

FutureArcticLives

- WP1

Physical meeting Copenhagen
March 2022

Martin Reinhardt Nielsen, Mona Bachmann,
Henrik Meilby and Birger Poppel

KØBENHAVNS UNIVERSITET



WP1 activities and deliverables

Climate change implications for biodiversity and the welfare of Greenland's traditional hunters and fishers

Overall objective

Assess climate change welfare impacts on traditional hunting and small-scale fisheries households and hence the feasibility of traditional livelihood strategies and the sustainability of small settlements along the coast of Greenland delivering input to development of future regulations that best possibly ensure biodiversity conservation and serve the long-term interests of society and specific user groups relying on nature's contribution

WP1 activities and deliverables – plans and progress

Three overall objectives

1. Evaluate hunter catch records as a user-generated source of monitoring data on species population trends to inform management decisions and assist overcoming inherent data constraints (Deliverable 1.1.)
 - Published biological point estimates collected on 13 species
 - Awaiting reported catch – through Piniarneq - requested from Greenland Statistics on a month and household level – in-shore fishers and hunters incl. occupational and recreational hunters obtaining license and/or reporting catch or trading catch
 - Some climate data has been obtained from DMI – the rest is freely available. Sea surface temperature (SST) and Sea Ice Concentration (SIC) potential indicators.
 - Match locations and compare species-by-species – controlling for effort, quotas, climate and CPI

WP1 activities and deliverables – plans and progress

2. Determine to what extent cash and subsistence income from hunted species contribute to hunting households' total annual income as well as Greenland's national economy
 - Awaiting detailed income and socioeconomic data – through municipal tax authorities
 - requested from Greenland Statistics on an annual and a household level
 - Trade data and methods used to be obtained from – Fisheries Licence Control – through Greenland Statistics
 - Subsistence value determined from trade value for each species, month and location – non traded catch is subsistence use
 - Calculate reliance defined as the share in total household income
 - Accumulated value for all hunting household reflects contribution to national economy

WP1 activities and deliverables – plans and progress

3. Compare reliance on hunting and hunting yield composition over time and between locations and examine to what extent species substitute each other, how this is influenced by climate, hunting regulations and trade prices and evaluate potential biodiversity implications (Deliverable 1.2)
 - Using simple cross-correlation tests
 - Obtain information on management measures - including closed seasons, quotas and local regulations - from the Ministry of Fisheries, Hunting and Agriculture (MFHG) on a monthly basis
 - Acquire data on subsidies and aid schemes in relation to catch and fisheries as well as pensions, housing assistance and other social benefits at the household level and local price data per month for fuel and ammunition by location and from Greenland Statistics
 - Use pseudo space-time models controlling for these aspects as well as climate to predict reliance and catch
 -

WP1 activities and deliverables – plans and progress

4. Conduct future scenario analysis and simulations to predict household welfare and societal aggregated economic and biodiversity consequences of reduced access to individual species, due to climate change and proposed hunting regulations
 - Ongoing literature review of predicted wildlife abundance and distribution changes due to climate change
 - Planned species expert interviews to obtain opinions about changes in two future scenarios based on the IPCC report
 - Simulation approaches applied to predict the welfare consequences in these future climate scenarios

WP1 activities and deliverables – plans and progress

5. Determine whether particular groups of hunters and fishers, such as highly specialized hunters in remote communities, are more exposed to these impacts than others (Deliverable 1.3)
 - Make wealth and catch type specialization groups using cluster or latent class analysis based on catch, methods etc.
 - Compare vulnerability based on income gap or welfare decline in future scenarios
 - Make maps facilitating optimization of strategic investments in social services

Data Management Plan

1. Internal ID	2. Description	3. Source	4. Type	5. File format	6. Volume	7. Sensitive	8. Ethics	9. License	10. Storage	11. Sharing
WP1-UCPH-1	Time-series data on catch per month of individual species by location from individual hunters and fishers (occupational and recreational hunters) in Greenland for the period 1994-2019 from Greenlandic hunting license (Piniarneq) and catch database (LULI)	Greenland statistics and or Ministry of Hunting, fishing and Agriculture; Greenland Self Rule Government	Numeric registered by social security number	csv	<1 MB	Personal data. Anonymization unfeasible	Security clearance handled by GS	Access only to anonymized data through GS server. Restrictions on export - prohibited	Access only through GS server	Not shared
WP1-UCPH-2	Scientific monitoring data for selected species and populations in Greenland	Greenland Institute of Natural Resources	Numeric point estimates, densities or counts for specific locations	csv	<1 GB	No	None	No license agreement exist. Determined on a case basis.	Temporary storage in UCPH data repository. Subsequent import to GS server	Not shared
WP1-UCPH-3	Temperature, precipitation, wind speed, cloud cover, air pressure, humidity and snow cover for the period 1994-2019 and ice charts for the period 2000-2019 in Greenland (available from DMIs homepage). Older ice charts can be requested	Danish Meteorological Institute (DMI)	Numeric data from GPS localized measuring stations	csv	< 1GB	No	None	DMI open data license allows open use, distribution and publishing.	Temporary storage in UCPH data repository. Subsequent import to GS server	Openly shared
WP1-UCPH-3	Information about prices for individual species caught in Greenland on a monthly basis to the extent available	Local trading points. Alternatively, there is a report from the Hunting Division valuating species and cuts	Numeric registered as species price per unit by time and location	csv	<1MB	No	None	Requested through GS	Temporary storage in UCPH data repository. Subsequent import to GS server	Openly shared

Data Management Plan

WP1-UCPH-4	Information about prices for individual species caught in Greenland on a monthly basis to the extent available	Local trading points. Alternatively, there is a report from the Hunting Division valuating species and cuts	Numeric registered as species price per unit by time and location	csv	<1MB	No	None	Requested through GS	Temporary storage in UCPH data repository ERDA . Subsequent import to GS server	Openly shared
WP1-UCPH-5	Records on local trade in sealskin and fisheries landings in Greenland	Local buying stations and the Greenlandic fisheries license control (GLFK).	Numeric registered as species price per unit by time and buying point	csv	< 1GB	No	None	Requested through GS	Temporary storage in UCPH data repository ERDA . Subsequent import to GS server	Openly shared
WP1-UCPH-6	Monthly household income from each source for all individuals registered in the hunting license register in Greenland for the period 1994-2019.	Tax Agency	Numeric recorded based on time and social security id	csv	<1GB	Personal data. Anonymization unfeasible	Security clearance handled by GS	Access only to anonymized data through GS server. Restrictions on export - prohibited	Access only through GS server	Not shared
WP1-UCPH-7	Management measures including closed seasons, quotas and local regulations enacted on a monthly basis for the period 1994-2019 in Greenland	Ministry of Fisheries, Hunting and Agriculture (MFHG) in Greenland	Text describing numbers, dates and locations. To be converted to numeric measures	word	<1MB	No	None	Publically available	Storage in UCPH repository ERDA	Openly shared

Data Management Plan

WP1-UCPH-8	Data on subsidies and aid schemes in relation to catch and fisheries as well as pensions, housing assistance and other social benefits received at the household level.	Ministry of Fisheries, Hunting and Agriculture (MFHG) and the Tax Agency in Greenland	Numeric recorded based on time and social security id	csv	<1MB	Personal data. Anonymization unfeasible	Security clearance handled by GS	Access only to anonymized data through GS server. Restrictions on export - prohibited	Access only through GS server	Not shared
WP1-UCPH-9	Local price data per month for fuel and ammunition by location throughout Greenland in the period 1994-2012	Greenland Statistics	Numeric recorded based on time and location	csv	<1MB	No	None	Publically available	Storage in UCPH repository ERDA	Openly shared

WP2: Biodiversity and welfare implications of climate change for reindeer herding Saami in Northern Sweden and Norway.



Göran Bostedt, Umeå University



Anne Borge Johannesen, NTNU, Trondheim

Irmelin Slettemoen Helgesen, NTNU Trondheim

Erlend Danke Sandorf, NMBU, Ås



Overarching objective:

Assess the biodiversity and welfare implications of climate change for reindeer herding Saami and hence the risk of collapse of reindeer pastoralism in Northern Sweden and Norway and facilitate necessary adaptations.

Task 2.1: Assess the future viability of reindeer herding as the basis for Saami livelihoods

Objective: Assess the viability of Saami herder livelihood strategies and the risk of a collapse of reindeer pastoralism based on productivity forecasts.

Activities:

- 1) **Review literature** on the impact of climate driven vegetation change on reindeer productivity.
- 2) **Review literature** on the impact of climate change on losses of reindeer to carnivores.
- 3) **Collect and structure data on reindeer production** (reindeer numbers and weights) **and losses** to carnivores over time, and compare trends across villages and countries. Data is available for the period 2000-2020 at the Saami reindeer herding community level/district level.
- 4) **Obtain and organize climate variables** describing environmental conditions and vegetation productivity in reindeer herding areas.
- 5) **Combine data and make a model** enabling productivity forecasts.

Task 2.2: Assessment of the importance of reindeer herding

Objective: Determine to what extent cultural and intrinsic values and income derived from reindeer husbandry are important to the modern Norwegian and Swedish reindeer herder household including as an adaptation strategy in the face of climate change.

Activities:

- 1) **Develop a household survey** to quantify market and non-market values of reindeer husbandry.
- 2) **Implement the survey** in selected reindeer herding areas covering productive and nonproductive environments and less and more carnivore dense areas.
- 3) **Compare** the role of market and non-market values across areas.
- 4) **Combine survey data with existing data** on vegetation and climate, herd size, losses to carnivores, and income for individual herders.
- 5) **Develop a bioeconomic model** capturing the impact of climate change on reindeer productivity and predict the economic impact of climate changes considering also the non-market values.

Task 2.3: Identify effective adaption strategies depending on geographical area

Objective: Determine how the Saami adapts to varying impacts of climate change on grazing across geographical areas. The impact of climate changes on vegetation may differ across geographical areas, in both strength and direction. Consequently, the economic impact and optimal adaption strategies may also differ between geographical areas.

Activities:

- 1) **Design and include in the household survey** (task 2.2) **a choice experiment** to reveal the optimal adaption strategy as seen by the individual herder depending on how the herder weigh non-market values and harvest income identifying adaption strategies (e.g., adjusting herd size, introducing supplementary feeding) and how these differs between geographical areas.
- 2) **Determine the optimal adaption strategy** using the bioeconomic model (task 2.2), considering that climate changes impacts on vegetation and reindeer productivity differs across geographical areas.

Task 2.4: Predict welfare consequences of climate change across Saami communities

Objective: Conduct future scenario analysis and simulations to predict the impact of climate change and the proposed adaption strategies and compare welfare effects across different geographical areas.

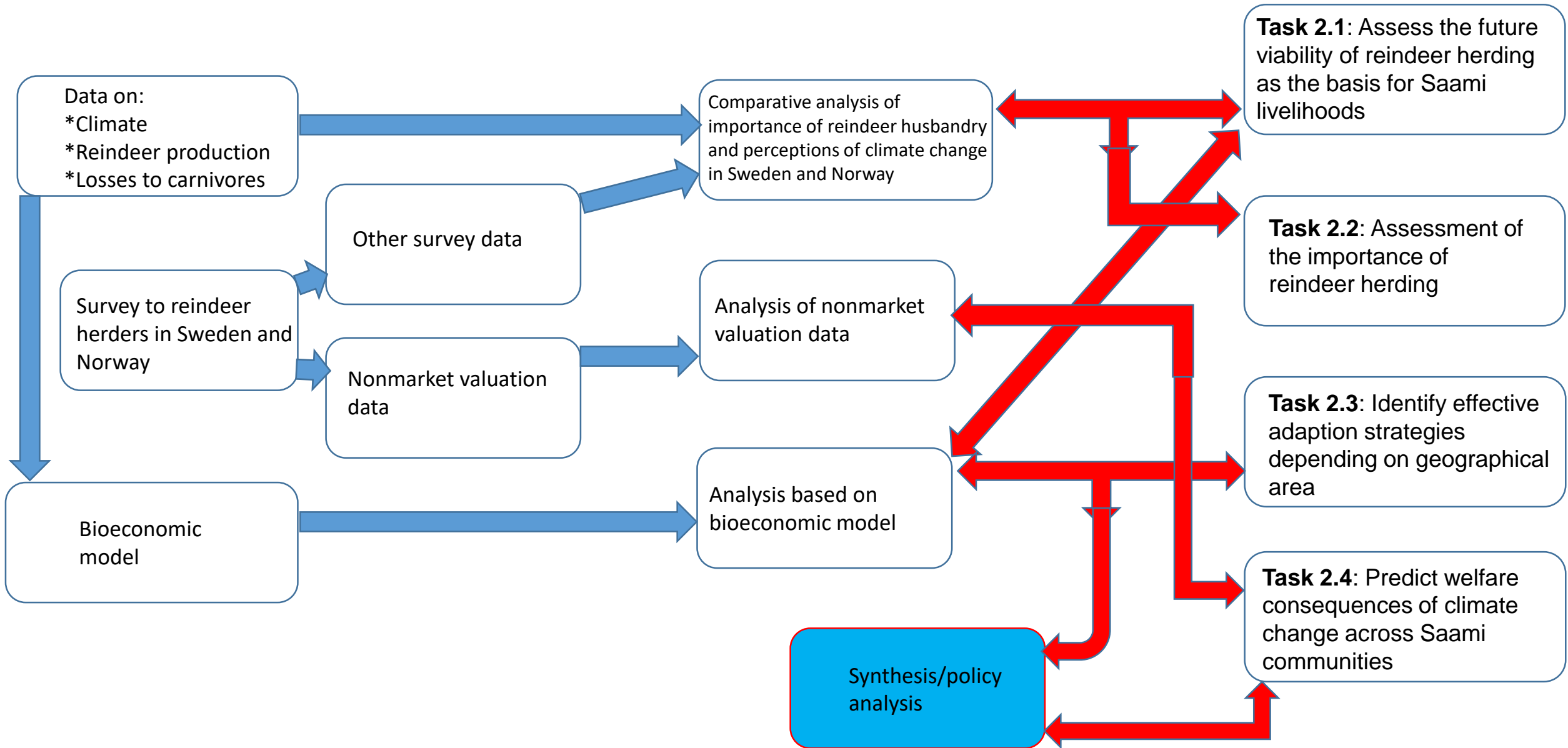
Activities:

- 1) Apply the output of the literature reviews and forecasts (task 2.1), as input to development of **future scenarios of Saami reindeer herding** in Norway and Sweden.
- 2) Use the extended bioeconomic model (task 2.3) to **make simulations based on these future scenarios and predictions of the welfare consequences**.
- 3) **Allow for altering predator densities** to account for any differences in welfare consequences between areas with more or less dense carnivore populations.

Data and models

Analyses

Tasks



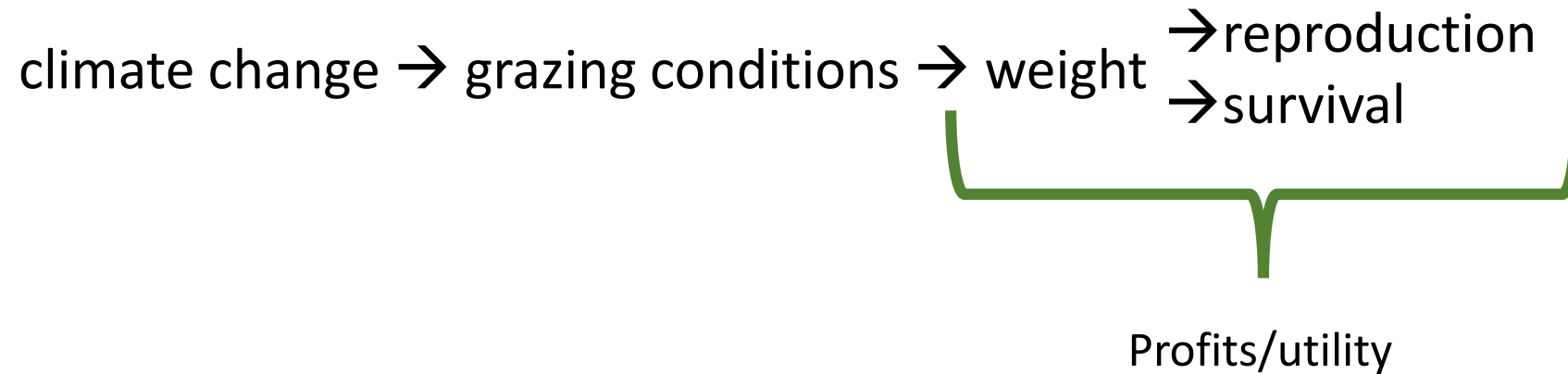
Bioeconomic model

Modeling the impact of climate change on reindeer herding

- Create a model that incorporates the profits of reindeer herding and the intrinsic/cultural value of having reindeer.
- The model also includes functions that govern the herd dynamics.
 - Simulate the future impact of climate change with current harvesting pattern
 - Find the harvesting level that maximizes future profits/utility
 - Later: include policy such as supplementary feeding

Bioeconomic model

How does climate change affect reindeer herding?



Bioeconomic model

Expected impact

- Earlier spring → improved grazing conditions/carrying capacity → increased weight → positive effect on profits/utility
- Warmer winters → more frequent rain-on-snow events and thaw-freeze cycles → increased frequency of ice-locked pastures → decreased weight → negative effect on profits/utility

Bioeconomic model

Data

- Use historic data on weight and number of reindeer in combination with climate data to get an estimate of how different weather conditions affect weight.
- Use estimated effects in combination with climate predictions (three scenarios) to simulate the future.
-
- Use survey data to weight the importance of profits from reindeer herding versus cultural value

The survey

- Draft version tested with reference group and Swedish focus group consisting of active reindeer herders..
- Will be tested with comparative Norwegian focus group in the end of March.
- Swedish ethics application approved.
- Norwegian ethics approval under way.
- Ambition to send out the survey by end of May/ beginning of June.



Thank you!





UiT Norges arktiske universitet

WP 3

Biodiversity and wellbeing implications of climate change for coastal Saami in Norway

Camilla Brattland (UMAK)

Bente Sundsvold (HSL, ISV)

Arne Eide (BFE, NFH)

Future Arctic Lives project meeting
Copenhagen 16 – 17 March 2022

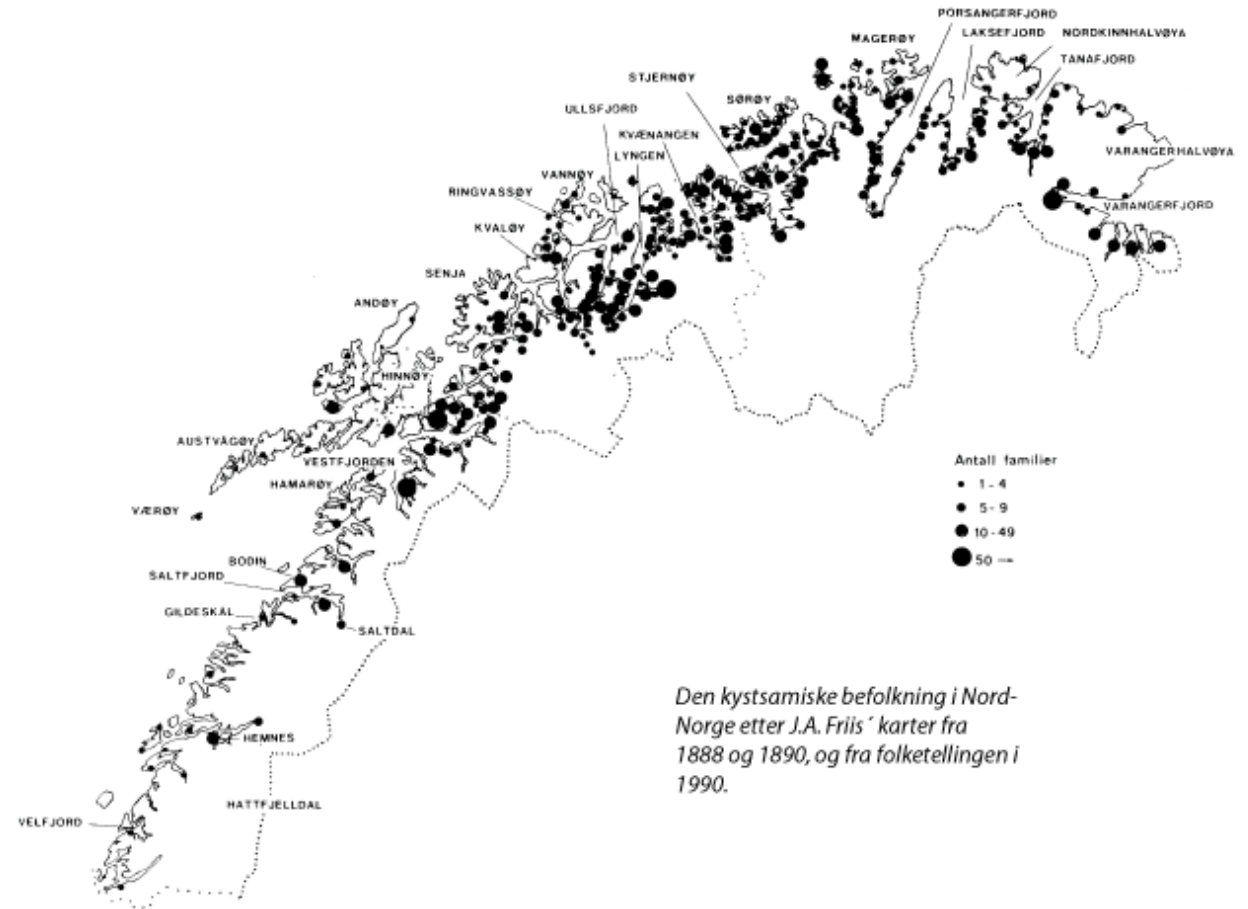


Objectives, tasks and research questions: Ecosystem services, wellbeing and harvest control rules

- **Overarching objective:** Provide input to the development of an adaptive ecosystem-based approach for indigenous and small scale marine resource management in northern Norway
- **Task 3.1:** Marine ecosystem contributions to coastal Sami culture and livelihoods (Camilla)
- **Task 3.2:** Wellbeing and ecosystem services for coastal Saami livelihoods (Bente)
- **Task 3.3:** Harvest control rules and adaptive local management initiatives in Porsanger (Arne).
- **Task 3.4:** Policy implications of an adaptive ecosystem-based management approach for indigenous and small-scale marine resource management
- **RQ 1** What are the consequences of degradation of ES supporting Sami small-scale fisheries and diverse local economies?
- **RQ** What are local and Sami perceptions of ecosystem health and wellbeing (task 3.2.1 and 3.2.2)? What kind of indicators of wellbeing can be arrived at? What kind of ES are important not only for marine and terrestrial livelihoods but also to support community and ecosystem wellbeing ? (connection between marine and terrestrial resource use and traditions) (task 3.2.3)?
- **RQ:** What are the relevant HCR for the Porsangerfjord SES? How can these be adapted to fisheries management in the Porsanger fjord?
-

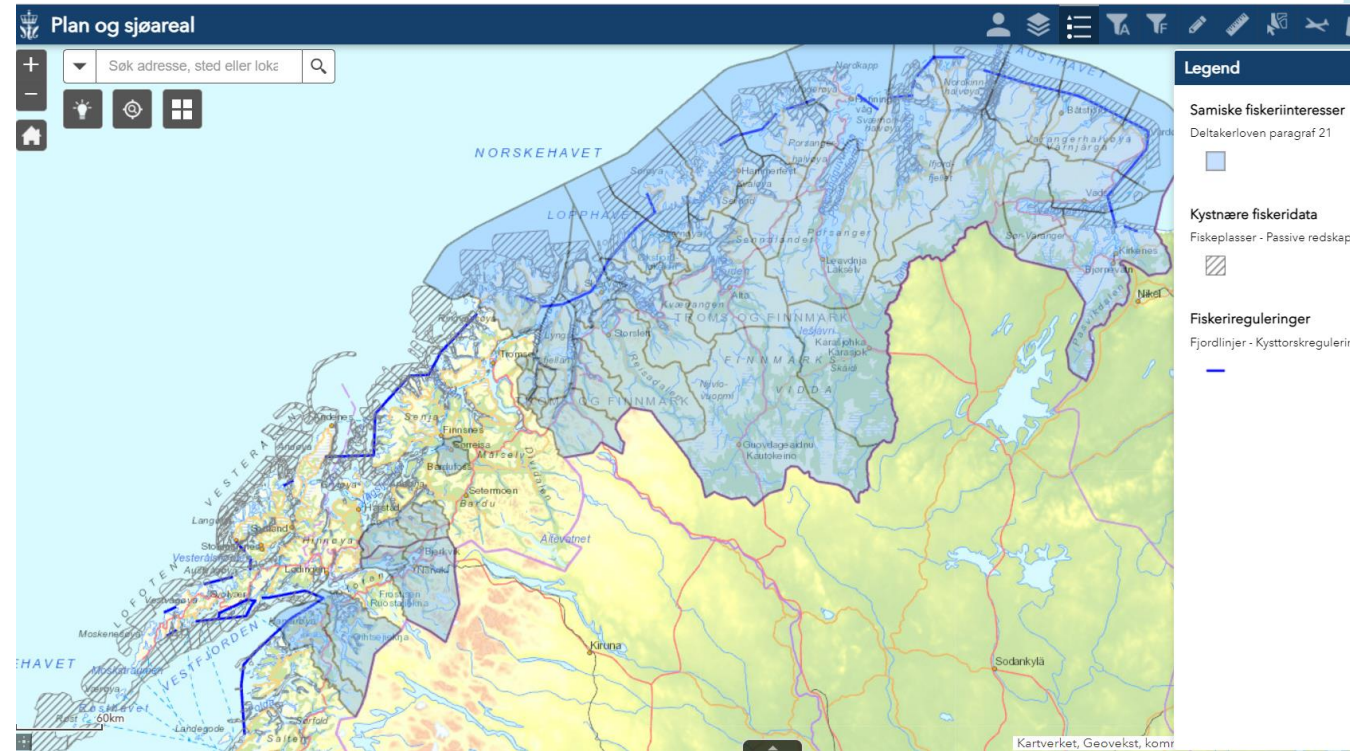
Introduction to coastal Sami communities and fisheries regulations

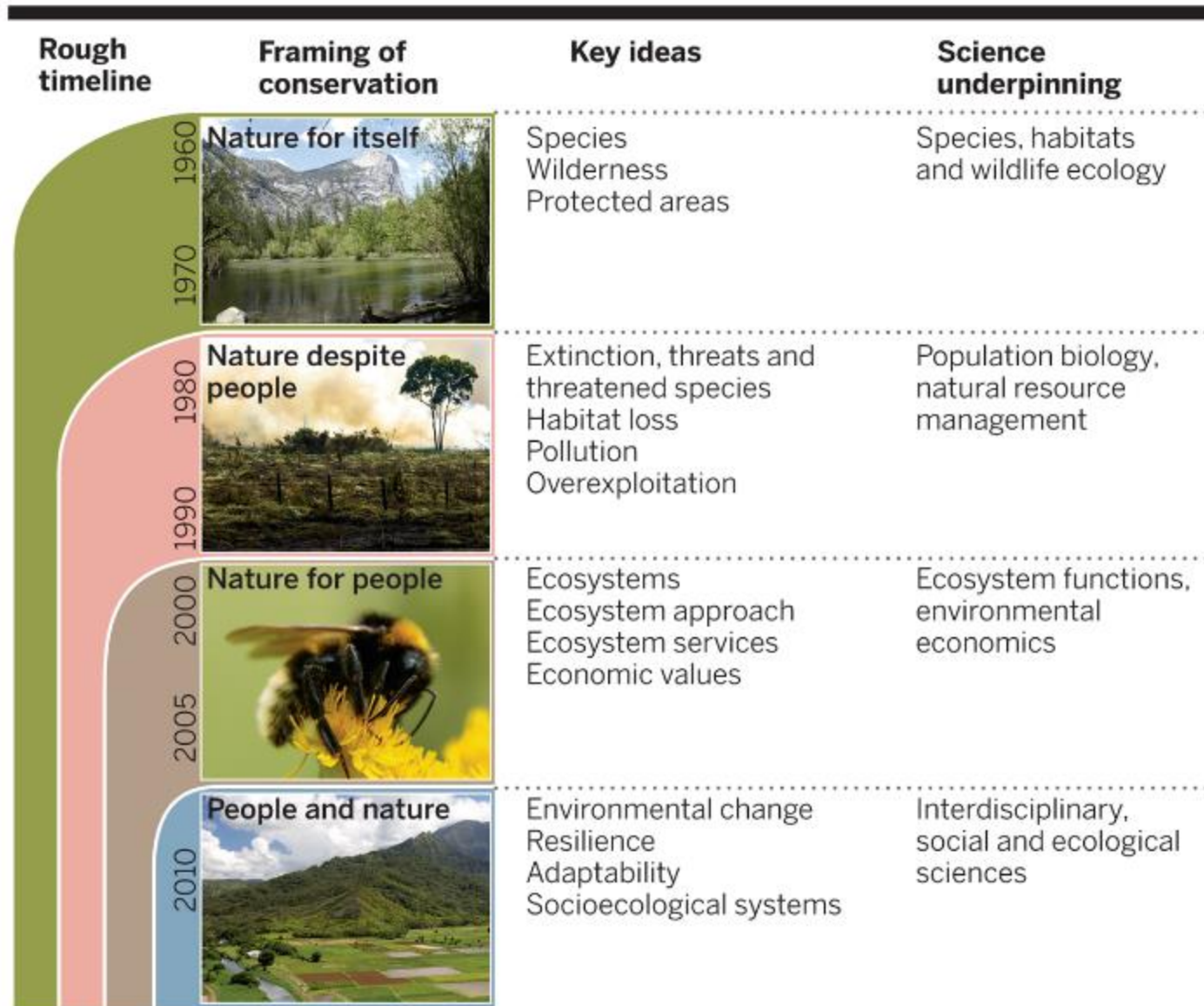
- Prior to 1990s: Northern Norwegian and Sami fishers utilise catch-moderating strategies that preserve the fish stocks: selective gear, low effort, "peasant mentality" (Nilsen 1998, Brox 1966)
- 1990s— introduction of individual vessel quota system, closing of the fisheries commons and the end of the household mode of production
- 1992 Sami Parliament participates in fishery management regulations – the need to keep an open group for small-scale fisheries recognized (material basis for culture)
- Finnmark Act 2005 - only terrestrial rights
- 2008 – 2012 Coastal Fishing Commission (NOU 2008:5) proposals trashed, no recognition of historical fishing rights for the Sami. Structuring the fleet: larger quotas on fewer hands, but keeping the open group, and the division of quotas between smaller and larger vessel groups



After 2011- the Fisheries Agreement

- A fishing right for vessels below 11 meters fishing with conventional gir (Deltakerloven par.21)
- Two management measures designed to protect small-scale and Sami fisheries: The coastal quota area (0,9 % of total cod quota) and fjord lines (vessels above 15 meters not allowed inside fjord lines)
- Spatial rights investigated by Finnmark Commission
- Finnmark 2020: Local cod stocks struggling, king crab fisheries an emerging new industry. Welfare support reduces risk of settlement restructuring
- New kid on the block: Fish farming
- In general: Discussing the «duty to process» fresh fish in coastal communities vs exporting frozen fish
- Scenarios: Centralization (quota structuring and private income), decentralisation (distributed)
- The role of municipalities in ensuring small-scale fisheries as a viable livelihood





Changing views of nature and conservation.

Over the past 50 years, the prevailing view of conservation has changed several times, resulting, for example, in a shift in emphasis from species to ecosystems. None of the framings has been eclipsed as new ones have emerged, resulting in multiple framings in use today. PHOTOS: THINKSTOCK/GETTYIMAGES

Mace, 2014:
Whose
conservation,
Science

Wellbeing

- **RQ** What are local and Sami perceptions of ecosystem health and wellbeing (task 3.2.1 and 3.2.2)? What kind of indicators of wellbeing can be arrived at? What kind of ES are important not only for marine and terrestrial livelihoods but also to support community and ecosystem wellbeing ? (connection between marine and terrestrial resource use and traditions) (task 3.2.3)?

Task 3.2.1 Collection of personal and collective narratives and existing interviews: films (Sirkka, Bente), NVivo-koding (Tuva) (Conducted as of March 2022)

Task 3.2.2 Narratives mediated through StoryMaps (draft per january 2022 on). Input from films, interview narratives from NVivo coding, maps from Camilla. Camilla leads the process, with input from Bente specifically on visual ethnography techniques (June). Goal: Presentation of almost finished draft in autumn 2022, meeting in Porsanger lead by the Porsangerfjorden 3.0 project.

Task 3.2.3 Ecosystem services analysis focused on coastal Sami well-being (Bente). Identifying new categories for ecosystem services/natures' contributions to people that capture multiple, combining and overlapping contributions – for example, an ecological contribution is also a cultural contribution. New categories emerging. Bundles of services. Contribution: Identifying new ES, but also that the particular combination of contributions is an important characteristic of coastal Saami use of nature and wellbeing.

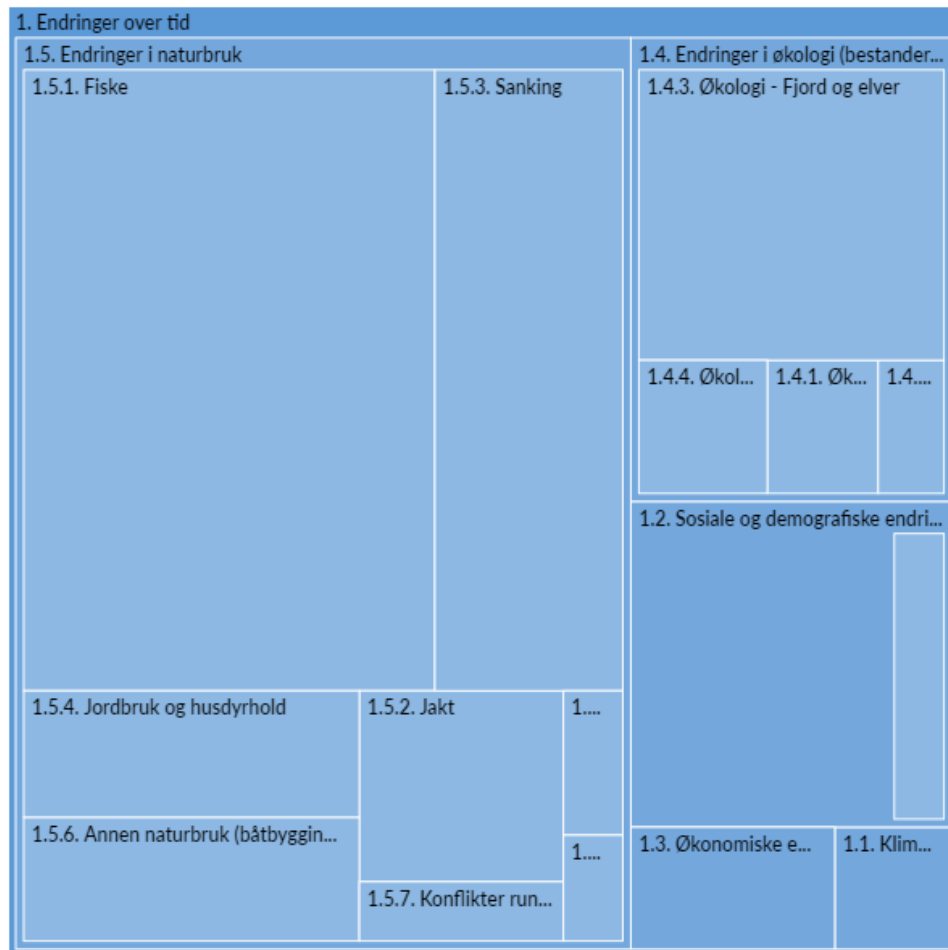
Methods and data tasks 1 and 2

- Interview guide developed in collaboration with Mearrasiida
- Visual ethnography
- Community-based mapping: Community researchers employed by the project
- Integration in GIS database, development of StoryMaps
- Local workshops in collaboration with Mearrasiida and Porsangerfjorden 3.0 (all tasks)
- Ecosystem services identification

-Linked to NRC projects IndKnow, FoodCoast, FairCoast, FramCentre TRACE

-[StoryMaps](#)

Qualitative analysis of interviews (NVIVO, Tuva Nervold)



NVIVO

fal.nvp

Quick Access

IMPORT

Data

- Files
 - Indre Porsanger
 - Ytre Porsanger
- File Classifications
- Externals

ORGANIZE

Coding

- Nodes
- Sentiment
- Relationships
- Relationship Types

Cases

- Cases
- Case Classifications

Notes

Sets

EXPLORE

File Home Import Create Explore Share Modules Code

Memo Link See-Also Link Content Quick Coding Quick Coding Annotations See-Also Links Coding Stripes Highlight

Uncode From This Code Autocode New Annotation Word Cloud Query This Code

Nodes

Search Project

Name	Files	Reference
1. Endringer over tid	0	0
2. Lokal forvaltning	0	0
3. God helsetilstand, godt økosystem (wellbein)	0	0
3.1. Økosystemets helse	4	7
3.2. Det gode liv	5	14
3.2.1. Åndelighet	2	3
4. Skjøtselspraksiser (restaurering)	3	5
5. Mobilitet	0	0
6. Kart	0	0

Drag selection here to code to a new code

3.1. Økosystemets helse

At fisken er borte, første og fremst. Vi har ikke det store plastproblemet. Det driver inn over her. Men mikroplast kommer selvfølgelig inn, men forurensnings som søppel – helt merkelig, det kommer ikke inn. Det rekker ikke hit inn. Den største trusselen- katastrofen - har allerede skjedd. Når det ikke er fisk. Da er det allerede ødelagt. HKS tanker om at storfisken mangler – det er nesten som jeg begynner å tro på det. At det alltid i naturen må være storinger som holder systemet i balanse. Det testet vi jo i Goarahatjauri – der var det tusen småfisk, 1980-årene. Foreninga starta vi i 1988 – så fiska vi i to år – 217 000 fisk, 14 tonn, da ble vannet bra. Fisken begynte å vokse. Hvor? Vannet ved oss. Stort 2.4 km2. Lemesjavri (?). (kartet har et annet navn enn de HOH bruker)

Reference 3 - 1,26% Coverage

Noe du, bygda, familien, samfunnet rundt kunne gjøre berge fjorden

JA, selvsagt, men da må vi vite hva vi skal gjøre. Ellers. Prøve å frede og tenke over saken, Frede slik at kanskje storfisken kommer inn her. Og så skulle vi adoptert noen hval hit, spekkhoggere og hva som helst som kan ta hull på sildeknutene som det er så mye av - rekeyngel, som HKS sier spiser opp loddeyngel, og det er jo torsken sin mat, det liker torsken. Ja.

Reference 4 - 0,90% Coverage

Første pri er å få fisken tilbake. Få liv i fjorden. Audun Merok – tråleredernes mann, sier at vi må tenke på nytt i Barentshavet. De merker det også. Vi må få stor stamfisken hit. Fersk – når storingene kommer så bryter de opp knutene.

Betrakter fjorden som ødelagt. På den måten at det er full ubalanse.

<Files\Indre Porsanger\02-CoastChange Intervju BW ingen dato> - \$ 1 reference coded [2,09% Coverage]

In Codes Code to Enter code name (CTRL+Q)

CB 82 Items Files: 4 References: 7 % Unfiltered

Future scenarios

- **RQ:** What are the policy implications of an adaptive management plan with local HCR for marine resources management in coastal Sami areas?
- This task will build on task 3.1 to 3.4 to develop an adaptive ecosystem-based management model for coastal Saami areas. It will deliver input to the development of future regulations that best possibly ensure biodiversity conservation and serve the long-term interests of society and specific user groups relying on nature's contribution. The model will take the form of a proposed management plan for the Porsanger fjord, with suggestions for how it can be adapted to other areas in the same region. Collaboration with the local and regional authorities on planning is key to the development of the plan. Lastly, this task will communicate the results and the proposal to relevant management institutions and policy levels (Norwegian fisheries ministry and Sami Parliament, as well as relevant municipalities and regional authorities).
- Task 3.4.1 Develop map-based presentation of local management plan with adaptive HCR to be discussed with reference group and relevant policy makers (presentation at stakeholder workshop)
- Task 3.4.2 Plan and conduct reference group and stakeholder meetings
- Task 3.4.4 Assess implications of proposed scenarios for future coastal Sami livelihoods and wellbeing

Future livelihoods and wellbeing

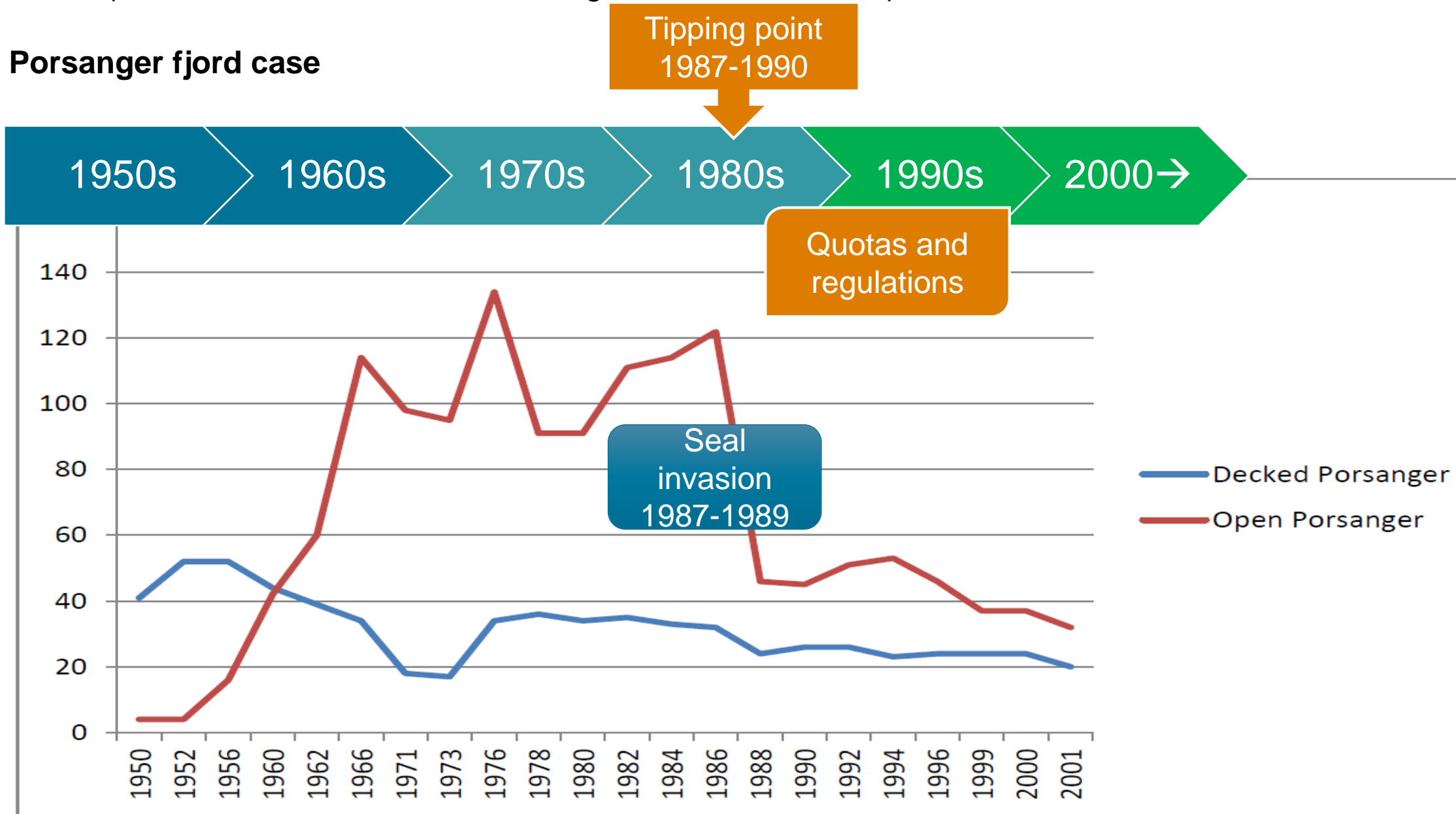
- What kind of futures are possible? How do they depend on and affect climate and biodiversity change?
- Business as usual: Centralization, fewer vessels, larger quotas (dwindling resources) – individual wellbeing
- Transformative change: Ecosystem health and community wellbeing
- De-centralized, keep small-scale and diverse fishing fleet, adapt quotas to productivity and resource fluctuations (fluctuating resources, new species)
- Other alternatives?

Picture: Invasion of Greenlandic seals to Porsanger in 1987



*The seal invasion and quota introduction: a social-ecological tipping point
(Brattland et al. 2018, Social-ecological timelines, Ambio)*

Porsanger fjord case



Porsanger Fjord, Finnmark

Local partner Mearrasiida

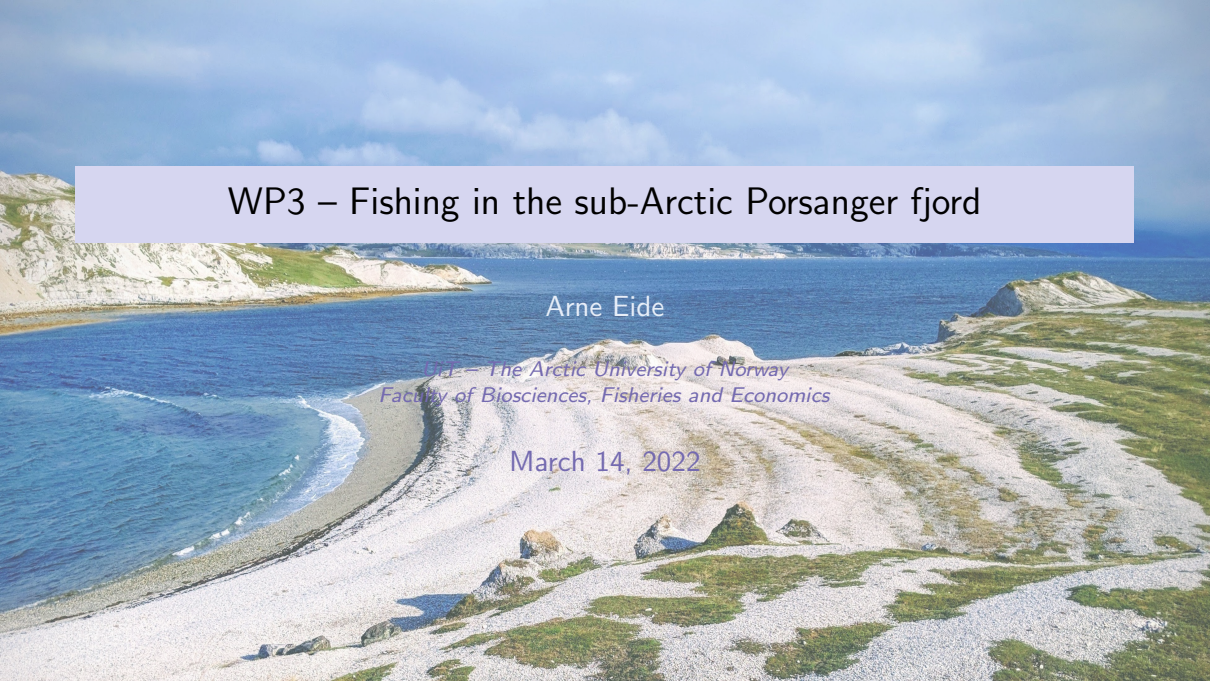
(Coastal Sami Resource Centre)



Reference group:

Mearrasiida (local partner in Porsanger)
Regional partner (Fisheries Directorate)
Institute of Marine Research
Sami Parliament
Porsangerfjorden 3.0

The reference group will support the development of alternative future development trajectories with members from the Porsanger municipality (Porsangerfjorden 3.0, Alf Emil Paulsen), Fisheries Directorate (Bernt Bertelsen), Sami Parliament (Vegar Jacobsen Bæhr), and the Marine Research Institute (Hans Kristian Strand), in addition to Mearrasiida as the local partner in the project (Ove Stødle). The reference group has not met in 2021 but there was a digital meeting where most of the participants were present. There could be more members added as the planning proceeds. A main meeting will be in autumn 2022 in collaboration with the Porsangerfjorden



WP3 – Fishing in the sub-Arctic Porsanger fjord

Arne Eide

*UiT – The Arctic University of Norway
Faculty of Biosciences, Fisheries and Economics*

March 14, 2022

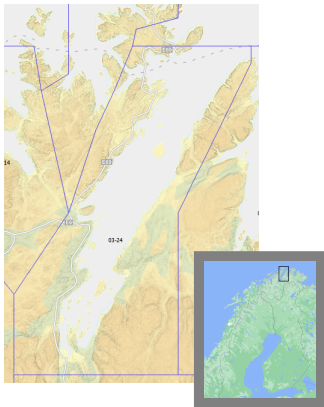
Location and population



(Google map)

- ▶ **Porsanger is a municipality** in the northernmost county of Norway, with a population of about 4,000 residents
- ▶ The administration centre is placed in the southern end of the fjord, about 60% of the residents are living here
- ▶ The municipality covers an area of almost 5,000 km²
- ▶ The municipality is located on both sides of the **Porsanger fjord**, the fourth longest Norwegian fjord, 123 km long and with a maximum depth of about 250 meter
- ▶ On the north-western side of the fjord there are three **fish landing sites** annually receiving about 300 tons of different fish species, mainly cod

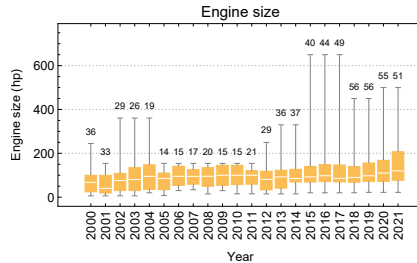
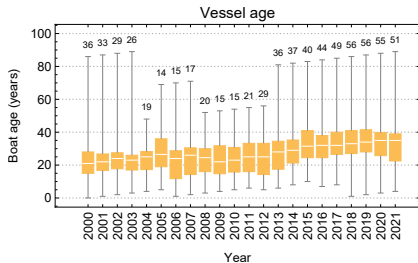
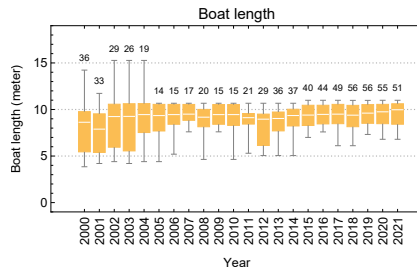
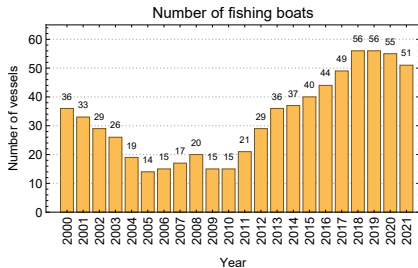
Porsanger fjord is one statistical unit (3-24)



(Fisheries Directorate of Norway)

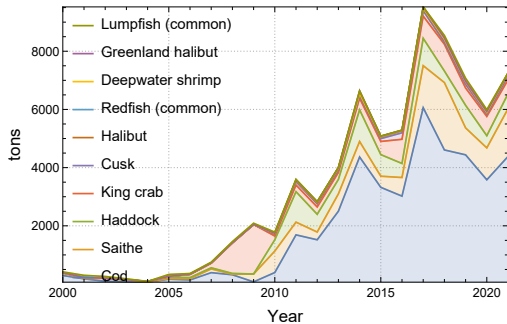
- ▶ The map shows the area identified as **home fishing area** by the Porsanger fleet
- ▶ **Cod - capelin - herring - saithe - dynamics** constitute a complex and diverse ecosystem where also physical and climatic properties of the different parts of the fjord are essential
- ▶ The local cod fishery is historically the most important fishery in the fjord but has never recovered to levels before the last **harp seal invasion** in the 1980s
- ▶ Over the last twenty years **king crab** has become by far the economically most important species in the fjord
- ▶ The king crab fishery has led to a **strong growth in the fishing fleet** in the fjord

Development of the Porsanger fleet, 2000-2021

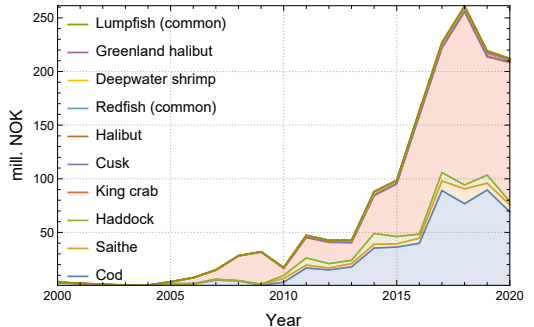


Registered catches in the Porsanger fjord (from landing notes)

Catches in the Porsanger area

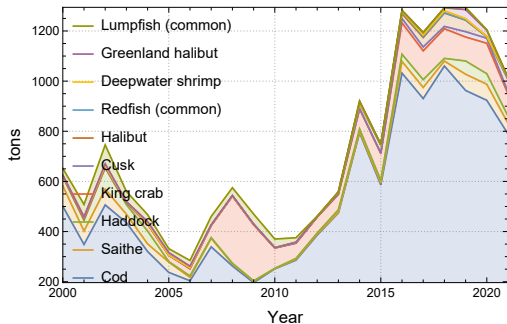


Value of catches in the Porsanger area

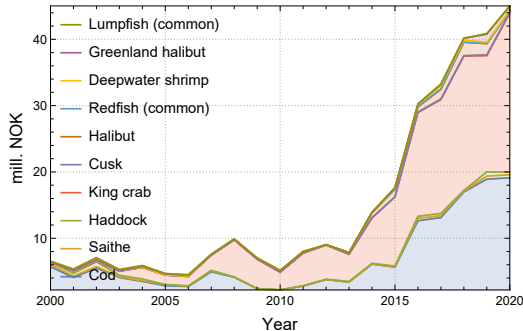


Registered catches by the Porsanger fleet (from landing notes)

Total catches by the Porsanger fleet

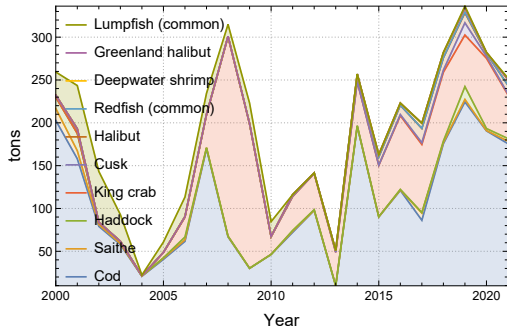


Total value of catches by the Porsanger fleet

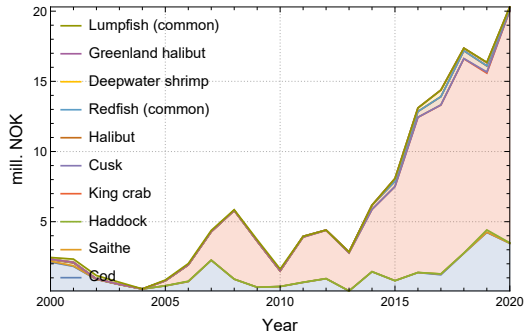


Registered catches by the Porsanger fleet in the fjord (from landing notes)

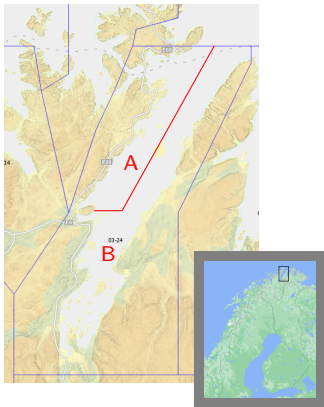
The Porsanger fleet catches in home area



Value of catches by the Porsanger fleet in home area



Suggested spatial management arrangement



(Fisheries Directorate of Norway)

- ▶ On basis of ecological and physical knowledge about the fjord dynamics, a possible division into two areas is indicated on the map
- ▶ In area **A** the fishery could continue as normal today
- ▶ In area **B** only pot fishing, hand lines and fishing rods should be legal fishing methods
- ▶ **Olderfjord**, on the western side of the fjord just south of the border between areas A and B, is an important cod spawning area
- ▶ Ocean ranching areas for king crab is planned
- ▶ By protecting area B, also all shrimp trawling in the southern part of Porsanger fjord have to end, improving the **survival of fish juveniles** in the area

Local Harvest Control Rules

- ▶ The suggested spatial regulation of the fjord could be the basis of local **harvest control rules** (HCR)
- ▶ The **fjord dynamics** makes it necessary to **adjust the HCR** according to the changes in the ecosystem

Fisheries management of the fjord resources today

- ▶ The southern part of Porsanger fjord is a **national salmon fjord** and protected by law, together with three associated rivers (Stabburselva, Lakselva and Børselva)
- ▶ In this area it is **illegal to establish salmon aquaculture** or produce juvenile fish
- ▶ The management of salmon species – including the marine environment – are not regulated by the the **Directorate of Fisheries** in Bergen but the **Directorate for Nature Management** in Trondheim
- ▶ The management of other marine resources are regulated by the Directorate of Fisheries on a national level
- ▶ The additional coastal quota led to a catch of 3.6 thousand tons distributed on 612 boats in 2021 (an average of about 5 tons each)
- ▶ More than 500 of these boats are localised in Finnmark

Additional fishing quota is given to all northern Norwegian coastal fishers



- ▶ On background on green papers NOU 2001:34 and NOU 2008:5 an additional coastal fishing quota was implemented for coastal fishers in the northern part of Norway in 2011
- ▶ The coastal quota of cod today covers 0.9% of the total quota
- ▶ The additional quota is given on basis of historical utilisation and the rules of international law of indigenous people and minorities
- ▶ The right applies to all ethnic groups in Finnmark

Tasks to address local management possibilities

Task 3.3:

Developing harvest control rules adapted to local management in Porsanger

- ▶ How should local HCR be implemented?
- ▶ Local HCR could simply start with a division of the fjord into two fishing areas where special restrictions are introduced in one of them
- ▶ How should local monitoring, control and surveillance (MCS) be organised?
- ▶ Should there be established local management bodies?

Task 3.4:

An adaptive ecosystem-based management model for coastal Sámi areas

- ▶ This task builds on task 3.3, focusing on the adaptive capacity of local HCR
- ▶ A local co-management body will more easily be able to follow up and adjust existing local regulations

The Fjord Fishing Commission

- ▶ **The Fjord Fishing Commission** (FFN) was established in 2014 as an advisory body in the management of coastal fish resources in the north
- ▶ Three representatives are appointed by the **Sámi parliament** and one by each of the three Norwegian counties **Finnmark, Troms and Nordland**
- ▶ Could FFN take a role of facilitating local **co-management arrangements** in areas as the Porsanger fjord?

WP4

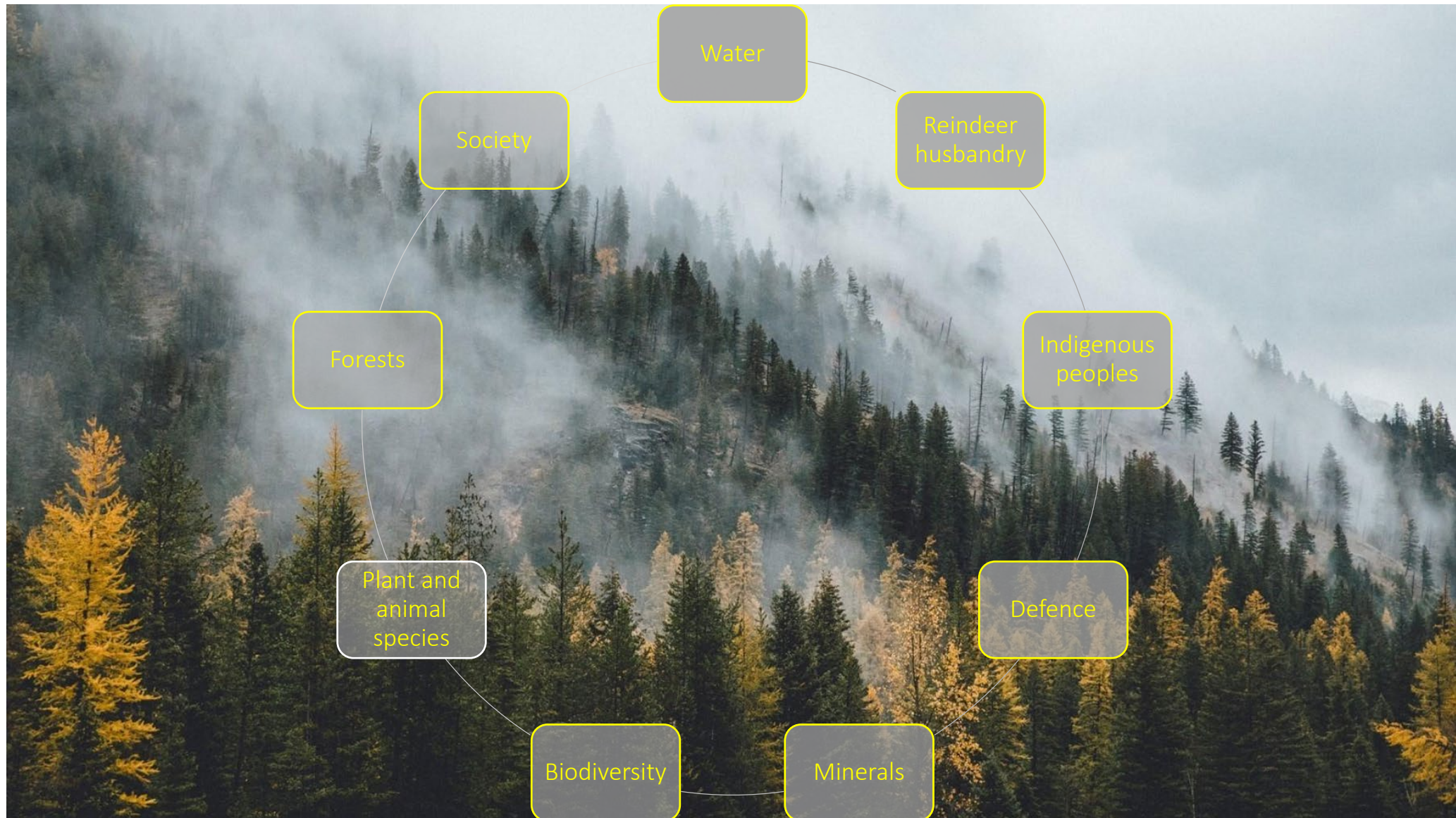
Cross-cutting study of the legislative and policy context of nature-based primary industries

Synergies, Trade-offs and Adaptation Potential

Participants

- **Carina Keskitalo**, Professor, Political Science
 - *Umeå University, Sweden (lead)*
- **Stine Rybråten**, Ph.D. Social Anthropology
 - *Norwegian Institute for Nature Research, Norway*
- **Kåre Hendriksen**, Associate Professor, Sustainable Urban Transitions
 - *University of Aalborg, Denmark*
- **Birgitte Hoffmann**, Associate Professor, Sustainable Urban Transitions
 - *University of Aalborg, Denmark*
- **Maria Pettersson**, Professor, Environmental Law
 - *Luleå University of Technology, Sweden*

Background – WP context



Background – WP context



Overarching objectives

- By analysing **relations between interests across different sectors** in Greenland, Sweden and Norway, we hope to:
 - ⇒ Deliver theoretically generalizable information
 - ⇒ Provide information on the specific cases to support decision-making

The overarching objectives (as described in the application) are to:

- ⇒ Study legislative and policy context to WP1-3
- ⇒ Conduct case studies contextualising results from WP1-3 (not necessarily building on those)

Description of activities

Task 4.1 – Analyse legal and policy synergies and trade-offs

Objective

- Analyse synergies and trade-offs between policies and laws applicable to hunting, fishing and reindeer husbandry vis-a-vis biodiversity, climate etc. at relevant levels

Activities

- Combine approaches from policy, legal studies and pol. ecology to analyze the national, international, EU legal and policy context
- Compare the scope for local use and adaptation in the regulatory frameworks relating to natural resources in Sweden and Norway
- Analyse relationships between Greenlandic policies and regulations governing fisheries, hunting, tourism, mining, marine transport and infrastructure dev. at local and national level

Description of activities

Task 4.2 – Possibilities and barriers for adaptation and mitigation for actors at different levels

Objective

- Discuss the extent to which policy or legal change and NBS for mitigating and adapting to CC may be undertaken, and the role for “agents of change” at local, regional and national level

Activities

- Interviews with local level actors in case study areas to assess the potential for NBS
- Interviews at regional, national and potentially EU level to evaluate the extent to which actors at diff. levels can implement NBS
- Describe lessons learned from cases in Greenland, Norway and Sweden
- Qualify results and develop policy recommendations

Deliverables

D4.1 – Comparison of protection for resource users in Sweden & Norway

- Paper II: "Scope for local use and adaptation in the regulatory frameworks relating to natural resources in Sweden and Norway"
- The paper focuses on individuals' right to natural resources/nature in northern Sweden and Norway (in contrast to the situation in e.g. GB). Draws mainly on legal and policy review as well as literature
- State of development
 - Zero draft developed by Umeå, now under development by Luleå and NINA/Norwegian partners

Deliverables

D4.2 – Assessment of relationships between policies and regulation at the local and national level in Greenland

Document analysis – ongoing

- National and local regulation and planning in relation to fishery, especially the ‘Fishery Commission’
- National and local regulation and strategies in relation to climate change
- Transport Commission, infrastructure plans, municipal plans

Interviews – national, regional and municipal actors

- Politicians, municipalities, Infrastructure Suppliers, Majoriaq, businesses, Fishermen and women, KNAPK

Deliverables

D4.2 – Assessment of relationships between policies and regulation at the local and national level in Greenland, cont.

Study trip – registrations and interview/workshop locally

- KNAPK, local residents, fish factories, infrastructures
- Draw on data from earlier fieldtrips to Qaanaaq, Upernavik and South of Greenland (2010-2019)
- Planning for Ammassalik district – August 2022 – is ongoing
- Perhaps Upernavik district in spring 2023
- Porsangerfjord – September

Deliverables

D4.3 – Description of the potential for NBS across cases

- Paper III: ” The potential for nature-based solutions: the role of understanding the possibilities for different actors in historically developed scaled systems ”
- The paper focuses on examples of “natural” NBS solutions/cases from Norway, Sweden and Greenland. Draws mainly on cases, legal and policy review as well as literature
- State of development
 - Zero draft developed by Umeå, now under development by Luleå and NINA/Norwegian partners

Additionally...

- Zero draft for potential additional publication on the Swedish case
 - Interview work in Sweden has been cancelled (as described in the ethical guidelines)
 - Legal and policy reviews instead
 - Interview work in Norway is limited to local and regional level
-
- Regular WP meetings discussing potential studies and progress