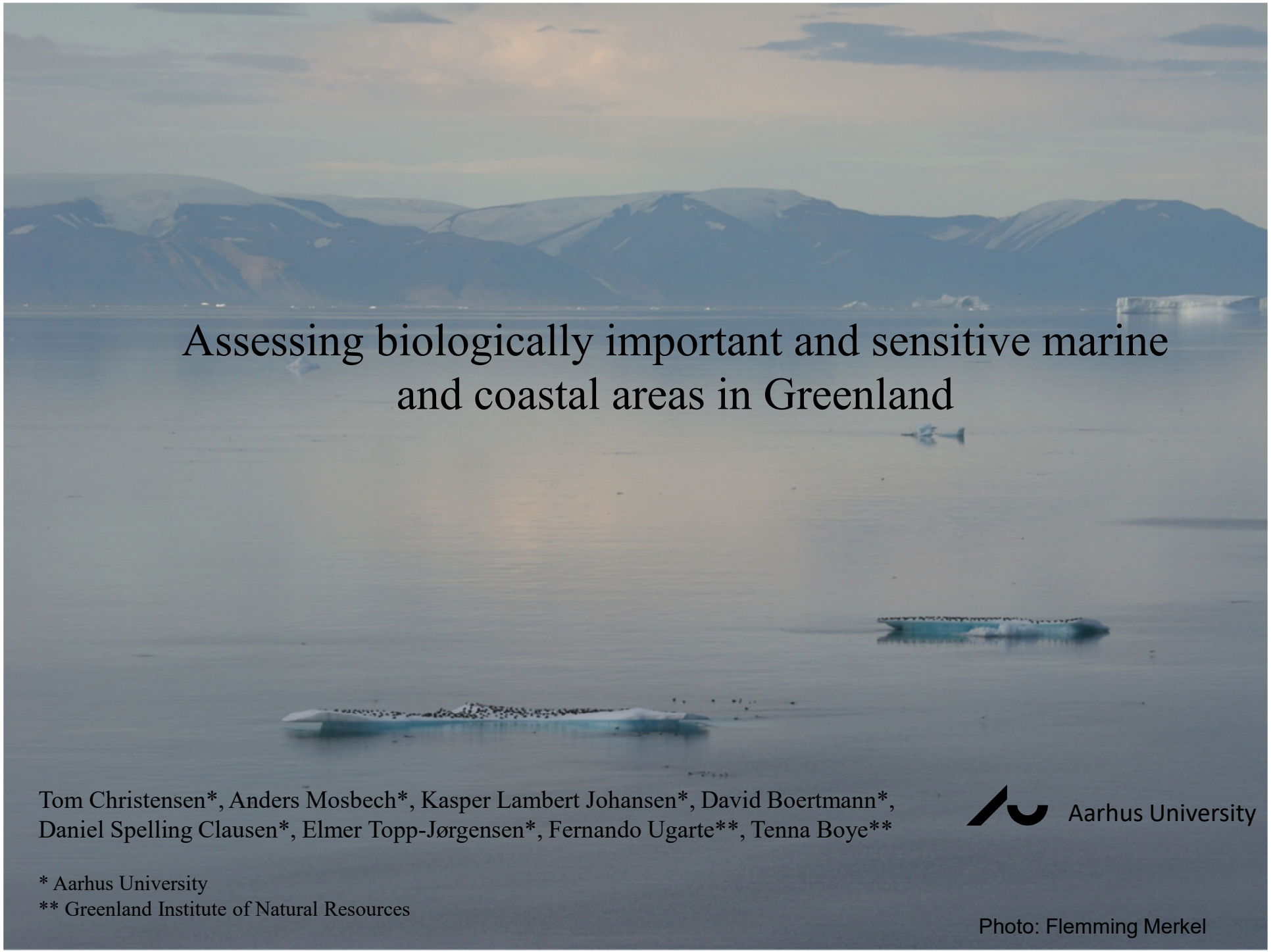

Assessing biologically important and sensitive marine and coastal areas in Greenland

Tom Christensen*, Anders Mosbech*, Kasper Lambert Johansen*, David Boertmann*, Daniel Spelling Clausen*, Elmer Topp-Jørgensen*, Fernando Ugarte**, Tenna Boye**

* Aarhus University
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Aarhus University

Photo: Flemming Merkel

Background

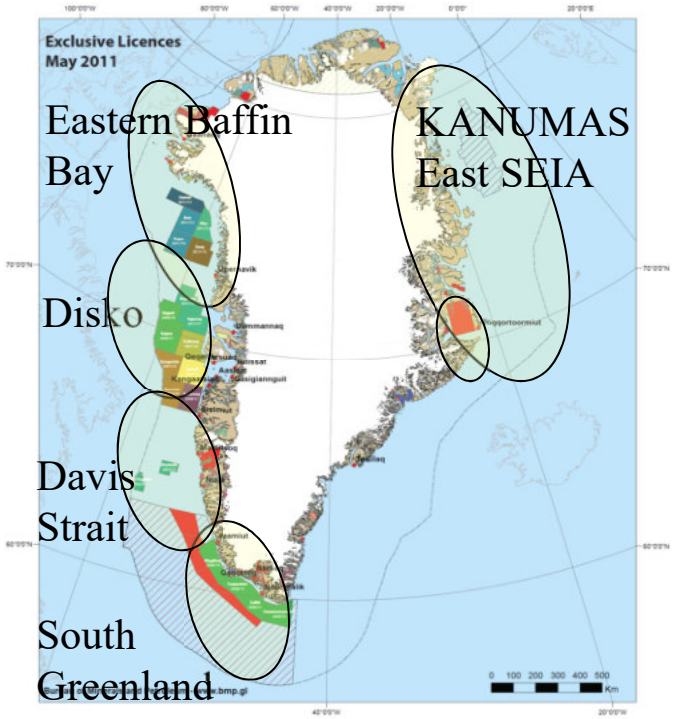
- Marine hotspots are a focus point in the entire Arctic
- Increased focus on Arctic MPA from various conventions and organizations: Ramsar, CBD, CAFF, IUCN etc
- CBD goal: 10% of all marine areas are protected in 2020
- Connectivity and ecosystem based consideration are also in focus
- Today app. 5 % of Greenland marine areas are protected (IUCN category)
- Requests and tasks from agencies about ecologically and biologically important and sensitive areas are increasing

Recent work on ID of important and sensitive areas

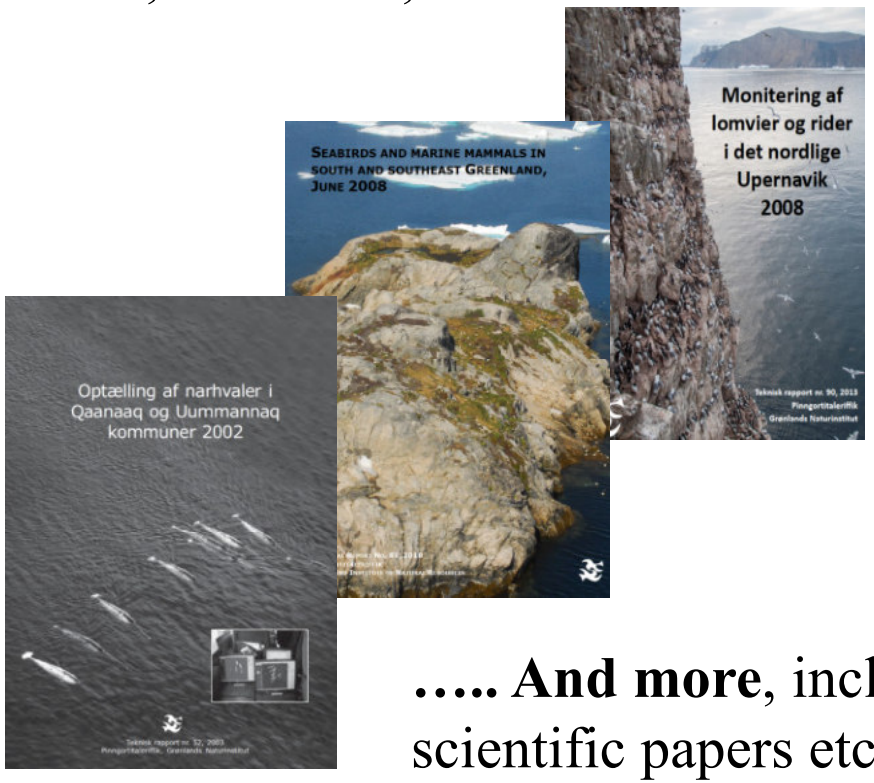
- ID ecologically valuable and sensitive marine areas
- ID of ecologically and biologically valuable areas in Greenland (2017)
- More detailed studies of *Disko Bay and Store Hellefiskebanke (2015)*
- More detailed studies of the *North Water Polynya (2017)*
- Input to several international processes *(2010 – 2017)*

Data source

SEIA Studies include spatial information about key habitats, migration routes, sensitive species etc.



Advise on sustainable expl. of living resources including status and trends on several species of fish, mammals, birds etc.

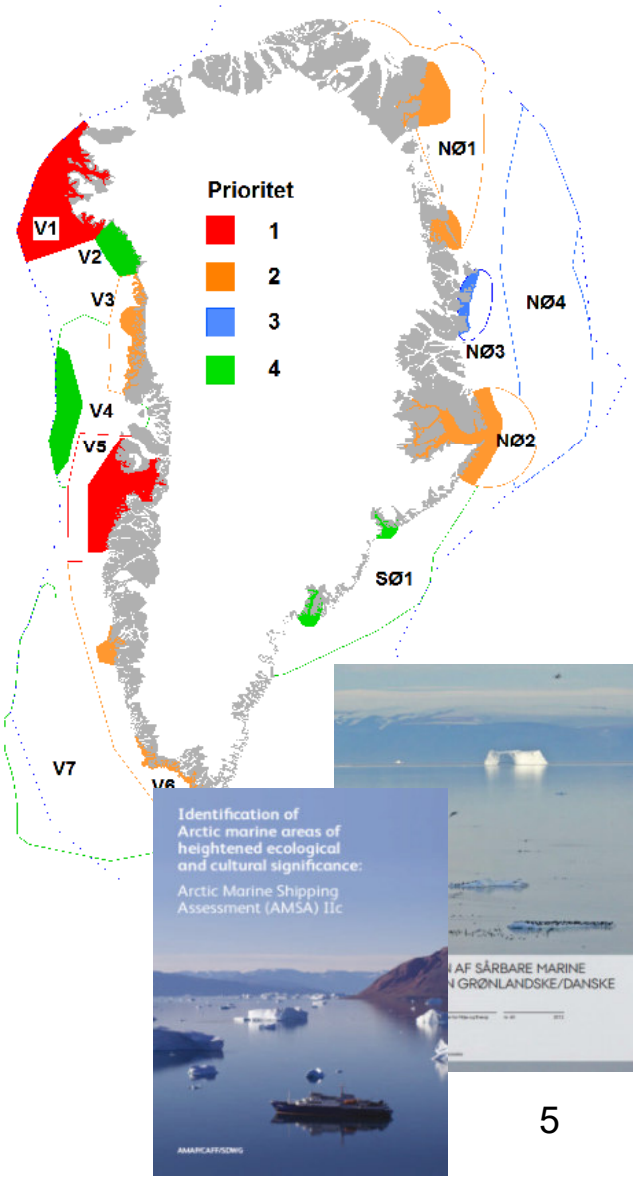


….. And more, including scientific papers etc.

Using the PSSA criteria for Greenland/ Denmark (2012)

- 12 areas identified and prioritized
- Same areas as described in AMSA IIc
- Areas are prioritized; two areas – *North Water Polynya* and *Disko Bay area* – stand out, and are ranked priority 1
- Most important areas reflected in the *Kingdom of Denmark Strategy for the Arctic;*

Area – number and name	PSSA Criteria											(Super) EBSA	PRIORITY
XXX = High extend XX = medium extend X = some extend	Unique/ rarity	Critical habitat	Dependency	Representativeness	Diversity	Produktivity	Spawning/ Breeding grounds	Naturalness	Integrity	Frigility	Biogeo-graphic importance		
V1: North Water Polynia	XXX	XXX	XXX	XXX	XX	XXX	XXX	XXX	XXX	XXX	XXX	S	1
V2: Melville Bay		XX	XX				X	XXX				E	3
V3: Northwest Greenland Shelf	X	XXX	XXX	XX	XX	X	XX	XX	X	XX	XX	E	2
V4: Baffin Bay / Uummaannaq		XXX	XXX					XX					4
V5: Disko Bay/ St. Hellefiskebanke	XX	XXX	XXX	XX	XXX	XXX	XX	X	XX	X	XX	S	1
V6: Southwest Greenland shelf	X	XXX	XX	XX	XXX	XXX	XX	X	XX	X	X	E	2
V7: Labrador sea and drift ice		XX	XX				XX	X				E	4
SØ1: Southeast Greenland/ DK str.		X	X				X	X				(E)	4
NØ1: Northeast Water polynia	XX	XX	XX	XX	X	XX	XX	XXX	XXX	X	XX	E	2
NØ2: Scoresby Sund	XX	XXX	XX	XX	XX	XX	XXX	XXX	XX	X	X	E	2
NØ3: Sirius Water/ Young Sund	X	X	X	X	XX	X	XX	XXX	X	XX		E	3
NØ4: Southwestern Greenland Sea		XX	XXX		X	XX	XXX	XXX		XX		E	3



Ecologically and Biologically Important Areas in Greenland (2017)

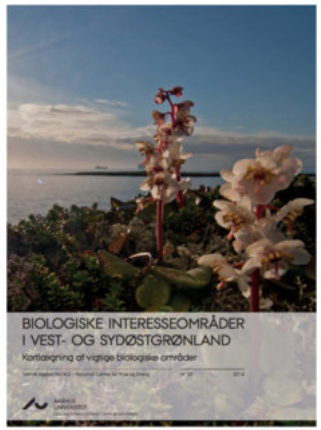
Authors: Tom Christensen, Peter Aastrup, Tenna Boye, David Boertmann, Rasmus Hedeholm, Kasper Lambert Johansen, Flemming Merkel, Aqqalu Rosing-Asvid, Christian Bay, Martin Blicher, Daniel Spelling Clausen, Fernando Ugarte, Kristine Arendt, AnnDorthe Burmeister, Elmer Topp-Jørgensen, Anja Retzel, Nanette Hammeken, Knud Falk, Morten Frederiksen, Morten Bjerrum & Anders Mosbech.

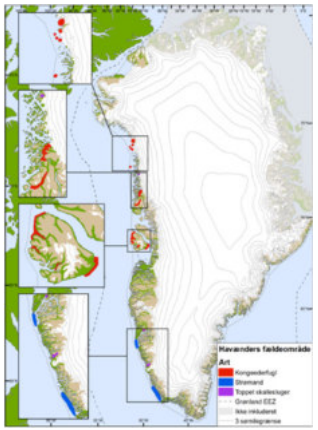
Institutions: Aarhus University, Greenland Institute of Natural Resources

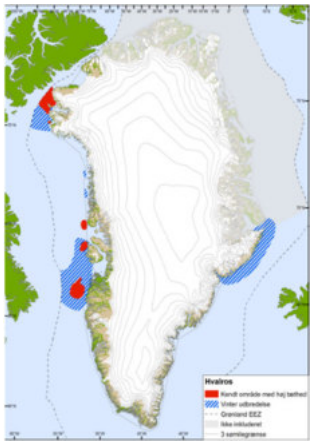
Ecological and Biological Important Areas in Greenland (2017)

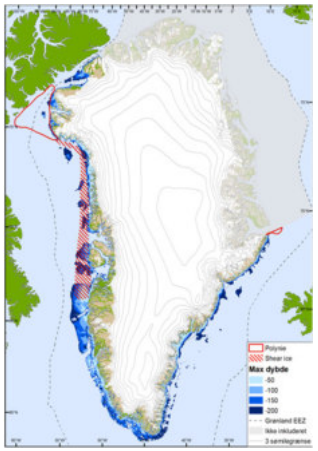
The report provides an overview of:

- Relevant legislation
- Population status and trends, including species specific core areas and spatial information on 65 animal species
- Important habitats, nature types or other ecosystem components: spatial information on 15 habitat types



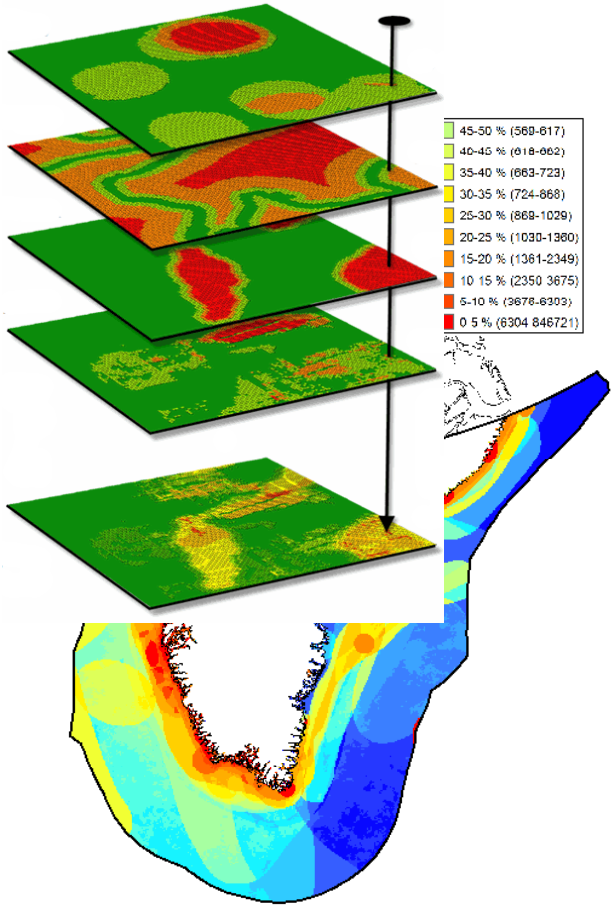






Based on this the report identifies a number of ***Ecologically and Biologically Valuable areas***. The ecosystem in each of these areas is described

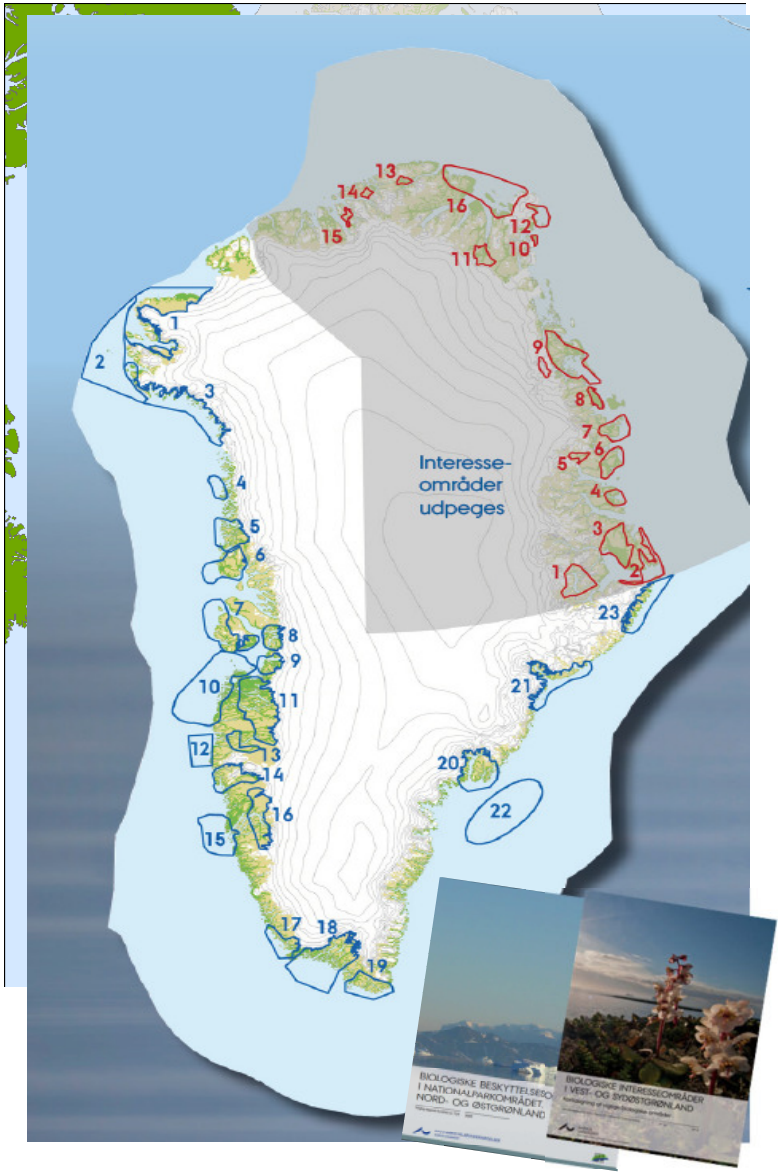
ID of Ecologic and Biologic valuable areas



The identification of important biological areas builds on two parallel processes:

- Small expert workshops (Expert judgement)
- Use of GIS overlay analysis
  - Each biological layer is ranked according to the importance (based on national priorities, Ramsar criteria, PSSA criteria, EBSA criteria etc. -inspired by Halpern et al. 2008)
  - Layers are divided into grids (2.5x2.5 km) and each cell will get a score
  - Biological valuable areas: Areas where many and/or important FECs overlap

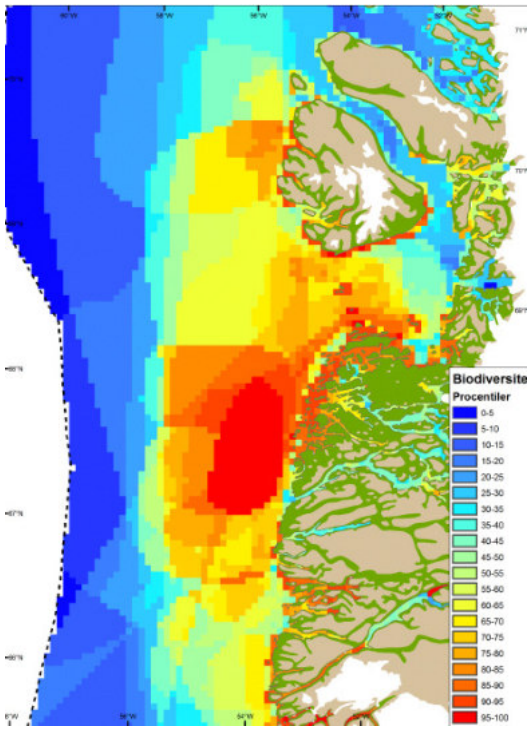
ID of Ecologically and Biologically valuable areas



- Based on these methods 23 Ecol. and Biologically important areas in West- and Southeast Greenland are identified
- Combined with an older study from Northeast Greenland in total 39 areas are identified
- The GIS analysis has been used at finer scales in the North Water and The Disko Bay/ Store Hellefiskebanke areas.

Finer scale information and sensitivity to ship trafic
Disko Bay/ Store Hellefiskebanke

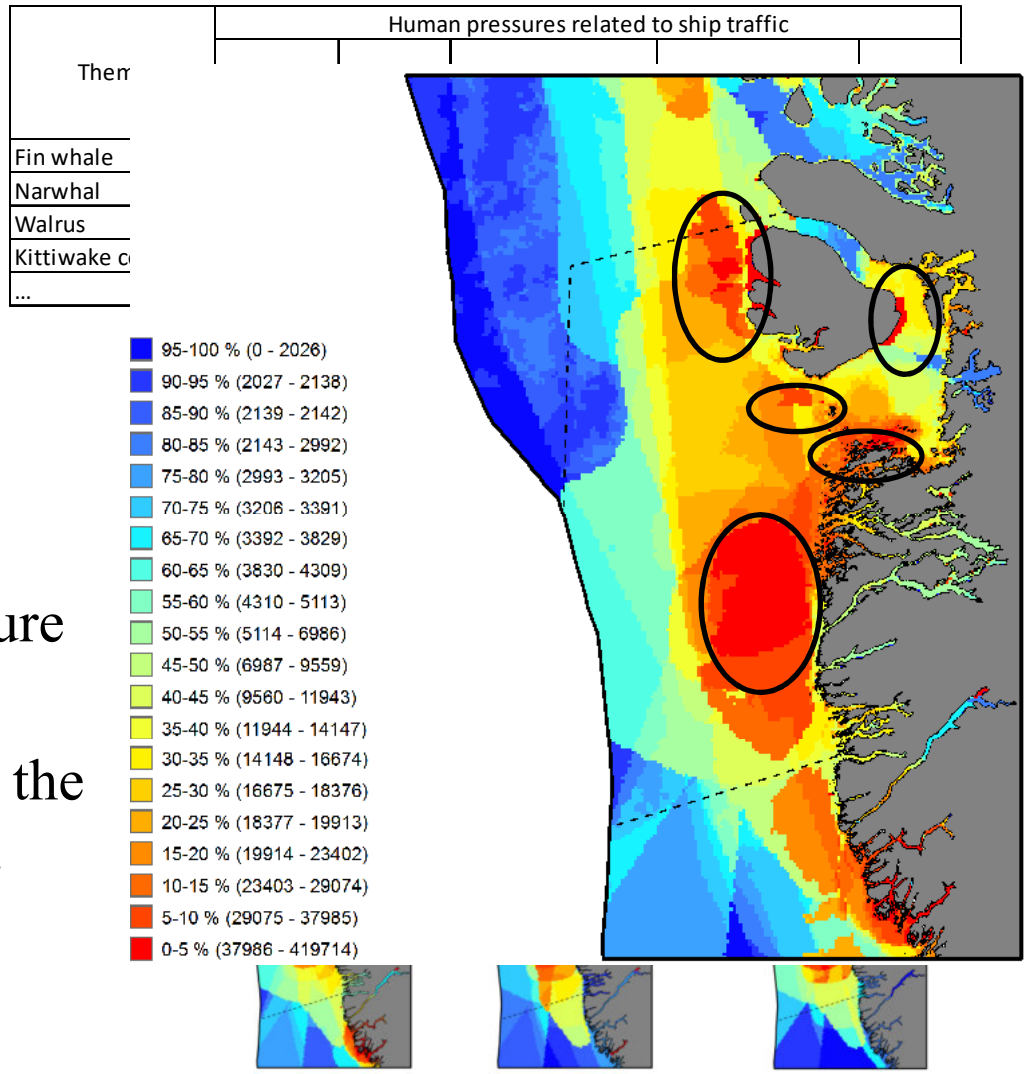
- Many areas of biological significance are of critical importance for several species.
- Report provides spatial information on app. 50 marine FEC and/ or species
- Same GIS method used in finer scale



Photos: David Boertmann, Carsten Egevang

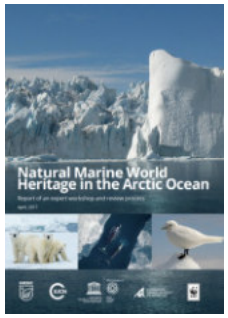
Finer scale information and sensitivity to shipping
Disko Bay/ Store Hellefiskebanke

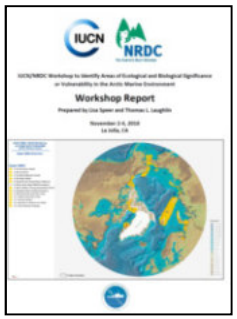
- The sensitivity of each of the biological layers towards five pressures related to ship traffic was weighted
- Each layer from the biodiversity ranking was multiplied with the sensitivity weight.
- A sensitivity map for each pressure is mapped
- Accumulated map: Five areas in the region requires special attention.

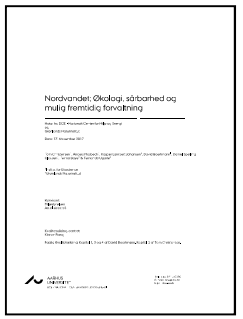


Finer scale information and seasonal descriptions
North Water

- Unique area in Greenland/ Canada and in the Arctic!
- Most productive polynya in the Arctic
- Identified as SUPER EBSA and potential WHS by IUCN
- Ranked as outstanding based on a national assessment (PSSA criteria)
- Based on request from Danish and Greenland authorities AU and GINR finalized assessment in 2017 describing biological features at fine scale and potential conservation tools.



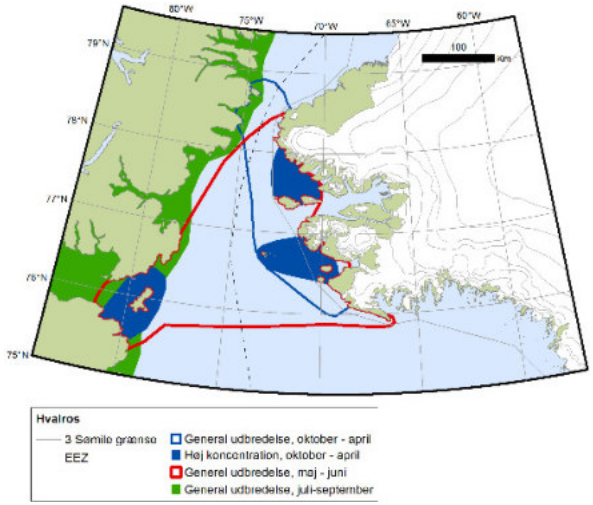




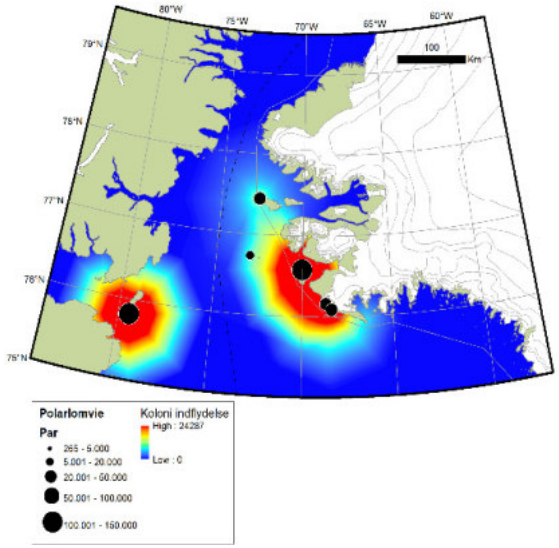
Finer scale information and seasonal descriptions
North Water

- Ecosystem description and information about important and sensitive areas for 24 species in the area and a total of 57 FEC´s

Walrus



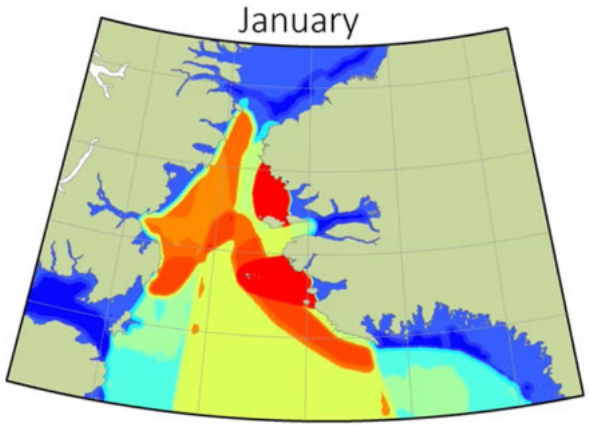
Thick-billed murre

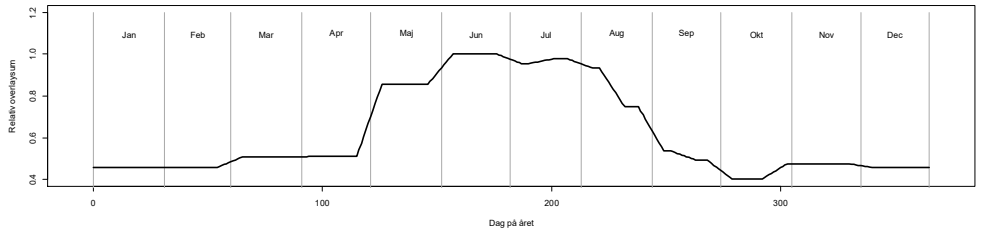


Finer scale information and seasonal descriptions
North Water

- Ecosystem description and information about important and sensitive areas for 24 species in the area and a total of 57 FEC´s

- GIS overlay analysis for all seasons and descriptions of the most important areas





Next steps

- The results will be used to look at conservation needs and potential use of more ecosystem based management, considerations related to ecological connectivity etc.
- Project initiated to further analyse stressors and potential threats in the identified important areas
- Same project will suggest for future conservation measures
- Workshop in winter 2018/19 with relevant stakeholders in Greenland and Denmark to discuss how results can be used across sectors to initiate relevant conservation measures (Ecosystem Based Management)
- Potential project will assess an area in East Greenland (Scoresbysund Polynya)
- Focus on publishing results in English to inform international/ bilateral processes

Photo: David Boertmann

More Information:

- Report about North Water: http://dce.au.dk/fileadmin/dce.au.dk/Udgivelser/Notater_2018/Nordvandet.pdf
- Report about Disko Bay: http://www.natur.gl/fileadmin/user_files/Dokumenter/Rapporter/TR61_EMBR_rapport_copy.pdf
- ID of important marine areas in Greenland: http://www2.dmu.dk/Pub/SR43.pdf
- Ecologically and biologically important areas in Greenland: http://dce2.au.dk/pub/TR89.pdf
- SEIA for Baffin Bay/ Davisstrait (Reports for other areas are also available): http://dce2.au.dk/pub/SR218.pdf
- IUCN report on potential WHS: https://portals.iucn.org/library/sites/library/files/documents/2017-006.pdf
- AMSA :https://www.amap.no/documents/doc/identification-of-arctic-marine-areas-of-%20heightened-ecological-and-cultural-significance-arctic-marine-shipping-assessment-amsa-iic/869

Thank you

Comparison of selected criteria to identify import. biodiv. / ecosyst. areas

CBD- EBSA	IUCN – MPA	Ramsar	IUCN KBA	IMO (PSSA)
Uniqueness or rarity • Species, populations, communities • Habitats or ecosystems • Geomorphological or ocean graphic features	Rare biogeographic qualities Unique or unusual geological features Rare or unique habitat	Wetland containing unique example of a wetland type found within the appropriate biogeographic .	Irreplacebility	Uniqueness or rarity
Importance for threatened, endangered or declining species and/or habitats	Presence of habitat for rare or endangered species Rare or unique habitat for any species	wetland supporting endangered, or critically endangered species or threatened ecological communities.	Occurrence of a significant (exceeding a threshold) population of a globally threatened species	Critical habitat for rare or endangered marine species
Biological diversity · Ecosystems, habitats, communities · Species · Genetic diversity	The variety of habitats Degree of genetic diversity within species	wetland important for maintaining the biological diversity of a particular biogeographic region	Sites contributing significantly to the global persistence of biodiversity.	Diversity
Biological productivity	Ecological processes or life-support systems	Wetland supporting a significant proportion of indigenous fish or host an important source of food for fishes, spawning ground, nursery and/or migration path		Productivity
Special importance for life history stages of species • Breeding grounds, spawning areas, nursery areas, juvenile habitat, etc. • Habitats of migratory species	Presence of nursery or juvenile areas Presence of feeding, breeding or rest areas	Wetland supporting plant and/or animal species at a critical stage in their life cycles Wetland supporting 20,000 or more waterbirds. Wetland regularly supporting 1% of the individuals in a population of one species or subspecies of waterbird or other wetland species.	Site that holds a significant proportion of a species' global population at any stage of the species' lifecycle.	Spawning, breeding and nursery grounds Migratory routes Critical habitat for the survival, function, or recovery of fish stocks
Naturalness	Naturalness			Naturalness
Vulnerability, fragility, sensitivity, or slow recovery • Sensitive habitats, biotopes or species that are functionally fragile or with slow recovery				Fragility .
	Representative of a biogeo-	Site that contains representative wetland type within the		Representative: Bio-geographic importance, representative of a

Source: Skjoldal and Toropova (2010), IUCN, 2010, Skjoldal et al. 2013, Langhammer et al. 2007, CBD – COP 9 Decision IX/20 http://www.cbd.int/decision/cop/?id=11663, IMO, 2002 & Ramsar, 1999, 2005, 2009)