002 work completed: 0%
Projected costs to complete: \$20,000 (FY 2004 SOW)
- E. Recovery Program funds spent for publication charges: \$0

X. Status of Data Submission: Not applicable.

XI. Signed: Gerry Roehm December 10, 2002
Principal Investigator Date

XII. References

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