BIENNIAL IMPLEMENTATION PLAN 2022-2024
for the
ARCTIC RESEARCH PLAN 2022-2026

Product of the Interagency Arctic Research Policy Committee
of the National Science and Technology Council

NOVEMBER 2022

About the Cover Graphic

The Arctic Research Plan 2022-2026 prioritizes four areas: Community Resilience and Health, Arctic Systems Interactions, Sustainable Economies and Livelihoods, and Risk Management and Hazard Mitigation. These priority areas address the relationships between people and the environment and the urgently needed research to better understand and respond to the most rapidly changing region on Earth.

The plan's cover graphic brings together many of the natural and cultural elements of the Arctic, including the importance of participatory research, Indigenous leadership in research, and co-production of knowledge between academic science and Indigenous Knowledge. The center art was produced by Molly Trainor (mollytrainor.com), an artist, designer, and copywriter from Nome, Alaska. Molly's Iñupiaq heritage influences her work, which is aimed at cultural heritage preservation by combining traditional technology and science subjects, storytelling, and pop culture. Design of the complete cover graphic was produced by Eric Cline of TerraGraphica.

Biennial Implementation Plan 2022–2024

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Arctic Research Plan 2022–2026

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November 2022

About the Office of Science and Technology Policy

The Office of Science and Technology Policy (OSTP) was established by the National Science and Technology Policy, Organization, and Priorities Act of 1976 to provide the President and others within the Executive Office of the President with advice on the scientific, engineering, and technological aspects of the economy, national security, homeland security, health, foreign relations, the environment, and the technological recovery and use of resources, among other topics. OSTP leads interagency science and technology policy coordination efforts, assists the Office of Management and Budget with an annual review and analysis of Federal research and development in budgets, and serves as a source of scientific and technological analysis and judgment for the President with respect to major policies, plans, and programs of the Federal Government. More information is available at www.whitehouse.gov/ostp.

About the National Science and Technology Council

The National Science and Technology Council (NSTC) is the principal means by which the Executive Branch coordinates science and technology policy across the diverse entities that make up the Federal research and development enterprise. A primary objective of the NSTC is to ensure science and technology policy decisions and programs are consistent with the President's stated goals. The NSTC prepares research and development strategies that are coordinated across Federal agencies aimed at accomplishing multiple national goals. The work of the NSTC is organized under committees that oversee subcommittees and working groups focused on different aspects of science and technology. More information is available at www.whitehouse.gov/ostp/nstc.

About the Interagency Arctic Research Policy Committee

The Arctic Research and Policy Act of 1984 (ARPA), Public Law 98-373, July 31, 1984, as amended, provides for a comprehensive national policy dealing with national research needs and objectives in the Arctic. ARPA establishes an Arctic Research Commission (USARC) and an Interagency Arctic Research Policy Committee (IARPC) to help implement the act. Since its inception, IARPC activities have been coordinated by the National Science Foundation (NSF), with the Director of the NSF as chair. A Presidential Memorandum issued on July 22, 2010, made the NSTC responsible for IARPC, with the Director of the NSF remaining chair of the committee.

About This Document

This report was developed by IARPC, which is a working group of the NSTC. This report is published by OSTP.

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Acknowledgements

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Acronyms Used in This Plan

CARE	Collective benefit, authority to control, responsibility, ethics
DHS	Department of Homeland Security
DHS-CISA	DHS Cybersecurity and Infrastructure Security Agency
DHS-FEMA	DHS Federal Emergency Management Agency
DHS-USCG	DHS United States Coast Guard
DOC	Department of Commerce
DOC-EDA	DOC Economic Development Administration
DOC-NOAA	DOC National Oceanic and Atmospheric Administration
DOC-NOAA/NCCOS	DOC NOAA National Centers for Coastal Ocean Science
DOC-NOAA/NMFS	DOC NOAA National Marine Fisheries Service
DOC-NOAA/OAR	DOC NOAA Office of Oceanic and Atmospheric Research
DOD	Department of Defense
DOD-NGA	DOD National Geospatial-Intelligence Agency
DOD-ONR	DOD Office of Naval Research
DOD-USACE	DOD United States Army Corps of Engineers
DOE	Department of Energy
DOE-AE	DOE Arctic Energy Office
DOE-EERE	DOE Office of Energy Efficiency and Renewable Energy
DOE-OE	DOE Office of Electricity
DOE-SC	DOE Office of Science
DOI	Department of the Interior
DOI-BIA	DOI Bureau of Indian Affairs
DOI-BLM	DOI Bureau of Land Management
DOI-BOEM	DOI Bureau of Ocean Energy Management
DOI-BSEE	DOI Bureau of Safety and Environmental Enforcement
DOI-FWS	DOI Fish and Wildlife Service
DOI-NPS	DOI National Park Service
DOI-USGS	DOI United States Geological Survey

DOT	Department of Transportation
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FAIR	Findable, accessible, interoperable, and reusable
GIS	Geographic information system
HABS	Harmful algal blooms
HHS	Department of Health and Human Services
HHS-CDC	HHS Centers for Disease Control and Prevention
HHS-CDC/NCEZID	HHS-CDC National Center for Emerging and Zoonotic Infectious Diseases
HHS-CMS	HHS Centers for Medicare and Medicaid Services
HHS-CMS/OPOLE	HHS CMS Office of Program Operations and Local Engagement
HHS-CMS/OPOLE/LEA	HHS CMS OPOLE Local Engagement & Administration
HHS-FDA	HHS Food and Drug Administration
HHS-FDA/CFSAN	HHS FDA Center for Food Safety and Applied Nutrition
HHS-FDA/CFSAN/OAO	HHS FDA CFSAN Office of Analytics and Outreach
HHS-FDA/CFSAN/OFS	HHS FDA CFSAN Office of Food Safety
HHS-FDA/CFSAN/ORS	HHS FDA CFSAN Office of Regulatory Science
HHS-FDA/CVM	HHS FDA Center for Veterinary Medicine
HHS-NIH	HHS National Institutes of Health
HHS-NIH/NIEHS	HHS NIH National Institute of Environmental Health Sciences
HUD	Department of Housing and Urban Development
IARPC	Interagency Arctic Research Policy Committee
IASC	International Arctic Science Committee
ICAMS	Interagency Council for Advancing Meteorological Services
MMC	Marine Mammal Commission
NASA	National Aeronautics and Space Administration
NSF	National Science Foundation
OSE	Observing system experiments
PFAS	Perfluoroalkyl and polyfluoroalkyl substances

SAON	Sustaining Arctic Observing Networks
SI	Smithsonian Institute
STEM	Science, technology, engineering, and math
USAON	United States Arctic Observing Network
USARC	United States Arctic Research Commission
USCLIVAR	United States Climate Variability and Predictability Program
USDA	United States Department of Agriculture
USDA-NRCS	USDA Natural Resources Conservation Service
USDA-RD	USDA Rural Development
USDA-USFS	USDA United States Forest Service
USGCRP	United States Global Change Research Program
USGEO	United States Group on Earth Observations

Current IARPC Collaboration Teams and Communities of Practice[1]

Priority Area Collaboration Teams

Priority Area 1: Community Resilience and Health

Priority Area 2: Arctic Systems Interactions

Priority Area 3: Sustainable Economies and Livelihoods

Priority Area 4: Risk Management and Hazard Mitigation

Foundational Activity Collaboration Teams

Data Management (formerly Arctic Data Sub-Team)

Education, Training, and Capacity Building (formerly Arctic STEM Education Working Group)

Monitoring, Observing, Modeling, and Prediction

Participatory Research and Indigenous Leadership in Research

Technology Innovation and Application (formerly Polar Technology Community Forum)

Communities of Practice Supporting this Biennial Implementation Plan

Atmosphere

Coastal Resilience

Diversity and Inclusion

Field Operations

Glaciers and Sea Level

Health and Well-Being

Marine Ecosystems

Modeling

Observing

Permafrost

Physical Oceanography

Sea Ice

Terrestrial Ecosystems

[1]This list reflects IARPC Communities of Practice as of October 2022. The current list of teams is available on the IARPC Collaborations website (https://www.iarpccollaborations.org/teams/index.html).

Glossary of Plan Structural Terms

Biennial Implementation Plan: Document developed every two years that will outline specific objectives and deliverables that will be completed in the subsequent two years.

Convergence Research: Investigations driven by a specific and compelling problem that requires deep integration across disciplines.

Deliverable: Tangible, measurable, and easily communicated research product that demonstrates progress made toward satisfying the objectives and goals and is made available to relevant decision-makers and partners. Deliverables could also include achievements resulting from the establishment of new relationships.

Foundational Activity: Activity that relates to, supports, and informs the priority areas. Foundational activities are critical to improving research and better addressing each of the priority areas.

Goal: Intended convergent research outcome(s) that is realized from Federal investment and non-Federal partner efforts.

Lead Agency/Agencies: The Federal agency or agencies responsible for leading priority areas.

Objective: Specific research action that advances the goals.

Policy Driver: Underlying U.S. Arctic and research policy that guides the development of the plan.

Priority Area: Broad cross-cutting theme that needs additional research, supports one or more policy driver, meets the mission and interests of more than one Federal agency, and engages multiple existing communities of practice and non-Federal partners.

Preface

In December 2021, the White House Office of Science and Technology Policy released the Interagency Arctic Research Policy Committee's (IARPC) Arctic Research Plan 2022–2026. The Arctic Research Plan is a high-level research strategy to address emerging research questions about the Arctic, including the impacts of climate change to the Arctic region and beyond. It presents a research framework with thematic goals and outlines a vision for Federal agencies to address emerging research questions about this vital region. It also provides pathways to strengthen relationships between Federal agencies and Indigenous communities, academia, non-Federal researchers, the state of Alaska, Tribes, nonprofits, the private sector, and international organizations.

In order for IARPC to respond more swiftly to emerging and immediate needs, including those caused by climate change, while continuing to support U.S. Arctic policy, the Arctic Research Plan will be achieved through Biennial Implementation Plans. This first Biennial Implementation Plan will be implemented from fall 2022 through fall 2024. It includes objectives, which are specific research actions that advance the goals of the Arctic Research Plan 2022-2026. It also includes deliverables, which are tangible, measurable, and easily communicated research products that demonstrate progress made toward satisfying the objectives and goals and are made available to decision-makers and partners.

This Biennial Implementation Plan provides specific actions that IARPC and its member agencies will take to promote research aimed at improving community resilience and well-being, advancing scientific understanding of climate change and ongoing changes in the Arctic system, creating more sustainable economies and livelihoods, and improving risk management and hazard mitigation. Results of these concerted efforts will yield greater predictive capabilities and improved capacity for groups including Arctic communities; state of Alaska, local, and Tribal authorities; research institutions; nonprofit, private sector, and international organizations; and Federal agencies to respond to climate change and adapt to pressing environmental changes while also making more informed decisions.

The Arctic Research Plan 2022–2026

The Arctic Research Plan adheres to four critical policy drivers in U.S. Arctic research policy that reflect long-standing and ongoing[1] U.S. interests in the Arctic and the collective priorities of IARPC Federal agencies: Well-Being, Stewardship, Security,[2] and Arctic-Global Systems. The plan includes four priority areas with thematic goals that (1) represent broad, cross-cutting themes that need additional research; (2) support one or more policy drivers; (3) meet the mission and interests of more than one Federal agency; and (4) engage multiple existing communities of practice and non-Federal partners. Priority areas and goals include:

1. **Community Resilience and Health:** Improve community resilience and well-being by strengthening research and developing tools to increase understanding of interdependent social, natural, and built systems in the Arctic.

2. **Arctic Systems Interactions:** Enhance our ability to observe, understand, predict, and project the Arctic's dynamic interconnected systems and their links to the Earth system.

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[1]National Strategy for the Arctic Region. Oct 2022. https://www.whitehouse.gov/wp-content/uploads/2022/10/National-Strategy-for-the-Arctic-Region.pdf

[2]National Security Strategy. Oct 2022. https://www.whitehouse.gov/wp-content/uploads/2022/10/Biden-Harris-Administrations-National-Security-Strategy-10.2022.pdf

3. **Sustainable Economies and Livelihoods:** Observe and understand the Arctic's natural, social, and built systems to promote sustainable economies and livelihoods.

4. **Risk Management and Hazard Mitigation:** Secure and improve quality of life through research that promotes an understanding of disaster risk exposure, sensitivity to hazard, and adaptive capacity.

In addition to identifying four priority areas, the Arctic Research Plan builds upon five foundational activities. These activities are critical to achieving the priority area goals and will remain foundational to Arctic research beyond the five-year duration of the Arctic Research Plan. Foundational activities include: Data Management; Education, Training, and Capacity Building; Monitoring, Observing, Modeling, and Prediction; Participatory Research and Indigenous Leadership in Research; and Technology Innovation and Application.

Overarching Principles

Progress in Arctic research will remain incomplete without identifying and addressing barriers to diversity, equity, inclusion, and justice in Arctic research. Ongoing work is needed to include underrepresented and historically excluded groups. This includes but is not limited to addressing barriers such as lack of funding to support underrepresented groups, encouraging respectful and meaningful engagement, acknowledging the history and ongoing trauma of colonization, and ensuring that the benefits from Federal investments are delivered to disadvantaged communities[3].

This Biennial Implementation Plan seeks to advance equity[4] and strengthen diversity, equity, inclusion, and accessibility[5]. Throughout the development of the Arctic Research Plan and the Biennial Implementation Plan, IARPC has been guided by the following overarching principles:

1. Sustained Engagement: Advance respectful, responsive, and continuous engagement with Indigenous and Tribal organizations, Arctic communities, Federal agencies, the state of Alaska, and non-Federal partners.

2. Inclusion and Equity: Encourage diversity and ensure that everyone is treated fairly and respectfully and promote access to the tools needed to succeed.

3. Transparency and Accessibility: Commit to activities and decisions that are transparent and communicated clearly and in accessible formats.

These principles are woven through the work of all Arctic Research Plan objectives and will continue to guide all implementation activities. All teams are encouraged to reflect upon whether their group is diverse and commit to taking the appropriate actions to ensure meetings are inclusive.

[3]The Path to Achieving Justice40. July 2021. https://www.whitehouse.gov/omb/briefing-room/2021/07/20/the-path-to-achieving-justice40/

[4]Executive Order on Diversity, Equity, Inclusion, and Accessibility in the Federal Workforce. June 2021. https://www.whitehouse.gov/briefing-room/presidential-actions/2021/06/25/executive-order-on-diversity-equity-inclusion-and-accessibility-in-the-federal-workforce/

[5]Executive Order On Advancing Racial Equity and Support for Underserved Communities Through the Federal Government. January 2021. https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/executive-order-advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government/

Implementation Approach

IARPC's work under this Biennial Implementation Plan will be carried out by IARPC Priority Area Collaboration Teams, Foundational Activity Collaboration Teams, and existing IARPC Communities of Practice, all of which are open to anyone wishing to advance knowledge about the Arctic. Teams may include members from Federal, State, academic, nonprofit, private sector, Tribal, Indigenous, and international organizations. The Priority Area and Foundational Activity Collaboration Teams will direct and coordinate activities to reach the plan goals and ensure coordination and collaboration across agencies and engage non-Federal partners. These multi-disciplinary teams are co-lead by at least two Federal program managers and one non-Federal partner and draw on Federal agency and community of practice expertise to achieve their goals. The leadership of specific deliverables will be updated as needed on the IARPC Collaborations website (https://www.iarpccollaborations.org/).It may be necessary to form additional new communities of practice or redistribute coverage for certain activities or topics, especially in areas where there has been little prior IARPC engagement.

The IARPC Collaborations website is a critical component of IARPC and serves as a hub for coordinating Federal government program managers and scientists, the non-Federal research community, and other collaborators to accelerate the pace of Arctic research and achieve priority area goals. The IARPC Collaborations website is used to help implement the Biennial Implementation Plan. Progress on implementing the plan will be tracked through an online tool on the website where those participating in implementation can post achievements towards the goals outlined in this plan and the objectives and deliverables described in the Biennial Implementation Plans.

Stewardship

The Biennial Implementation Plan is stewarded by the IARPC Principals, Staff Group, collaboration teams, and participating agencies and partners, with support from the IARPC Secretariat as funding and resources allow.
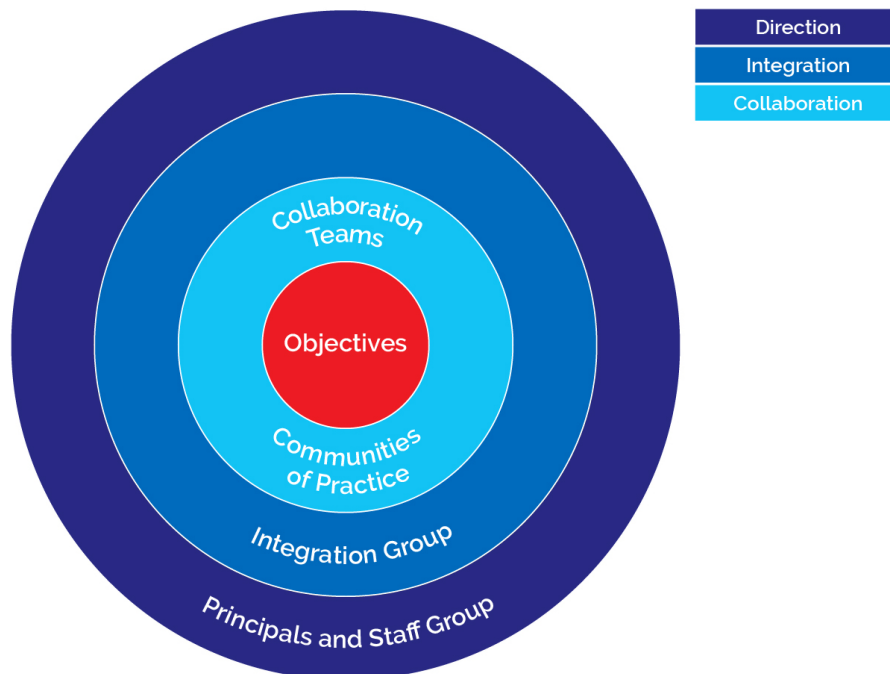
Figure 1: Biennial Implementation Plan Stewardship Structure

Objectives: Objectives are specific research actions that advance the goals and they lie at the core of this Biennial Implementation Plan.

Collaboration: Priority Area and Foundational Activity Collaboration Teams collaborate on and advance objectives and deliverables. Within these teams, the communities of practice will contribute expertise and knowledge necessary to meet the objectives and deliverables laid out in the Biennial Implementation Plan.

Integration: The Biennial Implementation Plan Integration Group will:

- Receive quarterly updates from the collaboration teams,

- Meet quarterly to facilitate progress toward meeting objectives and deliverables,

- Identify and evaluate gaps and opportunities and consider adjustments to implementation as necessary,

- Prepare the biennial report on progress under the Biennial Implementation Plan and provide input to other IARPC reports as needed,

- Evaluate and make recommendations regarding the development of subsequent Biennial Implementation Plans, and

- Provide implementation updates to Staff Group.

Direction: The IARPC Principals and Staff Group provide direction on the Biennial Implementation Plan. The Principals provide policy direction, suggest adjustments for future Biennial Implementation Plans, and, when needed, approve official IARPC reports. The Staff Group facilitates agency engagement in designing and implementing objectives, addresses issues brought forth by the Biennial Implementation Plan Integration Group, approves updates to new objectives and deliverables, and reviews and clears drafts of official IARPC reports when needed.

Timeline

The 2022 Biennial Implementation Plan will be executed through fall 2024. It will be updated in 2025 with consideration of previous achievements and a current assessment of the most effective approach to achieve the long-term goals.
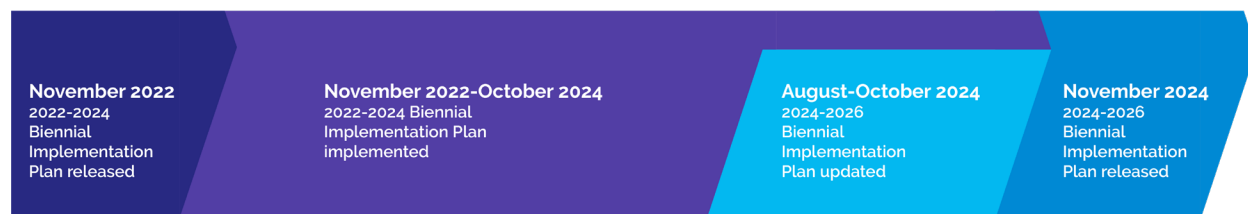
Figure 2: Schematic of the process by which the Biennial Implementation Plans will be updated, implemented, evaluated, and updated.

Topical Threads

Key topical threads, listed below, emerged during development of the Biennial Implementation Plan, notably through public input received on the plan. These threads are interconnected and infused in many of the objectives and deliverables of the priority areas and foundational activities and illustrate

areas where research is critical for informing management decision-making. They are relevant to and informative of the Federal research investment over the next two years. The threads identified in this Biennial Implementation Plan are:

Food Security: Food security[6] is fundamental to the well-being and resilience of Arctic residents. Climate change and other social and environmental changes present challenges to ensuring and improving food security. Research related to food security spans the priority areas and foundational activities of this Biennial Implementation Plan. Research questions include identifying emerging threats to food safety and nutrition; understanding how climate and environmental changes are impacting abundance and accessibility of traditional foods; undertaking observing, monitoring, and prediction activities related to food security; and fostering partnerships around identifying the impacts of climate change on food security.

Infrastructure: Community well-being and security depend on reliable infrastructure. Climate change in the Arctic is impacting critical infrastructure across sectors. This Biennial Implementation Plan advances research to understand how climate change is and will continue to impact infrastructure and specific risks related to infrastructure. It advances research on how to support resilient infrastructure across sectors, including around food storage and water and sanitation.

Biennial Implementation Plan Reporting

Progress on objectives and deliverables will be tracked quarterly using the IARPC Collaborations website. Any organization or individual that is a member of IARPC Collaborations may report actions towards a deliverable. Quarterly tracking will be used by collaboration teams for biennial reporting.

In the fall of 2024, the Biennial Implementation Plan Integration Group will produce a public report detailing progress on deliverables. The report will communicate outcomes and products that advance understanding of Arctic processes and are relevant to Arctic communities and decision-makers. The report will also include how deliverables were made readily accessible as appropriate based on the nature of the topic. This and future biennial reports will help the public, research, and policy communities understand the progress, obstacles, and pathways toward achievement of goals in the Biennial Implementation Plan. They will also demonstrate connections and responsiveness to the U.S. Arctic Research Commission's Biennial Goals Report.

Biennial reports will address a variety of questions, including:

- How did objectives and deliverables advance the missions and capabilities of more than one Federal agency and result in an efficient use of government resources?

- How did objectives and deliverables meet the needs of decision-makers in the Arctic, in Alaska, and throughout the nation?

- How did foundational activities enhance and support progress towards priority area goals?

- How were deliverables conveyed and made readily accessible and how did IARPC engage with and communicate outcomes to non-Federal partners?

- What is the significance of these findings? Why is this important?

- Were there specific challenges or obstacles to successful completion of deliverables?

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[6]See for example: Food Sovereignty and Self Governance: Inuit Role in Managing Arctic Marine Resources: iccalaska.org/wp-icc/wp-content/ uploads/2020/09/FSSG-Report_-LR.pdf

Conclusion

This document is the first Biennial Implementation Plan for the Arctic Research Plan 2022-2026 and the two documents should be considered together. The Arctic Research Plan identifies broad, cross-cutting priority areas, while this Biennial Implementation Plan articulates interdisciplinary research questions that are critical to advancing those priority areas. The Biennial Implementation Plan builds from the strong communities of practice around disciplinary and multidisciplinary research areas established through previous Arctic research plans. As future Biennial Implementation Plans are developed, these communities of practice will become increasingly integrated in order to best respond to the complex, dynamic, and interconnected changes occurring in the Arctic.

Non-Federal entities play, and will continue to play, critical roles in Arctic research and in responding to climate change and its effects in the Arctic and beyond. The Arctic Research Plan and this Biennial Implementation Plan are developed to help guide Federal research investments and collaboration. IARPC recognizes the importance of working with entities across all sectors to achieve the goals of the Arctic Research Plan and the Biennial Implementation Plan objectives and deliverables. Over the next two years, IARPC aims to build new, and strengthen existing, relationships, and to incorporate non-Federal partners into collaboration teams as leaders and participants.

Objectives and Deliverables for
Priority Areas and Foundational Activities
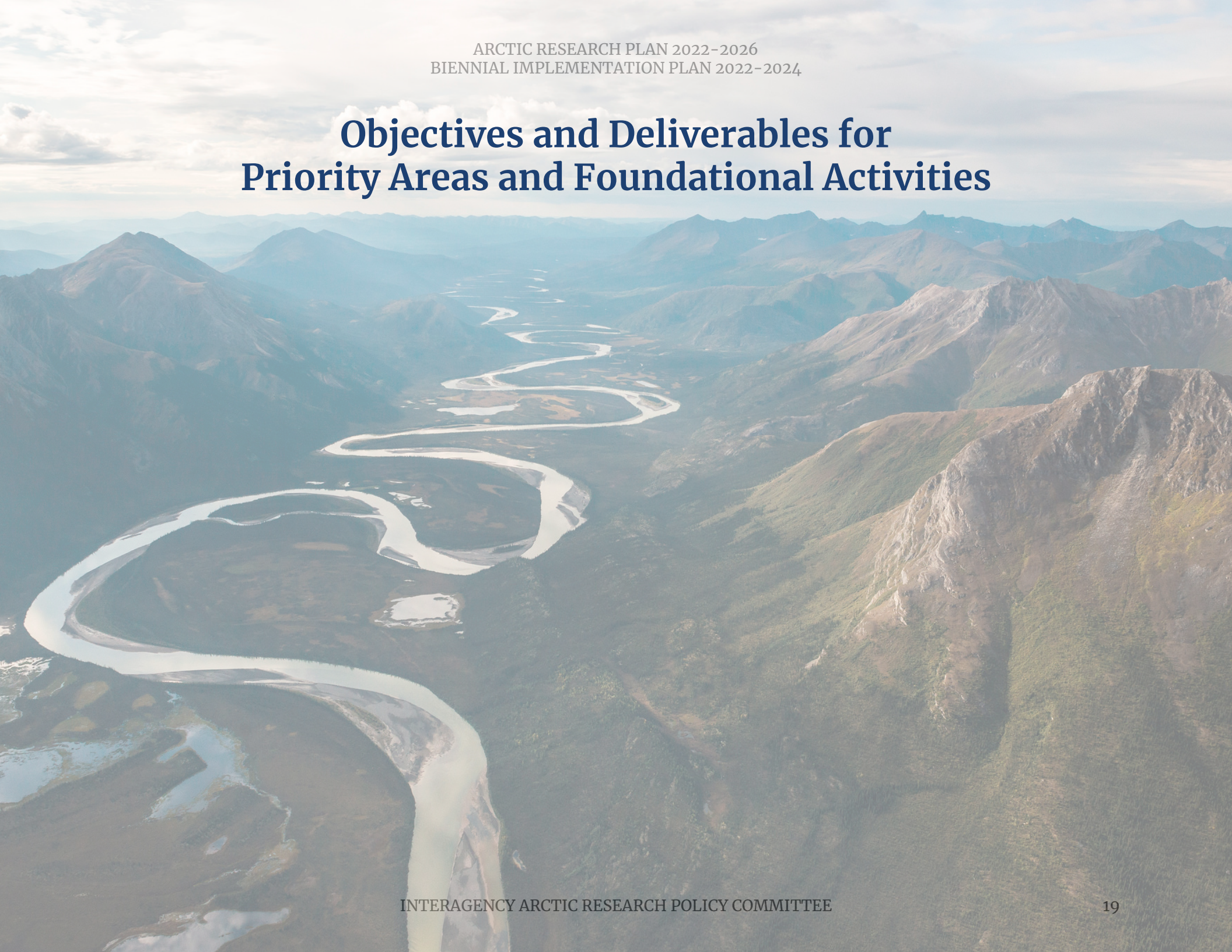
Photo: DOI

Priority Area 1: Community Resilience and Health

Goal: Improve community resilience and well-being by strengthening research and developing tools to increase understanding of interdependent social, natural, and built systems in the Arctic.

Objective 1.1: Support the health of Arctic residents through research on public health needs, disparities, and delivery.

The COVID-19 pandemic is a stark reminder of the vulnerability to infectious disease of rural communities in the Arctic. Public health resources are limited in many communities, and services such as preventive care and health education are often lacking. Cultural wellness is also a vital component of community resilience and health. Through this objective, IARPC seeks to support the health of Arctic residents with research on public health needs, disparities, and delivery. This research will be driven by community priorities, will be culturally responsive and respectful, and will be focused foremost on improving the health of Arctic residents.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
1.1.1 Initiate a Federally-funded project with local partners researching the feasibility and success rate in the treatment of chronic Hepatitis C in remote Arctic communities.	**HHS-CDC (lead)**[1]; HHS-CMS/OPOLE/LEA	Health and Well-Being	3/24

[1]Lead agencies for deliverables are bolded.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
1.1.2 Conduct research on preventive measures for COVID-19 disease and evaluate lessons learned for future pandemic preparedness in the Arctic. Prepare a report on COVID-19 vaccine effectiveness in preventing hospitalizations specifically within Alaska.	**HHS-CDC (lead)**; HHS-NIH	Health and Well-Being	10/24
1.1.3 Continue research on air quality and human health. This will include an evaluation of outdoor air quality and health outcomes in Alaskan communities and a Federally-funded, local-partner-conducted evaluation of interventions to improve indoor air quality and decrease respiratory symptoms in children. Research will be shared and summarized in webinars, publications, and reports.	**HHS-NIH/NIEHS (lead)**; DOC-NOAA; EPA; HHS-CDC; NASA	Atmosphere; Data Management; Health and Well-Being; Monitoring, Observing, Modeling, and Prediction; Terrestrial Ecosystems	10/24
1.1.4 Along with local health partners, conduct research to support understanding and awareness of emerging zoonotic disease threats identified in the CDC's One Health Zoonotic Disease Prioritization for Alaska workshop report.	**DOI-USGS (lead)**; DOI-FWS; HHS-CDC; HHS-CMS/OPOLE/LEA	Health and Well-Being	4/24
1.1.5 Along with collaborating partners, investigate human illness associated with harmful algal blooms (HABs), and develop and distribute preventive messaging based on what is learned.	**HHS-NIH/NIEHS (lead)**; DOC-NOAA; DOI-USGS; EPA; HHS-CDC/NCEZID; HHS-FDA/CFSAN/OFS; USDA	Health and Well-Being; Marine Ecosystems	10/24

Objective 1.2: Address emerging threats to food safety and access, as well as food and nutrition security in the Arctic, through research that addresses how climate and environmental change is affecting the abundance, accessibility, and use of traditional foods and traditional ways of life.

Terrestrial and marine ecosystems are changing rapidly with implications for accessibility and availability of healthy, nutritious, and culturally relevant foods. Environmental toxins and novel diseases also pose emerging risks to food security for Arctic residents. Both traditional and commercial foods, and the infrastructure to store and maintain them, play key roles in meeting communities' nutritional and cultural needs. Improved observations, forecasts, and models are critical to provide a greater understanding of how Arctic environmental change, climate change, and other factors are affecting Arctic food safety and security, including traditional food abundance, access, use patterns, and cultural connections and reliance.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
1.2.1 Provide funding opportunities for research on food safety and food and nutrition security in the Arctic.	**NSF (lead)**; HHS-FDA/CFSAN/CVM; USDA	Technology Application and Innovation	10/24
1.2.2 Provide funding opportunities and conduct studies on the impact of harmful algal blooms (HABs) on availability and safety of traditional and commercial foods.	**NSF (lead)**; DHS-USCG; DOC-NOAA/NCCOS; DOI-FWS; DOI-USGS; EPA; HHS-FDA/CFSAN/OFS; HHS-FDA/CFSAN/ORS; MMC; NASA	Marine Ecosystems; Monitoring, Observing, Modeling, and Prediction; Technology Application and Innovation	10/24

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
1.2.3 Conduct research and produce a report on seabird mortality events in the Bering Sea, including severity, causes, and ecological implications.	**DOI-USGS (lead)**; DOC-NOAA; DOI-FWS; DOI-NPS	Coastal Resilience; Monitoring, Observing, Modeling, and Prediction; Technology Application and Innovation	10/24
1.2.4 Conduct investigations and report on marine mammal unusual mortality events in the Bering, Chukchi, and Beaufort seas to evaluate the severity, causes, ecological implications, and potential health risks to traditional users.	**DOC-NOAA/NMFS (lead)**; DOI-FWS	Marine Ecosystems; Monitoring, Observing, Modeling, and Prediction	10/24
1.2.5 Conduct investigations and report on trends in abundance, distribution, and condition of ice-dependent marine mammals in the Bering, Chukchi, and Beaufort seas to identify and forecast changes that may impact food security and the long-term sustainability of traditional food supplies.	**DOC-NOAA/NMFS (lead)**; DOI-FWS; DOI-USGS	Marine Ecosystems; Monitoring, Observing, Modeling, and Prediction	10/24
1.2.6 Assess and model changes in abundance, distribution, and harvest of select marine mammals and fishes that are food sources in rural Alaska.	**DOI-NPS (lead)**; DOI-BOEM; DOI-FWS; DOC-NOAA/NMFS; HHS-FDA/CFSAN/OFS; HHS-FDA/CFSAN/OAO; MMC; NSF; USDA	Coastal Resilience; Marine Ecosystems; Monitoring, Observing, Modeling, and Prediction; Sustainable Economies and Livelihoods (PA 3); Technology Application and Innovation	10/24

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
1.2.7 Fund and conduct research, and produce a report, on changes in abundance and distribution of migratory caribou in Arctic Alaska.	**DOI-USGS (lead)**; DOI-BLM; DOI-FWS; DOI-NPS; NASA; NSF	Monitoring, Observing, Modeling, and Prediction; Participatory Research and Indigenous Leadership in Research; Technology Application and Innovation; Terrestrial Ecosystems	10/24
1.2.8 Provide funding opportunities and conduct research, and produce a report, on the impacts of rapid expansion of beaver habitat in the U.S. Arctic, including effects on fisheries and ecosystem services, access to traditional foods, and overall community health.	**DOI-USGS (lead)**; DOI-BLM; DOI-NPS; NASA; NSF	Monitoring, Observing, Modeling, and Prediction; Technology Application and Innovation; Terrestrial Ecosystems	10/24
1.2.9 Host a session at the 2023 Arctic One Health, One Future conference to advance understanding of causes and consequences of emerging threats to Arctic food safety and security, and identify high-priority research needs.	**DOI-NPS (lead)**	Health and Well-Being	10/23

Objective 1.3: Provide research and technical support for water and sanitation infrastructure.

The characteristics of the Arctic present unique water and sanitation infrastructure challenges. Solutions to these challenges need to address small and remote communities, energy availability and cost, operation and maintenance capabilities, freezing seasonal temperatures and thawing permafrost, changes in climate patterns, and other issues. Through this objective, IARPC agencies and partners will analyze and evaluate potential impacts of climate change on existing and planned infrastructure, synthesize available infrastructure solutions applicable to Arctic conditions and conduct research to support climate resilient and energy efficient infrastructure, provide a database for information on and treatment options for drinking water contaminants, and support research on perfluoroalkyl and polyfluoroalkyl substances (PFAS) treatment of surface water and groundwater in Arctic conditions.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
1.3.1 Synthesize and expand upon existing efforts to create data visualization maps of areas at high risk for coastal erosion, permafrost thaw, and flooding within specified future time periods (e.g., 10 years, 50 years, 100 years) to identify at-risk areas and inform investments in climate resilient infrastructure.	**DOI-USGS (lead)**; **NASA (lead)**; DHS-FEMA; DOC-NOAA; DOD-USACE	Coastal Resilience; Data Management; Permafrost; Risk Management and Hazard Mitigation (PA 4); Terrestrial Ecosystems	10/24
1.3.2 Develop a publicly accessible database for information on drinking water contaminants (including PFAS) and effective treatment processes. The database will be of use to water treatment operators, regulatory agencies, researchers, and treatment process consultants and designers. It could also support responses to emergency contamination events.	**EPA (lead)**	Data Management; Health and Well-Being	10/24
1.3.3 Support research on the feasibility of PFAS treatment for surface water and groundwater in the Arctic. This will help inform a strategy on PFAS remediation of contaminated sites.	**EPA (lead)**	Health and Well-Being; Marine Ecosystems; Terrestrial Ecosystems	12/23

Priority Area 2: Arctic Systems Interactions

Photo: Art Howard, via DOD

Goal: Enhance our ability to observe, understand, predict, and project the Arctic's dynamic interconnected systems and their links to the Earth system.

Objective 2.1: Advance understanding of Arctic amplification and the associated connections with lower latitudes.

Arctic amplification is the accelerated warming of the Arctic compared to the rest of the Earth. It is the result of feedbacks and interactions within the Arctic system and interactions between the Arctic and lower latitudes. Work under this objective will focus on increasing understanding of Arctic Amplification, including processes that contribute to it (e.g., sea ice albedo feedback), the interactions between changes in the Arctic and lower latitude weather and climate (e.g., transport of heat, moisture, salinity, and pollutants), and changes in the Arctic that are a result of this amplification (e.g., changes in extreme events in the Arctic). This objective will enhance understanding of Arctic systems interactions by emphasizing connections among atmospheric, oceanic, and cryospheric components of the Arctic system with the use of appropriate models, observations, and data. Changes in the Arctic, including climate-related changes, that are of direct relevance to natural hazards influencing communities and the commercial sector will be considered.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
2.1.1 Provide funding opportunities for investigator-driven modeling and observational studies that focus on the following aspects of Arctic Amplification: (1) ice-albedo feedback; (2) impacts of atmospheric and oceanic circulation on Arctic Amplification; and (3) transport of heat, moisture, and pollutants between Arctic and lower latitudes. Share knowledge and synthesize results arising from these studies.	**DOE-SC (lead)**; **NSF (lead)**; DOC-NOAA; DOD-ONR; NASA	Atmosphere; Modeling; Monitoring, Observing, Modeling, and Prediction; Observing; Physical Oceanography; Sea Ice	10/24
2.1.2 Hold workshops and webinars and produce publications to encourage interagency research coordination on Arctic Amplification.	**DOE-SC (lead);** DOC-NOAA; DOD-ONR; NASA; NSF	Atmosphere; Modeling; Monitoring, Observing, Modeling, and Prediction; Observing; Sea Ice	10/24
2.1.3 Provide opportunities to support and coordinate research to enhance the understanding of connections between Arctic and global ocean circulation with a particular focus on Atlantic Meridional Overturning Circulation.	**DOE-SC (lead)**; **NSF (lead)**; DOC-NOAA; DOD-ONR; DOI-BSEE; NASA	Data Management; Modeling; Monitoring, Observing, Modeling, and Prediction; Observing; Physical Oceanography; Sea Ice	10/24
2.1.4 Advance understanding of the role of atmospheric rivers in Arctic Amplification with a specific task of hosting a conference session in 2023 or 2024.	**DOE-SC (lead)**; DOC-NOAA; DOD-ONR; NASA; NSF	Atmosphere; Modeling; Monitoring, Observing, Modeling, and Prediction	10/24

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
2.1.5 Hold cross-collaboration-team meetings and workshops, and produce publications, to explore the results of high-resolution and regional Arctic modeling. Meetings will focus on the importance of model resolution to capture Arctic Amplification and its relationship with the lower latitudes.	**DOE-SC (lead)**; NSF	Modeling; Monitoring, Observing, Modeling, and Prediction	10/24
2.1.6 Quantify the contributions of surface properties, clouds, aerosol particles, and precipitation to the Arctic summer surface radiation budget and sea ice melt during the early melt seasons.	**NASA (lead)**; DOC-NOAA	Atmosphere; Glaciers and Sea Level; Sea Ice	10/24
2.1.7 Facilitate regular discussions to reflect on the diversity of those active in Priority Area 2 and on identifying ways to improve inclusivity. In addition, use the quarterly meeting to consider what has worked well, as well as suggest changes and implement actions to better address barriers to diversity, equity, and inclusion in Priority Area 2 activities.	**NSF (lead)**; DOC-NOAA; NASA	Diversity & Inclusion	10/24

Objective 2.2: Observe, understand, predict, and project Arctic ecosystem change and its impacts on humans and the entire Earth system.

Rapid climate change and other changes in the Arctic are having profound impacts on terrestrial, aquatic, and marine ecosystems. For example, ocean primary productivity in nearly all regions of the pan-Arctic is higher than in the past, which can be linked to lower sea ice cover and increased nutrient availability. Terrestrial ecosystems are also experiencing changes resulting from a variety of factors such as climate change, extended growing seasons, earlier snow melt, altered precipitation patterns, and changing disturbance regimes. These changes in Arctic ecosystems have impacts on local human populations as well as the Earth system as a whole.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
2.2.1 Advance capacity to better understand, quantify, and predict methane emissions from permafrost changes in the Arctic through international collaborations.	**NSF (lead)**; DOC-NOAA; DOE-SC; NASA	Atmosphere; Data Management; Permafrost; Technology Application and Innovation; Terrestrial Ecosystems	12/23
2.2.2 Carry out and synthesize research and monitoring needed to improve understanding of important Arctic ecosystem processes and feedbacks. This will include responses to environmental changes, such as the associated impacts on wildlife and human communities and infrastructure. This work will include conference sessions and scientific publications.	**DOI-USGS (lead)**; DOE-SC; DOI-BLM; DOI-BOEM; DOI-FWS; DOI-NPS; NASA; NSF; USDA-NRCS; USDA-USFS	Atmosphere; Coastal Resilience; Monitoring, Observing, Modeling, and Prediction; Permafrost; Terrestrial Ecosystems	12/23

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
2.2.3 Develop and update meaningful products for delivering findings and information concerning key climate features, including the annual release of the peer-reviewed Arctic Report Card on the current state of the Arctic relative to the historical record.	**DOC-NOAA/OAR (lead)**; **DOI-USGS (lead)**; DOE-SC; DOI-BOEM; DOI-FWS; NASA; NSF	Monitoring, Observing, Modeling, and Prediction; Sea Ice; Terrestrial Ecosystems	12/23
2.2.4 Continue coordinated interdisciplinary Arctic marine climate and ecosystem observations, and share data and promote synthesis of field observations.	**DOC-NOAA/OAR (lead)**; **NSF (lead)**; DHS-USCG; DOC-NOAA/NMFS; DOI-BOEM; DOI-FWS; NASA	Field Operations; Marine Ecosystems; Monitoring, Observing, Modeling, and Prediction	10/24
2.2.5 Convene community-wide workshop highlighting how remote sensing data products can be used to inform multi-scale land models from plot to pan-Arctic and inform use of remote sensing data in land surface models.	**DOE-SC (lead)**; **NASA (lead)**; DOI-BLM; DOI-FWS; DOI-NPS; DOI-USGS	Data Management; Monitoring, Observing, Modeling, and Prediction; Permafrost; Sea Ice; Terrestrial Ecosystems	10/24

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
2.2.6 Continue support for research programs that document Arctic marine species distribution, abundance, biodiversity, health and condition, foraging ecology, demography, habitat use in the Arctic, and basic life history information as well as age and growth rates of key links in the food web.	**DOI-USGS (lead)**; DOC-NOAA; DOD-ONR; DOI-BOEM; DOI-FWS; MMC; NASA; NSF	Marine Ecosystems; Monitoring, Observing, Modeling, and Prediction; Sea Ice	10/24
2.2.7 Produce and support publications and data products enhancing understanding of the linkages among marine species, oceanographic and sea ice conditions, and climate change. Specifically improve understanding of mechanisms that affect trends in trophic interactions, abundance, distribution, vital rates, and behavior.	**DOI-USGS (lead)**; **DOC-NOAA/OAR(lead)**; DOD-ONR; DOI-BOEM; DOI-FWS; MMC; NASA; NSF	Data Management; Marine Ecosystems; Participatory Research and Indigenous Leadership in Research; Monitoring, Observing, Modeling, and Prediction	10/24

Objective 2.3: Understand interactions between social, ecological, and physical Arctic systems, particularly in the context of coastal, climate, and cryospheric change.

In order to understand Arctic systems interactions, it is important to focus on the spaces where these interactions occur. Coastal areas are important zones of interaction across a wide range of social ecological systems: atmosphere, ocean, sea ice, land-fast ice, land, glaciers, permafrost, animals, plants, and humans all interact at and around coastlines. Work carried out under this objective seeks to build better understanding of the interconnected pieces and processes, including climate change, contributing to Arctic coastal change and its multifaceted impacts, both proximal and relational. This objective includes short-term and long-term activities, and relies on a variety of observation types, including community observers and high-tech sensors. Deliverables will facilitate expanded connectivity and standardization of observations with the aims of bridging gaps between interconnecting Arctic systems and between observations and models. This objective focuses on building a broad, interconnected understanding of Arctic coastal change both to provide knowledge important for Arctic residents now, especially in responding to and mitigating the effects of climate change, and to build environmental understanding for the future.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
2.3.1 Observe, understand, and model processes to manage and mitigate potential and realized threats from coastal invasive species, biotoxicoses, and wildlife diseases on animals and human populations via existing research networks and initiatives, publications, participation in scientific meetings, and public engagement.	**HHS-NIH/NIEHS (lead)**; DOC-NOAA; DOI-BOEM; DOI-FWS; DOI-USGS; MMC	Coastal Resilience; Risk Management and Hazard Mitigation (PA 4)	10/24
2.3.2 Through conference sessions, scientific publications, and IARPC Collaborations meetings, highlight results from missions that contribute to long-term observations of land ice.	**DOI-USGS (lead)**; **NASA (lead)**	Glaciers and Sea Level	10/24
2.3.3. Develop and assess ice sheet models for better prediction of sea level rise.	**DOE-SC (lead)**; DOC-NOAA; DOI-USGS; NASA; NSF	Monitoring, Observing, Modeling, and Prediction; Glaciers and Sea Level	10/24

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
2.3.4 Integrate information from field, laboratory, and remote sensing studies to examine and quantify relationships among surface topography, vegetation composition, hydrology, disturbance effects (including fire, thermokarst, land use change, and wildlife), geophysical processes in permafrost soils, and humans. Share results in reports, presentations, and scientific publications.	**DOI-USGS (lead)**; DOE-SC; DOI-NPS; NASA; NSF; USDA-NRCS	Community Resilience and Health (PA 1); Data Management; Monitoring, Observing, Modeling, and Prediction; Risk Management and Hazard Mitigation (PA 4); Sustainable Economies and Livelihoods (PA 3); Technology Application and Innovation; Terrestrial Ecosystems	10/24
2.3.5 Better understand the rate of terrestrial and subsea permafrost degradation and their roles in environmental and ecosystems processes and services (e.g., atmospheric and terrestrial carbon, Arctic greening, species invasion) by integrating empirical information into modeling efforts at various scales and delivering results via publications and presentations.	**DOI-USGS (lead)**; DOE-SC; DOI-NPS; NASA; NSF; USDA-NRCS	Permafrost; Terrestrial Ecosystems	10/24
2.3.6 Foster continued efforts to link multi-agency investments while expanding empirical datasets and synthesizing information that will inform the development of updated essential variable maps for Alaska, Greenland, and the circumpolar Arctic (e.g., permafrost ground ice content, topography, bathymetry, vegetation).	**NSF (lead)**; DOC-NOAA; DOE-SC; DOI-BLM; DOI-NPS; NASA; USDA-NRCS	Permafrost; Terrestrial Ecosystems	10/24

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
2.3.7 Improve high-resolution models' ability to capture coastal processes at the interface of ocean, land, and atmosphere by supporting targeted collaborations among model developers, users, and decision-makers. Products will include an interagency scientific peer-reviewed publication and conference sessions that address these models.	**DOI-USGS (lead)**; DOC-NOAA; DOE-SC; EPA; NASA; NSF	Atmosphere; Coastal Resilience; Data Management; Glaciers and Sea Level; Marine Ecosystems; Monitoring, Observing, Modeling, and Prediction; Permafrost; Sea Ice; Terrestrial Ecosystems	10/24

Priority Area 3: Sustainable Economies and Livelihoods

Photo: Tanadgusix Corporation, via DOE

Goal: Observe and understand the Arctic's natural, social, and built systems to promote sustainable economies and livelihoods.

Objective 3.1: Conduct and support research to foster the development of Arctic infrastructure. This includes research on improvements in community capacity and infrastructure projects that are prioritized by Arctic communities to support resilience and leverage technology in community redevelopment and relocation efforts.

Recognizing the urgency of rural community needs for Arctic infrastructure, coordinated research can facilitate improved sharing of information about funding resources, threats to existing infrastructure, and Arctic-relevant advances in construction and communication technology. Arctic communities in rural Alaska have an important role in identifying critical infrastructure needs, and research efforts can support development of models to better optimize decisions on cost avoidance and use of local geography for development of renewable energy, raw materials, and other human and built environment resources.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
3.1.1 Conduct a study to create an asset map of existing infrastructure as a baseline for understanding how to equip a community to be resilient to climate impacts. Facilitate sharing resources about and mitigation techniques for known threats to infrastructure impacted by climate change.	**Denali Commission (lead)**; **DOE-AE (lead)**; DHS; DOC-EDA; DOC-NOAA; DOD-Ted Stevens; DOE-AE; DOE-EERE; DOE-OE; DOI-USGS; DOT; EPA; HUD; NSF; USDA-RD	Data Management	10/23
3.1.2 Support new innovations and off-the-shelf technology that can be implemented in community development plans to support the ability of Arctic communities to combat climate change impacts.	**Denali Commission (lead)**; **DOE-AE (lead)**; DOD-Ted Stevens; DOI-USGS; HUD; DOE-AE; DOE-EERE; DOE-OE; DOT; NSF	Data Management; Technology Innovation and Application	10/24

Objective 3.2: Improve understanding of the importance and value of economies in the Arctic. Support local access to Arctic economic opportunities by examining the linkages among economic initiatives, infrastructure, socioeconomic factors, and values of rural Arctic communities.

Environmental changes in the Arctic have increased global pressure to transform and expand Arctic economies. However, sustainable pathways for achieving this are not well understood. Transitioning undeveloped and under-developed locally accessible economic opportunities into sustainable economies will benefit from understanding effective support mechanisms (e.g., public and private funding) that can stimulate economic activity. This is particularly important in fast-growing sectors of healthcare and infrastructure development. Federal investment in infrastructure can be a valuable economic stimulus, but research is needed to support the transition to sustainable economies. Existing economic sectors in Alaska also face challenges with capacity building, climate change, and external factors. Improved socio-economic models, studies on the transferability of successful place-based economic programs, and research on community-defined priorities for sustainable livelihoods can provide insights for pathways towards more sustainable local job creation and retention while keeping the unique values of Arctic residents at the forefront.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
3.2.1 Support research that incorporates economic model insights and synthesizes available data to identify important factors affecting job availability and wages in major economic sectors.	**DOC-EDA (lead)**; DOE-AE; DOE-SC; DOT; EPA; NSF; USDA-NRCS; USDA-RD	Data Management	4/24
3.2.2 Research regionally appropriate and feasible options for building local human capacity, considering cultural attributes and vocational capabilities juxtaposed with evolving environmental trends and economic opportunities, and articulate results within regional economic development strategies and plans.	**DOC-EDA (lead)**; DOE-AE; DOE-SC; DOT; EPA; USDA-NRCS; USDA-RD	Data Management	10/24

Objective 3.3: Improve multi-species and ecosystem approaches to predict climate change impacts on species distributions and on economically viable access to commercial and subsistence species in the next 50 years.

Living resources have great subsistence, cultural, and commercial value to people living in the Arctic. Living Arctic resources such as fish, fowl, marine mammals, pollinators, and plant species are important food sources. The worldview and spiritual practices of Arctic Indigenous Peoples are connected to the animals, plants, and places of their Arctic home. In order to develop effective adaptation strategies, Arctic communities and businesses need to understand how climate change will impact the abundance and distributions of species, predict potential collapses in key fisheries such as salmon, and affect ecosystems in ways that also increase the economic burden for accessing these resources. Understanding the changing impacts to ecosystem services requires a multi-species ecosystem-based approach for research observations and model predictions.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
3.3.1 Develop short-term comparative model predictions of the distribution and populations of fishery species (e.g. pollock, cod, salmon, halibut, crab) in response to evolving climatic conditions in the Northern Bering Sea and Southern Chukchi Sea.	**DOC-NOAA/NMFS (lead)**; **NSF (lead)**	Arctic Systems Interactions (PA 2); Community Resilience and Health (PA 1); Marine Ecosystems; Monitoring, Observing, Modeling, and Prediction	3/24

Photo: Lisa Hupp/DOI

Priority Area 4: Risk Management and Hazard Mitigation

Goal: Secure and improve quality of life through research that promotes an understanding of disaster risk exposure, sensitivity to hazard, and adaptive capacity.

Objective 4.1: Summarize currently available data and information requirements associated with hazard and risk mitigation, adaptation, and response efforts. Synthesize community-led activities and information to identify potential needs for future efforts.

Work carried out under this objective will improve understanding of how data and information generated by the Arctic research community and local and Indigenous communities can be applied to real-world challenges tied to risk and hazards such as wildfire, permafrost thaw, and coastal erosion. In turn, this work will be used as a foundation to better address data gaps, accessibility, and other issues that often limit the use of Arctic research activities in risk management and hazard mitigation. Meeting this objective will require engagement and collaboration with communities, Tribes and Indigenous organizations, Indigenous knowledge holders, and the private sector, as well as cooperation across the full range of scientific and engineering disciplines, and state of Alaska and Federal agencies working in the Arctic.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
4.1.1 Conduct a study identifying where information used in decision-making and planning can be improved through access to new or additional data sources. This study should consider a wide range of activities associated with ongoing responses to common and emerging hazards, including risk reduction efforts and emergency preparedness and response.	**DOI-BIA (lead)**; Denali Commission; DOC-NOAA; DOI-USGS	Data Management; Monitoring, Observing, Modeling, and Prediction; All Communities of Practice	4/23
4.1.2 Share findings of deliverable 4.1.1 as a means (1) to spur additional research and science communication aimed at addressing unmet needs for planning, prevention, response, and recovery and (2) to inform time-sensitive decision-making and planning processes.	**DOI-BIA (lead)**; Denali Commission; DHS; DOC-NOAA; DOD-USACE; DOI-USGS	All Foundational Activities; All Communities of Practice	10/24

Objective 4.2: Update and improve the "Statewide Threat Assessment: Identification of Threats from Erosion, Flooding, and Thawing Permafrost in Remote Alaska Communities."

Work to meet this objective will involve reviewing, updating, and building upon the 2018 Statewide Threat Assessment by expanding and updating the scope of hazards cataloged in the assessment and integrating community resilience information. Sea ice and coastal erosion will be added to this effort. The goal is to better understand the threats to Alaska communities from acute and long-term hazards, including climate change, as well as what level of community intervention (adaptation, mitigation, and/or other protective measures) are in place. This will lead to identifying and developing an index of threat risk and community capacity for the variety of risks that Alaska villages face.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
4.2.1 Undertake a study to identify the top 10 threats/hazards to communities and critical remote state and Federal government infrastructure in the state of Alaska that should be included in the Statewide Threat Assessment. This might include coastal and river erosion, flooding, thawing permafrost, and changes in the seasonal snowpack.	**HHS-NIH/NIEHS (lead)**; DOC-NOAA; DOD; DOI-USGS; NSF	Data Management; Monitoring, Observing, Modeling, and Prediction; All Communities of Practice	4/23
4.2.2 Upon completion of 4.2.1, establish a data collection and collation plan to include mechanisms to collect threat/hazard data that may not be readily available.	**HHS-NIH/NIEHS (lead)**; DHS; DOD; DOI-USGS	Data Management; Monitoring, Observing, Modeling, and Prediction; All Communities of Practice	10/23
4.2.3 Collect and integrate disparate threat/hazard information and perform modeling and analysis to understand where natural and human-made threats and hazards pose a risk to Arctic communities.	**Denali Commission (lead)**; **HHS-NIH/NIEHS (lead)**; DHS-FEMA; DOD; DOI-USGS	Data Management; Monitoring, Observing, Modeling, and Prediction; All Communities of Practice	10/24

Objective 4.3: Research to support more resilient and transformative infrastructure to withstand potential impacts from acute and long-term hazards, including those hazards brought about by climate change.

This objective seeks to identify resilient infrastructure capabilities and technologies that can minimize infrastructure risk and reduce the impacts of hazards.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
4.3.1 Conduct a study focused on expedient and enduring cold regions infrastructure, including water and wastewater, energy, and temporary and enduring structures. Results will be disseminated into a report that will identify and provide background information on the variety of available and emerging water/wastewater, energy, and structure technologies and best practices.	**DOD-USACE (lead)**; **DOT (lead)**; DHS-CISA; DHS-USCG; DOE-AE; EPA; HHS; USDA-NRCS	Technology Application and Innovation	10/23
4.3.2 Conduct a study that looks at novel materials that could be used to improve resilience for physical infrastructure from the effects of hazards. Areas of interest include energy, communications, and transportation infrastructure. Share findings in a report.	**DOD-USACE (lead)**; **DOE-AE (lead)**; DHS-CISA; DHS-USCG; USDA-NRCS	Technology Application and Innovation	10/24

Foundational Activity: Data Management

Photo: NPS

Data Objective 1: Encourage and implement FAIR (Findable, Accessible, Interoperable, and Reusable) and CARE (Collective benefit, Authority to control, Responsibility, and Ethics) data management principles in the Arctic.

The deliverables will draw from two sustained lines of effort, culminating in summaries of Arctic data management considerations. The first line of effort is to convene new and existing IARPC partners and members to develop a community of practice focused on FAIR and CARE. This will build a networked community of practice while also supporting new insights in data management. The Data Management Foundational Activity Collaboration Team will maintain a living document to capture the community's ideas to allow IARPC members to shape team efforts. The second line of effort is to convene semi-structured meetings to share perspectives from individuals and groups on implementing FAIR and CARE. These meetings will help collect perspectives from data users, owners, publishers, providers, managers, and researchers on specific aspects of FAIR and CARE data management principles.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
Data 1.1 Identify verified points of contact (e.g., agency champions, data practitioners, Arctic residents, Indigenous organizations) and their areas of expertise and interests for working with the data team on exploring and implementing FAIR and CARE in Arctic data management. As part of developing the points of contact, identify and track representation across many axes of diversity (demographics, disciplines/sectors, IARPC experience, career stage, and others) to ensure a diverse and representative group of contributors. The data team will check in with these groups regularly to ensure the points of contact are up to date.	**DOD (lead)**; Denali Commission; DHS-USCG; DOC-NOAA; DOE-SC; DOI-USGS; DOT; HHS; NASA; NSF; SI; USDA	All Priority Areas; All Foundational Activities; Atmosphere; Coastal Resilience; Diversity and Inclusion; Glaciers and Sea Level; Health and Well-Being; Marine Ecosystems; Permafrost; Physical Oceanography; Sea Ice; Terrestrial Ecosystems	10/24
Data 1.2 In order to build community buy-in and promote sustained efforts, develop and revisit and update terms of reference which articulate Biennial Implementation Plan Data Management roles, activities, and metrics.	**DOD (lead)**; DOC-NOAA; DOE-SC; DOI-USGS; NASA; NSF	Arctic Systems Interactions (PA 2); Participatory Research and Indigenous Leadership in Research	10/24

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
Data 1.3 Based on input from engagement activities, develop and update centralized documentation of thematic areas of interest, ongoing activities, and key documents and resources that can inform deliverables and future Biennial Implementation Plans.	**DOD (lead)**; DOC-NOAA; DOE-SC; DOI-USGS; EPA; NASA; NSF	All Priority Areas; Atmosphere; Coastal Resilience; Diversity and Inclusion; Education, Training, and Capacity Building; Glaciers and Sea Level; Health and Well-Being; Marine Ecosystems; Participatory Research and Indigenous Leadership in Research; Permafrost; Physical Oceanography; Sea Ice; Technology Innovation and Application; Terrestrial Ecosystems	10/24

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
Data 1.4 Convene quarterly seminars, discussions, and training on FAIR and CARE data management in the Arctic. Ensure a diverse group of presenters and contributors are represented in these activities.	**DOD (lead)**; Denali Commission; DHS-USCG; DOC-NOAA; DOE-SC; DOI-USGS; DOT; HHS; NASA; NSF; SI; USDA	All Priority Areas; Atmosphere; Coastal Resilience; Diversity and Inclusion; Education, Training, and Capacity Building; Glaciers and Sea Level; Health and Well-Being; Marine Ecosystems; Permafrost; Participatory Research and Indigenous Leadership in Research; Physical Oceanography; Sea Ice; Technology Innovation and Application; Terrestrial Ecosystems	10/24
Data 1.5 Develop a common format and structure (e.g., questions, prompts) for team meetings to help elicit and articulate perspectives on all aspects of FAIR and CARE to help work towards the community summary/synthesis products below.	**DOD (lead)**; DOC-NOAA; DOE-SC; DOI-USGS; NASA; NSF	All Priority Areas; Participatory Research and Indigenous Leadership in Research	11/23

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
Data 1.6 Develop a summary document of perspectives on implementing FAIR and CARE in Arctic contexts.	**DOD (lead)**; DOC-NOAA; DOE-SC; DOI-USGS; NASA; NSF	All Priority Areas; Participatory Research and Indigenous Leadership in Research	10/24
Data 1.7 Based on the summaries mentioned above, develop concise (i.e., one-pager) public-facing documents on data management considerations to align with FAIR and CARE principles.	**DOD (lead)**; DOC-NOAA; DOE-SC; DOI-USGS; NASA; NSF	All Priority Areas; Participatory Research and Indigenous Leadership in Research	10/24

Photo: Lisa Hupp/USFWS

Foundational Activity: Education, Training, and Capacity Building

Edu Objective 1: Develop a ONE STEM hub.

The ONE STEM (Science, Technology, Engineering, and Math) hub will serve as a nexus for all Federal programs and the communities these programs serve. By leveraging capacity among Federal partners with similar aims, a ONE STEM hub will enhance local research capacity, bring greater diversity to Federal STEM initiatives and ultimately to Arctic research, work to include Indigenous Knowledge in STEM, enhance community engagement, and guide development of new community-specific programming. A hub is essential for much-needed interagency coordination as well as non-Federal engagement. It is also essential as a focal point of relationship building which has been identified as a critical need within Arctic communities and among researchers to ensure long term Arctic research capacity.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
Edu 1.1 Establish a ONE STEM hub.	**DOC-NOAA (lead)**; DHS; DOE-AE; MMC; NSF; SI	Diversity and Inclusion; All Priority Areas	10/24

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
Edu 1.2 Provide access to STEM internships, skill development opportunities, and career pathways for those living in and/ or with interest in the Arctic, in particular for rural and Indigenous communities.	**NSF (lead)**; DHS; DOC-NOAA; DOE-AE; NASA; NSF; SI; USDA	Diversity and Inclusion; All Priority Areas	10/24
Edu 1.3 Engage in ongoing and respectful dialogue with communities about education, training, and capacity building needs. Document feedback.	**DOC-NOAA (lead)**; DHS; DOE-AE; NASA; NSF; SI	Data Management; Diversity and Inclusion; All Priority Areas	10/24
Edu 1.4 Use quarterly meetings to build the STEM Education team into a robust community that supports promotion of STEM careers and skills for rural and Indigenous students.	**NSF (lead)**; DHS; DOC-NOAA; DOE-AE; DOI-USGS; MMC; NASA; SI	Diversity and Inclusion; All Priority Areas	10/24

Foundational Activity: Monitoring, Observing, Modeling, and Prediction

Photo: Allyson Woodard (PolarTREC 2018), via ARCUS

MOMP Objective 1: Coordinate activities and communities of practice that bring together Arctic modeling, observing, monitoring, and prediction to advance Arctic research.

Work under this objective will improve the synthesis of monitoring, observing, and modeling activities to advance Arctic science and prediction. Models require observations for initialization, evaluation, and assimilation and can in turn provide critical information to inform the design and optimization of observing networks. Integrating observational and modeling output enables creation of value-added products and can help fill spatial and temporal gaps in analysis. Improved coordination and integration of observational and modeling activities will accelerate the advancement of knowledge of the dynamic Arctic system and lead to improved predictive capabilities.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
MOMP 1.1 Develop synthesis products, best-estimate datasets, model simulations, and model intercomparison studies from major Arctic field campaigns and long-term observational sites to advance the integration of observational and modeling studies and process-based assessment of model simulations.	**DOE-SC (lead)**; DHS-USCG; DOC-NOAA; DOI-USGS; NASA; NSF; USDA	Arctic Systems Interactions (PA 2); Atmosphere; Observing; Modeling; Permafrost; Sea Ice; Terrestrial Ecosystems	10/24

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
MOMP 1.2 Support development of metrics that measure key Arctic processes and implementation of these metrics in benchmarking packages to facilitate model validation against observations.	**DOE-SC (lead)**; DOC-NOAA; DOI-BLM; USDA	Arctic Systems Interactions (PA 2); Modeling; Observing; All Priority Areas	10/24
MOMP 1.3 Provide funding opportunities for research coordination between groups working on Arctic coupled data assimilation and reanalysis, emphasizing intercomparison assessments of the full atmosphere-land-ocean-cryosphere coupled system.	**NSF (lead)**; DOC-NOAA; DOE-SC; NASA	Arctic Systems Interactions (PA 2); Modeling	10/24
MOMP 1.4 Support ongoing work, such as observing system experiments (OSEs), to quantify the current and potential value of Arctic ocean, atmosphere, sea ice, and land observations for initialized predictions spanning daily to decadal timescales.	**NASA (lead)**; DOC-NOAA; NSF	Arctic Systems Interactions (PA 2); Modeling; Observing	10/24
MOMP 1.5 Hold regular joint meetings of the Observing and Modeling communities of practice to better coordinate these communities of practice, bridge the communication gap between the modeling and observation science communities, and support the priority area research activities.	**DOE-SC (lead)**; DOC-NOAA; NASA; SI	Observing; Modeling	3/23

MOMP Objective 2: Support assessment, gaps analysis, and intercomparisons to understand observational and modeling needs in Arctic research.

Work under this objective will identify observational or modeling capability gaps that hamper predictive skill of models of the Arctic system, barriers that hold back progress in filling these gaps, and key activities most critical to improving predictability, including the need to maintain critical existing MOMP capabilities.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
MOMP 2.1 Develop an online tool for the research community to support expert elicitation and data visualization for the value tree gaps analysis methodology.	**DOC-NOAA (lead)**; NASA; NSF	Observing; US AON Board; All Priority Areas	10/24
MOMP 2.2 Conduct observational gaps analysis case studies using the value tree methodology to inform understanding of the capabilities, opportunities, and gaps in Arctic observing and data systems, with an initial focus on risk hazard and mitigation.	**DOC-NOAA (lead)**; DOE-SC; NASA; NSF	Arctic Systems Interactions (PA 2); Observing; Risk Management and Hazard Mitigation (PA 4); Communities of Practice as appropriate	10/24
MOMP 2.3 Provide support and/or funding opportunities for researchers to participate in existing Arctic-focused model intercomparison projects and explore the feasibility of developing new model intercomparison projects focused on the Arctic system, its components, or its coupling with the broader climate system to understand gaps in modeling and predictability of the Arctic system.	**DOE-SC (lead)**; DOC-NOAA; NASA; NSF	Arctic Systems Interactions (PA 2); Modeling; Sea Ice	10/24
MOMP 2.4 Conduct workshops to identify Arctic modeling needs and priorities across research and operational modeling communities.	**DOE-SC (lead)**; DOC-NOAA; NASA; NSF	Modeling; All Priority Areas; Communities of Practice as appropriate	10/24

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
MOMP 2.5 Publish observing report tasked to the United States Arctic Observing Network (US AON) Board via IARPC.	**NSF (lead)**; DOC-NOAA; DOD; DOI-BOEM; DOI-NPS; DOI-USGS; EPA; HUD; NASA; SI	US AON Board; All Priority Areas	12/22

MOMP Objective 3: Support coordination and engagement with Federal, international, and non–Federal partners who are conducting monitoring, observing, modeling, and prediction of the Arctic.

Significant activities in monitoring, observing, modeling, and prediction of the Arctic system are conducted by non-Federal entities. Additionally, the Arctic is an important component of the broader Earth system and Arctic monitoring, observing, modeling, and prediction activities should be coordinated with other Federal interagency activities focused on observation and modeling of the Earth system. Work under this objective will strengthen monitoring, observing, modeling, and prediction capabilities for Arctic research by improving coordination and integration of Arctic observational and modeling activities conducted or supported by Federal agencies with those conducted or enabled by non-Federal partners and with broader Federal Earth system activities.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
MOMP 3.1 Support participation of United States researchers in international Arctic modeling and prediction efforts in order to quantify and improve the predictive capabilities of Arctic models as evidenced by relevant scientific papers, presentations, and meeting sessions.	**DOE-SC (lead)**; DOC- NOAA; NASA; NSF	Arctic Systems Interactions (PA 2); Data Management; Modeling	10/24

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
MOMP 3.2 Coordinate communication of information about field activities to Alaska communities where the research is being conducted through the research expedition vessel status tracker and spring and fall reports on research season activities.	**DOC-NOAA (lead)**; DHS-USCG; DOI-BOEM; DOI-FWS; DOI-NPS; DOI-USGS; NASA; NSF	Arctic Systems Interactions (PA 2); Community Resilience and Health (PA 1); Field Operations; Marine Ecosystems; Participatory Research and Indigenous Leadership in Research; Sea Ice; Sustainable Economies and Livelihoods (PA 3); Terrestrial Ecosystems	10/24
MOMP 3.3 Coordinate U.S. Federal Arctic observing and modeling research efforts with other relevant U.S. interagency groups (e.g., ICAMS, USCLIVAR, USGCRP, and USGEO) to identify priority activities to support the Arctic component of Earth System Predictability Research and Development Strategic Framework and Roadmap.	**DOE-SC (lead)**; DHS; DOC-NOAA; NASA; NSF	Arctic Systems Interactions (PA 2); Modeling; Observing; Risk Management and Hazard Mitigation (PA 4)	10/24

MOMP Objective 4: Support best practices in field observations and modeling.

The purpose of this objective is to identify, share, and implement best practices to promote safe, inclusive, diverse, and environmentally sustainable Arctic observing and modeling activities and to make Arctic observational and modeling data more accessible.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
MOMP 4.1 Build on existing efforts within Federal agencies to share resources and implement best practices for improving field safety culture, diversity, and inclusivity, and enforcing safe working environments in the field, including both physical safety while working in harsh and remote Arctic environments and emotional safety from harassment and hostile working conditions.	**NSF (lead)**; DHS-USCG; DOC-NOAA; DOE-SC; NASA	Field Operations; Observing	10/24
MOMP 4.2 In coordination with the IARPC Diversity and Inclusion Community of Practice and the Participatory Research and Indigenous Leadership in Research Foundational Activity, promote and support best practices for improving diversity and inclusion in Arctic monitoring, observing, modeling, and prediction efforts, including identifying pathways to support Indigeneous co-leadership of activities.	**NSF (lead)**; DOC-NOAA; DOE-SC	Diversity and Inclusion; Participatory Research and Indigenous Leadership in Research	10/24
MOMP 4.3 In coordination with the Data Management foundational activity, promote and support FAIR and CARE principles for observational and modeling data.	**DOE-SC (lead)**; DOC-NOAA	Data Management	10/24

Foundational Activity: Participatory Research and Indigenous Leadership in Research
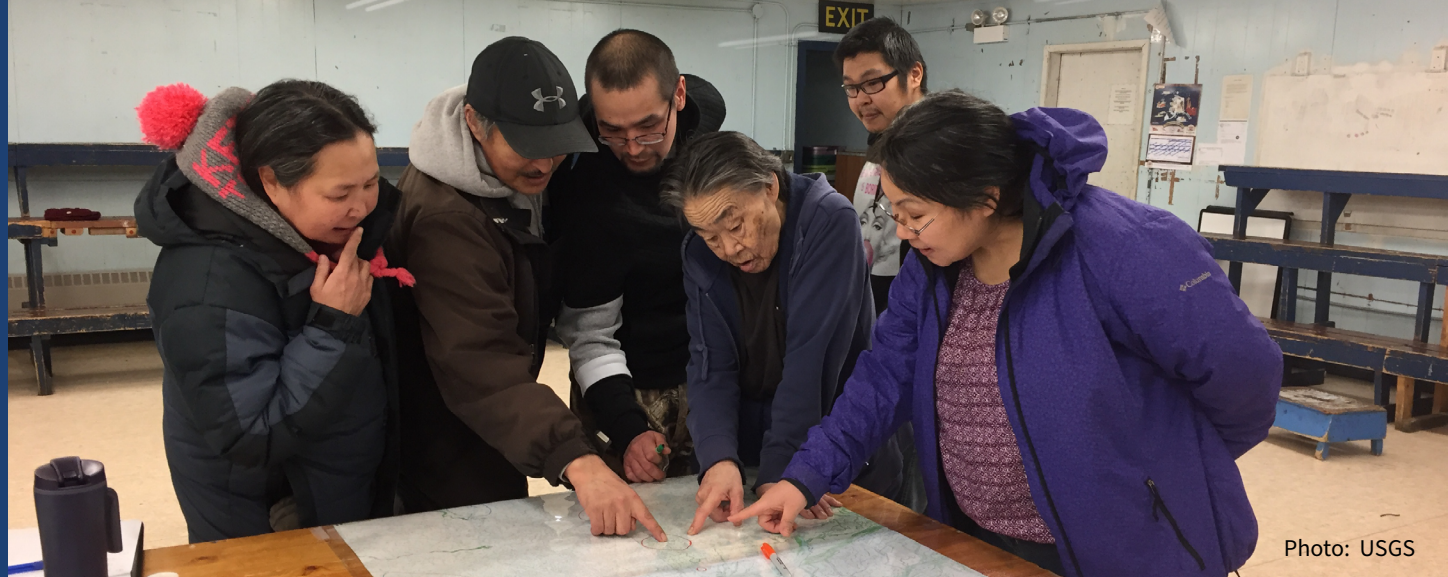

Photo: USGS

PRILR Objective 1: Fulfill Federal requirement to consult with Federally recognized Tribes and Alaska Native Corporations.

All Federal agencies are required to fulfill Federal consultation policies. Executive Order 13175 directs agencies to engage in "meaningful consultation and collaboration"[1] in a way that honors Tribal sovereignty and self-determination. Federal agencies, departments, and offices may also develop and follow their respective consultation policies and guidance.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
PRILR 1.1 Create a best practices document on meaningful consultation and engagement on Arctic research with Alaska Indigenous communities that is applicable to all Federal agencies.	**DOI-FWS (lead)**; This will be a coordinated effort among all IARPC Federal agencies	All Collaboration Teams; All Communities of Practice	10/23

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[1]Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships, Jan 2021. Executive order 13175, "Consultation and Coordination With Indian Tribal Governments." Nov 2000.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
PRILR 1.2 Evaluate the Principles for Conducting Research in the Arctic 2018, and update as needed based on the evaluation.	**NSF (lead)**; This will be a coordinated effort among all IARPC Federal agencies	All Collaboration Teams; All Communities of Practice	10/23
PRILR 1.3 Develop and deliver training for agencies to implement the Principles for Conducting Research in the Arctic.	**DOI-FWS (lead)**; This will be a coordinated effort among all IARPC Federal agencies	All Collaboration Teams; All Communities of Practice	10/24

PRILR Objective 2: Engage Arctic communities and individuals in research in a way that is meaningful to them.

Engage Arctic communities and individuals through cooperative opportunities among residents, Indigenous Knowledge[2] holders, and researchers in knowledge co-production research processes. Ensure that research benefits Arctic communities and is not extractive. Employ Indigenous Knowledge to jointly conceive of and plan research activities and to report research results back to communities. Demonstrate what good examples of engagement look like so that similar spaces can be created in other regions and groups.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
PRILR 2.1 Create a training toolkit for scientists that can be self-guided and used as needed. Topics may include cross-cultural communication, consultation, participatory research, Indigenous Knowledge, overview of Indigenous culture groups, formal agreements, and how to contract and consult with Indigenous companies and individuals.	**DOI-FWS (lead)**; This will be a coordinated effort among all IARPC Federal agencies	All Collaboration Teams; All Communities of Practice	10/23

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[2]Memorandum on Indigenous Traditional Ecological Knowledge and Federal Decision Making, Nov 2021. Additional guidance forthcoming from Office of Science and Technology Policy and Council on Environmental Quality.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
PRILR 2.2 Create a report of examples where IARPC member agencies have engaged Indigenous Knowledge holders in research.	This will be a coordinated effort among all IARPC Federal agencies	All Collaboration Teams; All Communities of Practice	10/23
PRILR 2.3 Request that each Priority Area Collaboration Team host regular meetings that meaningfully engage with Indigenous leaders, groups, and/or communities. This includes developing a list of contacts to support requests for engagement or tracking engagement with Indigenous participation.	This will be a coordinated effort among all IARPC Federal agencies	All Collaboration Teams; All Communities of Practice	10/23
PRILR 2.4 Analyze and develop a report on broader impacts of science/research teams on Indigenous health and resilience.	This will be a coordinated effort among all IARPC Federal agencies	All Collaboration Teams; All Communities of Practice	10/24
PRILR 2.5 Hold interagency meetings/workshops to identify mechanisms for Federal agencies to effectively communicate science plans and findings among themselves and with communities.	This will be a coordinated effort among all IARPC Federal agencies	All Collaboration Teams; All Communities of Practice	10/24

PRILR Objective 3: Develop guidance for agencies to consistently apply participatory research and Indigenous leadership in research.

Indigenous Knowledge is critical for understanding Arctic systems. Participatory Research and Indigenous Leadership can help sustain a subsistence way of life, improve food security, and include a unique set of information otherwise inaccessible to scientists. The deliverables below will assist in building capacity and supporting participatory research and Indigenous leadership in research across all priority areas.

Deliverable	Collaborating Agencies	Contributing Communities of Practice	Expected Completion Date (M/Y)
PRILR 3.1 Co-define "Indigenous leadership in research" with Tribes, Indigenous organizations, and Federal agencies; and integrate into the Principles for Conducting Research in the Arctic and its training toolkit and best practices documents.	This will be a coordinated effort among all IARPC Federal agencies	All Collaboration Teams; All Communities of Practice	10/23
PRILR 3.2 Hold interagency meetings/workshops to identify methods to streamline contracting/agreements and compensation processes to make co-stewardship and co-production in research more equitable and achievable.	This will be a coordinated effort among all IARPC Federal agencies	All Collaboration Teams; All Communities of Practice	10/23
PRILR 3.3 Convene discussions to identify mechanisms to foster equitable pathways for Indigenous leadership in research.	This will be a coordinated effort among all IARPC Federal agencies	All Collaboration Teams; All Communities of Practice	10/24
PRILR 3.4 Identify best practices for Federal agencies to support capacity for Tribes and Indigenous Knowledge holders in research. Distribute guidance on best practices to IARPC agencies.	This will be a coordinated effort among all IARPC Federal agencies	All Collaboration Teams; All Communities of Practice	10/24
PRILR 3.5 Ensure consistent terminology for Indigenous Traditional Ecological Knowledge, Indigenous Knowledge, Traditional Ecological Knowledge, and Local Knowledge for IARPC. Suggest primary language for IARPC be Indigenous Knowledge.	This will be a coordinated effort among all IARPC Federal agencies	All Collaboration Teams; All Communities of Practice	10/24

Foundational Activity: Technology Innovation and Application

Photo: Cristina Solis (PolarTREC 2012), via ARCUS
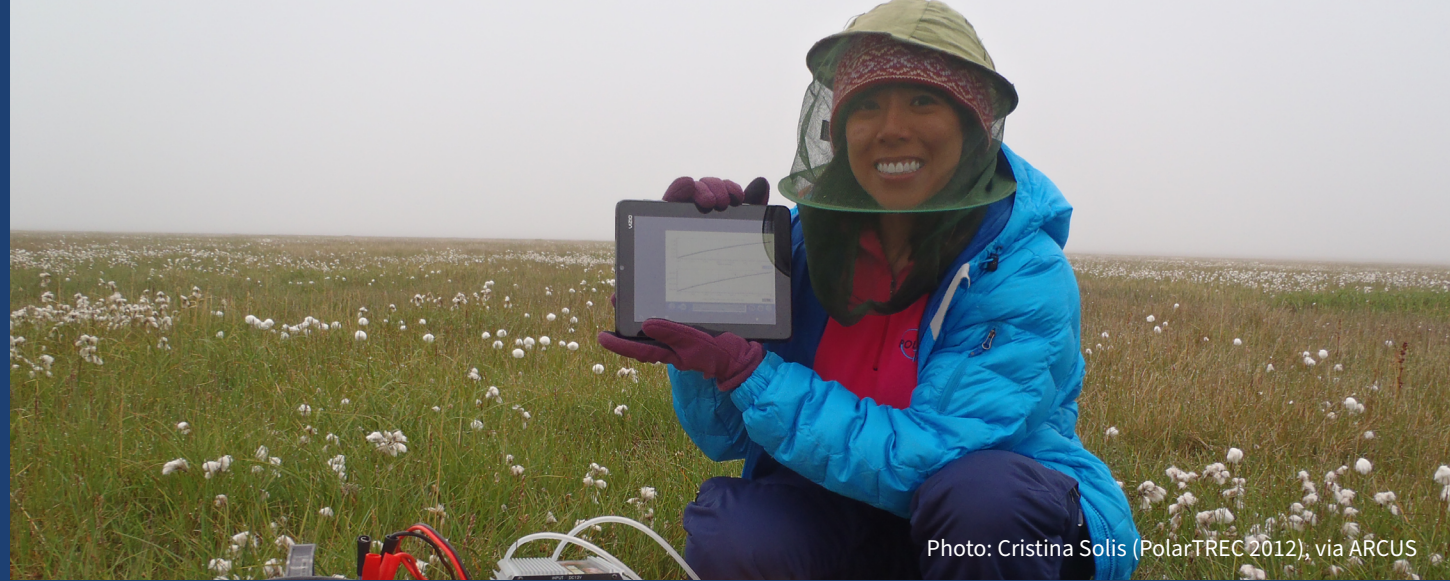
Technology is a crosscutting challenge for Arctic researchers, as the Arctic setting requires dedicated investments in technology support to make research activities possible. As such, technology is an essential part of many priority area research activities. The Technology Innovation and Application Foundational Activity Collaboration Team does not identify separate objectives or deliverables, but instead will support deliverables across this Biennial Implementation Plan.

Technology supports the Arctic Research Plan and Biennial Implementation Plan goals and objectives when existing technology is reconfigured and modified for the Arctic setting, or when a research objective necessitates research and development into new technology. Also, activities under this Biennial Implementation Plan will provide opportunities for collaboration with the private entities to help advance the Arctic Research Plan, potentially leveraging federal technology investments to benefit Arctic communities.