

2016-17

North Slope Science Initiative

Report to Congress

NSSI

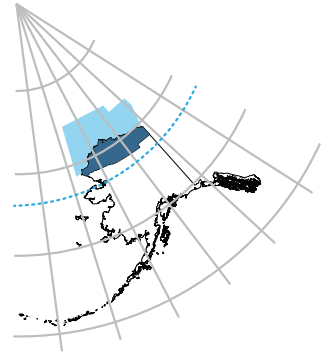
North Slope Science Initiative

<https://NorthSlopeScience.org>



NSSI

North Slope Science Initiative



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.

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 the dynamics of a changing Arctic environment.

Vision of the NSSI is to identify data and information needs, management agencies and governments rely upon to develop management scenarios using the best science and information to protect the environments of the North Slope. The NSSI adopts a strategic framework to provide resource managers with the data and analyses necessary to help evaluate multiple simultaneous goals and objectives related to each agency's mission on the North Slope. The NSSI utilizes information produced under other North Slope science programs, both internal and external to the Department of the Interior in order to complement and enhance regional science outcomes and priorities. The NSSI also facilitates information sharing among agencies, non-governmental organizations, industry, academia, international programs and members of the public to improve communication, enhance data availability, and reduce redundancies among science programs.

2005 Legal Mandate

Under the provisions of the Energy Policy Act of 2005 (PL 109-58), an annual report is due from the Secretary of the Interior. This report describes NSSI's background, scope, mission and vision, objectives, administrative structure and accomplishments, and outlines future directions based on identified issues and priorities on the North Slope and in adjacent seas.

Credits

Sara W. Longan, Ph.D., NSSI Executive Director, Mark E. Miller, Ph.D., NSSI Deputy Director, Bureau of Land Management Public Affairs Specialist Lisa Gleason and Graphic Designer Vanessa Rathbun, University of Alaska Anchorage Research Specialist Jess Grunblatt, 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.

2016-2017 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 estimated to have some of the largest oil, gas, and coal potential remaining in the United States. The North Slope supports oil and gas production that contributes heavily to the state's general fund revenue and Prudhoe Bay remains America's largest oil field covering 213,543 acres and originally containing approximately 25 billion barrels of oil. 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. These same North Slope ecosystems also receive inputs from distant sources, both in the form of benefits such as harvestable migratory species and in the form of threats such as chemical and biological pollutants. The condition and continuity of all of these systems, on land, sea and ice are essential to Iñupiat culture, food security, and well-being. In sustaining these resources and planning for safe energy exploration and development, managers also face the challenge of understanding ecosystems in a rapidly changing environment. With the recognition of these unparalleled challenges and opportunities in a changing Arctic, it remains apparent that public agencies, the private sector, and North Slope residents require a more effective mechanism to inform future management development related decisions.

Over time, the changes experienced across the North Slope were of such interest and magnitude that a clear federal, state, and local consensus emerged, concluding that enhanced coordination, and sustained observation, research, and monitoring are 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 Report to Congress outlines again the formation and organization of the NSSI and highlights its 2016-2017 accomplishments.



Pipeline over tundra on the north slope. (USGS)

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DOI Priorities and Notable Accomplishments (2016-2017)

In 2016 and 2017, the NSSI and associated partner organizations made significant progress in several areas, supporting select DOI Priorities:

DOI Priority: Creating a Conservation Stewardship Legacy Second only to Teddy Roosevelt

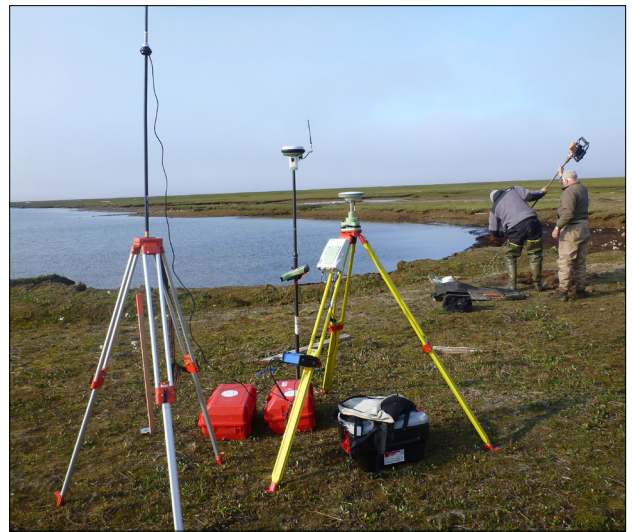
Arctic Collaboration: Participated on the multi-disciplinary U.S. AON Board as expert contributor to the development of the U.S. AON 2017-2021 Research Plan. The Plan will provide a framework for coordinating Arctic monitoring studies and network linkages for facilitating dissemination of monitoring results to supplement and enhance achievement of partner programs' research objectives. U.S. AON continues its work and leadership to improve long-term measurements of Arctic variables;

Continued to collaborate closely with other initiatives including the Department of the Interior's Arctic Landscape Conservation Cooperative (Arctic LCC) and Alaska Climate Science Center, the National Oceanic and Atmospheric Administration (NOAA) Climate Programs, and non-governmental initiatives such as Alaska Oceans Observing Systems (AOOS), North Pacific Research Board (NPRB), Arctic Council working groups, and others within the greater circumpolar Arctic community;

Continued to enhance coordination and collaboration with academic institutions, the National Science Foundation (NSF), the U.S. Arctic Research Commission (USARC), industry and other non-governmental organizations, the Interagency Arctic Research Policy Committee (IARPC), and others to share information, address management issues, and collaborate on common science needs;

NSSI Influence on Arctic Monitoring: Initiated a collaborative project with the U.S. Department of Agriculture, Natural Resources Conservation Service (USDA NRCS) to advance efforts to improve North Slope sections of the nationwide ecological land-type classification system, leveraging data and analyses associated with BLM's Assessment, Inventory and Monitoring (AIM) program.

Arctic Council: On behalf of BLM, the NSSI continues to represent the U.S. as co-lead with the Kingdom of Denmark for the Circumpolar Biodiversity Monitoring Program (CBMP) under the Arctic Council's Conservation of Arctic Flora and Fauna (CAFF) Working Group, currently under U.S. chairmanship (2017-2019). The CBMP seeks to harmonize and enhance Arctic monitoring efforts in order to facilitate more rapid detection, communication, and response to significant trends and pressures. At the request of DOI, the NSSI and BLM accepted the challenge of building this Arctic partnership and have now successfully coordinated the marine, freshwater, coastal and terrestrial monitoring programs. In the past year, the NSSI, BLM, the National Park Service (NPS) and Canada began working with the other Arctic Council nations to develop a coastal strategy, the final international monitoring plan under the CBMP. The U.S. Fish and Wildlife Service (U.S. FWS) is the current Chair of the CAFF Working Group (2017-2019).



Ground surveys on Ikpikpuk River delta.
(Benjamin Jones USGS)

DOI Priority: Utilizing our Natural Resources

Energy and Resource Development Scenarios: Oversaw preparation and accepted delivery of the final project report, *Prioritizing Science Needs Through Participatory Scenarios for Energy and Resource Development on the North Slope and Adjacent Seas*, documenting results of the Scenarios Project that was initiated in 2014 in partnership with the University of Alaska Fairbanks and GeoAdaptive LLC (see <https://catalog.northslope.org/catalog/entries/8302>). NSSI is currently working with North Slope collaborators and NSSI partners to advance the next steps necessary for implementing lessons learned from the effort and applying them to present and future North Slope development interests and associated science coordination needs;

Arctic Cumulative Impacts: Initiated a collaborative project with stakeholders and industry representatives to synthesize information from the NSSI Scenarios Project, BLM's 2013 Integrated Activity Plan for the National Petroleum Reserve in Alaska (NPR-A), and recent Arctic LCC science products to understand potential cumulative impacts of North Slope development activities and climate change on sensitive resources;

Arctic Industry Interests: Expanded outreach efforts to non-governmental entities and members of industry to understand mutual interests and science coordination needs across the North Slope. Key outcomes from these outreach efforts include, but are not limited to, developing a task force to evaluate current multi-agency environmental study requirements for relevancy, streamlining requirements where possible to reduce redundancy and help streamline data collection to help inform future management decisions.

DOI Priority: Restoring Trust with Local Communities

Arctic Stakeholder Interests: In response to a major issue of concern expressed by North Slope residents and local governments, initiated an effort to investigate acoustical and non-acoustical aspects of residents' annoyance with increasing levels of aircraft noise generated by aviation activities on the North Slope, including flights conducted in support of research and monitoring;

In response to DOI leadership and mutual interest expressed by North Slope residents and decision-makers in Alaska, initiated efforts to host a series of workshops evaluating North Slope infrastructure development priorities. NSSI is working with Alaska Native groups and local experts to proactively evaluate management tools and data needs necessary to protect North Slope ecosystems and support the safe and responsible development of critical infrastructure in the Arctic.



Blanket Toss in Utqiagvik, Alaska 2017 Nalukataq (Lisa Gleason)

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—

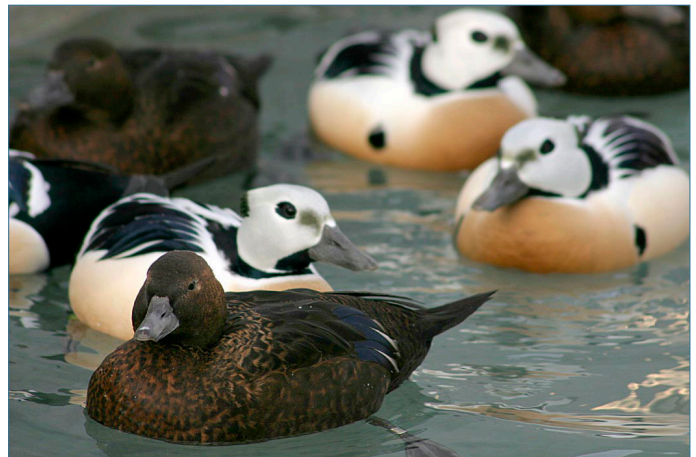
1. identify and prioritize information needs for inventory, monitoring, and research activities to address the individual and cumulative effects of past, ongoing, and anticipated development activities and environmental change on the North Slope;
2. develop an understanding of information needs for regulatory 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. #).

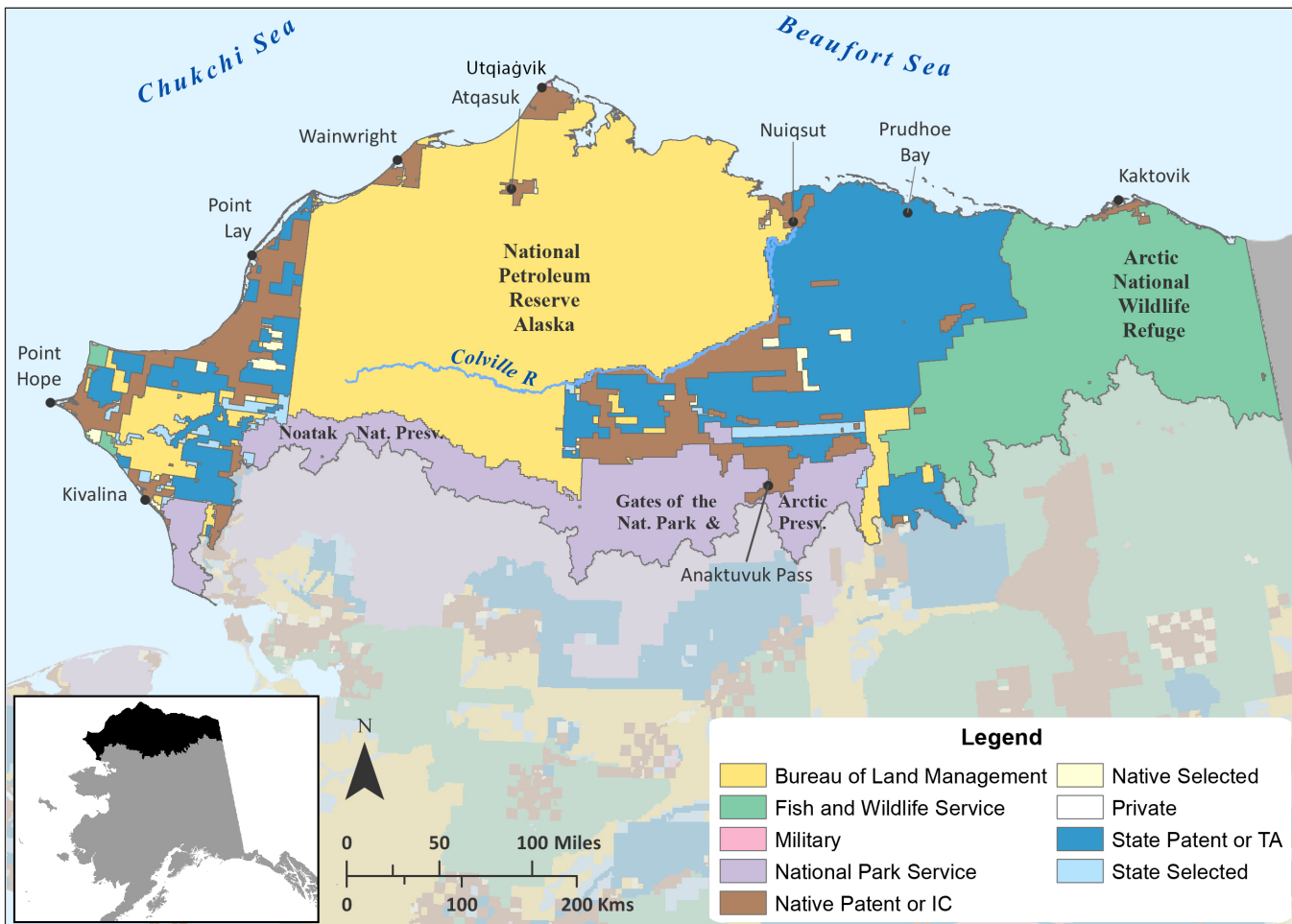
Background and Need for the North Slope Science Initiative

The North Slope of Alaska is a vast area of the polar arctic — in total, an area encompassing roughly the combined size of all of America’s eastern seaboard states from Maine through Virginia. 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 offshore 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. 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 fishes, 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



Steller's Eider. (USFWS)



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

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 a changing Arctic environment.

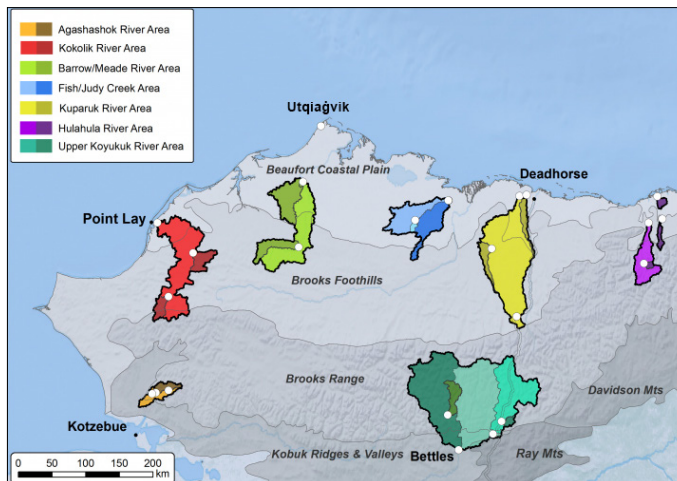
All of these resources and their patterns of development are of vital importance, both nationally and internationally and to the residents of the North Slope who depend on them for subsistence and economic well-being. The resources are managed by federal, state, and local agencies to maintain healthy 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. 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: (1) observing change, (2) understanding change, (3) 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 with partners to facilitate the collection, communication, synthesis, and application of high-quality scientific information and indigenous knowledge to development planning, implementation, and impact mitigation in the context of a rapidly changing Arctic.

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 consistently engaged to support ongoing or new national initiatives that are served by the NSSI purpose and mission. Today, NSSI remains well-poised to provide substantive support for national priorities through performance of its mission to enhance scientific understanding necessary for understanding effects and opportunities of North Slope development activities, thereby contributing to the clean and safe development of our Nation's energy resources.



The Terrestrial Environmental Observation Network (TEON), designed under the auspices of the Arctic LCC, is organized around representative focal watersheds. For more information, visit: <http://arcticlcc.org/projects/teon>. (ALCC)



Arctic Countries. (Canadian Cryospheric Information Network)



Weather Service Office in Utqiagvik with dome housing radiosonde tracking antenna. (NOAA)

Relationship of the U.S. Arctic Policy Directives to the North Slope Science Initiative

The U.S. has had over 40-years of articulating U.S. Arctic interests and developing consistent policies. Beginning in 1971 with the issuance of the National Security Decision Memorandum, which created the Interagency Arctic Policy Group, the U.S. had its first national guidance that made agencies responsible for overseeing the implementation of the U.S. Arctic Policy. The guidance served as a starting point for continuing refinements in 1983, 1984, 1994, 2009, 2010, 2013 and 2014.

The most recent iteration of the U.S. Arctic policy was issued in 2013 with the release of the National Strategy for the Arctic Region. This document was based in part on the findings of a report to the President in 2013, *Managing for the Future in a Rapidly Changing Arctic*. The strategy is built on three lines of effort:

1. Advance U.S. Security Interests – evolve Arctic infrastructure and capabilities;
2. Pursue Responsible Arctic Region Stewardship – protect Arctic environments and conserve its resources; employ scientific research to increase our understanding of the region; and
3. Strengthen International Cooperation – advance collective interests; promote shared Arctic state property; work toward U.S. accession to the “Law of the Sea Treaty.”

In 2017, the President released the Plan to Rebuild America’s Infrastructure. The initiatives set forth in this Plan are supported by NSSI’s current focus, working with our Arctic partners to implement the recommendations from the report: *Prioritizing Science Needs Through Participatory Scenarios for Energy and Resource Development on the North Slope and Adjacent Seas*, an effort that can highlight critical infrastructure needs to support responsible energy development in the U.S. Arctic.



Icebreaker corridor. (NOAA)

In 2017, the President also released the America First Energy Plan, which commits the Administration to pursue energy policies that maximize the use of energy resources in the U.S., at the same time this need “... must go hand-in-hand with responsible stewardship of the environment. Protecting clean air and clean water, conserving our natural habitats, and preserving our natural reserves and resources will remain a high priority.”

Also in 2017, U.S. Secretary of the Interior Ryan Zinke signed Secretarial Order No. 3352 to Jump-Start Alaska Energy by striking an appropriate statutory balance for development in the NPR-A and updating the resource assessments and maximizing the resource potential across the North Slope of Alaska. NSSI is well-poised to help validate the current scientific understanding of the ecosystems across the North Slope and help establish other science priorities in order to fully support the initiatives set forth in the Order.

As the U.S. Arctic strategy has evolved, the NSSI has worked to facilitate access to scientific information for decision makers; promote international cooperation; and identify plausible scenarios to help decision-makers better plan for future Arctic activity.

Organizational Structure and Administration of the North Slope Science Initiative

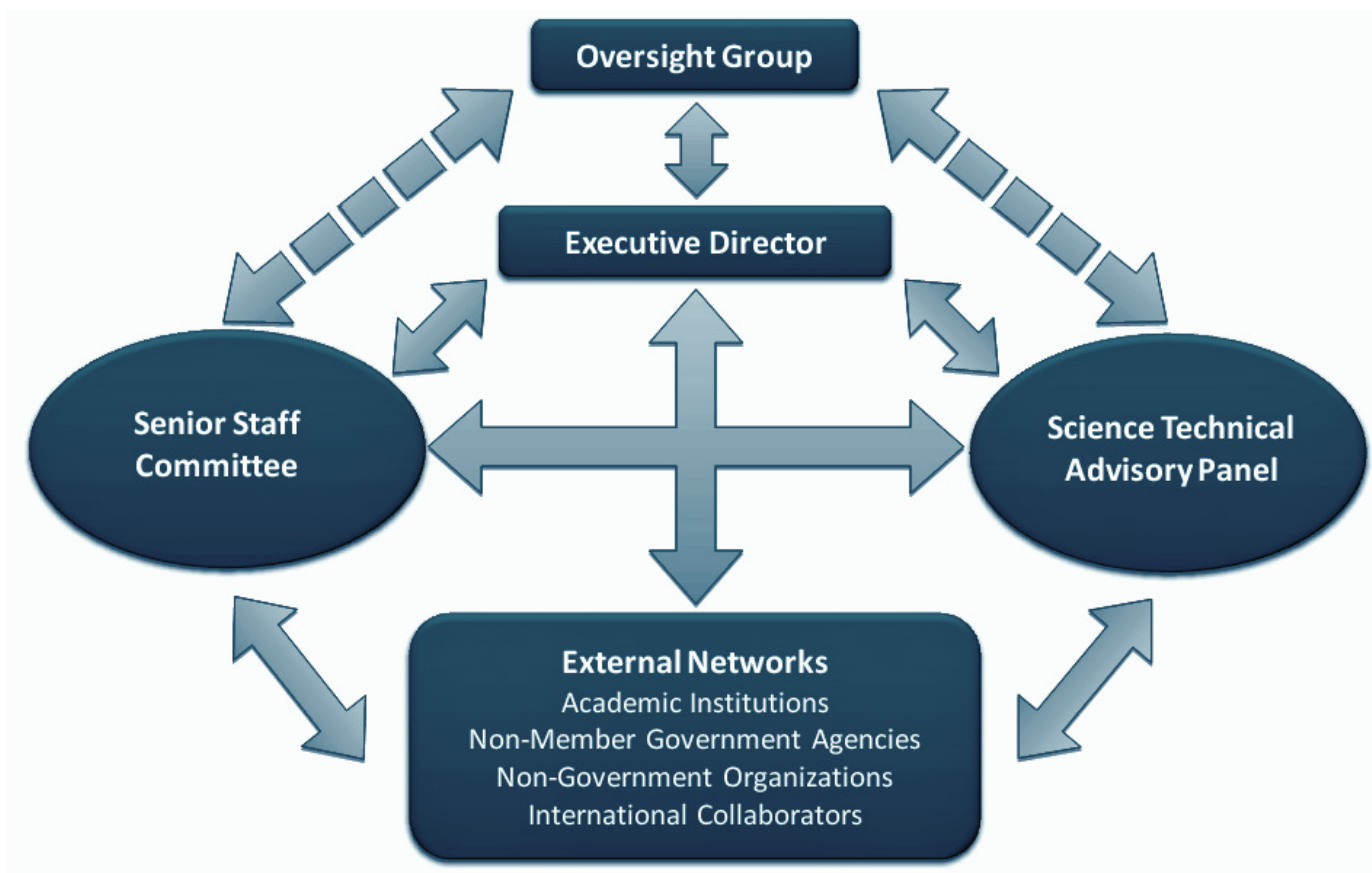
Why is the North Slope Science Initiative Unique in its Organization?

The NSSI’s uniqueness begins with its senior leadership on the Oversight Group (See charter, Appendix 1). The group’s membership comes from lead agency, government, and organization managers with responsibilities for resources on the North Slope and its offshore 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’s members include:

Department of the Interior	
Agency Name	Leadership
Bureau of Land Management (administrative agency)	State Director
Bureau of Ocean Energy Management	Regional Director
Bureau of Safety and Environmental Enforcement	Regional Director
National Park Service	Regional Director
U.S. Fish and Wildlife Service	Regional Director
Department of Commerce	
Agency Name	Leadership
National Marine Fisheries Service	Regional Administrator
State of Alaska	
Agency Name	Leadership
Department of Fish and Game	Commissioner
Department of Natural Resources	Commissioner
Local Government/ Resource Manager	
Agency Name	Leadership
Arctic Slope Regional Corporation	President
North Slope Borough	Mayor
Advisory to the NSSI	
Agency Name	Leadership
National Weather Service	Regional Director
U.S. Arctic Research Commission	Chair
U.S. Department of Energy	Arctic Energy Office
U.S. Geological Survey	Regional Director
U.S. Coast Guard	Commander, 17th District

Consistent with its mission and vision, the NSSI is a highly interactive and widely cross-cutting 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 facilitate 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 NSSI 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.

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 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 with tasks identified above, and serves as the Acting Designated Federal Officer for the Science Technical Advisory Panel on an as-needed basis. The Deputy Director also serves as Senior Staff Scientist and Chair of the Senior Staff Committee (below), providing scientific leadership and contributions to science integration, synthesis, and application to address information needs related to North Slope development activities and environmental change.



Musk oxen. (USFWS)

Senior Staff Committee

The Senior Staff Committee (SSC) is composed of representatives from member entities with experience in North Slope management and science. The NSSI Deputy Director serves as the 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.



Ice cellar near Wainwright, Alaska, is threatened by permafrost degradation and increasing coastal inundation. (Li Erikson, USGS)

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 2). 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 3, or <https://www.NorthSlopeScience.org>). Panel members may come from disciplines such as:

- | | | |
|------------------------------------|-------------------------|------------------|
| ◆ North Slope indigenous knowledge | ◆ Ecology | ◆ Remote Sensing |
| ◆ Petroleum engineering | ◆ Wildlife biology | ◆ Economics |
| ◆ Civil engineering | ◆ Marine Ecology | ◆ Ornithology |
| ◆ Geology | ◆ Biometrics | ◆ Oceanography |
| ◆ Botany | ◆ Social Science | ◆ Fisheries |
| ◆ Hydrology | ◆ Public Health | ◆ Biology |
| ◆ Limnology | ◆ Cultural anthropology | |

2016-2017 Progress and Accomplishments

Data Management and Information Sharing – NSSI Catalog

The high costs and logistical constraints associated with data collection on the North Slope can pose serious impediments to the collection of new data. Consequently, data management tools that provide for the archival, discovery and distribution of data are important to maximize the utility of existing data. In addition, diverse, existing datasets can be compiled and synthesized to develop new data products that facilitate analysis. Data stewardship (archival, discovery and distribution) and data development (compilation and synthesis) can reduce the time and expense required for acquiring data. Efficient data management can ensure that the best available scientific data are widely available to promote a common understanding of resource management issues, facilitate permitting and allow for effective decision-making.

Every year a wide variety of scientific research is conducted on the North Slope. Understanding the nature, scope and timeframe of ongoing research can provide managers with a strategic view of ongoing research that can facilitate collaborative initiatives and minimize duplication of effort. In addition, a better understanding of ongoing research can help to promote communication of science on the North Slope and to mitigate the impacts of those research activities on local communities.

The NSSI Catalog delivers data stewardship, data development and project tracking resources that support science-based decision making on the North Slope. NSSI works closely with the University of Alaska's Center for Conservation Science (ACCS) and Geographic Information Network of Alaska (GINA) to maintain the NSSI Catalog (<https://catalog.NorthSlopeScience.org>).



North Slope Science Catalog (<https://catalog.NorthSlopeScience.org>) has been updated to incorporate new technology and tools in 2017. (NSSI)

NSSI
North Slope Science Initiative

Home Catalog Documents Partners About Contact

3014 results found Displaying entries 1 - 20 of 3014 in total

Meteorological Monitoring Program - Data Summary - National Petroleum Reserve - Alaska - BLM

The Bureau of Land Management (BLM) has established a meteorological monitoring station in a remote location of the southeastern NPR-A where there is a lack of high quality dispersion meteorological data for use in modeling and climatological data representing the region between the North Slope Coastal Plain and Brooks Range foothills. The meteorological data collected are intended to support...

Status: Ongoing **Starts:** 2014-04-01 **Ends:** 2017-03-31
Updated: 2017-08-21 12:50:30 -0800

Regional Cover Mapping of Tundra Plant Functional Types in Arctic Alaska, circa 2011

ABR, Inc. (ABR) - Ecosystem maps are foundational tools that support multi-disciplinary study design and applications including wildlife habitat assessment, monitoring, and earth-system modeling. Here we present continuous-field cover maps for tundra plant functional types (PFTs) across ~125,000 km² of Alaska's North Slope at 30 m resolution. To develop maps, we collected a field-based training dataset using a...

Status: Complete **Ends:** 2016-02-11 **Updated:** 2017-10-10 07:13:41 -0800

List of Common Species on the North Slope with Inupiaq Names

North Slope Borough (NSB) - This list was prepared by the North Slope Borough Division of Wildlife Management and contains a listing of common, Inupiaq and scientific names for common birds, marine mammals, terrestrial mammals, fish, invertebrates, vegetation and berries.

Status: Complete **Ends:** 2014-10-01 **Updated:** 2017-08-11 17:50:50 -0800

North Slope Science Catalog Search page. (NSSI)

Data Stewardship

NSSI Catalog promotes access to data through flexible, web-based tools that allow for the discovery of and access to a wide range of information products such as data tables, reports, maps, images, and Geographic Information System (GIS) files. The Catalog currently provides free, public access to over 3000 records that describe over 1400 reports, 1270 projects and 320 data sets. Over the past year the Catalog has provided over 40,000 downloads and is averaging over 150 downloads daily.

Catalog promotes data sharing through protocols that allow information exchange among agencies, local government, industry and NGOs. Information products from over 40 public repositories are discoverable at the Catalog website using advanced search tools. This facilitates broader discovery of information products and ensures that users get up to date and accurate information while eliminating duplication of effort.

Project Tracking

NSSI works closely with members to maintain up-to-date project information. NSSI holds an annual project coordination meeting and solicits project updates throughout the year. NSSI promotes the automated sharing of project tracking resources among members. Catalog project tracking information was used by the NSSI Science Technical Advisory Panel (STAP) to identify long-term monitoring projects in the U.S. Arctic. Over 150 long-term monitoring projects are identified.

Software/Web Services Development

The software infrastructure that supports the Catalog has undergone substantial development to take advantage of continually improving technology and evolving NSSI requirements. These software upgrades have improved the user interface and allowed greater integration of the Catalog holdings with other data repositories and search engines (ie. DataONE and Google).

Data Development

NSSI works closely with other partners to develop important North Slope data products that support development planning and environmental assessment. For example, in partnership with National Fish and Wildlife Foundation (NFWF), synthetic aperture radar (SAR) data was used to complete the first-ever comprehensive mapping of the winter availability of water on the North Slope. NSSI has also collaborated with partners to develop landscape level ecological subsection mapping of the North Slope, as well as compilations of existing hydrological/meteorological data, permafrost data and vegetation field data. Catalog provided data and services to support the NOAA Arctic Environmental Response Management Application (ERMA) and the NSSI Scenarios Project. Current data development efforts include the compilation of North Slope infrastructure, hydrology, wildlife and plant community data.

Workshops & Related Activities

Workshops provide opportunities to identify common issues or concerns, share current knowledge, and provide a forum for increasing communication and understanding. In 2017, the NSSI continued to support these important forums, including hosting or preparing for two important international gatherings – the fifth 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 U.S. Arctic Observing Network (U.S. AON) to bring what has, to date, been a National Science Foundation principal investigator effort to observe, understand and respond to Arctic change. The outcome of the U.S. AON workshop was to build linkages between those principal investigators and agencies that are monitoring Arctic resources.



Participants in the Scenario Implications Workshop compare outcomes from all breakout groups. (GeoAdaptive)



Southeast end Deadhorse runway flooding resulted from aufeis on the Sag River. (Jeff Organek/ADOT)

United States and Canada Northern Oil and Gas Research Forum

The fifth United States and Canada Northern Oil and Gas Research Forum was held October of 2017, 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. Currently, both countries are considering proposals for the transmission of natural gas resources, and for both 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 <https://www.NorthSlopeScience.org> for the full workshop report). For example, forum sections for this fifth 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: role of government, industry, and other groups in funding these needs



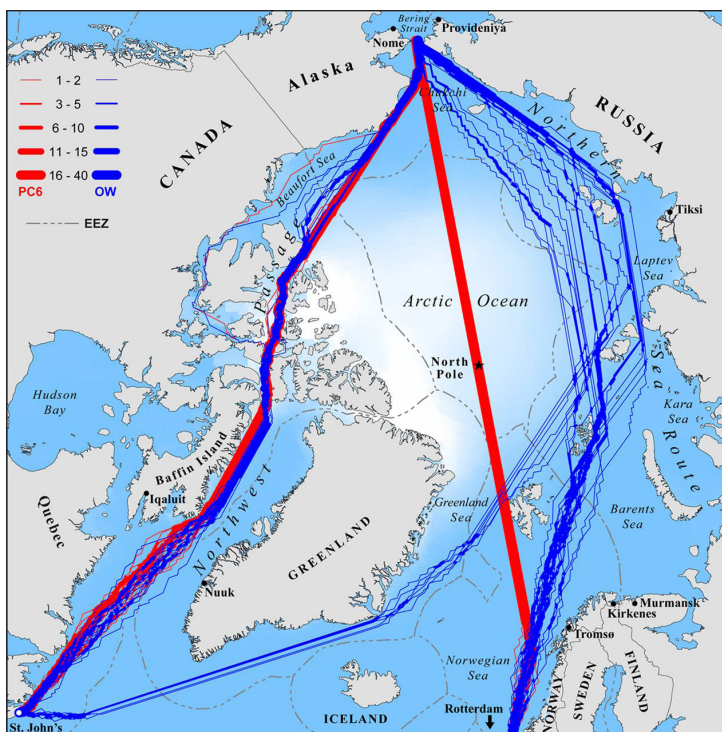
Robert (Capt. Bob) Meyer, a current NSSI Science Technical Advisory Panel member, and his crew sort a trawl sample from the Chukchi Sea. (NOAA)

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

Circumpolar Biodiversity Monitoring Activities

The North Slope Science Initiative continues to represent the U.S. on behalf of BLM as co-lead for the Circumpolar Biodiversity Monitoring Program (CBMP) along with the Kingdom of Denmark (Denmark, Greenland and Faroe Islands). The CBMP is being undertaken through the Conservation of Arctic Flora and Fauna (CAFF), which is the biodiversity working group of the Arctic Council, currently under U.S. Chairmanship (2017-2019). A complete description of the Circumpolar Biodiversity Monitoring Program is available at: <https://www.caff.is/about-the-cbmp>.

The NSSI, at the request of the Department of the Interior (DOI), initiated the first partnership with the CBMP several years ago when the CBMP was charged with developing a coordinated monitoring plan for Arctic terrestrial ecosystems. The DOI recognized that



Projection of potential future ship traffic across the circumpolar Arctic. (NAS)



The Terrestrial Expert Monitoring Group meeting in Akureyri. (Kari Fannar)

the NSSI was deeply involved with addressing much of the North Slope terrestrial environment and deemed that our experience on the North Slope with long-term monitoring would be a natural fit. During the development of the terrestrial CBMP strategy, the Bureau of Land Management offered considerable expertise using its recently developed Assessment, Inventory and Monitoring Program (AIM), which was being piloted in the National Petroleum Reserve in Alaska.

The efforts of NSSI and BLM were so successful with the terrestrial CBMP that the Conservation of Arctic Flora and Fauna Working Group of the Arctic Council asked if the NSSI and BLM would co-lead the entire CBMP, which included the marine, freshwater, terrestrial and coastal monitoring strategies. NSSI and BLM accepted the challenge to develop a significant international partnership with all eight Arctic Council nations and has since successfully coordinated the marine, freshwater and terrestrial monitoring programs. The final international monitoring plan under development is the coastal CBMP. This is the most complex of the four plans as coastal landscapes are the intersection of the marine, freshwater and terrestrial environments, and an area with significant challenges related to climate change, industrial activities and human settlements. During the past year, NSSI, BLM, USGS and Canada have begun working with the other Arctic Council nations that have coastal territory to develop a comprehensive and coordinated monitoring strategy.

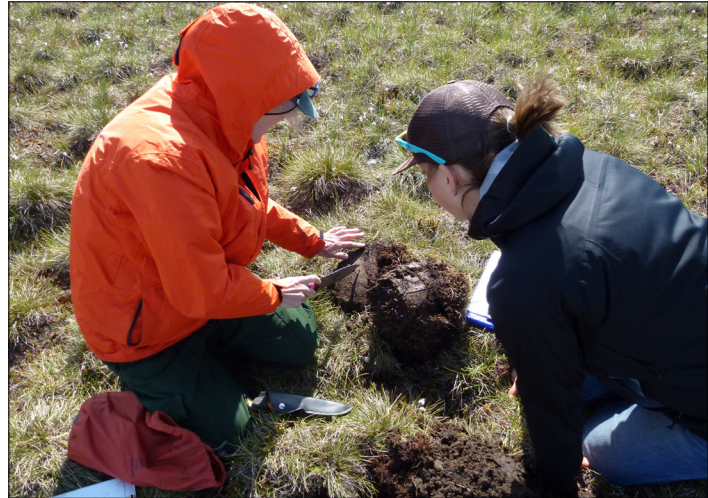
The need to measure change in arctic biodiversity is increasing, given the emerging evidence that Arctic ecosystems are already responding, in some cases quite dramatically, to climatic changes (Hinzman et al. 2005; Post et al. 2009). Substantial shifts in the arctic environment are predicted for the near future through encroachment of more southerly species and ecosystems (IPCC 2016; 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.

The CBMP is coordinating the wide range of Arctic biodiversity monitoring activity spanning biological, geographical, and climatic disciplines. This includes standardizing practices, coordinating and integrating information across the Arctic, and providing services in biodiversity management through the Arctic Biodiversity Data Service, which effectively interface with the NSSI data catalog and project management tracking systems (<https://catalog.NorthSlopeScience.org>), helping decision-making on the North Slope and in other Arctic nations.

In 2017, the NSSI Executive Director was an integral contributor to CBMP's draft strategic plan for 2018-2021, which was presented to the CAFF Board for approval in September 2017.

Science Technical Advisory Panel Activities

STAP activities focus on unresolved technical issues and science information needs for which the NSSI Oversight Group has requested external advice and recommendations. During the first half of 2016, STAP members were significant contributors to workshops and final outcomes of the NSSI Scenarios Project. Since completion of final Scenarios products in mid-2016 (see <https://catalog.NorthSlopeScience.org/catalog/entries/8302>), STAP has initiated or continued on-going work on the following topics as charged or otherwise approved by the Oversight Group:



Examining vegetation and soil content from soil pit near Atqasuk. (BLM)

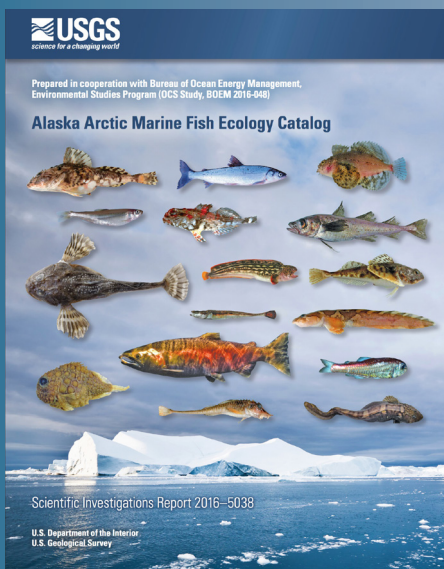
- ◆ **Synthesis and Prioritization of Existing Recommendations for Research and Monitoring.** In addition to the recent Scenarios Project, several past efforts have identified a broad suite of research and monitoring needs to support decision making in the context of North Slope energy development and environmental change. The Oversight Group has requested that STAP review and synthesize existing recommendations for North Slope research and monitoring, consider them in relation to new information, and provide the Oversight Group with advice and recommendations for advancing efforts to address the most critical information needs. This work is fundamental to the purpose of NSSI and is expected to continue into 2018.
- ◆ **Development of an NSSI Communications Strategy.** NSSI serves a diverse set of audiences and stakeholders. These include local, state, and federal government agencies that require scientific information to support decision making; the research community that requires an understanding of managers' un-met information needs in relation to specific decisions that must be made and timeframes that must be met, as well as an understanding of the financial, regulatory, and logistical constraints and collaborative opportunities for conducting research on the North Slope; North Slope residents that have the potential to be impacted by agencies' management decisions, development activities, and research activities in the context of rapid social and environmental change; and the public as a whole, which has a stake in North Slope issues as citizens of Alaska, the United States, and the circumpolar Arctic. NSSI and the Oversight Group have recognized the need for an explicit communications strategy that clearly articulates and tailors specific communications objectives, messages, and methods to meet the needs of this varied set of audiences. With approval from the Oversight Group, STAP began work on this topic in 2016 in partnership with NSSI staff, with an expectation of submitting a communication strategy for review, approval, and implementation in 2018.

- ◆ **Advice and Recommendations for Mitigation of Aviation Impacts on North Slope Residents and Subsistence Activities.** Due to the North Slope's remote location, great spatial extent, and relative lack of developed infrastructure and road connectivity, air travel is an essential component of nearly all activities that occur there. With community growth, increasing levels of energy exploration and development, and increasing levels of public and scientific interest on the North Slope, there has been a corresponding increase in the amount of aviation activity, particularly involving helicopters and small propeller-driven aircraft capable of operating in areas without developed airstrips. North Slope residents and local governments have identified the issue of aviation impacts on residents and residents' subsistence (hunting and gathering) activities as foremost among those related to energy development and associated research and monitoring efforts. In late 2016, the Oversight Group determined the need for NSSI to engage in this issue by facilitating the identification and implementation of practical measures to mitigate aviation impacts. STAP began work on this charge in early 2017 through establishment of a working group that was assigned to develop and provide recommendations to the Oversight Group. Recommendations are expected to be forthcoming in 2018.

In April 2017, the DOI initiated a status review for all current federal advisory committees established for the purpose of advising the Secretary or other departmental officials. Advisory committee activities were temporarily suspended during the course of the review period. Three-year appointments for six STAP members expired during this period, and NSSI issued a call for nominations to fill these six vacancies on October 25, 2017.

See Appendix 2 for a list of NSSI STAP members that served during 2016 and 2017.

Project Highlight



The recently completed Bureau of Ocean Energy Management (BOEM) study Alaska Arctic Marine Fish Ecology Catalog, conducted in partnership with USGS and researchers from the University of California, Santa Barbara, is just one example of BOEM's many collaborative efforts. This project produced a major synthesis and compendium of biological information about the marine fishes occurring in the U.S. Arctic, providing detailed descriptions of 104 species, including 20 newly confirmed species. The report summarizes what is known about the natural history of each species and explores the adaptations and limitations of fish populations to Arctic environments. Priority species include those that are used in subsistence activities and are seasonally important to the food security of many Alaska Native communities and those that are important to the functioning of marine ecosystems. BOEM has distributed the Catalog, which also documents colloquial Iñupiat names for the marine fish species used by indigenous peoples, to approximately 90 Alaska Native communities and organizations and other stakeholder groups. This information will inform decisions on oil and gas activities as well as natural resource management and conservation decisions and policies.



Vegetation monitoring at a tundra rehabilitation site on the North Slope. (Lorene Lynn, Red Mountain Consulting, LLC)

Long-term Monitoring

As noted above, 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. The Subcommittee membership is comprised of 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 have been previously identified by the STAP. For the purposes of this exercise, “long-term” referred to projects that were ten or more years in duration or projects that had been undertaken in the last five years and are intended to continue into the foreseeable future. This list of long-term monitoring projects is currently being updated to reflect further information.

The inventory of long-term monitoring programs is currently being shared with the NSSI stakeholders to enable quality assurance/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 of course depend on the outcomes of the Scenario Planning exercise described above.

Outreach and Communications

Communicating about science on the North Slope is essential to NSSI's mission. With increased focus on the Arctic related to the U.S. Chairmanship of the Arctic Council, NSSI is playing an important role as a conduit for communicating the latest science to inform policy discussions. It is with that in mind that the NSSI has been active on the web and social media during the past year.

The NSSI website (<https://www.NorthSlopeScience.org>) was revamped in 2017 to update the look and sharpen its focus. The emphasis is now on up-to-date NSSI content, with a special section for Arctic-related documents and publications. This section is intended to help provide context for greater understanding of the strategic priorities to address the unique challenges facing the Arctic. In addition, the website now features multiple links to direct visitors to the research and monitoring data found on the North Slope Science Catalog site.


NSSI saw increased visibility through its social media activities as the number of people following NSSI's Facebook posts more than tripled. In addition, the NSSI Facebook page is now linked to the NSSI Twitter account, so all Facebook postings are automatically posted to Twitter. The NSSI Twitter account saw modest growth in followers during the past year.

Coordination and Cooperation

One of the primary goals of local, state, and federal partners when forming the North Slope Science Initiative was to improve upon their awareness and collective understanding of each other's missions, management concerns, and science needs and to promote cooperation in 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.




Polar Bear on the coast. (Mike and Patsy Aamodt)



NSSI
North Slope Science Initiative


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Fostering Science Collaboration on Alaska's North Slope

The North Slope Science Initiative


The mission of the North Slope Science Initiative (NSSI) is to improve the scientific and regulatory understanding of Alaska's North Slope in the context of resource development and environmental change and to identify data and information products that management agencies and governments will need in the future.




Catalog
NSSI catalog is a repository of projects, data, and literature for the North Slope.
[Explore...](#)



Oversight Group
The Oversight Group (OG) is an executive level organization that sets direction for the NSSI.
[Read more...](#)



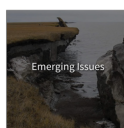
Science and Technical Advisory Panel
The Science and Technical Advisory Panel (STAP) advises the OG on inventory, monitoring, and research needs.
[Read more...](#)




Documents and Reports
The NSSI maintains a repository of federally mandated documents as well as reports and publications produced by the organization.
[Explore...](#)

Featured Products


Featured products are reports, data, and mapping applications produced by NSSI efforts. The focus of our products is to identify or fulfill critical science needs.




Emerging Issues




Scenarios for North Slope



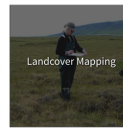
Ecological Mapping




Permafrost Mapping



Winter Water Availability



Landcover Mapping



IMI Hydro/Mgt Database

New NSSI website. (NSSI)

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

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

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



Permafrost Erosion. (USGS)

External Communication

The mission and administrative structure of 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 through: 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.

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 (IAWG), 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 (EPA) 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 IAWG.

For example, the NSSI-generated Emerging Issue Summaries (see: Featured Products at <https://NorthSlopeScience.org>) directly contribute to the IAWG commitment, in its white paper titled “Addressing Additional Arctic Science Needs,” to helping 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 IAWG 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, Nongovernmental Organizations (NGOs), industry officials, native Alaskans, 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.

Collaboration with Arctic Research and Policy

The Arctic Research and Policy Act (ARPA) 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 ARPA established the Arctic Research Commission (ARC) 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 ARC 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 ARC 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



Hoar frost forms in permafrost tunnel near Utqiagvik, Alaska.
(Lorene Lynn, Red Mountain Consulting, LLC)

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.

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 ongoing 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 meet 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). Such interface also helps determine future information needs by providing these forums for emerging management questions.

NSSI Member Agency Cooperative Science on the North Slope

The NSSI has also provided 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.



Large dolly varden, *Salvelinus malma*. (John Wenburg USFWS)

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Appendix I: Oversight Group Charter

1. **Official Designation:** North Slope Science Initiative, North Slope Science Oversight Group (hereafter the Oversight Group).
2. **Background and Need:** Alaska's North Slope and adjacent seas provide important terrestrial, estuarine, and marine habitat for a wide range of fish, migratory birds, terrestrial and marine mammals (for example, caribou, seals, whales), and other species that are culturally important to many Alaska Natives and their communities. This area is also believed to have some of the largest remaining oil, gas, and coal potential in the United States. As production from these reserves becomes more economically feasible, the strategic and economic importance of the North Slope's energy resources will be even greater. In sustaining these resources and planning for safe energy exploration and development, managers also face the challenge of a rapidly changing Arctic climate. The domestic and international scale of these challenges, opportunities, and changes are of such magnitude that there is federal, state, and local consensus that enhanced, coordinated, and sustained inventory, monitoring, and research are vital to supporting an integrated ecosystem-based management approach. In response, federal, state, and local governments collectively formed the North Slope Science Initiative, which was formally authorized under the Energy Policy Act of 2005 (Public Law 109-58, Sec. 348).
3. **Mission:** The mission of the Oversight Group is to enhance the quality and quantity of the scientific information available for aquatic, terrestrial, and marine environments on the North Slope and to make this information available to decision makers, governmental agencies, industry, and the public. This mission will be accomplished through a coordinated and integrated approach to conducting inventory, monitoring, and research activities on the North Slope.
4. **Goals:** The Oversight Group directs and facilitates a coordinated approach to information gathering and analysis on the North Slope and its associated marine environment, including the integration of contemporary and traditional local knowledge. Specifically, the Oversight Group will:
 - Develop an understanding of informational needs for regulatory and land management agencies, local governments, and the public;
 - Identify and prioritize informational needs for inventory, monitoring, and research activities to address the impacts of past, ongoing, and anticipated development activities on the North Slope;
 - 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;
 - Identify priority needs not addressed by existing agency science programs, and develop a funding strategy to meet these needs;

- Maintain and improve public and agency access to accumulated and ongoing research, and to contemporary and traditional local knowledge; and
- Ensure through appropriate peer review that the science conducted under the oversight of the NSSI and by participating NSSI agencies and organizations is of the highest technical quality.

5. Membership: The Oversight Group consists of the following member agencies with voting privileges: the State Director of the Bureau of Land Management; the Regional Directors of the U.S. Fish and Wildlife Service, National Park Service, National Marine Fisheries Service, and the Bureau of Ocean Energy Management; the Commissioners of the Alaska Department of Natural Resources and the Alaska Department of Fish and Game; the Arctic Slope Regional Corporation President; and the Mayor of the North Slope Borough. These represent the principal agencies at the regional, State, and Federal levels with management responsibilities for public lands, fish, and wildlife on the North Slope. In addition, the U.S. Geological Survey, National Weather Service, and U.S. Arctic Research Commission will participate on the Oversight Group as the primary advisory agencies on science issues related to the North Slope, but will not have voting privileges.

6. Summary of Agency Missions and Roles:

A. Federal/Voting

1. Bureau of Land Management collaboratively manages its Alaska lands and its uses on the North Slope to promote healthy and productive ecosystems for present and future generations, in accordance with the Federal Land Policy Management Act (FLPMA) and the Naval Petroleum Reserves Production Act of 1976 (NPRPA). The NPRPA encourages oil and gas leasing in the National Petroleum Reserve in Alaska (NPR-A), while requiring protection of important surface resources and uses, including any activities related to the protection of environmental, fish and wildlife, and historical or scenic values.
2. U.S. Fish and Wildlife Service is one of the primary natural resource-management agencies on the North Slope. The mission of the Fish and Wildlife Service is to work with others to conserve, protect, and enhance the fish, wildlife, and plants and their habitats for the continuing benefit of the American people. The Fish and Wildlife Service manages the 19-million acre Arctic National Wildlife Refuge in northeast Alaska and has primary management authority for migratory birds, certain threatened and endangered species, polar bear, and Pacific walrus. The Service also cooperates with other Federal and State agencies and various industries to minimize the effects of development on fish and wildlife resources. To accomplish this mission, the Service is involved in a variety of research, monitoring, and management projects on the North Slope and in the adjacent coastal waters of the Beaufort Sea.
3. Bureau of Ocean Energy Management manages the exploration and development of the nation's offshore resources. It seeks to appropriately balance economic development, energy independence, and environmental protection through oil and gas leases, renewable energy development and environmental reviews and studies. Functions include: Leasing,

Plan Administration, Environmental Studies, National Environmental Policy Act (NEPA) Analysis, Resource Evaluation, Economic Analysis and the Renewable Energy Program.

4. National Park Service preserves the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations. The Park Service cooperates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country and the world.
5. NOAA/National Marine Fisheries Service (NMFS) provides stewardship of living marine resources through science-based conservation and management and the promotion of healthy ecosystems. NMFS activities on Alaska's North Slope include consultation and coordination regarding federal water development projects under the Fish and Wildlife Coordination Act and other laws, consultation regarding the effects of federal actions on species listed under the Endangered Species Act, and authorizations for the unintentional take of small numbers of marine mammals under the Marine Mammal Protection Act. NMFS also conducts research concerning marine mammals and fish under NMFS jurisdiction. NMFS assesses populations of bowhead whales, ribbon seals, ringed seals, spotted seals, and bearded seals, and works routinely with partners in Alaska Native Organizations such as the Alaska Eskimo Whaling Commission and the Ice Seal Committee. Additionally, NMFS staffs the U.S. delegation to the International Whaling Commission.

B. Federal/Ex Officio

1. U.S. Geological Survey serves the Nation as the Department of the Interior's lead science agency by providing scientific expertise responsive to important natural resources issues and natural hazards assessments. The mission of the USGS Alaska Science Center (ASC) is to provide scientific leadership and accurate, objective, and timely data, information, and research findings about the earth and its flora and fauna to Federal and State resource managers and policy makers, local government, and the public to support sound decision making regarding natural resources, natural hazards, and ecosystems in Alaska and circumpolar regions. To meet the specific information needs of resource-management agencies for the marine and terrestrial ecosystems of the North Slope of Alaska, the ASC will combine and enhance the Center's diverse science programs, capabilities, and talents with capabilities of USGS from across the nation to strengthen its scientific capacity and contribution to the resolution of the complex natural resource issues associated with change within the North Slope region.
2. NOAA/National Weather Service Alaska Region provides weather, hydrologic, climate forecasts and volcanic ash and tsunami warnings for the state of Alaska and its surrounding waters to protect lives and property and enhance the economic interests of our Nation. Alaska Region offices and facilities include the Weather Forecast Offices, Weather Service Offices, Alaska-Pacific River Forecast Center, Alaska Aviation Weather Unit, Anchorage Center Weather Service, and the Alaska Region Headquarters.

3. U.S. Arctic Research Commission principal duties are (1) to establish the national policy, priorities, and goals necessary to construct a federal program plan for basic and applied scientific research with respect to the Arctic, including natural resources and materials, physical, biological and health sciences, and social and behavioral sciences; (2) to promote Arctic research, to recommend Arctic research policy, and to communicate our research and policy recommendations to the President and the Congress; (3) to work with the National Science Foundation as the lead agency responsible for implementing the Arctic research policy and to support cooperation and collaboration throughout the Federal Government; (4) to give guidance to the Interagency Arctic Research Policy Committee (IARPC) to develop national Arctic research projects and a five-year plan to implement those projects; and (5) to interact with Arctic residents, international Arctic research programs and organizations and local institutions including regional governments in order to obtain the broadest possible view of Arctic research needs.

C. State of Alaska

1. Department of Fish and Game protects, maintains, and improves the fish and game resources of the State, and manages their use and development for the maximum benefit of the people of the State, consistent with the sustained yield principle. The Alaska Department of Fish and Game has a responsibility to collect biological information necessary to evaluate land-development activities, present this information to decision makers so they can make informed decisions, and provide options for development activities that will minimize or mitigate negative impacts of development.
2. Department of Natural Resources is the lead resource-development agency for the State of Alaska. Several divisions in DNR have major responsibilities regarding North Slope developments.
 - (a) The Division of Oil and Gas develops and manages the State's oil and gas leasing programs. The division staff identifies prospective lease areas; performs geologic, economic, environmental, and social analyses; develops a five-year leasing schedule; and conducts public review of proposed sales. The division conducts competitive oil and gas lease sales and monitors collection of all funds resulting from its programs.
 - (b) The Division of Geological and Geophysical Surveys (DGGS) generates, analyzes, and interprets data on geologic resources and natural conditions and maps and inventories mineral and energy resources on State land for use by government, private industry, scientists, educators, and the public.
 - (c) The Division of Mining, Land, and Water is the primary manager of Alaska's land holdings. Responsibilities include ensuring the State's title; preparing land use plans and easement atlases; classifying land; leasing and permitting State land for commercial and industrial uses; and coordinating needed authorizations for major developments on the North Slope. The division allocates and manages the State's water resources on all lands in Alaska, adjudicates water rights, provides technical hydrologic support, and assures dam safety.

- (d) The Office of Project Management and Permitting administers the State of Alaska's Large Projects Team which is responsible for coordinating State agency participation on major resource development projects throughout Alaska.

D. Arctic Slope Regional Corporation (ASRC)

The ASRC is the Alaska Native-owned regional corporation representing more than nine thousand Iñupiat Eskimos of Alaska's North Slope. The shareholders of ASRC own surface and subsurface title to more than four million acres of North Slope lands. By virtue of this title, the ASRC represents the largest private landowner on the North Slope. The ASRC ownership stems from an earlier claim of aboriginal title, covering the entire Alaskan North Slope, that was eventually settled in part by the Alaska Native Claims Settlement Act of 1971 (ANCSA). The mission of ASRC includes actively managing its lands and resources in order to enhance Iñupiat cultural and economic freedoms. ASRC is involved with a number of North Slope resource development activities, and has a variety of subsidiary companies that are active in North Slope resource development and other sectors.

E. North Slope Borough

The North Slope Borough's responsibilities include planning, zoning, and permitting; coastal management; wildlife research with a focus on subsistence; and support for the traditional culture of the North Slope. The Borough's planning and zoning authority through its Home Rule Charter mandates active land use management across Federal, State, Native and municipal lands. The Borough has a coastal management plan which stresses the health, safety, and cultural welfare of NSB residents and compliance with environmental policies of local concern. The Borough monitors and conducts scientific research on marine and wildlife resources to ensure healthy population levels and to sustain a continued subsistence harvest for its residents. All of the Borough's planning and research activities are conducted in part to guarantee strong local input into subsistence resource management, with a special emphasis on the blending of contemporary and traditional local knowledge as a mechanism to sustain the resources and the local indigenous culture.

7. Officers and Organization

Chair and Vice Chair: The Oversight Group shall designate a Chair and Vice Chair. The Chair shall alternate annually between Federal and non-Federal voting members. The Chair may participate in discussion and debate at the meetings and may vote on all questions before the Oversight Group. The Vice Chair shall assume the responsibilities of the Chair in the event of the Chair's absence. The Vice Chair shall be the Chair Elect for the annual rotation. The Chair will hold the position from July 1 through June 30 of each year.

Designees: Oversight Group members may appoint designees to act on their behalf in their absence.

Advisory Groups: The Oversight Group may recommend to the Secretary of the Interior the establishment of formal advisory groups, such as the North Slope Science Technical Advisory Group, as appropriate. Charters for any advisory group must be reviewed and approved by the Oversight Group and forwarded to the Secretary of the Interior following the guidance provided by the Federal Advisory Committee Act.

Staffing and Budget: Base staffing and budget will be provided through the BLM, as the administrative agency of record. For operations and/or salary beyond the base budget provided by BLM, this Charter, along with an interagency, intergovernmental, assistance agreement, or other legal instrument will be established through the Executive Director. Salary and/or operational funding provided through such process shall have overhead expenses waived by BLM.

The Executive Director will report programmatically to the Chair and Vice Chair of the Oversight Group. Annual performance evaluations of the Executive Director are completed by the BLM with input from the Chair and past-Chair (both are required as the Chair rotates based on a State fiscal year of July 1 through June 30, while the performance evaluation period is based on a Federal fiscal year of October 1 through September 30).

Committees: The Oversight Group may establish other ad hoc and standing committees as deemed necessary, and will specify the purpose and duration of each committee. Any ad hoc committees established would automatically expire upon completion of their committee assignment. The Oversight Group will establish a standing staff-level committee composed of one member from each representative Oversight Group member agency or organization. Staff committee members will advise their respective Oversight Group members on issues prior to each Oversight Group meeting, and will provide assistance to the Executive Director of NSSI, as appropriate. Salary, travel or other expenses incurred by staff committee members are paid by their respective supporting organization.

8. Oversight Group Meetings and Procedures

A. Notice of Meetings: Reserved.

B. Conduct of Meetings: Oversight Group meetings will be open to the public and will be generally conducted according to Roberts Rules of Order. The Oversight Group shall provide a reasonable opportunity for public comment.

C. Voting Procedures: A quorum of Oversight Group members, or their designees, shall be convened prior to any voting (a quorum shall consist of at least three Federal members and two non Federal members). All decisions shall be made by the voting members by consensus. Oversight Group members may participate by telephone or teleconference. The U.S. Geological Survey, National Weather Service, and U.S. Arctic Research Commission will not have voting privileges. The use of a proxy by voting members is not permitted.

D. Recusal: Oversight Group members may recuse themselves from voting, if necessary to avoid a conflict of interest.

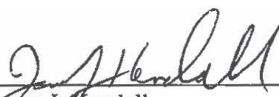
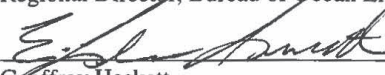



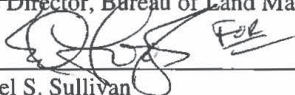
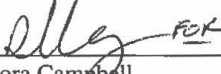
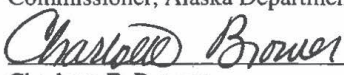
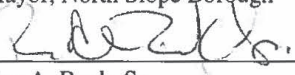
- E. Records:** Meeting minutes and summaries of key decisions will be posted on the NSSI website. Hard copies will be available upon request.
- F. Closed Meetings (Executive Sessions):** The Oversight Group members, or their designees, and the Executive Director may close meetings, or portions of meetings, on matters pertaining to confidential personnel issues, litigation, confidential information such as archaeological information, and other matters included under applicable State and Federal laws and Borough ordinances. Ex Officio members, or their designees, may participate in Executive Sessions by permission of the Oversight Group Chair.
- G. Frequency and Location of Meetings:** The Oversight Group will meet a minimum of two times per year-preferably once in Anchorage and once in Barrow.
- H. Expenses for Oversight Group:** Expenses related to salary, travel, lodging, and per diem for Oversight Group meetings shall be borne by the representatives' respective member agencies.

9. Availability of Funds




This agreement shall not be construed as a commitment by any Federal agency signatory to expend funds in excess of available appropriations. However, it does suggest the sharing of funds, without direct or indirect overhead, to accomplish the collaborative mission of the NSSI.

SIGNATURE AUTHORITY:

Voting Members

	11/09/12
James J. Kendall Regional Director, Bureau of Ocean Energy Management, Alaska Region	Date
	12/4/12
Geoffrey Haskett Regional Director, U.S. Fish and Wildlife Service, Alaska Region	Date
	10/31/12
Sue Masica Regional Director, National Park Service, Alaska Region	Date
	11/15/12
^{FR} James W. Balsiger Administrator, NOAA/National Marine Fisheries Service, Alaska Region	Date
	12/5/12
Bud C. Cribley State Director, Bureau of Land Management, Alaska State Office	Date
	11/7/2012
Daniel S. Sullivan Commissioner, Alaska Department of Natural Resources	Date
	4 DEC 2012
Cora Campbell Commissioner, Alaska Department of Fish and Game	Date
	6 th - May 2013
Charlotte E. Brower Mayor, North Slope Borough	Date
	6/12/13
Rex A. Rock, Sr. President, Arctic Slope Regional Corporation	Date

Ex Office Members

	6 Dec 2012
Leslie E. Holland-Bartels Regional Executive, U.S. Geological Survey, Alaska Area	Date
	12/13/12
Aimee Devaris Acting Regional Director, NOAA/National Weather Service, Alaska Region	Date
	11/13/12
John Farrell Executive Director, U.S. Arctic Research Commission	Date

Appendix 2: Science Technical Advisory Panel Appointees, 2016-2017

Name	Expertise	End of Appointment
Robyn Angliss	Marine Mammals	Apr 2017
Robert Bolton	Geomorphology, Permafrost	Oct 2018
Linda Brewer	Cultural Anthropology	Oct 2018
David Cairns	Landscape Ecology	Oct 2018
James Hemsath	Project Development, Strategic Planning	Oct 2018
Lorene Lynn	Restoration Ecology	Oct 2018
Jerry McBeath	Political Science	Apr 2017
Robert Meyer	Fisheries	Apr 2017
Jeff Organek	Civil Engineering	Apr 2017
Scott Pegau	Oceanography, Oil Spill Mitigation	Oct 2018
Martin Robards	Wildlife Conservation	Oct 2018
Robert Shuchman	Remote Sensing	Apr 2017
Elizabeth Snyder	Public Health	Apr 2017
Robert Suydam	Marine Mammals	Oct 2018
Sheyna Wisdom	Oceanography	Oct 2018

Appendix 3: 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), of the Energy Policy Act of 2005 (42 U.S.C. 15906); 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. Appendix 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:** The Panel's duties and responsibilities are as follows:
 - a. Advise 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 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; and
 - h. Provide other scientific advice as requested by the Oversight Group.

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 ANNUAL 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 0.50 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 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 Secretary.
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 will become inactive 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 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.

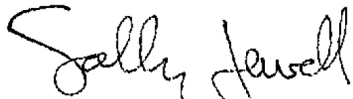
Members are appointed as special Government employees (SGEs) and may be required to file on an annual basis a Confidential Financial Disclosure Report.

13. **ETHICS RESPONSIBILITIES OF MEMBERS:** No Panel or subcommittee member will 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. For the purposes of this paragraph, indirect interests include holdings of a spouse or dependent child.

The Department of the Interior will provide materials to members appointed as SGEs explaining their ethical obligations. Consistent with the ethics requirements, members will endeavor to avoid any actions that would cause the public to question the integrity of the Panel's operations, activities, or advice. The provisions of this paragraph do not affect any other statutory or regulatory ethical obligations to which a member may be subject.

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. **RECORDKEEPING:** The Records of the Panel, and of formally and informally established subcommittees of the Panel, shall be handled in accordance with General Records Schedule 26, Item 2, and 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.



Secretary of the Interior

JUN 18 2014

Date

JUN 19 2014

Date Charter Filed

Appendix 4: Acronyms

Acronym	Name
ACCS	University of Alaska Center for Conservation Science
ADFG	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
ADOT	Alaska Department of Transportation
AKNHP	Alaska Native Heritage Program
Alaska CSC	Alaska Climate Science Center
Alaska OCS	Alaska Outer Continental Shelf
ANCSA	Alaska Native Claims Settlement Act
AOOS	Alaska Oceans Observing Systems
ARC	Arctic Research Commission
Arctic ERMA	Arctic Environmental Response Management Application
Arctic LLC	Arctic Landscape Conservation Cooperative
ARPA	Arctic Research and Policy Act
ASRC	Arctic Slope Regional Corporation
BLM	Bureau of Land Management
BOEM	Bureau of Ocean Energy Management
CAFF	Conservation of Arctic Flora and Fauna
CBMP	Circumpolar Biodiversity Monitoring Program
DFO	Designated Federal Officer
DGGS	Division of Geological and Geophysical Surveys
DOI	U.S. Department of the Interior
EPA	Environmental Protection Agency
FACA	Federal Advisory Committee Act
FLPMA	Federal Land Policy Management Act
GINA	Geographic Information Network of Alaska
IARPC	U.S. Interagency Research Policy Committee
IAWG	Interagency Working Group
NAS	National Academy of Sciences
NASA	National Aeronautics and Space Administration
NFWF	National Fish and Wildlife Foundation
NGOs	Nongovernmental Organizations
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPR-A	National Petroleum Reserve in Alaska
NPRB	North Pacific Research Board
NPRPA	Naval Petroleum Reserves Production Act
NPS	National Park Service
NSB	North Slope Borough

Acronym	Name
NSSI	North Slope Science Initiative
OG	Oversight Group
SAR	Synthetic Aperture Radar
SGE	Special Government Employee
STAP	Science Technical Advisory Panel
U.S.AON	U.S. Arctic Observing Network
UAA	University of Alaska Anchorage
UAF	University of Alaska Fairbanks
USARC	U.S. Arctic Research Commission
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey



NSSI 
North Slope Science Initiative

<https://NorthSlopeScience.org>

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

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

Front Cover Photo Captions:

(Top) Researchers out on Arctic sea ponds. (NASA); *(Inset 1)* Wildflowers. (BLM); *(Inset 2)* Caribou. (BLM); *(Inset 3)* NSSI Senior Staff Committee member Gordon Brower (North Slope Borough) retrieves a net full of Aanaaktiq. (G. Brower); *(Inset 4)* Bowhead whale and calf. (NOAA)

Back Cover Photo Caption: Caribou crossing the Hulahula River in mid-summer. (USGS)