
HAVFORSKNINGSINSTITUTTET
INSTITUTE OF MARINE RESEARCH

Shipping in Arctic Waters :
towards an understanding of the biosecurity risks

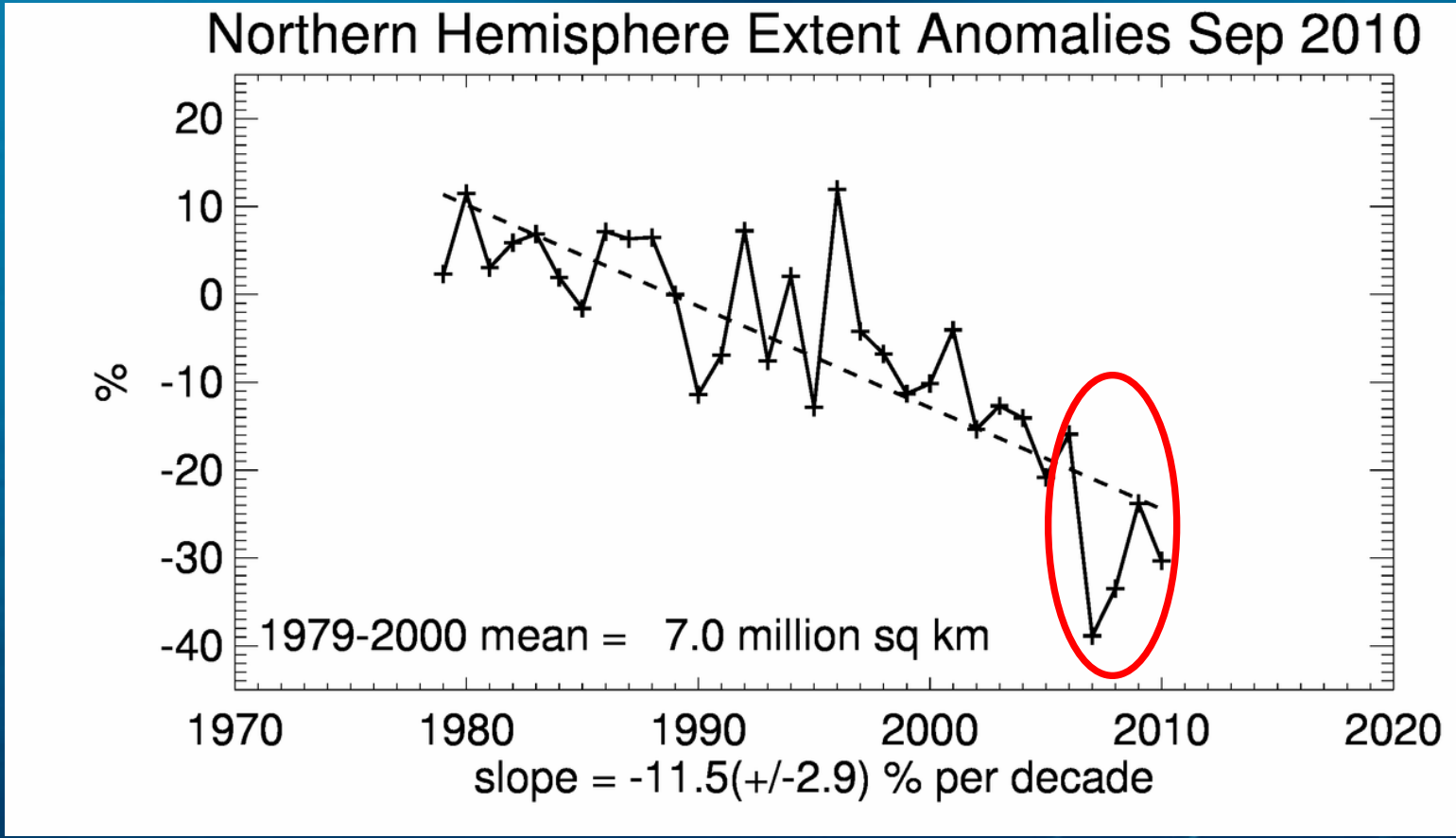
Anders Jelmert

Institute of Marine Research, Norway

Outline

- Background
- Risks
  - Oil in arctic waters
  - Alien species
- Knowledge gaps
- Possible arenas for cooperation and mutual benefits

Ice anomaly at annual minimum



http://www2.sunysuffolk.edu/mandias/global_warming/modern_day_climate_change.html

Why should marine and maritime scientists cooperate?

- The Arctic sea routes have potentially several environmental advantages.
  - Saves fuel/energy (=lower CO_2 emissions)
  - May even reduce the risk for transfer of alien species (but we are lacking data, we don't know this now).
- The Artic is considered "pristine" and vulnerable. Neglecting environmental risks may compromise ability to communicate potential benefits

Oilspills will happen

- Ice, possibly rough weather conditions
- Remote areas, TIME –factor and logistics
- Limited knowledge of the oil's:
  - Physical / chemical behaviour and fate
  - Technologies for collection / removal?
  - Effects on arctic biota? Effects of dispersion -, burning -. Compartmentalization in food-web?
  - How can these effects be minimised?
    - Improve contingency plans
    - Capacity building & training.

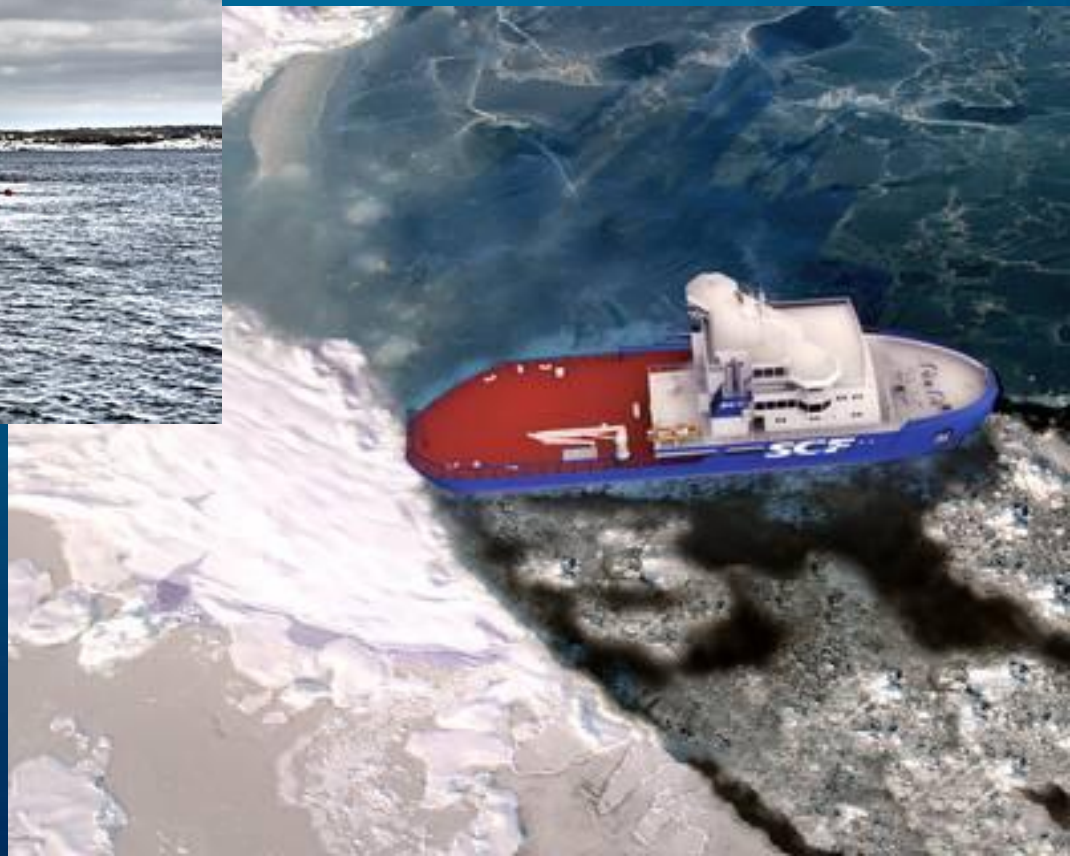
Oil spills: Current capacity Murmansk area

- A regional oil spill response system has not been fully developed.
- The system lacks a clearly formulated state policy, a single governing authority and a unified structure.
- The agencies and organizations involved in tackling oil spill emergencies in the Murmansk region are hampered by insufficient funding, which probably reduces their preparedness to combat oil spills. Ivanova, M., 2011. Polar Research 2011, 30, 7285, DOI: 10.3402/polar.v30i0.7285

Oilspills in ice

Photo : Norw. Maritime Authority

Photo : Wikipedia



The importance of reliable information

- Google search: ”Oil spill, arctic”
  - 237 000 hits
- ”Oil spill, arctic, Greenpeace”
  - 51 600 hits
- Despite much attention, still rather few studies having addressed the issue.

Large scale oil-in-ice experiment (2009)

- Low concentrations of dissolved hydrocarbons.
- Predicted/anticipated acute toxicity was low.
- The ice field drifted nearly 80 km during the experimental period, and although the oil drifted with the ice, it remained contained between the ice floes.

(Faksness et al. , Marine Pollution Bulletin (2011)

- Volume: 62, Issue: 5, Pages: 976-984)

The public's perception both wrong and right

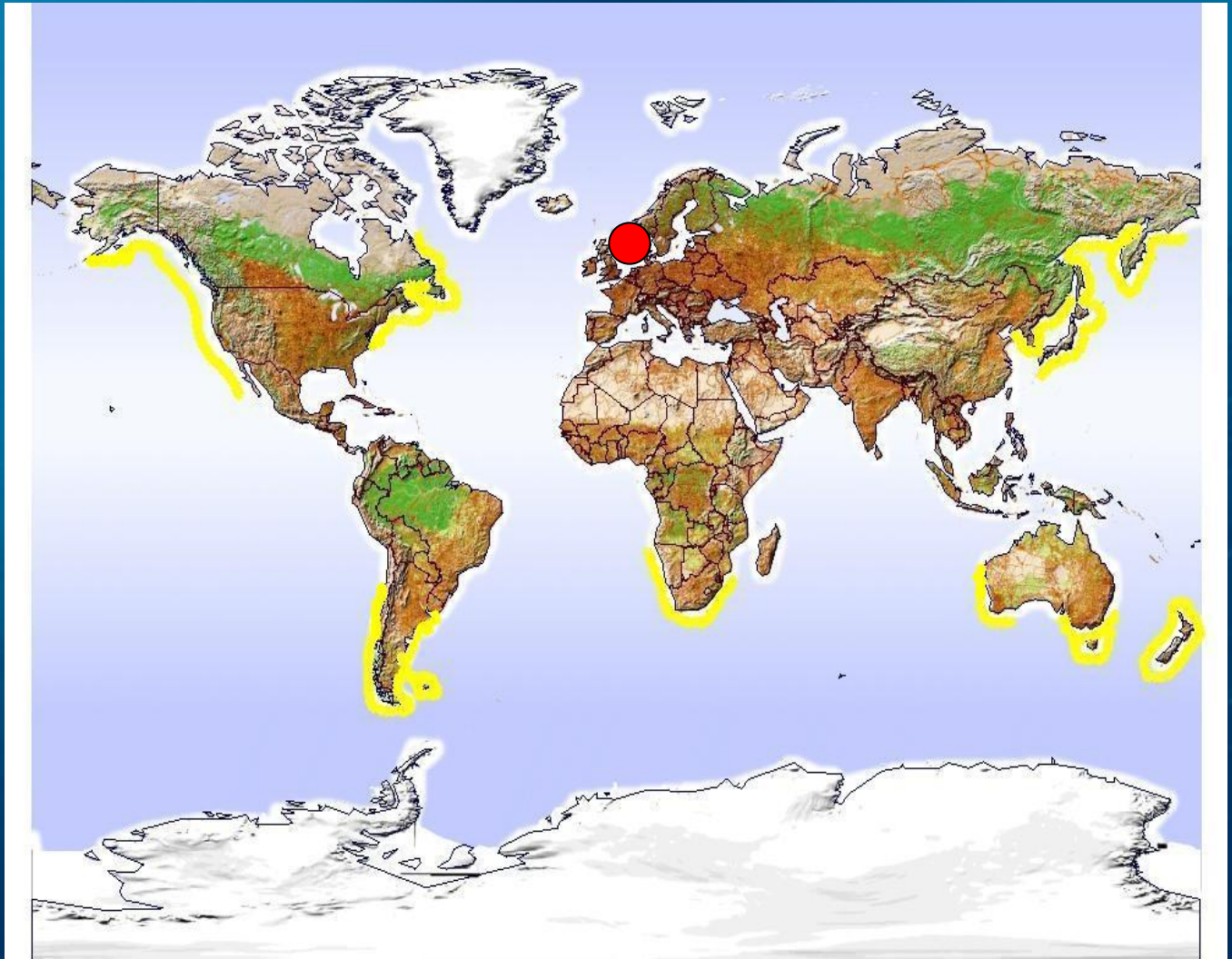
- The arctic is less pristine than "what meets the eye" (But still more pristine than many other areas)
- Some of the studies may indicate smaller than expected impacts
- Real vulnerable biotic components
  - Top predators, birds, marine mammals
  - Early life stages (fish)

Alien Species through PSR

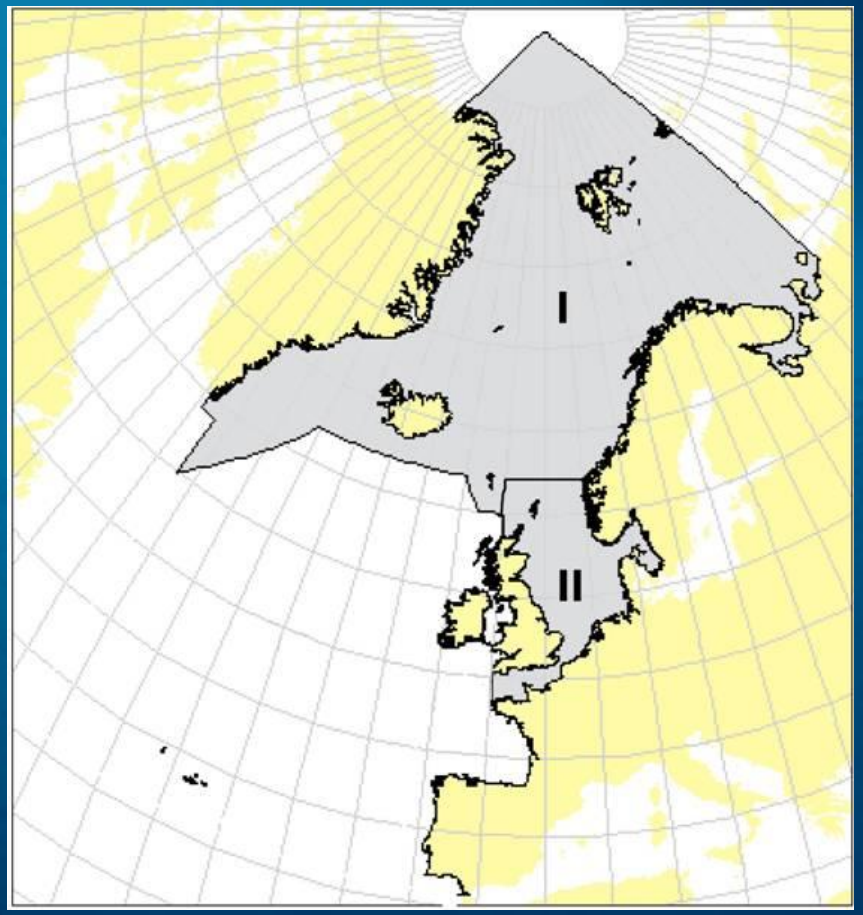
Why we need to look at biota through PSR?

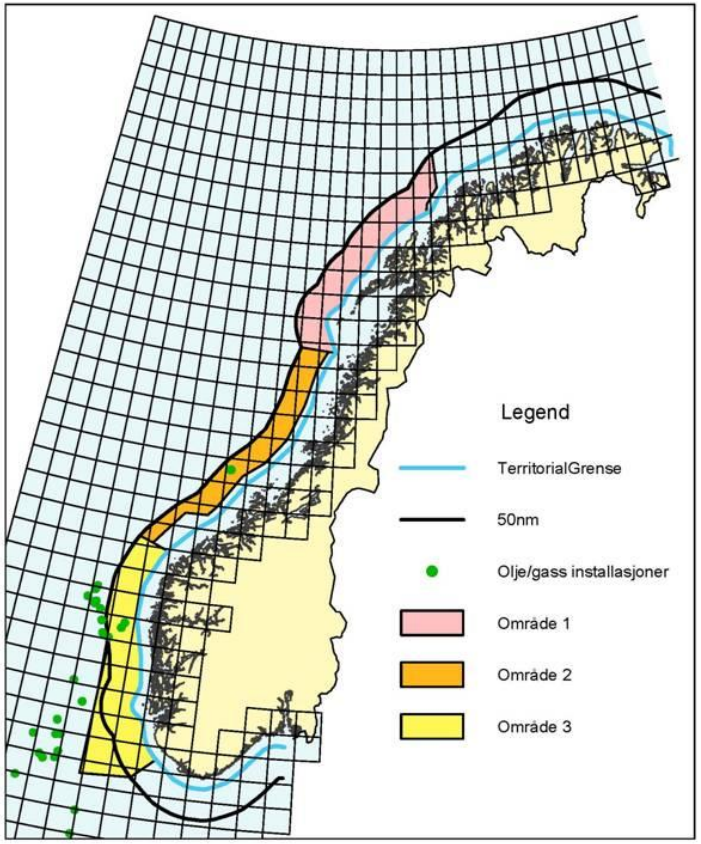
- An entirely new ***transportation route***
  - Shipping as vector: shorter voyage
- Organisms adapted to a cold and temperate climate have adapted to low winter temperatures. High probability for survival
  - Algae species (including HAB's?)
  - *Calanoid* copepodes

Environmental matching

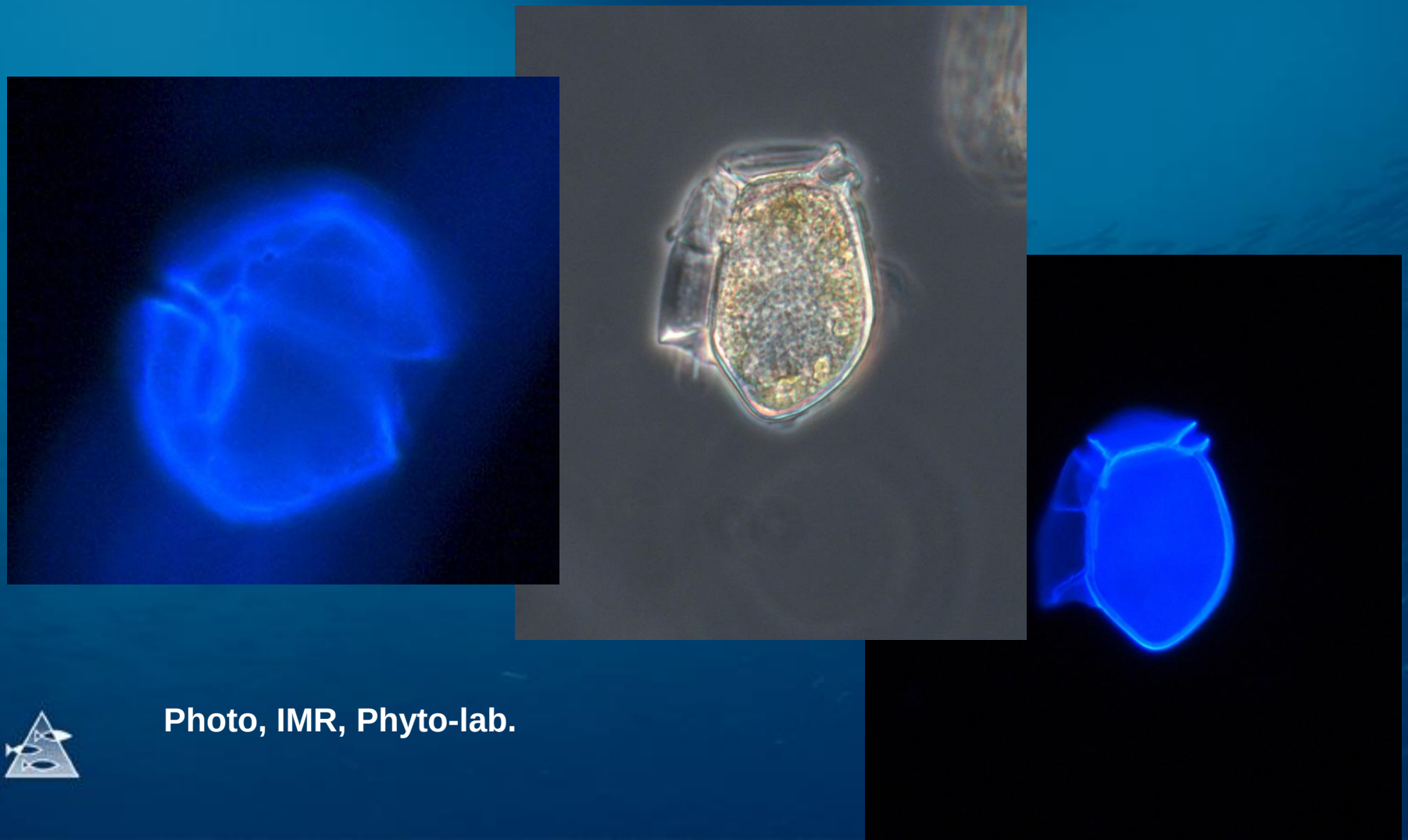


Ballast water exchange





Toxin-producing algae

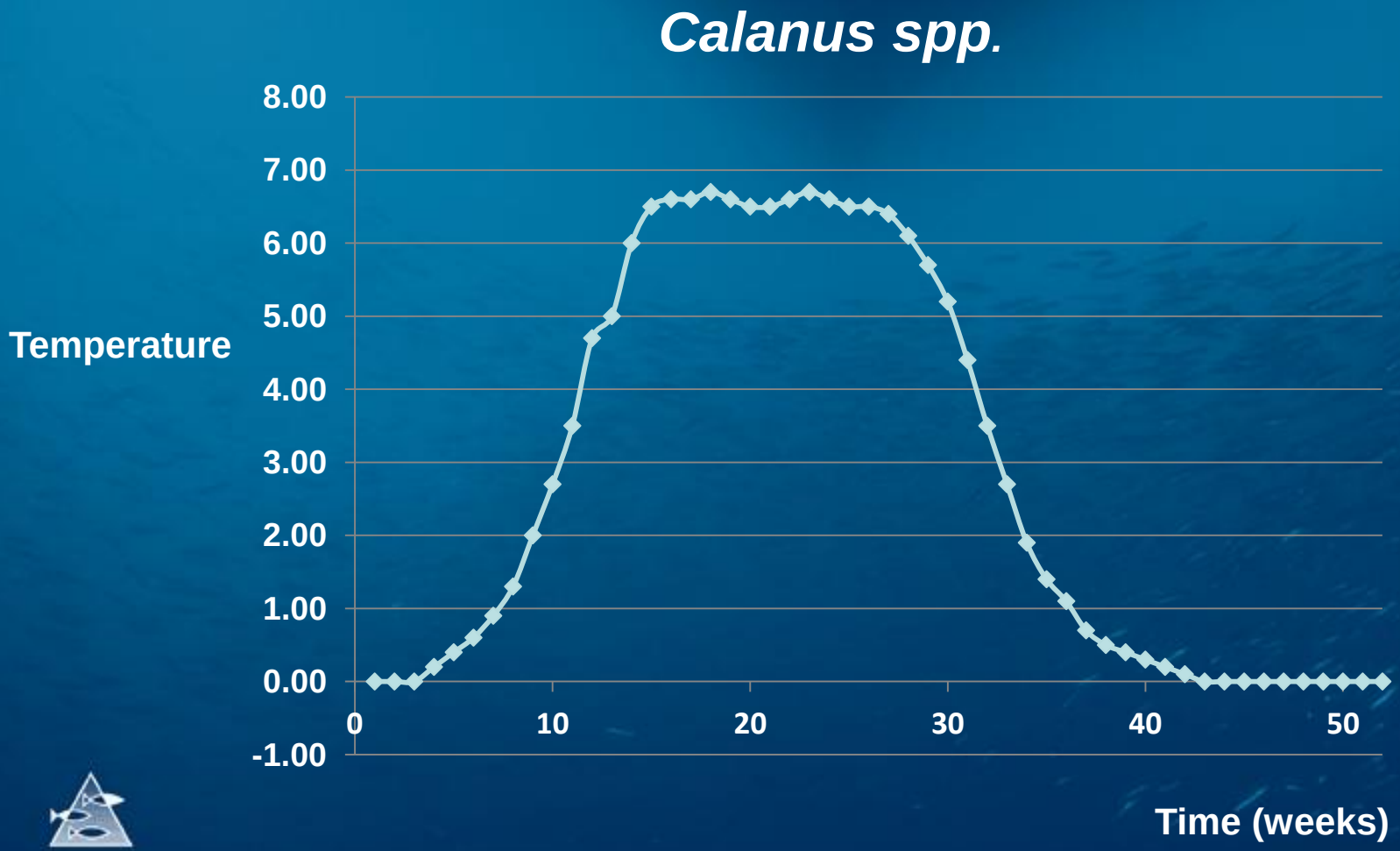


Photo, IMR, Phyto-lab.

Zooplankton: e.g. copepods

Photo; T. Falkenhaug, IMR

Some will likely cope in the BW



How do hull-fouling species cope?

- We don’t know much, limited data.
  - Data from Svalbard study indicates concentration in “niche areas” (Ice-scouring).
- (If properly adressed): reduction of hull fouling benefits both ship-owners and the environment.

Pilot project 2012

- Merged with an on-going project on alien species to Svalbard. P.I. Inger Alsos, UniT.
- Ocean-going survey(s) for studying BW
  - Participants from ICES BOSV
  - Funding: Fram Center (Norw. Env. Dep.) and the Svalbard Env. Fund)
- Hull fouling: Docking studies targeting ice-classed vessels from PSR traffic.

Preliminary data

- 8 vessels sammpeled summer 2011
  - The Netherlands, Portugal, The Netherlands / UK
  - approx. 780 000 tonnes BW
- 18 different taxa found, incl crabs, water fleas, sea arrows, mussels and barnacels
- Many native, but a few alien, and with some indications of survival abilities.

Benefits from cooperation

- Oilspills
  - On-board detection equipment
    - Better temporal and spatially response
  - Better knowledge of effects on biota
    - More efficient contingency plans
    - More efficient clean-up methods

Benefits from cooperation

- Alien species:
  - Better knowledge of mortality and survival *en route*
    - More effective BW management plans
    - Appropriate localization of BW exchange zones
    - Validation of BW treatment equipment efficacy in cold-water conditions
  - On.board detection equipment: ”Ferybox, mark x”
    - Ability to reduce risk for transfer of alien species
    - May give input to extemption regulations

Acknowleged

Arctic stowaways: the potential for species introduction to occur in Svalbard associated with shipping

Chris Ware, Inger Greve Alsos Jørgen Berge, Jan H. Sundet og Per Arneberg

Preliminary project report ailable from http://www.framsenteret.no/