

U.S. GLOBEC - Global Ocean Ecosystems Dynamics: Synthesis in the Northwest Atlantic/Georges Bank Program and the Northeast Pacific/Coastal Gulf of Alaska Program

Program Solicitation

NSF 05-552



National Science Foundation
Directorate for Geosciences
Division of Ocean Sciences

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

May 09, 2005

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

U.S. GLOBEC - Global Ocean Ecosystems Dynamics: Synthesis in the Northwest Atlantic/Georges Bank Program and the Northeast Pacific/Coastal Gulf of Alaska Program

Synopsis of Program:

As part of a continuing series of solicitations for the U.S. Global Ocean Ecosystem Dynamics Program (U.S. GLOBEC), this solicitation covers two distinct regions - the Northwest Atlantic (NWA) and the Northeast Pacific (NEP). Proposals submitted to the NWA regions should continue synthesis of data from the NWA/Georges Bank projects and conduct comparative analysis of upstream and broader, basin-scale studies. Proposals submitted to the NEP regions should initiate synthesis of data from the Coastal Gulf of Alaska (CGOA) and conduct comparative analyses of the CGOA with the California Current System and other appropriate ocean regions.

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

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

- 47.050 --- Geosciences

Eligibility Information

- **Organization Limit:** Please see Section III. ELIGIBILITY INFORMATION for details.
- **PI Eligibility Limit:** None Specified.
- **Limit on Number of Proposals:** None Specified.

Award Information

- **Anticipated Type of Award:** Standard or Continuing Grant or Cooperative Agreement
- **Estimated Number of Awards:** 20 to 30 - with about 10-15 integrated, interdisciplinary projects for each region, some of which will be multi-organizational collaborative projects.

- **Anticipated Funding Amount:** \$8,000,000 pending the quality of proposals received and the availability of funds. Please see Section IV. AWARD INFORMATION for details on anticipated funding.

Proposal Preparation and Submission Instructions

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):
May 09, 2005

Proposal Review Information

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

Award Administration Information

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

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I. INTRODUCTION

The solicitation is being issued under the auspices of the U.S. Global Ocean Ecosystem Dynamics (U.S. GLOBEC) program within the NSF Division of Ocean Sciences, as well as the Regional Ecosystem Studies and U.S. GLOBEC initiatives of the National Oceanic and Atmospheric Administration's (NOAA) Center for Sponsored Coastal Ocean Research. NSF and NOAA have been in partnership in supporting the U.S. GLOBEC from its initiation.

The 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 animals (holozooplankton, fish and benthic invertebrates) respond to changes in the global climate. U.S. GLOBEC is also a 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). Specific goals of the U.S. GLOBEC 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 over a broad range of spatial and temporal scales; and (3) to improve the predictability and management of U.S. living marine resources. U.S. GLOBEC science and implementation plans and other reports are available at <http://www.usglobec.org/reports/reports.home.html#reports>.

U.S. GLOBEC is comprised of three regional programs: Northwest Atlantic (NWA), Northeast Pacific (NEP) and Southern Ocean. Data collection and process studies in each of the three regions have been funded through a series of previous solicitations. Publications resulting from these U.S. GLOBEC studies are catalogued at <http://www.usglobec.org/misc/funded.contributions.html>. The focus of the U.S. GLOBEC program is now on synthesizing the results from the field phase, both within and across the regional programs. For the NWA/Georges Bank program, a previous solicitation resulted in several data integration efforts and modeling studies, abstracts of which are available at <http://globec.whoi.edu/globec-dir/phase4doc/project-titles.html>. New awards will be made soon for synthesis of data and comparative analysis for the California Current System (CCS) subregion. An open solicitation for synthesis and modeling in the Southern Ocean Program is currently available at <http://www.nsf.gov/pubs/2005/nsf05516/nsf05516.htm>.

This solicitation pertains to two of the regional programs, NWA/Georges Bank and the NEP/Coastal Gulf of Alaska (CGOA) subregion. For both programs, synthesis and comparative analysis are the focus. No new field studies will be funded. This is a second stage of synthesis for the NWA program. The priority focus for this stage of the NWA program will be on basin-scale coupling or climate-related phenomena. This solicitation marks the beginning of synthesis for the NEP/CGOA program because field studies have recently ended. The two regional programs, their goals, and the research areas of particular interest are each discussed in detail in the Program Description Section below.

Electronic Data Access: The synthesis and comparative analysis opportunities described in this solicitation are open to scientists without past involvement in U.S. GLOBEC as well as those that have had funding through past GLOBEC activities. U.S. GLOBEC Data Policy requires that all data collected under the U.S. GLOBEC program and associated documentation be made available to all researchers. The U.S. GLOBEC Data Policy (U.S. GLOBEC Report 10) is available at <http://www.usglobec.org/reports/datapol/datapol.contents.html>. Data for all three U.S. GLOBEC regional programs is available at <http://globec.whoi.edu/jg/newdir>.

II. PROGRAM DESCRIPTION

Part I. The Northwest Atlantic (NWA) Regional Program

A. *Project Description - - U.S. GLOBEC NWA / Georges Bank Program*

The NWA regional program has progressed through three phases of field studies on Georges Bank and the surrounding continental margin and shelf, in the context of the larger oceanic boundary region with emphasis on the processes and phenomena that affect the ecosystem of the Bank. Each phase focused field studies on a particular physical process and the influence of that process on the bank's biology: Phase I - stratification, Phase II - source/retention/loss of water and organisms from the Bank, Phase III - cross frontal exchange. The coordinated field effort was in support of the overall goal of improving the predictability and management of U.S. marine resources through understanding of the NWA / Georges Bank ecosystem.

The purpose of Phase IV is to synthesize the results from the program's earlier phases. In 2001, proposals funded under Phase IVa initiated the overall synthesis effort resulting in several data integration efforts and modeling studies. This solicitation constitutes Phase IVb. The principle objectives of Phase IVb are to place the research findings of the Georges Bank program into the context of basin-scale phenomena in the North Atlantic, and to use that knowledge to predict the Georges Bank ecosystem response to future climate variability. PIs submitting proposals to this solicitation are encouraged to focus on synthetic activities, including conceptual and analytical modeling activities that capitalize on and integrate data and intermediate-stage syntheses from the prior solicitations as well as upstream and broader-scale studies including comparisons

with international and other U.S. GLOBEC study areas. The coordination of new principal investigators with existing U.S. GLOBEC Georges Bank Phase I-IV projects will be vital to the success of this broad synthesis effort. Team proposals emphasizing integration of observations and models are anticipated, although individual proposals are welcome.

B. *Research Program Goals – U.S. GLOBEC NWA / Georges Bank Program*

Within the overall U.S. GLOBEC goals, the NWA / Georges Bank Regional Program continues to have three specific goals:

1. To determine the processes that control the Georges Bank circulation and transport of biological, chemical, and geological materials in a strongly tidal and wind-driven system, and to determine how physical and biological processes control the population dynamics of the target organisms (early life stages of cod and haddock and the copepods *Calanus finmarchicus* and *Pseudocalanus* spp.) in the NWA / Georges Bank area.
2. To embody this understanding in conceptual and quantitative models capable of elucidating ecosystem dynamics and responses on a broad range of space and time scales.
3. To understand the effects of climate variability and climate change on the distribution, abundance and production of the target organisms.

The specific objectives and scientific questions related to these goals are described in greater detail in U.S. GLOBEC NWA Plan (Report No. 6). This report should be consulted when responding to this solicitation. It is available at <http://www.usglobec.org/reports/reports.home.html#6>.

C. *Research Approach – U.S. GLOBEC NWA / Georges Bank Program*

Phase IVb of the U.S. GLOBEC NWA / Georges Bank program will emphasize synthesis of the research findings of the Georges Bank program into the context of basin-scale phenomena in the North Atlantic and the use of that knowledge to investigate the Georges Bank ecosystem response to future climate variability. The intent is for coordinated activities that collectively address GLOBEC program goals. Although not exclusive, the following topics are of particular interest to the program at this time:

1. Physical / biological coupling.
 - a. Regional and Basin-Scale Effects Influenced by Climate Variability.

Studies that investigate the impacts of regional and basin-scale manifestations of climate variability on populations in the Northwest Atlantic Ocean are a high priority. Waters from the Labrador Sea and Gulf of St. Lawrence flow southwestward along the eastern Canadian slope and shelf, and can be traced downstream to the Middle Atlantic Bight. Thus, the planktonic populations located off eastern Canada are connected with those of the Gulf of Maine/Georges Bank region and points south through transports in the slope water and along the Scotian Shelf. Results from phases I to IVa have shown that these advective fluxes are important contributors to the dynamics of target species in the Gulf of Maine and on Georges Bank. Hydrographic changes observed in the Georges Bank/Gulf of Maine region are now known to be part of a larger-scale regional change likely associated with ocean basin-scale atmospheric forcing (e.g., the North Atlantic Oscillation).

At these regional to basin scales, it is possible to address the effects of climate variability as manifest through changes in the slope and shelf transports and water properties. For example, general circulation model products, as well as examination of the historic hydrographic record, could yield insight into the nature and magnitude of past or projected changes which could be imposed on simulations of the coupled physical/biological shelf system. Such research could be facilitated through the use of a nested series of coupled physical/biological models that link the basin-scale forcing to the local biological and physical dynamics, and through studies that foster the integration of target species data sets from other parts of the North Atlantic.

- b. Georges Bank/Gulf of Maine population dynamics.

The development and use of conceptual and quantitative models to investigate physical and coupled physical/biological processes in the Georges Bank ecosystem have been emphasized throughout the U.S. GLOBEC NWA / Georges Bank program. Three-dimensional circulation models have been used to study the influence of seasonal stratification and wind forcing on flow to and over the Bank using both idealized and realistic regional bathymetry and forcing. The roles of advection, turbulent mixing, nutrient supply, insolation, predation, and other factors on the early population development of the

target species need to be examined further using both continuous and individual-based models. Initial studies have involved both diagnostic and predictive models, and more recently included data assimilation to improve model accuracy and understanding of key processes. Further advancement of these and other modeling approaches is encouraged, with particular emphasis on coupling the lower and upper trophic level models of the Georges Bank ecosystem. Ideally, a product of synthesis will be quantitative coupled physical/biological ecosystem models that embody the collective knowledge learned in the Georges Bank program. Such models can then be used to investigate the Bank ecosystem response to future climate variability. Higher priority will be given to 'bank-scale' models that are explicitly linked to larger-scale phenomena.

2. Integrative analysis of the US GLOBEC Programs

Synthesis and interpretation of information derived from the NWA / Georges Bank program will be greatly strengthened by integration and comparison with results for the target species derived from other programs in the North Atlantic (e.g., GLOBEC Canada, TASC, Mare Cognitum). As the synthesis phases of other regional U.S. GLOBEC programs mature, contrasts among the NWA / Georges Bank, NEP, and Southern Ocean programs will be of increasing importance. For instance, understanding how transport processes provide a connection between regional, local, and small scales and how they affect the dynamics of target species should be addressed. Understanding the functioning of the systems will allow for the design of projects to explore commonalities and differences in these systems including circulation patterns and dynamics of target populations. Proposals are encouraged that initiate the process of synthesis and intercomparison of results from NWA / Georges Bank with other Atlantic Basin scale programs and other U.S. GLOBEC programs as appropriate. A separate solicitation for Pan-Regional Synthesis projects will be released in the future.

3. Development of applications for ecosystem-based management

A more complete understanding of the Georges Bank ecosystem gained through the U.S. GLOBEC Program should allow for the design of more efficient and informative ecosystem stewardship programs. Achieving this goal will involve utilizing observational and model results that best characterize status and change in the ecosystem. An important goal is to identify the interaction between human and natural effects on population variability of valuable marine resources in this region. Retrospective projects conducted by collaborating scientists and managers that utilize indices and model information to address questions related to ecosystem stewardship are encouraged.

Part II. The Northeast Pacific (NEP) Regional Program

A. *Project Description – U.S. GLOBEC NEP/ CGOA Program*

The NEP regional program has two subregions, the California Current System (CCS) and the Coastal Gulf of Alaska (CGOA). Thus far, the NEP program has consisted of regionally combined modeling, retrospective and pilot field studies (Phase I) and separate subregional field and model studies (Phase II). These studies have resulted in substantial new data sets and understanding of the physical-chemical-biological interactions in shelf, slope and adjacent deep-ocean habitats in the NEP. Synthesis in the CCS was initiated with a prior solicitation (Phase IIIa ([NSF 04-544](#))).

This solicitation constitutes the initiation of a Phase IIIb to conduct synthesis of the CGOA subregion and comparative analysis with the CCS and other appropriate areas. The objective of Phase IIIb is to foster integration and synthesis of data collected during the field phases of the CGOA program and other relevant data and knowledge (including comparison to results of CCS studies and other regions, satellite data, and retrospective data sets) through group interactions and modeling activities. Anticipated products of the NEP 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 (Phase IIIb) 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 solicitation should focus on achieving these products.

B. *Research Program Goals– U.S. GLOBEC NEP/ CGOA Program*

Within the overall U.S. GLOBEC goals, 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 CGOA, and variability related to climate change, impact zooplankton biomass, production, distribution, and the retention and loss of zooplankton from coastal regions. There is a particular emphasis on the euphausiids *Euphausia* spp. and *Thysanoessa* spp. and calanoid copepods *Calanus* spp. and *Neocalanus* spp., and how these, in turn, influence the distributions of higher trophic levels, such as forage fish, pink salmon, and marine birds and mammals.
3. To quantify the impacts of key coastal physical and biological processes, including (i) freshwater runoff and its strong impacts on the strength and stratification of the nearshore region (Alaska Coastal Current), (ii) primary and secondary production, (iii) cross-shelf transport of nutrients and plankton associated with synoptic storms, intermittent upwelling, flow-topography interactions, (iv) shelf-slope eddies that alter hydrographic structure and onshore-offshore exchanges of nutrients and biota, and (v) variability in the timing and spatial aspects, and of the size-structure and composition, of the spring bloom food web in controlling juvenile salmon growth and survival in the coastal zone of the CGOA.
4. To determine the extent to which high and variable mortality of juvenile pink salmon in the coastal region of the Northern Gulf of Alaska 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 Niño-La Niña cycles and regime shifts) on similar marine animal populations (copepods, euphausiids, salmon) of the CCS and CGOA.

The specific objectives and scientific questions related to these goals are described in greater detail in the U.S. GLOBEC NEP Implementation Plan (Report No. 17). This report should be consulted in responding to this solicitation. It is available at <http://www.usglobec.org/reports/reports.home.html#17>.

C. Research Approach— U.S. GLOBEC NEP/ CGOA Program

This phase of the U.S. GLOBEC NEP program will emphasize synthesis within the CGOA and the NEP and U.S. GLOBEC overall. The intent is for coordinated activities that collectively address the program goals. Although not meant to be exhaustive, examples of appropriate topics to be considered are described below. It is anticipated that proposed work may address more than one of these or other topic areas.

1. Synthesis of Data Sets:

A fundamental goal is to understand the physical and biological processes that regulate the abundance and distribution of key target species (calanoid copepods, euphausiids, juvenile salmon, salmon forage). Of particular importance are the environmental influences during the spring-fall, when juvenile pink 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 do winter physical and chemical conditions (e.g., nutrient replenishment on the shelf, mixing) impact subsequent biological rates/processes in the spring and summer? What are the important mechanisms replenishing the nutrients into the nearshore CGOA ecosystem that fuel the primary and secondary production on the shelf? How often and where do planktonic populations and salmon encounter retentive regions near or on the shelf? How important are topographic-flow interactions in producing or maintaining highly productive and predictable regions that favor secondary production and salmon growth and survival? How important is the intermittent and weak summertime upwelling in establishing productive regions nearshore for juvenile salmon? Eddies can be significant in forcing cross-shelf exchanges of nutrient and plankton; how regular is this mechanism and what is its relative importance in stimulating shelf productivity? What are the dominant pathways of energy flow through the system and how do they vary in space and time? How does interannual and long-term environmental variability impact this ecosystem? 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. Data from multiple disciplines need to be integrated to enable interannual comparisons of population processes and their coupling to the physical structure and variability of the environment. Integration of data sets from the long-term observation program (LTOP), process and survey components of the program, remote sensing data, retrospective data sets, and modeling analyses are critical in the development of multidisciplinary synthesis research efforts.

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 NEP program. Circulation models have been used to explore the influence of wind forcing on alongshore and cross-shelf flow using realistic

regional bathymetry and forcing. Ecosystem models have been developed to examine the specific contributions of multiple zooplankton grazers (micro, meso, and macro) to energy transfer from lower trophic levels to higher levels. These studies have mostly involved hindcast models. In Phase IIIb, these and other modeling 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 CGOA; (b) to understand how episodic events (eddies, onshore intrusions), climate variability and potential longer-term changes (e.g., regime shifts) modify these processes; (c) to help integrate and synthesize the various physical, chemical 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:

Long-term changes in ocean basin-scale atmospheric forcings have had well documented impacts on physical structure and biological populations in both coastal and oceanic regions of the northeast Pacific Ocean. A well documented regime shift occurred in 1976-77 and another may have occurred in 1998, fortuitously during the U.S. GLOBEC investigations. The ecosystem signal of the more recent shift, e.g., changes in plankton abundance and salmon survival, are more clear in the CCS than in the CGOA. However, it is not clear what, if any, impacts have occurred on the CGOA marine ecosystem have occurred as a result of the post-1997 changes in atmospheric forcing. Significantly, the variability in basin-wide SST patterns since 1990 indicate a dominance of a new atmospheric forcing pattern and SST response oriented differently (more N-S than E-W; 2nd EOF of SST referred to as the Victoria Pattern) than the PDO pattern (1st EOF of SST). It appears that shifts in the Victoria pattern may have larger impacts on conditions and productivity in the CCS than in the CGOA, but more analysis of the U.S. GLOBEC data sets from both regions are needed.

This phase of investigation will provide an opportunity for evaluation of large-scale environmental influences. Integration and synthesis of data sets from throughout the NEP (including both U.S. 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 U.S. 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. This solicitation also encourages comparative studies of broader nature, including other GLOBEC regions and non-GLOBEC funded studies in similar shelf systems elsewhere, where they increase our understanding of ecosystem response to changing conditions in the CGOA. Comparative studies could 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. Comparative studies could 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 CGOA to other regions, it is critical that the proposals clearly identify the processes and characteristics of the CGOA that will be better understood through generalizations to and/or contrasts with the other systems. By encouraging proposals that reach beyond the CGOA, this solicitation does not downplay the value of studies that integrate the data sets, models and understanding gained entirely within the CGOA. These have high priority, since in many cases they are necessary before broader comparisons can be attempted.

4. Development of metrics to characterize environmental and ecosystem status and change.

A more complete understanding of the NEP/CGOA ecosystem gained through the U.S. GLOBEC program should allow for the design of more efficient and more informative monitoring programs in the region. Achieving this improvement will involve determining indices (sets of key parameters) 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 environmental influences on living marine resource variability (e.g., salmon) and protected species (e.g., marine mammals) that can be incorporated into the assessment of the status of these resources and populations 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 CGOA ecosystem during the U.S. GLOBEC years, including potential indices that characterize the state of the ecosystem. The North Pacific Marine Science Organization (PICES) has recently completed an assessment of the status of North Pacific Marine Ecosystems (http://www.pices.int/publications/ecos_status/default.aspx) that might provide guidance for future metrics that characterize ecosystem conditions.

Organization Limit: Proposals will be accepted from U.S. universities and colleges, U.S. non-profit, non-academic organizations, and for-profit organizations. Foreign organizations are not eligible for funding through this solicitation.

Proposals may be submitted by organizations in support of individual investigators or small groups. Synergistic collaboration among researchers and collaboration or partnerships with industry or government laboratories is encouraged when appropriate. Group and collaborative proposals involving more than one organization must be submitted as a single administrative package from one of the organizations involved.

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 through 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. 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, 603-862-4680).

Due to the limited availability of funds, prospective proposers are strongly urged to contact one of the program officer(s) listed in Section VIII of this solicitation.

PI Eligibility Limit: None specified.

Limit on Number of Proposals: None specified.

IV. AWARD INFORMATION

NOAA and NSF will each be contributing up to \$4 million for a total budget of \$8 million. 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 to 30 pending the quality of proposals received and the availability of funds. This consists of \$2 million for projects in the NWA/Georges Bank region, with durations of about 2 years; and \$6 million for projects in the NEP/CGOA region, with durations of about 3 years. Awards for both types of projects are anticipated to be \$100,000 to \$500,000 per year, but the funding provided for each award will not necessarily be the same amount each year.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

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.

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

Proposal titles should include the prefix "**U.S.-GLOBEC: NWA Georges Bank**" or "**U.S.-GLOBEC: NEP Phase IIIb-CGOA**" 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 by the following via email:

Excel spreadsheet of 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 single comprehensive listing of 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 one of the following categories: (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).

The conflicts list should be in an excel spreadsheet with the following columns:

- Column 1 - identify the researcher
- Column 2 - identify the researcher's organization
- Column 3 - identify the person with whom the researcher has the conflict
- Column 4 - identify the conflict's organization
- Column 5 - identify the nature of the conflict (collaborative, Ph.D. Advisor, Ph.D. Advisee, etc.).

This conflict list must be provided to the Program via email (biooce@nsf.gov) by the proposal deadline.

Proposers are reminded to identify the program announcement/solicitation number (05-552) 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

Cost Sharing:

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

C. Due Dates

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

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

May 09, 2005

D. FastLane Requirements

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: <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 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

A. NSF Proposal Review Process

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

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 proposers whether their proposals have been declined or recommended for funding within six months. The time interval begins on the closing date of an announcement/solicitation, or the date of proposal receipt, whichever is later. 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

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 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

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. 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 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

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

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

For questions related to the use of FastLane, contact:

- Brian Midson, Assistant Program Director, Directorate for Geosciences, Division of Ocean Sciences, 725 N, telephone: (703) 292-8580, fax: (703) 292-9085, email: bmidson@nsf.gov

IX. OTHER PROGRAMS OF INTEREST

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

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 (FASED) 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>

- **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; 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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