

Bering Ecosystem Study (BEST)

Program Solicitation

NSF 07-533



National Science Foundation

Office of Polar Programs
Arctic Sciences Section

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

March 15, 2007

REVISION NOTES

In furtherance of the President's Management Agenda, NSF has identified programs that will offer proposers the option to utilize Grants.gov to prepare and submit proposals, or will require that proposers utilize Grants.gov to prepare and submit proposals. Grants.gov provides a single Government-wide portal for finding and applying for Federal grants online.

In response to this program solicitation, proposers may opt to submit proposals via Grants.gov or via the [NSF FastLane](#) system. 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.3 of the Grant Proposal Guide provides additional information on collaborative proposals.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Bering Ecosystem Study (BEST)

Synopsis of Program:

This solicitation seeks proposals focused on the ecosystem of the eastern continental shelf of the Bering Sea (see the Program Description section for details) and designed to develop understanding of the effects of a varying sea-ice cover on the shelf ecosystem, to project the potential changes in response to anticipated climate variations on decadal time scales, and to assess the vulnerability and sustainability of the local communities to such changes. Particular emphasis should be placed on development of proposals that clearly and significantly contribute to an ecosystem level understanding of the Eastern Bering Sea shelf. This solicitation draws upon the community planning embodied in the *Bering Ecosystem Study Science Plan* (http://www.arcus.org/Bering/reports/downloads/BEST_Science_Plan.pdf), *Sustaining the Bering Ecosystem: a Social Sciences Plan* (http://www.arcus.org/Bering/reports/downloads/HBEST_Science_Plan).

pdf), and the *Implementation Plan for the Bering Ecosystem Study (BEST)* (http://www.arcus.org/Bering/reports/downloads/BEST_Implementation_Plan.pdf); however, it should not be considered the full implementation of or confined only to activities described in any of these plans.

NSF will coordinate this solicitation, and the resulting science, with the North Pacific Research Board's (NPRB) Bering Sea Integrated Ecosystem Research Program (www.nprb.org/research/bsierp_intro.htm). The synergies developed through this partnership will allow support for a comprehensive vertically-integrated investigation of the ecosystem of the eastern continental shelf of the Bering Sea. Proposals funded by each organization will be expected to mesh smoothly to produce a seamless, coordinated research program.

Cognizant Program Officer(s):

- Anna Kerttula de Echave, telephone: (703) 292-7432, email: akerttul@nsf.gov
- William Wiseman, telephone: (703) 292-4750, email: wwiseman@nsf.gov

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

- 47.078 --- Office of Polar Programs

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 7 to 15

Anticipated Funding Amount: \$10,000,000 -- in fiscal years 2007-2010, depending on suitability of proposals and availability of funds.

Eligibility Information

Organization Limit:

None Specified

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not Applicable
- **Full Proposals:**

- Full Proposals submitted via FastLane: 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/bfa/dias/policy/docs/grantsgovguide.pdf/>)

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required by NSF.
- **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):

March 15, 2007

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

The Arctic Sciences Division has been working with the arctic research community and residents of the Arctic to develop a comprehensive approach to research in the Bering Sea. The Bering Sea Ecosystem Study (BEST; <http://www.arcus.org/bering/>) is the result of several years of planning for research beginning in 2006.

The eastern Bering Sea supports highly productive marine ecosystems. The resources of the area include vast numbers of marine birds and mammals -- including federally protected species -- and productive commercial stocks that generate more than 50% of all fish and shellfish landings in the United States. The Bering Sea is also directly or indirectly the source of over 25 million pounds of subsistence foods used by nearly 55,000 local residents, primarily Alaska Natives in small rural communities. As the system responds to external forcing, its ability to support the resources on which people depend may change. These physical and ecological changes affect the ability of Bering Sea communities (residents and non-resident users) to access marine resources and the safety of doing so. They alter the structure of economic opportunities and challenge the maintenance of cultures whose traditions reflect dependence on and a relationship to subsistence resources. All communities living and working in the Bering Sea worry about how climate change will affect human activity in the region, including subsistence hunting and fishing opportunities, commercial fisheries and other economic development, public health and safety, policy and resource management, and, more generally, community survival and resilience.

Recent changes in the marine ecosystems of the eastern Bering Sea, in many cases, have been correlated with physical variability. As this dynamic region undergoes transition, an understanding of the underlying processes responsible for these ecosystem responses is needed to provide the basis for good stewardship. The United States Arctic Research Commission has noted both the need for "...process studies to illuminate the interactions between environmental variables and the ecosystem..." and the present "...absence of emphasis on the ability to predict change in the Bering Sea system..." (<http://www.nsf.gov/cgi-bin/good-bye?http://www.arctic.gov/files/USARCReportOnGoals2005.pdf>). This solicitation for proposals is an effort to address these deficiencies in our understanding of the Bering Sea ecosystem.

NSF will coordinate this solicitation, and the resulting science, with the North Pacific Research Board's Bering Sea Integrated Ecosystem Research Program (www.nprb.org/research/bsierp_intro.htm). The synergies developed through this partnership will allow support for a comprehensive vertically-integrated investigation of the ecosystem of the eastern continental shelf of the Bering Sea. Proposals funded by each organization will be expected to mesh smoothly to produce a seamless, coordinated research program.

The vertically-integrated program envisioned provides for end-to-end coverage of the Bering Sea ecosystem from physical oceanography up through people and their communities, including the attendant economic and social effects of a changing marine ecosystem. NSF and NPRB both realize this cooperation and leveraging of resources will allow for a more comprehensive ecosystem study than if each organization were to pursue something similar on its own.

Toward that end, NSF anticipates providing support for studies of physical and chemical oceanography and the lower trophic levels (LTL), up to and including macro-zooplankton and benthic infauna, as well as social science and community projects focused on the relationships between a changing marine environment and the communities residing around the Bering Sea. NPRB will provide support for studies of the upper trophic levels (UTL) including and above macro-zooplankton and benthic infauna up to and including people, their communities, and social and economic systems.

The assumption underlying this approach is that the trophic pathways will meet at the macro-zooplankton and/or benthic infauna and that the sensitive points in the trophic pathways of the LTL studies will, in general, be responsive to any particular focus of the UTL team. There are likely a few key species and species groups of macro-zooplankton and benthic infauna with differing life histories that make them susceptible to climate variability in different ways.

There is a need to identify, know, and understand the implications of these differences because they may have major impacts

on the pathways of energy flow in the shelf ecosystem.

For the purposes of this solicitation, the eastern Bering Sea shelf is considered to be the shelf region from the Aleutian Islands northward to St. Lawrence Island that lies within U.S. waters, with the understanding that some social science proposals may include a limited comparative sample from western Bering Sea communities, including the communities of St. Lawrence Island. The seasonal sea-ice cover of the eastern Bering Sea shelf, a dominant characteristic of this region's oceanographic environment, has a significant influence on the shelf ecosystem. Recent changes in the timing and extent of this ice cover appear to be occurring on decadal or longer time scales and correlated with climate variability. This solicitation calls for proposals to understand the effects of a varying sea-ice cover on the shelf ecosystem, to project the potential changes in response to anticipated climate variations on decadal time scales, and to assess the vulnerability and sustainability of the local communities and their social-cultural systems to such changes. Proposals may include, among others, retrospective analyses, process studies, and synthesis studies. These may include, but are not limited to, some or all of the following approaches: observational cruises, moorings, satellite studies, social science surveys, ethnographies, oral histories, and model development. Funded proposals will be coordinated by the Arctic Sciences Division and the research team of funded principal investigators to make best use of available logistics resources and address science goals creatively and deliberately.

The Arctic Sciences Division particularly seeks proposals focused on the ecosystem of the eastern shelf of the Bering Sea addressing one or more aspects of the following coupled themes:

- How are global and regional climate processes, reflected in the variability of the sea ice characteristics of the eastern Bering Sea, linked to the physical oceanography of the region?
- How does variability in the physical aspects of the marine system, driven by variability in the sea-ice characteristics, affect ecosystem processes and structure?
- How will changes in sea-ice characteristics affect the productivity and sustainability of the lower trophic levels of the marine ecosystems of the eastern Bering Sea?
- In what ways are social and economic systems that rely on the eastern Bering Sea vulnerable to the likely future spatial and temporal scales of variation in sea ice characteristics and ecology?
- What are the time scales and processes of development of Bering Sea communities and their social-cultural systems?
- How have climate and environmental changes in the past affected humans living on the Bering Sea and how are Bering Sea communities likely to change in response to environmental and social changes?
- How will changes in weather, ice, water temperature, and marine species affect economic development in the Bering Sea?
- How are communities affected by state and federal policies designed to manage natural resources, foster economic development, or raise education levels?
- How does local understanding of the ecosystem and its fluctuations shape people's understanding and response to changes?

II. PROGRAM DESCRIPTION

This solicitation seeks proposals focused on the ecosystem of the eastern continental shelf of the Bering Sea (see below for details) and designed to develop understanding of the effects of a varying sea-ice cover on the shelf ecosystem, to project the potential changes in response to anticipated climate variations on decadal time scales, and to assess the vulnerability of the local communities to such changes. Particular emphasis should be placed on development of proposals that clearly and significantly contribute to an ecosystem level understanding of the Eastern Bering Sea shelf. For the purposes of this solicitation, the eastern Bering Sea shelf is considered to be the shelf region from the Aleutian Islands northward to St. Lawrence Island that lies within U.S. waters. The seasonal sea ice cover of the eastern Bering Sea shelf, a dominant characteristic of this region's oceanographic environment, has a significant influence on the shelf ecosystem. Recent changes in the timing and extent of this ice cover appear to be occurring on decadal or longer time scales and correlated with climate variability.

Particular emphasis should be placed on understanding how the shelf ecosystem (including human societies) responds to these changes in sea ice. This solicitation draws upon the community planning embodied in the *Bering Ecosystem Study Science Plan* (http://www.arcus.org/Bering/reports/downloads/BEST_Science_Plan.pdf), *Sustaining the Bering Ecosystem: a Social Sciences Plan* (http://www.arcus.org/Bering/reports/downloads/HBEST_Science_Plan.pdf), and the draft *Implementation Plan for the Bering Ecosystem Study (BEST)* (http://www.arcus.org/Bering/reports/downloads/BEST_Implementation_Plan.pdf); however, it should not be considered the full implementation of or confined only to activities described in any of these plans. The research efforts resulting from this solicitation are expected to be a partial contribution to the interagency Study of Environmental Arctic Change (SEARCH) (<http://www.arcus.org/SEARCH/index.php>) and the international Ecosystem Studies of Sub-Arctic Seas program (<http://www.pml.ac.uk/globec/structure/regional/essas/essas>).

htm).

To ensure a high degree of cross-project collaboration and coordination, the geographical extent of the eastern Bering Sea to be studied has been deliberately limited. It is not a requirement of the final program that it encompass the full extent of this limited area. The intent is to have projects co-locate and investigate ecosystem processes in this region collaboratively, but with the larger goal of understanding how interactions and linkages in other arctic shelf regions may respond to climate variability.

The proposals funded under this solicitation, though, are expected to mesh seamlessly with the project funded by the NPRB BSIERP competition (www.nprb.org/research/bsierp_intro.htm) in order to comprise an integrated program. Proposals must include specific explanation of how the proposed research contributes to such systems-level understanding. This system level understanding is anticipated to culminate in and emerge from models developed with support from the coordinated NSF-NPRB programs. In particular, proposals submitted in response to this solicitation must clearly identify how their outputs will contribute to upper trophic level studies and models proposed to NPRB (if appropriate), and what outputs are needed from such upper trophic level studies, e.g., grazing rates. In order to facilitate proposal preparation, in mid-December NPRB will post, on their website, contact information for PIs who have been invited to submit full proposals to the NPRB competition. To facilitate evaluation of proposals' ability to mesh between programs, the two programs will share proposals between each other. The normal NSF rules of confidentiality will be maintained by both organizations.

The projects funded under this solicitation will be NSF's contribution to a broader, multi-agency interest in the Bering Sea ecosystem. It is expected that these projects will create synergies, when appropriate, with programs funded by other agencies interested in processes over the eastern Bering Sea shelf, such as NOAA's North Pacific Climate Regimes and Ecosystem Productivity program (NPCREP) and Russian-American Long-Term Census of the Arctic (RUSALCA), and the Arctic-Yukon-Kuskokwim Sustainable Salmon Initiative (AYK SSI)

It is further expected that these projects will use effectively the large and excellent data sets that have been collected for many years from the Bering Sea and surrounding regions during such programs as the Processes and Resources of the Bering Sea study (PROBES), the Outer Continental Shelf Environmental Assessment Program (OCSEAP), the Fisheries Oceanography Coordinated Investigations (FOCI), the Western Arctic Shelf Basin Interactions project (SBI), and the US GLOBEC Northeast Pacific program, among others. Proposers are expected to justify why new measurements need to be collected over the Bering Sea shelf when these are proposed.

NSF's priority for BEST is development of the understanding necessary to predict the responses of the physical environment and ecosystem of the Bering Sea to changes in sea ice characteristics under realistic projected climate scenarios and the vulnerability of these systems, including their social-cultural systems.

BEST Field Program

For projects funded from this competition, three field seasons are anticipated, followed by a synthesis year. Thus, proposals are solicited for four years duration. Each of the three field seasons, in calendar years 2008, 2009, and 2010, are anticipated to consist of two cruises – one 40-day cruise in the mid-March to late April period aboard an icebreaker and one month-long cruise later in the spring or early summer. The precise timing of this second annual cruise will be determined based upon the needs of the proposals supported. Participation in any or all cruises is not a necessary characteristic of successful proposals. Opportunities to change crews or depart the ship mid-way through a cruise may be a possibility.

Proposals must contain a specification of the amount of wire time required on stations and the amount of bench space required for the proposed effort, as well as the number of berths their team will require. Cruise tracks and goals will be decided upon at annual PI meetings following any awards made as a result of this competition. Proposers should budget funds to attend such a meeting, once a year. The location for this meeting is not yet certain and could be in Alaska, the DC area, or in conjunction with a major national meeting such as the Fall American Geophysical Union (AGU) meeting.

Additional opportunities to collect field data may become available through coordination with the winning team from the NPRB competition.

Priority Research Areas

Two types of proposals are solicited – service proposals and curiosity-driven proposals.

Service proposals are sought for the collection and interpretation of physical oceanographic data, including temperature, salinity, oxygen, and nutrient profiles, as well as underway shipboard acoustic Doppler current profiler data. These proposals should indicate and justify the level of accuracy proposed for the data, e.g. World Ocean Circulation Experiment (WOCE) quality or some other level of accuracy.

Consequent to the intention to produce an integrated ecosystem program, certain types curiosity-driven proposals are particularly sought for this competition. These include:

1. Physical oceanographic projects that address the processes controlling variability in sea ice characteristics, water mass structure, stratification, and circulation that affect shelf trophic structure;
2. Chemical oceanographic projects that address the variability of nutrients occurring in response to variations in sea-ice characteristics and impacting primary production;
3. Projects that address the variability of primary production and phytoplankton community structure occurring in response to variations in sea ice characteristics;
4. Projects that address processes controlling zooplankton (microzooplankton, mesozooplankton, and macrozooplankton) and benthic infauna variability occurring in response to variations in sea-ice characteristics;
5. Ecosystem models that synthesize the resultant information, at least, through the zooplankton and benthic infauna;
6. Social science projects that address the economic, social, and /or cultural effects of variations in Bering Sea productivity occurring in response to variations in sea-ice characteristics.

Each proposal must discuss, in detail, how it will address the hypotheses posed or processes studied with the data it proposes to collect, e.g. what tests will be applied to data collected. Each proposal must also justify the adequacy of the proposed data for the task, e.g. provide a power analysis. Modeling proposals must include a detailed discussion of model calibration, skill assessment, and expected errors in prognostic output. This solicitation will not fund any new climate modeling studies. Prognostic modeling efforts involving future climate scenarios should state clearly which scenarios they propose to use and where they will obtain the appropriate initial, forcing, and boundary conditions. Proposals, also, must address how they contribute to the core of an integrated ecosystem program (see Additional Review Criteria, below). All proposers are urged to provide a management plan, including a timeline for the project containing milestones.

The PIs of proposals recommended for support by both NSF and NPRB will be required to develop a mutually agreeable management plan by December 2007. This plan will be developed as the product of a series of meetings and conference calls. It will involve, among others, such issues as communications between teams, particularly between field scientists and modelers, coordination with other programs, coordination of outreach activities, report planning, identification of product deliverables, especially as it pertains to syntheses, and associated responsibilities. Furthermore, annual PI meetings must be attended. These are mentioned above under the heading 'The BEST Field Program'.

Proposers are particularly encouraged to contact the cognizant program officers, if they have any questions concerning the suitability of a proposal topic or other issues that are unclear. Even if they have no questions, they are urged to contact a cognizant program officer to indicate their interest in responding to this solicitation and the topic of their proposal. This will assist the program officers in optimizing the review process.

Proposals addressing BEST goals should be submitted to the Arctic Natural Sciences program, which will coordinate management of the review process for the Arctic Sciences Division. See Section V., Proposal Preparation and Submission Instructions and Section VII., B. and C., Award Conditions, for further details on submitting proposals for BEST.

ADDITIONAL OPPORTUNITIES

Other NSF Funding Opportunities

See Section IX on Other Information and consult the NSF online program guide to browse for funding opportunities http://www.nsf.gov/funding/browse_all_funding.jsp

III. AWARD INFORMATION

Pending availability of funds, \$10,000,000 may be available for proposals to this solicitation. This does not include logistics support that may be provided through the Arctic Research Support and Logistics program. NSF estimates 7 – 15 awards, with a maximum duration of four years, as standard or continuing grants, or cooperative agreements. Award size is expected to range between \$250,000 and \$1,400,000. The number of awards and average award size and duration are subject to the availability of funds.

IV. ELIGIBILITY INFORMATION

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the [Grant Proposal Guide](#), Chapter I, Section E.

Organization Limit:

None Specified

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

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 pubs@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/bfa/dias/policy/docs/grantsgovguide.pdf>). 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 pubs@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.3 of the Grant Proposal Guide provides additional information on collaborative proposals.

Proposals received in response to this solicitation will be shared, according to NSF's rules of confidentiality, with the North Pacific Research Board.

Proposals may be returned without review for failing to comply with the Grant Proposal Guide, this solicitation and the instructions that supplement the GPG (if submitted via FastLane) or the NSF Grants.gov Application Guide (if

submitted via Grants.gov).

Please note:

- Proposals that are re-submissions must be substantially changed from the original,
- Proposals must comply with specifications for minimum font size and maximum lines and characters per centimeter,
- Biosketches must follow formatting rules, in particular, do not include more than 10 publications,
- For efficiency of processing, please arrange entries alphabetically by last name in lists such as collaborators, students, advisors, other affiliations, and suggested reviewers.

Principles for the Conduct of Research in the Arctic

Researchers should conform to the *Principles for the Conduct of Research in the Arctic*, prepared by the Social Science Task Force of the U.S. Interagency Arctic Research Policy Committee (IARPC) and approved by IARPC in 1990. These principles apply to all researchers and are listed at <http://www.nsf.gov/od/opp/arctic/conduct.jsp>. Proposers may also find the "Guidelines for Improved Cooperation between Northern Communities and Arctic Researchers" helpful (<http://www.arcus.org/guidelines>).

Proposals Involving Human Subjects

The NSF Grant Proposal Guide (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg) provides procedural information for projects with human subjects in the section Projects Involving Human Subjects. Investigators must ensure that human subjects are protected from research risks in conformance with the relevant federal policy known as the Common Rule (*Federal Policy for the Protection of Human Subjects*, 45 CFR 690). Additional information is available at <http://www.nsf.gov/bfa/dias/policy/guidance.jsp>. Letters of permission or approval, such as those from Native organizations or communities in which the work will take place, should be included in the Supplementary Documents section of proposal.

Proposals Involving Arctic Field Work

The Foundation and researchers to whom it makes awards are obliged to conform to the various acts governing activities affecting the environment and cultural or historic properties. Researchers should be aware of these acts and adhere to their requirements. Further information concerning environmental issues is provided below under the heading 'Environmental Policy Considerations of Fieldwork'. Researchers proposing work that may affect cultural or historic properties, or whose work involves tribal lands must cooperate with the agency in complying with the consultation requirements of section 106 of the National Historic Preservation Act. Researchers are encouraged to contact OPP for more information about cultural or historic impact considerations of their proposed field work. For additional information on cultural or historic preservation issues, see the Advisory Council on Historic Preservation's web site at <http://www.achp.gov/work106.html>.

The Arctic Sciences Division does not require the use of logistics forms for arctic fieldwork. However, for proper review of the proposal and to initiate logistics planning for successful proposals, the anticipated fieldwork should be described in the proposal. Proposals are encouraged to include a section describing the scope of the fieldwork, the overall project schedule, maps and figures in the Project Description.

If a third-party is arranging logistics (a logistics contractor) their costs should **not** be itemized or included in the FastLane or Grants.gov budget forms. Instead, the scope and kind of support should be described clearly in the budget justification to allow the logistics provider and reviewers to assess the scope, feasibility and initiate planning (see [Section II](#), "Arctic Research Support and Logistics" of [Arctic Research Opportunities solicitation, NSF 06-603](#)).

The Arctic Research Logistics and Support (RSL) program was created, in part, to enhance access, safety and interactions with arctic communities. Accordingly investigators are encouraged to propose effective and efficient use of logistics resources to reach research goals and cooperate with communities near field research sites. More information is available on the RSL program web site (http://www.nsf.gov/od/opp/arctic/res_log_sup.jsp).

Logistics Providers and Field Stations

The RSL program works with several organizations to meet the needs of arctic field research. NSF's prime arctic logistics contractor is VECO Polar Resources (VPR; <http://vecopolar.com/>). VPR can help scope out logistics for all projects, regardless of whether they ultimately provide the logistics services. They are helpful in proposal preparation and can provide letters of support for projects to establish they are achievable. Investigators are encouraged to contact VPR to develop a preliminary plan and to provide project support if appropriate.

Arctic Logistics Information And Support (ALIAS)

The ALIAS database contains useful information about research support and logistics capabilities around the Arctic <http://www.arcus.org/alias/>.

UNOLS Vessel Requests

Researchers intending to use a vessel from the University-National Oceanographic Laboratory System (UNOLS) or the U.S. Coast Guard (USCG) icebreakers *Healy*, *Polar Sea* or *Polar Star* should follow the UNOLS procedure (<http://www.unols.org>).

Environmental Policy Considerations of Fieldwork

Federal agencies must comply with the National Environmental Policy Act (NEPA). The Code of Federal Regulations (CFR) pertaining to NSF can be found at Title 45 Part 640 (<http://www.gpoaccess.gov/cfr/index.html>). Most NSF awards support individual scientific research projects and are not considered major Federal actions significantly affecting the quality of the human environment. Projects involving construction, drilling or major disturbance to the local environment may need to have an assessment of environmental impacts performed.

In addition to NEPA, all federal agencies are regulated under acts such as the Endangered Species Act, the Marine Mammal Protection Act, and the National Historic Preservation Act. Researchers proposing projects with fieldwork involving perturbation of the environment, excavation of archaeological sites, use of underwater seismic air guns, drilling, construction, or other activity that may be considered a major Federal action should confer with program officers for guidance on project planning in compliance with NEPA and other federal environmental protection acts. For example, work proposed in the tundra area around Barrow, Alaska should consider the presence of threatened Steller's eiders (*Polysticta stelleri*) May-July and may require federal consultations. Researchers are encouraged to contact OPP for more information about environmental impact considerations of their proposed field work.

Identify this Solicitation Number on the Proposal Cover Sheet.

B. Budgetary Information

Cost Sharing: Cost sharing is not required by NSF in proposals submitted to the National Science Foundation.

C. Due Dates

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

March 15, 2007

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. The Grants.gov's Grant Community User Guide is a comprehensive reference document that provides technical information about Grants.gov. Proposers can download the User Guide as a Microsoft Word document or as a PDF document. The Grants.gov User Guide is available at: <http://www.grants.gov/CustomerSupport>. 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 and, if they meet NSF proposal preparation 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 who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts with the proposer.

A. NSF Merit Review Criteria

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

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

What is the intellectual merit of the proposed activity?

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

What are the broader impacts of the proposed activity?

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

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

Integration of Research and Education

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

Integrating Diversity into NSF Programs, Projects, and Activities

Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

Additional Review Criteria:

BEST Competition

In addition to the two NSB-approved merit review criteria, which are essential to all NSF competitions, proposals will be evaluated specifically on how well they mesh with NPRB proposed projects to form the core elements of a societally-relevant, integrated ecosystem program. This additional criterion will be used to evaluate proposals after they have been deemed meritorious according to the NSB-approved criteria.

B. Review and Selection Process

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

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the date of receipt. 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 Federal Demonstration Partnership (FDP) 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/general_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

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

Special Award Conditions:

Principles for the Conduct of Research in the Arctic

Principal Investigators are expected to follow the Principles for the Conduct of Research in the Arctic, prepared by the Social Science Task Force of the U.S. Interagency Arctic Research Policy Committee (IARPC) and approved by IARPC in 1990. These principles are listed at <http://www.nsf.gov/od/opp/arctic/conduct.jsp>. Investigators may find useful the Guidelines for Improved Cooperation between Arctic Researchers and Northern Communities (<http://www.arcus.org/guidelines>).

Guidelines for Scientific Data (OPP 9-91)

This statement provides guidelines from the Office of Polar Programs (OPP) at the National Science Foundation (NSF) and sets out special conditions applicable to OPP grants to implement the Foundation's Sharing Policy by assuring timely submission of OPP-award data to national data centers and other OPP-specified repositories for secondary use by the scientific community. The Office of Polar Programs, in conformance with NSF policy (see Grant Proposal Guide, <http://www.nsf.gov/pubsys/ods/getpub.cfm?gpg>), expects investigators to share with other researchers, at no more than incremental cost and within a reasonable time, the data, derived data products, samples, physical collections and other supported materials gathered or created in the course of the research project. The purpose of this policy is to facilitate full and open access to data and materials for polar research from projects supported by OPP.

General Guidelines

For all OPP-supported projects:

- All data and derived data products collected under OPP-awards which are appropriate for submission to a national data center or OPP specified data repository (OPP-approved web site) should be promptly submitted within a reasonable amount of time, as described below, in responsibilities of Principal Investigators of OPP-Awards.
- OPP considers the documentation of data sets, known as metadata, as vital to the exchange of information on polar research and to a data set's accessibility and longevity for reuse.
- Data archives of OPP-supported projects should include easily accessible information about the data holdings, including quality assessments, supporting ancillary information, and guidance for locating and obtaining the data.
- National and international standards should be used to the greatest extent possible for the collection, processing and communication of OPP-sponsored data sets.

Special Note for Arctic Social Sciences Awards: The Arctic Social Sciences Program supports the full range of social science disciplines and adheres to the Data Sharing Policy developed by NSF's Directorate for Social Behavioral and Economic Research (SBE). The nature of the data, the way they are collected, analyzed, and stored, and the pace at which this occurs, vary widely. Different storage facilities and access requirements exist for different types of social science data, e. g., archaeological data, specimens from physical anthropology, large-scale survey data, oral interviews, and field records. Where appropriate and possible, grantees from all social science fields will develop and submit specific plans to share materials collected with NSF support. These plans should cover how and where these materials will be stored, at reasonable cost, and how access will be provided to other researchers, at their cost. Many complexities arise across the range of data collection supported by the Arctic Social Sciences Program. Therefore, such unusual circumstances and any necessary modifications or exemptions to the general policy of data sharing should be described in the OPP-awardees sharing plans.

Responsibilities of Principal Investigators of OPP-Funded Awards

Principal investigators should make their data available to all reasonable requests and where applicable the principal investigators should submit the data collected to designated data centers as soon as possible, but no later than two (2) years after the data are collected.

Principal investigators working in coordinated programs (multi-investigator and/or multi-agency programs) may, in consultation with the OPP program managers and other funding agencies involved, establish more stringent data submission procedures to meet the needs of these larger coordinated programs. Principal Investigators with OPP-funded awards should comply with data policies established for these coordinated programs and submit their data as required to the appropriate repository stipulated by the coordinated program office.

Beyond these general OPP guidelines, further data sharing conditions will apply to the projects funded under this competition in order to ensure a coordinated, cohesive, integrated ecosystem study. Any service data collected will be quality-controlled and made available to interested participants in the coordinated program supported by NSF and NPRB within 6 months of

collection. All other metadata and data will be made available to all participants within the coordinated program within one year of collection unless delays have been authorized specifically by the funding agency program officers. Data will be considered proprietary, in the sense that it will not be available for use in publications without an offer of co-authorship to the PI responsible for its collection, for two years after collection. Non-compliance with data policies will be considered justification for withholding incremental funding.

Compliance with the data guidelines will be considered in the program managers' overall evaluation of a Principal Investigator's prior support record.

Conditions for OPP Awards

Principal Investigators of OPP-funded awards are REQUIRED to submit to appropriate electronic data directories, a description of their data (i.e., metadata) resulting from OPP-funded research in the form of a Directory Interchange Format (DIF) entry. Submission of the DIF may be at any time during the tenure of the grant. At the time of submission of the Final Report to NSF, a copy of the DIF must be sent to the cognizant program officer in OPP. Failure to provide final technical reports delays NSF review and processing of pending proposals for that Principal Investigator. Principal Investigators should examine the formats of the required reports in advance to assure availability of required data. Sample DIFs can be found on the Global Change Master Directory web page at <http://gcmd.gsfc.nasa.gov>.

Data sets from OPP-supported arctic scientific research should go to the appropriate data center for the specific type of data collected. Any questions concerning this policy should be directed to the cognizant program officer in the Office of Polar Programs.

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.

Failure to provide the required annual or final project reports 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.

Please see the [OPP Guidelines for Scientific Data \(OPP 9-91\)](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=opp991) (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=opp991) described in Section VII. B. Award Conditions in this program solicitation for information about award conditions for data.

VIII. AGENCY CONTACTS

General inquiries regarding this program should be made to:

- Anna Kerttula de Echave, telephone: (703) 292-7432, email: akerttul@nsf.gov
- William Wiseman, telephone: (703) 292-4750, email: wwiseman@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.
- Linda Izzard, telephone: (703) 292-7430, email: lizzard@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, MyNSF (formerly the Custom News Service) 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 Regional 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. MyNSF also is available on NSF's Website at <http://www.nsf.gov/mynsf/>.

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 40,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and 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: pubs@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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