

COLORADO RIVER RECOVERY PROGRAM
FY-2010-2011 PROPOSED SCOPE OF WORK for:
Water Quality Monitoring on the Yampa and Green Rivers

Project No.: new

Lead Agency: National Park Service
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Date: February 2, 2012

Category:

Expected Funding Source:

- | | |
|--|--|
| <input type="checkbox"/> Ongoing project | <input type="checkbox"/> Annual funds |
| <input type="checkbox"/> Ongoing-revised project | <input type="checkbox"/> Capital funds |
| <input type="checkbox"/> Requested new project | <input type="checkbox"/> Other (explain) |
| <input checked="" type="checkbox"/> Unsolicited proposal | |

I. Title of Proposal:

Water Quality Monitoring on the Yampa and Green Rivers and its Relevance to Endangered Fish

II. Relationship to RIPRAP:

General Action Plan:

- II. Restore Habitat (Habitat Development and Maintenance)

Green River Action Plan: Mainstem

II.B. Support actions to reduce or eliminate contaminant impacts. [NOTE: Contaminants remediation (in all reaches) will be conducted independently of and funded outside of the

Recovery Program]

Yampa River Action Plan:

II.A.3. Review NPS/USGS report to assess potential for negative impacts of elevated pH to endangered fish [complete].

III. Study Background/Rationale and Hypotheses:

Dinosaur National Monument (DINO) has a unique location in the Upper Colorado River Basin as it contains the confluence of the Green and Yampa Rivers. These two rivers have approximately equal mean annual flow and watershed size, however, due to human management the rivers are now quite different. Above the confluence, the Green River is almost entirely influenced by the operation of Flaming Gorge Dam. The Yampa River remains as the longest relatively free-flowing reach of river in the Colorado River basin and partially “naturalizes” the flow-regulated Green River downstream from the confluence. The Yampa River Basin has recently been identified by the Department of the Interior (DOI) as one of three priority projects of the America’s Great Outdoors Initiative (AGO), noting the basin is one of the most hydrologically and biologically intact watersheds in the West. However, recent findings from water-quality monitoring studies in DINO have raised some concerns about water-quality conditions in the Monument. In addition, new reservoirs and trans-basin diversions from upper basin sources, including Flaming Gorge reservoir and the Yampa River, have been recently been proposed for development. If implemented, such projects could substantially alter the hydrology (natural hydrograph, peak spring flows, low summer flows, water temperature fluctuation), and assimilative capacity of the Green and Yampa Rivers. Such alterations could further exacerbate the condition of the four federally endangered fish species found in DINO, the humpback chub (*Gila cypha*), Colorado pikeminnow (*Ptychocheilus lucius*), razorback sucker (*Xyrauchen texanus*), and bonytail (*Gila elegans*).

In 2010 the Northern Colorado Plateau Network (NCPN) partnered with the Environmental Protection Agency (EPA) to conduct a screening study to characterize the presence of emerging chemical contaminants (ECC’s) in waters within the NCPN, including the Yampa River at Deerlodge Park and the Green River above Gates of Lodore. This project was an initial screening assessment to measure pesticides and ECC’s in waters within parks. The results are being used to determine the significance of any threats to aquatic life and inform any future comprehensive assessments are needed to elucidate threats to the resources. Screening for 119 pesticides and wastewater indicator compounds was done by the Region 8 EPA laboratory. Three sampling dates on the Yampa River at Deerlodge in 2010 detected ECC’s, such as components of antibacterial soaps, contraceptives, cosmetics, dyes, estrogens, flame retardants, fungicides, herbicides, insecticides, plastics, surfactants and caffeine. The Yampa river site had some of the highest levels and widest range of contaminants of any site sampled within NCPN despite the sparsely populated watershed that contains no major cities above DINO. It is possible that some of these contaminants (endocrine disruptors) could be the cause for the high number of intersex fish found in the Yampa River (Hinck et al. 2006). The major land use in the watershed is grazing which is not known to have high levels of these types of contaminants.

In a separate and unrelated effort, the NCPN and USGS are in the process of finalizing a report on the historical nutrient concentrations across the network (Brown and Thoma, in

review). There were very few significant upward trends in total nitrogen and total phosphorus across the NCPN network. Out of 34 sites examined for trends in total nitrogen for various dates from 1974-2007, 2 of the 4 sites that showed increasing trends for total nitrogen were located on the Green (increasing trend from 1991 to 2002) and Yampa Rivers (increasing trend from 1990 to 2002) upstream from DINO. Organophosphates and other contaminants have contributed to declines in aquatic habitat quality (Gebler, 1998; Gellenbeck and Anning, 2002). Much of the data utilized in these trend assessments are the product of NCPN and USGS collaboration. Since 2005, the NCPN has partnered with USGS, and other federal and State partners, to support long-term quarterly water-quality sampling activities (physical parameters, nutrients, major ions, and trace elements) in DINO at both the Yampa River at Deerlodge Park and the Green River above Gates of Lodore sampling locations. A downturn in other agencies budgets has resulted in an inability by NCPN to fully fund this important sampling program. Currently, there is only enough NCPN funding to cover semiannual sampling, thus making an ongoing assessment of core water-quality conditions and trends in the Green and Yampa Rivers in DINO difficult if not impossible.

NCPN and others have also found elevated iron and manganese concentrations in the Yampa River (Roehm 2004; Harza 2002; Thoma et al. 2008, Van Grinsven et al. 2010). Naturally occurring mineralization of iron and manganese minerals is prevalent in the watershed. Elevated concentrations may also be a result of runoff from mining operations throughout the basin. Some samples have exceeded the secondary standard for manganese. In 2006, the aquatic life criterion for total recoverable iron was changed from 1,000 µg/L to 1,900 µg/L for the segment of the Yampa River that includes Dinosaur NM (CDPHE 2006). Total recoverable iron concentrations in the Yampa River at Deerlodge Park, Colorado, were consistently higher than concentrations observed at Craig, Colorado, indicating that there is a distinct source of iron located between these two sites.

IV. Study Goals, Objectives, End Product:

Goal: Assess and document trends in core water-quality parameters at Yampa River at Deerlodge Park and the Green River above Gates of Lodore

Objective – Conduct quarterly sampling of core water-quality parameters at Yampa River at Deerlodge Park and the Green River above Gates of Lodore

End Product: 1) The data collected at this site will be quality assured and permanently archived in the USGS National Water Information System (NWIS) database following standard USGS protocols. 2) annual report provided to Recovery Program

V. Study area *[including river miles and sampling dates, if appropriate]*

Quarterly samples will be taken Yampa River at Deerlodge Park and the Green River above Gates of Lodore.

VI. Study Methods/Approach

Though separate agreements, an additional 6 samples will occur at these two sites resulting in a total of 4 samples at each location. Through a separate USGS-funded program these sites are already collecting real-time stream temperature data. The funding requested here would ensure two additional samples each year at each location so that quarterly samples are collected at each site. As part of this agreement water-quality samples will include the collection of field measurements (streamflow, pH, water temperature, specific conductance, dissolved oxygen, and alkalinity); nutrients (ammonia, nitrite, nitrate plus organic nitrogen, nitrite plus nitrate, phosphorus, and orthophosphate); major ions (carbonate, bicarbonate, hardness, calcium, magnesium, sodium, sodium adsorption ratio, potassium, chloride, sulfate, fluoride, and silica) and trace elements (cadmium, copper, iron, lead, manganese, selenium, silver, and zinc). Total dissolved solids will be calculated as the sum of constituents (same as previous sampling events). Samples will also be analyzed for E. coli. Field blanks and replicate samples will be collected twice annually for quality control. All samples will be collected and processed per USGS standard protocol (USGS, variously dated). Sample analyses will be performed at the USGS NWQL. The data collected at this site will be quality assured and permanently archived in the USGS National Water Information System (NWIS) database following standard USGS protocols.

VII. Task Description and Schedule

Task 1a. Task 1a. Paired water-quality field measurements and samples will be collected at USGS 09260050, Yampa River at Deerlodge (DINO) four times during FY 2012 coordinated with the NCPN. Preliminary data will be provided quarterly, or as requested, and final data will be provided annually. Samples will be taken in October, March, June, and September

Task 1b. Task 1b. Paired water-quality field measurements and samples will be collected at USGS 404417108524900, Green River above Gates of Lodore (DINO) four times during FY 2012 coordinated with the NCPN. Preliminary data will be provided quarterly, or as requested, and final data will be provided annually. Samples will be taken in October, March, June, and September

VIII. FY-2012 Work

- Deliverables/Due Dates

The data collected at this site will be quality assured and permanently archived in the USGS National Water Information System (NWIS) database following standard USGS protocols.

Preliminary data will be provided quarterly, or as requested and final data will be provided annually.

Annual report to the Recovery Program will be provided in November.

NCPN will continue to fund six samples per year, at each location, as part of their routine monitoring regardless of the outcome of this proposal with the methods as outlined above. The funding requested here (\$5,000) would ensure two additional samples in FY12 at each location so that quarterly samples are collected at each site. Budget and SOW for any future water quality sampling work would be determined by subsequent agreements.

FY12 Budget: USGS			
Salary and Benefits	Hours	NPS>USGS	Program>USGS
GS-7-12 Hydrotech	194	\$3,100	\$1,550
		(129 hours)	(65 hours)
Direct Costs			
Travel		\$512	\$256
Other (analytical costs and related items)			
		\$2,688	\$1,344
Indirect costs			
58% of net		\$3,700	\$1,850
Total		\$10,000	\$5,000*

	\$10,00	
From National Park Service to USGS	0	
From Recovery Program to USGS	<u>\$5,000*</u>	please see itemized budget below
	\$15,00	
Total	0	

Item	Unit	No. of samples	Sub Total
Trace Element analysis	\$ 143.36	2	\$ 286.72
Major Ions analysis	\$ 103.95	2	\$ 207.90
Nutrients analysis	\$ 79.56	2	\$ 159.12
Quality Assurance Sample	\$ 143.36	0	\$ -
Additional expenses			
Supplies	-	-	\$ 690.26
Labor	-	-	\$ 1,550.00
Travel	-	-	\$ 256.00
Overhead	-	-	\$ 1,850.00
Total:			\$ 5,000.00

IX. Budget Summary
 FY-2012 \$5,000
 FY-2013 \$0, or TBD

Total: \$5,000

X. Reviewers
 Melissa Trammell, Fisheries Biologist, NPS
 Steve Anders, USGS

XI. References

Colorado Department of Public Health and Environment (CDPHE). 2006. Water Quality Control Commission regulation no. 37. Classifications and numeric standards for the Lower Colorado River Basin (5 CCR 1002-37).
<http://www.cdphe.state.co.us/regulations/wqccregs/100237wqcclowercoloradoriverbasin.pdf>.
Last accessed August 25, 2010.

Gebler JB. 1998. Water quality of selected effluent-dependent stream reaches in southern Arizona as indicated by concentrations periphytic chlorophyll a and aquatic-invertebrate communities. U.S. Geological Survey Water Resources Investigations Report 98-4199, Tuscon, AZ, 18 pp.

Gellenbeck DJ and D. W. Anning. 2002. Occurrence and distribution of pesticides and volatile organic compounds in ground water and surface water in Central Arizona Basins, 1996–98, and their relation to land use: U.S. Geological Survey Water Resources Investigations Report 01-4144 Tuscon, AZ. 111 pp.

Harza, M. 2002. Yampa Basin watershed plan. Colorado Department of Public Health and Environment: Water Quality Control Division.

Hinck, J. E., V. S. Blazer, N. D. Denslow, T. S. Gross, K. R. Echols, A. P. Davis, T. W. May, C. E. Orazio, J. J. Coyle, and D. E. Tillit. 2006. Biomonitoring of environmental status and trends (BEST) program: environmental contaminants, health indicators and reproductive biomarkers in fish from the Colorado River Basin. U.S. Geological Survey, Scientific Investigations Report 2006-5163, 119 p.

Roehm, G. 2004. Management plan for endangered fishes in the Yampa River Basin and environmental assesment. U.S. Fish and Wildlife Service, Mountain-Prairie Region (6) Denver, Co.

Thoma, D., M. Malick, and M. Moran. 2008. Water quality monitoring in the Northern Colorado Plateau Network, 2005–2007. Natural Resource Technical Report NPS/NCPN/NRTR–2008/117. National Park Service, Fort Collins, Colorado.

U.S. Geological Survey, variously dated, National field manual for the collection of water-quality data: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chaps. A1-A9, available online at <http://pubs.water.usgs.gov/twri9A>.

Van Grinsven, M., D. Thoma, M. Malick, and M. Moran. 2010. Water quality in the Northern Colorado Plateau Network, 2006–2009. Natural Resource Technical Report NPS/NCPN/NRTR—2010/358. National Park Service, Fort Collins, Colorado.

* Do NOT include overhead costs on funds transferred from Reclamation to the Service (11%) **EXCEPT FOR CAPITAL PROJECTS**. IF YOU ARE UNSURE WHETHER YOUR PROJECT WILL BE FUNDED WITH CAPITAL OR ANNUAL FUNDS, PLEASE SHOW THE POTENTIAL OVERHEAD COST AS A LINE ITEM. If you have questions about this, please call Angela Kantola at 303/969-7322, ext. 221.