

**FY-2002 PROPOSED SCOPE OF WORK for:**  
Hydrology Support for Biological Research

**Project #:**19B

Lead Agency: U. S. Fish and Wildlife Service

Submitted by: George Smith  
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<u>Category:</u>	<u>Expected Funding Source:</u>
<input type="checkbox"/> Ongoing project	<input checked="" type="checkbox"/> Annual funds
<input checked="" type="checkbox"/> Ongoing-revised project	<input type="checkbox"/> Capital funds
<input type="checkbox"/> Requested new project	<input type="checkbox"/> Other (explain)
<input type="checkbox"/> Unsolicited proposal	

I. Title of Proposal: Hydrology Support for Biological Research

II. Relationship to RIPRAP:

Green River Action Plan: Mainstem  
I.A.3.a Operate Flaming Gorge pursuant to biological opinion

Green River Action Plan: White River  
I.A.2 Identify year-round flows needed for recovery

Green River Action Plan: Yampa and Little Snake Rivers  
I.C.2 Identify year-round flows needed for recovery

Colorado River Action Plan Gunnison River  
I.A.2 Identify year-round flows needed for recovery

Green River Action Plan Duchesne River  
I.D.1 Determine feasibility and benefits of coordinate reservoir operations

III. Study Background/Rationale and Hypothesis:

This proposal represents a completion of Division of Water Resources activities that support ongoing research and monitoring activities. Activities are, for the most part, broken down by specific task with task descriptions, budgets, and deliverables.

IV. Study Goals, Objectives, and End Products:

To provide hydrology and temperature data to researchers and principal investigators, and to support the objectives of the Recovery Implementation Program (Recovery Program).

V. Study Area:

Colorado and Green River Basins.

VI. Study Methods/Approach:

The Division of Water Resources works as a service Bureau to the Recovery Program, providing hydrological and temperature information to program researchers. In addition to this work, there are a number of specific tasks (described below) that are undertaken in support of operational and research activities/venues of the Recovery Program.

VII. Task Description and Schedule:

A. Temperature Data Collection and Analysis:

In coordination with the CRFP offices in Grand Junction and Vernal, water temperature data will be gathered systematically to support the water temperature model and other research projects. Thermographs will be installed at four locations on the Gunnison River, five locations on the Colorado River, and eight locations on the Green River. The thermographs will be checked periodically and calibrated with on-site temperature readings. Temperature data collection on the Colorado River by CRFP was consolidated in this Scope of Work beginning in FY- 99.

The temperature data, together with climatic, hydrologic, and stream geometry data, will be used to support ongoing research and future stream network temperature model. An annual report will be prepared and presented at the annual research meeting and made available on the Internet. The temperature data along with the channel monitoring and sediment monitoring data will added to the Recovery Program Physical Data Repository.

One of the recommendations of the report "Recommendations for Endangered Fish in the Green River Downstream of Flaming Gorge Dam" is that temperatures in the Green River be maintained within levels which are advantageous to endangered fish. The report targets water temperatures of 18° C or greater for 2 to 5 weeks in upper

Lodore Canyon beginning at the onset of base flows. The report recommends that the temperature of the Green River be no more than 5° C older than the Yampa River at the confluence during the summer base-flow period to prevent cold shock to drifting Colorado pikeminnow larvae.

To achieve these recommendations, water released from Flaming Gorge will need to be managed and monitored closely at the dam and at various points along the Green and Yampa Rivers. This monitoring requirement has been recognized by the Upper Colorado River Endangered Fish Recovery Program. The FWS Division of Water Resources has been asked to establish a network of water temperature monitors which can be accessed on a near real-time basis. The monitors would need to be located at remote locations in Dinosaur National Monument and will require some type of special use or data collection permit. Temperature monitors would be located on the Green and Yampa rivers at the following locations

1. Lodore Boat Launch
2. Upstream of the Yampa confluence River left 1/4 mile
3. Below the Confluence of the Yampa River, river left in Mitten Park.
4. Yampa River 1/4 mile upstream confluence on River left.

B. Hydrology Support for Colorado River Biological Opinions:

The Water Resources Division will help in the coordination of releases from Flaming Gorge and the Aspinall Unit for endangered fish. Releases will be monitored and researchers and administrators will be notified of important changes in planned release patterns. The Water Resources Division will also be scheduling and monitoring releases from Ruedi and Wolford Mountain Reservoir for flow augmentation in the 15-Mile Reach.

Work will support activities of the Yampa River Management Plan and Programmatic Biological Opinion.

Work will support activities of the Gunnison River Management Plan and Programmatic Biological Opinion

C. Hydrology Support for Other Scopes of Work:

The RIPRAP identifies the need to develop or refine flow recommendations on almost every river segment in the Upper Basin with priorities for the Duchesne, White, Little Snake, and Gunnison. The Division of Water Resources will provide hydrology support for researchers working on developing flow recommendations for the Colorado River above the State line, and for the Gunnison, White, and Little Snake Rivers. Work will include developing information on historic flows, Section 7 baseline flows, and peak flows.

The Division of Water Resources will continue to participate in the team work finding solutions to issues relating to flow and channel capacity in the Fryingpan and Roaring Fork Rivers.

The Division of Water Resources will continue to operate stage recorder equipment purchased for the 1996 high-flow study at Ouray National Wildlife Refuge to help quantify flood levels and support the levee removal program. This data will also be used to continue the calibration of the FLO-2D model and provide real time data for two flood bottomland areas in the vicinity of Ouray Refuge. The work will also support FLO-2D analysis for the Flaming Gorge operations EIS.

The Division of Water Resources will provide technical and installation support for the deployment of sediment load sensors on the Green and Yampa Rivers. The project is described in a separate Scope of Work.

#### Study Schedule:

Work will be scheduled to match the dates set out in the RIPRAP and individual research schedules. Because most of the work is in response to other research objectives, a detailed schedule is not possible.

#### VIII. FY-2002 Work Deliverables Due Dates:

Due to the diverse components of the effort, there are limited defined deliverables. Most of the work is in support of other efforts that have specific products. Listed below are five deliverables that are direct products of the effort:

- A. A database of temperature data is assembled each year for each thermograph that is maintained by the Division of Water Resources. The data will also be made available on the Recovery Programs riverdata web page at <http://www.r6.fws.gov/riverdata/> Real time river temperature data from the Green and Yampa Rivers in Dinosaur National Monument will be made available online or by cell phone.
- B. Each year a report is generated documenting the releases from Ruedi and the Wolford Mountain reservoirs that describes release volumes, stages at various locations, and any observed benefits that the Biological Opinion releases have on endangered fish habitat.
- C. A report will be prepared that contains the hydrological data developed in support of flow recommendation development. This report will also include information on river stage and the contribution of the Yampa, White, and Duchesne Rivers to the water stage in Green River.

IX. FY- 2002 Budget

Task Breakout

A. Temperature Data Collection	\$28,000
Real Time Temperature Monitoring Equipment	17,500
B. Hydrology Support for BO's	11,000
C. Hydrology Support for Other Scopes	<u>16,000</u>
Total:	\$72,500

Task A

Cost Category	Cost/Wk.	Weeks.	Total
Principal Investigator	1900	2	3,800
Computer assistant technician	1700	6.5	11,050
Clerical & Accounting	890	3.5	3,115
Travel	650	2.4	1,560
Equipment			3,000
Supplies			17,000
Other (GJ CRFP for Temperature Work)			225
Task Subtotal			6,000
			45,000

Task B

Cost Category	Cost/Wk.	Weeks.	Total
Principal Investigator	1900	4.9	9,310
Computer Assistant technician	1700	0	0
Clerical & Accounting	890	0	0
Travel	650	1	650
Equipment			1,000
Supplies			0
Other			0
Task Subtotal			11,000

Task C

Cost Category	Cost/Wk.	Weeks.	Total
Principal Investigator	1900	7.0	13,300
Computer Assistant Technician	1700	0	0
Clerical & Accounting	890	0	0
Travel	650	3.5	2,275
Equipment			1,000
Supplies			0
Other			425
Task Subtotal			0
			16,000
			Total: 72,500

IX. FY- 2003 Budget

Task Breakout

A. Temperature Data Collection	\$32,000
Real Time Temperature Monitoring Equipment O&M	4,500
B. Hydrology Support for BO's	12,000
C. Hydrology Support for Other Scopes	<u>17,000</u>
Total:	\$65,500

Task A

Cost Category	Cost/Wk.	Weeks.	Total
Principal Investigator	1976	2	3,952
Computer Assistant	1768	8	14,144
Technician	915	3.5	3,205
Clerical & Accounting	675	2	1,350
Travel			3,000
Equipment			4,500
Supplies			350
Other (GJ CRFP for Temperature Work)			6,000
Task Subtotal			36,500

Task B

Cost Category	Cost/Wk.	Weeks.	Total
Principal Investigator	1976	5	9,880
Computer Assistant	1768	0	0
Technician	915	0	0
Clerical & Accounting	675	1	675
Travel			1,000
Equipment			0
Supplies			445
Other			0
Task Subtotal			12,000

Task C

Cost Category	Cost/Wk.	Weeks.	Total
Principal Investigator	1976	7	13,830
Computer Assistant	1768	0	0
Technician	915	0	0
Clerical & Accounting	675	2	1,350
Travel			1,000
Equipment			200
Supplies			120
Other			0
Task Subtotal			17,000
			Total: 65,500

IX. Budget Summary:

FY- 2002	\$ 72,500
FY- 2003	\$ 65,500

X. Reviewers: Mike Carpenter USGS

APPENDIX A THERMOGRAPH LOCATIONS

<u>Yampa River</u>	<u>River Mile</u>
Craig	128
Milk Creek Dirt Road	119
Juniper Springs Bridge	92.8
Yampa Green Confluence	0.5

<u>Green River</u>	<u>River Mile</u>
Browns Park Refuge	367
Mitten Park	343
Jensen	301
Ouray Refuge	258
Green River (Discontinued 1993)	120
Mineral Bottom Boat Ramp	52
Anderson Bottom	32.5

<u>Gunnison River</u>	<u>River Mile</u>
Below Crystal Reservoir	100
Below Confluence with North Fork	71.6
North Fork above Confluence with Gunnison	.1
Uncompahgre above Confluence with Gunnison	1.5
Johnson Boys Ranch	42
Redlands Fish Ladder	2

Colorado River Maintained by Grand Junction Colorado River Fisheries Office

	<u>River Mile</u>
Rulison Bridge	230
Palisade 35 Rd.	182
Walker Wildlife Area	164
Cisco above Delores	98
Gold Bar near Moab	54