

**COLORADO RIVER RECOVERY PROGRAM  
FY-2010-2011 PROPOSED SCOPE OF WORK for:  
(Recovery Program Hydrology Support)**

**Project No.: 19 Hydro**

Lead Agency: FWS Division of Water Resources  
Submitted by:

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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:** Recovery Program Hydrology Support

**II. Relationship to RIPRAP:**

General Recovery Program Support Action Plan:

I.A. Evaluate methods for defining habitat-flow needs and select methods most appropriate to specific stream reaches.

Green River Action Plan: Mainstem

I.A.3.d. Operate Flaming Gorge Dam to provide winter and spring flows and revised summer/fall flows, pursuant to the new Biological Opinion.

I.A.4., I.B.3. Legally protect identified flows.

I.D. Evaluate and revise as needed, flow regimes to benefit endangered fish populations.

ID1d, Determine relationship of backwater development to sediment availability and peak flows in Reach 2.

Green River Action Plan: Yampa and Little Snake Rivers

I.A.1.f Install, operate, and/or maintain stream flow monitoring gages.

I.B.2.a.2.b. Deliver Elkhead Reservoir Releases

Green River Action Plan: Duchesne River

I.D.1 Determine feasibility and benefits of coordinated reservoir operations.

I.F. Determine need and feasibility of additional gageing.

I.G. Evaluate and revise as needed, flow regimes to benefit endangered fish populations.

Green River Action Plan: White River

I.A. Assess need for tributary management plan for the White River.

I.F. Evaluate and revise as needed, flow regimes to benefit endangered fish populations.

### Colorado River Action Plan

I.A.3.a. Collect data for 15-MR PBO depletion accounting.

I.A.3.b. Develop Consumptive Use and Loss report for CRDSS model

I.A.5. Provide and legally protect instream flows pursuant to Colorado River PBO

I.A.5.a. Deliver Ruedi flows to 15-Mile Reach

I.A.5.h. Deliver Wolford Mountain flows.

I.A.5.i.2. Coordinated Reservoir operations (CROPS)

I.A.5.m.2. Coordinated Facilities operations (CFOPS)

I.A.6. Review implementation of RIPRAP items to determine timely compliance with applicable schedules (every 2 yrs. beginning in 2003).

I.B.4.c.2. Continue annual coordination (meeting 3 times/year) of Aspinall operation until biological opinion complete.

I.E. Evaluate and revise as needed, flow regimes to benefit endangered fish populations.

### **III. Study Background/Rationale and Hypotheses:**

This proposal represents Division of Water Resources activities that support the Program Directors office, river temperature monitoring and 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, End Product:**

**Study Goal:** To support, identify, evaluate and protection of instream flows to benefit Colorado River endangered fish.

#### **Study Objectives:**

1. To negotiate contracts and leases of water for endangered fish.
2. To collect temperature and hydrological data in support of Recovery program research priorities.
3. To provide water management services to the Recovery Program and Service to manage water the Service has secured for endangered fish augmentation.
4. To provide staff support to the Recovery Program Directors Office on an as-needed basis in the area of instream flow identification, delivery and protection.

### **V. Study Area:**

The Colorado and Green River Basin above Lake Powell.

### **VI. Study Methods/Approach:**

The Division of Water Resources provides hydrological and temperature information to Recovery Program researchers. In addition to this work a number of specific tasks (described below) are undertaken to support instream flow protection of the Recovery Program.

**VII. Schedule: Tasks will be completed between October 1, 2010 and September 30 2011**

**VIII. FY 2010 and 2011 Tasks:**

Task 1. 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 were installed at five locations on the Gunnison River, five locations on the Colorado River, and five 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 and a separate budget table is included for this work, the information for these gages can be found at:

<http://www.r6.fws.gov/riverdata/>

The temperature data, together with climatic, hydrologic, and stream geometry data, will be used to support ongoing research and future river temperature modeling and backwater studies. The temperature data from each of the thermographs will be made available on the Internet shortly after the data is collected. The temperature data along with the channel monitoring and sediment monitoring data will added to the Recovery Program Physical Data Repository.

Task 2. Hydrology Support for Colorado River Biological Opinions:

The Water Resources Division will help coordinate 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 schedule and monitor releases from Ruedi, Williams Fork 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 in managing the water from Elkhead Reservoir in 2010 and 2011.

Colorado River PBO periodic review of Progress; the Division of Water Resources will continue to work with the staff of the Recovery Program and the Colorado Water Conservation Board which began in 2007, and will be revisited in 2009 to monitor progress under the PBO.

Tabulate the requirements of the Flaming Gorge BO/ROD/Study Plan (like the spreadsheets for 15MR PBO and Yampa PBO). Add to 2011 a review of terms & conditions of BO (e.g., gaging adequacy, temperatures, etc.) and UCREFRP's involvement.

In the event that the program decides to move forward with PBO's on other tributaries, support will be provided to the Program Directors office in attending meetings and preparing position statements relating to these PBO's.

Continue to update and promote the PIT tag/GIS database.

Task 3. Hydrology Support for Other Scopes of Work:

Coordinated Reservoir Operations- Assistance will be provided to Bureau of Reclamation in implementing the annual coordinated reservoir program. A monitoring program will be developed to identify the habitat benefits of coordinated reservoir activities. Work will be coordinated with the Loveland and Grand Junction offices of Bureau of Reclamation, Denver Water, CWCB, and the State Engineer. Activities will include: representing the Service at coordinated reservoirs work group meetings, assisting in scheduling public meetings, reviewing press releases, representing the Recovery Program at public meetings, monitoring runoff, and participating in scheduling reservoir releases to enhance peaks.

The Division of Water Resources will continue to work with USGS in support of support Scope of Work for sediment monitoring. The work will include providing technical and installation support for the deployment of suspended sediment sampling sensors on the Green, Gunnison and Duchesne River.

The Division of Water Resources will work with whoever is selected to conduct of integration of sediment movement information with river habitat development and maintenance of river habitats in Reach 2. Work will also include help in the development of a synthesis report that addresses the following hypotheses and information needs, and identifies the need for additional studies. Work will entail periodic meetings with contractors to review suspended sediment sampling work group and guide the development of a synthesis report.

Task 4. Gage Installation and Maintenance

The Division of Water Resources will continue to work with the U.S. Geological Survey, Bureau of Reclamation, and Colorado Division of Wildlife to maintain the current gage at the head of the 15-Mile Reach of the Colorado River and two gages at Deerlodge Park on the Yampa River. Work will continue on the development and coordination of agreements with the Central Utah Water Conservancy District and USGS for the operation and maintenance of two gages located on the Duchesne River and a temperature probe to be installed on the Jensen gage. Work with the USBR Central Utah Water Conservancy District to maintain a USGS gage at Woodside on the Price River.

Task 5 Hydrology Support for the Water Acquisition Committee and Water Right Acquisition

The Division of Water Resources will continue to support the Water Acquisition Committee in water right investigations as originally envisioned by the Recovery Program. The task requires working with willing sellers and potential leasers to gather information and acquire water rights. This task has become less important recently as water right acquisition has been given less priority and optimization of existing facilities has become the focus of the Water Acquisition Committee. The tasks listed below support the expanded mission of the Water Acquisition Committee.

Developing scopes of work for water rights evaluations by the water right consultant, and overseeing contract administration, consultant supervision, and review of the consultant's work.

Coordinating conservation flow releases from Elkhead Reservoir with the River District, the City of Craig and the Colorado Water Conservation District. Work will also continue on providing annual reports on the delivery and benefits of flows from Ruedi and Wolford Mountain reservoirs.

The PD's office and Jana Mohrman will continue to support the Utah ES Field Office in their involvement on the Flaming Gorge Technical Work Group. In the 2011 SOW, Jana needs to include gages and evaluating the temperatures.

Preparing scopes of work and annual reports for projects in support of Water Acquisition Committee activities. Annual reports will be submitted to the Recovery Program Directors Office in November of each year.

Task 6. General Support Activities:

The Division of Water Resources will participate in technical discussions with the CWCB staff in an effort to clarify and quantify the Service's instream flows for endangered fish. The work will include attending meetings, reviewing reports, providing comments, and reporting back to the Service and the Water Acquisition Committee. This effort supports the flow filings outlined in the RIPRAP.

The Division of Water Resources will represent the Service and the Recovery Program as one of the "HUP managing Entities" which was set up to implement the Orchard Mesa Check settlement. Work includes attending annual kickoff and wrap-up meeting in Grand Junction and participation in weekly conference calls beginning early in July and ending when irrigation ends in November. Each week river flows must be tracked, flow targets coordinated with Service biologists and recommendations made on how best to release reservoir water secured by to Recovery Program to meet targets and provide benefits to endangered fish.

The Division of Water Resources will participate in updating the RIPRAP, developing Program Guidance and other activities in support of the Program Directors office.

Task 7. Fish Capture GIS

- Upload up to date Colorado Pikeminnow , Humpback Chub and Bonytail capture data to the GIS
- Set up an procedures so that CRFP offices to user upload of new capture data via web interface
- Integrate river flow and water temperature data (both FWS and USGS) with capture date

## VIII. FY- 2010 Deliverables:

Given the diverse nature of the work involved, some deliverables are hard to specify. Annual progress reports will be prepared for the Recovery Program. In addition to the Program reports, annual reports will be prepared documenting Ruedi releases and gage operation with the appropriate data. Documents such as appraisal reports, water rights evaluations, and reports of the water rights consultant and other reports under the supervision of the Division of Water Resources will be packaged and submitted to the WAC for consideration. Preliminary findings summarized in annual report to Program- December 2006 will be produce for use in developing annual Program Guidance

Deliverables that are direct products of the tasks outlined above include:

- 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 Colorado from the USGS:

[http://waterdata.usgs.gov/co/nwis/current/?type=qw&group\\_key=basin\\_cd](http://waterdata.usgs.gov/co/nwis/current/?type=qw&group_key=basin_cd)

- Each year a report is generated documenting releases from Ruedi and Wolford Mountain reservoirs that describe release volumes, stages at various locations, and benefits that the Biological Opinion releases have on endangered fish habitat.
- A report will be prepared as necessary to document work on flow recommendations implementation. The Division of Water Resources will continue to coordinate the reviews by the Geomorphology Peer Review Panel, serve as Chairman of the Water Acquisition Committee, develop annual updates to the RIPRAP, coordinate scopes of work, develop meeting agendas, distribute meeting material, and conduct meetings.
- Reports will be prepared for the instream flow section of the biannual Program Directors Update.
- Scopes of work will be prepared for projects under the purview of the WAC

Work on the fish capture GIS will include the following tasks.

### Task List

1. Obtain and import the Access Fish Capture database and import into ArcIMS.
  - a. Review the Access database structure to determine how to write queries on pit tag attributes and display the data in report formats
  - b. Develop a methodology to query fish with multiple pit tags.
  - c. Develop a report format to display information on fish which have multiple pit tag numbers.

- d. Develop necessary web page protocols and, arrange for the transfer of the Fish Capture database, Internet Map Server, and Spatial Database Engine to FWS secure Servers.<sup>1</sup>
  - e. Develop a map base of the Upper Colorado Basin which displays rivers, gages, critical habitat, fish ladders, fish screens, fish hatcheries, major dams/diversions, and restored floodplain sites.
2. When the work described in task has been completed, the contractor will meet with several Recovery Program researchers to demonstrate how the updated Fish Capture database and GIS works and solicit input on programming changes which would enhance the capabilities to accomplish research. Once this review is completed the product will be presented to the Biology Committee. The site will be password-protected based upon current FWS standards and the Recovery Program Director's office and the Biology Committee will determine who will be allowed access to the site.
3. An annual report will be prepared for the project to document progress on the work.
4. The contractor will deliver to the Recovery Program a set of CDs which contain the product of the work tasks described above.

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<sup>1</sup> All web sites residing on web servers other than the web server managed by the Service's Branch of Communications Technology in Denver must be moved to that web server. This decision was made by the Directorate for security reasons during their October conference. This includes all web sites residing on the Region 6 web server.

**FY 2010 Work/Costs:**

FWS Division of Water  
Resources  
labor rates

<b>Task 1. Temperature Data</b>	Rate/Week	Weeks	Total
Principal Investigator GS 13/4	\$2,244	3	\$6,732
Computer Analyst GS 13/10	\$2,892	2	\$5,784
Water Right Specialist GS 11/2	\$1,690	4	\$6,760
Equipment	*Thermographs 10@ 150 ea	Days	\$1,500
Per diem + Hotel	\$143	15	\$2,145
Thermograph Supplies (Cable, Clamps, Weights)			\$525
Task subtotal			<b>\$23,446</b>
<b>Grand Junction CRFP</b>			
Project leader GS 14 (CSRS)	\$2,397	0.5	\$1,199
Administrative Officer GS 9	\$1,441	0.5	\$721
Fishery Biologist GS 12	\$1,997	3	\$5,991
Biological technician GS 6	\$1,075	2	\$2,150
Vehicle Mileage			\$320
Supplies			\$300
Replacement Thermographs	*Thermographs 7 @ 150 ea		\$1,029
Task subtotal			<b>\$11,709</b>
Task total			<b>\$35,155</b>
<b>Task 2. BO Hydrology Support</b>	Rate/Week	Weeks	Total
Principal Investigator GS 13/4	\$2,244	6	\$13,464
Annual update Pit Tag GIS		Days	\$600
Per diem + Hotel	\$143	10	\$1,430
Task subtotal			<b>\$15,494</b>
<b>Task 3. Other Hydrology Support</b>	Rate/Week	Weeks	Total
Principal Investigator GS 13/4	\$2,244	7	\$15,708
Travel		Days	
Per diem + Hotel	\$143	8	\$1,144
Task subtotal			<b>\$16,852</b>
<b>TASK 4. Gages</b>	Rate/Week	Weeks	Total
Principal Investigator GS 13/4	\$2,244	7	\$15,708
Travel		Days	
Per diem + Hotel	\$143	8	\$1,144
Task subtotal			<b>\$16,852</b>
<b>TASK 5. Water Acquisition Committee</b>	Rate/Week	Weeks	Total
Principal Investigator GS 13/4	\$2,244	12	\$26,928
Airfare to Las Vegas (1 trip)			\$1,000
Task subtotal			<b>\$27,928</b>
<b>TASK 6. General Support</b>	Rate/Week	Weeks	Total
Principal Investigator GS 13/4	\$2,244	12	\$26,928
Travel		Days	
Per diem + Hotel	\$143	7	\$1,001
Task subtotal			<b>\$27,929</b>
<b>Task 7. Colorado River Fisheries Project Temperature Data Collection</b>			
Annual update Pit Tag GIS			\$625
Task subtotal			<b>\$625</b>
<b>Grand Total</b>			<b>\$140,835</b>

47 weeks = 90% pf Jana's time

equaling 47

**FY 2011 Work/Costs:**

FWS Division of Water  
Resources  
labor rates

<b>Task 1. Temperature Data</b>	Rate/Week	Weeks	Total
Principal Investigator GS 13/4	\$2,289	3	\$6,867
Computer Analyst GS 13/10	\$2,950	2	\$5,900
Water Right Specialist GS 11/2	\$1,724	4	\$6,896
Equipment	*Thermographs 10@ 150 ea	Days	\$1,530
Per diem + Hotel	\$146	15	\$2,190
Thermograph Supplies (Cable, Clamps, Weights)			\$525
<b>Task subtotal</b>			<b>\$23,908</b>
Project leader GS 14 (CSRS)	\$2,886	0.13	\$375
Administrative Officer GS 9	\$1,542	0.413	\$636
Fish Biologist GS 12	\$2,318	3.268	\$7,577
Assistant Project Leader GS 13	\$2,455	.305	\$749
Vehicle Mileage			\$324
Supplies			\$100
Replacement Thermographs	*Thermographs 2 @ 150 ea		\$300
<b>Task subtotal</b>			<b>\$10,061</b>
<b>Task subtotal</b>			<b>\$33,969</b>
<b>Task 2. BO Hydrology Support</b>	Rate/Week	Weeks	Total
Principal Investigator GS 13/4	\$2,289	6	\$13,734
Annual update Pit Tag GIS		Days	\$600
Per diem + Hotel	\$146	10	\$1,460
<b>Task subtotal</b>			<b>\$15,794</b>
<b>Task 3. Other Hydrology Support</b>	Rate/Week	Weeks	Total
Principal Investigator GS 13/4	\$2,289	7	\$16,023
Travel		Days	
Per diem + Hotel	\$146	8	\$1,168
<b>Task subtotal</b>			<b>\$17,191</b>
<b>TASK 4. Gages</b>	Rate/Week	Weeks	Total
Principal Investigator GS 13/4	\$2,289	7	\$16,023
Travel		Days	
Per diem + Hotel	\$146	8	\$1,168
<b>Task subtotal</b>			<b>\$17,191</b>
<b>TASK 5. Water Acquisition Committee</b>	Rate/Week	Weeks	Total
Principal Investigator GS 13/4	\$2,289	12	\$27,468
Airfare to Las Vegas (1 trip)			\$1,020
<b>Task subtotal</b>			<b>\$28,488</b>
<b>TASK 6. General Support</b>	Rate/Week	Weeks	Total
Principal Investigator GS 13/4	\$2,289	12	\$27,468
Travel		Days	
Per diem + Hotel	\$146	7	\$1,022
<b>Task subtotal</b>			<b>\$28,490</b>
<b>Task 7. Colorado River Fisheries Project Temperature Data Collection</b>			
Annual update Pit Tag GIS			\$650
<b>Task subtotal</b>			<b>\$650</b>
<b>Grand Total</b>			<b>\$141,773</b>

47 weeks = 90% of Jana's time which equals aproximatle 47 weeks

**X. Budget Summary:**

FY-2010	Division of Water Resources	\$ 129,126
	CRFP Grand Junction	11,709
	<b>TOTAL</b>	<b>\$ 140,835</b>
FY-2011	Division of Water Resources	\$ 131,712
	CRFP Grand Junction	10,061
	<b>TOTAL</b>	<b>\$141,773</b>

**IX. Reviewers:** Robert Muth, Angela Kantola, Recovery Program Water Acquisition Committee