RECLAMATION
Managing Water in the West

U.S. Department of the Interior
Bureau of Reclamation

NOTICE OF INTENT TO AWARD

This Funding Announcement is not a request for applications. This announcement is to provide public notice of the Bureau of Reclamation's intention to fund the following project activities without full and open competition.

ABSTRACT	
Funding Announcement	R12AS20022
Project Title	Assessment of ecological roles of gravel bar features restored by gravel augmentation and channel rehabilitation activities below Lewiston Dam
Recipient	University of California, Berkley
Principal Investigator	Dr. Giyoung Ock
Anticipated Federal Amount	$15,000
Cost Share	None
Total Anticipated Award Amount	$15,000
New Award or Continuation?	New
Anticipated Period of Performance	June 1, 2012 through September 20, 2012
Award Instrument	Cooperative Agreement
Statutory Authority	Fish and Wildlife Coordination Act, Public Law 85-624, 16 U.S.C. 661 et seq., as amended.
CFDA Number	15.517
Single Source Justification Criteria Cited	Justification Criterion: (1) Unsolicited Proposal and (4) Unique Qualifications, of the Department of Interior Single Source Policy Requirements
Reclamation Point of Contact	Ms. Robin Schrock, rschrock@usbr.gov

OVERVIEW

This proposal integrates both physical and ecological monitoring activities focusing on gravel bar features newly formed by continuous efforts either of (1) gravel augmentation or (2) channel rehabilitation activities below Lewiston Dam. One of main purposes of Trinity River Restoration Program (TRRP) is to restore complex habitat structures in response of diverse life stages of anadromous salmonids as well as other aquatic animals (Kondolf & Minear 2004). For instance, *Chinook* salmon needs specific environmental conditions (e.g. flow velocity, territory size, substratum, water temperature, depth, dissolved oxygen concentration etc.) corresponding

to adult spawning, egg incubation, fry emergency, juvenile rearing and smolt outmigration in river (USFWS 1988, USFWS & HVT 1999). Adult salmon returning to riverine spawning grounds need streambed gravel in which to excavate nests (redds) and lay their eggs, and the eggs in redds require sufficiently low water temperatures and sufficiently high dissolved oxygen supply for incubation and hatching. Emerging fry and juveniles need sufficient food resources and safe refuge for rearing until they are ready to travel to river mouth as smolts. In addition, both functional feeding groups and life forms group of macro-invertebrates are known to be adaptively evolved according to food resources diversity and hydrogeomorphic diversity, respectively as shown in Figure 1 (Takemon 2005).

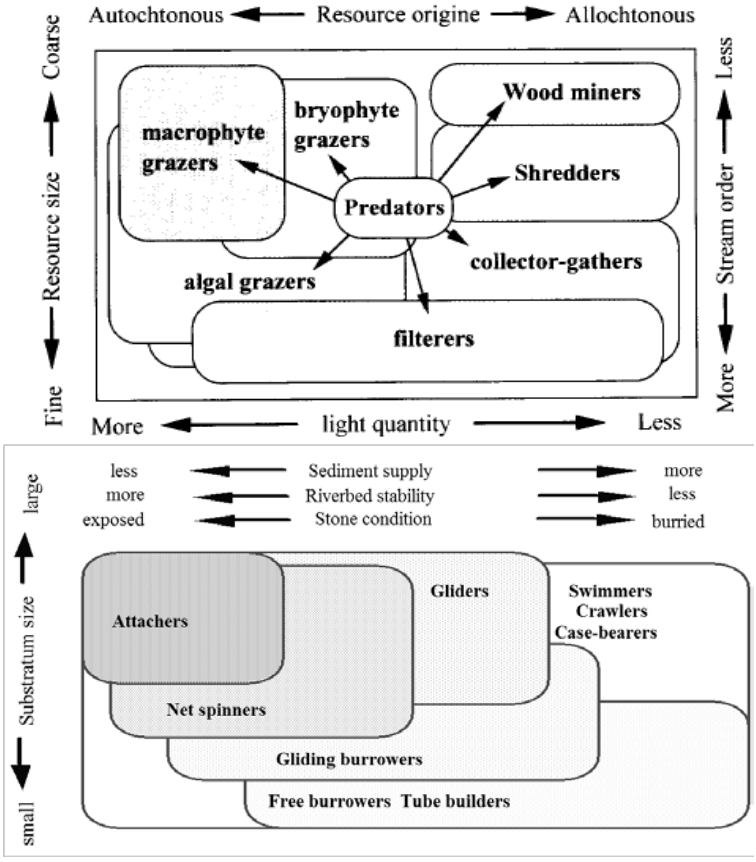

Figure 1. Requirement of diverse physical and biological conditions in Life-form types (top) and Functional feeding groups (bottom) for macro-invertebrates communities (Takemon, 2005).

Ecological Roles of gravel bar in riverine ecosystem

Habitat Complexity: Topographiical asymmetry and surface-subsurface water exchanges in a gravel bar system can make diverse hydro-geomorphological differences in a reach scale, such as main channel, side channel, riffle, pool and pond. Takemon(2010) categorized the habitats as riffle-head, riffle-tail, bar-head backwater, bar-tail back water, riffle in secondary channel, active pool, and terrace pool as shown in Figure 2. In Particular, the head and tail portion of the bar and riffle as an independent habitat can be differentiated by physio-chemical environmental conditions corresponding to exchanges of surface-subsurface waters (Figure 2).

Biodiversity and material exchanges: This 'hydro-geomorphological complexity' derived from bar features can contribute to increase ecological functions such as habitats for diverse organism

groups, organic matter filtering, nutrient processes and biodiversity. Ock (2010) showed that riffles contribute to mitigate the disturbance of reservoir plankton to downstream foodweb. And Ock & Takemon (2011) investigated the quantity and quality of organic matter distributed along the edge of mid-channel bars. Paetzold et al. (2005) demonstrated that riverine bars support high biodiversity of macro-invertebrate community, functioning as an interface between terrestrial and aquatic ecosystems.

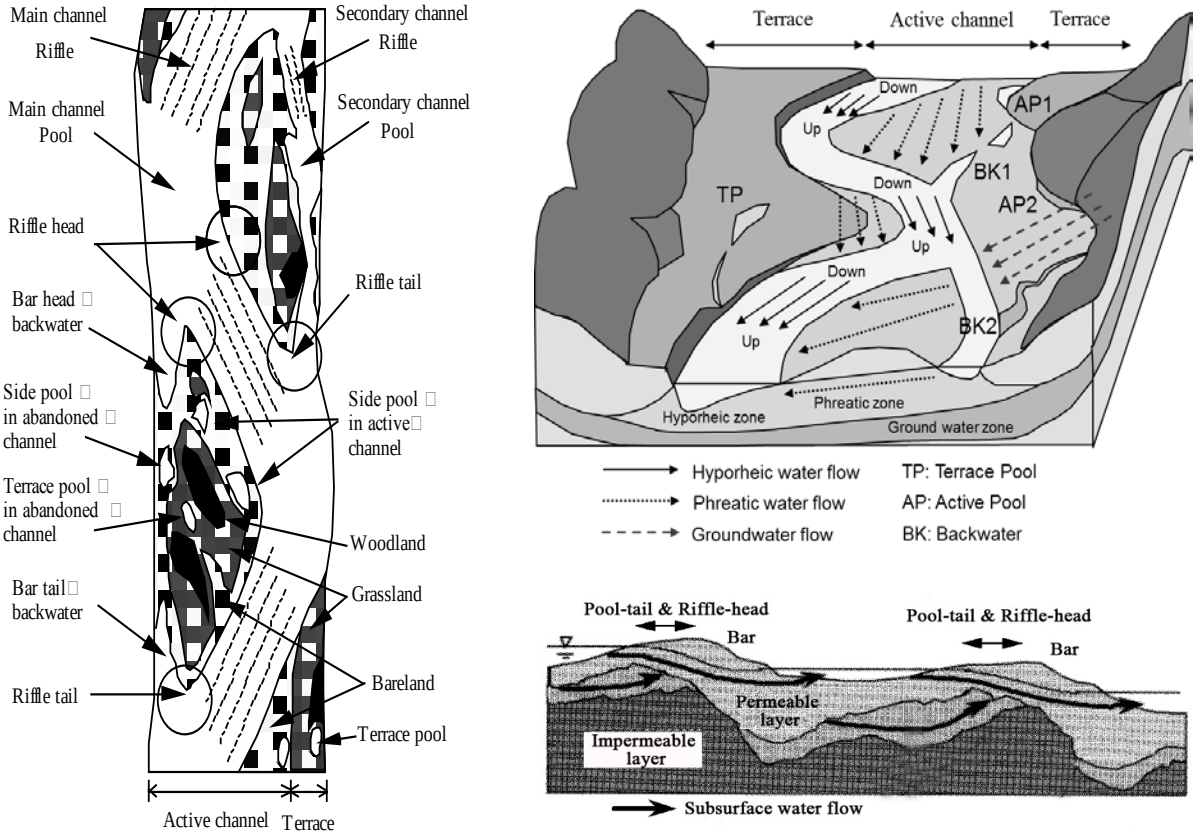

Figure 2. 2D and 3Dimentional scheme for various habitat structures produced by riverine bar systems (Takemon 2010)

RECIPIENT INVOLVEMENT

University of California, Berkeley agrees to:

1. Define and quantity habitat complexity of gravel-bar formation both by naturally deposited below sites of gravel augmentation, and by mechanically shaped through channel rehabilitation, and

2. Assess their ecological functions for recommendation to TRRP.

The proposed research is composed of habitat categorization and field monitoring works as:

(i) topographically quantify meso-scale habitats in response of gravel bar formation process

(ii) define the habitats by multi-variance of environmental conditions, using hydro-chemical-biological factors

(iii) find out the relationship between the hydro-geomorphological conditions and ecological functions in the bar: habitats for salmon and aquatic insects; material and nutrient exchanges and processing below dam.

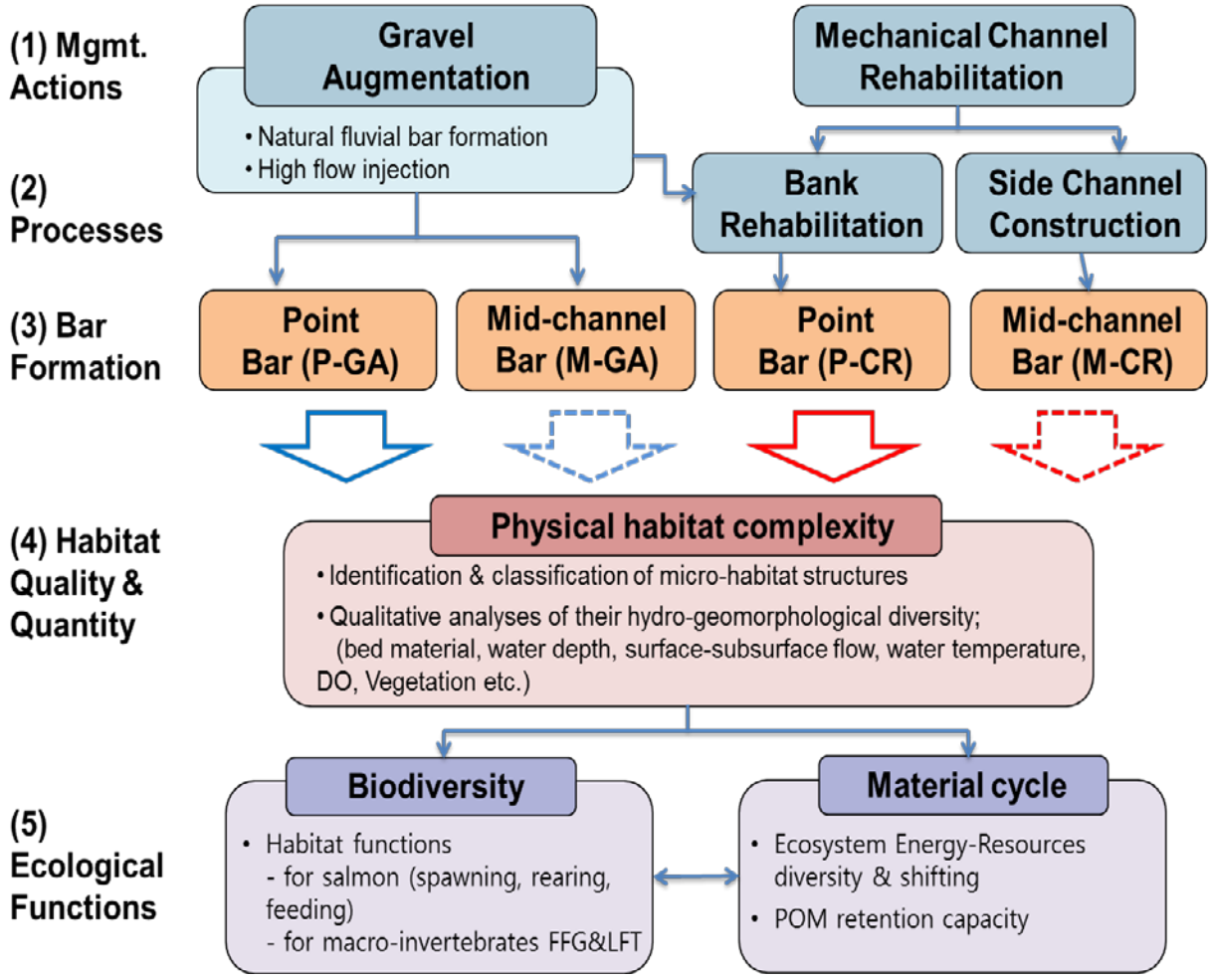

Figure 3 Proposed research outlines for integrating bar formation processes, physical habitat complexity and ecological functions

RECLAMATION INVOLVEMENT

Substantial involvement is anticipated during the performance of the project. Reclamation will provide:

1. Field equipment for researchers to collect data in the field.

2. Input on proposed methods and field sites to ensure that the work compliments other studies such as a Gravel Implementation Monitoring Project.

3. Monitor and provide federal oversight of activities performed under the Agreement. Monitoring and oversight includes review and approval of financial status and performance

reports, payment requests, and any other deliverables identified as part of the Scope of Work and Milestones. Additional monitoring activities may include site visits, conference calls, and other on-site and off-site monitoring activities.

SINGLE-SOURCE JUSTIFICATION

DEPARTMENT OF THE INTERIOR SINGLE SOURCE POLICY REQUIREMENTS
Department of the Interior Policy (505 DM 2) requires a written justification which explains why competition is not practicable for each single-source award. The justification must address one or more of the following criteria as well as discussion of the program legislative history, unique capabilities of the proposed recipient, and cost-sharing contribution offered by the proposed recipient, as applicable.
In order for an assistance award to be made without competition, the award must satisfy one or more of the following criteria: (1) Unsolicited Proposal – The proposed award is the result of an unsolicited assistance application which represents a unique or innovative idea, method, or approach which is not the subject of a current or planned contract or assistance award, but which is deemed advantageous to the program objectives; (2) Continuation – The activity to be funded is necessary to the satisfactory completion of, or is a continuation of an activity presently being funded, and for which competition would have a significant adverse effect on the continuity or completion of the activity; (3) Legislative intent – The language in the applicable authorizing legislation or legislative history clearly indicates Congress' intent to restrict the award to a particular recipient of purpose; (4) Unique Qualifications – The applicant is uniquely qualified to perform the activity based upon a variety of demonstrable factors such as location, property ownership, voluntary support capacity, cost-sharing ability if applicable, technical expertise, or other such unique qualifications; (5) Emergencies – Program/award where there is insufficient time available (due to a compelling and unusual urgency, or substantial danger to health or safety) for adequate competitive procedures to be followed.

Reclamation did not solicit full and open competition for this award based the following criteria:

(1) Unsolicited Proposal – The proposed award is the result of an unsolicited assistance application which represents a unique or innovative idea, method, or approach which is not the

subject of a current or planned contract or assistance award, but which is deemed advantageous to the program objectives;

(2) Unique Qualifications – The applicant is uniquely qualified to perform the activity based upon a variety of demonstrable factors such as location, property ownership, voluntary support capacity, cost-sharing ability if applicable, technical expertise, or other such unique qualifications;

Single Source Justification Description:

This proposal was reviewed by Reclamation R&D reviewers and found to represent a new and unique approach to evaluating the available data, monitoring approaches and modeling tools needed to synthesize physical and ecological change during river restoration. The proposed work brings together an international team who will work with Reclamation technical staff during real time channel rehabilitation activities, using existing Program data, field protocols, and monitoring results to develop and ground truth the method for applications within the TRRP. The anticipated product(s) support the Program's Adaptive Assessment and Monitoring goals and will provide additional benefits to other Reclamation restoration programs.

The unique qualifications of the research team include river ecology related to gravel processes in dammed rivers with an emphasis on flow and sediment dynamics with effects on fish life history, in particular salmonid spawning. This team brings together the physical, geomorphic and ecological expertise to develop and test data and unique synthetic approaches to inform Program performance measures and demonstrate Program success. In carrying out those responsibilities, the team has acquired a vast array of information and knowledge in:

- Compilation and analysis of past gravel augmentation projects through 2004, Trinity River, California. (Kondolf and Minear 2004)
- Analysis of flushing flow requirements, Trinity River (Kondolf and Wilcock 1996, Wilcock et al 1996a,b)
- Evaluation of performance of gravel augmentation projects in the San Joaquin River basin (Kondolf et al 1996)
- Field and analytic study of channel geomorphology, hydrologic exchange, and organic matter dynamics in the Tagliamento River (Ock and Takemon 2011).
- Stable isotope ecology for assessment of dam downstream impacts on energy resources changes and aquatic invertebrates in river ecosystem (Ock and Takemon 2010, Oct et al 2010)

No other entity could achieve a similar level of familiarity and expertise without first engaging in the lengthy process of studying and analyzing the data acquired thus far. References listed below:

PI , Professor G. Mathias Kondolf
PhD, The Johns Hopkins University, Geography and Environmental Engineering 1988. Dissertation: Salmonid spawning gravels: A geomorphic perspective on their distribution, size modification by spawning fish, and application of criteria for gravel quality.
MS, University of California at Santa Cruz, Earth Sciences 1982. Thesis: Recent channel instability and historic channel changes of the Carmel River, Monterey County, California.

AB (cum laude) Princeton University, Geology 1978. Thesis: Genesis and development of Sandy Hook, New Jersey

Post-Doctoral Scholar, Giyoung Ock
PhD, Kyoto University in Japan, Urban and Environmental Engineering 2010. Dissertation: Particulate Organic Matter Dynamics in the Downstream of Dam Reservoirs: Roles of Channel Geomorphology and Responses of Benthos Communities.
MS, Seoul National University in South Korea, Environmental Planning 1999. Thesis: Effects of environmental factors on soil respiration in the riparian soils of three streams.
BA, Seoul National University, Agriculture and Life Science 1997.

Cooperating Co-Investigators
Prof Mary Power, UC Berkeley
PhD, University of Washington, Zoology 1981. Dissertation: The grazing ecology of armored catfish in a Panamanian stream.
Research field: Freshwater and watershed ecology, food webs, landscape controls on ecosystems

Prof Tetsuya Sumi, Kyoto University
PhD, Kyoto University, Civil Engineering 1998
Research field: Comprehensive sediment management on sediment routing system, Impacts of discharge and sediment flow regime changes in reservoirs and these improve method

Prof Yasuhiro Takemon, Kyoto University
PhD, Kyoto University, Ecology 1990
Research field: Reservoir dam impacts on tailwater river ecosystems, Evaluation of sediment dynamism required for healthy river ecosystems

STATUTORY AUTHORITY

Fish and Wildlife Coordination Act, 16 U.S.C. § 661, authorizes the Secretary of the Interior:

> To provide that wildlife conservation shall receive equal consideration and be coordinated with other features of water-resource development programs through the effectual and harmonious planning, development, maintenance, and coordination of wildlife conservation and rehabilitation … the Secretary of the Interior is authorized (1) to provide assistance to, and cooperate with, Federal, State, and public or private agencies and organizations in the development, protection, rearing, and stocking of all species of wildlife, resources thereof, and their habitat, in controlling losses of the same from disease or other causes, ….

Departmental Manual Part 255 DM 1, Chapter 1 authorizes the Commissioner of Reclamation:

1.1 Delegation. Subject to the exceptions in Section 1.2, the Commissioner of Reclamation (Commissioner) is delegated the authority of the Assistant Secretary – Water and Science to:

B. Take the following actions, either directly or by providing financial assistance to non-Federal parties, pursuant to the Conservation of Wild Life, Fish and Game Act of March 10, 1934 (Pub. L. 73-121; 48 Stat. 401) as amended by the Fish and Wildlife Coordination Act of August 14, 1946 (Pub. L. 85-624; 72 Stat. 563; 16 U.S.C. 661-666c); Section 5 of the Endangered Species Act of 1973, December 28, 1973 (Pub. L. 93-205; 87 Stat. 884; 16 U.S.C. 1534); and Section 7(a) of the Fish and Wildlife Coordination Act of 1956, August 8, 1956 (70 Stat. 1122; 16 U.S.C. 742f(a)), regarding the construction and/or continued operation and maintenance of any Federal reclamation project:

(1) plan, design, and construct, including acquiring lands or interest therein as needed for: (a) fish passage and screening facilities at any non-Federal water diversion or storage project; or
    (b) projects to create or improve instream habitat.
(2) acquire or lease water or water rights from willing sellers or lessors; or
(3) monitor and evaluate the effect of Reclamation actions on Endangered Species Act-listed species.