ABA Chapter 16: Invasive Species – Human Induced

Denny Lassuy, North Slope Science Initiative, Alaska, USA

Pat Lewis, Biofouling Solutions, Tazmania, AUS

"We expect most aspects of global change to favor invasive alien species & thus exacerbate the impacts of invasions on ecosystems."

Dukes & Mooney 1999

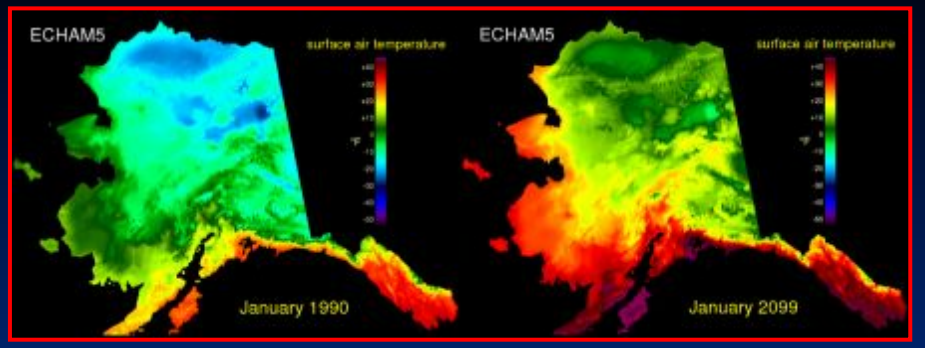
"With the inevitable expansion of international trade in the coming decades, the threat of invasions looms ominously over the past century's work to preserve native biological diversity."

UCS 2001

"Biological invasion is now widely recognized as second only to habitat alteration … and may be the less reversible of the two … … many consider invasive species and climate change to be among the most important ecological challenges facing global ecosystems today."

ABA 2013

Invasion Drivers



Climate Change

Shipping

Energy Devpt.

Ports, barges

Mining

Shoreline protection

Roads, roads, …

Aquaculture

Gravel source

Horticulture

Revegation

Translocated structures (piers, etc.)

Research activities

Marine debris

Invasion Effects

Resilience

Predation

Competition

Community structure

Disease

Profits/losses

Ecosystem services

$34 billion CAD

$138 billion USD

Native species distributions

Community composition

Evolutionary trajectory

Habitat structure

Trophic pathways

Species Invading the Arctic

(some here, many on the way!?)

ABA Chapter: Recommendations

- More baseline surveys for credible comparisons (per Ruiz et al. 2006)
- Early detection monitoring networks (TK-informed & citizen-involved)
- Improved data integration & information flow (NOBANIS, AKEPIC, …)
- Increased and targeted prevention measures (e.g., BWM & hull cleaning)
- Pathway risk assessments & targeted risk management plans (e.g., NIMPIS for oil rigs & HACCP across multiple pathways)
- Avoid/limit intentional introductions (incl. "assisted migration")
- Ecophysiology & life history studies of potential invaders (to better assess risks & design prevention measures)

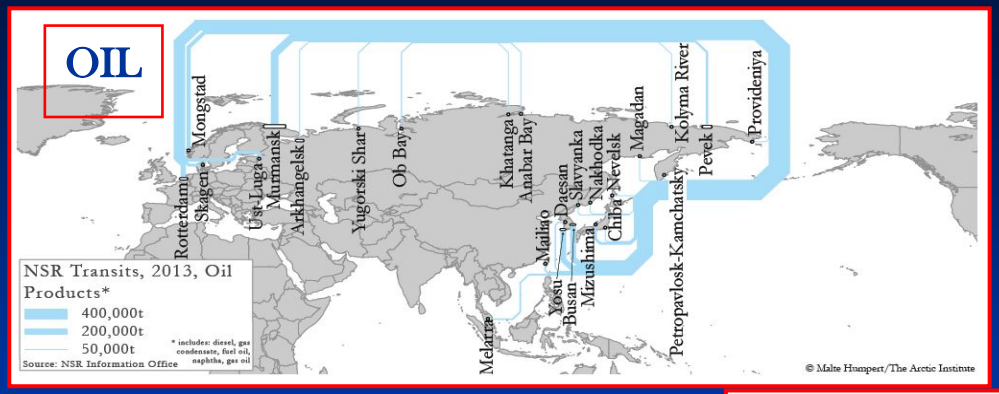
Policy Rec. #9: Reduce the threat of invasive alien/non-native species to the Arctic by developing and implementing common measures for early detection and reporting, identifying and blocking pathways of introduction, and sharing best practices and techniques for monitoring, eradication and control. This includes supporting international efforts currently underway, for example those of the International Maritime Organization to effectively treat ballast water to clean and treat ship hulls and drilling rigs.

DRAFT ABA Implementation Plan

- 9.1. Expert group. Establish an expert group to oversee the review and analysis of existing knowledge, status and trends of alien species in the Arctic, and advise on coordinated, pan-Arctic actions to implement this recommendation.
- 9.2 Indicator development. Develop an Arctic Invasions Indicator, and monitoring system that supports it. The indicator will contribute to broader global initiatives for monitoring and reporting on the status of biological invasion and efforts to address the problem.
- 9.3. Report on pathways. Identify pathways of introduction and spread of alien species. Prioritize these pathways for mitigation efforts, taking into consideration risk and potential scale of impacts to ecosystems, risk of economic losses, threats to food security, and potential for disruption of Arctic cultures.
- 9.4. Report on monitoring and control. Produce a report summarizing current policy and practice related to monitoring, eradication and control of invasive species in the Arctic and identify best practices and gaps. Include consideration of national policies, international frameworks, best practices and guidelines for relevant industries, such as shipping and petroleum exploration. This report may act as a stepping stone toward the creation of pan-Arctic guidelines and/or recommendations for harmonization of regulatory efforts through Arctic Council.
- 9.5. CBMP protocols. Ensure CBMP plans incorporate protocols for early detection and reporting of alien species in the Arctic.
- 9.6. International agreements. Communicate with and share findings and recommendations on invasive species with relevant international agreements.

"Areas of human disturbance and those located along pathways of human activity (e.g., shipping and road corridors) are the most likely sites of invasion."

ABA 2013



Shipping = directional ballast risk?

Arctic Shipping: An Analysis of the 2013 Northern Sea Route Season

FIGURE 1: SHARE OF VOLUME, EASTBOUND

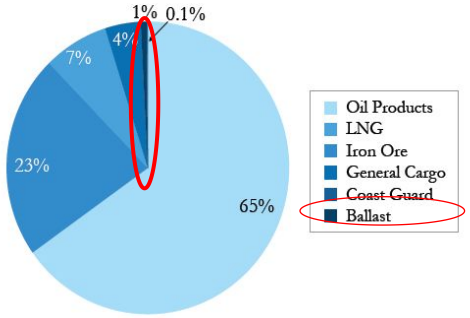
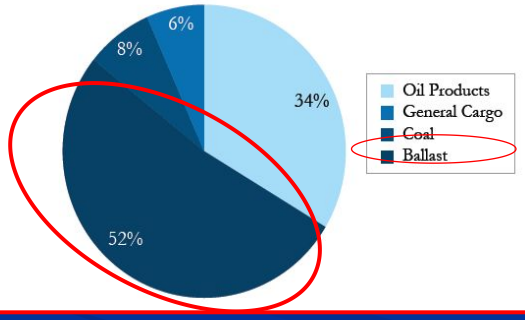


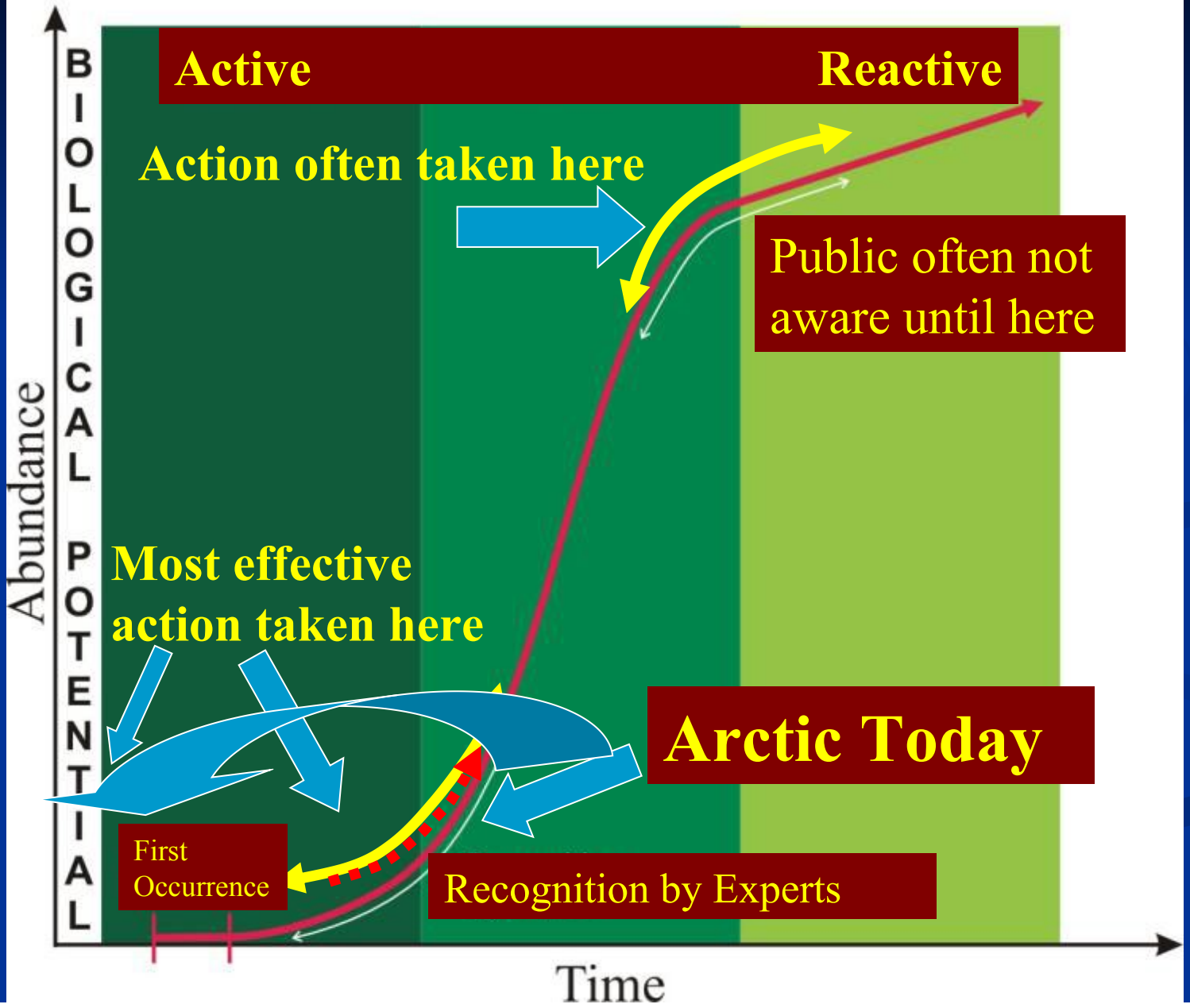
FIGURE 2: SHARE OF VOLUME, WESTBOUND



"The export of Arctic hydrocarbon resources, primarily from Russia, and their transport along the NSR can be expected to grow over the coming years ... (this will) place even greater emphasis on one-directional traffic from west to east."

See also: Danielle Verna -- http://gradworks.umi.com/1555186.pdf

Perception of an Invasive Species



If We Can't Stop the Warming (soon), We Can Slow the Tide of Invasion -- if (and only if) we work together to:

- **Prevent (assess, plan, educate, implement & do not intentionally introduce more!)**
- **Detect (TK-informed, citizen-enabled, and science-driven)**
- **Respond (Do Not Dither!)**

QUESTIONS?

Denny Lassuy
Deputy Director
North Slope Science Initiative
Visit: http://northslope.org
Email: dlassuy@blm.gov
Call: 1-907-271-3212
or
Patrick Lewis
Principal Marine Scientist
M: +61 3 6229 2107
E: plewis@biofoulingsolutions.com.au
W: www.biofoulingsolutions.com.au

What's the Biggest Disaster for Alaska Seabirds?

Think it was EVOS?

RAT SPILLS

Are Even Worse!!

RATS!!

Norway Rats – mostly from ship wrecks, have invaded many Alaska islands (Unalaska, Adak, Kiska, …)

Did You Know?

Each year rats kill more Alaska seabirds than did the entire Exxon Valdez Oil Spill!

Rats eat eggs, chicks, and adult birds!