

**WP 3** Biodiversity and wellbeing implications of  
climate change for coastal Saami in Norway

Outputs and results

Camilla Brattland, Bente Sundsvold and Arne  
Eide. Tromsø 30<sup>th</sup> of August 2023  
Future Arctic Lives second physical meeting

# 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?
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# Adaptive ecosystem-based management approach in

## Porsanger: Policy implications of an adaptive ecosystem-based management approach for indigenous and small-scale marine resource management in northern Norway

- Adaptive Ecosystem-Based Management (EBM) is a concept that integrates the conservation, sustainable management, and restoration of ecosystems to help people adapt to the impacts of change<sup>1</sup>. (IUCN) (a form of NBS)
- Ecosystem restoration project lead by Porsanger municipality and IMR and based on guidance from traditional and local knowledge
- Support coastal Sami livelihoods and wellbeing
- Towards a local management area/MPA (under discussion) with ecosystem restoration/EbA «with associated cultural values.. «(IUCN Category VI)
- Could be an alternative to conventional use of coastal zone in northern Norway

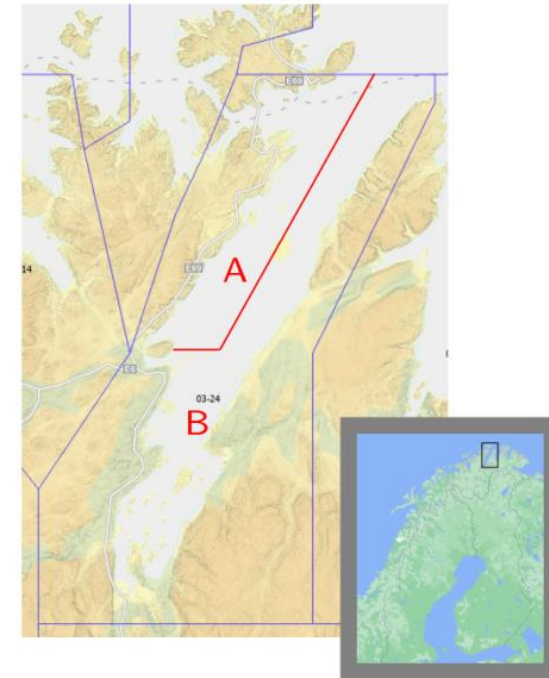
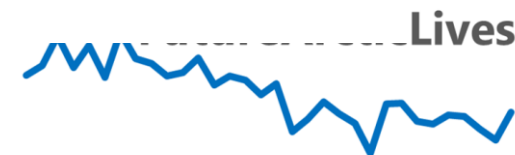


Figure 7: Proposed partition of the Porsanger Fjord into sections A and B, wherein area A's fishing opportunities will remain unaltered, while greater fishing restrictions will be imposed upon area B.



## 3.1 and 3.2 Marine ecosystem degradation and ecosystem services to coastal Sami culture and livelihoods

-Linked to NRC projects IndKnow, FoodCoast, FairCoast, FramCentre TRACE  
-[StoryMaps](#)

- 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

# Wellbeing as being able to care for landscapes

- <https://arcg.is/0efvqm>
- [Lokal forvaltning av fjorden og holmene i indre Porsangerfjorden \(vimeo.com\)](https://vimeo.com/708888888)
- Presented at the Landscape Practices conference in Kautokeino fall 2022

# Framtidsvisjoner for Porsangerfjorden

## Arbeidsverksted

4 mai 2023, 16:00 – 20:00

Møteledere: Camilla Brattland (UiT), Alf Emil Paulsen (Porsanger kommune) Camilla Risvoll og Majken Paulsen (Nordlandsforskning),

Arrangører



Porsanger og Nordkapp kommuner



# Fremtidsvisjoner – fremtidsalternativer

- **Ulike alternativer**



Alternativ 1: Å fortsette dagens forvaltning – uten større endringer



Alternativ 2: Vern og restaurering – verne deler av fjorden og innføre kunstig infrastruktur for å sikre stabil produksjon av torsk og krabbe



Alternativ 3: industrialisering – åpner opp hele fjorden for havbruk og oppdrett

Et verktøy for å diskutere og forberede oss på mulige fremtidige situasjoner.

Idémyldring: Hvilken visjon har du for framtiden?

Diskutere hvordan livet i og rundt fjorden:- kan se ut om 10-20 år

Hvilke ønsker har dere for framtiden?

Hva må til?

## Harvesting and cultivation

– inputs from ES mapped interviews in Porsanger (2019-2020).

- **Harvesting** – Local Harvest Control rules
- **Cultivation** – Porsangerfjorden 3.0 Restoration of the fjord ecosystems.
  - NbS – Nature based Solutions
  - NCP → PCN people's contributions to nature



- Interviews from previous projects Foodcoast & CoastChange, 2019-2020)
  - 3 datasets – 23 (24) interviews
    - Different interview guides, but all focus on
      - harvesting/hunting practices +
      - experiences of change (climatic, environmental, social & management) +
      - prospects for the future
    - Avoiding science fatigue in a small community
- ES mapping based on the wording of the interviews
- (+ scenario workshops, HCR, Storymaps)

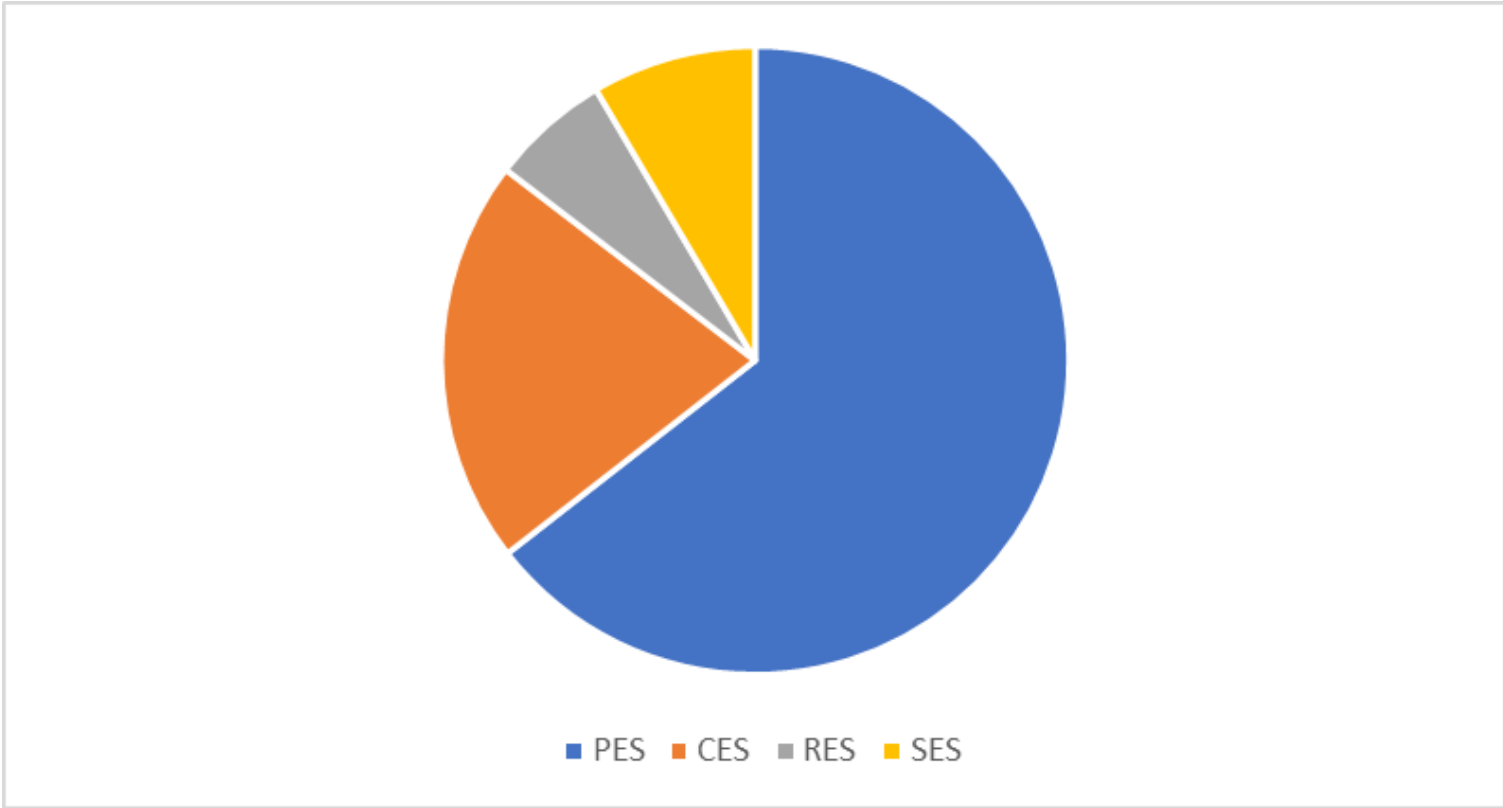
## *Birgejupmi & meahcceávkkastallan*

- *Birgejupmi* – refers to a perspective of eternity, of the renewable processes of the living environment, to moderation, and to circular economy (Meld St 37:7).
- It stems from the concept *birget* – to manage, cope, and adheres to harvesting of renewable nature resources, in *Sámi meahcceávkkastallan*.
- They refer to subsistence as well as to income generating use (ibid).
  - Provisioning ES – both income and subsistence (matauk)
- Meld.St. 37 (2020-2021) Samisk språk, kultur og samfunnsliv. Næringsgrunnlaget for levende samiske lokalsamfunn (Kommunal og moderniseringsdepartementet)
- "Meahcci – et grunnlag for identitet, kultur og *birgejupmi*. (Rapport fra Sametingets arbeidsgruppe for utmark 2016)

# A more suitable typology...?

PES Economic
PES Subsistence
PES Terra
PES Marine
PES Wild species
PES cultiv reared species
PES Wild plants
PES Cultivated plants
PES indirect (fodder)
PES direct -food material
PES reiseliv
diservices
CES Terra
CES marine
CES direct
CES indirect (indoor)
CES interaction experiential
CES interaction intellectual
CES recreation
CES science
CES education
CES heritage
CES aesthic
CES spiritual
CES skjøtselsmetoder
CES høsting/fangstmetoder
CES kost-tradisjon-foredling
RES life-cycle maintenance
RES flow maintenance
RES pest control
RES invasive species
RES predator control
RES migration routes/pastures
RES flood storm protect
RES habitat maintenance
RES gene pool protection
RES AB
SES habitat
SES spawning places
SES fish nurseries
SES migration routes
før 1970
1970-1990
1990-2000
iste 25 år
Klima forklaring?
Forvaltningsendring
Annet

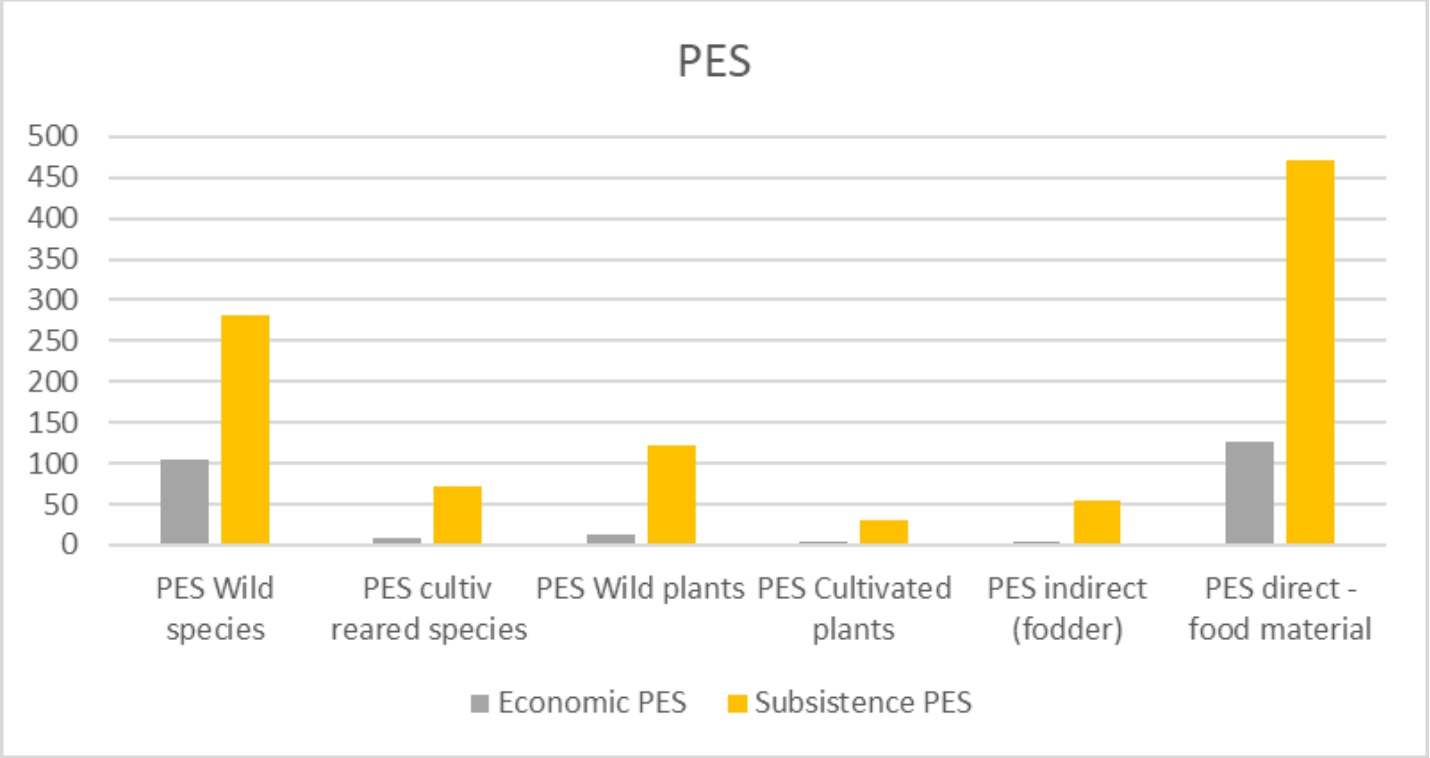
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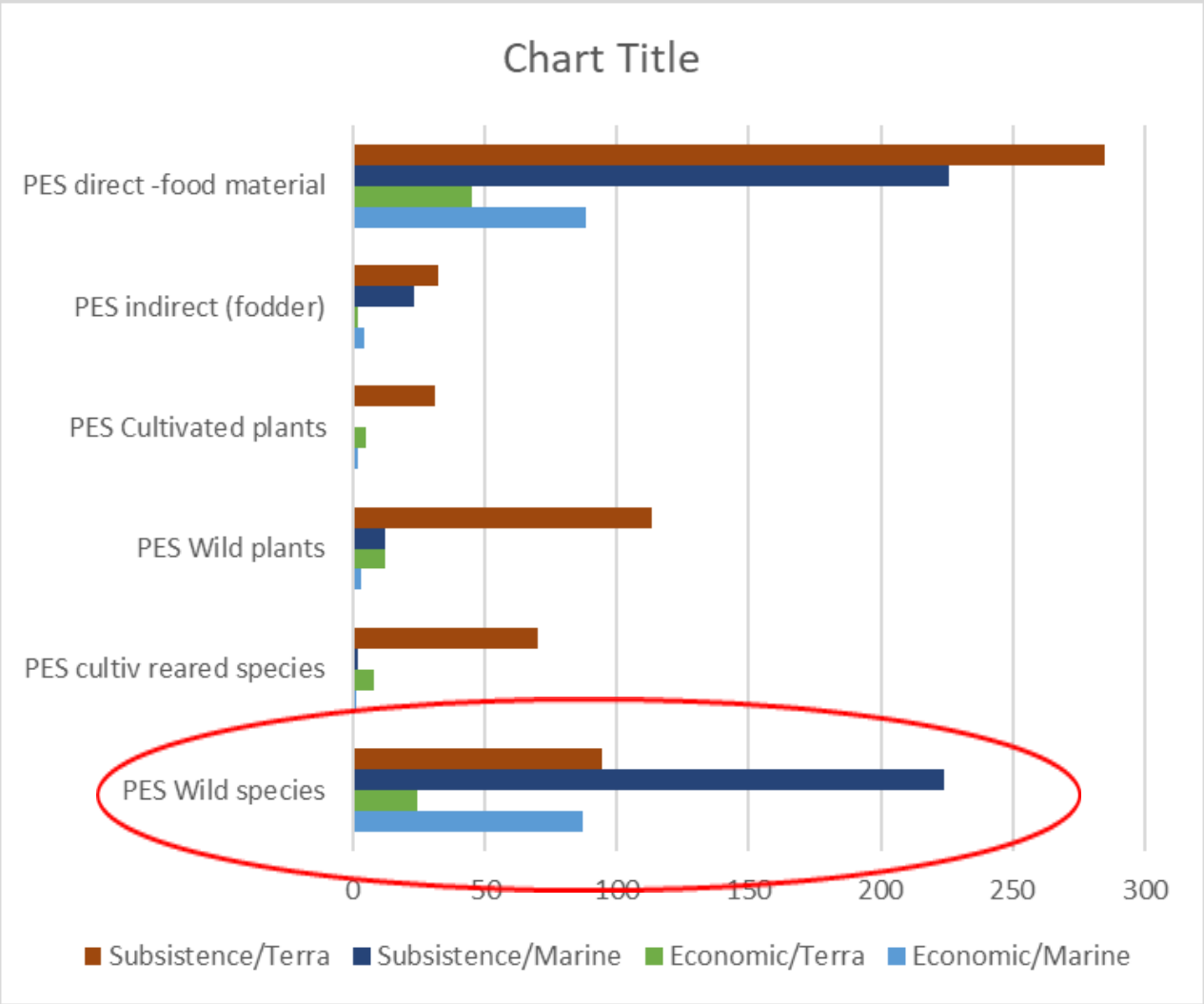
App 800 "services" – 23 interviews



# Harvesting - subsistence & economic PES



# Cultivated



Giitu

Thank you for your attention



**FutureArcticLives**



An aerial photograph of a coastal landscape. In the foreground, a wide, light-colored pebble beach stretches from the bottom left towards the center. To the left, the beach meets the blue water of a fjord. The water is clear, showing some rocky patches. In the background, there are white, rocky cliffs and a blue sky with scattered white clouds. The overall scene is a scenic view of a fjord region.

# Fisheries Management Projects in the Porsanger Fjord

Arne Eide

*Dr. E. – The Arctic University of Norway  
The Norwegian College of Fishery Science*

August 30, 2023

# Tasks addressing the possibilities of local management rules

## **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 Porsanger Fjord



(OpenStreetMap)

- ▶ **The fjord is situated to the north of Norway**, positioned between 70 and 71 degrees north
- ▶ It extends for approximately **123 km from north to south**, boasting a width of over 20 km
- ▶ This fjord is part of the **Porsanger municipality**, covering an area of almost 5000 square km and home to a population of around **4000 individuals**
- ▶ With more than half of these residents residing in **Lakselv**, the central hub located at the southern end of the Porsanger Fjord
- ▶ The remaining inhabitants are largely concentrated along **the western coast of the fjord**

# The ecosystem of the Porsanger Fjord



(The Norwegian Fisheries Directorate)

- ▶ Interactions among **cod - capelin - herring - pollack** create a complex and diverse ecosystem, in which the physical and climatic characteristics of different fjord areas also play a crucial role
- ▶ Historically, local cod fishing has been the primary fjord fishery, but the cod population has not returned to previous levels following the **seal invasion** in the 1980s
- ▶ Over the past twenty years, the **king crab** has become the most economically significant species in the local fjord fishery
- ▶ The king crab fishery has led to a **significant increase in the number of local fishing vessels** in Porsanger Fjord

## Additional fishing quotas are allocated to all coastal fishers in northern Norway



- ▶ Building upon the context provided by green papers NOU 2001:34 and NOU 2008:5, an additional coastal fishing quota was introduced for fishers in the northern region of Norway in 2011
- ▶ The current coastal cod quota accounts for 0.9% of the overall quota
- ▶ The supplementary quota is allocated based on historical utilisation and in accordance with the international legal principles concerning indigenous peoples and minorities
- ▶ The entitlement extends to all ethnic groups in Finnmark

## Current Management of Fisheries Resources in the fjord

- ▶ The southern segment of Porsanger Fjord has been designated a **national salmon fjord** and holds legal protection, along with three connected rivers (Stabburselva, Lakselva, and Børselva).
- ▶ Within this area, the **establishment of salmon aquaculture and the rearing of juvenile fish are prohibited**.
- ▶ The management of salmon species, including their marine environment, falls under the purview of the **Directorate for Nature Management** in Trondheim, rather than the **Directorate of Fisheries** in Bergen.
- ▶ The oversight of other marine resources is carried out by the Directorate of Fisheries on a national scale.
- ▶ The introduction of an additional coastal cod quota led to a 2021 catch of 3.6 thousand tons, distributed among 612 boats (averaging approximately 5 tons per vessel).
- ▶ Of these boats, over 500 are situated in Finnmark.

# Porsanger Fjord: Identified problems – Possible solutions

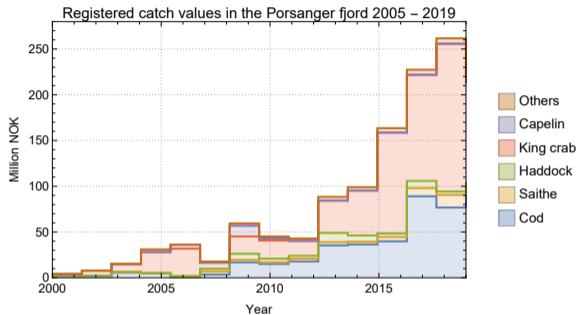
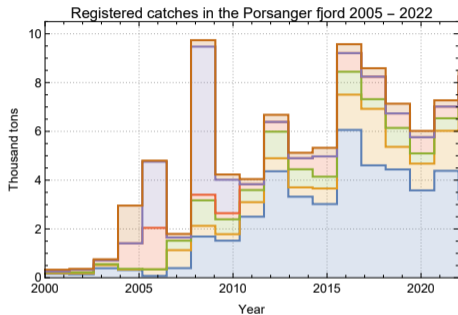
## **Problem:**

- ▶ The regional stock of cod (coastal cod) has reached *a historical low level*, as reported by management authorities
- ▶ The convergence of diminished kelp forests and a relatively high predator population results in increased predation on juvenile and young cod

## **Proposed course of action:**

- ▶ Positioning artificial reefs to promote the growth of kelp
- ▶ Implement a designated closure of a specific area for gillnetting and seining to protect young cod
- ▶ Cultivation of juvenile cod locally

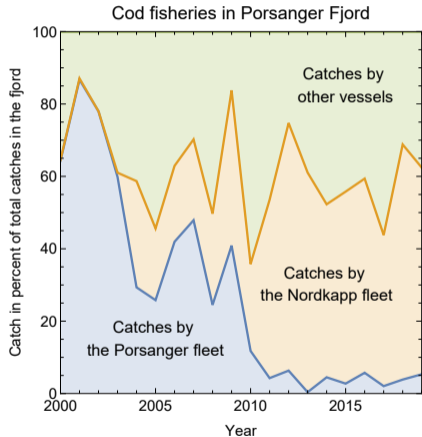
# All catches in Porsanger Fjord – Quantities and Values



- ▶ Cod and saithe catches have increased over the last decades
- ▶ The introduction of king crabs has completely altered the revenue generated from fjord fishing

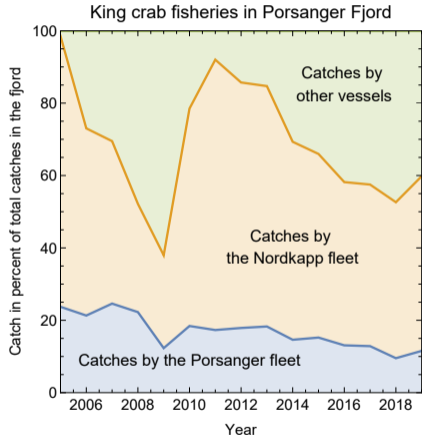


# The cod fishery in Porsanger Fjord



- ▶ Cod is the most important species in terms of quantity
- ▶ Coastal cod catches account for about 80% of the total cod catch in the fjord
- ▶ In 2019, the Porsanger fleet caught 236 tons cod, constituting 5% of the total cod catch in the fjord
- ▶ Total catch in the fjord has increased from 300 tons in 2000 to 4440 tons in 2019
- ▶ The cod catch by the Porsanger fleet has remained relatively consistent over the past two decades

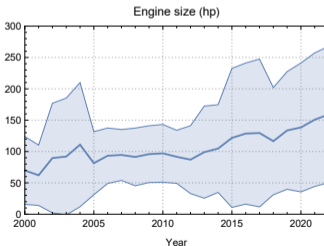
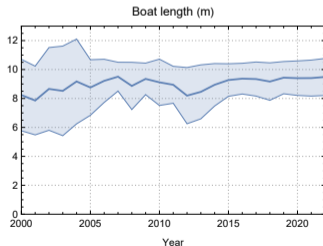
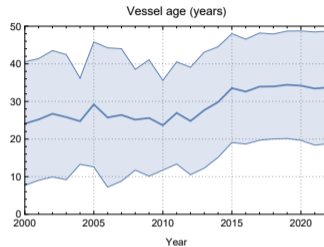
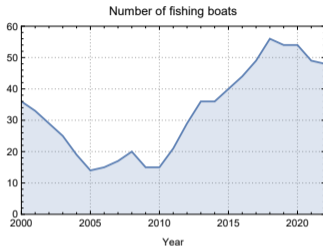
# The king crab fishery in Porsanger Fjord



- ▶ King crab is today the most important species in terms of value
- ▶ The total quantity caught in the fjord has increased from 26 tons in 2005 to almost 600 tons in 2019
- ▶ The catch quantity peaked with 920 tons in 2018

# The fishing fleet of Porsanger, 2000-2022 (landing receipt registrations)

- ▶ The fleet tripled over a period of ten years after the entrance of king crab
- ▶ The fleet consists of quite small vessels
- ▶ The average vessel age is 34 years, and increasing
- ▶ Engine sizes are becoming more diverse



# Cod catches by Porsanger vessels in total



- ▶ Porsanger vessel fishing in the Porsanger Fjord and landing their fish in Porsanger

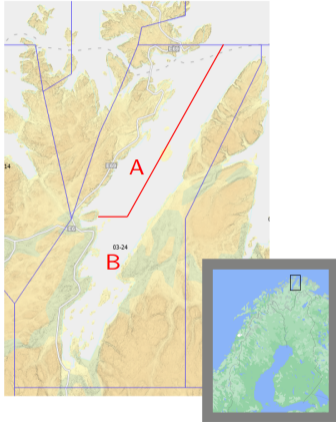
▶ Total catch in 2022: **147 tons**

- ▶ Porsanger vessels fishing and landing their catches outside Porsanger

▶ Total cod catch in 2022: **528 tons**

Total cod catch in the fjord in 2022: **3212 tons**

# Area regulation (Marine Protected Area – MPA)



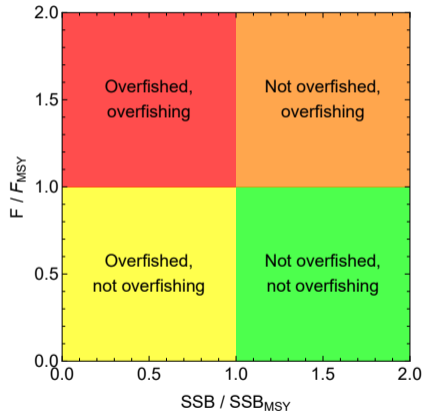
(The Norwegian Fisheries Directorate)

- ▶ **Area A** will continue to be accessible for fishing activities as it is presently.
- ▶ **Area B** is designated exclusively for the use of hook-based gears and traps.
- ▶ This regulation remains consistent throughout the year for all vessels, irrespective of their home port or size.
- ▶ Monitoring will be conducted through local observations and reporting.
- ▶ For this monitoring system to be effective, it is crucial that the regulation is regarded as legitimate and supported by the local population.

# The principles of Rule Based Management

- ▶ If a system is complex and hard to see through and understand, it is useful **to search for simple measures characterising the current system**, in order to be able to compare different states during a process of development
- ▶ ICES has suggested two such indicators in the management of a single stock: **The current fishing mortality rate** and **The current spawning stock**
- ▶ These are both **model outputs**, which is a second best solution
- ▶ Preferably indicator measures should be measured directly, not modelled

# The principles of Rule Based Management



- ▶ The indicator values are evaluated on basis of previously defined criteria with reference to calculated indicator values for Maximum Sustainable Yield (MSY)
- ▶ In the Kobe-plot MSY defines the evaluation criteria
- ▶ ICES uses ranges of indicators to define the criteria
- ▶ What could be the indicators and criteria of the Porsanger Fjord?
- ▶ The evaluation will not provide a quota proposal but possible changes in the management scheme

# The Fjord Fishing Commission

- ▶ **The Fjord Fishing Commission** (FFN) was founded in 2014 as an advisory entity for the oversight of coastal fish resources in the northern region
- ▶ Three representatives are designated by the **Sámi Parliament**, and one is appointed by each of the three Norwegian counties: **Finnmark**, **Troms**, and **Nordland**
- ▶ Could FFN potentially play a role in facilitating local **co-management arrangements**, particularly in regions like the Porsanger Fjord?