



INTRODUCTION

The Arctic is regarded as containing some of the last physically undisturbed marine spaces on earth. Early in the 21st century, the Arctic has also been undergoing extraordinary environmental and developmental changes. Long known as a storehouse of untapped natural resources, high commodity prices and a growing worldwide demand in recent years have the Arctic poised as a significant contributor to the global economy. Increasing regional and coastal marine transport to support the exploration and extraction of oil, gas and hard minerals, coupled with the increasing presence of the global marine tourism industry, have brought a complex set of users to the maritime Arctic. The potential impacts of these new marine uses - social, environmental, cultural and economic - are unknown, but will be significant for Arctic indigenous people and the marine environment already undergoing significant changes due to climate change.

Simultaneous with the globalization of the Arctic, marine access in the Arctic Ocean has been changing in unprecedented ways driven by global climate change. Arctic sea ice is undergoing an historic transformation - thinning, extent reduction in all seasons and substantial reductions in the area of multi-year ice in the central Arctic Ocean - which has significant implications for longer seasons of navigation and new access to previously difficult to reach coastal regions. The international scientific community has already taken advantage of these changes through pioneering voyages in the central Arctic Ocean. The same sea ice retreat also has important influences on the regional, Arctic marine ecosystems and future fisheries. Taken together, these changes present increased demands on the existing legal and regulatory structures challenged to meet the needs for enhanced marine safety and environmental protection in the face of increasing Arctic marine activity. Such challenges will

require unprecedented levels of cooperation among the eight Arctic states and broad engagement with many non-Arctic stakeholders within the global maritime industry.

Actions Leading to a Shipping Assessment

The Arctic Council anticipated the need to evaluate current and future increasing use of the Arctic Ocean. In 2002 at the Council's third Ministerial meeting in Inari, Finland, the ministers recognized "that existing and emerging activities in the Arctic warrant a more coordinated and integrated strategic approach to address the challenges of the Arctic coastal marine environment." The ministers agreed to "develop a strategic plan for the protection of the Arctic marine environment under leadership by the Protection of the Arctic Marine Environment (PAME) working group." The Arctic Marine Strategic Plan (AMSP) was developed by PAME and approved by the Arctic Council in 2004. Four strategic goals were outlined in the AMSP: reduce and prevent pollution in the Arctic marine environment; conserve Arctic marine diversity and ecosystem functions; promote the health and prosperity of all Arctic inhabitants; and advance sustainable Arctic marine resource use. The AMSP addressed the need for future application of an ecosystem approach to management of the Arctic marine environment and also called for a comprehensive assessment of Arctic marine shipping.

In November 2004, the Arctic Council released a major study, the Arctic Climate Impact Assessment (ACIA), which received global attention. The ACIA found that the Arctic: is extremely vulnerable to observed and projected climate change; is today experiencing some of the most rapid and severe climate change on Earth; and will experience accelerated climate change during the 21st century. Widespread physical, ecological, social and economic changes, many of which have already begun, were projected. Of particular relevance to marine use and Arctic transport, one of ACIA's 10 Key Findings (#6) stated: "Reduced sea ice is very likely to increase marine transport and access to resources."

Consistent with the work of the AMSP and the ACIA, the Arctic Council Ministers in November 2004 in Reykjavik asked PAME to "conduct a comprehensive Arctic marine shipping assessment as outlined in the Arctic Marine Strategic Plan (AMSP) under the guidance of Canada, Finland and the United States as lead countries and in collaboration with the Emergency Prevention, Preparedness and Response (EPPR) working group of the Arctic Council and Permanent Participants as relevant." AMSA data gathering and planning began in summer 2005.



Arctic Council

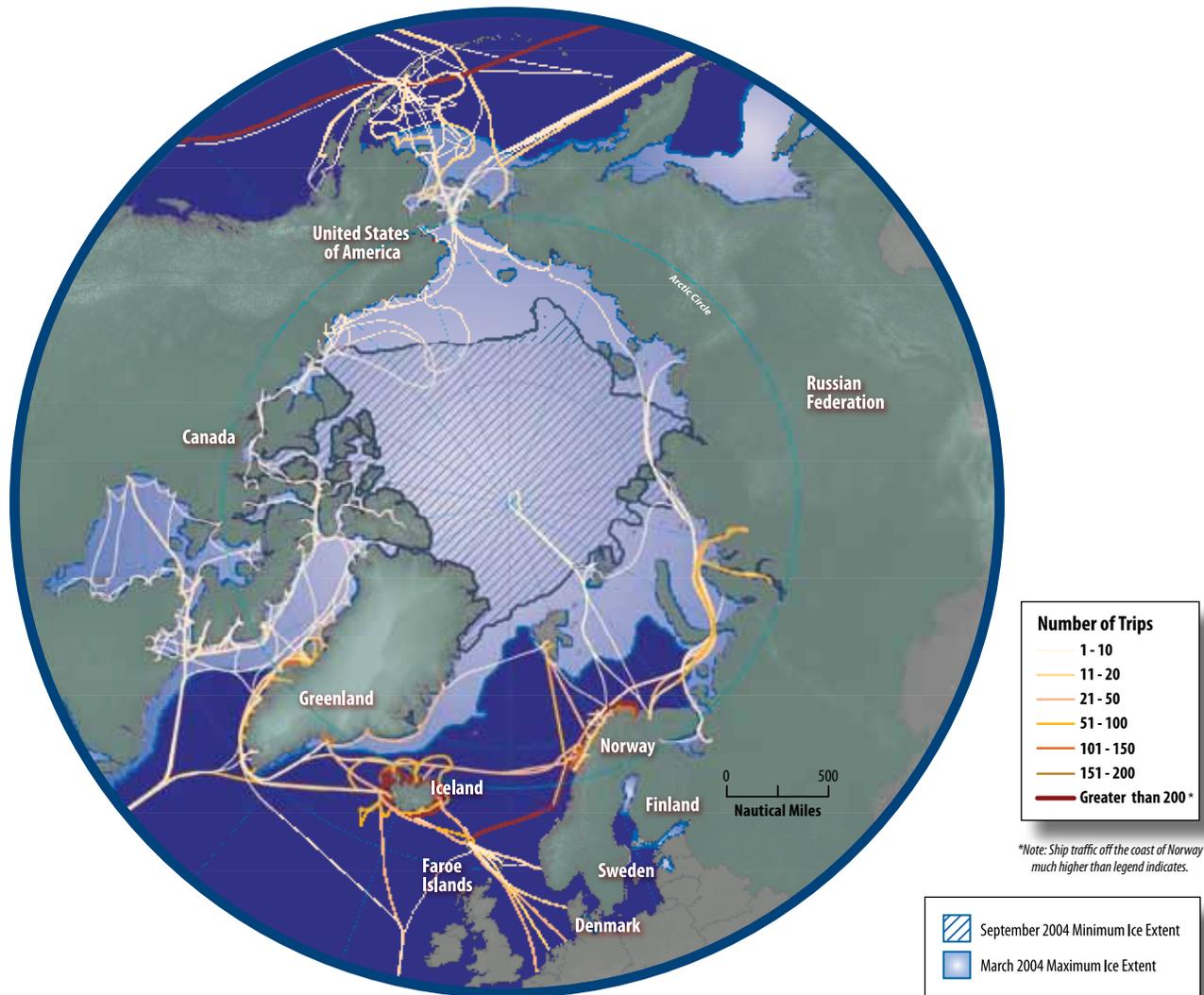
The Ottawa Declaration of 1996 formally established the Arctic Council as a high level intergovernmental forum to provide a means for promoting cooperation, coordination and interaction among the Arctic states, with the express involvement of Arctic indigenous communities and other Arctic inhabitants on common Arctic issues, especially issues of sustainable development and environmental protection in the Arctic.

The Arctic Council is comprised of Canada, Denmark (including Greenland and the Faroe Islands), Finland, Iceland, Norway, the Russian Federation, Sweden and the United States of America.

In addition to the member states, the council created the category of Permanent Participants in order to provide for the active participation of, and full consultations with, Arctic indigenous representatives within the council. Open equally to Arctic organizations of indigenous people with a majority of Arctic indigenous constituency, the Permanent Participants represent a single indigenous people resident in more than one Arctic state; or more than one Arctic indigenous people resident in a single Arctic state. The following organizations are Permanent Participants of the Arctic Council: Aleut International Association, Arctic Athabaskan Council, Gwich'in Council International, Inuit Circumpolar Council, Saami Council and Russian Arctic Indigenous Peoples of the North.

Working groups of the Arctic Council execute the programs and projects mandated by the Arctic Council ministers. Each working group, with its supporting scientific and technical expert groups, holds meetings at regular intervals throughout the year, ahead of the meetings of Senior Arctic Officials and Arctic Council Ministers. The six working groups include: Arctic Contaminants Action Program; Arctic Monitoring and Assessment Programme; Conservation of Arctic Flora and Fauna; Emergency Prevention, Preparedness and Response; Protection of the Arctic Marine Environment; and Sustainable Development Working Group.





Map 1.1 Shipping traffic in the Arctic for survey year 2004. Source: AMSA

Focus and Conduct of the Assessment

The focus of the AMSA is marine safety and marine environmental protection, which is consistent with the Arctic Council's mandates of environmental protection and sustainable development. The AMSA was designed to be circumpolar in breadth, but also considers regional and local perspectives where impacts, particularly on Arctic communities, are considered to be greatest. However, the overall scope of the AMSA focuses on ships and their infrastructure needs and impacts in the Arctic Ocean.

The AMSA lead countries (Canada, Finland and the United States) recognized early in the planning the importance of contributions from the broader, global maritime community. Therefore, the AMSA reached out to such key stakeholders as non-Arctic states (examples

include the United Kingdom and Germany), shipping companies, ship designers, shipbuilders, ship classification societies, non-commercial partnerships, marine insurers and non-governmental environmental organizations. With the assistance of the Permanent Participants of the Arctic Council, town hall meetings were organized in selected Arctic communities to listen to issues and concerns about future Arctic marine activity. AMSA also linked with the Arctic Council working group experts of the Emergency Prevention, Preparedness and Response (EPPR) working group on issues related to spills, and response infrastructure requirements, and with the Sustainable Development Working Group (SDWG) on issues related to the human dimension.

The AMSA covers all types of marine transport under the general topic of “shipping”: tankers, bulk carriers, offshore supply vessels, passenger ships, tug/barge combinations, fishing vessels, ferries, research vessels and government and commercial icebreakers. Knowing the sum of the voyages completed by these different ships will help to understand the potential environmental impacts (especially from discharges and emissions) of Arctic marine shipping operations. An AMSA Database Survey, requesting these ship types, was sent to the Senior Arctic Officials of the Arctic states in February 2006 to obtain the official shipping statistics of each state for the survey year 2004. The objective was to create the first baseline database of all ships (less naval vessels) operating in the Arctic during a single year. Each Arctic state defined its own Arctic waters for the purpose of the AMSA data collection effort. The AMSA data effort yielded an historic survey that provides a comprehensive estimate for how many ships had operated in the Arctic for the survey year.

More than 185 experts participated directly in AMSA. Thirteen major AMSA workshops were held from July 2006 through October 2008; workshop topics included: scenarios of future Arctic navigation;

indigenous marine use; Arctic marine incidents; environmental impacts; Arctic marine infrastructure; and the future of the Russian Federation’s Northern Sea Route. AMSA town hall meetings were held in northern communities in Canada, Iceland, Norway and the United States. AMSA leads and team members conducted outreach and presented AMSA topics at 56 professional venues throughout the world during 2005-2008.

A large number of source documents were collected from the following activities: the results of the AMSA workshops, reports of the AMSA town hall meetings, the AMSA Data Survey, special reports created by maritime experts, and reviews of AMSA topics drafted by lead and contributing authors. These documents, referred to collectively as the AMSA Research Documents, will be found on the PAME and Arctic Council websites. The AMSA Research Documents represent a significant body of work and, while they have not been reviewed by the Arctic Council, the documents provided the background for drafting the AMSA 2009 Report, which was approved by the Arctic Council Ministers at the 2009 Ministerial meeting in Tromsø, Norway.



Modes of Arctic Marine Transport

In addition to the ship types to be addressed in the assessment, four modes, or types of voyages undertaken in the Arctic Ocean, were identified. They are:

Destinational transport, where a ship sails to the Arctic, performs some activity in the Arctic and sails south. Examples include: large cruise ships sailing from southern ports to the west coast of Greenland in summer; LNG and oil tankers sailing from ports in northern Norway and northwest Russia to world markets; and an ice-breaker from Europe conducting scientific operations in the central Arctic Ocean in summer.

Intra-Arctic transport, a voyage or marine activity that stays within the general Arctic region and links two or more Arctic states. A key example is the marine route between the port of Churchill, Manitoba, Canada on Hudson Bay and Murmansk, Russia, touted as an “Arctic-bridge” between the two continents. Two other examples include an Icelandic fishing vessel working in Greenlandic waters, and

tug-barge traffic operating between Canada’s Northwest Territories and the U.S. Beaufort Sea off the Alaskan coast.

Trans-Arctic transport or navigation, voyages which are taken across the Arctic Ocean from Pacific to Atlantic oceans or vice versa. These are full voyages between the major oceans using the Arctic Ocean as a marine link. There are several options for trans-Arctic navigation.

Cabotage, to trade or marine transport in coastal waters between ports within an Arctic state. A prime example is the year-round traffic between the port of Dudinka on the Yenisei River and Murmansk - Russian-flag ships carrying nickel plates processed at the industrial complex in Norilsk to Murmansk for further distribution to Russian and international markets. Other examples are the summer sealift of cargoes to Canadian Arctic communities from southern Canadian ports and the delivery of consumer goods to Russian Arctic communities using the Northern Sea Route.



185+

Number of international experts who worked on the AMSA.

The Origin of the AMSA

The Arctic Council Ministers in November 2004 in Reykjavik asked PAME to “conduct a comprehensive Arctic marine shipping assessment as outlined in the Arctic Marine Strategic Plan (AMSP) under the guidance of Canada, Finland and the United States as lead countries and in collaboration with the Emergency Prevention, Preparedness and Response (EPPR) working group of the Arctic Council and Permanent Participants as relevant.”

Protection of the Arctic Marine Environment: PAME

PAME is an example of the international cooperation that is a hallmark of the Arctic Council: while the PAME Secretariat is based in Akureyri, Iceland, its chairmanship in the spring of 2009 is held by Canada.

Increased economic activity and significant changes due to climatic processes are resulting in increased use, opportunities and threats to the Arctic marine and coastal environments. These predicted changes require more integrated approaches to address both existing and emerging challenges of the Arctic marine and coastal environments.

PAME’s mandate is to address policy and non-emergency pollution prevention and control measures related to the protection of the Arctic marine environment from both land and sea-based activities, including coordinated action programs and guidelines complementing existing legal arrangements.

According to the Arctic Marine Strategic Plan, PAME aims to improve knowledge and respond to emerging knowledge of the Arctic Marine Environment. The AMSA is the primary action item for this objective. The plan also calls on PAME to determine the adequacy of applicable international/regional commitments and promote their implementation and compliance; and facilitate partnerships, program and technical cooperation and support communication, reporting and outreach both within and outside the Arctic Council.

At the 2004 Arctic Council ministers meeting in Iceland, the Reykjavik Declaration asked the PAME work group “to conduct a comprehensive Arctic marine shipping assessment as outlined in the Arctic Marine Strategic Plan (AMSP) under the guidance of Canada, Finland and the United States as lead countries and in collaboration with the Emergency Prevention, Preparedness and Response (EPPR) working group of the Arctic Council and Permanent Participants as relevant.”

Emergency Prevention, Preparedness and Response: EPPR

The EPPR Secretariat rotates with the chairmanship of the Arctic Council and as such is located in the spring of 2009 at the Norwegian Coastal Administration, Department for Emergency Response, Norway.

Harsh conditions and lack of infrastructure in much of the Arctic create a higher vulnerability to emergencies than in more temperate climates. Consequently, prevention, preparedness and response must be adapted to Arctic conditions. Accordingly, international cooperation in this area is of major importance.

The mandate of the EPPR working group is to deal with the prevention, preparedness and response to environmental emergencies in the Arctic. Members of the working group exchange information on best practices and conduct projects (for example, development of guidance and risk assessment methodologies, response exercises, training, etc.). EPPR is not a response agency. In 2004, EPPR was directed by the Arctic Ministers to expand its mandate to include natural disasters.

Ongoing EPPR projects address oil pollution spill response in the face of increased Arctic shipping and development; technological support of radiological and other hazard assessments; and natural disaster response, particularly catastrophic river flooding.



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The Assessment Report Structure

The AMSA 2009 Report is designed to educate and inform the Arctic Council, the Arctic community, the global maritime industry and the world at large about the current state of Arctic marine use and future challenges. The topics presented in the report include:

- Arctic Marine Geography, Climate and Sea Ice
- History of Arctic Marine Transport
- Governance of Arctic Shipping
- Current Marine Use and AMSA 2004 Database
- Scenarios, Futures and Regional Futures to 2020
- Human Dimensions
- Environmental Considerations and Impacts
- Arctic Marine Infrastructure

The initial sections on Arctic marine geography and Arctic marine transport history provide background and context for the subsequent sections. The complex geography of the Arctic Ocean and its surrounding coastline influences all aspects of Arctic marine operations. The history section emphasizes that industrial and commercial uses of the Arctic Ocean date back to the 17th century. There is also a rich history of marine operations in the Russian and Canadian Arctic regions, around Svalbard and Greenland, and off Alaska. Governance is identified in the AMSA as one of the key uncertainties and drivers of future Arctic marine navigation, and this section provides a critical overview and current state of international and coastal state governance of Arctic marine activities. The section on current marine use provides a comprehensive and historic baseline of Arctic marine activity early in the 21st century, developed principally from the AMSA Data Survey.

AMSA scenario workshops in 2007 and 2008 identified natural resource development and trade as key drivers and uncertainties. Two regional AMSA studies - for the Bering Strait and Canadian Arctic, as well as outcomes of ARCOP and INSROP - all emphasize oil and gas and hard minerals development as important indicators for future Arctic marine transport requirements.

The human dimension section communicates the results of the AMSA town hall meetings and identifies important concerns and issues of the Arctic indigenous people. Impacts are also highlighted in the environmental considerations section where ship types and their specific impacts are characterized. The final section of the report on Arctic infrastructure identifies the Arctic Ocean as a region with limited infrastructure in most areas, lacking communications, response capability, salvage and other basic services that are readily available to the maritime community in lower latitudes.

The Arctic Marine Shipping Assessment is a comprehensive study and evaluation of Arctic marine activity today and the future. The AMSA 2009 Report highlights a single set of findings and recommendations important to the future protection of Arctic people and the marine environment. The AMSA team of experts has also provided for each section in the report a list of non-negotiated research opportunities that can be considered by the Arctic research community and organizations such as the International Arctic Science Committee. The AMSA Report is a strategic guide for understanding the complexity and multiple factors that will determine the future of Arctic shipping operations. ☀

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