

Water Sustainability and Climate (WSC)

PROGRAM SOLICITATION

NSF 13-535

REPLACES DOCUMENT(S):

NSF 11-551



National Science Foundation

Directorate for Geosciences

Directorate for Engineering

Directorate for Social, Behavioral & Economic Sciences



National Institute of Food and Agriculture

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):

September 10, 2013

IMPORTANT INFORMATION AND REVISION NOTES

Revision Summary

Change in the limit on number of proposals per PI.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised NSF Proposal & Award Policies & Procedures Guide (PAPPG) ([NSF 15-1](#)), which is effective for proposals submitted, or due, on or after December 26, 2014. The PAPPG is consistent with, and, implements the new Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards (Uniform Guidance) (2 CFR § 200).

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Water Sustainability and Climate (WSC)

Synopsis of Program:

One of the most urgent challenges facing the world today is to ensure an adequate supply and quality of water in light of both burgeoning human needs and increasing climate variability and change. Despite the importance of water to life on Earth, there are major gaps in our basic understanding of water availability, quality and dynamics, and the impact of both human activity and a changing and variable climate on the water system.

The goal of the Water Sustainability and Climate (WSC) solicitation is to enhance the understanding and predict the interactions between the water system and land use changes (including agriculture, managed forest and rangeland systems), the built environment, ecosystem function and services and climate change/variability through place-based research and integrative models. Studies of the water system using models and/or observations at specific sites, singly or in combination, that allow for spatial and temporal extrapolation to other regions, as well as integration across the different processes in that system are encouraged, especially to the extent that they advance the development of theoretical frameworks and predictive understanding. Specific topics of interest include:

- Developing theoretical frameworks and models that incorporate the linkages and feedbacks among atmospheric, terrestrial, aquatic, oceanic, biotic and social processes that can be used to predict the potential impact of (1) climate variability and change, (2) land use and (3) human activity (including population change) on water systems on decadal to centennial scales in order to provide a basis for adaptive management of water resources.
- Determining the inputs, outputs, and potential changes in water budgets and water quality in response to (1) climate variability and change, (2) land use and (3) human activity (including population change), and the effect of these changes on biogeochemical cycles, water quality, long-term chemical transport and transformation, terrestrial, aquatic and coastal ecosystems, landscape evolution and human settlements and behavior.
- Determining how our built water systems and our governance systems can be made more

reliable, resilient and sustainable to meet diverse and often conflicting needs, such as optimizing consumption of water for energy generation, industrial and agricultural/forest rangeland production and built environment requirements, reuse for both potable and non-potable needs, ecosystem protection, and flood control and storm water management.

This activity enables interagency cooperation on one of the most pressing problems of the millennium--water sustainability -- how it is likely to affect our world, and how we can proactively plan for its consequences. It allows the partner agencies -- National Science Foundation (NSF) and the United States Department of Agriculture National Institute of Food and Agriculture (USDA/NIFA) - to combine resources to identify and fund the most meritorious and highest-impact projects that support their respective missions, while eliminating duplication of effort and fostering collaboration between agencies and the investigators they support.

Successful proposals are expected to study water systems in their entirety and to enable a new interdisciplinary paradigm in water research. Proposals that do not broadly integrate across the biological sciences, geosciences, engineering, and social sciences may be returned without review. Projects supported under this solicitation may establish new observational sites or utilize existing observational sites and facilities already supported by NSF (National Science Foundation) or other federal and state agencies (e.g. USGS (US Geological Survey), USEPA (US Environmental Protection Agency), USDA/ARS/FS (US Department of Agriculture/Agricultural Research Station/Forest Service), NOAA (National Oceanic and Atmospheric Administration)). See also specific guidance on the collection of new data for each category.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Thomas Torgersen, Program Director, Division of Earth Sciences, telephone: (703) 292 4738, email: ttorgers@nsf.gov
- Shemin Ge, Program Director, Division of Earth Sciences, telephone: 703-292-7411, email: sge@nsf.gov
- Bruce Hamilton, Program Director, Division of Chemical, Bioengineering, Environmental, and Transport Systems, telephone: (703) 292-8320, email: bhamilto@nsf.gov
- Debra Reinhart, Program Director, Division of Chemical, Bioengineering, Environmental, and Transport Systems, telephone: 703 292 5356, email: dreinhar@nsf.gov
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- Mary Ann Rozum, National Program Leader, Institute of Bioenergy, Climate, and Environment-NIFA, telephone: (202) 401-4533, email: mrozum@nifa.usda.gov
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Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 10.310 --- Agriculture and Food Research Initiative
- 47.041 --- Engineering
- 47.050 --- Geosciences
- 47.075 --- Social Behavioral and Economic Sciences

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant or Cooperative Agreement

Estimated Number of Awards: 10 to 24

Three categories of awards are anticipated for this solicitation.

Category 1 Awards: Small team synthesis, modeling, integration and assessment projects that will use existing data (or new measurements) to study entire watersheds and groundwater sites. Both NSF and USDA/NIFA funds will be used to support this category. Some projects may be funded directly by USDA/NIFA. Projects will have a duration of 2-4 years for a maximum of \$600,000 for each award. An estimated 4-8 awards are expected to be made for Category 1 proposals.

Category 2 Awards: Place-based modeling studies with new observations, 3 to 5 years in duration and in the range of \$2million to \$4million maximum for each project. An estimated 2- 5 awards are expected to be made for Category 2 proposals.

Category 3 Awards: Synthesis, modeling and integration grants that will use only existing data to integrate and synthesize across watershed and groundwater sites. Both NSF and USDA/NIFA funds will be used to support this category. Some projects may be funded directly by USDA/NIFA. Project duration of 3-5 years and in the range of \$1million to \$2.5million maximum for each project. An estimated 6-8 awards are expected to be made for Category 3 proposals.

Anticipated Funding Amount: \$26,000,000

Approximately \$26,000,000 is expected for the FY2014 competition, pending availability of funds. Of this amount, NIFA anticipates contributing approximately \$5,000,000 which will be available for this program pending appropriation action to make standard grants. This solicitation is being released prior to the passage of an Appropriations Act for FY 2014. Enactment of Continuing Resolutions or an Appropriations Act may affect the availability or level of funding for this program.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.
- For-profit organizations: U.S. commercial organizations, especially small businesses with strong capabilities in scientific or engineering research or education.
- For proposals to be considered for funding under USDA/NIFA : Eligible applicants for the grant program implemented under WSC include: (1) State agricultural experiment stations; (2) colleges and universities (including junior colleges offering associate degrees or higher); (3) university research foundations; (4) other research institutions and organizations; (5) Federal agencies, (6) national laboratories; (7) private organizations or corporations; (8) individuals who are U.S. citizens, nations, or permanent residents; and (9) any group consisting of 2 or more entities identified in (1) through (8). Eligible institutions do not include foreign and international organizations.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

Because of the complexity of the teams formed in response to this solicitation, collaborative submissions can include a maximum of four institutions (four institutional cover sheets). Other participating institutions must be funded via subcontracts through one of the four lead collaboratives.

Limit on Number of Proposals per PI or Co-PI: 2

An individual may appear as Principal Investigator (PI), co-PI, other senior personnel or investigator on only two WSC proposals submitted for FY 2014 in response to this solicitation. This limitation includes proposals submitted by a lead organization, any sub-award submitted as part of a proposal, or any collaborative proposal. Proposals that do not meet this requirement will be returned without review.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required
- **Preliminary Proposal Submission:** Not required
- **Full Proposals:**
 - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.
 - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide)

B. Budgetary Information

- **Cost Sharing Requirements:** Inclusion of voluntary committed cost sharing is prohibited.
- **Indirect Cost (F&A) Limitations:**

For NSF, Grant Proposal Guide (GPG) guidelines apply.

For awards made by USDA/NIFA, section 720 of the General Provisions in Title VII of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Programs (HR 112-284), limited indirect costs to 30 percent of the total Federal funds provided under each award. Applicants should anticipate that the FY 2013 (and 2014) appropriation will contain a similar limitation. Revised budgets will be solicited if these guidelines are not met by an application to be awarded by USDA/NIFA.

- **Other Budgetary Limitations:** Not Applicable

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

September 10, 2013

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions: Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements: Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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I. INTRODUCTION

One of the most urgent challenges facing the world today is to ensure an adequate supply and quality of water in light of both burgeoning human and ecosystem needs and climate variability and land use change. Variations in evaporation and precipitation patterns due to climate and land use changes, as well as increasing water usage to meet human needs, are fundamentally changing the availability, quality, and temporal variability of water across the globe. Despite its importance to life on Earth, there are major gaps in our basic scientific knowledge of the water cycle, including the impact of a changing climate and human activity on water availability and quality. Forces shaping the vulnerability/sustainability of water as an essential resource include, but are not limited to, extreme events such as floods and droughts; watershed disturbances such as deforestation, desertification, and urbanization; construction of engineered infrastructure such as dams and irrigation systems; and threats such as pollutants, invasive species, human population and climate change.

Water connects physical, geochemical and ecological processes occurring at the Earth's surface, and in the atmosphere and oceans, and links and integrates the natural environment with human, social and engineered systems at multiple scales of space and time. Water systems are distribution networks for natural and anthropogenic chemicals, living organisms, and particles, encompassing complex and interacting suites of chemical, biological, and physical processes that alter and are altered by water and its constituents. On this foundation, humans add engineered and social systems to control, manage, utilize, and alter the water environment for a variety of uses and through a variety of organizational and individual decisions. The central role that water plays in human existence, and the challenges that face our society in adapting to our altered water resources, lead to an overarching question that links societal needs with fundamental science:

How can we protect ecosystems and better manage and predict water availability for future generations given alterations to the water cycle caused by climate variability and human activities?

In order to address this question, we require a holistic, predictive understanding of complex water cycle and water resource processes, the feedbacks associated with the water system, and the vulnerability and resilience of water systems to climate and anthropogenic change. In this context, a water system comprises the drainage basin and its physical, chemical, and biological constituents, including water networks, ecosystems, the built environment, the oceanic and atmospheric systems that govern evaporation and precipitation in the basin, and the source water bodies and terminal lakes or seas into which the water flows. There have been few attempts to study an entire water system with an integrative, systems science approach or even study similar aspects of different water systems in a comparative sense that will develop such a framework. Scaling from the leaf or engineered infrastructure element level to transboundary basin level as well as transferability of our understanding from one system to the next are significant challenges in water systems science and engineering. A systems analysis of the planet's water system focused on aspects such as feedbacks and linkages among climate change, ecosystems, built environments requirements, and human activity can provide a common theoretical framework that can transcend disciplinary boundaries and lead to improved understanding, prediction, and management of water resources and protection of ecosystems.

A number of technical reports that have influenced the scope of science for this particular solicitation and may be of interest to prospective investigators are listed in the FAQ section of this solicitation. See Appendix in Section X of this solicitation. The FAQ's contain additional important information.

II. PROGRAM DESCRIPTION

The goal of the Water Sustainability and Climate (WSC) solicitation is to understand and predict the interactions among the water system and climate change, land use (including agriculture and forest production systems), the built environment, and ecosystem function and services through place-based research and integrative models. Studies of a water system in its entirety using models and/or observations at specific sites, singly or in combination, that allow for spatial and temporal extrapolation, as well as integration across the different processes in that system are encouraged, especially to the extent that they advance the development of theoretical frameworks and predictive understanding. Water systems may include relatively pristine systems, built or engineered water environments or anthropogenically modified ecosystems and may range from a built environment site or a single watershed to the basin scale. Proposals may involve field observations and data collection (specifically Category 1,2; collection of new data is not allowed in category 3) and the installation of advanced sensor arrays, in situ instrumentation and equipment at facilities and sites already supported by NSF (e.g., Long-Term Ecological Research (LTER) sites, Critical Zone Observatories (CZOs), WATERS Network Test Beds, Cyberinfrastructure for Environmental Observatories: Prototypes (CEOPs) or sites supported by other federal, regional, private or state agencies (e.g., USEPA, USDA (including NIFA, the Forest Service and ARS), USGS, NOAA).

Successful proposals in all categories are expected to broadly integrate across the biosciences, geosciences, engineering and social sciences enabling a new interdisciplinary paradigm in water research using a systems science and engineering approach to develop theoretical frameworks for a predictive understanding. Specific topics of interest include:

* Developing theoretical frameworks and models that incorporate the linkages and feedbacks among atmospheric, terrestrial, aquatic, oceanic, biotic and social processes that can be used to predict the potential impact of (1) climate variability and change, (2) land use and (3) human activity (including population change) on the water cycle and water availability on decadal- to centennial-scale in order to provide a basis for adaptive management of our water resources.

* Determining the inputs, outputs and potential changes in water budgets and water quality in response to (1) climate variability and change, (2) land use and (3) human activity (including population change), and the effect of these changes on biogeochemical cycles, water quality, long-term chemical transport and transformation, terrestrial, aquatic and coastal ecosystems, landscape evolution and human settlements and behavior.

* Determining how our built water systems and our governance system can be made to be reliable, resilient and sustainable to meet diverse and often conflicting needs such as optimizing consumption of water for energy generation, industrial and agricultural production and built environment requirements, reuse for both potable and non-potable needs, as well as, for flood control and storm water management.

Projects that incorporate rich legacy data or remote sensing data are highly encouraged. Generation of new data/measures (including social surveys) is not an allowable budget item for Category 3.

This solicitation seeks proposals to build interdisciplinary research teams to pursue topics such as those listed above that cannot readily be addressed by traditional disciplinary programs within the National Science Foundation.

This activity enables interagency cooperation on one of the most pressing problems of the millennium --water sustainability -- how it is likely to affect our world, and how we can proactively plan for its consequences. It allows the partner agencies -- National Science Foundation (NSF) and the USDA National Institute of Food and Agriculture -- to combine resources to identify and fund the most meritorious and highest-impact projects that support their respective missions, while eliminating duplication of effort and fostering collaboration between agencies and the investigators they support.

USDA/NIFA Areas of Interest:

The USDA Strategic Plan for 2010-2015 under Strategic Goal 2, Objective 2.2: Lead Efforts to Mitigate and Adapt to Climate Change, in particular the strategy to "Develop models, national observing and monitoring systems, decision support tools, and new technology and adaptation strategies for communities, agriculture producers, and natural resource managers"; and "Encourage the adoption of reasonable, transparent, and science-based programs to adapt to, or mitigate the effects of, climate change on agriculture and forestry".

The Program Area for 2013 supports the USDA Research, Education, and Economics Action Plan (<http://www.ree.usda.gov/ree/news/USDAREEActionPlan02-2102Final.pdf>) Goal 2: Responding to Climate and Energy Needs, Sub-goal 2A: Responding to Climate Variability, with direct reference to the Actionable item to "Create adaptation strategies (including "transformative" systems as described by the 2010 National Research Council [NRC] publication "Toward Sustainable Agricultural Systems in the 21st Century", e.g., crop-livestock, organic, agro-forestry, etc.), to sustain and increase the resiliency of crop, livestock, and forest tree production systems, biodiversity, and ecosystem services, including practices and technologies that increase the resiliency of subsistence food systems to climate variability, weather extremes, and changes in the composition of the atmosphere".

Agricultural modeling needs related to the sustainability of water resources through climate, land-use and population change arise from the necessity to project crop, livestock, forestry, rangeland, and aquaculture yields at multiple watershed and groundwater scales while balancing ecosystem needs. Increasing air temperature, wide swings of air temperature over short periods of time (e.g., warm conditions followed by a hard frost early during the growing season), increased precipitation or drought in different areas, changing intensity and timing of precipitation and snowmelt patterns increasing length of growing season, conditions accelerating crop maturation, and severe weather are factors that are likely to affect hydrologic processes on different scales, and in different parts of the country. In addition to climate and precipitation downscaling to the farm and ranch scale, further temporal downscaling to sub daily time intervals is needed for precipitation intensities to drive hydrology, erosion, and water quality process-based models where infiltration, excess runoff, or manmade drainage mechanisms are dominant.

USDA/NIFA seeks research projects that clearly demonstrate the linkages between water sustainability for agriculture and forestry and the broader program goals described in this solicitation (please refer to synopsis). Within these broader goals, USDA/NIFA aims to support projects that increase knowledge of water sustainability and climate variability and change at the watershed and groundwater scale. In particular, successful projects will focus on the creation of hydrologic and climate models that are 1) integrated with or can later be coupled to models on agricultural production or natural resource management; or 2) that can be used to describe and predict thresholds or trends in water quality and quantity, resilience of agricultural lands/water, forests or rangelands to changes in water availability that affect their ability for food, feed, fiber and fuel production or provide ecosystem services under altered seasonal or extreme climate-driven conditions. Approaches include but are not limited to:

- >Scenario-based analysis of the hydrological, climatological, environmental, resource, technological, and economic implications of different climate impacts on the sustainability of water resources in agroecosystems.
- Spatially explicit hydrologic and climate-ecosystem models at regional to global scales, to improve our understanding of contemporary and historical changes in agroecosystem structure and functioning, and synthesis of known effects of increasing CO₂, warming, and changes in the hydrologic cycle.

Developing the next comprehensive integrated watershed/groundwater and global model is a major challenge requiring engagement by researchers from many disciplines. The next generation water sustainability models will need to be high resolution, enabling predictions in the decadal timeframe and at regional scales. They will need to incorporate and advance sophisticated understanding of natural and human-moderated systems; not only their physical aspects, but also biological and human, including contributions from the built environment. USDA/NIFA will support research to develop watershed and groundwater and climate models that can be linked to crop, forestry, aquaculture, and livestock models to assess risks and potential outcomes of management strategies so that development and yields can be projected reliably at different spatial and temporal scales. These types of models include:

- Water systems models for watersheds and groundwater yielding data on water availability and quality that can interact with new or existing climate and crop models that can be down-scaled to predict impacts on agricultural production and processing systems, forests, rangelands and grasslands.
- Water systems models that can be used to predict the potential impact of climate variability and change, land use change, and human activity or population change on water availability for agricultural lands, forests or rangelands and rural community needs.
- Coupled climate and water systems models to help manage water allocations from snowmelt, reservoirs, groundwater, and surface water, to deal with competing demands from agricultural, energy, environmental, urban/industrial, and western land management uses.
- variability, changing land use and changing land management practices on agricultural lands, forests, or rangelands, with enough specificity to identify and account for environmentally sensitive "hot spots" on the landscape that may indicate areas of low water quality or water shortage, or increased flooding.
- Watershed and groundwater models addressing how social and economic factors affect the quality and quantity of surface and groundwater in agricultural production and processing systems, urban/urbanizing environments, and rural communities.
- Coupled climate, agronomic, water quality and quantity, resource conservation and economic impact models suitable for the development and assessment of planning and management strategies that exploit opportunities and mitigate adverse impacts of anticipated, yet uncertain, climate change scenarios.

Projects are required to be trans-disciplinary incorporating physical, hydrological, biological, and economic/social-sciences; and are encouraged to address the interconnectivity of agricultural practices and environmental and social impacts and responses. This includes mechanisms to coordinate and support regional land use changes to improve water sustainability, stabilize agricultural productivity, and marketing of ecosystem services to economically enhance producers. A system science approach that incorporates the natural, mathematical, engineering and social sciences is an integral part of modeling to understand the impacts of climate change on agroecosystems and the human interventions for adapting to and mitigating these impacts.

For more information on this solicitation, you may view the Frequently Asked Questions (FAQ's) in Appendix X.

III. AWARD INFORMATION

Anticipated Type of Award: Standard Grant or Continuing Grant or Cooperative Agreement

Estimated Number of Awards: 10 to 24

Three categories of awards are anticipated for this solicitation.

Category 1 Awards: Small team synthesis, modeling, integration and assessment projects that will use existing data (or new measurements) to study entire watersheds and groundwater sites. Both NSF and USDA/NIFA funds will be used to support this category. Some projects may be funded directly by USDA/NIFA. Projects will have a duration of 2-4 years for a maximum of \$600,000 for each award. An estimated 4-8 awards are expected to be made for Category 1 proposals.

Category 2 Awards: Place-based modeling studies with new observations, 3 to 5 years in duration and in the range of \$2million to \$4million maximum for each project. An estimated 2- 5 awards are expected to be made for Category 2 proposals.

Category 3 Awards: Synthesis, modeling and integration grants that will use only existing data to integrate and synthesize across watershed and groundwater sites. Both NSF and USDA/NIFA funds will be used to support this category. Some projects may be funded directly by USDA/NIFA. Project duration of 3-5 years and in the range of \$1million to \$2.5million maximum for each project. An estimated 6-8 awards are expected to be made for Category 3 proposals.

Anticipated Funding Amount: \$26,000,000

Approximately \$26,000,000 is expected for the FY2014 competition, pending availability of funds. Of this amount, USDA/NIFA anticipates contributing approximately \$5,000,000 which will be available for this program pending appropriation action to make standard grants.

Estimated program budget, number of awards and average award size/duration are subject to the availability of funds and quality of proposals. This solicitation is expected to be the final call for WSC proposals in this form subject to availability of funds and programmatic considerations.

This is an interagency partnership between NSF and USDA, therefore meritorious proposals may be funded by one or more agencies at the option of the agencies, not the proposer. For proposals selected for funding entirely by USDA/NIFA, PIs will be asked to withdraw their proposal from NSF and resubmit it to USDA/NIFA in accordance with instructions given by the cognizant USDA/NIFA Program Officer. Subsequent grant administration procedures will be in accordance with the individual policies of the awarding agency.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such

- organizations also are referred to as academic institutions.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.
- For-profit organizations: U.S. commercial organizations, especially small businesses with strong capabilities in scientific or engineering research or education.
- For proposals to be considered for funding under USDA/NIFA : Eligible applicants for the grant program implemented under WSC include: (1) State agricultural experiment stations; (2) colleges and universities (including junior colleges offering associate degrees or higher); (3) university research foundations; (4) other research institutions and organizations; (5) Federal agencies, (6) national laboratories; (7) private organizations or corporations; (8) individuals who are U.S. citizens, nations, or permanent residents; and (9) any group consisting of 2 or more entities identified in (1) through (8). Eligible institutions do not include foreign and international organizations.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

Because of the complexity of the teams formed in response to this solicitation, collaborative submissions can include a maximum of four institutions (four institutional cover sheets). Other participating institutions must be funded via subcontracts through one of the four lead collaboratives.

Limit on Number of Proposals per PI or Co-PI: 2

An individual may appear as Principal Investigator (PI), co-PI, other senior personnel or investigator on only two WSC proposals submitted for FY 2014 in response to this solicitation. This limitation includes proposals submitted by a lead organization, any sub-award submitted as part of a proposal, or any collaborative proposal. Proposals that do not meet this requirement will be returned without review.

Additional Eligibility Info:

Individual researchers and researchers at ineligible organizations (including foreign universities and colleges) may be included on proposals from eligible institutions through subawards or as consultants.

For proposals to be considered for funding under USDA/NIFA: Eligible applicants for the grant program implemented under WSC include: (1) State agricultural experiment stations; (2) colleges and universities (including junior colleges offering associate degrees or higher); (3) university research foundations; (4) other research institutions and organizations; (5) Federal agencies, (6) national laboratories; (7) private organizations or corporations; (8) individuals who are U.S. citizens, nations, or permanent residents; and (9) any group consisting of 2 or more entities identified in (1) through (8). Eligible institutions do not include foreign and international organizations.

Federal Agencies and FFRDCs should also be aware to the specific Indirect cost (F&A) Limitations for awards made by USDA/NIFA elsewhere in this solicitation.

Projects involving USDA FFRDC or National Laboratories will only be considered for co-funding by NSF if they are collaborative efforts that involve non-federally funded institutions. Proposals from FFRDCs must obey NSF budget guidelines and may not include costs already covered by federal funds. To facilitate possible interagency funding of such collaborations, an institution other than the USDA FFRDC facility must serve as the lead institution.

As a general rule, projects funded by USDA/NIFA with follow normally operational USDA/NIFA guidelines for agencies and FFRDCs; projects funded under this solicitation by NSF with follow normally operational NSF guidelines for agencies and national laboratories (GPG I-E.7). Under exceptional circumstances, research or education projects at other Federal agencies or FFRDCs that can make unique contributions to the needs of researchers elsewhere or to other specific NSF objectives may receive NSF support. This generally means that other federal agencies and/or FFRDCs should not be the lead organization and specific budgetary restrictions apply per NSF.

Because of the complexity of the teams formed in response to this solicitation, collaborative submissions can include a maximum of four institutions (four institutional cover sheets). Other participating institutions in a single project must be funded via subcontracts through one of the four lead collaborative institutions.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab

on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. Chapter II, Section D.5 of the Grant Proposal Guide provides additional information on collaborative proposals.

See Chapter II.C.2 of the [GPG](#) for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation instructions provided in this program solicitation may deviate from the GPG instructions.

Please note: All materials should be submitted to NSF. NSF will share all submitted materials with USDA/NIFA.

All proposals should explain how the proposed activity would address the goals of this program. Successful proposals are expected to broadly integrate across the biosciences, geosciences, social sciences, and engineering enabling a new interdisciplinary paradigm in water research using a systems science and engineering approach. Principal Investigators should carefully identify within the proposal the innovative aspects that are the focus of their project. They should also provide clear explanation and justification of the importance (within the context of the water system science and engineering) of the predictive understanding that will be generated by their project. In addition, Category 2 proposals should clearly lay out the arguments for why their proposed water system is best to accomplish this goal and how they expect to transfer the knowledge they gain more broadly to other sites or systems. Proposals should have a brief, but compelling description of how the proposed work integrates across the biosciences, geosciences, social sciences, and engineering and the expertise that each team member would bring to the project.

Title of Proposal

The title of a WSC proposal must be preceded by the words "WSC-Category 1, 2 or 3" as appropriate (followed by Collaborative, if appropriate). The title should state clearly and succinctly the focus of the project.

Special information and Supplementary Documentation:

- **Management Plan** (governance structure, up to 4 pages): The management plan should describe the management and administrative structure with sufficient detail to demonstrate the capability for conducting the proposed work; identify the members of the project leadership team and the level of effort of the main participants.
- **Postdoctoral Researcher Mentoring Plan (PRMP)**, up to 1 page): Proposals that request funding to support postdoctoral researchers must include a description of the disciplinary and cross-disciplinary mentoring activities that will be provided for such individuals. Only one PRMP should be submitted, even if multiple postdoctoral researchers from different institutions are involved. Please be advised that if required, FastLane will not permit submission of a proposal that is missing a PRMP. See Chapter II.C.2.j of the GPG for further information about the implementation of this requirement.
- **Data Management Plan (DMP)**, up to 2 pages): The DMP should describe how the project will use and contribute to centralized efforts for data management including model-run output.
 - The types of data, samples, physical collections, software, and other materials to be produced in the course of the project;
 - The standards to be used for data and metadata format and content (where existing standards are absent or deemed inadequate, this should be documented along with any proposed solutions or remedies);
 - Policies for access and sharing including provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements;
 - Policies and provisions for re-use, re-distribution, and the production of derivatives;
 - Plans for archiving data, samples, and other research products, and for preservation of access to them;
 - The data management plan is considered an integral part of the project and therefore subject to reviewer, panel, and program evaluation. Successful applicants will be expected to address data management issues in annual and final project reports.

Letters of Collaboration:

This supplementary documentation should include any letters of collaboration from individuals or organizations that are integral parts of the proposed project, (such as the involvement of collaborator organizations that are not supported by sub awards) or documentation of permission to access sites, materials, or data for research or other associated project activities. Letters of collaboration should focus solely on affirming that the individual or organization is willing to collaborate on the project as specified in the project description of the proposal for the duration of the project. No additional text, praiseworthy statements or elaboration of the nature of activities to be undertaken by the collaborator and endorsements of the potential value or significance of the project for the collaborator, may be included. Letters of collaboration are not required for any individual designated as a principal investigator or senior personnel (and having a biosketch), nor are letters of collaboration required for any organization that will be a subawardee in the proposal budget (inclusion of biographical sketches and current and pending support statements for individuals and subaward budgets for organizations are considered to be implicit statements affirming involvement in the proposed project). **However, individuals and organizations providing letters of collaboration must be included in the COI matrix (see below).**

The project description should document the nature and need for all collaborations. Each letter of collaboration must be signed by the designated collaborator. Requests to collaborators for letters of collaboration should be made by the PI well in advance of the proposal submission deadline, because they must be included at the time of the proposal submission.

Conflicts of Interest Table Required (single copy documents)

Proposals must include a conflicts of interest table, in the single copy documents section of FastLane, as a list in a single alphabetized table, with the full names and institutional affiliations of all people with conflicts of interest for all senior personnel (PI and co-PIs) and any named personnel whose salary is requested in the project budget. Conflicts to be identified are (1) Ph.D. thesis advisors or advisees, (2) collaborators or co-authors, including postdoctoral researchers, for the past 48 months, and (3) any other individuals with whom or institutions with which the senior personnel (PI, co-PIs, and any named personnel) have financial ties, including advisory committees (please specify type). (This list generally replicates information that should be provided in the biographical sketches, but it is collated into one alphabetized table to facilitate the identification of individuals who would have conflicts of interest in the review of the proposal.) If submitting via Grants.gov, complete the information and attach as a PDF file (see Field 5, Additional Single Copy Documents, on the NSF Grant Application Cover Page).

Each Project should submit ONE COI matrix table for their PROJECT: the COI matrix will include the names of all individuals associated (named) with that project and their COI according to the following template.

Column A: PI, coPI or Senior Personnel on project or any individual or organization providing a letter of collaboration (last name, first name).

Column B: Institution of PI, coPI or senior personnel on project

Column C: name of person with whom there is a conflict for the person in column "A" (last name, first name)

Column D: institution of person in column "C"

Column E: type of COI

Please provide COI matrix alphabetized by Column A then Column C:

Other Considerations

Where appropriate, investigators are encouraged to work in association with existing projects, observational networks, experimental watersheds, long-term ecological research sites or research centers, or testing and evaluation facilities, whether supported by NSF or other agencies, such as USEPA, USGS, USDA/NIFA, ARS or NOAA. In such proposals, the project description should make clear how the proposed work differs from and augments activities already supported. A letter stating the specifics of cooperation or support from the ongoing activity for the proposed project should be included as Supplementary Documentation.

Education and outreach must be addressed and integrated effectively. Competitive projects must integrate research and education and PIs are encouraged to extend their education and outreach efforts beyond the traditional university setting, especially when partnering with other agencies or groups. Investigators are encouraged to include students as active participants on interdisciplinary teams. Informal education channels, such as science centers, aquariums, and similar facilities may be used to help enhance the public's ability to deal with complex environmental information related to water systems science and engineering to make informed decisions.

Proposals are encouraged to use innovative instrumentation, observational technologies, and associated software for observing, modeling and analyzing complex water cycle and water resource processes, and to coordinate with partnering organizations on their methodologies. Proposals should clearly discuss how the instrumentation and the field measurement techniques or strategies would be used. However, proposals for the development of specific in situ instrumentation or remote sensing technologies should be directed to other programs.

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited.

Indirect Cost (F&A) Limitations:

For NSF, Grant Proposal Guide (GPG) guidelines apply.

For awards made by USDA/NIFA, section 720 of the General Provisions in Title VII of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Programs (HR 112-284), limited indirect costs to 30 percent of the total Federal funds provided under each award. Applicants should anticipate that the FY 2013 (and 2014) appropriation will contain a similar limitation. Revised budgets will be solicited if these guidelines are not met by an application to be awarded by USDA/NIFA.

Budget Preparation Instructions:

Research Platforms and Facilities: Questions regarding costs and use of NSF shared-use facilities should be directed to one of the NSF program directors named in the solicitation.

Budgets should include all costs appropriately charged to the project for platforms and facilities required for the proposed research supported by NSF (e.g. UNOLS research vessels, research aircraft, or field equipment) or other agencies (e.g., USGS, USDA/NIFA, ARS, NOAA, USEPA) except where those costs are explicitly waived (in writing) by the operating agency. Please contact a cognizant NSF program officer for information on which platform or facility costs must be included in the proposal. Principal investigators are responsible for filing the appropriate requests with the operators of such major research platforms; a copy of the request (e.g. a UNOLS ship time request) must be attached as an appendix to the proposal.

Grantee Conference: All PIs funded through this program are required to attend a 3-day annual grantee conference to be held in the Washington DC region and should include the travel costs for this in their budget.

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

September 10, 2013

D. FastLane/Grants.gov Requirements

For Proposals Submitted Via FastLane:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

For Proposals Submitted Via Grants.gov:

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: <http://www.grants.gov/web/grants/applicants.html>. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact

the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

Proposers that submitted via FastLane are strongly encouraged to use FastLane to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in the GPG as [Exhibit III-1](#).

A comprehensive description of the Foundation's merit review process is available on the NSF website at: http://nsf.gov/bfa/dias/policy/merit_review/.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in [Investing in Science, Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014-2018](#). These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the strategic objectives in support of NSF's mission is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

NSF's mission calls for the broadening of opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (GPG Chapter II.C.2.d.i. contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including GPG Chapter II.C.2.d.i., prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
 - a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
 - b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

In responding to the standard NSF review criteria, reviewers will be asked to place emphasis on the following:

- The extent to which the proposal addresses the three topics listed under Program Description (Section II of this Solicitation). Novel approaches that will result in a theoretical framework for a predictive understanding of one or more of these topics will be given priority.
- Proposals that are interdisciplinary and broadly integrate across the biological/agricultural sciences, geosciences, social sciences, and engineering. This breadth of interdisciplinary research is expected to be reflected in the Principal Investigators involved in this project.
- **Category 2** proposed sites that are of sufficient size to address socially and scientifically significant water processes, encompassing surface earth, ecosystem, and engineering problems with ties to issues of climate change or sustainability. Each site should present well-defined, but poorly understood, processes that can be measured and studied with potential for significant advances in understanding expected in a 5 year time frame. It is anticipated that such sites will have background measures and data that will provide context to additional new measures.
- **Category 3** (synthesis) proposals that place a high priority on "scaling" the results from observations made at individual sites and "integrating" observations made at multiple sites, to obtain better understanding of processes at the regional scale.
- **Category 1** proposals (smaller team synthesis, modeling, integration and assessment projects) that use existing data and may make new measurements to study entire watersheds and groundwater sites.
- The extent to which data and results of the proposed work will be freely and openly available to other researchers and the general public.
- The extent to which the project provides for recruitment, education and training of the future scientific, engineering, technical, and policy workforce needed to pursue basic research on water systems;
- The extent to which the project provides for tools and infrastructure to provide government and industry policymakers with current knowledge on issues related to water systems, so as to better inform decisions on adaptation and mitigation;
- The extent to which the project provides for improving public awareness and understanding of interconnections between water systems, climate change and sustainability and the impacts, and technical strategies for adaptation and mitigation;
- The extent to which the project provides for opportunities to engage a diverse community of learners and educators in WSC research; and,
- The extent to which the project provides for development and dissemination of water systems-related education resources for formal (K-16) and informal settings that have been informed by research in the learning sciences.
- The extent to which the Management Plan, the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, serve the goals of the project and the solicitation.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Panel Review.

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will be completed and submitted by each reviewer. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

Applicants selected for funding by NIFA will be required to provide additional information in accordance with policies and procedures of the AFRI program. Applications selected for funding by NIFA will be forwarded to the USDA/NIFA Awards Management Division for award processing in accordance with the USDA/NIFA procedures.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process).

NIFA:

The award document will provide pertinent instructions and information including, at a minimum, the following:

1. Legal name and address of performing organization or institution to whom the Director has issued an award under the terms of this request for applications;
2. Title of project;
3. Name(s) and institution(s) of PDs chosen to direct and control approved activities;
4. Identifying award number assigned by the Department;
5. Project period, specifying the amount of time the Department intends to support the project without requiring recompetition for funds;
6. Total amount of Departmental financial assistance approved by the Director during the project period;
7. Legal authority(ies) under which the award is issued;
8. Appropriate Catalog of Federal Domestic Assistance (CFDA) number;
9. Applicable award terms and conditions (see <http://www.nifa.usda.gov/business/awards/awardterms.html> to view NIFA award terms and conditions);
10. Approved budget plan for categorizing allocable project funds to accomplish the stated purpose of the award; and
11. Other information or provisions deemed necessary by NIFA to carry out its respective awarding activities or to accomplish the purpose of a particular award.

B. Award Conditions

An NSF award consists of: (1) the award notice, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the *NSF Award & Administration Guide (AAG)* Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

Special Award Conditions:

Standard NSF award conditions apply to all awards funded by NSF.

- All NSF projects will be subject to the NSF Data Policy, a copy of which can be found on the solicitation's companion website (<http://www.nsf.gov/crssprgm/climate/>).
- For each award, one or more project representatives will be required to attend an annual PI meeting where they will report on project progress to other awardees, the funding agencies, and other interested parties, as well as to work to integrate their efforts with those of other awardees.
- Meritorious proposals that are deemed to be competitive may be funded by NSF and/or USDA/NIFA. No funds will be transferred between agencies. Therefore, for awards funded by USDA/NIFA, PIs will be asked to withdraw their proposal from

NSF and resubmit it to USDA/NIFA according to that agency's policies and procedures under the guidance of the cognizant USDA/NIFA Program Officer listed in the solicitation.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF Award & Administration Guide (AAG) Chapter II, available electronically on the NSF Website at [46]http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

USDA/NIFA

Awards issued as a result of this solicitation will have designated the Automated Standard Applications for Payment System (ASAP), operated by the Department of Treasury's Financial Management Service, as the payment system for funds. For more information see http://www.nifa.usda.gov/business/method_of_payment.html.

Several Federal statutes and regulations apply to USDA/NIFA grant applications considered for review and to project grants awarded under this program. These include, but are not limited to:

- 2 CFR Part 220 - Cost Principles for Educational Institutions (OMB Circular A-21).
- 2 CFR Part 225 - Cost Principles for State, Local, and Indian Tribal Governments (OMB Circular A-87).
- 2 CFR Part 230 - Cost Principles for Non-profit Organizations (OMB Circular A-122).
- 7 CFR Part 1, subpart A-USDA implementation of the Freedom of Information Act.
- 7 CFR Part 3-USDA implementation of OMB Circular No. A-129 regarding debt collection.
- 7 CFR Part 15, subpart A-USDA implementation of Title VI of the Civil Rights Act of 1964, as amended.
- 7 CFR Part 331 and 9 CFR Part 121-USDA implementation of the Agricultural Bioterrorism Protection Act of 2002.
- 7 CFR Part 3015-USDA Uniform Federal Assistance Regulations, implementing OMB directives (i.e., OMB Circular Nos. A-21, A-87, and A-122, now codified at 2 CFR Parts 220, 225 and 230), and incorporating provisions of 31 U.S.C. 6301-6308 (formerly the Federal Grant and Cooperative Agreement Act of 1977, Pub. L. No. 95-224)), as well as general policy requirements applicable to recipients of Departmental financial assistance.
- 7 CFR Part 3016 - USDA Implementation of Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments.
- 7 CFR Part 3017-USDA implementation of Governmentwide Debarment and Suspension (Nonprocurement).
- 7 CFR Part 3018-USDA implementation of Restrictions on Lobbying. Imposes prohibitions and requirements for disclosure and certification related to lobbying on recipients of Federal contracts, grants, cooperative agreements, and loans.
- 7 CFR Part 3019-USDA implementation of OMB Circular A-110, Uniform Administrative Requirements for Grants and Other Agreements With Institutions of Higher Education, Hospitals, and Other Nonprofit Organizations (2 CFR Part 215).
- 7 CFR Part 3021-USDA Implementation of Governmentwide Requirements for Drug-Free Workplace (Grants).
- 7 CFR Part 3022 -Research Institutions Conducting USDA-Funded Extramural Research; Research Misconduct.
- 7 CFR Part 3052-USDA implementation of OMB Circular No. A-133, Audits of States, Local Governments, and Nonprofit Organizations.
- 7 CFR Part 3407-USDA procedures to implement the National Environmental Policy Act of 1969, as amended.
- 7 CFR 3430-Competitive and Noncompetitive Non-formula Grant Programs--General Grant Administrative Provisions.
- 29 U.S.C. 794 (section 504, Rehabilitation Act of 1973) and 7 CFR Part 15b (USDA implementation of statute) -prohibiting discrimination based upon physical or mental handicap in Federally assisted programs.
- 35 U.S.C. 200 et seq. -Bayh Dole Act, controlling allocation of rights to inventions made by employees of small business firms and domestic nonprofit organizations, including universities, in Federally assisted programs (implementing regulations are contained in 37 CFR Part 401).

Responsible and Ethical Conduct of Research

The responsible and ethical conduct of research (RCR) is critical for excellence, as well as public trust, in science and engineering. Consequently, education in RCR is considered essential in the preparation of future scientists. In accordance with sections 2, 3, and 8 of 7 CFR Part 3022, institutions that conduct extramural research funded by USDA must foster an atmosphere conducive to research integrity, bear primary responsibility for prevention and detection of research misconduct and are to maintain and effectively communicate and train their staff regarding policies and procedures. In the event an application to NIFA results in an award, the AOR assures, through acceptance of the award that the institution will comply with the above requirements. Per award terms and conditions, grant recipients shall, upon request, make available to NIFA the policies and procedures as well as documentation to support the conduct of the training.

Note that the training referred to herein shall be either on-campus or the Collaborative Institutional Training Initiative (CITI) program for RCR (<https://www.citiprogram.org/rcrpage.asp>). The general content of the ethics training, at a minimum, will emphasize three key areas of research ethics: authorship and plagiarism, data and research integration and reporting misconduct. Each institution will be responsible for developing its own training system, as schools will need flexibility to develop training tailored to their specific student needs. Typically RCR education addresses the topics of: Data Acquisition and Management - collection, accuracy, security, access; Authorship and Publication; Peer Review; Mentor/Trainee Responsibilities; Collaboration; Conflict of Interest; Research Misconduct; Human Subject Research; and Use of Animals in Research.

Other Requirements

USDA/NIFA:

1. Delegation of Fiscal Responsibility
Unless the terms and conditions of the grant state otherwise, the grantee may not, in whole or in part, delegate or transfer to another person, institution, or organization the responsibility for use or expenditure of grant funds.

2. Changes in Project Plans

- a. The permissible changes by the grantee, PD(s), or other key project personnel in the approved project grant shall be limited to changes in methodology, techniques, or other similar aspects of the project to expedite achievement of the project's approved goals. If the grantee or the PD(s) is uncertain as to whether a change complies with this provision, the question must be referred to the Authorized Departmental Officer (ADO) for a final determination. The ADO is the signatory of the award document, not the program contact.
- b. Changes in approved goals or objectives shall be requested by the grantee and approved in writing by the ADO prior to effecting such changes. In no event shall requests for such changes be approved which are outside the scope of the original approved project.
- c. Changes in approved project leadership or the replacement or reassignment of other key project personnel shall be requested by the grantee and approved in writing by the ADO prior to effecting such changes.
- d. Transfers of actual performance of the substantive programmatic work in whole or in part and provisions for payment of funds, whether or not Federal funds are involved, shall be requested by the grantee and approved in writing by the ADO prior to effecting such transfers, unless prescribed otherwise in the terms and conditions of the grant.
- e. Changes in Project Period: The project period may be extended by USDA/NIFA without additional financial support, for such additional period(s) as the ADO determines may be necessary to complete or fulfill the purposes of an approved project, but in no case shall the total project period exceed ten years. Any extension of time shall be conditioned upon prior request by the grantee and approval in writing by the ADO, unless prescribed otherwise in the terms and conditions of a grant.
- f. Changes in Approved Budget: Changes in an approved budget must be requested by the grantee and approved in writing by the ADO prior to instituting such changes if the revision will involve transfers or expenditures of amounts requiring prior approval as set forth in the applicable Federal cost principles, Departmental regulations, or grant award.

C. Reporting Requirements

NSF:

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period. (Some programs or awards require more frequent project reports). Within 90 days after expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report will delay NSF review and processing of any future funding increments as well as any pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through FastLane, for preparation and submission of annual and final project reports. Such reports provide information on activities and findings, project participants (individual and organizational), publications, and other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

USDA/NIFA:

Grantees are to submit initial project information and annual summary reports to USDA/NIFA's electronic, Web-based inventory system that facilitates both grantee submissions of project outcomes and public access to information on Federally-funded projects. The details of these reporting requirements are included in the award terms and conditions.

Any additional reporting requirements will be identified in the terms and conditions of the award (see Part VI, B.9. for a link to view the USDA/NIFA award terms and conditions).

Additional Reporting Requirements

- For awards funded by NSF, PIs will be required to include descriptions of their project milestones and their data management activities in their annual reports. Data reporting should conform to current NSF data policy guidelines; PIs should consult with the GPG.
- For awards funded by USDA/NIFA, reporting requirements for awards funded will conform to those specified by USDA/NIFA.
- For multi-proposal collaborative projects that are funded by NSF and USDA/NIFA, the annual report of the lead project in the collaborative must be resident at NSF and must include a description of the activities and milestones of the parts of the project that are funded by the other agencies.

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Thomas Torgersen, Program Director, Division of Earth Sciences, telephone: (703) 292 4738, email: torgers@nsf.gov
- Shemin Ge, Program Director, Division of Earth Sciences, telephone: 703-292-7411, email: sg@nsf.gov
- Bruce Hamilton, Program Director, Division of Chemical, Bioengineering, Environmental, and Transport Systems, telephone: (703) 292-8320, email: bhamilto@nsf.gov
- Debra Reinhart, Program Director, Division of Chemical, Bioengineering, Environmental, and Transport Systems, telephone: 703 292 5356, email: dreinhar@nsf.gov
- Robert O'Connor, Program Director, Division of Social and Economic Sciences, telephone: (703) 292-7263, email: roconnor@nsf.gov

- Cheryl Eavey, Program Director, Division of Social and Economic Sciences, telephone: (703) 292-7269, email: ceavey@nsf.gov
- Mary Ann Rozum, National Program Leader, Institute of Bioenergy, Climate, and Environment-NIFA, telephone: (202) 401-4533, email: mrozum@nifa.usda.gov
- Nancy Cavallaro, National Program Leader, Institute of Bioenergy, Climate, and Environment-NIFA, telephone: 202 401 5176, email: ncavallaro@nifa.usda.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF [Grants Conferences](#). Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on NSF's website at https://public.govdelivery.com/accounts/USNSF/subscriber/new?topic_id=USNSF_179.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this mechanism. Further information on Grants.gov may be obtained at <http://www.grants.gov>.

About the National Institute of Food and Agriculture

The National Institute of Food and Agriculture (NIFA) is an agency within the U.S. Department of Agriculture (USDA), part of the executive branch of the Federal Government. Congress created NIFA through the Food, Conservation, and Energy Act of 2008. NIFA replaced the former Cooperative State Research, Education, and Extension Service (CSREES), which had been in existence since 1994. NIFA's unique mission is to advance knowledge for agriculture, the environment, human health and well-being, and communities by supporting research, education, and extension programs in the Land-Grant University System and other partner organizations. NIFA doesn't perform actual research, education, and extension but rather helps fund it at the state and local level and provides program leadership in these areas. Through grants offered by NIFA, the USDA enables researchers throughout the United States to solve problems critical to our farmers, consumers, and communities. NIFA is the USDA's major extramural research agency, funding individuals, institutions, and public, private, and non-profit organizations. NIFA's education programs supports and promotes teaching excellence, enhances academic quality, and develops tomorrow's scientific and professional workforce. In cooperation with public institutions, private sector partners, and the Land-Grant University System, NIFA provides national leadership to address critical educational issues. NIFA's extension projects deliver science-based knowledge and informal educational programs to people, enabling them to make practical decisions.

NIFA Web site:

<http://www.nifa.usda.gov/>
Phone: 202-720-4423

Street Address:

National Institute of Food and Agriculture
Waterfront Centre
800 9th St. SW., Washington, DC 20024

Mailing Address:

United States Department of Agriculture
National Institute of Food and Agriculture
1400 Independence Avenue SW., Stop 2201
Washington, DC 20250-2201

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 55,000 proposals each year for research, education and training projects, of which approximately 11,000

are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at <http://www.nsf.gov>

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230
- **For General Information** (NSF Information Center): (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**
 - Send an e-mail to: nsfpubs@nsf.gov
 - or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, *NSF-50*, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and *NSF-51*, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
Reports Clearance Officer
Office of the General Counsel
National Science Foundation
Arlington, VA 22230

X. APPENDIX

Water Sustainability and Climate Solicitation Frequently Asked Questions (WSC FAQ's)

1. Question: What is meant by a water system?

Answer: In this context, a water system comprises the drainage basin and its social, physical, chemical, and biological constituents, including water networks, ecosystems, the built environment, the atmospheric system that governs evaporation and precipitation in the basin, and the source water bodies and terminal lakes or seas into which the water flows.

2. Question: What is meant by "place-based research"?

Answer: Studies of a water system (as defined above) using observations at specific locations in considered place-based research in combination with models that allow for spatial and temporal interpolation within the system as well as extrapolation beyond the specific system under study to other systems.

3. Question: Are there any restrictions on the sites that may be proposed for proposals? Should they be located only in the U.S.?

Answer: No. The sites may be located anywhere in the world, but there must be a clear justification for why a particular site best suits the goals of the proposal and this solicitation. Sites may include relatively pristine systems, built or engineered water environments or anthropogenically modified ecosystems and may range from a built environment site or a single watershed to the basin scale. Sites should be of sufficient size to address socially significant water, surface earth, ecosystem and engineering problems with ties to issues of climate change, land use change, population change or sustainability.

4. Question: Can sites build upon existing observational and engineering infrastructure?

Answer: Yes, proposers are encouraged, where appropriate, to build upon existing observational and engineering infrastructure (e.g. NSF-funded LTER sites, CZOs, WATERS Network Test Beds, Cyberinfrastructure for Environmental Observatories: Prototypes (CEO-Ps) sites or facilities operated by other agencies such as USEPA, USGS, USDA, ARS, USFS or NOAA).

5. Question: The solicitation is entitled "Water Sustainability and Climate." Does this mean that all proposals must include climate research?

Answer: Proposed research must take an integrative systems approach to study water dynamics and take into account the feedbacks and linkages amongst a number of facts. While water sustainability is often connected to climate change and variability, this need not be an explicit component or focus of every proposal, as long as the proposed research addresses sustainability issues and spans the bioscience, engineering, geoscience, and social science disciplines. Land use and population change are also important water system stressors.

6. Question: Can proposals submitted to this solicitation include the cost of developing and testing new sensors or instrumentation?

Answer: No. While proposers are encouraged to utilize advanced in situ sensor and instrumentation and new remote sensing technology, proposals for the development and testing of new sensors and instrumentation, and other remote sensing techniques should be directed to other NSF programs.

7. Question: I am interested in developing integrated, regional scale climate and water system models. Is it appropriate to submit to this solicitation?

Answer: Your work might be appropriate for a Category 3 (Synthesis and Modeling) proposal for this solicitation, but the NSF Solicitation on Decadal and Regional Scale Climate Prediction Using Earth System Models (EaSM) might be more appropriate for your project. Please talk with the relevant Program Officers.

8. Question: Category 1 proposals no longer include a planning grant aspect. Does this mean that the "Water Sustainability and Climate" solicitation will not be re-issued in future years?

Answer: This WSC solicitation for 2014 is intended to be the final solicitation in this format subject to availability of funds and programmatic considerations.

9. Question: My co-proposers and I would like to involve industry in our WSC proposal, and we have an industry partner who wants to participate. Is a GOALI proposal permitted under the WSC solicitation?

Answer: Yes. The title of a WSC GOALI proposal must be preceded by the words "WSC-Category (1, 2, or 3, as appropriate)-GOALI:". Make sure to comply with the instructions posted for GOALI. In particular, intellectual property (IP) requirements must be addressed.

10. Question: What types of sites should I be working in?

Answer: This solicitation includes all types of watersheds and no one type is specifically emphasized and/or eliminated. However, NIFA is particularly interested in urban/urbanizing, agricultural, managed forest and rangeland systems.

11. Question: My project will need to make a few measurements (or take some surveys) and generate some new data. Do I have to write a proposal for a Category 2 grant?

Answer: Category 2 proposals should focus on place-based observational and modeling studies. The Category defines a maximum duration and dollar amount but allows a scope of project design with a broad range. Projects for less than the maximum are considered on their merit within their self-defined scope. Data collection is also allowable under Category 1.

12. Question: I do not understand if my project is a Category 1, 2 or a Category 3. How do I tell the difference?

Answer: All three categories require synthesis, integration and assessment activities. Generation of new data/measures is not an allowable budget item for Category 3. Category 1, 2 projects fundamentally include place-based observational and modeling studies where new observational data (including surveys) is allowable for the project. Category 1 proposals are smaller in scope than Category 2 or Category 3 proposals. There are also dollar and duration limits which further serve to differentiate each Category of WSC project.

13. Question: My colleagues and I wish to explore the possibility of submitting a proposal that involves USEPA facilities and/or researchers. How can we do this? What about utilization of facilities operated by other Federal agencies (e.g. USGS, USDA, NOAA)?

Answer: As a general rule, projects funded under this solicitation by NSF with follow normally operational NSF guidelines for agencies and national laboratories (GPG I-E.7). Projects funded by USDA/NIFA with follow normally operational USDA/NIFA guidelines for agencies and national laboratories.

For NRMRL/USEPA, contact Thomas Speth at [61]Speth.Thomas@epamail.epa.gov. Also refer to the material at [62]<http://www.epa.gov/nrmrl/wswrd/facilities.html>. For other units of USEPA, contact Jennifer Orme-Zavaleta at [63] Orme-Zavaleta.Jennifer@epa.gov; 919.541.2283.

For Dept. of Agriculture contact Mary Ann Rozum, NIFA, telephone (202) 401-4533, email mrozum@nifa.usda.gov.

For other Federal agencies talk to one of the cognizant NSF program officers identified in this solicitation for appropriate contact information.

14. Question: I would like to conduct a Category 3 study but I would also like to conduct a social survey to provide a context for the analysis. Is this allowable?

Answer: Conducting a survey constitutes the collection of new data and is not allowed as a budget item within Category 3 project. You can submit your project as a Category 1 or 2.

15. Question: What defines "to broadly integrate across the biological sciences, geosciences, social sciences, and engineering"?

ANSWER: Integration can occur at many levels of research. This solicitation competition is particularly interested in discovery and elucidation of the coupling of process-level interactions that occur among these disciplinary processes within a water sustainability system. Thus, not only must all components be fully integrated but all components must also be sufficient to convey their disciplinary processes and to convey the coupling of those disciplinary processes to the other necessary components.

16. Question: What defines the biological sciences, geosciences, social sciences, and engineering research?

ANSWER: This should be drawn from the types of programs currently existing within the NSF Directorates for BIO, ENG, GEO, SBE.

Suggested Technical Reports for Reference

Landscapes on the Edge: New Horizons for Research on Earth's Surface, National Research Council, National Academy Press, Washington, D.C., 2010.

http://www.nap.edu/openbook.php?record_id=12700&page=R1

WATERS Network Science Plan http://www.watersnet.org/docs/WATERS_Network_SciencePlan_2009May15.pdf

Climate Change and Water Resources Management: A Federal Perspective. Circular 1331, U.S. Geological Survey Circular 1331, 65p. 2009

<http://pubs.usgs.gov/circ/1331/>

GEO Vision Report (Water: Changing Perspectives)

<http://www.nsf.gov/geo/acgeo/geovision/start.jsp>

2001 Water and Watersheds Progress Review

http://www.epa.gov/ncer/publications/workshop/pdf/2001_water_watersheds.pdf

Transitions and Tipping Points in Complex Environmental Systems

http://www.nsf.gov/geo/ere/ereweb/ac-ere/nsf6895_ere_report_090809.pdf

Energy Demands On Water Resources: Report To Congress On The Interdependency Of Energy And Water

<http://www.sandia.gov/energy-water/docs/121-RptToCongress-EWwEIAComments-FINAL.pdf>

NAE Grand Challenges (March 1, 2009 Summit on the National Academy of Engineering Grand Challenges at Duke University)

<http://www.engineeringchallenges.org/cms/challenges.aspx>

WATERS Network Social/Behavioral/Economic Science Agenda Workshop Final Report

<http://www.watersnet.org/docs/WATERS-SBE-Workshop-Report-Final-20091123.pdf>

Subcommittee on Water Availability and Quality Strategic Plan

<http://www.ostp.gov/galleries/NSTC/Fed%20ST%20Strategy%20for%20Water%2009-07%20FINAL.pdf>

NOAA Hydrology program Strategic Science Plan http://www.weather.gov/oh/src/docs/Strategic_Science_Plan_2007-Final.pdf

National Research Council, 2012, *New Research Opportunities in the Earth Sciences*, http://www.nap.edu/catalog.php?record_id=13236

National Research Council, 2012, *Challenges and Opportunities in the Hydrologic Sciences*, National Academy Press, Washington, D.C. 162 pp. http://www.nap.edu/catalog.php?record_id=13293

Global Water Security, ICA 2012-08

[http://www.transboundarywaters.orst.edu/publications/publications/ICA_Global%20Water%20Security%5B1%5D%20\(1\).pdf](http://www.transboundarywaters.orst.edu/publications/publications/ICA_Global%20Water%20Security%5B1%5D%20(1).pdf)

National Research Council, 2012. *Ecosystems Services: charting a path to sustainability* http://www.nap.edu/catalog.php?record_id=13331

National Research Council, 2012. *Computing Research for Sustainability* http://www.nap.edu/catalog.php?record_id=13415

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