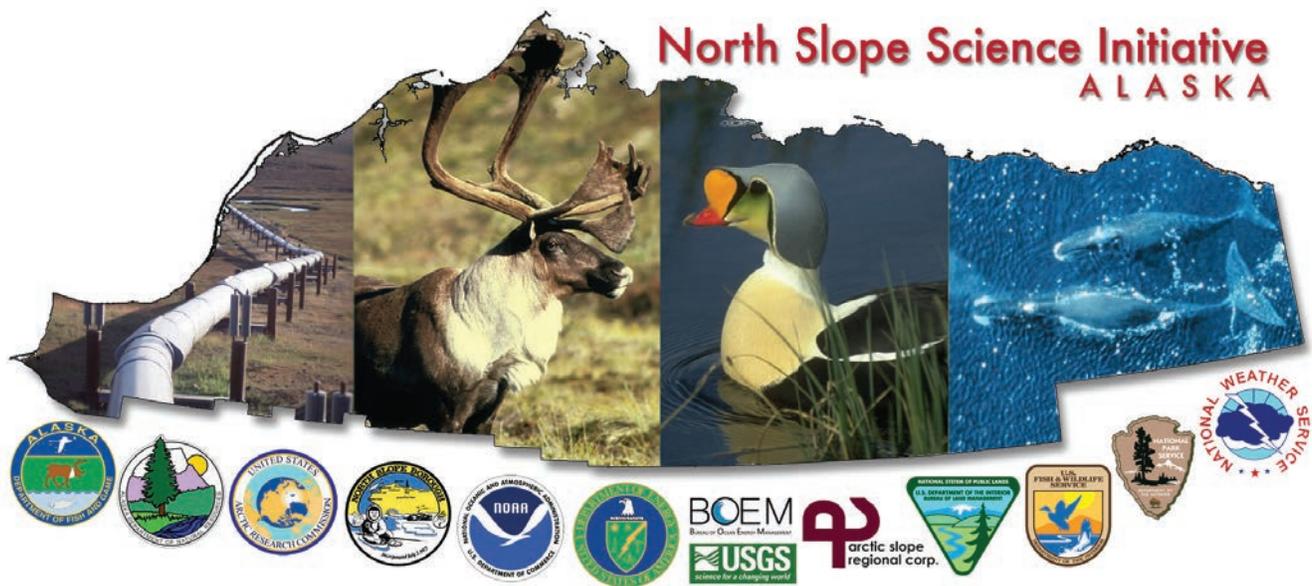


2012 NORTH SLOPE SCIENCE INITIATIVE Report to Congress



USS Healy in first-year Beaufort Sea ice floes and nilas ice followed by the Canadian Louis S. St. Laurent (NOAA)



Scope, Mission and Vision

The North Slope Science Initiative (NSSI) was developed by local, state and Federal governments with trust responsibilities for land and ocean management, to facilitate and improve collection and dissemination of ecosystem information pertaining to Alaska’s North Slope region, including coastal and offshore regions. The mission of the NSSI is to improve scientific and regulatory understanding of terrestrial, aquatic and marine ecosystems for consideration in the context of resource development activities and climate change. The vision of the NSSI is to identify those data and information needs management agencies and governments will need in the future to develop management scenarios using the best information and mitigation to conserve the environments of the North Slope. The NSSI adopts a strategic framework to provide resource managers with the data and analyses they need to help evaluate multiple simultaneous goals and objectives related to each agency’s mission on the North Slope. The NSSI uses and complements the information produced under other North Slope science programs, both internal and external. The NSSI also facilitates information sharing among agencies, non-governmental organizations, industry, academia, international programs and members of the public to increase communication and reduce redundancy among science programs.

2005 Legal Mandate

Under the provisions of the Energy Policy Act of 2005 (PL 109-58), the annual report is due to the Secretary of the Interior each August. This is the fifth such report and describes NSSI’s background, scope, mission and vision, objectives, administrative structure, accomplishments, and outlines future directions based on identified issues on the North Slope and in the adjacent marine environment.

Credits

John F. Payne, Ph.D., NSSI Executive Director, Dennis R. Lassuy, Ph.D., NSSI Deputy Director, and the NSSI Oversight Group are the principal authors of this report with input from the NSSI Science Technical Advisory Panel and input and review from the NSSI Senior Staff Committee.

2012 Report to Congress

North Slope Science Initiative

Executive Summary

The North Slope of Alaska is America's Arctic. Encompassing 526,000 km² (203,000 mi²) of land and sea, it is a vast area believed to have some of the largest oil, gas, and coal potential remaining in the United States. The North Slope and adjoining seas are also home to a diverse array of fish, wildlife, and plant resources that support a vibrant subsistence culture. In sustaining these resources and planning for safe energy exploration and development, managers also face the challenge of a rapidly changing climate. With the recognition of these unparalleled challenges and opportunities in a changing Arctic, it was apparent that there was a growing need in the public and private sectors for more information and more effective ways to support climate and development related decisions. In fact, the changes being experienced were of such magnitude that a clear Federal, state, and local consensus emerged that enhanced, coordinated, and sustained observation, research, and monitoring is vital. In response, Federal, state, and local governments collectively formed the NSSI, which is formally authorized under the Energy Policy Act of 2005 (Section 348). The NSSI, with its broad legislative mandate, is integrated across Federal, state, and local governments with both partnered research and service. The NSSI membership believes it can increase collaboration and coordination among its membership and with industry, academia, non-governmental organizations, the public, and the Circumpolar Arctic community that will lead to better informed management decisions in the future. This fifth *Report to Congress* outlines again the formation and organization of the NSSI and highlights its 2012 accomplishments.



A collaboration between the Barrow Whaling Captains Association, University of Alaska Fairbanks, and the North Slope Borough Department of Wildlife Management measures ice thickness to enhance community safety and advance the state of ice mass budget science. (UAF, Hajo Eicken)

Executive Summary (Continued)

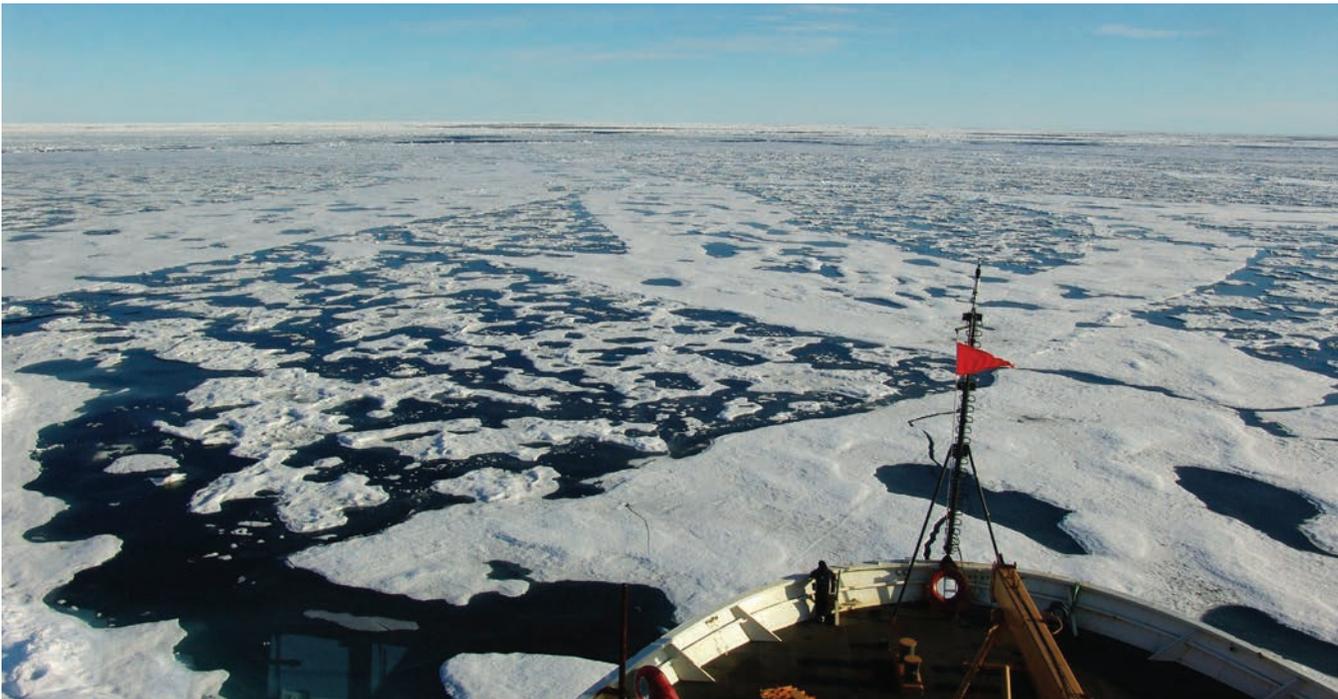
In 2012, with the full engagement of its member agencies, the NSSI and its Science Technical Advisory Panel made significant progress in several areas:

- ◆ Co-led the Arctic Council's Terrestrial Circumpolar Biodiversity Monitoring Program with the Kingdom of Denmark;
- ◆ Hosted and assisted with several workshops, including the highly successful Arctic Observing Network (AON) workshop;
- ◆ Finalized additional Emerging Issue Summaries for management-sensitive science needs;
- ◆ Collaborated closely with other initiatives including the Department of the Interior's Arctic Landscape Conservation Cooperative and Alaska Climate Science Center, National Oceanic and Atmospheric Administration Climate Service, and non-governmental initiatives;
- ◆ Collaborated with the BLM in testing of their "Assessment, Inventory, and Monitoring" methodology within NPR-A as a potential model for use at landscape scales;
- ◆ Enhanced coordination and collaboration with academic institutions, National Science Foundation, U.S. Arctic Research Commission, non-governmental organizations, industry, Interagency Arctic Research Policy Committee, and others to share information, address management issues, and collaborate on common needs;
- ◆ Continued to refine a data management and information sharing system for North Slope science that provides linkages to other systems and circumpolar Arctic information;
- ◆ Completed a remote sensing study of 158,000 North Slope lakes to classify winter liquid water availability for fish habitat or industrial use;
- ◆ Worked with the U.S. Fish and Wildlife Service, Alaska Natural Heritage Program, Natural Resources Conservation Service, Spatial Solutions, and Ducks Unlimited to develop a more consistent and accurate vegetation baseline for the entire North Slope;
- ◆ Compiled a preliminary list of ongoing long-term monitoring efforts to begin, in combination with scenario planning, to identify gaps in North Slope monitoring activities;
- ◆ Initiated preparations for a scenario planning exercise to gain insight into the potential future of human activities (e.g., energy development, shipping, tourism, fishing, ports, transportation, etc.) on the North Slope and adjacent seas over the next 20-30 years;
- ◆ Continued to expand a project tracking database of ongoing North Slope projects; and,
- ◆ Enhanced outreach and communication functions by revamping the NSSI website to create a more user friendly face to the public and by engaging NSSI in the use of social media.

Additional information on these and many other NSSI accomplishments in 2012 are presented on pages 12-30 of this report.

Executive Summary (Continued)

As the NSSI has matured, so have the demands for its services and products. The completion of the emerging issue summaries and connectivity paper has raised the need to prioritize inventory, monitoring and research that benefit multiple stakeholders and decision makers. Resource managers are seeking ways to adapt to a rapidly changing Arctic environment. Climate change impacts to the Arctic have both regional and global implications and will likely have increasing significant Arctic and worldwide environmental and societal consequences (IPCC 2007). These Arctic-wide changes are of such magnitude and rate that there is broad consensus that enhanced, coordinated, and sustained observation, research, and monitoring is vital. This includes implementation of priority needs among emerging concerns such as permafrost, hydrology, erosion, fire regime, social and economic challenges, increasing marine activities, and an array of species of shared interest. Each of these broad categories of information raises important management questions and challenges that require both short- and long-term budget planning. Since its inception, the NSSI has continued to evolve its organizational effectiveness, interagency interaction and coordination on Federal, state and local levels. This growth in cooperation is increasingly reflected as the benefits of the initiative. For the near future, the NSSI will focus on identifying future development scenarios on Alaska's North Slope and adjoining seas. It will also identify information needs for management decision making relative to those development scenarios; identify and coordinate long-term monitoring relative to development scenarios, management decision information needs and emerging issues; improve coordination and communication among managers, residents and scientists; and develop NSSI informational materials for multiple audiences and media formats. It is essential for all of the NSSI member organizations, as well as the greater Arctic community to move forward with a well-planned and coordinated inventory, monitoring and research strategy that could serve as a basis for more integrated Arctic management.



The USS Healy pushes through melting Beaufort Sea ice. (NOAA)

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Table of Contents

Executive Summary	i
Table of Contents	v
Background and Need for the North Slope Science Initiative	2
Legislative Purpose and Objectives of the North Slope Science Initiative	2
Relationship of the National Security Presidential Directive (NSPD-66) and Homeland Security Presidential Directive (HSPD-25) to the North Slope Science Initiative	5
The NSSI and Other National Initiatives: Putting the Power of Collaboration to Work	5
National Research Council Reports and the NSSI	7
Organizational Structure and Administration of the North Slope Science Initiative	8
Oversight Group	10
Executive Director	10
Senior Staff Committee.....	11
Science Technical Advisory Panel	11
2012 Progress and Accomplishments	12
Data Management and Information Sharing	14
Outreach and Communications	16
Workshops	17
U.S. and Canada Northern Oil and Gas Research Forum	17
Terrestrial Circumpolar Biodiversity Monitoring Workshop	18
Arctic Observing Network (AON) Workshop	20
North Slope Land Cover Mapping	21
North Slope Winter Lake Mapping.....	22
Science Technical Panel Activities.....	23
Development Scenarios and Long-term Monitoring	24
NSSI and the “AIM” Strategy of BLM.....	26
Coordination and Cooperation	28
External Communication	28
Collaboration under Presidential Executive Order 13580	28
Collaboration with Arctic Research and Policy	29
NSSI Internal Communication	30
NSSI Member Agency Cooperative Science on the North Slope	31
Literature Cited and Agency Websites	33
Appendices	
Appendix 1: Science Technical Advisory Panel Appointees	34
Appendix 2: Science Technical Advisory Panel Charter	35
Appendix 3: Organizations and Initiatives Related to the Arctic	38

Legislative Purpose and Objectives of the North Slope Science Initiative

The NSSI was formally authorized in Section 348, Energy Policy Act of 2005 (Public Law 109-58). The legislative purpose and objectives are stated below:

§(a)(2) The **purpose** of the Initiative shall be to implement efforts to coordinate collection of scientific data that will provide a better understanding of the terrestrial, aquatic, and marine ecosystems of the North Slope of Alaska.

§(b) **Objectives:** To ensure that the Initiative is conducted through a comprehensive science strategy and implementation plan, the Initiative shall, at a minimum—

1. identify and prioritize information needs for inventory, monitoring, and research activities to address the individual and cumulative effects of past, ongoing, and anticipated development activities and environmental change on the North Slope;
2. develop an understanding of information needs for regulatory and land management agencies, local governments, and the public;
3. focus on prioritization of pressing natural resource management and ecosystem information needs, coordination, and cooperation among agencies and organizations;
4. coordinate ongoing and future inventory, monitoring, and research activities to minimize duplication of effort, share financial resources and expertise, and assure the collection of quality information;
5. identify priority needs not addressed by agency science programs in effect on the date of enactment of this Act and develop a funding strategy to meet those needs;
6. provide a consistent approach to high caliber science, including inventory, monitoring, and research;
7. maintain and improve public and agency access to—
 - a. accumulated and ongoing research; and
 - b. contemporary and traditional local knowledge; and
8. ensure through appropriate peer review that the science conducted by participating agencies and organizations is of the highest technical quality.

Note: Objectives will be referenced hereafter by (Obj. #).

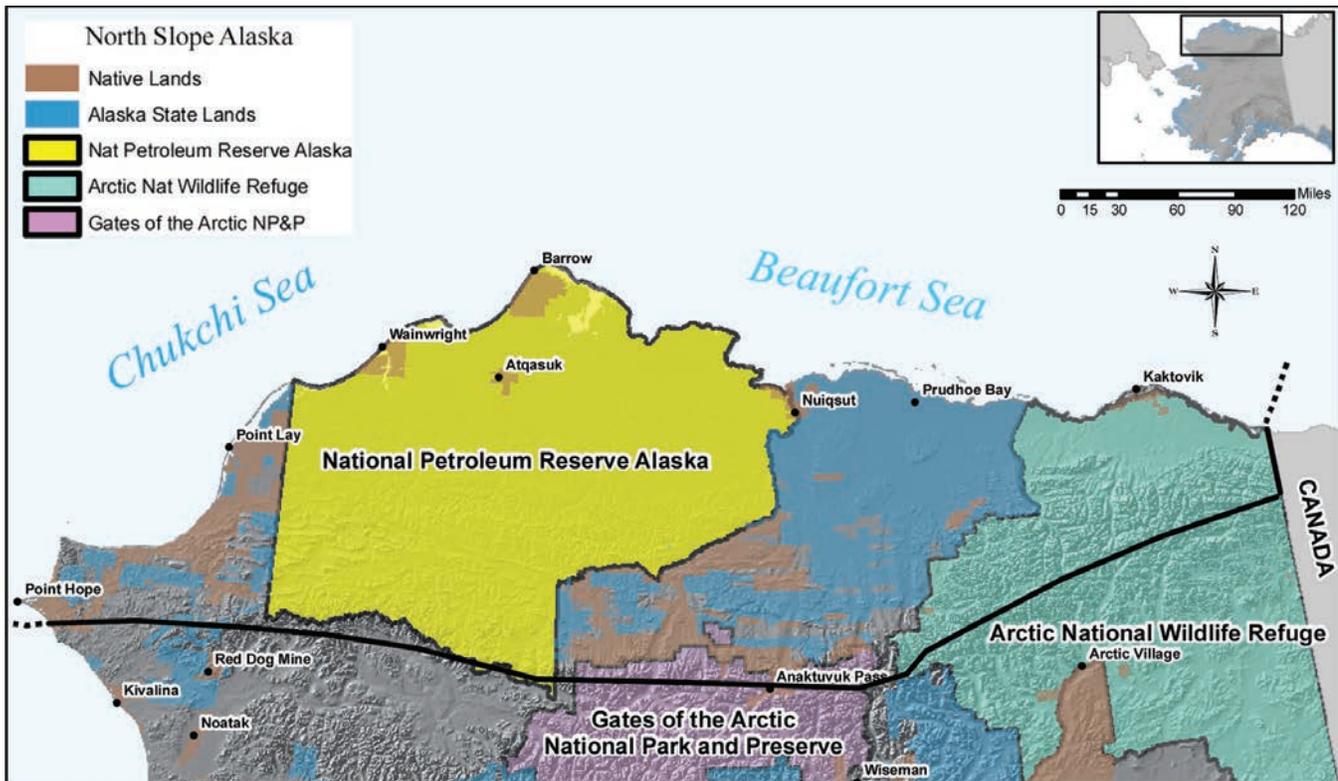
Background and Need for the North Slope Science Initiative

The North Slope of Alaska is a vast area of the polar Arctic encompassing 231,000 km² (89,000 mi²) on land; with an additional 295,000 km² (114,000 mi²) in the offshore areas of the Chukchi and Beaufort Seas – in total, an area roughly the combined size of all of America’s eastern seaboard states from Maine through Virginia. The natural resources of the North Slope are considerable. The area is believed to have some of the largest oil, gas, and coal potential remaining in the United States. The North Slope is also home to an abundant and diverse array of native fish, wildlife, and plant resources that supports the vibrant subsistence culture of the Iñupiat people who reside in the area. Balanced and scientifically informed management of fish, wildlife, subsistence, and energy resources continues to be the goal of agencies, Alaska residents, and industry.

The wetland, coastal, and off-shore habitats of the North Slope also support a wide variety of important fish and wildlife populations. Over 200 species of birds migrate to the North Slope each summer to nest and raise their young, including hundreds of thousands of waterfowl (including the threatened spectacled and Steller’s eiders), shorebirds and many others. These summer visitors migrate to the North Slope from nearly every U.S.



Shore birds like these semipalmated sandpipers rely on North Slope wetlands. (USFWS)



North Slope Land Status (information on this map should be used for graphic display only). (BLM)

state and as far away as South America, Africa, Asia, and Antarctica. Four caribou herds numbering about 400,000 animals, currently more than half of Alaska's caribou, make their home on the North Slope and provide a significant portion of the wild native foods harvested by North Slope residents. Offshore areas provide habitat for a variety of marine mammals, including the polar bear, four species of ice seals, walrus, and several species of whale. Marine mammals comprise over 60 percent of the annual subsistence harvest. Freshwater fish, particularly several whitefish species (e.g., Aanaakliq, Pikuktuuq, and Qaaktaq) and dolly varden (Iqalukpik), are also an important food source. The North Slope is the largest contiguous region of wetlands within the Arctic (CAVM Team 2003), in large part due to the continuous presence of permafrost beneath the surface.

The North Slope, all of which is above the Arctic Circle, is a place where global forces have long been converging. In years past, it was a pathway for the spread of the Inuit culture eastward across Arctic North America. In modern times, whalers followed the bowhead whales into the pack ice; military contractors constructed the network of Distant Early Warning radar stations bringing the first large scale-development to the region; and oil companies developed a large industrial complex. Today, the North Slope is a pan-Arctic focal point of growing global awareness and is used for observation and assessment of the near and long-term term impacts of climate change.

All of these resources and their patterns of development are of vital importance, both nationally and internationally and to the residents of the North Slope who depend on them for subsistence and economic well-being. The resources are managed by Federal, state, and local agencies to maintain healthy fish and wildlife populations and their habitats in a productive environment. The laws and

regulations that govern oil and gas development and protect the environment are among the most stringent in the United States, and Alaska is proud of its track record. Through continued technological improvements, industry has succeeded in reducing the footprint of development while expanding into new areas with directional drilling, targeting oil reservoirs several miles from the main drill site. Reserve pits for holding drilling wastes have been replaced by grind and inject facilities which return these materials to the formation underground. Ice roads have replaced gravel roads for exploration activities. Alaska has an impressive record of incorporating new technologies for exploration and development activities to reduce environmental impacts.

Resource managers are seeking ways to adapt to a rapidly changing Arctic environment. Climate change impacts to the Arctic have both regional and global implications and will likely have increasing significant Arctic and worldwide environmental and societal consequences (IPCC 2007). These Arctic-wide changes are of such magnitude and rate that there is broad consensus that enhanced, coordinated, and sustained observation, research, and monitoring is vital. The Study of Environmental Arctic Change (SEARCH), along with the International Study of Arctic Change (ISAC), both International Polar Year legacies, has identified three components to adapting to change: observing change, understanding change, and responding to change. NSSI is one of the entities within the larger Arctic science and resource management community that addresses each of these components. As such, the NSSI works within the greater community to move forward with a well-planned and coordinated inventory, monitoring, and research strategy to:



Permafrost and soil erosion along Arctic Coast of Alaska (USGS, Benjamin Jones)

1. Document the magnitude, variation, and rate of changes that are currently occurring and place them in the context of past environmental change;
2. Understand the regional and global causes and consequences of current changes;
3. Predict the magnitude, variation, rate and consequences of future Arctic and global change; and
4. Identify the information needed for effective adaptive management practices appropriate to Arctic change.



BLM and partner ground and photo crews gather in NPR-A for BLM Assessment, Inventory, and Monitoring project. (BLM, Jason Taylor)

The NSSI and Other National Initiatives: Putting the Power of Collaboration to Work

Since its authorization by Congress in 2005, the North Slope Science Initiative has continued to engage and collaborate with ongoing or new initiatives that help meet its mission. For example, from 2009 through 2011, the Departments of the Interior (DOI) and Commerce announced separate new national initiatives. On September 14, 2009, the Secretary of the Interior signed Secretarial Order Number 3289, “Addressing the Impacts of Climate Change on America’s Water, Land, and Other Natural and Cultural Resources.” This order established the Climate Change Response Council, chaired by the Secretary, to coordinate activities within and across the bureaus to develop and implement an integrated departmental strategy for climate change response. Working at the landscape, regional, and national scales through the establishment of DOI Climate Science Centers (CSCs) and Landscape Conservation Cooperatives (LCCs), the Department is defining and implementing a vision that integrates DOI science and management expertise with that of NSSI’s partners, providing available information and best management practices to support strategic

Relationship of the National Security Presidential Directive (NSPD-66) and Homeland Security Presidential Directive (HSPD-25) to the North Slope Science Initiative

On January 9, 2009, the President Bush issued two directives related to the U.S. Arctic. Although these directives are not specifically related to the administration and operation of the NSSI, they contain components which help set direction related to the NSSI. Section III (A)(2) states that the policy of the United States is to “Protect the Arctic environment and conserve its biological resources.” Section III (A)(3) states that the United States will “ensure that natural resource management and economic development in the region are environmentally sustainable.” Section III (A)(6) states that the United States will “enhance scientific monitoring and research into local, regional, and global environmental issues.”

These also direct that the United States will actively promote access to Arctic research, establish effective Arctic observing networks, work with the Interagency Arctic Research Policy Committee and U.S. Arctic Research Commission, and strengthen partnerships with academic and research institutions. The NSSI through its Science Technical Advisory Panel and the Oversight Group, with the assistance of its Senior Staff Committee, are addressing or coordinating many of these directives that are now the policy of the United States as a member of the pan-Arctic community.



Members with diverse expertise from the NSSI Science Technical Advisory Panel confer with agency staff from across the intergovernmental NSSI Senior Staff Committee. (NSSI)



Canadian Coast Guard helicopter visits U.S. Coast Guard Cutter Healy traveling through Beaufort Sea first-year ice floes. (NOAA)

adaptation and mitigation efforts on U.S. and international public and private lands. This vision supports individual bureau missions while creating synergies with other DOI agencies and partners to implement integrated climate change science, adaptation, and mitigation strategies across broad landscapes. DOI bureaus will pool their resources to support and leverage the joint work of CSCs and LCCs. Project-level funding and the implementation of regulatory, management, or policy decisions will continue to be the responsibility of each bureau and partner.

In addition, the National Oceanic and Atmospheric Administration (NOAA) created a Regional Climate Service in Alaska in 2010 and finalized an Arctic vision and strategy in 2011 (http://www.arctic.noaa.gov/docs/NOAAArctic_V_S_2011.pdf). NOAA envisions an Arctic where conservation management is based on sound science that supports healthy, productive, and resilient communities and ecosystems. The agency seeks a future that better understands and predicts the global implications of changes in the Arctic.

The NSSI has developed a solid intergovernmental and societally and academically informed partnership structure for identifying science needs and sharing information in the Arctic. Due not only to the rapid warming of the region but also to this solid foundation of Federal, state, and local resource management agency work in Alaska, the DOI chose the Arctic as one of its eight inaugural locations to launch its network of LCCs. Under the Arctic LCC, these agencies are working together to develop an integrated scientific approach to address landscape scale stressors, focusing on climate change. The NSSI Emerging Issues documents, combined with the pilot WildREACH report from the Arctic LCC, form an excellent foundational inventory of research and management issues facing the Arctic. This framework has helped prioritize science needs for the North Slope and put the power of collaboration to work. Alaska is also fortunate to serve as the first place nationwide to host a DOI Climate Science Center. This center is working with the University of Alaska system to meet climate science needs for conservation decisions in Alaska. The ability to meet these priorities and leverage multi-agency and partner resources will determine the success of these initiatives. All of the combined and integrated resources of the NSSI, Arctic LCC, Alaska CSC, and NOAA's Climate Service and Arctic Vision and Strategy, represent a good beginning for understanding and confronting the complexity of Arctic issues.

National Research Council Reports and the NSSI

Much of the early roots of the NSSI were in the first National Research Council report. In 2003, the National Academies in response to a request from Congress, prepared the *Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope*. The purpose of the report was to review information on oil and gas activities and assess the known and possible cumulative impacts of those activities. The report considered impacts on the physical, biotic, human and marine environments from past and present development activities. Several findings and recommendations were developed, including:

- ◆ **Climate Change:** Additional research and modeling is required to understand its impacts on the Arctic and, more importantly, on the North Slope region.
- ◆ **Need for Comprehensive Planning:** Currently, multiple agencies make decisions on industrial activities on a case-by-case basis, without a comprehensive plan to guide the process. A comprehensive plan is needed to ensure that future decisions match the overall goals for the region, in all phases of development.
- ◆ **Ecosystem Research:** Currently, the North Slope lacks ecosystem-level research. There is a need to increase research activities and focus on ecological processes.
- ◆ **Offshore Oil Spills:** The potential for a large arctic offshore oil spill requires additional research to address the effects of such a spill, how marine life could be protected, and the effectiveness of various cleanup activities, especially in broken sea ice.

In 2009, the National Research Council released a second report: *Informing Decisions in a Changing Climate: Panel on Strategies and Methods for Climate-related Decision Support*. This report reaffirmed the organizational structure and benefits of the NSSI by outlining a cooperative, stakeholder-based, deliberative approach that decision makers can use. The NSSI was originally established to follow the six principles of the report, long before the report was released. These guiding principles are:

- Begin with the users' needs.
- Give priority to products over process.
- Link to information producers and users.
- Build connections across disciplines and organizations.
- Seek institutional stability.
- Design processes for learning.

As the unparalleled challenges and opportunities of a changing climate, resource exploration, and development activities become more important to the nation, so does the need for information and more effective ways to support resource decisions. The NSSI, with its broad legislative mandate, is integrated across Federal, state, and local governments with partnered research and service. The NSSI believes it can increase collaboration and coordination with industry, the public, academia, non-governmental organizations, and the greater pan-Arctic community to lead to better informed management decisions in

the future. We anticipate a continuing linkage with NRC efforts. For example, an NRC project currently under way titled, *Responding to Oil Spills in Arctic Environments*, addresses scientific questions raised in the NSSI emerging issue summaries (www.northslop.org/issues). We expect this NRC project may well help identify research needs that can inform NSSI member efforts in the future.

Organizational Structure and Administration of the North Slope Science Initiative

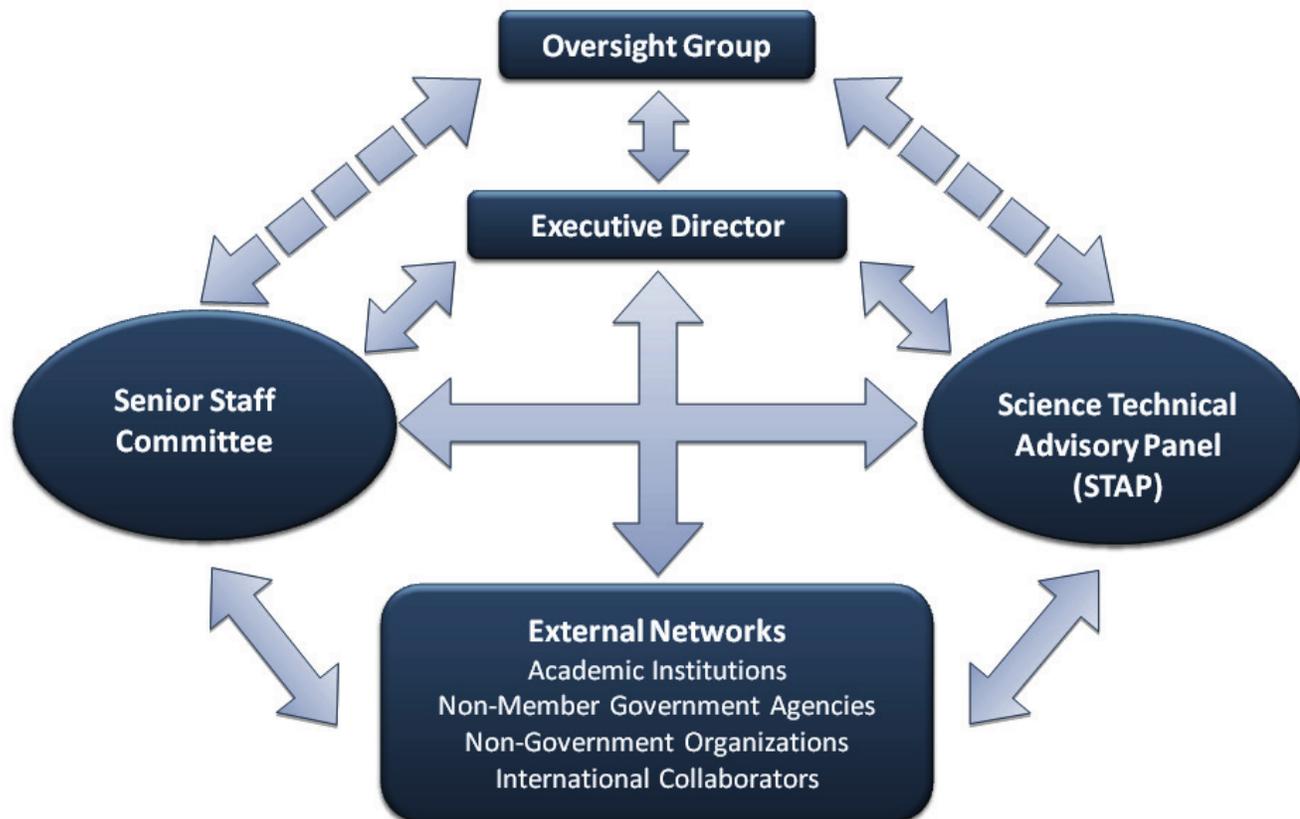
Why is the North Slope Science Initiative Unique in its Organization?

The NSSI's uniqueness begins with its senior leadership on the Oversight Group (See charter at <http://www.northslope.org>). The group's membership comes from lead agency, government, and organization managers with responsibilities for resources on the North Slope and its off-shore environments. The NSSI also has a unique Science Technical Advisory Panel, operated under the Federal Advisory Committee Act, whose 15 members represent more than 300 collective years of expertise in the Arctic. NSSI members include:

Department of the Interior	
Bureau of Land Management (administrative agency)	State Director
Bureau of Ocean Energy Management	Regional Director
National Park Service	Regional Director
U.S. Fish and Wildlife Service	Regional Director
Department of Commerce	
National Marine Fisheries Service	Regional Administrator
State of Alaska	
Department of Fish and Game	Commissioner
Department of Natural Resources	Commissioner
Local Government/ Resource Manager	
Arctic Slope Regional Corporation	President
North Slope Borough	Mayor
Advisory to the NSSI	
NOAA National Weather Service	Regional Director
U.S. Arctic Research Commission	Chair
U.S. Geological Survey	Regional Executive

Consistent with its mission and vision, the NSSI is a highly interactive organization. It draws advice from a variety of disciplines, expertise, and knowledge. This functional structure is designed to assist Federal, state, and local governments; academia; industry; and the public in making strategic, science-informed decisions based on short- and long-term ecosystem management needs. This structure, assisted by a small core of NSSI staff and a science advisory panel, provides independent expert review and advice; facilitates energetic liaison among member programs and their resources; provides effective coordination and communication; and develops a common infrastructure for data management, publications, and information processing.

North Slope Science Initiative Implementing Legislation



The NSSI is an organization that provides for highly effective interaction between government leadership, the senior staff specialists of member entities, its multidisciplinary Science Technical Advisory Panel, and outside networks to identify management needs and provide recommendations to address those needs to leadership. The NSSI organization is not intended to supplant individual agency science or management programs, but to validate many of the science directions already being addressed by some individual NSSI member agencies and help in the sharing of human and monetary capital to address needs beyond an individual agency capability. The entire organization is bounded by the collective needs of its membership while still providing individual agency science programs the opportunity to share in addressing those collective needs, or by offering an expanded network of expertise. (NSSI)

Functionally, the NSSI organizational structure includes: Oversight Group, Executive Director and staff, Science Technical Advisory Panel, and Senior Staff Committee. These four components are highly interactive and bring a variety of expertise and knowledge to the organization.

Oversight Group

The Oversight Group (OG) is the senior-level management from the NSSI member and advisory entities. The OG:

- ◆ Sets direction for the NSSI and cascades that direction through member agencies;
- ◆ Lays out a clear vision and sets goals and expectations;
- ◆ Serves as the decision maker for NSSI priorities and activities;
- ◆ Provides executive level leadership;
- ◆ Provides a forum for looking forward; and,
- ◆ Approves the NSSI's annual budget and *Report to Congress*

Executive Director and Deputy Director

The Executive Director's office provides the managerial guidance and executive oversight on day-to-day activities of the NSSI; advice and consultation to governmental agencies, scientific and academic institutions, and other interested parties to further the congressional objectives of the NSSI; and, coordinates and develops integration of science-based activities for the North Slope. In addition, the Executive Director:

- ◆ Identifies decision points for the Oversight Group;
- ◆ Implements the Oversight Group's decisions;
- ◆ Carries out direction from the Oversight Group through coordination with the Senior Staff Committee, Science Technical Advisory Panel, and others;
- ◆ Is the Designated Federal Officer for the Science Technical Advisory Panel;
- ◆ Manages the NSSI budget;
- ◆ Promotes the NSSI;
- ◆ Consults with the Oversight Group Chair when a subject matter may be outside the normal operations of the initiative. For example, a request to the NSSI for a response to a task may conflict with a member agency(ies) policy or operations. The Executive Director and Chair may consult with other members as necessary to draft the appropriate response;
- ◆ Speaks on behalf of the NSSI, but not on behalf of member agencies; and,
- ◆ Develops the annual *Report to Congress*.

The Deputy Director assists the Executive Director on all of the above-listed functions, but does not serve as the Designated Federal Officer for the STAP.

Senior Staff Committee

The Senior Staff Committee (SSC) members are representatives from member entities with experience in North Slope management and science. The NSSI Deputy Director serves as SSC Chair. The respective OG members are expected to clearly communicate their role within the NSSI to their SSC member and their immediate supervisor. These roles may include:

- ◆ Identifying environmental issues or needs as assigned by their respective OG member;
- ◆ Advise their respective OG member on assignments and direction of the NSSI;
- ◆ Compile input and information from across their respective entities;
- ◆ Serve as the liaison between their respective OG member and their entity; and,
- ◆ Reviews Science Technical Advisory Panel work and provides feedback to the OG.

Science Technical Advisory Panel

The Science Technical Advisory Panel (STAP) is a legislatively mandated Federal Advisory Committee Act (FACA) group consisting of not more than 15 scientists and technical experts from diverse professions and interests (See Charter, Appendix 1). This may include the oil and gas industry, subsistence users, Alaska Native entities, conservation organizations, wildlife management organizations, academia, and other areas determined by the Secretary of the Interior. The panel's duties are listed in the STAP Charter (Appendix 2, or <http://www.northslope.org>). Panel members may come from disciplines such as:

- | | | | |
|---|--------------------|-------------------------|----------------|
| ◆ North Slope traditional and local knowledge | ◆ Botany | ◆ Biometrics | ◆ Oceanography |
| ◆ Landscape ecology | ◆ Hydrology | ◆ Sociology | ◆ Fisheries |
| ◆ Petroleum engineering | ◆ Limnology | ◆ Cultural anthropology | ◆ Biology |
| ◆ Civil engineering | ◆ Ecology | ◆ Economics | ◆ Climatology |
| ◆ Geology | ◆ Wildlife biology | ◆ Ornithology | |



Team of scientists measures snow depth and analyze samples from snow stratigraphy pit at Barrow, Alaska. (UAF, Hajo Eicken)

2012 Progress and Accomplishments

The NSSI had a busy year. Working through workshops and with the valuable input of its Senior Staff Committee, Science Technical Advisory Panel, Oversight Group and many partners, NSSI accomplishments in 2012 included:

- ✓ Under the Arctic Council's Conservation of Arctic Flora and Fauna Working Group, the NSSI served as co-lead with the Kingdom of Denmark for the Terrestrial Circumpolar Biodiversity Monitoring Program;
- ✓ A series of workshops that the NSSI hosted or for which we assisted in the organization and planning brought resource and regulatory managers, scientists, and local residents together to build lasting relationships, and share knowledge across disciplines, across international borders, and among decision makers and the residents of the North Slope. In this area was the highly successful Arctic Observing Network (AON) workshop to bring National Science Foundation-funded AON principal investigators together with agency and non-governmental entities to implement programs designed to provide a better understanding of changing conditions in the Arctic. The results of this event will feed into a greater circumpolar Arctic workshop in early 2013 and more comprehensive monitoring of Arctic environments;
- ✓ Finalized additional Emerging Issue Summaries to identify resources and information needs for addressing data gaps that resource managers may need to make informed decisions;
- ✓ Close collaboration with other initiatives including the Department of the Interior's Arctic Landscape Conservation Cooperative and Alaska Climate Science Center, National Oceanic and Atmospheric Administration Climate Service, and non-governmental initiatives such as the Alaska Oceans Observing System, North Pacific Research Board, Arctic Council working groups, and others within the greater circumpolar Arctic community;
- ✓ Collaboration with the BLM to test their "Assessment, Inventory, and Monitoring" (AIM) methodology within NPR-A as a potential model for use at broader landscape scales;
- ✓ Enhanced coordination and collaboration with academic institutions, National Science Foundation, U.S. Arctic Research Commission, non-governmental organizations, industry, Interagency Arctic Research Policy Committee, and others to share information, address management issues, and collaborate on common needs;
- ✓ Refined a data management and information sharing system for North Slope science that provides linkages to other systems and circumpolar Arctic information;
- ✓ Completed a remote sensing study, in partnership with the University of Alaska Fairbanks and Michigan Tech Research Institute for classification of winter liquid water availability in 158,000 North Slope lakes to provide critical information for both fish and wildlife protection and industry winter infrastructure support;
- ✓ Worked with the U.S. Fish and Wildlife Service, Alaska Natural Heritage Program, Natural Resources Conservation Service, Spatial Solutions, Inc., and Ducks Unlimited, Inc. to develop a more consistent and accurate vegetation baseline for the entire North Slope;

- ✓ Compiled a preliminary list of ongoing long-term monitoring efforts to begin, in combination with scenario planning outcomes, to identify gaps in North Slope monitoring activities. This list will continue to be refined and updated as the NSSI scenario planning moves forward;
- ✓ Initiated preparations for a scenario planning exercise to gain insight into the potential future of human activities (e.g., energy development, shipping, tourism, fishing, ports, transportation, etc.) on the North Slope and adjacent seas over the next 20 years;
- ✓ Greatly expanded a project tracking database of ongoing North Slope projects; and,
- ✓ Enhanced outreach and communication functions by revamping the NSSI website to create a more visually appealing and user friendly face to the public and by engaging the NSSI in the use of social media.

Further details on many of the accomplishments are presented in the following sections.



UAF scientist Dr. Chris Petrich takes measurements of total albedo over melting landfast sea ice at Barrow, Alaska.
(UAF, James Barker)

Data Management and Information Sharing

A core objective of the NSSI is to maintain and improve public and agency access to management-relevant research and scientific data. To help accomplish this, the NSSI has been working with the University of Alaska's Geographic Information Network of Alaska (GINA) to develop a web-based information exchange called the North Slope Science Catalog (<http://catalog.northslope.org>). North Slope Science Catalog provides services in data discovery and access, project tracking, data management and data development.

Data Discovery and Access

The North Slope Science Catalog promotes data access through flexible, web-based tools and a wide range of information products such as data tables, reports, maps, images, and GIS files. The North Slope Science Catalog leverages existing capacity by providing access to products that are stored at other public data archives as well as products that are stored within the North Slope Science Catalog. This simplifies user operations and allows data to be discovered through one central resource while minimizing duplication of effort. The North Slope Science Catalog also promotes data sharing protocols that allow information exchange among agencies, local government, industry and NGOs. The North Slope Science Catalog currently has over 2,200 records and is being continually updated. These records reference data holdings within the North Slope Science Catalog as well as data from over 40 additional sources.

North Slope Science Catalog
Data Products & Project Tracking

Filters Search Results

Enter search terms here

Filter By Apply Search Filters Clear Filters Sort By Export Help

Final Pacific Walrus Stock Assessment Report
Section 117 of the Marine Mammal Protection Act, as amended in 1994, requires the U.S. Fish and Wildlife Service to report periodically on the status o...
Type: Asset Source: USFWS Status: Remote Location: Yes Regions: Alaska, Northslope Borough

Partial Bibliography of Sc
Bibliographic list of publica specifically of refuge
Type: Asset Source: USFWS Status: Remote Location: No Regions: Alaska, Northslope Borough

Active Layer Depth an
Active layer and snow depth Kuparuk Basin, Alaska, at vari
Type: Asset Source: NCAF Status: Remote Location: Yes Regions: Alaska, Northslope Borough

Permafrost Characteristi
This shapefile was used to ge in conjunction with the Nint
Type: Asset Source: INE Status: Remote Location: Yes Regions: Alaska, Northslope Borough

Marine Mammal Stock As
NMFS prepares marine mamm section 117 requirements for
Type: Asset Source: NMFS Status: Remote Location: Yes Regions: Alaska, Northslope Borough

Alaska Climate Datasets
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Type: Asset Source: UAF Status: Remote Location: Yes Regions: Alaska, Northslope Borough

Coastal and Marine Geok
Low altitude oblique photogr vicinities of Barter Island, Col
Type: Asset Source: USGS Status: Remote Location: Yes Regions: Alaska, Northslope Borough

Final Pacific Walrus Stock Assessment Report
Section 117 of the Marine Mammal Protection Act, as amended in 1994, requires the U.S. Fish and Wildlife Service to report periodically on the status of marine mammal stocks within Alaskan waters. Each stock assessment includes a description of the geographic range, a minimum population estimate, current population trends, maximum net productivity rates, optimum sustainable population levels, removal levels, and estimates of annual human-caused mortality and serious interactions with commercial fisheries and subsistence hunters. Stock assessments are used to evaluate the progress of fisheries towards achieving the sustainability and serious injury to marine mammals.
Status: Remote End Date: 2010/01/01
Primary Agency: US Fish and Wildlife Service Other Agencies:
Locations:
Tags: IS0002, Report Product
Geokeywords: Alaska, Northslope Borough
Download Size: 314 Bytes
Links:
Website: [Pacific Walrus Stock Assessment Report \(pdf\)](#)
Record Information Source: NSSI
Direct Record Link: [/catalog/228](#)

PACIFIC WALRUS (*Odobenus rosmarus divergens*): Alaska Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE
The family Odobenidae is represented by a single modern species, *Odobenus rosmarus*, of which two subspecies are generally recognized: the Atlantic walrus (*O. r. rosmarus*) and the Pacific walrus (*O. r. divergens*). The two occur in geographically isolated populations. The Pacific walrus is the only stock occurring in U.S. waters and in this account.

The geographic range throughout the continental shelf waters of the Bering and Chukchi seas, occasionally moving into the Laptev Sea and the Beaufort Sea (Figure 1). During the summer months most of the population migrates into the Chukchi Sea; however, several thousand animals, primarily adult males, aggregate near coastal haulouts in the Gulf of Anadyr, Bering Strait region, and in Bristol Bay. During the late winter breeding season walrus are found in two major concentration areas of the Bering Sea where open leads, polynyas, or thin ice occur (Fay *et al.* 1984). While the specific location of these groups varies annually and seasonally depending upon the extent of the

Download Close Window

Page 1 of 1 Show 3000 Total Results: 2760 Lat:

NSSI Catalog. (NSSI)

Project Tracking

The North Slope Science Catalog maintains project tracking information that describes the “who, what, when, and where” of on-going scientific research relevant to the North Slope. This enables researchers to be more in touch with the work of others and provides a strategic view of scientific research on the North Slope. The NSSI works closely with its members to maintain up-to-date project information and promotes methods for automated sharing of project tracking resources among members. A wide range of ongoing 2012 science-based projects are described in the project tracking system, including field sampling, modeling, teacher training and facility/systems infrastructure development.

Data Archiving and Management

The North Slope Science Catalog is designed to serve as a permanent data repository and provide data management services to partners. During 2012 the NSSI added a web-based managers’ interface to the North Slope Science Catalog that allows for remote data management. In addition the NSSI implemented a system of data access protocols that allow data managers to specify different levels of user access to data. This ensures that important data sets are preserved and made available even if projects are short-term and lack long-term data management support.



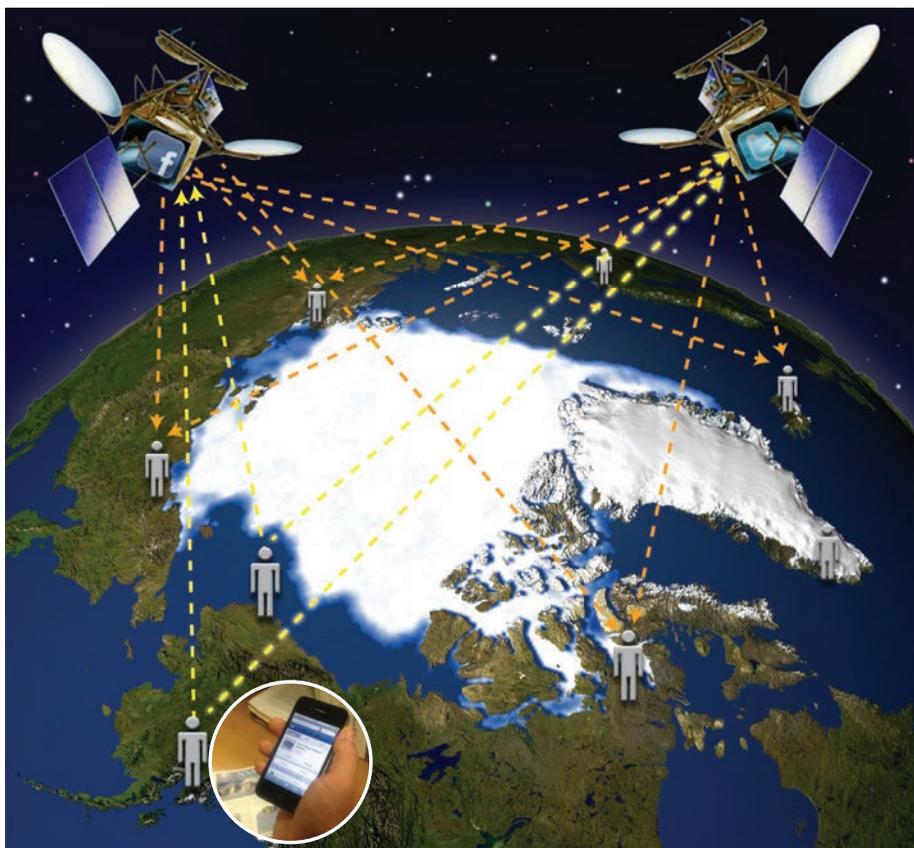
Matt Bobo (BLM) examines photo points during field work in the National Petroleum Reserve in Alaska. (BLM)

Data Development and Data Rescue

The North Slope Science Catalog allows NSSI to work closely with other partners such as the National Fish and Wildlife Foundation (NFWF) and the Arctic Landscape Conservation Cooperative to develop important North Slope data products. For example, NSSI in partnership with NFWF recently used synthetic aperture radar (SAR) data to complete the first-ever comprehensive mapping of winter availability of water in its liquid form on the North Slope. This product can also be useful for habitat modeling and environmental impact assessment and is available for download through the North Slope Science Catalog (see “North Slope Winter Lake Mapping” section below for more detail). Other data development/data rescue projects include landscape level ecological subsection mapping, a compilation of existing vegetation field data for the North Slope, and supporting the NSSI Science Technical Advisory Panel in its analysis of long-term monitoring (see “Long-term Monitoring” section), an effort which may help guide future data rescue efforts. The North Slope Science Catalog has also provided data and services in support of national projects such as the NOAA Arctic Environmental Response Management Application (ERMA) and internationally to the Polar Data Catalog and ArcticNet. Other ongoing projects include data rescue and compilation of vegetation and permafrost information.

Outreach and Communications

In 2012, the NSSI stepped up its outreach and communication functions. The NSSI website (<http://www.northslope.org>) was enhanced to create a much more visually appealing and user-friendly site. New additions easily let site users find links to the North Slope Science Catalog and Project Tracking functions. The NSSI recently compiled long-term monitoring summaries, new social media, ongoing activities, and other high priority information such as news and events, workshops, meeting times, reports and much more.



NSSI has joined Facebook and Twitter. Comment on posted information from anywhere around the world. (NASA and NSSI)

The NSSI now has active Facebook and Twitter accounts. This use of social media will strengthen the connection between the scientific community and the public, and will encourage them to share their experiences with each other. The NSSI Oversight Group member Bud Cribley (BLM) noted that “Communication in Alaska presents many unique challenges -- Alaska’s expansive physical geography, climate and the fact that many villages are disconnected from the road system add to the challenges of connecting with our stakeholders. Recent improvements in communications infrastructure, including new efforts to expand broadband internet and cell phone coverage in rural Alaska, have expanded the potential for using social media, and will allow citizens to interact and participate with programs and management decisions regarding public lands in ways they never could.” By using social media, the NSSI is taking an interactive approach to gaining involvement in the science of Arctic energy and environmental change issues and collaborations with partner agencies.

To stay current with North Slope issues and information, anyone can now “Like” our Facebook pages and “Follow” us on Twitter at:

<http://www.facebook.com/NorthSlopeScienceInitiative>

<http://www.twitter.com/NSlopeScience>

Workshops

Workshops provide the NSSI with opportunities to identify common issues or concerns, share current knowledge, and a forum to increase communication and understanding. In 2012, the NSSI continued to support these important forums, including hosting or preparing for two important international gatherings – the third *United States and Canada Northern Oil and Gas Research Forum* and the *Terrestrial Circumpolar Biodiversity Monitoring Workshop*. In addition to the international outreach, the NSSI co-chaired an important collaboration workshop for the Arctic Observing Network (AON) to expand what has, to date, been a National Science Foundation principal investigator effort to observe, understand and respond to Arctic change. The AON workshop build linkages between those principal investigators and the agencies who are monitoring Arctic resources.

United States and Canada, Northern Oil and Gas Research Forum



U.S./Canada Northern Oil and Gas Research Forum. (NSSI)

The third United States and Canada Northern Oil and Gas Research Forum took place on November 13-15, 2012, in Anchorage, Alaska. The U.S. and Canada share common human cultures as well as many transboundary species, both terrestrial and aquatic, across their shared northern borders. They also share a history of oil and gas exploration and development in the Beaufort Sea and adjoining coastal areas. Both countries are considering proposals for the transmission of natural gas resources and for onshore and offshore exploration and development of oil and gas resources.

Both countries have undertaken significant research in support of the environmental assessment and regulatory processes associated with oil and gas development. This research is important as it enables governments and industry to fulfill their responsibilities to the public by ensuring that oil and gas development is carried out in a way that minimizes environmental and social impacts and supports economic development. This joint forum brings United States and Canadian scientists, industry, regulators, and northern residents together to share information about research programs and knowledge systems and to discuss future directions for northern oil and gas exploration and development. The forum provides an important communication tool for all participants to become better informed about existing research and how information is used in decision-making, and to discuss future opportunities for international collaboration (visit <http://www.northslope.org> for the full workshop report). Forum sections scheduled for this third biennial conference include:

- ◆ Current research challenges to support decision-making for safe and sustainable Northern oil and gas management
- ◆ Scaling ecosystem information for decisions
- ◆ Incorporating traditional and local knowledge when formulating research priorities and programs for decision-making
- ◆ Arctic operations and drilling safety

- ◆ How both engineering and environmental research can inform safe operations
- ◆ Responding effectively if things go wrong: how research can assist response and clean up
- ◆ Developing data and information sharing tools, and assessing the needs of communities, researchers, and managers
- ◆ Scenario planning for future resource development and mapping of potential activities
- ◆ Where and how do we develop partnerships to address priority research needs: for the government, industry, and other groups.

This was another excellent international learning forum and its outcomes will be reported on in next year's *Report to Congress*.

Terrestrial Circumpolar Biodiversity Monitoring Workshop



Representatives of Alaska Native organizations and communities meet with TEMG Co-chair Tom Christensen (Denmark) (NSSI)

The United States and the Kingdom of Denmark (Denmark, Greenland, and the Faroe Islands) agreed in 2010 to serve as lead countries for the Terrestrial Circumpolar Biodiversity Monitoring Program. This effort is one of four under the broader Circumpolar Biodiversity Monitoring Program (CBMP), which will include similar efforts for marine, freshwater, and coastal ecosystems. The CBMP is being undertaken through the Conservation of Arctic Flora and Fauna (CAFF), which is the biodiversity working group of the Arctic Council. A complete description of the Circumpolar Biodiversity Monitoring Program is available at <http://cbmp.arcticportal.org>.

The need to measure change in Arctic biodiversity is increasing, given the emerging evidence that Arctic ecosystems are already responding, in some cases quite dramatically, to climatic changes (Hinzman et al. 2005; Post et al. 2009). Substantial shifts in the Arctic environment are predicted for the near future through encroachment of more southerly species and ecosystems (IPCC 2007; ACIA 2005), and recent changes in physical elements such as sea ice have outpaced predicted changes (Stroeve et al. 2007). Limited functional redundancy in Arctic ecosystems poses a particular risk as the loss of a single species could have dramatic and cascading effects on an ecosystem's state and function (Post et al. 2009). A common single-species approach to monitoring, especially with a bias toward charismatic (versus functional) species, limits the ability to detect and understand potentially critical changes in the Arctic ecosystems. A broader and more integrated approach that includes more functional species and ecosystem aspects is needed to develop a better understanding of how the Arctic's living resources are responding to change and how these changes compare with global biodiversity trends. The use of a broader and more integrated approach to biodiversity monitoring is essential in order to develop effective conservation and adaptation strategies.

Therefore, in support of the Terrestrial CBMP and on behalf of the U.S., the NSSI now co-leads the development of a Terrestrial Expert Monitoring Group (TEMG). The purpose of the TEMG is to ensure better coordination between existing terrestrial biodiversity monitoring initiatives and networks and to enable more efficient and effective synthesis and delivery of the results of this monitoring to decision makers, stakeholders, and the general public.

Prior to the first TEMG Workshop, the group drafted an Arctic Terrestrial Monitoring Background paper. That Background paper is now published as a CBMP/ CAFF report and can be found on CAFF's webpage <http://www.caff.is>. The paper provides an overview of the development of the monitoring and implementation plan and was produced with assistance from a number of experts in various countries.

The first workshop of the working group was held early in FY12 (October 11-14, 2011) in Sonnerupgård, Denmark. The workshop brought together about 50 of the world's Arctic experts to develop the first draft of a circumpolar monitoring plan. The workshop coincided with similar workshops (International Arctic Science Committee and the International Network for Terrestrial Research and Monitoring in the Arctic). The interactive nature of these workshops helped develop synergies in Arctic terrestrial research and monitoring.

On May 15-17, 2012, the NSSI hosted the second of three workshops for the TEMG in Anchorage, Alaska. Workshop participants included national representatives from Iceland, Norway, Sweden, Finland, Denmark, Greenland, Faroe Islands, Russia, Canada and the United States, as well as Alaska Native representatives from remote villages in Alaska. This workshop sought to provide a thorough and focused discussion of the critical elements of the Arctic Terrestrial Biodiversity Monitoring Plan, and to reach agreement on priority parameters, key ecosystem monitoring components, and sampling approaches that can be employed across the Arctic.



The third and final workshop in this series is planned for Akureyri, Iceland, in late September 2012. According to the timeline, the final plan will be approved by the CAFF Board prior to the Arctic Council Ministerial gathering in Kiruna, Sweden, in May 2013.

Niels Martin-Schmidt (Denmark) leads TEMG discussion of the ecological role and cultural importance of caribou in the Arctic. (NSSI)

Arctic Observing Network (AON) Workshop

The Arctic Observing Network (AON) constitutes a key piece of the United States Study of Environmental Arctic Change (SEARCH) effort. One of the defining aspects of the AON is the policy of rapid, free, and open access to all data and metadata. This open access approach is leading to broad and direct collaboration between scientists, agencies, and stakeholders. The Arctic Observing Network Coordination Workshop (March 20-22, 2012) was designed to build on this collaboration by bringing together researchers, representatives from the relevant agencies, and stakeholders involved with long-term observations of Arctic change.

The workshop started with a plenary session with nine invited presentations. These presentations discussed the observational needs of stakeholders, agencies, decision makers, and modelers and SEARCH science goals. There was also an evening poster session covering a wide range of topics, including Arctic observations and activities.

Breakout groups developed eleven showcase projects that balanced the research interests of the scientific community and the information needs of different agencies and stakeholders. These projects foster dual-use of resulting datasets and information products, both from a fundamental and an applied research perspective. The eleven showcase projects are:

1. From Observations to Management: Providing Scientific Information to Inform Decisions Regarding Offshore Oil and Gas Activities in the Chukchi Sea
2. A Distributed Biological Observatory
3. Multidisciplinary Drifting Observatory for the Study of Arctic Climate
4. Community-based observation network for Adaptation and Security
5. Ocean Observations to Improve Sea Ice Forecasting
6. Long-Term Sea Level Measurements along the Alaskan Chukchi and Beaufort Coasts
7. Arctic Ocean Freshwater and heat observing system
8. Distributed Environmental Observatory
9. Utilizing the State of the Existing Knowledge to Guide Infrastructure Development
10. What are the causes and consequences of the greening of the Arctic?
11. Connecting Arctic Communities with One Another and with Scientists: Building a Community-Based Observation Network

The full workshop report is available at <http://www.arcus.org/search/meetings/2012/coordination-workshop>

North Slope Land Cover Mapping

The NSSI has been working with partners over the past few years to bring North Slope land cover maps into the digital age. Land cover maps are integral to wildlife habitat evaluation and selection studies, climate change modeling, fire fuels planning and many other studies and uses. On the North Slope approximately 55 different prior land cover products have been completed by agencies, universities and industry. Many of these map products supported localized research projects; some were more regional with limited field data for validation; still others were computer-generated maps with no field validation. All of these map products had a common element: no map used a standard protocol that could be used to combine efforts into a single slope-wide land cover map.

The goal of the NSSI has therefore been to develop an accurate, field-verified, slope-wide land cover map that can serve as a baseline for a range of uses. Several of the Emerging Issue Summaries (which can be viewed at <http://northslope.org/issues>) identify the need for an accurate slope-wide land cover map to more fully understand issues such as vegetation change, lake drying, saltwater intrusion, changing fire regimes, and wildlife habitat selection and availability.

All field work is now complete and the final phases of photo interpretation, edge mapping, and land cover and vegetation classification have begun. Final products of this extraordinary effort are expected to be available in the Fall of 2012 for broad use as a baseline for landscape-scale change detection, with change quantification possible down to a 2.5- to 5-acre parcel level.



Arctic poppies along an eroding section of North Slope coast (USGS, Benjamin Jones)

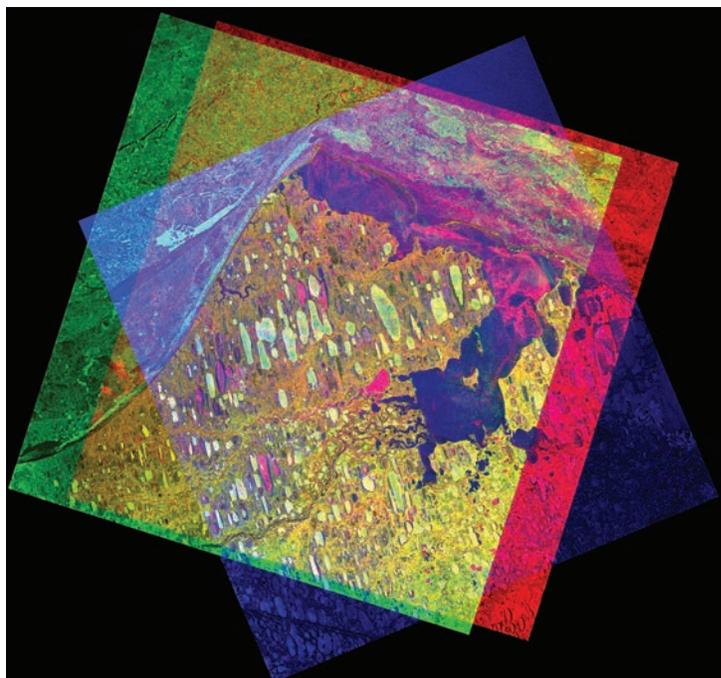
North Slope Winter Lake Mapping

The North Slope coastal plain of Alaska represents a unique landscape that is characterized by permafrost and an immense number of freshwater lakes of varying sizes and depths. Deep lakes provide drinking water to villages, habitat for fish and wildlife species that support subsistence resources for local populations, and a freshwater supply for industrial development. During winter, lakes on the coastal plain typically freeze to a depth of approximately 2 m, with deeper lakes retaining liquid water.

A variety of anadromous and resident fish species including sticklebacks, several salmonids, whitefish and blackfish overwinter in lakes on the coastal plain. Many of these fish are important subsistence resources and as forage fish for migratory bird species such as loons. Suitable overwintering habitat is widely believed to constrain fish populations on the North Slope.

The North Slope coastal plain also has significant oil production infrastructure and is an area of active exploration and development. Lakes that are deep enough to remain unfrozen during winter are an important source of freshwater for ice road construction. The appropriate selection of lakes as water sources for ice road construction is important to minimize environmental impacts during periods of restricted liquid water availability while still meeting the water demands for ice road construction. An understanding of the location and quantity of winter freshwater sources is therefore an important consideration for strategic design and the permitting processes of industry and resource management agencies.

Satellite remote sensing provides the ability to classify the approximate 158,000 lakes on the North Slope coastal plain in a cost-effective manner. Synthetic Aperture Radar (SAR) has the ability to see through clouds and image in winter. A project funded by the North Slope Science Initiative in collaboration with the National Fish and Wildlife Foundation was recently completed to classify the 158,000 lakes as either completely frozen or retaining liquid water. The project found that approximately 1/5th of these lakes (33,500) retain liquid water during the winter months, and that liquid water is readily available in winter throughout much of the North Slope. The figure at right summarizes the final data layer generated under this project. This data is available to all stakeholders and can be accessed at <http://catalog.northslope.org/catalog/3007>.



Multicolor Synthetic Aperture Radar (SAR) image of North Slope lakes across seasons (Michigan Tech Research Institute)

Science Technical Advisory Panel Activities



Seine crew from Alaska Department of Fish and Game samples fish in the Ivishak River on Alaska's North Slope. (ADFG)

STAP activities for the year began with a focus on completing additional Emerging Issue Summaries on fisheries, social and economic dimensions, and restoration. The first two are now posted on the NSSI website (<http://northslope.org/issues>), along with the other 13 Summaries previously completed by the STAP. Each issue summary includes the status of relevant science and information needs, preliminary findings on management concerns, and a shortlist of STAP recommendations to initiate and address the science of these critical shared needs. Other forums like the Alaska Climate Change Executive Roundtable, Alaska Governor's Subcabinet on Climate Change, the Department of the Interior's

Arctic Landscape Conservation Cooperative and Alaska Climate Science Center, and the Interagency Arctic Research Policy Committee have used these STAP products to help focus and build their science programs.

Completion of these summaries allowed the STAP to change its focus to addressing issues brought forth by the Oversight Group as a result of a strategic review and planning retreat it held in September 2011. Two focal areas that emerged from that gathering were long-term monitoring and potential development scenario planning. These two NSSI Oversight Group priorities are notably consistent with the findings and recommendations of the STAP's previous work, particularly its "connectivities paper" which was published in the peer-reviewed journal *Arctic* (Vol.64, No. 3) and highlighted in the *2011 Report to Congress* (see <http://northslope.org/reports>).

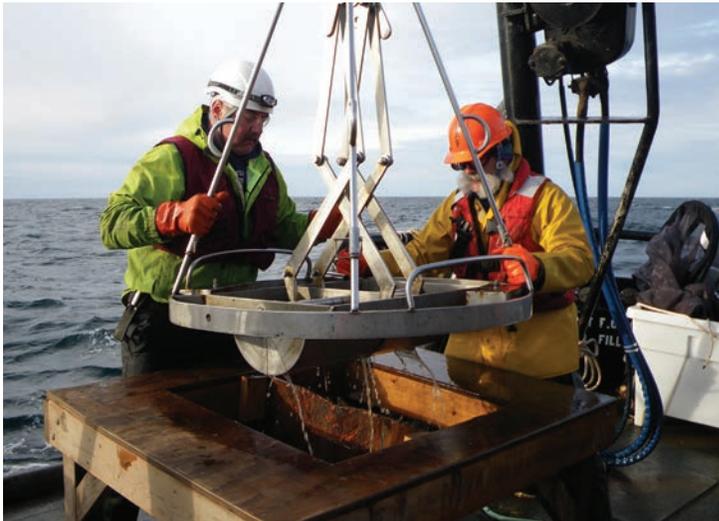
The initial steps the STAP has taken toward addressing long-term monitoring has been the identification of existing efforts. A preliminary list of over one hundred projects that have run or are expected to run for at least ten years was generated using the NSSI Catalog and other sources of information. This list is now being reviewed by STAP and Senior Staff Committee members to ensure the entries are accurate and meet the qualifications of long-term monitoring, as well as to identify projects that were missed in this initial effort. For more detail, see the "Long-term Monitoring" section of this *Report to Congress*.

The STAP was also tasked to make recommendations on the use of scenario planning to help identify priority needs for future research and monitoring efforts. Scenario planning provides a means to identify a range of possible scenarios (also called "plausible futures") and begin planning for their potential implications. A scenario planning subcommittee was formed and initial activity has focused on understanding existing scenario planning efforts and which approaches may work best for identifying research and monitoring needs for resource management applications. The STAP Chair and the Chair

of this subcommittee will join other NSSI staff in a scenario planning training later this year. At its next meeting the STAP will begin to identify the likely drivers of change that will factor into the NSSI scenario planning exercise. For more detail, see the “Scenario Planning” section of this Report to Congress.

Over the next year, the NSSI expects the long-term monitoring and scenario planning efforts to interact extensively and for the STAP to be integrally involved in both. The shape of this interaction will be guided by the existing Emerging Issue Summaries and the early patterns that emerge from the scenario planning exercise. For example, the NSSI fully expects that scenario planning will help guide the identification of gaps in the existing long-term monitoring efforts and the determination of critical variables to monitor in the future. In turn, the refinement of our knowledge of long-term monitoring efforts will likely provide a basis of understanding to inform the scenario development process.

Development Scenarios and Long-term Monitoring



Coastal ocean sediment sampling under the Alaska Monitoring and Assessment Program. (ADEC, Terri Lomax)

Potential Development Scenarios

In FY 2011, the NSSI Oversight Group, guided by the overarching priorities identified in the “connectivity paper” produced by the STAP, made some important decisions about the direction and focus of NSSI efforts for the near term. Chief among these was a decision to focus on the identification and coordination of long-term monitoring needs and potential development scenarios for the North Slope. Important initial steps have been taken to identify ongoing long-term monitoring work and our progress on this initial effort is summarized below. However, the breadth

of possibilities for what the future may bring to the North Slope and broad uncertainty about the impacts of those possibilities make it very difficult to know where best to target significant investment in future monitoring systems. Scenario planning is one of the best ways to prepare for an uncertain future. For that reason, NSSI is initiating a scenario planning exercise to gain insight into the potential future of human activities (such as energy development, shipping, tourism, fishing, ports, transportation, and so on) on the North Slope and adjacent seas over the next 20 years.

Scenario planning has been described as “a systematic method for thinking creatively about possible complex and uncertain futures.”¹ It provides an alternative to ‘taking your best guess’ at what the future will be (prediction) and then building plans around that one uncertain outcome. Instead, scenario planning exercises build on scientific knowledge by also addressing the complex social setting and the

¹Peterson, G.D., G.S. Cumming, and S.R. Carpenter. 2003. Scenario planning: a tool for conservation in an uncertain world. *Conservation Biology* 17(2):358-366.



Ice scientist investigates pressure ridge on the Beaufort Sea off the North Slope of Alaska. (NOAA)

local and global conditions in which the future will play out. The purpose is to identify a variety of plausible futures (possibilities) “that include many of the important uncertainties”¹ of the social-ecological system. This is a participatory process that includes expert prediction, but can also use steps like surveys and interviews, facilitated workshops, and interactive modeling to produce structured accounts of a defined range of possible futures (scenarios). These scenarios can then be used to help inform important management decisions, for example, about future investments in long-term monitoring systems.

A critical early step in scenario planning is usually to make some informed assumptions about what the drivers of change will be. Therefore, at its next meeting, the STAP, in collaboration with the Senior Staff Committee, will initiate the effort to identify these baseline assumptions and parse out what forces may act to change the future. In the interim, the NSSI Executive Director and Deputy Director, along with the STAP Chair and the leader of a STAP Subcommittee on Scenario Planning, will participate in a facilitated workshop on Scenario Planning for Arctic Futures. With these building blocks in place and with adequate funding from among NSSI member sources, the contracting process should begin this Winter for a full scale scenario planning exercise, with the initial stages of scenario planning beginning by next Spring and playing out over the following year to year-and-a-half.

Long-term Monitoring

When the NSSI Oversight Group tasked the STAP with addressing long-term monitoring in relation to scenario development on the North Slope and adjacent seas, a STAP Subcommittee on Long-term Monitoring was formed and is chaired by Dr. Robert Shuchman (Michigan Tech Research Institute). Subcommittee members include a combination of STAP, NSSI staff, and Senior Staff Committee members, with representation from academia, agencies, and industry. The subgroup is charged with creating an inventory of long-term monitoring programs on the North Slope and adjoining seas, identifying gaps in ongoing monitoring, and generating recommendations to the Oversight Group for additional monitoring efforts that support potential development scenarios.

A preliminary list of 104 long-term monitoring projects has been identified. For the purposes of this exercise, “long-term” refers to projects that are ten or more years in duration or projects that have been undertaken in the last five years and are intended to continue into the foreseeable future. The list is hosted on the NSSI website (<http://www.northslope.org/monitoring>) and is interactive to allow stakeholders to view, sort, export, and add records to the list. Information currently collected for each data record includes: title, description, status, duration, primary and secondary organizations, affiliations, topics, subtopics, location, contact, website URL, data source, and related publications.

The inventory of long-term monitoring programs is currently being shared with the NSSI stakeholders to enable quality assurance and quality control review, with additions or corrections where appropriate. The inventory will then be used to identify gaps in North Slope monitoring activities. Prioritized recommendations to the NSSI Oversight Group for additional or refocused monitoring are the targeted final product of this subgroup, but these will depend on the outcomes of the Scenario Planning exercise described above.

The screenshot shows the NSSI Long-Term Monitoring website in a Windows Internet Explorer browser. The page title is "NSSI Long-Term Monitoring | NorthSlope.org". The browser address bar shows "http://northslope.org/monitoring/". The website header includes "NORTH SLOPE SCIENCE INITIATIVE ALASKA" and a navigation menu with "Home", "Statistics", and "Study Details". A vertical banner on the left reads "Long-Term Monitoring". The main content area features a table titled "Monitoring Studies" with columns for ID, Title, Status, Duration, Primary Affiliation, Topics, Subtopics, Location, and Issues. The table lists 104 studies, with the first few rows visible. A "Welcome!" message on the right explains the purpose of the list and provides instructions on how to interact with the table.

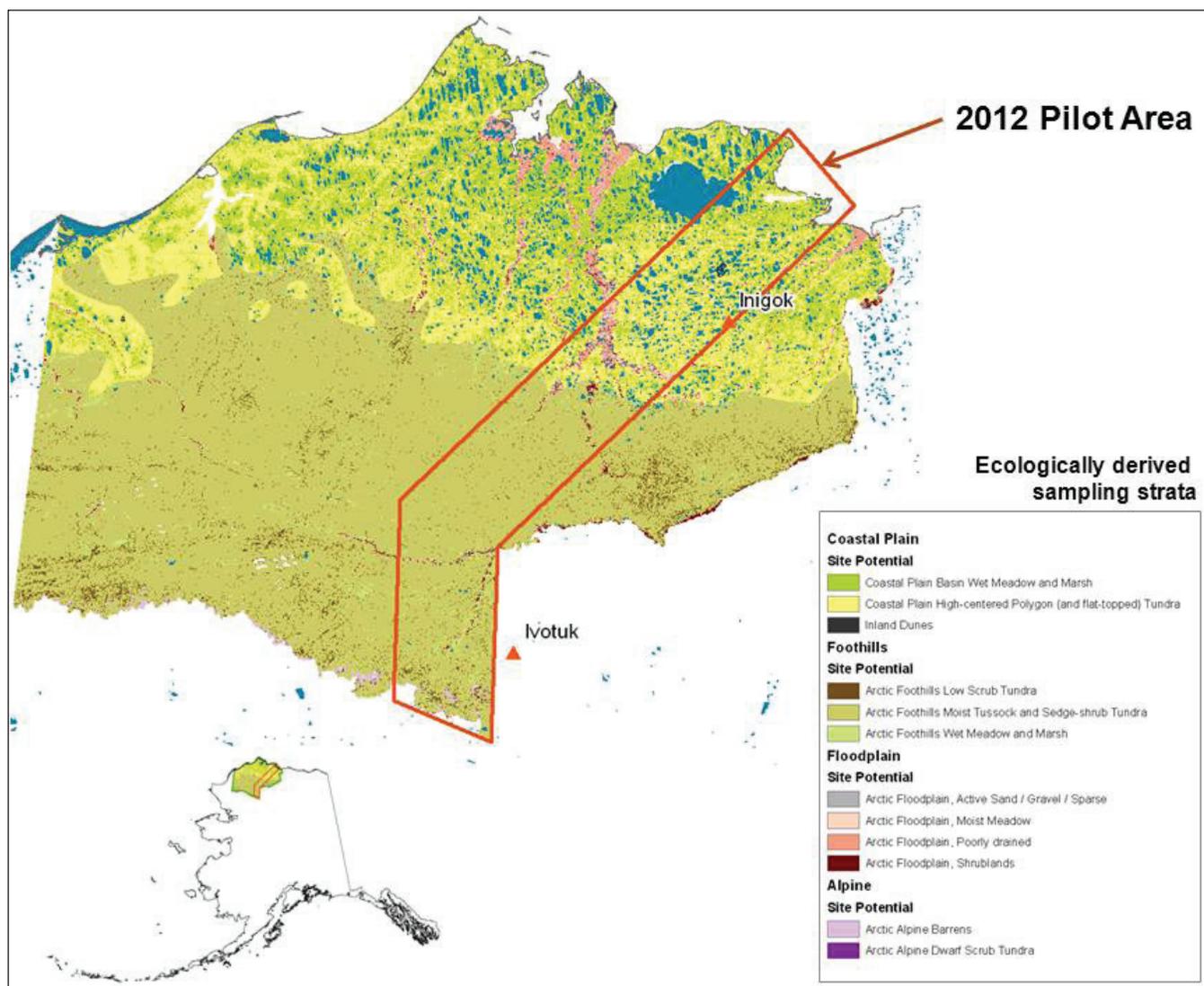
ID	Title	Status	Duration	Primary Affiliation	Topics	Subtopics	Location	Issues
117	Intern	Ongoing	1978-Present	Univer Academic	physical	ocean currents	Arctic	We
116	Teshe	Ongoing	2007-Present	U.S. G Federal	physical	inland lakes	Teshe	Coa
115	Satellit	Ongoing	2002-present	Michig Academic	vegetation, physi	remote sensing, i	North	Fire
114	Ocean	Ongoing	2004-2016	Bureau Federal	physical	water, sea ice, or	Beaufr	We
113	Oil Spi	Ongoing	2002-2016	Bureau Federal	physical	oil spill, contamin	Alaska	Cor
112	Ocean	Ongoing	1982-2013	Bureau Federal	physical	ocean circulation	Beaufr	We
111	Beaufr	Ongoing	1987-2013	Bureau Federal	social, mammals	subsistence, mari	Beaufr	Spe
110	Chukc	Ongoing	1988-2013	Bureau Federal	social, mammals	subsistence, mari	Chukc	Soc
109	Beaufr	Ongoing	2007-2016	Bureau Federal	fish	fish	Beaufr	Spe
108	BOEM	Ongoing	2000-2017	Bureau Federal	physical, mammal	water, water che	Beaufr	Cor
107	Circurr	Ongoing	2012-Present	Univer Academic	physical	permafrost	Toolik, Per	
106	Circurr	Ongoing	2012-Present	Univer Academic	physical	inland lakes	56 lak	Hyc
105	Raptoi	Ongoing	1978-Present	Bureau Federal	birds	raptors	Colville	Spe
104	Chukc	Ongoing	2008-2015	Bureau Federal	social, vegetation	water chemistry,	Chukc	We
103	Ocean	Unknown	1998-2010	Japan Unknown	physical	ocean bathymetr	Beaufr	We
102	Aerial	Ongoing	1979-2016	Bureau Federal	mammals	marine mammals,	Chukc	Spe
101	BOWF	Ongoing	2007-2017	Bureau Federal	mammals	humpback whale,	Beaufr	Spe
100	Contin	Ongoing	1999-2012	Bureau Federal	social, mammals	subsistence, bow	Cross	Spe

The "Welcome!" message on the right states: "This is a summary of long-term monitoring studies as compiled by the North Slope Science Initiative (NSSI). Please add additional studies to this summary that align with NSSI's definition of long-term monitoring. **Long-term monitoring is defined** as multiple collections of the same variable over a period of 10 years or longer by comparable methodology on the North Slope of Alaska and in adjacent waters. Acceptable entries also include projects or initiatives that have been undertaken in the last five years that are intended to continue into the foreseeable future. To explore the summary, **click on a row or multiple rows** in the table at left to view any stud(ies) in detail. **Multiple rows can be selected** using the Ctrl and Shift keys. Studies can be **sorted by clicking on the column headers**. To **add monitoring studies** to the list, click the **Add Monitoring Study** button at the top left. To **resize this panel**, hover over the border until a bevel appears, then click and hold to drag and resize."

Screenshot of the preliminary list of studies compiled by the long-term monitoring subgroup. The list can be accessed at the NSSI website (<http://www.northslope.org/monitoring/>). (NSSI)

NSSI and the “AIM” Strategy of the BLM

In 2011, the Bureau of Land Management (BLM) completed a national Assessment, Inventory, and Monitoring (AIM) Strategy (Toevs et al. 2011) which describes a “vision for integrated, cross-program assessment, inventory, and monitoring of resources at multiple scales of management.” The intent of the AIM Strategy is to “provide a process for the BLM to collect quantitative information on the condition, trend, amount, location, and spatial pattern of natural resources” from the individual tract to landscape and even national scales. To achieve this, each AIM monitoring survey will use a set of core indicators, standardized field methods, and a statistically valid study design to provide consistent and scientifically defensible information to track changes over time. Once collected, data can be managed and analyzed within a national geospatial infrastructure. Collectively, data, information, and reporting structures are designed to provide a basis for managers to adaptively manage resources to achieve management goals and objectives, improve understanding of the ecosystem, and adjust monitoring efforts as necessary using a well-documented and consistent approach.



Location of AIM pilot study area (within NPR-A) for 2012.. (NSSI)

AIM is designed to combine field assessment with remote sensing as a monitoring tool to improve monitoring efficiency. In order to test this AIM approach, the BLM has initiated field campaigns in several locations, one of which is based on the North Slope (within the NPR-A, see figure on previous page). This field campaign will evaluate core and supplemental indicators and collection methods, evaluate photogrammetry methods, test field and remote sensing integration, investigate variance within field sampling strata, learn optimal field logistic and sampling design for a remote location, and form a basis for estimating the future costs for broader-scale deployment. The NSSI assisted this AIM field campaign with logistical support in 2012 to help assess the potential suitability, and feasibility, of the AIM approach in an Arctic environment.

Coordination and Cooperation

One of the primary goals of local, state, and Federal partners when forming the North Slope Science Initiative was to improve awareness and understanding of each other's missions, management concerns, and science needs and to promote cooperation when addressing their shared concerns and needs. This purpose was solidified under the enabling legislation that emphasized coordination of ongoing and future inventory; monitoring and research activities; and cooperation among NSSI parties and the broader scientific community. The structure and organization of the NSSI was designed to enable, and NSSI leadership has promoted, the communications needed to accomplish this purpose.

External Communication

The mission and administrative structure of the NSSI requires a viable network of external contacts with academia, non-governmental entities, industry, and other science organizations. These contacts bring together potential partners, add a broader knowledge of North Slope endeavors, and assure scientific excellence in NSSI products. Networking for NSSI is accomplished in three major categories:

1. Internal communications with member agencies to gain knowledge of projects or programs occurring or planned for the North Slope;
2. Science Technical Advisory Panel expertise; and
3. Academia, workshops, seminars, and interaction with the National Science Foundation Office of Polar Programs, and other external networks having knowledge of Arctic and pan-Arctic environments (see Appendix 3)



Dr. Matt Sturm leads the NSSI Oversight Group and fellow STAP members on a tour of the U.S Army's CRREL Premafrost Tunnel. (NSSI)

Collaboration under Presidential Executive Order 13580

Executive Order 13580 (July 2011), Interagency Working Group on Coordination of Domestic Energy Development and Permitting in Alaska, declares it to be U.S. policy that “Interagency coordination is important for the safe, responsible, and efficient development of oil and natural gas resources in Alaska, both onshore and on the Alaska Outer Continental Shelf (OCS), while protecting human health and the environment, as well as indigenous populations.” In furtherance of this policy statement, the Executive Order established an interagency working group, led by the Department of the Interior with representation from the Departments of Defense, Commerce, Agriculture, Energy, and Homeland Security, plus the Environmental Protection Agency and the Office of the Federal Coordinator for Alaska Natural Gas Transportation Projects.

Among the assigned functions of this working group were to “facilitate the sharing of information and best practices,” “ensure the sharing and integrity of scientific and environmental information and cultural and traditional knowledge among agencies”, and “promote interagency dialogue.” Given these charges, the NSSI has fully engaged with and supported the working group.

For example, the NSSI-generated Emerging Issue Summaries (see: <http://northslope.org/issues>) directly contribute to the working group commitment, in its white paper titled “Addressing Additional Arctic Science Needs,” to help the Federal government use “a comprehensive, science-based approach” and “fill science needs in a broad spectrum of disciplines.” In another of its white papers, titled “Improving the Link between Science and Decision-making,” the working group seeks to “facilitate the delivery of relevant scientific information to officials responsible for making decisions related to energy development in Alaska” and to include non-Federal scientists, NGOs, industry officials, Alaska Natives, and State and Federal decision-makers in that dialogue. The structure of the NSSI, particularly with regularly scheduled and structured interactions between the Science Technical Advisory Panel and the NSSI Oversight Group, again directly contributes to the delivery of this commitment.



Instrument package being deployed in Beaufort Sea from stern of the USS Healy. (NOAA)

Collaboration with Arctic Research and Policy

The Arctic Research and Policy Act of 1984, Public Law 98-373, July 31, 1984; amended as Public Law 101-609, November 16, 1990, provides for a comprehensive national policy dealing with national research needs and objectives in the Arctic. The Act was followed on January 9, 2009, by two Presidential Directives (NSPD-66 and HSPD-25) that brought dated U.S. Arctic policy to the forefront of security and climate change. The Act established the Arctic Research Commission and an Interagency Arctic Research Policy Committee (IARPC) to help implement the Act.

The NSSI is a formal member of the IARPC as an independent organization. NSSI membership and participation in IARPC programs is important and mutually beneficial to both entities because of their difference in reach, but similarity in mission. The mission of IARPC:

- ◆ Helps set priorities for future Arctic research;
- ◆ Works with the Arctic Research Commission to develop and establish an integrated national Arctic research policy to guide Federal agencies in developing and implementing their research programs in the Arctic;
- ◆ Consults with the Arctic Research Commission on matters related to Arctic research policy, programs and funding support;
- ◆ Develops a five-year plan to implement the national policy, and updates the plan biennially;
- ◆ Coordinates preparation of multi-agency budget documents for Arctic research;
- ◆ Facilitates cooperation between the Federal, State, and local governments in scientific Arctic research;
- ◆ Coordinates and promotes cooperative scientific Arctic research programs with other nations;
- ◆ Promotes Federal interagency coordination of Arctic research activities, including logistical planning and data sharing; and,
- ◆ Submits a biennial *Report to Congress* through the President, containing a statement of the activities and accomplishments of the IARPC since its last report.

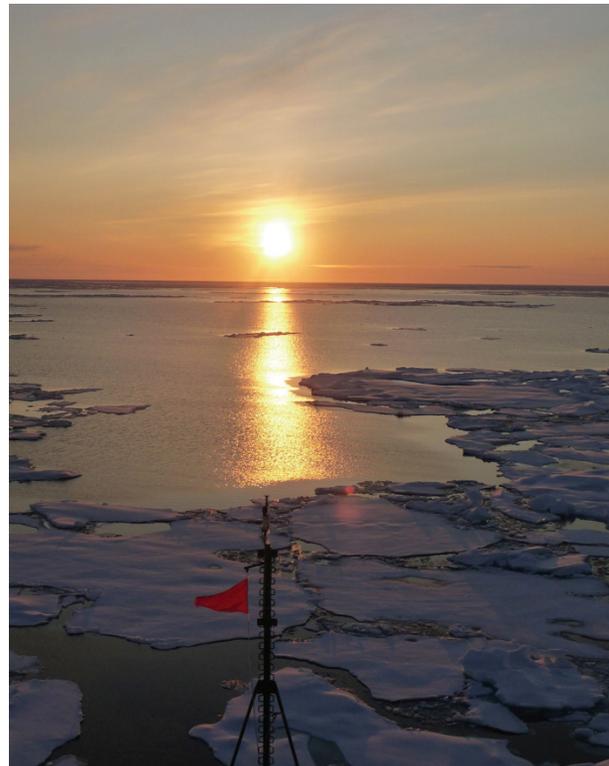


Saltwater intrusion dramatically alters vegetation along the coast of the North Slope of Alaska. (BLM)

Having principle investigator status in the development of the Arctic Observing Network and the larger Sustained Arctic Observing Network furthers the goals of the NSSI and expands networking capabilities and future partnership opportunities for Arctic activities outside the NSSI organization. There is strategic value to the NSSI in developing information sharing tools for the long-term sustainability of Arctic data. To this end, the NSSI has positioned itself as key player and contributor for the design and development of both the U.S. and the international observing systems.

NSSI Internal Communication

Even before the formation of the NSSI, the various member organizations each supported a range of inventory, monitoring, and research activities. That level of activity continues, but the substantial benefit of the organizational structure of the NSSI is that the Oversight Group and their senior staff regularly communicate and coordinate new and ongoing projects and their implications to management decisions. The Oversight Group generally meets four times a year; the Senior Staff Committee six times a year. These groups discuss each agency's specific North Slope issues and use of science for better decision making. In addition, the Senior Staff Committee meets annually to introduce new agency initiatives and report on the progress of ongoing projects. These meetings allow each organization to better understand what others are planning. They can share, collaborate, and coordinate both knowledge and resources (monetary and human capital). Each of the 2012 accomplishments described in this report has benefited from the NSSI-assisted coordination. Such interface also helps determine future information needs by providing these forums for emerging management questions.



Instrumentation on the bow mast of the U.S. Coast Guard Cutter Healy portends a busy future of scientific activity as the summer sun rises in the Arctic. (NOAA, Pablo Clemente-Colon)

NSSI Member Agency Cooperative Science on the North Slope

The NSSI provides a forum for its members to build on their own agency's study or research programs. Each year, senior staff from the member agencies gather to present their individual agency projects planned for the upcoming fiscal year. This forum provides a basis for additional cooperation and collaboration that is focused on the work each agency is planning within their mandates. Descriptions of some of the coordinated science efforts of each NSSI agency that has an operational component on the North Slope can be viewed either on the NSSI website through its Project Tracking/Data portal or on each of the member agency websites.

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United States Geological Survey. 2001. Arctic National Wildlife Refuge, 1002 area, petroleum assessment, 1998, including economic analysis. USGS Fact Sheet FS-028-01. April 2001.

For additional information on the North Slope of Alaska, or the membership organizations of the North Slope Science Initiative, please visit these websites:

Federal:

Bureau of Land Management, Alaska

<http://www.blm.gov/ak>

Bureau of Ocean Energy Management,
Alaska OCS Region

<http://www.boem.gov>

National Park Service, Alaska Region

<http://www.nps.gov/alaska>

National Marine Fisheries Service, Alaska Region

<http://fakr.noaa.gov>

National Weather Service, Alaska Region

<http://www.arh.noaa.gov>

U.S. Arctic Research Commission

<http://www.arctic.gov>

U.S. Fish and Wildlife Service, Region 7

<http://alaska.fws.gov>

U.S. Geological Survey, Alaska Science Center

<http://alaska.usgs.gov>

North Slope:

North Slope Borough

<http://www.north-slope.org>

Arctic Slope Regional Corporation

<http://www.asrc.com>

State of Alaska:

Alaska Department of Commerce,
Community & Economic Development

<http://commerce.alaska.gov>

Alaska Department of Environmental Conservation

<http://dec.alaska.gov>

Alaska Department of Fish and Game

<http://adfg.alaska.gov>

Alaska Department of Natural Resources

<http://dnr.alaska.gov>

Alaska Department of Transportation & Public Facilities

<http://dot.alaska.gov>

University of Alaska Fairbanks-Arctic Research

<http://www.uaf.edu/uaf/research>

Appendix I: Science Technical Advisory Panel Appointees

2012 Appointees and Representative Scientific Expertise	
Sue Moore, Ph.D.	Marine Ecology
Robert Suydam, Ph.D.	Marine Biology (Past Vice-Chair)
Donie Bret-Harte, Ph.D	Landscape Ecology
Amy Tidwell, Ph.D.	Hydrology
W. Scott Pegau, Ph.D.	Oceanography (Chair)
Wendy Loya, Ph.D.	Ecology/Biogeochemistry (Chair, Subcommittee on Scenario Planning)
Dan Reed, M.S.	Biometrics (Vice-Chair)
Bill Streever, Ph.D.	Arctic Restoration (Past Chair)
Michael Macrander, Ph. D.	Marine Mammals
Philip Martin, M.S.	Terrestrial Biology
Robert Shuchman, Ph.D.	Remote Sensing (Chair, Subcommittee on Data and Long-term Monitoring)
Matthew Sturm, Ph.D.	Geophysicist/Hydrology
Douglas Kane, Ph.D.	Civil Engineering
Jerry Brown, Ph.D.	Permafrost
Fenton Rexford	Traditional Ecological Knowledge

Appendix 2: Science Technical Advisory Panel Charter

1. **Committee's Official Designation:** North Slope Science Initiative Science Technical Advisory Panel (Panel).
2. **Authority:** The Panel is a statutory advisory committee established under Section 348(d), Energy Policy Act of 2005 (PL 109-58); Section 309 of the Federal Land Policy and Management Act (FLPMA), as amended (43 U.S.C. 1739); the Forest and Rangeland Renewable Resources Planning Act of 1974 (16 U.S.C. 1600); Section 14 of the National Forest Management Act of 1976 (16 U.S.C. 472a); and the Wilderness Act (16 U.S.C. 1131). The Panel is established in accordance with the provisions of the Federal Advisory Committee Act (FACA), as amended, 5 U.S.C. App. 2.
3. **Objectives and Scope of Activities:** The Panel will advise the North Slope Science Oversight Group through the Designated Federal Officer (DFO) on proposed inventory, monitoring, and research functions.
4. **Description of Duties:** Panel duties and responsibilities are generally as follows:
 - a. Provide advice to the Oversight Group on proposed inventory, monitoring and research functions;
 - b. Advise the Oversight Group on scientific information relevant to the Oversight Group's mission;
 - c. Review selected reports to advise the Oversight Group on their content and relevance;
 - d. Review ongoing scientific programs of North Slope Science Initiative (NSSI) member organizations on the North Slope at the request of the member organizations to promote compatibility in methodologies and compilation of data;
 - e. Advise the Oversight Group on how to ensure that scientific products generated through NSSI activities are of the highest technical quality;
 - f. Periodically review the North Slope Science Plan and provide recommendations for changes to the Oversight Group;
 - g. Provide recommendations for proposed NSSI funded inventory, monitoring and research activities to the Oversight Group;
 - h. Provide other scientific advice as requested by the Oversight Group; and
5. **Agency or Official to Whom the Panel Reports:** The Panel reports to the Secretary of the Interior through the DFO.

6. **Support:** Administrative support and funding for activities of the Panel will be provided by the Bureau of Land Management.
7. **Estimated Operating Costs and Staff Years:** The annual operating costs associated with supporting the Panel's activities are estimated to be \$45,000, including all direct and indirect expenses and .50 of Federal staff years.
8. **Designated Federal Officer:** The DFO is the Executive Director, North Slope Science Initiative who is a full-time employee appointed in accordance with Agency procedures. The DFO will approve or call all the Panel and subcommittee meetings, prepare and approve all meeting agendas, attend all Panel and subcommittee meetings, adjourn any meeting when the DFO determines adjournment to be in the public interest, and chair meetings when directed to do so by the official to whom the advisory Panel reports.
9. **Estimated Number And Frequency of Meetings:** The Panel will meet approximately two to four times annually, and at such other times as designated by the DFO.
10. **Duration:** Continuing.
11. **Termination:** The Panel's charter will expire 2 years from the date the charter is filed, unless, prior to that date, it is renewed in accordance with the provisions of Section 14(a)(2) of the FACA. The Panel will not meet or take any official action without a valid current charter.
12. **Membership and Designation:** The Panel shall consist of a representative group of not more than 15 scientists and technical experts from diverse professions and interests, including:
 - a. the oil and gas industry;
 - b. subsistence users;
 - c. Native Alaskan entities;
 - d. conservation organizations;
 - e. wildlife management organizations; and
 - f. academia
13. **Ethics Responsibilities of Members:** No Panel or subcommittee member shall participate in any specific party matter including a lease, license, permit, contract, claim, agreement, or related litigation with the Department in which the member has a direct financial interest. As provided in 43 CFR 1784.2-2, members of the Panel shall be required to disclose their direct or indirect interest in leases, licenses, permits, contracts, or claims that involve lands or resources administered by the BLM, or in any litigation related thereto.

14. **Subcommittees:** Subject to the DFO's approval, subcommittees may be formed for the purposes of compiling information or conducting research. However, such subcommittees must act only under the direction of the DFO and must report their recommendations to the Panel for consideration. Subcommittees must not provide advice or work products directly to the Agency. The Panel's Chair, with the approval of the DFO, will appoint subcommittee members. Subcommittees will meet as necessary to accomplish their assignments, subject to the approval of the DFO.
15. **Record keeping:** The Records of the Panel, formally and informally established subcommittees of the Panel, shall be handled in accordance with General Records Schedule 26, Item 2, or other approved Agency records disposition schedule. These records shall be available for public inspection and copying, subject to the Freedom of Information Act, 5 U.S.C. 552.



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Appendix 3: Organizations and Initiatives Related to the Arctic

Alaska Center for Climate and Policy (ACCAP) (<http://ine.uaf.edu/accap>)

Alaska Climate Change Executive Roundtable
(<http://www.doi.gov/csc/alaska/Stakeholder-Advisory-Council.cfm>)

Alaska Climate Science Center (<http://www.doi.gov/csc/alaska/index.cfm>)

Alaska Fisheries Science Center (NOAA, NMFS) (<http://www.afsc.noaa.gov>)

Alaska Marine Ecosystem Forum (AMEF)
(<http://www.fakr.noaa.gov/npfmc/conservation-issues/amef.html>)

Alaska Nanuuq Commission (<http://www.thealaskananuqcommission.org>)

Alaska Native Tribal Health Consortium Local Environmental Observer Network
(<http://www.anthc.org/chs/ces/climate/leo>)

Alaska Natural Heritage Program (<http://aknhp.uaa.alaska.edu>)

Alaska Oceans Observing System (AOOS) (<http://www.aos.org>)

Alaska Oil and Gas Association (AOGA) (<http://www.aoga.org>)

Alaska Sea Grant (<http://seagrants.uaf.edu>)

Arctic Council (<http://www.arctic-council.org>)

Arctic Contaminants Action Program (ACAP)
(<http://www.arctic-council.org/index.php/en/about-us/working-groups/acap>)

Arctic Domain Awareness (<https://www.piersystem.com/clients/c780/261751.pdf>)

Arctic Environmental Atlas (<http://maps.grida.no/arctic>)

Arctic Health (<http://www.arctichealth.org>)

Arctic Landscape Conservation Cooperative (<http://www.arcticlcc.org>)

Arctic Monitoring and Assessment Programme (AMAP) (<http://www.amap.no>)

Arctic Observing Network (AON) (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503222)

Arctic Ocean Biodiversity (ArcOD) (www.arcodiv.org)

Arctic Policy Group (APG) (<http://www.arctic-council.org/index.php/en/united-states-of-america>)

Arctic Research Consortium of the United States (ARCUS) (<http://www.arcus.org>)

Arctic Research Mapping Application (ARMAP) (<http://www.armac.org>)

Arctic Systems Science Program (ARCSS) (<http://www.arcus.org/arcss>)

ArcticNet, Network of Centres of Excellence of Canada (<http://www.arcticnet.ulaval.ca>)

Appleton Charitable Foundation (<http://www.appletonfoundation.org/arctic%20initiatives.html>)

Barrow Arctic Science Consortium (BASC) (<http://www.arcticscience.org>)

Barrow Area Information Database (BAID) (<http://baid.utep.edu>)

Canadian Sea Ice Service (<http://www.ec.gc.ca/glaces-ice/default.asp?lang=En&n=D32C361E-1>)

Circumarctic Environmental Observatories Network (CEON) (<http://www.ceon.utep.edu>)

Circumpolar Active Layer Monitoring (CALM) (<http://www.gwu.edu/~calm>)

Conservation of Arctic Flora and Fauna (CAFF) (<http://www.caff.is>)

Emergency Prevention, Preparedness and Response (EPPR) (<http://www.arctic-council.org/eppr>)

Forum of Arctic Research Operators (FARO) (<http://www.faro-arctic.org>)

Gateway to the United Nations Systems Work on Climate Change (<http://www.un.org/wcm/content/site/climatechange/gateway>)

Group on Earth Observations (GEO) (<http://earthobservations.org>)

Integrated Global Observing Strategy (IGOS) (<http://www.un.org/earthwatch/about/docs/igosptm5.htm>)

Interagency Arctic Research Policy Committee (IARPC) (<http://www.nsf.gov/od/opp/arctic/iarpc/start.jsp>)

Interagency Ocean Observation Committee (<http://www.iooc.us>)

International Arctic Science Committee (IASC) (<http://www.iasc.info>)

International Long-Term Ecological Research (ILTER) (<http://ilternet.edu>)

International Permafrost Association (IPA) (<http://ipa.arcticportal.org>)

International Polar Year (IPY) (<http://nas-sites.org/us-ipy>)

Morse Arctic Coastal Initiative (<http://www.morsearctic.net/links.php>)

National Energy Technology Laboratory
(<http://www.netl.doe.gov/technologies/oil-gas/AEO/FossilEnergy/AlaskaNSEnv.html>)

National Science Foundation, Office of Polar Programs (OPP)
(<http://www.nsf.gov/dir/index.jsp?org=OPP>)

National Security Presidential Directive/NSPD-66 & Homeland Security Presidential Directive/HSPD-25
(<http://www.fas.org/irp/offdocs/nspd/nspd-66.htm>)

National Snow and Ice Data Center (NSIDC) (<http://www.nsidc.org>)

Naval Research Laboratory Arctic Initiatives
(<http://www.star.nesdis.noaa.gov/star/documents/meetings/Ice2011/dayOne/Stewart.pdf>)

NOAA Arctic Theme Page (<http://www.fas.org/irp/offdocs/nspd/nspd-66.htm>)

Nordic Council
(<http://www.norden.org/en/news-and-events/news/new-initiatives-could-improve-eu-arctic-relations>)

North Pacific Research Board (NPRB) (<http://www.nprb.org>)

North Pole Environmental Observatory (<http://psc.apl.washington.edu/northpole>)

Office of Science and Technology Policy (OSTP) (<http://www.whitehouse.gov/administration/eop/ostp>)

Polar Bear Specialist Group of the IUCN (<http://pbsg.npolar.no>)

Polar Research Board (PRB) (<http://dels.nas.edu/prb>)

Prince William Sound Oil Spill Recovery Institute (OSRI) (<http://www.pws-osri.org>)

Protection of the Arctic Marine Environment (PAME) (<http://www.pame.is>)

SCANNET, Circumpolar Arctic Network of Terrestrial Field Bases
(<http://www.ist-world.org/ProjectDetails.aspx?ProjectId=ef3d8ecafe304278a90758c2a828d75d&SourceDatabaseId=9cd97ac2e51045e39c2ad6b86dce1ac2>)

State of Alaska, Governor's Sub-Cabinet on Climate Change (<http://climatechange.alaska.gov>)

Study of Environmental Arctic Change (SEARCH) (<http://www.arcus.org/search/index.php>)

Sustainable Development Working Group (SDWG) (<http://portal.sdwg.org>)

Sustained Arctic Observing Network (SAON) (<http://www.arcticobserving.org>)

The Ecosystems Center-Biological Discovery in Woods Hole Marine Biological Laboratory
(<http://www.mbl.edu/ecosystems>)

U.S. Arctic Research Commission (<http://www.arctic.gov>)

U.S. Army Cold Regions Research and Engineering Laboratory (CRREL)
(<http://www.crrel.usace.army.mil>)

United States Global Change Research Program (<http://www.globalchange.gov>)

Unmanned Aerial Systems (UAS) (<http://uas.noaa.gov>)

Vision for the Canadian Arctic Research Initiative
(<http://www.scienceadvice.ca/en/assessments/completed/canadian-arctic.aspx>)

World Wildlife Fund – Arctic Initiative (<http://www.wwf.ca/conservation/arctic>)



North Slope Science Initiative
ALASKA

<http://www.northslope.org>



U.S. Coast Guard buoy tender cruises along the Chukchi Sea coast off Barrow. (NSSI, John Payne)