Improvements in Facilities, Communications, and Equipment at Biological Field Stations and Marine Laboratories (FSML)

PROGRAM SOLICITATION
NSF 16-506

REPLACES DOCUMENT(S):
NSF 12-505

National Science Foundation

Directorate for Biological Sciences
Division of Biological Infrastructure

Directorate for Geosciences
Division of Ocean Sciences

Directorate for Education & Human Resources

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

January 11, 2016

December 09, 2016

Second Friday in December, Annually Thereafter

IMPORTANT INFORMATION AND REVISION NOTES

1. Award Information. Removed upper limit on award sizes for implementation proposals. Anticipated available funds and expected number of awards remain unchanged.
2. Program Description. Removed restrictions on certain types of construction projects.
3. Proposal Preparation Instructions. Reorganized and simplified guidelines for writing project description section.
4. Added Additional Budgetary Restrictions section.
5. References cited. Instructs submitters to use references cited to list all bibliographic material cited in the project description.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 16-1), which is effective for proposals submitted, or due, on or after January 25, 2016.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Improvements in Facilities, Communications, and Equipment at Biological Field Stations and Marine Laboratories (FSML)

Synopsis of Program:

Biological Field Stations and Marine Laboratories (FSMLs) are off-campus facilities for research and education conducted in the natural habitats of terrestrial, freshwater, and marine ecosystems. FSMLs support environmental and basic biological research and education by preserving access to study areas and organisms, by providing facilities and equipment in close proximity to those study areas, and by fostering an atmosphere of mutual scientific interest and collaboration in research and education. To fulfill these roles, FSMLs must offer modern research and educational facilities, equipment, communications and data management for a broad array of users. In recognition of the importance of FSMLs in modern biology, NSF invites proposals that address these general goals of FSML improvement.

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.

- Peter McCartney, Directorate for Biological Sciences, Division of Biological Infrastructure, telephone: (703) 292-8470, fax: (703) 292-9063, email: biofsml@nsf.gov

Kandace Binkley, Directorate for Geosciences, Division of Ocean Sciences, telephone: (703) 292-8583, fax: (703) 292-9085, email: biofsml@nsf.gov

- David Campbell, Directorate for Education and Human Resources, Division of Research on Learning in Formal and Informal Settings, telephone: (703) 292-5093, email: dcampbel@nsf.gov

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

- 47.050 --- Geosciences
- 47.074 --- Biological Sciences
- 47.076 --- Education and Human Resources

Award Information

Anticipated Type of Award: Standard Grant

Estimated Number of Awards: 20 to 25

Anticipated Funding Amount: $4,200,000

Approximately $4.2 million for new awards annually, subject to the availability of funds and quality of proposals. Award sizes for planning grants are limited to $25,000. Support for vessels is typically limited to $150,000; PIs considering submitting requests for vessels should contact the cognizant program officer for up-to-date guidance on budgets.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

Only one proposal may be submitted on behalf of any single facility per round of the FSML competition. This limitation does not prevent a single institution from submitting more than one proposal, as long as each proposal is submitted on behalf of a different eligible facility. This limitation is waived for one additional proposal in the event that a facility is also involved in a proposal that would improve multiple facilities.

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

There are no restrictions or limits.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

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

B. Budgetary Information

- **Cost Sharing Requirements:**

  Inclusion of voluntary committed cost sharing is prohibited.

- **Indirect Cost (F&A) Limitations:**

  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. submitter's local time):

  January 11, 2016

  December 09, 2016

  Second Friday in December, Annually Thereafter

Proposal Review Information Criteria

Merit Review Criteria:

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

Award Administration Information

Award Conditions:

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

Reporting Requirements:

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

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I. INTRODUCTION

Biological Field Stations and Marine Laboratories (FSMLs) are off-campus facilities for research and education pertaining to physical and biological phenomena and organisms in the natural habitats of terrestrial, freshwater, and marine ecosystems. FSMLs support environmental and biological research and education by preserving access to study areas and organisms, by providing facilities and equipment in close proximity to those study areas, and by fostering an atmosphere of mutual scientific interest and collaboration in research and education. For FSMLs to fulfill their role in biological research and education, they must offer modern research and educational facilities, equipment, and communications and data management systems for a broad array of users. A significant fraction of the research and education projects that use the proposing facility as a platform for their execution should be in science and engineering fields eligible for support by the National Science Foundation.

II. PROGRAM DESCRIPTION

In recognition of the continuing need for modern facilities and equipment at FSMLs, the NSF invites proposals that address the general goal of FSML improvement. Requests must fall exclusively into one of two classes: Improvement or Planning. Improvement proposals should focus on well-defined projects of major equipment acquisition, data management and communication systems modernization, or physical plant improvement. Planning proposals are for strategic institutional planning for the long term research and education goals of the station. In addition to a clear description of the proposed improvement or planning project, proposals are expected to present a compelling justification based on demonstrated need for the project, and a realistic appraisal of its potential impact on biological and environmental research and education activities at the proposing facility.

Improvement proposals may include the following:

- Improvements in the physical plant of a field station or marine laboratory. Funds may be requested for renovations to the overall physical structures on the station that are to be used for research, for associated training and education activities, or for temporary accommodations intended for visiting scientists and students. Limited support for new construction will be available with priority given to facilities that have direct advances to research capacity such as labs, greenhouses, or other structures with specialized research functions. Improvements for administrative, classroom, or office space will not be considered. Maintenance, repairs, or replacements of existing infrastructure that do not advance research capability beyond a prior state will also not be considered. Finally, requests for improvement of facilities or equipment used for research or educational activities to be carried out on board a UNOLS (University-National Oceanographic Laboratory System) research ship or similar vessel are inappropriate. Such requests should be directed to Oceanographic Facilities and Equipment Support in the Division of Ocean Sciences at: http://nsf.gov/funding/pgm_summ.jsp?pims_id=504848&org=OCE.

- Equipment purchase. Such requests should focus on major, shared-use items (including special purpose vehicles and boats) that are directly essential to the facility's research activities as well as associated training and education programs. These items should enhance and expand the research capabilities of the facility and attract additional users to the facility. Requests for extensive lists of miscellaneous items or equipment for exclusive use by a single research project will not be supported.

- Observational or experimental infrastructure. This may include fixed infrastructure such as towers, sensors/gauges, manipulative features, and other facilities used in support of research and data collection activities.

- Improvements in data management and communication systems. Such requests should be directed at deployment of appropriate, up-to-date technology and should be directed toward broad community use of such systems for research and training collaboration on the Internet. Requests for ongoing costs of operations, including staffing and fees for telecommunications services, are inappropriate.

Depending on the nature of the intended improvement, the proposal may need to address its potential for extensibility, portability, or interoperability as appropriate for enhancing the station's capacity to support larger scale or replicated biological research. Improvements that directly benefit multiple stations may also be proposed provided the PI consults with the program regarding eligibility in advance of submission.

Projects involving renovation, construction, or major fixed equipment installation may require completion of additional budget and project management documents, prior to award. These may include a Project Execution Plan (PEP) with additional details on scope of work, schedule, costs and management. In addition, the PI may be asked to complete additional budget forms and documentation of cost estimates. Such projects may also require additional information to assess compliance with any applicable laws such as the National Environmental Policy Act, National Historic Preservation Act, or Endangered Species Act. If review of this material indicates that the project execution is not adequately prepared or that the barriers to NEPA compliance are prohibitive, the program may elect to not proceed with an award. PIs are strongly encouraged to contact the program in advance if they are considering proposals that involve construction or renovation.

Planning proposals should address the need for comprehensive planning at the level of the whole facility (or a network of facilities) in support of its research and training mission. The effort should produce strategic plans for advancing research and education covering at least a five-year time frame. Planning proposals may address, but are not limited to, research/training program development, related facility needs appraisal activities, and research coordination at regional scales. Proposed activities will normally include workshops, conferences, and visits designed to involve broad participation of the scientific community from outside the proposing institution. Funds for architectural design or drawings are not supported as these activities are related to a specific improvement rather than strategic planning. Requests for support of planning efforts should not be combined with requests for support of equipment acquisition or other improvements. Award of a planning grant does not imply an NSF commitment for support beyond the planning period.

The FSML program encourages projects that will enable new and higher levels of collaboration in research and training. The program's emphasis on modernization of data management and communication systems is expected to foster opportunities for expanded spatial and temporal scales of research, and to facilitate substantive comparisons among biological entities in different biomes. Improvements which enable research at new temporal and spatial scales and lead to new collaborations among scientists across disciplines, and in different locations, are particularly encouraged.

III. AWARD INFORMATION

Estimated program budget, number of awards and average award size are subject to the availability of funds. The program expects to make, on an annual basis, approximately 20 - 25 new awards, of which 3 - 6 will be planning grants. The exact number of grants and their durations will depend on the quality of the proposals received, the size of the requests, and the availability of funds at NSF. The earliest possible start date for awards is six months from the annual deadline for receipt of proposals.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

Only one proposal may be submitted on behalf of any single facility per round of the FSML competition. This limitation does not prevent a single institution from submitting more than one proposal, as long as each proposal is submitted on behalf of a different eligible facility. This limitation is waived for one additional proposal in the event that a facility is also involved in a proposal that would improve multiple facilities.

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

There are no restrictions or limits.

Additional Eligibility Info:

An individual may be PI or coPI on more than one proposal; however, only one proposal may be submitted on behalf of an eligible facility per round of the FSML competition.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

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

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

- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

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

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

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

In developing the proposal, please keep in mind the merit review criteria that will be used to evaluate the proposal. As discussed below (Section VI.), these include the two National Science Board approved merit review criteria (Intellectual Merit and Broader Impacts) as well as the Additional Review Criteria specific to FSML proposals.

The following instructions supplement the GPG and NSF Grants.gov Application Guide guidelines. The proposal must include the following elements:

1. Project Description: This section must provide the information outlined in each of the sections below; the information should be provided in the order described. The section is limited to 15 pages, including any tables, lists or graphical material. Approximate page length is provided to give a relative guide to the weight of each section; actual page lengths may vary as appropriate within the collective limit of 15 pages.
    a. Brief description of proposed improvements and synopsis of the science rationale for them. (ca 1 page)
    b. Basic description of the existing station or laboratory, including its history of research, capabilities for supporting scientific research and training and other items of relevance such as unique aspects of the ecosystems and organisms that can be accessed through the station or laboratory. Details pertaining to facility administration, research areas, buildings, equipment, access and transportation, cyberinfrastructure, and staffing should be described in the Facilities, Equipment and Other Resources section (see #3 below). (ca 2-3 pages)
    c. Research and training use of the facility during the most recent five-year period, including scientist and student use

days on an annual basis, research projects supported, any courses (both academic and public) conducted, any special activities hosted (e.g. workshops, conferences), number of day visitors etc. Provide a summary of the most significant research and training accomplishments attributable to the facility during this period, including references to significant products (publications, datasets, or other outcomes). There is no need to include the full citations in the body of the project description, simply include them in the references cited section. (ca 2-3 pages)

   d. Detailed description of the proposed improvements or planning efforts with justification based upon current or projected research and training needs. The description should include sufficient detail to enable reviewers to judge their likely adequacy in meeting these needs, as well as a brief discussion of the manner in which the needs were identified. Provide as much detail as possible on existing or anticipated research that will be advanced by the proposed research including PIs, institutions, and funding sources if known. Special care should be taken to describe how the improvements will benefit visiting scientists and students. (ca 3-5 pages)
   e. Management of operations specifying how and by whom the requested equipment, structures, facility, data management or communication systems are to be operated and maintained. Information should include expenses, plans for user access, and priorities for allocating access in high demand. If applicable, plans for enabling remote access must be provided in this section. Fiscal requirements for ongoing maintenance and/or operation of the improvement should be outlined and provisions within the facility's business plan for meeting these needs should be identified. If applicable, provide information on current user fee structure and what changes may result from the proposed improvements. (ca 1-2 pages)
   f. Broader Impacts of the proposed project. For further information on what should be covered in this section see the discussion in **Section VI.A. Merit Review Principles and Criteria** below. (ca 2-3 pages)
   g. Brief description of the "Results from Prior NSF Support." This should report only the results of FSML (or other infrastructure) awards to the proposing facility during the previous five-year period (irrespective of the identity of the PIs). Results should include both intellectual merit and broader impacts of the project. (ca 1 page)

2. References Cited: Any citations used to justify or otherwise support the details of the proposed project should be provided in this section, along with citations to any research products referenced in the Project Description (see V.a.1.c. above).
3. Facilities, Equipment and Other Resources: This section should include technical details regarding space, equipment, staffing, or any other resources provided by the institution that are necessary for the completion of the project, or for the ongoing operation and maintenance of any capital improvements made under this award. As per the PAPP Guide Part I: Grant Proposal Guide (GPG) Chapter II.C.2.g(xi), descriptions of resources under this section must be narrative and must NOT include quantifiable financial information.
4. Budget and Budget Justification: The budget should clearly identify funds in each category of the budget form. Requests for support of planning efforts are limited to $25,000.

   The budget justification page should be used to provide details of project costs in each budget category. Multiple items of equipment, if requested, should be listed on the justification page with individual costs identified. Allocation of funds to be provided through sub-awards or consulting arrangements should be described. A separate budget form is required for each sub-award. Quotes for major equipment, consulting, or construction services should be included in supplementary documents and referenced in the Budget Justification.

   This program does not fund a) any research and research training activities, b) facility operations, consumable research supplies, or maintenance costs, c) administrative services/review, or d) salary costs of submission-eligible organizations' employees. Contingency is typically not allowed in FSML budgets. Exceptions require program office approval and compliance with Title 2, Code of Federal Regulations Section 200.433. Any inquiry regarding these restrictions and possible exceptions must be discussed with the program officer prior to submission.

5. Special Information and Supplementary Documentation: This section is limited to the following types of documentation, as appropriate. The documents should be provided by scanning and inserting as a PDF. Other types of information, including copies of brochures or other information about the proposing facility, and general letters of support or collaboration may NOT be included. Refer to PAPP Guide Part I: Grant Proposal Guide (GPG) Chapter II.C.2.j for further information on allowable items.

   a. Copies of site plans, building floor plans, or architectural/engineering documents necessary to corroborate statements in the project description.
   b. MOUs or other land access agreements, permits required by local or regional building permit codes or disability accessible approvals.
   c. Vendor/builder quotes, price quotes for capital equipment items, as relevant.

Applicants must complete the Proposal Classification Form. The Proposal Classification Form is required for all submissions to BIO; FastLane will not allow processing of the proposal without it.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Awards for support of planning efforts are limited to $25,000.

This program does not fund a) any research and research training activities, b) facility operations, consumable research supplies, or maintenance costs, c) administrative services/review, or d) salary costs of submission-eligible organizations' employees.

Contingency is typically not allowed in FSML budgets. Exceptions require program officer approval and compliance with Title 2, Code of Federal Regulations Section 200.433.

Applicants are advised to refer to the NSF Grant Proposal Guide II.C.2.g.iii http://www.nsf.gov/pubs/policydocs/pappguide/nsf15001/gpg_2.jsp#IIC2giii for guidance on charging general purpose equipment to NSF grants.

Any inquiry regarding these restrictions and possible exceptions must be discussed with the program officer prior to submission.

C. Due Dates

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

  January 11, 2016

  December 09, 2016

  Second Friday in December, Annually Thereafter

D. FastLane / Grants.gov Requirements

For Proposals Submitted Via FastLane:

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

For Proposals Submitted Via Grants.gov:

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: http://www.grants.gov/web/grants/applicants.html. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

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

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

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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

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

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

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

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

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which

projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

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

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

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

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

2. Merit Review Criteria

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

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

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

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

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

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

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

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

Additional Solicitation Specific Review Criteria

Consistent with the general NSF review criteria elaborated above, the evaluation of FSML proposals will center upon the following aspects of the proposed project:

1. Potential for the proposed improvements or planning efforts to advance research and training beyond current capacity at the proposing facility, including the quality and amount of data that can be collected and archived;
2. The extent to which the facility, as improved through this project, will support the research and training activities of a broad user community beyond the immediate faculty and students of the proposing institution;
3. The amount, breadth, and significance of NSF funded research that will be supported by the station and the proposed improvements;
4. Significance and uniqueness of the facility's current and potential impact on the progress of biological research and education at local, regional, national, and global levels;

5. Completeness, detail, and quality of the needs assessment, design, and cost documentation provided in the proposal;
6. Evidence that the facility has a plan and capacity for long term maintenance and operation of the proposed improvement;
7. Scope, utility and accessibility of data collected at the site, including the existence of well-defined data management and data sharing policies, and the utilization of standard communications protocols; and
8. Demonstration that the full range of available green and sustainable solutions been considered and a compelling justification for the choices has been provided.

B. Review and Selection Process

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

Ad hoc Review and/or Panel Review.

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will generally be completed and submitted by each reviewer and/or panel. 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 strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

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. After an administrative review has occurred, Grants and Agreements Officers perform 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.

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, 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.

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

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

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

Special Award Conditions:

National Environmental Policy Act. Awards made under this program may require additional measures to ensure compliance with regulations specified under the National Environmental Policy Act (NEPA), and also the National Historic Preservation Act, the Endangered Species Act, and other applicable federal environmental statutes and regulations. This process must be completed prior to award. Where this is applicable, the program officer will notify and advise the PI. The outcome of this process may lead to special award conditions required for compliance with these regulations.

Project Execution Plan. Awards involving construction or major renovation will be required to complete a Project Execution Plan (PEP) with additional details on scope of work, schedule, costs, and project management. In addition, these projects will be required

to complete additional budget forms and provide further documentation on cost estimates. These documents must be completed prior to award. Where this is applicable, the program officer will notify the PI and provide the necessary guidelines for creating the required documents.

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 no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 days following 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 all identified PIs and co-PIs on a given award. 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 Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also 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.

Projects involving construction or major renovation which have been required to develop a Project Execution Plan (see Special Award Conditions) will be required to address each scope of work element of their PEP in their annual progress reports.

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:

- Peter McCartney, Directorate for Biological Sciences, Division of Biological Infrastructure, telephone: (703) 292-8470, fax: (703) 292-9063, email: biofsml@nsf.gov
- Kandace Binkley, Directorate for Geosciences, Division of Ocean Sciences, telephone: (703) 292-8583, fax: (703) 292-9085, email: biofsml@nsf.gov
- David Campbell, Directorate for Education and Human Resources, Division of Research on Learning in Formal and Informal Settings, telephone: (703) 292-5093, email: dcampbel@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.

IX. OTHER INFORMATION

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

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

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the

national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

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

NSF receives approximately 55,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

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

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

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

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

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

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230
- **For General Information** (NSF Information Center)**:** (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**

  Send an e-mail to: nsfpubs@nsf.gov

  or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

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

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Reports Clearance Officer
Office of the General Counsel
National Science Foundation
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