MARINE EXCHANGE OF ALASKA

Captain Ed Page
U.S. Coast Guard Retired

PAME
Protection of the Arctic Marine Environment

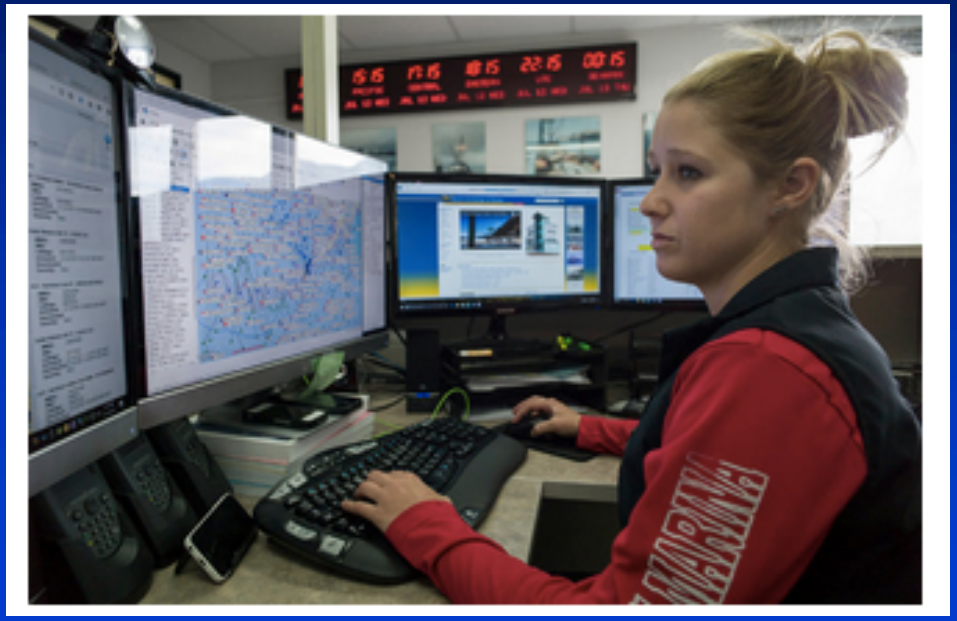
The Polar Code
Nearly Five Years On

Dissemination of Information to Enhance Prevention and Response

With More Ships in the Arctic, Fears of Disaster Rise

By HENRY FOUNTAIN JULY 23, 2017

Crystal Serenity, a 1,000-passenger luxury liner, at a stop in Ulukhaktok in Canada's Northwest Territories during a Northwest Passage cruise in August. Katie Orlinsky



The New York Times

At the Marine Exchange of Alaska in Juneau, Shelby Martin monitors ship traffic through the state's waters. *Credit Michael Penn for The New York Times*

Even relatively simple monitoring of ships can reduce the potential for disaster. Ed Page, a former Coast Guard captain, runs a private-public partnership, the Marine Exchange of Alaska, that uses a network of radio receivers to watch over ships around Alaska. Exchange operators can contact vessels that are getting too close to shore — a ship should usually be far from land, so that in the event of a mechanical problem, it has time for repairs without running aground — and have them change course.

Captain Page acknowledged that if something went disastrously wrong with a ship within the 1.5 million square miles of ocean his network covers, "it would be ugly."

"But we should stop worrying about what we're going to do when things go wrong," he said. "We should prevent things from going wrong."

HOW THE **POLAR** CODE PROTECTS THE ENVIRONMENT

OIL

DISCHARGES
Discharge into the sea of oil or oily mixtures from any ship is prohibited

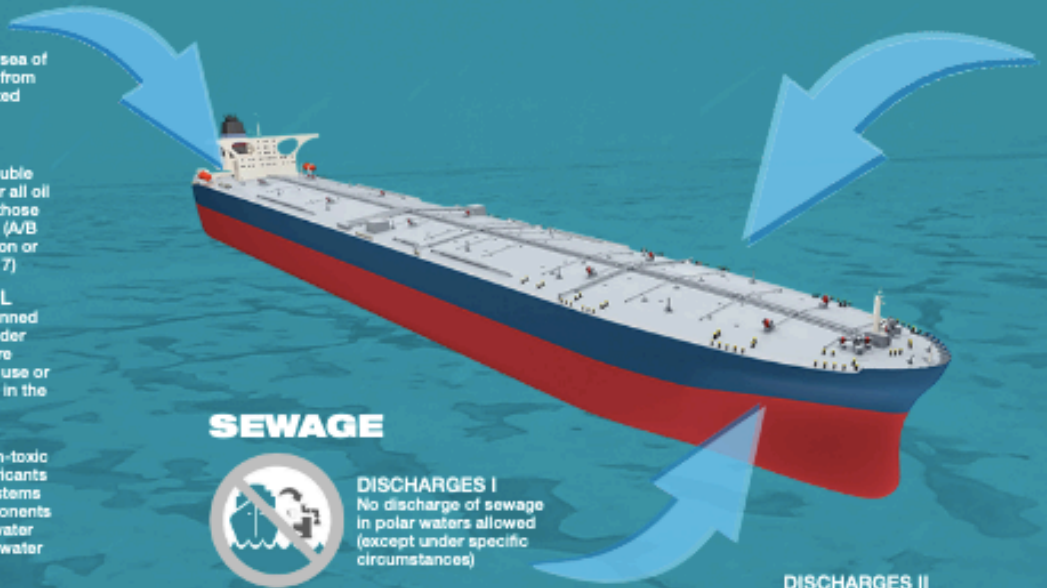
STRUCTURE
Double hull and double bottom required for all oil tankers, including those less than 5,000dwt (A/B ships constructed on or after 1 January 2017)

HEAVY FUEL OIL
Heavy fuel oil is banned in the Antarctic (under MARPOL). Ships are encouraged not to use or carry heavy fuel oil in the Arctic

LUBRICANTS
Consider using non-toxic biodegradable lubricants or water-based systems in lubricated components outside the underwater hull with direct seawater interfaces

INVASIVE SPECIES

INVASIVE AQUATIC SPECIES
Measures to be taken to minimize the risk of invasive aquatic species through ships' ballast water and biofouling



SEWAGE

DISCHARGES I
No discharge of sewage in polar waters allowed (except under specific circumstances)

TREATMENT PLANTS
Discharge is permitted if ship has an approved sewage treatment plant, and discharges treated sewage as far as practicable from the nearest land, any fast ice, ice shelf, or areas of specified ice concentration

DISCHARGES II
- Sewage not comminuted or disinfected can be discharged at a distance of more than 12nm from any ice shelf or fast ice
- Comminuted and disinfected sewage can be discharged more than 3nm from any ice shelf or fast ice

GARBAGE

PLASTICS
All disposal of plastics prohibited (under MARPOL)

FOOD WASTES I
Discharge of food wastes onto the ice is prohibited

FOOD WASTES II
Food wastes which have been comminuted or ground (no greater than 25mm) can be discharged only when ship is not less than 12nm from the nearest land, nearest ice shelf, or nearest fast ice

ANIMAL CARCASSES
Discharge of animal carcasses is prohibited

CARGO RESIDUES
Cargo residues, cleaning agents or additives in hold washing water may only be discharged if: they are not harmful to the marine environment; both departure and destination ports are within Arctic waters; and there are no adequate reception facilities at those ports. The same requirements apply to Antarctic area under MARPOL

CHEMICALS

DISCHARGES
Discharge of noxious liquid substances (NLS) or mixtures containing NLS is prohibited in polar waters

BACKGROUND INFO

- THE INTERNATIONAL CODE FOR SHIPS OPERATING IN POLAR WATERS WILL ENTER INTO FORCE ON 1 JANUARY 2017
- IT APPLIES TO SHIPS OPERATING IN ARCTIC AND ANTARCTIC WATERS: ADDITIONAL TO EXISTING MARPOL REQUIREMENTS
- IT PROVIDES FOR SAFE SHIP OPERATION AND PROTECTS THE ENVIRONMENT BY ADDRESSING THE UNIQUE RISKS PRESENT IN POLAR WATERS BUT NOT COVERED BY OTHER INSTRUMENTS

DEFINITIONS

SHIP CATEGORIES
Three categories of ship designed to operate in polar waters in:
A) at least medium first-year ice
B) at least thin first-year ice
C) open waters/ice conditions less severe than A and B

FAST ICE: Sea ice which forms and remains fast along the coast, where it is attached to the shore, to an ice wall, to an ice front, between shoals or grounded icebergs

ICE SHELF: A floating ice sheet of considerable thickness showing 2 to 50m or more above sea-level, attached to the coast

IMO INTERNATIONAL MARITIME ORGANIZATION

WHAT DOES THE POLAR CODE MEAN FOR SHIP SAFETY?

EQUIPMENT

WINDOWS ON BRIDGE
Means to clear melted ice, freezing rain, snow, mist, spray and condensation

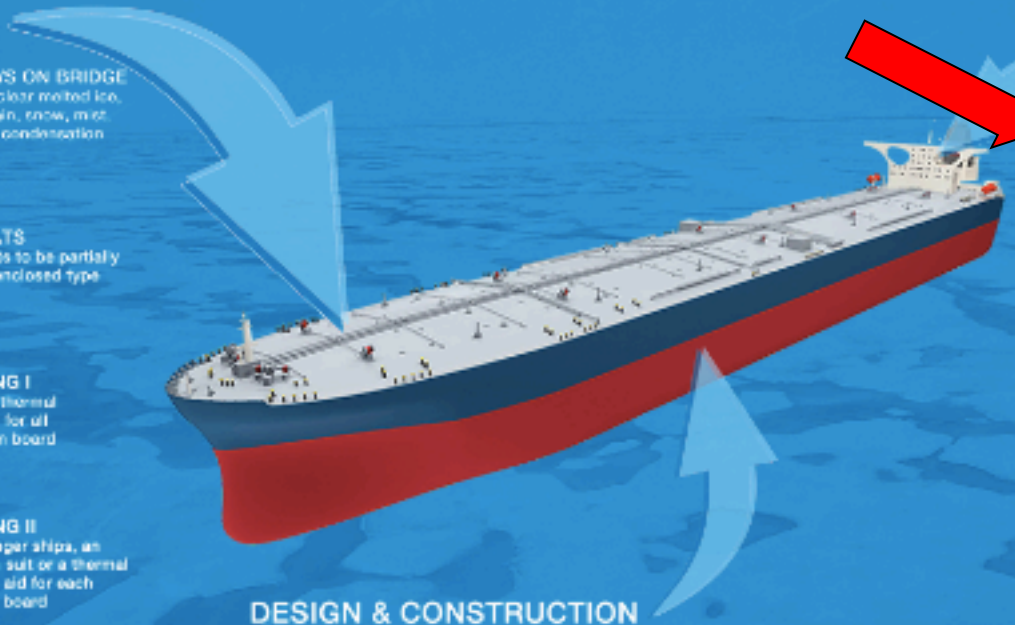
LIFEBOATS
All lifeboats to be partially or totally enclosed type

CLOTHING I
Adequate thermal protection for all persons on board

CLOTHING II
On passenger ships, an immersion suit or a thermal protective aid for each person on board

ICE REMOVAL
Special equipment for ice removal: such as electrical and pneumatic devices, special tools such as axes or wooden clubs

FIRE SAFETY
Extinguishing equipment operable in cold temperatures; protect from ice; suitable for persons wearing bulky and cumbersome cold weather gear



OPERATIONS & MANNING

NAVIGATION
Receive information about ice conditions

CERTIFICATE & MANUAL
Required to have on board a Polar Ship Certificate and the ship's Polar Water Operational Manual

TRAINING
Masters, chief mates and officers in charge of a navigational watch must have completed appropriate basic training (for open-water operations), and advanced training for other waters, including ice

DESIGN & CONSTRUCTION

SHIP CATEGORIES
Three categories of ship which may operate in Polar Waters, based on:
A) medium first-year ice
B) thin first-year ice
C) open water/ice conditions less severe than A and B

INTACT STABILITY
Sufficient stability in intact condition when subject to ice accretion and the stability calculations must take into account the icing allowance

MATERIALS
Ships intended to operate in low air temperature must be constructed with materials suitable for operation at the ships polar service temperature

STRUCTURE
In ice strengthened ships, the structure of the ship must be able to resist both global and local structural loads

BACKGROUND INFO

- THE INTERNATIONAL CODE FOR SHIPS OPERATING IN POLAR WATERS WAS ADOPTED NOVEMBER 2014 BY THE IMO MARITIME SAFETY COMMITTEE
- IT APPLIES TO SHIPS OPERATING IN ARCTIC AND ANTARCTIC WATERS
- THE AIM IS TO PROVIDE FOR SAFE SHIP OPERATION AND THE PROTECTION OF THE POLAR ENVIRONMENT BY ADDRESSING RISKS PRESENT IN POLAR WATERS AND NOT ADEQUATELY MITIGATED BY OTHER INSTRUMENTS

IMO

OPERATIONS & MANNING

NAVIGATION

Receive information about ice conditions

9.2.1 *Nautical information*

Ships shall have the ability to receive up-to-date information including ice information for safe navigation.

"Up to Date Information"
Coastal Dates Role in Receiving and Disseminating Information

CHAPTER 10 – COMMUNICATION

10.1 Goal

The goal of this chapter is to provide for effective communication for ships and survival craft during normal operation and in emergency situations.

10.2.1 *Ship communication*

10.2.1.1 Two-way voice and/or data communications ship-to-ship and ship-to-shore shall be available at all points along the intended operating routes.

CHAPTER 11 – VOYAGE PLANNING

11.1 Goal

The goal of this chapter is to ensure that the Company, master and crew are provided with sufficient information to enable operations to be conducted with due consideration to safety of ship and persons on board and, as appropriate, environmental protection.

Dynamic Information
Marine Mammal seasonal migration areas

.6 current information and measures to be taken when marine mammals are encountered relating to known areas with densities of marine mammals, including seasonal migration areas;[13]

.7 current information on relevant ships' routing systems, speed recommendations and vessel traffic services relating to known areas with densities of marine mammals, including seasonal migration areas;[14]

.8 national and international designated protected areas along the route; and

Dynamic Information

Marine Mammal seasonal migration areas

Current Communications Option – Coast Pilot

"Wainwright, on the beach 2.5 miles NE of the inlet, has stores, a hotel and restaurant, a school, a church, and an airstrip. Wainwright bans the possession, sale and importation of alcohol.Limited quantities of fuel are also available in town and include marine gasoline and diesel. Subsistence hunting of marine mammals occurs around Wainwright year round but is heaviest during the spring Bowhead whale season. Vessels should contact the Alaskan Eskimo Whaling Committee when transiting near Wainwright during the spring and summer months.Wainwright operates a volunteer search and rescue service which can be contacted on VHF-FM channel 16. Vessels are requested to check in with Wainwright SAR with their vessel name and position when transiting near Wainwright on VHF-FM channel 16."

INTERNATIONAL MARITIME ORGANIZATION

Strategy Implementation Plan (SIP) e-NAV Solutions

The IMO's 2018 e-NAV Strategy Implementation Plan calls for:

- improved, harmonized and user-friendly bridge design;
- the means for standardized and automated reporting;
- improved reliability, resilience and integrity of bridge equipment and navigation information;
- integration and presentation of available information in graphical displays received via communication equipment; and
- improved communication of VTS Service Portfolio (not limited to VTS stations).

USCG-MXAK CRADA

(Cooperative Research and Development Agreement)

"Arctic Next Generation Navigational Safety Information System"

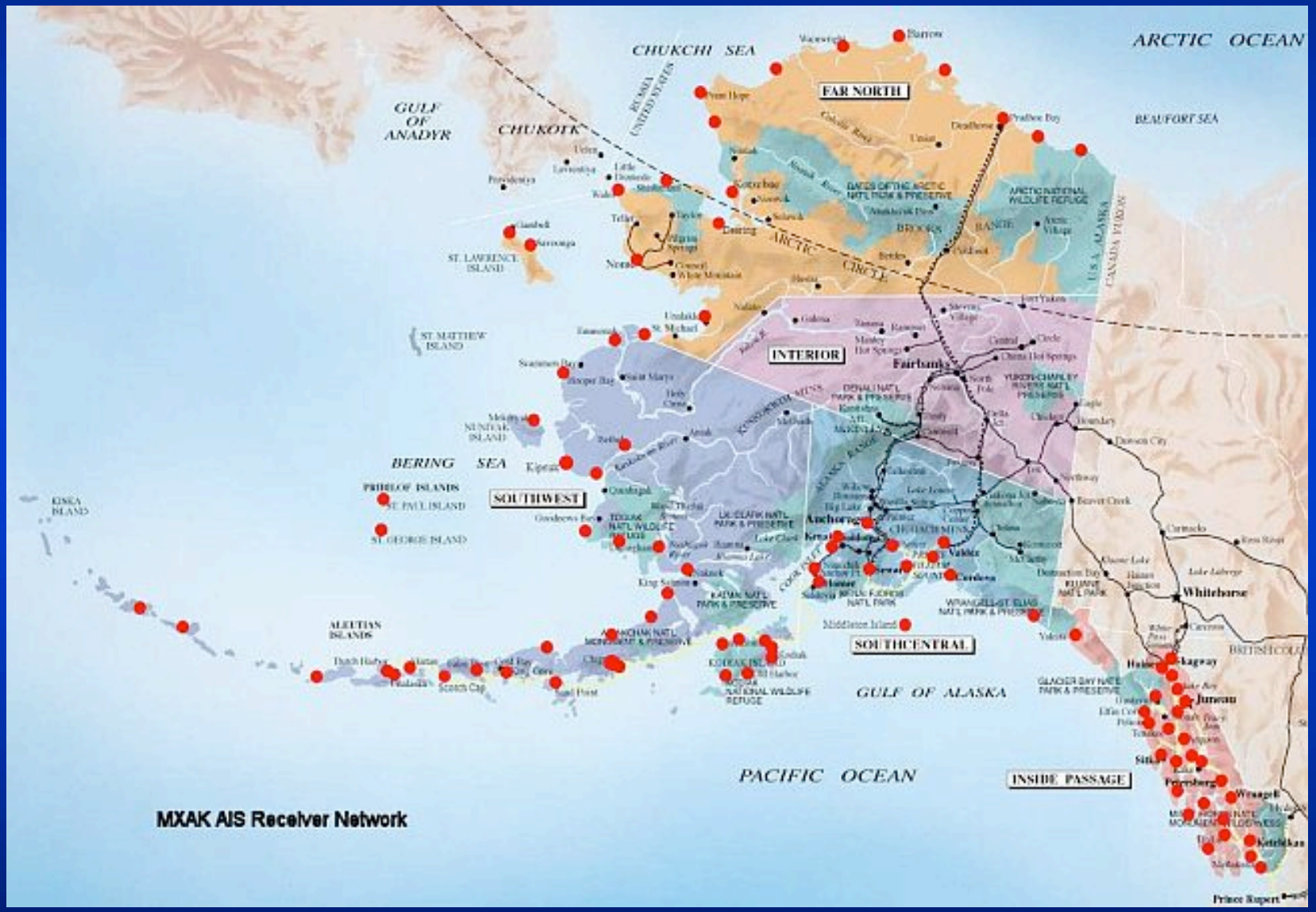
AIS transmission tests conducted with Coast Guard cutter Healy

Arctic Next Generation Navigational Safety Information System

Builds upon AOOS AIS/WX project to communicate information to vessels via AIS;

- Virtual aids to Navigation (i.e. buoys)
- Locations of whalers
- Environmental Data (i.e. weather and ice)
- Locations of whales
- Vessels in distress, etc.
- Notify vessels in “Areas to be Avoided” or exceeding speed restrictions

Alaska AIS Network



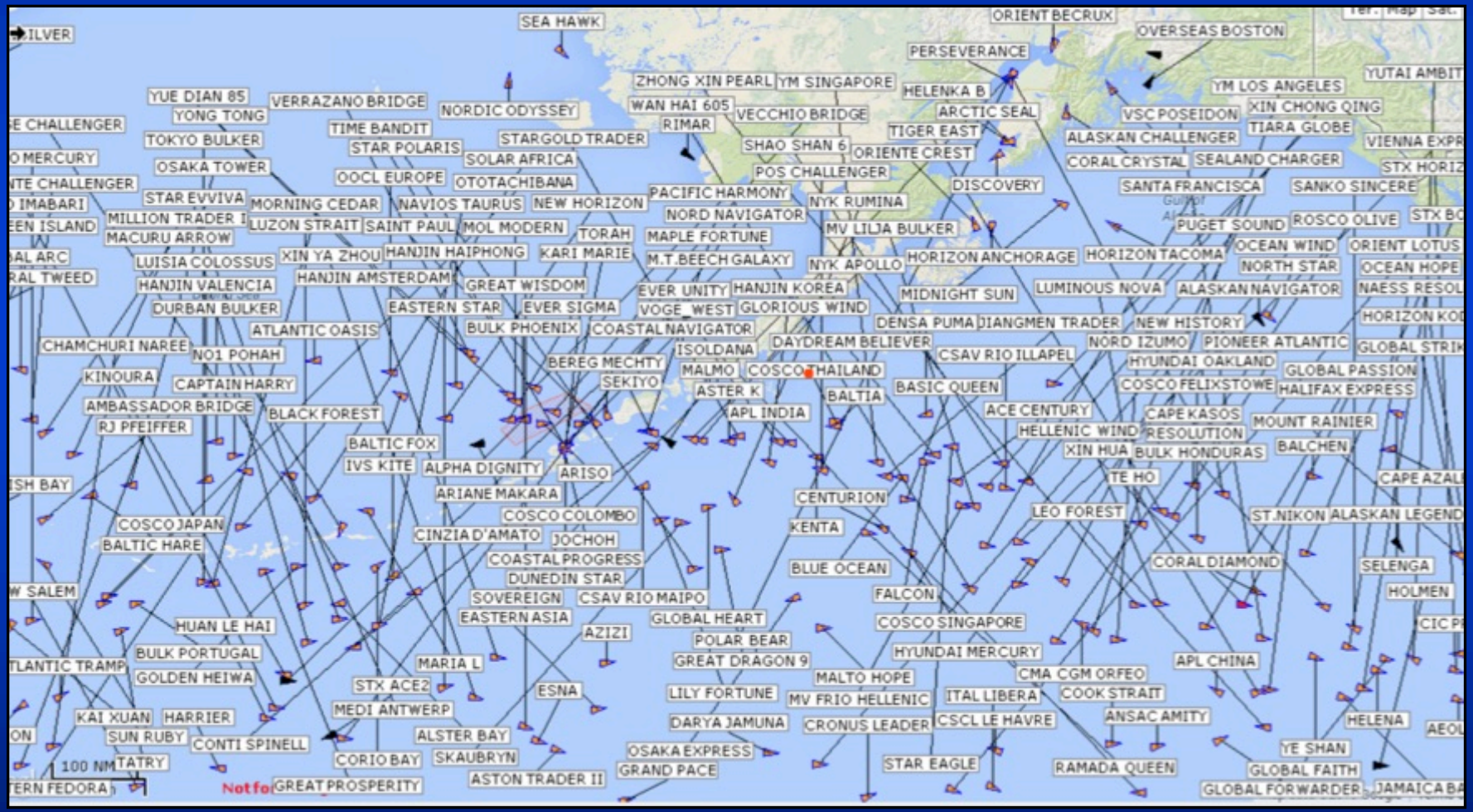
Marine Exchange of Alaska

24 Hour Operations Center

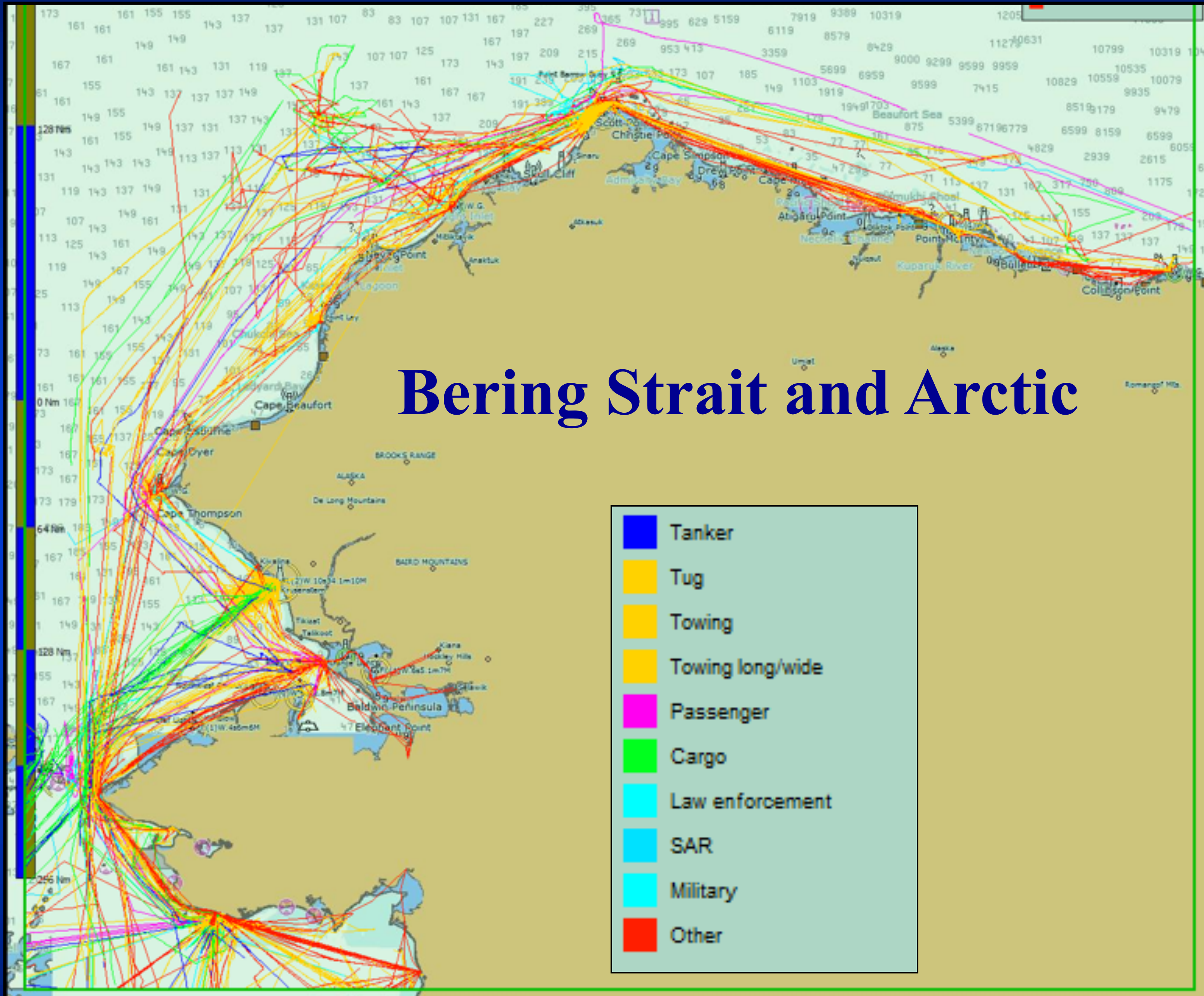
1.5 Million Square Miles

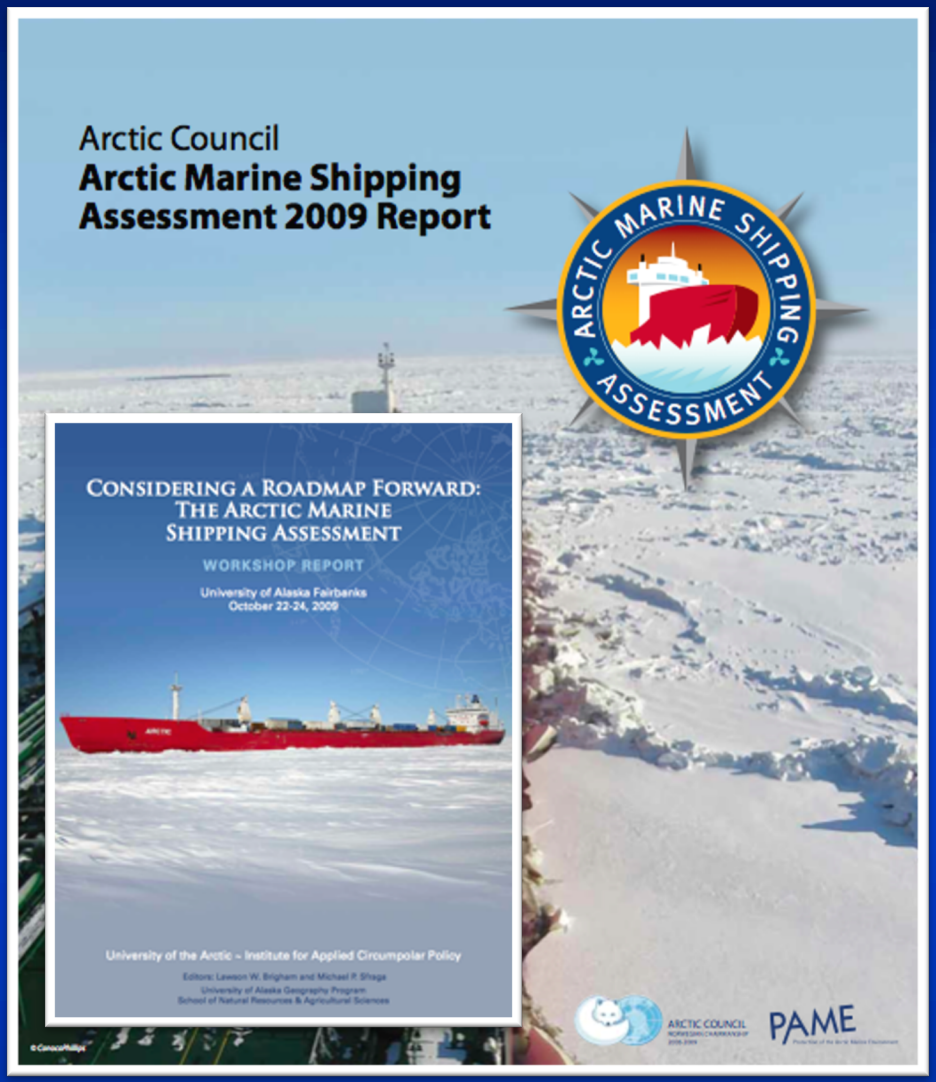
Alaska Vessel Traffic

Currently Monitoring and Managing Maritime Traffic in a region encompassing 1.5 Million Square Miles



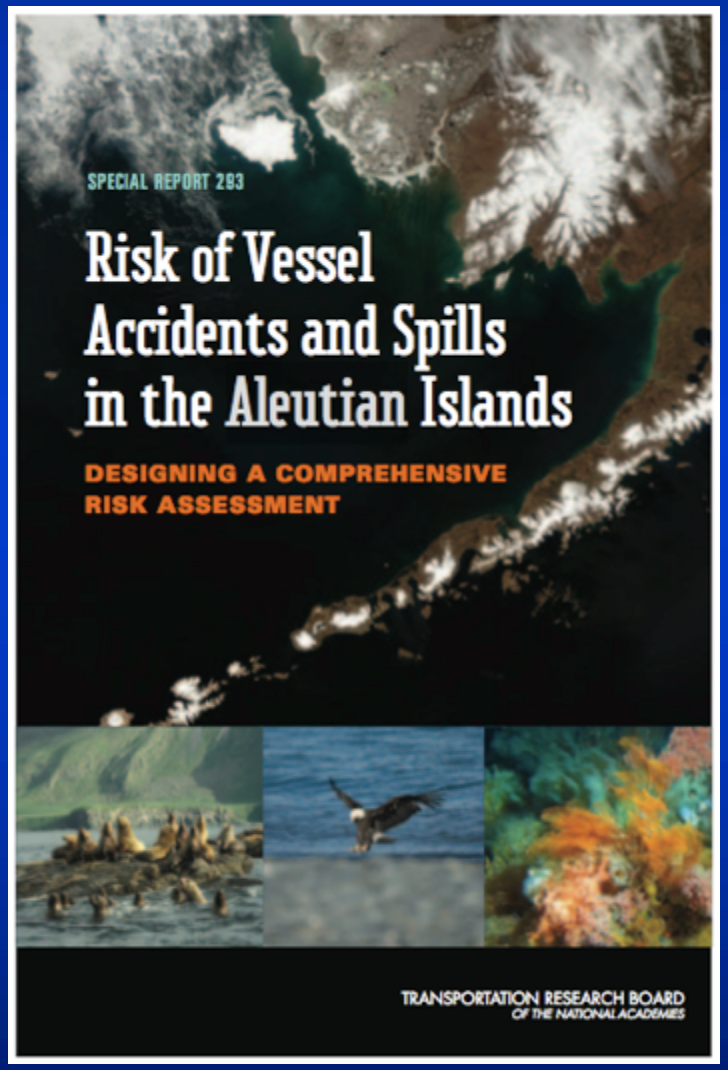
Bering Strait and Arctic





"Completion of an AIS receiver network in the Arctic is high priority; linkages between AIS and marine mammal awareness need to be developed."

"… take appropriate action to expand the AIS tracking network …"



- Commercial ships voyaging and operating in remote polar waters place a premium on ship monitoring and tracking. Sharing Arctic marine traffic data among the flag and port states may require a new binding agreement among the Arctic states. This information could provide new data on the effectiveness of the IMO Polar Code and how the marine industry is adjusting to these new rules and regulations.

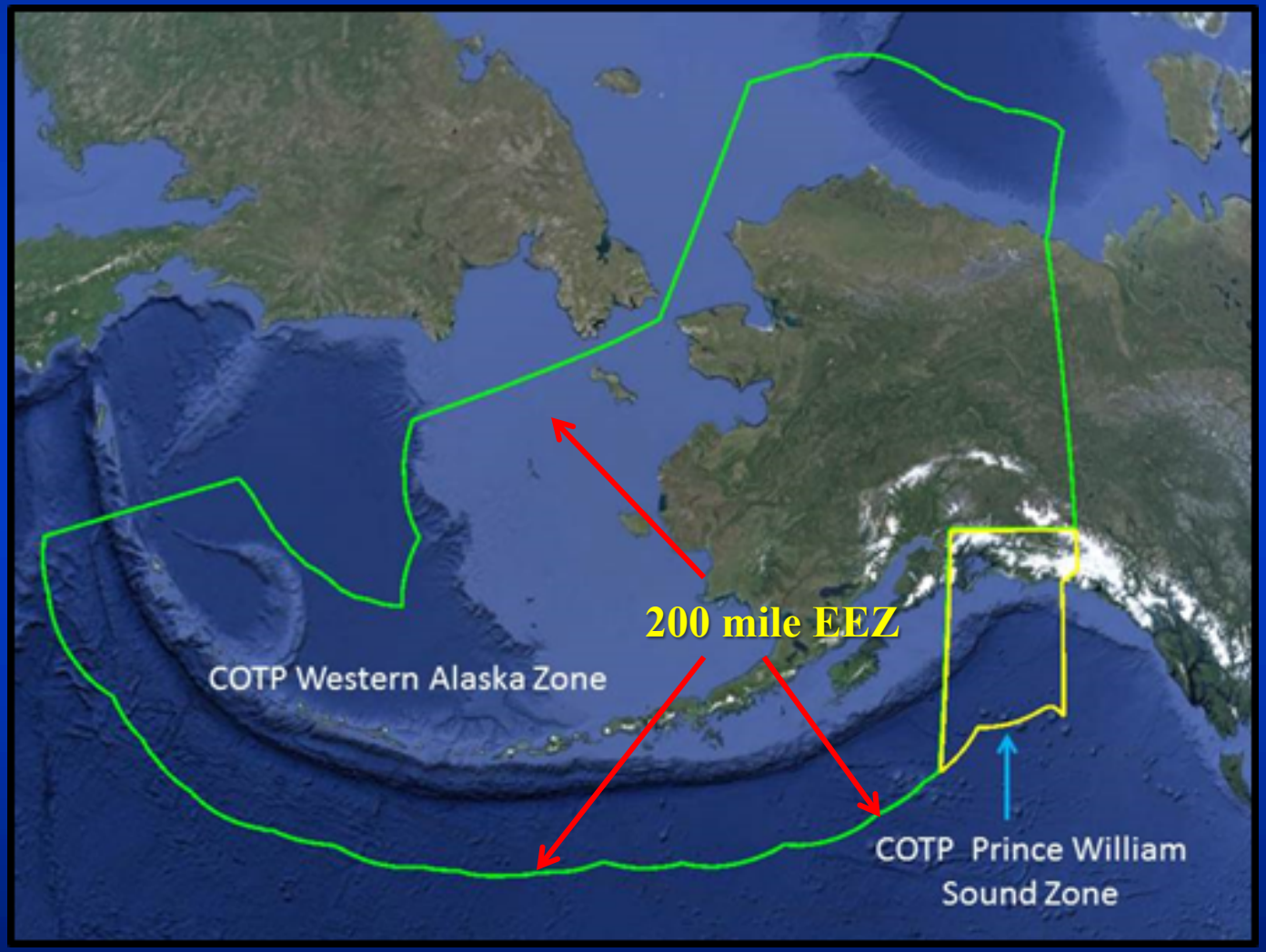
The Polar Code is intended to cover the full range of shipping-related matters relevant to navigation in waters surrounding the two poles – ship design, construction and equipment; operational and training concerns; search and rescue; and, equally important, the protection of the unique environment and eco-systems of the polar regions.

related to the future protection of Arctic people, especially those in Arctic coastal communities and their traditional lifestyles. The IMO is

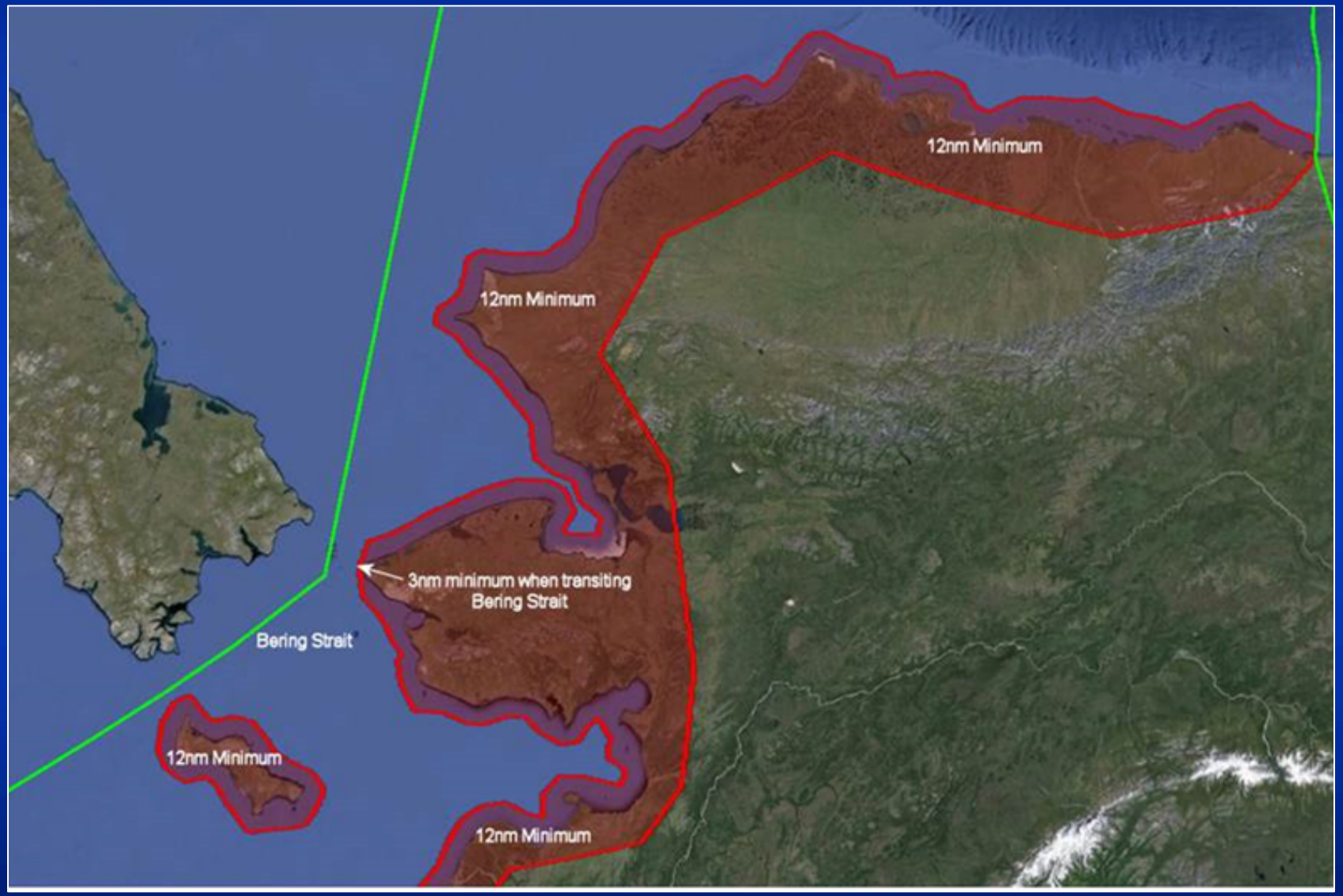
Arctic Maritime Safety Net Project

Vessel Compliance Monitoring and Response System

1.5 Million Square Miles



Risk Mitigating Distances Offshore



Vessels Enrolled in Alaska System

Annually

4,500 Different Vessels 10,000 Transits

Standards of Care – Communnications

-----Original Message-----
From: SANTA EMILIA [mailto:santa_emilia_120601@mot.amosconnect.com]
Sent: Monday, October 12, 2015 4:56 AM
To: Network APC Monitoring Center
Cc: wakdeviation@ak-mprn.org; mitsubishi@mot-tky.co.jp; MOT Mr. NUALDA; WNI; OpsPMX; DBC
Subject: SANTA EMILIA: APC Operating Procedure Deviation

To: Network APC Monitoring Center
Fm: Master of SANTA EMILIA
Dt: 12 October 2015
Ref:STEL-EM-15-10-043

Good Evening,

Message well recieved and noted. Presently we have deviated our course to comply with 50NM from nearest land.

1) Confirm reason for deviation (e.g. weather avoidance, etc.)
Weather Avoidance
2) Provide Sea Height, Wind Speed and Direction for both your original and deviation routes:
Original Route
Wind: NW / Force 7
Sea Height: 4.5m.
Deviation Route
Wind: NW / Force 5
Sea Height: 4.0m.
3) Closest intended distance from shore during this deviation.
60NM
4) Geographic reference or position of closest point to shore/ETA
Attu Island 60NM Off / 2230UTC 14th Oct. 2015
5) Last Port of Call/Next Port of Call/ETA
Long Beach, USA / Fangcheng, China / 1500UTC 27th Oct. 2015
6) Type and amount of cargo onboard (bbls):
Sulfur in Bulk : 59,919.766mt.
7) Type(s) and amount(s) of fuel oil and lubes aboard (bbls)
IFO:671.57mt. / MDO: 5.493mt. / LSMGO: 106.20mt. / LO:14,500Ltrs.
8) Confirm vessel is not experiencing any engineering difficulties and is fully operational: All Equipments are in good operational condition.
9) Confirm updated charts of area onboard:
Yes updated and corrected on latest weekly corrections.

Tks/Brgds
****
Capt. Nestor G. Gaviola
MASTER of SANTA EMILIA
E-mail : santa_emilia_120601@mot.amosconnect.com
Tel : 870-773155830 / Fax : 870-783255076 *Urgent case, Pls use Inm-C : 435422711
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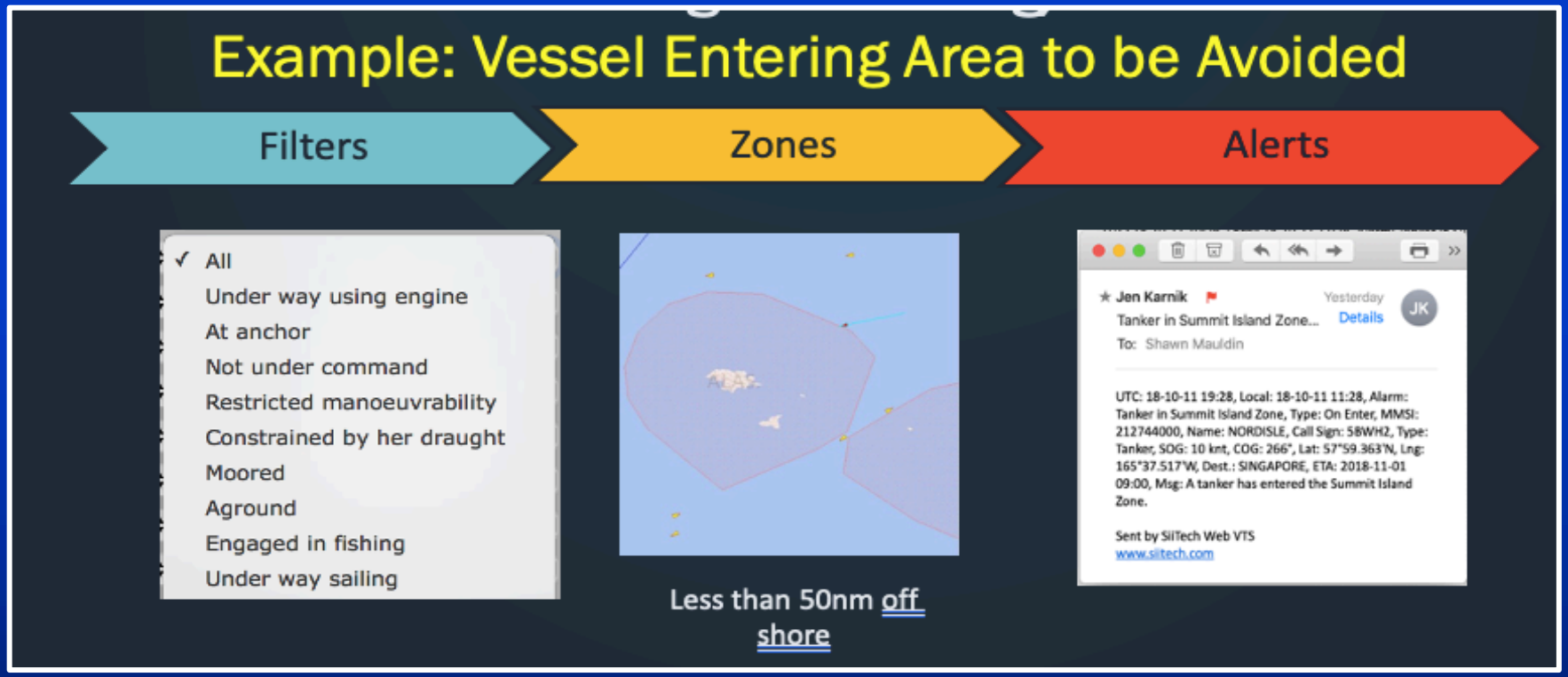
Automated Arctic Vessel Monitoring

AIS Geofencing – Watchdogs

ATBAs (Areas To Be Avoided)



Automated Arctic Vessel Monitoring

AIS Geofencing – Watchdogs

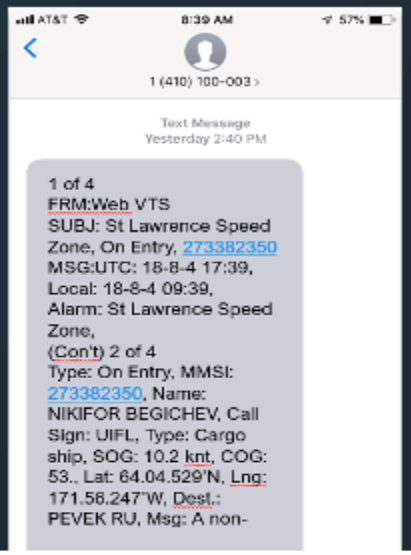
Subsistence Fishing

Example: Avoiding Subsistence Fishing Areas

Filters → **Zones** → **Alerts**

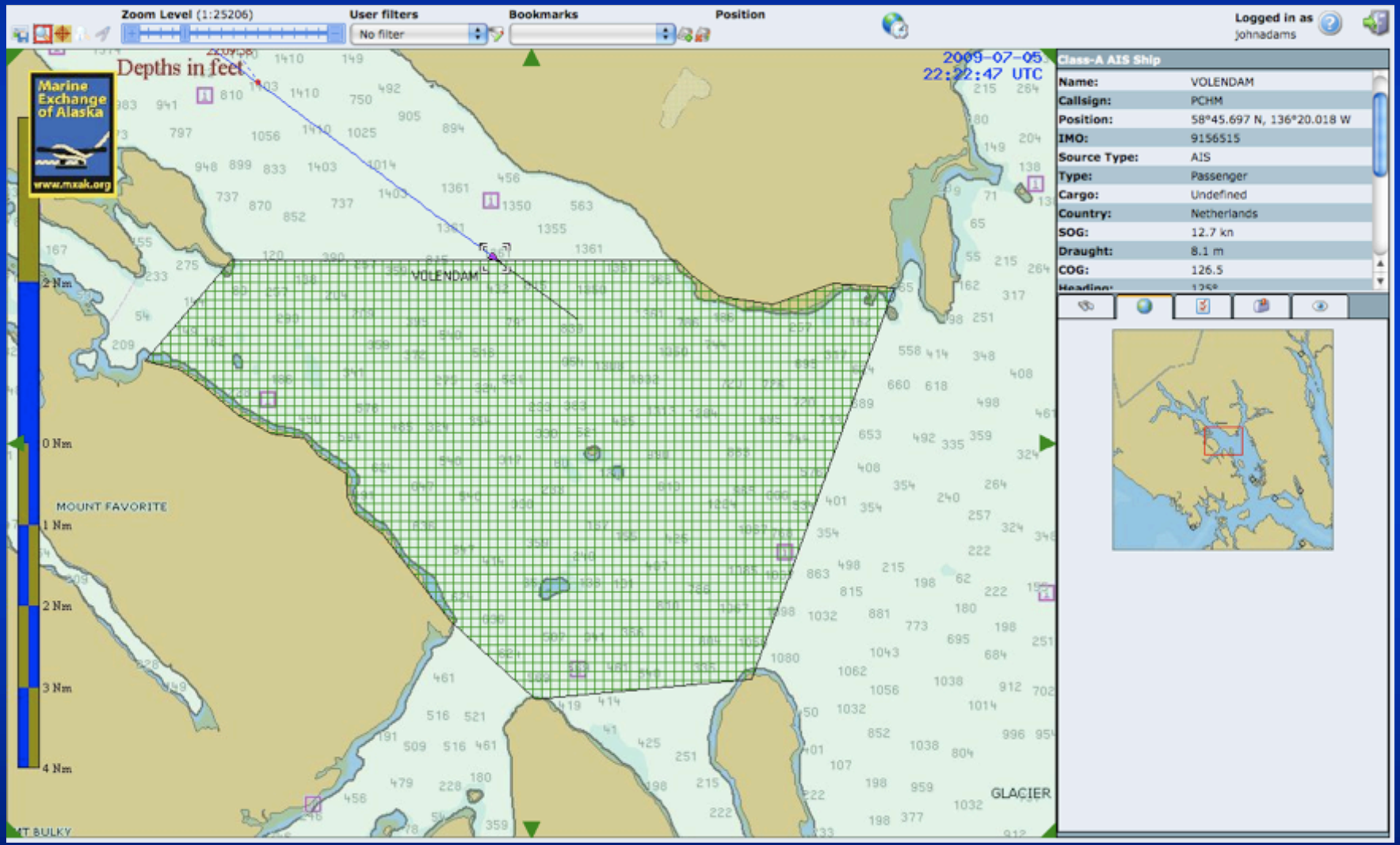
Notify local residents when vessels (excluding fishing vessels) enter the area at speeds greater than 10 kts.

An ~20 nautical mile buffer around St. Lawrence Island. The green track is a container vessel, while the blue track is a fishing vessel.

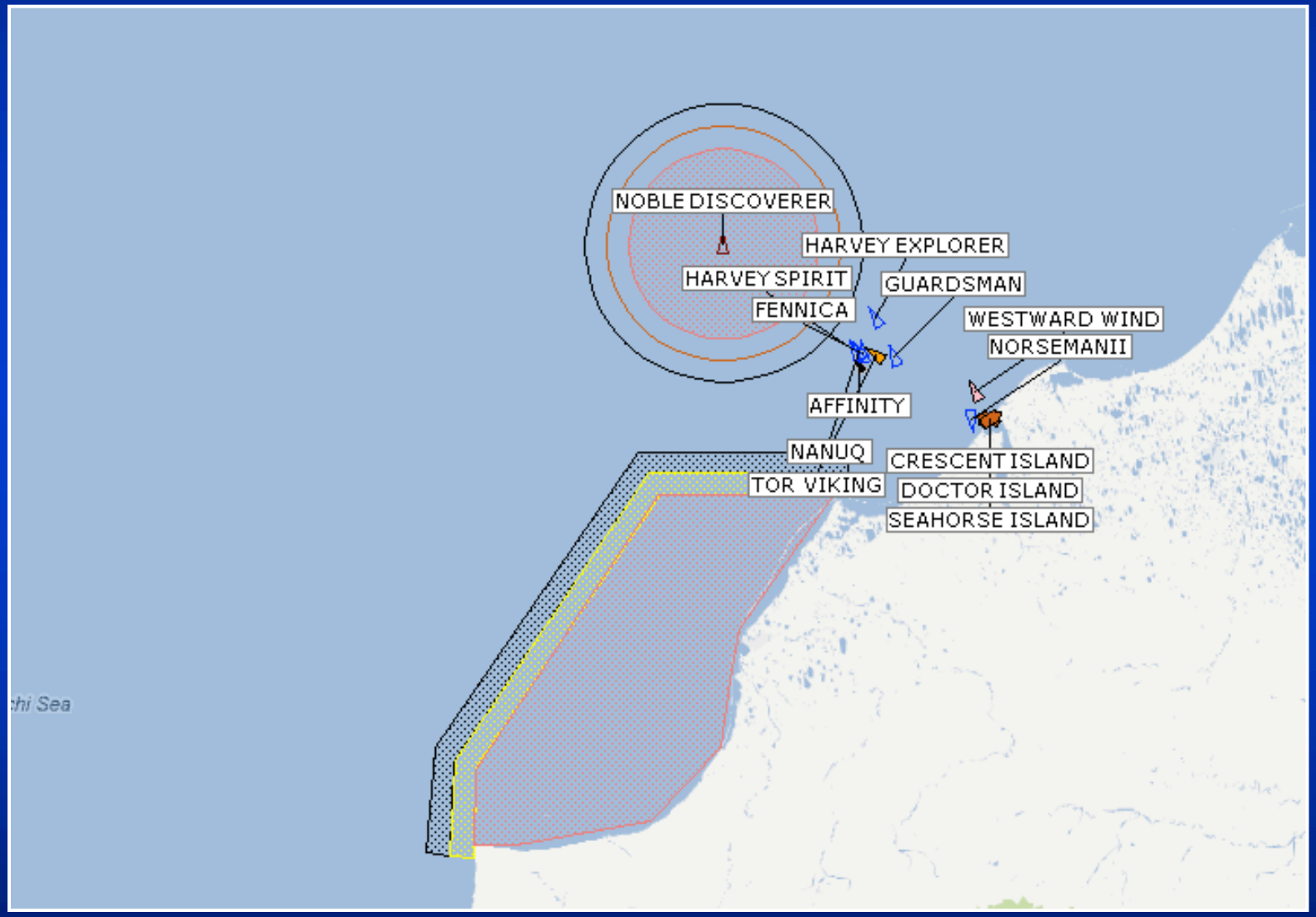


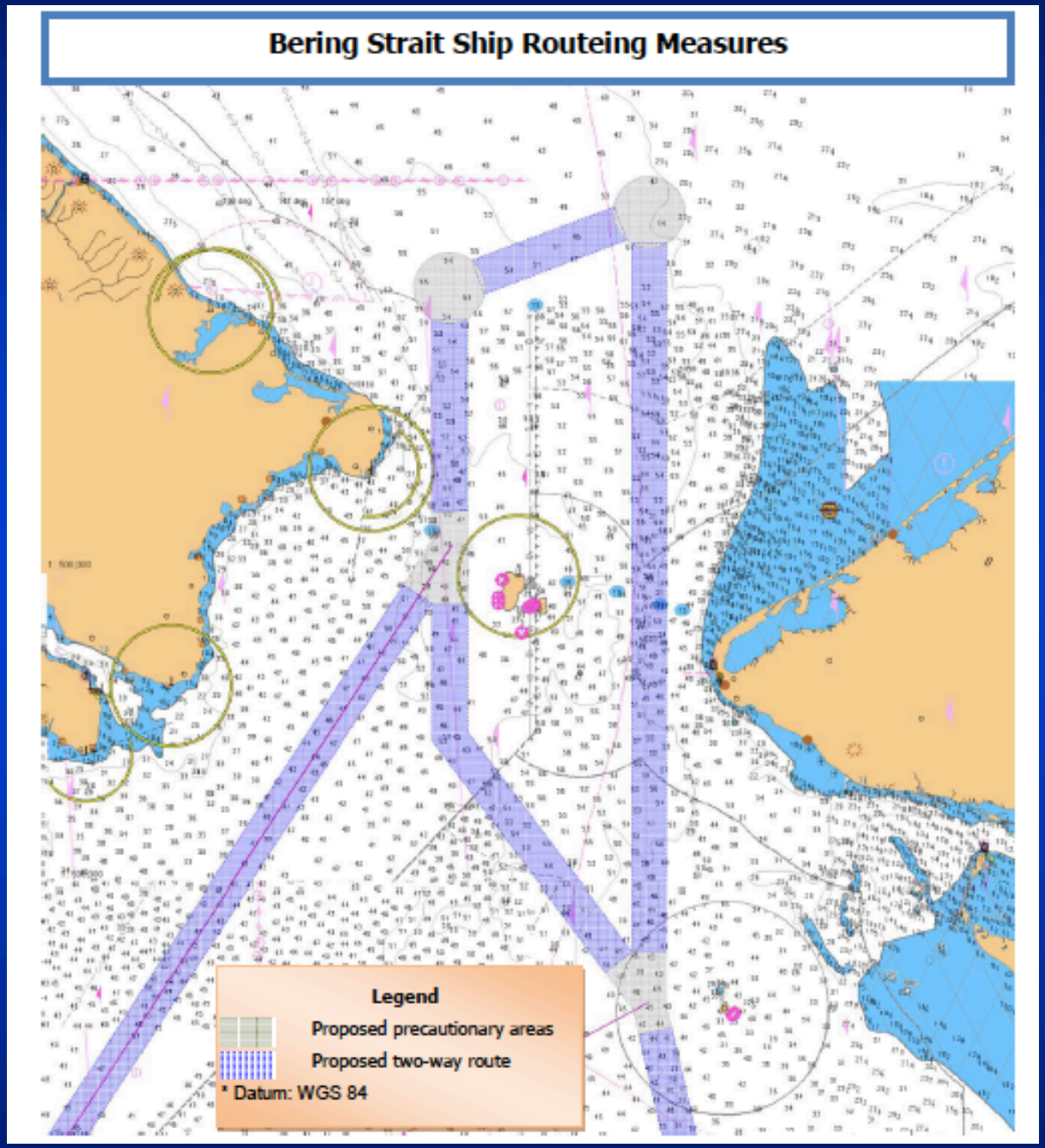
Cruise ships Transiting Whale Waters

Automatic generation of e-mail and text msg alerts



Shell Exploration Fleet Monitoring





PARS

Port Access Route Study

Action Plan

10.2.1 *Ship communication*

10.2.1.1 Two-way voice and/or data communications ship-to-ship and ship-to-shore shall be available at all points along the intended operating routes.

- Provide information to drive down the risk of marine casualties and environmental harm related to climate change
  - Dynamic ice conditions
  - Dynamic marine protected areas
  - Dynamic vessel and subsistence activities
  - Disabled vessels
  - Vessels not adhering to risk mitigating regulations or Standards of Care

CHAPTER 11 – VOYAGE PLANNING

11.1 Goal

The goal of this chapter is to ensure that the Company, master and crew are provided with sufficient information to enable operations to be conducted with due consideration to safety of ship and persons on board and, as appropriate, environmental protection.

- Maritime Information Centers Disseminate Information mariners obtained from Competent authorities
  - Real time, 24 hour monitoring & information center
  - Employ AIS and other communications tools to inform mariners: IMO eNAV initiatives
  - Employ automated alerts - Watchdogs
  - Employing Virtual and Synthetic aids to navigation vs buoys and lighthouses
  - Track locations of response resources


Information
Age
Global
Society
Revolution
Industrialization
Networking
Communications
Modern
Computer
Digital
Knowledge
Economy
Information Age
industrial
Knowledge-based
Traditional
producers
buyers
costs
Shift
shape
economic
industry
encouraged
lowering
Rapid
High-tech
daily life
New Media
Computer Age
onset
life style
Explore
evolution
marked
throughput
surrounded
influence
allow
decisions
New Media Age
formed
computerization
procedure
capitalizing
advances
activities
simplifying
overwhelmingly
personalized
accepted
individuals
efficient
associated
educational
Digital Age
characterized
participants
efficacy
operate
service
sector
new
needs
allowed
commercialized
brought
technology
human
Digital Revolution
way
convenient
period
creates
indigenously
microminiaturization
manufacturing
spans
able
throughout
history
incentives
significantly
therefore
transactions
phenomenon
just
entire