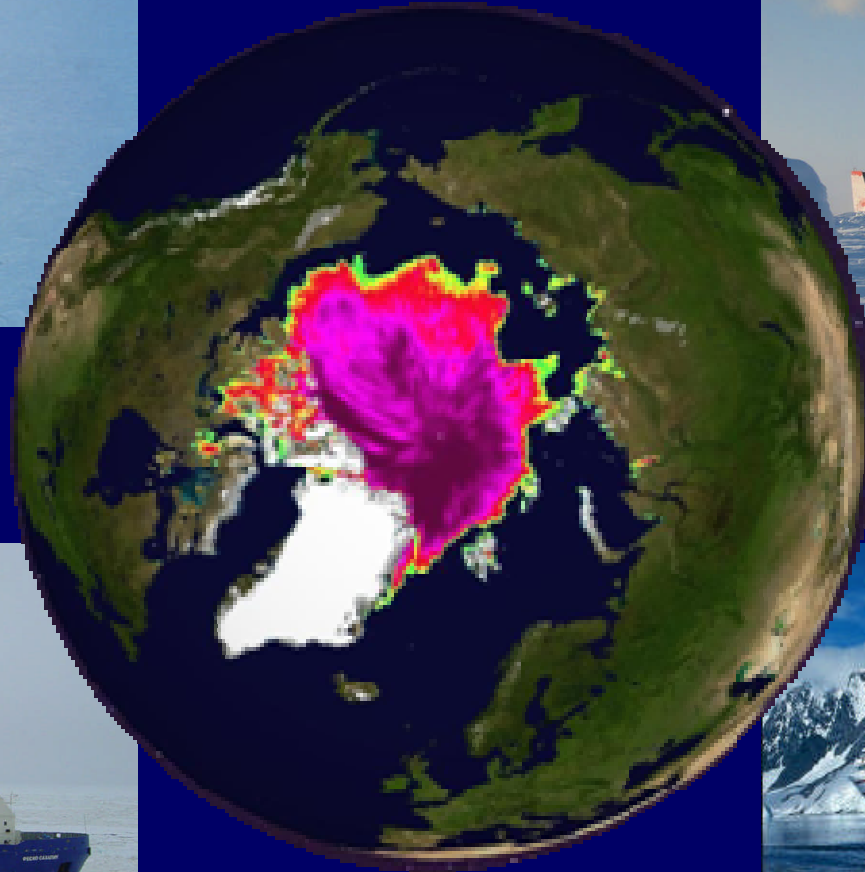


Arctic Marine Shipping Assessment (AMSA) Report to Senior Arctic Officials

Tromso, Norway
12-13 April 2007



Lawson W. Brigham, PhD
Vice Chair, PAME & Chair, AMSA
U.S. Arctic Research Commission ~ Anchorage

Arctic Council

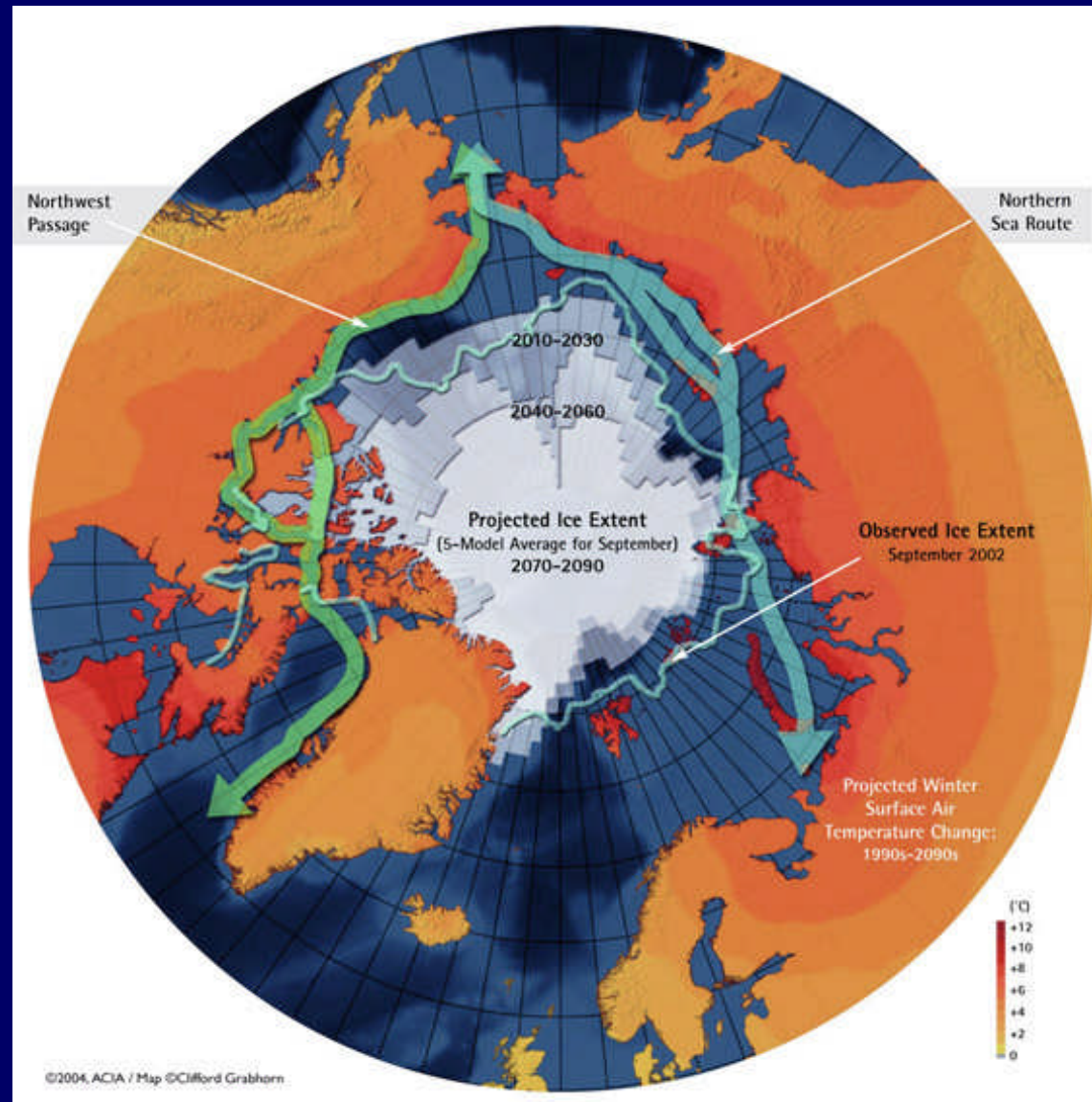
Arctic Marine Shipping Assessment (AMSA)

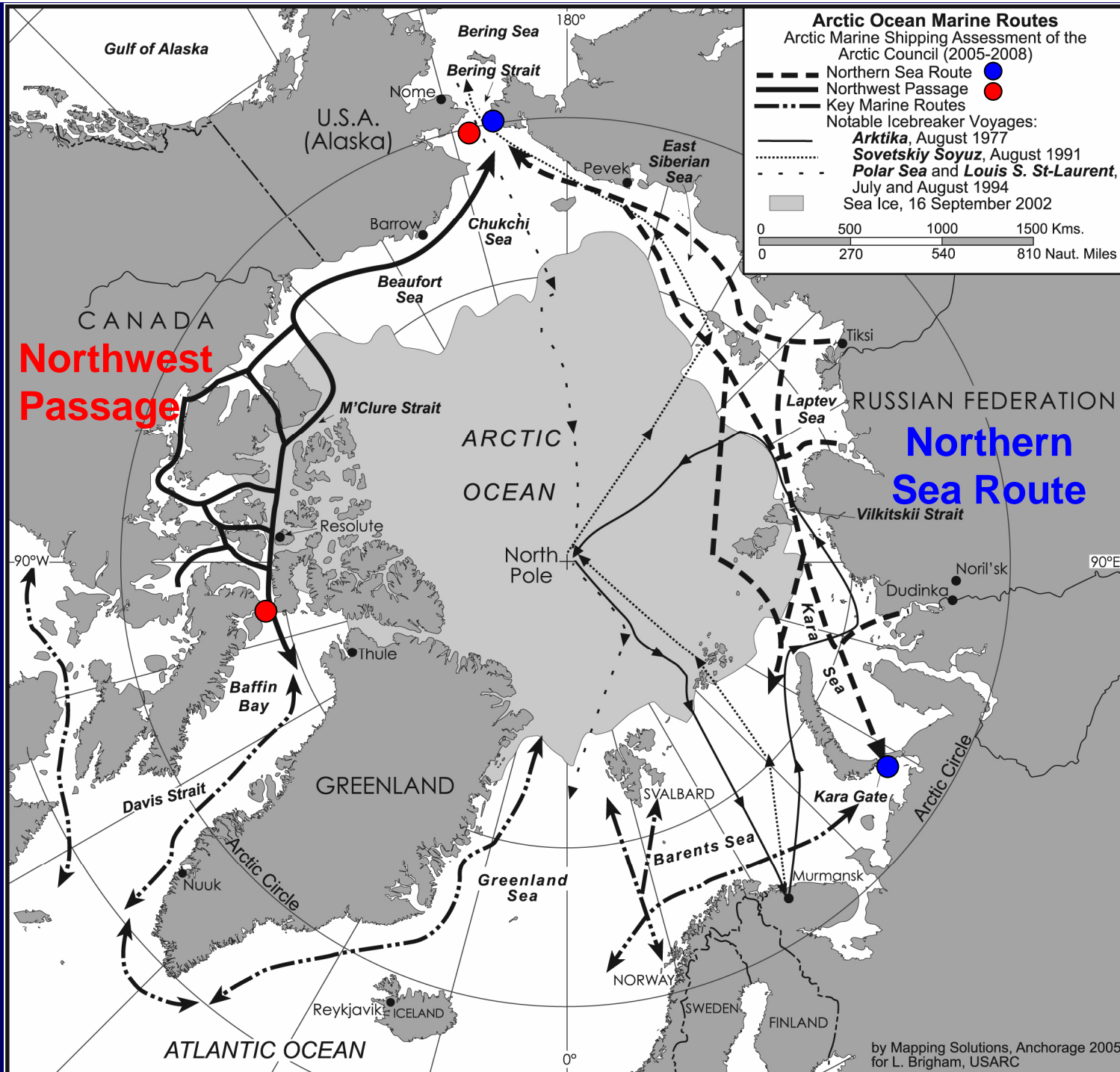
Reykjavik Declaration, 4th Ministerial (Nov 2004)

*“ Request PAME to conduct a comprehensive Arctic marine shipping assessment as outlined in the AMSP under the guidance of **Canada, Finland, and the United States as lead countries** and in collaboration with the EPPR working group and other working groups of the Arctic Council and Permanent Participants as relevant.”*

Arctic Climate Impact Assessment

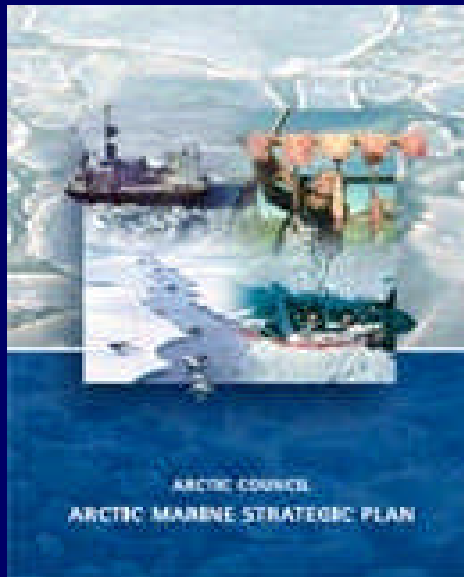
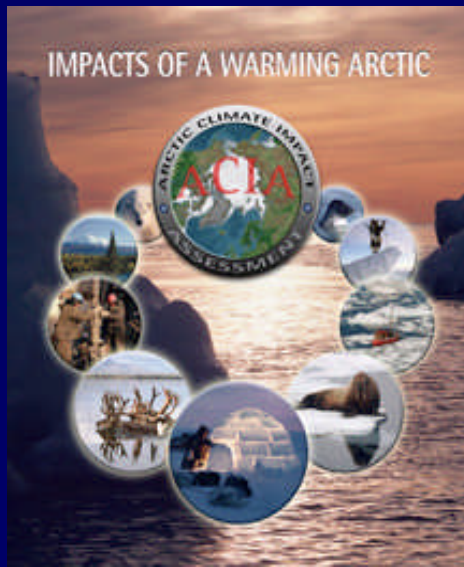
Key Finding #6: “Reduced sea ice is very likely to increase marine transport and access to resources.”





by Mapping Solutions, Anchorage 2005
 for L. Brigham, USARC

Arctic Marine Shipping Assessment (AMSA) Key Points



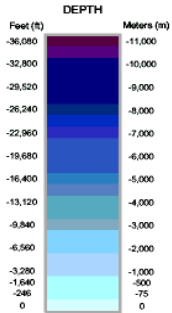
- AMSA Natural Follow-on to:
 - Arctic Climate Impact Assessment (ACIA)
 - Arctic Marine Strategic Plan (AMSP)
- Circumpolar, yet Regional (Large Marine Ecosystems) *and* Local Focus
- Member State Commitment & Support with Data Collection Effort
- AMSA web site: [www.pame.is]
- ACIA web site: [www.amap.no]

MAP KEY:

LME Numbers:

- 1 East Bering Sea
- 2 Gulf of Alaska
- 3 California Current
- 7 Northeast U.S. Continental Shelf
- 8 Scotian Shelf
- 9 Newfoundland - Labrador Shelf
- 18 Baffin Bay - Davis Strait
- 19 Iceland Shelf - Southeast Greenland
- 20 Barents Sea
- 21 Norwegian Sea
- 22 North Sea
- 23 Baltic Sea
- 24 Celtic-Biscay Shelf
- 48 Yellow Sea
- 50 Sea of Japan
- 51 Oyashio Current
- 52 Sea of Okhotsk
- 53 West Bering Sea
- 54 Chukchi Sea
- 55 Beaufort Sea
- 56 East Siberian Sea
- 57 Laptev Sea
- 58 Kara Sea
- 59 Greenland Sea
- 60 Faroe Plateau
- 62 Black Sea
- 63 Hudson Bay
- 64 Arctic Ocean
- 65 Arctic Archipelago

-  Large Marine Ecosystems
-  Watershed Bounds
-  Political Borders

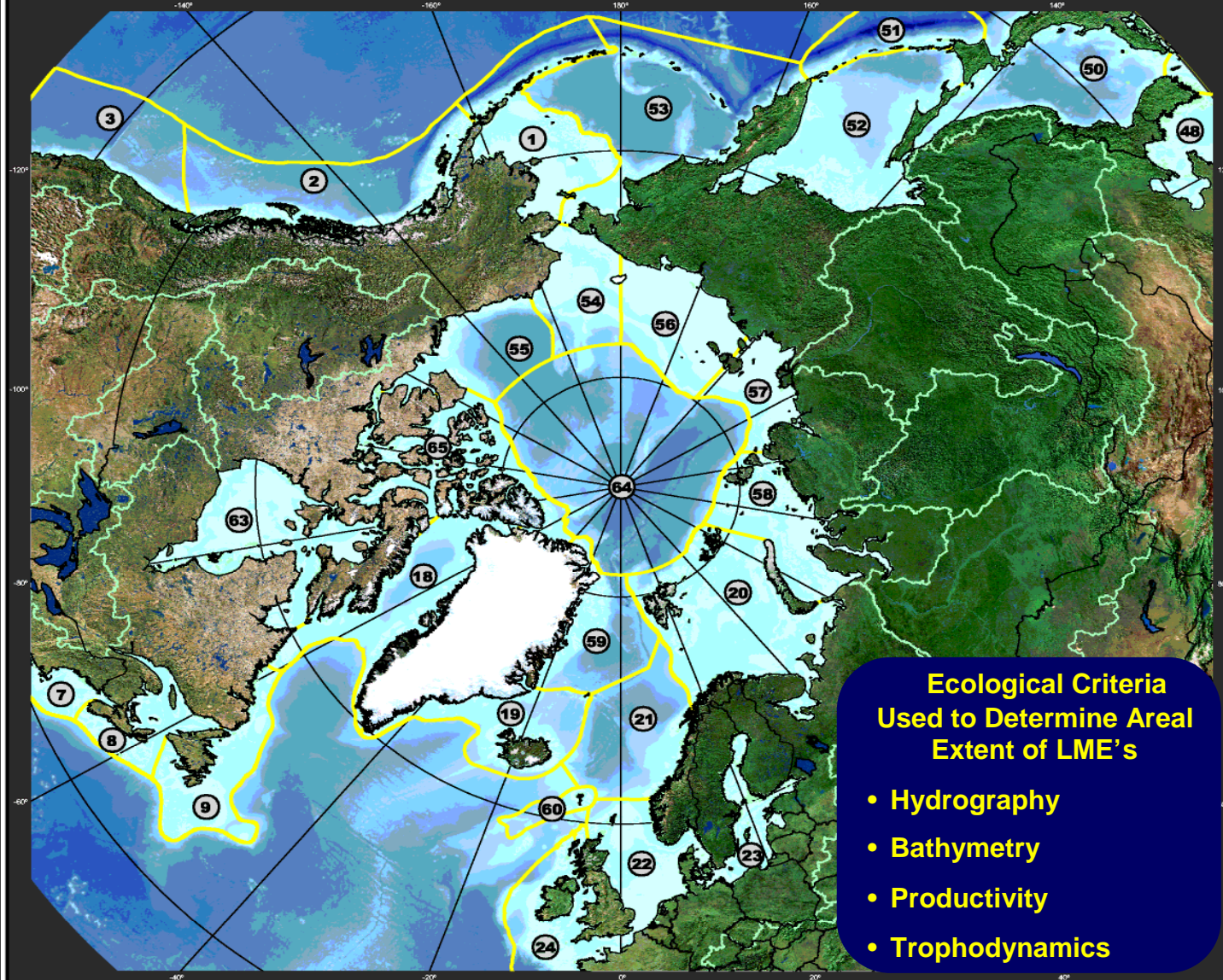


SCALE = 1 : 29,000,000
Universal Polar Projection
Units: Meters



Data Sources:
 Bathymetry (2-minute) : Smith and Sandwell, 1997
 Bathymetry (5-minute) : NAVOCEANO, DSDOS
 Watersheds (HYDRO 1K) : USGS Eros Data Center
 Topographical Image, Political Boundaries : ESRI

Large Marine Ecosystems of the Northern Polar Region and Linked Watersheds



PAME Working Group ~ Resolution of Boundaries



Arctic Council, PAME-led Arctic Marine Shipping Assessment

- **Lead Countries:** Canada, Finland, and USA
- **Key Countries & Regions:** Norway & Russia (Norwegian-Barents-Kara seas), Iceland, Denmark-Greenland-Faroe Islands, Sweden
- **Timeline:** 2005 – 2008
- **Electronic Survey Questionnaire** ~ Sent to SAOs Jan 2006; Continuing 2004 Data Collection from the Arctic States
- **Inclusive Participation:** Member States, Permanent Participants, Council Working Groups; Council Observers; Shipping Industry; Ship Classification Societies; Research Organizations; Others
~ Key Challenge: Many Non-Arctic Stakeholders

Arctic Marine Shipping Assessment

Task - View of Today's Arctic Marine Shipping Situation (Data from Arctic Coastal States for 2004)

Task - Review of Current Traditional / Indigenous Marine Use

Task - Projections of Maritime Activity Based on ACIA ~ Regional Climate & Economic Scenarios (2020 & 2050)

Task - Impacts (Social, Environmental, Economic) of Today's and Future Arctic Marine Activity

Task - Risk Analyses, Accident Scenarios, Responses

Findings of the Assessment

Arctic Council ~ PAME Recommendations for the Member States and the International Maritime Community

AMSA Strategy for Indigenous/Traditional Arctic Marine Use:

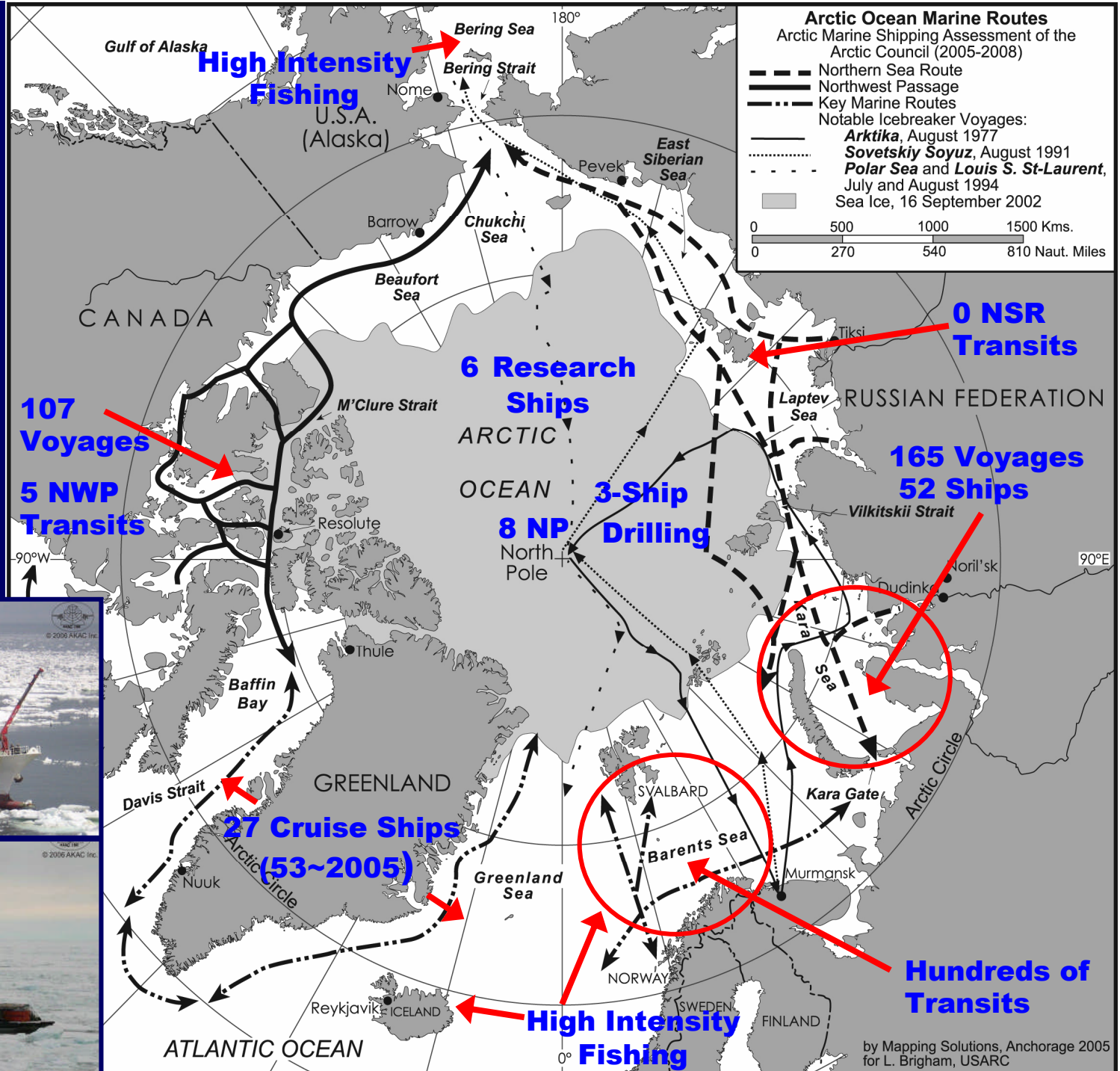
- **Hold Town Hall Meetings in Arctic Communities**
- **Establish Panel of Experts (~ Assessment Chapter 4)**
- **Request Sustainable / Traditional Arctic Marine Use Information from the Arctic States and the Permanent Participants ~ Review by the Chapter 4 Team**
- **Permanent Participants Involved in All Stages of AMSA Review (AMSA Team..... PAME..... SAO/Council)**

The Maritime Arctic of Today

Snapshot of Summer 2004 Traffic

Modes of Arctic Marine Transport

- Destinalional / Regional
- Trans-Arctic
- Trans-Arctic with Transshipment
- Intra-Arctic



by Mapping Solutions, Anchorage 2005 for L. Brigham, USARC



ARCTIC MARINE
SHIPPING ASSESSMENT

The Future of Arctic Marine Navigation in 2050

A Scenario Creation Exercise

San Francisco: 3-5 April, 2007

Erik Smith (*erik_smith@gbn.com*)

Matt Ranen (*matt_ranen@gbn.com*)

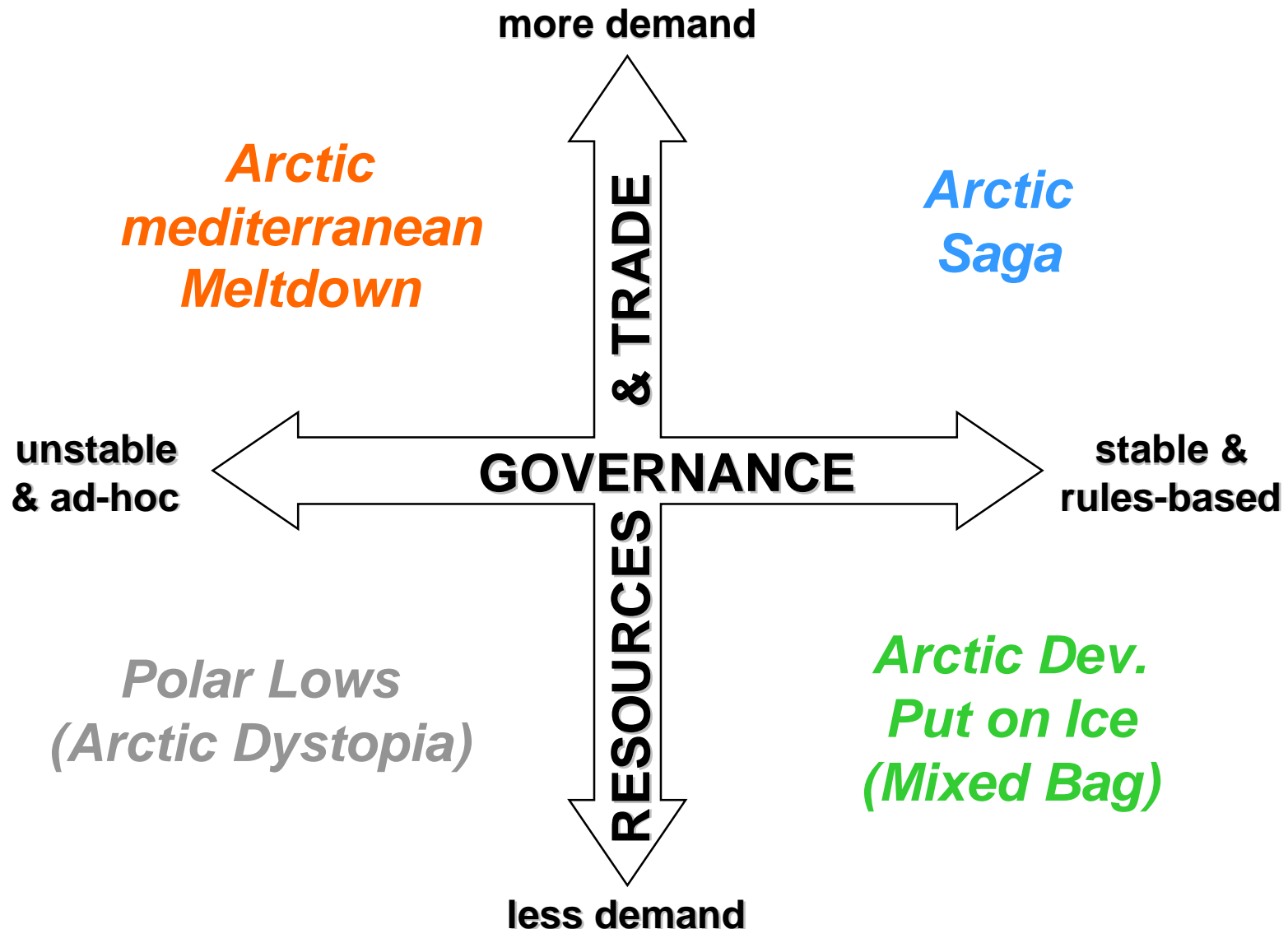
Bert Chan (*bertram_chan@gbn.com*)

**GBN Global Business
Network**

a member of the Monitor Group

www.gbn.com
101 Market St, Suite 101
San Francisco, CA 94105

Scenarios on the Future of Arctic Marine Navigation in 2050



AMSA Final Report Structure (Draft Chapter Outline)

Chapters

- 1: Introduction & Geography (AMSA Team)**
 - 2: History of Arctic Marine Use/Marine Transport (US & Canada)**
 - 3: Current (2004) Levels of Arctic Marine Use (Canada)**
 - 4: Current Indigenous Arctic Ocean Use (US & Canada)**
 - 5: Scenarios of Future Arctic Marine Activity ~ 2020/2050 (US)**
 - 6: Environmental Impacts of Current & Future Marine Activity (Support to 3 Co-leads Proposed)**
 - 7: Social & Economic Impacts of Current & Future Marine Activity (Support for Lead Author)**
 - 8: Arctic Marine Infrastructure & Anticipated Needs (US/Canada/3rd)**
 - 9: Findings of the Assessment**
- Appendices, Research Agenda**

AMSA Needs & Contributions

- **Arctic State Support for Lead Authors**
- **Contributing Authors & Experts ~ All Arctic Council Sources & Beyond**
- **Continued Data Survey ~ Arctic State Official Data & Indigenous Use Data**
- **Arctic State Funding ~ Publications**

Themes to Consider

Top of Endstate section: Broad Context

Indigenous communities

China, Japan, Korea

Maritime Disasters

World Trade Patterns

...Plus and from the list of 19 uncertainties and/or brainstorm

Middle of Endstate Section: Marine Navigation

Regional

Trans-Arctic

Tourism

Oil and Gas

Minerals

Fisheries