

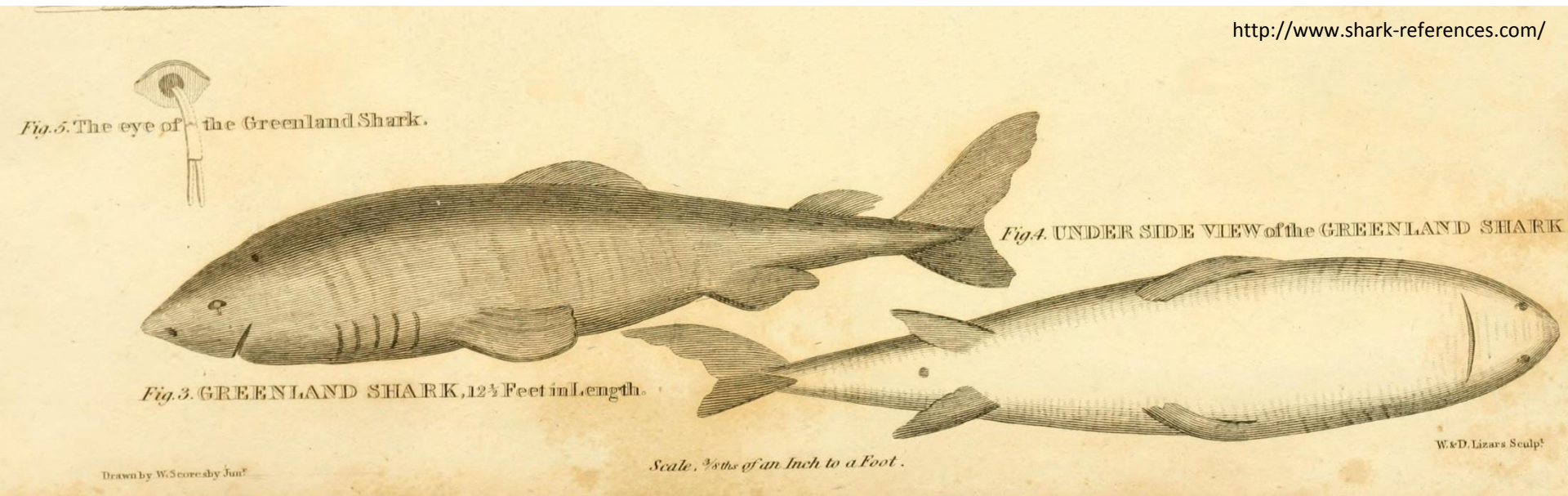
Status and Prospects for Marine Fishes of the Arctic

Arctic Biodiversity Congress 2014

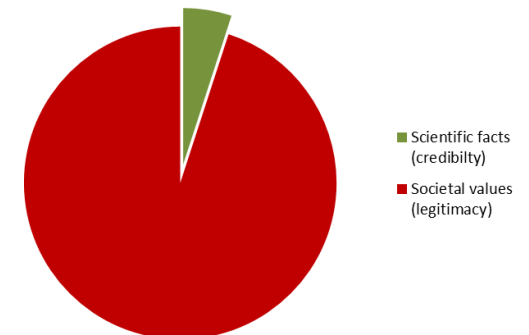
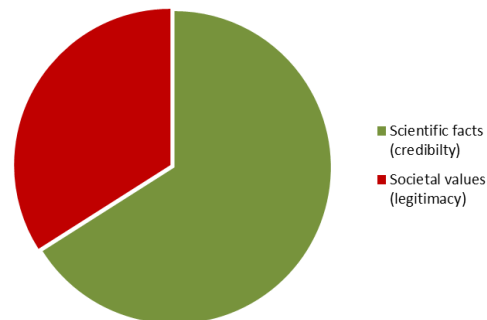
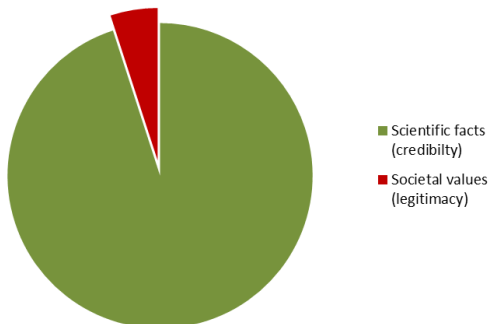
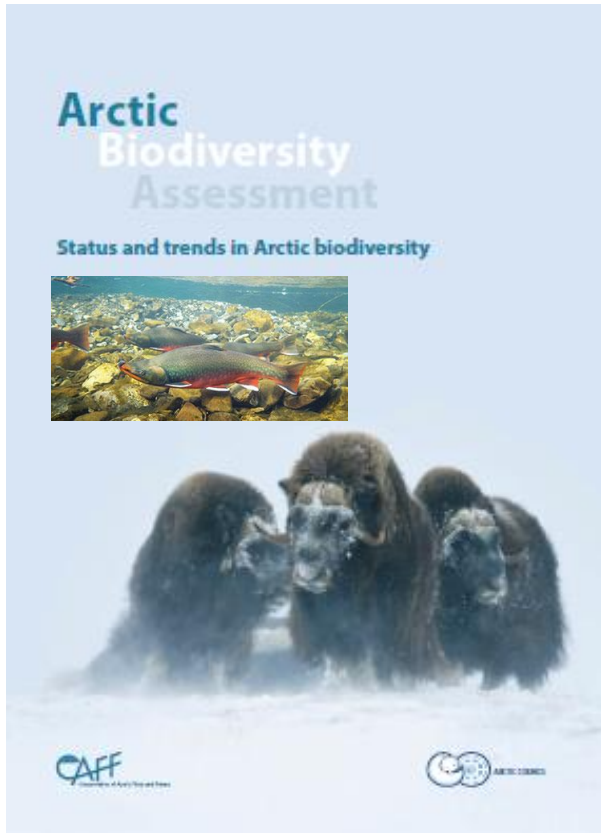
Jørgen S Christiansen

(CW Mecklenburg, OV Karamushko, PDR Møller, A Lynghammar)

<http://www.shark-references.com/>

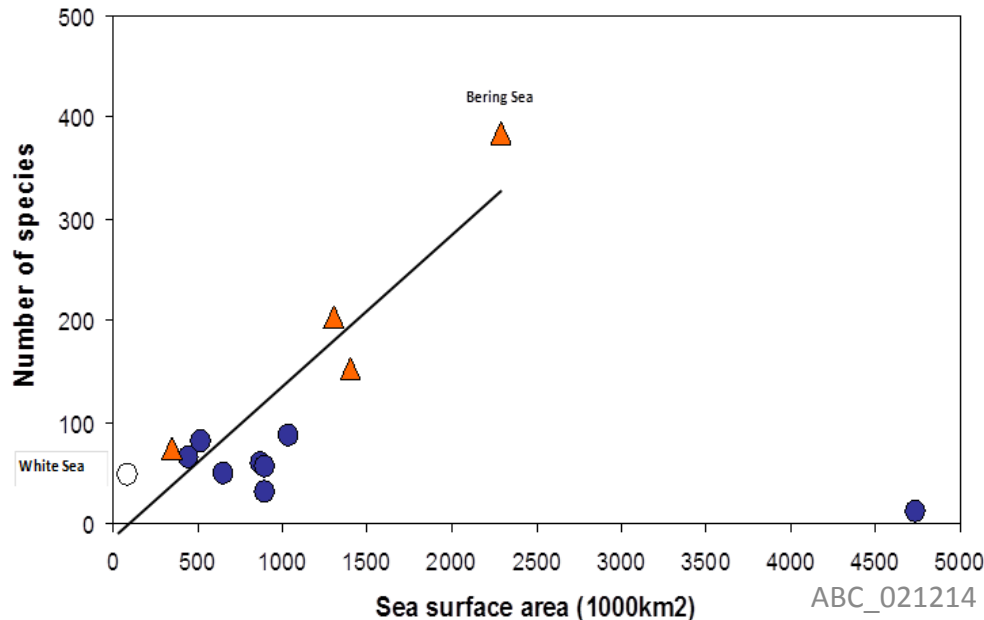
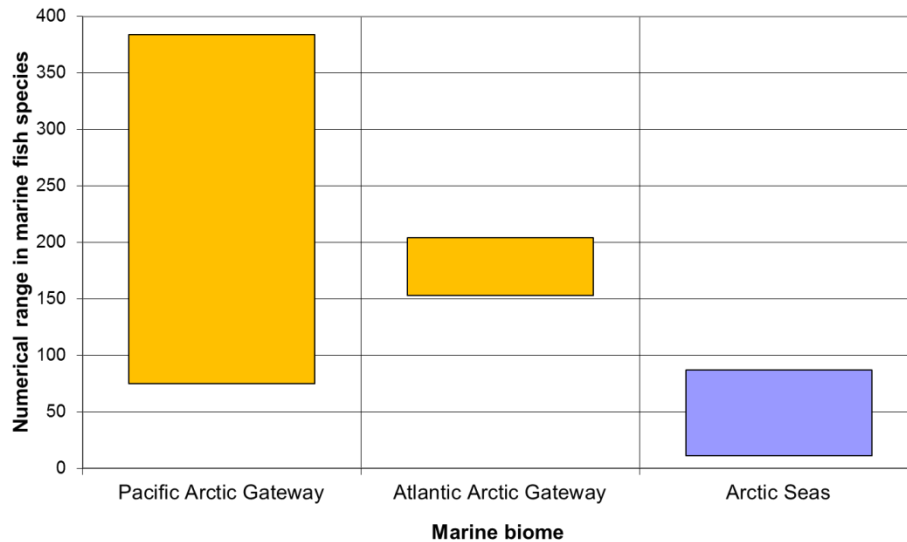


Credibility and legitimacy of ABA



Website: <http://www.arcticbiodiversity.is/the-report/>

Taxonomical biodiversity – species richness (N=633)



Species-area relationships –

- coupled for 'Arctic Gateways'
- decoupled for the Arctic Seas

Arctic marine biodiversity –

- chronic undersampling?
- real biological phenomenon?

Taxonomical biodiversity – fragments of discovery

(One is not a trend – Roky Erickson)

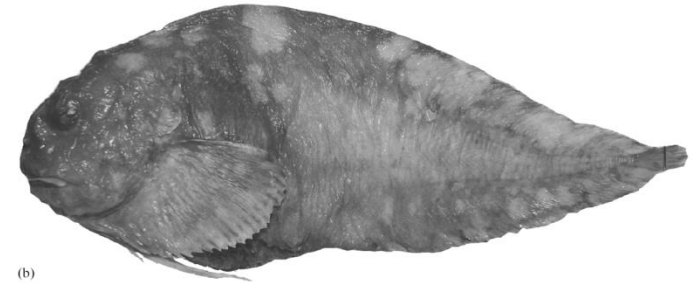
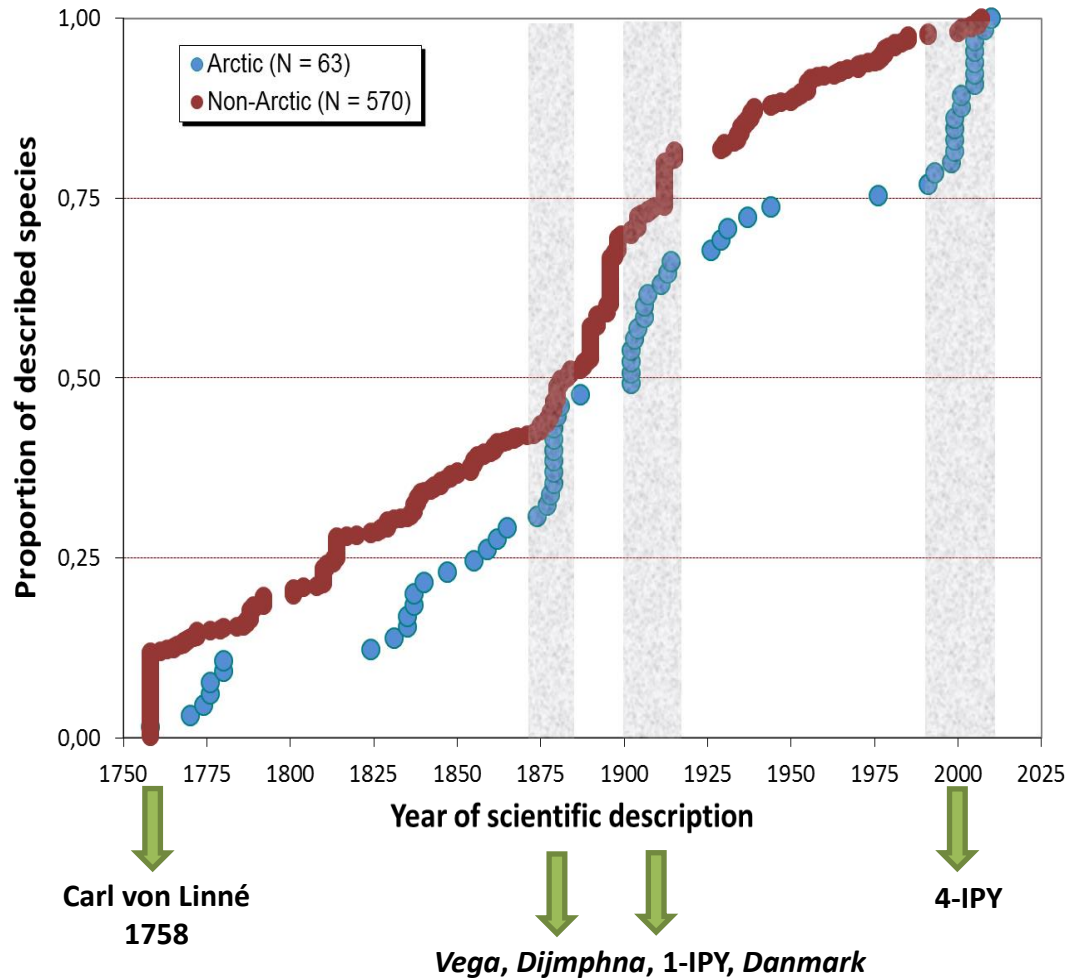


Fig. 1. Fulvous snailfish *Careproctus fulvus* sp. n., holotype ZIN 55421, female: (a) fresh specimen, 224 mm TL; (b) after fixation, 190 mm TL.

(Chernova 2014)



Scientific effort pays off!

Functional biodiversity – migration and the horizontal flow of energy across ecosystems

Energy advection, energy availability and energy change

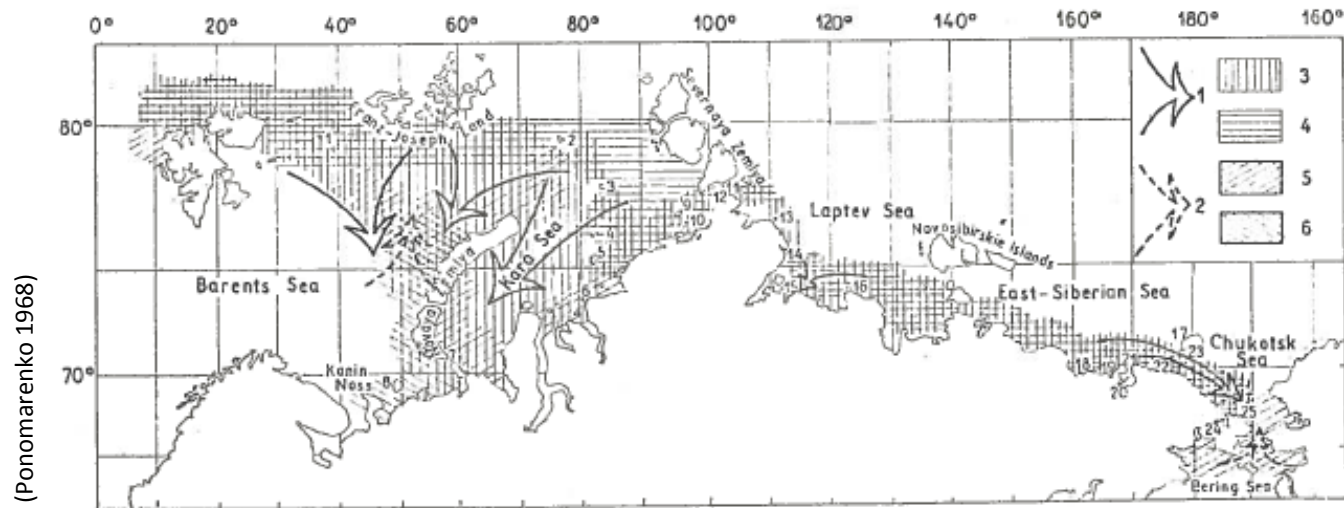
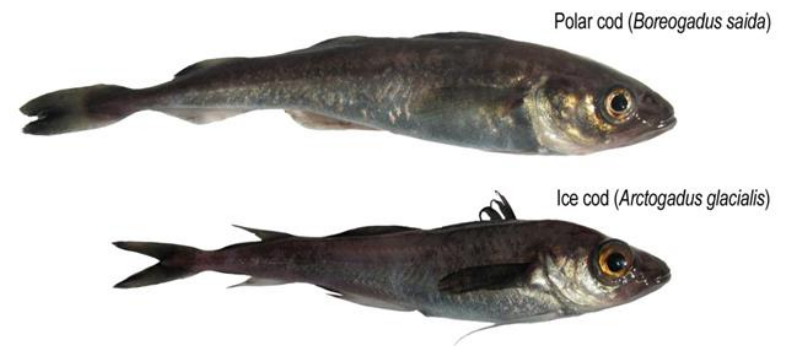
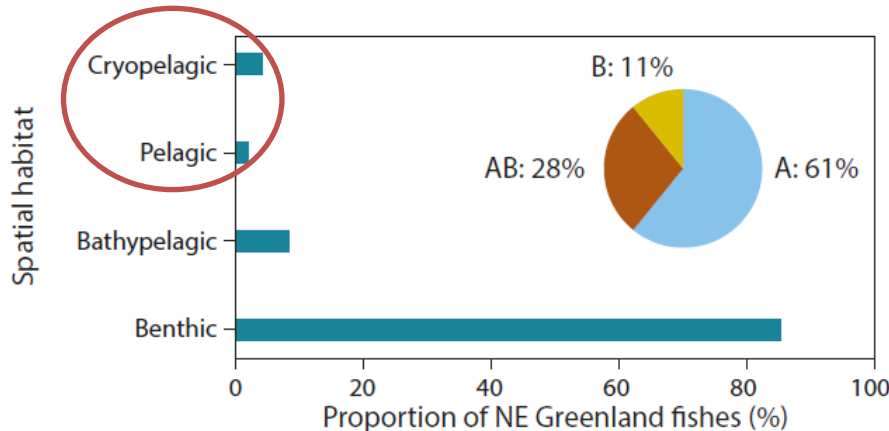
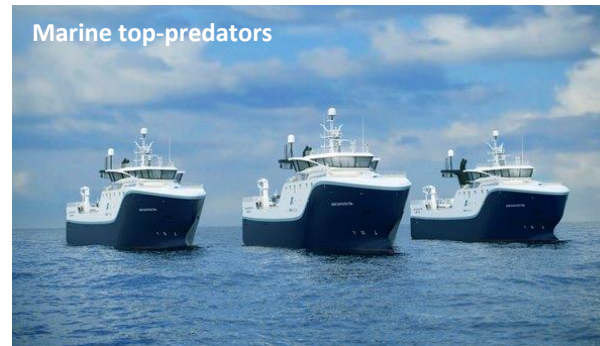
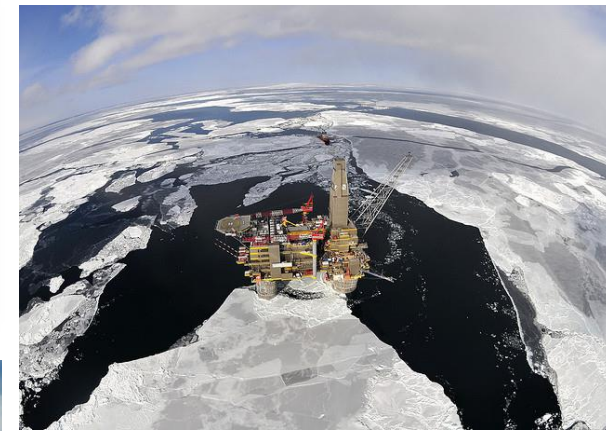
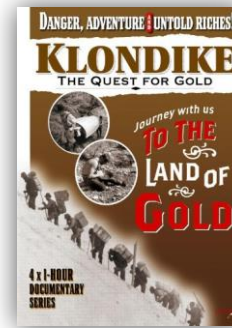


Figure 7:8.* Diagram of Polar cod migrations in the seas of the Soviet Arctic. 1. wintering and spawning migration; 2. feeding migrations; places of mass occurrence of Polar cod: 3. June to July; 4. August to September; 5. October; 6. from November-December to January-February.

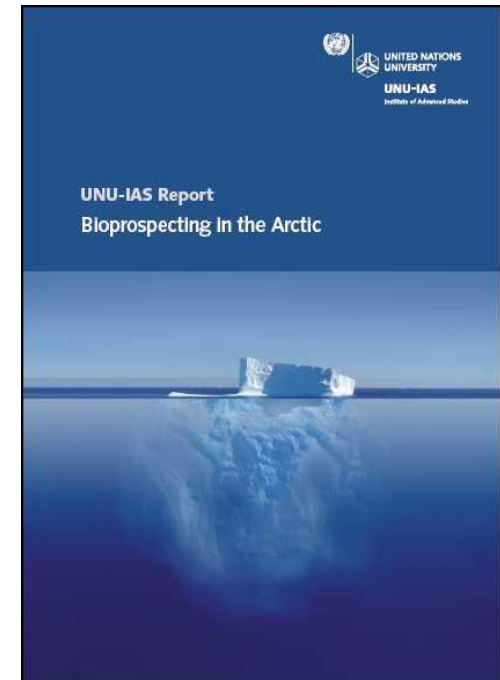
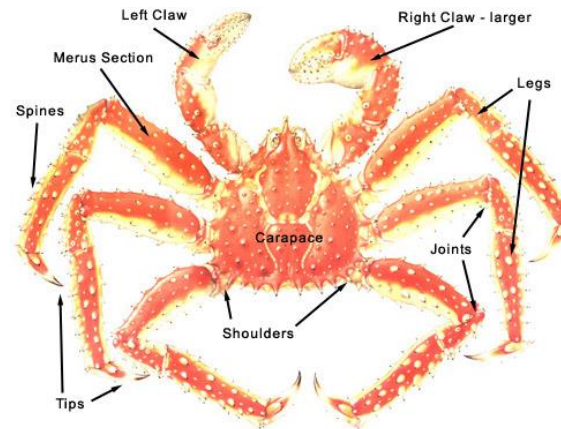


Major threats – Arctic Klondike emerging in light of climate change

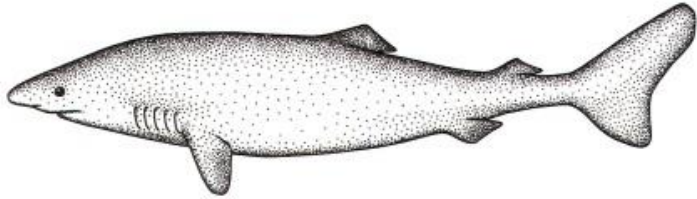
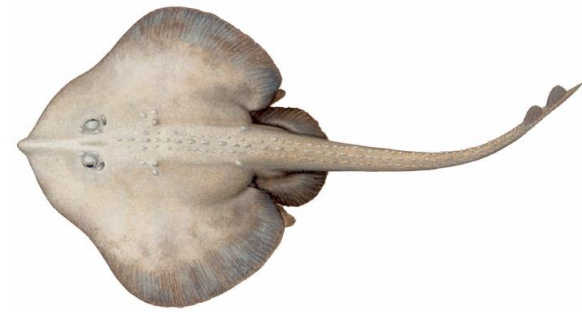
- Petroleum exploitation
- Groundfish fisheries
- Marine bioprospecting
- Invasive species & aquaculture
- Cargo & tourism shipping



‘Slow Boat from China’



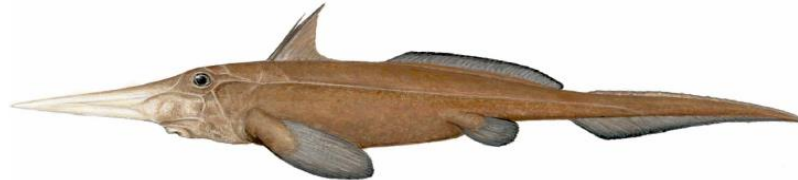
Arctic marine diversity today



Polar cod (*Boreogadus saida*)



Ice cod (*Arctogadus glacialis*)



... and tomorrow?



Life is our life's work



РОСНЕФТЬ



DONG
energy



Statoil



 **Aker**Solutions™



AkerSeafoods™



ConocoPhillips

 **NUNAOIL^A_S**



Mitigation actions

I. Biological credibility (scientific rigor & “facts”)

- Acknowledge scientific uncertainty – need for precautionary approaches
- Improve knowledge of taxonomical and functional biodiversity
- Upgrade natural history collections, build and uphold time series

II. Green technology

- Avoid bycatch and habitat destruction
- Ban conventional bottom trawling on the Arctic shelves
- Suspend seismic surveys on the Arctic shelves

III. Legitimate management (social & cultural values)

- Deploy Catch Quota Management (full accountability)
- Acknowledge and integrate traditional knowledge and citizen science
- Encourage IP youth to study natural sciences

IV. Overarching coordination

- Involve universities in biodiversity assessments
- Improve coordination within the Arctic Council and its member states

ICES Journal of Marine Science (2011), 68(8), 1606–1610. doi:10.1093/icesjms/fsr065

Fully documented fishery: a tool to support a catch quota management system

Lotte Kindt-Larsen*, Eskild Kirkegaard, and Jørgen Dalskov

National Institute of Aquatic Resources, DTU Aqua, Technical University of Denmark, Jægersborg Allé 1, 2920 Charlottenlund, Denmark

Arctic marine fishes and their fisheries in light of global change

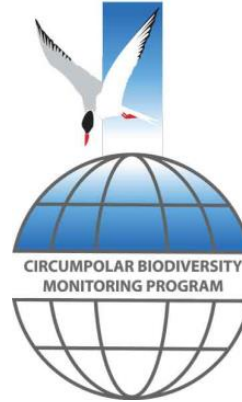
JØRGEN S. CHRISTIANSEN*¹, CATHERINE W. MECKLENBURG^{†‡} and OLEG V. KARAMUSHKO[§]

¹Department of Arctic and Marine Biology, Faculty of Biosciences, Fisheries and Economics, UiT – The Arctic University of Norway, Tromsø NO-9037, Norway, [†]Department of Ichthyology, California Academy of Sciences, 55 Music Concourse Drive, San Francisco, CA 94118, USA, [‡]Point Stephens Research, PO Box 210307, Auke Bay, AK 99821, USA, [§]Laboratory of Ichthyology, Murmansk Marine Biological Institute, Kola Science Centre, Russian Academy of Sciences, Vladimirskaia 17, Murmansk 183010, Russia



“What we got here is a failure to communicate” (Cool Hand Luke)

Copy and paste techniques are well-used tools



ARCTIC COUNCIL



THE IUCN RED LIST OF THREATENED SPECIES™



Atlas and Guide (2014-18)

Project holder:
Institute of Marine Research, Norway

Lead author:
CW Mecklenburg

Marine Fishes of the Arctic

C. W. Mecklenburg^{1,2}, E. Johannessen³, C. Behr⁴, I. Byrkjedal⁵, J. S. Christiansen⁶, A. Dolgov⁷, K. J. Hedges⁸, O. V. Karamushko⁹, A. Lynghammar¹⁰, T. A. Mecklenburg¹¹, P. R. Møller¹², R. Wienerroither¹³, B.A. Holladay¹⁴

¹California Academy of Sciences, USA; ²Polar Science Research, USA; ³Institute of Marine Research, Norway; ⁴Unit Circumpolar Council, USA; ⁵University Museum of Bergen, Norway; ⁶University of Tromsø, Norway; ⁷Polar Research Institute of Marine Fisheries and Oceanography, Russia; ⁸Fisheries and Oceans Canada, Canada; ⁹Russian Academy of Sciences, Murmansk Marine Biological Institute, Russia; ¹⁰University of Copenhagen, Zoological Museum, Denmark; ¹¹University of Alaska Fairbanks, Alaska, USA

Recognition of global climate change and the concomitant increased research in Arctic seas have revealed significant knowledge gaps, reviewed recently in the Council of Arctic Flora and Fauna (CAFF) Arctic Biodiversity Assessment. The chapter on marine fishes demonstrated the need for a comprehensive review and assessment of distribution, taxonomy, and biology. The atlas and guide under current development will provide a baseline reference for identifying marine fish species of the Arctic region and evaluating changes in diversity and distribution.

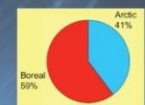
Marine Fishes of the Arctic builds on a guide to the Pacific Arctic marine fishes which is nearing completion and has been developed under the Russian-American Long-Term Census of the Arctic sponsored by the U.S. NOAA Arctic Research Office and the Russian Academy of Sciences. That work will now be expanded to cover the Atlantic Arctic, with expertise from additional world-recognized Arctic fish specialists as well as the CBMP's Marine Fish Expert Network. The atlas will provide global distribution maps for each species, descriptions of their morphology and characteristics for identification, and information on habitat, diet, and life history.

Marine Fishes of the Arctic is in the planning stage and its format will be the main topic at the kick-off meeting in Bergen, 5-6 December. The work is funded by the Norwegian Ministry of Foreign Affairs and the project period is 2015-2017.

ARCTIC REGION

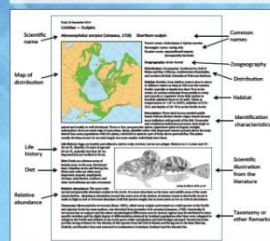


Arctic Region, defined as it pertains for marine fishes. Truly Arctic marine fish species are rarely found outside of this region. Many warmer-water, Boreal species have penetrated into this region.



Altogether, about 240 fish species inhabit the Arctic Region. The Boreal species have been moving into the Arctic for millennia as the glaciers and sea ice retreated and land bridges disappeared. At present the region has more Boreal than truly Arctic species and the trend continues as the climate warms.

SPECIES ACCOUNTS



Species accounts will include several kinds of information. A References section with literature as well as sources of previously unpublished data will be included.

LIFE HISTORY

Information on major life history features from spawning to maximum size and age will be included.



PHOTO IDENTIFICATION



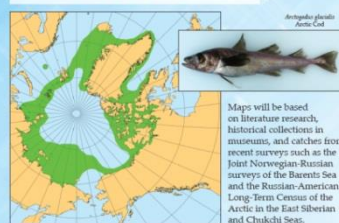
Species may be identified without reference to keys by searching the photo identification pages which point out the essential features of each species.

TRADITIONAL KNOWLEDGE



Where possible, information from traditional knowledge holders will be incorporated.

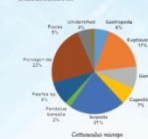
SPECIES MAPS



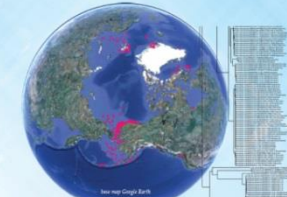
Maps will be based on literature research, historical collections in museums, and catches from recent surveys such as the Joint Norwegian-Russian surveys of the Barents Sea and the Russian-American Long-Term Census of the Arctic in the East Siberian and Chukchi Seas.

DIET

Recent research on diets will be summarized.



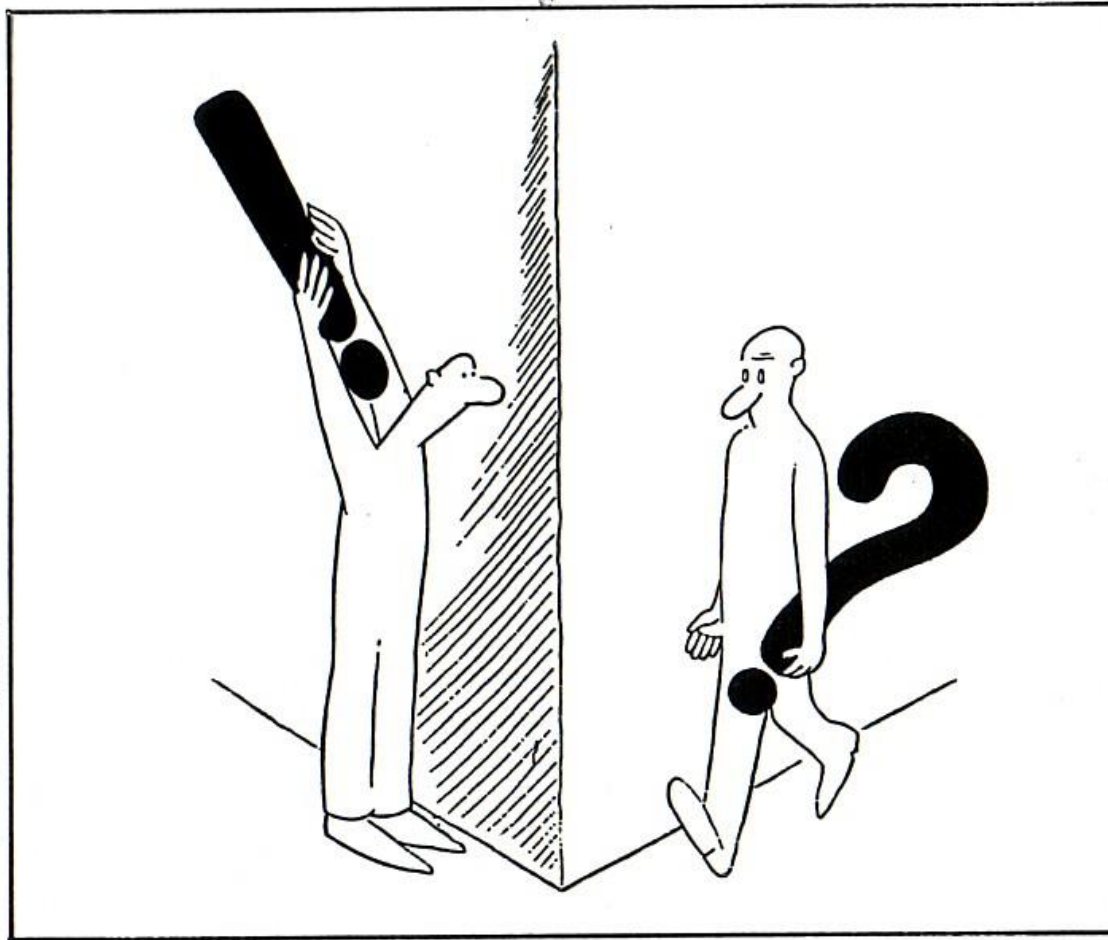
BARCODE REFERENCE LIBRARY



Completion of the Arctic marine fish barcode reference library is a part of this project. The barcodes can be used to identify difficult specimens and aid in resolution of controversial taxonomy. Pink dots represent the collection localities for the 1,445 barcoded fish specimens currently in the library.

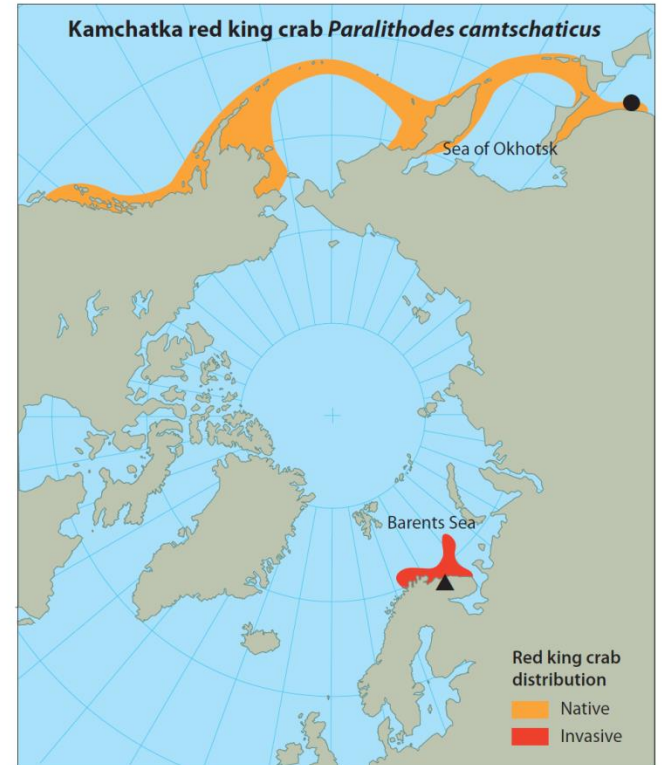
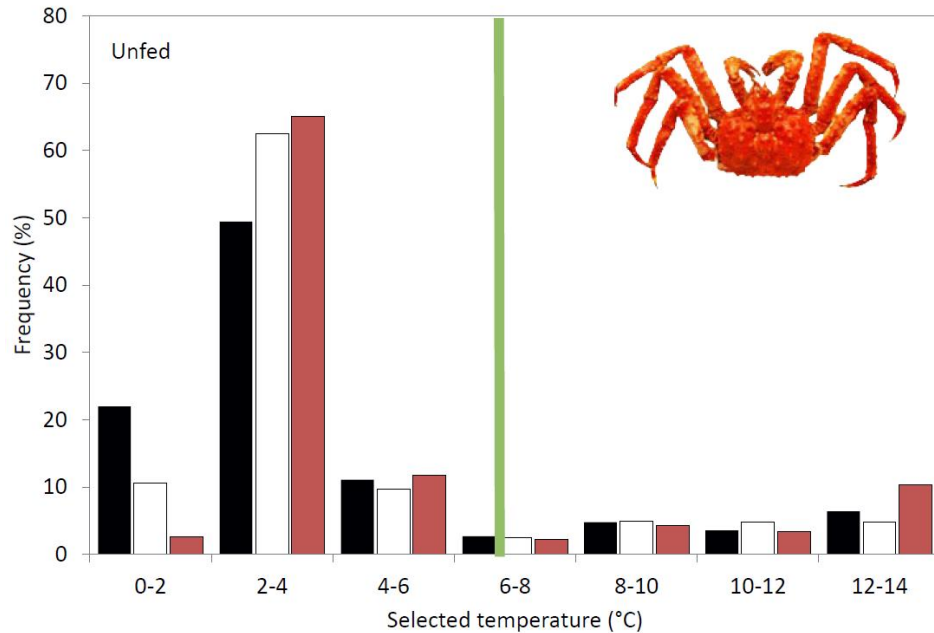


Thank you



Tegning av Anatolij Orekhov.

Major threats – invasive species on the Euro-Arctic shelves



Diversity and Distributions A Journal of Conservation Biogeography

Thermal behaviour and the prospect spread of the introduced Kamchatka red king crab *Paralithodes camtschaticus* (Tilesius, 1815) onto the Euro-Arctic shelves

Journal:	Diversity and Distributions
Manuscript ID:	DDI-2014-0298.R1
Manuscript Type:	Biodiversity Research
Date Submitted by the Author:	n/a
Complete List of Authors:	Christiansen, Jørgen S.; UIT-The Arctic University of Norway, Arctic and Marine Biology; Åbo Akademi University, Environmental and Marine Biology; Sparboe, Maria; UIT-The Arctic University of Norway, Arctic and Marine Biology; Sæther, Bjørn-Steinar; NORDIMA, Silikavuo, Steen; NORDIMA
Keywords:	Invasive Kamchatka red king crab, <i>Paralithodes camtschaticus</i> , prospect spread, realised and potential, thermal behaviour

