Social and Economic Assessments of the Future Arctic: Special Cases Local and Distant

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ESSAS Meeting, Seattle 2011

Arctic Overview

Willett slide

A Delicate Balance

Protecting the Arctic and recognizing the rights of its peoples/permanent residents, while acknowledging the legitimate interests of the outside world in the Arctic and its valuable resources

Young 2009. Arctic Frontiers Conf.

INTRODUCTION

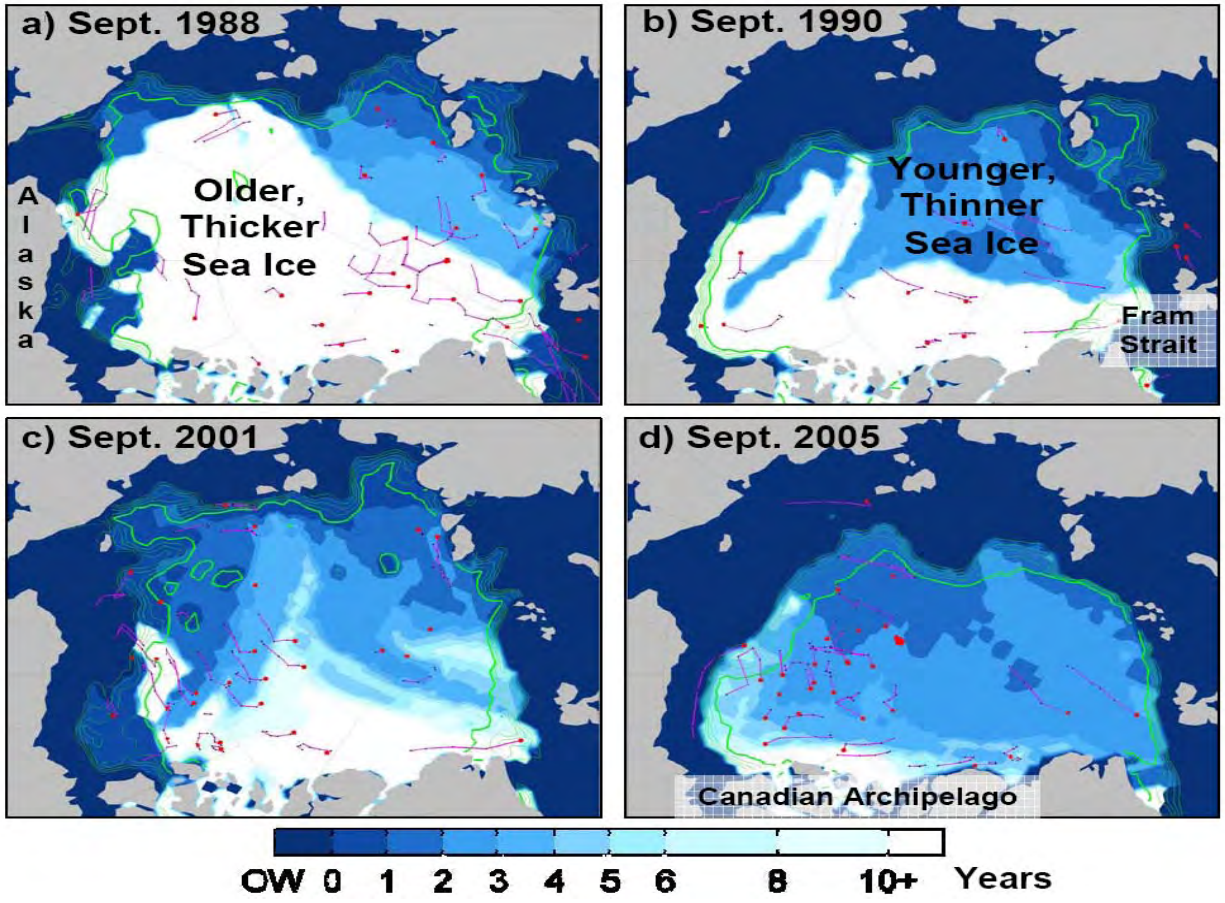
The Arctic presents an interesting case for how to identify, incorporate and balance the interests of largely indigenous peoples and national, regional and global interest in how its management regime is defined.

INTRODUCTION

The sudden prospect of a summertime ice-free Arctic has thrust social and economic assessment questions onto a global stage much more rapidly than expected.

Previously thinking characterized the Arctic as a very slowly changing Arctic whereas the currently observed events are more rapid. These “fast” and “slow” aspects of the emerging policy demands of the Arctic present significant challenges for analysis.

Changes in Age of Sea Ice 1988-2005 (NOAA 2006)



From Pal Prestrud - CICERO

INTRODUCTION

These “fast” and “slow” aspects of the emerging policy demands of the Arctic present significant challenges for analysis.

First, how can we characterize current knowledge and response to climate change?

Second, it is useful to examine other rapidly changing resource regimes – especially where there is a local indigenous population with direct interests and a regional or global set of private and public interests which might be orthogonal to the local peoples’ views. [e.g., Amazon, Madagascar, Africa]

Finally, what approaches are available to address this potential mismatch in interests of indigenous peoples, national and regional bodies and the global nature of Arctic issues?

Introduction

Similarly, social and economic impact assessment in the Arctic has a "large" and "small" scale dimension – both geographic and economic

Indigenous [resident] peoples occupy "place" but driving forces for changing Arctic are largely beyond their control.

Control is exercised far from site of activity, e.g., government regulation, oil and gas development, shipping, tourism. [The case of fisheries?]

Benefits that accrue from use of Arctic obtained outside region

Costs – so far experienced in Arctic by resident peoples

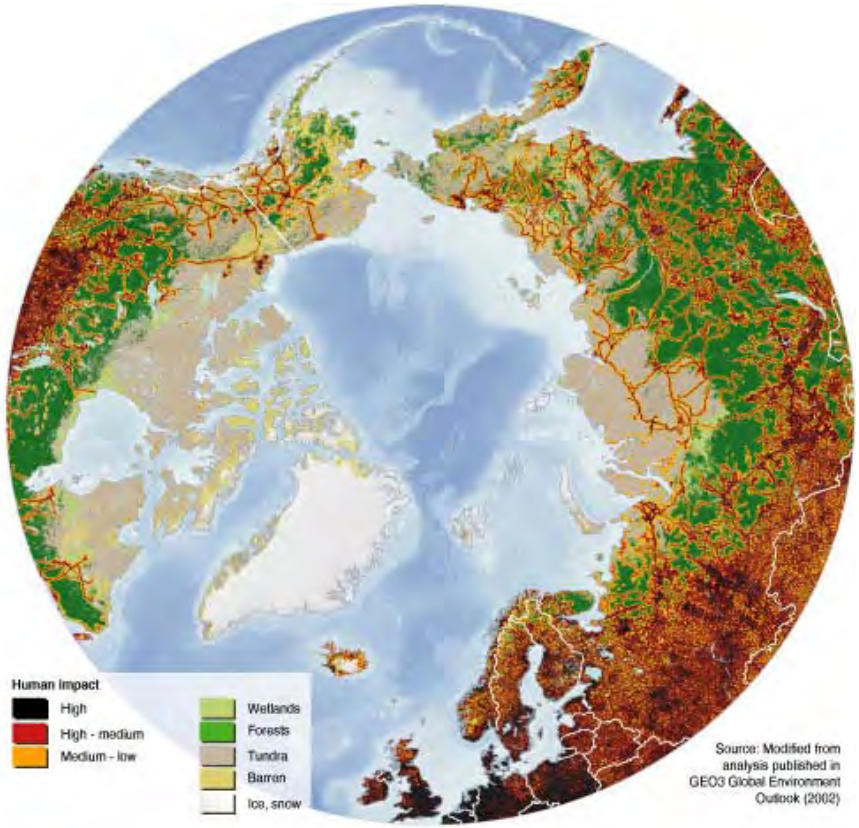
Climate Change

- **Greenhouse gas accumulation "slow" – warming effects below threshold [over threshold now?]**
- **Arctic climate "fast" in – melting of sea ice, permafrost, etc. as experience by native peoples.**
- **Global scale change "large" – impact remote and abstract**
- **Experienced in Arctic places by Arctic peoples "small" but intense**

Arctic Native Peoples

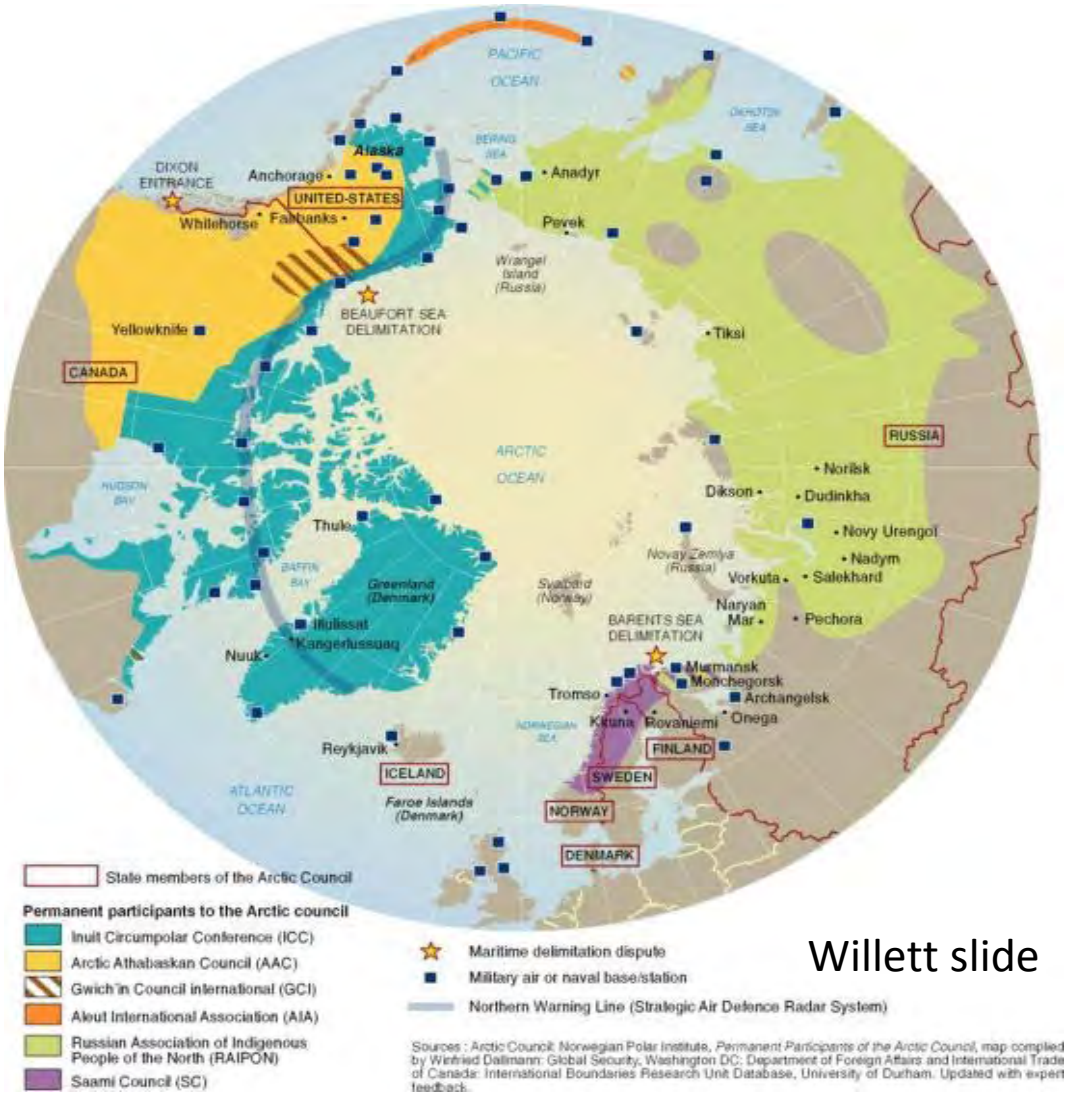
The map shows the impact of human development on the biosphere. In changing the nature by building roads, cities and houses we change the living conditions for animals, plants and indigenous peoples. The black in the map displays high human impact and high stress on the natural environment, red is medium to high and orange low impact. The boreal forest (the Taiga) and tundra with low level of disturbance and stress is depicted green and grey respectively.

Source: Lueälven: Quote from an interview carried out by the Snowchange Project - Northern Indigenous Observations of Ecological and Climate Change Project. Tampere Polytechnic, Finland 2004;Novy Vasyugan and Kuyumba: T. Sonne and C. Slyngborg (2002) When oil came to town. Published on a CD-rom SIBERIA 2003. © UNEP GRID-Arendal/ RAIPON/ Nordisk Film TV; Halkavarre: C. Nellemann and I. Vistnes New bombing ranges and their impact on Sami traditions in Polar Environment Times no. 3 (October 2003) © GRID-Arendal



Willett slide

Arctic Governance



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Governance Issues

- Five Arctic Coastal States
- Eight Arctic Nations [three without coasts]

Other nations expressing interest in Arctic regime: China, Brazil, India, Korea, European Union, …..

Interests – shipping, oil and gas, mineral resources, scientific research, tourism

THIS ISSUE

FLYING THE FLAG The recent flag-planting photo opportunity involving a Russian submersible on the Lomonosov ridge beneath the Arctic Ocean is the most dramatic example yet of a growing trend.

RTR/RUSSIAN CHANNEL/AP

Deep thought: floating the flag.

Geophysicists are being recruited to back up national claims on the seafloor and its associated mineral wealth. Daniel Cressey reports on the politicization of a science, and the legal wrangling that we can anticipate in the years to come as competing claims are considered. [News Feature p. 12]

Arctic Territorial Disputes

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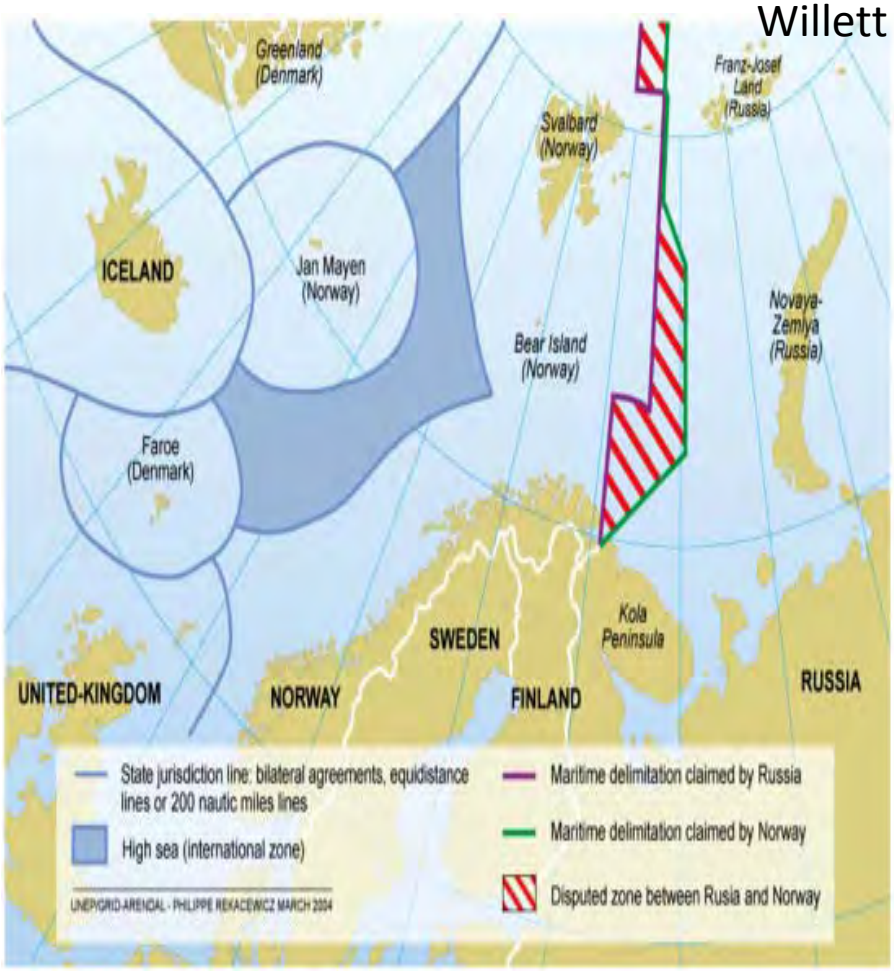

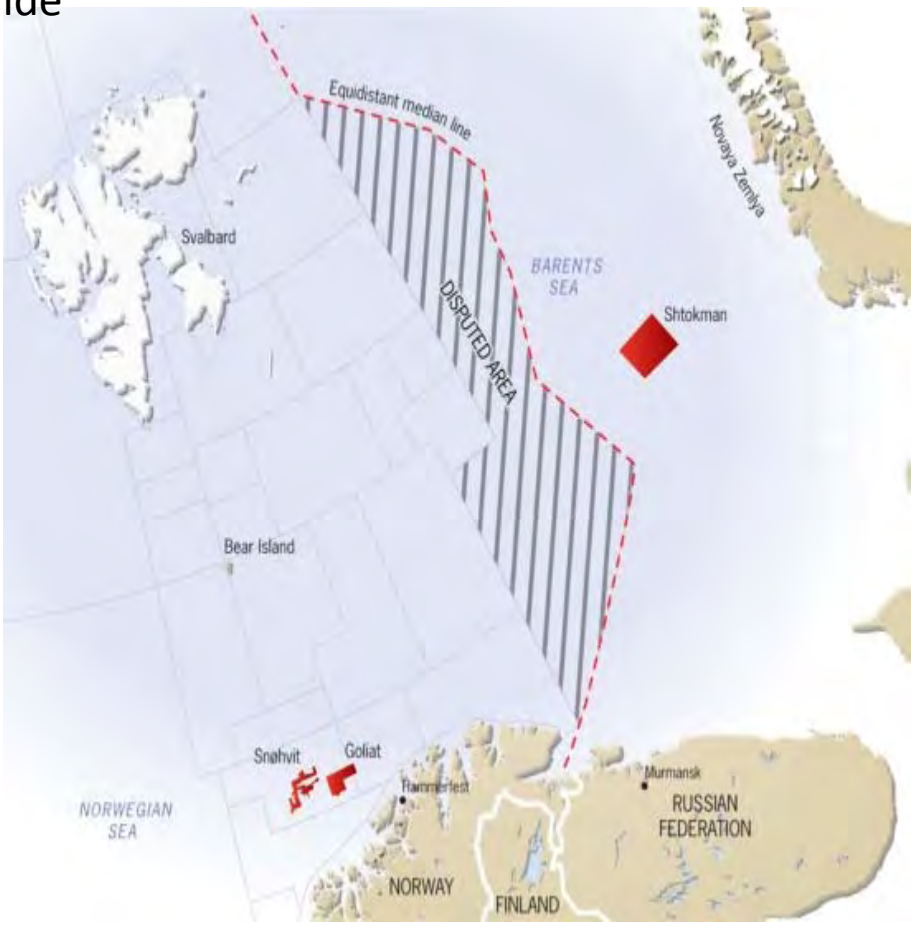

Governance

- “Slow” progress in resolving boundary disputes as long as “in the deep freeze”
- “Fast?” progress to resolve disputes or to make claims before UN under LOS [10 years] and US/Canada – Russia/Norway bilaterals
- “Large” scale global interest in resolution of Arctic claims - precedents
- “Small” scale areas in dispute – but purported resource implications.

Arctic Oil and Gas

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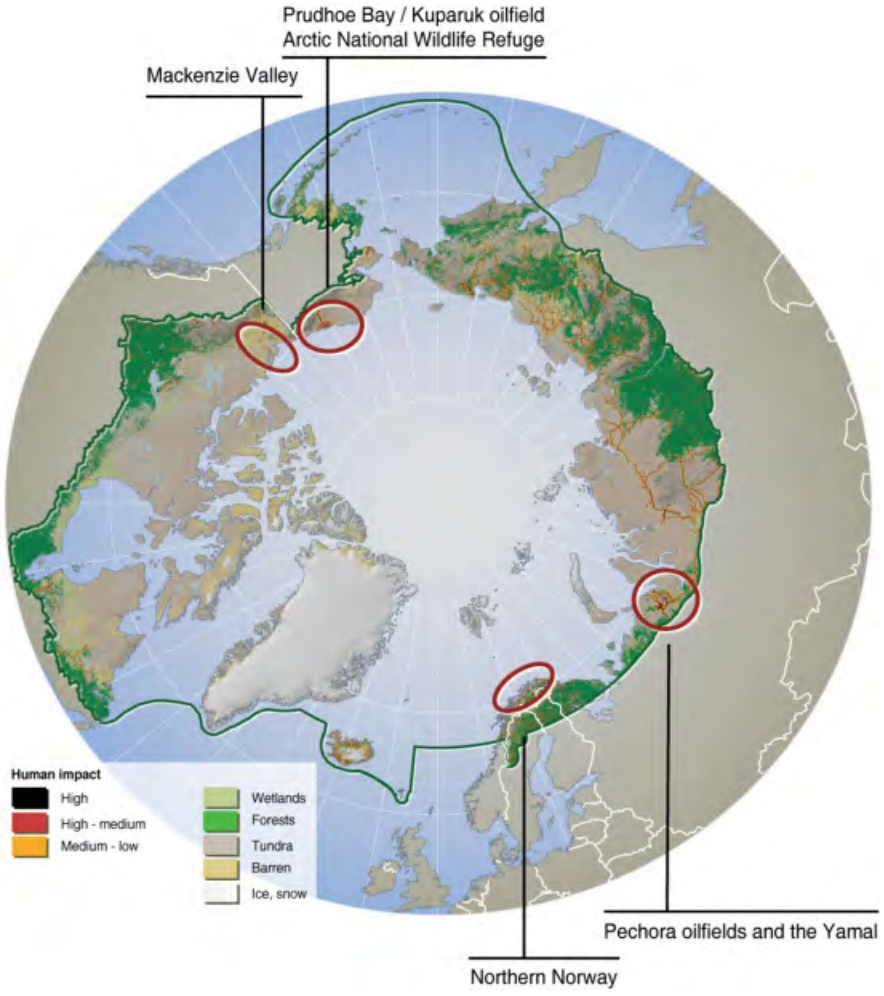


Oil and Gas

- **“Slow” exploration in frontier areas with high cost of production and transport –**
- **“Fast” response to claim resources develop frontier areas**
- **“Large” multinationals and national companies and governments making decisions outside of Arctic [Shell Oil, US Govt. /Chukchi Sea]**
- **“Small” footprint of oil development compared to total Arctic [large in event of spill?].**

35,000 jobs/ 72 billion $ salaries/ over 50 years

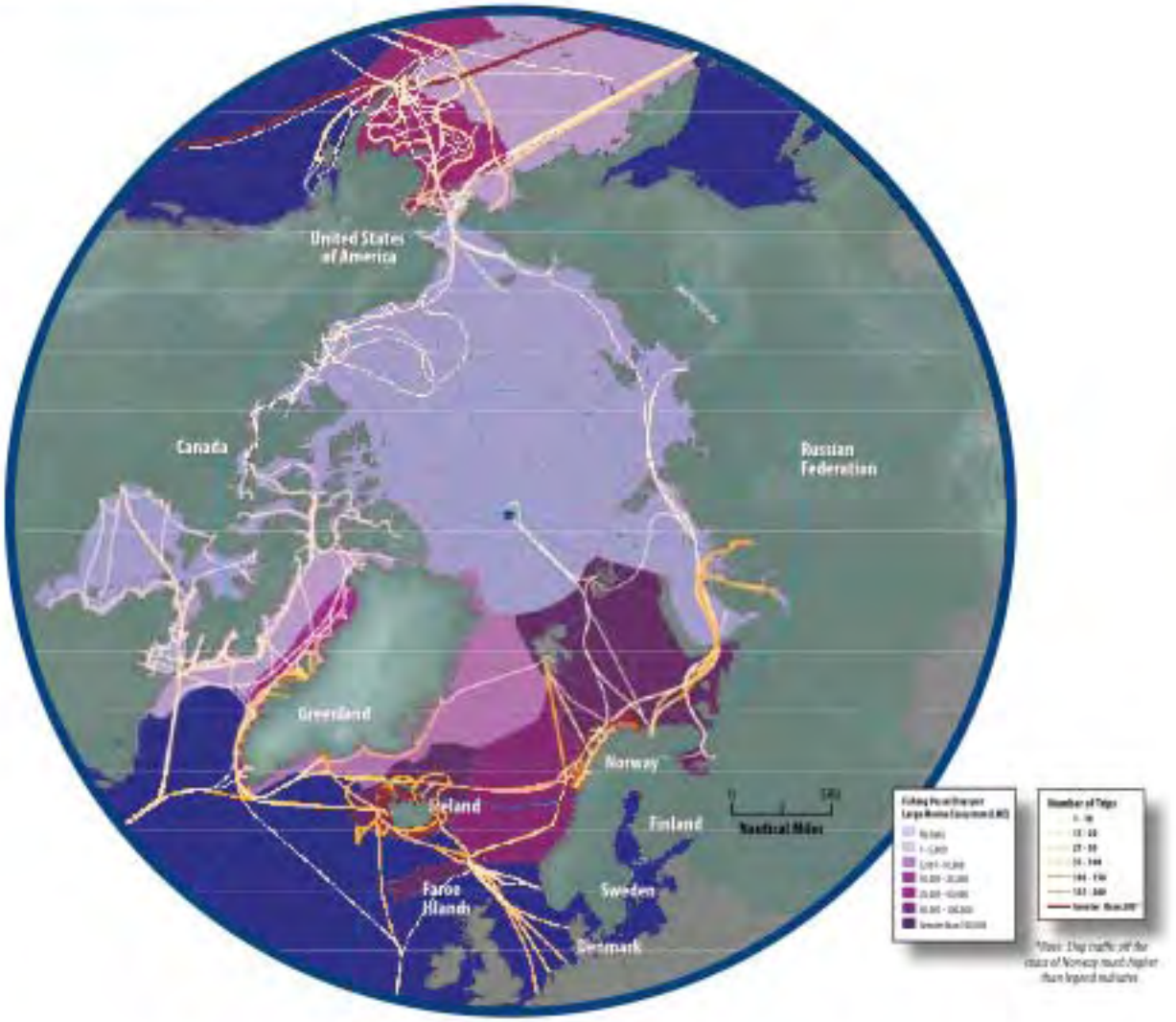
Shell Oil Co./Northern Economics 2009

Arctic Infrastructure and Shipping

Sources:
United States Geological Survey (USGS); AMAP 1997, 1998 and 2002; CAFF, 2001; UNEP/ World Conservation Monitoring Centre (WCMC); United States Energy Information Administration (EIA); International Energy Agency (IEA); Barents Euro-Arctic Council (BEAC); Comité professionnel du pétrole (CPDP), Paris; Institut français du pétrole (IFP), Paris; National Oceanic and Atmospheric Administration (NOAA); The World Bank; Alaska Department of Environmental conservation, Division of Spill Prevention and Response; United States Coast Guard (USCG); ESRI Data & Maps 2000.

6,000

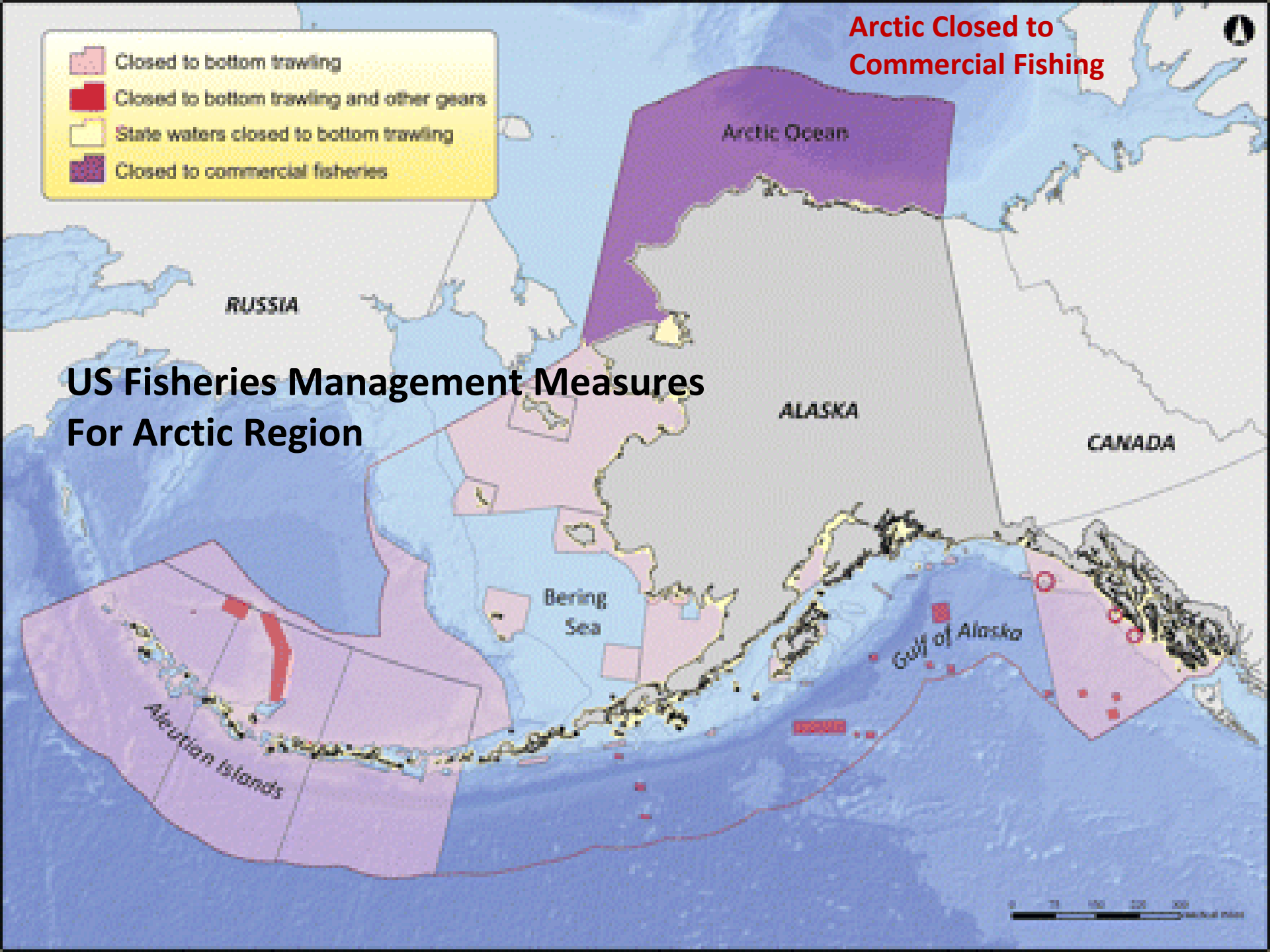
The approximate number of vessels in the Arctic marine area during 2004, including the North Pacific Great Circle Route.



Map 5.1 Overview of all vessel activity for 2004, including fishing vessels. Source: AMSA

Arctic Infrastructure

- “Slow” development due to “deep-freeze”
- “Fast” summer low ice allows shipping and other activities – push to develop navigation infrastructure for search, rescue, clean-up
- “Large” scale shipping and tourism decisions made outside Arctic – pass through
- “Small” scale coastal impacts of infrastructure siting [build on existing/ build new?] for navigation/rescue/safety


Arctic Closed to Commercial Fishing
Closed to bottom trawling
Closed to bottom trawling and other gears
State waters closed to bottom trawling
Closed to commercial fisheries
Arctic Ocean
RUSSIA
ALASKA
CANADA
US Fisheries Management Measures For Arctic Region
Bering Sea
Gulf of Alaska
Aleutian Islands

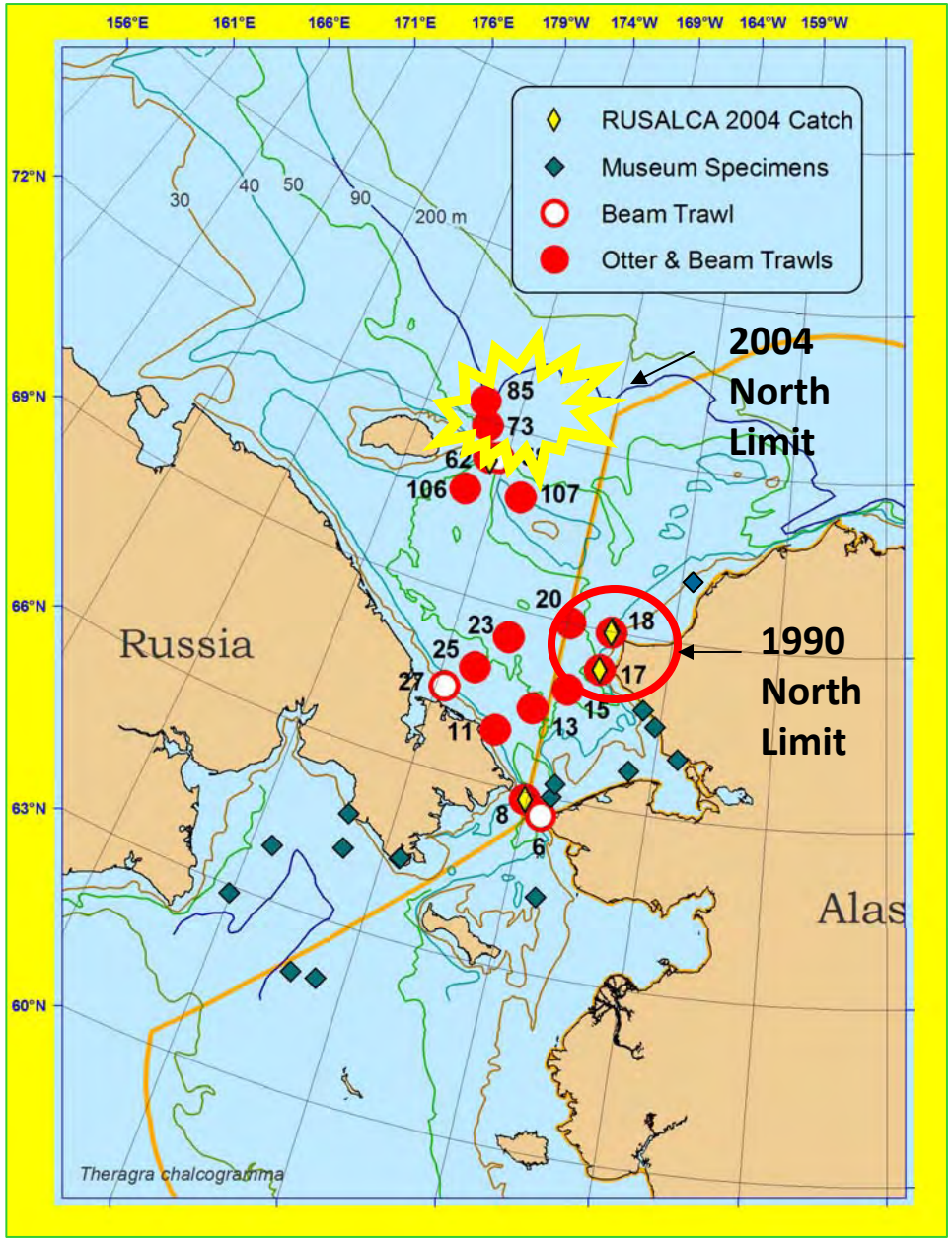
Ecosystem Essentials

- The Bering Sea is approximately 3 million square kilometers
- The eastern continental shelf is 1,200 km. and the width is 500 km.
- Ocean circulation and bathymetry make the area particularly rich in production
- Chukchi, Beaufort and East Siberian Seas and the Arctic Ocean are not productive areas for commercial fisheries
- Extremely strong seasonal component with sea ice being a dominant controlling factor

RUSALCA

Found Farther North

Walleye Pollock
Theragra chalcogramma



From K. Mecklenburg

Fisheries – Living Marine Resources

- “Slow” development in Western Arctic – Eastern to the ice edge
- “Fast” detection of northward expansion of fish/ regulatory response in US
- “Large” scale, e.g., EEZ wide closure
- “Small” scale fisheries continue for subsistence/ declining

[Note 75X More THAN REPORTED to FAO (Nature 2011)]!

Slow/Fast

- Arctic Indigenous peoples have long been seen as slow in adaptation to “modern” ways.
- Fisheries, e.g., among the best documented. [Zellner et al. various]
- Subsistence fisheries important among many hunting and gathering activities, e.g., whaling, sealing, reindeer hunting, etc.
- Key fisheries for food for sled dogs
- With advent of mechanized “dogs” less subsistence fishery.

Large/Small

- Large interacting ecosystem – sea birds, marine mammals, fish, invertebrates on which subsistence life relies
- Small scale of indigenous people fishing and hunting. Guiding for polar bear hunts $40-60,000 /trip.

ACIA FISHERIES Primary Tasks Before Social and Economic Impact Assessment

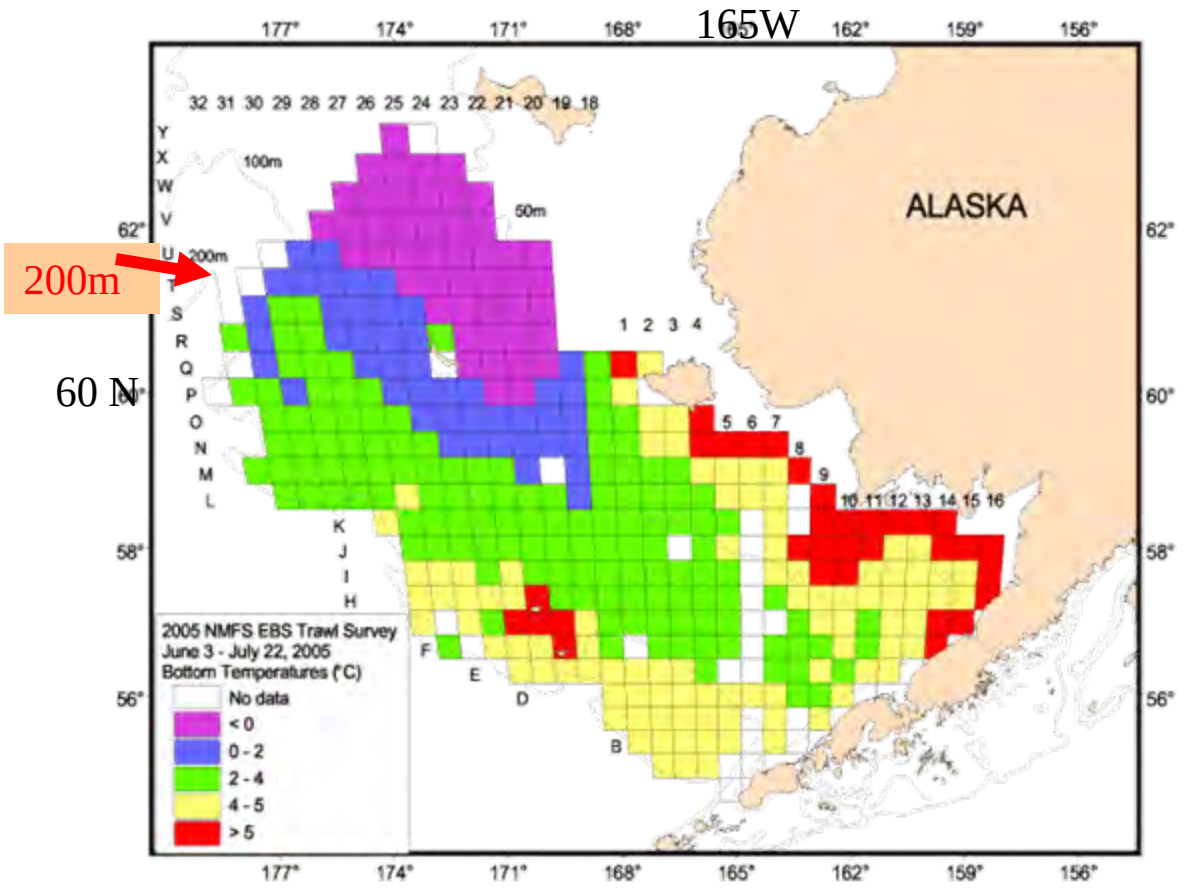
- Identifying the possible effects of climate change on selected fish stocks and their fisheries in the Arctic.
- Assessing the effects of climate change on commercial fisheries and the impacts on society as a whole. [See Chapters 9, 10 and 11 for fish and indigenous peoples].
- Aquaculture is of minor importance

Commercial Fishing - BS

- “Slow” start relative to rest of world
- “Fast” shifts experienced in Bering Sea [PDO] Regime Shifts
- “Large” area for fishing
- “Small” parts especially important for species and fishing, e.g., right whale feeding grounds

Summary of Anticipated Fisheries Effects

- **Increased subarctic habitat**
- **Increased pollock ?, Pacific cod + arrowtooth flounder abundance**
- **Decreased crab abundance**



Mundy 2007 with permission

Possible Future Climate Influence

- Assume that current fishery management practices [conservative] continue.
- Under a warming scenario would expect that Pacific salmon, pollock, Pacific cod, Tanner crab, and certain flatfish would find favorable conditions.
- Under a warming scenario would expect that king crab, shrimp, capelin, Greenland turbot, squid, and marine mammal dependent species, etc. would decrease.
- Mechanisms causing change are not well understood and require research and monitoring

Table 12.5.2. Trends in Abundance and Value in Major Alaska Fisheries (Inflation Adjusted Dollars)*

Species	Stock 1977	Value 1977	Stock 2001	Value 2001	Discussion
Salmon	200 million fish	500 million $ with peak value in 1988 of 1.18 billion $	175 million fish	205 million $	A small decrease in total catch but a large decrease in price due to competition with farm raised fish.
Groundfish	Very small US harvest	2-3 million $ but rapidly increasing to 1.0 billion $ in 1988 as a result of American-ization	1.65 m.t. million harvest	400 million $	Whitefish markets strong yet price weak but $ also weak.
Shellfish [primarily crab species but some shrimp in early years]	Red king crab strong other species small harvests	440 million $ drops when RKC bubble bursts but Opilio crab takes over	Most species at low levels	125 million $	Strong competition in Opilio from Eastern Canada but weak competition from Russia
Pacific halibut	Low catch most likely due to foreign fleet bycatch	Less than 30 million $	High levels of halibut abundance	150 million $	Strong stocks and good price vis a vis other white fish
Herring	Low abundance	Less than 30 million $ although value increased in mid 1980s / mid 1990s to 50+ million $	Low abundance	less than 30 million $	Herring in same situation

Source: ADFG as cited by Pacific Fishing, January 2002.

Socio-Economic Variability

- Major adjustments in fishing due to changes in fisheries regimes as a result of LOS III
- Adaptations to changes in relative commercial fish abundance
- Strong decrease in commercial use of marine mammals [and seabirds]
- Ripple effects through communities with different impacts depending on type and location of fishing fleet base and landing areas

NPFMC – Precautionary Response to Climate Change

June 2006 Requested Congress to memorialize intent to develop cooperative regime for fishery management in Arctic region in light of climate change.

110TH CONGRESS
1ST SESSION S. J. RES. 17
October 2007 passed

Directing the United States to initiate international discussions and take necessary steps with other Nations to negotiate an agreement for managing migratory and transboundary fish stocks in the Arctic Ocean.

2008 Preliminary talks

NPFMC – Precautionary Response to Climate Change

October 2006 Request staff "white paper"

December 2007 Reviewed "Artic Fishery White Paper"

April 2007 Revised Artic Fishery White Paper

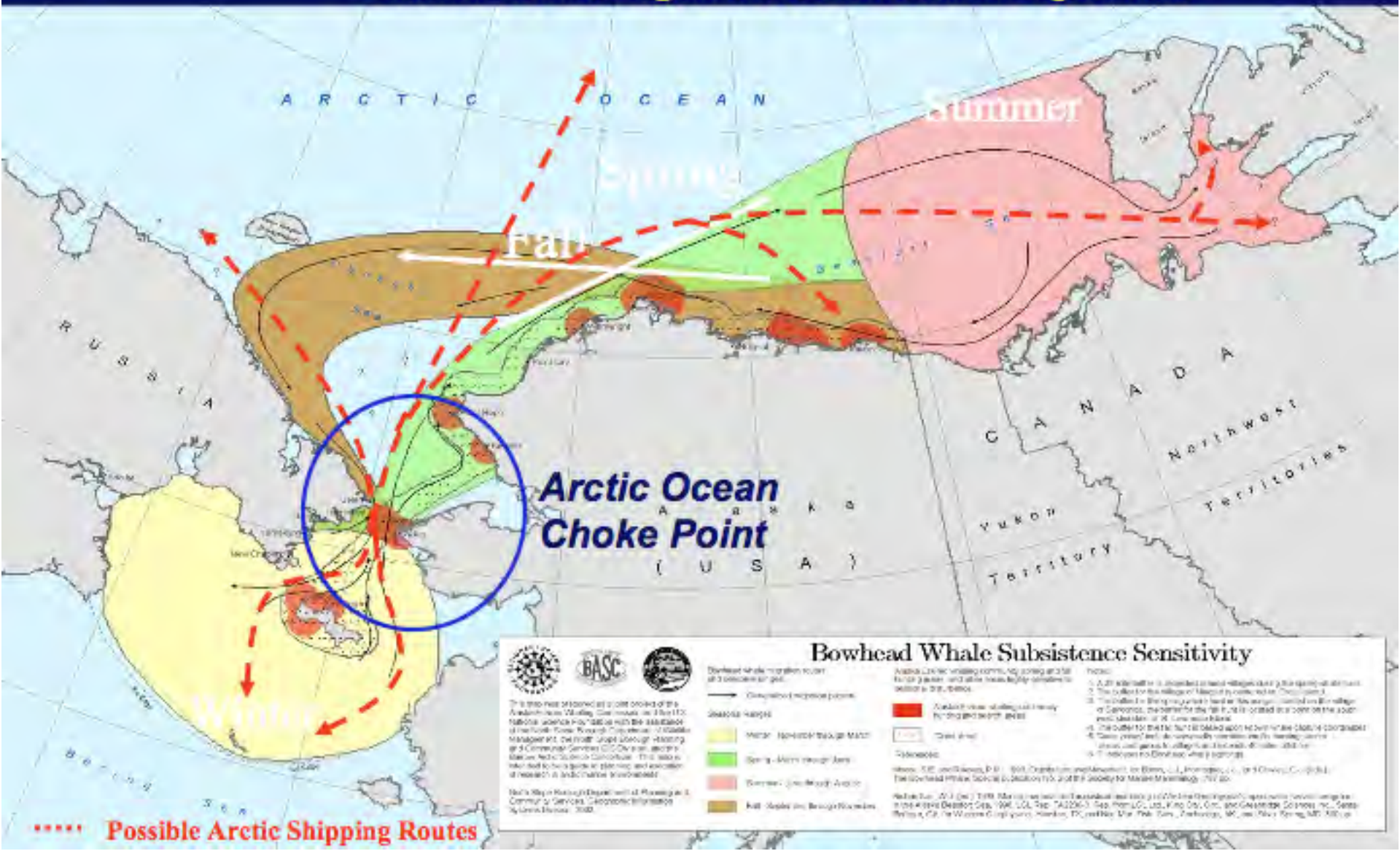
June 2007 began development of Fishery Management Plan to close US EEZ in Northern Bering and Chukchi Seas to fishing with test fishing under an "experimental fisheries permit" only.

December 2008 Final Action – closure

Assessing Social and Economic Impacts at Multiple Scales/ Rates

‘Wild Card’ Issue 1 ~ Multiple Ocean Use Management & Enforcement

Bowhead Whale Migrations & Arctic Marine Operations



US ARCTIC POLICY

- Meet homeland security needs
- Protect and conserve Arctic resources/envt.
- Ensure that resource management and economic development are sustainable
- Strengthen cooperation among 8 nations
- Involve Arctic's indigenous communities in decisions that affect them
- Enhance scientific monitoring and research

SIA/Economic Assessment

"In practice, industrial projects themselves could be affected by the changes in economics and politics at both local and global scales, which may lead to consequences that could hardly be foreseen in detail during a single phase of a given social (or economic) assessment. " (Meschtyb et al. 2005).

SIA/Economic Assessment

"A specific SIA should be prepared for each project, with possibilities for further monitoring of the different stages of the project.

It is…. important to pay attention to and investigate different vectors of the steadily changing Arctic, which include not only industrial development, but also other aspects of global change."(Meschtyb et al. 2005).

Slow/Fast. Large/Small

A wide range of social and economic assessments are required.

Climate change requires global IPCC scope

Coastal Alaskan village – small scale but many locations.

Tendency to require project level impact assessments but need cumulative impacts

Societal comparisons 50 years out!

Aleutian Islands Fishery Ecosystem Plan