

# Long-Term Ecological Research (LTER)

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## PROGRAM SOLICITATION

NSF 12-524



### National Science Foundation

Directorate for Biological Sciences  
Division of Environmental Biology

Directorate for Geosciences  
Division of Ocean Sciences

Office of Polar Programs  
Division of Arctic Sciences  
Division of Antarctic Sciences

Directorate for Social, Behavioral & Economic Sciences  
Division of Behavioral and Cognitive Sciences

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

March 21, 2012

## IMPORTANT INFORMATION AND REVISION NOTES

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**This solicitation formalizes the basic requirements and expectations of all Long Term Ecological Research (LTER) proposals. At the current time, the LTER program is accepting only renewal proposals from existing projects. Should funds become available to support new sites, a Dear Colleague Letter or a revised solicitation will be released specifying the criteria for an open competition.**

### Important Reminders

A revised version of the *NSF Proposal & Award Policies & Procedures Guide (PAPPG)*, [NSF 11-1](#), was issued on October 1, 2010 and is effective for proposals submitted, or due, on or after January 18, 2011. Please be advised that the guidelines contained in [NSF 11-1](#) apply to proposals submitted in response to this funding opportunity.

**Cost Sharing:** The PAPPG has been revised to implement the National Science Board's recommendations regarding cost sharing. Inclusion of voluntary committed cost sharing is prohibited. In order to assess the scope of the project, all organizational resources necessary for the project must be described in the Facilities, Equipment and Other Resources section of the proposal. The description should be narrative in nature and must not include any quantifiable financial information. Mandatory cost sharing will only be required when explicitly authorized by the NSF Director. See the PAPP Guide Part I: *Grant Proposal Guide (GPG) Chapter II.C.2.g(xi)* for further information about the implementation of these recommendations.

**Data Management Plan:** The PAPPG contains a clarification of NSF's long standing data policy. All proposals must describe plans for data management and sharing of the products of research, or assert the absence of the need for such plans. FastLane will not permit submission of a proposal that is missing a Data Management Plan. The Data Management Plan will be reviewed as part of the intellectual merit or broader impacts of the proposal, or both, as appropriate. Links to data management requirements and plans relevant to specific Directorates, Offices, Divisions, Programs, or other NSF units are available on the NSF website at: <http://www.nsf.gov/bfa/dias/policy/dmp.jsp>. See [Chapter II.C.2.j](#) of the GPG for further information about the implementation of this requirement.

**Postdoctoral Researcher Mentoring Plan:** As a reminder, each proposal that requests funding to support postdoctoral researchers must include, as a supplementary document, a description of the mentoring activities that will be provided for such individuals. Please be advised that if required, FastLane will not permit submission of a proposal that is missing a Postdoctoral Researcher Mentoring Plan. See [Chapter II.C.2.j](#) of the GPG for further information about the implementation of this requirement.

## SUMMARY OF PROGRAM REQUIREMENTS

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### General Information

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#### Program Title:

Long-Term Ecological Research (LTER)

#### Synopsis of Program:

To address ecological questions that cannot be resolved with short-term observations or experiments, NSF established the Long Term Ecological Research Program (LTER) in 1980. Three unique components differentiate LTER research from projects supported by other NSF programs: 1) the research is located at specific sites chosen to represent major ecosystem types or natural biomes; 2) it emphasizes the study of phenomena over long periods of time, based upon data collection in five core areas; and 3) projects include significant integrative, cross-site,

network-wide research. Research at LTER sites provides experiments, databases, and research programs for use by other scientists. It must test important ecological or ecosystem theories including, but not limited to, ecosystem stability, biodiversity, community structure, and energy flow. Recognizing that the value of long-term data extends beyond use at any individual site, NSF requires that data collected by all LTER sites be made broadly accessible.

Since its origin in 1980, the LTER program has grown in size and mandate. It currently supports 26 active sites representing major biotic regions of the continental US and Alaska, the marine environment, and the Antarctic continent. Its disciplinary scope includes population and community ecology, ecosystem science, evolutionary biology, phylogenetic systematics, social and economic sciences, urban ecology, oceanography, mathematics, computer science, and science education. The existence of a network across sites allows for continental-scale questions to be addressed.

#### **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.*

- Saran Twombly, Division of Environmental Biology, telephone: (703) 292-8133, email: [stwombly@nsf.gov](mailto:stwombly@nsf.gov)
- Thomas J. Baerwald, Social, Behavioral and Economic Sciences, telephone: (703) 292-7301, email: [tbaerwal@nsf.gov](mailto:tbaerwal@nsf.gov)
- David L. Garrison, Ocean Sciences, telephone: (703) 292-7588, email: [dgarriso@nsf.gov](mailto:dgarriso@nsf.gov)
- Peter Milne, Office of Polar Programs, telephone: (703) 292-4714, email: [pmilne@nsf.gov](mailto:pmilne@nsf.gov)

#### **Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):**

- 47.050 --- Geosciences
- 47.074 --- Biological Sciences
- 47.075 --- Social Behavioral and Economic Sciences
- 47.078 --- Office of Polar Programs

## **Award Information**

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**Anticipated Type of Award:** Continuing Grant

**Estimated Number of Awards:** 11

In FY 12 eleven sites are scheduled for renewal.

**Anticipated Funding Amount:** \$11,000,000

Renewal budgets will be allowed to increase by 15%, pending availability of funds.

## **Eligibility Information**

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#### **Organization Limit:**

Proposals may only be submitted by the following:

- U.S. universities and colleges, U.S. non-profit, non-academic organizations, and for-profit organizations are eligible to submit proposals under this program solicitation. Collaborative proposals must be submitted using the "single proposal" method as described in Chapter II, Section D.4.a. of the GPG. Separately submitted collaborative proposals will be returned without review.

Please note: The LTER program is currently accepting only renewal proposals. Only organizations with active LTER awards are eligible to apply.

#### **PI Limit:**

The LTER program is currently accepting only renewal proposals. Only PIs associated with active LTER awards are eligible to apply.

#### **Limit on Number of Proposals per Organization:**

None Specified

#### **Limit on Number of Proposals per PI:**

None Specified

## **Proposal Preparation and Submission Instructions**

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### **A. Proposal Preparation Instructions**

- **Letters of Intent:** Not Applicable
- **Preliminary Proposal Submission:** Not Applicable
- **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](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](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:** Not Applicable
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

## C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):  
March 21, 2012

## Proposal Review Information Criteria

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**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

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**Award Conditions:** Standard NSF award conditions apply.

**Reporting Requirements:** Standard NSF reporting requirements apply.

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## I. INTRODUCTION

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All ecosystems are in the process of long-term change. Identifying the nature of these changes and the mechanisms or processes driving them requires the collection, analysis, and interpretation of data collected over long periods of time. Similarly, understanding communities of organisms that have extended life spans and long turnover times, species interactions that may oscillate over decadal or longer periods, pools of materials such as nutrients in soils that turn over at intermediate to longer time scales, and external forcing functions such as climatic cycles that operate over long return intervals demand stable, long-term study.

To address questions that cannot be resolved with short-term observations or experiments, NSF established the Long Term Ecological Research Program (LTER) in 1980. Initial goals of the program were to collect comparative data at a network of sites representing major biotic regions of North America, and to evaluate the scientific, technical, and managerial issues associated with such long-term comparative research. Three unique components differentiate LTER research from projects supported by other NSF programs: 1) the research is located at specific sites chosen to represent major ecosystem types or natural biomes, 2) it emphasizes

the study of phenomena over long periods of time, based upon data collection in five core areas, and 3) projects include integrative, cross-site, network-wide research. Ongoing research at LTER sites must test important, current ecological or ecosystem theories and significantly advance understanding of the long-term dynamics of populations, communities and ecosystems.

The LTER program was initiated with a set of six sites selected in 1980. Since then, the program has grown in size; currently 26 sites comprise the program and represent a broad array of ecosystems and research emphases. Research activities are supported by the Directorate for Social, Behavioral and Economic Sciences; the Office of Polar Programs; the Directorate for Biological Sciences; and the Division of Ocean Sciences in the Directorate for Geosciences. Additional support for educational and international activities is provided by the Directorate for Education and Human Resources and the Office of International Science and Engineering, respectively.

The current 26 sites together constitute the LTER network, a collaborative effort among more than 1500 scientists and students investigating ecological processes over long temporal and diverse spatial scales. The network extends the opportunities and capabilities of the individual sites to promote comparative research across sites. The LTER Network Office provides leadership in developing and implementing data and information management standards and protocols for the LTER Network, as well as for the broader community of environmental scientists. It also supports, facilitates, and enhances the research and creative activities developed by individual sites. Additional information about the LTER network and the LTER Network Office can be obtained from the LTER homepage on the world wide web at <http://www.lternet.edu>.

Thirty years of LTER research have produced essential knowledge about ecosystem change in response to natural and human influences. Changes ranging from climate alteration to species introductions to land and water use decisions have far-reaching impacts on ecosystem function, community structure, and population and evolutionary dynamics. LTER research has advanced the field of ecology and helped to provide the empirical data needed to forecast change. It has also advanced continental-scale research, through cross-site analyses of ecological change. At some sites, engagement of social scientists and biophysical scientists has opened the door to studying questions of socio-ecological connections among organisms, processes, and ecosystems.

## II. PROGRAM DESCRIPTION

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As the LTER Program enters its fourth decade, it faces new demands for long-term research. To be successful, renewal proposals must test major ecological or ecosystem theories. These theories must motivate a suite of cohesive and well integrated questions that organize the proposed research, and this research should address the LTER Program's goals of 1) achieving a mechanistic understanding of ecological responses to past and present environmental change at multiple scales; 2) using this understanding to predict ecological, evolutionary, and social responses to future environmental change; and, when appropriate 3) informing social strategies to adapt to this change. To succeed in an increasingly complex universe of environmental science, sites and the network must clearly define questions that uniquely demand study on decadal time scales. These questions should be ones that cannot be addressed through other, more standard funding programs at NSF (for example, core programs or short-term special solicitations). Sites are encouraged to develop network-level interactions in order to integrate data necessary to tackle complex questions at diverse spatial scales, and to develop active collaborations with emerging programs that consider long time and broad spatial scales.

Data collection at LTER sites centers on the five core areas of primary production, population dynamics and trophic structure, organic matter accumulation, inorganic inputs and movements of nutrients through the ecosystem, and patterns and frequency of disturbances. These core data provide the foundation for testing a host of major ecological concepts and theories, for challenging existing paradigms in ecology and ecosystem science, and for developing new paradigms.

Renewal proposals are encouraged to broaden the spatial scale of long-term analyses through comparative research with other LTER sites or studies outside of the LTER network. These cross-site or cross-study activities should respond directly to the motivating conceptual framework proposed for innovative site-based research. They also should contribute to a broader understanding of the mechanisms underlying ecological responses to climate change, nutrient loading, loss of biodiversity, or changes in trophic structure, for example. The research must be innovative, conceptually motivated, and thoroughly justify the need for long-term support to understand ecological systems and processes.

Renewal proposals also must articulate milestones and deliverables for data management that, at the very least, include timelines for data release, publication of discovery-level metadata, and online access for all core data collected at a site. NSF sets a high priority on maximum performance with respect to this fundamental requirement for data availability and accessibility.

Proposals should include the following key components:

- Scientific goals, including both 1) site-specific research and 2) cross-site, non-LTER, international research, or involvement with other network-like activities. These must be placed within a cohesive, integrative, and synthetic research plan
- Information Management and Technology, including milestones and deliverable products from data management that contribute to compliance with LTER Network goals of full data accessibility
- Site Management, including personnel, fiscal, administrative, institutional, and logistical issues. Plans for involving new researchers in site activities will also be evaluated
- Outreach and Education including training of students, K-12 Schoolyard activities, application of results to management or policy decisions, and others as relevant.

Each of these components will be evaluated for quality, productivity, and impact.

The scientific goals of the proposed research will be evaluated based on the following principles:

1. focus on important and general ecological questions that a) derive from key theories, b) are motivated by long-term data in hand and c) require additional, long-term data collection to be answered
2. encouragement of or demand for new conceptual frameworks or theory that will significantly advance understanding of site-specific dynamics and relate site-specific results to other ecosystems at different spatial scales
3. use of existing, or development of new, conceptual, analytical and numerical models to guide the research
4. advancement of fundamental understanding of long-term ecological dynamics through cross-site collaborations or collaborations outside of the LTER network
5. if social science is proposed, the extent to which the research draws from and contributes to social science theory and understanding.

Additional merit review criteria designed to address these components and principles are stated below.

Four current LTER sites (North Temperate Lakes, Coweeta Hydrological Laboratory, Baltimore Ecosystem Study, and Central Arizona-Phoenix) incorporate social science components. In their renewal proposals, other LTER sites may elect to integrate social

science if there are key, conceptually motivated social science questions that can be uniquely addressed at these long-term sites.

### III. AWARD INFORMATION

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At the end of each 6 year award, active LTER sites in good standing are eligible for renewal. Annual renewal award amounts in FY 2012 will average \$980,000, including a 15% increase over previous funding levels, pending availability of funds.

### IV. ELIGIBILITY INFORMATION

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#### Organization Limit:

Proposals may only be submitted by the following:

- U.S. universities and colleges, U.S. non-profit, non-academic organizations, and for-profit organizations are eligible to submit proposals under this program solicitation. Collaborative proposals must be submitted using the "single proposal" method as described in Chapter II, Section D.4.a. of the GPG. Separately submitted collaborative proposals will be returned without review.

Please note: The LTER program is currently accepting only renewal proposals. Only organizations with active LTER awards are eligible to apply.

#### PI Limit:

The LTER program is currently accepting only renewal proposals. Only PIs associated with active LTER awards are eligible to apply.

#### Limit on Number of Proposals per Organization:

None Specified

#### Limit on Number of Proposals per PI:

None Specified

### V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

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#### A. Proposal Preparation Instructions

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**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](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](mailto: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](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](mailto:nsfpubs@nsf.gov).

The following instructions supplement the GPG and NSF Grants.gov Application Guide guidelines:

#### Proposal Format

Please note the page limits contained in this solicitation take precedence over those given in the NSF *Grant Proposal Guide (GPG)*. Additionally, collaborative proposals must be submitted using the "single proposal" method as described in Chapter II., Section D.4.a. of the *GPG*. Each project must be managed by a single organization with other organizations involved via sub-awards. The alternative, simultaneous submission of proposals from multiple organizations, will be returned without review. Proposals will be subjected to initial screening for the requirements in the *GPG* and this solicitation. Those that do not meet specific requirements will be returned without review. Proposals will not be forwarded to other Programs if found to be inappropriate for this competition.

The following guidelines deviate from those specified in the NSF GPG and NSF Grants.gov Application Guide:

Cover Sheet: The title must start with the acronym, "LTER:" followed by the substantive title. Failure to do this may delay processing.

Project Description: a maximum of 25 pages of text, with an additional 7 pages allowed for figures, that includes the following sections:

Section 1: Results from Prior Support: Describe results of prior LTER support, including the 10 most significant publications resulting from the last 6 years of funding. Include broader impacts and results of supplemental support in these results. To provide a context for the current renewal, it may be useful to summarize, in one or two sentences, the major foci of previous renewal proposals.

As a **Supplementary Document**, include a table that lists all data sets from the site that are available electronically and provide documentation of the use of these data by investigators and others not associated with your LTER site.

Section 2: Proposed Research (20 pages of text, with up to 7 additional pages of figures allowed. No substitution of text for figures, or figures for text, will be accepted): Essential to this section is a clear articulation of the conceptual framework and individual questions that motivate an integrated research plan. Describe in appropriate detail the long-term experiments and observations that will be carried out, and explain how they fit into the proposed conceptual framework. Describe the methods and data analyses so that reviewers can critically evaluate the quality of these long-term efforts. Describe proposed models or model development in sufficient detail to allow evaluation, and explain how these support the conceptual framework. Conceptually integrate new activities with the proposed long-term studies. Because budgets may increase at the time of renewal, the addition of new activities is appropriate. Integrate cross-site or other collaborative efforts into the overall research plan, and describe how these will advance understanding of site-specific dynamics or relate site-specific results to other ecosystems at different spatial scales. Close this section with a synthesis that ties together the proposed research activities, and shows how they will significantly advance understanding of ecological or ecosystem dynamics at different spatial and temporal scales.

There is no need to provide detailed methods for projects that are ongoing at the site; access to details may be provided through a web site address. For new research efforts, more detail on methods should be provided.

Section 3: Education and Outreach Activities: Describe the outreach program planned, including educational activities at all levels, public activities, media interactions, and applications of your research to policy and management, etc. Include a plan for the development and implementation of this program.

Section 4: Evaluation of mid-term Site Review Team: Describe in appropriate detail how the proposal addresses substantive issues identified during the mid-term site review.

References Cited: pages as required, following GPG format

Budget and Budget Justification: The annual budget over the next six years should total \$980,000, which is a 15% increase over the previous award cap. A few exceptions to this annual amount apply; please contact Program Officer managing your current award for clarification. Any increases over current levels are subject to the availability of funds. Thorough justification of items requested in the budget is required. Explain why you need the funds requested to carry out specific aspects of the proposed research. Describe other sources of funding, how LTER funds are leveraged at your site, and what other in-kind services are provided, and by whom. Formal cost sharing is now prohibited by NSF.

Budgets should include all costs charged to the project for platforms and facilities supporting the research except for those facilities separately supported by NSF (e.g., UNOLS research vessels, research aircraft, or field equipment). For research involving UNOLS vessels, a UNOLS ship request should be appended to proposals as a Supplementary Document. Likewise, research involving polar regions should follow established guidelines for requesting logistical assets, as discussed in the relevant proposal solicitations (for Antarctic Sciences, see [NSF 09-536](#); for Arctic Sciences, see [NSF 10-503](#)). Principal investigators are responsible for filing the appropriate requests for major research platforms, if applicable; a copy of the request must be attached as an appendix to the proposal.

Biographical Sketches: Provide a one-page biographical sketch for each PI and senior scientist listed in the proposal. List only FIVE publications per investigator on each sketch. Do not list conflicts separately on each sketch. Conflicts are to be listed separately as indicated below within Supplementary Documents.

Current and Pending Support: as specified in the GPG. This proposal is considered a pending support activity.

Supplementary Documents must include the following (order is not important):

1. An alphabetical, consolidated list of all scientific collaborators including conflicts of interest for all the PIs and other LTER participants whose biographical sketches appear in the proposal. Do not list conflicts separately on each biographical sketch.
2. Data Management Plan (maximum of 5 pages): This section must provide a description of the proposed data and information management system and metadata standards to be used at the site. It is expected that data derived from LTER funding will be made freely and publicly available as soon as possible (not to exceed 2 years after collection) as per LTER Data Policy (see [http://im.lternet.edu/im\\_requirements/im\\_review\\_criteria](http://im.lternet.edu/im_requirements/im_review_criteria)). This section should include milestones and deliverable products from data management that contribute to full compliance with LTER Network goals of data accessibility. More specifically, NSF places high priority on the availability of site-based data to a broad research community. Core data sets generated at a site must be available electronically and accompanied by metadata that meet EML Level 2 standards. Online access for the maximum number of datasets should take precedence over efforts expended on more advanced features for documentation, data integration, or application services. In addition, this section should include descriptions of how data management will be implemented in the design of research projects; how the data manager will be involved in designing research projects; and the mechanisms employed to assure that researchers contribute their data to the LTER databases. Proposers should describe the resources dedicated to harvesting, documenting, archiving, managing, and making data accessible; and should detail any anticipated major changes and why these are necessary.
3. Site Management Plan (maximum of 3 pages): Describe how site-level research, which involves a number of individuals and diverse projects, will be managed. This must include a cohesive management plan that is adequate for a project of the size and complexity proposed. The plan should describe how funding and research decisions will be made and implemented, along with efforts to integrate non-LTER scientists into research activities. Describe efforts to increase diversity among site participants. The Site Management Plan also must address continuity of leadership, succession planning, and the recruitment of new scientists to the project. Explain any major changes anticipated or proposed.
4. A table listing all site databases that are electronically accessible, as described above.
5. Postdoctoral Mentoring Plan (maximum 1 page): This must be included if salaries are listed for post-doctoral researchers on the appropriate line in the budget.
6. Ship time - Proposals may require the scheduling of ship time. These proposals must include a completed NSF-UNOLS Request Form (NSF Form 831). The UNOLS form may be obtained from the NSF Division of Ocean Sciences Ship

Operations Program by calling (703) 292-8581, or directly from the UNOLS World Wide Web site at <http://www.unols.org/>.

7. Logistical Support for Antarctic and Arctic LTER sites: Three current LTER sites rely on research support and logistics provided through the Office of Polar Programs. The Arctic Research Support and Logistics (RSL) Program supports the field component of research projects, usually through third party contractors. Third party logistics providers include CH2MHILL Polar Services, which manages support at many Arctic sites and includes a subcontract to Umiaq-UIC (Ukpeagvik Iñupiat Corporation), which supports work on Alaska's North Slope; and the Toolik Field Station, which is operated by the Institute of Arctic Biology at the University of Alaska Fairbanks. The Division of Antarctic Infrastructure and Logistics provides logistical support for US Antarctic Program (USAP) research projects in Antarctica via support contractors or agreements with Department of Defense organizations. The scope of polar fieldwork at both poles must be outlined in the proposal so NSF and logistics providers can evaluate the feasibility of requested support and institute appropriate planning.

## B. Budgetary Information

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

**Other Budgetary Limitations:**

Federal agency scientists and scientists based in other countries may participate contingent on funding from other federal agency or foreign agency partners, but not via NSF funding.

## C. Due Dates

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

March 21, 2012

## D. FastLane/Grants.gov Requirements

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- **For Proposals Submitted Via FastLane:**

Detailed technical instructions regarding the technical aspects of preparation and submission via FastLane are 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](mailto: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.

**Submission of Electronically Signed Cover Sheets.** The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Further instructions regarding this process are available on the FastLane Website at: <https://www.fastlane.nsf.gov/fastlane.jsp>.

- **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://www07.grants.gov/applicants/app\\_help\\_reso.jsp](http://www07.grants.gov/applicants/app_help_reso.jsp). In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding 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](mailto: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.

## VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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Proposals received by NSF are assigned to the appropriate NSF program where they will be reviewed if they meet NSF proposal preparation requirements. 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 who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the 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.

### A. NSF Merit Review Criteria

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All NSF proposals are evaluated through use of the two National Science Board (NSB)-approved merit review criteria: intellectual merit and the broader impacts of the proposed effort. In some instances, however, NSF will employ additional criteria as required to

highlight the specific objectives of certain programs and activities.

The two NSB-approved merit review criteria are listed below. The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which the reviewer is qualified to make judgements.

**What is the intellectual merit of the proposed activity?**

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

**What are the broader impacts of the proposed activity?**

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

Examples illustrating activities likely to demonstrate broader impacts are available electronically on the NSF website at: <http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf>.

Mentoring activities provided to postdoctoral researchers supported on the project, as described in a one-page supplementary document, will be evaluated under the Broader Impacts criterion.

**Additional Solicitation Specific Review Criteria**

The following additional merit review criteria will be used to evaluate the scientific goals of the proposed research. To what extent does the research:

- propose a cohesive, integrative, and synthetic research plan that focuses on important, general ecological questions. These questions must be motivated by existing long-term data but require additional, long-term data to be answered
- advance understanding of key concepts, questions, or theories in ecology and ecosystem science
- encourage new conceptual frameworks and develop new models that will broaden understanding of site-specific and cross-site dynamics
- if social science is proposed, draw from and contribute to social science theory and understanding
- expand the research at a particular site by including cross-site collaborations or collaborations outside of the LTER network and by attracting other researchers, approaches, and questions.

Proposals involving fieldwork in the polar regions will also be evaluated for operational feasibility, which includes resource availability, environmental protection and waste management provisions, safety and health measures, and safeguards of radioactive materials.

NSF staff also will give careful consideration to the following in making funding decisions:

***Integration of Research and Education***

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

***Integrating Diversity into NSF Programs, Projects, and Activities***

Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- 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.

## **B. Review and Selection Process**

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

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. 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.



## VII. AWARD ADMINISTRATION INFORMATION

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### A. Notification of the Award

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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.)

### B. Award Conditions

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An NSF award consists of: (1) the award letter, 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 letter; (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 letter. 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](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](mailto: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](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag).

### C. Reporting Requirements

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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.

## VIII. AGENCY CONTACTS

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*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:

- Saran Twombly, Division of Environmental Biology, telephone: (703) 292-8133, email: [stwombly@nsf.gov](mailto:stwombly@nsf.gov)
- Thomas J. Baerwald, Social, Behavioral and Economic Sciences, telephone: (703) 292-7301, email: [tbaerwal@nsf.gov](mailto:tbaerwal@nsf.gov)
- David L. Garrison, Ocean Sciences, telephone: (703) 292-7588, email: [dgarriso@nsf.gov](mailto:dgarriso@nsf.gov)
- Peter Milne, Office of Polar Programs, telephone: (703) 292-4714, email: [pmilne@nsf.gov](mailto:pmilne@nsf.gov)

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: [fastlane@nsf.gov](mailto: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](mailto:support@grants.gov).

## IX. OTHER INFORMATION

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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, National Science Foundation Update is a free e-mail subscription service 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 Regional Grants Conferences. Subscribers are informed through e-mail when new publications are issued that match their identified interests. Users can subscribe to this service by clicking the "Get NSF Updates by Email" link on the [NSF web site](#).

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

## ABOUT THE NATIONAL SCIENCE FOUNDATION

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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 40,000 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](mailto:nsfpubs@nsf.gov)
  - or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

## PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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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  
Division of Administrative Services  
National Science Foundation  
Arlington, VA 22230

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