Responses of Arctic Marine Ecosystems to Climate Change
Where do we go from here?

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Outline

• Recap of high points of conference
• What’s at stake?
• The tool box
• A pathway forward
“Step Change” noted in 2000-2002 then lowest sea ice extent recorded in September 2012

50% reduction in ice extent

“Step Change” in multi-year ice noted in 2008. Lowest amount ever recorded in 2012 with a 75% loss in volume

Photo: National Geographic
POLICY

“The American Lifestyle is not up for negotiation.”
- George H.W. Bush (Earth Summit, Rio de Janeiro, 1992)

- “The Arctic will be used” – it’s not all about conservation and protection *sustainable use*

- “Many key decisions (about the Arctic) will be made by 2020”

Messaging: how can scientists better communicate results and needs to the public, managers and policymakers
Productivity in the Arctic

The future: ~2035 NO summer sea ice
What happens to productivity?

Forecasts for a 30% increase in annual production
**but we are approaching this level NOW in the shallow OCS**

The timing of spring algal blooms is happening earlier and earlier

Consequences for the dependent species and the ecosystem, in general?
“Polar Bears are repackaged arctic cod.”

-Divoky

Arctic cod may serve as “bellwethers” of climate change
Piscivorous to planktonic shift
And what about changes we cannot see with our eyes?

Ocean acidification
Impacts on HUMANS

“Humans are an ice-dependent species!”
WHAT IS AT STAKE?

• Humans/cultures:
  Winter storms, ice changes making hunting dangerous or impossible, reduced access to subsistence resources and increased risk and reduced hunting efficiency, shipping and fisheries interest.

• Wildlife

• Infrastructure/economy

• The “rest of the country”: What gets their attention? Sea level rise? Maybe. Increased severity of storms? To some extent.
THE TOOLBOX
What’s in the box?

• Policy

• Management Strategies
  - Social and economic dimensions cannot be ignored

• Innovative Approaches
  - Need NEW ways to evaluate impacts
  - Need ways to un-confound impacts from human uses and climate change

• Collaborative Efforts
  - Data sharing agreements, IAM, BREA, PacMARS, SOAR
A PATH FORWARD
• Greater emphasis and coordination of research related to climate change and its effects on subsistence;

• Develop policy measures that help build resilience in local communities;

• Support and strengthen co-management groups so they can play a strong role in relaying local concerns (and potentially TK) across multiple levels of political organizations;

• Document local observations of climate change and talk to local people about what they think are useful strategies for dealing with climate change; and

• Establish community-based monitoring projects that incorporate both Western science and TEK.
Wildlife

• Design and support policy measures and management strategies that protect populations at risk
  • Not uniformly popular
  • Questionable efficacy in some cases

• Conduct research to better understand the Arctic ecosystem holistically

• Collect information on how underlying ecosystem productivity changes with sea ice loss and its impact on arctic species

• Develop methods to un-confound human and climate change impacts

• Researchers need to communicate needs/research gaps
Infrastructure/economy

• Determine infrastructure need priorities for Arctic research

• Implement transparent, inclusive, and comprehensive planning and include communities and commercial stakeholders in the decision-making process

• Increase accountability for shipping and development companies
“The rest of the world”

Communication is key.
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