



A Changing Arctic *and the Role of Hydrographic Services in U.S. Arctic Strategy*

2010 Canadian Hydrographic Conference

Ashley Chappell

Office of Coast Survey

National Oceanic and Atmospheric Administration | NOAA

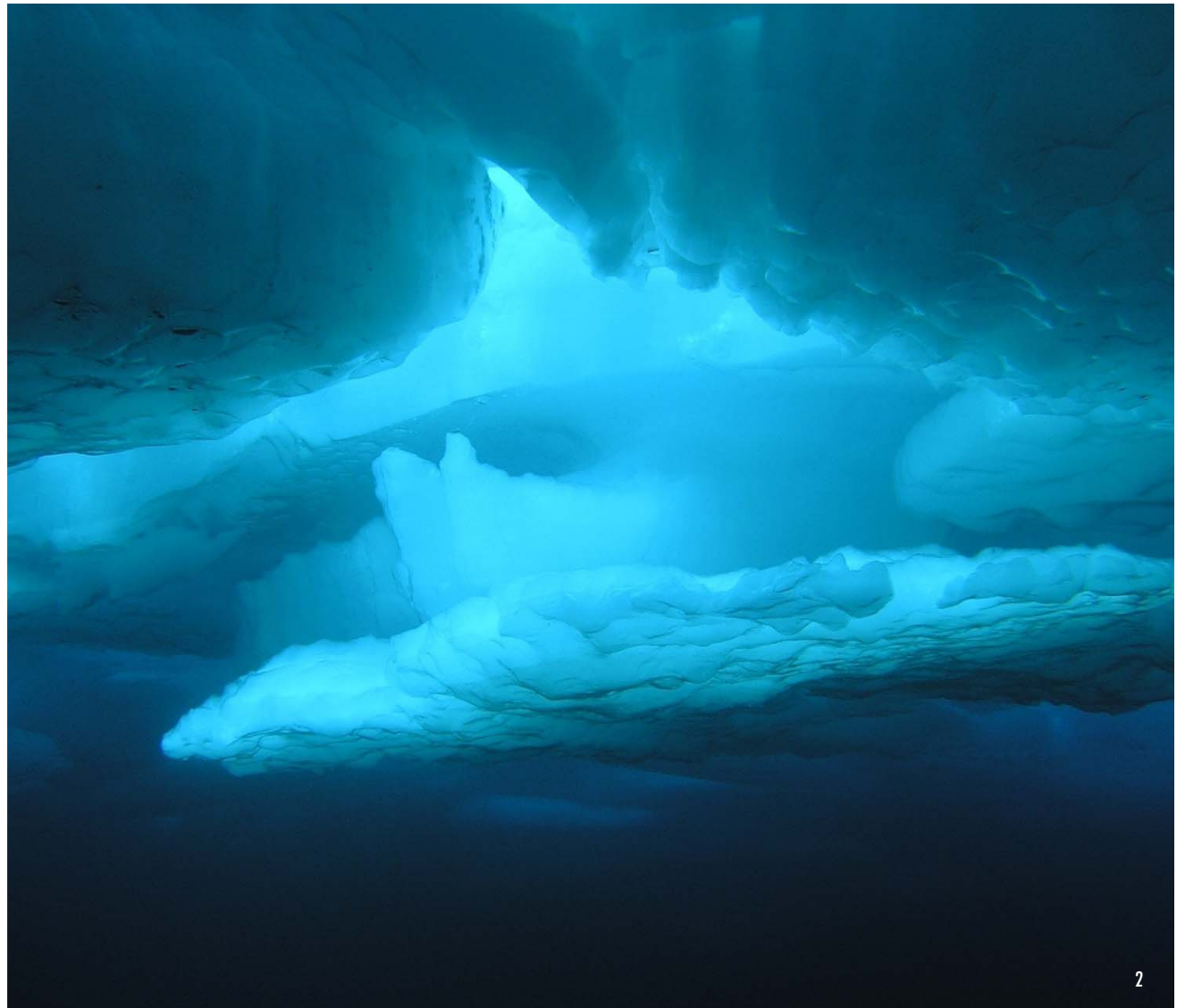
June 21, 2010



A Changing Arctic

Climate Change is impacting the Arctic...

- **Atmosphere**
- **Ocean**
- **Sea Ice**
- **Land**
- **Biology**

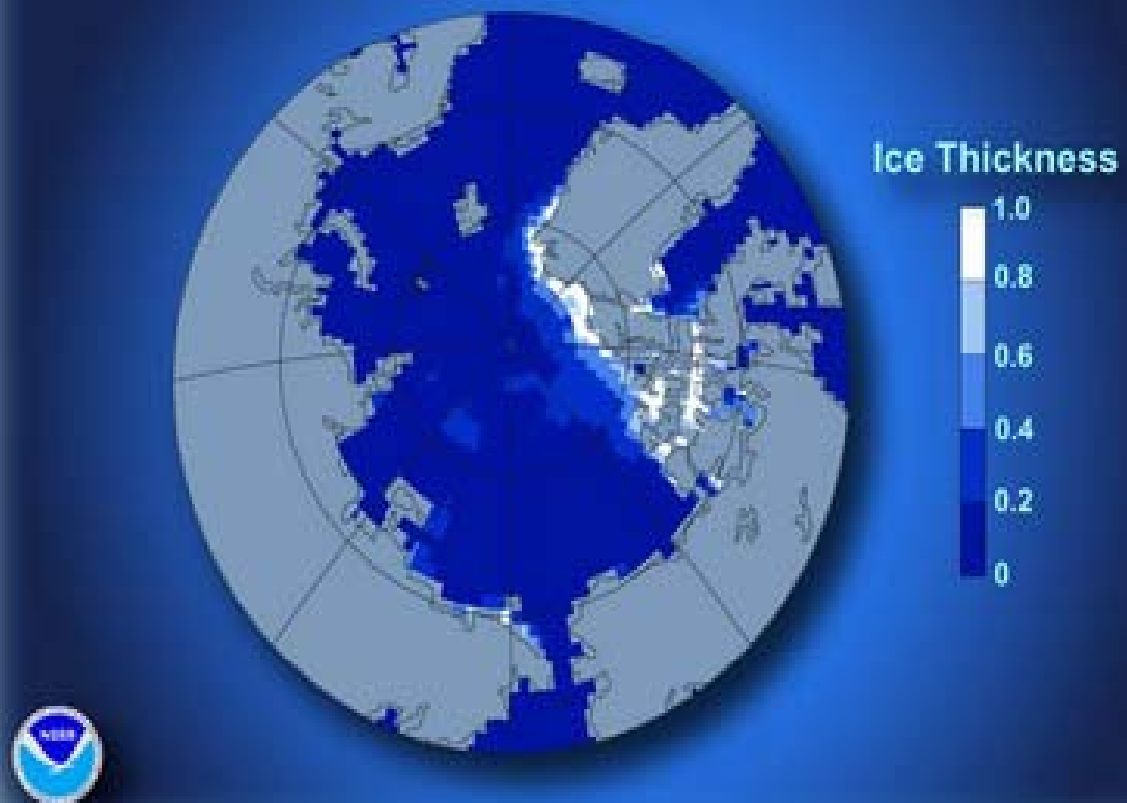


A Changing Arctic

**Changes most
evident in sea ice
extent, thickness**



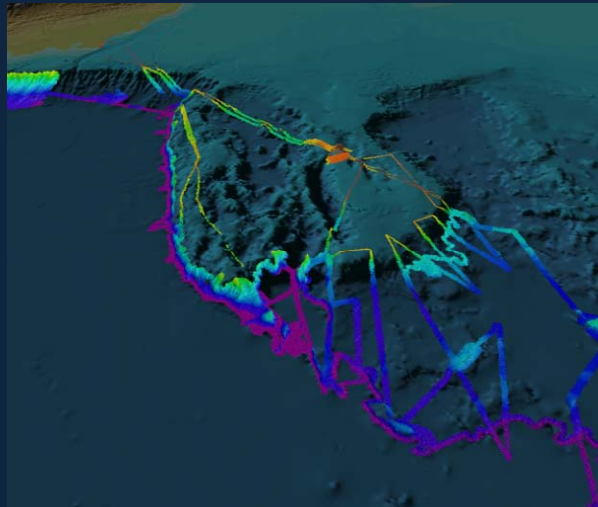
**Computer models predict that by 2035, the Arctic
could be nearly sea ice-free in summer.**



As Arctic Ice decreases...

Arctic Access Increases...

- Domestic/Int'l interest
- Law of the Sea Extended Continental Shelf
- Oil/Gas potential
- Fishing
- Shipping
- Tourism



As Arctic Ice decreases...

Concerns grow

- Maritime safety
- Homeland Security
- Search/Rescue
- Marine resource protections, regulations
- Climate adaptation
- Communities at risk



Domestic & International Policy Context

- **UNCLOS**
- **National Security Presidential Directive 66/HSPD 25**
- **North Pacific Fishery Mgmt Council Closure**
- **Arctic Marine Shipping Assessment**
- **Ocean Policy Task Force Report**
- **US Navy Arctic Roadmap**
- **US Coast Guard Arctic Strategic Plan**



Hydrographic Services underpin...



U.S. Arctic Policy: NSPD-66/HSPD-25

January 2009



- **National and Homeland Security Interests**
- **Strengthening International Governance and Arctic Nation Cooperation**
- **Extended Continental Shelf and Boundary Issues**
- **Promoting International Scientific Cooperation on Monitoring and Research**
- **Maritime Transportation**
- **Economic issues, including Energy**
- **Environmental Protection and Conservation of Natural Resources**

UNCLASSIFIED

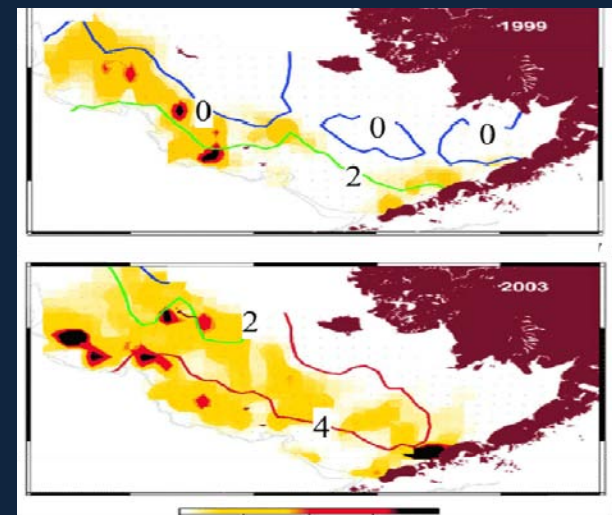
Domestic & International Policy Context

- **UNCLOS**
- **National Security Presidential Directive 66/HSPD 25**
- **North Pacific Fishery Mgmt Council Closure**
- **Arctic Marine Shipping Assessment**
- **Ocean Policy Task Force Report**
- **US Navy Arctic Roadmap**
- **US Coast Guard Arctic Strategic Plan**



Hydrographic Services underpin...

7



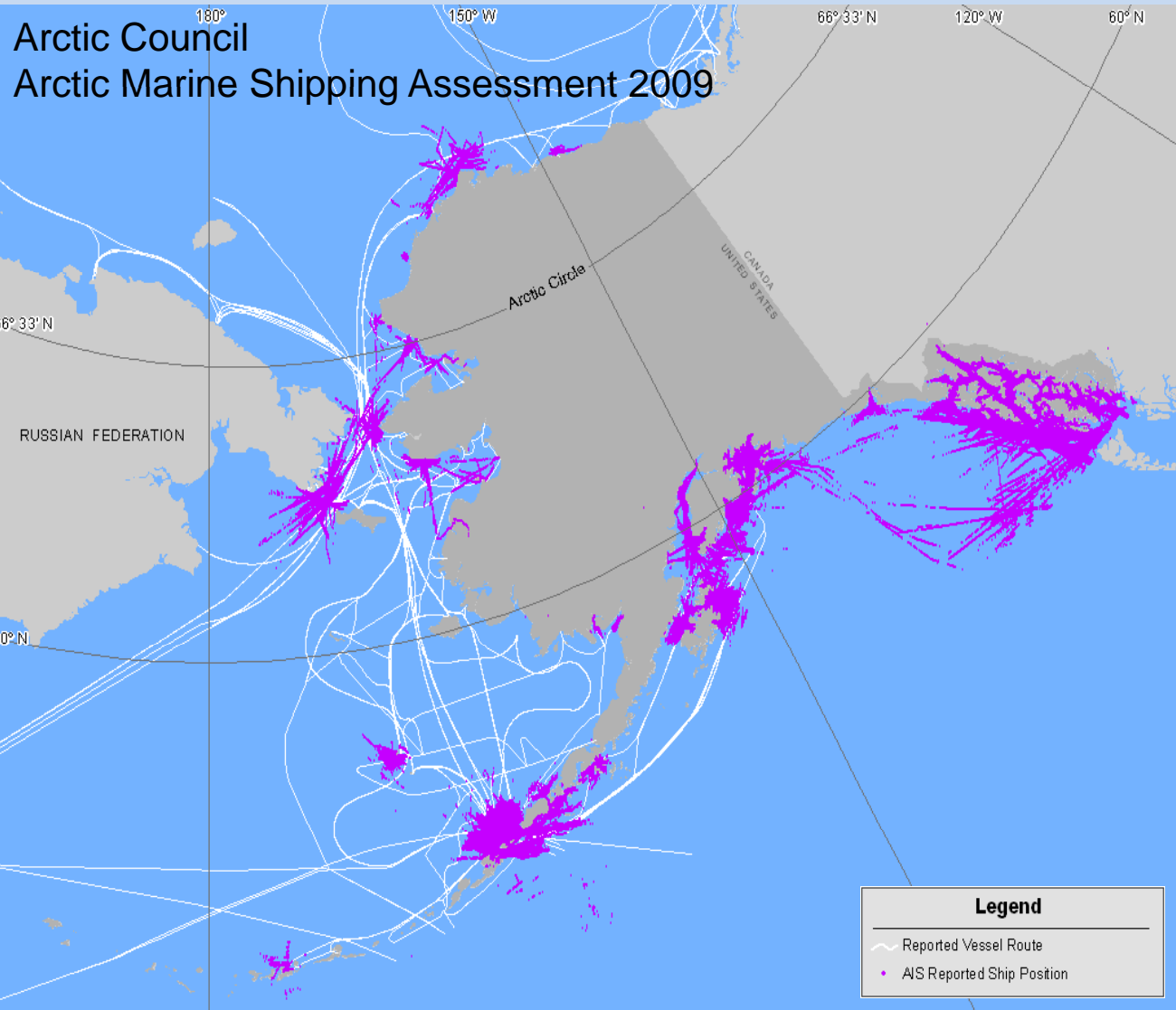
Change in Pollock distribution
1999-2003

Domestic & International Policy Context

- **UNCLOS**
- **National Security Presidential Directive 66/HSPD 25**
- **North Pacific Fishery Mgmt Council Closure**
- **Arctic Marine Shipping Assessment**
- **Ocean Policy Task Force Report**
- **US Navy Arctic Roadmap**
- **US Coast Guard Arctic Strategic Plan**



Hydrographic Services underpin...



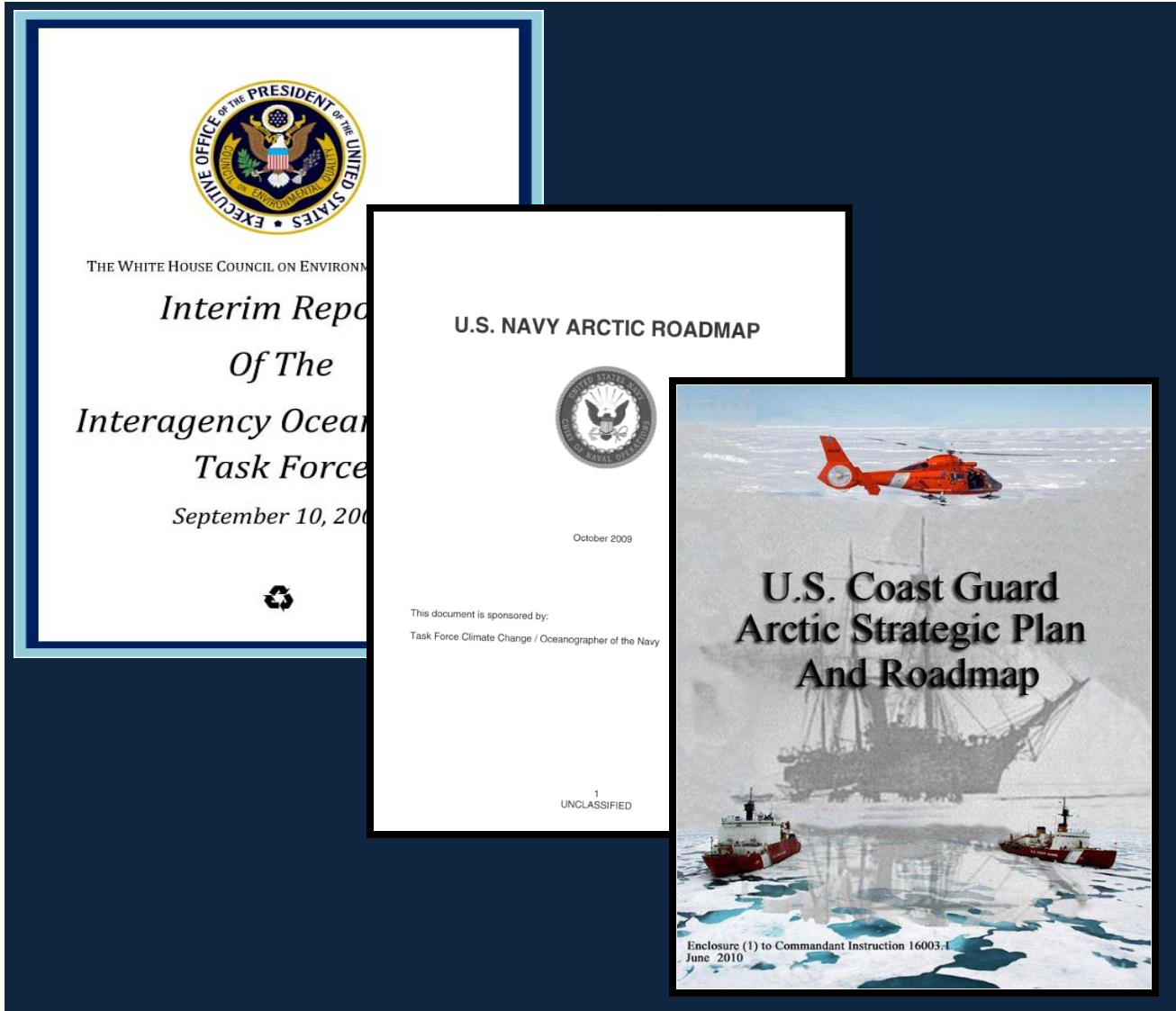
Domestic & International Policy Context

- **UNCLOS**
- **National Security Presidential Directive 66/HSPD 25**
- **North Pacific Fishery Mgmt Council Closure**
- **Arctic Marine Shipping Assessment**
- **Ocean Policy Task Force Report**
- **US Navy Arctic Roadmap**
- **US Coast Guard Arctic Strategic Plan**



Hydrographic Services underpin...

9

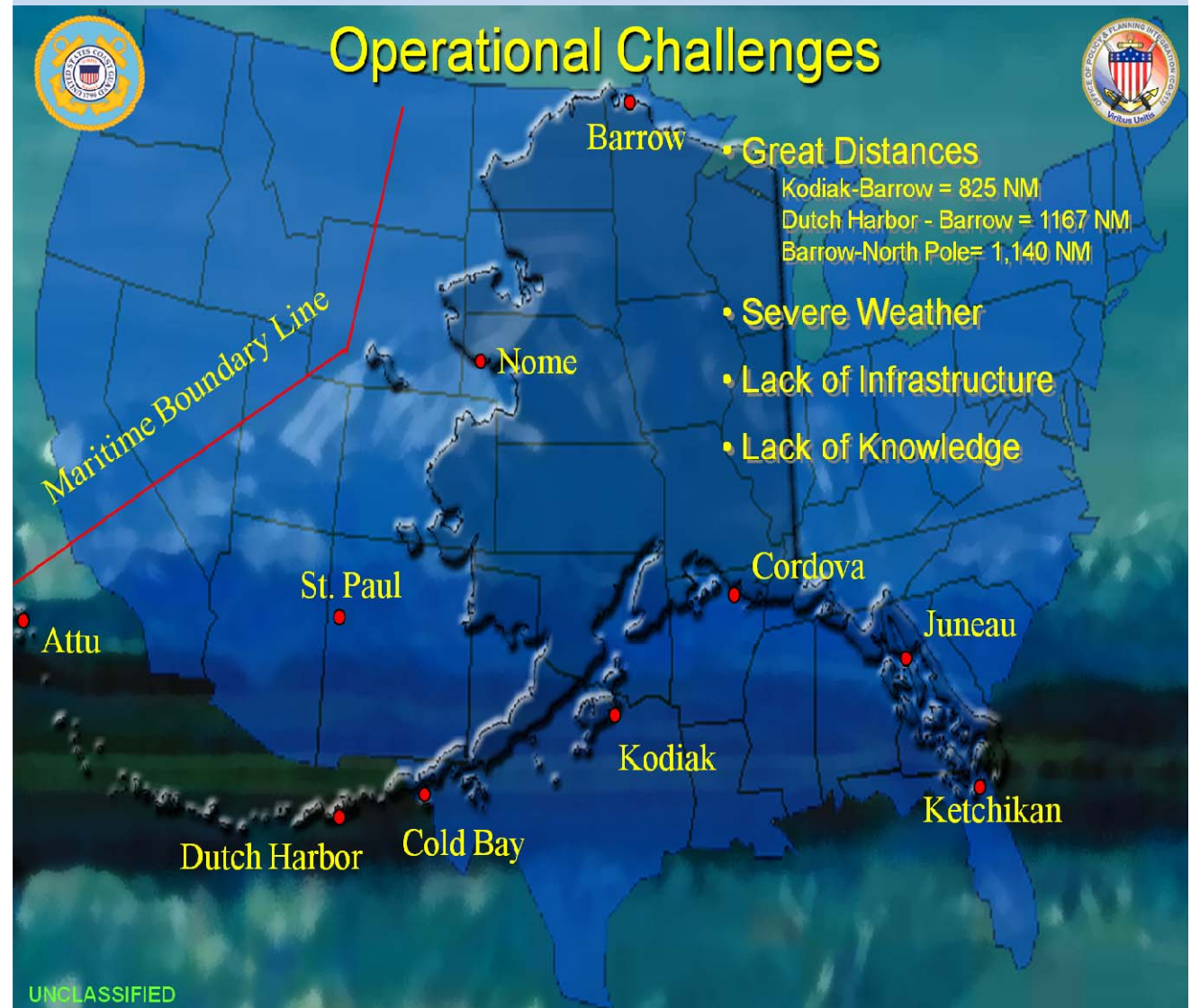


Domestic & International Policy Context

- **UNCLOS**
- **National Security Presidential Directive 66/HSPD 25**
- **North Pacific Fishery Mgmt Council Closure**
- **Arctic Marine Shipping Assessment**
- **Ocean Policy Task Force Report**
- **US Navy Arctic Roadmap**
- **US Coast Guard Arctic Strategic Plan**



Hydrographic Services underpin...

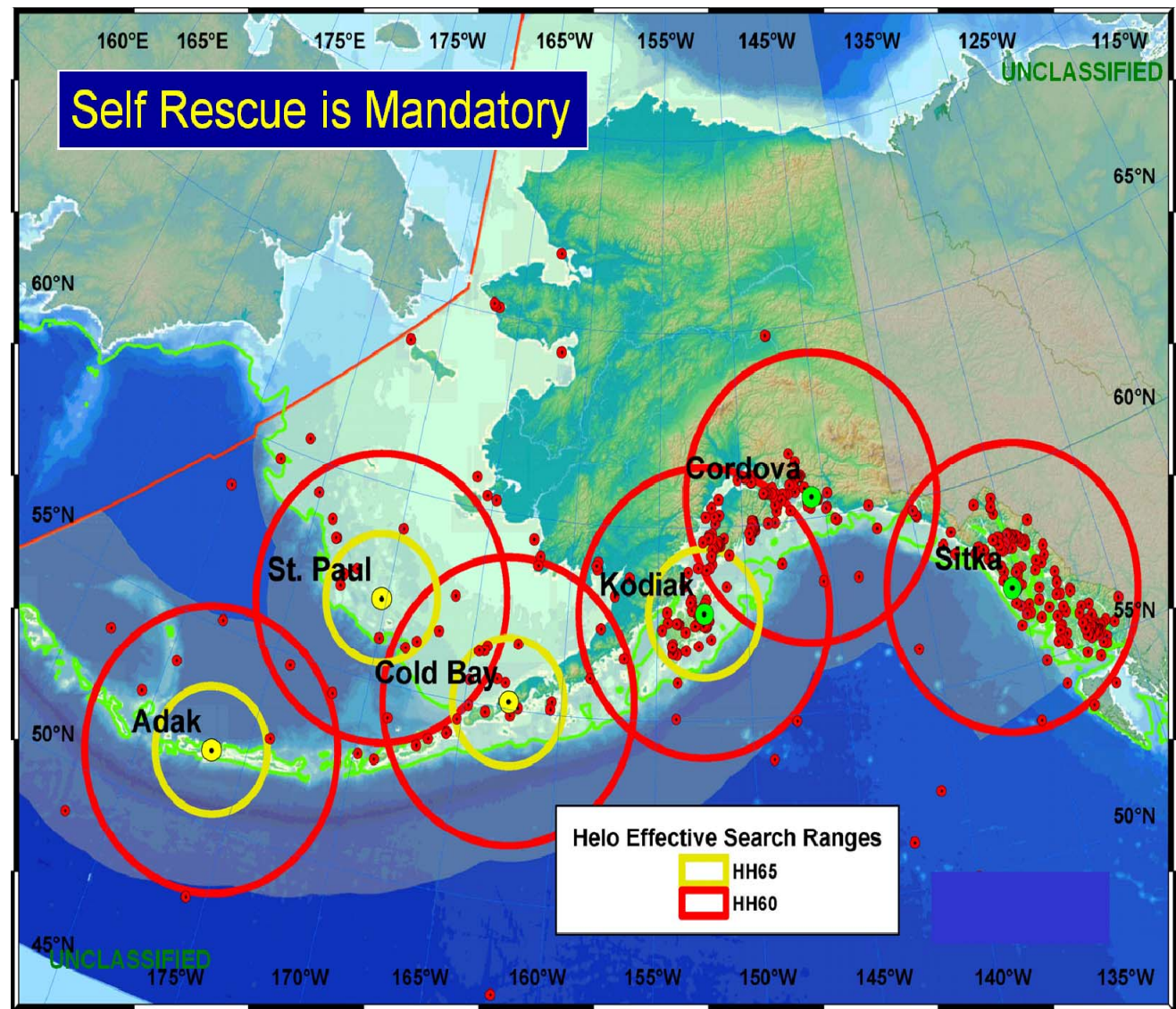


Domestic & International Policy Context

- **UNCLOS**
- **National Security Presidential Directive 66/HSPD 25**
- **North Pacific Fishery Mgmt Council Closure**
- **Arctic Marine Shipping Assessment**
- **Ocean Policy Task Force Report**
- **US Navy Arctic Roadmap**
- **US Coast Guard Arctic Strategic Plan**



Hydrographic Services underpin...

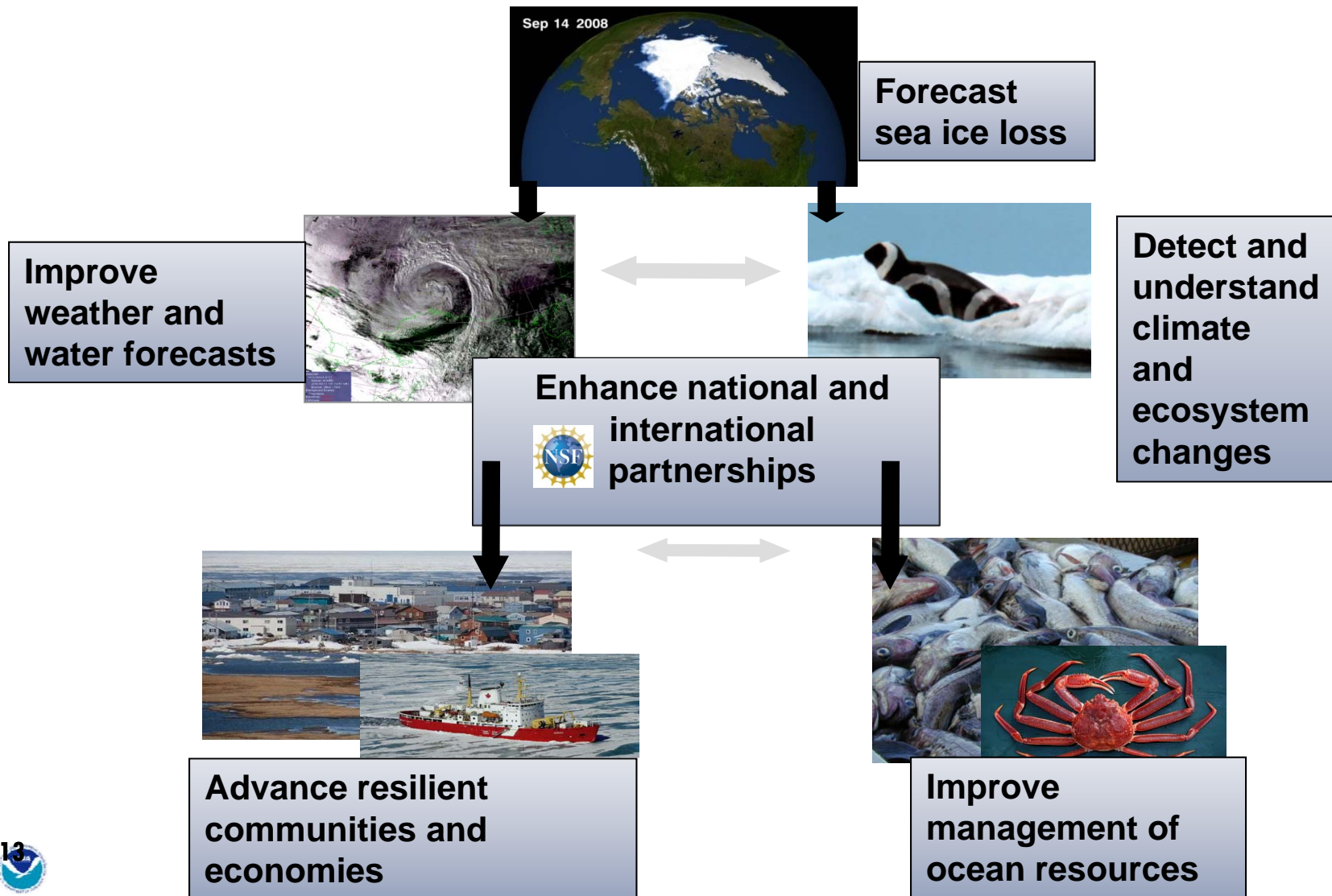


A Global Challenge

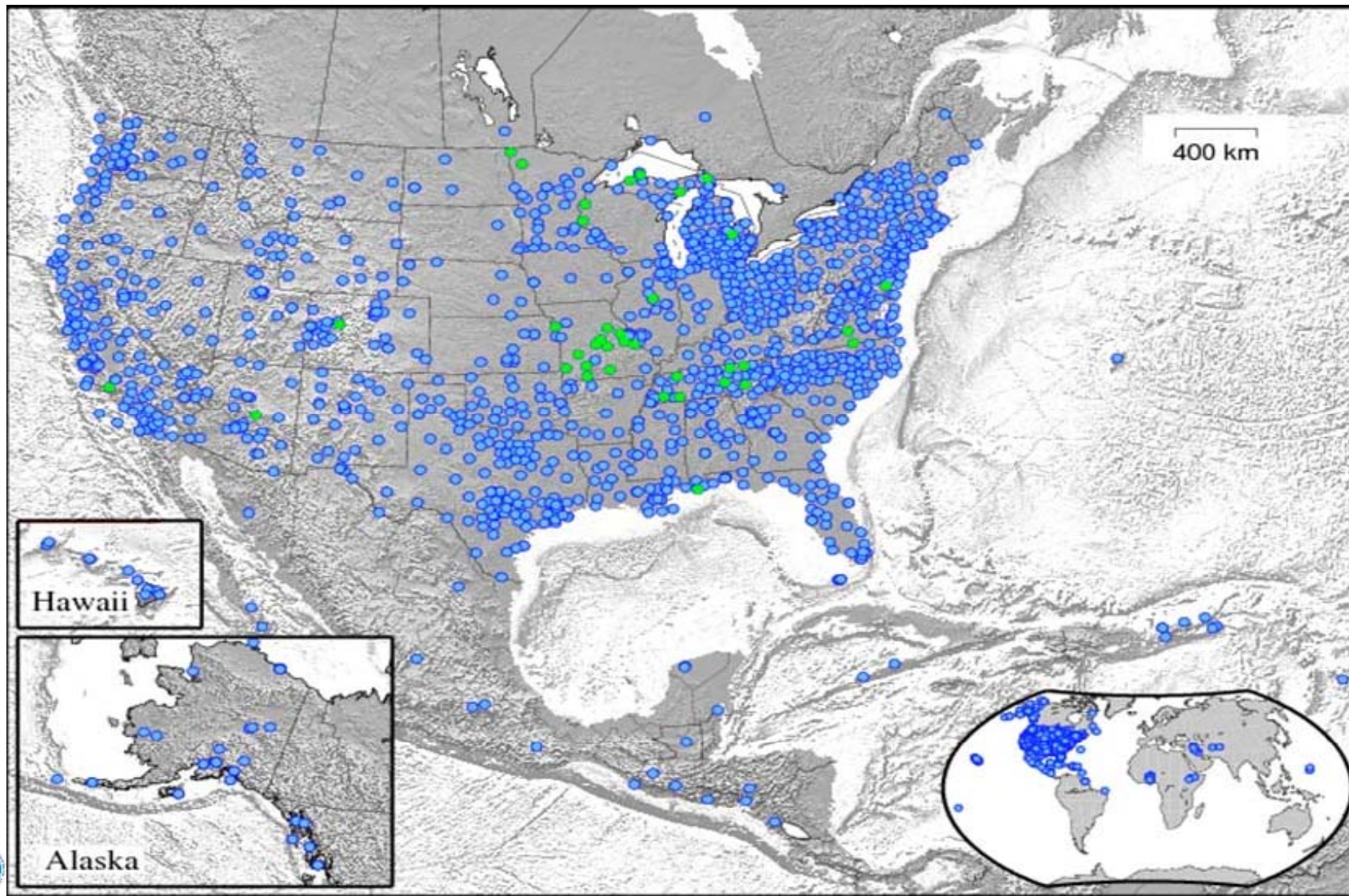
NOAA envisions an Arctic where:
Conservation, management, and use are based on sound science, and support healthy, productive, and resilient communities and ecosystems
and
The global implications of Arctic change are better understood and predicted.



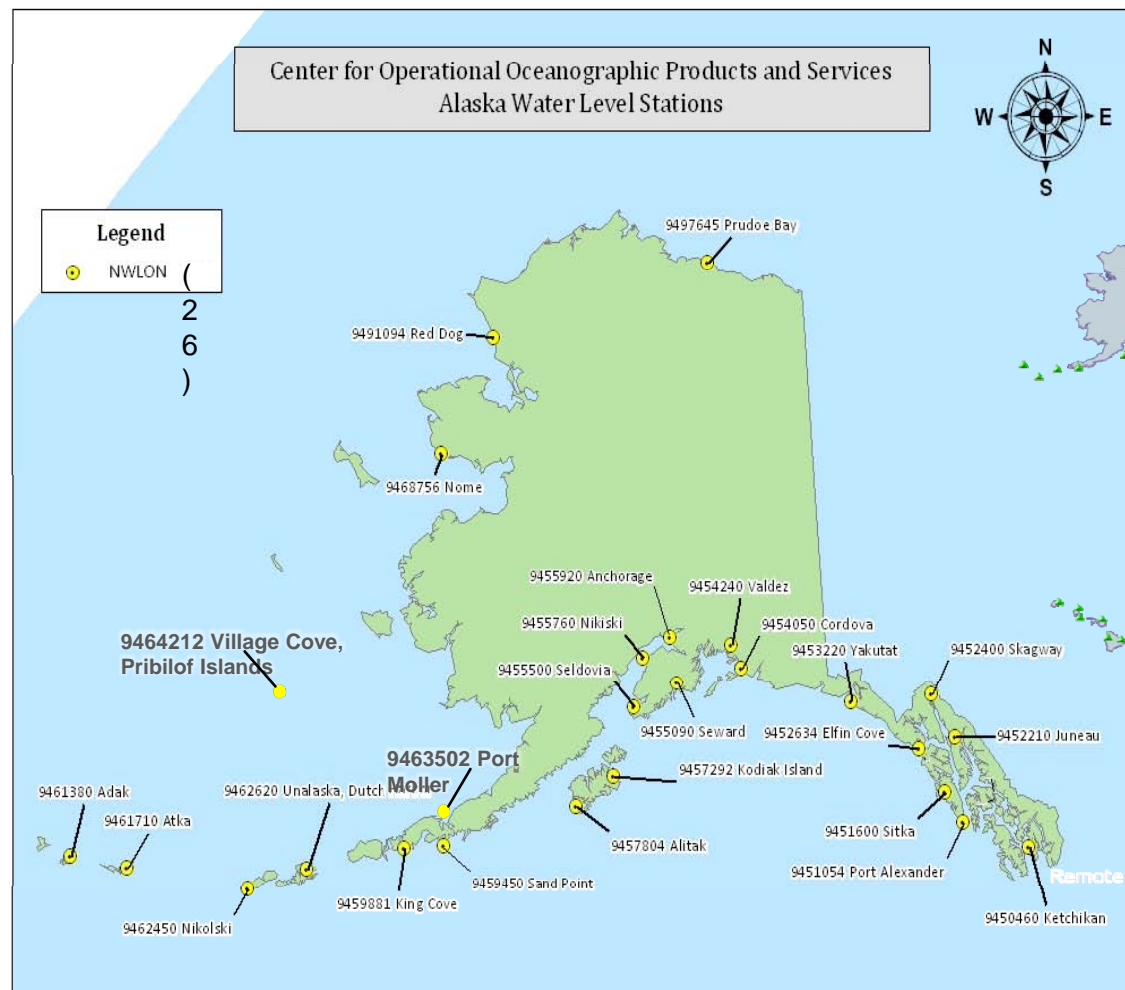
NOAA's 6 Arctic Goals



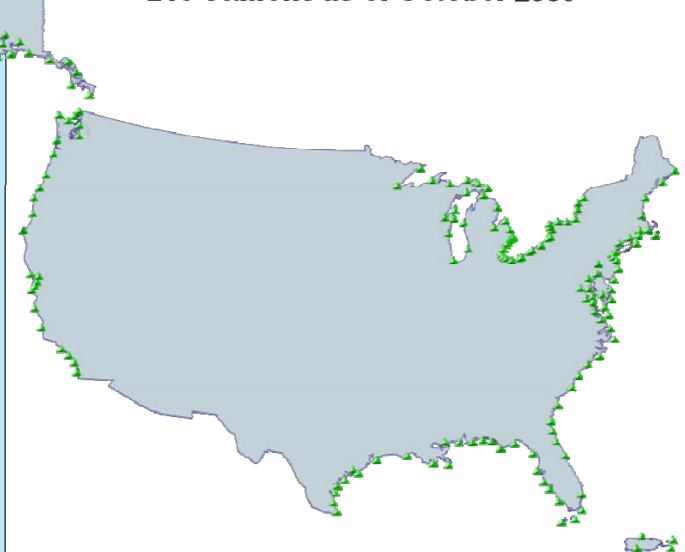
Foundational Geospatial Framework: Geodetic Control... Today



Foundational Geospatial Framework: Water Levels... Today



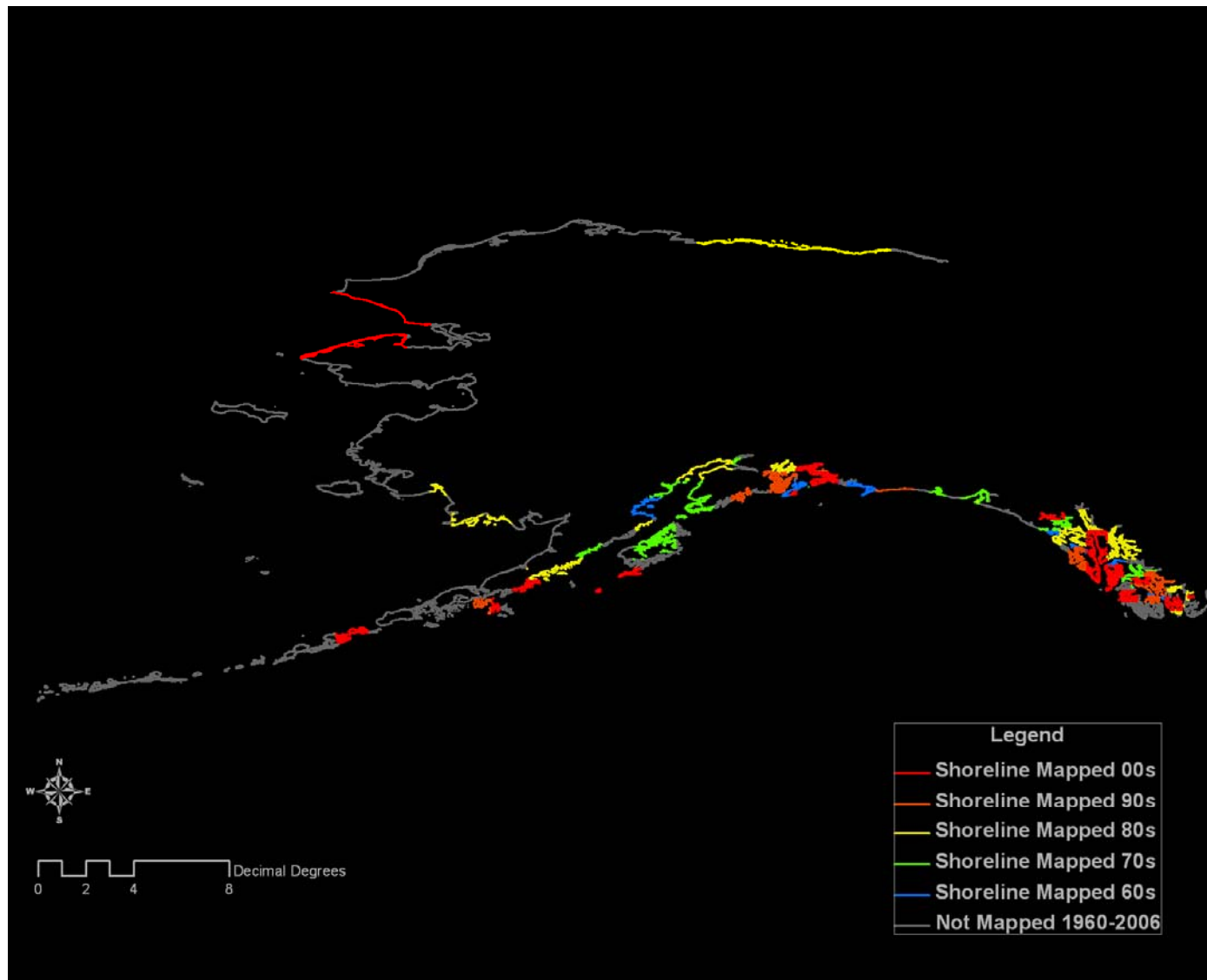
**National Water Level Observation Network
210 Stations as of October 2009**



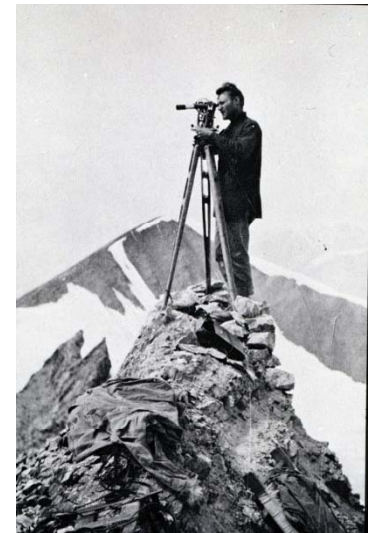
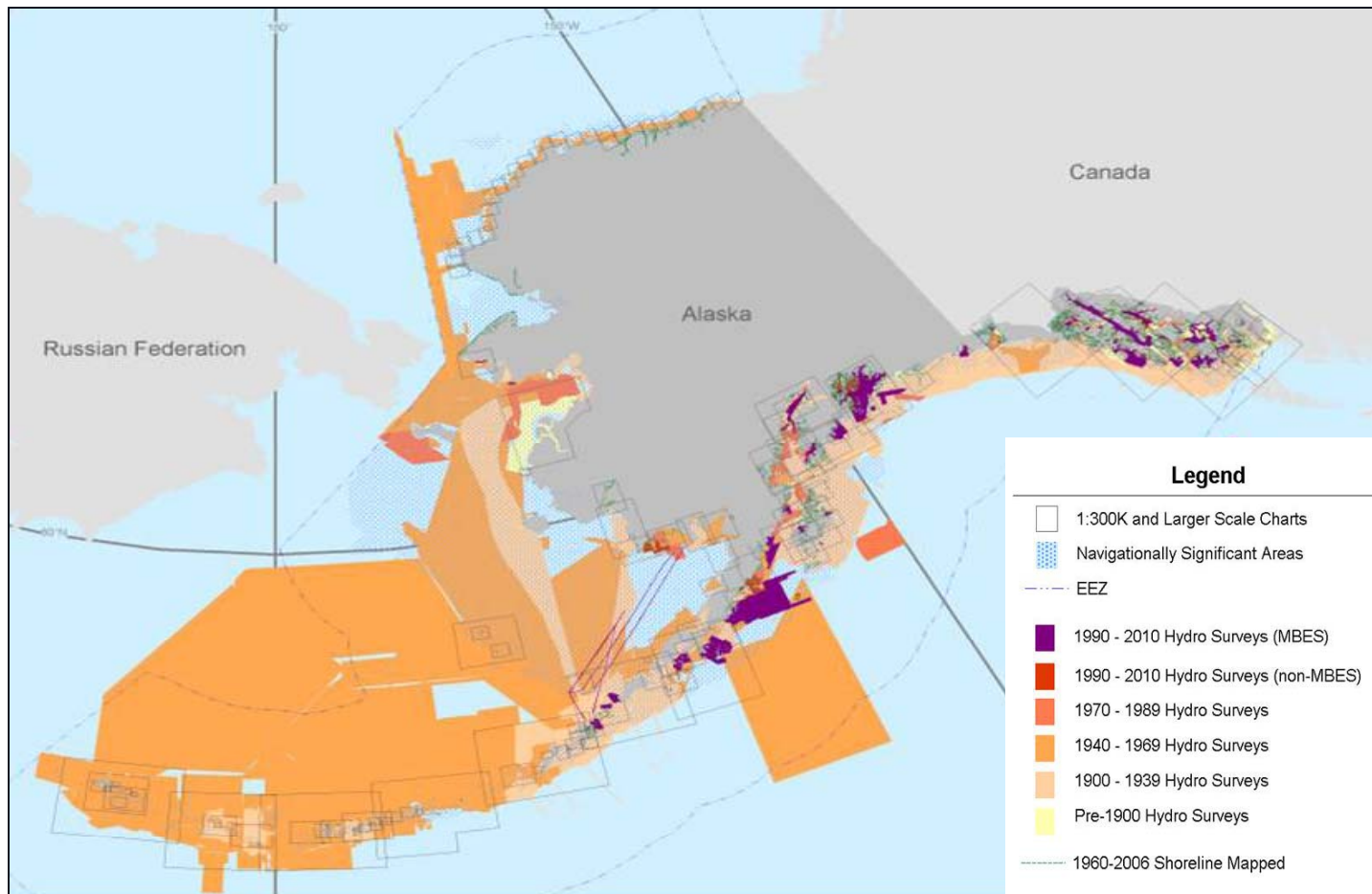
Remote Pacific Islands Stations not shown



Foundational Geospatial Framework: Shoreline... Today



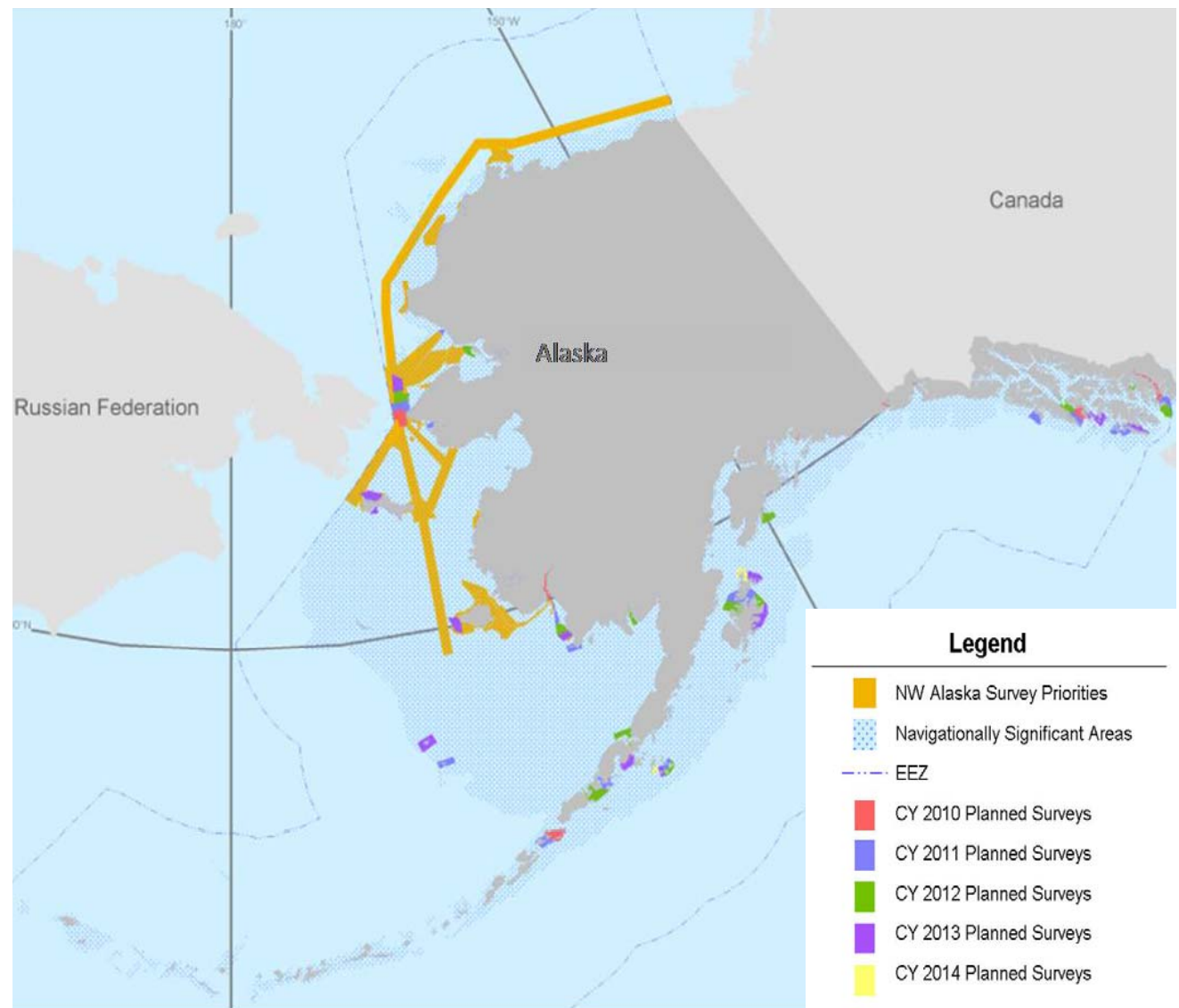
Foundational Geospatial Framework: Hydrography... Today



Foundational Geospatial Framework

Future

- **Survey area prioritization with stakeholders**



Foundational Geospatial Framework

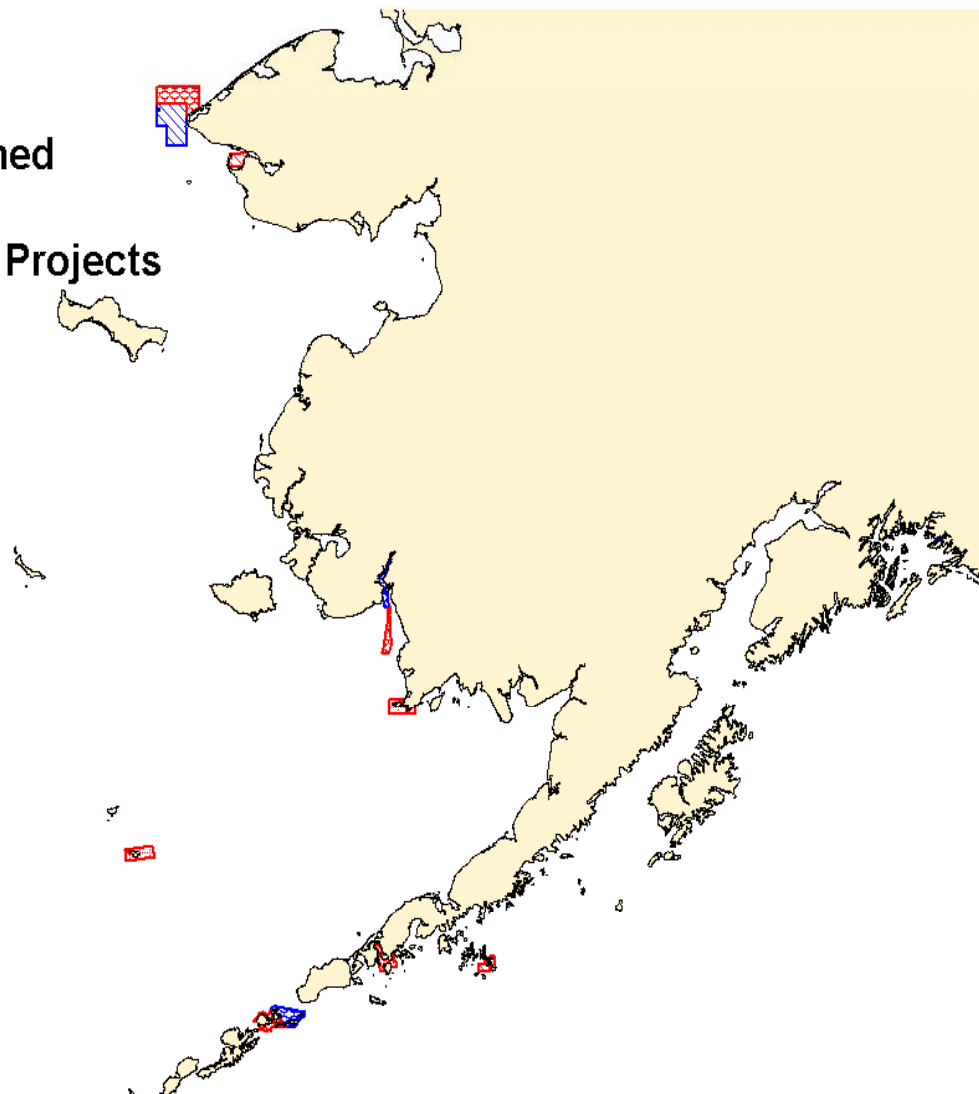
- **Survey area prioritization with stakeholders**
- **2010-2011 Bering Strait Surveys**



Future



**FY10-11 Planned
Coast Survey
Hydrographic Projects**

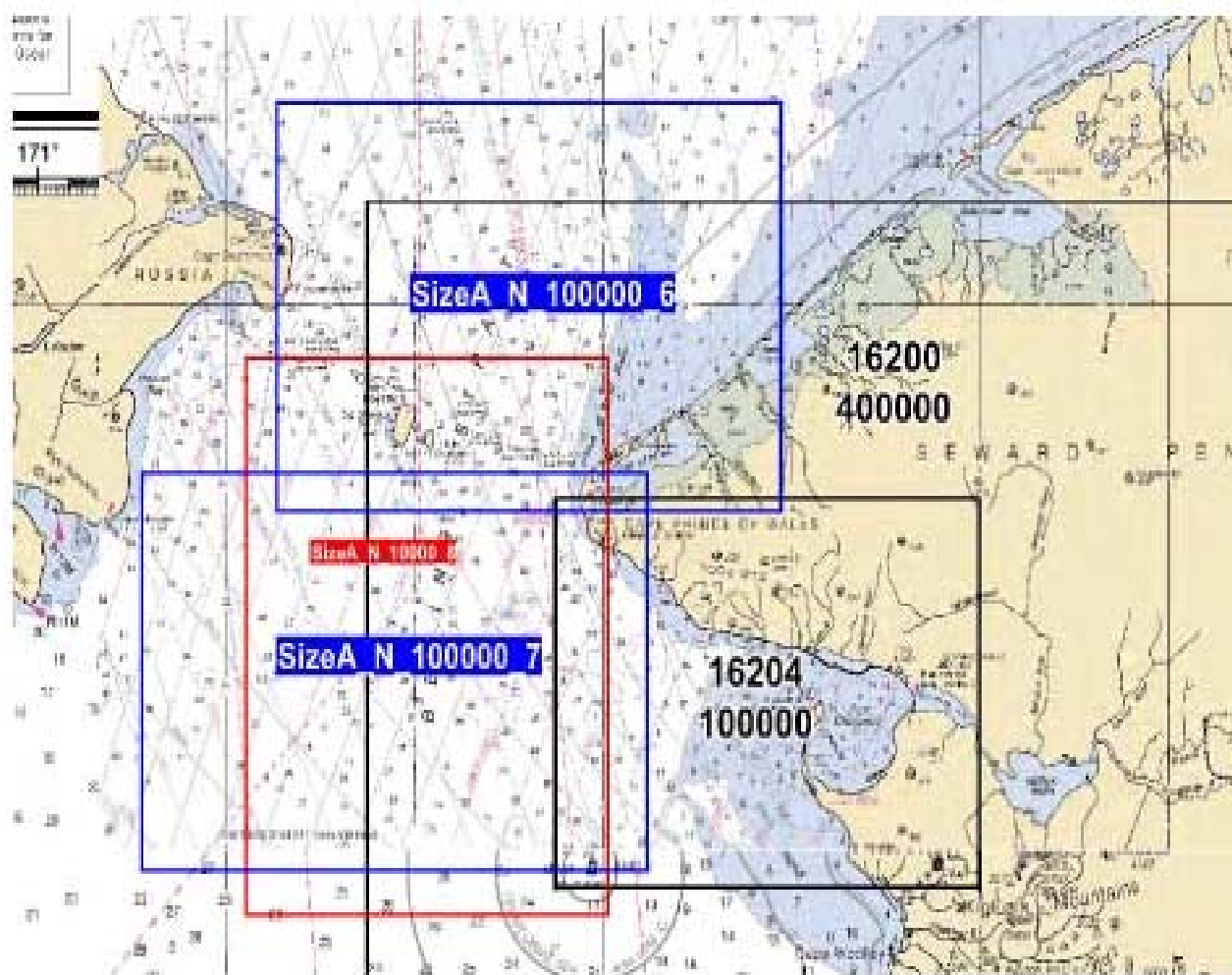


Foundational Geospatial Framework

- Survey area prioritization with stakeholders
- 2010-2011 Bering Strait Surveys
- New nautical chart scheme for Arctic/Alaskan waters

Future

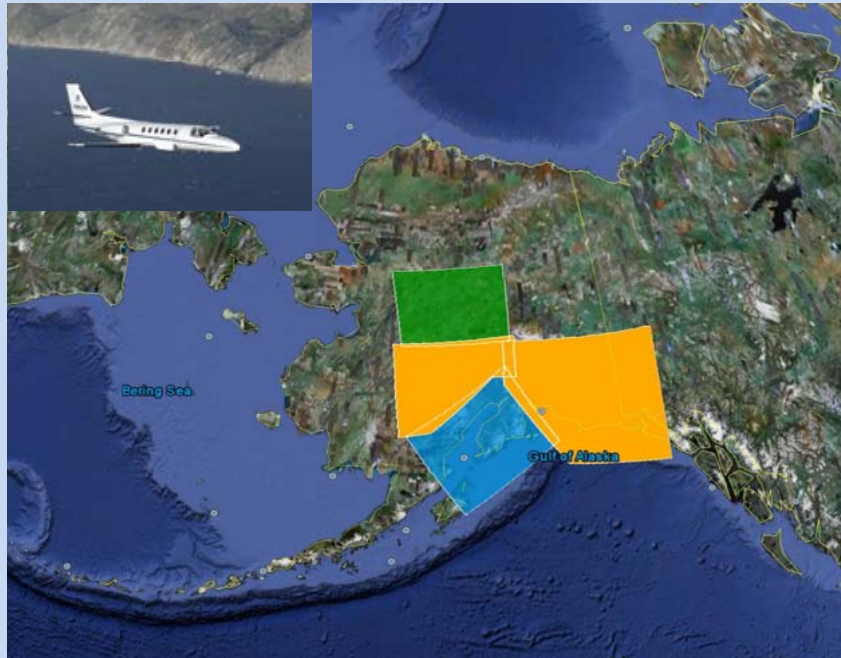
Bering Strait – Scale 1:100,000 – Portrait or Landscape Options



Foundational Geospatial Framework

Future

- **Survey area prioritization with stakeholders**
- **2010-2011 Bering Strait Surveys**
- **New nautical chart scheme for Arctic/Alaskan waters**
- **Adding CORS Stations, conducting GRAV-D flights for accurate elevations, positioning**



Foundational Geospatial Framework

- **Survey area prioritization with stakeholders**
- **2010-2011 Bering Strait Surveys**
- **New nautical chart scheme for Arctic/Alaskan waters**
- **Adding CORS Stations, conducting GRAV-D flights for accurate elevations, positioning**
- **Barrow tide gauge demo, gap analysis**



Future

NOAA Technical Memorandum NOS CO-OPS 0048

A Network Gaps Analysis For The National Water Level Observation Network



noaa National Oceanic and Atmospheric Administration
U.S. DEPARTMENT OF COMMERCE
National Ocean Service
Center for Operational Oceanographic Observations and Systems



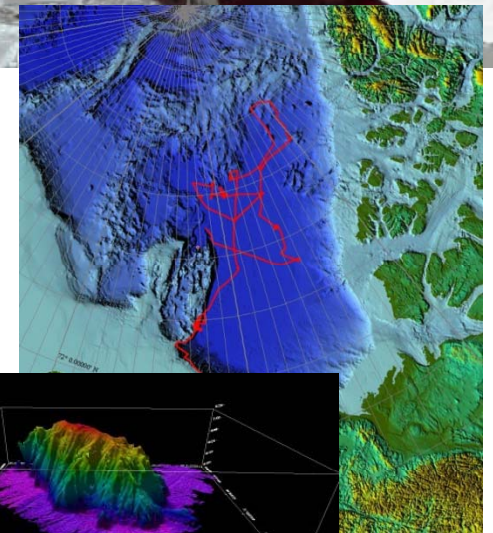
Operational Challenges

- Ice-diminished, not ice-free
 - Short survey season — late May to mid-September
 - Still a harsh environment — weather, light, ice
 - Uncertainty in predicting sea ice coverage
 - Lack of supporting infrastructure (communications, tides, positioning, supply, etc...)
- U.S. survey capacity in Arctic is limited
 - Age of existing hydro-capable fleet
 - Need for new concepts of operations that incorporate new technologies (AUV, UAS...)
- \$,\$,\$



International Partnerships are key

- Summer 2010 Extended Continental Shelf Mapping effort on icebreakers USCGC *Healy* and CCGS *Louis S. St-Laurent*
 - 6th expedition by NOAA and partners to map seafloor in the northern Chukchi Sea
 - Builds on 2009 effort with Canada and seamount discovery
- Partnership with Canada and other Arctic Nations on Arctic Hydrographic Commission under IHO
 - First meeting in Canada, September 2010



The Way Forward

Recognition that Hydrographic Services underpin U.S. Arctic action:

- Marine transportation
- Economy
- Security
- Sovereignty
- Safe use of resources
- Environmental protection
- Science
- Traditional ways of life

Initiating the operations needed to contribute this critical foundational geospatial framework

