C4F Barents Sea
Reference case

2020 International Forum on the Effects of Climate Change on Fisheries & Aquaculture

25-26 February 2020, Rome
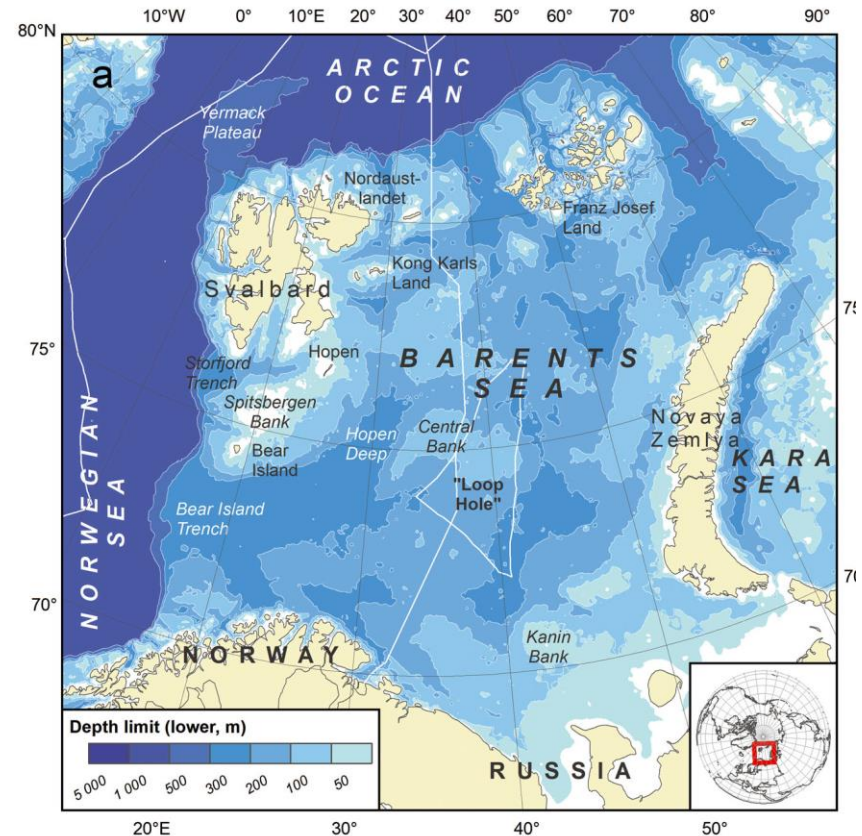
Staby, A & Fossheim, M
Institute of Marine Research
Norway

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Case study description

- Shelf sea bordering the Arctic Ocean, mainland Russia and Novaya Zemlya, mainland Norway and Svalbard, and the Norwegian Sea (Lat: 68-82°N , Long: 15-60 °E)

- Average depth 230 m and max depth 500 m

Jørgensen et al. 2019

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Case study description

Cod

• Which species:
  o Cod
  o Haddock
  o Snow crab

Photo credit: Thomas de Lange Wenneck
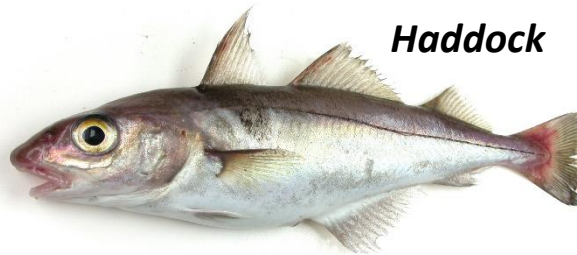
Haddock

Photo credit: Thomas de Lange Wenneck

• Main stakeholders:
  o Oceanic Fisheries
  o Coastal fishing communities
  o Coastal communes

Snow crab

Photo credit: Erlend Astad Lorentzen

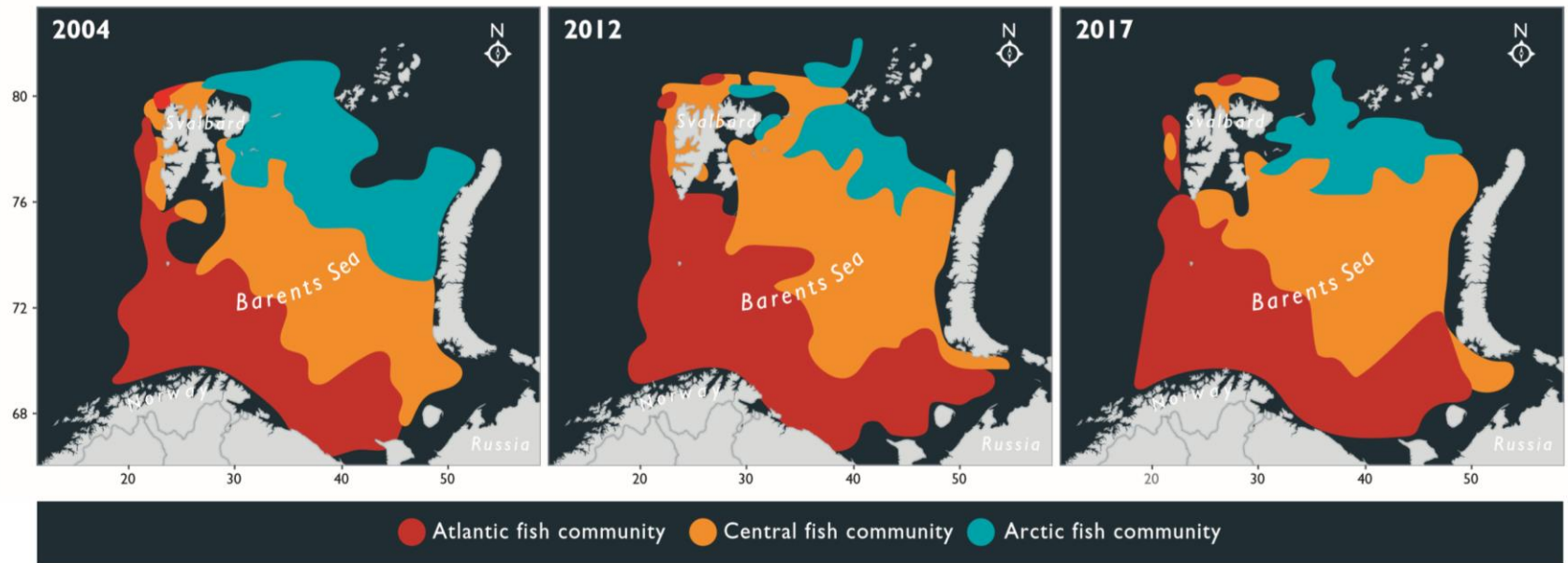ClimeFish

Major opportunities

Cod   *Haddock*

- Cod and haddock are likely to benefit from both a moderate increase in temperature and a related increase in secondary production (Bogstad et al. 2013; Landa et al. 2014)

- Haddock distribution can further expand into the north-eastern parts (Haug et al. 2017) and increase of the area of distribution and new feeding grounds may open up new seasonal fishing grounds

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Major opportunities

Change in fish communities (composition and abundance)

Cod   Haddock

Photo credit: Thomas de Lange Wenneck

Fossheim et al. 2019

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Major opportunities

Snow crab

Photo credit: Erlend Astad Lorentzen

- Under current conditions a further expansion of the snow crab into northern and north-western areas (around Svalbard) of the Barents Sea may on the long-term result in new fishing opportunities
- An increase in abundance and distribution of the species may result in it becoming an additional prey item of demersal organisms, including cod (WGIBAR report 2018)
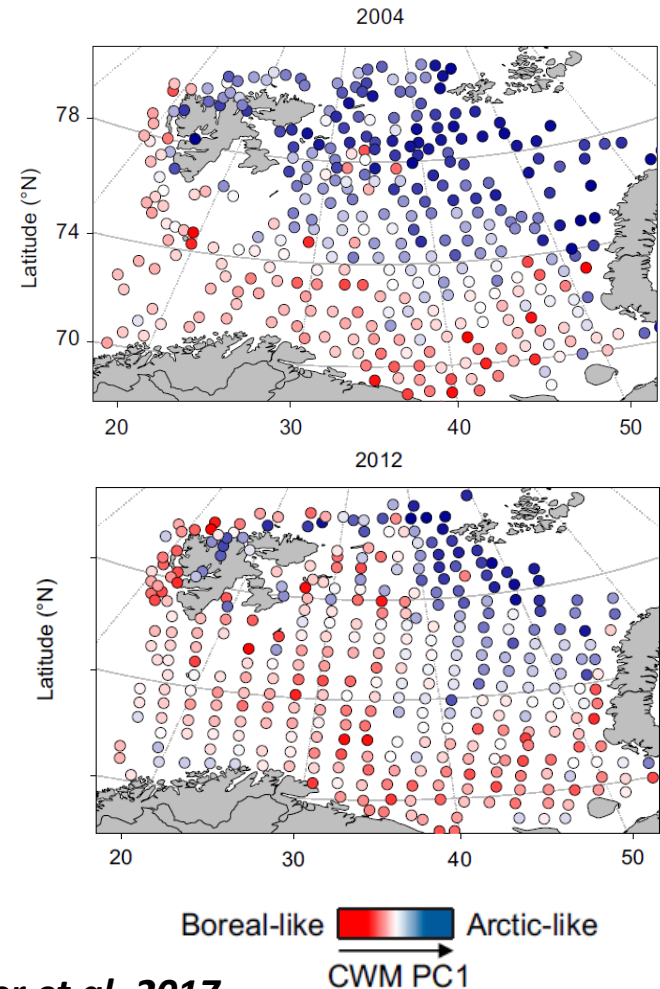
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Major risks

Cod   Haddock

Photo credit: Thomas de Lange Wenneck

- Increased area of distribution of cod and haddock can have potentially negative impact on pelagic and benthic fish species such as polar cod (Renaud et al. 2012)

- Result in local decrease of species diversity and abundance, and possible changes in community structure (Frainer et al. 2017)

2004

2012

Boreal-like ▬▬▬ Arctic-like
CWM PC1

Frainer et al. 2017

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Major risks

Cod

Photo credit: Thomas de Lange Wenneck

- Increase in acidification and decrease in thermohaline circulation may result in reduced growth and survival of cod larvae and a subsequent decline of cod biomass (Stiasny et al. 2016)

- Short-term predictions show a reduction of the adult cod stock (Årthun et al. 2018)
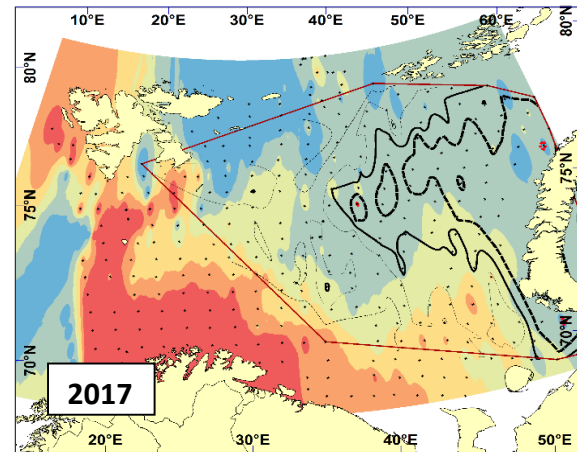

Stiasny et al. 2016

Major risks

Snow crab

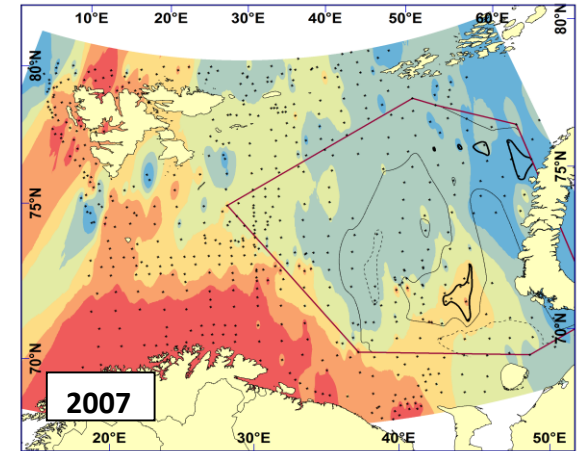*Photo credit: Erlend Astad Lorentzen*

- Increased area of distribution of snow crab (ClimeFish D1.3) can have potentially negative impact and benthic organisms due to increased predation
- Result in local decrease of species diversity and abundance, and possible changes in community structure (Jørgensen et al. 2019)
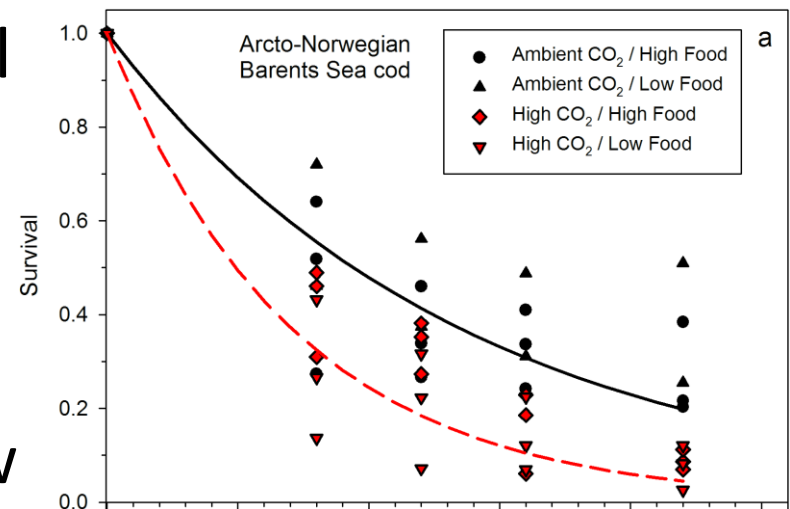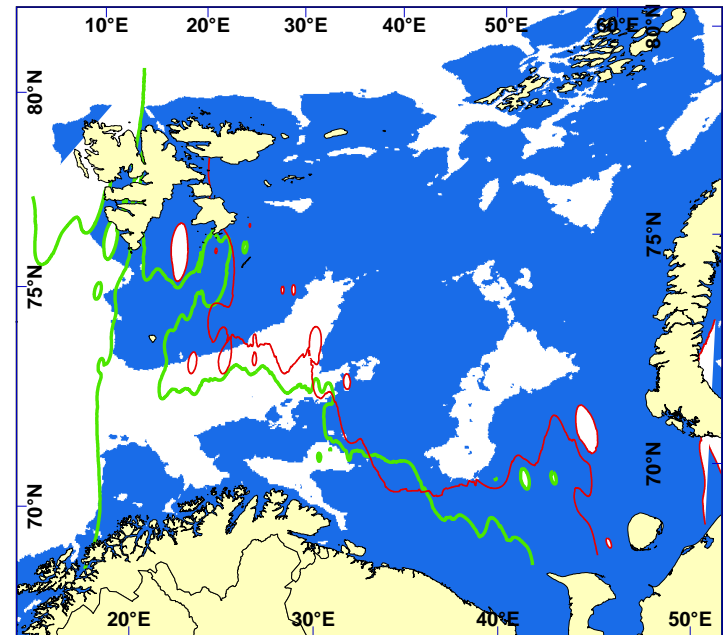

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Major risks

Snow crab

Photo credit: Erlend Astad Lorentzen

- Snowcrabs' temperature preferrence is -1 to 3°C, with a strong correlation between depth and temperature (ClimeFish D1.3)

- An increase in temperature will very likely restrict further expansion of area of distribution (ClimeFish D 1.3; Bakanev 2016)

Red and green lines show the 3^0C border in 2016 and 2017 respectively. The blue area shows the area covering depths to 300 m.

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References

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