NOAA Strategic Plan for the Arctic

NOAA in the Arctic: A Cross-Goal Strategy

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Commerce and Transportation Goal
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Why an Arctic Plan?

• Critical national issues emerging due to Arctic climate change
  – Environmental Threats
  – Socio-economic challenges and opportunities
  – National Security/Sovereignty

• NOAA has diverse capabilities to help address the issues

• NOAA Strategic Plan for the Arctic is first step in defining NOAA’s role(s) and directions for potential Arctic action
Why an Arctic Plan?

• With sea ice loss, access to region eased... “Age of the Arctic”
  • Oil exploration
  • Transit Routes
  • Tourism
  • Fisheries

• Arctic a bellwether for global climate change
  • Drives weather and climate in lower latitudes
  • Coastal/indigenous Alaskan communities hard hit

• Yet still many Arctic unknowns
Why an Arctic Plan?

• Other Arctic Nations preparing claims to Extended Continental Shelf under UNCLOS
  • U.S. only Arctic nation not party to UNCLOS

• NSPD 66/HSPD 25 on Arctic Region Policy issued 1/9/2009
  • National security
  • Local/global scale science
  • Sustainable development
  • Protect environment
  • Indigenous peoples
  • Arctic Governance
Why an Arctic Plan?

- Other Fed’l Agencies doing similar planning:
  - Navy
  - USCG
  - USGS
  - USFS
  - MMS
  - BLM

- State of Alaska developing Climate Change Strategy
  - Seeking help from NOAA

- Unique opportunity to plan, implement for sustainable use of an ocean
  - Before disruption, depletion
Why an Arctic Plan?

• Managing effectively in the Arctic requires significant, accurate information in such areas as:
  • Climate
  • Sea Ice
  • Marine ecosystems

• NOAA Capabilities:
  • Science-based information and baselines necessary for understanding and evaluating climate change and its impacts
  • Equitability of critical NOAA services in the Arctic region

• Weather
• Coastal change
• Transportation
The Task –
11/14/2008 Joint NEP/NEC meeting on 2011 Program Plans:
• Develop a plan for NOAA Action in the Arctic (C&T lead):
  – Where we are
  – Determine requirements/mandates
  – Other Players (Federal, State, Local, and International Agencies)
    • Activities already engaged in
    • How to leverage their efforts
  – Define NOAA priorities in the Arctic

Background

NOAA Strategic Plan for the Arctic
"Two things keep me awake at night in regards to the Arctic. We might not be able to respond to a massive search and rescue case or a significant environmental disaster with our current capabilities.”
ADM Thad Allen, USCG

"Because of climate change, the elders have forgotten how to hunt." Myra Henry, former Kivalina Mayor

"About $436 million in state and federal funds have been spent to recover from recent Alaskan disasters. More than half of these disasters and 2/3rds of the funds were for recovery from floods, storm surges, and erosion disasters."
John W. Madden, Director, AK HLS and Emergency Mgmt

"The Arctic is in crisis due to global warming. An entire ecosystem is rapidly melting away, and we risk losing not only the polar bear but the ice seals and other ice-dependent species if we do not take immediate action to address global warming." Rebecca Noblin, Center for Biological Diversity, Anchorage

"This area is changing very rapidly, and we need … understanding of how climate change and ocean acidification are going to affect U.S. Arctic waters. We also need basic information about the ecosystem, including what are the abundances of fishable species. We don't even have baseline information on that.”
Dr. Chris Krenz, Oceana, Juneau
Discussion

Followed a Strategic Plan outline:
• Mission/Vision
• Requirements
• Capabilities and Gaps
• Objectives
• Strategies to fill Gaps and Meet Objectives
Discussion: Mission/Vision

- NOAA protects life and property, conserves and sustainably manages natural resources, and enhances the economy through science, service and stewardship in the Arctic.
- NOAA supports a healthy, resilient Arctic where human and natural systems are in balance with each other and the planet as a whole with a coordinated, comprehensive and reliable suite of climate, weather, marine ecosystem, living marine resource, and geospatial information for the people and agencies making decisions.
Discussion

6 theme areas

- Climate Science and Services
- Coastal Community Hazard Resilience
- Weather and Water Services
- Marine Transportation and Homeland Security
- Marine Ecosystems and Resource Management
- Arctic Governance and International Cooperation
Discussion: Climate Science and Services

Requirements:
- Climate forecasts, sea ice and sea level projections – NWS Organic Act, National Climate Program Act.
- Coordinated clearinghouse or service to access the relevant and reliable science information and tools.

Stakeholders/Partners:
- State of Alaska, Native Communities, USCG, USN, MMS, USACE, USFWS, EPA, NASA, Academia, Int’l
- OAR, NESDIS, NWS, NMFS, NOS

Role for NOAA:
- Leveraging NOAA/partner observation networks and data as the go-to resource for science-based products on Arctic.
Sea Ice Changes in the Arctic
September 1979 - 2007
NOAA Data Gap Examples

- Observed changes far exceed model projections.
- Existing NOAA/partner observing capability inadequate for synthesis/modeling.
- Obs essential to understanding regional/global causes and consequences of Arctic Change, Sea Ice Melt.

Major Event 2007
Dramatic Decline in Sea Ice Cover
Discussion: Coastal Community Hazard Resilience

Requirements:

• Accurate GIS-based tools for near/long term climate change impacts to inform mitigation strategies for western/North Slope AK coastal communities – CZMA

Stakeholders/Partners:

• DOI, State of Alaska, Native Communities, FEMA, USACE, USFWS, EPA, DOS
• NOS, NMFS, OAR, NWS

Role for NOAA:

• Analysis tools/mitigation expertise for storm surge/flooding/erosion/sea level change, human health, Integrated Ocean and Coastal Mapping (IOCM) data acquisition strategies and foundational geospatial infrastructure.
Trends in Arctic/Alaska

- Erosion, permafrost thaw, fires, river flow
Discussion: Weather and Water Services

Requirements:

• Coast Guard, Marine Transportation/coastal users need better fundamental weather in Arctic – NWS Organic Act
• Maritime and Surface Weather users want Daily to Seasonal Ice forecasts

Stakeholders/Partners:

• USCG, State of Alaska, Native Communities, USN, MMS, USACE, BLM, Shipping/oil/gas industries
• NWS, OAR, NOS, NMFS, NESDIS

Role for NOAA:

• Extending marine offshore forecasts, National Ice Center /NWS sea ice forecasts, precipitation estimates
NOAA Data Gap Examples
Discussion: MTS and Homeland Security

Requirements:

- Coast Guard, Navy strengthening Arctic presence for security and maritime domain awareness, search/rescue, rapid response
- Marine Transportation System users need updated geospatial data to navigate major transit routes, harbors of refuge
- Daily to Seasonal Sea Ice forecasts critical

Stakeholders/Partners:

- USCG, USN, Shipping/oil/gas industries, DOS, MMS, State of Alaska, Int’l
- NOS, NMFS, NWS

Role for NOAA:

- Provide foundational geospatial infrastructure, IOCM data acquisition strategies, National Ice Center and NWS sea ice forecasts
- HazMat response capabilities, oil in ice R&D
Expanding Marine Transportation

- Arctic Shipping Routes
- Great Circle Routes

Trends in Arctic/Alaska
Trends in Arctic/Alaska

- Increasing Oil & Gas Exploration
Trends in Arctic/Alaska

• Expanded Military and Coast Guard Operations

**Arctic Domain Awareness**

- Air Patrols
  - ‘Eyes on’ above the Arctic Circle
  - Provide scientists platforms of opportunity

**Arctic Ops Summer ‘08**

- Develop Arctic Domain Awareness
  - Nome C130 Deployment
- Cutter Operations
  - HEALY, POLAR SEA
- CGC SPAR Waterways Analysis & Management System
- International Search and Rescue Exercise
- Tailored Force Package Deployment
- Prudhoe Bay Maritime Security Deployment
- Coastal Community Engagement
NOAA Data Gap Examples:
“The Charts are a Joke.” 2008 USCG SPAR Report

Current Marine Weather Coverage and Gap to EEZ
Discussion: Marine Ecosystems and Resource Mgmt

Requirements:

- Support regulatory responsibilities under Magnuson-Stevens Reauthorization Act
- Manage ecosystem impacts from climate change

Stakeholders/Partners:

- DOI, EPA, Alaska Fisheries Management Council, State of Alaska, Native Communities, Academia, Int’l
- NMFS, NOS, OAR

Role for NOAA:

- Understand ecosystem services
- Understand and manage ecosystem impacts from climate change
  - Loss of sea ice impact stock assessments
  - IOCM data acquisition strategies
  - Preparing for ecosystem hazard indicators (invasive species, Harmful Algal Blooms)
  - Ocean Acidification
Trends in Arctic/Alaska

- Changes in fishery stock distribution and composition


**NOAA Data Gap Examples**

**Samples Show Significant Northward Displacement within the Bering Sea**

- Greenland halibut 98 km
- Bering flounder 76 km
- Arrowtooth flounder 46 km
- Snow crab 89 km
- Flathead sole 57 km
- Pacific halibut 55 km

**Samples Show Range of Six Species Extended From Bering/Chukchi Seas to Beaufort Sea**

- Marbled eelpout
- Bering flounder
- Pacific cod
- Walleye pollock
- Bigeye sculpin
- Salmon snailfish

**More comprehensive Arctic data needed for fish and pinniped management actions, conservation and recovery plans**
Discussion: Arctic Governance, Int’l Cooperation

Requirements:
• U.S. presence as 1 of 8 Arctic nations in Extended Continental Shelf, fisheries, other marine boundary/resource negotiations

Stakeholders/Partners:
• Arctic Council Nations
• NOAA, DOS, other fed’l agencies

Role for NOAA
• Science-based legal expertise on international front
• Data sharing
• Marine Spatial Planning
• Extended Continental Shelf
• Arctic Hydrographic Commission
Extended Continental Shelf Surveys, 2008
Discussion: NOAA Capabilities

- Region-based assets – NWS Assets incl Riverine Forecast Ctr and Ice Desk, Kasitsna Bay Lab, Kachemak Bay NERRS, AK Fisheries Science Center, Fairbanks Satellite Command/Data Acq Stn
- Observation networks (wx, climate, water levels, positioning)
- Platforms based in region – Rainier*, Fairweather*, Freeman, Dyson, aircraft (*ice strengthened)
- National Ice Center, Suitland, MD
- PMEL and other Labs
- Scientific expertise – coastal/resource mgmt, survey/mapping, climate, spill response, weather, modeling
- Outreach/communication
Discussion: Gaps

• Observations - Sea Ice, Climate, Sea level, Bathymetry, Tide/Currents, Wave observations, Habitat
• Observational Platforms – Arctic ready vessels, aircraft, buoys, sensors
• Research - Fish stock assessments, Impacts of oil spills
• Resources – Gravity/tide gauges, Ship time
• Forecasts - Icecasts, Currents, Weather
Objective I: Design and deliver decision-support tools and information on climate change, supported by authoritative NOAA climate science, that are meaningful and useful to Arctic/Alaska and national climate data users.

Objective II: Provide Alaska managers with the geospatial models, tools, and assessments needed to make scientifically based decisions on coastal/ecosystem resource management, development, human health, and climate mitigation/adaptation planning.

Objective III: Deliver weather and water forecasts, warnings, and information that are more responsive to dynamic Arctic/Alaskan conditions for commerce, resource management, and safety of life and property.
Discussion: Objectives

- Objective IV: Support safe marine transportation, spill response, homeland security, and other geospatial data-dependent activities in Alaska and the Arctic with the same level of scientific support and services as NOAA provides to the rest of the nation.

- Objective V: Maintain healthy ecosystems and valued ecosystem services in Alaska and the Bering, Chukchi, and Beaufort Seas with informed scientific assessments, stewardship and management of ecosystems, and living marine resources.

- Objective VI: Support U.S. foreign policy and interests in the Arctic with international collaboration, enhanced scientific cooperation and effective representation on behalf of NOAA’s mission objectives.
Discussion: Strategies

- Develop an Alaska/Arctic Climate Services Partnership.
- Close critical oceanic and atmospheric observational gaps.
- Improve global climate model accuracy and work towards higher resolution regional models.
- Focus specific attention on Sea Ice observations, dynamics, analysis and projects to benefit climate predictions.
- Study loss of sea ice impacts on ecosystems and marine resources.
- Deliver the geospatial framework supporting marine transportation, coastal community resilience, climate modeling, etc...
Discussion: Strategies cont.

- Improve coastal/ocean marine, aviation, and surface weather and water services.
- Collaborate with Federal/State/Int’l partners to map and monitor the Alaskan coast and Arctic waters.
- Conduct adequate regional ecosystem assessments.
- Protect and conserve the Arctic’s living marine resources.
- Support USCG with scientific support for oil spill response.
- Support U.S. claim to Extended Continental Shelf and other Arctic governance issues.
Discussion

Common Threads, Immediate Needs

- Better understanding of Sea Ice and Forecasts – Daily to Seasonal/Decadal
- More accurate Weather forecasts and warnings
- Foundational geospatial infrastructure (at a minimum geodetic control, tides and currents)
- HazMat response capability increase in the region
- IOCM data acquisition for multiple missions
- Stock assessments
- Ocean Acidification
- Anthropogenic effects
- Integrated Ecosystem Assessments
DELIVERING SEA ICE FORECASTS & SERVICES TO THE NATION – A PROPOSED PPBES ALTERNATIVE FOR FY12-16

**GOAL** To deliver authoritative, accessible, user-responsive sea ice information & predictions required by NOAA, stakeholders, decision managers & policymakers.

**URGENCY** Dramatic environmental change in the Arctic region is occurring faster than any other region on Earth. A potentially seasonal, ice-free Arctic presents significant additional challenges, requirements & opportunities for shipping, energy resources, fisheries, ecosystems, national security & governance—all with increasing needs for sea ice information.

**SEA ICE FORECAST DELIVERABLES** Nowcasts & forecasts on multiple time & spatial scales; weekly, monthly, seasonal, regional, annual, decadal & centennial projections of sea ice extent, distribution, thickness, & ice type with probability distributions & uncertainties.

**MANY STAKEHOLDERS, MANY NEEDS**
- Government & commercial marine transportation
- Offshore oil & gas extraction & development
- Emergency rescue & oil spill responders
- Fisheries & ecosystem managers
- National security & governance community
- Coastal communities & managers, Tourism industry
- Environmental regulators & policymakers
- Infrastructure developers & planners
NOAA Strategic Plan for the Arctic

• Questions?
• Follow-ups with C&T?
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