

International Strategic Document Synthesis Narrative

Introduction

The International Strategic Document Synthesis (International Synthesis) is a synthesis of research priorities and needs identified in public facing strategic and research priority documents generated through international collaboration. Documents include strategic plans, work and action plans, assessments and priority documents, workshop reports, and agreements.

The purpose of the International Synthesis is to summarize Arctic research priorities and identify cross-cutting themes across the Arctic. The International Synthesis is complemented by three additional syntheses that highlight Arctic research priorities at the state, federal, and northern community level. Individually, these syntheses provide insight into research priorities in each sector, combined, they seek to highlight themes that exist across all four sectors.

How to Use the Synthesis

The International Synthesis is not a document created by international bodies or representatives. It is a survey of recently released strategic documents published over the past five years and may not fully represent the full suite of current research priorities. Additionally, the documents in the synthesis were not intended specifically as input to the development of the Arctic Research Plan. The International Synthesis should be used as a resource to aid workshop participants and drafting teams in the development of the next Arctic Research Plan. It should not be used as the definitive guide on international Arctic research priorities.

International Synthesis Thematic Overview

The International Synthesis identifies major regional research needs and priorities as well as research priorities that permeate across regions and throughout the Arctic. Major cross-cutting themes include monitoring, data sharing, and global linkages.

Monitoring, Observing and Forecasting: The need to strengthen and sustain long-term Arctic observations and identify gaps and integration with global observing systems. Increased observations of Arctic species, marine, coastal ecosystems, terrestrial, and freshwater ecosystems. Strengthening of data collection and integrated modeling of ecosystem changes where baselines have been established.

International Cooperation: Increased access to data and shared research including joint monitoring and coordination of existing data. Enhanced cooperation and data sharing on relevant data to Central Arctic Ocean ecosystems and potential future fisheries impacts in the Central Arctic Ocean. Circumpolar networks to harness innovative technologies to build knowledge and develop skills needed to maintain vibrant communities in a changing region.

Global Linkages: More accurate understanding of coupled Polar climate systems and the role of the Arctic in the global climate system.

Environmental Change: Improve knowledge of terrestrial, freshwater and marine ecosystems in the context of rapid change. Improve understanding of structure and functioning of polar ecosystems and projected changes as well as identify ecological indicators to evaluate risks to polar ecosystems and the services they provide to lower ecosystems. Increased predictive capacity of emerging threats, impacts of the changing hydrological cycle, and the consequences of variability in heat and momentum exchanges between ocean, land, ice, atmosphere and space in a changing climate.

Ecosystem Changes, Species Management, and Sea Ice: Improve the understanding of the cumulative impacts on marine ecosystems from multiple human activity-induced stressors including climate change. Research on areas particularly vulnerable to ocean acidification, biological productivity under changing regimes, and changes to coastal and marine species. Research on how changes are impacting areas of ecological and cultural significance.

Cryosphere: Improve understanding of snow-related processes including atmosphere-glacier-ocean interaction and implications for Arctic glacier mass budget, formation, development, frequency/intensity, and impacts of extreme cryospheric events. Increased understanding of the effect of diminishing ice cover on the carbon cycle in the Arctic.

Erosion, Permafrost and Infrastructure: Improve understanding of the impact of permafrost thaw on infrastructure. Information on how to adapt infrastructure to changes, develop sustainable transportation infrastructure, and support long-term investments in all forms of Arctic infrastructure. A need for information to support improved connectivity infrastructure throughout the Arctic.

Adaptation: A need to evaluate adaptation actions over time and implement research and monitoring focused on adaptation. Research on the cumulative impacts of climate change, industrial development, and societal change, including the complex dynamics of cross-scale and cross-sector comparisons. Need for social science approaches to adaptation including behavioral sciences, institutional analysis, and policy analysis.

Emissions and Pollutants: Better understanding of air pollution as well as the sources, trends, and impact of pollutants and contaminants on ecosystems and people. Research on persistent organic pollutants and short-lived climate pollutants. Increased information on improved waste management including as it relates to the need to reduce plastic marine litter and the release of microplastics into the Arctic environment.

Community Health: Research on ecosystem change impacts to human health and wellbeing. An increased understanding of the connection between community and environmental health.

Increased information exchange to support public health system with an emphasis on projects that reduce death and disability from environmental risk factors, suicide and high-burden infectious and chronic diseases. Deepen global understanding of the region's peoples, cultures, traditional ways of life, languages and values and promote Indigenous Knowledge. Support the identification and promotion of heritage sites and areas of cultural significance in the Arctic. Strengthen the participation of local communities in improving sustainable water, sanitation, and waste disposal management.

Economic Trends: Strengthen analysis and joint monitoring of economic trends and activities in the Arctic. Explore and evaluate potential benefits of economic development including in new and emerging sectors.

Energy: Research on the sustainable development of energy and resources as well as innovative approaches encouraging renewable energy across remote Arctic communities.

Biodiversity: Address monitoring and research gaps in scientific knowledge of biodiversity, advance the Arctic Biodiversity Data Service, and develop and apply standards of the Arctic Spatial Data Infrastructure (SDI) and further develop use of remote sensing.

Risk Management and Response: Increased guidance and risk assessment methodologies.

Documents from:

1. Arctic Council, Coastal Expert Monitoring Group (CEMG)
2. Arctic Council, Circumpolar Biodiversity Monitoring Program (CAFF, CBMP)
3. Second Arctic Science Ministerial, Joint Statement (ASM Joint Statement)
4. Second Arctic Science Ministerial (ASM Report)
5. Arctic Council, Protection of the Arctic Marine Environment (PAME)
6. International Arctic Science Committee (IASC)
7. EU Polar Net (PolarNet)
8. Arctic Council, Arctic Monitoring and Assessment Program (AMAP)
9. Polar Knowledge Canada (POLAR)
10. Arctic Observing Summit (AOS)
11. Ocean Obs' 19 (Ocean Obs'19)
12. Arctic Council (SAO Ministerial Statements)
13. Arctic Council, Arctic Contaminants Action Program (ACAP)
14. Arctic Council, Sustainable Development Working Group (SDWG)
15. Arctic Council, Conservation of Arctic Flora and Fauna Working Group (CAFF)
16. Arctic Council, Emergency Prevention, Preparedness and Response Working Group (EPPR)
17. Central Arctic Ocean Fisheries Agreement (CAO Agreement)
18. Agreement on Enhancing International Arctic Scientific Cooperation (Scientific Cooperation Agreement)
19. Adaptation Actions for a Changing Arctic: Perspectives from the Bering-Chukchi-Beaufort Region (AMAP)

Cross Cutting Themes:

Cross cutting themes are themes that emerge across and exist within the individual themes listed below. Cross-cutting themes are not in prioritized order.

- Monitoring
- Data Sharing
- Global Linkages

Themes:

¹ This document was prepared by Sorina Stalla for the Plan Development Steering Group

Themes are not in prioritized order.

- Monitoring and Observing
- International Cooperation and Data Sharing
- Global Linkages
- Environmental Change
- Marine Ecosystems and Sea Ice
- Cryosphere
- Permafrost and Infrastructure
- Pollutants and Contaminants
- Human Health and Sociological Systems
- Waste and Marine Debris
- Infrastructure
- Economic Trends
- Arctic Communities
- Energy
- Water and Sanitation
- Biodiversity

Monitoring and Observing

- Need a fully developed, implemented and sustained ocean observing system that meets – at a minimum, earth system prediction needs – but also meets other critical Arctic societal benefits ([Ocean Obs'19](#))
 - Need development of an Arctic node or regional alliance under the umbrella of a global observing framework ([Ocean Obs'19](#))
- Need to strengthen, integrate, and sustain Arctic observations ([ASM Joint Statement](#)) ([ASM Report](#)) ([IASC](#))
- Enhance coordination of Arctic observations, including identification of gaps and integration with global observing systems ([AOS](#))
- Long-term Arctic climate modelling capabilities via improved, coupled process understanding ([IASC](#))
- Better understand the trend of Arctic coastal ecosystems in terms of native species composition/condition, new and invasive species, geographic distributions, thresholds with respect to climate drivers, phenological norms, and key processes and functions ([CEMG](#))
 - Identify primary system drivers/disturbances and their impacts
 - How and which subsistence species are impacted by coastal ecosystem changes, which will be impacted in the future?
 - How will measured and predicted changes in Arctic coastal biodiversity impact the mandated biodiversity obligations of local, Indigenous, territorial and federal governments?
- How are Arctic coastal ecosystems impacted by ([CEMG](#))
 - Climate change
 - Oil and gas exploration
 - Mining

- Shipping
- Subsistence and commercial fishing
- Community activities
- Contaminants
- Invasive species
- Strengthen data collection and monitoring of Arctic marine environment ([PAME](#))
 - This could include hydrographic and bathymetric data; oceanographic data (including tides and currents) and meteorological information for numerical modeling and forecasting; pollutants; climate change-related impacts (especially ocean acidification); and ecosystem and biodiversity status and trends (including invasive species and other metrics of environmental change)
- Monitoring and integrated modelling of terrestrial, freshwater and marine ecosystem changes where baselines have been established ([PolarNet](#))

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|--------------------------|---|--|
| Monitoring and Observing | Second Arctic Science Ministerial - Joint Statement | Second Arctic Science Ministerial, Joint Statement (ASM Joint Statement) |
| | Second Arctic Science Ministerial - Co-Operation in Arctic Science - Challenges and Joint Actions | Second Arctic Science Ministerial (ASM Report) |
| | Arctic Observing Summit 2020 conference statement | Arctic Observing Summit (AOS) |
| | International Arctic Science Committee Strategic Plan 2018 -2023 | International Arctic Science Committee (IASC) |
| | Arctic Coastal Biodiversity Monitoring Plan: Coastal Expert Monitoring Group, Circumpolar Biodiversity Monitoring Program | Arctic Council, Coastal Expert Monitoring Group (CEMG) |
| | Arctic Council, Arctic Marine Strategic Plan 2015 -2025 | Arctic Council, Protection of the Arctic Marine Environment (PAME) |
| | EU-PolarNet White Paper Workshop: Five white papers touching upon the most pressing issues in the Polar Regions | EU Polar Net (PolarNet) |
| | OceanObs'19 - Conference Outcomes | Ocean Obs'19 |

International Cooperation and Data Sharing

- Increase access to Arctic biodiversity data ([CBMP](#))
- Need to facilitate access to Arctic data and share research infrastructure ([ASM Joint Statement](#)) ([IASC](#))
- Strengthen joint monitoring efforts with a focus on filling research gaps and developing mechanisms to share data ([PAME](#))

- Coordination of existing data into common databases, integrating different data among disciplines at different temporal and spatial scales, promoting interoperability of data ([PolarNet](#))
- Enhance cooperation in Scientific Activities in order to increase effectiveness and efficiency in the development of scientific knowledge about the Arctic ([Scientific Cooperation Agreement](#))
- Data sharing on relevant data of Central Arctic Ocean Ecosystems and potential future fisheries impacts in the Central Arctic Ocean ([CAO Agreement](#))
- Develop circumpolar networks and harness innovative technologies to build knowledge and develop skills needed to maintain vibrant communities in a changing region ([SDWG](#))

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| International Cooperation and Data Sharing | Circumpolar Biodiversity Monitoring Program Strategic Plan: 2018-2021 | Arctic Council, Circumpolar Biodiversity Monitoring Program (CBMP) |
| | Second Arctic Science Ministerial - Joint Statement | Second Arctic Science Ministerial, Joint Statement (ASM Joint Statement) |
| | International Arctic Science Committee Strategic Plan 2018 -2023 | International Arctic Science Committee (IASC) |
| | Arctic Council, Arctic Marine Strategic Plan 2015 -2025 | Arctic Council, Protection of the Arctic Marine Environment (PAME) |
| | EU-PolarNet White Paper Workshop: Five white papers touching upon the most pressing issues in the Polar Regions | EU Polar Net (PolarNet) |
| | Agreement on Enhancing International Arctic Scientific Cooperation (Scientific Cooperation Agreement) | U.S. Department of State |
| | Arctic Council, Sustainable Development Working Group Work Plan 2019-2021 | Arctic Council, Sustainable Development Working Group (SDWG) |

Global Linkages

- Achieving a more accurate understanding of the coupled Polar climate system through intensive new measurement campaigns and data collection field work as well as careful analysis and integration of existing data, via EU projects funded by new coordinated calls ([PolarNet](#))
- Role of the Arctic in the global climate system ([IASC](#))

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| Global Linkages | EU-PolarNet White Paper Workshop: Five white papers touching upon the most pressing issues in the Polar Regions | EU Polar Net (PolarNet) |
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| | International Arctic Science Committee Strategic Plan 2018 -2023 | International Arctic Science Committee (IASC) |
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Environmental Change

- Improving knowledge of dynamic northern terrestrial, freshwater and marine ecosystems in the context of rapid change ([POLAR](#))
 - Collect baseline information on terrestrial, freshwater and marine ecosystems, including abiotic elements such as the cryosphere (permafrost, snow and sea ice)
- Increased understanding of regional and global dynamics of Arctic change ([ASM Joint Statement](#)) ([ASM Report](#))
 - Narrow errors on assessments of sea level rise and to improve prediction of extreme weather events ([ASM Report](#))
 - More concerted research efforts should be devoted to understanding the adaptation of marine and terrestrial ecosystems ([ASM Report](#))
 - Role of the Arctic in the global climate system ([IASC](#))
- Improve predictive capacity of emerging threats ([PAME](#))
 - Satellite and modelling activities for improving the predictability of Arctic change on daily to seasonal timescales, including extreme events ([IASC](#))
- Consequences of variability in heat and momentum exchanges between ocean, land, ice, atmosphere and space in a changing climate ([IASC](#))
- Changes in the hydrological cycle and their impact on the Arctic system ([IASC](#))
- Improve the understanding of the current structure and functioning of polar ecosystems, and how they will change under predicted environmental pressures ([PolarNet](#))
- Identify the most relevant ecological indicators to evaluate risks to the polar ecosystems and services they provide, locally and to lower latitudes, and evaluate the impact of management options ([PolarNet](#))
- Documenting trends in key climate indicators and their environmental implications ([AMAP](#))
- Environmental and ecosystem consequences in the Arctic resulting from global climate change (including ocean acidification) ([AMAP](#))
- Improve predictive capacity through increased observations, research, scenarios, and models as tools for understanding of processes governing changes in the Arctic ([CAFF](#))

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| Environmental Change | POLAR's 2020-2025 Science and Technology Framework and Strategic Plan | Polar Knowledge Canada (POLAR) |
| | Second Arctic Science Ministerial - Joint Statement | Second Arctic Science Ministerial, Joint Statement (ASM Joint Statement) |
| | Second Arctic Science Ministerial - Co-Operation in Arctic Science - Challenges and Joint Actions | Second Arctic Science Ministerial (ASM Report) |
| | International Arctic Science Committee Strategic Plan 2018 -2023 | International Arctic Science Committee (IASC) |
| | Arctic Council, Arctic Marine Strategic Plan 2015 -2025 | Arctic Council, Protection of the Arctic Marine Environment (PAME) |

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| | EU-PolarNet White Paper Workshop: Five white papers touching upon the most pressing issues in the Polar Regions | EU Polar Net (PolarNet) |
| | Arctic Council, Arctic Monitoring and Assessment Program | Arctic Council, Arctic Monitoring and Assessment Program (AMAP) |
| | Actions for Arctic Biodiversity 2013-2021: implementing the recommendations of the Arctic Biodiversity Assessment | Arctic Council, Conservation of Arctic Flora and Fauna Working Group (CAFF) |

Marine Ecosystems and Sea Ice

- Improve the understanding of cumulative impacts on marine ecosystems from multiple human activity-induced stressors such as climate change, ocean acidification, local and long range transported pollution (land and sea-based), marine litter, noise, eutrophication, biomass overharvesting, invasive alien species and other threats ([PAME](#))
- Research on how climate change and human induced changes impact areas of heightened ecological and cultural significance ([PAME](#))
- Map areas of the marine environment that are particularly vulnerable to the effects of ocean acidification ([PAME](#))
- Biological productivity under changing sea ice regimes ([IASC](#))
- Report on changes in coastal Arctic species, ecosystems and the effects of stressors ([CAFF](#))
- Joint program of scientific research and monitoring to gain a better understanding of Arctic Ocean ecosystems ([CAO Agreement](#))
 - Increased understanding on fish stocks in the Central Arctic Ocean that exist now or in the future and possible impacts of fisheries on ecosystem ([CAO Agreement](#))

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| Marine Ecosystems and Sea Ice | Arctic Council, Arctic Marine Strategic Plan 2015 -2025 | Arctic Council, Protection of the Arctic Marine Environment (PAME) |
| | International Arctic Science Committee Strategic Plan 2018 -2023 | International Arctic Science Committee (IASC) |
| | Actions for Arctic Biodiversity 2013-2021: implementing the recommendations of the Arctic Biodiversity Assessment | Arctic Council, Conservation of Arctic Flora and Fauna Working Group (CAFF) |
| | Central Arctic Ocean Fisheries Agreement (CAO Agreement) | U.S. Department of State |

Cryosphere

- Atmosphere-glacier-ocean interaction and implications for Arctic glacier mass budget ([IASC](#))
- Formation, development, frequency/intensity, and impacts of extreme cryospheric events ([IASC](#))
- Improve interdisciplinary knowledge of snow-related processes ([IASC](#))

- Effect of diminishing ice cover on the carbon cycle in the Arctic and its impacts ([IASC](#))

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| Cryosphere | International Arctic Science Committee Strategic Plan 2018 -2023 | International Arctic Science Committee (IASC) |
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Permafrost and Infrastructure

- Permafrost and infrastructure, including the deployment of engineering expertise for adapting to change ([IASC](#))
- Information to inform responsible and sustainable long-term investments in all forms of Arctic infrastructure while taking into account the present needs of communities as well as the changing environment through independent efforts and in coordination with other subsidiary bodies and task forces ([SDWG](#))
- Promote the development of sustainable transportation infrastructure and traditional corridors that increase the capabilities for efficient movement of people and goods that have implications for Arctic communities ([SDWG](#))
- Need for improved connectivity in the Arctic ([SAO Ministerial Statements](#))
 - Develop connectivity that supports maritime and aeronautical users and, in particular, search and rescue efforts (Task Force on Improved Connectivity in the Arctic (TFICA)) ([SAO Ministerial Statements](#))
 - Engage with indigenous peoples during the design and implementation phases of network technology infrastructure ([SAO Ministerial Statements](#))
 - Facilitate the collection of statistics in order to measure connectivity, penetration and access across the Arctic region on an ongoing basis ([SAO Ministerial Statements](#))

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| Permafrost and Infrastructure | International Arctic Science Committee Strategic Plan 2018 -2023 | International Arctic Science Committee (IASC) |
| | Arctic Council, Sustainable Development Working Group Work Plan 2019-2021 | Arctic Council, Sustainable Development Working Group (SDWG) |
| | Arctic Council Ministerial Statements | Arctic Council (SAO Ministerial Statements) |

Pollutants and Contaminants

- Better understand Arctic air pollution: trace gas and aerosol forcing, community & ecosystem impacts, and climate feedbacks ([IASC](#))
- Examining the impact of pollution and climate change on Arctic ecosystems and people, including health of Arctic Indigenous peoples and other residents ([AMAP](#))
- Documenting of trends, sources, and effects of pollutants ([AMAP](#))
- Projects on persistent organic pollutants (POPs) such as the industrial compound PCB, and mercury and other chemicals of emerging Arctic concern ([ACAP](#)) ([AMAP](#))
- Increased waste management on shore to prevent hazardous substances, including obsolete pesticides, solvents and pharmaceuticals, and chemicals of emerging concern such as perfluorinated components ([ACAP](#))
- Work on Short-lived climate pollutants (SLPs) such as black carbon, methane and hydrofluorocarbons currently covered in international conventions ([ACAP](#))
- Assess trends in contaminants and resulting effects ([CAFF](#))

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| Pollutants and Contaminants | International Arctic Science Committee Strategic Plan 2018 -2023 | International Arctic Science Committee (IASC) |
| | Arctic Council, Arctic Monitoring and Assessment Program | Arctic Council, Arctic Monitoring and Assessment Program (AMAP) |
| | Arctic Contaminants Action Program Work Plan 2019-2021 | Arctic Council, Arctic Contaminants Action Program (ACAP) |
| | Actions for Arctic Biodiversity 2013-2021: implementing the recommendations of the Arctic Biodiversity Assessment | Arctic Council, Conservation of Arctic Flora and Fauna Working Group (CAFF) |

Human Health and Sociological Systems

- Human health, well-being, and ecosystem change ([IASC](#))
- Increasing understanding of the connections between northern community wellness and environmental health ([POLAR](#))
 - Community-led research (in ecosystems with long-term datasets) on abundance and diversity of country foods and their predators, including their habitats and how these changes affect food security and wellness;
 - Enhancing knowledge of diseases in northern wildlife, including impacts on country foods; and
 - Better understanding of the effects of environmental change on community wellness
- Exchange information, assessments and innovations that can support public health systems and health service delivery with emphasis on projects that reduce death and disability from environmental risk factors, suicide and high-burden infectious and chronic diseases ([SDWG](#))

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| Human Health and Sociological Systems | International Arctic Science Committee Strategic Plan 2018 -2023 | International Arctic Science Committee (IASC) |
| | POLAR's 2020-2025 Science and Technology Framework and Strategic Plan | Polar Knowledge Canada (POLAR) |
| | Arctic Council, Sustainable Development Working Group Work Plan 2019-2021 | Arctic Council, Sustainable Development Working Group (SDWG) |

Waste and Marine Debris

- Focus on solid waste management as it relates to the need to reduce plastic marine litter and the release of microplastics into the Arctic Environment (jointly: (ACAP) (SDWG) (AMAP) (EPPE (CAFF)) ([SAO Ministerial Statements](#)) ([AMAP](#))
 - Monitoring guidelines for marine plastics and litter ([SAO Ministerial Statements](#)) ([AMAP](#))
 - Understanding impacts of marine litter (CAFF) ([SAO Ministerial Statements](#))
 - Focus on waste management onshore to prevent plastic marine litter and the release of microplastics into the Arctic environment ([ACAP](#))
 - Increased waste management on shore to prevent marine litter, plastics and microplastics ([ACAP](#))

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| Waste and Marine Debris | Arctic Council Ministerial Statements | Arctic Council (SAO Ministerial Statements) |
| | Arctic Contaminants Action Program Work Plan 2019-2021 | Arctic Council, Arctic Contaminants Action Program (ACAP) |
| | Arctic Council, Sustainable Development Working Group Work Plan 2019-2021 | Arctic Council, Sustainable Development Working Group (SDWG) |
| | Arctic Council, Arctic Monitoring and Assessment Program | Arctic Council, Arctic Monitoring and Assessment Program (AMAP) |
| | Actions for Arctic Biodiversity 2013-2021: implementing the recommendations of the Arctic Biodiversity Assessment | Arctic Council, Conservation of Arctic Flora and Fauna Working Group (CAFF) |

Economic Trends

- Strengthen analysis and joint monitoring of economic trends and activities in the Arctic, including enhancing sustainable and diverse economic development, investments and policies ([SDWG](#))
- Explore economic development, including in new and emerging sectors, and evaluate its potential benefits, including job creation and promotion of local culture and products ([SDWG](#))
- More research on changing economic opportunities associated with shipping and resource development, in addition to impacts on Indigenous practices ([AMAP](#))

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| Economic Trends | Arctic Council, Sustainable Development Working Group Work Plan 2019-2021 | Arctic Council, Sustainable Development Working Group (SDWG) |
| | Adaptation Actions for a Changing Arctic: Perspectives from the Bering-Chukchi-Beaufort Region | Arctic Council, Arctic Monitoring and Assessment Programme (AMAP) |

Arctic Communities

- Deepen global understanding of the region's peoples, cultures, traditional ways of life, languages and values and promote traditional and local knowledge. Sustain and celebrate Indigenous languages, traditional lifeways and practices. Support the identification and promotion of heritage sites and areas of cultural significance in the Arctic ([SDWG](#))

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| Arctic Communities | Arctic Council, Sustainable Development Working Group Work Plan 2019-2021 | Arctic Council, Sustainable Development Working Group (SDWG) |
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Energy

- Promote responsible and sustainable management, use and development of energy and resources as well as innovative approaches encouraging renewable energy in even the most remote Arctic communities ([SDWG](#))

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| Energy | Arctic Council, Sustainable Development Working Group Work Plan 2019-2021 | Arctic Council, Sustainable Development Working Group (SDWG) |
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Water and Sanitation

- Strengthen the participation of local communities in improving sustainable water, sanitation and waste disposal management with an eye to the unique engineering challenges and environmental risks that the region faces ([SDWG](#))

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| Water and Sanitation | Arctic Council, Sustainable Development Working Group Work Plan 2019-2021 | Arctic Council, Sustainable Development Working Group (SDWG) |
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Biodiversity

- Address monitoring and research gaps in scientific knowledge identified as priorities in the ABA and Arctic Biodiversity Congress ([CAFF](#))
- Advance and sustain the Arctic Biodiversity Data Service ([CAFF](#))
- Develop and apply standards of the Arctic Spatial Data Infrastructure (SDI) and further develop use of remote sensing ([CAFF](#))

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| Biodiversity | Actions for Arctic Biodiversity 2013-2021: implementing the recommendations of the Arctic Biodiversity Assessment | Arctic Council, Conservation of Arctic Flora and Fauna Working Group (CAFF) |
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Risk Management and Response

- Developing guidance and risk assessment methodologies ([EPPR](#))

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| Risk Management and Response | Arctic Council, Emergency Prevention, Preparedness and Response Work Plan 2019-2021 | Arctic Council, Emergency Prevention, Preparedness and Response Working Group (EPPR) |
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Adaptation:

- Need to implement research and monitoring focused on adaptation ([AMAP](#))
- Need to address methodological and knowledge gaps in evaluating adaptation actions over time and better understand how adaptation actions may set up path dependencies by facilitating or constraining future action ([AMAP](#))
 - Need for longitudinal studies, for assessment of the effectiveness of adaptive actions, and for international comparisons with other regions ([AMAP](#))
- Better understanding of the cumulative impacts of climate change, industrial development, and societal change, including the complex dynamics of cross-scale and cross-sector comparisons ([AMAP](#))
- A need for explanatory (versus descriptive) social science approaches to adaptation, including behavioral sciences, institutional analysis, and policy analysis. Similarly, a knowledge gap exists in interdisciplinary work that could better engage the social sciences in adaptation research, especially psychology, communication, and decision sciences ([AMAP](#))

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| Adaptation | Adaptation Actions for a Changing Arctic: Perspectives from the Bering-Chukchi-Beaufort Region | Arctic Council, Arctic Monitoring and Assessment Programme (AMAP) |
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