WP1

Assessing multiple evidence for population trends of wildlife species in Greenland

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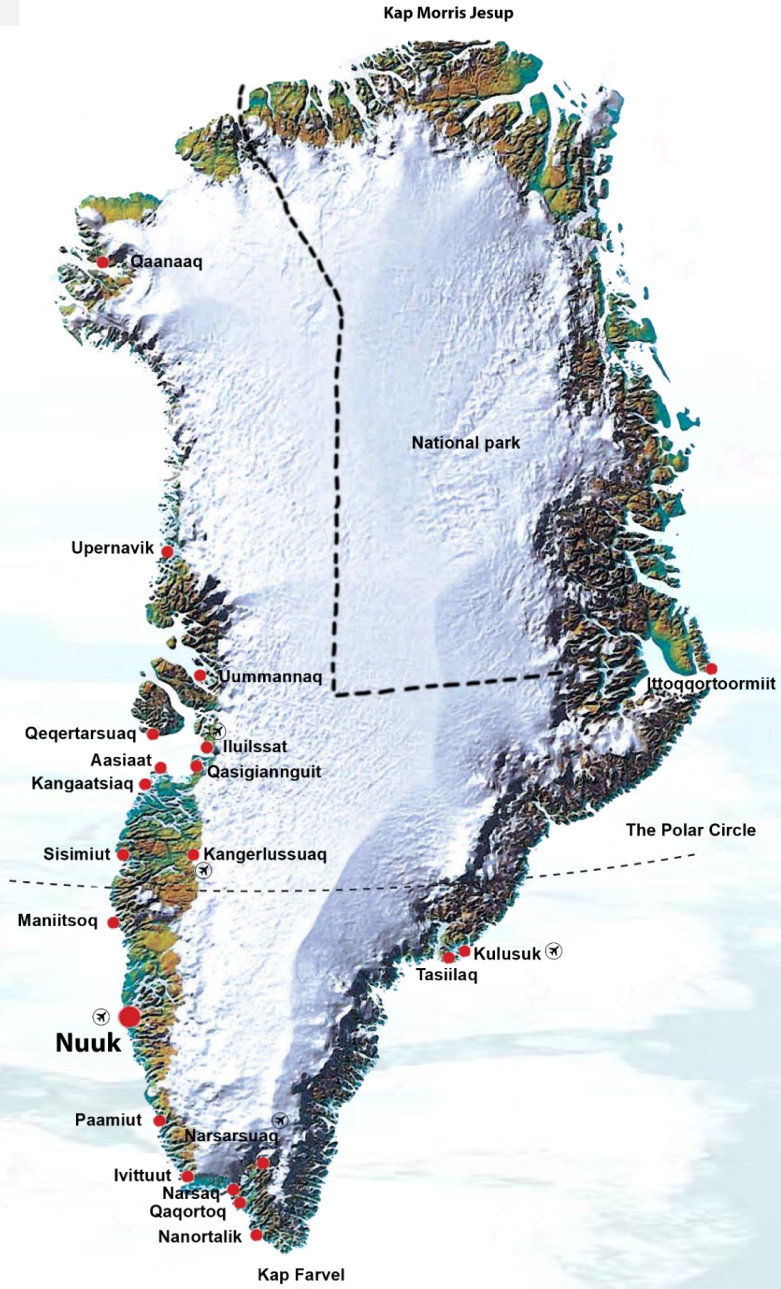
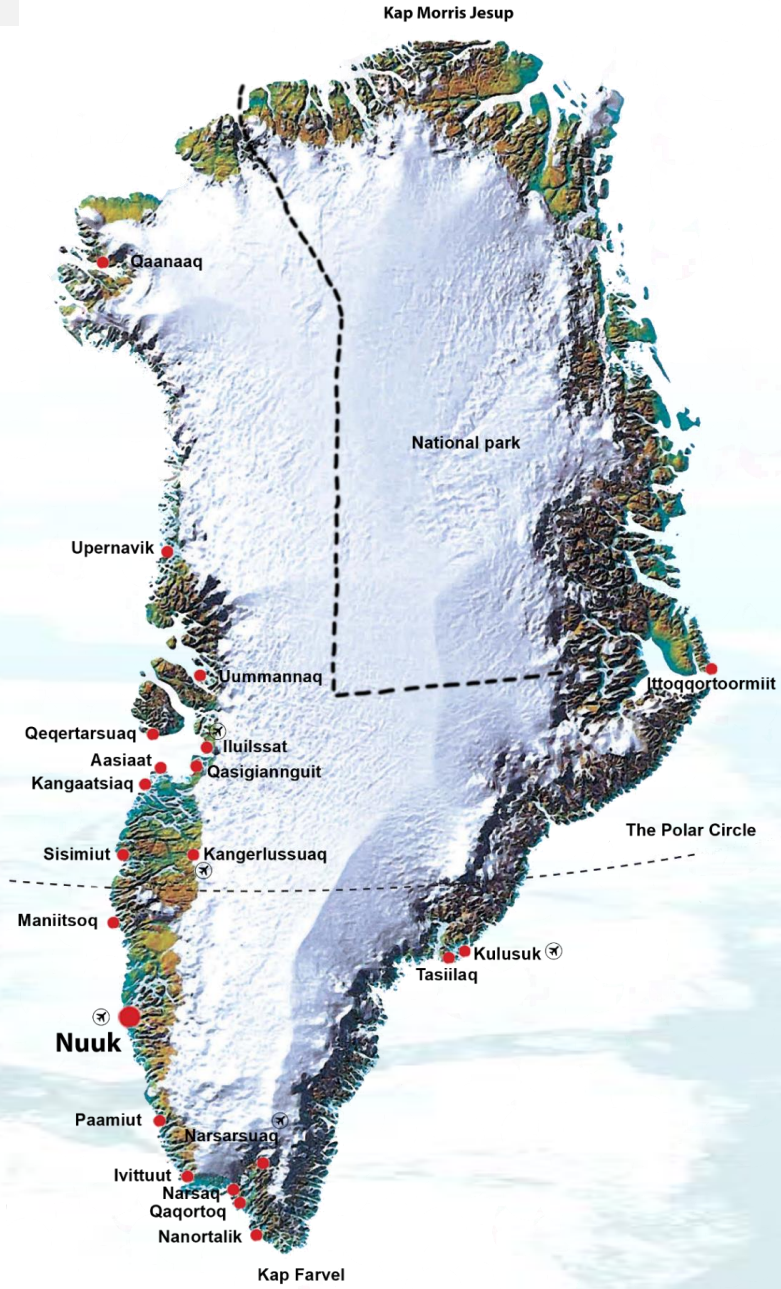
OBJECTIVE: COLLECT EVIDENCE ON WILDLIFE POPULATIONS

- Objective: Collect evidence on wildlife populations used by local communities in Greenland
- We identified 65 species used by local communities (Greenland statistics, interviews)



OBJECTIVE: COLLECT EVIDENCE ON WILDLIFE POPULATIONS

- Literature research:
- Challenge: Greenland:
- (Multiple) surveys are often physically, financially and time-wise not feasible, species are hard to detect from airplanes, opposing pieces of information, e.g.,…



METHOD: COLLECT EVIDENCE ON WILDLIFE POPULATIONS

- Scientists often use multiple indicators to assess population trends, e.g., counts, reproduction trends, habitat use and range, body condition, genetics

→ Assessment of status and trend of a population (sub-population, stock..)

METHOD: COLLECT EVIDENCE ON WILDLIFE POPULATIONS

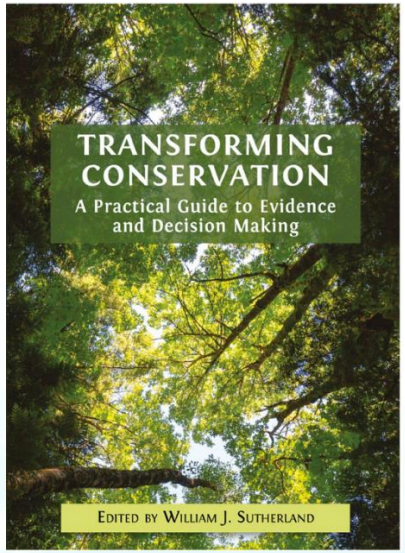
Evidence for declining/stable/increasing wildlife trends

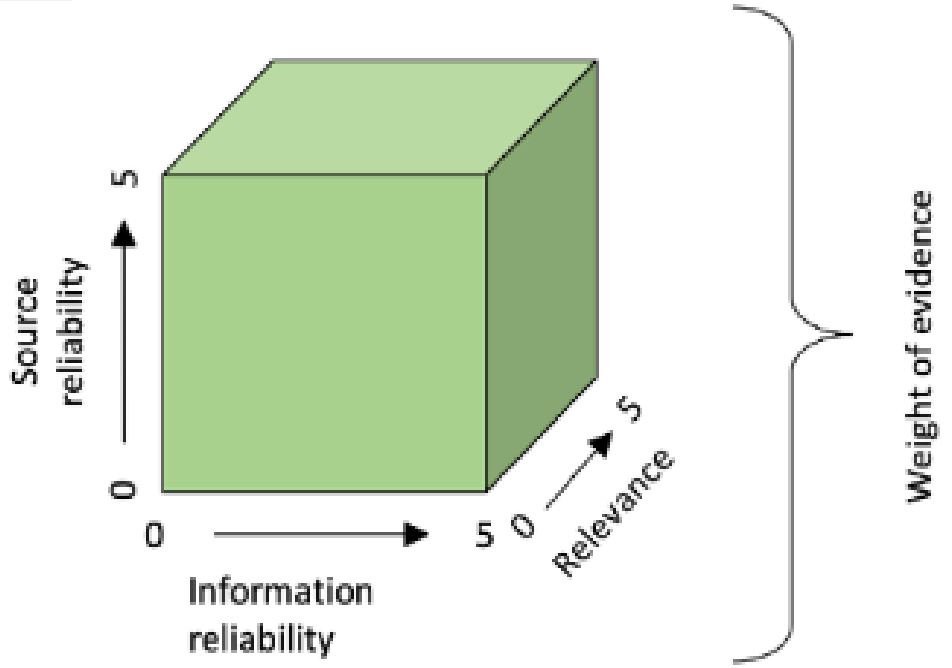
- Systematic approach: literature research: 498 pieces of evidence, peer-reviewed studies and expert reports

Species	Population	Indicator	Method	Direction	Assumed population trend

Different quality of evidence

METHOD: COLLECT EVIDENCE ON WILDLIFE POPULATIONS

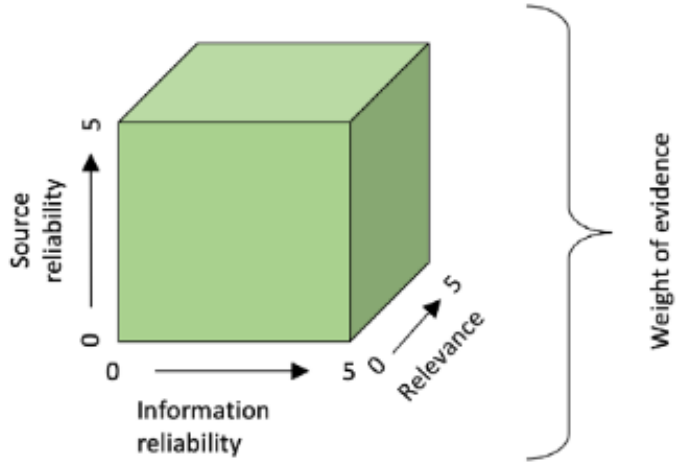




- **Information reliability (I**): i.e. "how much can the information contained within a piece of evidence be trusted - e.g., how rigorous is the experimental design"
- **Source reliability (S):** i.e. "how much trust can be placed in the source of the evidence - e.g., what is the quality of the journal/report, is there a conflict of interest, or bias"
- **Relevance (R):** i.e. "how closely does the context in which the evidence was derived apply to the assumption being considered - e.g., does it relate to a similar problem, action and situation" (Sutherland, 2022).

METHOD: COLLECT EVIDENCE ON WILDLIFE POPULATIONS

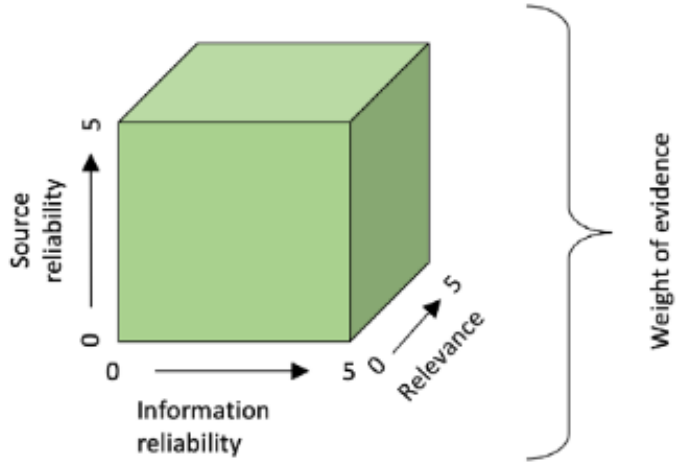
Evidence for declining/stable/increasing wildlife trends



Species	Population	Indicator	Method	Direction	Assumed population trend	Source	Information reliability (I):	Source reliability (S):	Relevance (R):	Cumulative evidence score (I x S x R)	Evidence
Polar bear	Davis Strait	Population trend	Multiple aerial surveys	↓	↓						
Polar bear	Kane basin	Reproduction trend	Long-term data	↑	↑						
Polar bear	Global	Future trends (30% decline within 50 yrs)	Scenario analyses	↓	↓						
Canada Geese	Svalbard Generic	Reproduction increases with temperatures	Long-term data	↑	↑						
Canada Geese	Artic	Population trend	Available abundance data	↑	↑						

METHOD: COLLECT EVIDENCE ON WILDLIFE POPULATIONS

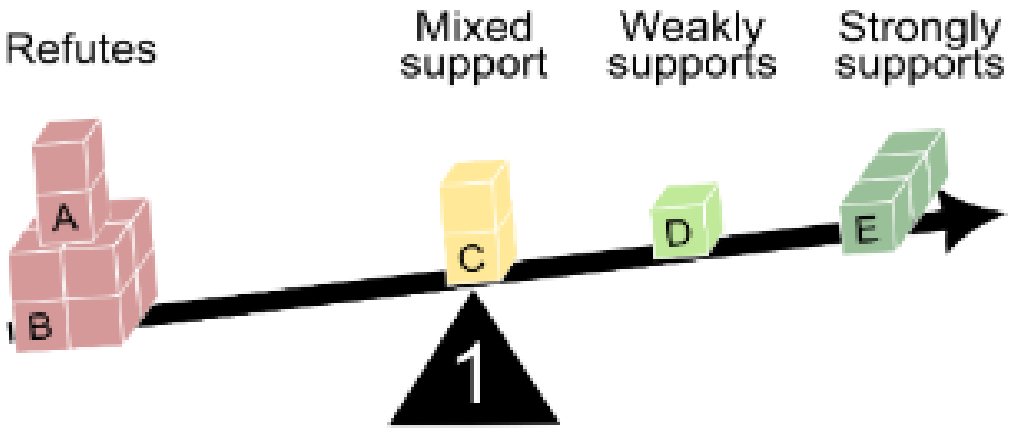
Evidence for declining/stable/increasing wildlife trends Current, 2030 and 2050

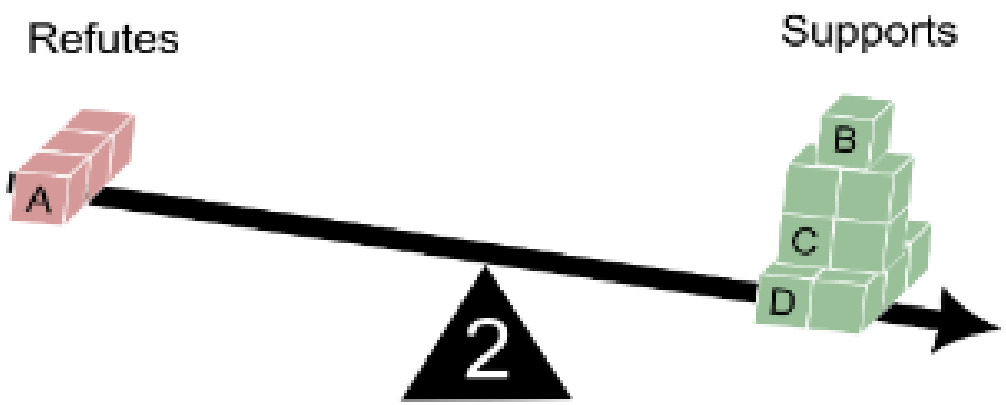


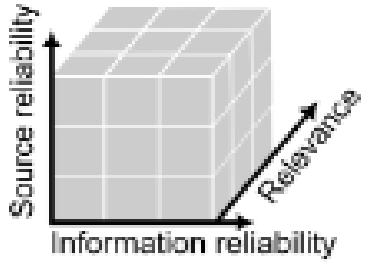
Species	Indicator	Direction	Assumed population trend	Relevance current	Relevance 2030	Relevance 2050
Polar bear	Future trends (30% decline within 50 yrs)	⬇	⬇	3 (relevant	4 (very relevant)	5 (extremely relevant)

METHOD: COLLECT EVIDENCE ON WILDLIFE POPULATIONS

Evidence for declining/stable/increasing wildlife trends Current, 2030 and 2050

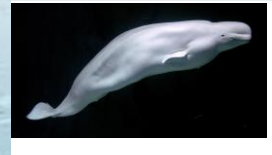


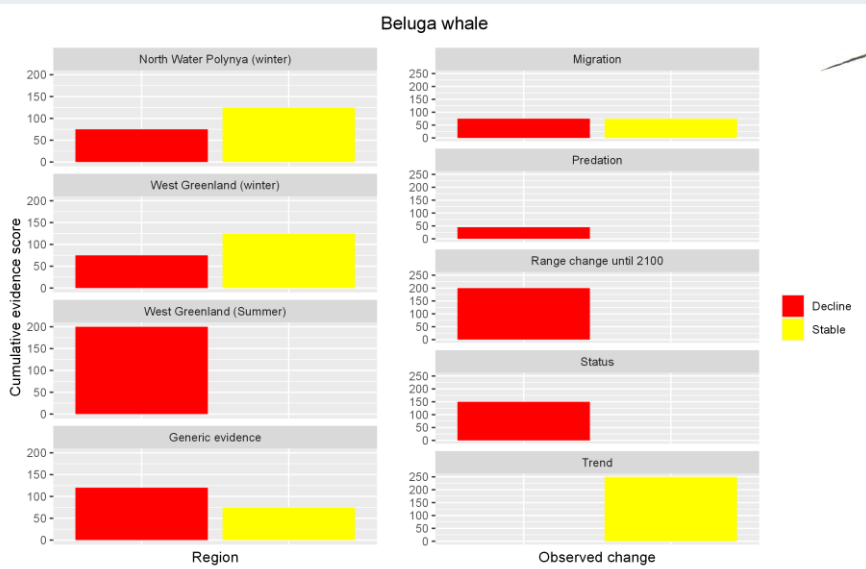


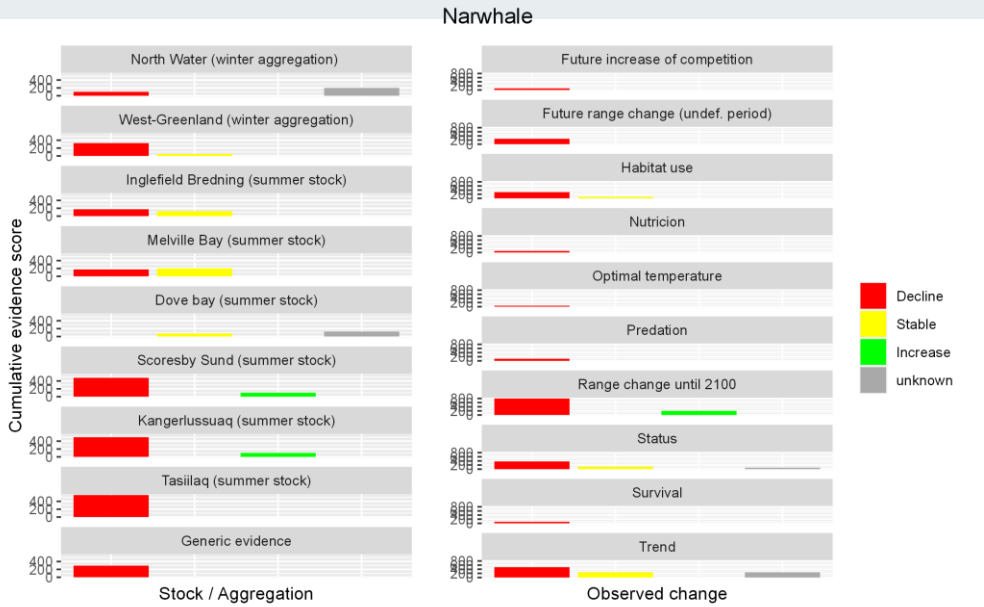


PRELIMINARY RESULTS: COLLECT EVIDENCE ON WILDLIFE POPULATIONS

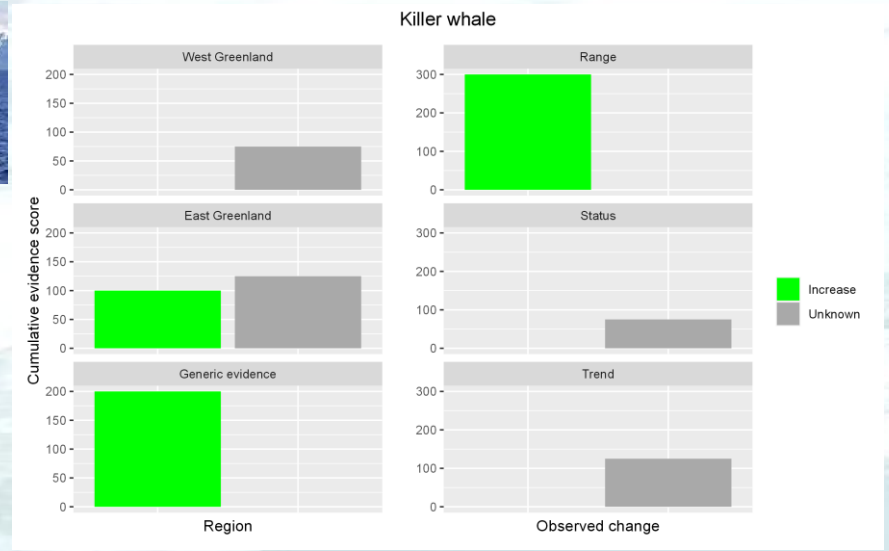
Arctic whales

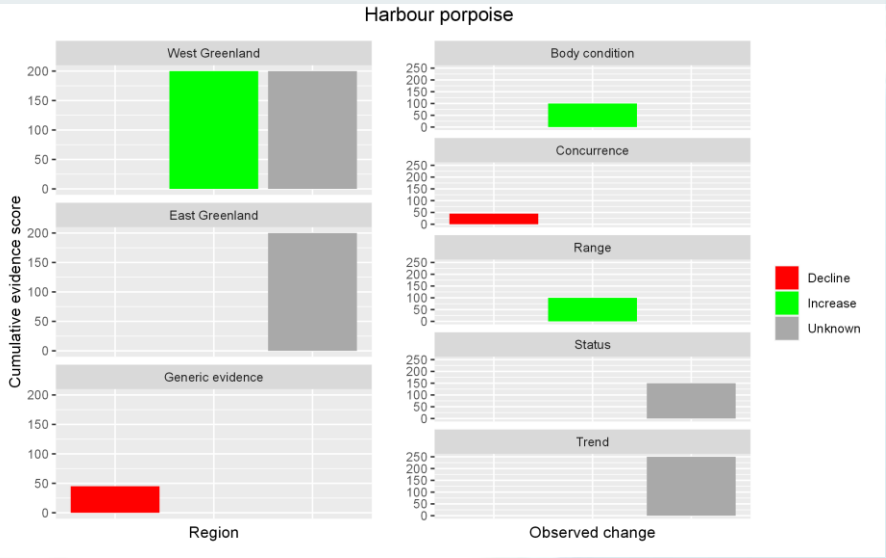






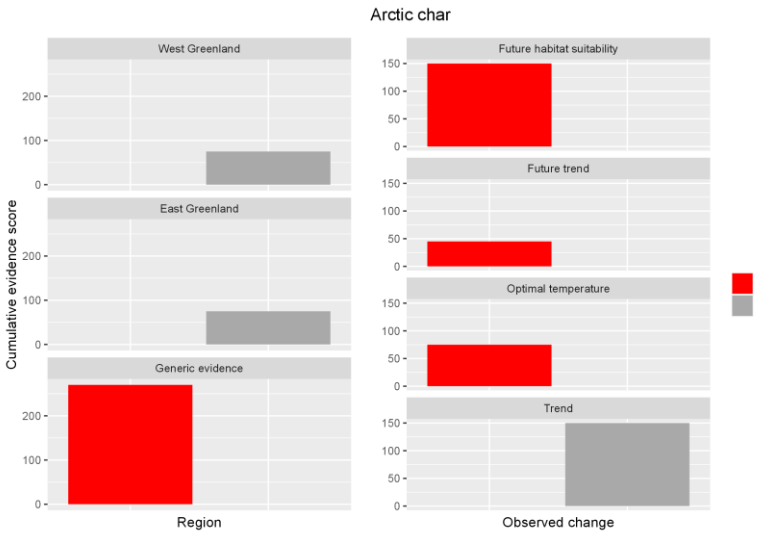
Boreal whales

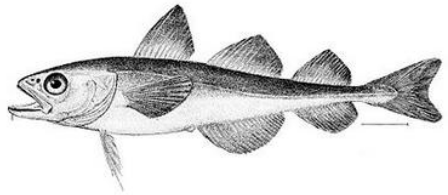


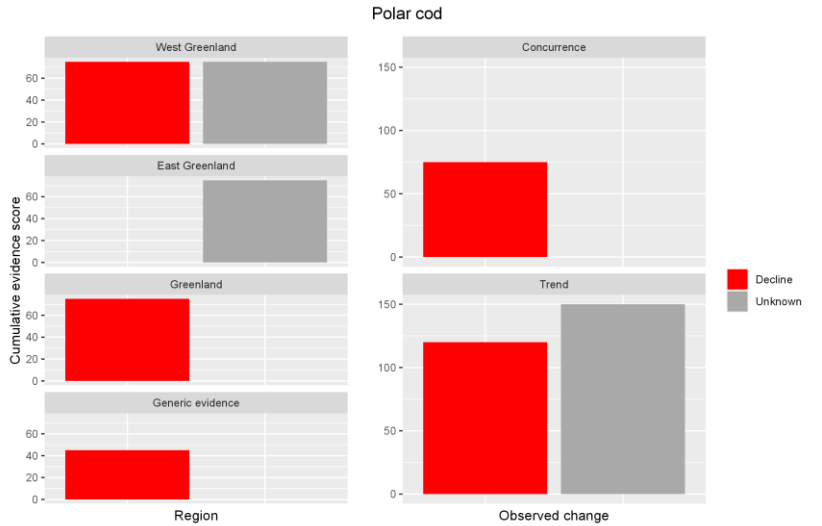


PRELIMINARY RESULTS: COLLECT EVIDENCE ON WILDLIFE POPULATIONS

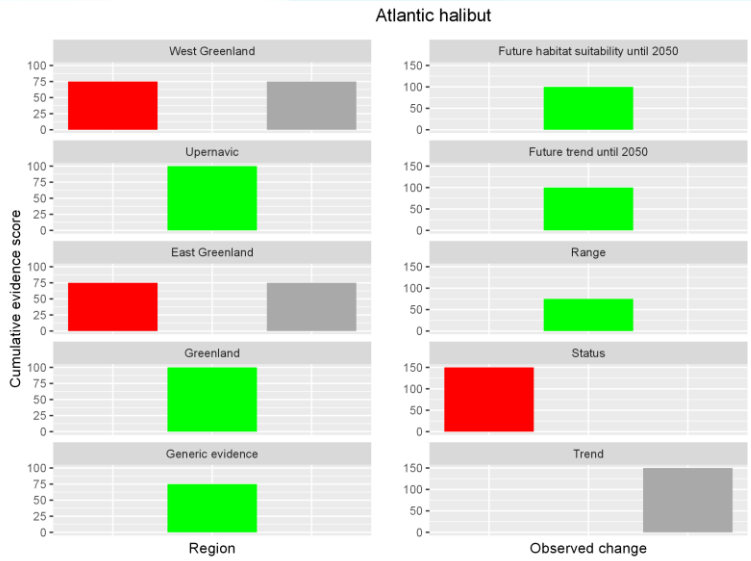
Arctic fish

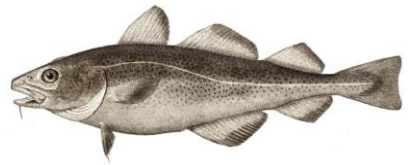


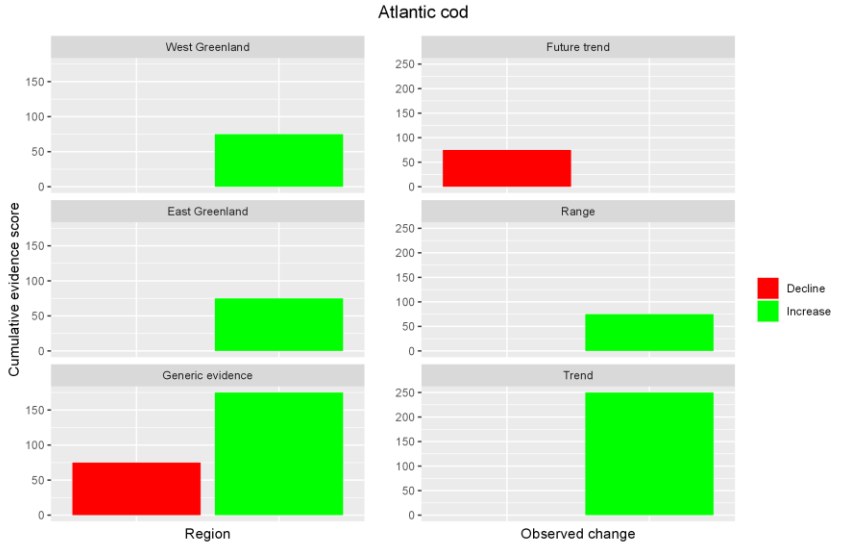




Boreal fish

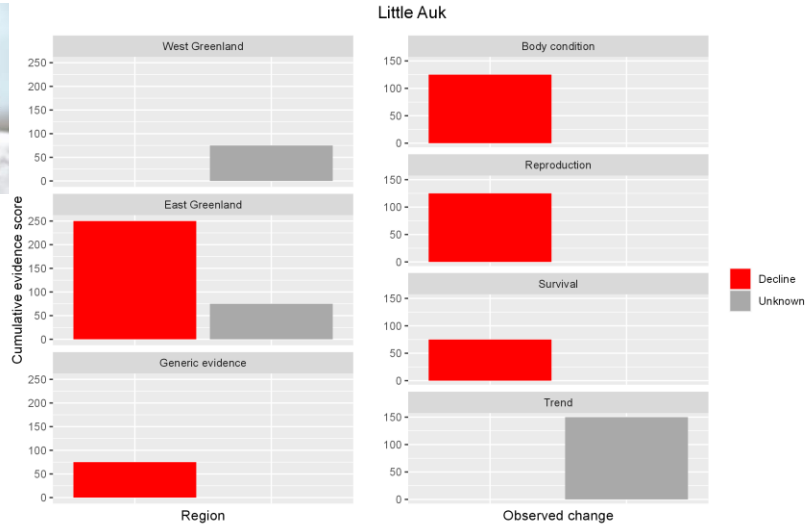


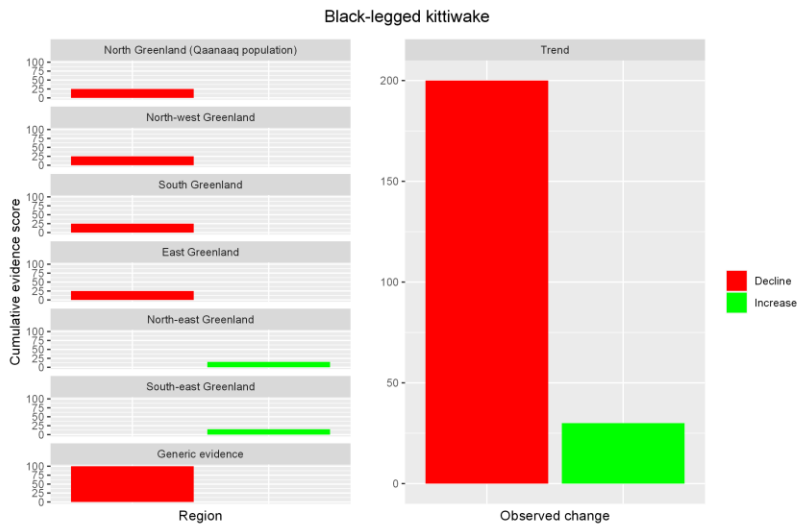




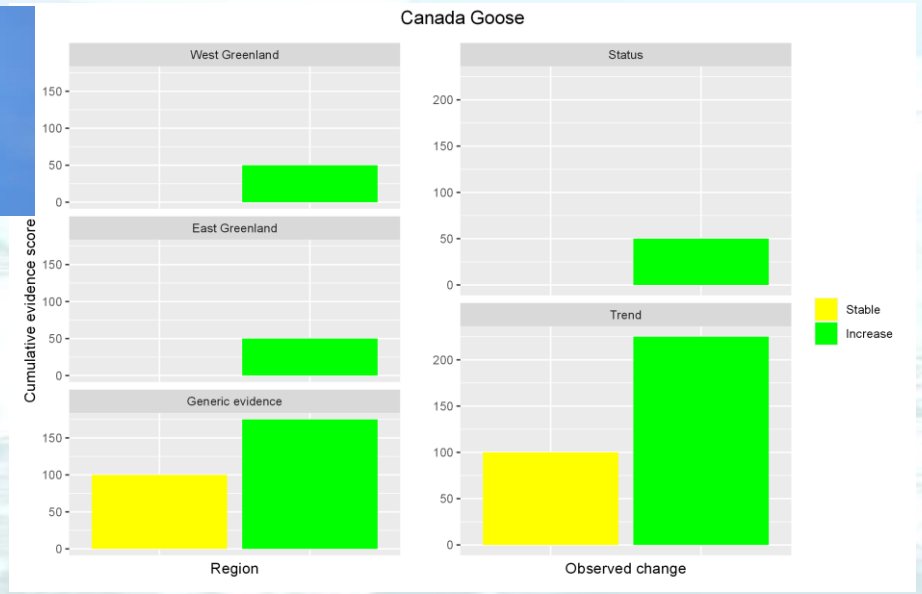
PRELIMINARY RESULTS: COLLECT EVIDENCE ON WILDLIFE POPULATIONS

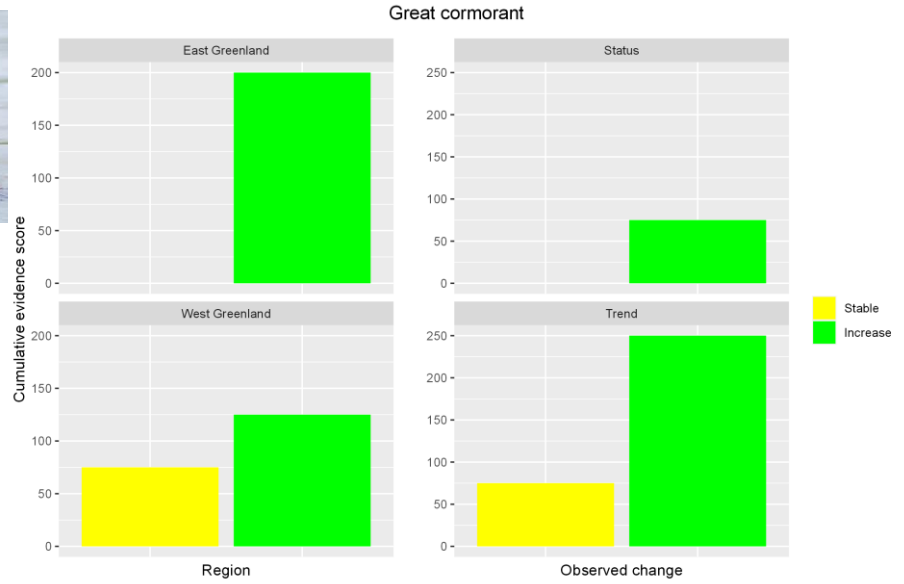
Arctic birds





Boreal birds





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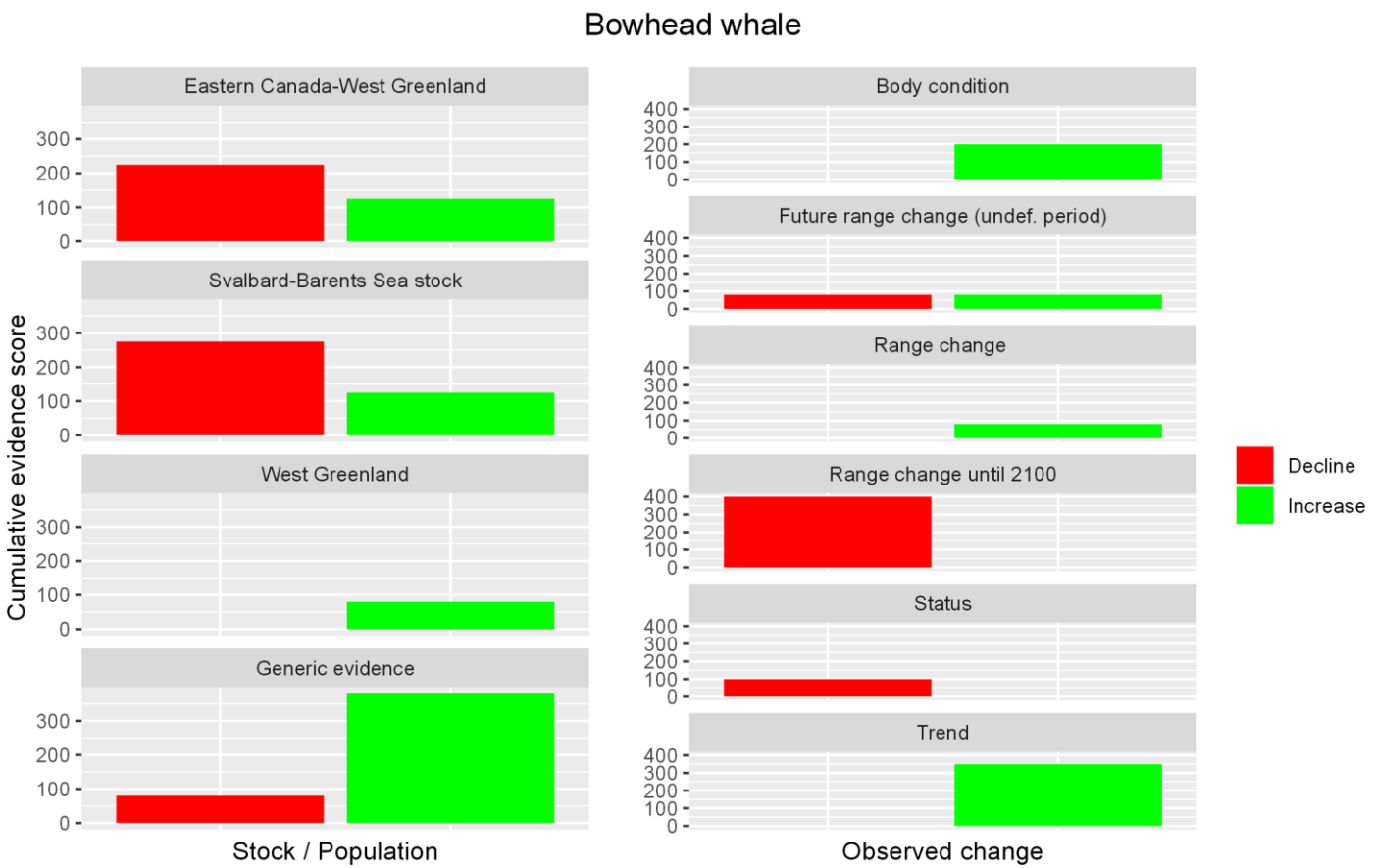
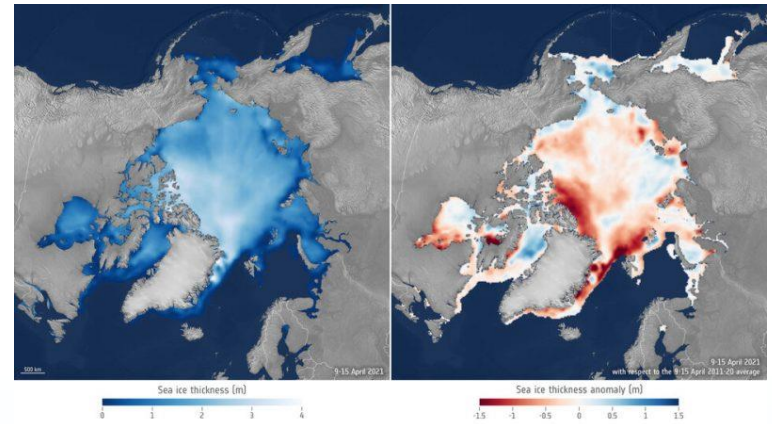


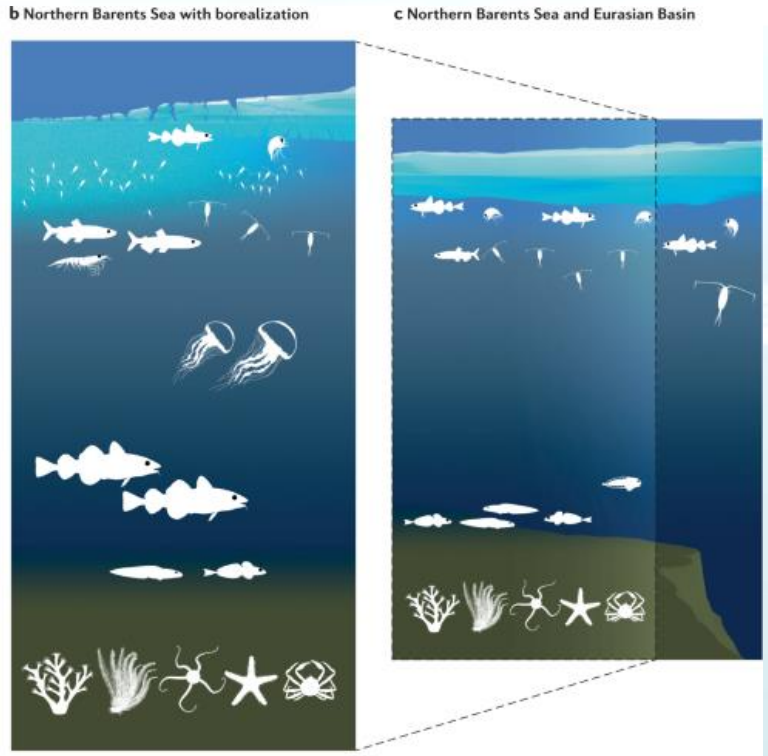
PRELIMINARY RESULTS: COLLECT EVIDENCE ON WILDLIFE POPULATIONS

1. The Atlantification process : Increasing influx of Atlantic water in the Arctic. The Arctic Ocean is becoming warmer and saltier and sea-ice is disappearing as a result

2. Borealization of Arctic communities: An influx of boreal species currently pushing Arctic species further northward (plankton, fish, birds, marine and terrestrial mammals). One of the most pronounced climate-driven changes in biodiversity in the Arctic.

3. Global rise of generalists versus specialists
   (e.g., boreal fish species entering the Arctic are typically larger and mobile generalists, with higher fecundity, a preference for pelagic resources
   → outcompete the bottom-dwelling Arctic specialist that have adapted to highly seasonal and harsh environments where specialization in a rich community of benthic prey, relatively low fecundity and investment in single, larger offspring increased their chances of survival.

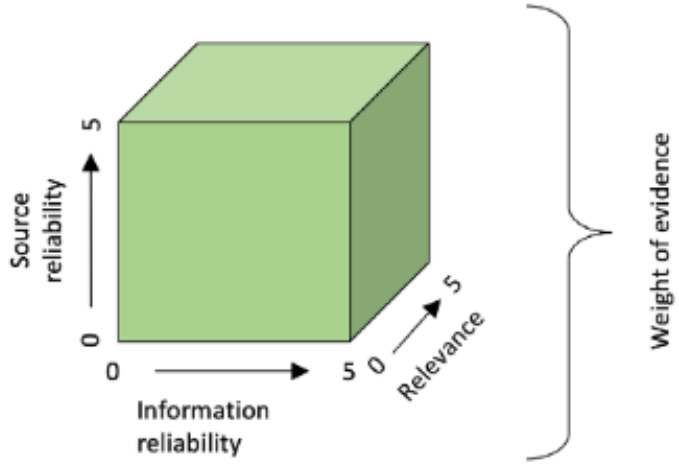




METHOD: COLLECT EVIDENCE ON WILDLIFE POPULATIONS

Problems and challenges

- Evaluation is sometimes arbitrary
- Evaluation is unclear due to species-specific differences



Species	Population	Indicator	Method	Direction	Assumed population trend	Source	Information reliability (I):	Source reliability (S):	Relevance (R):
Hooded seal	Northwest Atlantic stock	Reproduction	Long term data	⬆	⬆ ⬇				

METHOD: COLLECT EVIDENCE ON WILDLIFE POPULATIONS

→ Interviews with scientists (experts on the species in question n~46)

1) Rate the evidence using Sutherlands (2022) method

2) Questionnaire (Zoom):
   1) Provide estimates for current and potential future wildlife trends based on a synthesis of the available evidence
   2) Assess the determinants species vulnerability

- Expert-based approaches/scenarios use expert opinion, knowledge or judgement to inform the various aspects of scenario construction
- Widely used, for example, by IPBES, IUCN and IPCC when data are scarce

METHOD: COLLECT EVIDENCE ON WILDLIFE POPULATIONS

- Despite experts' often impressive knowledge within their domain, they do not necessarily significantly outperform non-experts when making judgments and forecasts in unpredictable environments

→ Huge uncertainty

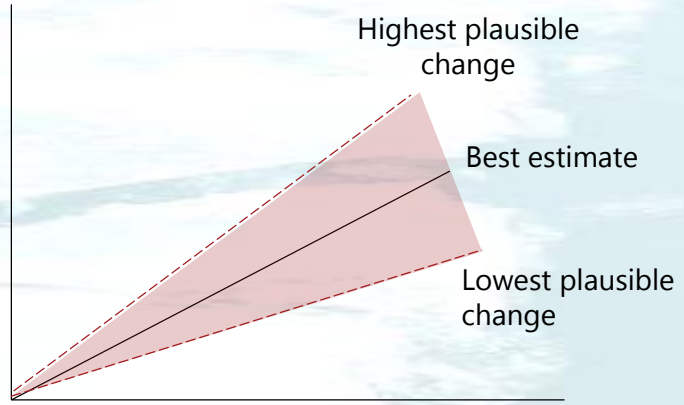
→ Experts are also susceptible to cognitive biases (Sutherland, 2022)

1) Include multiple experts: Combining the judgments of multiple experts can yield better aggregated judgements (three per species) (Sutherland, 2022).

2) Using a three-point interval elicitation method (Speirs-Bridge et al., 2010):

- "what is the highest plausible change (%) until 2030/2050 ?"
- "what is the lowest plausible change (%) until 2030/2050 ? "
- "what is your best estimate of plausible change (%) until 2030/2050 ?"

3) Rating of the confidence level of the answer provided

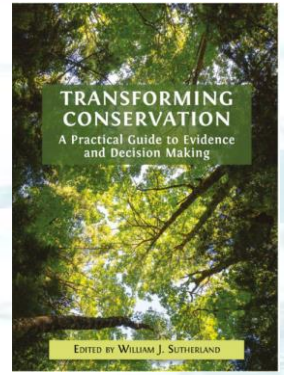


A methodical application

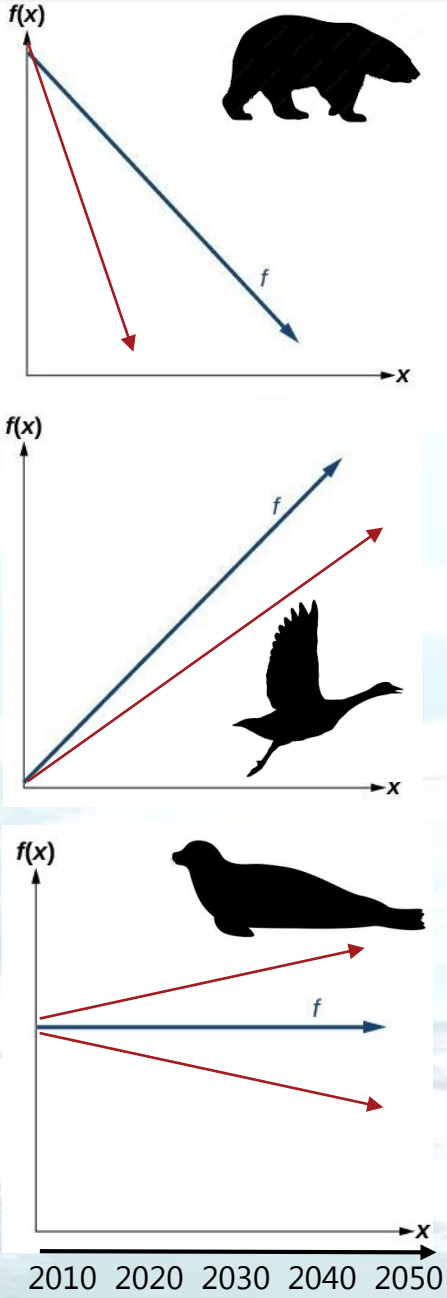
Catch data
Expert interviews:
Scientists
Local users
Literature research

1. What is the best way to combine these different strands of evidence?
2. Can we use Greenland as a case study to develop a general application for biodiversity assessments using a conservation evidence approach for regions where surveys are not possible?

→ Conservation Evidence Group in Cambridge



PROJECT II: Wildlife trends and climate vulnerability of species



Potential wildlife trends until 2030/2050

Catch data
Expert interviews:
Scientists
Local users
Literature research

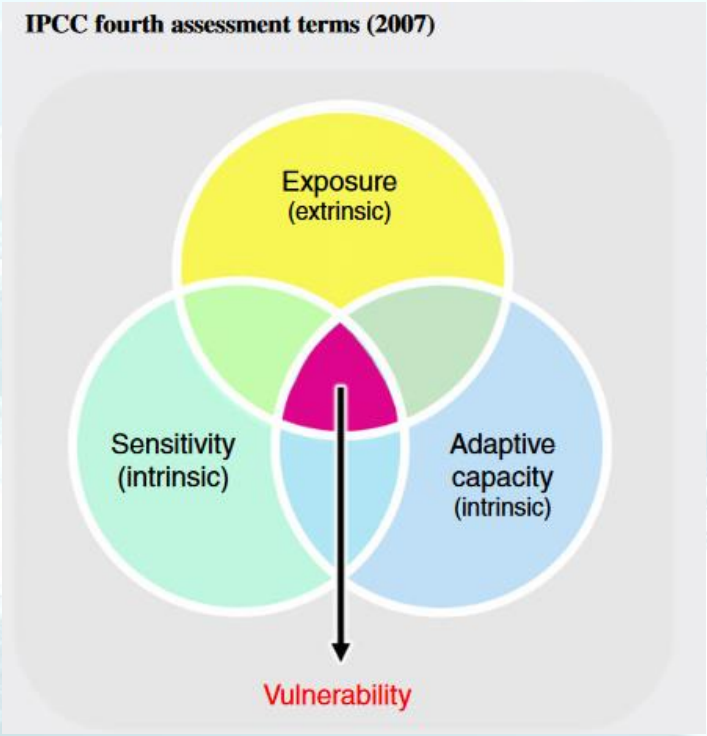
Project II: Wildlife trends and climate vulnerability of species

Assessment of climate vulnerability of species

(IPCC 2007, Foden et al, 2018, "Climate change vulnerability assessment of species)

The nature, magnitude, and rate of extrinsic climatic and associated environmental changes experienced by a species

The degree to which a species is affected, either adversely or beneficially, by climate change



The potential, capability, or ability of a species, to adjust to climate change, so as to moderate potential negative outcomes, to take advantage of opportunities, or to respond to the consequences

When the economic efficiency of ITQs meets the island opperation reality of small coastal fisher communities in Greenland

Martin Reinhardt Nielsen, Kåre Hendriksen and others

Second physical FutureArcticLives workshop in Tromsø August 2023

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What is the big deal?

- Unsustainable fisheries due to open access, rule of capture and over-capitalization
- Individual Transferable Quotas
  - Grant fishers, vessels or producers the exclusive right to catch a designated portion of the Total Allowable Catch (TAC), set by a regulatory agency and then divided into units that can be bought, sold or leased among participants in the fishery
  - Ownership of quotas are expected to create a sense of stewardship, encouraging the protection of the resource, ending the race to catch the fish, improving security, enabling better planning of fishing operations and reducing overcapacity of the fishing fleet - better biological performance and economic efficiency
- Remains contentious – especially in the context of small and indigenous communities

The Fisheries Commisions recommends ITQs in Greenlands inshore small vessel fishery

- Fish resources belong to society
- Exclusivity and security concerning fisheries rights
- Easy transferability, long ownership of quotas, limited administrative interference, and a high degree of flexibility
- Reduced fisheries capacity (i.e. high efficiency) to promote the highest possible societal return including high resource rent through a fair payment from to harvester to the society
- Cap on the share of quotas that the same entity can own

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The Fisheries Commissions recommends ITQs in Greenlands inshore small vessel fishery

- Time-limited ownership and payment of a resource rent tax
- Initial allocation of quotas based on the best three years catch the five previous years with no option for renting year quotas
- Opens for investment associations and pension funds etc. to invest in fishing so that individuals can become co-owners
- Separate quotas shares are envisioned with and without landing duty in Greenland, but no considerations are made about whether or not ITQs can be sold to foreign entities
- The capital-intensive fishery, consisting of the off-shore and coastal shrimp fishery and other off-shore fisheries are protected
- The labour-intensive coastal fisheries should be reduced in capacity through ITQs and revising the 6-meter rule to increase vessel sizes

What are the assumptions made and what would be the implications of ITQs in the inshore small vessel segment?

- Assumes that a fisher has to land 33 tons to be economically viable
  - The reality is a mixed economy of hunting and fishing
- Assumes mobility of labour and a availability of jobs in other sectors
  - Greenland is characterised by an Island opperation
  - Lack of housing in larger towns and prestige projects will end
- Does not consider the informal economy
  - Many fishers are primarely hunters supplying a culturally and nutritionally important food network without which additional food import will be required negatively affecting the trade balance
- Concentrating quotas is more efficient
  - Concentration will likely make the larger boat segment grow at the expense of the smaller vessels leading to more landings in towns and perhaps abroad reducing value

What are the assumptions made and what would be the implications of ITQs in the inshore small vessel segment?

- Pension funds and investment associations will spread the ownership and infuse capital for investment
  - In reality people with limited fisheries insights and incentive for restraint will be managers and former fishers and owners will be crew members
  - These new actors will have strong negotiation powers that can shift political opinion regarding quota caps etc.
- Grandfathering as initial quota allocation is fair
  - Young generations will be bared from entering the fishery, leading to intergenerational inequality as well as loss of tradition and culture

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Anything else wrong about this idea?

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