Fiskaaling
Aquaculture Research Station of the Faroes

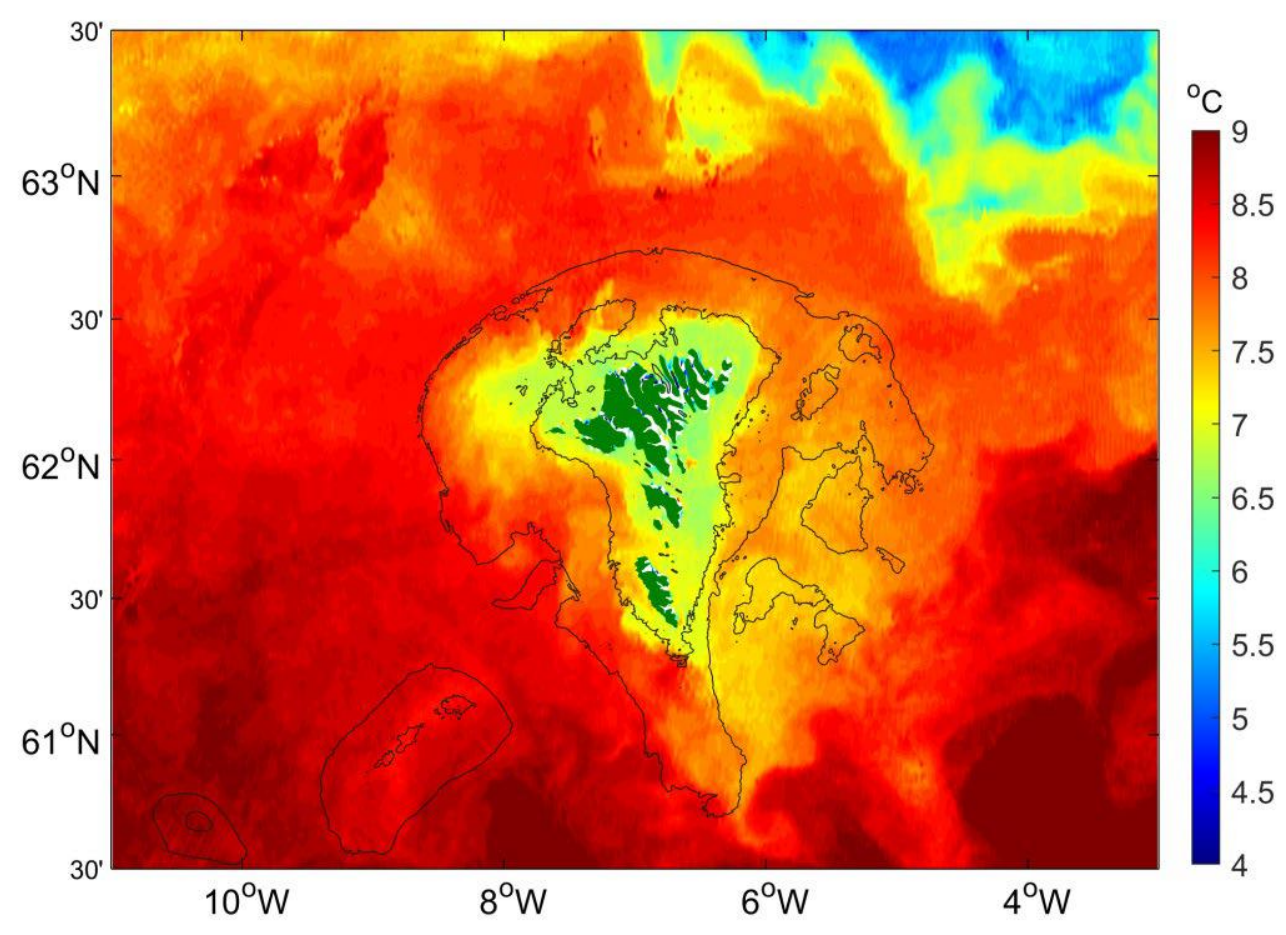
Hydrografiske og biologiske omstændigheder på de færøske fjorde

Gunnvør á Norði

Taraaling á føroysku firðunum – tørvurin á umhvørvismeting og eftiransing

15. mars 2023

The Faroe shelf



Persistent front at 100 – 150 m depth separating the shelf water from the open ocean

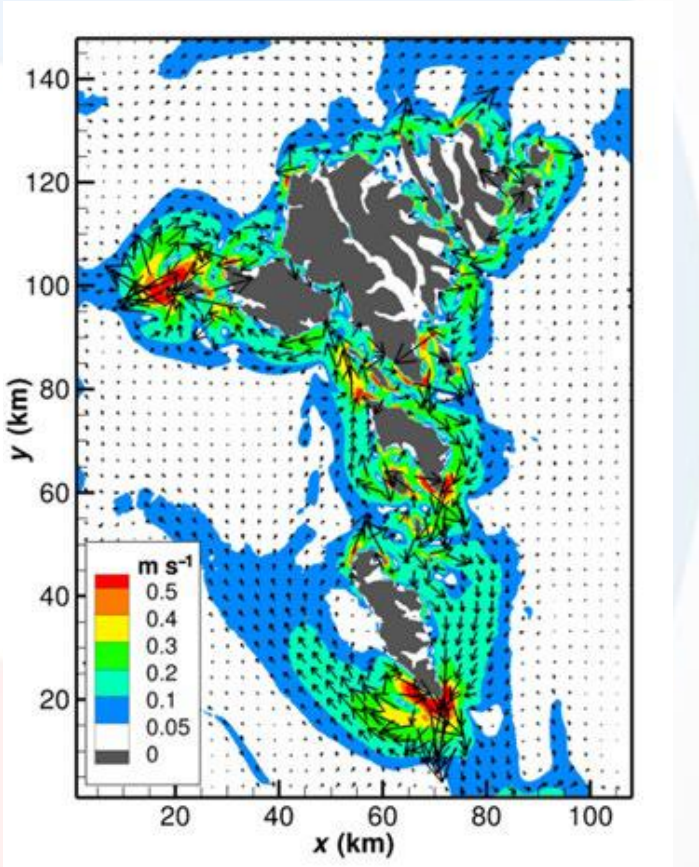
Stable temperatures and salinity

Vertically mixed watermasses

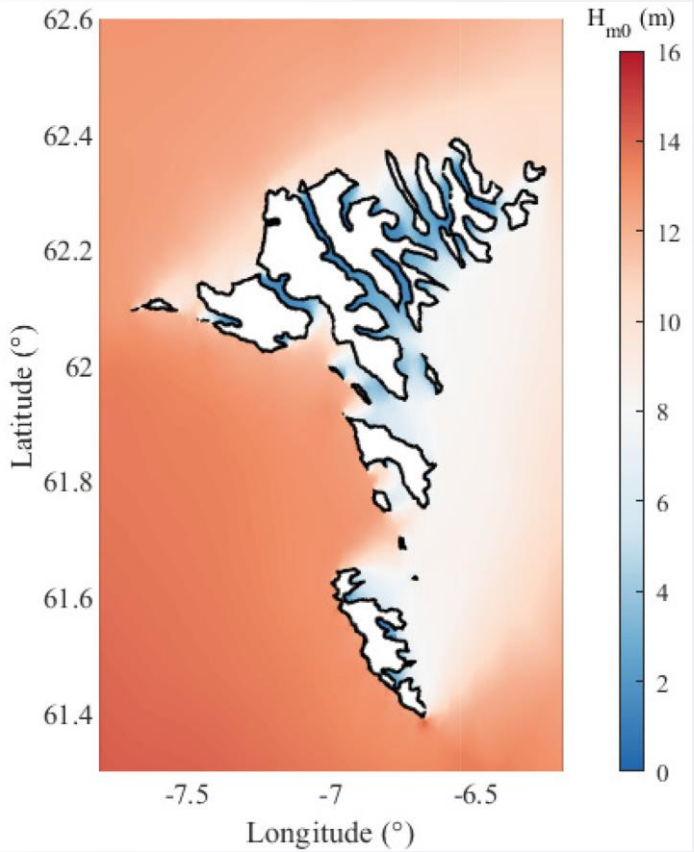
The shelf sustains a neritic ecosystem that differs from the oceanic environment

Source Havstovan, available in: ICES. 2023. Workshop on the Faroes Ecoregion Aquaculture Overview (WKFaroesAO). ICES Scientific Reports. 5:28. 87 pp. https://doi.org/10.17895/ices.pub.21551541

Currents and waves in near shore environments



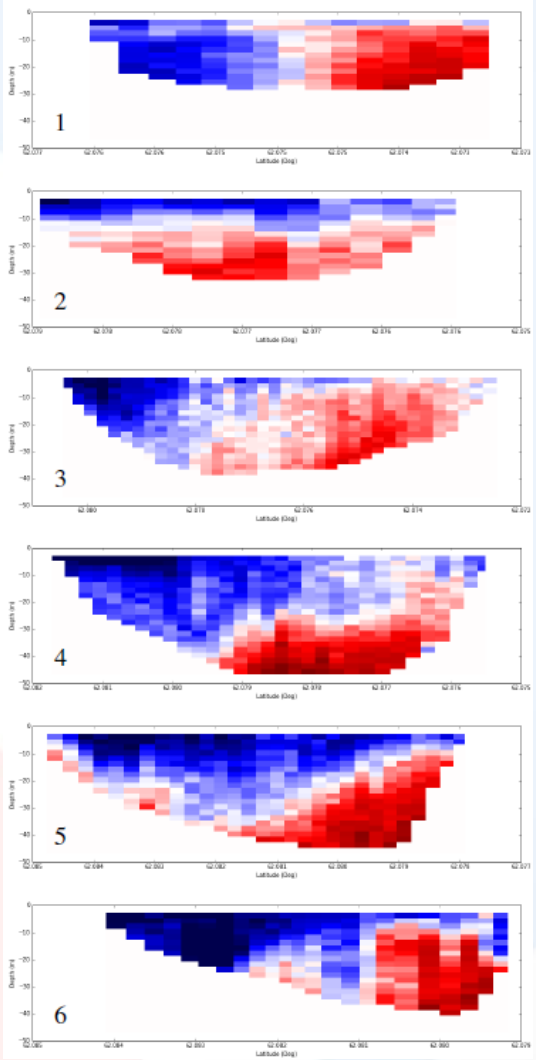
Kragesteen et al. 2018

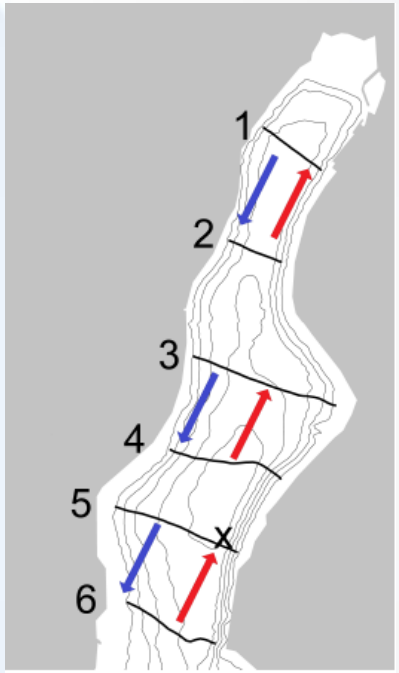


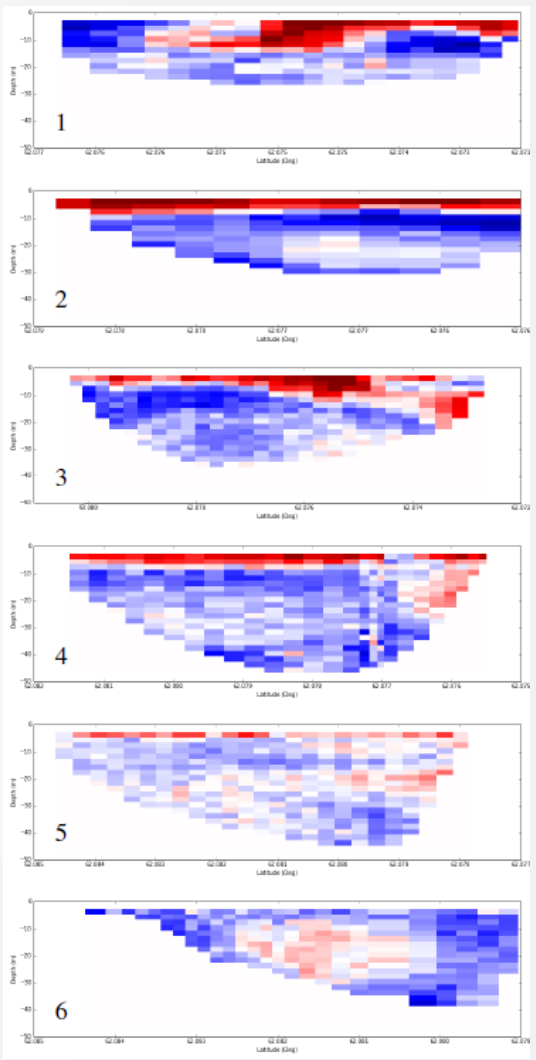
Joensen et al. 2021

- Strong tidal currents in most straits
- Considerably weaker currents in fjords
- Many areas exposed to ocean swells

Currents in Fjords





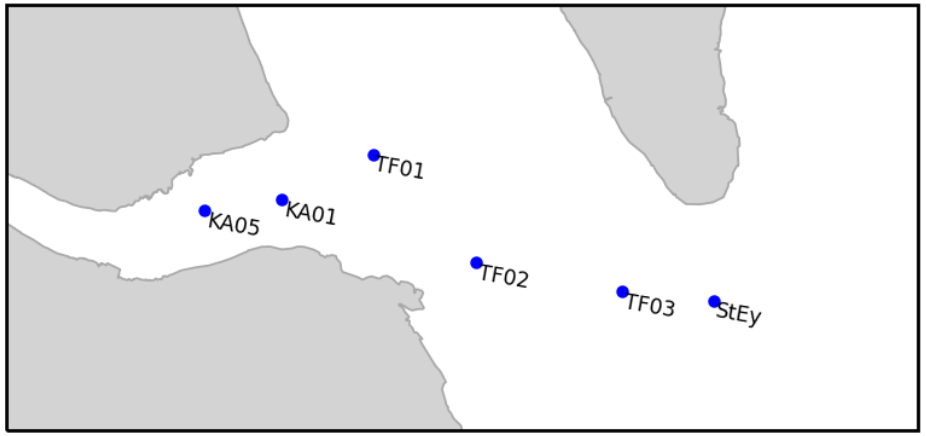


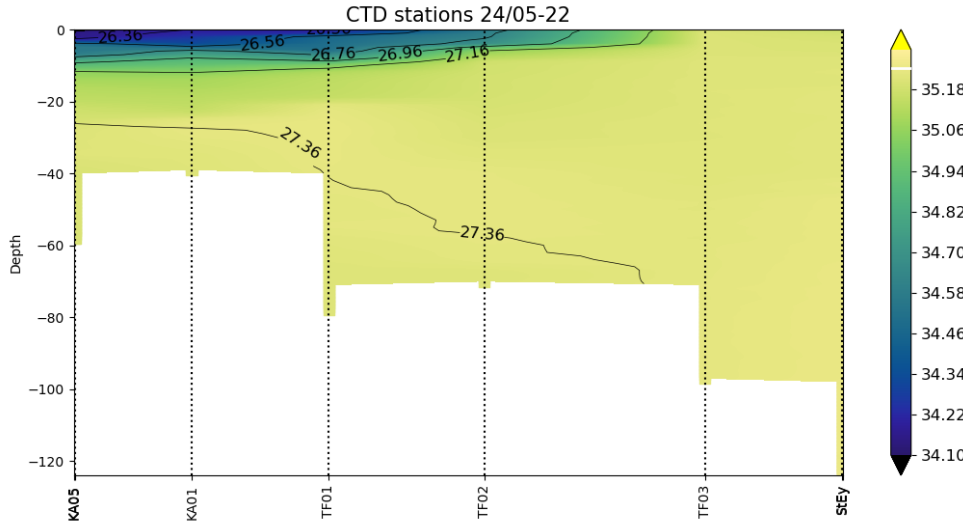
Estuarine circulation Influenced by wind and Coriolis

Circulation can be reversed due to winds

Source Fiskaaling , available in: ICES. 2023. ICES Scientific Reports. 5:28. 87 pp.

Stratification



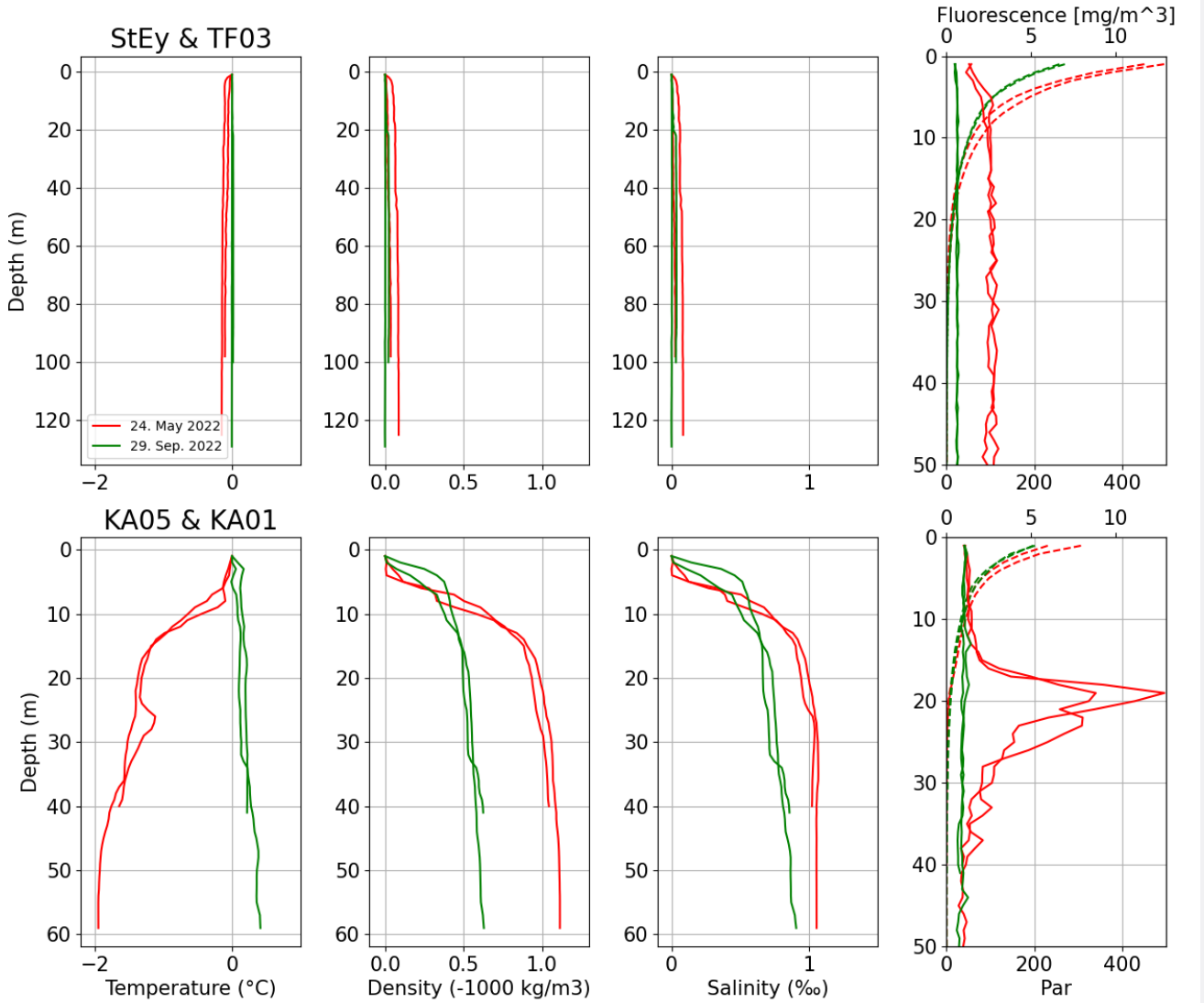


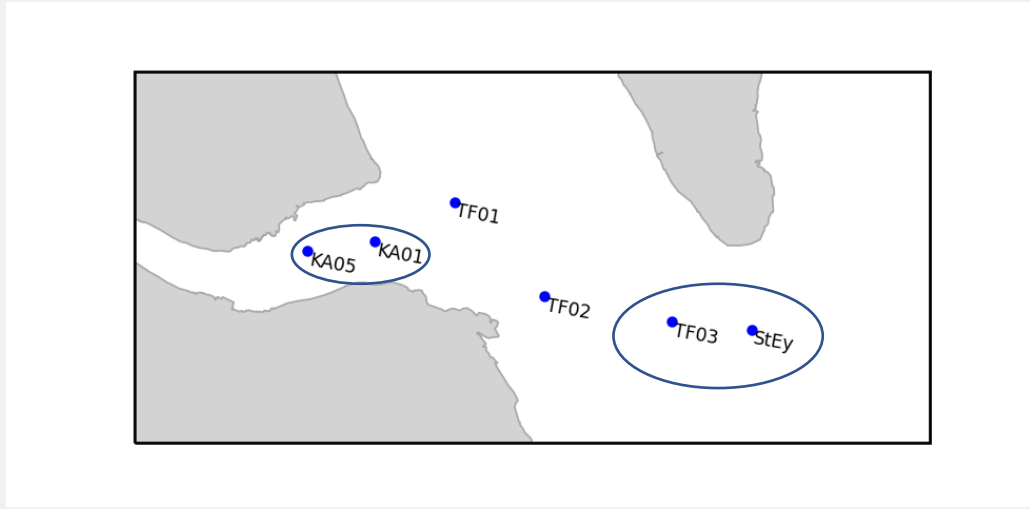
Source Fiskaaling, Project: FjordProcess

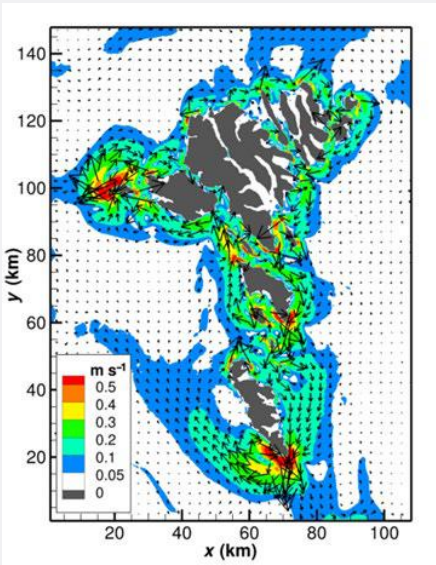
Year round stratification in fjords

Vertically mixed water masses in areas with tidal currents

Stratification





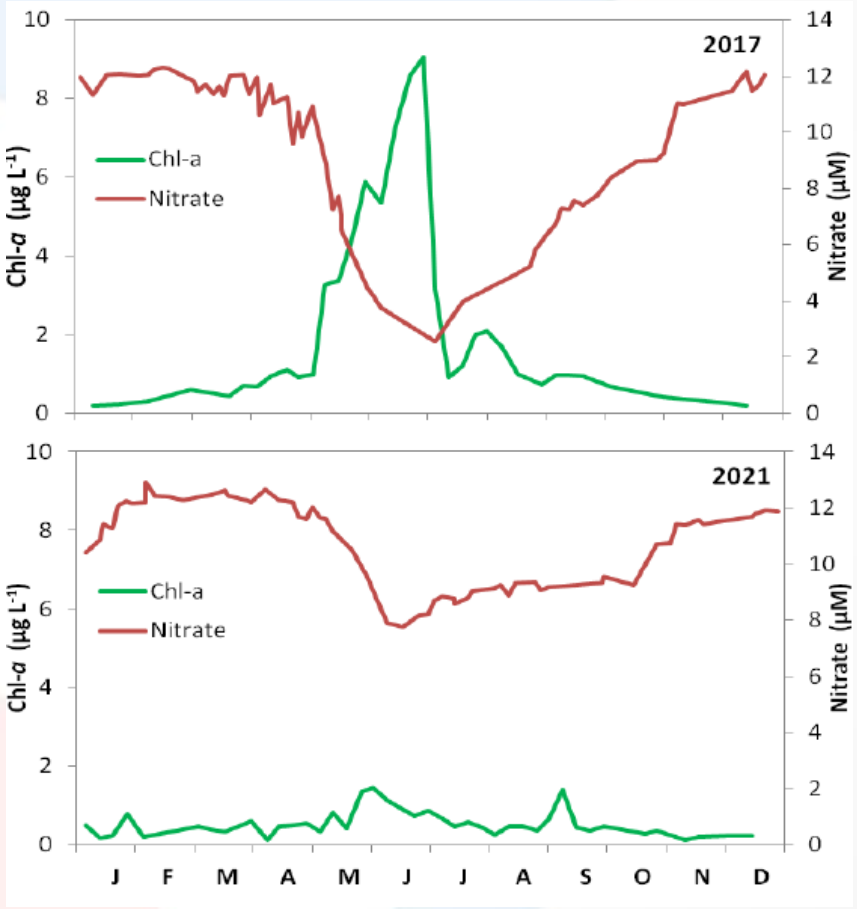


Faroese stratified areas: Generally small temperature and salinity differences with depth

Source Fiskaaling, Project: FjordProcess

Nutrient availability

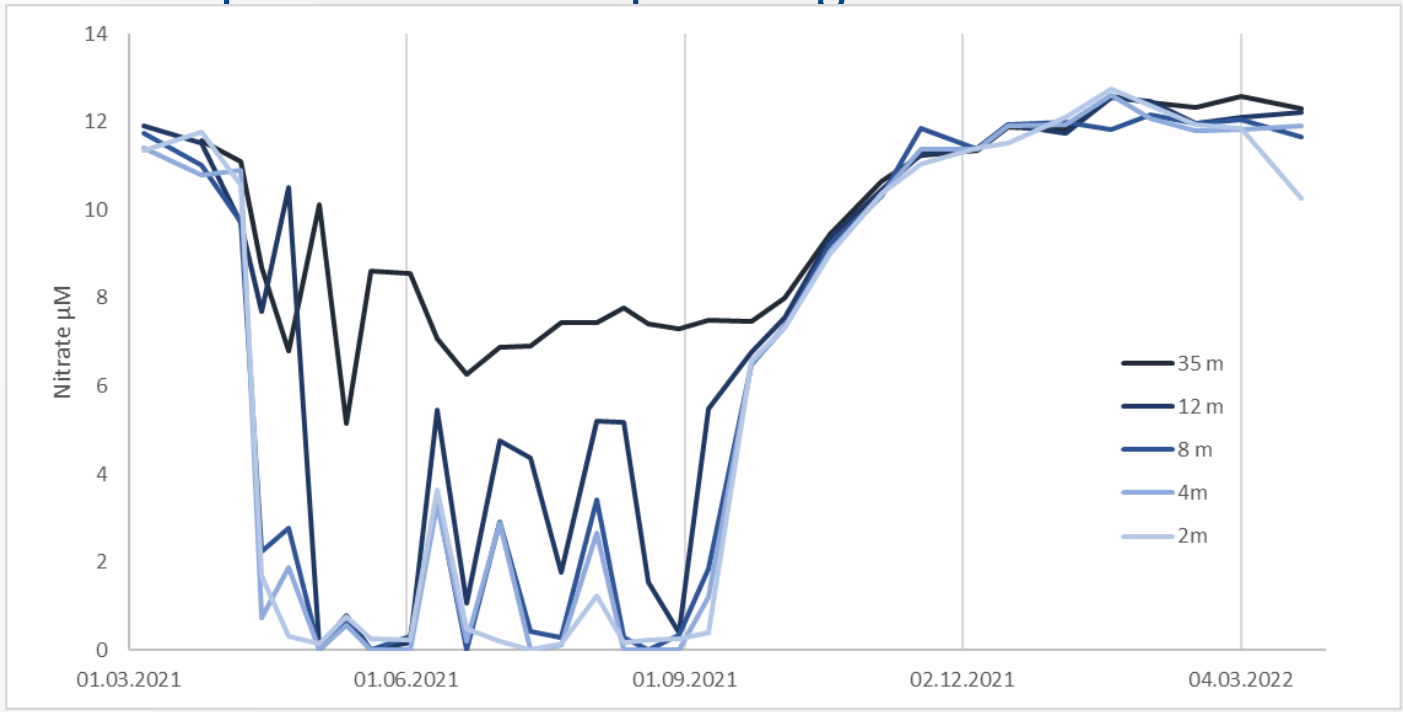
Faroe shelf



Source Havstovan,
available in: ICES. 2023 WKFaroesAO

Fjords

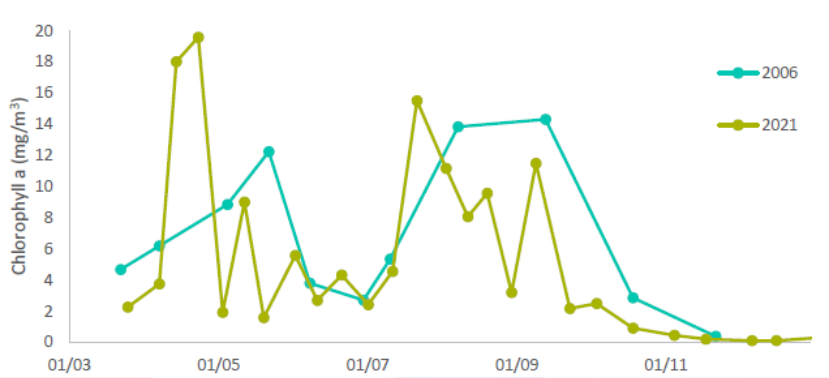
Stratification and nutrient depletion during summer but frequent nutrient upwelling



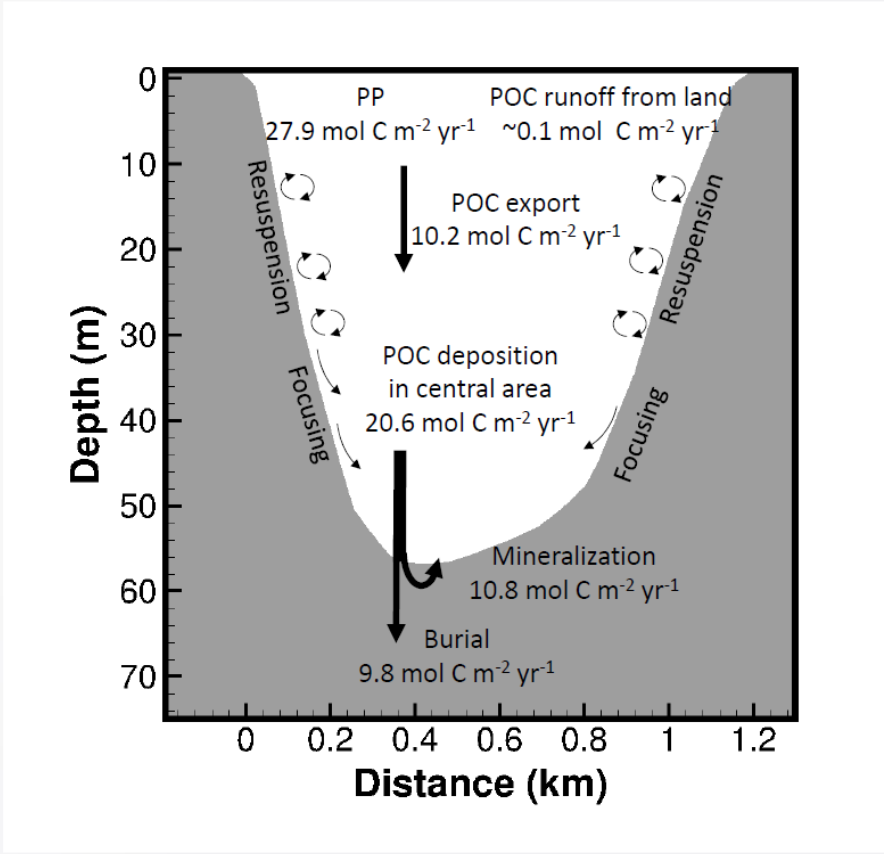
Østerø et al. 2021 Fiskaaling rit 2022-03

Microalgae production

Annual microalgae production in Faroese fjords ~335 gC m^{-2} y^{-1}
2 -3 times higher than in neighnouring regions (Gaard et al. 2011)



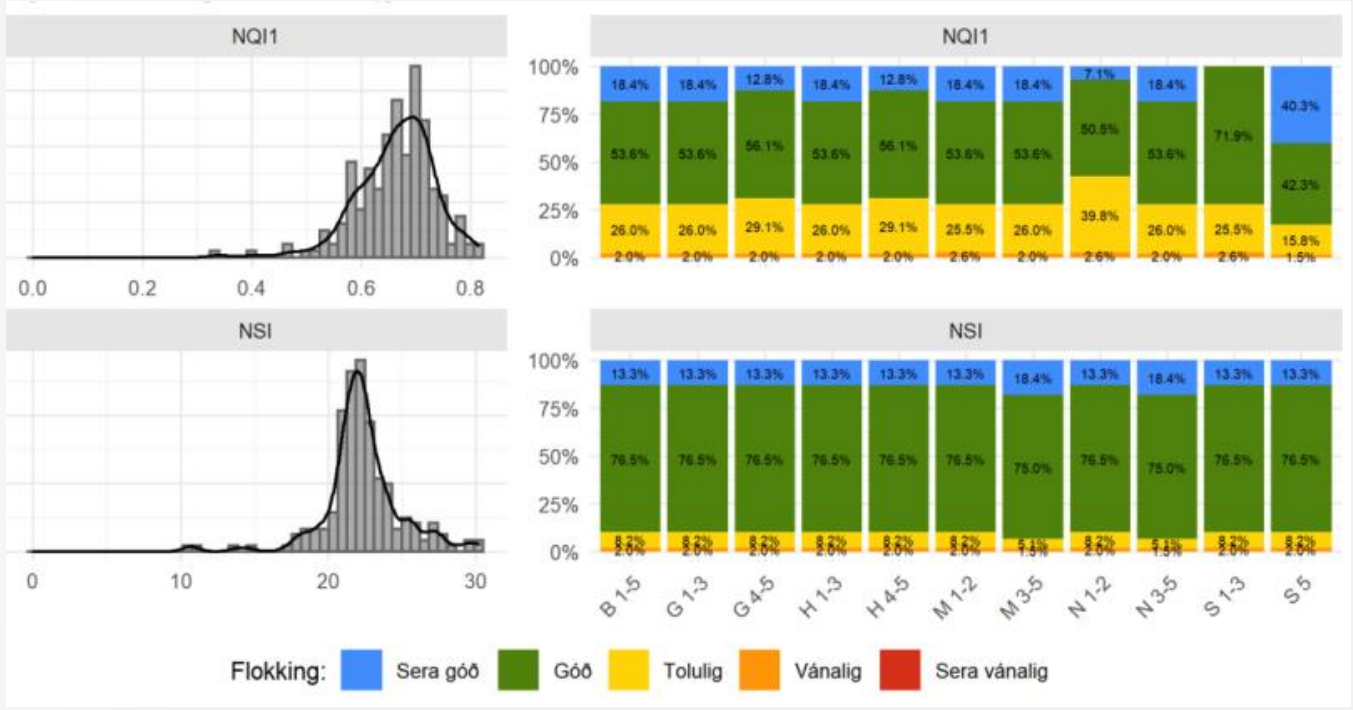
ICES. 2023 WKFaroesAO



á Norði et al. 2018

Benthic macrofauna

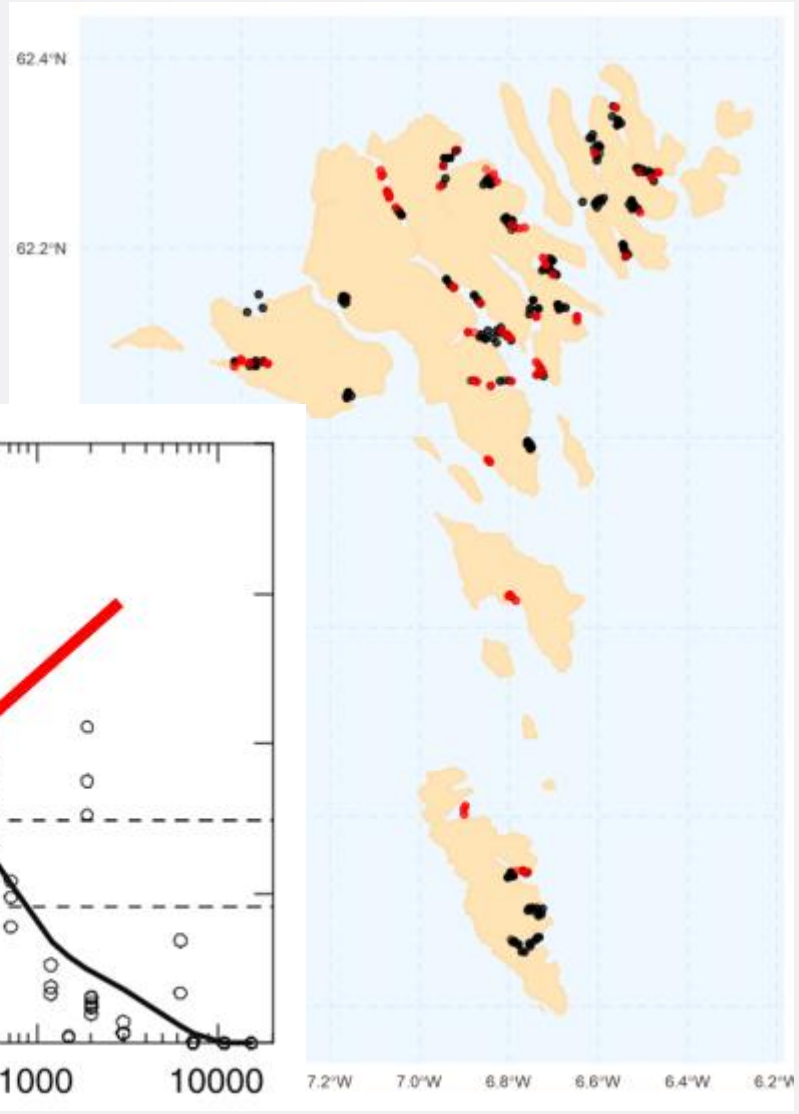
- Macrofauna samples from fish farming monitoring
- 196 reference samples
- Compared to ASC, GB, DK, SE, NO
- Macrofauna diversity comparable to NO

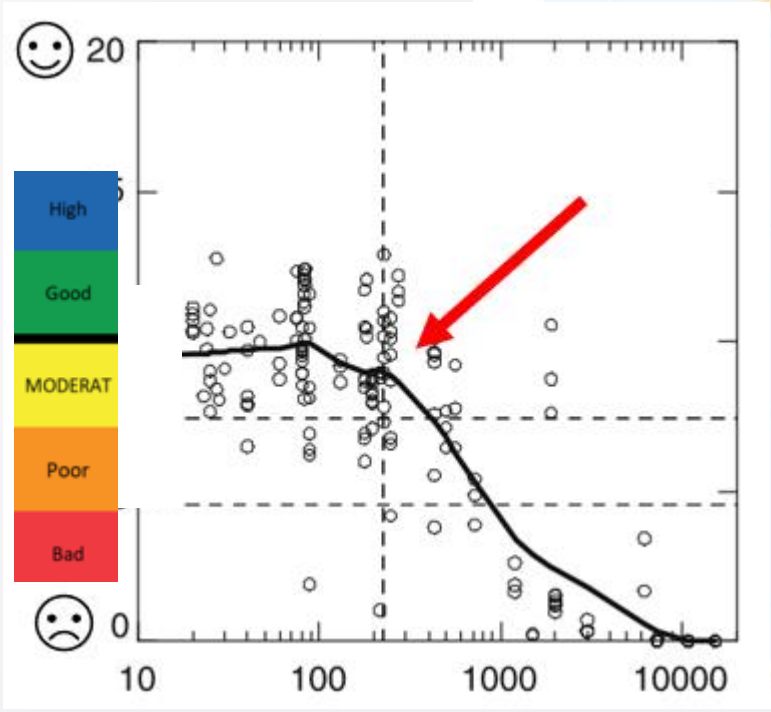


Mortensen et al. 2020 Fiskaaling rit 2020-16

Benthic macrofauna classification system for Faroese fjords

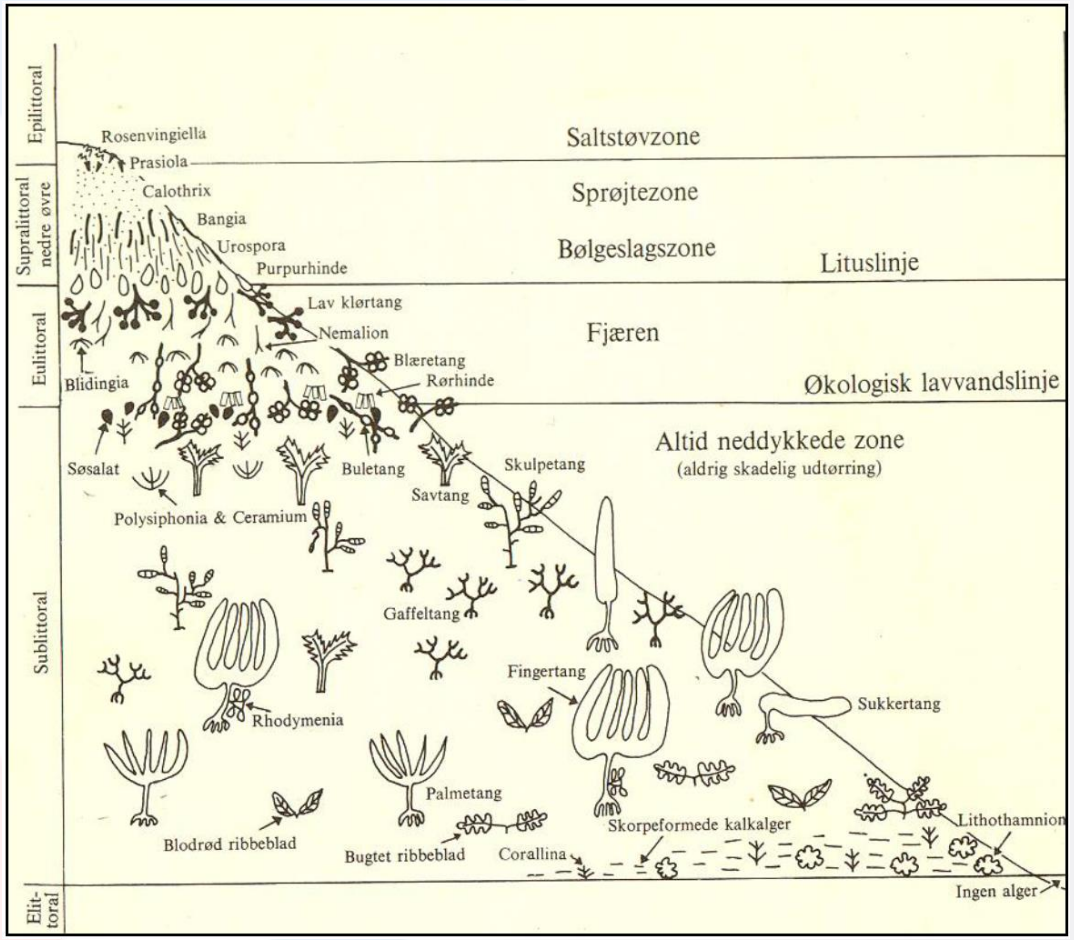
- Water framework directive
- Based on macrofauna samples from environmental monitoring of fish farms
- 741 samples
  - Environmental agency
  - ASC-Aquaculture Stewardship Council
- Zn as pressure gradient
- Multi-metric index NQI





Mortensen et al. 2021 Fiskaaling rit 2021-10

Seaweed zonation



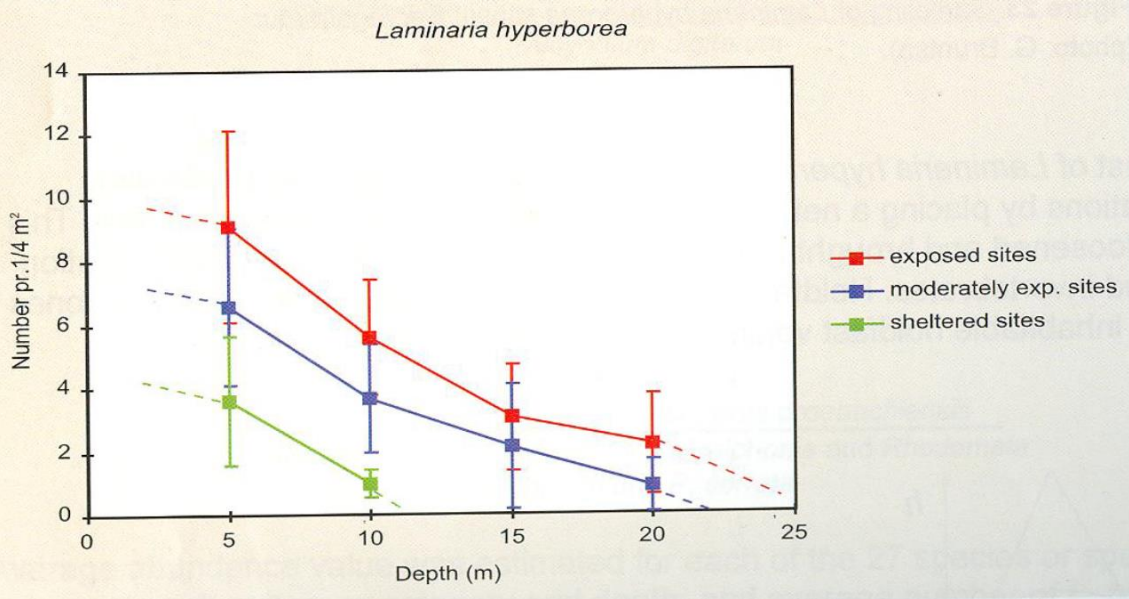
Substrate

Out drying

Competition

Light

Seaweed growth and wave exposure



Bruntse et al. 1999

TABLE 1 | Predicted kelp forest area (km^2) of the genera *Laminaria* and *Saccharina* per Nordic country or region.

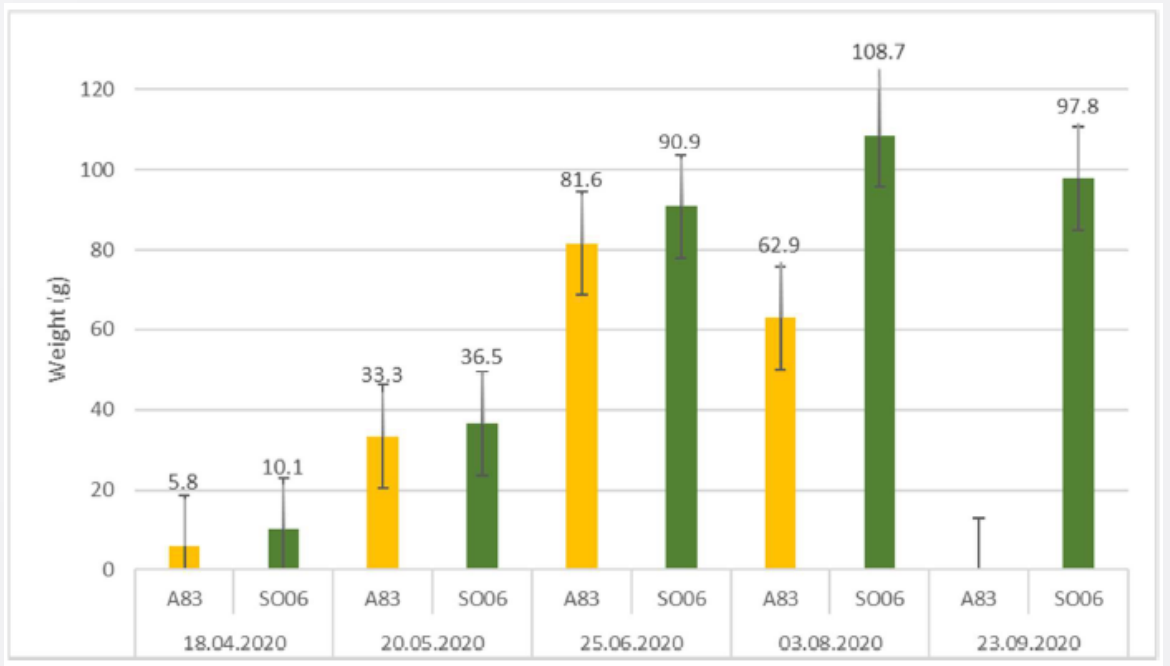
Country/region	*Laminaria*	*Saccharina*
Norway	6797 (14486)	1303 (1303)
Svalbard	0 (464)	172 (850)
Denmark	567 (8120)	1 (21)
Greenland	42 (53)	834 (1251)
Iceland	1649 (4612)	54 (54)
Faroe Islands	275 (1631)	0 (0)
Sweden	36 (36)	21 (21)
Finland	0 (0)	0 (0)
Total	9366 (29402)	2385 (3500)

Number in parentheses include predictions in grid cells north of the northernmost observation or deeper than the deepest observation, or where the substrate is classified as soft bottom (for Denmark), i.e., predictions shown in light blue in ***Figure 3****.*

Kvile et al. 2022

Seaweed grazing

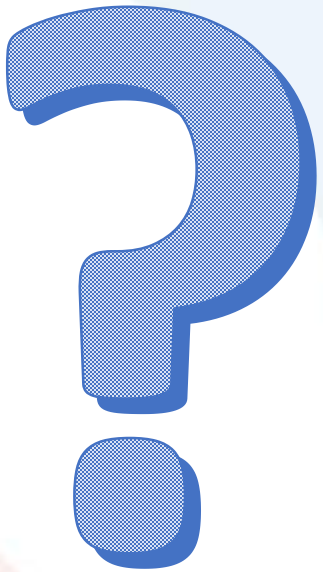
23 September 2021, reference (left) fish farm (right)



Reference (green) fish farm (yellow)

Schlund 2022

Seaweed as nursing areas

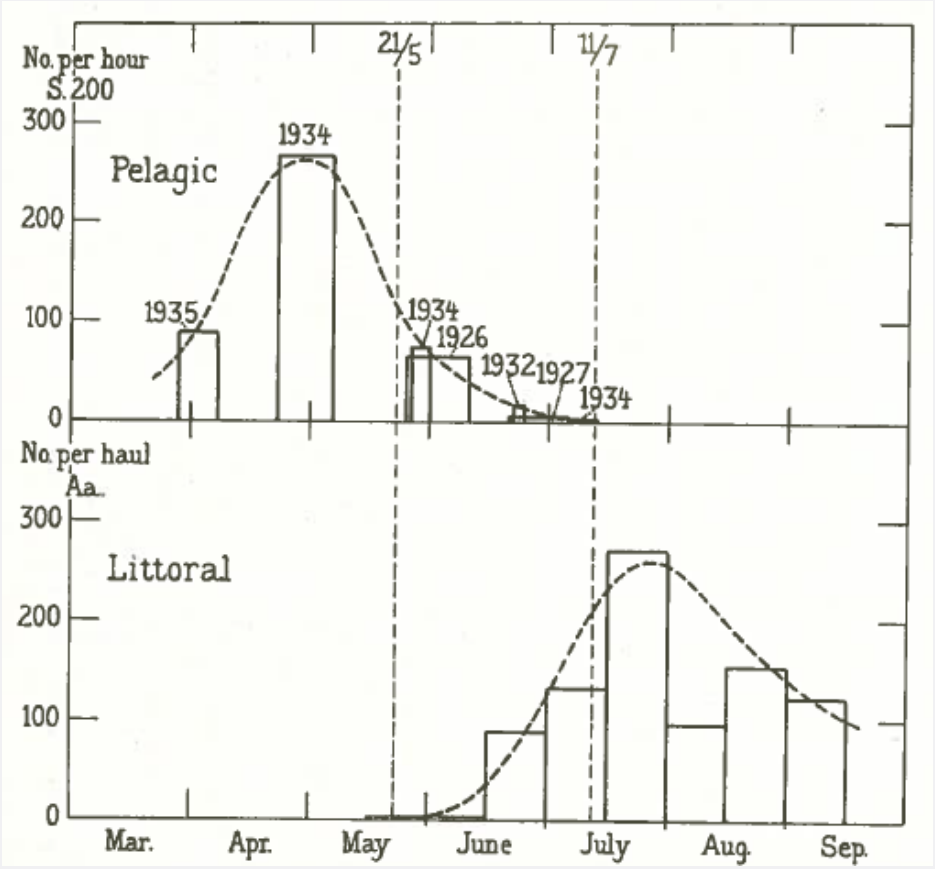


Few investigations

Bertelsen 1942
Investigations on the youngest age groups of saithe

Migrate to coastal areas in June

Ongoing pilot project
“Taraskógir sum uppvakstrarøki”
Havstovan, Tari, Fiskaaling



Knowledge gaps

	Knowledge gaps and data needs
Collected data	Making data FAIR, especially from old studies.
Time series in fjords	National seabed monitoring program in consensus to the Water Framework directive National monitoring of water parameters in fjords
Modelling	Hydrodynamic models (upcoming) Particle tracking models (on the way) Ecosystem models (Pelagic model will be generated in the project FjordProcess)
Seaweed	Mapping of the natural occurrence Epiphytes, epifauna and associated fish (some info in Brunte et al. 1999 and new project addresses this)