

Arctic Council
Arctic Marine Shipping
Assessment 2009 Report



AMSA

A Roadmap Forward & Relevant Alaska Activities

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Legislative Liaison to the
Denali Commission

CONSIDERING A ROADMAP FORWARD:
THE ARCTIC MARINE
SHIPPING ASSESSMENT

WORKSHOP REPORT

University of Alaska Fairbanks
October 22-24, 2009



University of the Arctic - Institute for Applied Circumpolar Policy

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University of Alaska Geography Program
School of Natural Resources & Agricultural Sciences

Arctic Boundary as defined by the Arctic Research and Policy Act (ARPA)

All United States and foreign territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering and Chukchi Seas; and the Aleutian chain.¹



Acknowledgement: Funding for this map was provided by the National Science Foundation through the Arctic Research Mapping Application (armap.org) and Contract #0520837 to CH2M HILL for the Interagency Arctic Research Policy Committee (IARPC).

Map author: Allison Gaylord, Nuna Technologies. May 27, 2009.

1. The Aleutian chain boundary is demarcated by the 'Contiguous zone' limit of 24-nautical miles.

Selected AMSA Key Findings

- UNCLOS: Fundamental framework
- IMO: Competent UN agency
- Winter Arctic sea ice cover remains
- No special, mandatory IMO environmental standards
- Today ~ nearly all destination traffic
- Key drivers: Natural resource development & regional trade plus governance
- Future Arctic transport: many factors of uncertainty
- Arctic residents: concerns for traditional way of life & recognition of benefits
- Most significant threat: release of oil
- General lack of marine infrastructure
(exceptions: coast of Norway & northwest Russia)

AMSA I.

Enhancing Arctic Marine Safety

- Linking with International Organizations
- IMO Measures for Arctic Shipping
- Uniformity of Arctic Shipping Governance
- Strengthening Passenger Ship Safety in Arctic Waters
- Arctic Search and Rescue (SAR) Instrument

AMSA II.

Protecting Arctic People and the Environment

- Survey of Arctic Indigenous Marine Use
- Engagement with Arctic Communities
- Areas of Heightened Ecological and Cultural Significance
- Specially Designated Arctic Marine Areas
- Protection from Invasive Species
- Oil Spill Prevention
- Addressing Impacts on Marine Mammals
- Reducing Air Emissions

AMSA III.

Building the Arctic Marine Infrastructure

- Addressing the Infrastructure Deficit
- Arctic Marine Traffic Systems
- Circumpolar Environmental Response Capacity
- Investing in Hydrographic, Meteorological and Oceanographic Data

AMSA Implementation Legislation

- **H.R. 5770** - 2010 – Congressman Young
 - International Agreements & IMO
 - Demonstration Projects to reduce emissions & discharge & train mariners for ice navigation
 - Analysis of icebreakers recapitalization through 2020
 - Coast Guard presence study in high latitude regions
- **S. 1514** – 2009 - Senator Murkowski
 - International Agreements & IMO
 - Maritime Transportation System coordination
 - Demonstration projects to reduce discharge and emissions
 - Appropriate for 2 polar class ice breakers
- **S. 1561** – 2009 – Senator Begich
 - International Agreements & IMO
 - Coast Guard Mission Analysis
 - Arctic Vessel Traffic Risk Assessments
 - Report on establishment of Arctic Deep Water Port
 - Appropriate for 2 polar class ice breakers

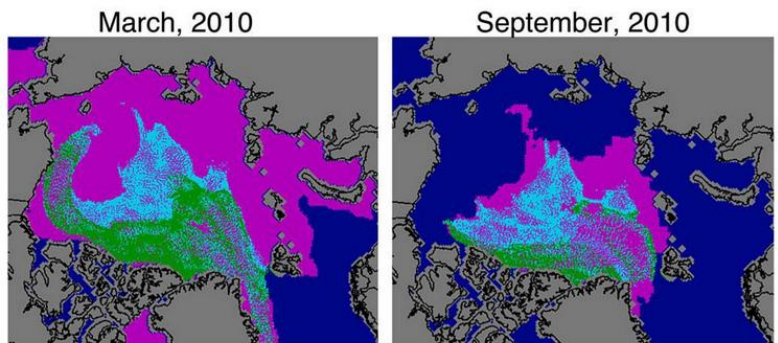
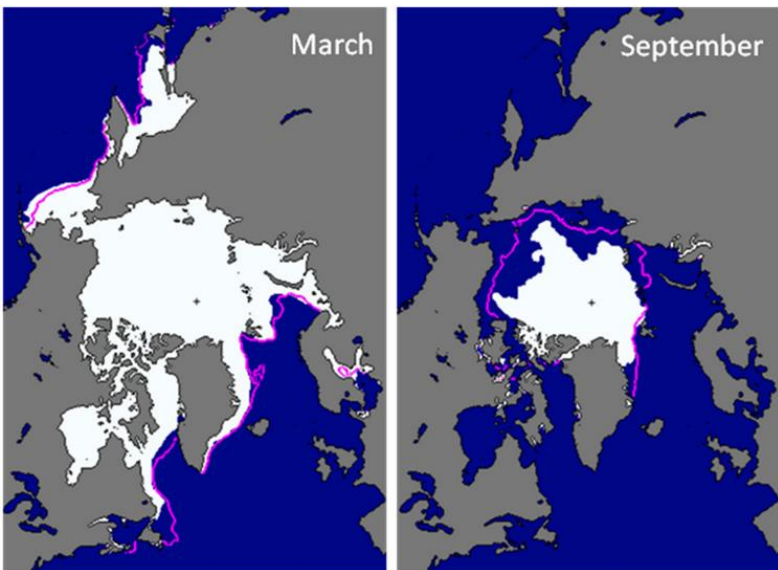
HR 3619 Section 307

Coast Guard Authorization Act of 2010

- Appropriates \$70M over 5 years to USCG for Arctic Marine Shipping Assessment Implementation
 - The purpose of this section is to ensure safe, secure, and reliable maritime shipping in the Arctic including the availability of aids to navigation, vessel escorts, spill response capability, and maritime search and rescue in the Arctic.
 - International Maritime Organization agreements
 - Coordination for an Ocean Action Plan for domestic transportation policies in the Arctic.
 - Independent Ice Breaker Analysis
 - High Latitude Study

The Arctic Report Card

Collaborative scientific assessment of annual Arctic environmental changes



■ First-year ice (<1 year old)
 ■ Second-year ice (1-2 years old)
 ■ Multiyear ice (>2 years old)



Arctic Report Card: Update for 2010

Tracking recent environmental changes

Return to previous Arctic conditions is unlikely

Record temperatures across Canadian Arctic and Greenland, a reduced summer sea ice cover, record snow cover decreases and links to some Northern Hemisphere weather support this conclusion

■	Atmosphere	■	Biology	■	Greenland
■	Sea Ice	■	Ocean	■	Land

Red boxes: Consistent evidence of warming.
Yellow boxes: Many indications of warming.



Atmosphere
Arctic climate is impacting mid-latitude weather, as seen in Winter 2009-2010

Sea Ice
Summer sea ice conditions for previous four years well below 1980s and 1990s

Ocean
Upper ocean showing year-to-year variability without significant trends

Land
Low winter snow accumulation, warm spring temperatures lead to record low snow cover duration

Greenland
Record setting high temperatures, ice melt, and glacier area loss

Biology
Rapid environmental change threatens to disrupt current natural cycles

<http://www.arctic.noaa.gov/reportcard/>



Investing in Hydrographic, Meteorological and Oceanographic Data

Quality circumpolar weather forecasting

Refined met-ocean-ice forecast and models

Improved training of Arctic forecasters

Access to Arctic Ocean real-time met-ocean-ice data

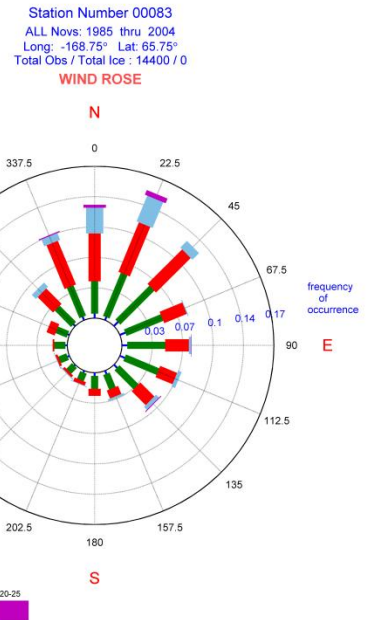
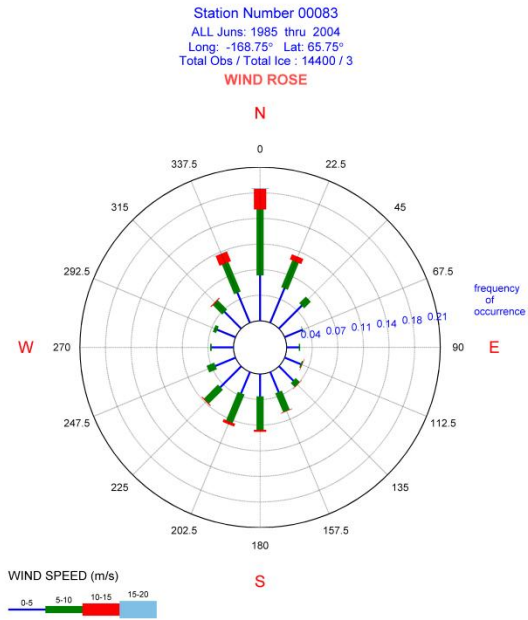
Increased local weather observations by Arctic ships

Alaska Ocean Observation System (AOOS) and Arctic Observation Network (AON)

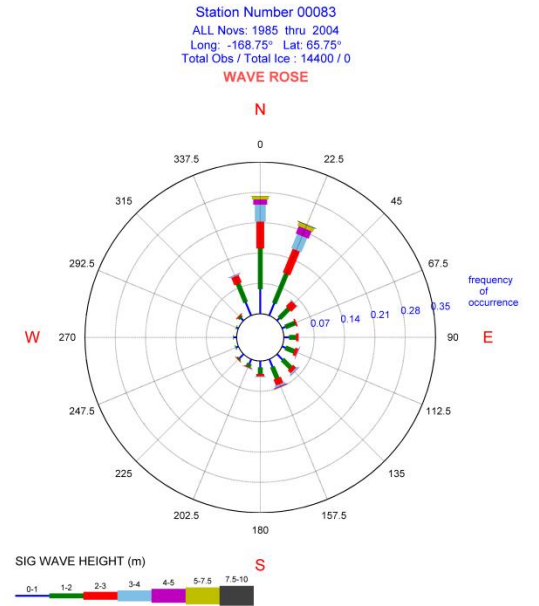
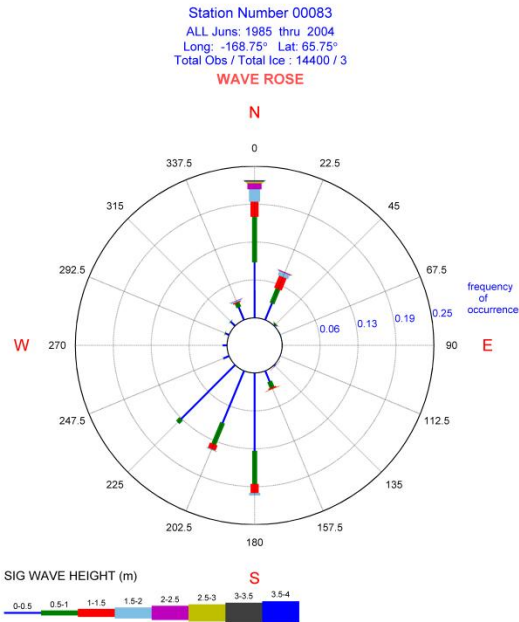


Diomedede Bering Straits

Waves & Wind June 1985-2004

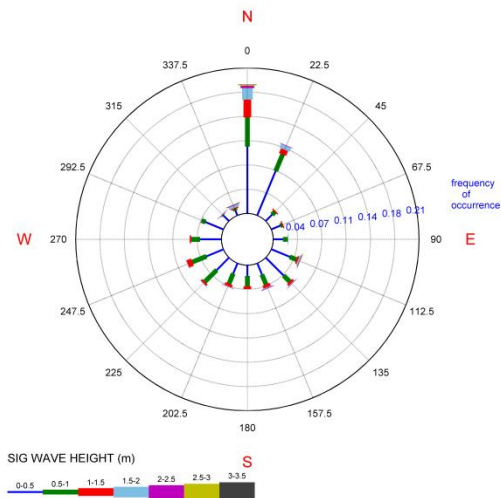


Waves & Wind November 1985-2004



Station Number 00128
 ALL Jul: 1985 thru 2004
 Long: -170° Lat: 63.75°
 Total Obs / Total Ice : 14890 / 0

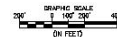
WAVE ROSE



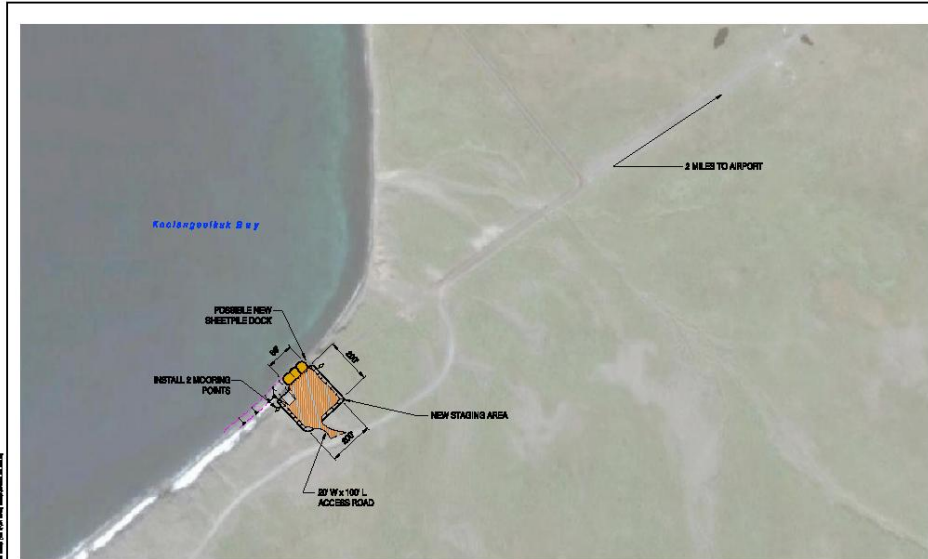
Savoonga barge landing site on St. Lawrence Island



- NOTES:
1. ALL PROPOSED NEW DEVELOPMENT IS PRELIMINARY PLANNING LEVEL. ONLY ACTUAL FACILITY IMPROVEMENTS LOCATIONS, LAYOUT, DIMENSIONS, ETC. WILL REQUIRE SITE VISIT INVESTIGATION TO DETERMINE SITE CONDITIONS, PROPERTY OWNERSHIP AND OTHER INFORMATION NEEDED PRIOR TO FINAL DESIGN.
 2. ELEVATIONS SHOWN ARE ESTIMATES ONLY, APPROPRIATED FROM ADJACENT COMMUNITY MAPS. UPDATED SURVEY IS REQUIRED PRIOR TO FINAL DESIGN.
 3. PERMAFROST MAY BE POSSIBLE BOTH ON AND OFFSHORE. ONSHORE PERMAFROST MAY BE AS SHALLOW AS 2 - 3 FT. OFFSHORE THE THICKNESS OF PERMAFROST MAY DECREASE WHILE THE DEPTH TO PERMAFROST MAY INCREASE.



SAVOONGA
 NOTION SOUND / BERING SEA REGION
 E3-A



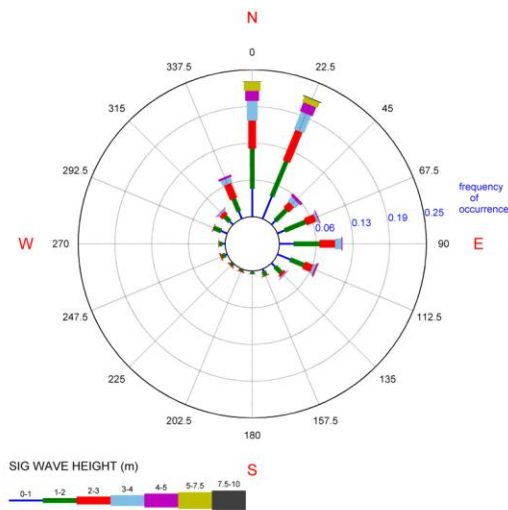
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 2. PRIOR TO FINAL DECISION OF ANY COASTAL STRUCTURES A DETAILED STUDY OF EROSION, SEDIMENT TRANSPORT, AND POSSIBLE COASTAL PROTECTION NEEDS MUST BE COMPLETED.
 3. PERMAFROST MAY BE POSSIBLE BOTH ON AND OFFSHORE. ONSHORE PERMAFROST MAY BE AS SHALLOW AS 2 - 3 FT. OFFSHORE THE THICKNESS OF PERMAFROST MAY DECREASE WHILE THE DEPTH TO PERMAFROST MAY INCREASE.



SAVOONGA
 NOTION SOUND / BERING SEA REGION
 E3-B

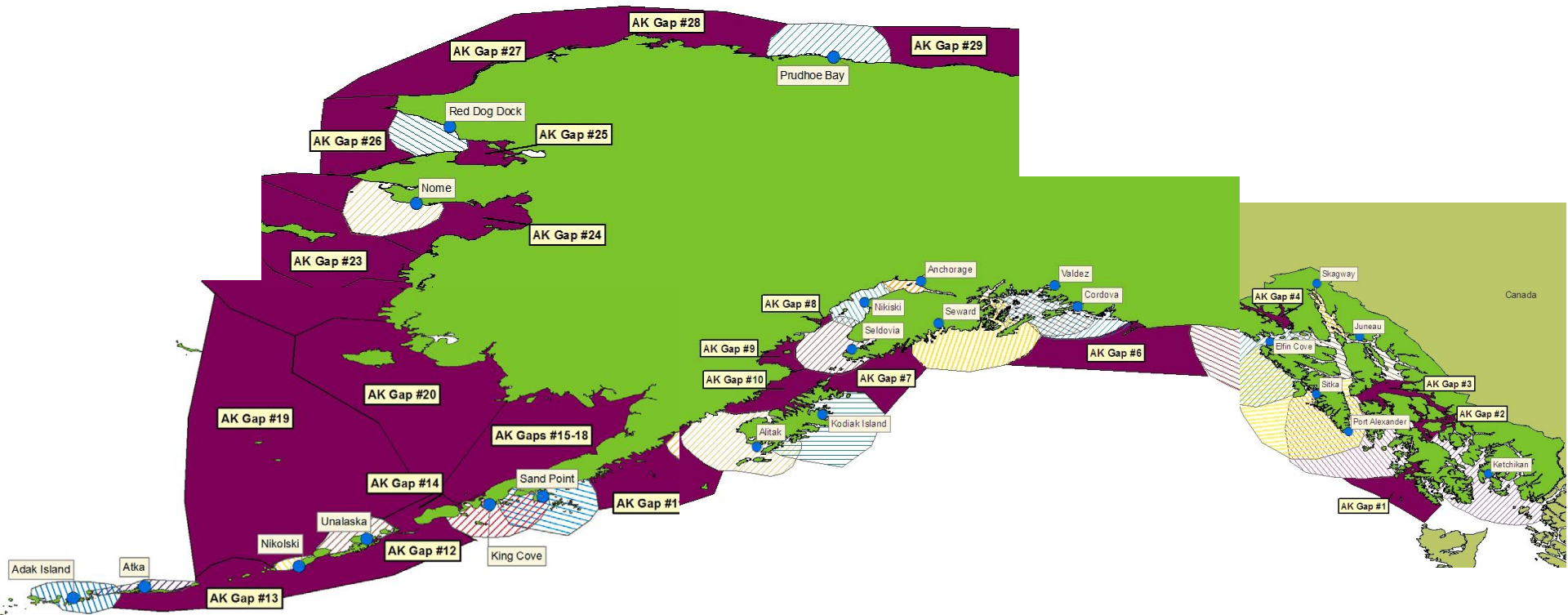
Station Number 00128
 ALL Nov: 1985 thru 2004
 Long: -170° Lat: 63.75°
 Total Obs / Total Ice : 14400 / 0

WAVE ROSE



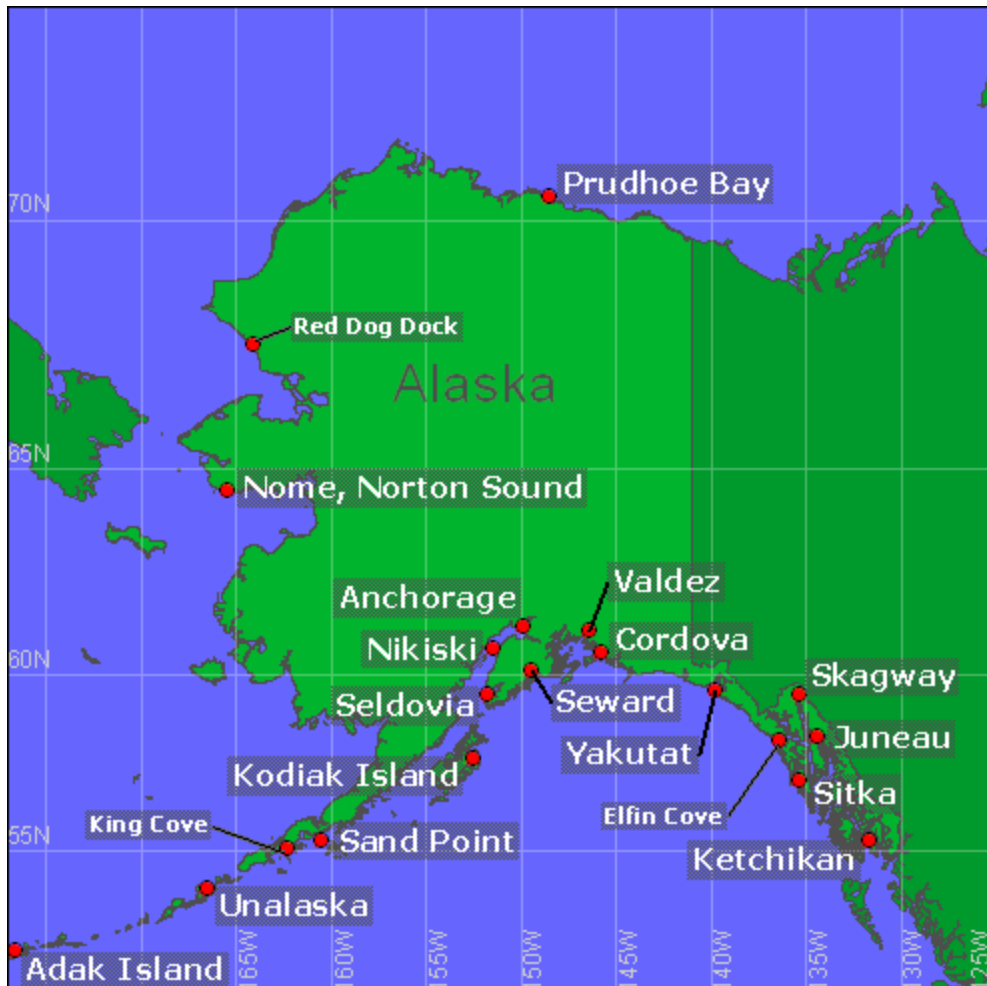
From: <http://frf.usace.army.mil-wis2010-hindcasts.shtml.url>

Tidal Data Gaps in Alaska



Gaps in water level elevations for determining shoreline and monitoring storm surge and sea level change

Vertical Control/Tidal Datum for Western Alaska



2006 New Tide Stations

Village Cove (Pribilof Islands)

Port Moller (Alaska Peninsula)

Recent Tide Stations online (2008/2009)

Quinhagak

Bethel

Nelson Island

Merkoyuk

Point Spencer

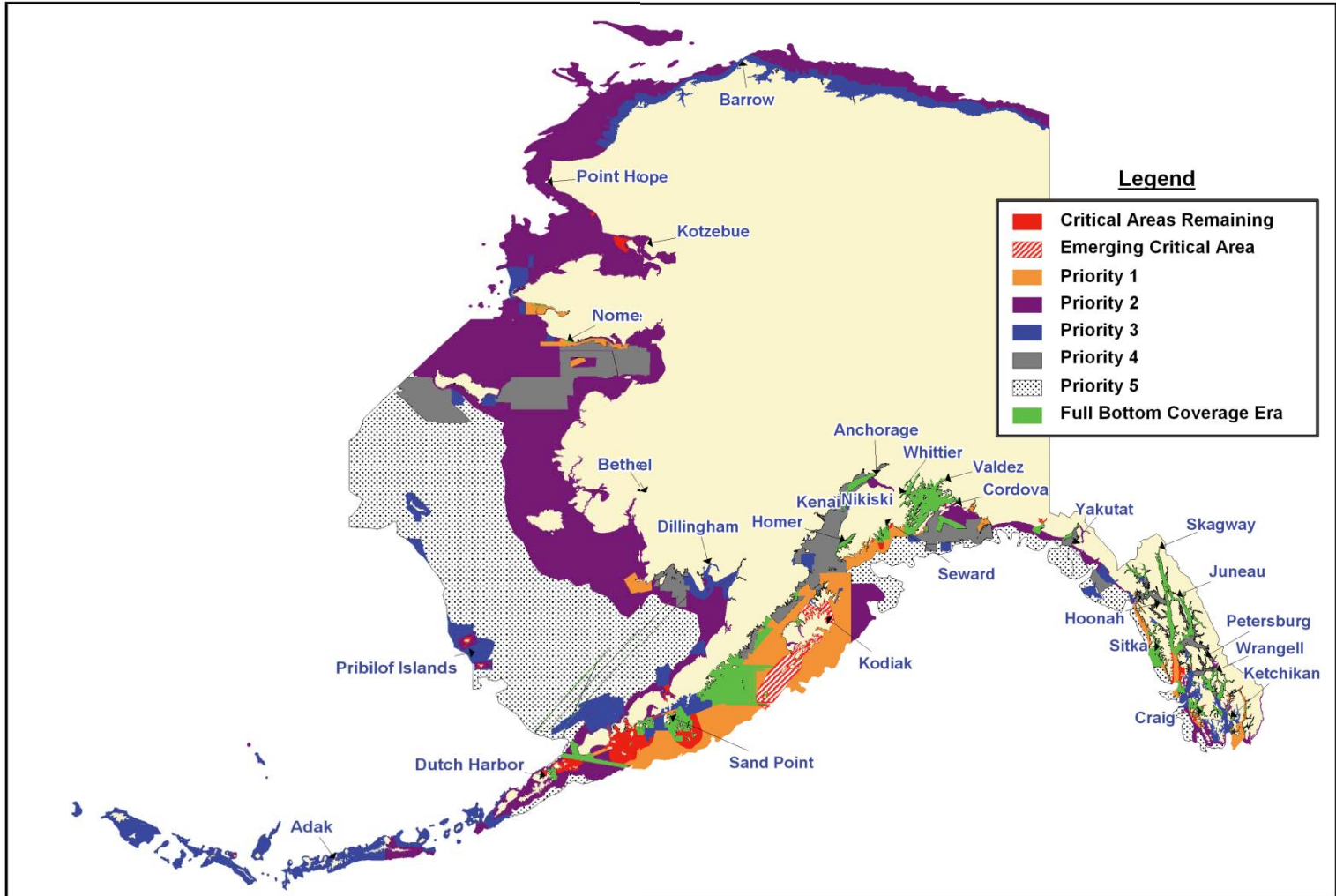
Tin City

Pt. Lay

DRAFT

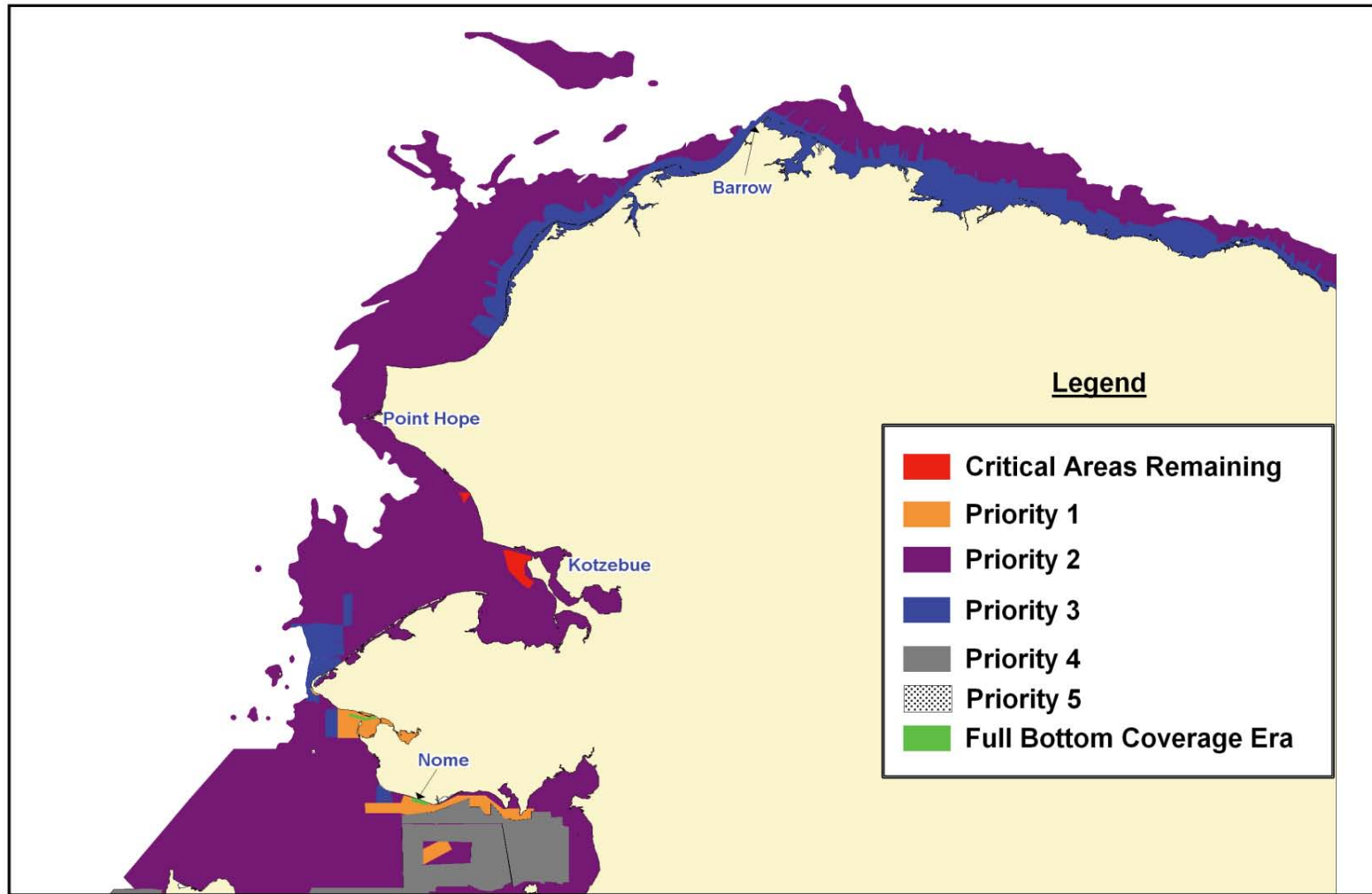
NOAA Hydrographic Survey Priorities - Alaska

2010

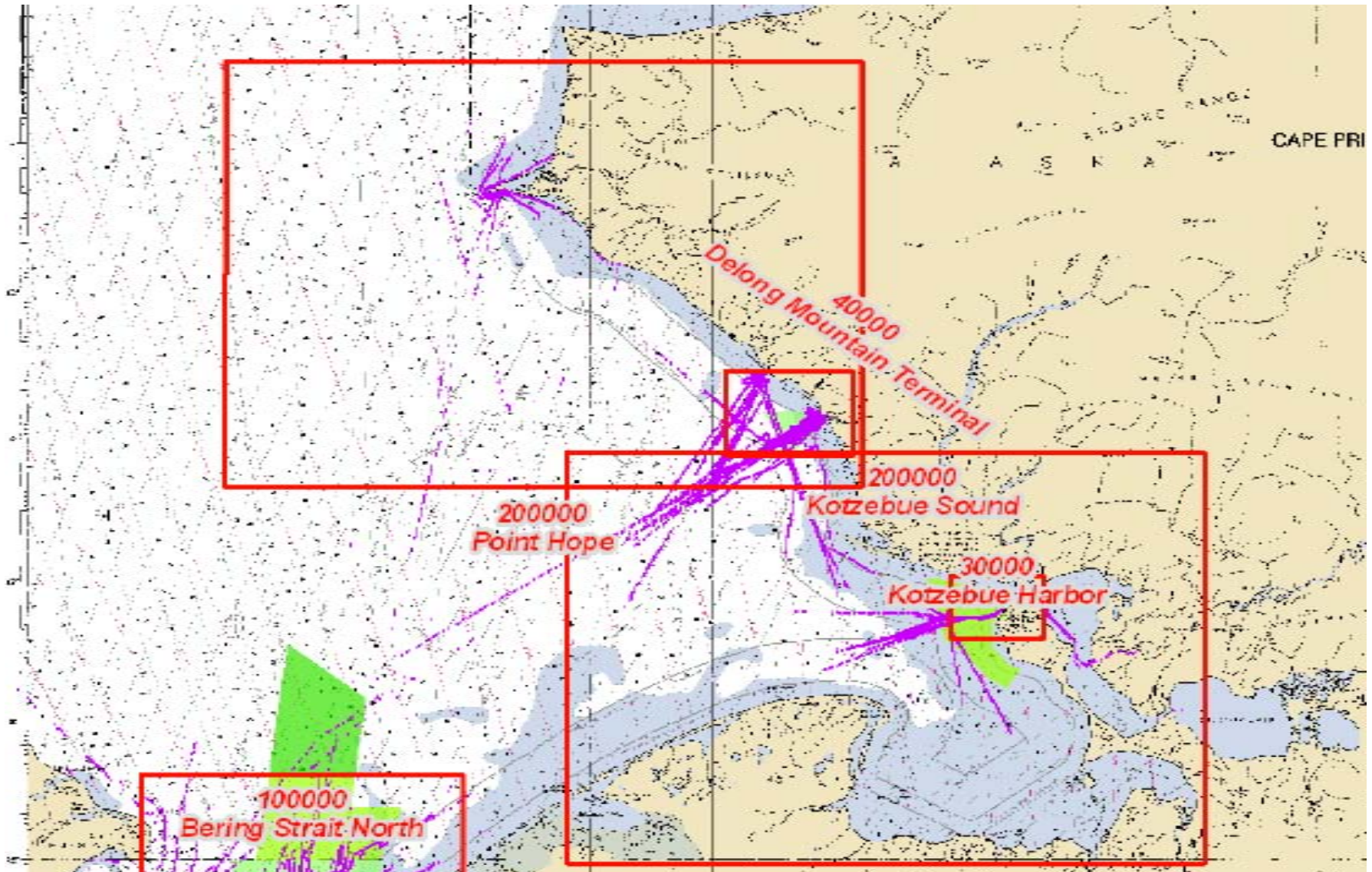


NOAA Hydrographic Survey Priorities - Alaska

North
2010

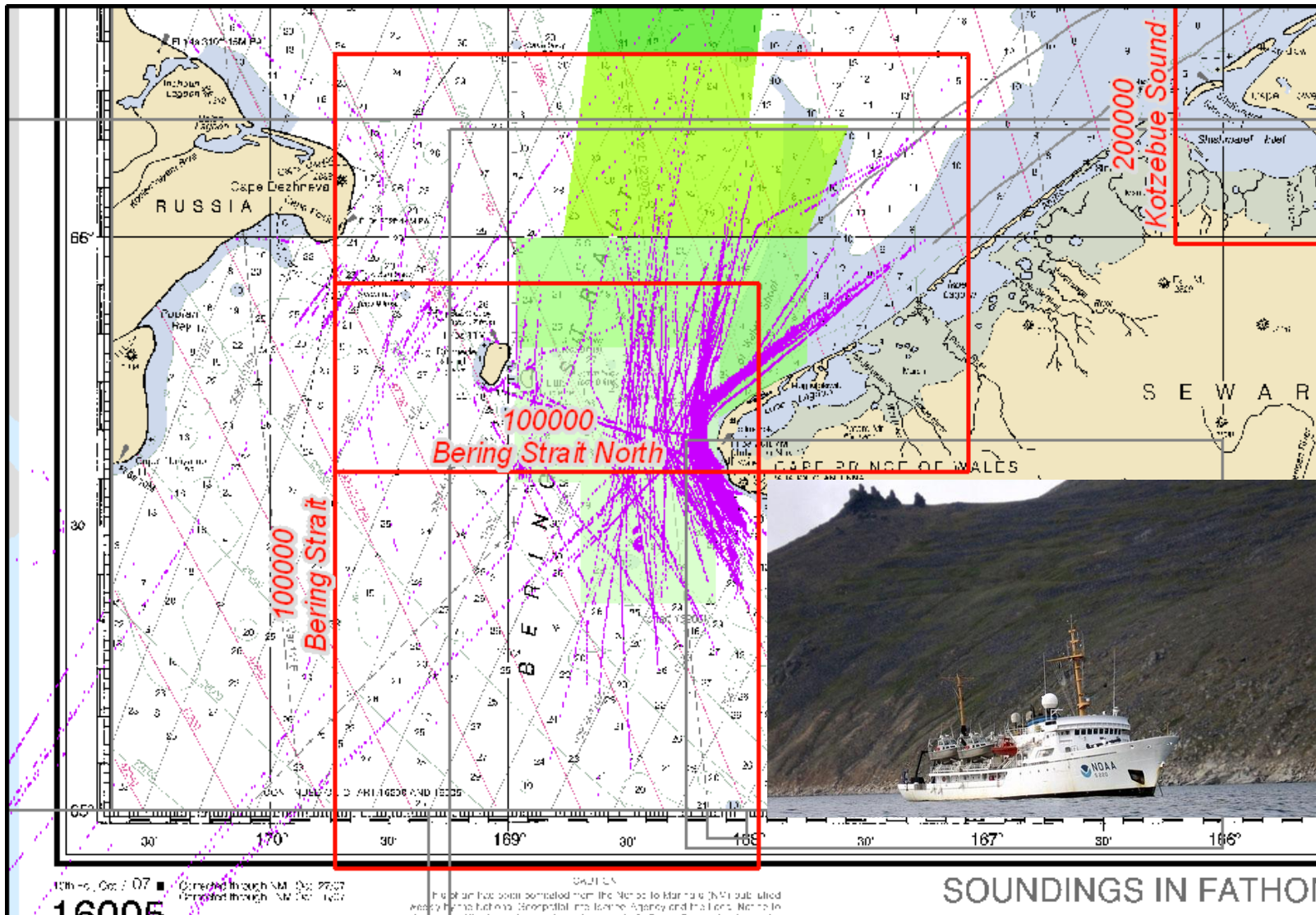


NOAA Arctic Chart Plan : Kotzebue Sound (*DRAFT*)



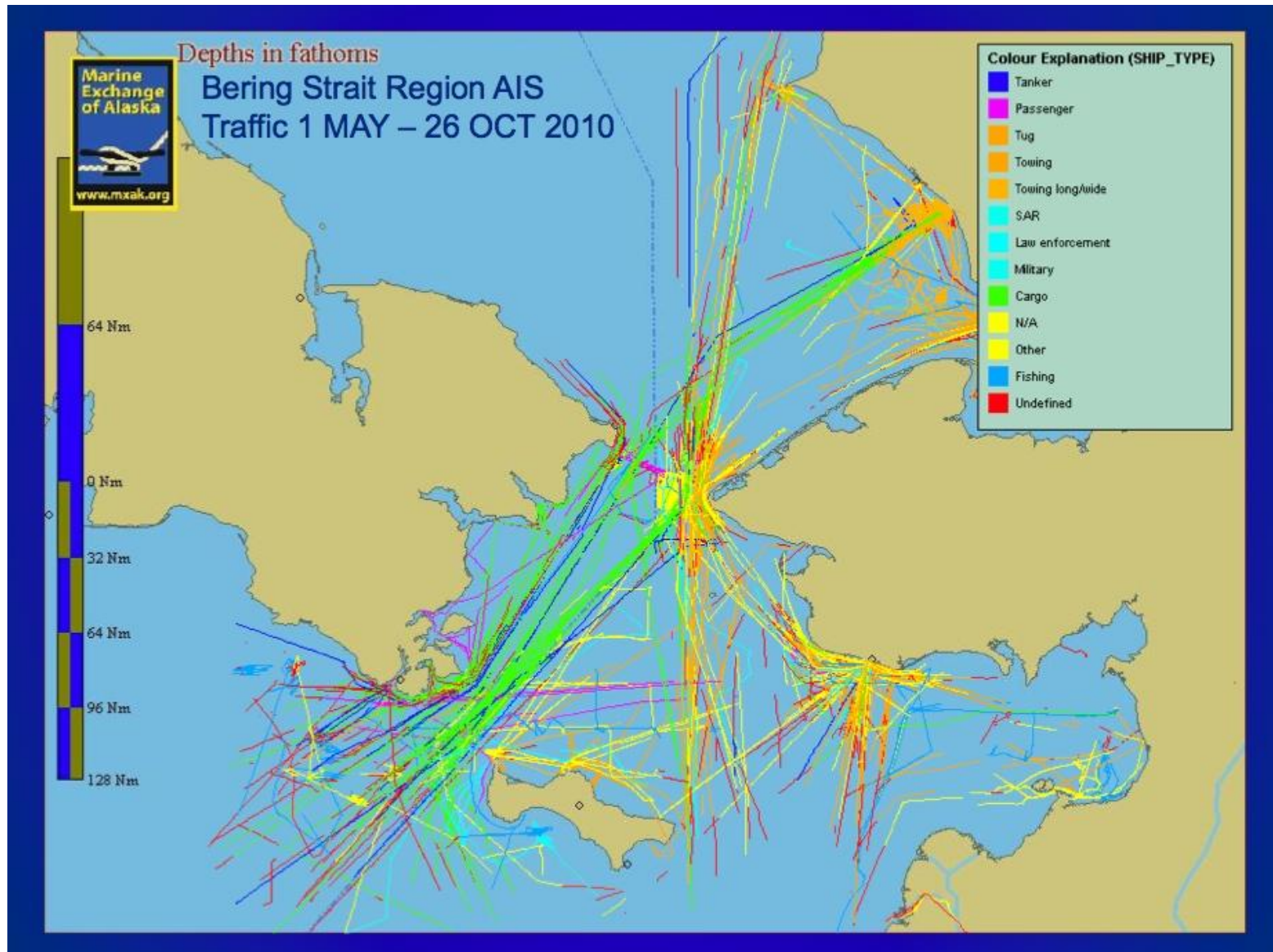
From: Arctic Nautical Charting Plan NOAA October 2010, In Draft

NOAA Arctic Chart Plan- Bering Straits (DRAFT)



From: Arctic Nautical Charting Plan NOAA October 2010, In Draft

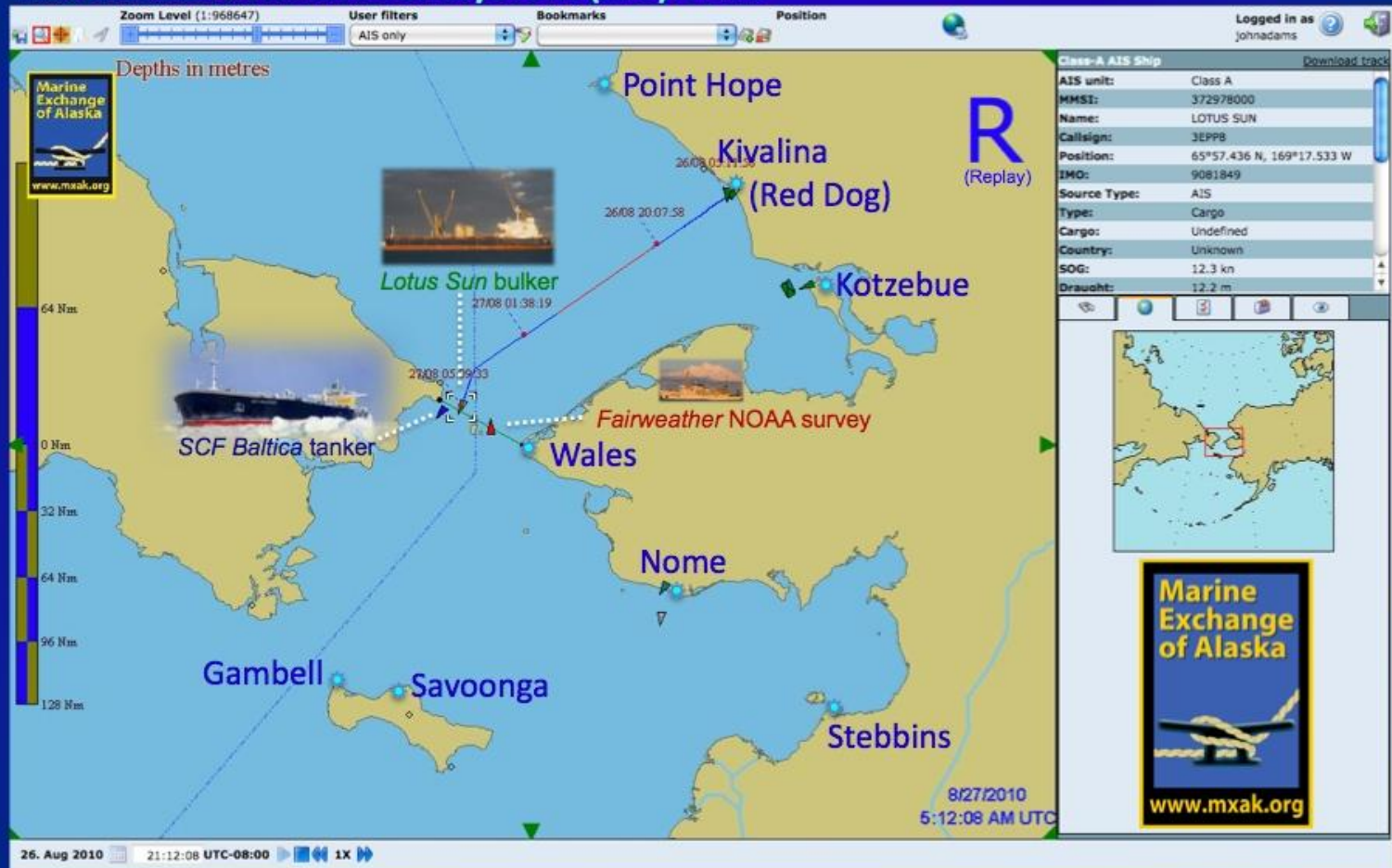
Arctic Marine Traffic Systems



From John Adams, Marine Exchange of Alaska

Vessel Tracking & Monitoring

Tracking & Monitoring – Marine Exchange of Alaska's Bering Strait region Automatic Identification System (AIS) Sites



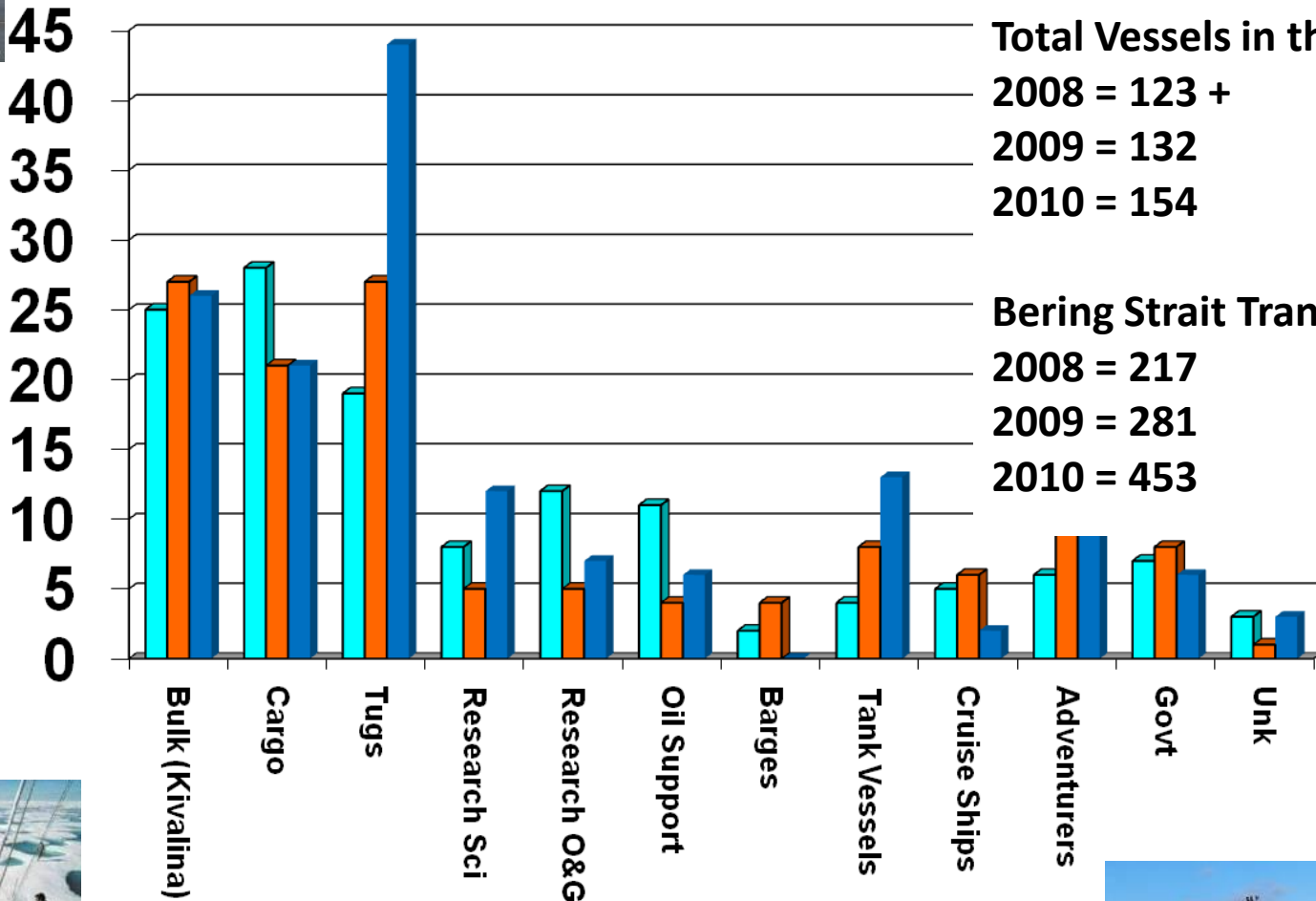
MXAK Arctic AIS Sites shown: Point Hope, Kivalina, Kotzebue

MXAK Subarctic AIS Sites shown: Wales, Nome, Gambell, Savoonga, Stebbins

From John Adams, Marine Exchange of Alaska

Documented Arctic Vessel Activity

■ 2008
 ■ 2009
 ■ 2010



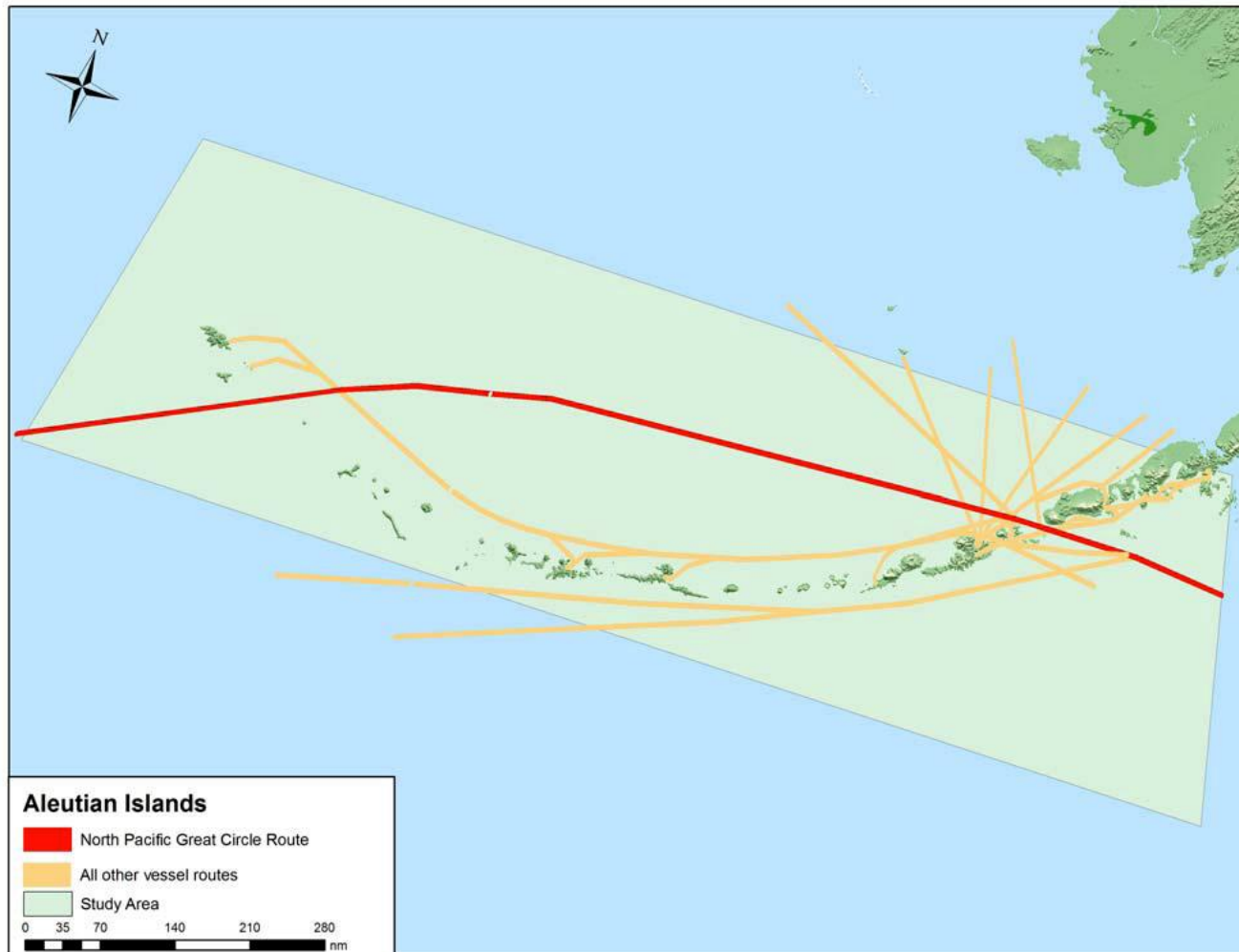
Total Vessels in the Arctic
 2008 = 123 +
 2009 = 132
 2010 = 154

Bering Strait Transits
 2008 = 217
 2009 = 281
 2010 = 453

From Cdr. Montoya, USCG



Aleutian Island Risk Assessment



<http://www.aleutiansriskassessment.com/>

Protecting Arctic People and the Environment – Aleutian Island Risk Assessment

- Phase A Risk Assessment began March 2009 and scheduled completion March 2011
- Includes:
 - Traffic Study (Completed)
 - Baseline Spill Study (Completed)
 - Consequence Analysis (Draft Report due 12/10)
 - Qualitative Assessment, Ranking & Prioritization of Risk Reduction Options (Draft Report due 2/11)

<http://www.aleutiansriskassessment.com/>



<http://www.dec.state.ak.us/spar/>

ALEUTIAN ISLANDS RISK ASSESSMENT

- Advisory Panel of Stakeholders:
 - Assist in identifying hazards and offer local knowledge to characterize the risks
 - Assist in establishing tolerance parameters for risks
 - Perform an initial prioritization of risk reduction measures
- Risk Mitigation Categories Considered:
 - Waterway Management & Traffic Control
 - Inspection & Enforcement
 - Emergency Operations & Procedures
 - Vessel Personnel & Pilotage
 - Vessel Enhancement
 - Response Improvement



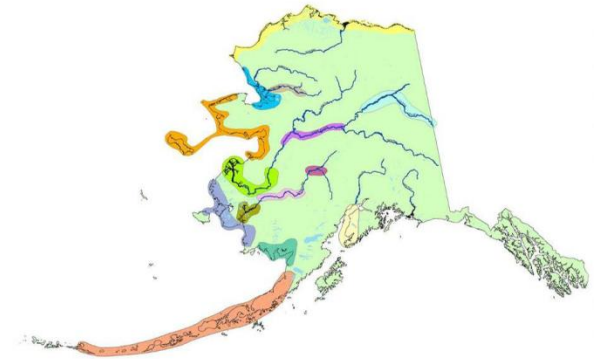
<http://www.aleutiansriskassessment.com/projectteam.htm>

Protecting Arctic People and the Environment

- Engagement with Arctic Communities

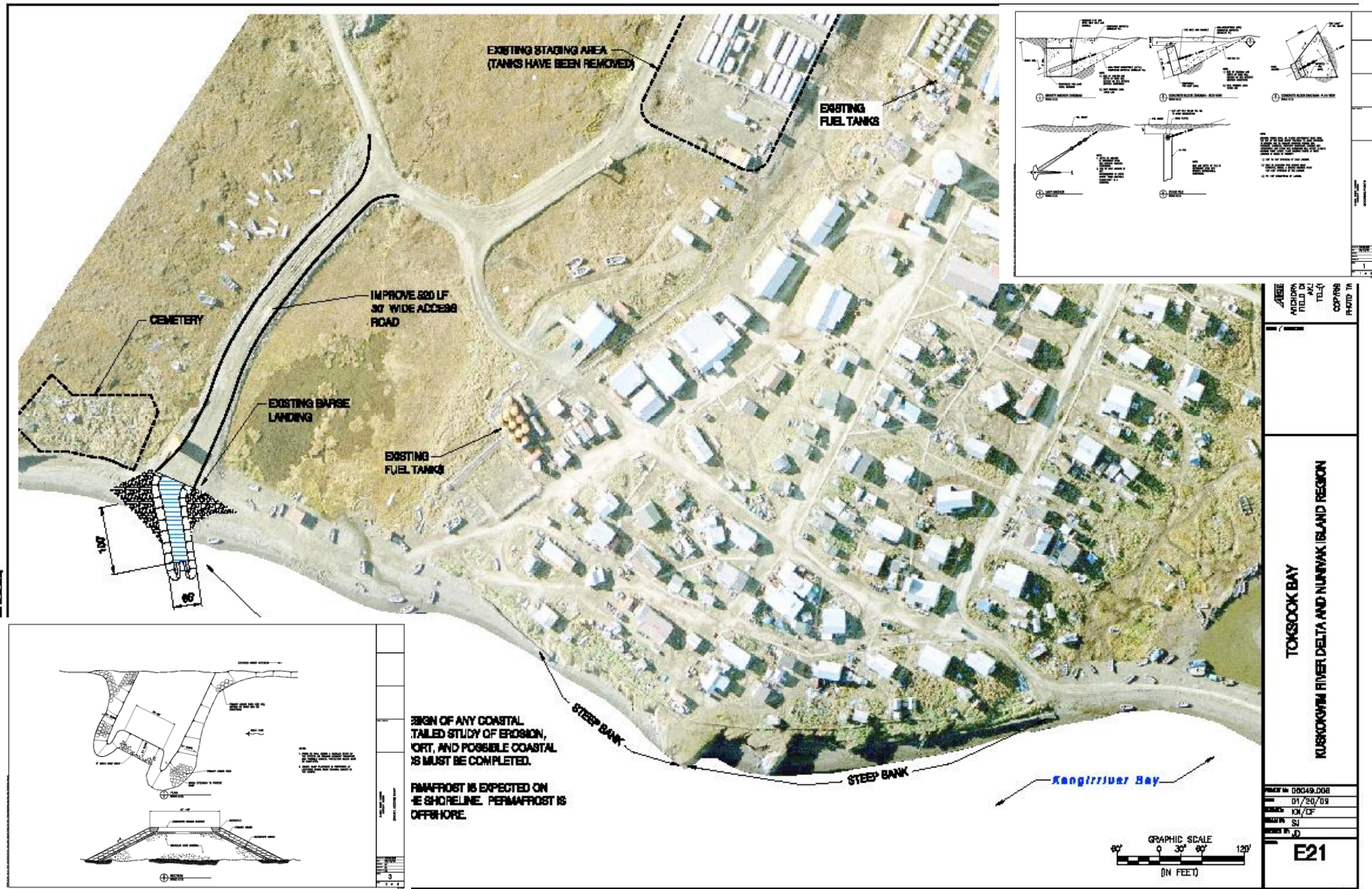
Alaska Barge Landing System Design Statewide – Phase 1

- Regional waterway approach
- Community and industry input for design and location
- Environmental Protection aspects



	Chukchi Sea / Beaufort Sea Region		Upper Kuskokwim Region
	Kotzebue Sound Region		Middle Kuskokwim Region
	Kobuk River Region		Kuskokwim River Delta & Nunivak Island Region
	Upper Yukon River Region		Lower Kuskokwim Region
	Norton Sound / Bering Sea Region		Bristol Bay Region
	Middle Yukon River Region		Cook Inlet Region
	Lower Yukon River and Delta Region		Aleutians Region

Community Input & Design



M/V Susitna Ice-Capable Ferry

Photos by Charley Starr, Ketchikan

Prototype
Ice breaking SWATH design
Adjustable shallow & deep
draft of 12 ft to 4 ft
Internal “Barge” deck &
landing ramp
Specialized Ice-Propulsion



Ice Navigator Training

Enhancing Marine Safety

- IMO Measures for Arctic Shipping

- Ice Navigator competence requirements in STCW
- Model ice navigation course with simulations
- Theoretical training, local knowledge and practical experience in ice conditions





The AVTEC Ship Simulator

- Running Kongsberg's Version 5.5.2 Software
- 3 Full Mission Interactive Bridge Simulators
- 42 Hydrodynamic Ship Models
- Highly accurate and detailed chart data bases covering major ports in and outside Alaska



AVTEC Ice Navigation Curriculum

- **Ice Physics**
- **Ice Classification**
- **Ice Climatology**
- **Remote Sensing**
- **Ice Forces**
- **Air and Sea Interactions with Ice**
- **Ice Piloting in Remote Polar Waters**



National Arctic Ports Strategy

- Location
 - Port and shoreside development
- Function
 - Natural resources
 - Supply and distribution hub
 - Refuge
 - Community
- Environmental Factors
 - Physical and ecological surveys
 - Traditional use and culture





AMSA 2009:

Baseline Assessment

Arctic Council Policy Document ~

Negotiated Text Approved 29 April 2009 ~

Strategic Guide

www.pame.is



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