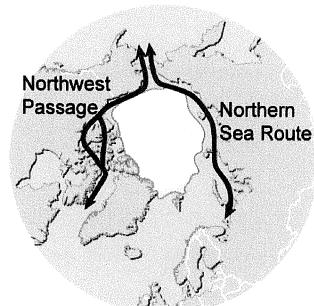


Marine Transportation

Introduction

Within the next ten to twenty years, the loss of perennial sea ice is expected to open Arctic waters for a part of each year to new shipping routes. Maritime powers have been searching for a shorter route from the Atlantic to Asia for centuries. The melting Arctic raises the possibility of two such routes:

- The Northern Sea Route runs along Russia's northern border from Murmansk to Providenya and could be used for trade between northeast Asia and northern Europe.
- The Northwest Passage runs through the Canadian Arctic Islands and the Alaskan Arctic Ocean and could be used for trade between northeast Asia and North America.



Source: Hugo Ahlenius,
UNEP/GRID- Arendal

The economic benefits of these new routes could be significant. Of the two sea lanes, the Northern Sea Route holds particular promise due to superior depth, summers freer of ice, and comparatively direct routing. Therefore, it is anticipated that this will be the preferred Arctic sea lane in the near future. Ships sailing between East Asia and Western Europe could save more than 40% in transportation time and fuel costs by navigating this route instead of the Suez Canal.

Currently, most Arctic marine traffic is destinational, delivering goods and supplies to the Arctic or transporting minerals out of the region. In 2006, it was estimated that some 6,000 vessels operated in or transited the Arctic in tourism, minerals mining, oil and gas exploration, military operations, and other activities. Today this number has reached more than 7,000, and many nations are actively building more ships designed to operate in Arctic waters. Notably, traffic related to eco-tourism is expanding rapidly in the region. In 2004, an estimated 1.2 million passengers visited the Arctic; by 2007 this number had doubled.

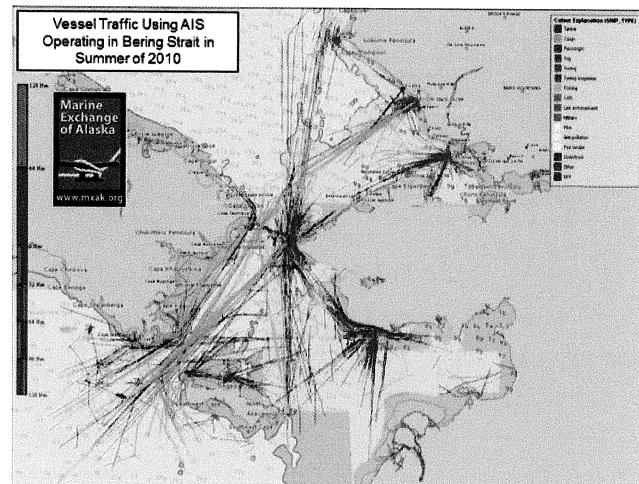
With increased shipping and marine traffic comes increased risk of vessel groundings, spills, collisions, pollutants, noise disturbances, and invasive species. This risk is particularly high due to the lack of detailed navigational charts, reliable weather forecasting, vessel traffic separation protocols, search and rescue infrastructure, and overall maritime domain awareness throughout the Arctic.

Based on these factors the ANWTF makes the following recommendations:

1. The ANWTF Recommends that the United States Work with the International Community to Finalize the Polar Code and Establish a Bering Strait Vessel Traffic Separation Scheme.

Maritime shipping is regulated through international treaties that establish standards for the safety and security of maritime operations. These standards are agreed upon through the International Maritime Organization (IMO), an agency of the United Nations.

Currently, ships navigating the Arctic are governed by the same requirements as any other open water ships. The IMO



Vessel Traffic in the Bering Strait Region during the summer of 2010 as depicted by the Marine Exchange of Alaska.

needs to finalize the Polar Code to supplement international maritime and environmental conventions that already apply in the Arctic. The Polar Code can provide additional requirements regarding rescue equipment, passenger safety, firefighting, ice navigation, and navigation in uninhabited areas. Additionally, the code can include requirements for ship construction, design, equipment, crew training, and operations. The IMO should also consider measures or regulatory frameworks to provide safety mechanisms for the regions of the central Arctic Ocean beyond coastal state jurisdiction.

The Polar Code is currently being drafted, and the rules are expected to be in force by 2014. The United States and Alaska should be actively involved in discussions with the IMO to ensure that Alaska's unique needs are met.

The United States and Russia need to begin a process with the IMO of establishing Bering Strait routing measures.

Clearly, all transient traffic in the future, regardless of the route taken, must transit the Bering Strait. This remote, narrow, and hazardous international strait is located in an environmentally sensitive area with little to no search and rescue or maritime disaster-response capability within 800 miles. Increased vessel traffic in the future will make this area particularly vulnerable to maritime disasters. It is only prudent that basic routing measures and vessel monitoring systems be put in place to reduce the risk of calamity in the Bering Strait.

2. The ANWTF Recommends the Establishment of Non-Tank Vessel Rules and Standards for Arctic Transit.

Today the most likely environmental threat to the Arctic is an incident involving a non-tank vessel. These are typically large commercial vessels with fuel tanks in excess of one million gallons of fuel and related hazardous cargos. These vessels make up the greatest percentage of transits, and they have proven over time to be the vessels most likely to experience an accident that puts them in jeopardy of sinking or running aground. Non-tank Vessel rules will require these vessels to meet more stringent standards of responsible-party requirements and allow government agencies to provide greater oversight.

Immediate implementation of the USCG Non-tank Vessel Response Plan (NTVRP) rules would advance development of a response capability as well as marine firefighting and salvage capacity in the Aleutians. This is critical in an area of the state that supports the largest commercial fishery in the country. This rule would require vessel response plans for non-tank vessels calling in U.S. ports. In combination with the tank vessel rule already in place, this rule would place the burden of providing sufficient salvage, firefighting, and response capabilities on all vessels passing through the Aleutians that call on U.S. ports. The requirement to comply with these rules would provide the necessary incentives for vessel owners/operators to fund increased salvage and spill response capabilities in the Aleutians. It may also be the means for financing an appropriate rescue tug for this economically and biologically important resource area.

3. The ANWTF Recommends that Navigational Charts and Other Aids to Navigation be Updated and Improved along with Vessel Tracking and Automatic Identification Systems (AIS).

For safe shipping, existing nautical charts for the Arctic need to be updated. In an effort to reduce the likelihood of accidents, an assessment of navigational needs should be undertaken to identify priority actions and target locations most likely to present hazards. Short and long range navigation aids will be needed, including buoys, iceberg and other sea-condition warning systems, high-risk-area ves-

sel-traffic management systems, and improved communication technology.

Alaska currently has over 70 automatic identification stations that track vessels in Alaskan waters. The existing Automatic Identification System should be expanded across Alaskan northern waters beyond the Canadian border to Tuktoyuktuk. This should be a high priority. The current system—an international government/industry partnership—serves vital governmental and private sector needs by aiding safe, secure, efficient, and environmentally sound maritime operations. Expanding AIS will provide a clear record of transport across the U.S. Arctic waters, particularly for vessels servicing Canadian western Arctic communities or bound for transit through the Northwest Passage. AIS also provides emergency contact information, port data, locations of other vessels, and navigational information via the internet. Expanding the AIS network across the western Arctic will also allow for compliance under the International Maritime Organization Guidelines for Ships Operating in Polar Waters (Resolution A.1024(26)).

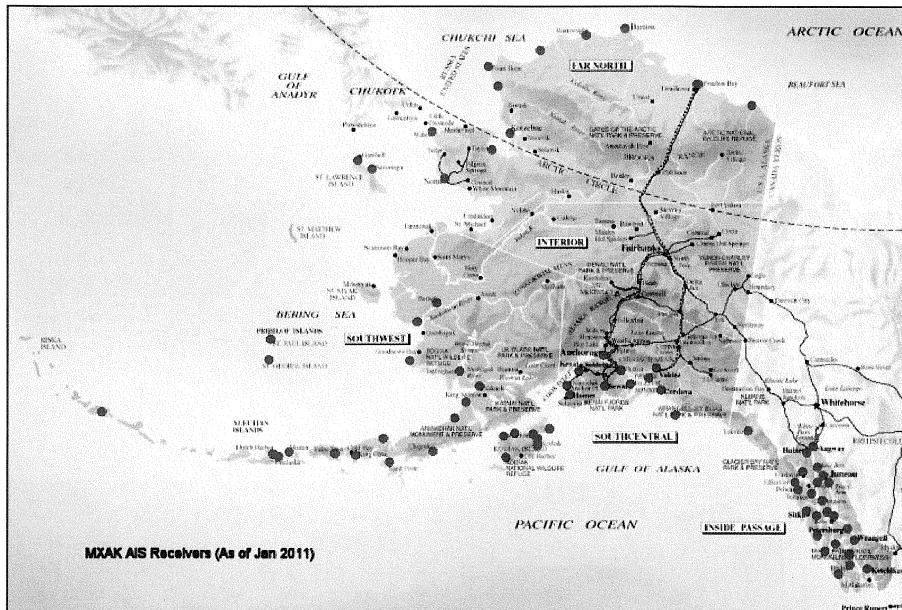
The Alaska State Legislature and the state of Alaska should continue to support the expansion of vessel tracking in the Arctic. The task force encourages the organizations and agencies involved in vessel tracking to pursue all channels of funding to increase their vessel tracking range.

4. Alaska Northern Waters Task Force Supports the National Oceanic and Atmospheric Administration's (NOAA) Hydrographic Arctic Mapping and Recommends that NOAA Also Include Detailed Near-Shore Bathymetric Mapping.

The ANWTF supports increased funding to expedite the mapping of the Arctic regions of Alaska, with particular support for updated mapping of coastal navigation routes and entrance routes to coastal villages.

The ANWTF concurs with the 2011 National Hydrographic Survey Priorities for Alaska. However, NOAA priorities for Alaska in the Bering Strait should be moved from priority two to priority one. The Bering Strait is the shipping choke point in Alaska's northern waters. It is imperative that up-to-date bathymetric information be provided for safe navigation. The ANWTF encourages the exchange of this information with the Russian government so that both governments have complete mapping of the entire strait.

The task force also supports NOAA's efforts to fund additional tidal observations to close the tidal data gap in accordance with the 2008 NOAA Network Gap Analysis for the National Water Level Observation Network. These increased observations will allow the joining of the digital mapping initiative vertical data with the Mean High Water and Mean Lower Low Water data that determine own-



Locations of the Marine Exchange of Alaska's AIS Receivers as of Jan 2011.

ership and jurisdiction of state, federal, Native, and private lands.

The ANWTF also encourages public release of bathymetric data collected by the U.S. Navy that would not threaten our national security, as well as public release of bathymetric data collected by private industry that would not threaten their proprietary economic interests.

5. The ANWTF Recommends that the Alaska State Legislature and the State of Alaska Continue to Support Maritime Training Centers in Alaska.

The need for trained and experienced mariners to operate in the Arctic is clear. The task force highly recommends the development of training programs throughout Alaska that can produce competent seafarers for safe operations in the Arctic. Specialized training—such as a USCG approved Ice Navigator curriculum that would implement the recommendations of the Arctic Marine Shipping Assessment and be consistent with the future requirements of the IMO Polar Code—is essential. In addition, qualifications, training, and experience standards for operation of icebreakers, arctic lightering operations, and high latitude navigation should be considered to ensure that increased maritime commerce in the Arctic is developed safely.

The ANWTF sees a real opportunity for Alaska to become the U.S. center of excellence in Arctic maritime training and seafarer development. Building on the state's strong university system, institutions such as the AVTEC Maritime Train-

ing Center, and practical training opportunities in Alaska's ice covered waters, this state is uniquely positioned to become an international leader in high latitude navigation safety training.

6. The ANWTF Supports Completion of the Aleutian Islands Risk Assessment; State of Alaska Participation in the U.S. Coast Guard Port Access Route Study; and Development of a Bering Strait Vessel Traffic Separation Scheme.

Aleutian Islands Risk Assessment

The Aleutian Islands Risk Assessment is a joint venture between the National Fish & Wildlife Foundation, the USCG, and the Alaska Department of Environmental Conservation. The project was organized in response to the grounding of the M/V Selendang Ayu in 2004 and the oil spill it caused. It is a multi-phase risk assessment of maritime transportation in the Bering Sea and the Aleutian Archipelago. Phase A of the Aleutian Island Risk Assessment has been completed.¹

The study mainly focused on traffic following the great circle route through the Aleutian Islands and Bering Sea. The guiding principles applied to the analysis of risk reduction options were that prevention measures take priority over response measures and all measures should be realistic and practical.

The advisory panel assembled for the project developed recommendations for risk reduction options in two categories: those recommended for immediate implementation and those recommended for further study in Phase B of the assessment.

Options for immediate implementation include:

- Develop an enhanced vessel monitoring and reporting program;
- Enhance towing capabilities on USCG cutters, and increase cutter presence in the Aleutians;
- Stage additional emergency towing systems in the Aleutians.

¹ The findings of the Aleutian Islands Risk Assessment can be found at <http://aleutiansriskassessment.com/>.

Options recommended for additional development or study in Phase B, prior to full implementation, include:

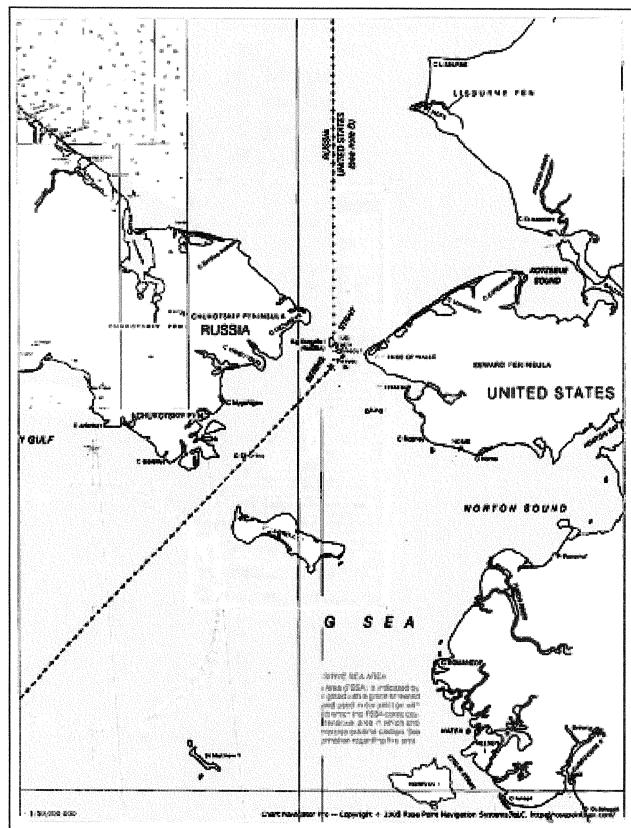
- Increase rescue tug capability in the Aleutians;
- Increase salvage and spill response capability in the Aleutians;
- Determine the boundaries of IMO Particularly Sensitive Sea Areas, and develop recommendations for associated protective measures;
- Strengthen the Aleutians Subarea Contingency Plan.

The ANWTF recommends that the risk assessment move forward with those risk reduction options that were identified by the advisory panel for immediate implementation. In addition, it is recommended that an additional risk reduction option be evaluated in Phase B of the project. A key consideration for reducing the risk of groundings and spills is offshore vessel routing for circumpolar traffic to provide timeframes for responding to disabled vessels. Offshore vessel routing has been successfully employed along the Pacific west coast and is a primary, cost-effective tool for reducing risk.

Bering Strait Port Access Route Study and Vessel Traffic Separation Scheme

The ANWTF recommends that the state of Alaska participate in and support the efforts of the USCG Port Access Route Study of the Bering Strait. Alaska should work with the USCG and Russia to bilaterally assess the risk of increased shipping through the Bering Strait and analyze the options for staging international assets to respond to that risk. The location of staging areas in Nome or other Alaska coastal locations should be considered for U.S. assets. Prov-

ideniya or other Russian coastal areas should be considered for Russian assets. This effort would contribute greatly to the development of any future IMO-led effort to establish internationally binding ship routing measures, such as a Bering Strait Vessel Traffic Separation Scheme.



The shaded region represents the Study Area for the USCG's Bering Strait Port Access Route Study as described in 75 FR 68568.

Planning and Infrastructure Investment

Introduction

A number of state initiatives are underway to look at the potential needs and feasibility of infrastructure projects in Alaska's Arctic region. These include the Alaska Department of Transportation and Public Facilities' (ADOTPF) Industrial Use Roads Study, several Arctic Ports studies, and similar work relating to possible land transportation links to Nome, Ambler, and the Umiat region.

Changes in temperature and precipitation are likely to hold enormous implications for both existing and future construction of all sorts. The ability to better predict and understand the effects of phenomena such as widespread thawing of permafrost will help Alaska prepare for considerable maintenance issues on existing roads, airports, buildings, and pipelines. Just as importantly, it will aid engineers when it comes to properly siting, designing, and constructing new infrastructure capable of withstanding future changes in their specific environments. These important concerns have also been examined in ADOTPF's "Impact of Climate Change on Alaska's Transportation Infrastructure."

These changes also pose significant challenges to some communities in Arctic coastal and riverine areas, most notably those located along the Bering and Chukchi Seas. A number of communities are threatened with increased rates of coastal erosion and flooding as a result of storm activity and battered shorelines once protected by shore-fast ice. These problems could become chronic as the climate warms, seasonal sea ice retreats, and destructive coastal storms become more frequent. These important concerns have been recognized in reports issued by the state of Alaska's Climate Change Subcabinet Immediate Action and Adaptation work groups.

Immediate investment in Arctic infrastructure is a foremost priority for Alaska and the entire United States. Alaska will need to explore ways to attract substantial sources of capital investment in addition to state and federal funding. Action is needed to enable the responsible development of resources; facilitate, secure, and benefit from new global transportation routes; and safeguard Arctic residents and ecosystems.

This investment will improve the safety, security, and reliability of transportation in the region—a goal established by the U.S. Arctic Policy signed by President Bush in 2009. As interest and activity in the Arctic continues to rise, America's preparedness in the region becomes ever more important to national security.

Increased human activity related to shipping, oil and gas development, commercial fishing, and tourism will require, at

a minimum, new ports and safe harbors, equipment and facilities for oil spill response, additional Polar Class icebreakers for the U.S. fleet, and improved charting and mapping.

The U. S. Coast Guard's needs in these areas well illustrate the magnitude of infrastructure investment necessary in the Arctic. The Search & Rescue (SAR) agreement recently negotiated by the eight Arctic Nations through the Arctic Council commits the United States to search and rescue response in regions of the Arctic. Domestically, the National Contingency Plan requires the U.S. Coast Guard to oversee oil spill planning and preparedness in coastal waters and to supervise any oil spill response. Additionally, the U.S. Coast Guard's mission is to protect the public, the environment, and U.S. economic interests in the nation's ports and waterways, along the coast, on international waters, or in any maritime region as required for national security.¹

At present, the Coast Guard has very limited Arctic emergency response capabilities and no permanent bases on Alaska's North Slope to support its operations. Basic needs there include communications, housing, and support facilities. It is especially notable that the Coast Guard has only one operational Polar Class icebreaker, the USCG Cutter Healy. Clearly, the Coast Guard does not have the assets required to carry out its expanding mission in the Arctic.

With transformation in the Arctic calling for a broad spectrum of new facilities on such a large scale, the state of Alaska must take an active role in regional planning efforts with communities and their stakeholders. This will help communities develop local strategies and ensure that the state is getting the most return on investment for local projects. Some communities may not have the resources to adequately prepare for the future, and the state should take this opportunity to help increase local capacity for the benefit of all Alaskans.

1. The ANWTF Recommends that the Alaska State Legislature Urge the United States to Forward Base the U.S. Coast Guard in the Arctic.

As human activity increases in Alaska's northernmost waters, the need to establish a Coast Guard base in the Arctic grows. The most northern Coast Guard base in the United States is in Kodiak, Alaska, more than 1,000 miles from pos-

¹. The Coast Guard has 11 Statutory (non-discretionary) missions: Search and Rescue, Maritime Safety, Ports & Waterways Security, Drug Interdiction, Migrant Interdiction, National Defense, Living Marine Resources, Marine Environmental Protection, Aids to Navigation, Ice Operations, and Law Enforcement.

sible Chukchi Sea drilling sites and nearly as far from existing Arctic shipping lanes in the Bering Strait.¹ This distance causes untenable logistical problems that negatively impact response times and capabilities. The Coast Guard must have a greater overall presence in the Arctic, with the ability to stage assets closer to future shipping, oil and gas drilling, and commercial fishing activities.

The federal government should begin planning immediately to establish an Arctic base, and it must also move forward on interim measures for search and rescue and oil spill response in the region. The latter include working with communities to site required equipment at strategic locations, upgrading regional airports and associated storage facilities to enable efficient airlifting of assets, and increasing communications infrastructure.

2. The ANWTF Recommends that the Alaska State Legislature Urge the United States to Fund Icebreakers and Other Ice-capable Vessels.

At present, the United States has only one Polar Class icebreaker in service, the Coast Guard's Healy. A second Polar Class icebreaker, the Polar Star, is undergoing extensive repairs in Seattle and is not expected to return to service until 2013. Its sister ship, the Polar Sea, was decommissioned in 2011.

Meanwhile, Russia has a fleet of eight service-ready nuclear powered icebreakers, including an ice-breaking container ship. A ninth is under construction and will join their fleet in 2015. China owns the world's largest non-nuclear icebreaker and plans to launch a second by 2013. Canada has committed \$38 billion to a 30-year plan to build additional icebreakers and other ice-strengthened ships suitable for Arctic service. Sweden, Finland, South Korea, and Japan are adding icebreakers to their fleets.²

The United States Coast Guard Cutter Healy is a medium strength vessel used most recently as a platform for scientific research. Its design is less suited to military missions. Congress has appropriated \$60 million for repairs to the Polar Star. At this level of funding, its overhaul is estimated to provide for seven to ten years of additional service—the same length of time the Coast Guard estimates is required to design and construct a new Polar Class icebreaker, at a cost of about \$860 million.

This limited number of icebreakers presents a major challenge to the Coast Guard mission in Alaska. Having ice-capable vessels is vital to maintain sovereignty, continue scientific research, and provide emergency and oil spill response.

1. To put this distance into perspective, the distance between Kodiak and Barrow is about the distance between Los Angeles and Seattle.

2. For a list of ice breaker assets around the world go to: <http://www.globalsecurity.org/military/world/icebreakers-list.htm>

Overreliance on the Healy, which was not designed to meet all these challenges, poses risks for the United States and Alaska.

The ANWTF urges the state of Alaska to prevail upon the U.S. government to fund the construction of new heavy icebreakers and additional cutters for the U.S. Coast Guard. The Coast Guard is developing a long term vessel asset plan, but so far it has been unable to secure funding. It is expected that additional vessels will be required in support of oil spill response; these vessels must be capable of year-round Arctic operations. Immediate steps should be taken to begin construction of these assets.

Further, the ANWTF supports planning for other necessary facilities for search and rescue responsibilities, spill cleanup equipment and response vessels, and research. The Coast Guard needs this infrastructure to fulfill its mission.

3. The ANWTF Recommends that the Alaska State Legislature Support Search and Rescue Coordination Centers along the Coast to Assist Federal and State Responders.

The ANWTF supports search and rescue efforts at all levels—federal, state, and local. Because the USCG doesn't have an Arctic presence, local communities are often the first responders to an emergency.

The state of Alaska should coordinate planning with the USCG and local communities to develop strategies for increased search and rescue capabilities in the Arctic. Strategies may include purchase of equipment, training, and increased communications capability at the community level.

Other countries are already moving ahead with similar initiatives. Russia is currently in the process of building ten search and rescue centers along its Arctic coast line. Given the size of the Alaskan Arctic, effective local response will be critical. State planning should begin immediately.

4. The ANWTF Recommends Supporting the University of Alaska Fairbanks Scenarios Network for Alaska and Arctic Planning.

Scientists reviewing weather data for Alaska believe the state has been experiencing a warming trend with drier conditions in parts of the state. The ANWTF heard presentations on impacts this could have on Arctic communities and businesses. They include, among others, drier conditions in Interior Alaska resulting in more frequent and severe forest fires; species moving outside their historical ranges and perhaps displacing other species; changes in the active layer and permafrost in areas of the state resulting in loss of structural support and other adverse effects on roads and infrastructure; increase in the rate of coastal erosion in areas of

the state; and changes in hydrology including loss of surface ponds used for drinking water. It is important for state and local governments and industry to have a better understanding of possible future climatic conditions in the state when planning long-term infrastructure and critical services.

The University of Alaska Fairbanks formed the Scenarios Network for Alaska and Arctic Planning (SNAAP) to help decision makers understand possible future climate scenarios and their impacts in the state. SNAAP has developed data-driven models and scenarios for specific areas of the state that describe possible effects from longer-term changes in air temperature and precipitation. SNAAP has been working with other researchers to integrate down-scaled climatic models with terrestrial models to make predictions of landscape changes and the implications of such changes (melting permafrost, shifting and intensity of fire regimes, etc.) on the state's roads, airports, ports, pipelines, and rural communities. Both marine and terrestrial models should include predictions of impacts on resource development and related infrastructure. Such models would inform future infrastructure development and management.

The ANWTF recommends the state of Alaska support the work being done by SNAAP and encourages making this information, along with any important caveats on the limitations on such climatic predictions, available to state agencies, local governments, and the public to assist them in their long-term planning. The ANWTF believes this information could also be useful to agencies and organizations involved in setting standards for construction around the state.

5. The ANWTF Recommends Continuing the Analysis and Development of Ports and Safe Harbors in the Arctic Region.

Studies by the U.S. Coast Guard, the U.S. Navy, the Arctic Council, the U.S. Army Corps of Engineers, and the Alaska Department of Transportation and Public Facilities all identify the need to develop ports and harbors in Arctic Alaska. Given the long lead times for such construction, ports should be among the highest priorities for Arctic infrastructure.

Building on the findings of the 2008 and 2011 state/federal Alaska Regional Ports Workshops and the 2011 Arctic Ports Charette, the state of Alaska and the U.S. Army Corps of Engineers should continue analyzing options for deep- and medium-draft port and safe harbor construction in the Alaskan Arctic. The state should convene an industry-focused Alaska Arctic Ports Workshop to assess the pros and cons of alternative locations and types of ports, address environmental conditions and engineering approaches, and explore funding alternatives.

Locations to consider include:

- St. Paul Island in the Pribilof Islands. Here there is an existing harbor for the Central Bering Sea fishing fleet and fish processing facilities.
- St. Lawrence Island. There is no existing sea port on St. Lawrence.
- Nome/Teller. A medium-draft port exists at Nome. Considerations include expanding the Nome causeway, improving the Nome-Teller road, and developing a seasonal deep-draft port at Port Clarence Bay off Teller.
- Kotzebue/Cape Blossom. A shallow-draft port complex exists at Kotzebue. During the ice-free season, deep-draft freighters anchor 15 miles out to sea and cargo is lightered to port. Shallow-draft barges deliver cargo to area communities. Cape Blossom, across Kotzebue Sound, offers a potential deep-draft port site.
- Mekoryuk. Located on Nunivak Island, Mekoryuk has no boat harbor but does have moorage for small boats protected by a breakwater.
- Cape Thompson. Located on the Chukchi Sea about 26 miles southeast of Point Hope, Cape Thompson has previously been considered for a port site. It is located on a promontory with bulk rip-rap and aggregate potential and is broadly sheltered from the north by the spit of Point Hope. It has an old airstrip but is otherwise largely undeveloped.
- Wainwright. Wainwright is the nearest village to the Chukchi Sea OCS leases and is located on Wainwright Inlet, which is capable of sheltering shallow- to medium-draft vessels. It is located 90 miles west of Barrow. The city presently does not have a seaport.
- Point Franklin. Located between Wainwright and Barrow, Point Franklin and its adjacent barrier islands may serve as a shelter and possible port site for shallow- to medium-draft vessels.
- Barrow. With a population of more than 4000, Barrow boasts considerable infrastructure despite its remote location and is the geographic midpoint between the active exploration areas in the Beaufort and Chukchi Seas. Just east of Point Barrow is Eluitkaak Pass, which is the "notch" between the Barrow spit and the barrier islands of Elson Lagoon. Eluitkaak Pass is about 50 feet deep at its deepest, although it shallows at both ends toward the north and the south. Elson Lagoon, although shallow, is protected from the open ocean by barrier islands. At present there is no protected harbor at Barrow.
- Prudhoe Bay. Prudhoe Bay has been extensively developed for oil industry support. There is a causeway and dock system on the east and west sides of Prudhoe Bay that currently services the line-haul barges that transport drilling and production infrastructure to the North Slope. The community, made up almost entirely of oil industry

employees, is connected year-round to the North American road system by the Dalton Highway.

- Mary Sachs Entrance. This is a channel between barrier islands located about 60 miles north and east of Prudhoe Bay.

Plans for the development of deep-draft ports and improved safe harbors in northern waters should be intended also to improve access to inland resources in the region. Consideration should be given to the proximity of exploitable natural resources and access to them by navigable inland waterways or through the construction of railways or roads.

A key economic factor in the viability of developing natural resources in Alaska is the distance to an ocean port. Natural resources within 100 miles of a coast line typically have a higher probability of development due to shipping proximity. Development of resource transportation corridors to Arctic ports is critical for both shipping of product to market and for resupply of materials and equipment necessary for resource exploration, development, and extraction. Options for public-private partnerships (P3's) should be explored as a mechanism to capitalize development of the resource deposits and provide a return on investment to the state and private sector industries. Port planning for the Arctic should include a prioritized strategy for approaches to specific resource deposits and options for developing infrastructure to support exploration, development, and transportation of the resource.

6. The ANWTF Recommends the State of Alaska Consider Proposals to Expand Fiber Optic Cable Routes Across Northern Waters.

The retreat of sea ice and stability of the sea floor in the Arctic is creating interest in a potential fiber optic cable route from London to Tokyo via the Canadian Northwest Passage and Alaskan Arctic. Just as shipping routes are significantly shorter across the northern waters, so would be cable routes.

Linking Alaska's Arctic communities to trans-Arctic cable routes would bring many benefits. Increased communications will be needed in support of the Coast Guard's mission, including search and rescue and oil-spill response operations. Better communications are also required for the safe operations of ships transiting the region and offshore oil

field development activities. At the same time, broadband links would enhance economic development and distance learning opportunities for Arctic communities.

The state should consider an assortment of strategies. In 2010, Kodiak Kenai Cable Company developed an international consortium for a Tokyo-London link with a landing at Prudhoe Bay. The company also proposed branches linking Kodiak with the more remote communities of Dutch Harbor, Nome, Kotzebue, and Barrow before rejoining the primary cable at the Prudhoe Bay landing. While this proposal was unsuccessful in obtaining funding, the effort produced valuable research, and the related Arctic Cable Company has now been formed.

On land, GCI's Terra SW has connected 65 coastal villages and communities in the Bristol Bay and Yukon-Kuskokwim Delta regions to a fiber optic/microwave network. GCI is exploring expanding the network to include the communities of northwest Alaska. On the North Slope of Alaska, the Arctic National Broadband Network initiative explored developing broadband capability between Barrow and Nuiqsut.

The state should continue to encourage fiber optic cable ventures that will include links to coastal hub communities and industry bases adjoining the northern waters.

7. The ANWTF Recommends that the State of Alaska Explore Models to Access Funding for Arctic Infrastructure.

As the state of Alaska determines its priorities for Arctic infrastructure projects, the Alaska Industrial Development and Export Authority (AIDEA) should begin examining which categories of projects are likely to meet its criteria for funding and which will need additional or wholly alternative sources.

The state should consult with financing and investment specialists to explore strategies to attract additional sources of capital to infrastructure priorities. Such considerations could include private sector investment as well as the creation of state, national, and international development corporations.