

Navigating the New Arctic (NNA)

PROGRAM SOLICITATION

NSF 20-514

REPLACES DOCUMENT(S):

NSF 19-511



National Science Foundation

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

February 11, 2020

IMPORTANT INFORMATION AND REVISION NOTES

This solicitation has several significant revisions:

- NNA's major goals have been revised and expanded.
- The research foci for Track 1 have been revised and expanded.
- Guidance for Track 2 proposals has been simplified and clarified.
- The solicitation includes a new section entitled "Special Considerations for Collaborations with Arctic Communities in NNA Proposals" that provides additional guidance related to co-production of knowledge, community engagement, and guidelines for NNA research sites near Arctic residents.
- The deadline date has been changed to February 11, 2020.
- There is a new limit of three (3) proposals that include any one individual as PI, co-PI, or Senior Personnel.
- The section on Budget Preparation Instructions give more explicit guidance on budgeting for participation in the NNA PI meetings.
- The Additional Solicitation-specific Review Criteria have been refined.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 19-1).

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Navigating the New Arctic (NNA)

Synopsis of Program:

In 2016, the National Science Foundation (NSF) unveiled a set of "[Big Ideas](#)," 10 bold, long-term research and process ideas that identify areas for future investment at the frontiers of science and engineering. The Big Ideas represent unique opportunities to position our Nation at the cutting edge of global science and engineering leadership by bringing together diverse disciplinary perspectives to support convergence research. As such, when responding to this solicitation, even though proposals must be submitted to the Directorate for Geosciences, once received, the proposals will be managed by a cross-Directorate team of NSF Program Directors.

Arctic temperatures are warming faster than nearly everywhere else on Earth, with some models predicting that continued warming could produce an ice-free Arctic Ocean by mid-century. The rapid and wide-scale changes occurring in response to this warming portend new opportunities and unprecedented risks to natural systems; social and cultural systems; economic, political and legal systems; and built environments of the Arctic and across the globe. Gaps in scientific observations and the prevalence of interdependent social, natural, and built systems in the Arctic make it challenging to predict the region's future. Understanding and adapting to a changing Arctic will require creative new directions for Arctic-related research, education, workforce development, and leveraging of science, engineering, and technology advances from outside the Arctic.

Navigating the New Arctic (NNA), one of NSF's 10 Big Ideas, embodies the Foundation's forward-looking response to these profound challenges and opportunities. NNA seeks innovations in fundamental convergence research across the social, natural, environmental, and computing and information sciences, and engineering that address the interactions or connections between natural and built environments and social systems and how these connections inform our understanding of Arctic change and its local and global effects. NNA promotes initiatives

that empower new research communities, diversify the next generation of Arctic researchers, integrate the co-production of knowledge, and engage partnerships, particularly among international stakeholders. NNA also strongly encourages projects with components that advance science, technology, engineering, and mathematics (STEM) education; public understanding of the changing Arctic to benefit both citizens and policy makers; and workforce development objectives. NSF recognizes the inherently international nature of the Arctic region, and that impacts of Arctic changes span geographic and political boundaries, and encourages proposals that include significant international components.

Major goals of NSF's NNA Big Idea include:

- Improved understanding of Arctic change and its local and global effects that capitalize on innovative and optimized observation infrastructure, advances in understanding of fundamental processes, and new approaches to modeling interactions among the natural environment, built environment, and social systems.
- New and enhanced research communities that are diverse, integrative, and well-positioned to carry out productive research on the interactions or connections between natural and built environments and social systems and how these connections inform our understanding of Arctic change and its local and global effects.
- Research outcomes that inform national security, economic development, and societal well-being, and enable resilient and sustainable Arctic communities.
- Enhanced efforts in formal and informal education that focus on the social, built, and natural impacts of Arctic change on multiple scales and broadly disseminate research outcomes.

This solicitation requests proposals that fall within two tracks. Track 1 supports research activities, while Track 2 is dedicated to planning grants to develop convergence research teams to tackle projects of larger scope in the future. This solicitation is the second of what is envisioned to be at least a five-year agency-wide program to support the research and dissemination of new knowledge needed to inform the economy, security, and resilience of the Nation, the larger Arctic region, and the globe with respect to Arctic change. NSF anticipates that future calls will further define "larger scope," with the potential to include projects up to the scale of centers and/or consortia.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- NNA Working Group, telephone: (703) 292-8030, email: nna@nsf.gov

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

- 47.041 --- Engineering
- 47.049 --- Mathematical and Physical Sciences
- 47.050 --- Geosciences
- 47.070 --- Computer and Information Science and Engineering
- 47.074 --- Biological Sciences
- 47.075 --- Social Behavioral and Economic Sciences
- 47.076 --- Education and Human Resources
- 47.079 --- Office of International Science and Engineering
- 47.083 --- Office of Integrative Activities (OIA)

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 25

The number of awards in both tracks is dependent upon the availability of funds; the number of proposals received; and the degree to which proposals meet the solicitation goals, NSF merit review criteria, and solicitation-specific review criteria.

Anticipated Funding Amount: \$30,000,000

This solicitation will consider proposals for two sizes of projects:

- Track 1: Research Grants with a budget of no more than \$3,000,000 and a maximum duration of 5 years.
- Track 2: Planning Grants with a total budget of no more than \$250,000 and a maximum duration of 24 months.

In both cases, project durations and budgets must be commensurate with the scope of the work proposed, and with guidance provided elsewhere in this solicitation regarding anticipated program resources. NSF anticipates a portfolio of awards with a range of budgets and durations up to these maxima.

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

Eligibility Information

Who May Submit Proposals:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the *NSF Proposal & Award Policies & Procedures Guide (PAPPG)*, Chapter I.E. Unaffiliated individuals are not eligible to submit proposals in response to this solicitation.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or Co-PI: 3

Individuals may participate as PI, co-PI, or Senior Personnel on at most three (3) proposals in response to this solicitation. Individuals may participate simultaneously in submissions for Track 1 and Track 2 of this solicitation, as long as the total number of submissions involving any one individual does not exceed three (3).

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

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

B. Budgetary Information

- **Cost Sharing Requirements:**

Inclusion of voluntary committed cost sharing is prohibited.
- **Indirect Cost (F&A) Limitations:**

Not Applicable
- **Other Budgetary Limitations:**

Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

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

February 11, 2020

Proposal Review Information Criteria

Merit Review Criteria:

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

Award Administration Information

Award Conditions:

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

Reporting Requirements:

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

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I. INTRODUCTION

Navigating the New Arctic (NNA), one of NSF's 10 Big Ideas, embodies the Foundation's forward-looking response to the profound challenges detailed in the Synopsis above. NNA addresses convergent scientific, engineering, and educational challenges in, and related to, the rapidly changing Arctic. The solutions to these challenges are needed to understand and forecast environmental change; advance economic prosperity; promote human and ecological health; and preserve security for the United States, the circumpolar Arctic region, and the globe.

NNA encourages proposals for projects that leverage partnerships to address fundamental science issues of societal importance and disseminate their results. These may include projects with stakeholders such as state and local governments, other nations and international groups with interests in the Arctic, the private sector, STEM educators and students, and community members. Given the extensive Indigenous presence in the Arctic and the broad local and traditional knowledge Indigenous people have regarding the changing Arctic, NSF encourages direct collaboration with Indigenous residents and local institutions and organizations at all project stages, as appropriate.

NNA strongly encourages projects with components that advance STEM education, public understanding of the changing Arctic to benefit both citizens and policy makers, and workforce development objectives. These efforts may include strengthening STEM education in northern communities specifically and the rest of the nation generally and developing the next generation of Arctic-related researchers. NSF also recognizes the inherently international nature of the Arctic region, and that impacts of Arctic changes span geographic and political boundaries, and encourages proposals that include significant international components.

Major goals of NSF's NNA Big Idea include:

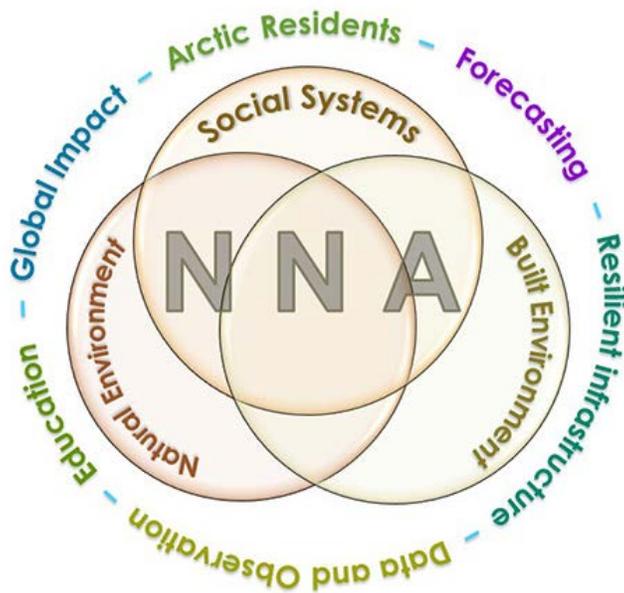
- Improved understanding of Arctic change and its local and global effects that capitalize on innovative and optimized observation infrastructure, advances in understanding of fundamental processes, and new approaches to modeling interactions among the natural environment, built environment, and social systems.
- New and enhanced research communities that are diverse, integrative, and well-positioned to carry out productive research on the interactions or connections between natural and built environments and social systems and how these connections inform our understanding of Arctic change and its local and global effects.
- Research outcomes that inform national security, economic development, and societal well-being, and enable resilient and sustainable Arctic communities.
- Enhanced efforts in formal and informal education that focus on the social, built, and natural impacts of Arctic change on multiple scales and broadly disseminate research outcomes.

This solicitation is the second of what is envisioned to be at least a five-year agency-wide program to support the research and dissemination of new knowledge needed to inform the economy, security, and resilience of the Nation, the larger Arctic region, and the globe with respect to Arctic change. This solicitation calls for fundamental convergence research across the social, natural, environmental, and computing and information sciences, and engineering.

II. PROGRAM DESCRIPTION

This NNA solicitation requests proposals that fall within two proposal submission tracks: Track 1 (Research Grants) and Track 2 (Planning Grants).

All NNA proposals must address questions on the interactions or connections between two or more of the following: the natural environment, the built environment, and social systems. To successfully address such questions, proposals are expected to be [convergent in nature as defined by NSF](#). The most competitive proposals will include expertise from multiple traditionally distinct and independent science and engineering disciplines.



Track 1 – Research Grants

Under Track 1, this solicitation calls for far-reaching, creative proposals for fundamental research that tackles convergent scientific and engineering challenges related to the rapidly changing Arctic. The solutions to these challenges are needed to understand, forecast, and respond to environmental changes; advance economic prosperity; promote human health and well-being; sustain ecological function; and preserve the security of the United States, the circumpolar Arctic region, and the globe. Proposals must have a strong connection to real-world needs of the changing Arctic or its global impact with clear evidence of appropriate expertise within the investigative team.

Proposals must address a question or questions on the interactions or connections between at least two of the following: the natural environment, the built environment, and social systems. Proposals must also address at least one of the following six research focus areas listed in alphabetical order (see FAQs for more detailed guidance on each area):

- **Arctic Residents.** Convergence research approaches to understand the complex relationship between Arctic residents and their natural and cultural landscape. Studies are needed to better understand how social, economic, and governance systems interact with infrastructure and how environmental and biophysical changes in the Arctic impact these interactions.
- **Data and Observation.** Innovations in interoperable national and international Arctic observational networks, instruments, sensing and sensor-networking technologies; shared and open data collections; and/or intelligent data management, analysis, and/or modeling efforts that address NNA goals. Engaging local and global communities in the design and deployment of these new technologies and observational networks is strongly encouraged.
- **Education.** Research on the effectiveness of formal and informal education activities; on methods and impact of dissemination of STEM research results; and on formation of collaborations for convergence research in the new Arctic. Studies are also needed on diverse methods to create an informed public, which is critical to the development of national policies and priorities.
- **Forecasting.** Studies to understand and forecast interdependent changes in the biogeochemical, geophysical, biological, ecological, institutional, and social processes occurring in the new Arctic, including, when appropriate, global feedbacks. The dramatic expansion of information and emergence of novel simulation techniques provides an exciting opportunity for the science community to understand present conditions and model possible futures to which we must respond.
- **Global Impact.** Understanding and forecasting global influences, consequences, and opportunities arising from a changing Arctic. Studies are needed to help researchers understand how biophysical and other changes in the Arctic link to environmental, social, geopolitical, and economic realities in the rest of the world.
- **Resilient Infrastructure.** Studies enabling fundamental science and engineering research in forward-looking, sustainable, adaptable, and resilient infrastructure to meet current and future challenges of a changing Arctic. Infrastructure must be capable of withstanding extreme and variable temperatures in Arctic marine, freshwater, soil, and sediment environments, as well as adapt to ongoing changes in the atmospheric, cryospheric, marine, terrestrial, and institutional systems.

Track 2 – Planning Grants

Under Track 2, this solicitation calls for proposals to support planning activities leading to convergence research team formation and capacity-building within the research community to address the important challenges of the changing Arctic, its global impact, and advancing Arctic science and engineering through education. Planning grants are also intended to help with the development of convergence research teams to tackle projects of larger scope in the future. One is not required to submit a planning grant proposal to participate in future NNA competitions.

NNA Planning Grant proposals should show clear potential to develop novel, leading edge research ideas and approaches that integrate at least two of the following: the natural, social, and built environments. These projects should address important societal challenges, build significant educational opportunities, and/or engage internationally and with local and Indigenous communities when appropriate. This may include support to conduct organizational planning meetings, facilitate team formation, foster stakeholder community networks, and conduct needs assessments, among others.

NSF particularly encourages Track 2 proposals that reflect integrative, multidisciplinary research; tangible research capacity-building; meaningful community engagement; and efforts to advance education. Proposals must present a strategy for crystallizing the research questions for a future high-impact project that

can contribute to the goals of NSF's NNA Big Idea. Planning grants are not meant to support actual research activities themselves.

Special Considerations for Collaborations with Arctic Communities in NNA Proposals

Given the deep knowledge held by local and Indigenous residents in the Arctic, NSF recognizes that scientists and Arctic residents will want to collaborate on NNA projects, and encourages these collaborations. NSF recognizes that these collaborations will take a variety of forms based on the nature of the scientific projects, needs and capacity of community members and organizations, and the intensity of planned collaboration. The following outlines and defines some (but not all) forms of engagement:

NNA Research Sites Near Arctic Residents. Proposers preparing projects working near, or impacting, Arctic communities are strongly encouraged to discuss the proposed work with those communities while the project is being developed. In accordance with the Interagency Arctic Research Policy Committee (IARPC) [Principles for Conducting Research in the Arctic](#), researchers should coordinate their field activities with nearby communities and are expected to share results with the community following each field season and/or at the end of the project. Investigators should include travel funds for this in their proposal budget. Some projects may require consultation with tribal or subsistence co-management organizations. Time for consultation should be included in the project schedule and travel and salary funds for these consultations should be included in the proposal budget. The Arctic Research Support and Logistics (RSL) program may also support requests to visit communities on an ad hoc basis to support communication with local communities. Please contact the RSL Program Directors for information about these opportunities.

Community engagement and outreach are important components of both integrative research and research capacity-building. Here, community engagement refers to substantive interaction with community partner organizations and anchor institutions such as governments, federal and state agencies, schools, libraries, health and social service providers, tribal and Indigenous-serving organizations, non-profits, cultural organizations, and businesses. In accordance with the IARPC [Principles for Conducting Research in the Arctic](#), investigators and community partners are encouraged to work closely to develop and evaluate creative approaches to achieving meaningful engagement for mutual benefit. Co-production of knowledge does not fall under this category for the purposes of NNA.

Co-production of Knowledge. Knowledge co-production with Arctic Indigenous communities is encouraged only when appropriate and must be strongly justified and supported in the proposal text and project budget. NSF identifies co-production of knowledge as the integration of different knowledge systems and methodologies to systematically understand the phenomena, systems, and processes being studied in a research project. In the Arctic, this often takes the form of Indigenous Knowledge holders and scientists working closely together to address shared research questions, pursue shared methodologies, and agree upon appropriate outreach and data sharing activities. A co-produced approach includes research in which local and Indigenous peoples and organizations fully engage in the complete research process from the development of research questions, to the collection, use and stewardship of data, and interpretation and application of results. Given the diversity of peoples, worldviews, ideas, approaches, and methodologies in the Arctic, the co-production of knowledge in NNA projects will take various forms, and the proposed plan of a co-produced approach should be well justified in the Management and Integration Plan. A substantive suite of resources regarding best practices in co-produced research with Indigenous partners has been collected by IARPC and can be found at <https://www.iarpcollaborations.org/members/updates/15239>. If intending to pursue knowledge co-production, community engagement must begin well in advance of proposal submission, and PIs are recommended to put into practice the IARPC [Principles for Conducting Research in the Arctic](#).

III. AWARD INFORMATION

This solicitation will consider proposals for two sizes of projects:

- Track 1: Research Grants with a budget of no more than \$3,000,000 and a maximum duration of 5 years.
- Track 2: Planning Grants with a total budget of no more than \$250,000 and a maximum duration of 24 months.

In both cases, project durations and budgets must be commensurate with the scope of the work proposed, and with guidance provided elsewhere in this solicitation regarding anticipated program resources. NSF anticipates a portfolio of awards with a range of budgets and durations up to these maxima.

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

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), Chapter I.E. Unaffiliated individuals are not eligible to submit proposals in response to this solicitation.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or Co-PI: 3

Individuals may participate as PI, co-PI, or Senior Personnel on at most three (3) proposals in response to this solicitation. Individuals may participate simultaneously in submissions for Track 1 and Track 2 of this solicitation, as long as the total number of submissions involving any one individual does not exceed three (3).

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

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

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.
- Full Proposals submitted via Research.gov: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal and Award Policies and Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov. The Prepare New Proposal setup will prompt you for the program solicitation number.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the *NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov*. The complete text of the *NSF Grants.gov Application Guide* is available on the Grants.gov website and on the NSF website at: (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

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

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. PAPPG Chapter II.D.3 provides additional information on collaborative proposals.

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

Special instructions for submitting to this Big Idea solicitation

FastLane Users: Proposers are reminded to identify the program solicitation number (located on the first page of this document) in the first block on the NSF Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Please note that even though proposals must be submitted to the Directorate for Geosciences, once received, the proposals will be managed by a cross-disciplinary team of NSF Program Directors.

Research.gov Users: The Prepare New Proposal setup will prompt you for the program solicitation number (located on the first page of this document). Compliance with this requirement is critical to determining the relevant proposal processing guidelines. As stated previously, even though proposals must be submitted to the Directorate for Geosciences, once received, the proposals will be managed by a cross-disciplinary team of NSF Program Directors.

Grants.gov Users: The program solicitation number will be pre-populated by Grants.gov on the NSF Grant Application Cover Page; however, you will need to locate the Division Code, Program Code, Division Name, and Program Name for the specific solicitation you are applying to by visiting the [Fastlane web site](#). As stated previously, even though proposals must be submitted to the Directorate for Geosciences, once received, the proposals will be managed by a cross-disciplinary team of NSF Program Directors.

Additional Guidance on Proposal Submission

Cover Sheet

Proposal Title: The title of the proposal must begin with "NNA Track 1:" or "NNA Track 2:". For submission of a collaborative proposal from multiple organizations, the title must begin with "Collaborative Research: NNA Track 1" or "Collaborative Research: NNA Track 2".

The rest of the title of the proposal should describe the project in concise, informative language so that a technically literate reader can understand what the project is about. The title should emphasize the research and/or training work to be undertaken and be suitable for use in public fora.

Personnel Listed on the Cover Sheet: Provide complete information requested on the Cover Sheet for the PI and up to four co-PIs.

Project Description:

Project Descriptions are limited to 15 pages in length.

In addition to the requirements of the PAPPG, the Project Description must fully describe the relevance of the project to the goals of NSF's NNA Big Idea, and:

- For Track 1 proposals, the Project Description must frame the proposed research in terms of the potential contribution toward addressing a question or questions on the interactions or connections between at least two of the following: the natural environment, the built environment, and social systems.
- For Track 2 proposals, the Project Description should clearly describe (1) the activities that will take place during the planning period and how they will integrate across at least two of the following: the natural environment, built environment, and social systems; (2) the organizations and departments that will be (or will likely be) partners in the project; and (3) the core team members or administrators who will manage the project.

Supplementary Documents:

Supplementary documents are limited to the specific types of documents listed in the PAPPG, with the following exception:

Management and Integration Plan: A Management and Integration Plan up to four (4) pages in length is required for all proposals. The Management and Integration Plan should: a) list all PIs, co-PIs, and Senior Personnel on the project; b) describe how the group effort will be coordinated; c) describe how the disciplinary components will be integrated; and d) describe collaborations and partnerships and their integration with the project. Information must also be provided on who from the research team will be responsible for the execution of the tasks described in the management and integration plan. A clear timeline of expected outcomes should be included.

The Management and Integration Plan must begin with a section entitled "Convergence Statement" that explicitly answers the following questions:

- Which of the three components (the natural environment, the built environment, and social systems) are connected in the proposed project goals?
- For Track 1 projects *only*: Which of the six focus areas listed above does the project address?
- Is co-production of knowledge part of the proposed project's methodology? (Note that co-production is encouraged only when appropriate.)
- Are there education and workforce development components?
- If applicable, what is the nature of international collaborations, and what is the justification for funding to a foreign organization, including subaward or consultant arrangement?

Letters of Collaboration: The Project Description must fully detail any substantial collaborations and engagements (included or not included in the budget) with partner organizations. Letters of Collaboration should be provided in the Supplementary Documents section of the proposal and follow the format instructions specified in the NSF PAPPG.

NSF recognizes that community-based organizations may need to explain in more detail how the proposed collaboration will meet their needs and goals, particularly with relation to the cultural and social aspects of the communities they represent. Therefore, letters of collaboration from community-based organizations may deviate from the PAPPG-specified format as needed to document the unique nature of the collaboration. "Community-based organizations" include those that primarily represent, research, and/or lead Indigenous and non-Indigenous residents of the Arctic and beyond. These can include, but are not limited to, tribal colleges and councils, local and international Indigenous organizations, and non-profit organizations. These do not include universities or major research facilities.

Data Management Plan: All NNA proposals must include a Data Management Plan that describes how the project will provide open and rapid access to quality-controlled and fully documented data and information during and after the project. This plan must be included as a Supplementary Document and be consistent with [NSF's policy on dissemination and sharing of research results](#) and NSF's PAPPG. The Data Management Plan must specifically discuss how the investigators will achieve the following data archiving and reporting requirements:

For all NNA projects, metadata files, full data sets, and derived data products must be deposited in a long-lived and publicly accessible archive within two years of collection, or by the end of the award, whichever comes first. In addition, a description of metadata, full data sets, and derived data products, and information describing how to access them, must be submitted to the [NSF Arctic Data Center](#) within the same time frame.

Exceptions to the above data reporting requirements may be granted for social science data and Indigenous Knowledge, where privacy or intellectual property rights might take precedence. Any such exception must be requested as part of the Data Management Plan.

Any limitations on access to metadata, full data sets, and/or derived data products for NNA projects that extend beyond the time limits given above must be based on compelling justification and documented in the Data Management Plan. Any such limitation on access that arises following award requires prior NSF approval with documentation in NSF's internal systems.

Proposals Involving Arctic Fieldwork or Ship Time

Proposals involving fieldwork in the Arctic must describe the field activities in the body of the proposal and include a schedule of proposed work. Logistics costs may be included directly in the proposal budget if the proposer plans to make the logistics arrangements. Alternatively, investigators may utilize third-party logistics providers paid for directly by the NSF Arctic Research Support and Logistics program (RSL). Investigators requesting third-party field support or services must include in the proposal a 1-2 page Supplementary Document describing the scope and cost estimate for support. Please allow service providers 4-6 weeks to prepare Supplementary Document information for the proposal by initiating the request far in advance of proposal submission. All proposals will be evaluated for total logistics costs and feasibility prior to funding, regardless of whether the logistics costs are in the proposal budget or provided directly by NSF to a third-party provider. The scope and cost estimate must include the demobilization or property transfer of instrumentation or infrastructure deployed to support the project.

Proposals requesting support for fieldwork should expect to go to the field no sooner than 12-18 months after proposal submission to allow time to plan, budget, and complete environmental compliance documentation. Per the NSF PAPPG, awardees are responsible for acquiring and complying with permits necessary for their work and are responsible for all activities conducted under the award. NSF is not responsible for costs associated with medical evacuations or other interruptions to scheduled fieldwork and reserves the right to seek reimbursement for costs incurred. Proposers should ensure all members of the field team are covered by organizational medical evacuation insurance or request funds to purchase medical evacuation insurance, which is an allowable grant cost.

NSF's prime contractor for Arctic field research support is CH2M HILL Polar Services (CPS; <http://cpspolar.com>). For assistance from CPS in planning field support, email planning@polarfield.com. The CPS website (<http://cpspolar.com>) provides more information on services available for researchers. Additional field support and service contractors include UNAVCO (<http://www.unavco.org>) for geodesy, the Incorporated Research Institutions for Seismology (IRIS; <https://www.iris.edu>) for seismology, the U.S. Ice Drilling Program (IDPO/IDDO; <https://icedrill.org/>) for ice core drilling and drill development, the National Science Foundation Ice Core Facility (NSF-ICF; <https://icecores.org/>) for ice core archival and storage, and the Polar Geospatial Center (PGC; <https://www.pgc.umn.edu/>) for satellite imagery.

Investigators requesting ice cores from NSF-ICF or other repositories should include with their proposal a letter detailing the request and approval from the repository authority. To request support from IDPO/IDDO, investigators should contact IDPO/IDDO at <https://icedrill.org>. Investigators should include as a Supplementary Document the letter provided by IDPO/IDDO describing the equipment, services and a cost estimate (budget and justification) for the equipment or drilling support that would be required if the project is funded. Contact information for these and other services is provided on the [RSL website](#).

Proposals requesting ship time on U.S. Coast Guard (USCG; <http://icefloe.net/>) or University-National Oceanographic Laboratory System (UNOLS; <https://www.unols.org/>) vessels should include the UNOLS Ship Time Request form, available from <https://www.unols.org/>, as Supplementary Documentation. Please contact the ship operator for more information during proposal development. If requesting ship time on foreign research vessels, include Supplementary Documentation describing scope, cost, and outlining the partnership arrangement and email Frank Rack at frack@nsf.gov to coordinate with NSF. Research

cruises in the Bering, Beaufort and Chukchi seas should plan to coordinate with coastal communities and to avoid local subsistence hunting activities. Information is available through the Arctic Icebreaker Coordinating Committee and on the USCG icebreaker planning website (<http://icefloe.net/>).

For work in Greenland, follow [the process laid out by the Government of Greenland](#). In response to the requirement that researchers in remote parts of Greenland carry DKK 1,000,000 in [Search and Rescue insurance payable to the Danish State](#), NSF made an agreement to cover Search and Rescue (SAR) costs as a self-insured government agency. NSF provides the names of each traveler under the auspices of NSF to the Government of Greenland. NSF would coordinate SAR activities with the Government of Greenland and reserves the right to seek reimbursement for costs incurred.

Proposals requesting use of NSF's Lower Atmospheric Observing Facilities (LAOF; <https://www.eol.ucar.edu/user-support>) should include a copy of the LAOF Facility Request form as Supplementary Documentation. Proposers must contact laof@nsf.gov prior to the submission of the proposal to discuss the proposed deployment activities with NSF personnel.

Environmental Policy Considerations of Fieldwork

Federal agencies must comply with the National Environmental Policy Act (NEPA) and other applicable laws and policies. Projects will be assessed for environmental impacts prior to award and additional consultations or mitigation efforts may be required. PIs should expect to be involved in the assessment and environmental compliance process for their projects. Most NSF awards support individual scientific research projects and are not considered 'major Federal actions significantly affecting the quality of the human environment' but must nevertheless be documented. All federal agencies are regulated under acts such as the Endangered Species Act, the Marine Mammal Protection Act, and the National Historic Preservation Act. Researchers proposing work that may affect cultural or historic properties, or whose work involves tribal lands must cooperate with NSF in complying with the consultation requirements of section 106 of the National Historic Preservation Act and the Native American Graves Protection and Repatriation Act (NAGPRA). For additional information on cultural or historic preservation issues, see the [Advisory Council on Historic Preservation's web site](#); for information concerning NAGPRA, [see their web site](#). Contact the Environmental Officer of the Office of Polar Programs, Dr. Polly Penhale (ppenhale@nsf.gov) for guidance on environmental consultations, permitting, and NSF's obligations under existing environmental laws.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Other budgetary limitations apply. Please see the full text of this solicitation for further information.

Budget Preparation Instructions:

Budgets for all projects must include funding for one or more designated NNA project representatives (PI/co-PI/senior personnel or NSF-approved replacement) to attend each NNA PI/co-PI meeting during the proposed lifetime of the award (see section VII of this program solicitation). For budget preparation purposes, PIs should assume these meetings will be held annually in the Washington, D.C. area.

C. Due Dates

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

February 11, 2020

D. FastLane/Research.gov/Grants.gov Requirements

For Proposals Submitted Via FastLane or Research.gov:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>. To prepare and submit a proposal via Research.gov, see detailed technical instructions available at: https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationandSubmission.html. For FastLane or Research.gov user support, call the FastLane and Research.gov Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov or rgov@nsf.gov. The FastLane and Research.gov Help Desk answers general technical questions related to the use of the FastLane and Research.gov systems. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

For Proposals Submitted Via Grants.gov:

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

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

Proposers that submitted via FastLane or Research.gov may use Research.gov to verify the status of their submission to NSF. For proposers that submitted via

Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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

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

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Building the Future: Investing in Discovery and Innovation - NSF Strategic Plan for Fiscal Years (FY) 2018 – 2022*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

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

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

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

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

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

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

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

2. Merit Review Criteria

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

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

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will

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

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

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

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

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

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

Additional Solicitation Specific Review Criteria

Proposals submitted in response to this program solicitation will be evaluated by a multi-disciplinary group of reviewers and may include *ad hoc* and/or Panel Review.

NSF anticipates that all NNA proposals will be evaluated for total logistics costs and feasibility prior to funding, regardless of whether the logistics costs are in the proposal budget or provided directly by NSF to a third-party provider.

In addition to NSB-approved merit review criteria, reviewers will be asked to consider the following questions for all NNA proposals:

- To what degree does the proposed work align with the goals of NSF's NNA Big Idea?
- To what degree would the proposed work address a question or questions on the interactions or connections between at least two of the following: the natural environment, the built environment, and social systems?
- To what degree does the Management and Integration Plan engender confidence that the research team will effectively coordinate activities and achieve the goals of the proposed project?

B. Review and Selection Process

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

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will generally be completed and submitted by each reviewer and/or panel. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

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

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process.)

B. Award Conditions

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

*These documents may be accessed electronically on NSF's Website at https://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=papppg.

Special Award Conditions:

NNA Principal Investigator Meetings

To accelerate the rate of dissemination of ideas among researchers, to build an intellectual research core to address NNA challenges, and to enable enhanced research collaborations, the NNA program plans to host annual principal investigator (PI/co-PI) meetings with participation from all funded projects and other representatives from academia, industry, government, and community organizations. As noted in "Budget Preparation Instructions," all NNA project budgets must include funding for at least one representative of the project to attend each PI meeting during the proposed lifetime of the award. For multi-organization projects, investigators from each participating organization are expected to attend. There may be anticipated circumstances for a given project that mean not every participating organization can be represented, which should be clearly articulated in the budget justification.

Communication, Coordination, and Engagement with Arctic Communities

In accordance with the Interagency Arctic Research Policy Committee (IARPC) [Principles for Conducting Research in the Arctic](#), proposers planning projects working near Arctic communities are strongly encouraged to discuss the proposed work with those communities while the project is being developed and throughout the research period, as appropriate. Researchers should coordinate their field activities with nearby communities and are expected to share results with the community following each field season and/or at the end of the project. Investigators should include travel funds for this in their proposal budget. Some projects may require consultation with Indigenous or subsistence co-management organizations. Time for consultation should be included in the project schedule and travel funds for these consultations should be included in the proposal budget.

Policies Related to Arctic Fieldwork

Participants in NSF-sponsored Arctic fieldwork are required to comply with the following NSF policies: Polar Code of Conduct, Field Safety Risk Management, Physical Qualifications for Arctic Fieldwork, and IT Security Rules of Behavior. Failure to comply can result in removal from the field or from NSF facilities, retraction of funding, debarment, and referral to law enforcement as appropriate. These policies are available on the [Arctic Research Support and Logistics program website](#) and the NSF [prime Arctic logistics contractor website](#).

Acknowledgement of Support

Grantees will be required to include appropriate acknowledgment of NSF support under Navigating the New Arctic in any publication (including World Wide Web pages) of any material based on or developed under the project, in the following terms:

"This material is based upon work supported by the National Science Foundation Navigating the New Arctic Big Idea under Grant No. (Grantee enters NSF grant number.)"

Grantees also will be required to orally acknowledge NSF support using the language specified above during all news media interviews, including popular media such as radio, television, and news magazines.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through [Research.gov](#), for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via [Research.gov](#) constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using [Research.gov](#). This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the *NSF Proposal & Award Policies & Procedures Guide (PAPPG)* Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

Special Reporting Requirements:

Data Management Policy. Proposals submitted under this solicitation are required to include a Data Management Plan as detailed in Section V.A of this solicitation. Principal Investigators are required to provide updates on the status of metadata and data archival in annual project reports. Compliance with the project Data Management Plan must be documented in the final project report. URLs for archived metadata and data should be included in these reports in the section entitled "Products-Websites." Archiving of data and metadata, and execution of the Data Management Plan, must be completed prior to the submission of the final project report. Final project report approval is contingent upon successful data and metadata archiving and execution of the Data Management Plan.

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- NNA Working Group, telephone: (703) 292-8030, email: nna@nsf.gov

For questions related to the use of FastLane or Research.gov, contact:

- FastLane and Research.gov Help Desk: 1-800-673-6188

FastLane Help Desk e-mail: fastlane@nsf.gov.

Research.gov Help Desk e-mail: rgov@nsf.gov

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

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

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

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

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

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

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the *NSF Proposal & Award Policies & Procedures Guide* Chapter II.E.6 for instructions regarding preparation of these types of proposals.

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

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

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

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

- **Location:** 2415 Eisenhower Avenue, Alexandria, VA 22314
- **For General Information** (NSF Information Center): (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**
 - Send an e-mail to: nsfpubs@nsf.gov
 - or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

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

Suzanne H. Plimpton
Reports Clearance Officer
Office of the General Counsel
National Science Foundation
Alexandria, VA 22314

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