

Coastal SEES (Coastal SEES)

Science, Engineering and Education for Sustainability

PROGRAM SOLICITATION

NSF 12-594



National Science Foundation
Directorate for Geosciences
Directorate for Biological Sciences
Directorate for Social, Behavioral & Economic Sciences
Directorate for Engineering
Office of Polar Programs

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

January 17, 2013

NSF anticipates an annual call for proposals by this program

IMPORTANT INFORMATION AND REVISION NOTES

A revised version of the **NSF Proposal & Award Policies & Procedures Guide** (PAPPG), [NSF 13-1](#), was issued on October 4, 2012 and is effective for proposals submitted, or due, on or after January 14, 2013. Please be advised that the guidelines contained in [NSF 13-1](#) apply to proposals submitted in response to this funding opportunity. Proposers who opt to submit prior to January 14, 2013, must also follow the guidelines contained in [NSF 13-1](#).

Please be aware that significant changes have been made to the PAPPG to implement revised merit review criteria based on the National Science Board (NSB) report, [National Science Foundation's Merit Review Criteria: Review and Revisions](#). While the two merit review criteria remain unchanged (Intellectual Merit and Broader Impacts), guidance has been provided to clarify and improve the function of the criteria. Changes will affect the project summary and project description sections of proposals. Annual and final reports also will be affected.

A by-chapter summary of this and other significant changes is provided at the beginning of both the [Grant Proposal Guide](#) and the [Award & Administration Guide](#).

Please note that this program solicitation may contain supplemental proposal preparation guidance and/or guidance that deviates from the guidelines established in the [Grant Proposal Guide](#).

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Coastal SEES (Coastal SEES)

Synopsis of Program:

A sustainable world is one in which human needs are met equitably and without sacrificing the ability of future generations to meet their needs. Meeting this formidable challenge requires a substantial increase in our understanding of the integrated system of society, the natural world, and the alterations humans bring to Earth. NSF's Science, Engineering, and Education for Sustainability (SEES) activities aim to address this need through support for interdisciplinary research and education.

Coastal SEES is focused on the sustainability of coastal systems. For this solicitation we define coastal systems as the swath of land closely connected to the sea, including barrier islands, wetlands, mudflats, beaches, estuaries, cities, towns, recreational areas, and maritime facilities; the continental seas and shelves; and the overlying atmosphere. These systems are subject to complex and dynamic interactions among natural and human-driven processes. Coastal systems are crucial to regional and national economies, hosting valued human-built infrastructure and providing ecosystem services that sustain human well-being. More than half of the world's human population lived in coastal areas in 2000, and this proportion is predicted to increase to 75 percent by 2025.

Humans benefit from their use of coastal environments for enjoyment, dwelling, food, industry, and commerce,

altering them physically, chemically, and ecologically. These alterations influence and interact with natural variability, extreme events, and long-term change to affect the system as a whole, including human benefits. A major challenge is to understand the dynamics of this coupled human-natural system in order to inform societal decisions about the uses of coastal systems, including for economic, aesthetic, recreational, research, and conservation purposes. Such understanding requires integration of natural, social, economic and behavioral sciences. It includes, for example, an understanding of reciprocal feedbacks between humans and the natural environment; how people and organizations interpret, assess, and act upon scientific and other evidence; and how they weigh these interpretations against other interests to influence governance and decision-making. Thus, coastal sustainability relies on broad and intimately interconnected areas of scholarship about natural and human processes.

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.

- Lewis Incze, Program Director, Ocean Sciences, telephone: (703) 292-7585, email: lincze@nsf.gov
- Richard J. Fragaszy, Program Director, Engineering, telephone: (703) 292-7011, email: rfragasz@nsf.gov
- David A. Spiller, Program Director, Biological Sciences, telephone: (703) 292-5113, email: daspille@nsf.gov
- Susan Sterett, Program Director, Social, Behavioral and Economic Sciences, telephone: (703) 292-7267, email: ssterett@nsf.gov
- William J. Wiseman, Program Director, Arctic Natural Sciences, telephone: (703) 292-4750, email: wwiseman@nsf.gov
- Lisa E. Park Boush, Program Director, Earth Sciences, telephone: (703) 292-4724, email: lboush@nsf.gov
- Larry H. Weber, telephone: (703) 292-8580, email: lweber@nsf.gov

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

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

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 15 NSF anticipates funding projects in both tracks: up to 10 Track 1 proposals and up to 5 Track 2 proposals.

Anticipated Funding Amount: \$15,000,000

pending availability of funds

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- Coastal SEES proposals may only be submitted by U.S. academic institutions that have research and degree-granting education programs in any area of research supported by NSF. U.S. academic institutions include universities as well as four-year colleges accredited in, and having a campus located in the U.S., acting on behalf of their faculty members. Proposals may also be submitted by non-profit, non-academic organizations, including independent museums, observatories, research laboratories, professional societies and similar organizations in the U.S. associated with educational or research activities.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI: 1

An individual may appear as Principal Investigator (PI), Co-PI, other Senior Personnel, consultant, or elsewhere in the proposal budget in no more than one proposal submitted in response to this solicitation. Proposers are responsible for ensuring that no individual is listed as PI, Co-PI, Senior Personnel, Consultant or elsewhere in the proposal budget on more than one proposal.

Proposal Preparation and Submission Instructions

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.
 - 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: Not Applicable
- Other Budgetary Limitations: Not Applicable

C. Due Dates

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

January 17, 2013

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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: Standard NSF award conditions apply.

Reporting Requirements: Standard NSF reporting requirements apply.

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I. INTRODUCTION

A sustainable world is one in which human needs are met equitably and without sacrificing the ability of future generations to meet their needs. Meeting this formidable challenge requires a substantial increase in our understanding of the integrated system of

society, the natural world, and the alterations humans bring to Earth. NSF's Science, Engineering, and Education for Sustainability (SEES) activities aim to address this need through support for interdisciplinary research and education.

Coastal SEES is focused on the sustainability of coastal systems. For this solicitation we define coastal systems as the swath of land closely connected to the sea, including barrier islands, wetlands, mudflats, beaches, estuaries, cities, towns, recreational areas, and maritime facilities; the continental seas and shelves; and the overlying atmosphere. These systems are subject to complex and dynamic interactions among natural and human-driven processes. Coastal systems are crucial to regional and national economies, hosting valued human-built infrastructure and providing ecosystem services that sustain human well-being. More than half of the world's human population lived in coastal areas in 2000, and this proportion is predicted to increase to 75 percent by 2025.

Humans benefit from their use of coastal environments for enjoyment, dwelling, industry, and commerce, altering them physically, chemically, and ecologically. These alterations influence and interact with natural variability, extreme events, and long-term change to affect the system as a whole. A major challenge is to understand the dynamics of this coupled human-natural system in order to inform societal decisions about the uses of coastal systems, including for scientific and conservation purposes. Scientific understanding is foundational, and includes not only the natural sciences, but also an understanding how people and organizations interpret, assess, and act upon scientific evidence and how they weigh these interpretations against other interests to influence governance and decision-making. Thus, coastal sustainability relies on broad and intimately interconnected areas of scholarship about natural and human processes.

II. PROGRAM DESCRIPTION

The Coastal SEES program is a multi-directorate program that seeks to

- enable place-based system-level understanding of coastal systems on a variety of spatial and temporal scales;
- yield outcomes with predictive value in coastal systems; and
- identify pathways by which outcomes could be used to enhance coastal sustainability.

An integral component of all proposals should be communication of outcomes and connection to related national and international activities where applicable. Sustainability is a global concern, and research findings and approaches should have broad application and transferability of knowledge.

Successful proposals will integrate across natural environmental and human dynamics of coastal systems and contribute to our understanding of complex systems. Concepts that underlie the science of sustainability include complex adaptive systems, emergent behavior, and multi-scale processes, as well as the feedbacks, adaptive capacity, vulnerability, and resilience of coupled human and natural systems. An important research goal is to understand how patterns and processes at local and regional scales are shaped by, and shape, processes and patterns that manifest at the global scale over the long term. In addition to encouraging place-based approaches, which can include multiple places, this solicitation acknowledges the value of issue-based science as well as longer time-scale perspectives. Relevant issues include, for example, sea-level rise; saline-water encroachment; coastal morphological, land use, and vegetative changes; ocean ecosystem changes; erosion and land defense; coastal energy development; and human actions concerning perceptions, attitudes and responses to these issues. In some cases, comparative approaches may be particularly instructive, and multiple domestic sites and international collaborations will be considered.

The Coastal SEES Program seeks proposals that create inter/trans-disciplinary research teams. To assist in the development of new potential partnerships, the initial competition provides two funding tracks:

Track 1: Incubator Research Proposals. These proposals bring new or emerging inter/trans-disciplinary teams together to develop ideas and approaches. Projects could, for example, do one or more of the following: mine, integrate, and synthesize existing data sets; collect new data; conduct modeling experiments, test new integrative approaches, and/or identify new conceptual ideas and key gaps in knowledge and methods. It is anticipated that some funded incubator projects will lead to mature teams and ideas that will be submitted as full research proposals in a later round of Coastal SEES, pending availability of funds. However, the emphasis of a Track 1 proposal should be the conduct of research and its outcomes, not preparation of plans and proposals. Incubator proposals should be in the range of \$200-600K over 2 years.

Track 2: Research Proposals. These proposals support inter/trans-disciplinary teams to conduct major new integrated coastal systems research. These may include theoretical, field, laboratory and/or modeling activities. Research proposal budgets can be up to \$3 million over 5 years.

When developing proposals, investigators are encouraged to look for synergies with other activities that may provide data, infrastructure support, and/or intellectual linkages. However, funding for Coastal SEES is distinct from funding for other activities that take place in the coastal zone. Whereas a proposal to Coastal SEES may include elements that are being investigated in one or more of these other programs, a distinguishing feature of a proposal to Coastal SEES should be its integrated, systems-oriented approach and its holistic and long-term viewpoint. Successful proposals will fit clearly and convincingly within the broader context of human-natural system interactions and sustainability, and the proposal must make this case.

Broader Impacts: Sustainability science offers many opportunities for education, training, and outreach. In addition, two of the goals of Coastal SEES are to (1) build a community of scholars who work in this interdisciplinary field, and (2) identify pathways by which project outcomes could be used to enhance coastal sustainability. The Broader Impact section of proposals should include a description of how the proposed activities contribute to education, training, and/or outreach, and specifically how they will advance the two aforementioned goals of Coastal SEES.

III. AWARD INFORMATION

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: NSF anticipates funding projects in both tracks: up to 10 Track 1 proposals and up to 5 Track 2 proposals.

Anticipated Funding Amount: \$15,000,000

Estimated program budget, number of awards and average award size/duration are subject to the availability of funds.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- Coastal SEES proposals may only be submitted by U.S. academic institutions that have research and degree-granting education programs in any area of research supported by NSF. U.S. academic institutions include universities as well as four-year colleges accredited in, and having a campus located in the U.S., acting on behalf of their faculty members. Proposals may also be submitted by non-profit, non-academic organizations, including independent museums, observatories, research laboratories, professional societies and similar organizations in the U.S. associated with educational or research activities.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI: 1

An individual may appear as Principal Investigator (PI), Co-PI, other Senior Personnel, consultant, or elsewhere in the proposal budget in no more than one proposal submitted in response to this solicitation. Proposers are responsible for ensuring that no individual is listed as PI, Co-PI, Senior Personnel, Consultant or elsewhere in the proposal budget on more than one proposal.

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.4 of the Grant Proposal Guide provides additional information on collaborative proposals.

Standard NSF page length limitations apply to both Track 1 and Track 2 proposals.

Proposal Cover Sheet

When preparing the cover page in FastLane, highlight the program solicitation number for Coastal SEES on the pull down list and click on the "Select" button. Your proposal will automatically be assigned to the correct managing division on the Cover Sheet. (Grants.gov users: The program solicitation number will be pre-populated by Grants.gov on the NSF Grant Application Cover Page.)

The proposal title should begin with "Coastal SEES (Track *n*):" or "Coastal SEES (Track *n*), Collaborative: ", as appropriate.

The Project Summary must include, as part of the statements of Intellectual Merit and Broader Impacts, a clear and

convincing explanation of how the project fits within the broader context of human-natural system interactions and sustainability in the coastal environment. The statement should address:

1. How the topic is relevant to sustainability of coastal systems and specifically to the program foci as outlined in the Program synopsis and description.
2. How the conceptual framework for the project addresses the integration of human and environmental components.
3. How the proposal takes an integrated, systems-oriented approach and a holistic and long-term viewpoint on sustainability.
4. Why the assembled research team is suited to addressing the proposed task.

Collaborations and other synergies are encouraged. Where appropriate, investigators are encouraged to work in association with existing projects, observational networks, 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, USACE, DOE or NOAA. Principal Investigators must obtain letters of support that affirm the activities and contributions to the project from the collaborating individuals and agencies. Letters of support must not exceed two pages. The project description should make clear how the proposed work differs from, and is augmented by, activities already supported.

We welcome collaborations with State and Federal agencies. Such collaborations must follow NSF guidelines (see PAPPG) and appear in proposals at no cost to the proposal. Supporting letters should describe and affirm the proposed commitment of personnel time, data, facilities, etc. We will consider supporting analytical services, etc. provided by State agencies or FFRDCs when they are essential to the research goals and not available elsewhere. The case must be made for doing this. The preferred method for supporting these costs is as "fees for service" in an institutional (proposer's) budget. A subcontract to the lead proposal will be allowed. For participation of this nature, consultation with a Program Director early in proposal development is required. Proposals submitted that are not in compliance with these guidelines will be returned without review.

A Data Management Plan is Required. Proposals must include a data and information management plan that describes how access to quality-controlled and fully-documented data and information by researchers, and others, will be achieved at no more than incremental cost and within a reasonable time during the course of the award, e.g., via a recognized data repository. The plan should address, as appropriate, provisions for reuse and derivative use, archival plans, and preservation of access for both research and non-research communities. If applicable, policies and provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements should be included.

Principal Investigators who propose to collaborate with data centers or data networks must include letters of commitment that affirm the collaboration. Where possible, all PIs must use existing data centers and data portals to archive and disseminate their data. All data must be made available in accordance with NSF data policy. The Data Management Plan must be submitted as a supplementary document, not to exceed two pages.

A Project Management and Integration Plan is Required. A document of no more than three pages must explain how the proposed research, integration, and synthesis will be led and coordinated. This plan must be submitted as a supplementary document. Elements of a Management and Integration Plan include leadership and coordination within the group, plans for integration across disciplines, plans for dissemination of data, models, tools and results (appropriate technical aspects can be relegated to the Data Management Plan), plans for education and workforce development, and a project timeline.

A Postdoctoral Mentoring Plan is Required. Each proposal that requests funding to support postdoctoral researchers must include, as a supplementary document of no more than one page, a description of the mentoring activities that will be provided for such individuals.

Facilities Request is Required. Projects that will be utilizing NSF research platforms (e.g. ships, airplanes) or other shared use facilities (e.g. field instrumentation, analytical or experimental facilities) are responsible for filing a Request for Facility Support, and providing a copy of their request as a supplementary document in their proposal. PIs should coordinate their requests with the appropriate facility to ensure that access is available and fits within the time line of the proposed research.

A Conflicts of Interest Table is Required. Proposals must include, in the single copy documents section, a table containing a single alphabetized list of the full names (last name, first name) and institutional affiliations of all people with conflicts of interest for all senior personnel and any named personnel whose salary is requested in the project budget. The table must be organized in three columns: person, institution, and nature of conflict. Conflicts to be identified are (1) Ph.D. thesis advisors or advisees, post-doctoral mentors and mentees; (2) collaborators or co-authors during the past 48 months; and (3) any other individuals with whom, or institutions with which, the senior personnel and any named personnel have financial ties, including advisory committees (please specify type). One entry per line. For institutional conflicts, begin with column 2.

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited

Budget Preparation Instructions:

Budgets should be prepared in compliance with guidelines in the [Proposal and Award Policies and Procedures Guide](#) or NSF Grants.gov Application Guide.

Investigators are reminded that requests for salary support beyond 2 months per year for faculty with nine-month appointments must be explicitly justified in the budget justification. Without this documentation in the proposal prior to its being exposed to merit review, the proposal will not be able to be funded. This limit includes salary compensation received from all NSF grants. Postdoctoral researchers should be listed on the Postdoctoral line of the budget request, and may receive 12 months of support. Senior personnel cannot expect to receive full support on any single project.

Please remember that postdoctoral researchers must have a postdoctoral mentoring plan associated with their participation.

Investigators should anticipate and budget for funds to attend an all-PI meeting for SEES or Coastal SEES Investigators in the Washington, D.C. area in the first and (in the case of Track 2 projects) third year of each project. Inclusion of junior scientists and postdoctoral researchers in this meeting is encouraged.

Research Platforms and Facilities Requests

The cost of facilities utilized by Coastal SEES proposals will be handled in the same manner as proposals submitted to relevant core programs. Proposal budgets must include all costs charged to the project for platforms and facilities supporting the proposed research except those facilities separately supported by NSF. Projects that will be utilizing NSF research platforms (e.g., ships,

airplanes) or other shared-use facilities (e.g., field instrumentation, analytical or experimental facilities) are responsible for filing a copy of their Request for Facility Support as a supplementary document in their proposal. Any costs that will be associated with such facilities should be clearly documented, and PIs should coordinate their requests with the appropriate facility to ensure that access is available to the facility and fits within the time line of the proposed research. For projects that will be utilizing NSF computational facilities, a copy of the allocation request that would be submitted to the facility in question should be provided as a supplementary document. Research involving polar regions must follow established guidelines for requesting logistical support, as discussed in the relevant proposal solicitations (for Antarctic Sciences, see NSF 10-543; for Arctic Sciences, see NSF 10-597). If in doubt, please contact a cognizant NSF program director for information about which facility costs must be included in your proposal.

C. Due Dates

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

January 17, 2013

NSF anticipates an annual call for proposals by this program

D. FastLane/Grants.gov Requirements

- 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. 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. 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. 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

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://www.nsf.gov/bfa/dias/policy/meritreview/>.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in [Empowering the Nation Through Discovery and Innovation: NSF Strategic Plan for Fiscal Years \(FY\) 2011-2016](#). 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 core strategies 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 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 variety of learning perspectives.

Another core strategy in support of NSF's mission is broadening 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

SEES activities span the entire range of scientific domains at NSF and aim to: 1) support interdisciplinary research and education that can facilitate the move towards global sustainability; 2) build linkages among existing projects and partners and add new

participants in the sustainability research enterprise; and 3) develop a workforce trained in the interdisciplinary scholarship needed to understand and address the complex issues of sustainability. Consequently, proposals submitted to this solicitation will be assessed for responsiveness to the following questions:

1. How well do the proposed research and educational activities integrate across NSF-supported disciplines, such as creating new interdisciplinary networks and/or collaborations?
2. How well do the proposed activities advance the foundations of sustainability by including a strong conceptual framework that addresses the human and natural components?
3. How will the proposed activities advance the development of a workforce skilled in the interdisciplinary scholarship needed to understand and address the complex issues of sustainability?
4. How will the data be archived and made accessible (as evidenced by the required Data Management Plan)?
5. How will project goals be managed? This will be judged by the quality and appropriateness of the Management and Integration Plan. This includes: a) a well defined management plan with a highly qualified project director, b) the extent to which the group effort integrates across disciplines and is focused on a cohesive, well-delineated goal or set of goals, c) the strength and appropriateness of proposed collaborations and partnerships, including, if appropriate, international collaborations; d) the quality of the plans for dissemination and sharing of data, models, tools and ideas, including dissemination to the research community and stakeholders; e) quality and expected significance of education and workforce development plan; f) the adequacy and appropriateness of the proposed timeline.

With respect to the second of these criteria, proposals will be assessed by reviewers with expertise in the disciplines represented in the proposal. The meaningful integration of all elements of the research plan will be a key feature of competitive proposals.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review, or Internal NSF Review.

Proposals are expected to be evaluated by panel review with ad hoc review in areas of special technical need. Panelists will be selected for their expertise in substantive areas of relevance to the solicitation, and efforts will be made to secure diversity among reviewers.

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

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.)

B. Award Conditions

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. 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.

C. Reporting Requirements

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.

More comprehensive information on NSF Reporting Requirements 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.

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:

- Lewis Incze, Program Director, Ocean Sciences, telephone: (703) 292-7585, email: lincze@nsf.gov
- Richard J. Fragaszy, Program Director, Engineering, telephone: (703) 292-7011, email: rfragasz@nsf.gov
- David A. Spiller, Program Director, Biological Sciences, telephone: (703) 292-5113, email: daspille@nsf.gov
- Susan Sterett, Program Director, Social, Behavioral and Economic Sciences, telephone: (703) 292-7267, email: ssterett@nsf.gov
- William J. Wiseman, Program Director, Arctic Natural Sciences, telephone: (703) 292-4750, email: wwiseman@nsf.gov
- Lisa E. Park Boush, Program Director, Earth Sciences, telephone: (703) 292-4724, email: lboush@nsf.gov
- Larry H. Weber, telephone: (703) 292-8580, email: lweber@nsf.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.

Important information for programs with deadline dates of January 14, 2013 or later:

- If the program you are submitting to has a deadline date of January 14, 2013 or later, and you submit your proposal prior to this date, you must prepare your proposal in accordance with the [Proposal & Award Policies & Procedures Guide \(PAPPG\) \(NSF 13-1\)](#), which requires that the one-page Project Summary include 1) an overview; 2) a statement on intellectual merit of the proposed activity; and 3) a statement on the broader impacts of the proposed activity. (See [GPG, Chapter II.C.2b](#))
- If you are your proposal prior to January 14, 2013, with the intention of submitting it on or after January 14, 2013, the information that you included in the Project Summary in FastLane will be inserted into the overview text box of the Project Summary. Per [PAPPG](#) guidelines, you will need to include this information in the three text boxes (overview; statement on intellectual merit; statement on broader impacts) or FastLane will not accept your proposal. (See [GPG, Chapter II.C.2b](#))

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, 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

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: nspubs@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
Division of Administrative Services
National Science Foundation
Arlington, VA 22230

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