I. Project Title: General Hydrology Support

II. Principal Investigator:

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III. Project Summary:

The Service's Division of Water Resources provides basic hydrology support to Recovery Program researchers and undertakes tasks to support the Recovery Program in basic data collection and monitoring projects. Accomplishments during FY 2004 include: 1) collecting temperature data at 10 sites on the Green River and four sites on the Gunnison River, and assembling a temperature database for use by Recovery Program researchers; 2) coordinating development of a sediment monitoring program; 3) providing technical hydrology support for a wide range of Recovery Program activities on a year-to-year basis; and 4) coordinating other Recovery Program efforts relating to hydrology and temperature analysis.

IV. Study Schedule: Initial Year - 1990, Final Year - Ongoing.

V. Relationship to RIPRAP:

General Recovery Program Support Action Plan
I.A.4.b. Conduct needed geomorphic research and monitoring.

Green River Action Plan: Mainstem
I.A.3. Deliver identified flows

Colorado River Action Plan: Mainstem
I.E. Evaluate and revise as needed flow regimes to benefit endangered fish populations.

Colorado River Action Plan: Gunnison River
I.D. Evaluate and revise as needed flow regimes to benefit endangered fish populations.
I.E. Initiate investigations of the feasibility of modifying releases from Aspinall Unit dams to increase water temperatures that would allow for upstream expansion of Colorado pikeminnow in the Gunnison River.

VI. Accomplishments of FY 2004 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

A. Temperature Data Collection

Temperature data collection went well during FY-2004. No thermographs were lost or stolen and very few data were lost due to thermographs being out of the water. We had a problem with the thermograph at Shepherd's Crossing, about 8 river miles below Craig, because someone had removed it from the river. However, replacement data were available from a nearby source. Because of low flows in the Gunnison River in 2004, we continued to have problems with the thermograph at the Redlands fish ladder being buried in mud. To solve this problem, we relocated the thermograph to the other side of the river. The new location near the Redlands diversion should improve the quality and continuity of the data.

We provided data to the biologist and consultants working on other Scopes of Work and related projects [George: Can you be specific? Who are they and what projects?]. Work included retrieving, reformatting and transmitting data. Routine temperature data collection continued in 2004; in addition, we prepared 2004 data for archiving and publishing on the web. The yearly process involves downloading data from the thermographs in the field in March, July, and October, graphically plotting the data, visually checking the data, and preparing presentation quality graphs using Excel spreadsheets. The spreadsheets are then web enabled and linked to the Riverdata web page. The temperature data can be accessed and downloaded from the River data web page at http://www.r6.fws.gov/riverdata/ or by email request from FWS Division of Water Resources (address above). An interactive map, included on the web page, displays the general location of each thermograph and links to temperature data for each of three rivers (Green, Yampa, and Gunnison). GPS coordinates for each thermograph are available by request; however, for security reasons the exact locations are not provided on the web page. We also completed organizing a strip-chart of temperature data collected between 1987 and 1992; data have been digitized and are available on the temperature web page in Microsoft Excel® format.

A new temperature monitoring project got underway in 2001 and continued in 2004 to monitor real-time water temperatures on the Green River at the Gates of Lodore and Echo Park above the Yampa River, and on the Yampa River at Deerlodge Park.

The Grand Junction CRFP office currently maintains thermographs at six sites on the Colorado River and one site on the Gunnison River. Current protocol calls for two thermographs per site to be installed at separate but closely spaced locations within each site so that backup data will be available if one should be lost or stolen. We continue to phase out older Onset StowAway® Tidbit® thermographs with 3-year batteries and replaced them with newer, cheaper devices with 5-year batteries and larger (32KB) data storage capacities.

Grand Junction CRFP continued data collection in 2004 and converted the raw 2-

hour interval data into daily means. In 2003 and 2004, the Grand Junction CRFP office has converted all their data to USGS standard page format and posted the pages to the Recovery Program Riverdata web site.

B. Hydrology Support for Biological Opinion Development and Monitoring

I monitor water releases from Flaming Gorge, Ruedi, and the Aspinall Unit for endangered fish during the spring runoff and post runoff period. I represented the interests of the Recovery Program at quarterly operational meetings, where I provided input on flow patterns and protection of water for endangered fish. I also provided support to researchers working on flow recommendations, management plans and related reports. Specific work accomplished is addressed under the appropriate work task below.

Green River: Attended Meetings of the Flaming Gorge Work Group and represented the Recovery Program at a public information meeting held in Vernal Utah. I will be providing the Recovery Program with an annual report on how the Flaming Gorge Work Group manages flow to implement the Flaming Gorge Biological Opinion.

Gunnison River: I continue to work with Reclamation and other water users in support of the Aspinall EIS process. I coordinated peer reviews of Gunnison River scopes of work for geomorphology work and provided peer review comments on the Gunnison River Transit Loss Study.

Colorado River: I presented a Powerpoint® presentation at the first annual meeting of Service hydrologists at the Service's National Conservation Training Center and answered questions about the Recovery Program. I worked with Recovery Program staff and CWCB to set up procedures and accounting methods for tracking depletions under the Colorado River Programmatic Biological Opinion (PBO).

Yampa River: I worked with Recovery Program staff in a support role to develop a working draft PBO for the Yampa River.

Duchesne River: I worked with Service staff and the USGS in Utah to implement testing of flow scenarios for the Duchesne River Biological Opinion (BO). I worked with the Program Director's office in reviewing the Duchesne River draft BO.

C. Hydrology Support for Development of Flow Recommendations

I spent a considerable amount of time to develop a Request for Proposal (RFP) for a habitat monitoring program for the Recovery Program based upon the findings of the Argonne (2004) study. The RFP was distributed to interested parties, three of whom submitted proposals in response to the RFP.

The three proposals were received and sent to the Geomorphology Peer review panel

for comments. The proposals and peer review comments were consolidated and presented to the Biology Committee in January. The Biology Committee along with Program staff reviewed the proposals and, based upon peer-review comments and a general discomfort with the proposals, a decision was made to defer the project until the objectives were better defined.

When the Habitat Monitoring program was deferred, a joint effort to begin collecting suspended sediment data was also re-evaluated. The end result was that at least 10 drafts of a scope of work were developed and evaluated by the Biology Committee and Recovery Program staff to insure that the objectives of the data collection effort were clearly defined. This effort took multiple months and considerable time and effort. The data retrospective effort finally got underway in late September 2004 after several contracting issues were clarified between USGS and Reclamation. The Recovery Program purchased automated sediment collection equipment which it transferred to USGS, so data collection can begin before spring runoff in 2005.

I continued to be participate in developing the Yampa Management Plan by reviewing documents and attending Hydrology Work Group meetings to provide historical perspective.

I continued work with Mike Carpenter and Ed Wick, retired Service volunteers, to maintain sediment bed load monitoring equipment on razorback sucker spawning bars near Jensen Utah and at the Echo Park bar,on the Yampa River in Colorado. Work included obtaining monitoring permits from the National Park Service, downloading data and maintaining the equipment put in place in 2001 and 2002. I also spent considerable time preparing a report to document the results of the work; the report is now under review by the Program Director's Office.

I continued work on developing flow recommendations for the Little Snake River. A draft report has been prepared and reviewed by the Program Director's Office.

VII. Recommendations:

The work undertaken by Service's Region 6 Division of Water Resources is, for the most part, in support of other research projects or activities such as flow delivery, flow quantification, and habitat restoration, all of which have a direct impact on the recovery of the Colorado River endangered fish. The direct quantification of the success of many of the activities is difficult because most of the activities are long-term in nature.

VIII. Project Status: Ongoing and on-track.

IX. FY 2004 Budget Status:

A. Funds provided: $ 76,500
B. Funds expended: $ 76,500
C. Difference: $ 0

X. Status of Data Submission: Not applicable.

XI. Signed: *George Smith* November 16, 2004
Principal Investigator Date:

APPENDIX: Reports, the temperature data collection, and database for water year 2004 are placed on the Recovery Program's Home Page for access by researchers within two weeks of collection, with the exception of data for the Colorado and Gunnison rivers, which is posted once a year.

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