

# **U.S. GLOBEC - Global Ocean Ecosystems Dynamics, Northeast Pacific (NEP) Program Phase IIIa. Synthesis for the California Current System**

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## **Program Solicitation**

NSF 04-544

*Replaces Document 97-163*



**National Science Foundation**

Directorate for Geosciences

Division of Ocean Sciences

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

April 15, 2004

## **SUMMARY OF PROGRAM REQUIREMENTS**

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### **General Information**

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**Program Title:**

U.S. GLOBEC - Global Ocean Ecosystems Dynamics, Northeast Pacific (NEP) Program Phase IIIa.  
Synthesis for the California Current System

**Synopsis of Program:**

This is part of a continuing series of solicitations as part of the U.S. Global Ocean Ecosystem Dynamics Program (U.S. GLOBEC) and is the fourth solicitation as part of the U.S. GLOBEC Northeast Pacific (NEP) Program. This solicitation seeks proposals to initiate the Phase IIIa synthesis of data from the California Current System (CCS), and comparative analyses of the CCS with other appropriate ocean regions. Phase IIIb will follow with a focus on the Coastal Gulf of Alaska (CGOA) system.

**Cognizant Program Officer(s):**

- Phillip R. Taylor, Program Director, Directorate for Geosciences, Division of Ocean Sciences, 725 N, telephone: (703) 292-8582, fax: (703) 292-9085, email: [prtaylor@nsf.gov](mailto:prtaylor@nsf.gov)

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

- 47.050 --- Geosciences

### **Eligibility Information**

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- **Organization Limit:**

The categories of proposers identified in the [Grant Proposal Guide](#) are eligible for support under this program solicitation. Proposals will be accepted from U.S. universities and colleges, U.S. non-profit, non-academic organizations, and for-profit organizations. Proposals may include Federal agency scientists but these will participate contingent on funding from other federal agency partners in the U.S. GLOBEC program, not via NSF funding. NOAA is the primary U.S. GLOBEC partner and has agreed to provide support for Federal researchers in the context of the inter-agency GLOBEC program.

- **PI Eligibility Limit:** None Specified.
- **Limit on Number of Proposals:** None Specified.

## Award Information

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- **Anticipated Type of Award:** Standard or Continuing Grant or Cooperative Agreement
- **Estimated Number of Awards:** 20 - as part of 5-10 integrated, inter-disciplinary projects, some collaborative projects in NSF parlance.
- **Anticipated Funding Amount:** \$6,000,000 cumulative over all years, depending on quality of the proposals, requested amounts, and the availability of funding. Individual awards are anticipated to be mostly of three years duration, \$100,000-\$500,000 per award year.

## Proposal Preparation and Submission Instructions

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### A. Proposal Preparation Instructions

- **Full Proposal Preparation Instructions:** This solicitation contains information that supplements the standard Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full text of this solicitation for further information.

### B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required.
- **Indirect Cost (F&A) Limitations:** Not Applicable.
- **Other Budgetary Limitations:** Not Applicable.

### C. Due Dates

- **Full Proposal Deadline Date(s)** (due by 5 p.m. proposer's local time):  
April 15, 2004

## Proposal Review Information

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- **Merit Review Criteria:** National Science Board approved criteria apply.

## Award Administration Information

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- **Award Conditions:** Standard NSF award conditions apply.
- **Reporting Requirements:** Standard NSF reporting requirements apply.

**Summary of Program Requirements**

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**I. INTRODUCTION**

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The Global Ocean Ecosystems Dynamics (U.S. GLOBEC) program is a component of the U.S. Global Change Research Program, with the goals of understanding and ultimately predicting how populations of marine animal species (holozooplankton, fish and benthic invertebrates) respond to natural and anthropogenic changes in global climate. U.S. GLOBEC is also the U.S. component of the International GLOBEC program, a core project of the International Geosphere-Biosphere Program (IGBP), with co-sponsorship from the Scientific Committee on Oceanic Research (SCOR) and the Intergovernmental Oceanographic Commission (IOC). This notice is under the auspices of the U.S. GLOBEC program within NSF/Division of Ocean Sciences and the regional ecosystem studies and U.S. GLOBEC initiatives of the National Oceanic and Atmospheric Administration's (NOAA) Coastal Oceans Program (COP). NSF and NOAA have been in partnership in supporting U.S. GLOBEC from its initiation.

Specific goals of the U.S. GLOBEC Northeast Pacific (NEP) program are (1) to understand the potential impacts of climate variability and change on the dynamics of shelf ecosystems and on the distribution, abundance and production of several specific target species; (2) to embody this understanding in conceptual and quantitative models capable of capturing ecosystem and population level responses on a broad range of space and time scales; and (3) to improve the predictability and management of U.S. living marine resources. The U.S. GLOBEC program in the Northeast Pacific has thus far consisted of a regionally-combined Phase I of modeling, retrospective and pilot field studies, followed by regionally-separate Phase II field and model studies in the two NEP sub-regions (California Current System (CCS) and Coastal Gulf of Alaska (CGOA),

Phases IIa. and IIb., respectively). Phase I and II studies have resulted in substantial new data sets and understanding of physical-chemical-biological interactions in shelf, slope, and adjacent deep-ocean habitats in each of these individual regions. Insights are emerging on how nearshore marine animal populations in these two regions have responded to large-scale atmospheric and ocean forcing.

**ELECTRONIC ACCESS:** Data collected under the U.S. GLOBEC Northeast Pacific (NEP) Program and associated documentation is available to all researchers at [http://globec.coas.oregonstate.edu/groups/nep/data\\_access/data\\_index.html](http://globec.coas.oregonstate.edu/groups/nep/data_access/data_index.html) under protocols established under the U.S. GLOBEC Data Policy. The U.S. GLOBEC Data Policy (U.S. GLOBEC Report 10) is available at: <http://www.usglobec.org/reports/datapol/datapol.contents.html>).

For a list of funded projects during the Northeast Pacific Study, consult <http://globec.coas.oregonstate.edu/groups/nep/projs.html>

Publications resulting from U.S. GLOBEC studies are catalogued at:<http://www.usglobec.org/misc/funded.contributions.html>

The synthesis and comparative analysis phase will be an open competition and not restricted to those investigators that have been funded in past NEP activities. The Northeast Pacific Implementation plan (U.S. GLOBEC Report No. 17) is based on U. S. GLOBEC documents resulting from several community-wide meetings where U.S. oceanographers and fisheries scientists specified key scientific issues and research priorities for the eastern Pacific. For the California Current System (CCS), these are U.S.GLOBEC Report No. 7 and U.S. GLOBEC Report No. 11. For the Coastal Gulf of Alaska (CGOA), the relevant reports are U.S. GLOBEC Report No. 15 and U.S. GLOBEC Report No. 16. Copies of these documents are available from the following website: <http://globec.coas.oregonstate.edu/groups/nep/reports/reports.home.html>

## II. PROGRAM DESCRIPTION

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This request for proposals constitutes the initiation of a Phase IIIa to conduct regional synthesis of the California Current System region (to be followed approximately one year later by a similar Phase IIIb for CGOA synthesis) and comparative analysis in the U.S. GLOBEC Northeast Pacific (NEP) Program. A principal objective of Phase IIIa is to foster integration and synthesis of data collected during the field phases of the California Current program and other relevant data and knowledge (including comparison to results of CGOA studies and other regions, satellite data, and retrospective data sets), through group interactions and modeling activities; no new field work will be supported. The Phase IIIa initiative is open to the participation of scientists without past involvement in U.S. GLOBEC as well as current U.S. GLOBEC investigators. Past U.S. GLOBEC NEP activities and data sets resulting from prior funded projects are cataloged or accessible from: <http://globec.coas.oregonstate.edu/>. Synthesis proposed towards this program solicitation should emphasize the integration of multidisciplinary observations and models in the CCS. Effective synthesis and comparative analysis projects may want to include many principal investigators of diverse CCS interests to ensure close coordination of research groups.

### Research Program Goals

Within the overall goal outlined above, the NEP Program continues to have five specific goals:

1. To determine how changing climate, especially its impacts on local wind and buoyancy forcing and basin-scale currents, affect spatial and temporal variability in mesoscale circulation and water column structure.
2. To quantify how physical features in the California Current System and variability related to climate change impact

zooplankton biomass, production, distribution, and the retention and loss of zooplankton from coastal regions. There is particular emphasis on the euphausiids *Euphausia pacifica* and *Thysanoessa spinifera* and calanoid copepods, and how these, in turn, influence the distributions of higher trophic levels, such as forage fish, coho and chinook salmon, and marine birds and mammals.

3. To quantify the impacts of key coastal physical and biological processes, including (i) primary and secondary production, (ii) intensity and effectiveness of upwelling, (iii) cross-shelf transport associated with wind-driven upwelling, and (iv) variability in the timing of the spring transition, on controlling juvenile salmon growth and survival in the coastal zone of the CCS.
  
4. To determine the extent to which high and variable mortality of juvenile coho and chinook salmon in the coastal region of the California Current is responsible for large interannual variation in adult salmon populations. To determine whether and how the proximate mortality causes (e.g., predation, parasites, starvation, loss by advection) are affected by climate variability.
  
5. To compare the impacts of climate variability and change (such as El Nino-La Nina cycles and regime shifts) on similar marine animal populations (euphausiids, salmon) of the CCS and CGOA.

Anticipated products of the Northeast Pacific projects will be 1) improved knowledge (e.g., mechanistic understanding) of the impact of climate variability on specific marine populations and ecosystems of the eastern North Pacific; 2) robust and reliable coupled biophysical models that can be used to examine impacts of climate variability on NEP ecosystems and integrate disparate observations in coastal ecosystems; 3) detailed and quality controlled datasets of physical, chemical and biological conditions in the NEP that will be used in model validation, for documenting episodic or natural variability, and to provide a baseline and basis for future research in the region, and 4) new tools, indices or strategies that provide better management of living marine resources--perhaps by using integrated environmental and ecosystem data to better account for variability in production and recruitment of key resources. Synthesis projects funded under the present program solicitation should focus on achieving these products.

The specific objectives and scientific questions related to these goals are described in greater detail in the U.S. GLOBEC Northeast Pacific Implementation Plan (Report No. 17) referenced earlier in this Document. This report should be consulted in responding to this program solicitation.

## Research Approach

Phase IIIa of the U.S. GLOBEC Northeast Pacific Program will emphasize a number of topic areas. Examples of appropriate topics to be considered are described below (this list is not meant to be exhaustive). The intent is for coordinated activities that collectively address the program goals. It is anticipated that proposed work may address more than one of these or other topic areas.

### 1. Synthesis of Data Sets:

Integration of long term observation program (LTOP), process, and survey components of the program, and of remote sensing data, retrospective data sets, and modeling analyses are critical in the development of the synthesis

research efforts. Investigators who have not been involved in the earlier phases of the program, but who have new ideas about how to analyze or model currently available data sets are strongly encouraged to participate. Investigators involved in the earlier field phases of the program are encouraged to collaborate in the integration of their data sets with other data sets to facilitate multi-disciplinary approaches to understanding factors affecting the dynamics of the target organisms. Topics under this initiative include, but are not limited to:

a. Abundance and distribution of target species:

The emphasis is on the determination of the distribution and abundance of the target organisms (calanoid copepods, euphausiids, juvenile salmon, salmon forage) in relation to their physical environment during the spring-fall, when juvenile salmon enter the coastal ocean, and when it is believed that mortality is both high and variable. What constitutes favorable habitat for juvenile salmon entering the coastal ocean, and where and when does such habitat occur both seasonally, and between years? How does interannual and long-term environmental variability impact this ecosystem? Creation of integrated data sets that can be used for inter-annual comparisons of population processes and their coupling to the physical structure and variability of the environment to answer the key questions listed above is of fundamental importance.

b. Processes that regulate the abundance and distribution of target species:

How often and where do planktonic populations and salmon encounter retentive regions near or on the west coast shelf? How important are topographically controlled recirculations in producing or maintaining highly productive and predictable regions that favor secondary production and salmon growth and survival? How important is the episodic upwelling (intermingled with periods of low or downwelling winds) off of central Oregon and Northern California in establishing productive regions nearshore for juvenile salmon? What are the mechanisms through which climate variability affects these processes? Answering these and similar questions will require a concerted effort to integrate the results of physical observations, estimates of in situ animal abundances, the condition and reproductive rates of plankton, and the distributions of predators.

2. Physical/biological modeling:

The development and use of conceptual and quantitative models to investigate physical and coupled physical/biological processes have been emphasized throughout the U.S. GLOBEC Northeast Pacific program. Circulation models have been used to examine the effects of episodic upwelling on nearshore retention of plankton populations, and to explore the influence of wind forcing on alongshore and cross-shelf flow near a shelf bank and coastal headland using both idealized and realistic regional bathymetry and forcing. These studies have mostly involved diagnostic models. In Phase IIIa, these and other model approaches (including prognostic and data assimilation) will be encouraged, with the following multiple aims: (a) to improve understanding of the key physical and biological processes that affect the distributions and local productivities of the target species in the CCS; (b) to understand how climate variability and potential longer-term changes (e.g., regime shifts) modify these processes; (c) to help integrate and synthesize the various physical and biological data collected during the field program; and (d) to begin coupling the lower and upper trophic level models of the NEP ecosystem.

### 3. Broader Scale Effects Influenced by Climate Change and Comparative Regional Studies:

Waters from the Subarctic and transition ocean regions that are advected eastward (West Wind Drift) split into two limbs (currents) as they approach the west coast of North America: to the south, the water enters and becomes a major contributor to the California Current; to the north, the water enters and becomes important to the Alaska Current. Nutrients and seed populations of plankton from the West Wind drift are important to these coastal ecosystems. Moreover, recent responses of the zooplankton fauna of the Pacific Northwest region suggest that there may be significant transport of subarctic species from the Gulf of Alaska to west coast regions. It has been hypothesized that the contributions of the West Wind Drift to these two downstream regions are out-of-phase and primarily controlled by longer-term large-scale fluctuations in North Pacific climate--particularly, by the positions and strengths of the atmospheric pressure systems in the region. These longer term changes in ocean basin scale atmospheric forcings have had well documented impacts on biological populations in both coastal and oceanic regions of the northeast Pacific Ocean. A well documented environmental shift ("regime shift") occurred in 1976-77, and, relevant to U.S. GLOBEC, another may have occurred in 1998. Plankton abundance and salmon survival have increased in the Pacific Northwest since 1998, corresponding to a change in the sign of the Pacific Decadal Oscillation.

In the Phase IIIa synthesis activities, emphasis will be placed on the inter-regional comparison and coupling of target species populations through the larger scale current systems. This initiative will provide an opportunity for evaluation of large-scale environmental influences. Integration and collective analysis of data sets from throughout the Northeast Pacific (including both GLOBEC CCS and CGOA programs as well as other research from the region) are encouraged. Together with historical data sets, recent observations made during earlier GLOBEC NEP phases can be used to evaluate the effects of environment on zooplankton populations and survival of juvenile salmon at multiple spatial and temporal scales.

In addition to the CCS and CGOA regions within the NEP, the U.S. GLOBEC program more broadly includes research conducted at sites in the Northwest Atlantic and the Southern Ocean. Non-GLOBEC funded, but conceptually related, research programs also exist in other eastern and western boundary currents. These related studies provide an opportunity for broader syntheses and comparative analyses that integrate data sets, models and knowledge gained in the CCS with similar information from comparable ecosystems. This solicitation encourages comparative studies of this broader nature, where they increase our understanding of ecosystem response to changing conditions in the CCS. Comparative studies might include such topics as inter-ocean analyses of target zooplankton or predator taxa with other species having similar (or contrasting) life histories; comparative study of regional circulation and ecosystem responses to basin- and larger-scale climate influences; inter-ocean contrasts of the effects of wind and buoyancy forcing on nearshore retention and loss of pelagic organisms, etc. Comparative studies might employ remote sensing and bio-physical models to analyze ecosystem responses to climate variability in different regions, or develop new indices and measures for comparison. In proposing to compare the CCS to other regions, it is critical that the proposals clearly identify the processes and characteristics of the CCS that will be better understood through generalizations to and/or contrasts with the other systems.

By encouraging proposals that reach beyond the CCS, this solicitation does not seek to downplay the value of studies that integrate the data sets, models and understanding gained entirely within the CCS. These have high priority, since in many cases they are necessary before broader comparisons can be possible. Rather, it seeks to point out the increased understanding of CCS processes that may be achieved by extending the proposed activities beyond the CCS. These extensions will also begin the broader synthesis activities that are expected to be requested specifically by subsequent program solicitations in U.S. GLOBEC.

### 4. Development of indices to characterize environmental and ecosystem status and change.

A more complete understanding of the NEP-CCS ecosystem gained through the U.S. GLOBEC program should allow for the design of better, more efficient, and more informative, monitoring programs in the region. Achieving this improvement will involve determining indices for the physical and lower trophic level system components that best characterize the status of the ecosystem, particularly in relation to potential

higher trophic level production. An important goal is for the indices to identify the environmental influence on juvenile salmon survival variability that can be incorporated into the assessment of the fish stocks in the region. Indices may be derived from directly measured parameters (from field observations), remotely sensed parameters, or from output of specific configurations of coupled physical-biological models. One form that this type of synthesis may take is a written documentation of the state of the Northern California Current ecosystem during the GLOBEC years. Such a document should include an overview of the GLOBEC NEP-CCS program and how it led to the identification of indices, and use of these variables in summarizing the state of the ecosystem. This could be published initially as a NOAA Coastal Ocean Program Decision Analysis Series report, but could also be updated on a regular basis as a tool to provide regional managers with ecosystem information. Information on the Decision Analysis Series is available at <http://www.cop.noaa.gov/pubs/das.html>.

### III. ELIGIBILITY INFORMATION

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The categories of proposers identified in the [Grant Proposal Guide](#) are eligible for support under this program solicitation. Proposals will be accepted from U.S. universities and colleges, U.S. non-profit, non-academic organizations, and for-profit organizations. Proposals may include Federal agency scientists but these will participate contingent on funding from other federal agency partners in the U.S. GLOBEC program, not via NSF funding. NOAA is the primary U.S. GLOBEC partner and has agreed to provide support for Federal researchers in the context of the inter-agency GLOBEC program. See Section IV. below for the cognizant NOAA contact for U.S. GLOBEC.

### IV. AWARD INFORMATION

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Estimated program budget, number of awards and average award size/duration are subject to the availability of funds. The estimated number of awards is 20 - as part of 5-10 integrated, inter-disciplinary projects, some collaborative projects in NSF parlance. The anticipated funding amount is \$6,000,000 cumulative over all years, depending on quality of the proposals and the requested amounts. Individual awards are anticipated to be mostly of three years duration, \$100,000-\$500,000 per award year.

Funding may be available to facilitate the support of participants that would not normally be eligible for NSF support, such as researchers from Federal agencies. Potential Federal participants are requested to discuss their level of participation with the cognizant U.S. GLOBEC contact at NOAA, Dr. Elizabeth Turner ([Elizabeth.Turner@NOAA.gov](mailto:Elizabeth.Turner@NOAA.gov), 301/713-3338).

### V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

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#### A. Proposal Preparation Instructions

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##### **Full Proposal Instructions:**

Proposals submitted in response to this program announcement/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/cgi-bin/getpub?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](mailto:pubs@nsf.gov).

In addition to those described in the Grant Proposal Guide (GPG), additional guidelines apply as follows:



Proposal titles should include the prefix "**US-GLOBEC NEP Phase IIIa-CCS:**" as an identifier.

The proposal to NSF **must include the following information**, which is to be entered into the "Special Information and Supplementary Documentation Section" in FastLane:

1. Provide a detailed management plan (limit: 3 pages), including means of communication and data tracking/management within the group, and timeline of activities.
2. Describe the means of sharing the outcome of the research with the rest of the scientific community, e.g. publications, web sites, databases, etc. (limit: 2 pages). The description should be specific and describe what, how and when the community should have access to the outcome of the project.

**In addition, the proposal must be accompanied, via an email, by the following:**

1. *Conflict List.* To facilitate identifying organizational or personal relationships that would constitute conflicts of interest for peer reviewers, the lead PI/Organization is required to provide a comprehensive table listing these relationships for all persons with significant participation in the proposed activity (e.g., all senior personnel, any named personnel whose salary is requested in the project budget). Please describe the nature of the conflict as well: (1) PhD thesis advisors or advisees, (2) postdoctoral advisors or advisees, (3) collaborators or co-authors for the past 48 months, and (4) any other individuals or organizations with which the investigator has financial ties (please specify type). This conflict list must be provided to the Program via email ([biooce@nsf.gov](mailto:biooce@nsf.gov)) by the proposal deadline.

Proposers are reminded to identify the program announcement/solicitation number (04-544) in the program announcement/solicitation block on the proposal Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

## **B. Budgetary Information**

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### **Cost Sharing:**

Cost sharing is not required in proposals submitted under this Program Solicitation.

## **C. Due Dates**

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Proposals must be submitted by the following date(s):

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

April 15, 2004

## **D. FastLane Requirements**

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Proposers are required to prepare and submit all proposals for this announcement/solicitation through the FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at: <http://www.fastlane.nsf.gov/a1/newstan.htm>. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail [fastlane@nsf.gov](mailto:fastlane@nsf.gov). The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program announcement/solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this announcement/solicitation.

*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. Proposers are no longer required to provide a paper copy of the signed Proposal Cover Sheet to NSF. Further instructions regarding this process are available on the FastLane Website at: <http://www.fastlane.nsf.gov>

## VI. PROPOSAL REVIEW INFORMATION

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### A. NSF Proposal Review Process

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Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

The National Science Board approved revised criteria for evaluating proposals at its meeting on March 28, 1997 ([NSB 97-72](#)). All NSF proposals are evaluated through use of the two merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

On July 8, 2002, the NSF Director issued [Important Notice 127](#), Implementation of new Grant Proposal Guide Requirements Related to the Broader Impacts Criterion. This Important Notice reinforces the importance of addressing both criteria in the preparation and review of all proposals submitted to NSF. NSF continues to strengthen its internal processes to ensure that both of the merit review criteria are addressed when making funding decisions.

In an effort to increase compliance with these requirements, the January 2002 issuance of the GPG incorporated revised proposal preparation guidelines relating to the development of the Project Summary and Project Description. Chapter II of the GPG specifies that Principal Investigators (PIs) must address both merit review criteria in separate statements within the one-page Project Summary. This chapter also reiterates that broader impacts resulting from the proposed project must be addressed in the Project Description and described as an integral part of the narrative.

Effective October 1, 2002, NSF will return without review proposals that do not separately address both merit review criteria within the Project Summary. It is believed that these changes to NSF proposal preparation and processing guidelines will more clearly articulate the importance of broader impacts to NSF-funded projects.

The two National Science Board approved merit review criteria are listed below (see the [Grant Proposal Guide](#) Chapter III.A for further information). 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 he/she is qualified to make judgments.

#### **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.

## **B. Review Protocol and Associated Customer Service Standard**

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All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Proposals submitted in response to this announcement/solicitation will be reviewed by Ad Hoc and/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.

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 Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

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.

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

## **VII. AWARD ADMINISTRATION INFORMATION**

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### **A. Notification of the Award**

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Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division 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.A. for additional information on the review process.)

## B. Award Conditions

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An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (NSF-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 agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

\*These documents may be accessed electronically on NSF's Website at [http://www.nsf.gov/home/grants/grants\\_gac.htm](http://www.nsf.gov/home/grants/grants_gac.htm). Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from [pubs@nsf.gov](mailto:pubs@nsf.gov).

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at <http://www.nsf.gov/cgi-bin/getpub?gpm>. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is (202) 512-1800. The GPM may be ordered through the GPO Website at <http://www.gpo.gov>.

## C. Reporting Requirements

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For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for the PI and all Co-PIs. 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. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, 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.

## VIII. CONTACTS FOR ADDITIONAL INFORMATION

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General inquiries regarding this program should be made to:

- Phillip R. Taylor, Program Director, Directorate for Geosciences, Division of Ocean Sciences, 725 N, telephone: (703) 292-8582, fax: (703) 292-9085, email: [prtaylor@nsf.gov](mailto:prtaylor@nsf.gov)

For questions related to the use of FastLane, contact:

- Kandace S. Binkley, Associate Program Director, Directorate for Geosciences, Division of Ocean Sciences, 725 N, telephone: (703) 292-8583, fax: (703) 292-9085, email: [kbinkley@nsf.gov](mailto:kbinkley@nsf.gov)

## IX. OTHER PROGRAMS OF INTEREST

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The NSF *Guide to Programs* is a compilation of funding for research and education in science, mathematics, and engineering. The NSF *Guide to Programs* is available electronically at <http://www.nsf.gov/cgi-bin/getpub?gp>. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF *E-Bulletin*, which is updated daily on the NSF Website at <http://www.nsf.gov/home/ebulletin>, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's *Custom News Service* (<http://www.nsf.gov/home/cns/start.htm>) to be notified of new funding opportunities that become available.

## ABOUT THE NATIONAL SCIENCE FOUNDATION

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The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF, although some programs may have special requirements that limit eligibility.

*Facilitation Awards for Scientists and Engineers with Disabilities* (FASSED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the GPG Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

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>

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#### PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; 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 applicant 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 needing information as part of the review process or in order to coordinate programs; 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," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). 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 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 this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne Plimpton, Reports Clearance Officer, Division of Administrative Services, National Science Foundation, Arlington, VA 22230.

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