

FISCAL YEAR 2011

**Request for Proposals for Program Announcement
G11AS20008**

**Natal Origins of Rainbow Trout in Marble Canyon/LCR
Confluence Area**

U.S. Geological Survey
Grand Canyon Monitoring and Research Center
2255 N. Gemini Dr.
Flagstaff, AZ 86001

March 26, 2011

PROGRAM ANNOUNCEMENT NO. G11AS20008

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IMPORTANT NOTICE

Begin your application process by visiting the *Grants.gov* web site and click on the tab in the upper right side of the screen marked, “Get Started.” Begin working on the six steps now because it will take time to complete each step. If you wait until the last minute, you will not have enough time to complete the steps before the deadline for receipt of applications. Also, it will take time to become familiar with filling out the electronic versions of the SF 424 forms that must be completed and submitted with your application.

For all technical questions about applying through *Grants.gov*, call the *Grants.gov* Help Desk at: 1-800-518-GRANTS, or Laura M. Mahoney 703-648-7344 lmahoney@usgs.gov

For questions concerning this Program Announcement, please contact Joyce E. Stevenson, Contracting Officer, at (916) 278-9344; jstevenson@usgs.gov.

INTRODUCTION AND BACKGROUND

Geographic and Institutional Scope

The geographic scope of Grand Canyon Monitoring and Research Center's (GCMRC) activities is the Colorado River ecosystem within Glen Canyon National Recreation Area and Grand Canyon National Park. The Colorado River ecosystem¹ is defined as the Colorado River mainstem corridor and interacting resources in associated riparian and terrace zones, located primarily from the forebay of Glen Canyon Dam (GCD) to the western boundary of Grand Canyon National Park, a distance of approximately 293 river miles. The scope of GCMRC activities includes limited investigations into tributaries. It also includes, in general, cultural resource impacts of dam operations for inundation levels associated primarily with flows up to 256,000 cubic feet per second (cfs) as addressed in the Programmatic agreement², and for physical, biological, recreational and other resources, impacts of dam operations for inundation levels associated primarily with flows up to 100,000 cfs. In between these levels, stakeholder concerns with respect to relict native vegetation, endangered species, and cultural resources may require activities by the GCMRC. All proposed projects relate to scientific activities intended to obtain information on "... the effects of the Secretary's actions³..." primarily on downstream resources located in the Colorado River ecosystem.

GCMRC scientific activities are constrained to those probable effects on downstream resources associated with dam operations; for this reason upstream monitoring by GCMRC in Lake Powell, and downstream in tributaries, (i.e., Little Colorado River) are constrained by design. Participants in the Glen Canyon Dam Adaptive Management Program (GCDAMP) realize these to be constraints that inhibit understanding of the entire ecosystem and therefore accept that scientific information from programs outside the GCDAMP may be needed as a means of strengthening understanding of the entire Colorado River ecosystem. Nevertheless, the ultimate purpose of GCMRC monitoring and research activities is to develop information on changes in the Colorado River ecosystem related to "... the effects of the Secretary's actions..." primarily on "downstream resources."

Mission of GCMRC

The Grand Canyon Protection Act (GCPA), and the Operations of Glen Canyon Dam – Final Environmental Impact Statement (GCDEIS), direct the Secretary of the Interior, "To establish and implement long-term monitoring programs and activities that will ensure that Glen Canyon Dam is operated in a manner consistent with that of Section 1802..." of the GCPA. The mission of the GCMRC is:

1 "Colorado River ecosystem" will be used throughout this document as the standard definition of the monitoring and study area for GCMRC. This definition is consistent with that used in the FY 1997-2002 Strategic Plan.

2 The Programmatic Agreement, finalized in August 1994, is a legal agreement between federal and state agencies and tribal groups that specifies the responsibilities of the parties to comply with the National Historic Preservation Act (1996; 1992) and 36 CFR 800. This program is the responsibility of the Bureau of Reclamation.

3 As specified in the 1992 GCPA and in the Record of Decision for the Glen Canyon Dam EIS (DOI 1996).

“To provide credible, objective scientific information to the GCDAMP on the effects of operating Glen Canyon Dam on the downstream resources of the Colorado River ecosystem, as well as other information needs specified by the AMWG, utilizing an ecosystem science approach.”

The Adaptive Management Work Group (AMWG) is composed of concerned stakeholders that represent federal and state agencies, tribal groups, environmental and recreational groups, and power customers. These groups have been officially identified by the Secretary of the Interior and serve on a special Federal Advisory Committee (the AMWG) to advise the secretary on the effects of his actions and the operations of Glen Canyon Dam on downstream resources.

Ensuring Objective, Quality Science

The GCMRC was established to provide objective, high quality scientific information to the Secretary of the Interior and to the Adaptive Management Work Group (AMWG). To accomplish these goals, specific protocols regarding science planning, competition, peer review, administration and publication have been established. The quality and objectivity of GCMRC research findings is ensured through competition and independent external scientific peer review. All technical proposals, data, reports, etc. are reviewed by independent, external scientists as well as by the GCMRC science team.

To ensure that the long-term monitoring and research activities initiated by the GCMRC are unbiased, objective, and scientifically sound, an independent panel of Science Advisors was established to advise the GCMRC, the Adaptive Management Work Group, and the Secretary of the Interior on the coordination and planning of its monitoring and research programs, and to review the results of GCMRC monitoring and research programs. The Science Advisors serve as an advisory, not a decision-making, body. The Science Advisors form an interdisciplinary board composed of scientists who were competitively selected based on their record of scientific achievement, in a range of disciplines related to the work of the GCMRC.

Current Knowledge

For information on current knowledge of Colorado River ecosystem resources and work that has taken place related to the GCDAMP, please go to the GCMRC website: <http://www.gcmrc.gov>. You can find recent publications associated with the resources through the Library and Publications link at the top of the home page.

GCMRC Scientific Activities

Science activities that are conducted and supported by GCMRC include both monitoring and research that address management objectives of the GCDAMP. You can find recent publications associated with the resources that are studied through the Library and Publications link at the top of the GCMRC website home page: <http://www.gcmrc.gov>. Long-term monitoring is designed to determine changes in resource attributes. Research is used to improve monitoring, interpret and explain trends observed from monitoring to determine cause-and-effect relationships and

research associations, and to better define interrelationships among physical, biological and social processes.

In addition to monitoring and research activities, the GCMRC operates a Data Acquisition, Storage and Analysis program (DASA) that is designed to ensure proper data management, data integration and analysis, and data dissemination to managers, stakeholders and scientists. The DASA program incorporates the fields of Database Management Systems (DBMS), Geographic Information Systems (GIS), Remote Sensing and other data acquisition technologies (e.g. satellite telemetry) into a cohesive unit designed to support the research and monitoring needs of the GCMRC science objectives. Additionally, the DASA group provides for access to spatial and tabular data via web services such the Internet Map Server (IMS) and the Water Flow & Elevation Data web access page.

The GCMRC also employs a surveying group to provide consistent, quality, cost-effective support that provides and maintains federally compliant and spatial accurate data that is vital to monitoring and research projects, and a logistics program to provide cost-effective support to monitoring and research field activities.

Ownership and Access to Scientific Data

All data and supporting information generated and resulting from this effort are to be delivered to the GCMRC under the terms shown herein and the awarded agreement (See Access to Research Data). One critical role of GCMRC is to make all data and reports regarding this ecosystem program widely available to all stakeholders and other interested parties. In the spirit of cooperative agreement, the GCMRC strives to make all such scientific data available both electronically through its web site and through other means described below. Therefore, it is necessary that the government have license/rights and access to the scientific data and related reports from studies, analyses, raw data, or similar data produced for this effort, since the studies, analyses, are specified as an element of performance of this effort, and will be developed exclusively with government funds. It is the Government's intent to exercise the Government's rights in this area in accordance with OMB Circulars A-110 and A-102.

Program Integration

All GCMRC monitoring and research programs utilize ecosystem science approaches that require integrated studies that conform to the appropriate spatial and temporal scales of the issues at hand. As the 1995 report of the Ecological Society of America Committee on the Scientific Basis of Ecosystem Management indicates, the incorporation of good science into management decisions at a landscape level is an essential component of ecosystem management. An ecosystem approach will serve to advance both scientific understanding and management capabilities, while supporting protection, management, and use of natural resources.

Contingency Planning

The Technical Work Group (TWG), technical representatives of the AMWG, and AMWG have adopted hydrologic criteria and resource criteria for triggering releases above peak power-plant capacity from Glen Canyon Dam (such as Beach/Habitat-Building Flows). When triggered, these criteria provide little lead time for monitoring and research planning. In addition, hydrologic conditions can lead to unplanned release events which will also require GCMRC to implement monitoring and research activities with little to no lead time. Owing to the potential for these events to occur results in the need for developing a contingency plan. Annually, GCMRC will develop contingency plans for implementation of:

- (1) Supplemental monitoring before and/or after unplanned events, as appropriate.
- (2) Research assessments of flows above peak power-plant capacity (as per the GCDEIS) or other short-duration high flow unplanned events.
- (3) A supplemental monitoring and research program for planned events.

Funding to support monitoring and research activities beyond those which constitute annual monitoring and planned research activities (described in the FY11 Annual Work Plan) will be sought from the U.S. Geological Survey and the Western Area Power Administration subject to the recommendation of the AMWG/TWG. You will find a requirement for Contingency Planning in the Program Description for this effort.

Science Symposium and SCORE Reporting

The GCMRC has initiated a program of regular scientific symposia to discuss the current state of the knowledge of scientific information regarding the Colorado River ecosystem, as well as to learn about similar research in other systems. The GCMRC convenes a biennial Colorado River ecosystem science symposium, and between these years GCMRC program managers and participating scientists make presentations at the biennial Colorado Plateau symposium hosted by the Colorado Plateau Field Station of the Biological Resources Division of the USGS. GCMRC hosted scientific symposia in 1997, 1999, 2001, 2003, 2005, 2008, and plans to do so again in 2012. Typically, these meetings are held in the fall.

Future Challenges

GCMRC and the adaptive management program, in general, face a number of challenges with respect to designing monitoring and research activities to gather information on specific experimental management actions. These include the implementation of long-term experimental plans that include changes in the daily range of discharge (e.g., 5000 – 20,000 ft³/s to 6,500 – 9,000 ft³/s to steady 8,000 ft³/s), and manipulation of the system in addition to dam operations such as exotic fish removal. Respondents to this solicitation should be cognizant of how these factors may affect their research plans.

FISCAL YEAR 2011 PROGRAM ANNOUNCEMENT

Program Authority: Grand Canyon Protection Act, PL 102-575; Catalog of Federal Domestic Assistance (CFDA) No. 15.808—U.S. Geological Survey Research & Data Acquisition

An award made in response to this Program Announcement is dependent upon responsiveness to the announcement, the quality of the technical proposal regarding monitoring, research, associated scientific activities, the cost, as well as other explicit criteria outlined in this Announcement. **Unsatisfactory performance by a recipient under prior Federal awards may result in an application not being considered for funding.** Period of performance for this effort is one year. Initial funding will be for one year, and may be renewable annually (no more than a total of five years) on the basis of available funding and progress. The **approximate** amount available for this effort is \$245,000.00 for one year. You can find recent publications associated with the resources through the Library and Publications link at the top of the home page.)

Application Procedure and Closing Date

Applicants are to submit proposals electronically at <http://www.grants.gov/Apply>, no later than **JULY 20, 2011** at 2:30 p.m. PDT. **USE OPPORTUNITY NUMBER G11AS20008.** If you have questions concerning the submission process, please contact Joyce E. Stevenson at 916-278-9344 or jstevenson@usgs.gov or Laura M. Mahoney at 703-648-7344 or lmahoney@usgs.gov. Applicants will receive an email response from the USGS Office of Acquisition and Grants to acknowledge receipt of submitted proposals.

Proposals submitted through <http://www.grants.gov/Apply> after the closing date and time **may not be considered** for award. If it is determined that an application will not be considered due to lateness, the applicant will be so notified immediately.

Please arrange your application according to the format provided below. Following this format ensures that every proposal contains all essential information and is evaluated equitably. **Failure to follow these guidelines may result in your proposal not being considered.**

Do not send proposals directly to the GCMRC. Submissions by any other method other than grants.gov will not be accepted, unless so directed by the Contracting Officer.

Amendments to the Solicitation

- (a) If this solicitation is amended, then all terms and conditions that are not modified remain unchanged.

- (b) The proposal is not binding until both parties sign the final agreement. Proposals may be withdrawn by written notice received at any time before the agreement is signed.

Proposal Guidelines

It is likely that the proposed sampling design, methods, and analyses used by the respondent need to be structured in a spatial context. GCMRC recognizes that there are other sampling methodologies and modeling frameworks than those identified in this solicitation that could be used to address the study objectives (listed below). Therefore, we would encourage all respondents to propose alternative approaches that could be used, so long as methods are adaptable within the constraints of available funding, and the spatial extent, duration, and timing identified in this solicitation. Please provide a sampling design and set of methods to use for addressing each set of study objectives, as well as, demonstrate conclusively his/her knowledge and ability to accomplish **all** of the study components identified in the solicitation under “Program Description and Federal Involvement Introduction”.

Proposals must, at a minimum address the following:

- (1) Design and implement a multi-year study plan (i.e., for no less than 2-years. Note that depending on results from this study or parallel studies, the duration of this contract may be extended up to a total of 5 years) that describes the overall sampling design for each of the listed study components (**See the “Program Description and Federal Involvement Introduction” for the 4 components**), and identifies and discusses the application of different sampling approaches, analytical methods, and models used to address the specific study objectives,
- (2) Describe the approaches and methods used incorporating data collected from other monitoring and research programs,
- (3) Identify a conceptual construct of the trout emigration/immigration models, and identify the analytical methods, parameters, and assumptions for the different models and approaches,
- (4) Develop a contingency plan for releases above peak-power plant capacity that details how these releases will affect the proposed research.
- (5) Budget break-down of specific project related costs.

The respondent is expected to provide the sampling design, methods, and personnel costs needed for conducting field work, analyses, write-up, travel, lodging and board (i.e., in reference to Annual Age-0 Marking Effort Conducted at Lees Ferry). This study plan should include all field logistical components [e.g., sampling schedule, personnel, study areas, (mode of transport-number and type of boats required), and equipment]. All other equipment, supplies and logistical costs will be covered by GCMRC Biology and Logistical Programs (refer to GCMRC Equipment, Supplies and Logistics). All technical personnel necessary for data collection effort will be provided by the recipient; with the exception of the technical boat operators (refer to **Study Components 1, 2 & 4**). Excluding the logistics required for the downstream river trips,

the recipient must make the necessary arrangements for the lodging and accommodations of his/her personnel.

Proposal Forms

Proposal forms are available at Grants.gov. Begin by registering at <http://www.grants.gov> under the “Get Registered” tab in the menu bar on the left side of the home page. Once registered, apply using the Opportunity Number G11AS20008. Fill out and submit the required forms in grants.gov, the BUDGET SUMMARY PAGE attached in this document, and the Proposal Narrative in the format described below.

The DI-2010 U.S. Department of the Interior Certifications Regarding Debarment, Suspension and Other Responsibility Matters, Drug-Free Workplace Requirements and Lobbying is required but is not yet available through *Grants.gov*. This form will be completed when the grant/cooperative agreement is awarded.

Proposal Narrative

a. **Proposal Summary Sheet**

The first page of the proposal must contain the following information:

Project Title:

Principal Investigator(s) (person we can contact, if needed):

Name:

Address:

Phone:

FAX:

Email:

Name of university, state agency, or other organization:

Project Deliverable:

Total Funds Requested: \$ _____

b. **Proposal Text**. The text (i-vii below, including figures and tables), should be *no longer than 15 pages* (excluding Project Personnel) when printed on letter-size paper, with 1-inch margins and a font size no smaller than 12 points. **Proposals not following these guidelines will not be considered.** Please include the following:

- i **Objectives**. Clearly define goals of project. State how the proposal addresses the goals.
- ii **Relevance and Impact**. Explain why the work is important. Specify the contribution to science related to the Grand Canyon ecosystem and the benefits that society will receive from the project.
- iii **Work Plan**. This section should include a detailed discussion of the work plan and technical approach. The percentage of your time that you can devote to the proposed work should also be indicated.

- iv Prior Work, On-going Work, and Preliminary Results. Provide a brief summary of findings or outcomes of any prior work you or others have completed in this area. If on-going work is being funded through another source of funds, specify what work is already funded and what work will be conducted with funds requested in this proposal. **Include Agreement or work identifier number, point of contact, email and phone number for each entity.**
- v References Cited. List all references to which you refer in text and references from your past work in the field that the research problem addresses. Be sure to identify references as journal articles, chapters in books, abstracts, maps, digital data, etc.
- vi Project Personnel. List the Principal Investigator first, followed by the names of other individuals. Indicate the role for each participant in the project (geologist, geochemist, field assistant, etc.). Include a **brief** vita for each person. Vita will not be included in the 15 page limit. Emphasize previous experience in the field of study that the proposal addresses.

Budget Summary Page. This information will provide more details than what is required under the SF 424A form. **Please use the budget summary page provided with this announcement in addition to the SF 424A**, and follow the guidelines listed below.

1. Salaries and Wages. List names, positions, and rate of compensation. If contract employees are hired, include their total time, rate of compensation, job titles, and roles.
2. Fringe benefits/labor overhead. Indicate the rates/amounts in conformance with normal accounting procedures. Explain what costs are covered in this category and the basis of the rate computations.
3. Field Expenses. Briefly itemize the estimated travel costs (i.e., number of people, number of travel days, lodging and transportation costs, and other travel costs).
4. Lab Analyses. Include any analyses, if they will be required. Briefly itemize cost of all analytical work.
5. Supplies. Enter the cost for all tangible property. Include the cost of office, laboratory, computing, and field supplies separately. Provide detail on any specific item, which represents a significant portion of the proposed amount.
6. Equipment. Show the cost of all special-purpose equipment necessary for achieving the objectives of the project. "Special-purpose equipment" means scientific equipment having a useful life of more than 1 year and having an acquisition cost of \$5,000 or more per item. Each item should be itemized and include a full justification and a dealer or manufacturer quote, if available. General-purpose equipment must be purchased from the applicant's operating funds. Title to non-expendable personal property shall be vested solely with the Recipient. Under no circumstances shall property title be vested in a sub-tier recipient.
7. Services or consultants. Identify the tasks or problems for which such services would be used. List the contemplated sub-recipients by name (including consultants), the estimated amount of time required, and the quoted rate per day or hour.

8. Travel (non-field related). State the purpose of the trip and itemize the estimated travel costs to show the number of trips required, the destinations, the number of people traveling, the per diem rates, the cost of transportation, and any miscellaneous expenses for each trip. Calculations of other special transportation costs (such as charges for use of applicant-owned vehicles or vehicle rental costs) should also be shown.
9. Publication costs. Show the estimated cost of publishing the results of the research, including the final report. Include costs of drafting or graphics, reproduction, page or illustration charges, and a minimum number of reprints.
10. Other direct costs. Itemize the different types of costs not included elsewhere; such as, shipping, computing, equipment-use charges, or other services.
11. Total Direct Charges. Totals for items 1 thru 10.
12. Indirect Charges (Overhead). Indirect cost/general and administrative (G&A) cost. Show the proposed rate, cost base, and proposed amount for indirect costs based on the cost principles applicable to the Applicant's organization. If the Applicant has separate rates for recovery of labor overhead and G&A costs, each charge should be shown.
13. Amount proposed. Total of items 11 plus 12.
14. Total Period of Performance: The Applicant shall provide summary information as well as a detailed budget for the first program year and 1 potential out-year. **The SF 424 shall reflect support for the base year and one potential out-year.**

15.

BUDGET SUMMARY PAGE

COST CATEGORY	First Year	Second Year²	TOTAL Both years²
1. Salaries and Wages	\$	\$	\$
Total Salaries and Wages	\$	\$	\$
2. Fringe Benefits/Labor Overhead	\$	\$	\$
3. Field Expenses	\$	\$	\$
4. Lab Analyses	\$	\$	\$
5. Supplies	\$	\$	\$
6. Equipment	\$	\$	\$
7. Services or Consultants	\$	\$	\$
8. Travel (non-field related)	\$	\$	\$
9. Publication Costs	\$	\$	\$
10. Other Direct Costs	\$	\$	\$
11. Total Direct Costs (items 1-10)	\$	\$	\$
12. Indirect cost/General and Administrative (G&A) cost	\$	\$	\$
13. Amount Proposed (items 11+12)	\$	\$	\$

¹Use this format for the required Budget Summary. The detailed budget **must** be keyed directly into this Budget Summary page

Review and Selection Process:

Applications are considered based on the completeness of documentation. Specific evaluation criteria are identified in the Application Review Information. Budget information is evaluated for reasonableness, realism and appropriateness to the program as well as to applicant project goals.

Technical proposals will be evaluated by qualified external Peer Reviewers and GCMRC Program Managers. Peer Reviewers are experts who are familiar with the technical aspects of the field of study which this application addresses. Technical proposals will be evaluated against general and initiative-specific criteria identified in the announcement.

Final selection of awardees will be based on recommendations of Peer Reviews, programmatic considerations, and compliance with all appropriate federal regulations. Upon conclusion of scientific Peer Review, GCMRC review, and Acquisitions Agreement review, a meritorious application will be awarded by the USGS Contracting Officer.

Application Review Information

Evaluation Criteria. All proposals will be evaluated in accordance with the following criteria:

1. Scientific quality and impact: (20 points)
 - a) How will the work basic research address the goals of the USGS?
 - b) How does the proposed work respond to societal or customer needs?
 - c) How will this work make fundamental advances in research and provide information on the Grand Canyon Colorado River Ecosystem?
2. Methods: (25 points)
 - a) Is the strategy clear and designed for success?
 - b) How appropriate are the scientific objectives for proposed time frame?
 - c) How appropriate are the tools selected for research?
3. Planned Products and Dissemination of Results: (10 points)
 - a) How well will the products respond to customer needs?
 - b) How likely is it that the results will be published in a peer-reviewed publication?
 - c) How adequate is the plan for dissemination of the project results to the scientific community and appropriate professional organizations; local, state, regional and federal agencies; and the general public?
 - d) How far-reaching are the products – do they have regional or national impact?
 - e) How clearly defined are the products?
 - f) How appropriate are the products to the requested work as well as to the expected users?
 - g) What is the likelihood that these products can be produced in the proposed time frame with the resources requested?
4. Budget Justification and Clarity: (10 points)

- a) How sufficient are staff levels to accomplish the proposed goals?
 - b) How appropriate are field expenses, supplies, lab work, and other expenses?
 - c) Are expenses adequately itemized?
5. Experience/Competence of Research Personnel: (35 points)
- a) How well has the applicant demonstrated in-depth knowledge of mechanical removal of rainbow trout from waterways?
 - b) How well has the applicant demonstrated ability to conduct field studies comparable to this effort?

Award Administration Information

Award recipients are responsible for managing the day-to-day operations of the grant/cooperative agreements and sub-award (or other award type) supported activities to assure compliance with applicable Federal requirements, and that performance goals are being achieved. Recipient monitoring must cover each program, function or activity.

- (d) The proposal is not binding until both parties sign the final agreement. Proposals may be withdrawn by written notice received at any time before the agreement is signed.

Award Information

Proposals will be evaluated by qualified external Peer Reviewers and GCMRC program managers. Peer Reviewers are experts who are familiar with the technical aspects of the field of study which this application addresses. Proposals will be evaluated against general and initiative-specific criteria identified herein.

Award Recommendation: After scientific, technical and GCMRC Program Manager's review and consideration of appropriate factors, the GCMRC Program Manager recommends to the GCMRC Chief whether a proposal should be declined or supported. If the program recommendation is for award, then the recommendation goes to the USGS Office of Acquisition and Grants for processing and issuance of a grant, contract, cooperative, or other appropriate agreement.

Applicants are cautioned that only an appointed Contracting Officer in the USGS Office of Acquisition and Grants may make commitments, obligations or awards on behalf of the Government or authorize the expenditure of funds. This notice must be received in writing from the USGS contracting officer before any obligation exists.

It is anticipated that one award will be made for this project in 2011. Award of this action is contemplated on or about 30 September 2011, pending approval/funding in the NEPA process. The estimated funding for this project is \$245,000.00.

Pre-Proposal Open Teleconference Meeting

GCMRC scientists will convene a pre-proposal teleconference meeting **on June 27, 2011 from 9-10:30 am (PDT)** to answer questions from, and initiate a dialog with, persons interested in responding to this solicitation. This meeting is not mandatory; however, all potential respondents are strongly encouraged to participate. Meeting minutes will be posted on the GCMRC website for those unable to participate. Use the following numbers to access the audio bridge: **(toll free number) 855-547-8255** and access number is **75207#**. Each participating location must dial in number: **toll free 855-547-8255**. There will be a voice prompt asking for the Conference Security Code **75207** followed by the # sign. The teleconferencing time will be from **9-10:30 am (PDT) on June 27, 2011**.

Contact Barbara Ralston (e-mail: bralston@usgs.gov, telephone: 928-556-7455) for questions concerning this meeting. If you plan to participate in this open-meeting, please notify Barbara Ralston (bralston@usgs.gov) and include the subject line 'pre-proposal open meeting for Natal Origins of RBT.'

Agency Contacts

Further information regarding GCMRC activities, if needed, may be obtained from the U.S. Geological Survey (USGS) officials indicated below:

Theodore S. Melis, Ph.D., Acting Chief of GCMRC
email: tmelis@usgs.gov
voice: 928/556-7282
fax: 928/556-7092

Physical Science Resources
Paul Grams, Program Manager
email: pgrams@usgs.gov
voice: 928/556-7458
fax: 928/556-7092

Biological Resources
Scott P. Vanderkooi, Program Manager
email: svanderkkooi@usgs.gov
voice: 928/556- 7376
fax: 928/556-7092

Cultural and Socioeconomic Resources
Ms. Helen Fairley, Program Manager
email: hfairley@usgs.gov
voice: 928/556-7285

fax: 928/556-7092

Information Officer
Philip Davis, DASA Program Manager
email: pdavis@usgs.gov
voice: 928-556-7084
fax: 928-556-7092

Logistics and Survey Support
Carol Fritzing, Coordinator
email: cfritz@usgs.gov
voice: 928-556-7207
fax: 928-556-7092

Office of Acquisition and Grants, Sacramento
Joyce Stevenson, Contract Specialist
email: jstevenson@usgs.gov
voice: (916) 278-9344
fax: (916) 278-9339

Questions associated with this solicitation may be submitted electronically to the Contracting Officer at jstevenson@usgs.gov until **July 11, 2011**. Please include the subject line 'Trout Emigration Solicitation' in any correspondence.

Responses will be posted during the solicitation period at the GCMRC website every Friday until **July 15, 2011** (<http://www.gcmrc.gov/about/links.aspx>). Look for the link to "[Questions about Trout Emigration Solicitation](#)"

PROGRAM DESCRIPTION AND FEDERAL INVOLVEMENT

Natal Origins of Rainbow Trout in Marble Canyon/LCR Confluence Area

Introduction

The rainbow trout natal origin study is one of a number of research and prescriptive studies that are being solicited by Grand Canyon Monitoring and Research Center to support the US Bureau of Reclamation's Environmental Assessment as described in the US Geological Survey's Science Plan (USBR 2011). The primary purpose of this solicitation is to determine the natal sources of rainbow trout (*Oncorhynchus mykiss*) found in and around the confluence of the LCR and the Colorado River mainstem. The underlying hypothesis supporting this study is that young fish emigrate from Lees Ferry sport fishery, and contribute solely to the downstream rainbow trout population. The alternative explanation is that downstream population is sustained by local reproduction, which is either independent or supplemented from upstream immigration. Testing this hypothesis requires understanding the origin of rainbow trout in Marble Canyon and determining the emigration rate for multiple year classes out-migrating from Lees Ferry, into Marble Canyon and down to the LCR confluence. The geographic area of focus for this study will be between Lees Ferry and the confluence of the LCR (figure 1).

The underlying motivation for the rainbow trout (RBT) emigration study has come from recent findings showing that both RBT and brown trout (*Salmo trutta*) are consuming native fish in the Colorado River in Grand Canyon (Yard and others, 2011). The majority of native fish consumed by trout were juvenile and subadults (< age-3) (Yard and others, 2011), and it has been inferred that the loss of so many young fish, especially humpback chub (*Gila cypha*; HBC) may have affected recruitment to the adult chub population (USBR 2011). Results from the age-structured mark-recapture model indicate an increasing trend in adult (\geq age-4) abundance of humpback chub (Coggins and others 2006; Coggins and Walters 2009) that corresponds with trout removal efforts during a system-wide decline in trout numbers (Coggins and others, 2011; Makinster and others, 2010). Although these data are compelling, the negative correlation between rainbow trout abundance and chub recruitment cannot be inferred to be causal. Therefore, reducing trout abundance for the purpose of restoring native fish populations, especially HBC may not have the desired management response (Yard and others, 2011).

Korman and others (2009b, 2011) have shown that age-0 rainbow trout abundance, growth and survival are influenced by fluctuating flows and high flows in the Lees Ferry reach. Also that observed declines in age-0 abundance over the summer period were greatest for years when abundance was high, indicating that mortality and possibly emigration may be density-dependent. If rainbow trout move downstream into Marble Canyon, this study project will help inform trout control actions that are currently scheduled for 2011 (Paria-Badger Rapid); as well as potential actions that might occur near the Little Colorado River confluence area (LCR). Therefore, understanding how trout population dynamics influence movement of different age classes of trout is an important first step in being able to assess the potential for successful

control of rainbow trout immediately below Lees Ferry. If fish from Lees Ferry are found to be the source of most or all rainbow trout downstream, then removing fish in this reach of river may be less intrusive and more culturally acceptable than control efforts conducted at the LCR confluence. Information from this project will include ongoing monitoring data for rainbow trout upstream from Lees Ferry to assess any potential correlation between rainbow trout density in the Lees Ferry reach and potential emigration out of the reach.

This study is proposed as an experimental research project to determine if Lees Ferry is the natal source of trout emigrating into the downstream reaches of Marble and Grand Canyons (Korman and others, 2011). This information will help to resolve some of the uncertainties about prescribing nonnative fish control activities in locations that are geographically distant to the area of concern (Little Colorado River confluence area). The duration of this contract is scheduled for no less than 1-year, and depending on results from this study or parallel studies, the duration of this contract may be extended up to a total of 5-years. Owing to the availability of funding, the spatial extent, duration, and timing of the sampling design have been predefined for this study project. **This particular solicitation contains four study components, which include (1) Annual Age-0 Trout Marking at Lees Ferry, (2) Recapture of Marked Rainbow Trout, (3) Rainbow Trout Emigration Model, and (4) Mainstem Juvenile Humpback Chub Assessment.**

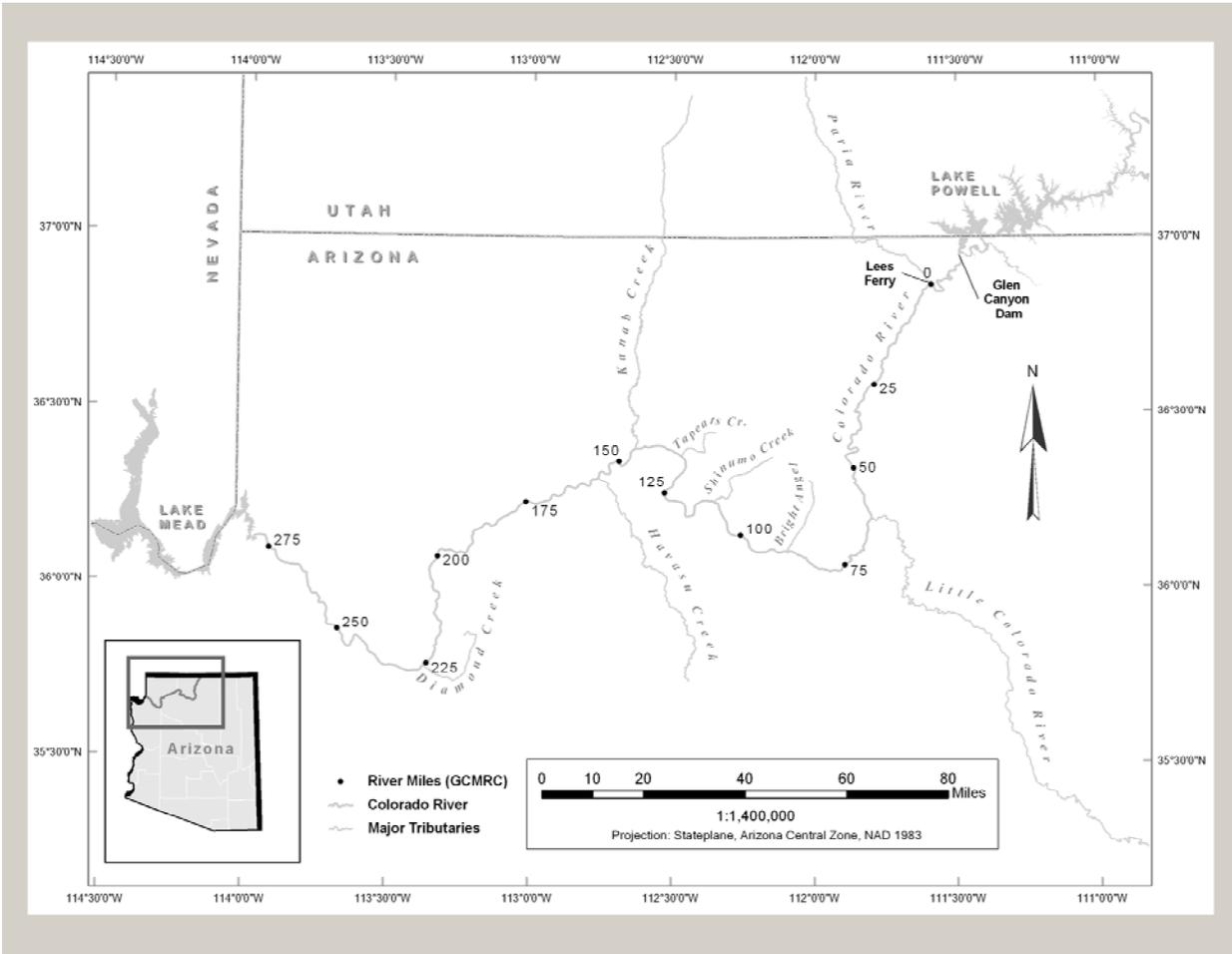


Figure 1. Map of the extent of the study area with river miles identified in 25-mile segments starting at Lees Ferry. The Little Colorado River is identified and its confluence is at river mile 61.

Geographical setting and constraints

The Colorado River Ecosystem (CRE) is defined as the Colorado River mainstem corridor, tributary streams, and adjacent terrestrial habitats, that are located between the forebay of GCD and the western boundary of Grand Canyon National Park, a distance of approximately 293 river miles that is punctuated by frequent rapids and over 1700 feet change in elevation. The Grand Canyon is a deeply incised canyon with physiographic features that act as structural control at geomorphic and local levels (Stevens and others, 1997). The rock strata (sedimentary, metamorphic, and igneous) have different erosive characteristics that affect the channel morphometry. Channel widths (40-120 m) and depths (4-15 m) vary, as does the shoreline that change in character from homogeneous bedrock cliffs and alluvial sand bars to complex talus slopes. Access to the river is extremely limited and consists of vehicle access at the upper and lower end of the CRE, scattered foot paths that descend several thousand vertical feet into Grand Canyon or boat-based river trips that are launched from the upper end of the CRE and travel the entire length of the CRE. The remote nature and setting of the CRE within Grand Canyon National Park makes for a spectacular research site, but it also presents considerable challenges to researchers.

A considerable amount of study and logistical planning is required to accommodate research within Grand Canyon including acquisition of necessary permits from the National Park Service, US Fish and Wildlife Service, and the Arizona Game and Fish Department. Large daily fluctuations in discharge, cold water temperatures (10-13°C), and deep and powerful currents limit the areas of the CRE that can be sampled. Boat trips provide the most effective means of accessing the CRE, but it takes a week or more to complete such a trip. Further, the time and expense of these boat trips (1-2 weeks, ~\$40,000-60,000 per trip) severely limits the spatial and temporal intensity of any sampling regime. As above, research within the CRE must be permitted by National Park Service considering seasonal restrictions on the mode of transportation (motor boats versus oar-powered boats) and deployment of research equipment. Additionally, certain rapids constrain upstream travel reducing the extent and times that some areas may be sampled.

Native and nonnative fish community

The original native fish assemblage consisted of eight species, half of which have been extirpated due to habitat alterations (e.g., changes in temperature and spatial connectivity) and interactions with nonnative fishes (Carothers and Minckley 1981, Minckley 1991). The remaining native species consist of humpback chub, flannelmouth sucker *Catostomus latipinus*, bluehead sucker *Catostomus discobolus*, and speckled dace *Rhinichthys osculus*. Declining trends (composition, abundance and distribution) have been observed across components of the remaining native fish community and are generally attributed to habitat modifications following the construction (1957-1963) and operation of GCD (Minckley and Deacon 1968). Physical changes to habitat have included abrupt loss in connectivity between upper and lower drainage basins (Ward and others, 1999), and seasonal changes in flow (Poff and Ward 1989), temperature (Clarkson and Childs 2000), and turbidity (Johnson and Hines 1999). The magnitude, frequency, and timing of these physical factors have departed considerably from the natural conditions this native fish assemblage evolved (Carothers and Brown 1991). Although

some of these changes were abrupt, others were chronically slow and took years to change from one state to another.

The current environmental conditions are strikingly different from pre-dam. This river is now a regulated system, with legal and operational constraints that limit annual, monthly, and daily discharge (Ingram and others, 1991; USDOJ, 1996). Consequently, normal flows fluctuate between 142 and 710 m³/s. Variation in daily flow results in vertical changes in stage (i.e., water surface may exceed 2 m vertical depending on channel width) that may influence habitat selection of shoreline types (e.g., backwaters, talus slopes), depths and velocities (Barrett and Maughan 1995). The flows from GCD are hypolimnetic releases, cold and clear, hence water temperatures (10-13°C) vary little; however, changes in water clarity are extreme and seasonally variable (Yard 2003) due to sediment discharges from unregulated tributaries (Topping and others, 2000).

At least 24 species of nonnative fishes have been reported in the CRE (Maddux and others, 1987; Valdez and Ryel 1995). While some of these species have become established, most have not, though concerns are prevalent regarding impending introductions and their potential effects. These nonnative fishes consist of a warm-water assemblage, channel catfish (*Ictalurus punctatus*), black bullhead (*Ameiurus melas*) and common carp (*Cyprinus carpio*) remnants of introductions prior to GCD; a cold-water assemblage, rainbow trout (*Onchorhynchus mykiss*) and brown trout (*Salmo trutta*) introduced for recreation; and small bait-fish that persist in the CRE from earlier introductions or periodic dispersal from tributaries, fathead minnow (*Pimephales promelas*), and plains killifish (*Fundulus zebrinus*). The spatial distribution and abundance of nonnative fishes varies throughout the system, due in part to dissimilar tolerances in temperature and sediment loads and tributary locations (Valdez and Ryel 1995). These biological changes (food resources and nonnative fish introductions) in the Colorado River and have probably affected not only native fish abundance and distribution patterns (Tyus and Saunders 2000), but limited suitable habitat available for juvenile fish rearing. How these physical and biological factors interrelate with native fishes are largely unknown and potentially complex (Korman and others, 2004).

Study Component 1. Annual Age-0 Trout Marking at Lees Ferry

The primary goal of the first study component is to apply sufficient number of marks to age-0 rainbow trout such that the proportion of marked fish is $\geq 15\%$ of the entire age-0 population as estimated in October of each year. The fish marking reach extends a total of 25 km from Glen Canyon Dam to Lees Ferry (Fig 1). As described by Korman and others, (2009a and 2011), a slow (average rate 0.1m/sec) single-pass electrofishing method will be used to catch and mark age-0 rainbow trout. Sampling is scheduled for October following stabilization of monthly mortality rates of age-0 trout. Fish of targeted size (70-110 mm TL) will be marked with passive integrated transponders (PIT-tags), returned, and released at capture sites. A stratified sampling design should be used; suggested strata include longitudinal sections and major habitat types [examples that could be incorporated include low-angle (cobble and vegetated sand bars and debris fans), and high-angle (talus) shorelines]. It has been estimated that 10 field days are required to effectively sample the entire study reach and mark approximately 15,000 fish. For additional background information on study area and trout dynamics, refer to this literature

(Korman and others, 2009a, 2009b, 2011; Makinster and others, 2010; McKinney and others, 2001)

The study reach for Lee's Ferry has been previously subdivided into spatially referenced shoreline habitat (Mietz 2003). Study maps (scale, 1:4,000) are available for conducting fieldwork and will be provided to the awardee during the beginning of each field season. Respondent must develop the appropriate sampling design, contact Tom Gushue for information concerning linear distance of sampleable shoreline found within the sampling reach [email address: tgushue@usgs.gov]. The awardee will sample shorelines nightly using two electrofishing boats. To optimize capture efficiency, electrofishing will be conducted only at night during low discharge levels (i.e., refer to stage discharge relationship for Lees Ferry, http://waterdata.usgs.gov/usa/nwis/uv?site_no=09380000). Additional days may be required to conduct a number of mark-recapture, and tagging mortality experiments for age-0 trout at representative sites within the fish marking reach.

Objectives

- (1) Estimate fall abundance for age-0 trout in the Lees Ferry reach,
- (2) Determine size-specific capture probabilities for age-0 trout,
- (3) Determine tagging mortality for age-0 trout,
- (4) Determine length-weight relationship age-0 trout, and
- (5) Apply marks to $\geq 15\%$ of the estimated age-0 trout population.

Study Component 2. Recapture of Marked Rainbow Trout

Each year, three monthly sampling trips are scheduled for the summer/fall (July - October) that sample for marked fish throughout the entire Marble Canyon reach (8-56 RM). The purpose of the river trips is to intercept marked fish of multiple cohorts that have emigrated downstream from the Lees Ferry reach. These three river trips have been scheduled for summer/fall due to another study component included in this project (refer to **Study Component 4**). Electrofishing will be the primary gear used for capturing rainbow trout. The awardee will sample shorelines nightly using two electrofishing boats. Owing to changes in the size of available marked fish (\geq age-1) the electrofishing sampling rates (0.5 – 1.0 m / sec) can be faster than the predefined rates used for the marking age-0 fish in Lees Ferry reach. To optimize capture efficiency, electrofishing should be conducted during night time operations. It has been estimated that seven field days are required to effectively sample the entire Marble Canyon reach. For logistical purposes, the awardee should use a stratified sampling design that subdivides Marble Canyon into multiple sampling sites and that sampling units be equally distributed between sites.

The entire shoreline length (right and left bank) of the Marble Canyon reach is approximately 222 km. Respondents should structure their sampling design and schedule based on the logistics of available campsites and navigable sections found in Marble Canyon. Study maps (scale, 1:4,000) are available for conducting fieldwork and will be provided to the awardee during the beginning of the field season. Not all of the shoreline and habitat types are sampleable within the designated reach. Shorelines containing cliff habitat (<19%) have low catchability, this habitat type as well as rapids should be excluded from the sampling design. Multiple sampling sites

should be established throughout the study area based on the distribution of navigable rapids or stream length (approximately 10 to 13 km/site). It is recommended that within a study site that spatially referenced sampling units (≈ 500 m) be established. GCMRC has estimated that the cumulative sampling coverage for three trips would represent approximately 85% of the sampleable shoreline in Marble Canyon. Respondent must develop the appropriate sampling design, contact Tom Gushue for information concerning linear distance of sampleable shoreline found within the sampling reach [email address: tgushue@usgs.gov]).

Data collection and data entry needs to be compatible with existing GCMRC data format structure. Data will be collected on all fish (native and nonnative) using the most updated GCMRC fish sampling protocol (Persons and others, 2011). The catch metrics used will include fish density (fish/shoreline distance) and catch per unit effort (CPUE, fish/hr). All trout and native fish encountered are to be scanned for the presence of PIT-tags (134.2 kHz). Also other types of tags may be present (e.g., floy tags, VIE-tags and fin clips), which need to be accounted for. For safe boat operation, electrofishing crew size must be minimal.

Objectives

- (1) Estimate monthly and average summer/fall RBT relative abundance for marked and unmarked fish (density and CPUE); as well as other fish species encountered,
- (2) Determine the spatial distribution of RBT relative abundance for marked and unmarked fish,
- (3) Determine length frequency distributions of marked and unmarked RBT,
- (4) Determine the spatial distribution of length frequencies of marked and unmarked fish,
- (5) Determine growth rates of recaptured RBT,
- (6) Determine if RBT recruitment in Marble Canyon is due to immigration or natural reproduction.

Study Component 3. Rainbow Trout Emigration/Immigration Model

The intended purpose of this Emigration/Immigration model (EIM) is to ascertain the probability that the Lees Ferry sport fishery acts as the primary natal source of rainbow trout observed in Marble Canyon and confluence area of the LCR. Repeat marking efforts over multiple years are necessary for addressing the modeling questions that concern (1) does trout emigration from Lees Ferry occur; and if so, 2) when does it occur (season), 3) what age-class(es) are likely to move downstream, 4) do emigration rates vary annually, and 5) what factors (i.e., density dependent, hydrological, life-history) are responsible for inducing the emigration response in rainbow trout. The awardee needs to have and demonstrate the modeling skills required for constructing the types of analytical models capable of estimating rainbow trout emigration and immigration rates respective to Lees Ferry and Marble Canyon. Obviously, a number of different models are needed to address the research questions identified above. Also, as part of this modeling process the awardee has to acquire all sources of information to populate models from the marking and recapture components of this study (refer to **Study Components 1 & 2**); as well as other data from monitoring and research programs, these include (1) Lees Ferry tri-annual monitoring, (2) Rainbow trout early life stage survival, (3) Nonnative fish monitoring, (4) Paria-Badger Nonnative Fish Control, and (5) LCR Nonnative Fish Control.

Modeling objectives

- (1) Estimate emigration rates for the rainbow trout population in Lees Ferry,
- (2) Estimate immigrations rates for rainbow trout in Marble Canyon,
- (3) Determine the likely age-class(es), seasons, and distances traveled by emigrating trout,
- (4) Determine the season(s) when rainbow trout emigration is likely occurring,
- (5) Determine the spatial distribution of immigrants (random, uniform, normal, etc.).
- (6) Determine the natal source of Marble Canyon recruits.

Study Component 4. Mainstem Juvenile Humpback Chub Assessment

Assessment criteria are to be used to monitor juvenile humpback chub in the Colorado River, in response to varying trout densities near the confluence of the LCR. Certain state variables (abundance) and vital rates (growth and survival rates) for juvenile HBC have been incorporated into this decision making framework to help managers evaluate the outcome(s) of actions used to control nonnative fish, especially trout (USBR 2011). These assessment criteria are intended to help guide the decision making process by identifying when and how to initiate or suspend nonnative fish control actions conducted upstream at the PBR (RM 1-8) and downstream at the LCR confluence area (RM 56-65). The decision-making framework proposed in the science plan (USBR 2011) is dependent on data collected annually during the summer/fall to determine the level of nonnative fish control actions that are considered necessary in the subsequent year.

For background, a research initiative referred to as the Near Shore Ecology project (NSE) was implemented (2008-2012) for the purpose of understanding how river flow (fluctuating versus steady) influenced survival rates of juvenile native and non-native fishes in the Colorado River in Grand Canyon (Pine 2009). This research project has been very effective in developing the methods used in sampling, as well as the types of analyses used for monitoring juvenile chub abundance, growth, and survival. Currently, the analytical methods used for estimating these parameters are being refined (e.g., tracking batch marks and individual tag histories of fish). The NSE project is scheduled to be completed by 2012 (field work 2011); and as a deliverable the NSE investigators are going to include a retrospective analysis of all sampling (area and effort), and analytical methods. Upon completion, GCMRC will provide the awardee with the analytical methods (text files containing the executable program scripts [R-scripts]) needed for estimating state variables and vital rates.

For logistical reasons, we have combined this study component (#4) for assessing juvenile HBC with the scheduled river trips, used in recapturing marked trout in Marble Canyon (refer to **Study Component 2**). These river trips are scheduled for summer/fall (July - October) of each year (2012-2013, and may be further extended). Each of the scheduled river trips are intended to provide the data for addressing the objectives identified for both study components. To maintain continuity with the past NSE project the awardee will use the established NSE sampling methods (Pine 2009 and 2010).

The sampling area extends from Heart Island (just downstream of the Little Colorado River confluence, (RM 63.2) to just upstream of Carbon Canyon (RM 65.0). Two 3000-m sampling sites (~1500-m on each side of the river) have been selected for determining monthly juvenile chub (Age-0 to Age-4) abundance, and survival and growth rates. Study maps (scale, 1:2,500)

are available to the awardee identifying the spatially referenced habitat sampling units (HSU's) found in each site. Sites are to be sampled using a combination of electrofishing and hoop nets. A total of eight days per river trip are necessary for completing the monthly mark-recapture effort. Pine and others, (2009 and 2010) findings would indicate that capture probabilities for juvenile HBC are generally low (about 4-13 %) with limited recaptures for both gear types (electrofishing and hoop netting). The cumulative catch between gears is similar; however, each gear type has been found to have different sampling selectivity. Typically, total catch of humpback chubs (all sizes) was higher in hoopnets; whereas, electrofishing catch of small humpback chubs (<100 mm TL) was greater than hoopnets. The awardee will sample nightly the shorelines using two electrofishing boats. Boats are to be operated slowly (average rate 0.1m/sec) (Korman and others, 2009a), with catch assigned to each HSU (50 m shoreline length). The electrofishing effort will alternate every other night (3-passes / 48 hr) between the two study sites. In addition, hoop nets (60) will be deployed for a total of seven days (24 hr sets) each trip. All fish collected with hoop nets are to be processed similarly to the fish captured via electrofishing. Hoop net processing will occur between morning and mid-day.

To spatially track the fish catch, all fish are placed in distinct buckets that correspond to a specific HSU. Fish are to be transported to a shore station for processing (2-personnel): fish are identified to species, measured (TL and FL) and given one of two tag types (batch mark or individual identifier) as per fish handling protocols in Grand Canyon (Persons and others, 2010). All native fish (humpback chub ≥ 100 -mm TL and all other native fish ≥ 150 -mm TL) are scanned for presence of PIT tags, and if absent tagged; otherwise, all native fish and fathead minnows (> 40 mm and < 100 -mm TL) receive a batch mark referred to as a Visual Implant Elastomer (VIE) identifying the specific year ($n \leq 2$), river trip ($n = 3$), capture gear ($n = 2$), and sampling site ($n = 2$). Once processed, fish are to be returned to their specific HSU capture location.

Recapture information are to be used for estimating fish abundance for a particular site. Differences in abundance (batch and individual capture histories) associated with summer/fall sampling trips are to be used for estimating survival rates between sampling sites, trips, and years. Nephelometric turbidity unit (NTU) measurements will be collected and used to account for differences in capture probabilities due to changes in water clarity.

Objectives

- (1) Quantify capture probabilities by habitat/gear type, species, and fish size using short-term, closed, mark-recapture experiments,
- (2) Estimate juvenile HBC abundance using a closed population model approach,
- (3) Estimate the annual apparent survival for multiple size classes of juvenile HBC (batch marks and individual PIT-tags),
- (4) Estimate growth using a combination of modal progression (shifts in length-frequency) and direct ageing (individual capture histories),
- (5) Monitor changes in trout (RBT and BNT) relative abundance and distribution using data collected as part of study component 2,
- (6) Report total catch and size frequency for the fish community.

Although, this component of the study is independent of the rainbow trout natal origin study, these data and their analyses are considered necessary for informing managers of when and how to implement nonnative fish control measures at the Little Colorado River.

The respondent is expected to provide the sampling design, methods, and personnel costs needed for conducting field work, analyses, write-up, travel, lodging and board (i.e., in reference to Annual Age-0 Marking Effort Conducted at Lees Ferry). This study plan should include all field logistical components (e.g., sampling schedule, personnel, study areas, mode of transport, and equipment). Otherwise, all equipment, supplies and logistical costs will be covered by GCMRC Biology and Logistical Programs (refer to GCMRC Equipment, Supplies and Logistics). All technical personnel necessary for data collection effort will be provided by the awardee; with the exception of the technical boat operators (refer to **Study Components 1, 2 & 4**). Excluding the logistics required for the downstream river trips, the awardee must make the necessary arrangements for the lodging and accommodations of his/her personnel.

GCMRC Equipment, Supplies and Logistics

All costs associated with logistics will be supported by GCMRC. A list of equipment, supplies and personnel that are to be provided by GCMRC, these items include:

- (1) Lees Ferry - electrofishing boats (two 16 ft. Osprey, aluminum hull), and equipment (generators, voltage pulsators, electrical harness, and electrodes).
- (2) Lees Ferry - tender boat (one 18 ft. john-boat or equivalent) will be provided for transporting contract personnel, gear/supplies and fish to the processing sites.
- (3) Lees Ferry - experienced technical boat operators (3), provided by GCMRC logistical awardee.
- (4) Marble Canyon and LCR - electrofishing boats (2), technical boat operators (2) and logistical support boats (2).
- (5) Study maps provided by GCMRC, GIS Department.
- (6) PIT-tags (15,000 134 Khz tags/yr), applicators and scanning equipment.
- (7) Data entry recorders (Getac GC145 Ruggedized Laptop [2]).
- (8) Other miscellaneous supplies and gear include: boat gas, measuring boards, scales, buckets, nets, etc.
- (9) Transport vehicles, boat trailers and boats.

Links/Relationships to Other Monitoring Projects

This proposed research project is to be closely coupled with other GCMRC monitoring projects owing to the hypothesized link between rainbow trout movement and density dependent or hydrological factors occurring in the Lees Ferry reach, and the perceived effect of rainbow trout has on humpback chub in Marble and Grand Canyons. As part of the Glen Canyon Adaptive Management Program there are a number of long-term monitoring projects (USGS, 2010) that should be used to provide additional capture history (PIT-tags and VIE tags) information for (1) trout mark-recapture data to inform the development of the EIM model, and (2) humpback chub

mark-recapture data to inform assessment (abundance, growth and survival). These long-term monitoring projects include:

- (1) Monitoring Lees Ferry Fishes (BIO 4.M2.10) –
 - a. Ongoing status of the Lees Ferry trout fishery (Adult and juvenile fish),
 - b. Rainbow trout early life stage survival (RTELSS)
- (2) Monitoring Mainstem Fishes (BIO 2.M4.10 – Ongoing downstream monitoring of nonnative fish distribution and relative abundance in the Colorado River mainstem (includes Diamond down),
- (3) Annual Nonnative Fish removal occurring between the Paria River and Badger Rapid, referred to as the PBR, and
- (4) Nonnative Fish removal in the Little Colorado river confluence area (56-66 RM)
- (5) Stock Assessment of Native Fish in Grand Canyon (BIO 2.R7.10) - age-structured mark recapture recruitment modeling update for adult humpback chub (Age- 4+),
- (6) Little Colorado River Humpback Chub Monitoring (BIO 2.R1.10) - annual point estimates for HBC population in the lower 13.57 km,
- (7) Mainstem HBC aggregation trips. - distribution and relative abundance of HBC in the mainstem.

Project Schedule

This project will be funded for one federal fiscal year. Based on the results of the proof of concept scenario for this year, additional periods of performance may be considered at a later date. Respondents to this solicitation should develop their budget and research plan based on the estimate of funding (\$245,000 annually, with logistical costs covered by GCMRC). Awardee is expected to attend GCMRC's Annual Fish Cooperators Meeting (late November/early December) to present preliminary findings and assessment criteria used in the decision making process for nonnative fish control actions. As stated above, the proposal and the data collection schedule should be developed in such a manner to adequately address the objectives included in this solicitation.

Products/Reports

- (1) Draft annual report with full analysis by December 1 of each year (annual report contingent on available funding and adequate progress)
- (2) Data delivered in standard USGS annual report format
- (3) Annual presentation provided at Annual Fish Cooperators Meeting (December)
- (4) Final report in USGS Open File Report format by June 1 of each year (Final report contingent on available funding and adequate progress)

STATEMENT OF FEDERAL INVOLVEMENT

USGS scientists at the GMCRC will have substantial involvement in all aspects of this project. A GCMRC fish Biologist that has expertise and experience in juvenile humpback chub mark recapture in the Colorado River mainstem, and rainbow trout research and monitoring in Grand Canyon and Lees Ferry will collaborate on all aspects of this project including planning, field

work, data analysis, and publication. Specifically, the fishery biologist will spend up to 40% of his/her time devoted to fulfilling the objectives of the Cooperative Agreement. Other GCMRC scientists David Ward and Bill Persons also have extensive expertise in this area and will be available to provide guidance and advice to the project team during all phases of this project. The logistic program is also involved by providing boats, food and transportation support for downstream trips.

References

- Barrett, P.J., and O.E. Maughan. 1995. Spatial habitat selection of roundtail chub (*Gila robusta*) in two Central Arizona streams. *Southwestern Naturalist* 40:301-307.
- Carothers, S. W., and Brown, B.T., 1991, *The Colorado River through Grand Canyon*. University of Arizona Press, Tucson, AZ.
- Clarkson, R.W., and M.R. Childs. 2000. Temperature effects of hypolimnial-release dams on early life stages of Colorado River basin big-river fishes. *Copeia* 2:402-412.
- Coggins, L.G., Jr., Pine, W.E., III, Walters, C.J., Van Haverbeke, D.R., Ward, D., and Johnstone, H.C., 2006, Abundance trends and status of the Little Colorado River population of humpback chub: *North American Journal of Fisheries Management*, v. 26, no. 1, p. 233–245.
- Coggins, L.G., and Walters, C.J., 2009, Abundance trends and status of the Little Colorado River population of humpback chub: an update considering data from 1989–2008: U.S. Geological Survey Open–File Report 2009–1075, 18 p.
- Coggins, L.G., Jr., and Pine, W.E., III, 2010, Development of a temperature-dependent growth model for the endangered humpback chub using capture-recapture data: *The Open Fish Science Journal*, v. 3, p. 122-131.
- Coggins, L.G., Jr., Yard, M.D., and Pine, W.E., III, 2011, Nonnative fish control in the Colorado River in Grand Canyon, Arizona: an effective program or serendipitous timing?: *Transactions of the American Fisheries Society*, *in press*.
- Ingram, H., A.D. Tarlock, and C.R. Oggins. 1991. *The law and politics of the operation of Glen Canyon Dam*. Colorado River Ecology and Dam Management. National Academy Press, Washington, D.C., USA.
- Johnson, J.E., and R.T. Hines. 1999. Effect of suspended sediment on vulnerability of young razorback suckers to predation. *Transactions of the American Fisheries Society* 128:648-655.
- Korman, J., S.M. Wiele, and M. Torizzo. 2004. Modelling effects of discharge on habitat quality and dispersal of juvenile humpback chub (*Gila cypha*) in the Colorado River, Grand Canyon. *River Research and Applications* 20: 379-400.
- Korman, J., Yard, M., Walters, C., and Coggins, L.G., 2009a, Effects of fish size, habitat, flow, and density on capture probabilities of age-0 rainbow trout estimated from electrofishing at discrete sites in a large river, *Transactions of the American Fisheries Society*, 138:58-75.
- Korman, J., and Campana, S.E., 2009b, Effects of hydropeaking on nearshore habitat use and growth of age-0 rainbow trout in a large regulated river, *Transactions of the American Fisheries Society*, 138:76-87.
- Korman, J., Kaplinski, M., and Melis, T.S., 2010, Effects of high-flow experiments from Glen Canyon dam on abundance, growth, and survival rates of early life stages of rainbow trout in the Lees Ferry reach of the Colorado River: U.S. Geological Survey Open–File Report 2010–1034, 31 p.

- Korman, J., Kaplinski, M., and Melis, T. S., 2011, Effects of fluctuating flows during spawning and incubation on rainbow trout hatching success and age-0 abundance in a large regulated river: Transactions of the American Fisheries Society, *in press*.
- Maddux, H.R., D.M. Kubly, J.S.DeVos, W.R. Persons, R.Staedicke, and R.L. Wright. 1987. Effects of varied flow regimes on aquatic resources of Glen and Grand Canyons. Final Report to the U.S. Bureau of Reclamation, Glen Canyon Environmental Study, Arizona Game and Fish Department, Phoenix. ACCESS: http://www.gcmrc.gov/library/reports/biological/Fish_studies/Maddux1987.pdf
- Makinster, A.S., Persons, W.R., Avery, L.A., and Bunch, A.J., 2010, Colorado River fish monitoring in Grand Canyon, Arizona – 2000 to 2009 Summary: U.S. Geological Survey Open-File Report 2010-1246, 26 p.
- McKinney, T., Speas, D.W., Rogers, R.S., and Persons, W.R., 2001, Rainbow trout in a regulated river below Glen Canyon Dam, Arizona, following increased minimum flows and reduced discharge variability, North American Journal of Fisheries Management, 21:216-222.
- Minckley, W.L., Deacon, J.E., 1968, Southwestern fishes and the enigma of endangered species. Science 159:1424-1432.
- Minckley, W.L., 1991, Native fishes of the Grand Canyon region: An obituary? Pages 124-177., in Marzolf G.R., (ed). Colorado River Ecology and Dam Management. National Academy Press, Washington, DC.
- Mietz, S.W., 2003, Evaluating historical electrofishing distribution in the Colorado River, Arizona, based on shoreline substrate, M.Sc. thesis, Department of Biology, Northern Arizona University, Flagstaff, AZ.
- Persons W., Ward D., Avery L., and Burtner A., 2011, Standardized methods for Grand Canyon fisheries research. U.S. Geological Survey, *in review*
- Pine, B., Allen, M, Frazer, T., Finch, C., Gerig, B., Dodrill, M., Limburg, K., Hayden, T., and Korman, J., 2009, Nearshore Ecology (NSE) of Grand Canyon Fish 2009 Annual Progress Report. <http://floridarivers.ifas.ufl.edu/NSE/NSE%202009%20report.pdf>
- Pine, B., Allen, M, Frazer, T., Finch, C., Gerig, B., Dodrill, M., Limburg, K., Hayden, T., and Korman, J., 2010, Nearshore Ecology (NSE) of Grand Canyon Fish 2009 Annual Progress Report. <http://floridarivers.ifas.ufl.edu/NSE/NSE%202009%20report.pdf>
- Poff, N.L., and J.V. Ward. 1989. Implications of streamflow variability and predictability for lotic community structure: a regional analysis of streamflow patterns. Canadian Journal of Fisheries and Aquatic Sciences 46:1805-1818.
- Speas, D.W., Walters, C.J., Ward, D.L., and Rogers, R.S., 2004, Effects of intraspecific density and environmental variables on electrofishing catchability of brown and rainbow trout in the Colorado River. North American Journal of Fisheries Management 24:586-596.
- Stevens, L.E., Shannon J.P., and Blinn D.W., 1997, Colorado River benthic ecology in Grand Canyon, Arizona, USA: dam, tributary and geomorphic influences. Regulated Rivers 13:129-149.
- Topping, D.J., D.M. Rubin, and L.E. Vierra, Jr. 2000. Colorado River sediment transport 1. Natural sediment supply limitation and the influence of Glen Canyon Dam. Water Resources Research 36:515-542.
- Tyus, H.M. and J.F. Saunders, III. 2000. Nonnative fish control and endangered fish recovery: lessons from the Colorado River. Fisheries 25:17-24.
- U.S. Department of the Interior, 1996, Record of decision (ROD) on the operation of Glen Canyon Dam final Environmental Impact Statement (EIS), Bureau of Reclamation, Salt Lake City, UT, <http://www.gcmrc.gov/library/reports/LawoftheRiver/ROD1996.pdf>

- U.S. Bureau of Reclamation, 2011, Public review draft environmental assessment: non-native fish control downstream from Glen Canyon Dam: U.S. Bureau of Reclamation, Upper Colorado Region, Salt Lake City, Utah, 103 p.
<http://www.usbr.gov/uc/envdocs/ea/gc/mnfc/NNFC-EA.pdf>
- U.S. Geological Survey, 2010. Grand Canyon Monitoring and Research Center: Fiscal Year 2010 Annual Project Report, Glen Canyon Adaptive Management Program, Flagstaff, AZ, 100 p. <http://www.usbr.gov/uc/rm/amp/twg/mtgs/09sep29/index.html>
- Valdez, R.A., and Ryel, R.J., 1995, Life history and ecology of humpback chub (*Gila cypha*) in the Colorado River, Grand Canyon, Arizona. Final report to the Bureau of Reclamation, Salt Lake City, Utah, contract no. 0-CS-40-09110: Logan, Utah, BIO/WEST Report, Inc. ACCESS: http://www.gcmrc.gov/library/reports/biological/Fish_studies/Biowest/Valdez1995.pdf
- Ward J.V., K. Tockner, and F. Schiemer. 1999. Biodiversity of floodplain river ecosystems: ecotones and connectivity. *Regulated Rivers: Research & Management* 15:125-139
- Yard, M.D. 2003. Light availability and aquatic primary production: Colorado River, Glen and Grand Canyons, AZ. Doctoral Dissertation. Northern Arizona University, Flagstaff, AZ. ACCESS: <http://www.gcmrc.gov/library/reports/biological/Foodbase/Yard2003.pdf>
- Yard, M.D., Coggins, L.G., Jr., Baxter, C.V., Bennett, G.E., and Korman, J., 2011, Trout piscivory in the Colorado River, Grand Canyon: effects of turbidity, temperature, and fish prey availability: *Transactions of the American Fisheries Society*, *in press*.

AWARD TERMS AND CONDITIONS for Cooperative Agreements (Other award vehicles, if utilized, will carry their applicable terms and conditions.)

Cash Management and Financial Reporting Requirements

1. Annual Financial Reports.

The awardee will submit annual STANDARD FORM 425, FEDERAL FINANCIAL REPORT(S) for each individual USGS award. The SF 425 is available at - http://www.whitehouse.gov/omb/grants_forms. The SF 425 will be due ninety (90) calendar days after the grant year (i.e., 12 months after the approved effective date of the grant agreement and every 12 months thereafter until the expiration date of the grant agreement). USGS acknowledges that this annual reporting schedule may not always correspond with a specific budget period. The SF 425 must be submitted electronically through the FedConnect Message Center (www.fedconnect.net). If after 90 days, awardee has not submitted a report, the awardee's account in ASAP will be placed in a manual review status until the report is submitted.

2. Final Financial Report.

a. The awardee will liquidate all obligations incurred under the award and submit a final STANDARD FORM 425, FEDERAL FINANCIAL REPORT through FedConnect (www.fedconnect.net) no later than 90 calendar days after the grant/cooperative agreement completion date. The SF 425 is available at - http://www.whitehouse.gov/omb/grants_forms. Awardee will promptly return any unexpended federal cash advances or will complete a final draw from ASAP to obtain any remaining amounts due. Once 120 days has passed since the grant/agreement completion date, the ASAP subaccount for this award may be closed by USGS at any time.

b. Subsequent revision to the final SF 425 will be considered only as follows -

- (i) When the revision results in a balance due to the Government, the awardee must submit a revised final Federal Financial Report (SF 425) and refund the excess payment whenever the overcharge is discovered, no matter how long the lapse of time since the original due date of the report.
- (ii) When the revision represents additional reimbursable costs claimed by the awardee, a revised final SF 425 may be submitted to the Contracting Officer with an explanation. If approved, the USGS will either request and pay a final invoice or reestablish the ASAP subaccount to permit the awardee to make a revised final draw. Any revised final report representing additional reimbursable amounts must be submitted no later than 1 year from the due date of the original report, i.e., 15 months following the agreement completion date. USGS will not accept any revised SF 425 covering additional expenditures after that date and will return any late request for additional payment to the awardee.

Publications

Please see No Endorsement Provision for additional regulation of publications.

a. Acknowledgement

Awardee is required to place an acknowledgment of USGS support and a disclaimer, as appropriate, on any publication written or published with such support and, if feasible, on any publication reporting the results of, or describing, a grant-supported activity. An acknowledgment shall be to the effect that:

The project described in this publication was supported by Grant/Cooperative Agreement Number _____ from the United States Geological Survey. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the USGS.

b. Publication

Publication of the results of any project carried out under this assistance award is authorized in professional journals, trade magazines, or may be made by the USGS. Manuscripts submitted to journals or professional publications for publication shall be accompanied by the following notation:

This manuscript is submitted for publication with the understanding that the United States Government is authorized to reproduce and distribute reprints for Governmental purposes.

One copy of each article planned for publication shall be submitted to the USGS Project Officer simultaneously with its submission for publication. One reprint of each published article shall be submitted to the USGS Project Office immediately following publication.

c. Departmental Manual Requirements

505 DM requires that two copies of each publication produced under a Grant or Cooperative Agreement be sent to the Natural Resources Library with a transmittal that identifies the sender and the publication. The address of the library is:

U.S. Department of the Interior
Natural Resources Library
Division of Information and Library Services
Gifts and Exchange Section
18th and C Streets, NW
Washington, DC 20240

Publications issued on the work performed under this agreement must acknowledge the support and collaboration of the Department of the Interior, USGS and the Awardee under Assistance Award Number _____

Payment

If using ASAP, payments under financial assistance awards must be made using the Department of the Treasury Automated Standard Application for Payments (ASAP) system (www.asap.gov).

- a. The Recipient agrees that it has established or will establish an account with ASAP. USGS will initiate enrollment in ASAP. If the Recipient does not currently have an ASAP account, they must designate an individual (name, title, address, phone and e-mail) who will serve as the Point of Contact (POC).
- b. With the award of each grant/cooperative agreement, a sub-account will be set up from which the Recipient can draw down funds. After recipients complete enrollment in ASAP and link their banking information to the USGS ALC (14080001), it may take up to 10 days for sub-accounts to be activated and for funds to be authorized for drawdown in ASAP.
- c. Inquiries regarding payment should be directed to:

Regional Finance Center	Time Zone	Phone Number	Business Hours	Mailing Address
Philadelphia	Eastern	(215) 516-8021	7:30 a.m - 4:00 p.m.	P.O. Box 51317 Philadelphia, PA 19115-6317
Kansas City	Central	(816) 414-2100	7:30 a.m - 4:00 p.m.	P.O. Box 12599-0599 Kansas City, MO 64116-0599
San Francisco	Mountain or Pacific	(510) 594-7182	7:30 a.m - 4:00 p.m.	P.O. Box 24700 Oakland, CA 94623-1700

- d. Payments may be drawn in advance only as needed to meet immediate cash disbursement needs.

Dissemination of results

The Principal Investigator is strongly encouraged to disseminate research results promptly to the scientific community and appropriate professional organizations; local, state, regional and federal agencies; and the general public. Research findings must be published in scientific or technical journals, in a peer-reviewed form.

The Government may publish, reproduce, and use all technical data developed as a result of this award in any manner and for any purpose, without limitation, and may authorize others to do the same. Data generated as a part of work funded under this program is not subject to a proprietary period of exclusive data access. Any data generated must be made available to the USGS as soon as it is available. The USGS reserves a royalty-free, nonexclusive and

irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use the data for Government purposes. Any project funded in whole or part with funds obtained under this program shall fall under this clause. The USGS Contracting Officer is the sole person to decide which data fall into this category if questions arise.

GENERAL PROVISIONS

Cost Principles, Audit, and Administrative Requirements

The Recipient shall be subject to the following OMB circulars and regulations, which are incorporated herein by reference. Copies of these Circulars can be obtained from the Internet at: <http://www.whitehouse.gov/omb/circulars/index.html>.

Educational Institutions

- a. 2 CFR 220, Cost Principles for Educational Institutions (OMB Circular No. A-21)
- b. 2 CFR 215, Uniform Administrative Requirements for Grants and Other Agreements with Institutions of Higher Education, hospitals, and Other Non-profit Organizations (OMB Circular No. A-110), as implemented in 43 CFR Part 12, Subpart F.
- c. OMB Circular No. A-133, Audits of States, Local Governments and Non-Profit Organizations, as implemented in 43 CFR Part 12, Subpart A: Administrative and Audit Requirements and Cost Principles for Assistance Programs

State and Local Governments

- a. 2 CFR 225, Cost Principles for State, Local, and Indian Tribal Governments (OMB Circular A-87)
- b. OMB Circular A-102, Grants and Cooperative Agreements with State and Local Governments; as implemented in 43 CFR Part 12, Subpart C
- c. OMB Circular No. A-133, Audits of States, Local Governments and Non-Profit Organizations, as implemented in 43 CFR Part 12, Subpart A: Administrative and Audit Requirements and Cost Principles for Assistance Programs

Non-Profit Organizations

- a. 2 CFR Part 230, Cost Principles for Non-Profit Organizations (OMB Circular A-122), except recipients listed in Appendix C to Part 230 are subject to Federal Acquisition Regulation (FAR) Subpart 31.2, Contracts with Commercial Organizations (Contract Cost Principles and Procedures)
- b. 2 CFR 215, Uniform Administrative Requirements for Grants and Other Agreements with Institutions of Higher Education, hospitals, and Other Non-profit Organizations (OMB Circular No. A-110), as implemented in 43 CFR Part 12, Subpart F.

c. OMB Circular No. A-133, Audits of States, Local Governments and Non-Profit Organizations, as implemented in 43 CFR Part 12, Subpart A: Administrative and Audit Requirements and Cost Principles for Assistance Programs

Organizations for Profit, Individuals, and Others Not Covered Above

a. Federal Acquisition Regulation (FAR) Subpart 31.2, Contracts with Commercial Organizations (Contract Cost Principles and Procedures)

b. 2 CFR 215, Uniform Administrative Requirements for Grants and Other Agreements with Institutions of Higher Education, hospitals, and Other Non-Profit Organizations (OMB Circular No. A-110), as implemented in 43 CFR Part 12, Subpart F,

c. FAR Subpart 42.1, Contract Audit Services; FAR Subpart 42.7, Indirect Cost Rates; FAR Subpart 42.8, Disallowance of Costs

Additional Regulations

This award is subject to the following additional Government-wide regulations:

- 2 CFR 180, Government Debarment and Suspension (Nonprocurement)
- 2 CFR 1400, Department of the Interior Nonprocurement Debarment and Suspension

This award is subject to the following additional regulations of the U.S. Department of the Interior:

- 43 CFR Part 12, Subpart E: Buy American Requirements for Assistance Programs
- 43 CFR Part 17, Subpart A: Nondiscrimination on the Basis of Race, Color, or National Origin
- 43 CFR Part 17, Subpart B: Nondiscrimination on the Basis of Handicap
- 43 CFR Part 17, Subpart C: Nondiscrimination on the Basis of Age
- 43 CFR Part 17, Subpart E: Enforcement of Nondiscrimination on the Basis of Handicap in Programs or Activities Conducted by the Department of the Interior
- 43 CFR Part 18, New Restrictions on Lobbying
- 43 CFR Part 41, Nondiscrimination on the basis of sex in education programs or activities receiving Federal financial assistance [*Applies only if this award provides assistance to an education program or student(s).*]
- 43 CFR Part 43, Governmentwide Requirements for Drug Free Workplace

Additional Articles Required For Compliance with Statute or Regulation

a. Buy American Act Notice (43 CFR Sec. 12.710 (c))

Pursuant to Sec. 307(b) of the Department of the Interior and Related Agencies Appropriations Act. FY 2000, Public Law 106-113, please be advised of the following:

In case of any equipment or product that may be authorized to be purchased with financial assistance provided using funds made available in this Act, it is the sense of the Congress that entities receiving the assistance should, in expending the assistance, purchase only American-made equipment and products.

b. Metric Conversion (43 CFR Sec 12.915)

All progress and final reports, other reports, or publications produced under this award shall employ the metric system of measurements to the maximum extent practicable. Both metric and inch-pound units (dual units) may be used if necessary during any transition period(s). However, the recipient may use non-metric measurements to the extent the recipient has supporting documentation that the use of metric measurements is impracticable or is likely to cause significant inefficiencies or loss of markets to the recipient, such as when foreign competitors are producing competing products in non-metric units.

c. Anti-Lobbying (43 CFR Part 18)

The Recipient shall not use any part of the appropriated funds from the Department of Interior for any activity or the publication or distribution of literature that in any way tends to promote public support or opposition to any legislative proposal on which Congressional action is not complete.

d. Use of Government-Owned Vehicles

(a) When it is in the interests of the parties, and with the concurrence of the USGS Contracting Officer, the USGS Program Officer may authorize the Awardee to use a Government-owned vehicle (GOV) to perform work within the scope of this Agreement. The specific GOV provided and the periods of use by the Awardee are subject to availability and the mutual agreement of the parties.

(b) GOVs may only be used by bona fide employees of the Awardee for performance of work within the scope of this Agreement. Awardee employees shall not use any GOV for commuting to and from home and shall not store any GOV other than at the worksite except as required to perform fieldwork under the scope of this Agreement and with written authorization of the USGS Program Officer.

(c) Before any Awardee employee drives a GOV, the employee's supervisor must assure that the employee is a least 18 years of age, has a valid license to drive the type of vehicle to be used and a clean driving record, and understands all applicable state, local and federal (including USGS) laws and regulations.

(d) Before the first use of a GOV under this Agreement, the Awardee shall provide the USGS Contracting Officer with proof of liability insurance or self insurance for at least the following coverage: \$200,000.00 per person and \$500,000.00 per occurrence for bodily injury; and \$20,000.00 per occurrence for property damage. Subject to the limitations and conditions of any state or local laws limiting tort claims, the Awardee agrees to accept responsibility for all tort claims resulting from accidents occurring while the GOV is under the control of Awardee

employees. In the event of an accident while the GOV is in use by an Awardee employee, the Awardee shall immediately submit a report using Standard Form 91, Operator's Report of Motor Vehicle Accident, and 91A, Investigative Report of Motor Vehicle Accident, or equivalent forms to the USGS Contracting Officer.

(e) Reimbursement of reasonable costs for fuel and/or emergency supplies required to safely operate the GOV and necessary to perform work within the scope of this Agreement are allowable in accordance with the cost principles applicable to the Awardee as outlined in Article VIII. The USGS will provide the GOV's preventive maintenance and related supplies unless otherwise agreed to.

(f) Use of a GOV is subject to OMB Circular A-110, part 33, regarding the use of Government-owned controlled property, 41 CFR 101-39.2 and 39.3, 41 CFR 102-34, US Geological Survey Manual Chapters 409.1 and 451.1, and all applicable state and local laws and regulations.

d. The Seat Belt Provision (43 CFR Sec. 12.2 (e))

Recipients of grants/cooperative agreements and/or sub-awards are encouraged to adopt and enforce on-the-job seat belt use policies and programs for their employees when operating company owned, rented, or personally owned vehicles. These measures include, but are not limited to, conducting education, awareness, and other appropriate programs for their employees about the importance of wearing seatbelts and the consequences of not wearing them.

e. Prohibition on Text Messaging and Using Electronic Equipment Supplied by the Government while Driving (Executive Order 13513)

Executive Order 13513, Federal Leadership On Reducing Text Messaging While Driving, was signed by President Barack Obama on October 1, 2009 (ref.: <http://edocket.access.gpo.gov/2009/pdf/E9-24203.pdf>). This Executive Order introduces a Federal Government-wide prohibition on the use of text messaging while driving on official business or while using Government-supplied equipment. Additional guidance enforcing the ban will be issued at a later date. In the meantime, please adopt and enforce policies that immediately ban text messaging while driving company-owned or rented vehicles, government-owned or leased vehicles, or while driving privately owned vehicles when on official government business or when performing any work for on behalf of the government.

f. Use of U.S. Flag Air Carriers

Any air transportation to, from, between or within a country other than the U.S. of persons or property, the expense of which will be paid in whole or in part by U.S Government funding, must be performed by, or under a code-sharing arrangement with, a U.S. flag air carrier if service provided by such a carrier is "available" (49 U.S.C. 40118, commonly referred to as the Fly America Act). Tickets (or documentation for electronic tickets) must identify the U.S. flag air carrier's designator code and flight number. See the Federal Travel Regulation §301-10.131 - §301-10.143 for definitions, exceptions, and documentation requirements. (See also Comp. Gen. Decision B-240956, dated September 25, 1991.)

g. Activities on Private and Other Non-Federal Lands

1) The awardee shall comply with applicable State, local and Tribal government laws, including laws relating to private property rights.

(select this box if it does not involve BRD research) *This award does not involve funds appropriated to the biological research activity of the USGS. Therefore the following subsection of this provision does NOT apply:*

(select this box if it does involve BRD research) *This award involves funds appropriated to the biological research activity of the USGS. Therefore the following subsection of this provision applies:*

2) Funds provided for the biological research activity in USGS annual appropriations may not be used to conduct surveys on private property, unless specifically authorized in writing by the property owner.

a) Accordingly, the awardee shall not enter non-Federal real property for the purpose of collecting information regarding the property, unless the owner of the property has –

- (i) consented in writing to the entry;
- (ii) been provided notice of that entry; and
- (iii) been notified that any raw data collected from the property must be made available at no costs, if requested by the land owner.

b) In this provision, the term “recipient” includes any person that is an officer, employee, or agent of the recipient, including a person acting pursuant to a contract or sub-agreement.

h. No Endorsement Provision (43 CFR 12.2(d))

Paragraph 2) applies to all awards.

(select appropriate box below)

The remainder of this provision does not apply.

The remainder of this provision applies because:

- *the principal purpose of the agreement is a partnership where the recipient/partner contributes resources to promote agency programs or publicize agency activities, assists in fundraising, or provides assistance to the agency; and*
- *the agreement authorizes joint dissemination of information and promotion of activities being supported; and*
- *the recipient is not a State government, a local government, or a Federally-recognized Indian tribal government.*

1) Recipient shall not publicize or otherwise circulate, promotional material (such as advertisements, sales brochures, press releases, speeches, still and motion pictures, articles, manuscripts or other publications) which states or implies governmental, Departmental, bureau, or government employee endorsement of a product, service, or position which the recipient represents. No release of information relating to this award may state or imply that the Government approves of the recipient's work products, or considers the recipient's work product to be superior to other products or services.

2) All information submitted for publication or other public releases of information regarding this project shall carry the following disclaimer:

The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the opinions or policies of the U.S. Government. Mention of trade names or commercial products does not constitute their endorsement by the U.S. Government.

3) Recipient must obtain prior Government approval for any public information releases concerning this award which refer to the Department of the Interior or any bureau or employee (by name or title). The specific text, layout photographs, etc. of the proposed release must be submitted with the request for approval.

4) A recipient further agrees to include this provision in a subaward to any subrecipient, except for a subaward to a State government, a local government, or to a Federally-recognized Indian tribal government.

i. Access to Research Data

1) By regulation (43 CFR 12.936), recipients that are institutions of higher education, hospitals, or non-profit organizations are required to release research data first produced in a project supported in whole or in part with Federal funds that are cited publicly and officially by a Federal agency in support of an action that has the force and effect of law (e.g., regulations and administrative orders). "Research data" is defined as the recorded factual material commonly accepted in the scientific community as necessary to validate research findings. It does not include preliminary analyses; drafts of scientific papers; plans for future research; peer reviews; communications with colleagues; physical objects (e.g., laboratory samples, audio or video tapes); trade secrets; commercial information; materials necessary to be held confidential by a researcher until publication in a peer-reviewed journal; information that is protected under the law (e.g., intellectual property); personnel and medical files and similar files, the disclosure of which would constitute an unwarranted invasion of personal privacy; or information that could be used to identify a particular person in a research study.

2) These requirements do not apply to commercial organizations or to research data produced by State or local governments. However, if a State or local governmental grantee contracts with an educational institution, hospital, or non-profit organization, and the contract results in covered research data, those data are subject to these disclosure requirements.

3) Requests for the release of research data subject to this policy are required to be made to USGS, which will handle them as FOIA requests under 43 CFR 2.25. If the data are publicly available, the requestor will be directed to the public source. Otherwise, the USGS Contracting Officer/Grants Officer, in consultation with the affected recipient and the PI, will handle the request. This policy also provides for assessment of a reasonable fee to cover recipient costs as well as (separately) the USGS costs of responding.

j. Government Furnished Property or Property Authorized For Purchase

The recipient shall comply with 2CFR Part 215, Section 215.34. Title to nonexpendable personal property acquired wholly or in part with Federal funds shall be vested in the Recipient unless otherwise specified in the award document. The Recipient shall retain control and maintain a property inventory of such property as long as there is a need for such property to accomplish the purpose of the project, whether or not the project continues to be supported by Federal funds. When there is no longer a need for such property to accomplish the purpose of the project, the Recipient shall use the property in connection with other Federal awards the Recipient has received. Under no circumstances shall title to such property be vested in a sub-tier recipient. Disposal of nonexpendable personal property shall be in accordance with the applicable OMB circular.

GFP provided under this agreement is for use during mechanical removal of rainbow trout for individual river trips only. The GFP will not be vested with the awardee.

k. Trafficking in Persons (22 U.S.C. § 7104(g))

1. Provisions applicable to a recipient that is a private entity.

(a) You as the recipient, your employees, subrecipients under this award, and subrecipients' employees may not--

(1) Engage in severe forms of trafficking in persons during the period of time that the award is in effect;

(2) Procure a commercial sex act during the period of time that the award is in effect; or

(3) Use forced labor in the performance of the award or subawards under the award.

b) We as the Federal awarding agency may unilaterally terminate this award, without penalty, if you or a subrecipient that is a private entity --

(1) Is determined to have violated a prohibition in paragraph a.1 of this award term; or

(2) Has an employee who is determined by the agency official authorized to terminate the award to have violated a prohibition in paragraph a.1 of this award term through conduct that is either—

i. Associated with performance under this award; or

ii. Imputed to you or the subrecipient using the standards and due process for imputing the conduct of an individual to an organization that are provided in 2 CFR part 180, "OMB Guidelines to Agencies on Governmentwide Debarment and Suspension (Nonprocurement)," as implemented by our agency at 43 CFR Part 42.

2. Provisions applicable to any recipient.

- (a) You must inform us immediately of any information you receive from any source alleging a violation of a prohibition in paragraph a.1 of this award term.
- (b) Our right to terminate unilaterally that is described in paragraph a.2 or b of this section:
 - (1) Implements section 106(g) of the Trafficking Victims Protection Act of 2000 (TVPA), as amended (22 U.S.C. 7104(g)), and
 - (2) Is in addition to all other remedies for noncompliance that are available to us under this award.
- (c) You must include the requirements of paragraph a.1 of this award term in any subaward you make to a private entity.

3. Definitions. For purposes of this award term:

- (a) “Employee” means either:
 - (1) An individual employed by you or a subrecipient who is engaged in the performance of the project or program under this award; or
 - (2) Another person engaged in the performance of the project or program under this award and not compensated by you including, but not limited to, a volunteer or individual whose services are contributed by a third party as an in-kind contribution toward cost sharing or matching requirements.
- (b) “Forced labor” means labor obtained by any of the following methods: the recruitment, harboring, transportation, provision, or obtaining of a person for labor or services, through the use of force, fraud, or coercion for the purpose of subjection to involuntary servitude, peonage, debt bondage, or slavery.
- (c) “Private entity”:
 - (1) Means any entity other than a State, local government, Indian tribe, or foreign public entity, as those terms are defined in 2 CFR 175.25.
 - (2) Includes:
 - i. A nonprofit organization, including any nonprofit institution of higher education, hospital, or tribal organization other than one included in the definition of Indian tribe at 2 CFR 175.25(b).
 - ii. A for-profit organization.
- (d) Severe forms of trafficking in persons,” “commercial sex act,” and “coercion” have the meanings given at section 103 of the TVPA, as amended (22 U.S.C. 7102).

1. Transparency Act Subaward and Executive Compensation Reporting (2 CFR Part 170).

a. Reporting of first-tier subawards.

- 1. Applicability. Unless you are exempt as provided in paragraph d. of this award term, you must report each action that obligates \$25,000 or more in Federal funds that does not include Recovery funds (as defined in section 1512(a)(2) of the American Recovery and Reinvestment Act of 2009, Pub. L. 111–5) for a subaward to an entity (see definitions in paragraph e. of this award term).
- 2. Where and when to report.
 - (i) You must report each obligating action described in paragraph a.1. of this award term to <http://www.fsrc.gov>.
 - (ii) For subaward information, report no later than the end of the month following the month in which the obligation was made. (For example, if the obligation was

made on November 7, 2010, the obligation must be reported by no later than December 31, 2010.)

3. What to report. You must report the information about each obligating action that the submission instructions posted at <http://www.fsr.gov>.

b. Reporting Total Compensation of Recipient Executives.

1. Applicability and what to report. You must report total compensation for each of your five most highly compensated executives for the preceding completed fiscal year, if—

- (i) the total Federal funding authorized to date under this award is \$25,000 or more;
- (ii) in the preceding fiscal year, you received—

- a. 80 percent or more of your annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and
- b. \$25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and

(iii) The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at <http://www.sec.gov/answers/excomp.htm>).

2. Where and when to report. You must report executive total compensation described in paragraph b.1. of this award term:

- (i) As part of your registration profile at <http://www.ccr.gov>.
- (ii) By the end of the month following the month in which this award is made, and annually thereafter.

c. Reporting of Total Compensation of Subrecipient Executives.

1. Applicability and what to report. Unless you are exempt as provided in paragraph d. of this award term, for each first-tier subrecipient under this award, you shall report the names and total compensation of each of the subrecipient's five most highly compensated executives for the subrecipient's preceding completed fiscal year, if—

- (i) in the subrecipient's preceding fiscal year, the subrecipient received—
 - (A) 80 percent or more of its annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and
 - (B) \$25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts), and Federal financial assistance subject to the Transparency Act (and subawards); and
- (ii) The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the

compensation information, see the U.S. Security and Exchange Commission total compensation filings at <http://www.sec.gov/answers/execomp.htm>.)

2. Where and when to report. You must report subrecipient executive total compensation described in paragraph c.1. of this award term:

(i) To the recipient.

(ii) By the end of the month following the month during which you make the subaward. For example, if a subaward is obligated on any date during the month of October of a given year (i.e., between October 1 and 31), you must report any required compensation information of the subrecipient by November 30 of that year.

d. Exemptions

If, in the previous tax year, you had gross income, from all sources, under \$300,000, you are exempt from the requirements to report:

(i) Subawards,
and

(ii) The total compensation of the five most highly compensated executives of any subrecipient.

e. Definitions. For purposes of this award term:

1. Entity means all of the following, as defined in 2 CFR part 25:

(i) A Governmental organization, which is a State, local government, or Indian tribe;

(ii) A foreign public entity;

(iii) A domestic or foreign nonprofit organization;

(iv) A domestic or foreign for-profit organization;

(v) A Federal agency, but only as a subrecipient under an award or subaward to a non-Federal entity.

2. Executive means officers, managing partners, or any other employees in management positions.

3. Subaward:

(i) This term means a legal instrument to provide support for the performance of any portion of the substantive project or program for which you received this award and that you as the recipient award to an eligible subrecipient.

(ii) The term does not include your procurement of property and services needed to carry out the project or program (for further explanation, see Sec. __ .210 of the attachment to OMB Circular A-133, "Audits of States, Local Governments, and Non-Profit Organizations").

(iii) A subaward may be provided through any legal agreement, including an agreement that you or a subrecipient considers a contract.

4. Subrecipient means an entity that:

(i) Receives a subaward from you (the recipient) under this award; and

(ii) Is accountable to you for the use of the Federal funds provided by the subaward.

5. Total compensation means the cash and noncash dollar value earned by the executive during the recipient's or subrecipient's preceding fiscal year and includes the following (for more information see 17 CFR 229.402(c)(2)):

a. Salary and bonus.

- b. Awards of stock, stock options, and stock appreciation rights. Use the dollar amount recognized for financial statement reporting purposes with respect to the fiscal year in accordance with the Statement of Financial Accounting Standards No. 123 (Revised 2004) (FAS 123R), Shared Based Payments.
 - c. Earnings for services under non-equity incentive plans. This does not include group life, health, hospitalization or medical reimbursement plans that do not discriminate in favor of executives, and are available generally to all salaried employees.
 - d. Change in pension value. This is the change in present value of defined benefit and actuarial pension plans.
 - e. Above-market earnings on deferred compensation which is not tax-qualified.
 - f. Other compensation, if the aggregate value of all such other compensation (e.g. severance, termination payments, value of life insurance paid on behalf of the employee, perquisites or property) for the executive exceeds \$10,000.
- m. Central Contractor Registration and Universal Identifier Requirements (2 CFR Part 25)
- A. Requirement for Central Contractor Registration (CCR)
Unless you are exempted from this requirement under 2 CFR 25.110, you as the recipient must maintain the currency of your information in the CCR until you submit the final financial report required under this award or receive the final payment, whichever is later. This requires that you review and update the information at least annually after the initial registration, and more frequently if required by changes in your information or another award term.
 - B. Requirement for Data Universal Numbering System (DUNS) Numbers
If you are authorized to make subawards under this award, you:
 - 1. Must notify potential subrecipients that no entity (*see* definition in paragraph C of this award term) may receive a subaward from you unless the entity has provided its DUNS number to you.
 - 2. May not make a subaward to an entity unless the entity has provided its DUNS number to you.
 - C. Definitions
For purposes of this award term:
 - 1. Central Contractor Registration (CCR) means the Federal repository into which an entity must provide information required for the conduct of business as a recipient. Additional information about registration procedures may be found at the CCR Internet site (currently at <http://www.ccr.gov>).
 - 2. Data Universal Numbering System (DUNS) number means the nine-digit number established and assigned by Dun and Bradstreet, Inc. (D&B) to uniquely identify business entities. A DUNS number may be obtained from D&B by telephone (currently 866-705-5711) or the Internet (currently <http://fedgov.dnb.com/webform>).
 - 3. Entity, as it is used in this award term, means all of the following, as defined at 2 CFR part 25, subpart C:
 - a. A Governmental organization, which is State, local government, or Indian Tribe;
 - b. A foreign public entity;

- c. A domestic or foreign nonprofit organization;
 - d. A domestic or foreign for-profit organization; and
 - e. A Federal agency, but only as a subrecipient under an award or subaward to a non-Federal entity.
4. Subaward:
- a. This term means a legal instrument to provide support for the performance of any portion of the substantive project or program for which you received this award and that you as the recipient award to an eligible subrecipient.
 - b. The term does not include your procurement of property and services needed to carry out the project or program (for further explanation, *see* Sec. II.210 of the attachment to OMB Circular A-133, “Audits of States, Local Governments, and Non-Profit Organizations”).
 - c. A subaward may be provided through any legal agreement, including an agreement that you consider a contract.
5. Subrecipient means an entity that:
- a. Receives a subaward from you under this award; and
 - b. Is accountable to you for the use of the Federal funds provided by the subaward.

Additional General Terms and Conditions

a. Research Integrity

1) USGS requires that all grant or cooperative agreement recipient organizations adhere to the Federal Policy on Research Misconduct, Office of Science and Technology Policy, December 6, 2001, 65 Federal Register (FR) 76260, http://www.ostp.gov/html/001207_3.html. The Federal Policy on Research Misconduct outlines requirements for addressing allegations of research misconduct, including the investigation, adjudication, and appeal of allegations of research misconduct and the implementation of appropriate administrative actions.

2) The recipient must promptly notify the USGS Project Office when research misconduct that warrants an investigation pursuant to the Federal Policy on Research Misconduct is alleged.

b. Fiscal Integrity

The recipient will notify the USGS Contracting Officer/Grants officer of any significant problems relating to the administrative or financial aspects of the award, such as misappropriation of Federal funds.

c. Program Income

1) The recipient will have no obligation to the Federal Government for program income earned from license fees and royalties for copyrighted material, in accordance with 43 CFR 12.924(h) (for A-110 recipients) or 43 CFR 12.65(e) (for A-102 recipients).

2) If the recipient is an educational institution or nonprofit research organization, any other program income will be added to funds committed to the project by the Federal awarding

agency and recipient and be used to further eligible project or program objectives, as described in 43 CFR 12.924(b)(1).

3) For all other types of recipients, any other program income will be deducted from total allowable costs to determine the net allowable costs before calculating the Government's share of reimbursable costs, as provided in 3 CFR 12.65(g)(1) (for A-102 recipients) or 43 CFR 12.924(b)(3) (for A-110 recipients).