



# Ecosystem survey 2019 R/V Johan Hjort part 1

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20/01/2020

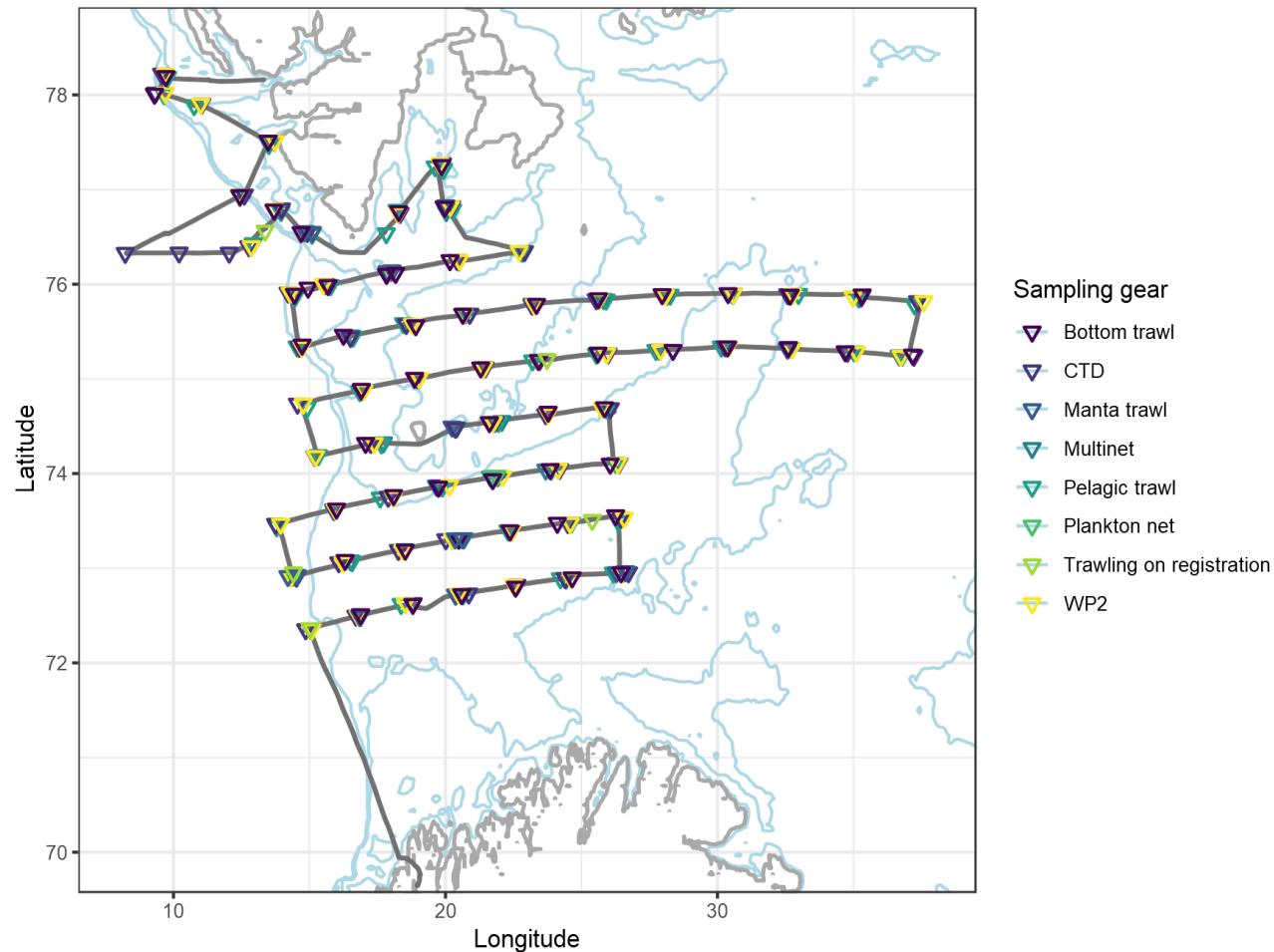
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## Cruise tracks and stations

Cruise tracks from the position log with points indicating start positions for different sampling gear. The points are jittered slightly for better visual representation:

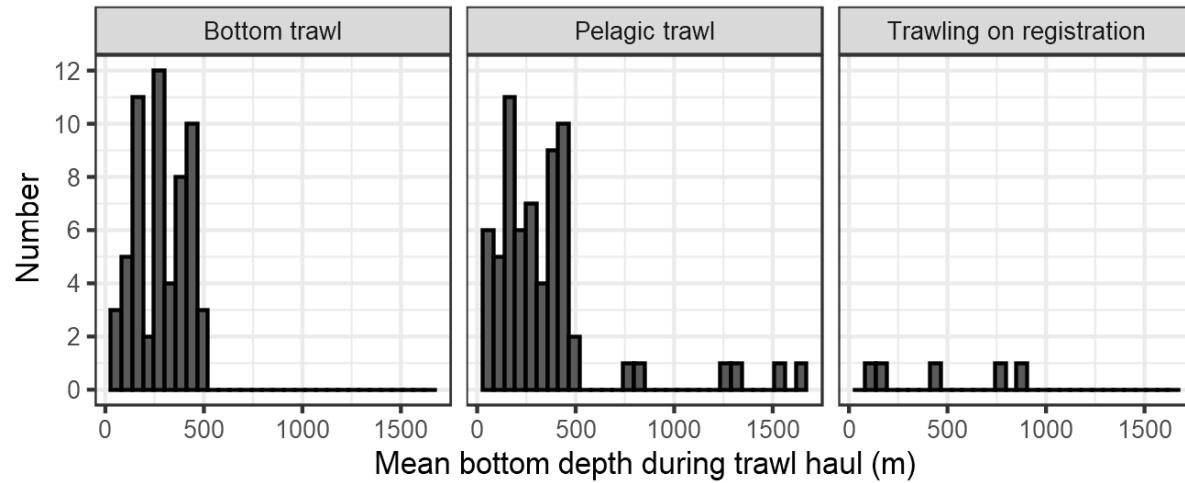


## Sampling depth for trawl hauls

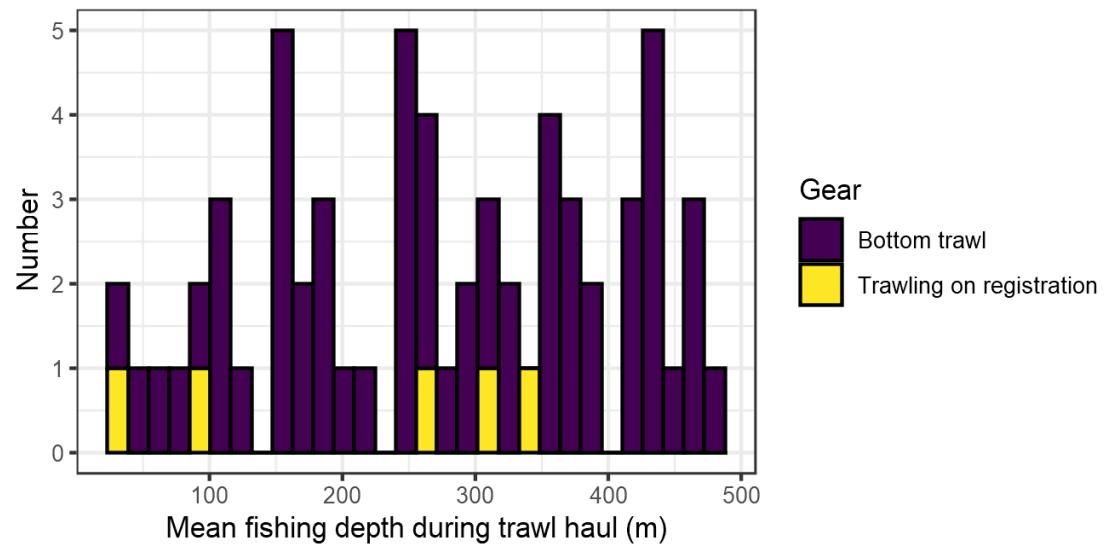
128 trawl hauls were taken during the survey, of which 58 were bottom trawl, 66 pelagic trawl, and 5 were trawling on registration. The trawl hauls covered a total distance of 323.3 km (174.6 nmi).

The sampling stations were located in areas with bottom depths from 43.3 m to 1633.3 m, and the fishing depth varied from 10 m to 473.3 m.

### Mean bottom depth during trawl hauls



Mean fishing depth during trawl hauls (excluding pelagic hauls)

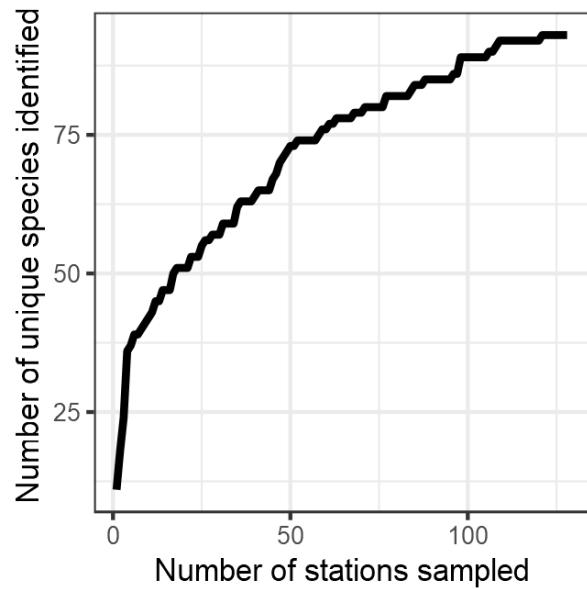


## Catch rates - biomass and number per nautical mile trawled for species registered in Sea2Data

### Species diversity

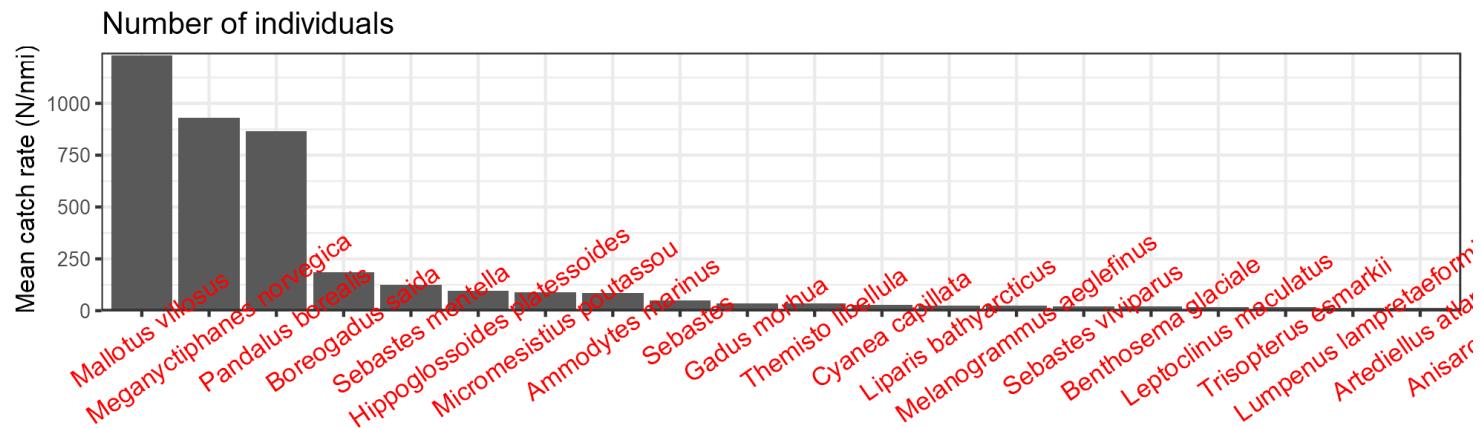
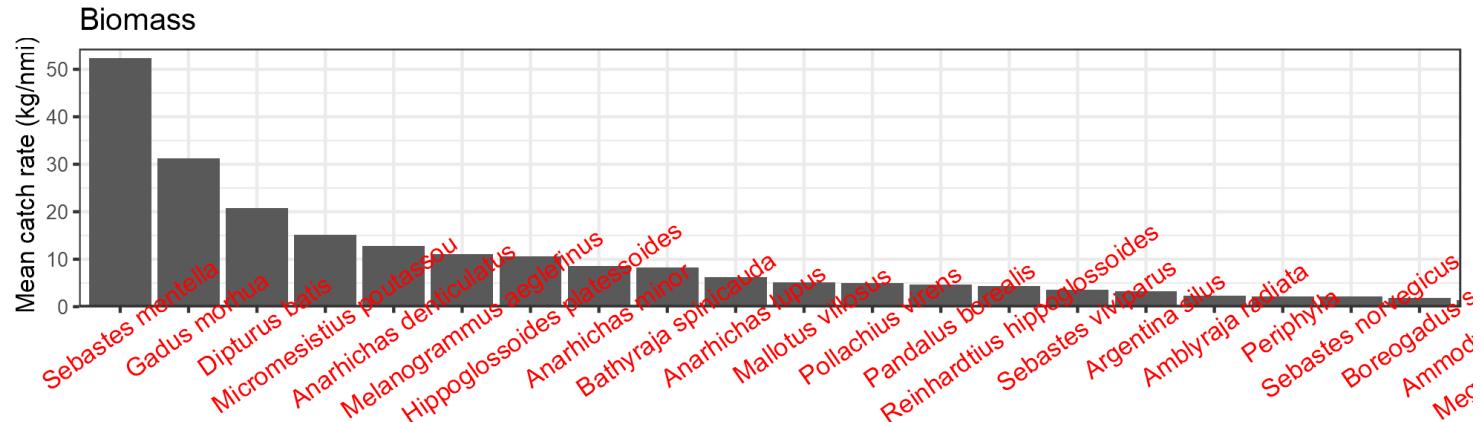
A total of 93 species were registered in Sea2Data during the survey.

Number of species identified versus the number of stations sampled

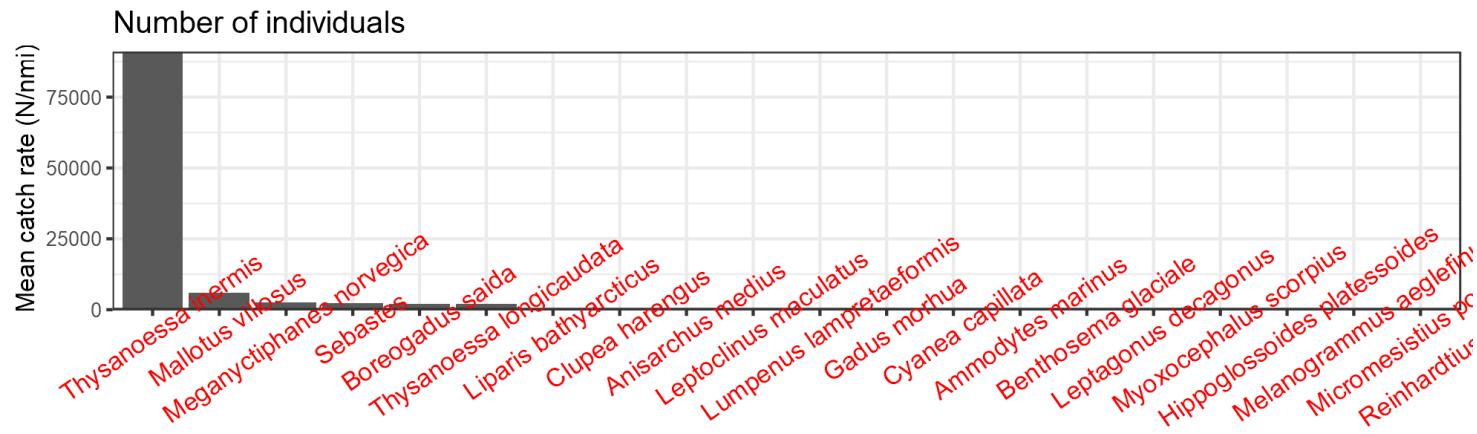
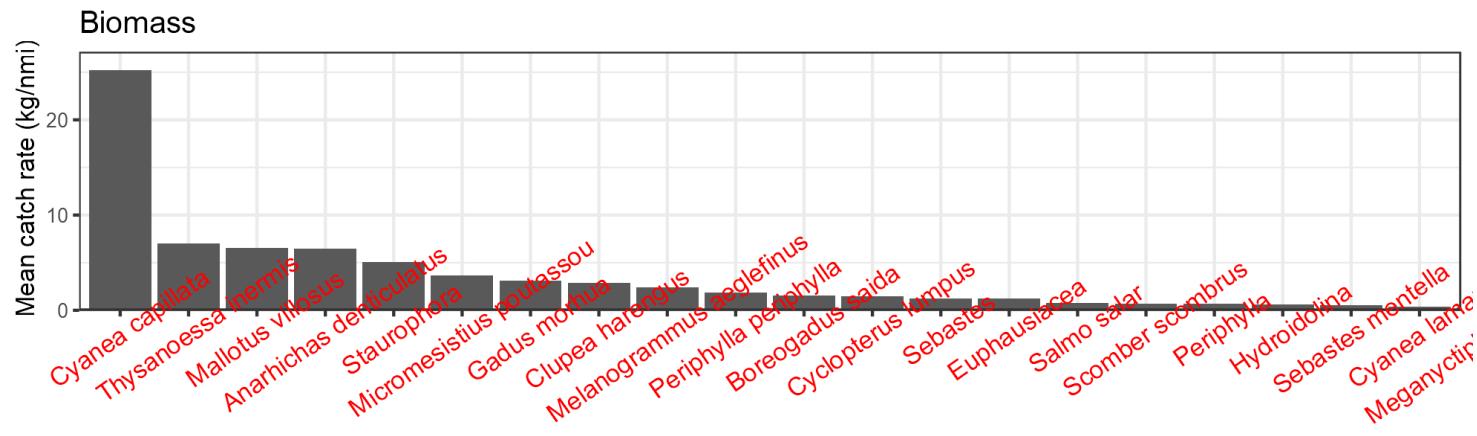


## Average catch rate by species for the 20 species with highest catch rates

Bottom trawl



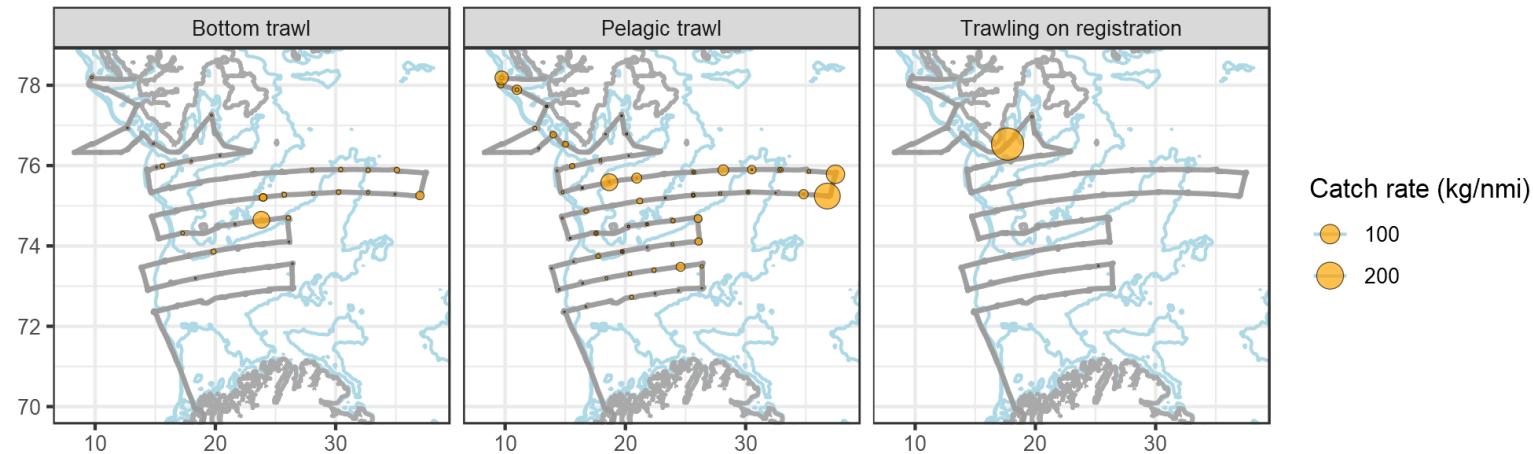
## Pelagic trawl



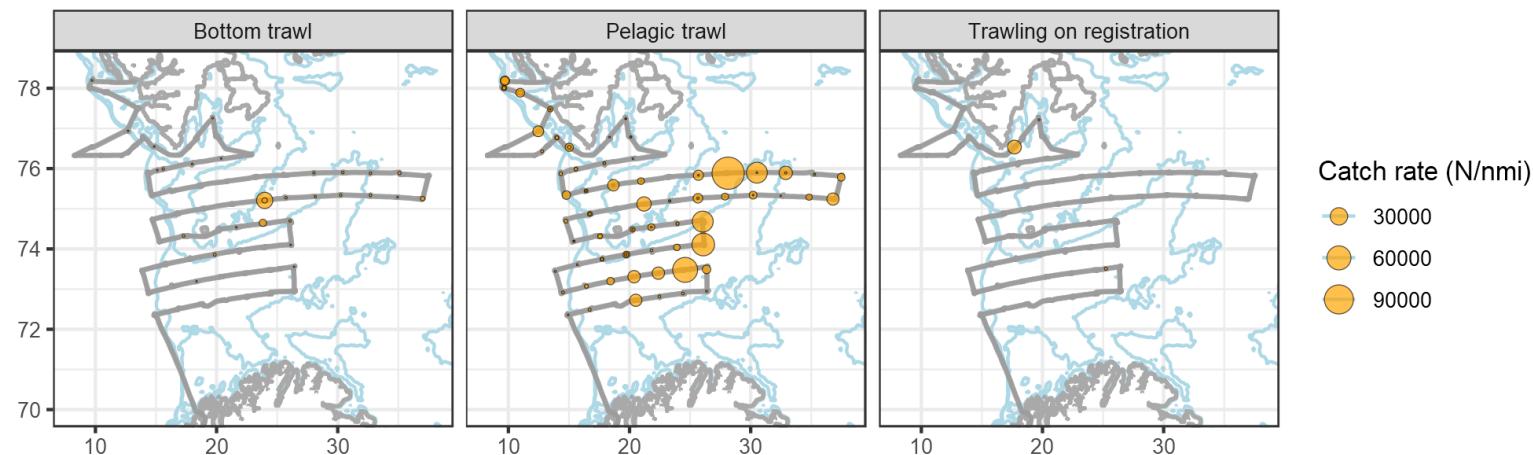
## Spatial variation in catches of common species

Capelin

Biomass | 2019 | *Mallotus villosus*

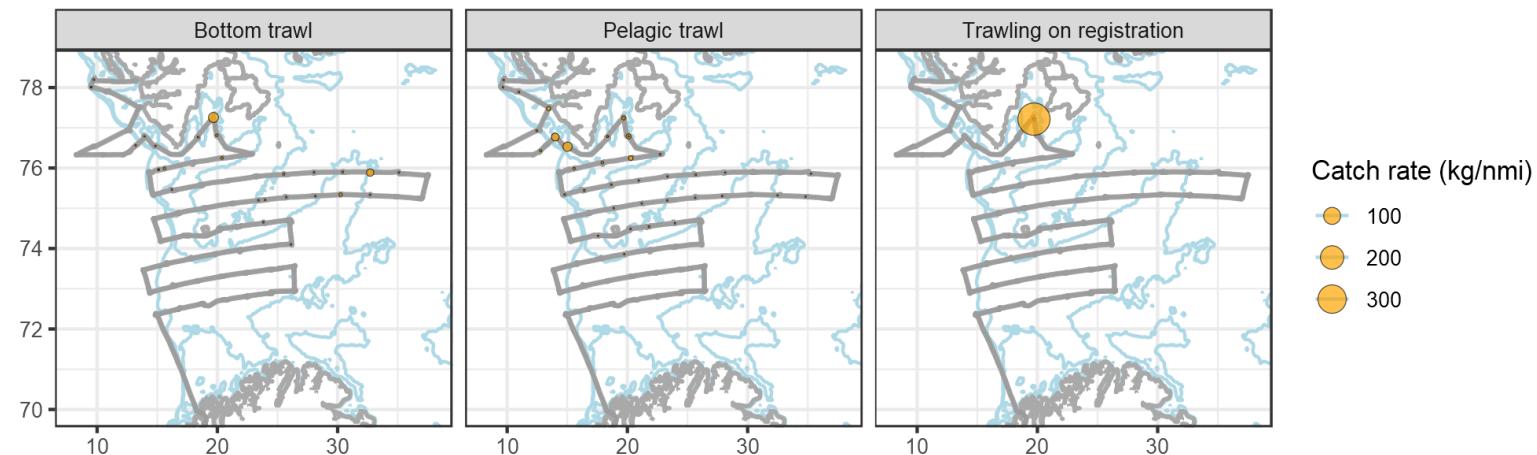


Number of individuals | 2019 | *Mallotus villosus*

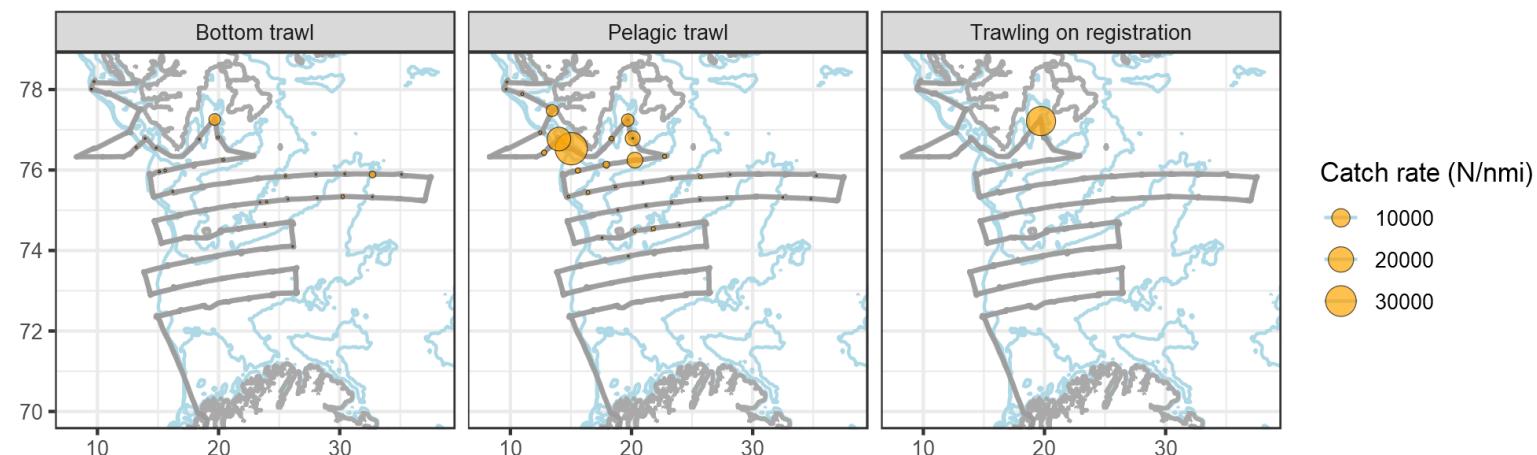


## Polar cod

Biomass | 2019 | *Boreogadus saida*

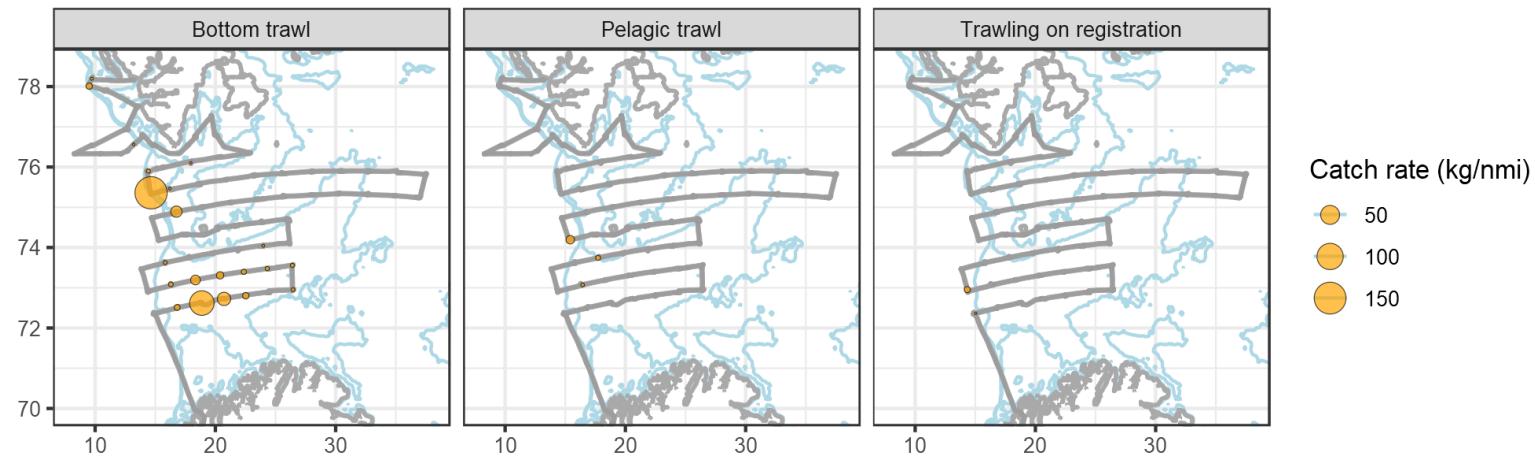


Number of individuals | 2019 | *Boreogadus saida*

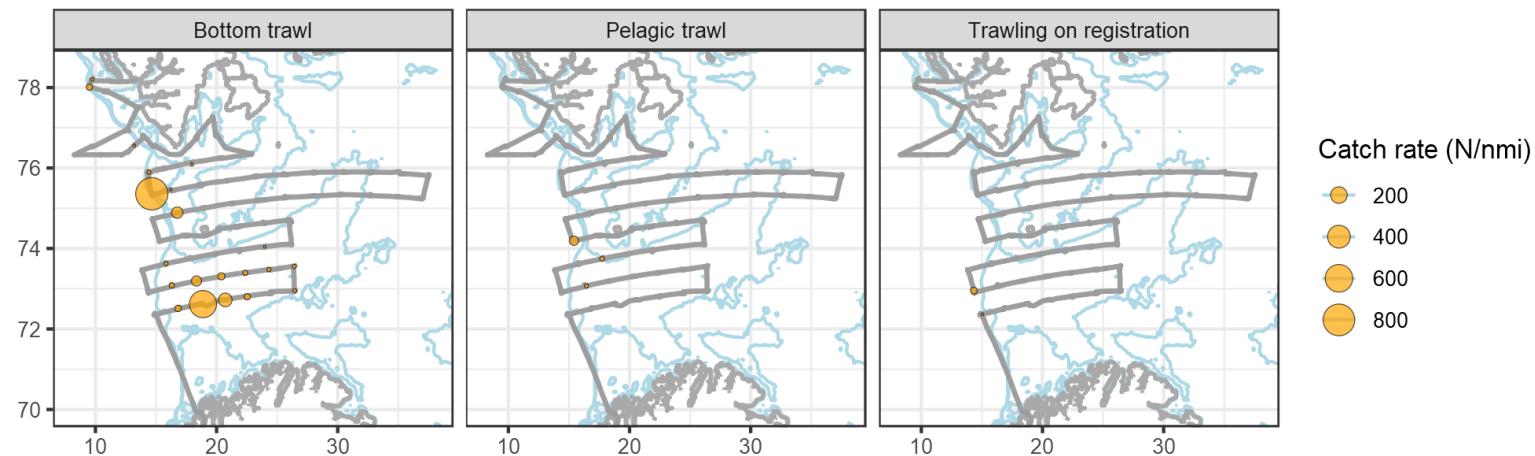


## Blue whiting

Biomass | 2019 | *Micromesistius poutassou*

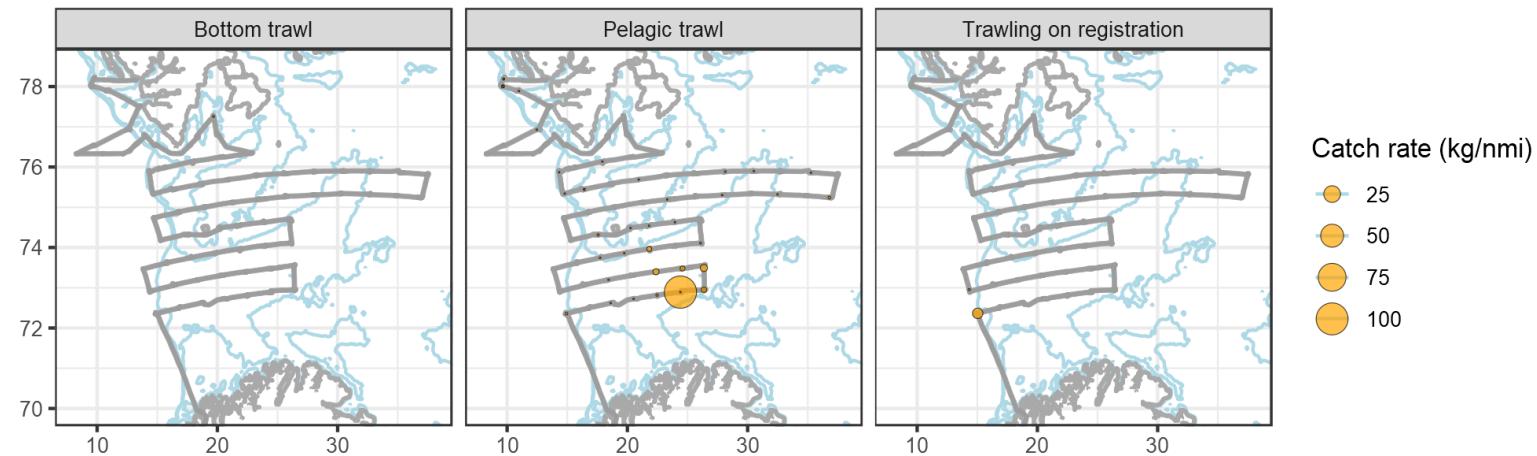


Number of individuals | 2019 | *Micromesistius poutassou*

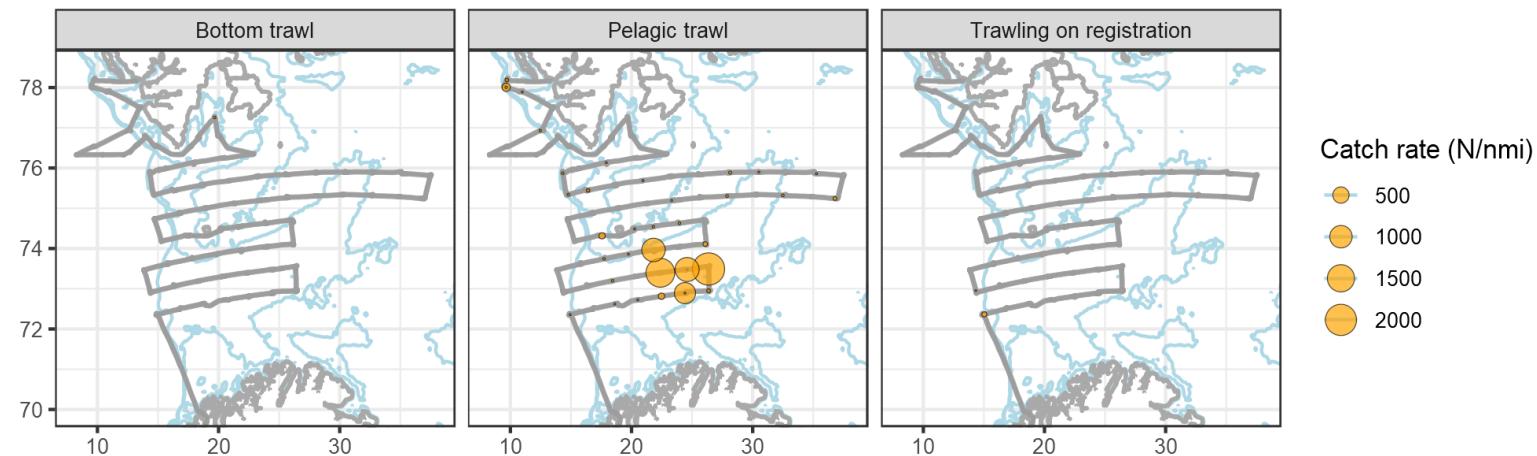


## Herring

Biomass | 2019 | *Clupea harengus*

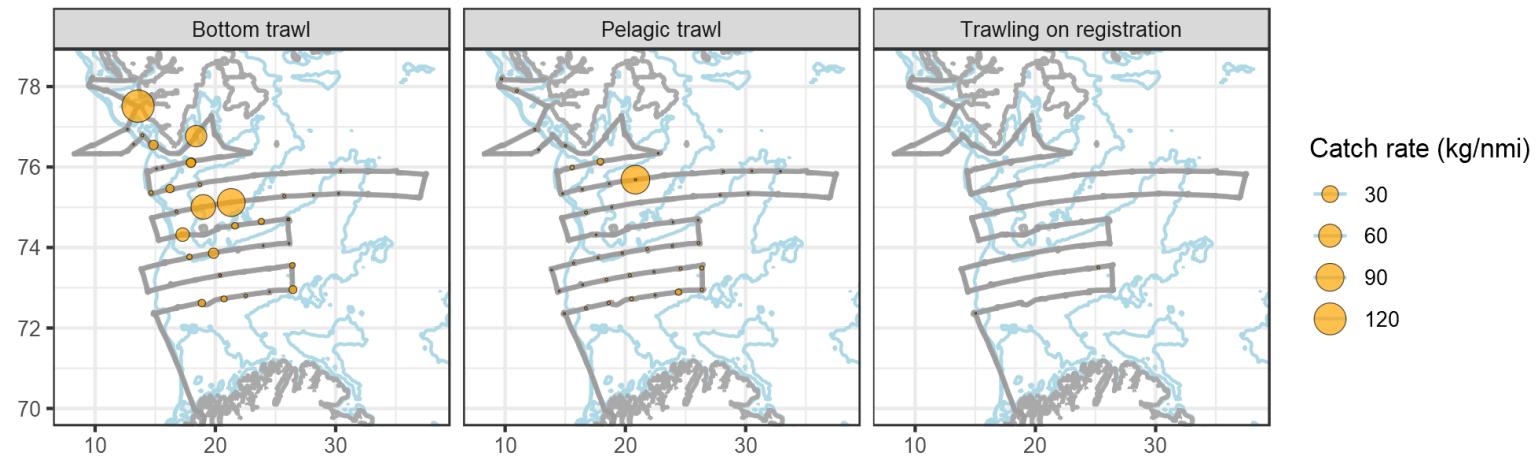


Number of individuals | 2019 | *Clupea harengus*

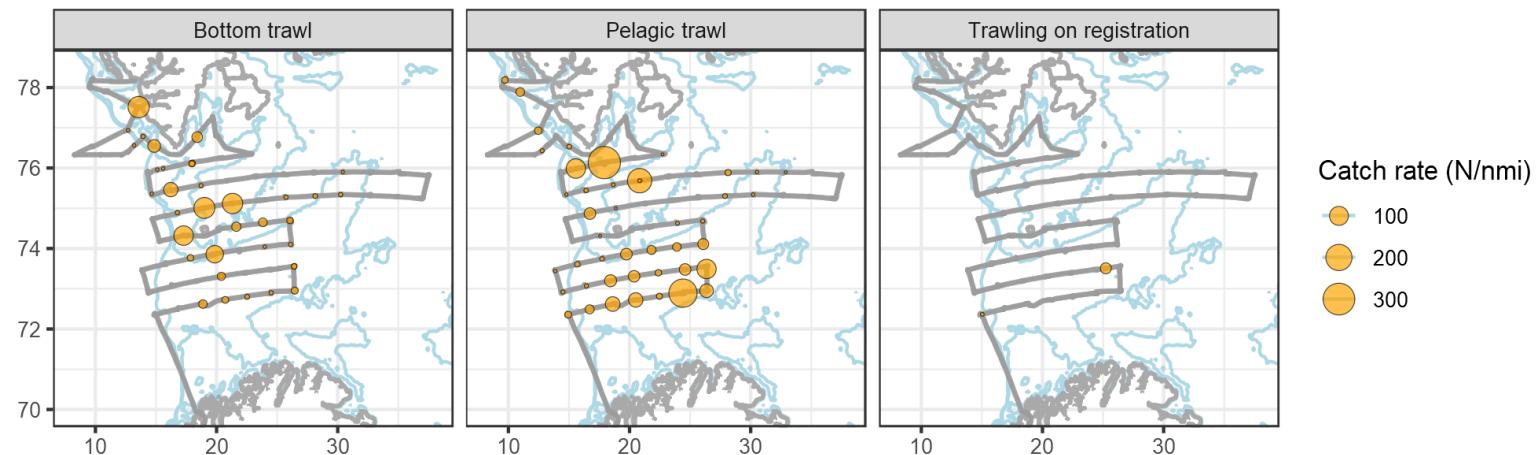


## Haddock

Biomass | 2019 | *Melanogrammus aeglefinus*

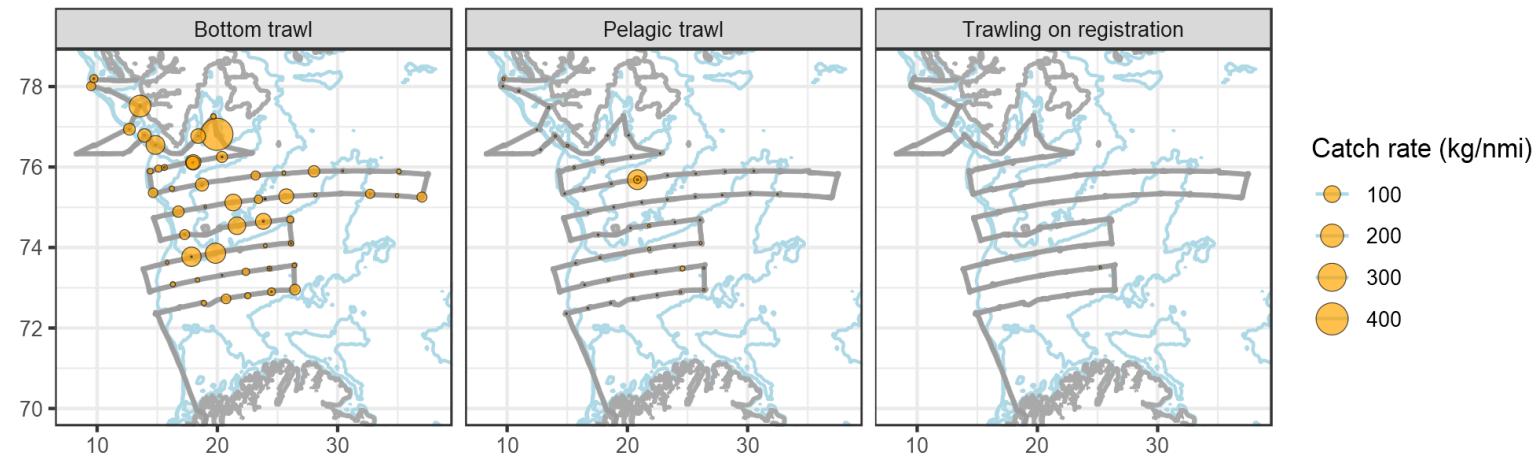


Number of individuals | 2019 | *Melanogrammus aeglefinus*

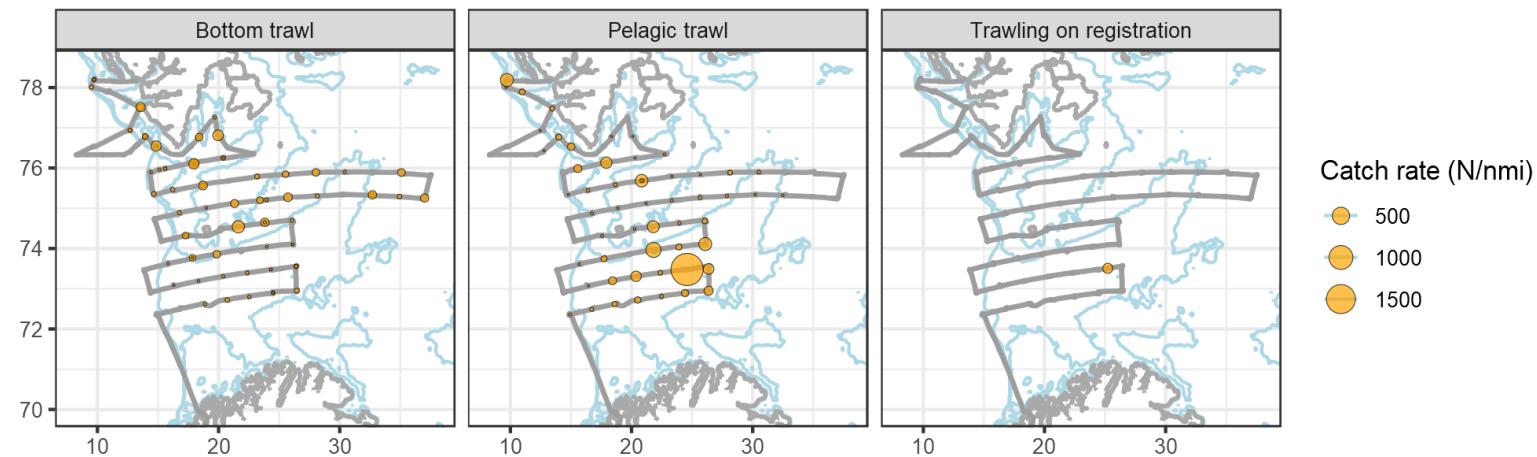


## Cod

Biomass | 2019 | *Gadus morhua*

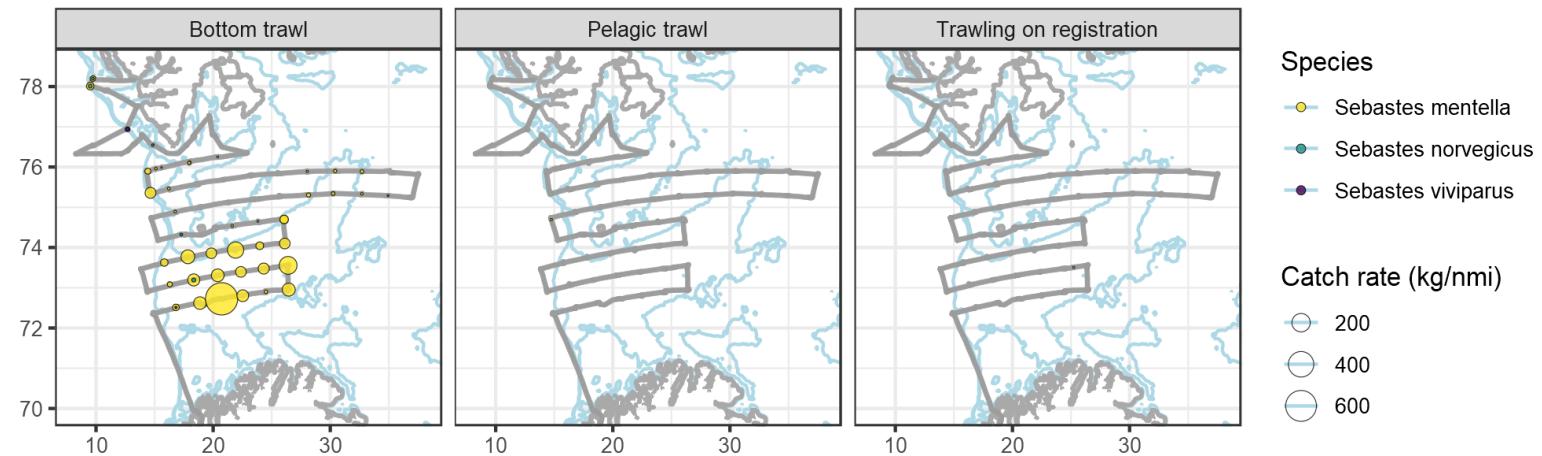


Number of individuals | 2019 | *Gadus morhua*

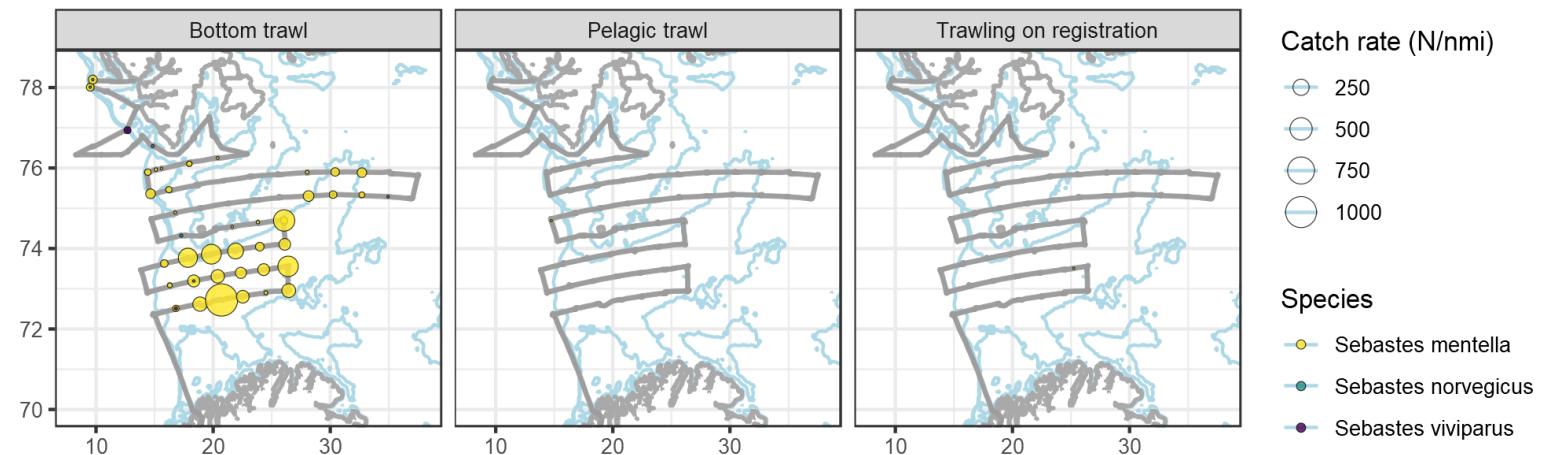


## Redfish

Biomass | 2019 | Redfish species

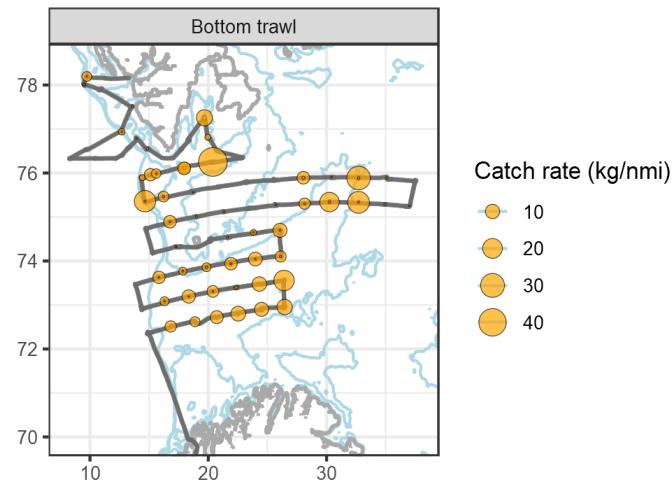


Number of individuals | 2019 | Redfish species

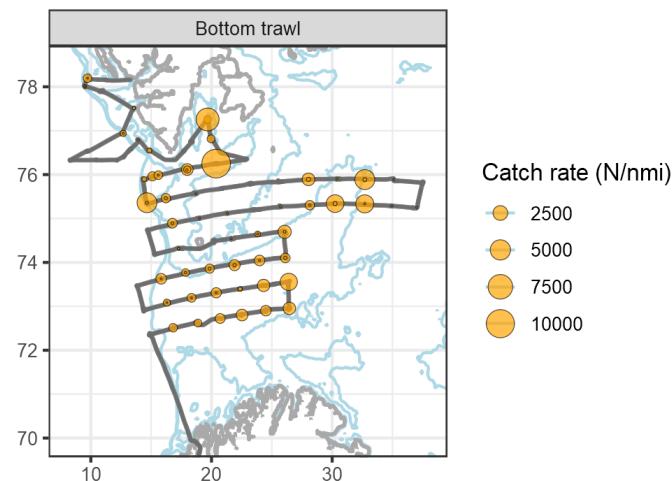


## Deep-water shrimp

Biomass | 2019 | *Pandalus borealis*

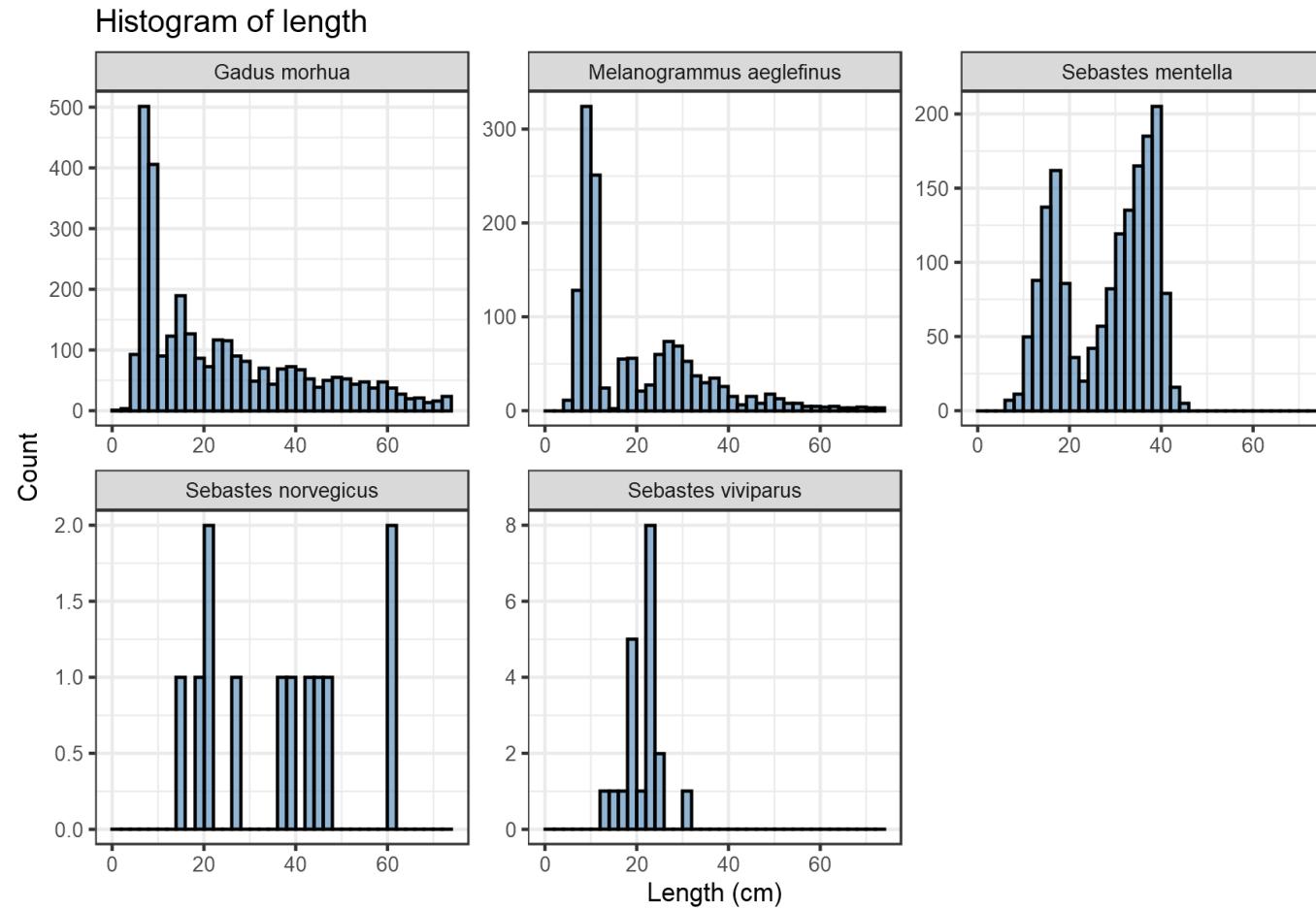


Number of individuals | 2019 | *Pandalus borealis*

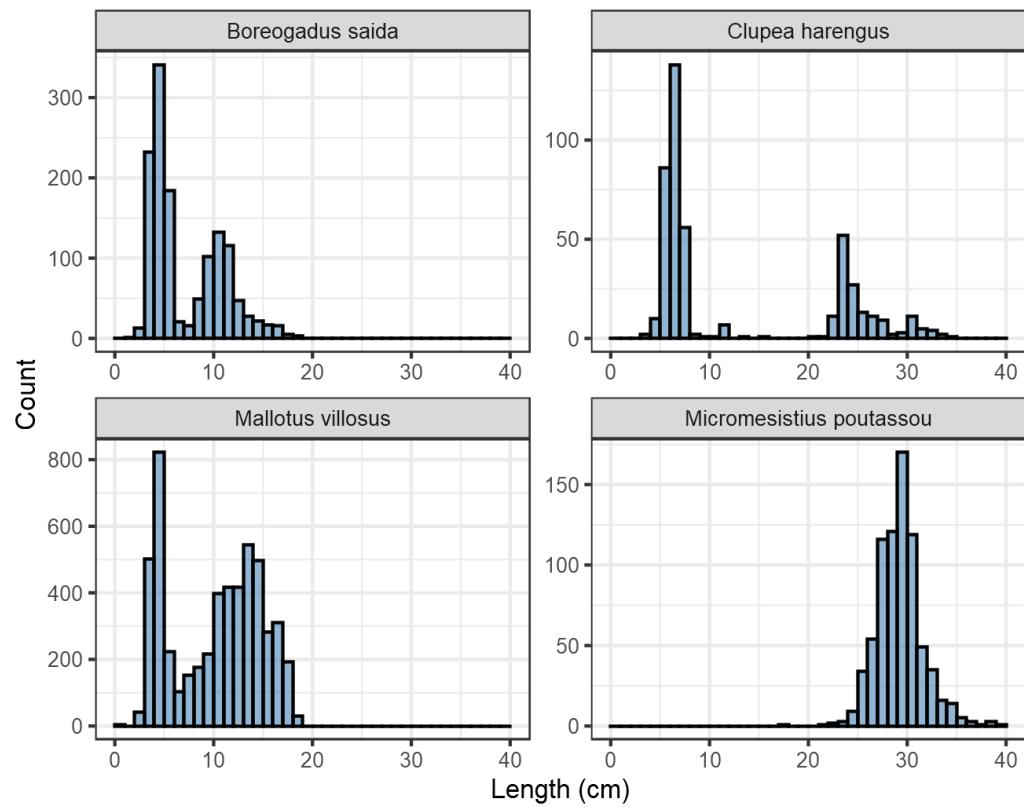


## Length distributions

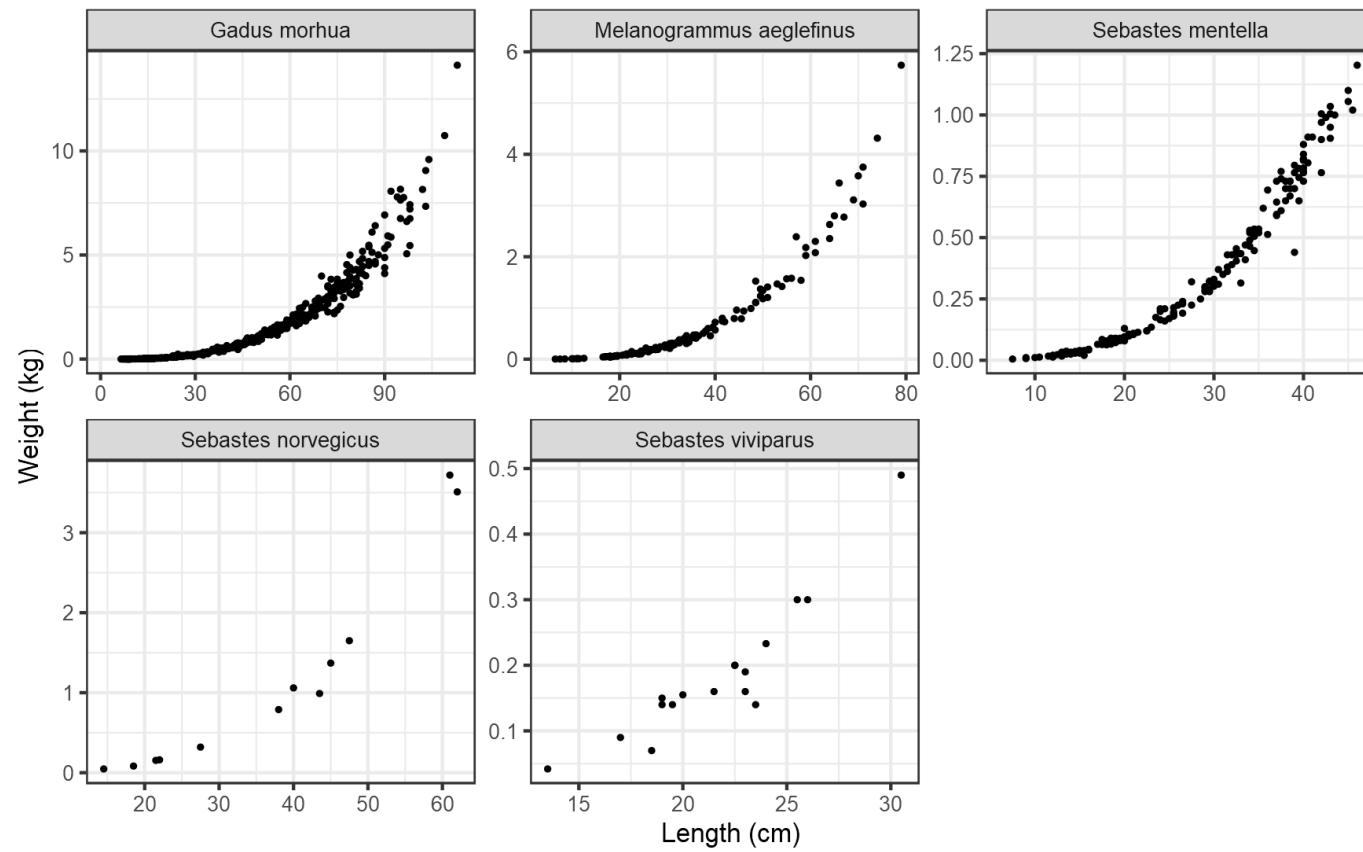
The following figures shows the length distribution of individuals sampled during the survey.

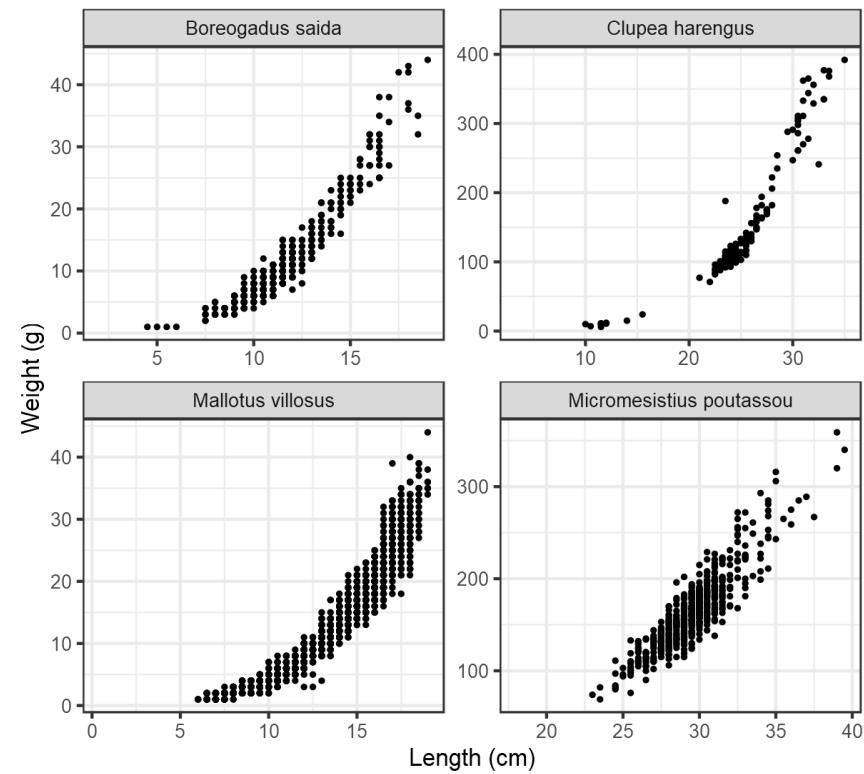


Histogram of length

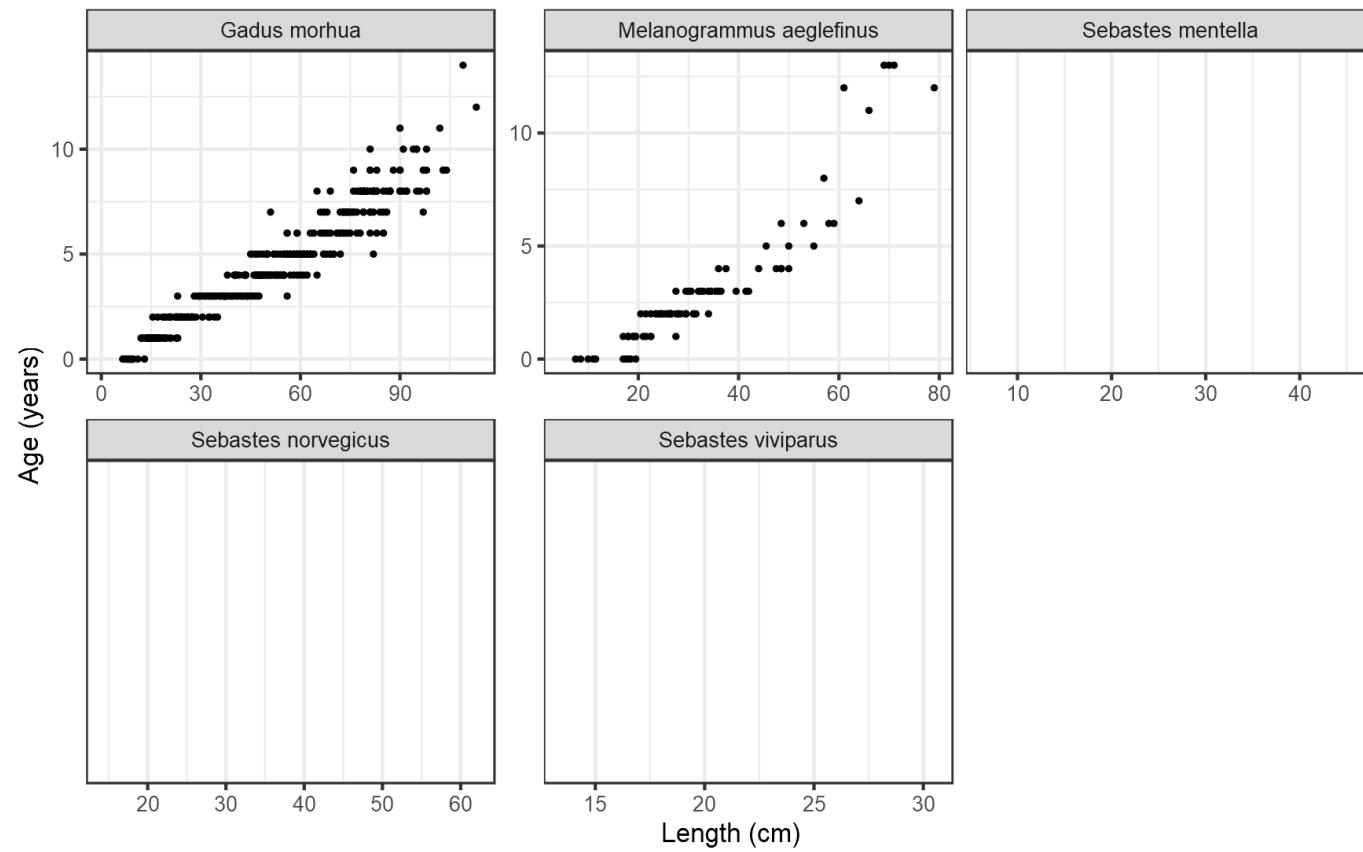


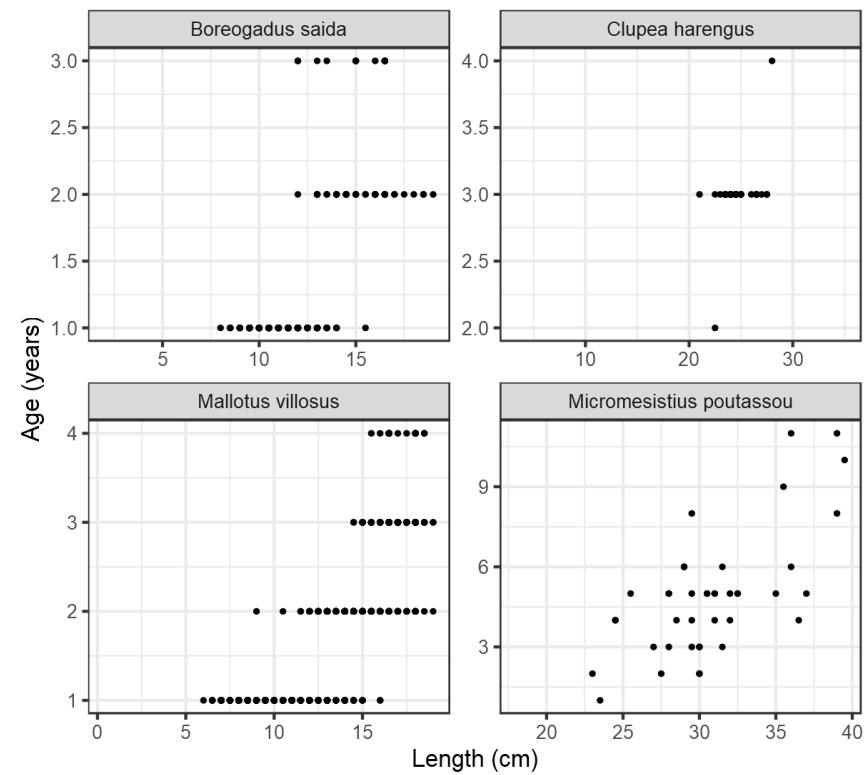
## Length-weight relationships





## Length-age relationships





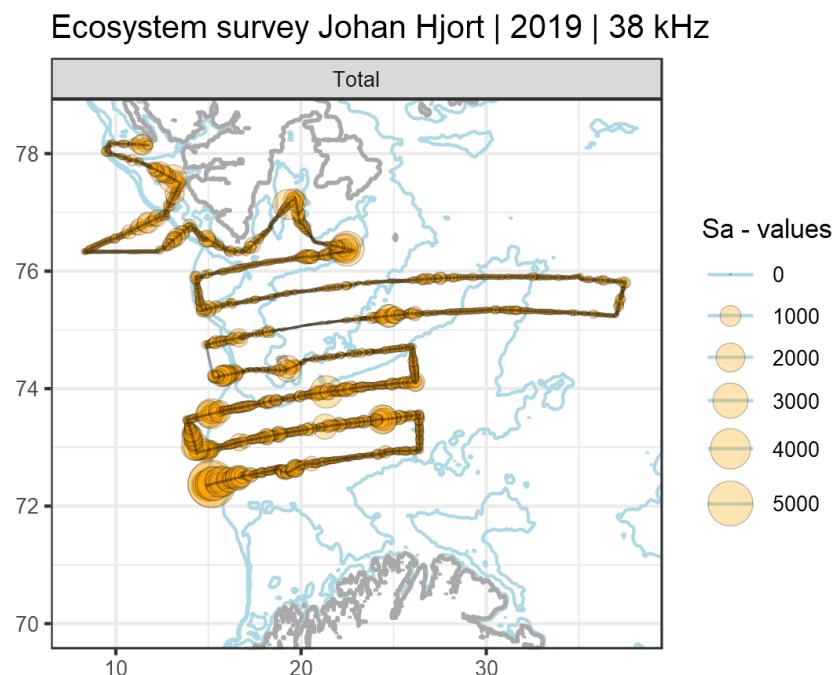
## Acoustic registrations

A total of 4365.164 km (2357 nmi ) of acoustic transects were scrutinized.

## Example echograms

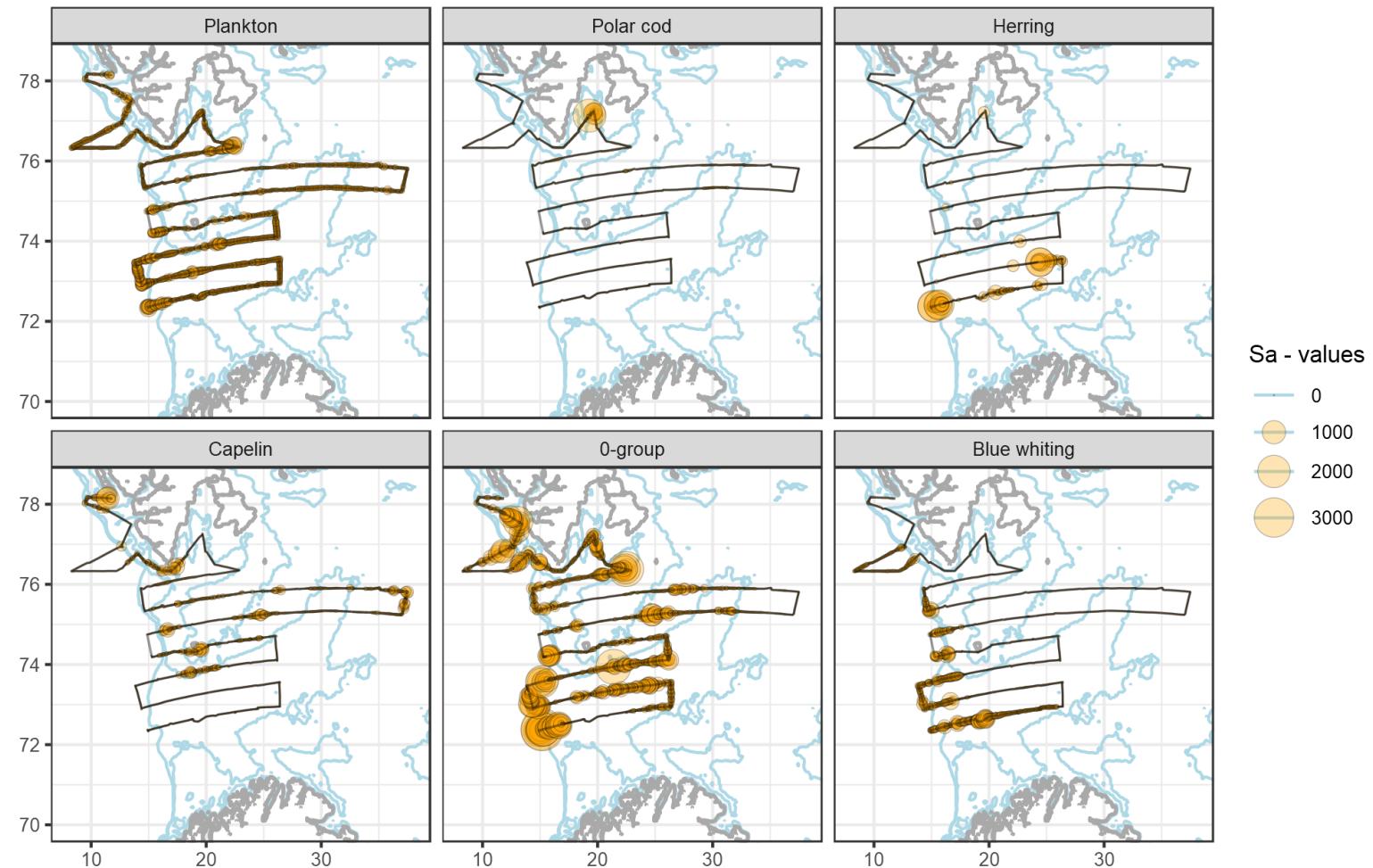
### Depth-integrated acoustic backscatter

#### Total backscatter



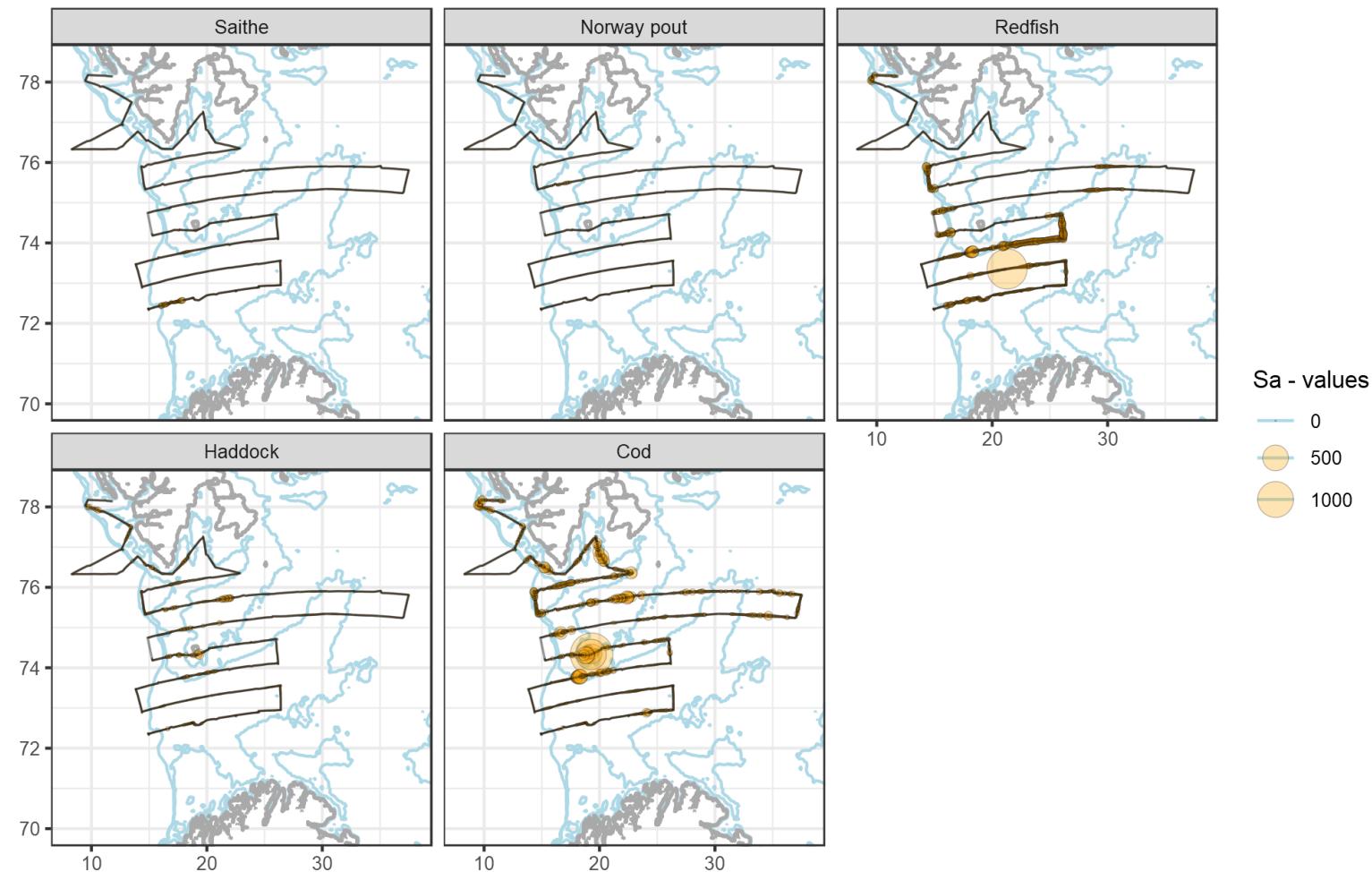
## Pelagic species

Ecosystem survey Johan Hjort | 2019 | 38 kHz



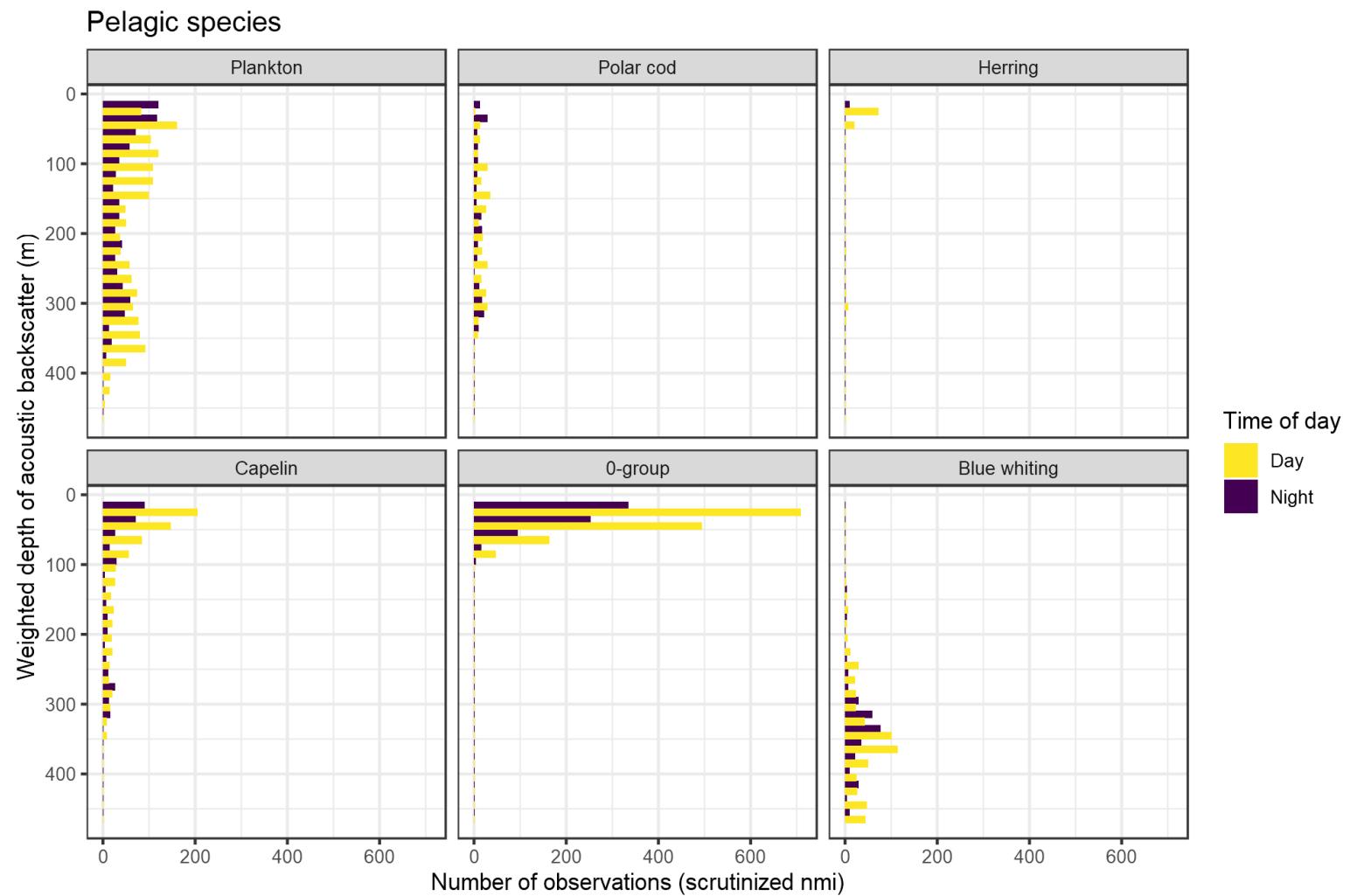
## Demersal species

Ecosystem survey Johan Hjort | 2019 | 38 kHz

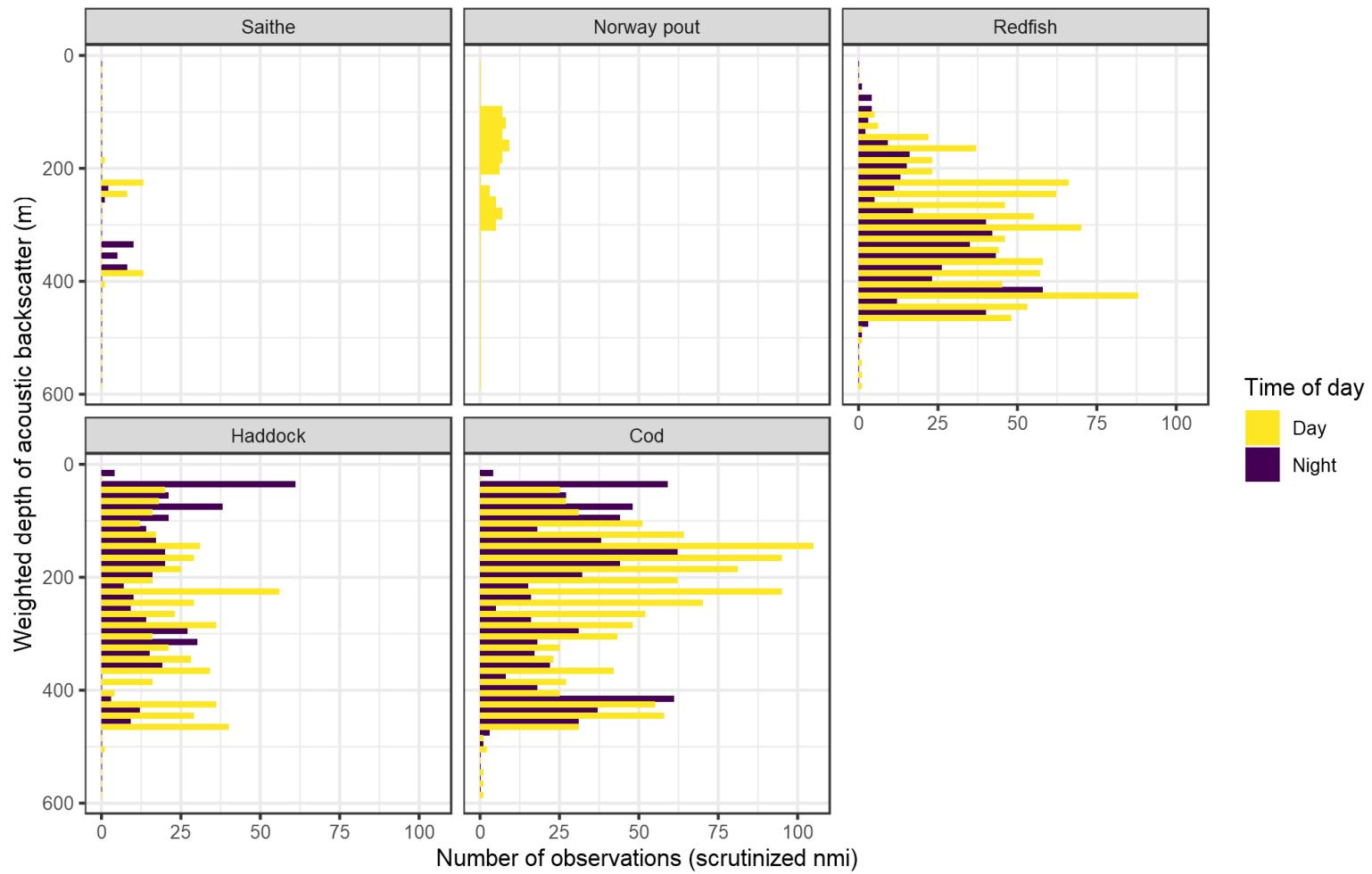


## Acoustic backscatter in depth channels

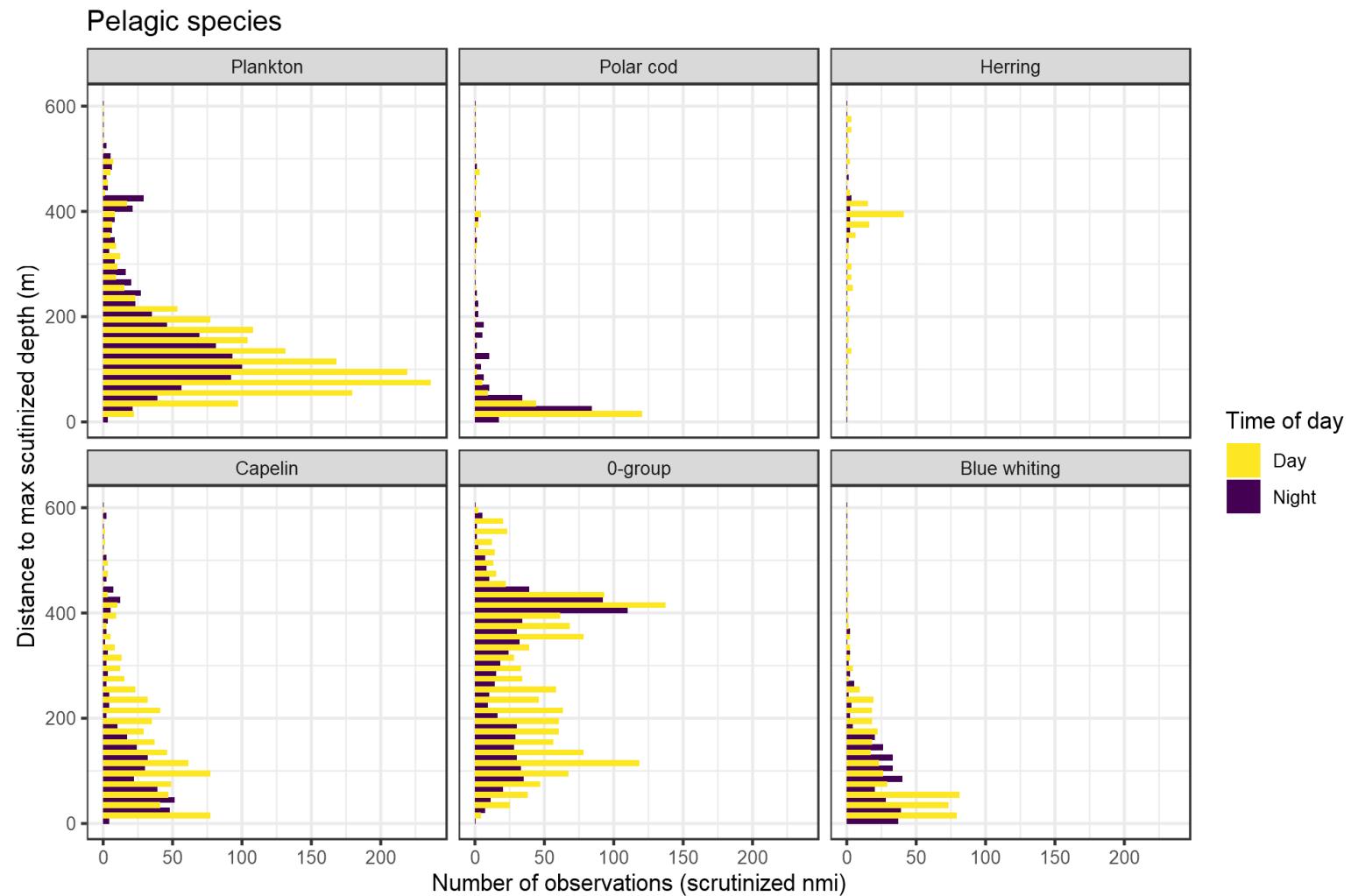
Distance from the surface to weighted depth of acoustic registrations



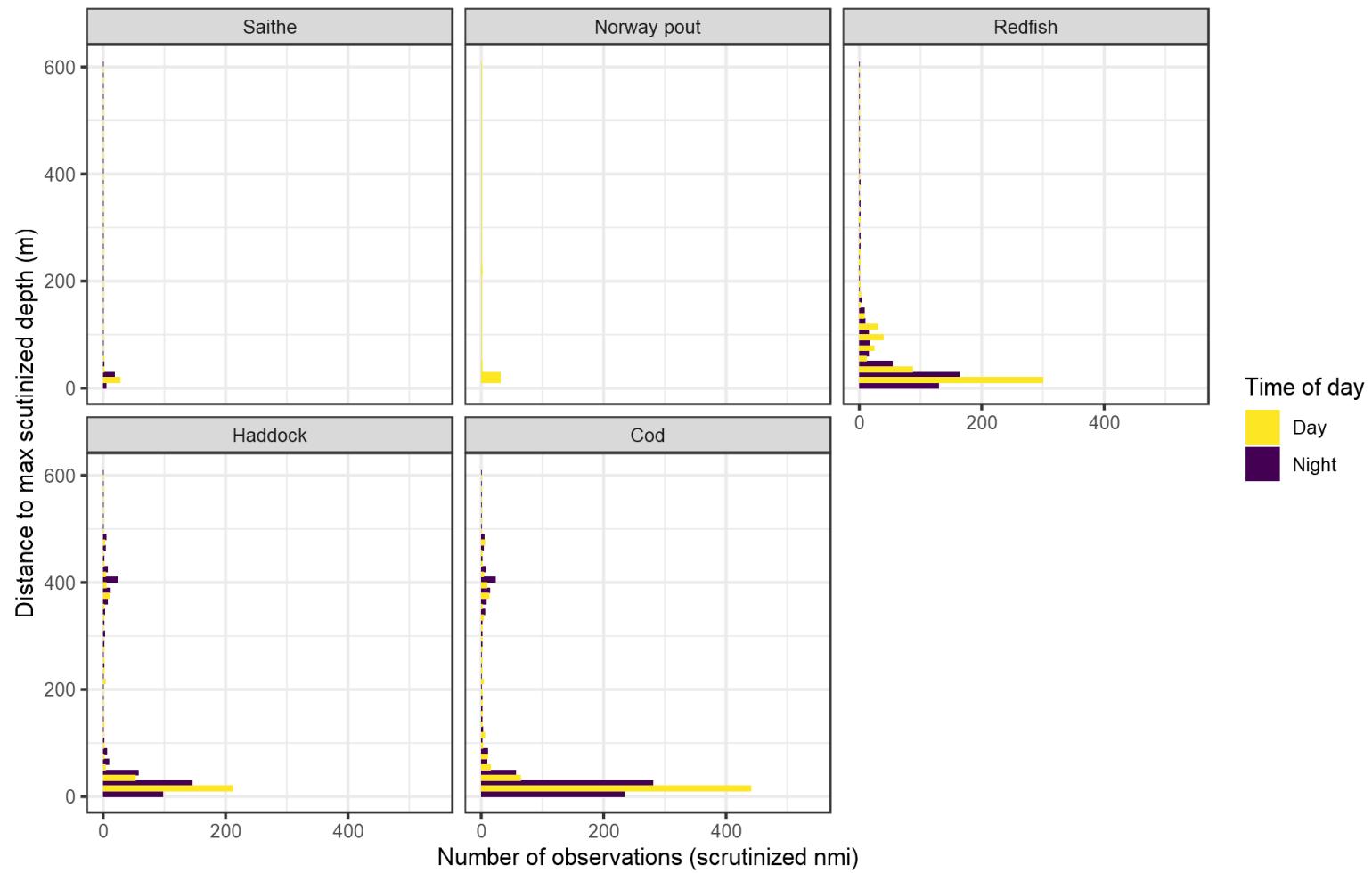
## Demersal species



Distance from the seafloor (or max scrutinized depth) to weighted depth of acoustic registrations



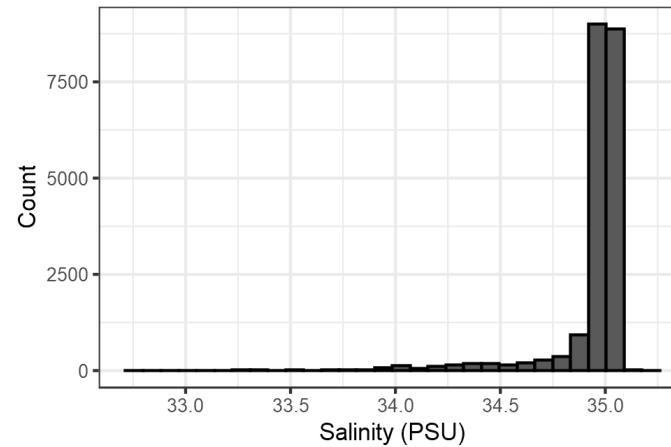
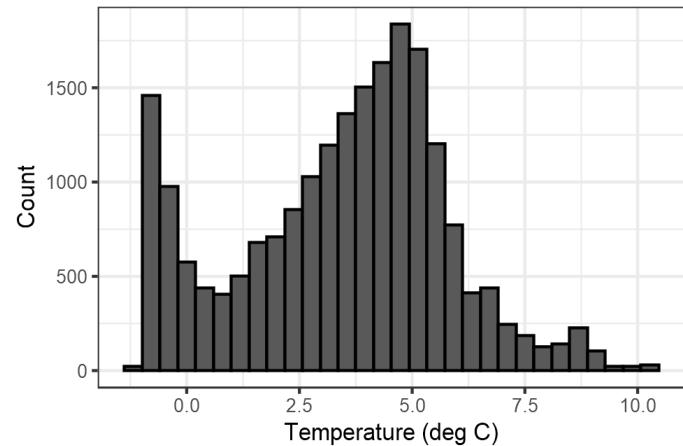
## Demersal species



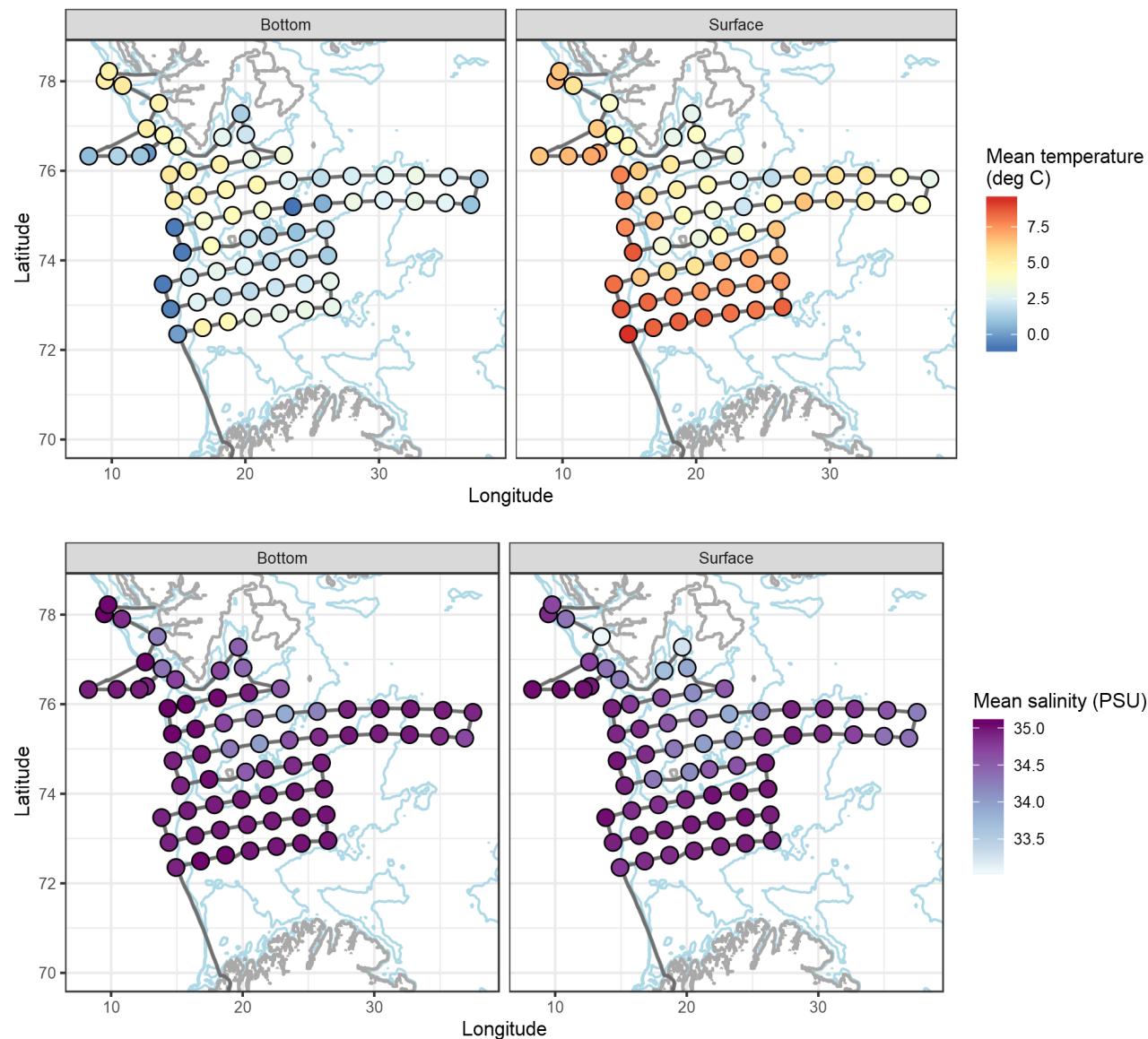
# CTD

## Summary of measurements

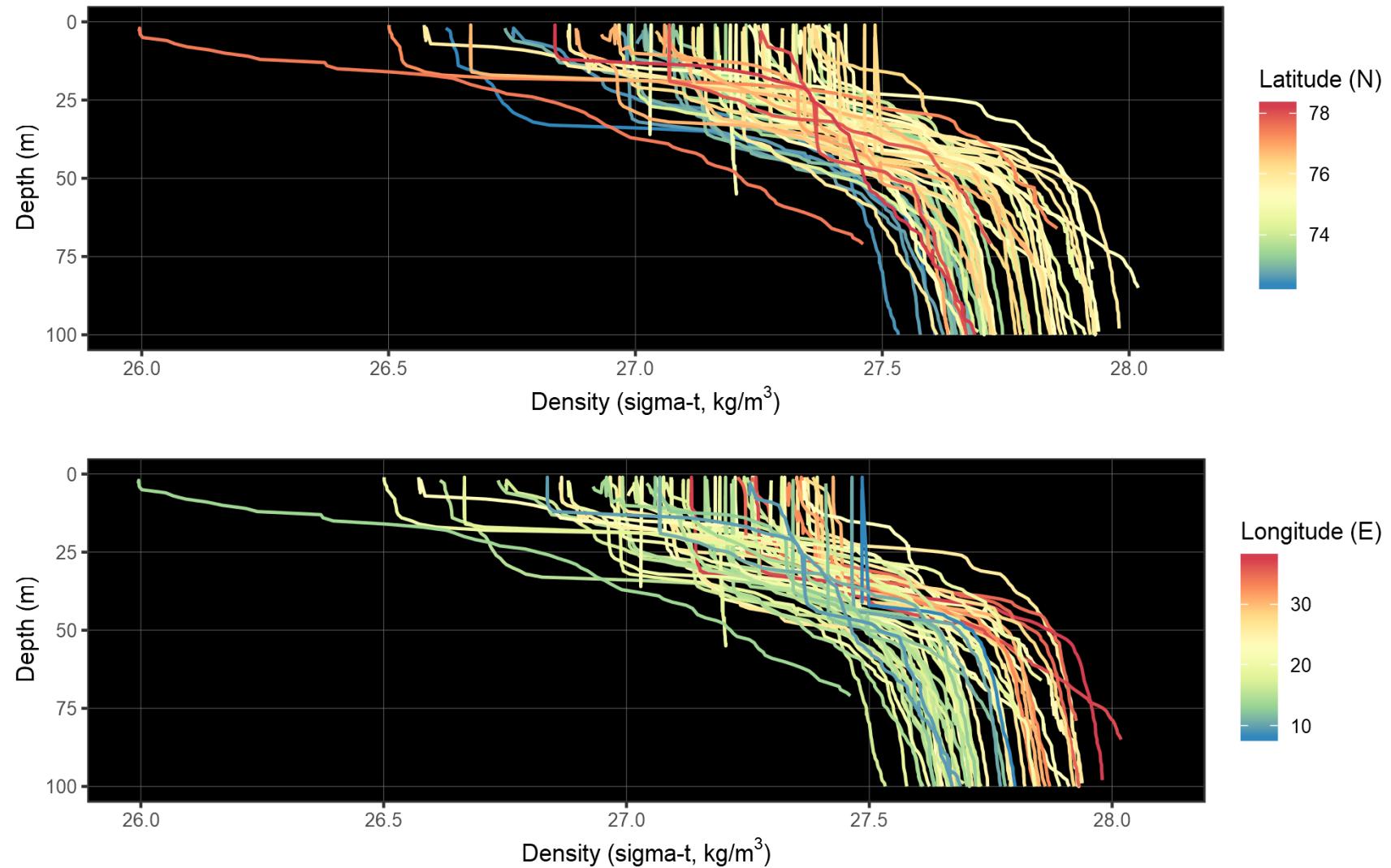
68 CTD casts were done during the survey, covering a total depth of 20.6 km.



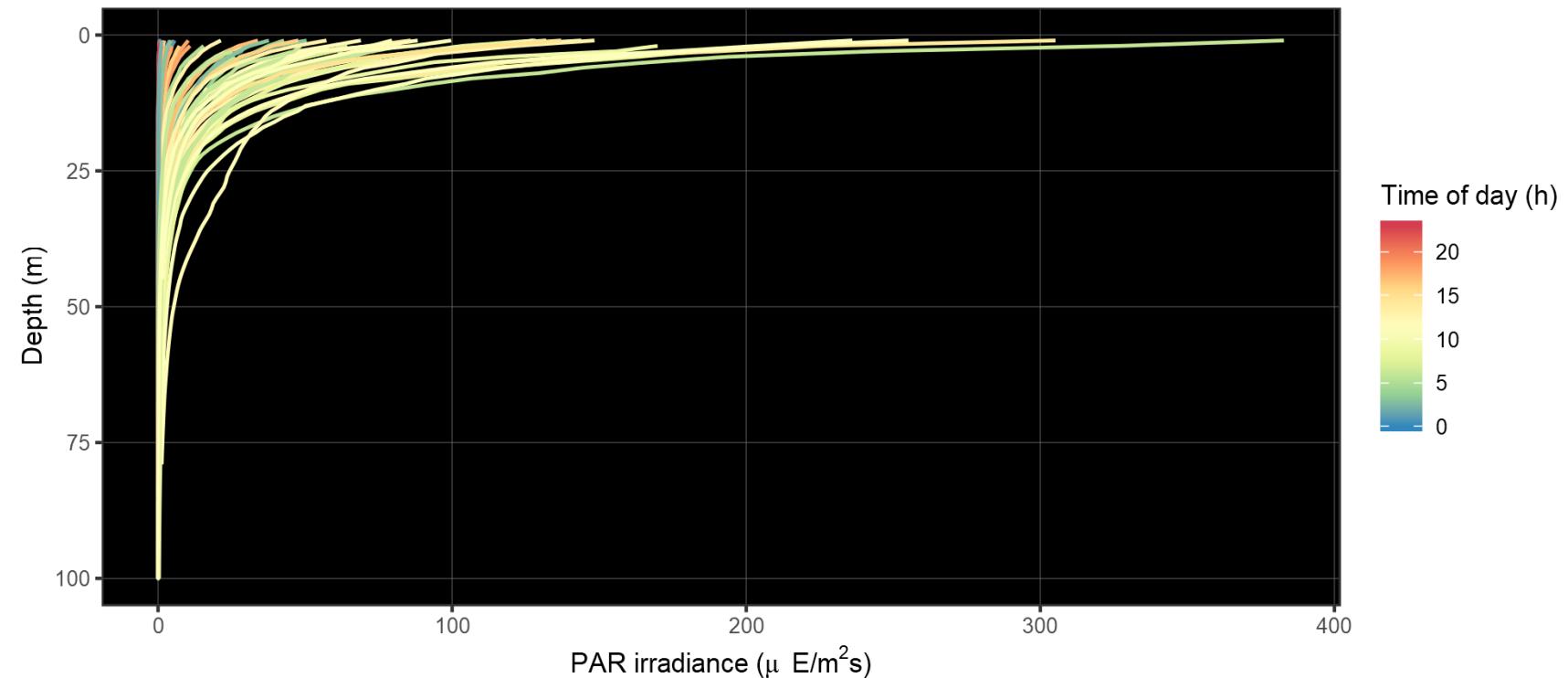
## Variation in temperature and salinity with bathymetry and geographical location



## Density in the water column



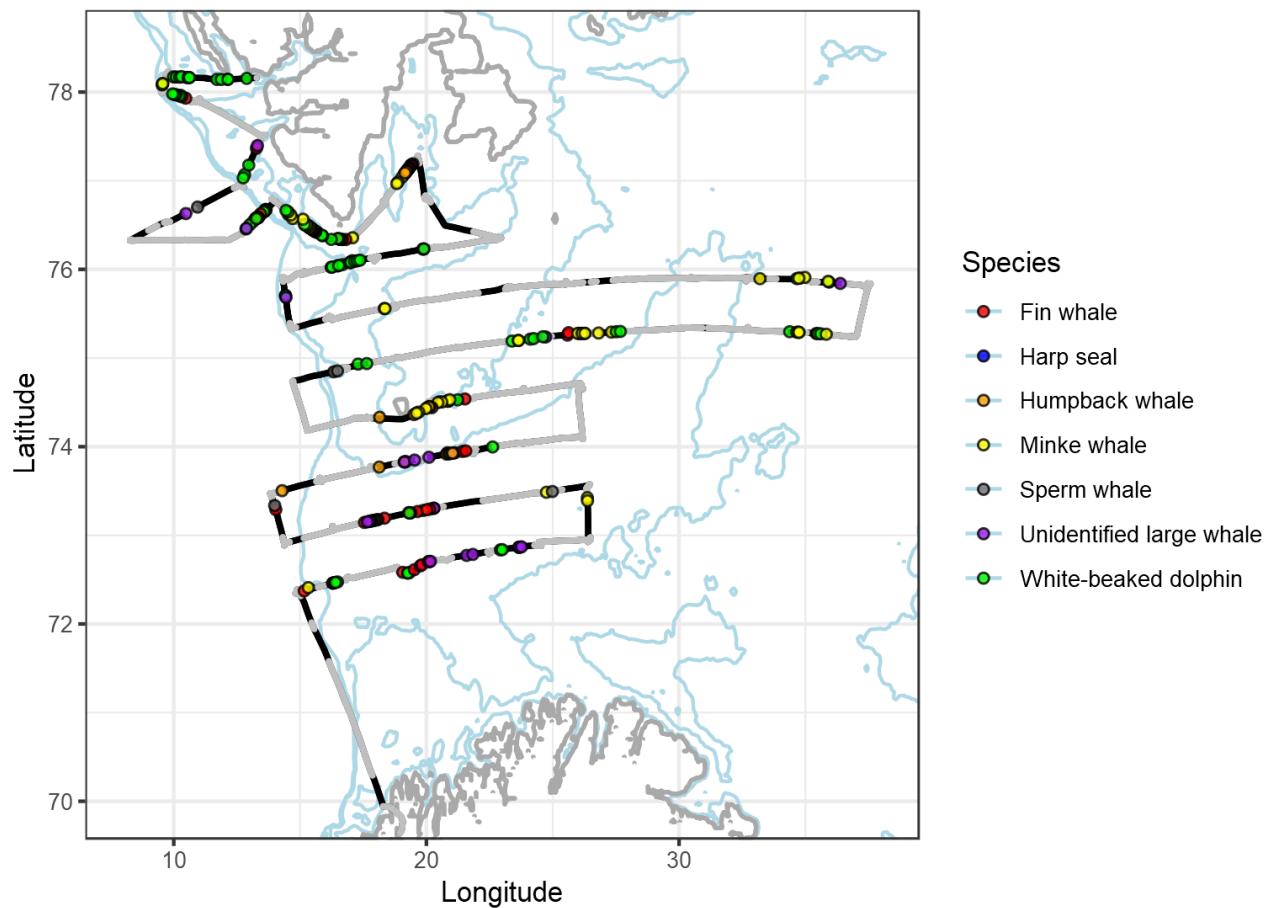
## Light in the water column



# Whales

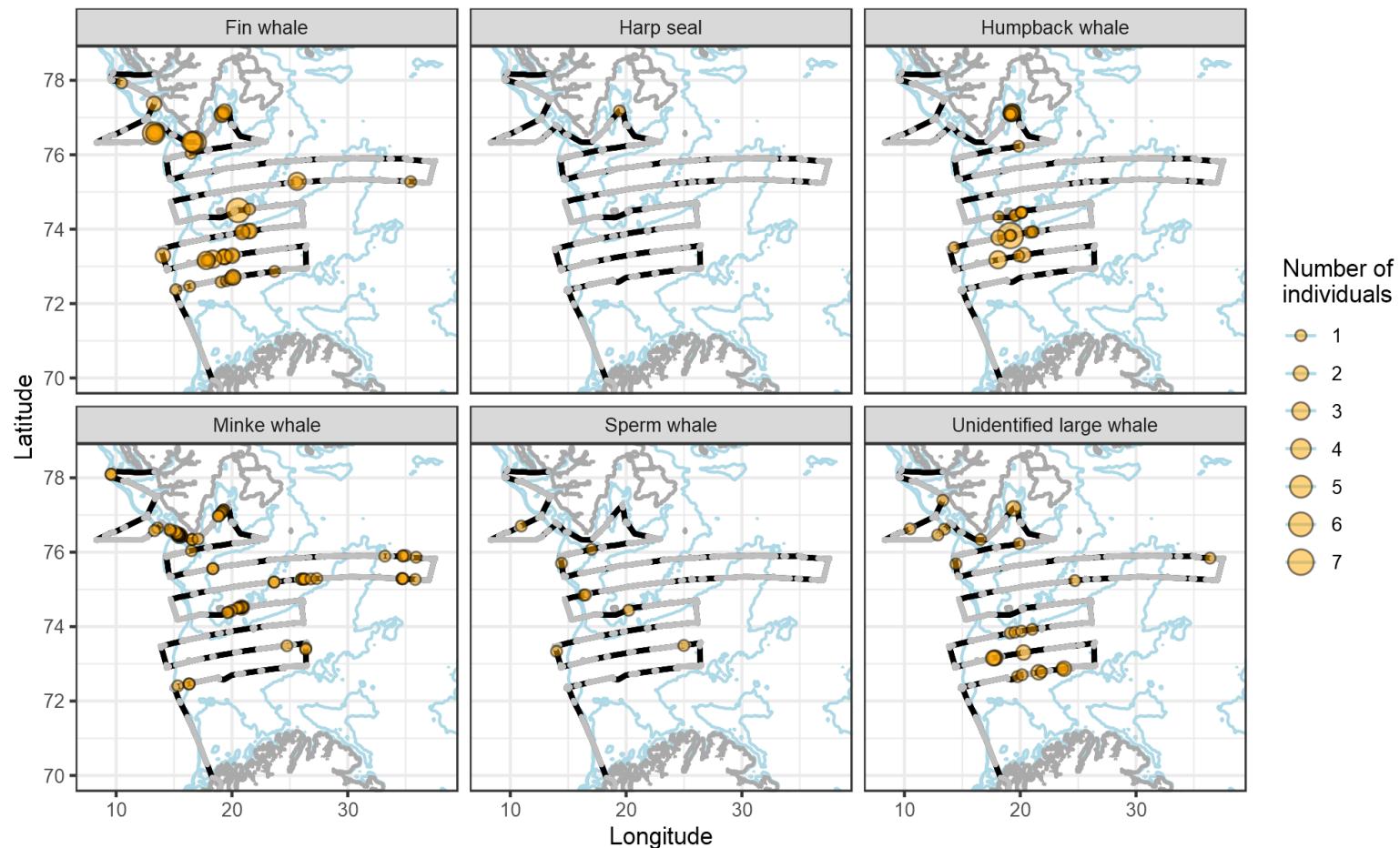
## Positions of sightings by species

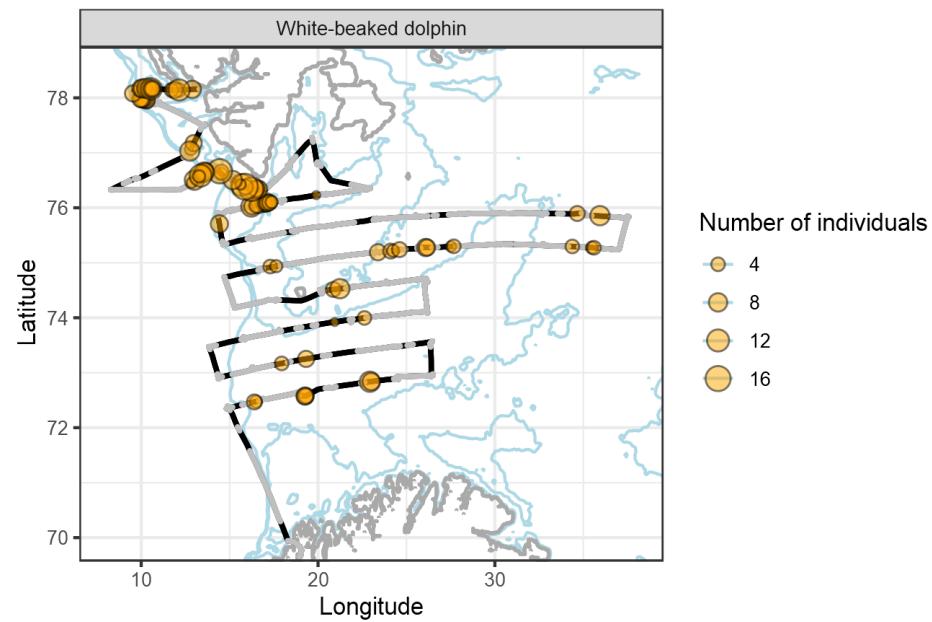
This figure shows presence/absence sightings of whales and seals along the cruise track. The cruise track colour indicates whether the observers have been on watch (black) or off watch (grey).



## Number of individuals

Here the circles are proportional to the number of individuals observed at the location. The cruise track colour indicates whether the observers have been on watch (black) or off watch (grey).





## Seabirds (non ship followers)

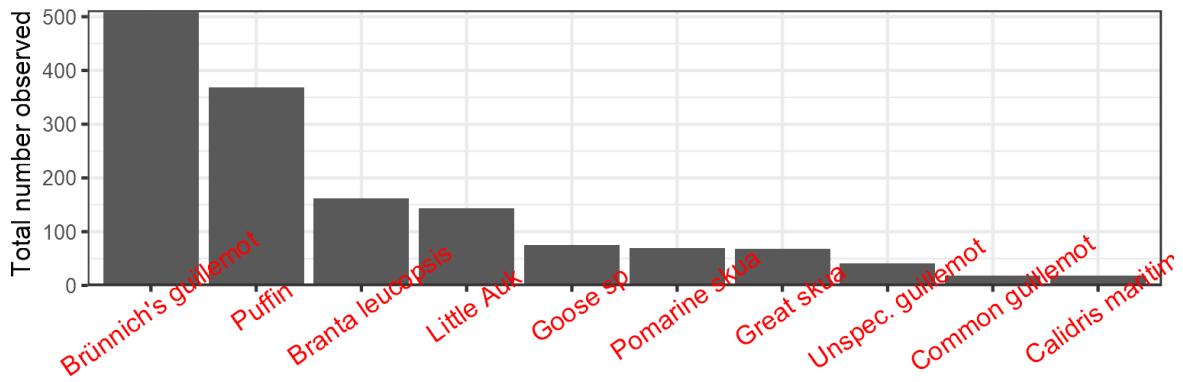
- NB work to generalise this code -

### Summary of observations

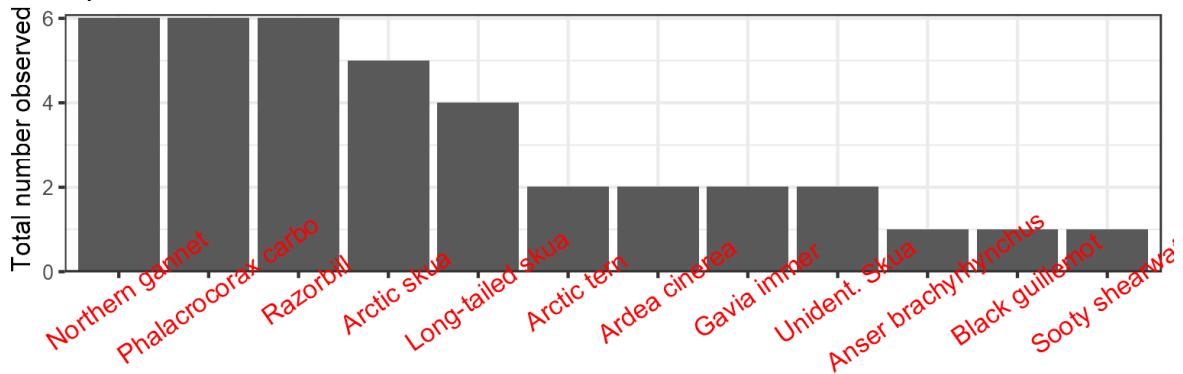
The most frequently observed seabird species was Puffin, while the species with highest group numbers (number of individuals in a single sighting) was *Branta leucopsis*. Brünnich's guillemot, Puffin, and *Branta leucopsis* were the species with the three highest total number of observations.

6 species were observed only once: *Anser brachyrhynchus*, Arctic tern, *Ardea cinerea*, Black guillemot, Goose sp, Sooty shearwater.

Species with > 6 individuals observed



Species with <= 6 individuals observed



## Spatial distribution of observations

The cruise track colour indicates whether the whale observers have been on watch (black) or off watch (grey). -NB update with bird effort-

