

## ***State of Alaska Strategic Document Synthesis Narrative***

### **Introduction**

The State Strategic Documents Synthesis (State Synthesis) is a compilation and synthesis of research priorities identified in public facing state strategic documents. Documents include State of Alaska generated strategic and development plans, mitigation plans, and assessments. Key documents from state recommender bodies are also included.

The purpose of the State Synthesis is to summarize Arctic research priorities and identify cross-cutting themes across departments. The State Synthesis is complemented by three additional syntheses that highlight Arctic research priorities at the federal, northern community, 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 State Synthesis is not a document created by state agencies. It is a survey of recently released strategic documents 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 State 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 state Arctic research priorities.

### **State Synthesis Thematic Overview**

The State Synthesis identifies major cross-cutting themes that permeate across state agencies as well as themes shared by multiple agencies. Major cross-cutting themes include community resilience and monitoring.

### **State of Alaska**

*Energy Development, Shipping, Hazard Response and Mitigation:* The understanding, monitoring of, and response development to the main natural hazard threats in Alaska: cryosphere, earthquakes, ground failure, floods, tsunami, volcano, weather, and wildlife. The establishment of a baseline of local knowledge and understanding of risk management concepts. The development of safe, reliable, and efficient energy systems.

*Erosion, Permafrost and Infrastructure:* Understanding of and planning for community risks from erosion, flooding, storm surge, and thawing permafrost as well as increased forecasting for safety and travel. Assessments of community infrastructure threatened by erosion, permafrost thaw, and flooding as well as understanding of how trails and transportation corridors will be impacted. Increase baseline data related to coastal flooding and erosion.

*Fisheries:* An understanding of the impact of ocean acidification on mariculture. Increased research and stock assessments on Chinook salmon, genetics research on and monitoring of commercially important fish and shellfish. Research and development of mariculture systems, including economic and environmental information relevant for Alaska Mariculture. Research on marine invertebrates and on emerging threats including on disease, ocean acidification, harmful algal blooms, and climate change.

*Ecosystem Changes, Species Management, and Sea Ice:* Understanding of species shifts (marine, avian, and terrestrial), threatened and endangered species, and wildlife diseases.

*Food Security and Subsistence:* Data and studies on the role of subsistence in the lives of Alaskans. A need to evaluate impacts of state and federal regulations on subsistence hunting and fishing as well as conduct subsistence harvest assessments.

*Community Health:* Assess health impacts of climate change and increase availability of health data.

**State of Alaska Recommender Bodies:**

*Environmental Change:* The strengthening of science and research on climate change including impacts to environment, ecosystems and human health. Monitoring and data gathering to understand impacts of climate change in community risk monitoring, assessment, and planning. Research that includes engaging local and regional entities and municipal and tribal governments in community risk monitoring, assessment, and planning.

*Community Resilience:* An understanding of how communities can respond to social changes for example, major climate-driven landscape changes, changes in resource availability and emerging natural hazards such as forest fires.

*Energy Development, Shipping, Hazard Response and Mitigation:* Development of advanced exploration and production technology. Improved data to refine oil permitting to be more efficient and scientifically sound as well as improvement of oil spill responses. Research on natural gas potential. Research and promotion of technologies and processes related to carbon emissions reduction and sequestration as well as analysis of sectors that will be impacted by a transition to a low-carbon future. Identification of research gaps related to valuation of land, forest, wetlands, and water carbon sequestration. Identification of resources and optimal sites for power generation as well as improved technology on efficient home heating. Studies on expanding shipping and port development as well as studies to improve port design. Research on global supply chain logistics to decrease the amount of perishables spoiled or damaged on route to Alaskan communities.

*Technology:* Research and development of mapping, aerial and unmanned aerial systems. Research on ways to improve land transportation and feasibility of next generation airships for cargo transport in Alaska. Research on improving laying fiber-optic cables in Alaskan environments.

*Indigenous Languages:* Survey research on Indigenous language speakers and promotion of the survival of Indigenous languages.

*Community Health:* Monitoring of and research on climate and environmental health impacts. Research on epidemiology in rural populations as well as research on rural-urban health disparities. Increased understanding of behavioral and mental health challenges.

*Fisheries:* A need to understand trends in Chinook salmon populations as well as conduct species assessments on salmon, sablefish, pollock, and halibut. Research on coastal and marine food webs including impact of ocean acidification on fisheries as well as long-term monitoring on fish and fish habitat. Increased research on mariculture potential.

*Ecosystem Changes, Species Management, and Sea Ice:* Research on marine ecosystem structure and processes, endangered and stressed species, and contaminants. Understanding of the effects of water system changes on aquatic communities and marine mammal management. The need to identify information needs, data gaps, and emerging threats and increase monitoring and forecasting capabilities on harmful algal blooms.

*Food Security and Subsistence:* Research on bolstering local food production and improving food security as well as continued study of the nexus of food, energy and water.

## State of Alaska Strategic Document Synthesis<sup>1</sup>

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### Documents from:

State of Alaska:

1. State of Alaska Department of Military and Veteran Affairs (DMVA)
2. Alaska Division of Homeland Security and Emergency Management (Alaska DHS)
3. Department of Health and Social Services, Alaska Division of Public Health (DHSS)
4. Alaska Department of Commerce, Community, and Economic Development (DCCED)
5. Alaska Department of Fish and Game (ADFG)
6. Alaska Department of Fish and Game Division of Subsistence (ADFG Subsistence)
7. Alaska Department of Fish and Game - Management and Research (ADFG Research)
8. Alaska Energy Authority (AEA)
9. Alaska Division of Geological & Geophysical Surveys (DGGS)
10. State of Alaska Epidemiology, Department of Health and Social Services (State of Alaska Epidemiology)
11. State of Alaska Department of Natural Resources Division of Geological & Geophysical Surveys (DNR)

State of Alaska Recommender Bodies:

12. Climate Action for Alaska Leadership Team (CALT)
13. The Alaska Native Language Preservation & Advisory Council (ANLPAC)
14. Alaska Harmful Algal Bloom Network, Alaska Dept. of Health and Social Services & Alaska Dept. of Environmental Conservation (Alaska Harmful Algal Bloom Network)
15. AYK Chinook Salmon Research Action Plan, AYK Sustainable Salmon Initiative (AYKSSI)
16. Alaska Arctic Policy Commission, State Legislature (AAPC)
17. The Alaska State Committee for Research (Committee for Research)

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### 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.*

- Community resilience
- Monitoring

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### State of Alaska Themes:

*Themes are not in prioritized order.*

- Hazard Mitigation and Natural Disaster Management
- Erosion/Flooding/Community Relocation

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

- Infrastructure
- Species Management
- Public Health
- Mariculture
- Ocean Acidification
- Harmful Algal Blooms
- Energy
- Subsistence
- Fisheries

#### State of Alaska Recommending Bodies Themes<sup>2</sup>:

- Climate Change
- Community Resilience
- Clean and Efficient Energy
- Resource Extraction
- Indigenous Languages
- Public Health
- Harmful Algal Blooms
- Fisheries
- Agriculture
- Species Management
- Technology
- Shipping

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#### Hazard Mitigation and Natural Disaster Management

- Small Community Emergency Response Plans identify main hazards/threats facing small communities in Alaska as floods, tsunamis, wildland fires, and pandemics, among others that are not climate related like terrorism and earthquakes ([DMVA](#))
- The State of Alaska Hazard Mitigation Plan identifies the eight natural hazards that potentially threaten Alaska as ([Alaska DHS](#)):
  - Cryosphere:
    - Encourage agencies to develop localized landslide and avalanche zone maps
  - Earthquakes
    - Modern seismic monitoring and recording to record and evaluate the seismic response of built infrastructure for opportunities to improve design and construction
  - Floods
    - Understand/create prioritized list of potential flood damage structures and promote development practices that reduce flood risk

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<sup>2</sup> Themes are not in priority order

- Ground failure
  - Develop an inventory of historical landslides and landslide prone areas
- Tsunami: Research and implement rapid tsunami forecasting methods
  - Identify, locate, and characterize tsunami sources in Alaska
  - Research and model the tsunami risk for vulnerable coastal communities.
  - Obtain bathymetric data for accurate tsunami inundation mapping
  - Research and model the tsunami risk for vulnerable coastal communities
  - Develop tsunami inundation maps for tsunami-threatened communities statewide
  - Encourage NOAA to continue researching and developing rapid tsunami warning technologies such as near real-time moment tensor inversion, extension of earthquake source inversion procedures, and “GPS shield technique” early tsunami warning efforts
- Volcano
  - Conduct comprehensive volcano hazard and risk assessments for the Cook Inlet
- Weather
  - Expand Weather Monitoring Networks
- Wildlife Fire
- Establish a baseline of local knowledge and understanding of risk management concepts ([DCCED](#))
- Monitor and understand future impacts of climate related geologic hazards ([DGGS](#))

Hazard Mitigation and Natural Disaster Management	<a href="#">Small Community Emergency Response Plans</a>	State of Alaska Department of Military and Veteran Affairs (DMVA)
	<a href="#">State of Alaska State Hazard Mitigation Plan</a>	Alaska Division of Homeland Security and Emergency Management (Alaska DHS)
	<a href="#">Alaska Mapping Business Plan Integrating Mapping, Risk Assessment, and Resilience Planning</a>	Alaska Department of Commerce, Community, and Economic Development (DCCED)
	<a href="#">Alaska and Climate Change</a>	Alaska Division of Geological & Geophysical Surveys (DGGS)

**Erosion/Flooding/Community Relocation**

- Understand and plan for community risks and need for community relocation from erosion, flooding, storm surge, and thawing permafrost ([DCCED](#))
- Safety and travel, forecasting ([DCCED](#), Western Alaska Landscape Conservation Cooperative)
- Increased baseline data related to flooding and erosion ([DNR](#))

Erosion/Flooding/Community Relocation	<a href="#">Alaska Mapping Business Plan Integrating Mapping, Risk Assessment, and Resilience Planning</a>	Alaska Department of Commerce, Community, and Economic Development (DCCED)
	<a href="#">Alaska Coastal Mapping Gaps &amp; Priorities for the assessment of coastal flood &amp; erosion hazards</a>	State of Alaska Department of Natural Resources Division of Geological & Geophysical Surveys (DNR)

**Infrastructure**

- Assessment of community infrastructure threatened by erosion, flooding and permafrost degradation ([DCCED](#), Adapt Y-K Delta Partnership)
- Understanding of how trails and transportation corridors will be affected by thawing permafrost and lack of river ice ([DCCED](#), Adapt Y-K Delta Partnership)

Infrastructure	<a href="#">Alaska Mapping Business Plan Integrating Mapping, Risk Assessment, and Resilience Planning</a>	Alaska Department of Commerce, Community, and Economic Development (DCCED)
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### Species Management

- Understand species shifts
  - Look at links and relationships among trophic levels and drivers, and need for flexible subsistence/harvest management (including invasive species) ([DCCED](#), Western Alaska Landscape Conservation Cooperative)
  - Information on subsistence activities impacting by shifting seasons ([DCCED](#), Adapt Y-K Delta Partnership)
- Work with NMFS and USFWS to conduct research on marine mammals ([ADFG Research](#))
- Increase understanding of small game (grouse, ptarmigan, hares, etc.) ([ADFG Research](#))
- Conduct research on waterfowl ([ADFG Research](#))
- Fill information gaps on threatened and endangered species ([ADFG Research](#))
- Understand and manage wildlife diseases ([ADFG Research](#))

Species Management	<a href="#">Alaska Mapping Business Plan Integrating Mapping, Risk Assessment, and Resilience Planning</a>	Alaska Department of Commerce, Community, and Economic Development (DCCED)
	<a href="#">Alaska Department of Fish and Game - Management and Research</a>	Alaska Department of Fish and Game - Management and Research (ADFG Research)

### Public Health

- Assess potential health impacts of climate change ([State of Alaska Epidemiology](#))
- Identify gaps in the public health system ([DHSS](#))
- Increase availability of reliable, trusted public health data to improve the health of Alaskans ([DHSS](#))

Public Health	<a href="#">Healthy Alaskans 2030: State Health Assessment 2019</a>	Department of Health and Social Services, Alaska Division of Public Health (DHSS)
	<a href="#">Assessment of the Potential Health Impacts of Climate Change in Alaska</a>	State of Alaska Epidemiology, Department of Health and Social Services (State of Alaska Epidemiology)

### Mariculture

- Research and development of mariculture systems - existing mariculture companies, mariculture enhancement, new companies, new products and mariculture building capacity ([ADFG](#))
  - Research on macroalgae
  - Research on enhancement

- Research on marine invertebrates ([ADFG](#))
  - Research on methods for combating disease outbreaks
  - Identify shellfish resistant to ocean acidification
- Studies on mariculture economics and environmental information relevant for Alaska Mariculture ([ADFG](#))
  - Monitoring of biotoxins and collection of oceanographic data
  - Water quality monitoring
- Increased understanding of existing and emerging threats: disease, ocean acidification harmful algal blooms, bacterial diseases, and climate change ([ADFG](#))

Mariculture	<a href="#">Alaska Mariculture Development Plan</a>	Alaska Department of Fish and Game (ADFG)
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#### Ocean Acidification

- The impact of ocean acidification on mariculture ([ADFG](#))
  - Long term monitoring
  - Understand variability in carbonate parameters
  - Understand biological and economic risks

Ocean Acidification	<a href="#">Alaska Mariculture Development Plan</a>	Alaska Department of Fish and Game (ADFG)
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#### Harmful Algal Blooms

- The impact of harmful algal blooms on mariculture ([ADFG](#))
  - Identify environmental conditions associated with harmful algal blooms
  - Long term monitoring
  - Identify spatial extent of blooms and oceanographic processes that link blooms
  - Identify linkages between seed beds and blooms
  - Develop predictive models

Harmful Algal Blooms	<a href="#">Alaska Mariculture Development Plan</a>	Alaska Department of Fish and Game (ADFG)
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#### Energy

- Development of safe, reliable, and efficient energy systems ([AEA](#))

Energy	<a href="#">Alaska Energy Authority</a>	Alaska Energy Authority (AEA)
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#### Subsistence

- Compile data and conduct studies on the role of subsistence in the lives of Alaskans ([ADFG Subsistence](#))
  - Quantify the amount, nutritional value, and extent of dependence on food acquired through subsistence hunting and fishing

- Evaluate the impact of state and federal laws and regulations on subsistence hunting and fishing ([ADFG Subsistence](#))
- Conduct subsistence harvest assessments ([ADFG Research](#))

Subsistence	<a href="#">Alaska Department of Fish and Game Division of Subsistence</a>	Alaska Department of Fish and Game Division of Subsistence (ADFG Subsistence)
	<a href="#">Alaska Department of Fish and Game - Management and Research</a>	Alaska Department of Fish and Game - Management and Research (ADFG Research)

### Fisheries

- Research and stock assessments of Chinook Salmon ([ADFG Research](#))
- Genetics research on commercially important fish and shellfish ([ADFG Research](#))
- Monitor finfish and shellfish diseases ([ADFG Research](#))

Fisheries	<a href="#">Alaska Department of Fish and Game - Management and Research</a>	Alaska Department of Fish and Game - Management and Research (ADFG Research)
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### Climate Change

- Strengthen science and research on climate change ([AAPC](#))
  - Incorporate Traditional Knowledge into science and research
  - Improve data collaboration, integration, management and long-term storage and archiving
  - Monitoring, baseline and observational data collection to enhance understanding of arctic ecosystems and regional climate changes
  - Improved weather, water and ice forecasting systems
  - Update hydrocarbon and mineral resource mapping and estimates in the Alaskan Arctic
- Support research and data gathering and engage local and regional entities and municipal and tribal governments in community risk monitoring, assessment, and planning ([CALT](#))
  - Climate research and monitoring programs in response to prioritized community needs
  - Increase the efficacy and accessibility of vulnerability and risk assessment tools and activities, including their utility for monitoring, evaluating, and prioritizing threats
- Monitor and gather data needed to better understand the impacts of climate change on the natural environment to identify areas of high vulnerability and risk ([CALT](#)) ([Committee for Research](#))
  - High-quality climate observations over extended periods
  - Cumulative impact research
  - Increased programs that provide critical marine, atmospheric, and terrestrial data, including operations, equipment, and infrastructure
  - Assess impact of climate change on food security
  - Continue and increase monitoring and reporting on ocean acidification and its impacts on Alaska’s fisheries and coastal/marine ecosystems.
- Work to better understand and address environmental and ecosystem changes, and their effect on human health and well-being ([CALT](#))

- Increased earth science research in general can enable more accurate predictions of changing environmental conditions that contribute to permafrost thaw, flooding, and coastal erosion ([Committee for Research](#))

Climate Change	<a href="#">Alaska Arctic Policy Commission Implementation Plan</a>	Alaska Arctic Policy Commission, State Legislature (AAPC)
	<a href="#">Alaska Climate Resilience</a>	Climate Action for Alaska Leadership Team (CALT)
	<a href="#">The Alaska Science and Technology Plan</a>	The Alaska State Committee for Research (Committee for Research)

#### Community Resilience

- Understand how communities can respond to environmental and social changes ([Committee for Research](#))
  - Research on subsistence, rural-urban migration, sustainable communities, risk perception, and other aspects of social, economic and cultural change

Community Resilience	<a href="#">The Alaska Science and Technology Plan</a>	The Alaska State Committee for Research (Committee for Research)
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#### Clean and Efficient Energy

- Promote and export technological and process innovation related to carbon emission reduction and sequestration ([CALT](#))
- Conduct an analysis of sectors that will be impacted by the state’s energy transition to a low-carbon future ([CALT](#))
- Identify ways to reduce fugitive emissions and increase carbon capture, use, storage, and sequestration ([CALT](#))
- Research related to carbon emission reduction and mitigation at the University and other institutions ([CALT](#))
- identify research gaps, including tools that value land, forest, wetlands, and water carbon sequestration ([CALT](#))
- Identification of resources and optimal sites for power generation is needed ([Committee for Research](#))
- Improved technology on efficient home heating ([Committee for Research](#)) ([AAPC](#))

Clean and Efficient Energy	<a href="#">Alaska Arctic Policy Commission Implementation Plan</a>	Alaska Arctic Policy Commission, State Legislature (AAPC)
	<a href="#">Alaska Climate Resilience</a>	Climate Action for Alaska Leadership Team (CALT)
	<a href="#">The Alaska Science and Technology Plan</a>	The Alaska State Committee for Research (Committee for Research)

#### Resource Extraction

- Use technology and improved data to refine oil permitting to be more efficient and scientifically sound ([Committee for Research](#))
- Develop and implement advanced exploration and production technology ([Committee for Research](#))
- Natural gas research ([Committee for Research](#))
- Improving oil spill response through better mapping, communications, cooperation and investment ([Committee for Research](#))

Resource Extraction	<a href="#">The Alaska Science and Technology Plan</a>	The Alaska State Committee for Research (Committee for Research)
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#### Indigenous Languages

- Promote survival and enhancement of Alaska Native Languages ([ANLPAC](#)) ([Committee for Research](#))

- Research: Survey the Numbers of Alaska Native Language Speakers

Indigenous Languages	<a href="#">The Alaska Native Language Preservation &amp; Advisory Council's 2020 Biennial Report to the Governor and Legislature</a>	The Alaska Native Language Preservation & Advisory Council (ANLPAC)
	<a href="#">The Alaska Science and Technology Plan</a>	The Alaska State Committee for Research (Committee for Research)

#### Public Health

- Monitor climate change induced health impacts and survey for climate change health indicators ([Committee for Research](#))
- Research on environmental health risks ([Committee for Research](#))
  - Impact of contaminants on food safety and security; improved infrastructure for water supplies, sewage and waste disposal; air quality; maternal and child health; and occupational health and safety. Also important are ecosystem and human health ties including toxicology, zoonotic diseases and other infectious agents, and methods for monitoring food and water safety ([Committee for Research](#))
- Research and development on epidemiology in rural populations ([Committee for Research](#))
- Increased understanding on behavioral health challenges and causes for mental health challenges ([Committee for Research](#))
- Studies on rural-urban health disparities ([Committee for Research](#))

Public Health	<a href="#">The Alaska Science and Technology Plan</a>	The Alaska State Committee for Research (Committee for Research)
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#### Harmful Algal Blooms

- Identify information needs, data gaps, and emerging threats ([Alaska Harmful Algal Bloom Network](#))
- Expand monitoring and develop forecasting capabilities ([Alaska Harmful Algal Bloom Network](#))

Harmful Algal Blooms	<a href="#">Alaska Harmful Algal Bloom Network</a>	Alaska Harmful Algal Bloom Network, Alaska Dept. of Health and Social Services & Alaska Dept. of Environmental Conservation (Alaska Harmful Algal Bloom Network)
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#### Fisheries

- Understand the trends and causes of variation in Chinook salmon abundance ([AYKSSI](#))
  - Which variables and processes are the most likely causative factors of the AYK Chinook salmon declines
  - Better understand the key drivers of salmon abundance in the region
- Research on coastal and oceanic food webs ([Committee for Research](#))
- Understand impact of ocean acidification on fisheries ([Committee for Research](#))
- Species-specific assessment and modeling for salmon, sablefish, pollock, halibut ([Committee for Research](#))
- Increased research on mariculture potential ([Committee for Research](#))
- Long-term monitoring, process studies, and models of fish and their habitats ([Committee for Research](#))

Fisheries	<a href="#">AYK Chinook Salmon Research Action Plan</a>	AYK Chinook Salmon Research Action Plan, AYK Sustainable Salmon Initiative (AYKSSI)
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	<a href="#">The Alaska Science and Technology Plan</a>	The Alaska State Committee for Research (Committee for Research)
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**Agriculture**

- Research into bolstering local food production and improving food security ([Committee for Research](#))
- Continued study of the nexus of food, energy and water ([Committee for Research](#))

Agriculture	<a href="#">The Alaska Science and Technology Plan</a>	The Alaska State Committee for Research (Committee for Research)
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**Species Management**

- Research into marine ecosystem structure and processes, endangered and stressed species; contaminants, effects of water system changes on aquatic communities; and marine mammal management ([Committee for Research](#))

Species Management	<a href="#">The Alaska Science and Technology Plan</a>	The Alaska State Committee for Research (Committee for Research)
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**Technology**

- Research and development of mapping, sensing and unmanned aerial systems ([Committee for Research](#))
- Research on technology to improve land transportation (ex. construction techniques to improve road longevity) ([Committee for Research](#))
- Research on feasibility of using next generation airships for cargo transport in Alaska ([Committee for Research](#))
- Research on techniques for improving laying fiber-optic cable in hostile Alaskan environments, such as river crossings and permafrost soil ([Committee for Research](#))

Technology	<a href="#">The Alaska Science and Technology Plan</a>	The Alaska State Committee for Research (Committee for Research)
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**Shipping**

- Feasibility studies of expanded shipping and related construction of ports and infrastructure ([Committee for Research](#))
- Engineering studies to improve port design and operations and integration of marine transportation into intermodal systems ([Committee for Research](#))
- Research on global supply chain logistics to decrease the amount of perishables spoiled or damaged en route to Alaskan communities ([Committee for Research](#))

Shipping	<a href="#">The Alaska Science and Technology Plan</a>	The Alaska State Committee for Research (Committee for Research)
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