



U.S. Arctic Research Policy:

What do we need to know now?

Mead Treadwell, Chair
U.S. Arctic Research Commission
Third Symposium: Impacts of an Ice-Diminishing
Arctic on Naval and Maritime Operations
Annapolis, MD – June 9, 2009



US ARCTIC RESEARCH COMMISSION



Mead Treadwell, Chair



Michele Longo Eder



Helvi Sandvik



Virgil (Buck) Sharpton



Vera Kingeekuk Metcalf



Warren Zapol



Charles Vörösmarty



US Arctic Research... strategic knowledge

... ~ \$400M/yr across >15 federal agencies

...cooperating with over a dozen nations

...using research infrastructure worth billions

...completing 2007-2009 International Polar
Year

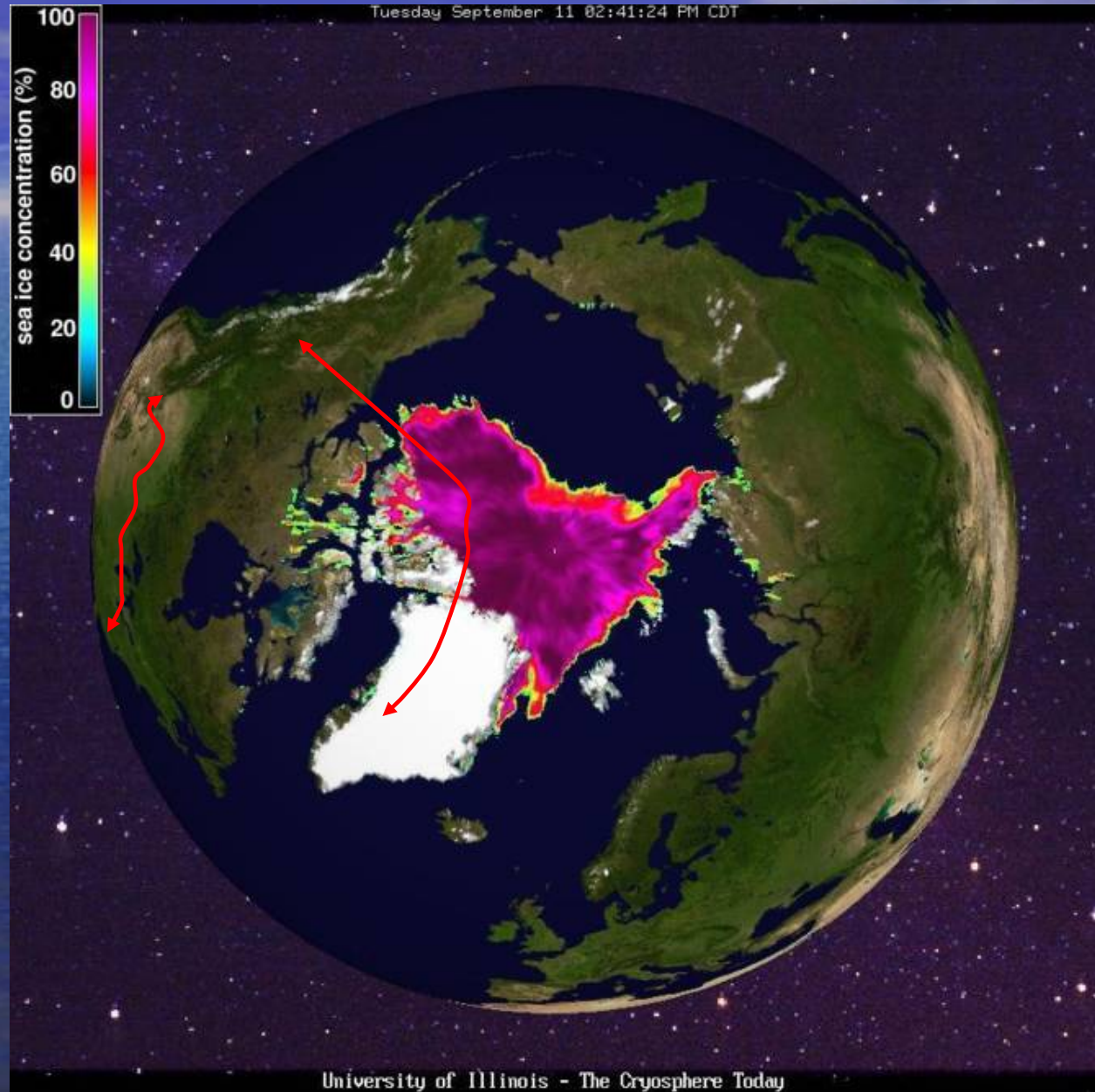


Today's talk

- Update: events since 2007
- U.S. Arctic Policy
- U.S. Arctic Research Goals
- What do we need to know now?

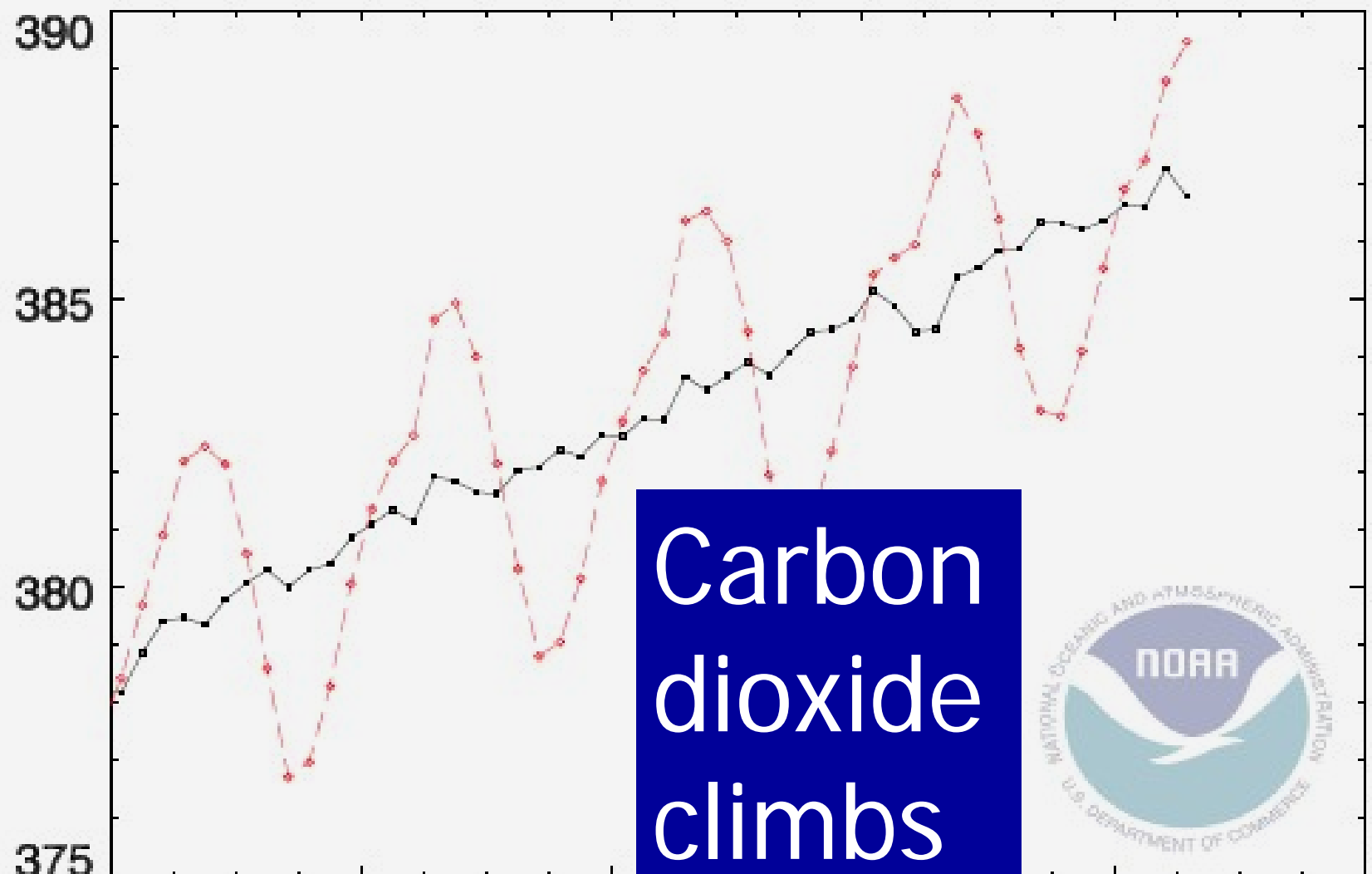
11 September 2007

Arctic ice
retreat –
minimum
coverage
and
thickness



RECENT MONTHLY MEAN CO₂ AT MAUNA LOA

PARTS PER MILLION



Carbon dioxide climbs

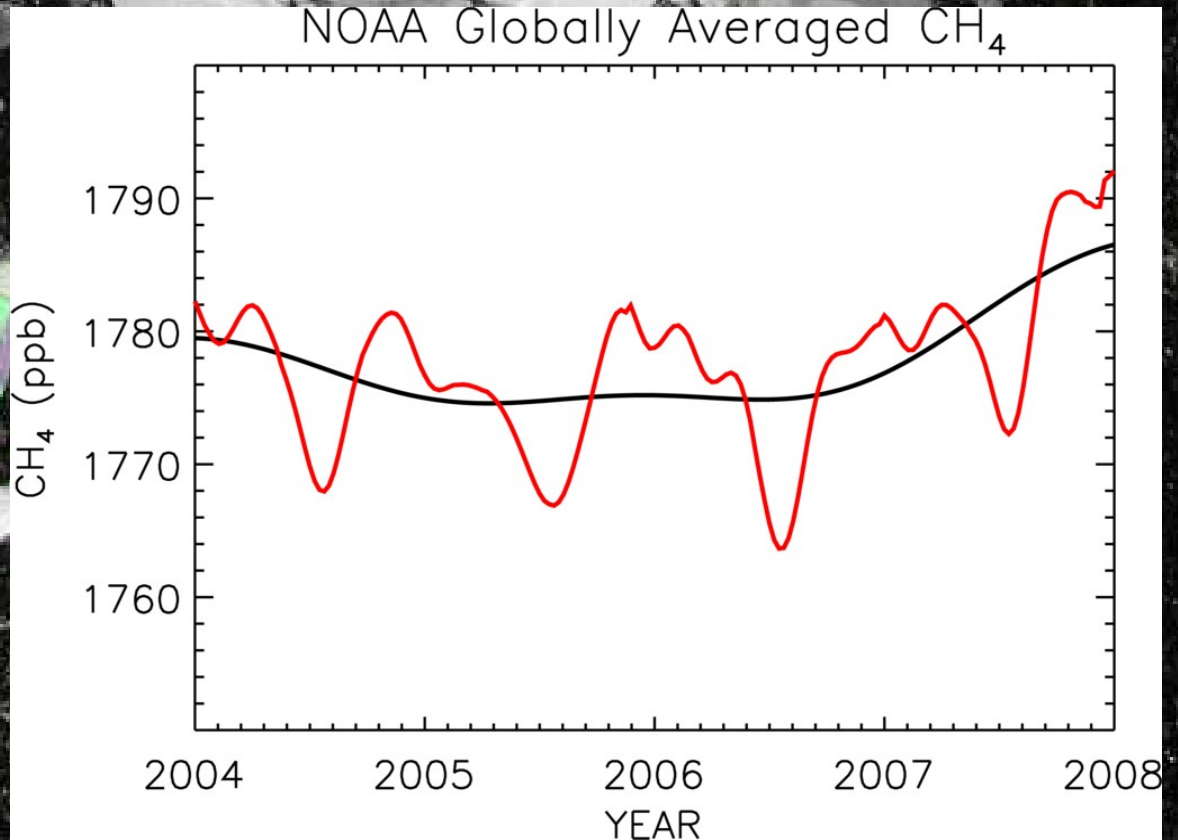
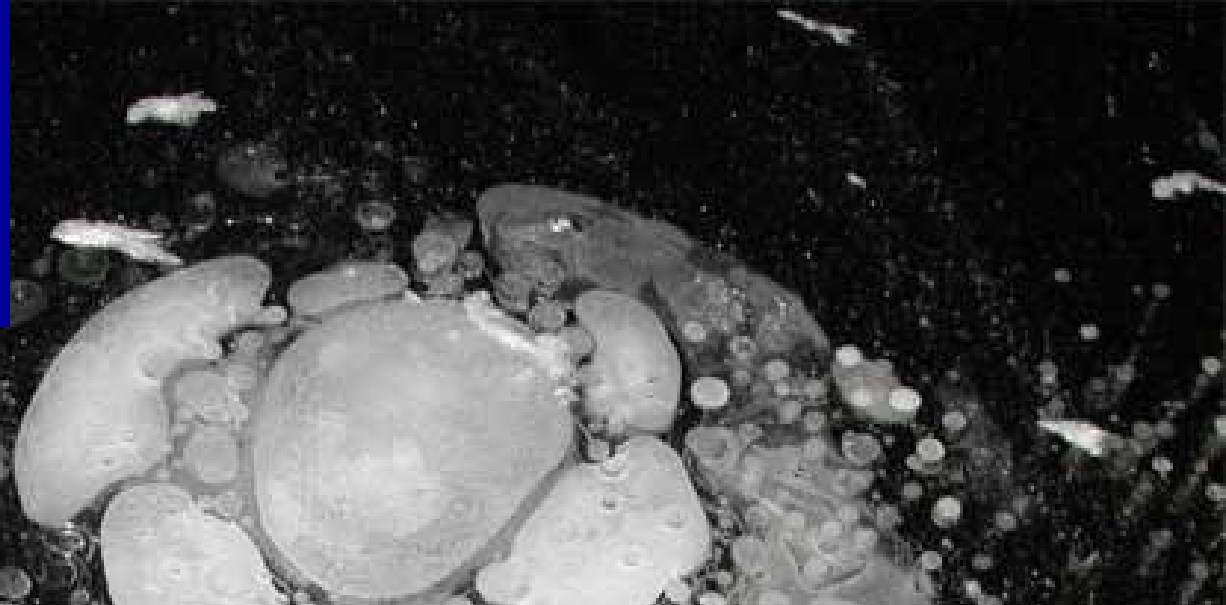


May 2009

2005 2006 2007 2008 2009 2010

YEAR

Methane spikes...



Permafrost degradation - NPRA, Alaska



Beaches
erode...



Ocean Acidification Potential Fishery Effect

NAS Acidification Study

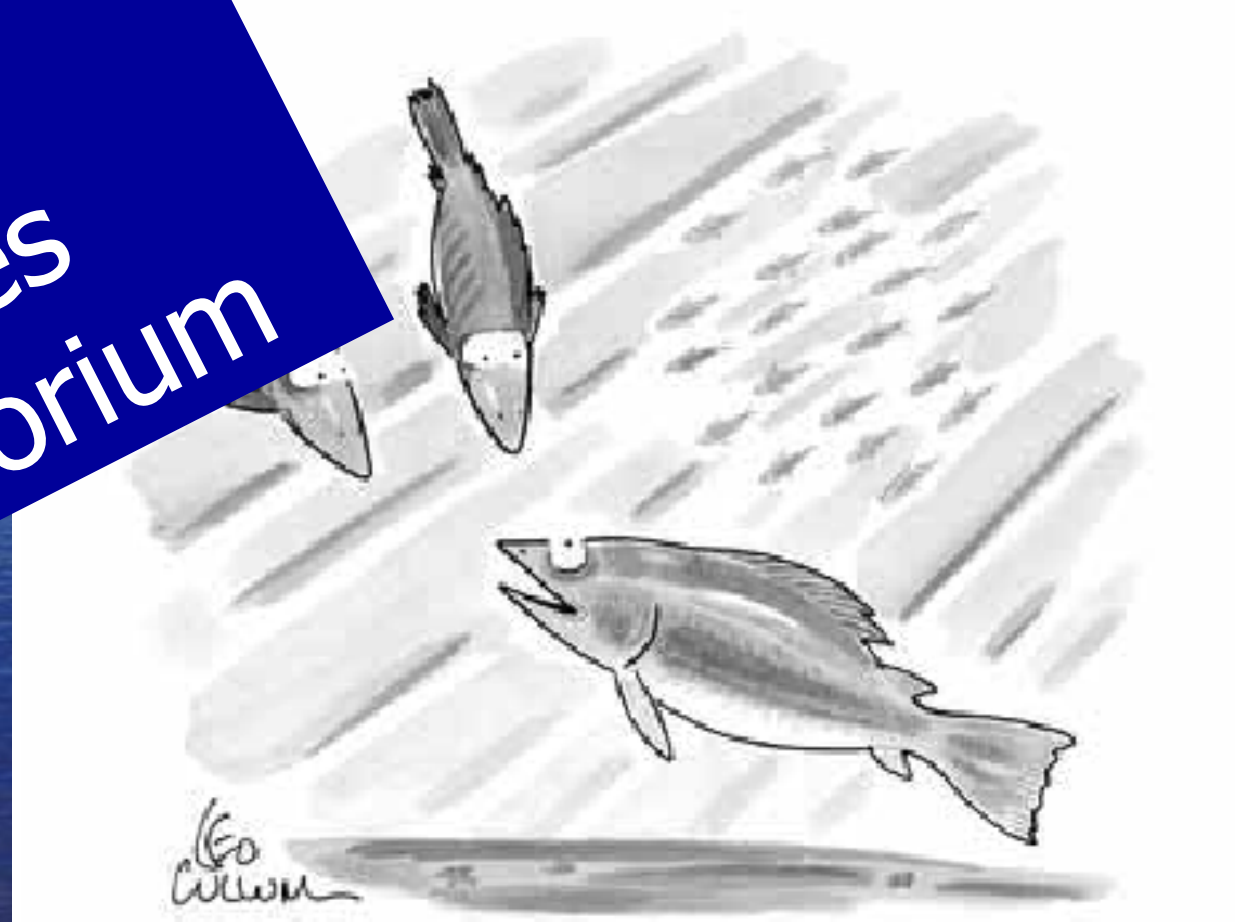
- ... a projected
... mean pH change
... the current century.
- ~15% reduction in growth and ~67% reduction in survival when pH was reduced 0.5 units.



M. Litzow and J. Short, AFSC



**NPFMC
Arctic
Fisheries
Moratorium**



*"I'm not sure what I am, but I believe
I'm a product of Norway."*

Polar Bears:
ESA
threatened
listing



Ice-dependent seals

Ringed seals



Pups in under-snow lairs in coastal fast ice:
feeds in water column/under ice

Bearded seals



Pups/feeds in pack ice zone over shelf,
in areas of rich benthic productivity

Varying dependence on sea ice

Pups/molts in marginal ice zone, perhaps as a predator avoidance strategy



Ribbon seals

Pups in pack ice – uses land haulout sites during summer



Spotted seals



IPY Legacy...

TOWARD AN INTEGRATED

ARCTIC OBSERVING NETWORK



NATIONAL RESEARCH COUNCIL
OF THE NATIONAL ACADEMIES

USGS Arctic Oil and Gas Assessment

PETROLEUM POTENTIAL OF ASSESSMENT UNITS AND PROVINCES IN THE CIRCUM-ARCTIC

In the Circum-Arctic Resource Appraisal (CARA), 33 provinces were evaluated, of which 25 were judged to have a 10-percent or less probability of at least one significant undiscovered petroleum accumulation at any continental assessment unit (CAU) and were therefore quantitatively assessed. Shown in three steps are the relative probabilities for all assessment units assessed and the unassessed relative potentials for undiscovered oil and gas in the assessed provinces.

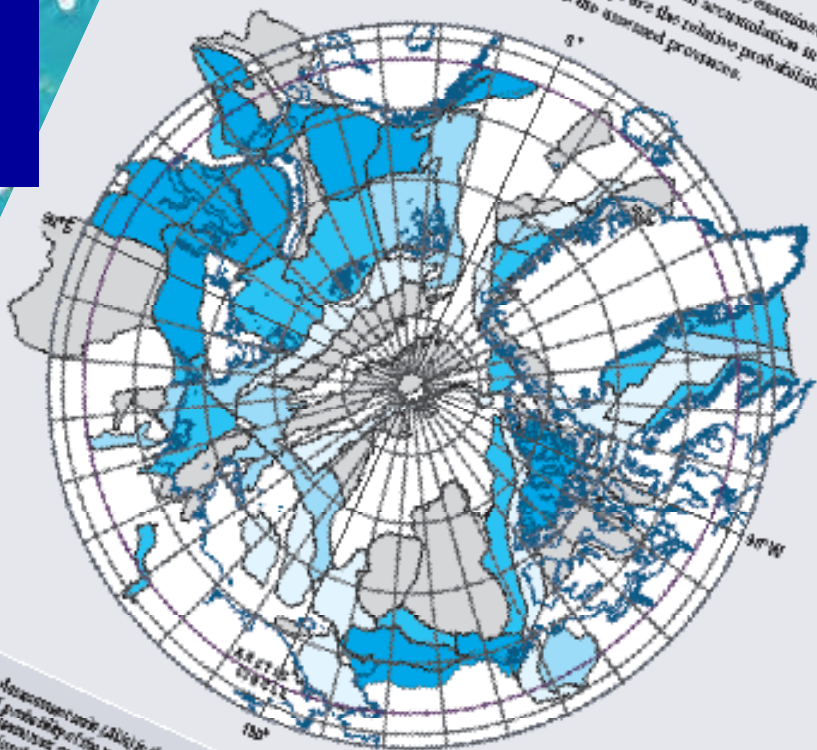
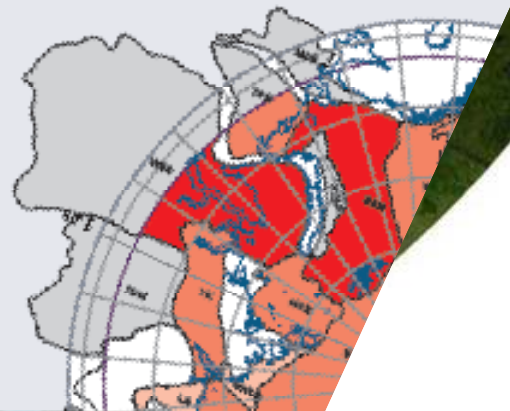


Figure 1. Assessment units (AU) in the Circum-Arctic Resource Appraisal (CARA) color-coded by assessed probability of the presence of at least one significant accumulation of any oil, natural gas, or coal seam gas (methane) in any assessment unit (CAU). Shaded areas for AU are based on the area of the AU, including any part of the Arctic Ocean.

PROBABILITY (percent)	Color
100	Dark Blue
50-100	Medium Blue
30-50	Light Blue
10-30	Very Light Blue
<10	White

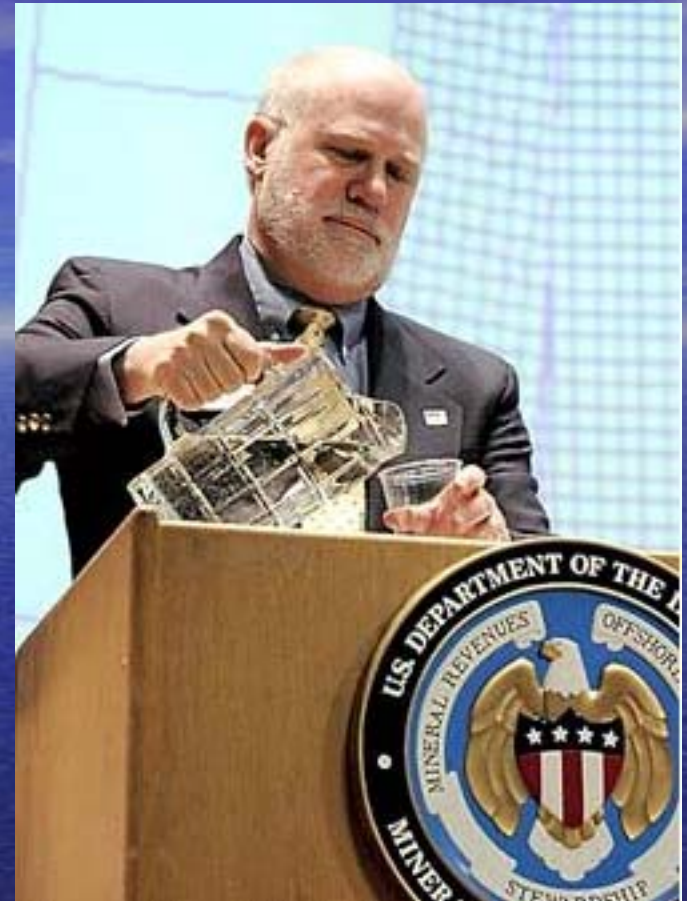
Area of low petroleum potential



Record \$2.7 billion bid for Alaska oil and gas leases

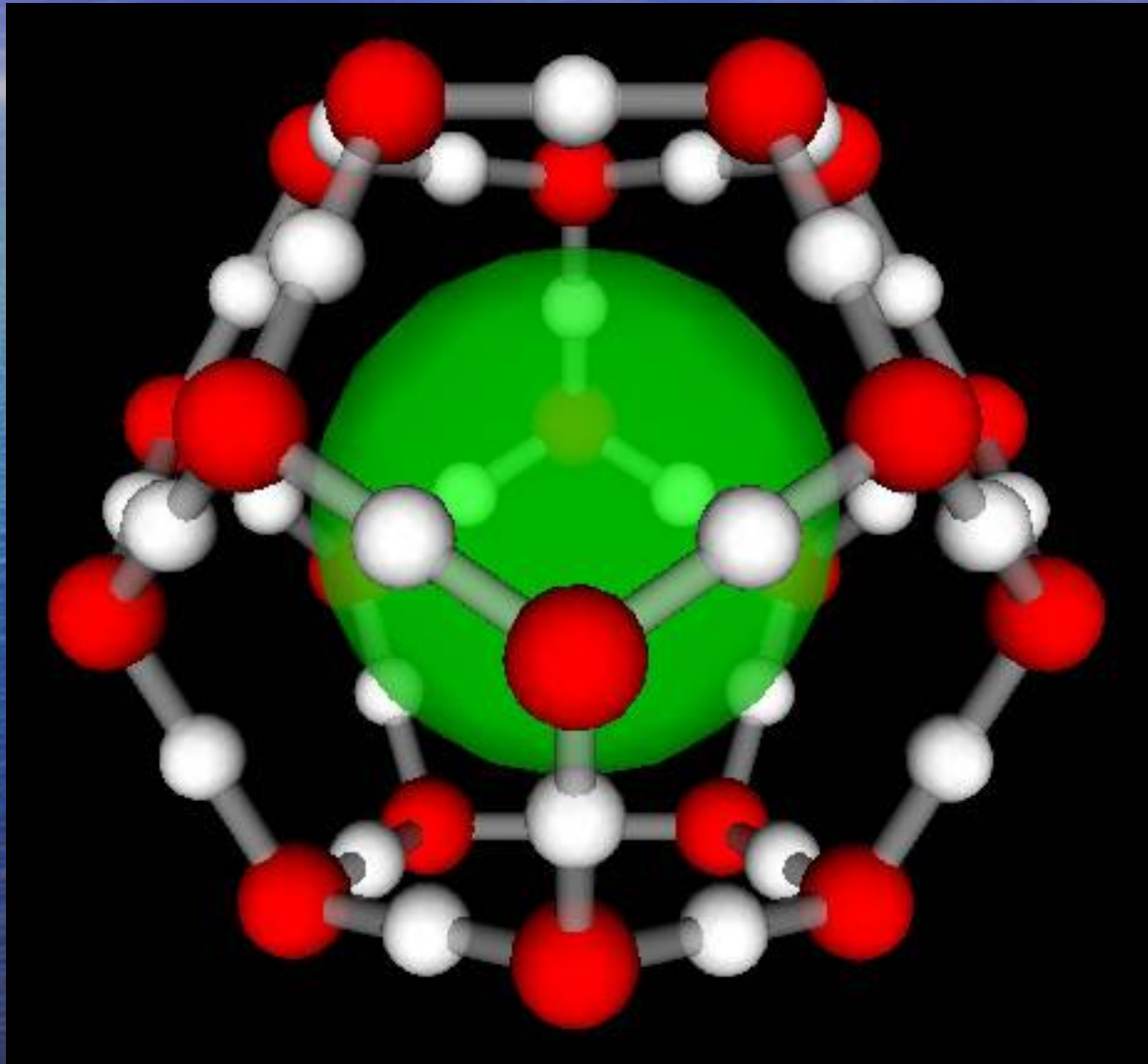


RON ENGSTROM / Anchorage Daily News

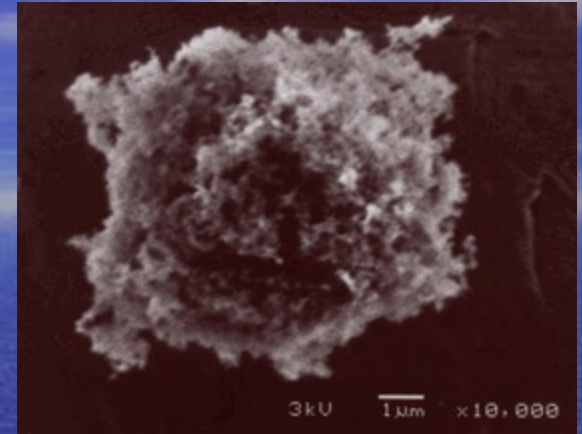


Minerals Management Service's Alaska Regional Director John Goll pours a glass of water before reading the 667 lease sale bids for the Chukchi Sea that totaled \$2.66 billion, the largest lease sale in Alaska's history. Photo/Rob Stapleton/AJOC

Gas Hydrate Research



Is soot causing Arctic amplification?



Arctic Council
Black Carbon Task
Force, 2009

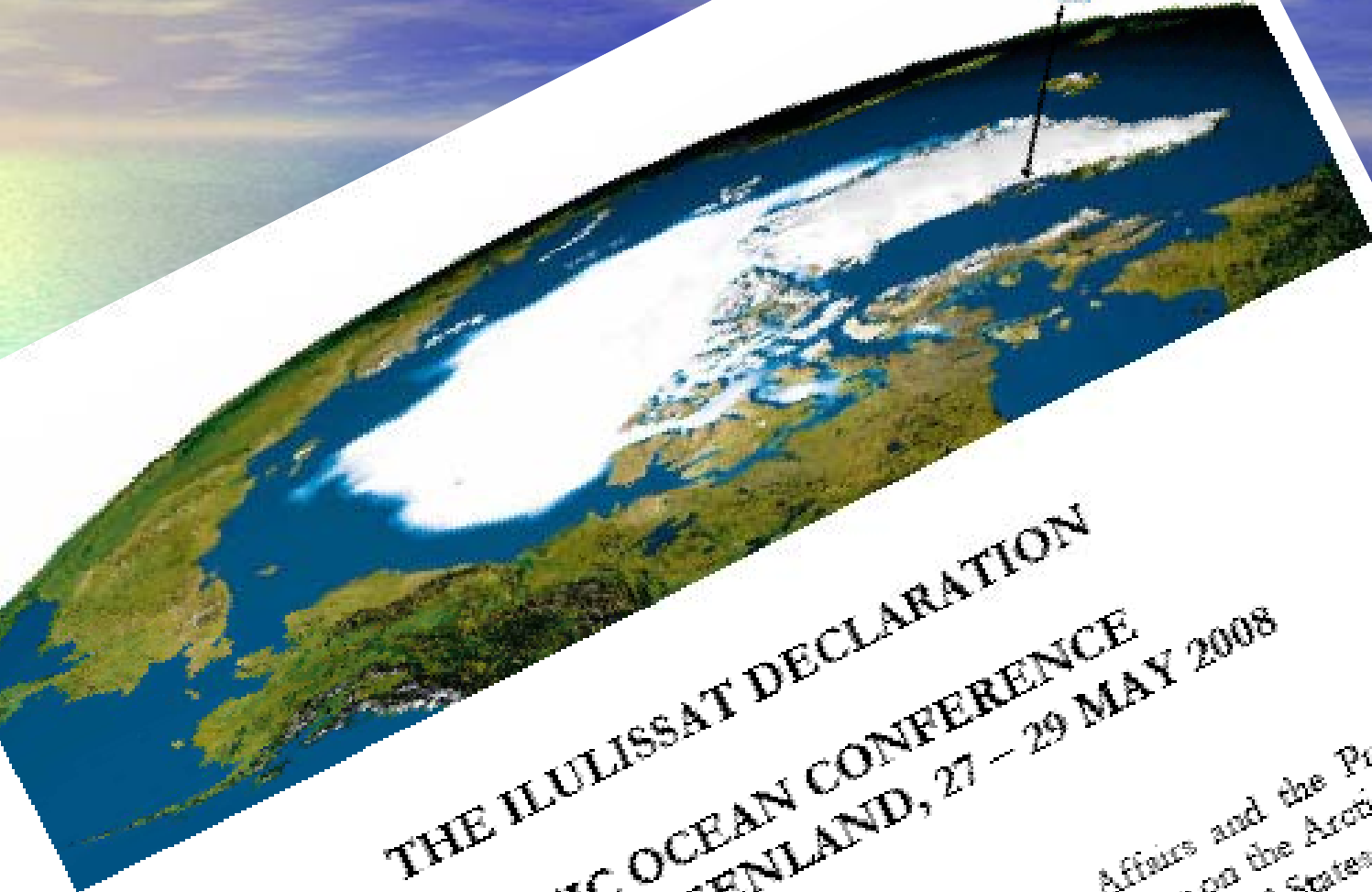


Sovereign Rights and Jurisdiction



- 1) North Pole
- 2) Lomonosov Ridge
- 3) 200 nautical mile line
- 4) Russian-claimed ECS
- 5) EEZ & CS Dispute

28 May 2008



THE ILULISSAT DECLARATION

ARCTIC OCEAN CONFERENCE
ILULISSAT, GREENLAND, 27 – 29 MAY 2008

British Minister for Foreign Affairs and the Premier of
five coastal States bordering on the Arctic Ocean –
Federation and the United States of America –
2008 in Ilulissat, Greenland, to hold
Climate change and
the livelihoods
of

Arctic Council
Arctic Marine Shipping
Assessment 2009 Report



ARCTIC COUNCIL
The High Arctic Commission
2009

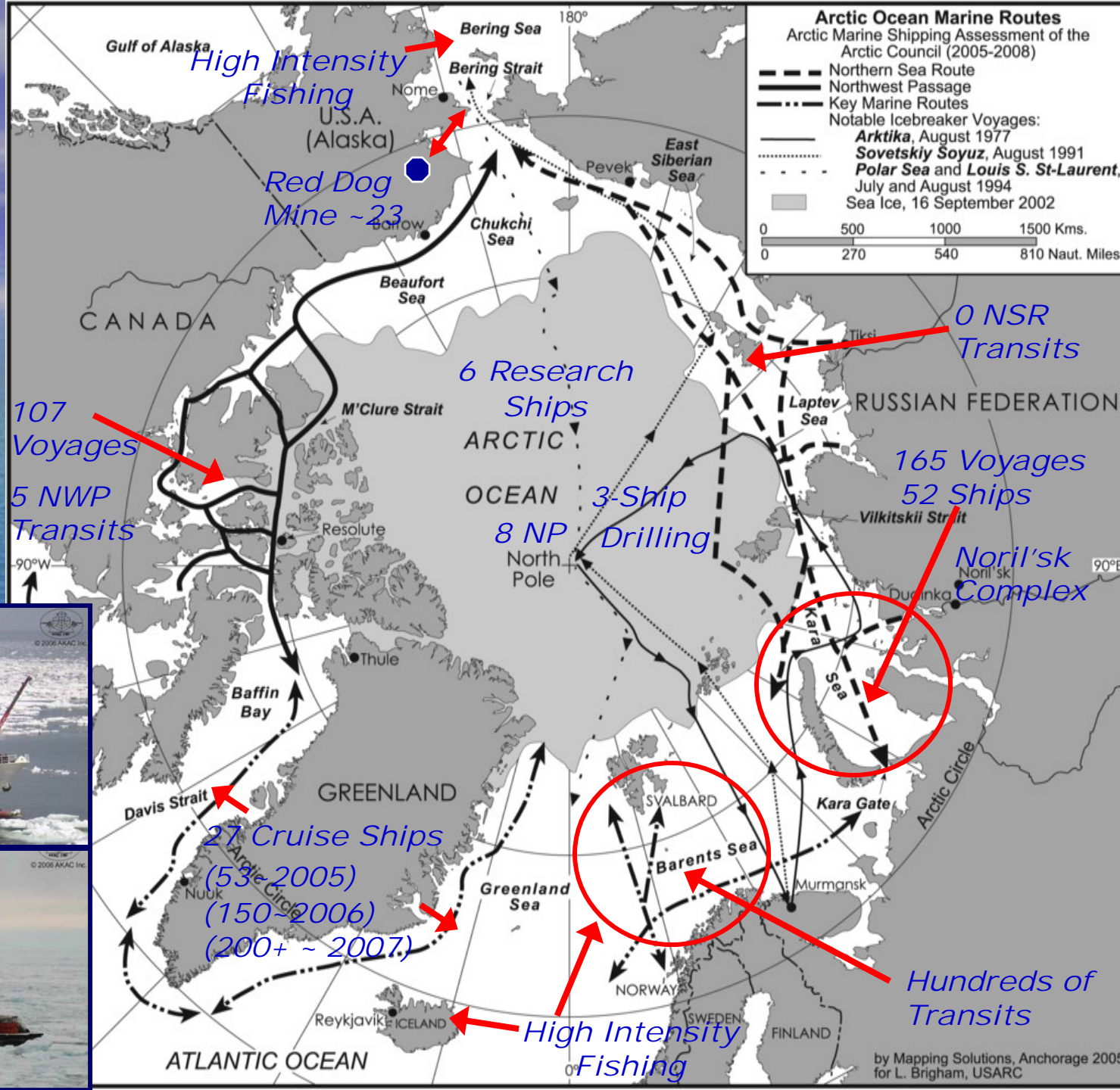
PAME
Polar Marine Assessment

The Maritime Arctic of Today

Snapshot of Summer 2004 Traffic:
~ 5475 Ships

Modes of Arctic Marine Transport

- Destinational & Regional
- Trans-Arctic
- Trans-Arctic with Transshipment
- Intra-Arctic



Joint industry program on oil spill contingency for Arctic and ice covered waters.

FULL SCALE OFFSHORE FIELD EXPERIMENT 2009. FEX 2009 HANDBOOK

Activities, resources and safety procedures.



New US Arctic Policy

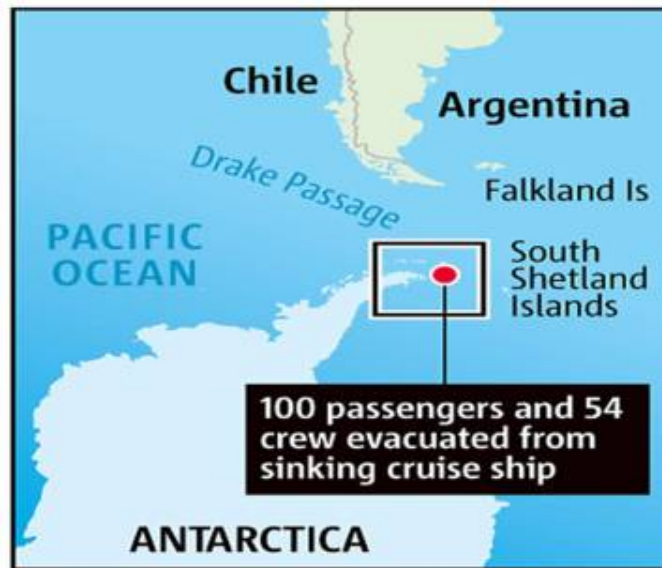
- National security/homeland security needs
- Protect environment/conserve biological resources
- Environmentally sustainable resource management and development
- Strengthen institutions for international cooperation; ratify Law of the Sea
- Involve indigenous communities in decisions
- Enhance scientific monitoring and research into local, regional and global environmental issues



Having a safe, secure and reliable Arctic shipping regime is vital to the proper development of Arctic resources, especially now given the extent of Arctic ice retreat we witnessed this past summer...We can have such a regime only through cooperation, not competition, among Arctic nations. Denial of passage through international waterways, even though they may be territorial waters, and burdensome transit requirements will not benefit any nation in the long run.”

-- Assistant Secretary of State Daniel S. Sullivan, 10/15/2007

“Stricken cruise ship off Antarctica evacuated” MSNBC-11/23/07





USARC ECUMENICAL BELIEF



- The United States must maintain its global maritime capability—as a government AND as a Nation
- If the U.S. does not exercise its visible maritime presence in the Arctic Ocean—we cede it to whomever wants it!

US Arctic Policy: Implementation

- Climate change: mitigation, adaptation, Arctic feedbacks, alternative energy, sequestration, Black Carbon Task Force
- National security/homeland security: moving the Coast Guard north; providing new icebreakers
- Protect environment/conserve biological resources: OCS review; Arctic fishing moratorium; oil spill research
- Environmentally sustainable resource management and development: gas pipeline
- Institutions for international cooperation: ratify Law of the Sea; "safe, secure, reliable" shipping: IMO code/SAR
- Involve indigenous communities in decisions: IARPC
- Enhance scientific monitoring and research into local, regional and global environmental issues



REPORT ON
GOALS AND
OBJECTIVES FOR
ARCTIC RESEARCH
2009



Research Themes

- Environmental Change of the Arctic & Bering Seas
- Arctic Human Health
- Civil Infrastructure
- Natural Resource Assessment & Earth Science
- Indigenous Languages, Identities, Cultures



What do we need to know from here?

- Oil Spill Research program
- AMSA identified research needs
- Policy approaches to shipping cooperation



WWF for a living planet®



Oil Spill

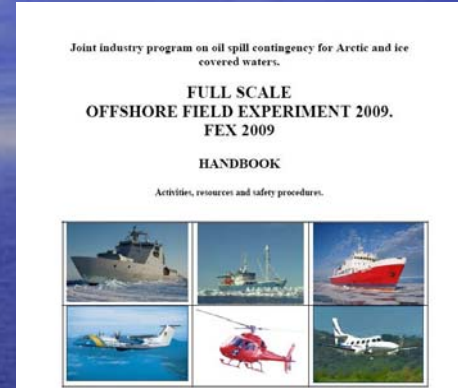
Response Challenges
in Arctic Waters

- Oil industry pays nickel a barrel to response fund
- Interagency committee seldom meets
- US spill research program is way behind promise of Oil Pollution Act of 1990

FEX 2009: 6 projects & 11 separate experiments

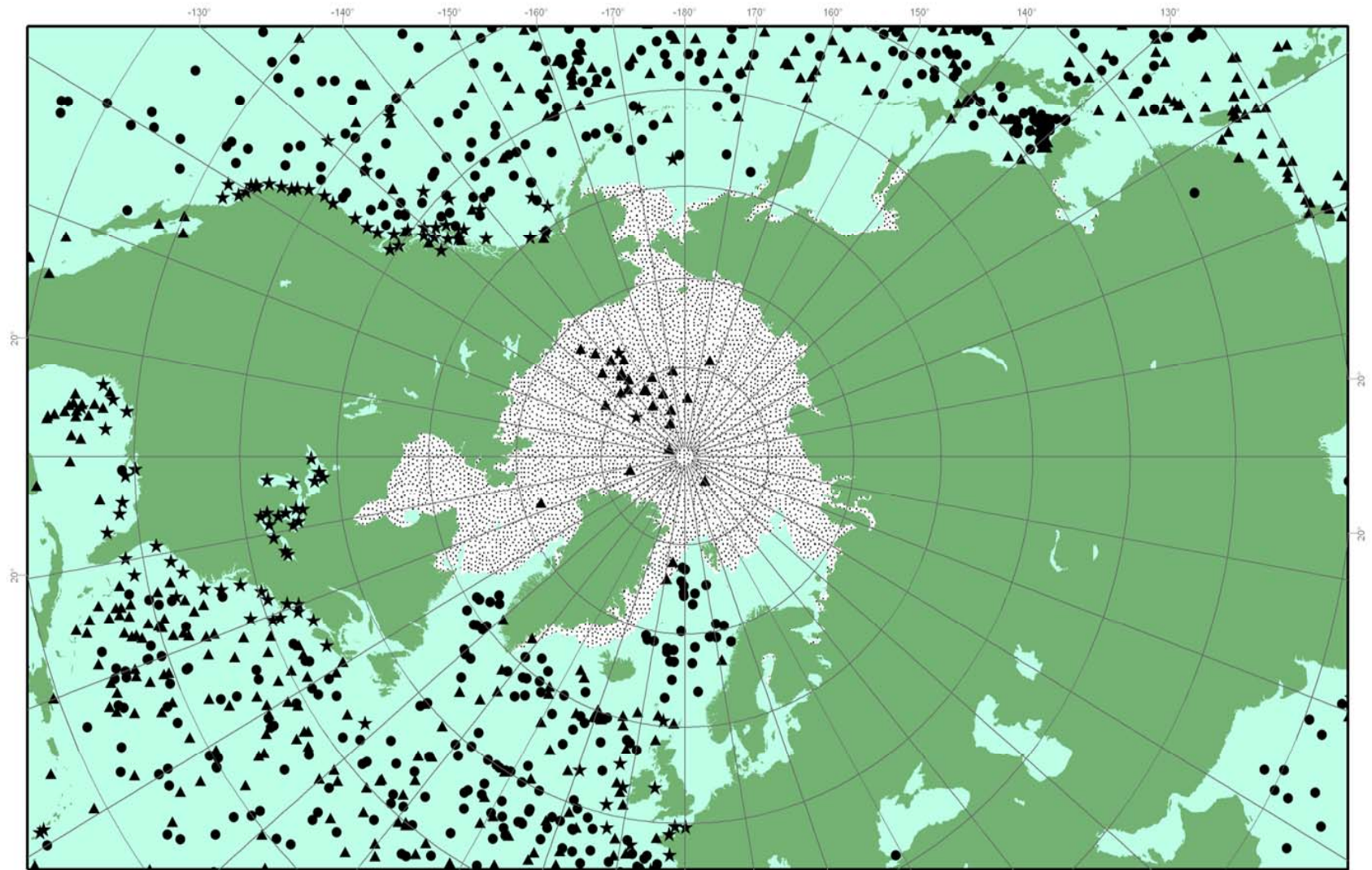
A total release of stabilized crude of 20 m³:

- Half will be treated by burning
- 15% by dispersants
- 35% will be used in the largest experiment
 - 40 % of this oil will evaporate during the first 24-36 hours while the remaining 60 % (4-5 m³) will have to be taken care of by mechanical recovery and absorbents at the end of the experiment.
- A total release of 5 m³ of emulsified oil (50 % water). This oil will be reused in approximately 4 different experiments. Experience from the 2008 experiment shows that the oil used in this type of experiment will be recovered to almost 100%.



AMSA identified research needs

- *Arctic Marine Geography & History of Arctic Marine Transport*
- *Governance of Shipping & International Cooperation*
- *Shipping Economics, Future Development & Arctic Marine Technology*
- *Human Dimension & Indigenous Perspectives*
- *Arctic Environment & Impacts*
- *Arctic Marine Infrastructure & Regional Studies*



Arctic Ocean Observations,
status as of November 2005

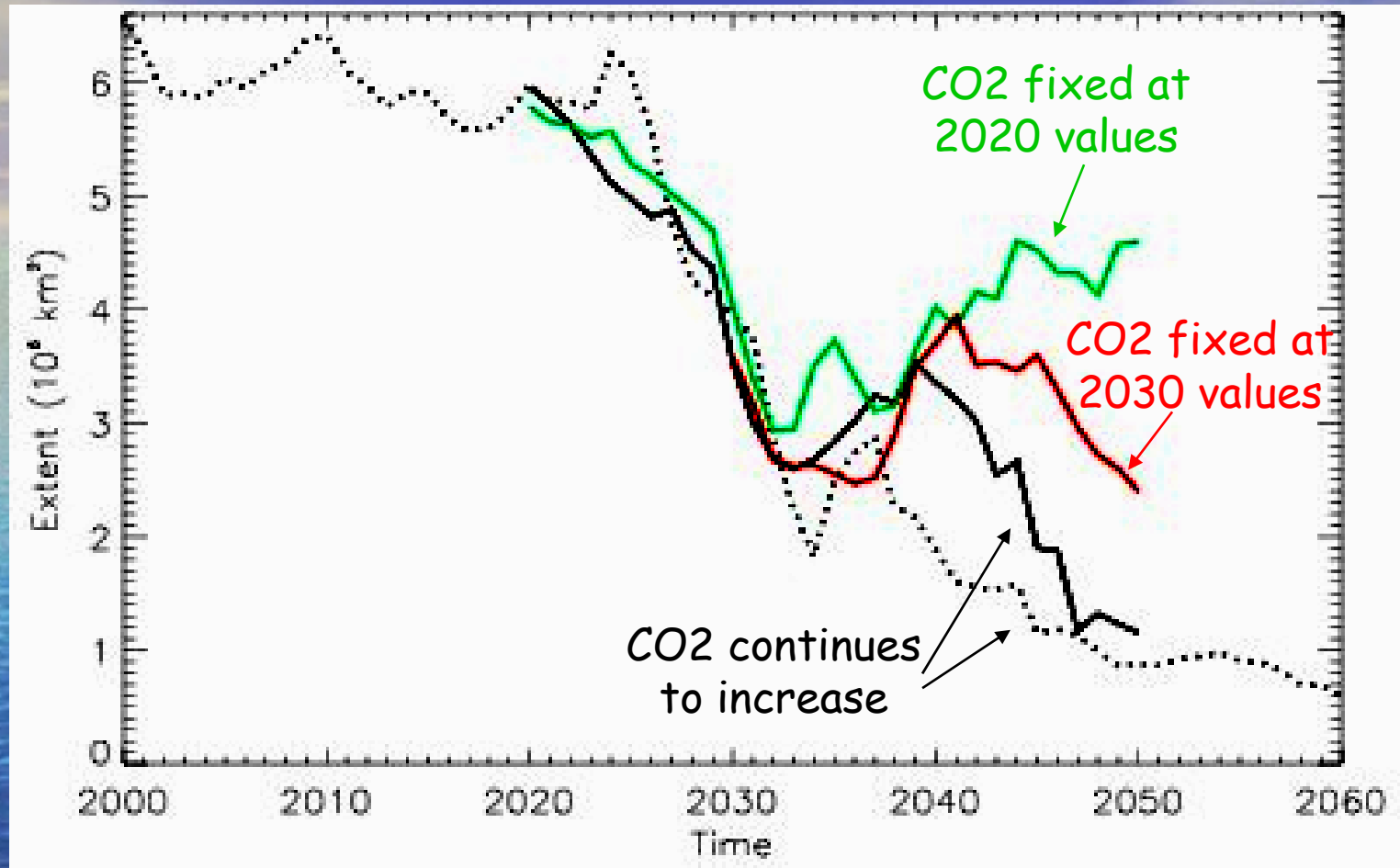
<http://www.jcommops.org>

Ice Edge

- ▲ Drifting Buoy
- ★ Moored Buoy
- Argo Float

But there are many gaps...

Have we passed a point of no return?



Preliminary model results suggest

- that sea ice can recover if CO_2 levels fixed/decline
- that a seasonally ice-free Arctic might be avoidable.
- May depend on when/for what ice state this occurs.

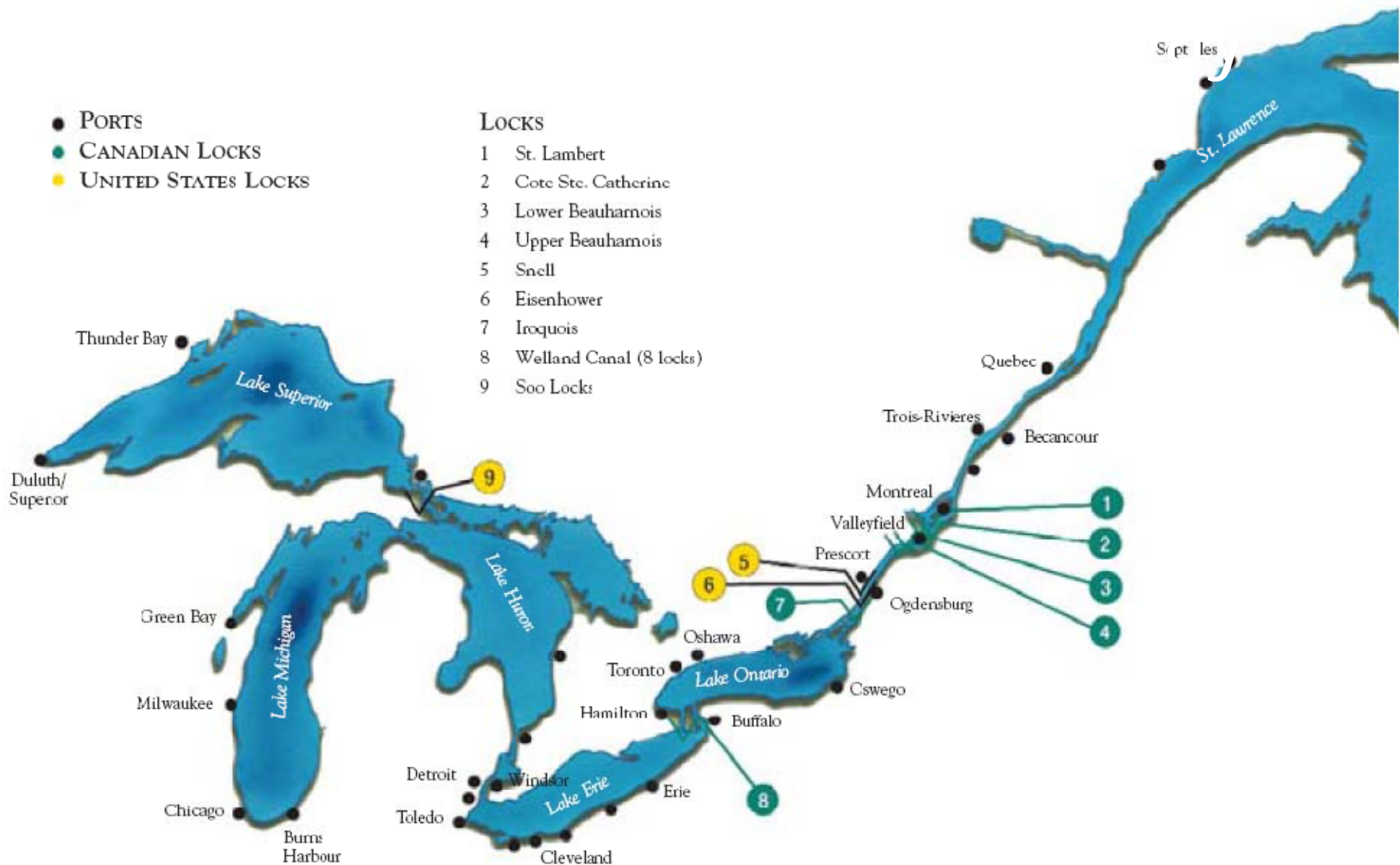
Black Carbon Task Force

- Commissioned by Arctic Council Ministers last month
- Soot, in all its forms, may be major contributor to Arctic ice melting
- Primary sources: industrial output, open fires: wildfire, agricultural waste, cooking fires

- PORTS
- CANADIAN LOCKS
- UNITED STATES LOCKS

LOCKS

- 1 St. Lambert
- 2 Cote Ste. Catherine
- 3 Lower Beauharnois
- 4 Upper Beauharnois
- 5 Snell
- 6 Eisenhower
- 7 Iroquois
- 8 Welland Canal (8 locks)
- 9 Soo Locks



Thanks...

jfarrell@arctic.gov

meadwell@alaska.net

