

## ***Northern Communities Strategic Document Synthesis Narrative***

### **Introduction**

The Northern Communities Strategic Document Synthesis (Communities Synthesis) is a synthesis of research priorities and needs identified in public facing, community generated strategic documents. Documents include strategic plans, action and implementation plans, priority documents, workshop reports, resolutions, and comment letters.

The purpose of the Communities Synthesis is to summarize Arctic research priorities and identify cross-cutting themes across Arctic regions<sup>1</sup>. The Communities Synthesis is complemented by three additional syntheses that highlight Arctic research priorities at the state, federal, and international 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 Communities Synthesis is not a document created by northern communities. It is a survey of various recently released strategic documents<sup>2</sup> that are a “snapshot” in time 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 Five Year Arctic Research Plan. The Communities 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 northern communities’ Arctic research priorities.

### **Communities Synthesis Thematic Overview**

The Communities Synthesis identifies major regional research needs and priorities as well as research priorities that permeate across regions and throughout the Arctic. Many community themes are cross-cutting and tightly interwoven with other challenges. Major cross-cutting themes include monitoring and observations, community resilience, food security, the co-production of knowledge in research processes and climate change.

*Co-Production:* Relevant to all research priorities is the need for true co-production in research processes. Partner with Indigenous Peoples at the beginning of project development, using research questions driven by and created by and in partnership with communities. Include Indigenous Knowledge and co-production in the creation of research plans and throughout the entire research process, including specific research on how to bring together different knowledge and value systems.

*Sovereignty:* Highlight ethical approaches for research and ensuring data sovereignty of Indigenous Knowledge.

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<sup>1</sup> Arctic, Alaska, Aleutian and Pribilof Islands, Bering Straits, Interior, Northwest, North Slope, Southwest, Southcentral, Yukon-Kuskokwim Delta

<sup>2</sup> Such as business plans, community economic development plans, policy documents, etc.

*Data Management:* The need for a better definition of what data are collected, standardization of collection protocols and systems for connecting local data with research institutions. Need to ensure maintenance of security and integrity of data, particularly with Indigenous Knowledge and ensure that Indigenous Knowledge is interpreted by Indigenous Knowledge holders .

*Food Security and Subsistence:* The cross-cutting challenges of food security intersect with many northern communities' research themes. There is a need for increased research on food security and the impacts of climate change, development, and contaminants on the food web, species, habitats, and subsistence activities. More specifically, the need for baseline data, support studies, and impact assessments on subsistence species and long-term monitoring of species.

*Energy Development, Shipping, Hazard Response and Mitigation:* Increased research on sustainable energy as well as methods to improve and enlarge renewable the energy base. Broad sustainability is a research priority including research to promote sustainable tourism and the potential impacts of tourism as well as research on the impacts of shipping including potential risks (invasive species, pollution and others). Research on climate mitigation and adaptation measures are also needed as well as data analysis related to coastal hazards and hazard mitigation planning.

*Environmental Changes:* An increased understanding and information on climate change, its drivers and impacts. This includes baseline data on climate change as well as impacts on water and food security, regional and local impacts, cultural impacts and increased understanding on future changes.

*Ecosystem Changes, Species Management, and Sea Ice:* Increased understanding, monitoring and forecasting of ice changes including in thickness and coverage. Understanding the impacts of climate change and marine litter on marine, coastal and watershed ecosystems broadly and on specific species. Research on ocean acidification, its impacts on marine species, invasive species and possibilities for adaptation. Increased research on harmful algal blooms and paralytic shellfish poisoning monitoring to provide early detection on emerging food security concerns.

*Fisheries:* Increased understanding and monitoring of fisheries changes. Identification of important fisheries habitats. Research on mariculture as well as applied research to support seafood and other food producers in developing new products, improving processes, and reducing waste.

*Community Health:* Need to better understand the environmental causes of health programs including research that addresses community health through food security and impacts on community infrastructure. The development and implementation of suicide prevention strategies is needed as well as increased research on community health and healing. An increased monitoring of lake conditions and changes as habitat and a drinking source as well as increased testing for contaminants and emerging illness from water sources.

*Emissions and Pollutants:* Increased monitoring and research on airborne and water pollutants as well as impacts of pollutants.

*Erosion, Permafrost and Infrastructure:* Increased monitoring and understanding of permafrost changes as well as distribution of permafrost. Research on erosion of coasts and rivers as well as the interplay of factors contributing to erosion. Research that guides mitigation and adaptation responses. Research on the main threats to infrastructure including community infrastructure focusing on areas with the greatest need for this research.

*Education:* Development of new pedagogies that reflect Indigenous values as well as focus on youth, gender and language studies. The development of education and research materials that increase awareness on the deleterious effects of colonization, establish a research and knowledge base, and form alliances to promote Indigenization. Research on high teacher turnover rate.

*Convergence and Socio-Ecological Systems:* Convergent research on socio-ecological systems as well as inclusion of social science research in research mandates.

*International and Cross-Disciplinary Cooperation:* Increased international and interdisciplinary research including research on transboundary toxins, fish stocks, and on health and social research programs.

### Cross Cutting Themes:

*Cross cutting themes are themes that emerge across and exist within the individual themes listed below. For example, monitoring and observation is mentioned within the majority of research themes. Cross-cutting themes are not in prioritized order.*

- Monitoring & Observations
  - Community Resilience
  - Food Security
  - Co-Production
  - Climate Change
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### Themes:

*Themes are not in prioritized order.*

- Need for True Co-Production Throughout Research Processes
- Sovereignty/Self-Determination
- Data Management
- Food Security
- Energy Security
- Fisheries
- Ocean Acidification
- Sea Ice/Marine & Coastal Ecosystems
- Harmful Algal Blooms
- Water Quality
- Infrastructure
- Permafrost
- Erosion/Community Relocation
- Community Health
- Education
- Emissions/Pollutants
- Climate Change
- Hazard Mitigation
- Shipping
- Socio-Ecological Systems
- Sustainable Development/Tourism

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<sup>1</sup> This document was prepared by Sorina Stalla for the Plan Development Steering Group

- International/Multi-disciplinary Collaboration

**Co-Production in Research Processes (Arctic):**

- Develop and operate in true partnership with Indigenous Peoples
- Research questions need to be driven by communities and done in partnership with communities:
  - Research that informs management agencies decision making needs to be identified/driven by communities and include co-production in all research including design and implementation of research questions, methodologies, analyses, interpretations and outputs
  - Prioritize community-driven research that fills the information gaps of greatest importance and need to communities and resource managers
  - Improve research coordination
- Research needs to include Indigenous Knowledge and utilize a true co-production approach to build better research plans:
  - Integrate Indigenous Knowledge and science throughout research process and environmental assessments
  - Integrate community-driven monitoring into research activities
  - Include appropriate and sufficient budget allocations to community partners' involvement
- Need to support more research on how to bring together different knowledge and value systems:
  - Need for models that successfully bring together different value systems with each system contributing equally to the outcome that goes beyond integrating one into another (e.g., IK, TK, LK, western science, observations, stories, etc.)
  - Develop a system that respects and includes Indigenous Knowledge and Local Knowledge
  - Develop effective systems to collect and classify Indigenous Knowledge, particularly in regard to Arctic resources, the Arctic environment, and cultures must be further developed. This work must be done by Indigenous Peoples.

Co-Production in Research Processes	Partnering with Indigenous Peoples needs to happen at the very beginning of project development (prior to proposal being written)	<a href="#">Navigating the New Arctic Comment Letter</a>	Kawerak, Bering Sea Elders Group, Aleut Community of St. Paul Island, Association of Village Council Presidents	Arctic
	Research questions need to be driven by communities and done in	<a href="#">Food Sovereignty and Self Governance Collective Meeting: Food Sovereignty and Self Governance - Inuit Role in Managing Arctic Marine Resources</a>	Inuit Circumpolar Council	Arctic
		<a href="#">Savoonga Marine Mammal Advisory Committee Focus Group: Food Sovereignty and Self Governance - Inuit Role in Managing</a>	Inuit Circumpolar Council	Arctic

	partnership with communities	<a href="#">Arctic Marine Resources</a>		
		<a href="#">Navigating the New Arctic Comment Letter</a>		
		<a href="#">Inuit Arctic Policy</a>	Inuit Circumpolar Council	Arctic
		<a href="#">Promoting Resilience and Adaptation in Coastal Arctic Alaska</a>	Alaska Landscape Conservation Cooperatives	Aleutian and Pribilof Islands/Southwest/Bering Straits/Northwest
		<a href="#">Eskimo Walrus Commission: A Business Plan for Sustainability 2015-2020</a>	Eskimo Walrus Commission	Southwest/Bering Straits/Northwest/North Slope
	Research needs to include Indigenous Knowledge and a co-production approach to build better research plans	<a href="#">Arctic Horizons</a>	Arctic Horizons	Arctic
		<a href="#">Navigating the New Arctic Comment Letter</a>	Kawerak, Bering Sea Elders Group, Aleut Community of St. Paul Island, Association of Village Council Presidents	Arctic
		<a href="#">Building a Pathway to Advance Alaskan Inuit Food Sovereignty</a>	Inuit Circumpolar Council	Arctic
		<a href="#">Community-Based Monitoring and Indigenous Knowledge in a Changing Arctic: A Review for the Sustaining Arctic Observing Network</a>	Inuit Circumpolar Council	Arctic
		<a href="#">Inuit Circumpolar Council Wildlife Management Summit Report</a>	Inuit Circumpolar Council	Arctic
		<a href="#">Observing frameworks need to reflect a co-production of knowledge approach to equitably include Indigenous Knowledge systems</a>	Arctic Observing Summit	Arctic
		<a href="#">BSEG Resolution 2019-2: Resolution Requiring Researchers and Funders to Engage Western Alaska Communities in a Co-Production of Knowledge Approach on all Research Activities and to Directly Fund Knowledge Holders, Tribes, and Native Organizations for Such Efforts</a>	Bering Sea Elders Group	Bering Straits
		<a href="#">BSEG's press release on the 2019 Summit and Resolutions</a>	Bering Sea Elders Group	Bering Straits
		<a href="#">Central Bering Sea Fishermen's Association 2018 Annual Report</a>	Central Bering Sea Fishermen's Association	Aleutian and Pribilof Islands
		<a href="#">Understanding the Arctic through Co-production of Knowledge</a>	Kawerak	Bering Straits
<a href="#">Hunting, Fishing, Gathering Taskforce Brief - Tanana Chiefs</a>	Tanana Chiefs Conference	Interior		

		<a href="#">Conference</a>		
		<a href="#">Improving Local Participation in Research in Northwest Alaska</a>	Northwest Arctic Borough	Northwest
		<a href="#">Promoting Resilience and Adaptation in Coastal Arctic Alaska</a>	Collaborative	Aleutian and Pribilof Islands/Southwest/Bering Straits/Northwest
		<a href="#">Inuit Arctic Policy</a>	Inuit Circumpolar Council	Arctic
		<a href="#">Eskimo Walrus Commission: A Business Plan for Sustainability 2015-2020</a>	Eskimo Walrus Commission	Southwest/Bering Straits/Northwest/North Slope
	Research needs to be done on how to bring together different knowledge and value systems	<a href="#">An Indigenous approach to ocean planning and policy in the Bering Strait region of Alaska</a>	Kawerak	Bering Straits
		<a href="#">Promoting Resilience and Adaptation in Coastal Arctic Alaska</a>	Alaska Landscape Conservation Cooperatives	Aleutian and Pribilof Islands/Southwest/Bering Straits/Northwest
		<a href="#">Inuit Arctic Policy</a>	Inuit Circumpolar Council	Arctic

**Sovereignty/Self-Determination:**

- Highlight ethical approaches for Arctic research
- Ensure information sovereignty of Indigenous Knowledge

Sovereignty/Self-Determination	<a href="#">Utqiagvik Declaration. 2018.</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Arctic Horizons</a>	Arctic Horizons	Arctic

**Data Management:**

- Maintain security and integrity of data. Indigenous and Traditional Knowledge is difficult to share taken out of context, and it is difficult to know if it (and local input generally) is being used by state and federal agencies
- Innovations are needed in data curation, management, sharing, discoverability, and access

Data Management	<a href="#">Arctic Horizons</a>	Arctic Horizons	Arctic
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**Food Security:**

- Need for increased research on food security, specifically on climate change impacts on food webs
- Need for baseline data, support studies, and impact assessments on subsistence species
  - Including on critical habitat identification and characterization (that includes Indigenous Knowledge)

- On how shipping, fishing industry, oil/gas exploration will impact subsistence species
- Research on lower trophic species
- The need for long monitoring and observation systems of subsistence species to support food security
  - Involve hunters in monitoring and reporting
  - Need PSP monitoring for early detection of emerging food safety concerns
  - Monitor climate impacts like changes in sea ice and ocean temperatures on subsistence resources like fish and seals
  - Research the stressors on salmon and effects caused by warming temperatures
- Increased understanding of contaminants in subsistence species
  - Need for research to inform subsistence marine fisheries, contaminants in subsistence fish, and moldy fish
  - Research wildlife populations with a focus on parasites
  - More information on seabird die-offs and sick seals
- Impact of road development on caribou migration

Food Security	<a href="#">Alaska Federation of Natives: 2017 Federal Priorities</a>	Alaska Federation of Natives	Alaska
	<a href="#">Navigating the New Arctic Comment Letter</a>	Kawerak, Bering Sea Elders Group, Aleut Community of St. Paul, Association of Village Council Presidents	Arctic
	<a href="#">Climate Change in Port Heiden, Alaska; Strategies for Community Health</a>	Alaska Native Tribal Health Consortium	Aleutian and Pribilof Islands
	<a href="#">St. Paul Island Comprehensive Economic Development Strategy: 2017-2022</a>	Aleut Community of Saint Paul Tribal Government	Aleutian and Pribilof Islands
	<a href="#">Food Sovereignty and Self Governance Collective Meeting: Food Sovereignty and Self Governance - Inuit Role in Managing Arctic Marine Resources</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Building a Pathway to Advance Alaskan Inuit Food Sovereignty</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Utqiagvik Declaration. 2018.</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Inuit Circumpolar Council Alaska Strategic Plan 2018-2022</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Inuit Arctic Policy</a>	Inuit Circumpolar	Arctic



		Council	
	<a href="#">Coastal Monitoring Indigenous Knowledge Holders Meeting Report</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Climate Change in the Bering Strait Region.</a>	Center for Climate and Health	Bering Straits
	<a href="#">Bering Straits Comprehensive Economic Development Strategy</a>	Kawerak	Bering Straits
	<a href="#">Research Processes and Indigenous Communities in Western Alaska: Workshop Report</a>	Kawerak	Bering Straits
	<a href="#">Marine Mammal Oil Spill Response Nome Workshop February 2018</a>	Kawerak	Bering Straits
	<a href="#">North Slope Subsistence Regional Advisory Council</a>	North Slope Subsistence Regional Advisory Council	North Slope
	<a href="#">North Slope Borough Comprehensive Plan 2019 - 2039</a>	North Slope Borough Assembly	North Slope
	<a href="#">Southcentral Alaska Subsistence Regional Advisory Council</a>	Southcentral Alaska Subsistence Regional Advisory Council	Southcentral
	<a href="#">Yukon-Kuskokwim Delta Subsistence Regional Advisory Council</a>	Yukon-Kuskokwim Delta Subsistence Regional Advisory Council	Yukon-Kuskokwim Delta
	<a href="#">Promoting Resilience and Adaptation in Coastal Arctic Alaska</a>	Collaborative	Aleutian and Pribilof Islands/Southwest/Bering Straits/Northwest
	<a href="#">Eskimo Walrus Commission Focus Group Summary on Food Sovereignty and Self Governance</a>	Eskimo Walrus Commission /ICC	Southwest/Bering Straits/Northwest/North Slope
	<a href="#">Eskimo Walrus Commission: A Business Plan for Sustainability 2015-2020</a>	Eskimo Walrus Commission	Southwest/Bering Straits/Northwest/North Slope
	<a href="#">Central Council of the Tlingit &amp; Haida Indian Tribes of Alaska: Climate Change Adaptation Plan</a>	Central Council of the Tlingit & Haida Indian Tribes of Alaska	Southeast

**Energy Security:**

- Development and research on methods to improve and enlarge the renewable resource base (Bering Straits) (North Slope) (Arctic)
  - Explore potential for natural gas to reduce dependence on imported diesel and vulnerability to power cost swings (Bering Straits)
  - Monitor and develop alternative energy sources such as solar systems, coal, natural gas and wind power (North Slope, Aleutian and Pribilof Islands)
- Perform sustainable energy applied research (Southwest) (Bering Straits)
  - To benefit Bristol Bay (Southwest)
  - In the context of rural Alaska (Southwest, Aleutian and Pribilof Islands)
  - Explore resilient microgrid technologies to maintain energy security (Bering Straits)

Energy Security	<a href="#">Arctic Horizons</a>	Arctic Horizons	Arctic
	<a href="#">Inuit Arctic Policy</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Bering Straits Comprehensive Economic Development Strategy</a>	Kawerak	Bering Straits
	<a href="#">North Slope Borough Comprehensive Plan 2019 - 2039</a>	North Slope Borough Assembly	North Slope
	<a href="#">Bristol Bay Comprehensive Economic Development Strategy: 2017-2021</a>	Bristol Bay Native Association	Southwest
	<a href="#">Southwest Alaska Municipal Conference Comprehensive Economic Development Strategy 2020-2024</a>	Southwest Alaska Municipal Conference	Southwest

**Fisheries:**

- Enhance the sustainable use and conservation of Alaska's marine and freshwater resources through research
- Identification of important crab habitats
- Increase monitoring of fisheries changes
  - Expand data collection and monitoring efforts of key system variables for fisheries
  - Monitor impact of ocean changes (temperature, acidity) on fish and crab populations
- Increase understanding of fisheries and fisheries changes
  - Understand Pollock fishery bycatch impacts on Bering Strait Salmon runs
  - Understand impacts of large-scale industrial fishing on subsistence resources
  - How climate change will affect commercially valuable fisheries
  - Understand the northward movement of fish stocks and the potential impact of fisheries to emerge in the Bering Sea (little to no long-term scenarios or data about impacts to ESA listed species or impacts to subsistence resources)

- Conduct specific lab analysis and applied research to support seafood and other food producers in developing new products, improving processes, and reducing waste
- Support research on aquaculture
  - On culturing systems and cultured species to improve the production and economic viability of aquaculture operations
  - About interactions between cultured and wild species, including implications for disease transmission, genetic diversity, and water quality

Fisheries	<a href="#">St. Paul Island Comprehensive Economic Development Strategy: 2017-2022</a>	Aleut Community of Saint Paul Tribal Government	Aleutian and Pribilof Islands
	<a href="#">Bering Straits Comprehensive Economic Development Strategy</a>	Kawerak	Bering Straits
	<a href="#">Research Processes and Indigenous Communities in Western Alaska: Workshop Report</a>	Kawerak	Bering Straits
	<a href="#">Bering Sea Elders Group: Northern Bering Sea and Bering Strait: Food Security</a>	Bering Sea Elders Group	Bering Straits
	<a href="#">Arctic Shipping Federal Advisory Committee Act – Kawerak Comments</a>	Kawerak	Bering Straits
	<a href="#">Nome Tribal Climate Adaptation Plan</a>	The Nome Eskimo Community	Bering Straits
	<a href="#">Bristol Bay Comprehensive Economic Development Strategy: 2017-2021</a>	Bristol Bay Native Association	Southwest
	<a href="#">Central Bering Sea Fishermen’s Association 2018 Annual Report</a>	Central Bering Sea Fisherman's Association	Bering Straits
<a href="#">Central Council of the Tlingit &amp; Haida Indian Tribes of Alaska: Climate Change Adaptation Plan</a>	Central Council of the Tlingit & Haida Indian Tribes of Alaska	Southeast	

**Ocean Acidification:**

- Better understand ocean acidification, its impacts, and how people can adapt
- Monitor and understand impact of ocean acidity on fish populations

Ocean Acidification	<a href="#">Bering Straits Comprehensive Economic Development Strategy</a>	Kawerak	Bering Straits
	<a href="#">Chugach Regional Resources Commission Climate Change Adaptation Planning Project</a>	Chugach Regional Resources Commission	Southcentral

**Sea Ice/Marine Ecosystems:**

- Better understand sea ice changes including thickness and coverage
  - Increase the seasonal breadth and spatial resolution of monitoring efforts to track changes on future productivity and resilience of coastal/ arctic ecosystems
- Increase the shared body of knowledge about marine, coastal, and watershed ecosystems in Alaska
  - Support programs that safeguard marine ecosystems and wildlife from marine litter and microplastics
  - Research to support understanding of invasive species
- More research on key species

Sea Ice/ Marine & Coastal Ecosystems	<a href="#">The Indigenous Sentinel Network: The use of community-based monitoring to enhance food security in northern coastal communities</a>	Aleut Community of St. Paul Island,	Aleutian and Pribilof Islands
	<a href="#">Utqiagvik Declaration. 2018.</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Coastal Monitoring Indigenous Knowledge Holders Meeting Report</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Bristol Bay Comprehensive Economic Development Strategy: 2017-2021</a>	Bristol Bay Native Association	Southwest
	<a href="#">Marine Mammal Commission Summary of Alaska Listening Sessions and Anchorage Public Meeting</a>	Marine Mammal Commission Listening Session Notes	North Slope/Northwest/Bering Straits
	<a href="#">Central Council of the Tlingit &amp; Haida Indian Tribes of Alaska: Climate Change Adaptation Plan</a>	Central Council of the Tlingit & Haida Indian Tribes of Alaska	Southeast

**Harmful Algal Blooms:**

- Need for research on the impact of harmful algal blooms on marine life
- Need an Alaska coast wide harmful algal bloom sentinel program with regional or village level testing
- PSP monitoring to provide early detection of emerging food safety concerns

Harmful Algal Blooms	<a href="#">Alaska Federation of Natives: 2017 Federal Priorities</a>	Alaska Federation of Natives	Alaska
	<a href="#">Climate Change in Port Heiden, Alaska; Strategies for Community Health</a>	Alaska Native Tribal Health Consortium	Aleutian and Pribilof Islands

	<a href="#">Savoonga Marine Mammal Advisory Committee Focus Group: Food Sovereignty and Self Governance - Inuit Role in Managing Arctic Marine Resources</a>	Inuit Circumpolar Council	Bering Straits
	<a href="#">Climate Change in the Bering Strait Region.</a>	Center for Climate and Health	Bering Straits

**Water Quality:**

- Increased monitoring of lake conditions and changes
  - As habitat and drinking source
  - Including timing of break-up and freeze-up, water level, temperature, turbidity, and other measures of change
- Increased water quality monitoring
- Surface water quality monitoring
  - Water-monitoring protocols to test for possible contamination from neighboring septic leach fields
  - Impact of permafrost change to local water and sanitation systems
- Need for research on emerging environmental change-related illnesses from water sources
- Research and information on watershed changes
  - Recording and broadcast of river conditions, low water, slide areas and poor ice condition
  - Data are necessary concerning each Arctic watershed and the biological resources that depend on it

Water Quality	<a href="#">Climate Change in Port Heiden, Alaska: Strategies for Community Health</a>	Alaska Native Tribal Health Consortium	Aleutian and Pribilof Islands
	<a href="#">Inuit Arctic Policy</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Climate Change in the Bering Strait Region.</a>	Center for Climate and Health	Bering Straits
	<a href="#">Community Observations on Climate Change: Arctic Village, Fort Yukon and Venetie, Alaska</a>	Alaska Native Tribal Health Consortium	Interior
	<a href="#">Climate Change in Atkasuk, Alaska</a>	Alaska Native Tribal Health Consortium	North Slope

**Infrastructure:**

- Focus research projects on threats to community infrastructure
- Increased understanding of threats to infrastructure
  - Potential ramifications of climate change/permafrost thaw on the region's infrastructure and plan accordingly

- Improve ‘communications infrastructure’ to better understand risks to the physical infrastructure. (For example, work with the National Weather Service (NWS) to obtain and improve forecasts for various weather phenomena)
- Increased coordination on climate resilient infrastructure
  - Between community and emergency planners to ensure that new infrastructure considers new understandings of projected climate conditions during the intended design life of the infrastructure
  - Adaptation plans for infrastructure

Infrastructure	<a href="#">Alaska Federation of Natives: 2017 Federal Priorities</a>	Alaska Federation of Natives	Alaska
	<a href="#">Navigating the New Arctic Comment Letter</a>	Kawerak, Bering Sea Elders Group, Aleut Community of St. Paul, Association of Village Council Presidents	Arctic
	<a href="#">Climate Change in the Bering Strait Region.</a>	Center for Climate and Health	Bering Straits
	<a href="#">Bering Straits Comprehensive Economic Development Strategy</a>	Kawerak	Bering Straits
	<a href="#">Community Observations on Climate Change: Arctic Village, Fort Yukon and Venetie, Alaska</a>	Alaska Native Tribal Health Consortium	Interior
	<a href="#">Climate Change in Atkasuk, Alaska</a>	Alaska Native Tribal Health Consortium	North Slope
	<a href="#">North Slope Borough Comprehensive Plan 2019 - 2039</a>	North Slope Borough Assembly	North Slope
	<a href="#">Climate Change in Atkasuk, Alaska</a>	Alaska Native Tribal Health Consortium	North Slope
	<a href="#">Promoting Resilience and Adaptation in Coastal Arctic Alaska</a>	Alaska Landscape Conservation Cooperatives	Aleutian and Pribilof Islands/Southwest/Bering Straits/Northwest

**Permafrost:**

- Greater monitoring and understanding of permafrost changes
  - Via infrastructure monitoring
  - Monitoring systems to provide early detection of permafrost change and to prevent structural damage
- Information on the location of permafrost is needed

Permafrost	<a href="#">Climate Change in the Bering Strait Region.</a>	Center for Climate and Health	Bering Straits
	<a href="#">Nome Tribal Climate Adaptation Plan</a>	The Nome Eskimo Community	Bering Straits

**Erosion / Community Relocation:**

- Increased research and data collection on erosion of coasts and rivers
- More long-term work is needed to understand the interplay of factors (including declining sea-ice extent, increasing summertime sea-surface temperature, rising sea level, and possible increases in storm power and corresponding wave action) and how they drive changes in coastal erosion
- Community driven research that guides mitigation and adaptation responses
  - Share research that builds climate resilience / share and showcase the adaption and innovative mitigation responses -- including erosion, and community relocation
  - Need for comprehensive assessment in all coastal environments and on coastline changes to guide managed response to sea-level rise and storm impacts

Erosion / Community Relocation	<a href="#">Alaska Federation of Natives; Erosion and Alaska Native Communities</a>	Alaska Federation of Natives	Alaska
	<a href="#">Arctic Horizons</a>	Arctic Horizons	Arctic
	<a href="#">Utqiagvik Declaration. 2018.</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Improving Local Participation in Research in Northwest Alaska</a>	Northwest Arctic Borough	Northwest

**Community Health:**

- Development and implementation of regional and national evidence-based suicide prevention strategies
- Environmental causes of health problems in the Arctic should be carefully studied
- Increased research on community health and healing, social aspects of health
- Community health should be addressed through food security and impacts on community infrastructure
  - Research projects should focus on projects that support the health of Arctic peoples and the sustainability of Arctic communities - specifically food security and infrastructure

Community Health	<a href="#">Utqiagvik Declaration. 2018.</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Inuit Arctic Policy</a>	Inuit Circumpolar Council	Arctic

	<a href="#">Navigating the New Arctic Comment Letter</a>	Kawerak, Bering Sea Elders Group, Aleut Community of St. Paul Island, Association of Village Council Presidents	Arctic
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**Education:**

- Development and implementation of new pedagogies/curricula that reflect Indigenous values, culture, and language
- Youth and Gender Studies
- Encourage educators to develop awareness about the deleterious effects of colonization, establish a research and knowledge base, and form alliances to promote Indigenization
  - Encourage research and study Indigenization efforts in education and research worldwide for potential application in Indigenous homelands
  - Develop partnerships between Indigenous researchers and students, and institutions of higher education to broaden and deepen the body of Indigenous research
- Research causes for the high teacher turnover and seek programmatic solutions and funding
- Invest in language research and revitalization programs

Education	<a href="#">Utqiagvik Declaration. 2018.</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Arctic Horizons</a>	Arctic Horizons	Arctic
	<a href="#">Inuit Education</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Research Processes and Indigenous Communities in Western Alaska: Workshop Report</a>	Kawerak	Bering Straits
	<a href="#">North Slope Borough Comprehensive Plan 2019 - 2039</a>	North Slope Borough Assembly	North Slope
	<a href="#">St. Paul Island Comprehensive Economic Development Strategy: 2017-2022</a>	Aleut Community of St Paul Tribal Government, City of St. Paul, CBSFA, TDX	Aleutian and Pribilof Islands

**Emissions/Pollutants:**



- Increased monitoring of pollutants
  - Proactively monitor, report and seek protection for trans-boundary streams and rivers that have a potential to be impacted by current and future mining development in the Yukon Territory
  - Monitor changes to air quality
- Increased research on pollutants
  - Support work on black carbon/short lived climate influencers
  - Research into pollution, its effects, and the ways to mitigate it
  - Identify and effectively address the principal sources of oil pollution in marine environments. These sources may be “operational” discharges from ships (e.g. ballasting), ocean dumping of wastes or major spills from offshore drilling rigs
  - Specific attention to threats including acid rain and snow, mercury pollution, pesticides, polychlorinated biphenyls (PCBs), POPs, radionuclides, and other toxic and persistent substances from sources that are in many instances from outside the Arctic
- Research on the impacts of pollutants
  - The effects of antibiotics when they get into waterways
  - Impacts of industrial activity
  - Impact of mineral Development on fish and wildlife

Emissions / Pollutants	<a href="#">Climate Change in Port Heiden, Alaska: Strategies for Community Health</a>	Alaska Native Tribal Health Consortium	Aleutian and Pribilof Islands
	<a href="#">Utqiagvik Declaration. 2018.</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Community-Based Monitoring and Indigenous Knowledge in a Changing Arctic: A Review for the Sustaining Arctic Observing Network</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Inuit Arctic Policy</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Coastal Monitoring Indigenous Knowledge Holders Meeting Report</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Research Processes and Indigenous Communities in Western Alaska: Workshop Report</a>	Kawerak	Bering Straits
	<a href="#">Bering Straits Comprehensive Economic Development Strategy</a>	Kawerak	Bering Straits
	<a href="#">Resolution 2018-29: Protect Transboundary Watersheds</a>	Tanana Chiefs Conference	Interior

**Climate Change and Hazard Mitigation:**

- Increased understanding of climate changes and impacts, generally

- Past and present drivers of change in the North, including climate change
- How climate change will unfold, especially in terms of the rate of change in summer and winter, and how change will vary between the southern and northern regions
- More baseline data as it pertains to climate change
- Increase Indigenous participation and knowledge in climate change research
- Greater understanding of the impacts of climate change
  - Climate change effect on food and water security
  - Understand local impact of climate change
  - Research effects of climate change on people
  - Rapid loss of cultural heritage, including the loss of Indigenous languages and the destruction of archaeological sites by climate change
  - More understanding on what changes are coming
- Research on climate mitigation and adaptation
  - Work to mitigate harmful impacts of climate change
  - Research and prepare an adaptation plans
  - Continued research and information to address and mitigate climate change impacts in the Y-K Delta region. Engage in research to better understand the impacts of climate change on important subsistence resources and work on possible mitigation measures that will help support subsistence communities
- Collection, and data analysis related to coastal hazards and hazard mitigation planning<sup>2</sup>

Climate Change and Hazard Mitigation	<a href="#">Arctic Horizons</a>	Arctic Horizons	Arctic
	<a href="#">Inuit Circumpolar Council Wildlife Management Summit Report</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Bering Sea Elders Group: Northern Bering Sea and Bering Strait: Ecosystem and Climate Change</a>	Bering Sea Elders Group	Bering Straits
	<a href="#">Research Processes and Indigenous Communities in Western Alaska: Workshop Report</a>	Kawerak	Bering Straits
	<a href="#">Resolution 2019-23: Establishing a Climate Change Advisory Committee</a>	Tanana Chiefs Conference	Interior
	<a href="#">Hunting, Fishing, Gathering Taskforce Brief - Tanana Chiefs Conference</a>	Tanana Chiefs Conference	Interior
	<a href="#">Climate Change in Atkasuk, Alaska</a>	Alaska Native Tribal Health Consortium	North Slope
	<a href="#">Nuiqsut Comprehensive Development Plan 2015 - 2035</a>	North Slope Borough	North Slope

<sup>2</sup> FEMA and Hazard mitigation plans are under State synthesis

	<a href="#">Improving Local Participation in Research in Northwest Alaska</a>	Northwest Arctic Borough	Northwest
	<a href="#">Yukon-Kuskokwim Delta Subsistence Regional Advisory Council</a>	Yukon-Kuskokwim Delta Subsistence Regional Advisory Council	Yukon-Kuskokwim Delta
	<a href="#">Bristol Bay Comprehensive Economic Development Strategy: 2017-2021</a>	Bristol Bay Native Association	Southwest
	<a href="#">Alaska Native Tribal Health Consortium Climate Adaptation Plans</a>	Alaska Native Tribal Health Consortium	Arctic
	<a href="#">Bureau of Indian Affairs Tribal Resilience Program 2020 Funding Awards Summary</a>	Bureau of Indian Affairs	Arctic

**Shipping:**

- Research on impacts of shipping
  - Of increased shipping on natural resources
  - Vessel noise, ship tracks, and oil spills and their consequences on marine mammal migration as well as on subsistence practices of Inuit, and their diverse use of sea ice
  - On food security: noise disturbance to marine mammals, contaminated discharges, conflict with hunters and fishermen, and danger to small boats
  - Work still remains to be done in relation to HFO phase out, ship air emissions, discharge, impacts to wildlife, impacts to communities, climate change
- Invasive species and the potential risks associated with an increase in shipping

Shipping	<a href="#">Inuit Circumpolar Council Calls for Safe Arctic Shipping to Protect Inuit Rights and the Marine Environment</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Inuit Circumpolar Council Wildlife Management Summit Report</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Coastal Monitoring Indigenous Knowledge Holders Meeting Report</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Inuit Arctic Policy</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Bering Straits Comprehensive Economic Development Strategy</a>	Kawerak	Bering Straits
	<a href="#">Research Processes and Indigenous Communities in Western</a>	Kawerak	Bering Straits

	<a href="#">Alaska: Workshop Report</a>		
	<a href="#">Marine Mammal Oil Spill Response Nome Workshop February 2018</a>	Kawerak	Bering Straits
	<a href="#">Kawerak Comments on Unresolved Issues Re: Port of Nome Feasibility Report</a>	Kawerak	Bering Straits
	<a href="#">Bering Sea Elders Group: Northern Bering Sea and Bering Strait: Food Security</a>	Bering Sea Elders Group	Bering Straits
	<a href="#">Arctic Shipping Federal Advisory Committee Act – Kawerak Comments</a>	Kawerak	Bering Straits
	<a href="#">Marine Mammal Commission Summary of Alaska Listening Sessions and Anchorage Public Meeting</a>	Marine Mammal Commission Listening Session Notes	North Slope/Northwest/Bering Straits

**Socio-Ecological Systems:**

- Convergent research on socio–ecological systems
- Include funding for Arctic social science research in research mandates

Socio-Ecological Systems	<a href="#">Arctic Horizons</a>	Arctic Horizons	Arctic
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**Sustainable Development/Tourism:**

- Sustainable development and sustainability are research priorities
- Research and promote tourism
- The effects of wildlife guiding activities

Sustainable Development / Tourism	<a href="#">Arctic Horizons</a>	Arctic Horizons	Arctic
	<a href="#">Inuit Arctic Policy</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Bering Straits Comprehensive Economic Development Strategy</a>	Kawerak	Bering Straits
	<a href="#">Research Processes and Indigenous Communities in Western Alaska: Workshop Report</a>	Kawerak	Bering Straits
	<a href="#">St. Paul Island Comprehensive Economic Development Strategy: 2017-2022</a>	Aleut Community of St. Paul Island Tribal Government	Aleutian and Pribilof Islands

**International / Multidisciplinary Collaboration:**

- Pursue international, interdisciplinary, and comparative research
- International Collaboration on fish stocks
- International research on transboundary toxins
- Inclusion of Inuit in international agreements in regard to cooperative northern research
- International cooperation in health and social research programs

International / Multidisciplinary Collaboration	<a href="#">Arctic Horizons</a>	Arctic Horizons	Arctic
	<a href="#">Inuit Circumpolar Council Wildlife Management Summit Report</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Inuit Arctic Policy</a>	Inuit Circumpolar Council	Arctic
	<a href="#">Research Processes and Indigenous Communities in Western Alaska: Workshop Report</a>	Kawerak	Bering Straits