



# Winter survey 2020 R/V Johan Hjort

Report generated by: Johanna Fall

07/03/2020

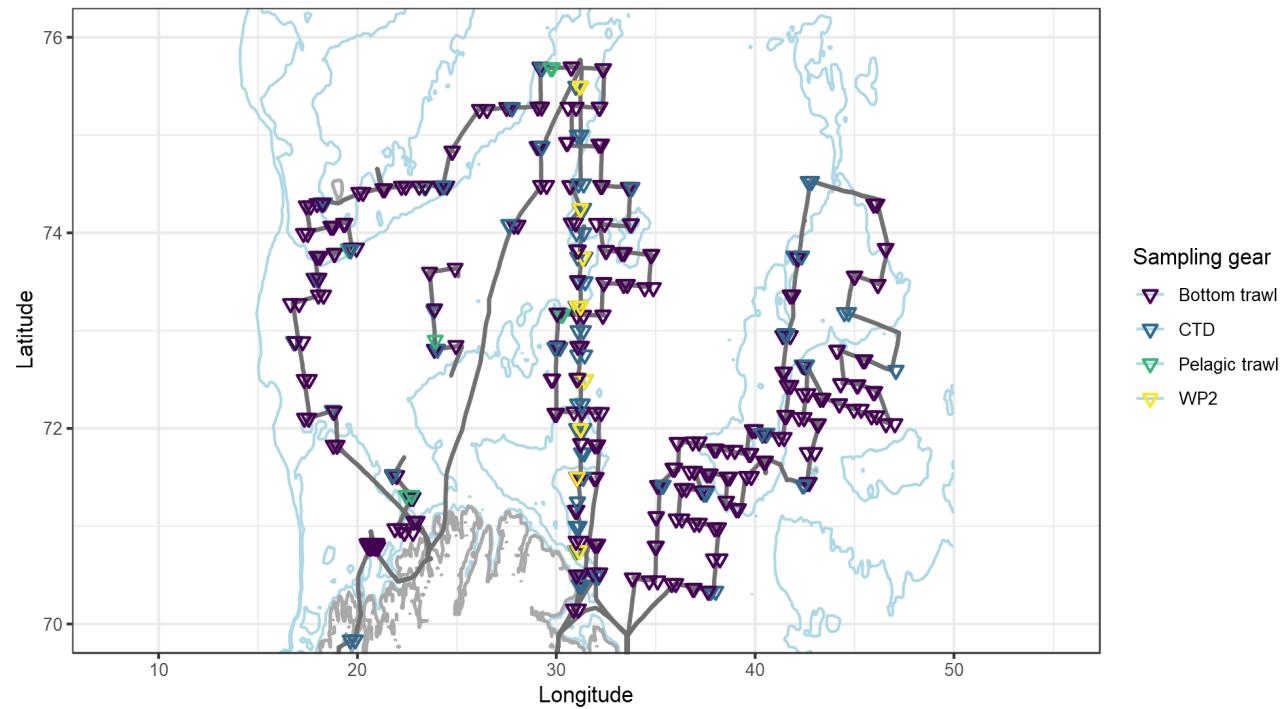
## Contents

<b>Cruise tracks and stations</b>	<b>3</b>
<b>Sampling depth for trawl hauls</b>	<b>4</b>
Mean bottom depth during trawl hauls . . . . .	4
Mean fishing depth during trawl hauls (excluding pelagic hauls) . . . . .	5
<b>Catch rates - biomass and number per nautical mile trawled for species registered in Sea2Data</b>	<b>6</b>
Species diversity . . . . .	6
Number of species identified versus the number of stations sampled . . . . .	6
Average catch rate by species for the 20 species with highest catch rates . . . . .	7
Bottom trawl . . . . .	7
Bottom trawl excluding sponges . . . . .	8
Spatial variation in catches of common species . . . . .	9
Capelin . . . . .	9
Polar cod . . . . .	10
Blue whiting . . . . .	11
Herring . . . . .	12
Haddock . . . . .	13
Cod . . . . .	14

Redfish . . . . .	15
Length distributions . . . . .	16
Length-weight relationships . . . . .	18
Length-age relationships . . . . .	20
GSI versus maturity stage of female cod and haddock . . . . .	22
GSI versus length and maturity stage for female haddock . . . . .	23
GSI versus length and maturity stage for female cod . . . . .	24
<b>Acoustic registrations</b>	<b>25</b>
Example echograms . . . . .	25
Depth-integrated acoustic backscatter . . . . .	25
Total backscatter . . . . .	25
Pelagic species . . . . .	26
Demersal species . . . . .	26
Acoustic backscatter in depth channels . . . . .	27
Distance from the surface to weighted depth of acoustic registrations . . . . .	27
Distance from the seafloor (or max scrutinized depth) to weighted depth of acoustic registrations . . . . .	28
<b>CTD</b>	<b>29</b>
Summary of measurements . . . . .	29
Variation in temperature and salinity with bathymetry and geographical location . . . . .	30
Density in the water column . . . . .	31
Light in the water column . . . . .	32

## 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:

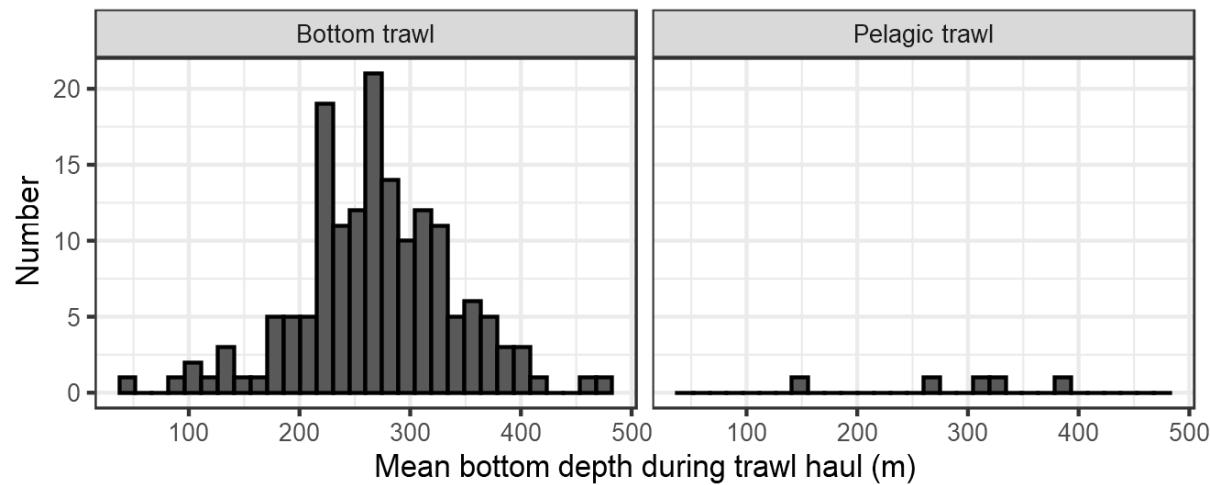


## Sampling depth for trawl hauls

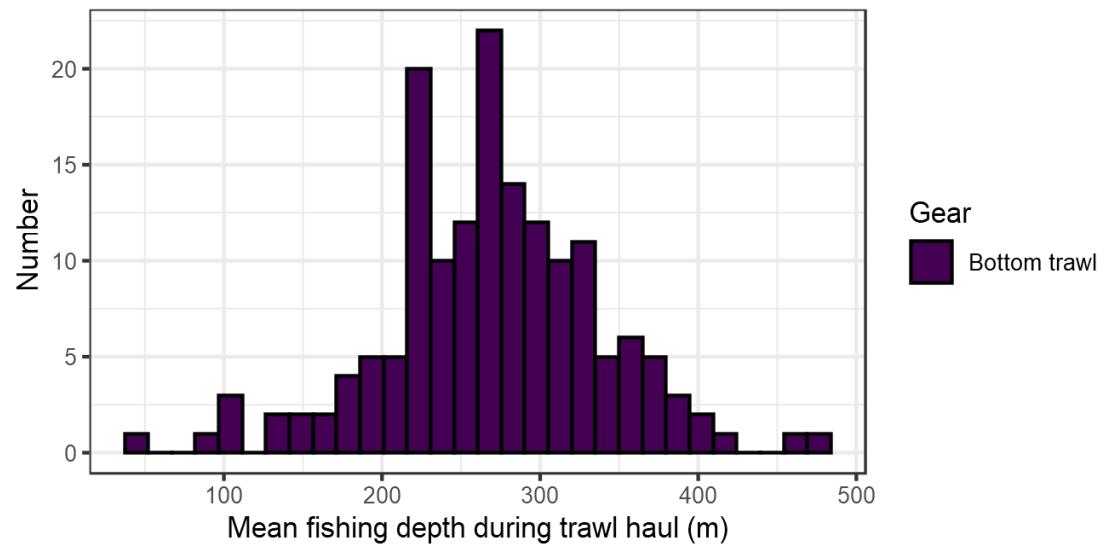
141 trawl hauls were taken during the survey, of which 136 were bottom trawl, and 5 pelagic trawl. The trawl hauls covered a total distance of 245.6 km (132.6 nmi).

The sampling stations were located in areas with bottom depths from 48.7 m to 479.3 m, and the fishing depth varied from 25.7 m to 480.7 m.

### Mean bottom depth during trawl hauls



Mean fishing depth during trawl hauls (excluding pelagic hauls)

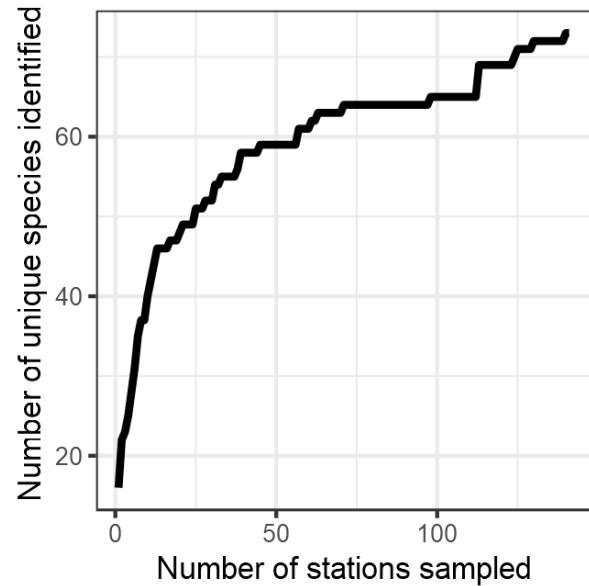


## Catch rates - biomass and number per nautical mile trawled for species registered in Sea2Data

### Species diversity

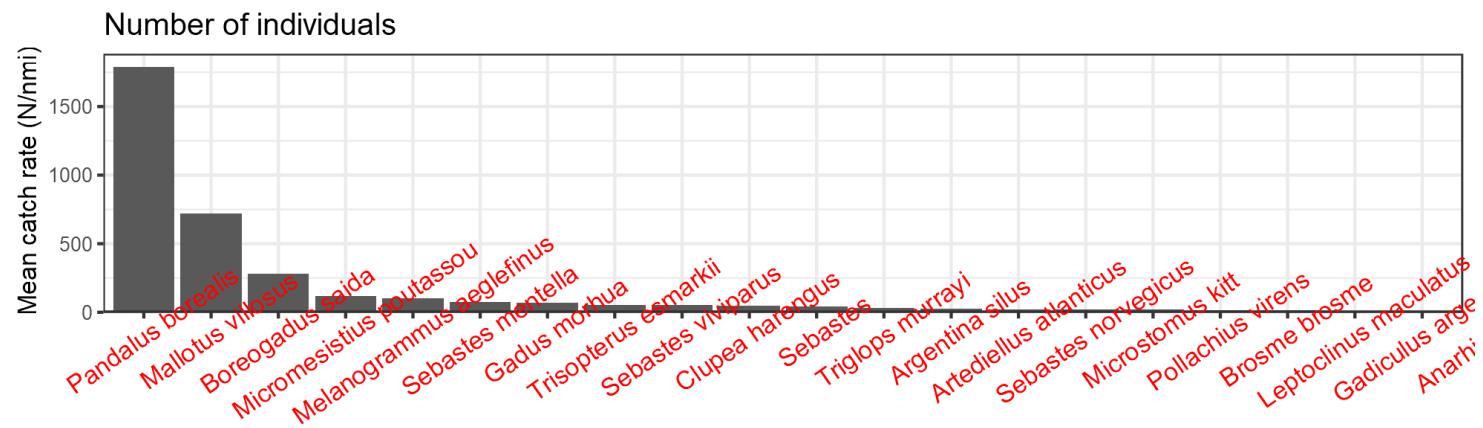
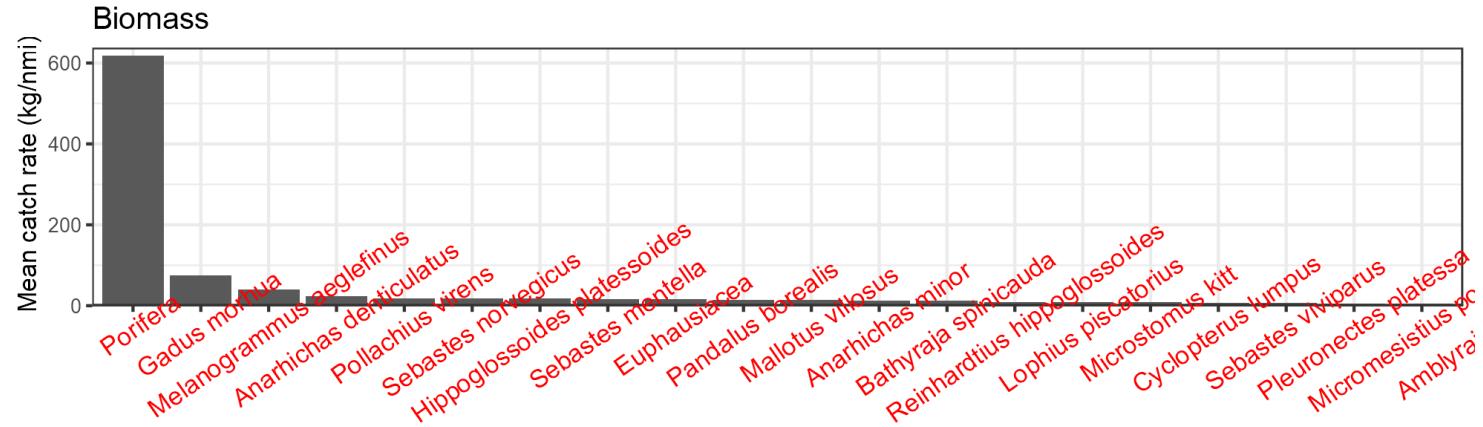
A total of 73 species were registered in Sea2Data during the survey.

#### Number of species identified versus the number of stations sampled

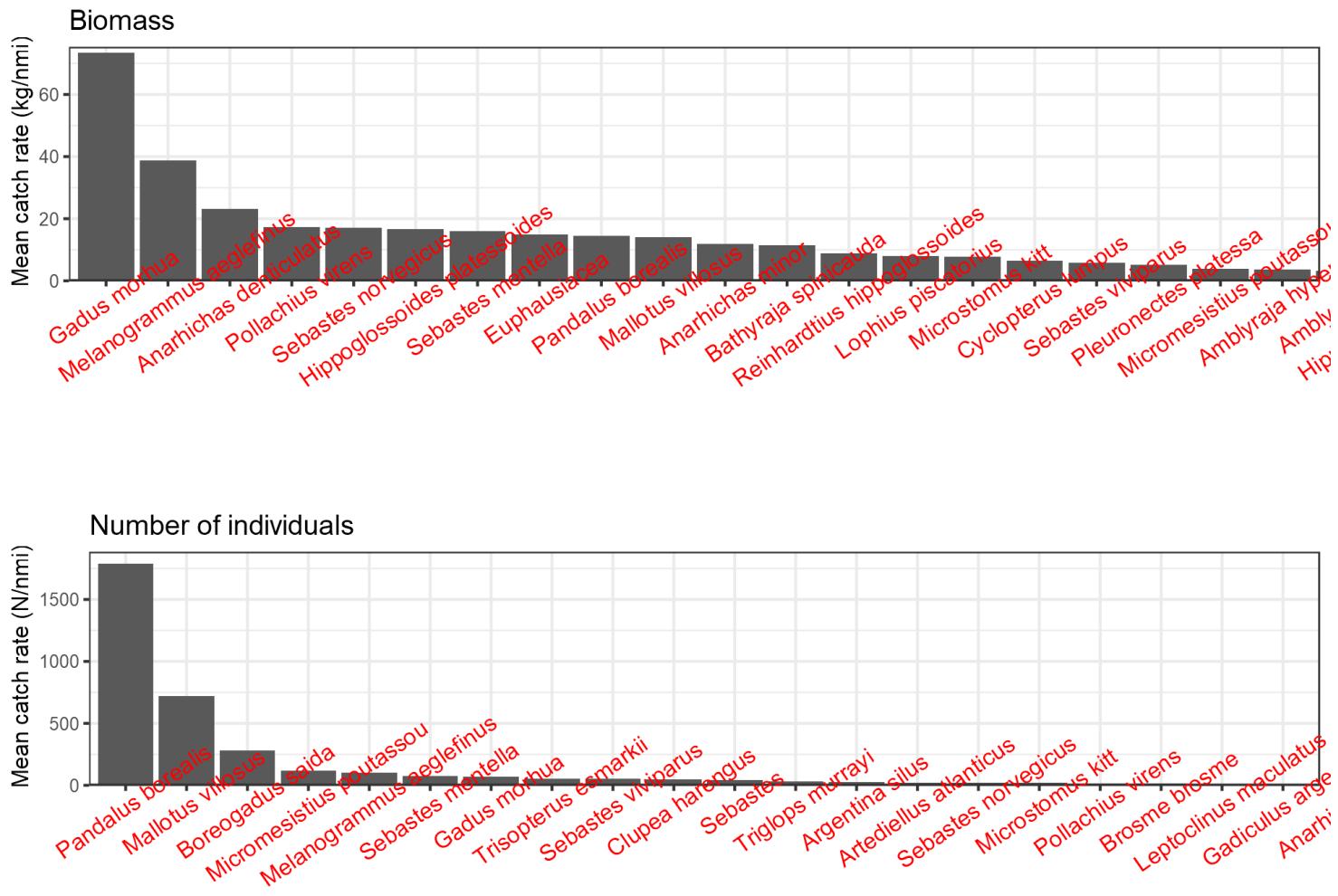


## Average catch rate by species for the 20 species with highest catch rates

Bottom trawl

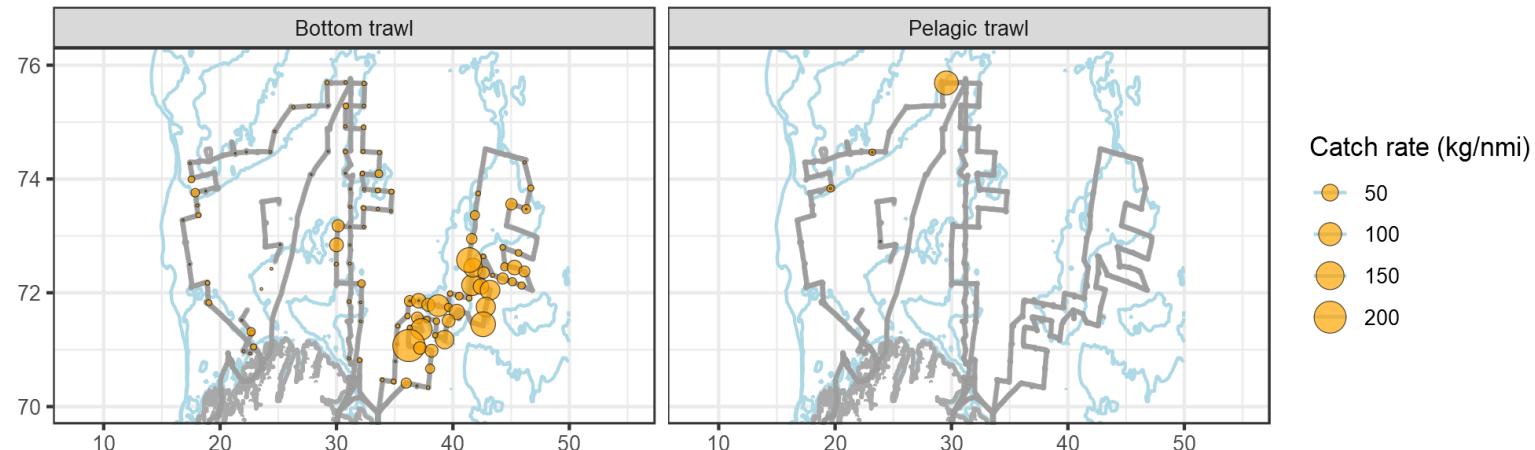


Bottom trawl excluding sponges

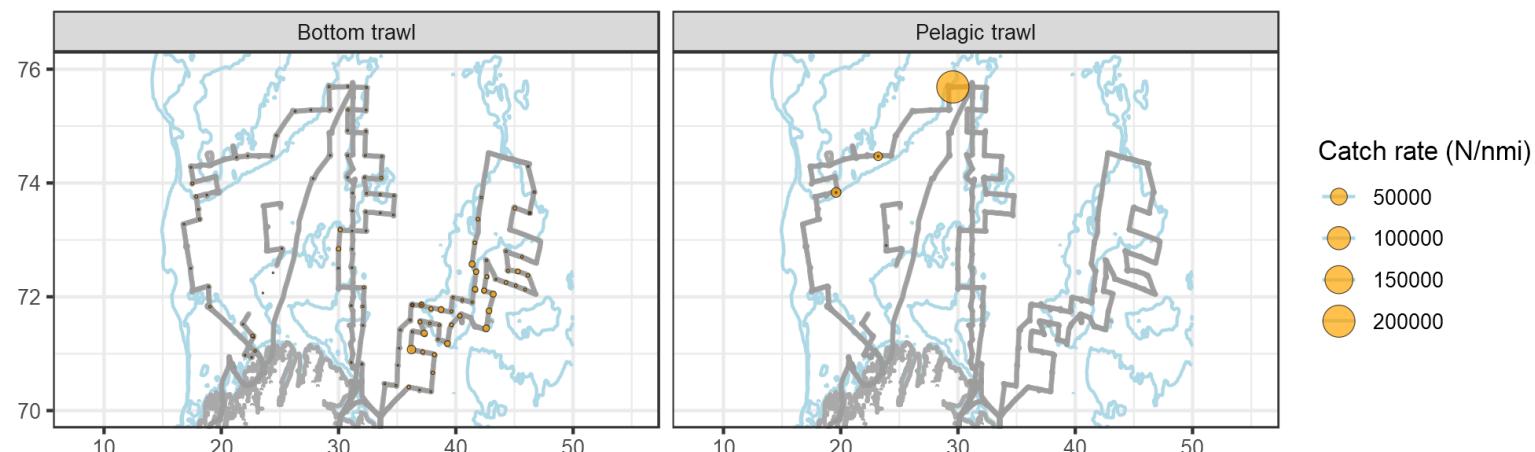


Spatial variation in catches of common species  
Capelin

Biomass | 2020 | *Mallotus villosus*

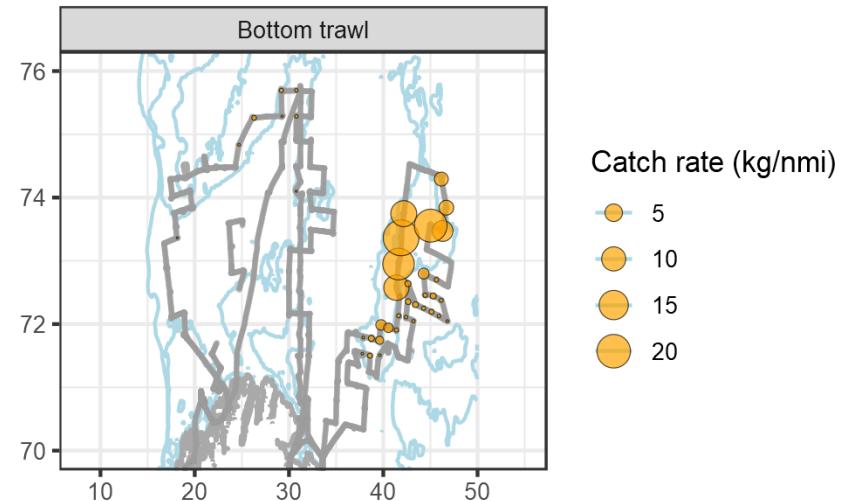


Number of individuals | 2020 | *Mallotus villosus*

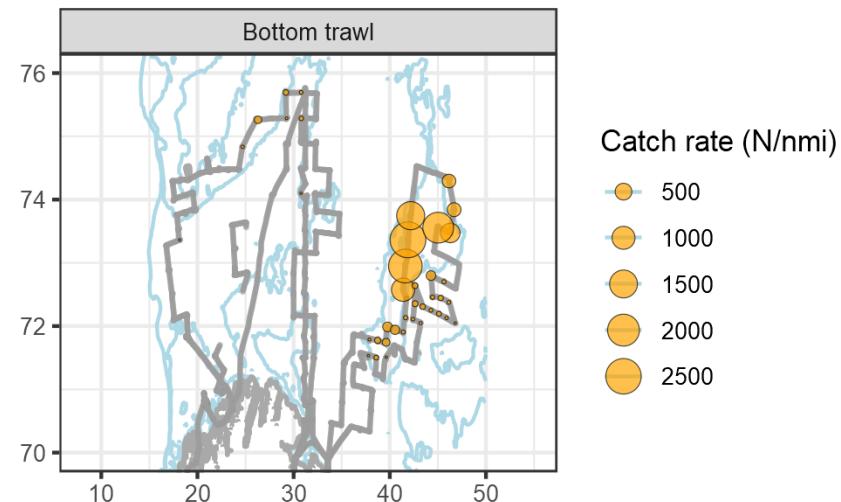


Polar cod

Biomass | 2020 | *Boreogadus saida*

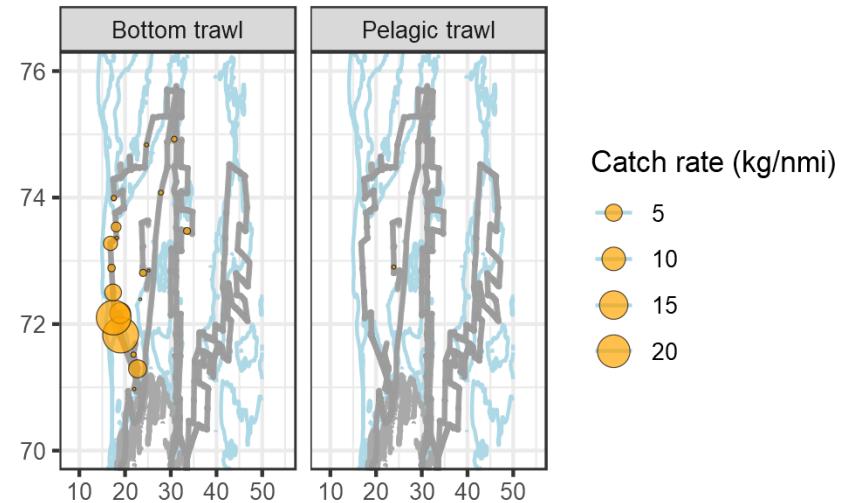


Number of individuals | 2020 | *Boreogadus saida*

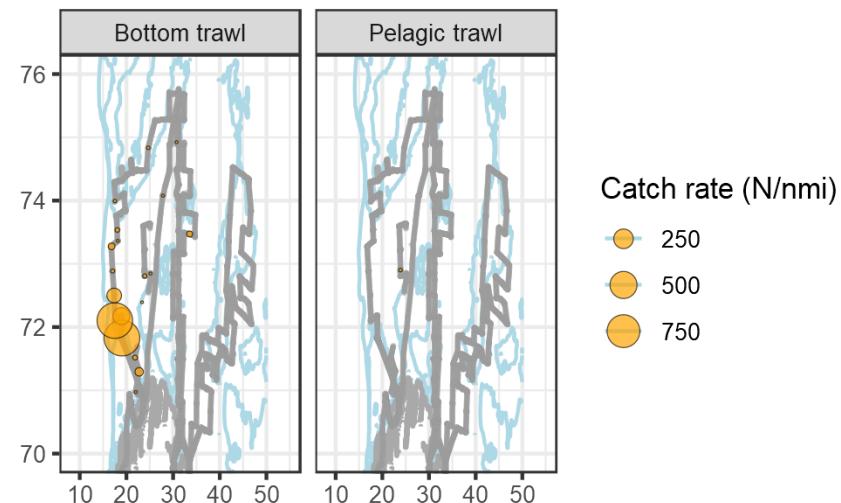


## Blue whiting

Biomass | 2020 | *Micromesistius poutassou*

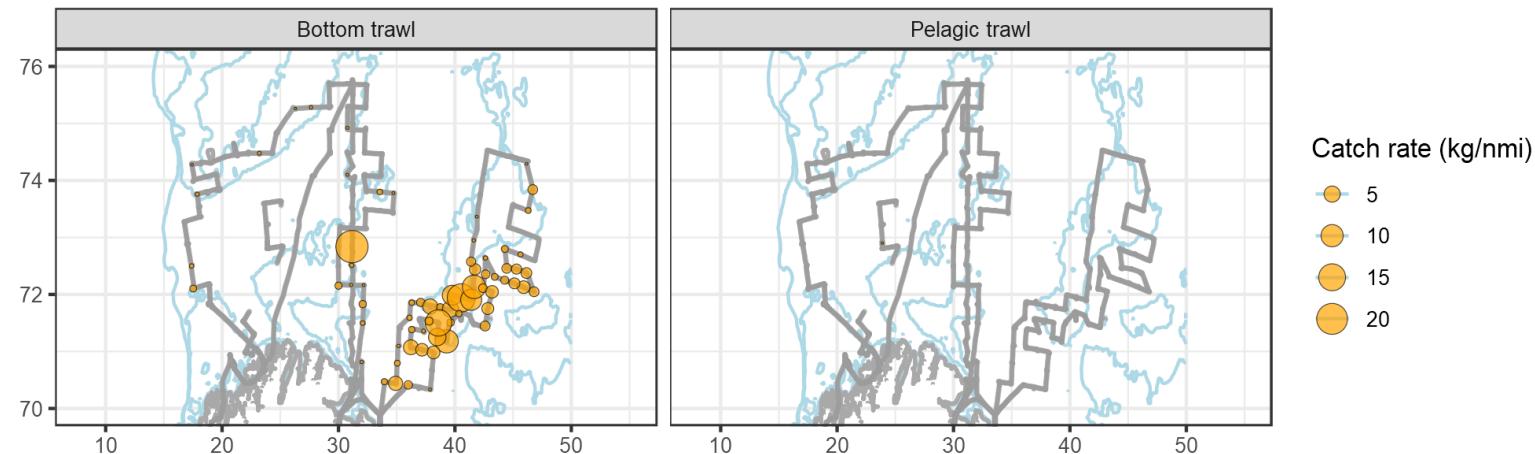


Number of individuals | 2020 | *Micromesistius pouta*

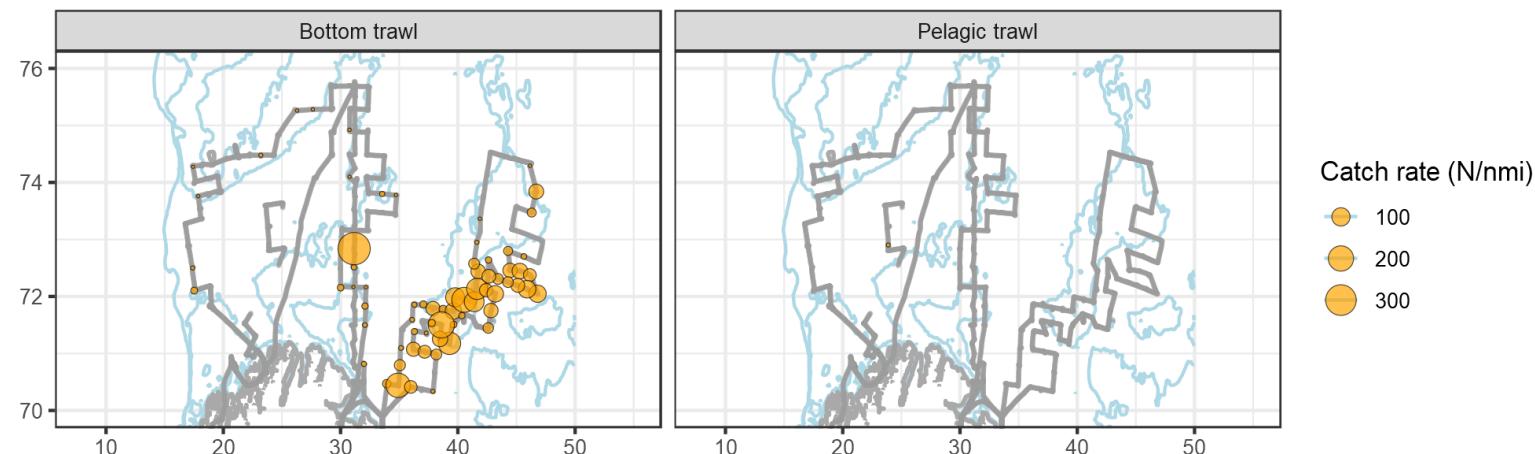


## Herring

Biomass | 2020 | *Clupea harengus*

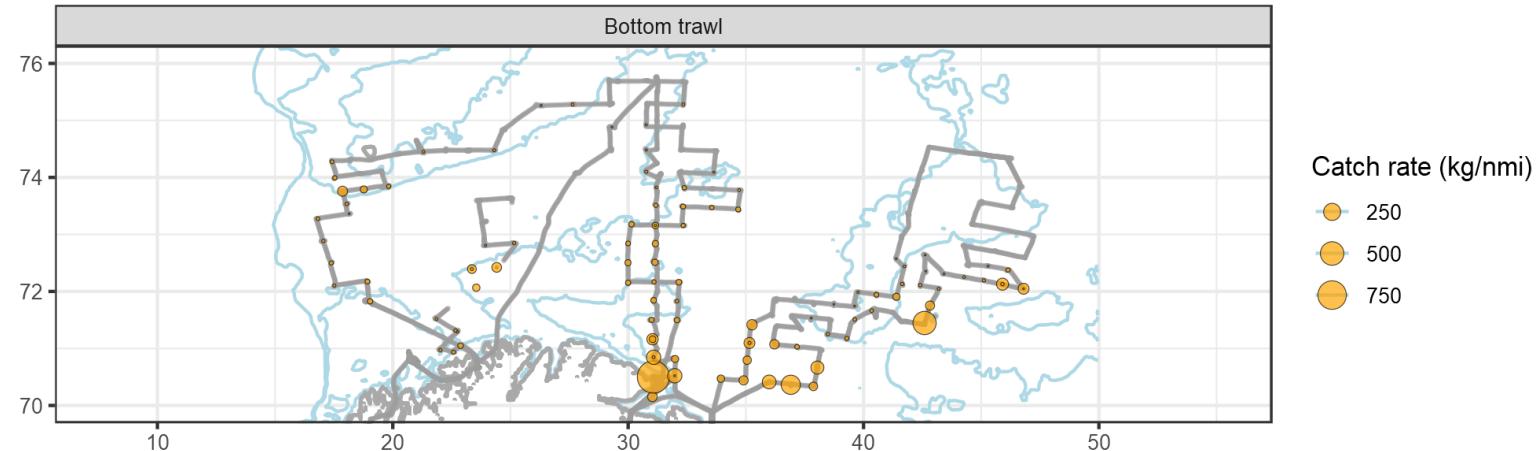


Number of individuals | 2020 | *Clupea harengus*

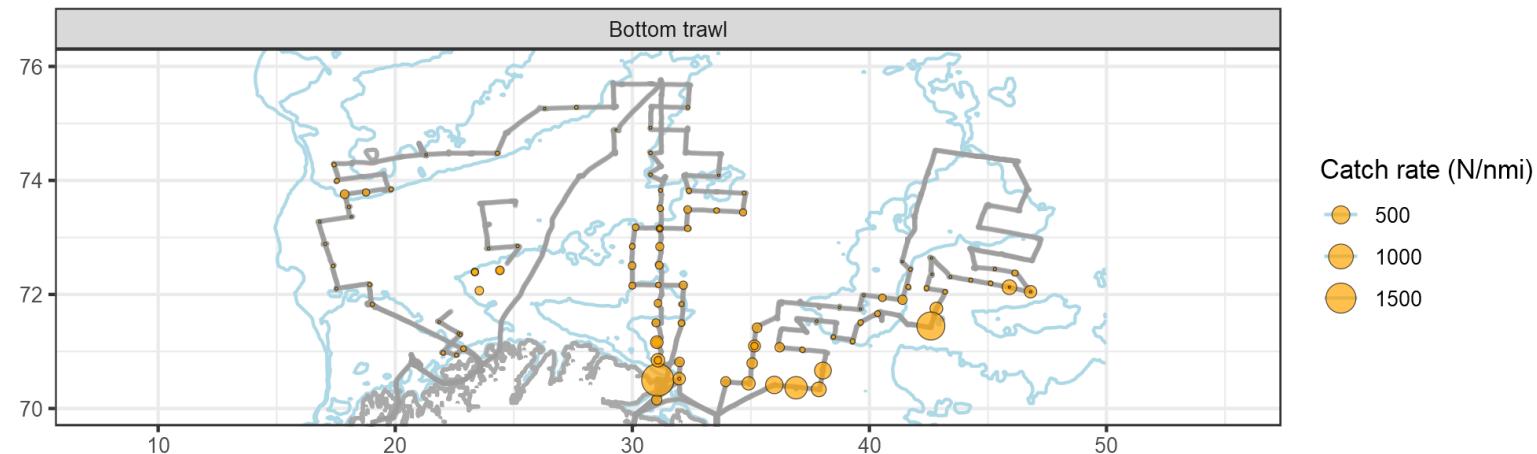


## Haddock

Biomass | 2020 | *Melanogrammus aeglefinus*

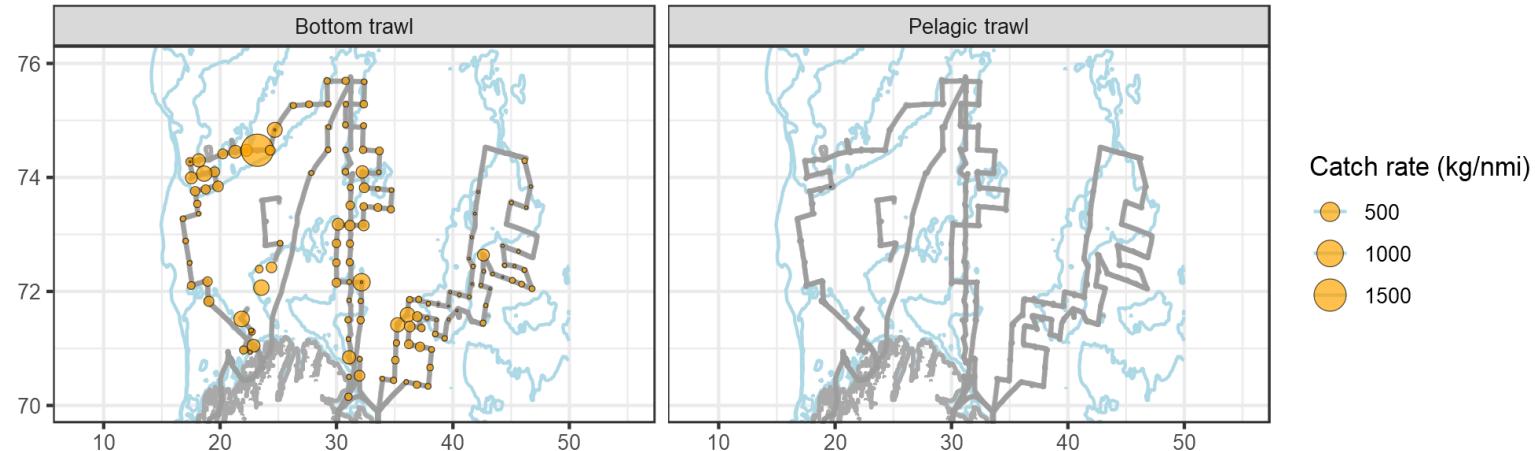


Number of individuals | 2020 | *Melanogrammus aeglefinus*

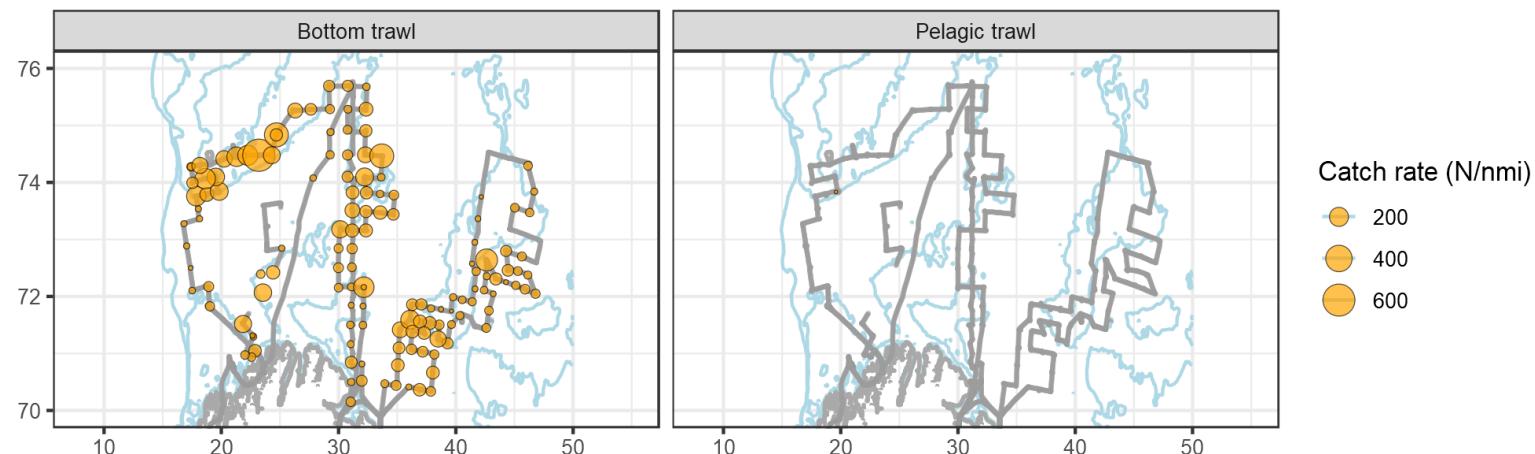


Cod

Biomass | 2020 | *Gadus morhua*

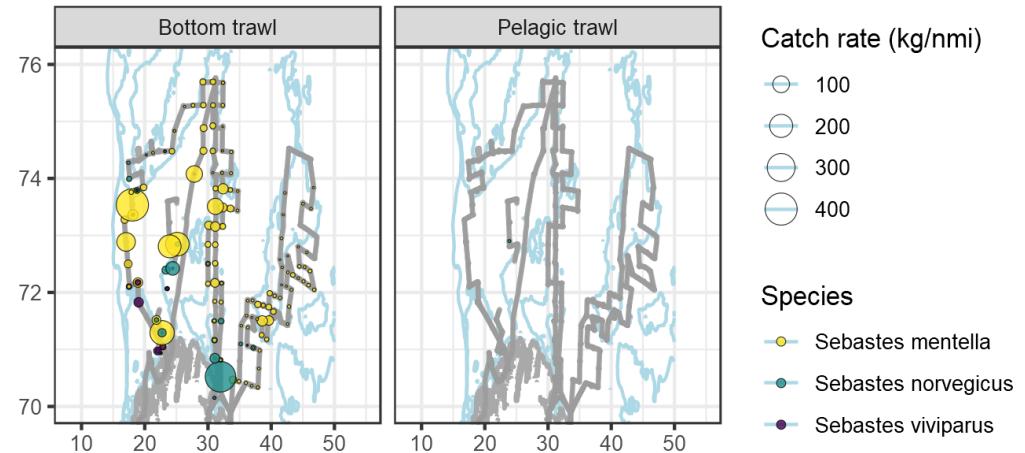


Number of individuals | 2020 | *Gadus morhua*

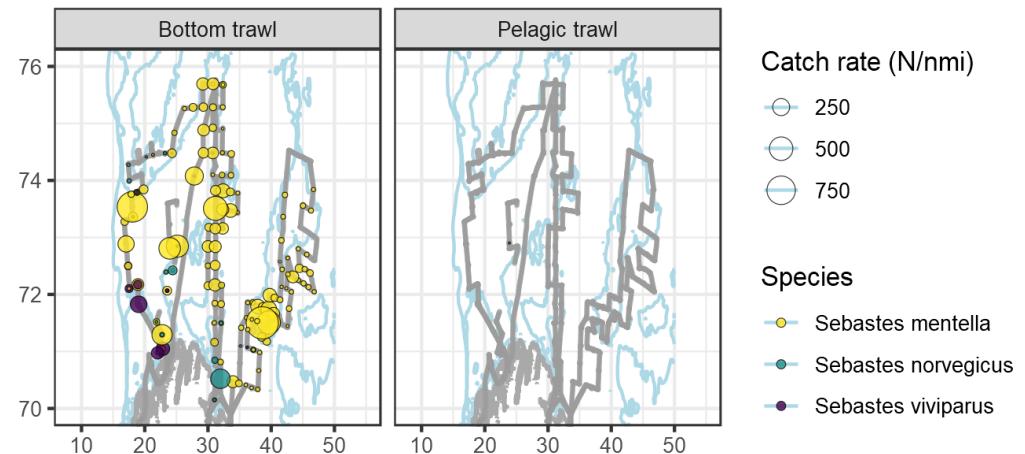


## Redfish

Biomass | 2020 | Redfish species



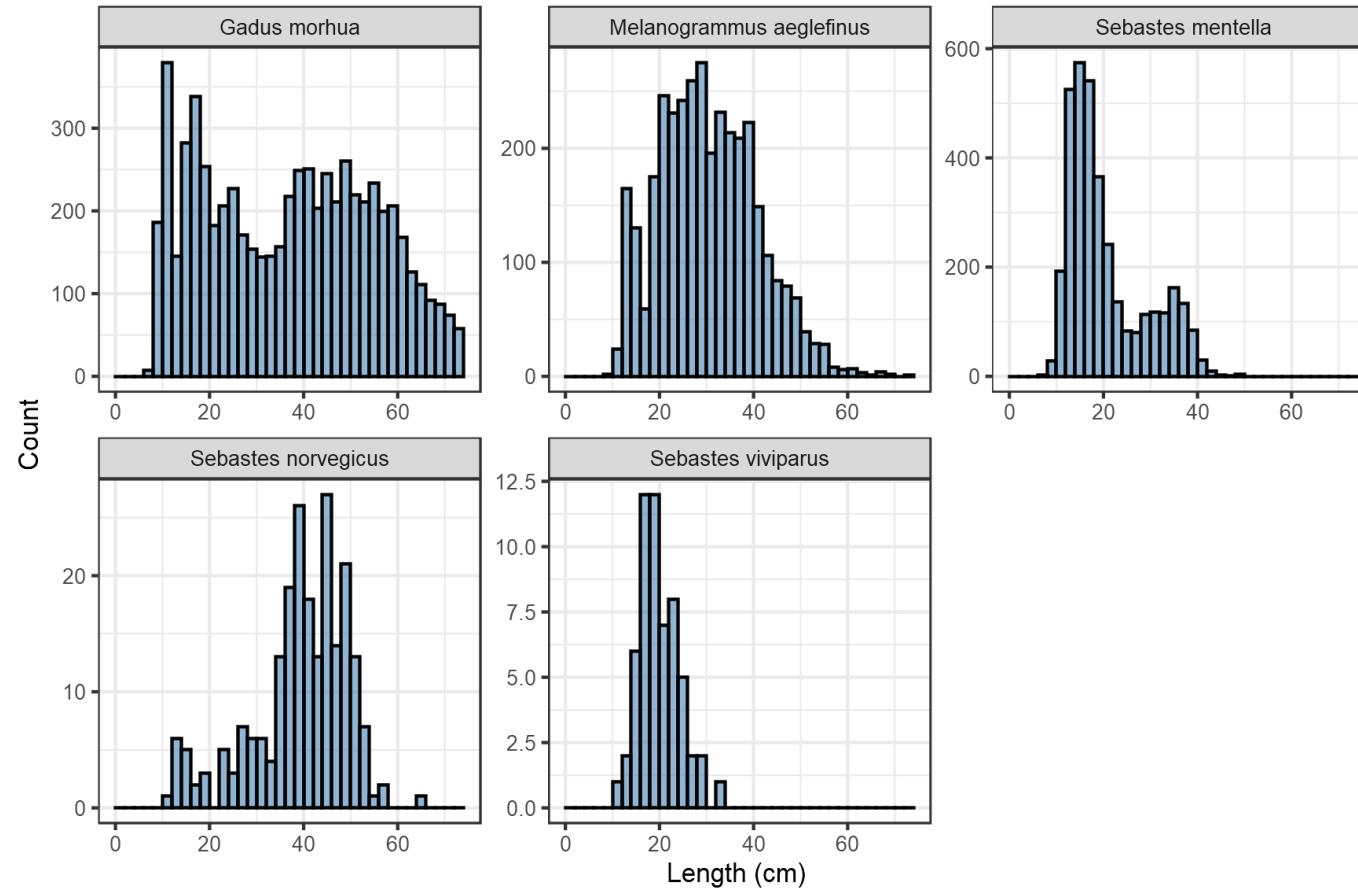
Number of individuals | 2020 | Redfish species



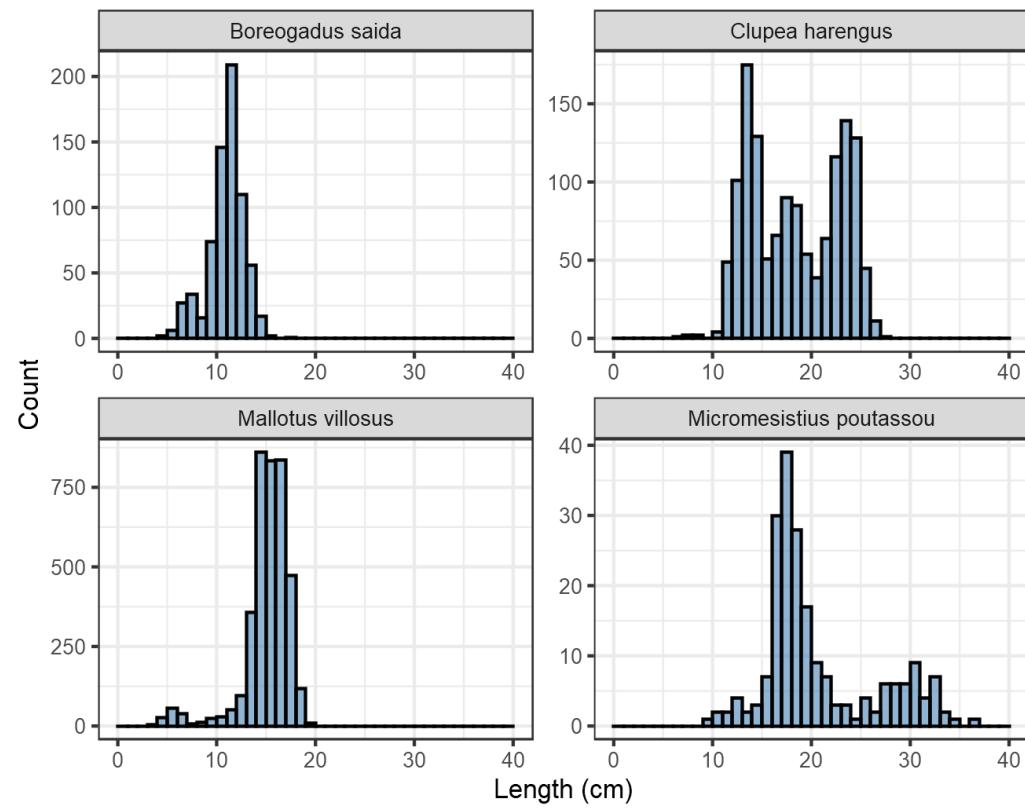
## Length distributions

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

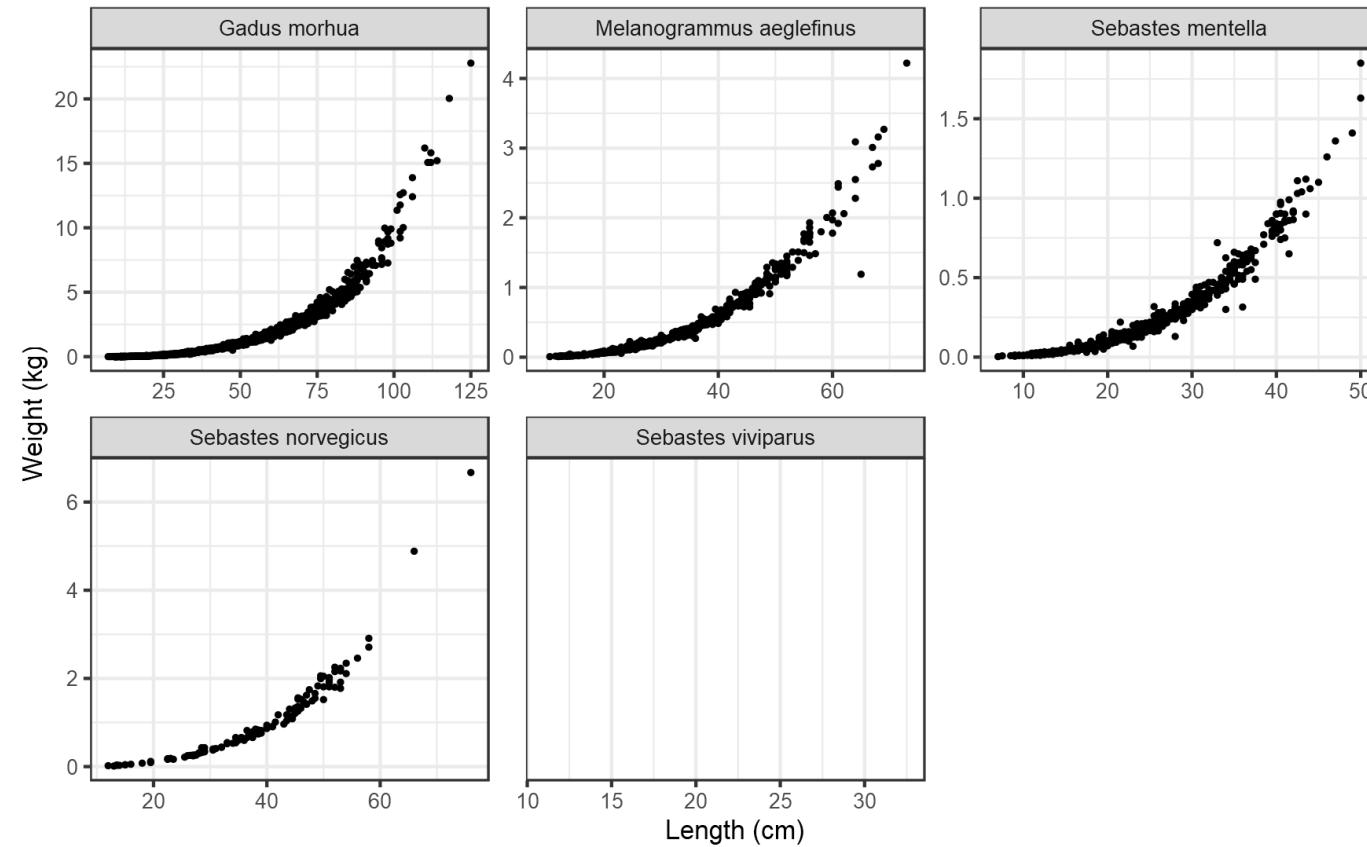
Histogram of length

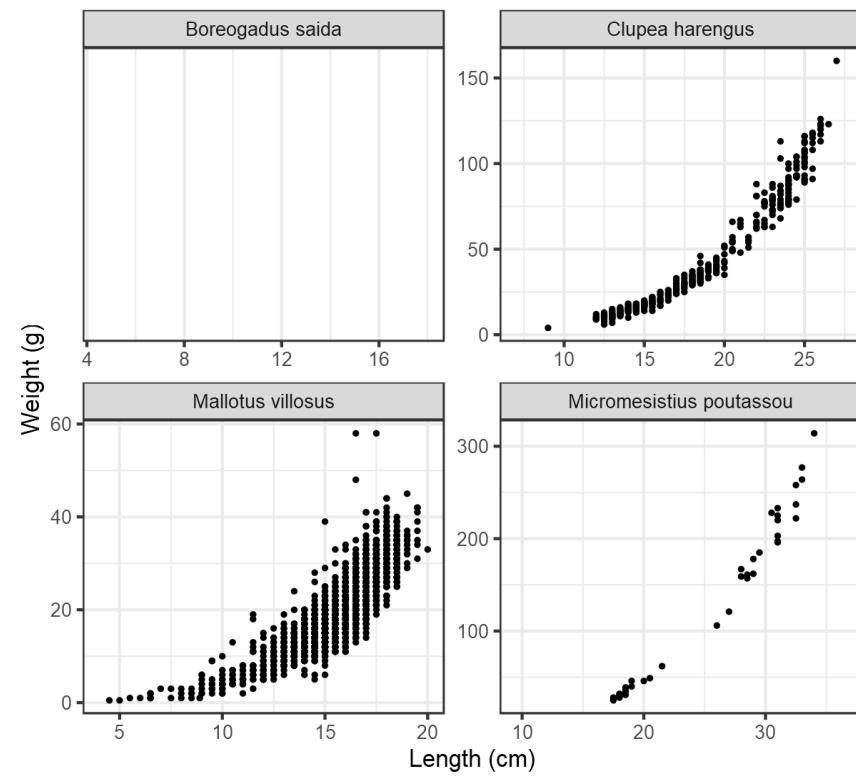


Histogram of length

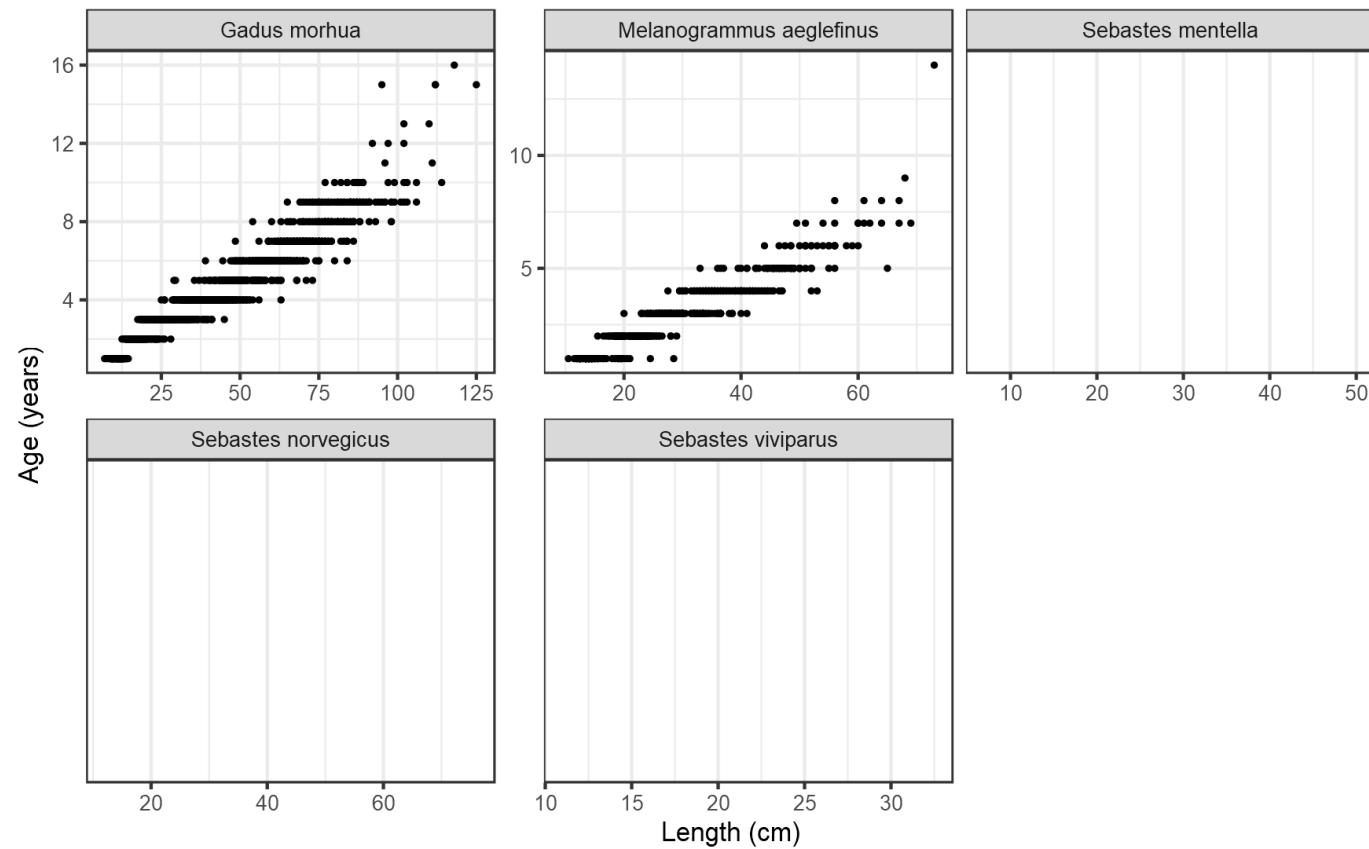


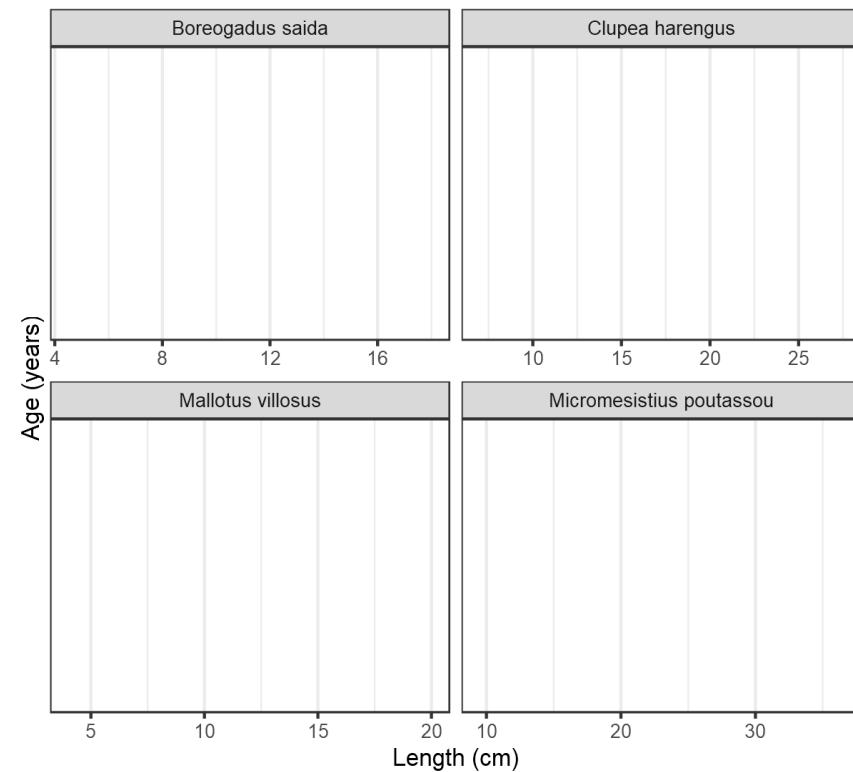
## Length-weight relationships



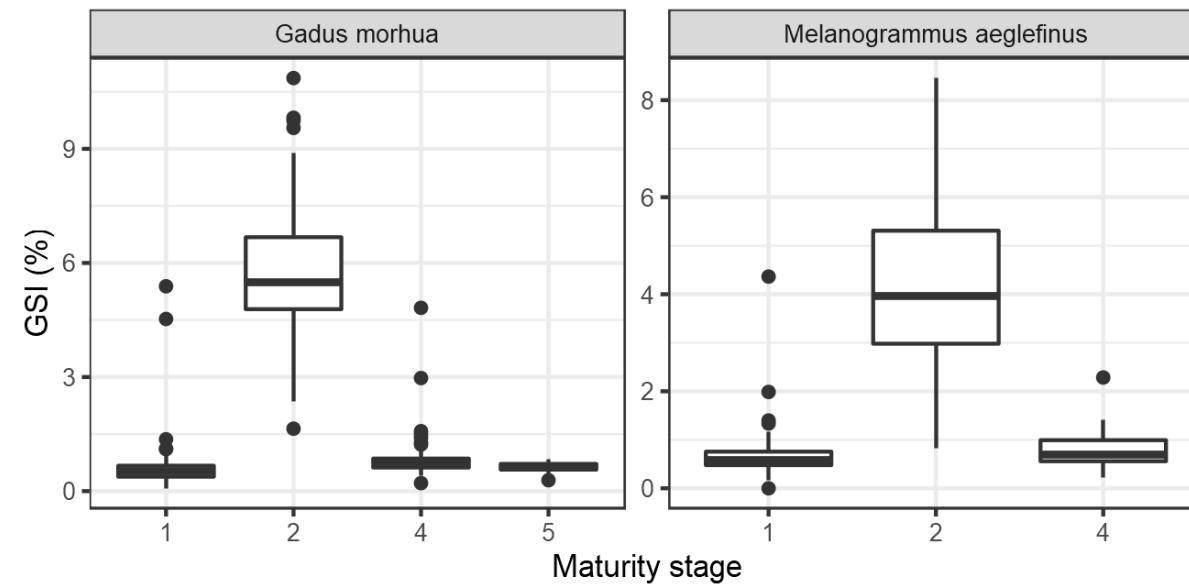


## Length-age relationships



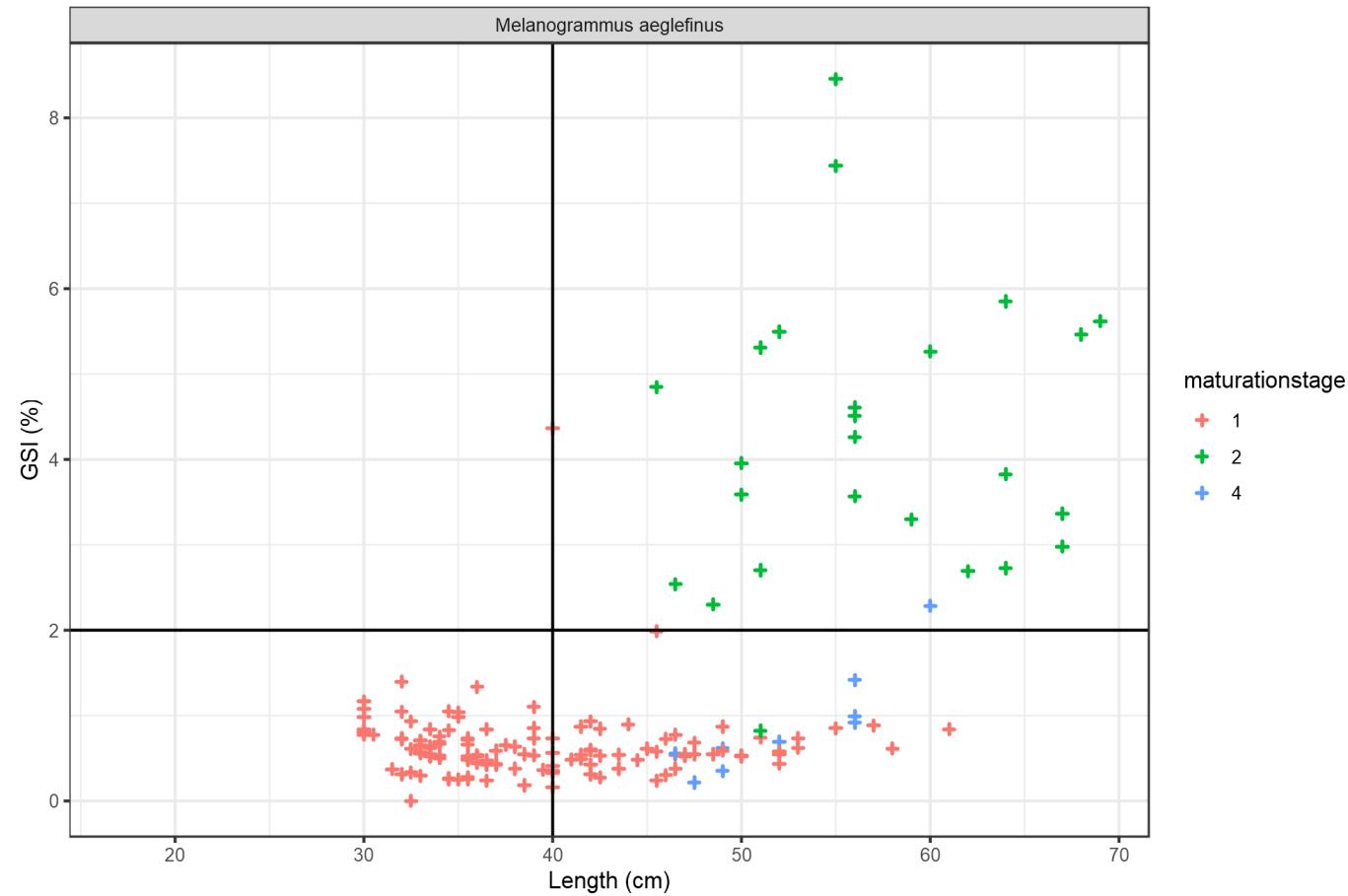


GSI versus maturity stage of female cod and haddock



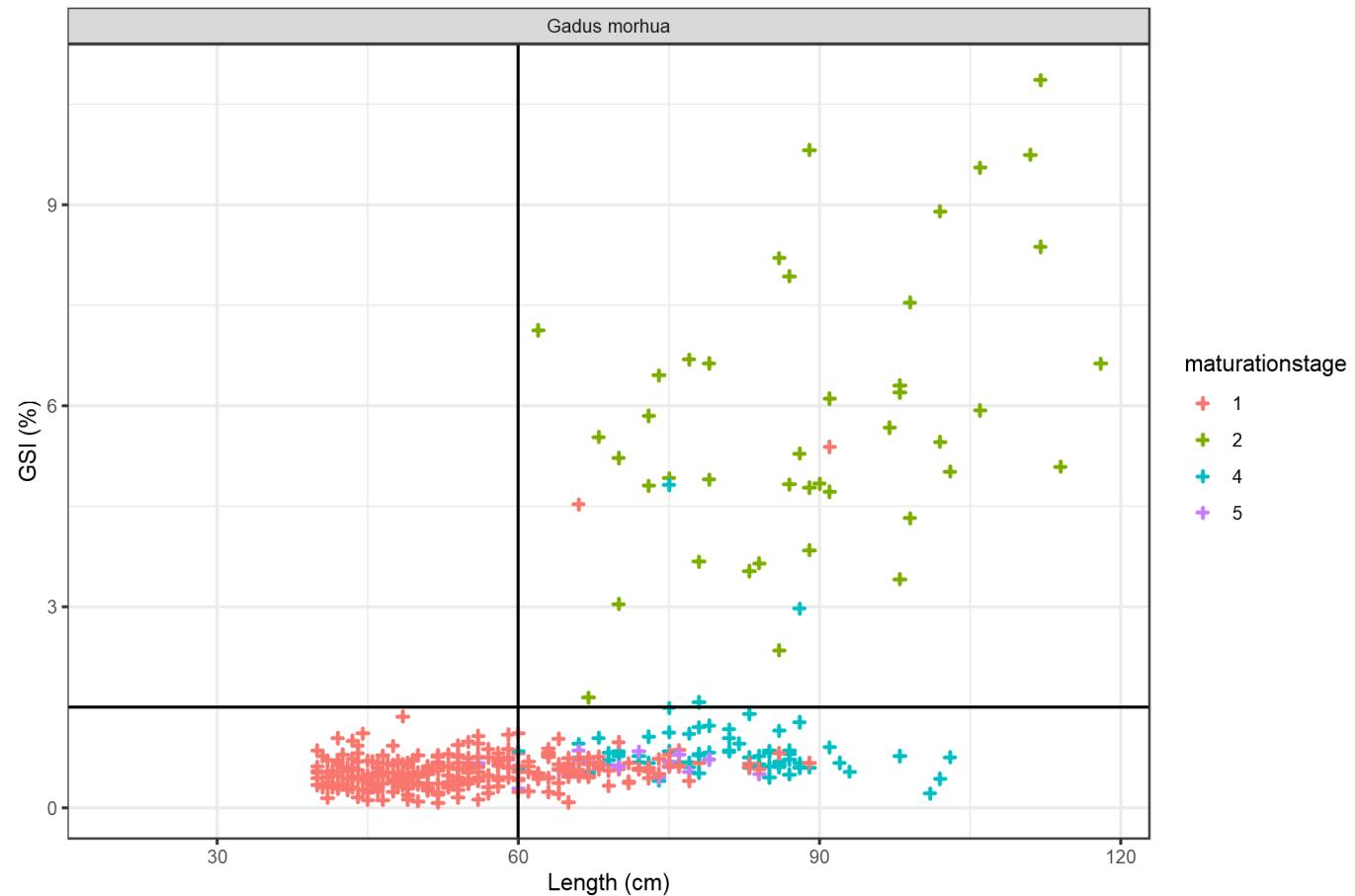
## GSI versus length and maturity stage for female haddock

The vertical line represents the size (40 cm) over which gonad samples should be taken if GSI < 2 % (horizontal line).



## GSI versus length and maturity stage for female cod

The vertical line represents the size (60 cm) over which most females with GSI > 1.5 % (horizontal line) are maturing (Skjæraasen et al. 2012).



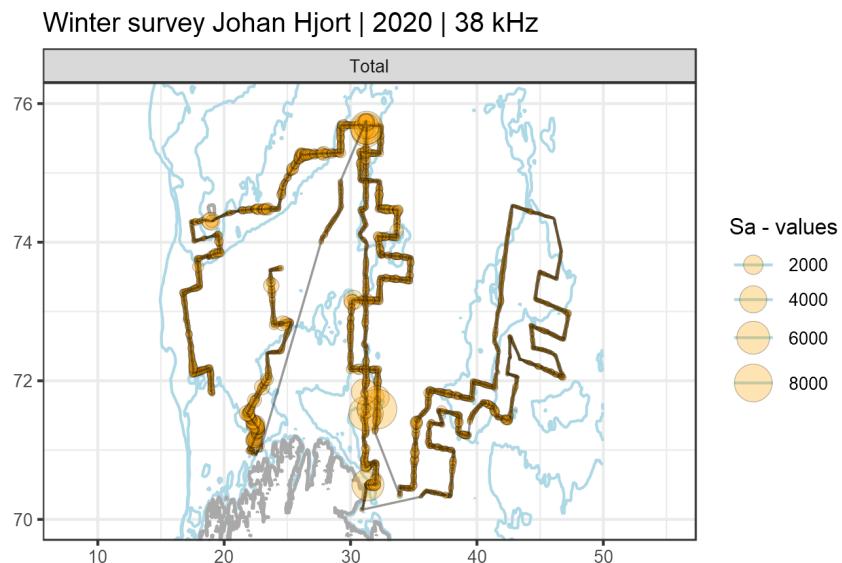
## Acoustic registrations

A total of 5781.944 km (3122 nmi) of acoustic transects were scrutinized.

### Example echograms

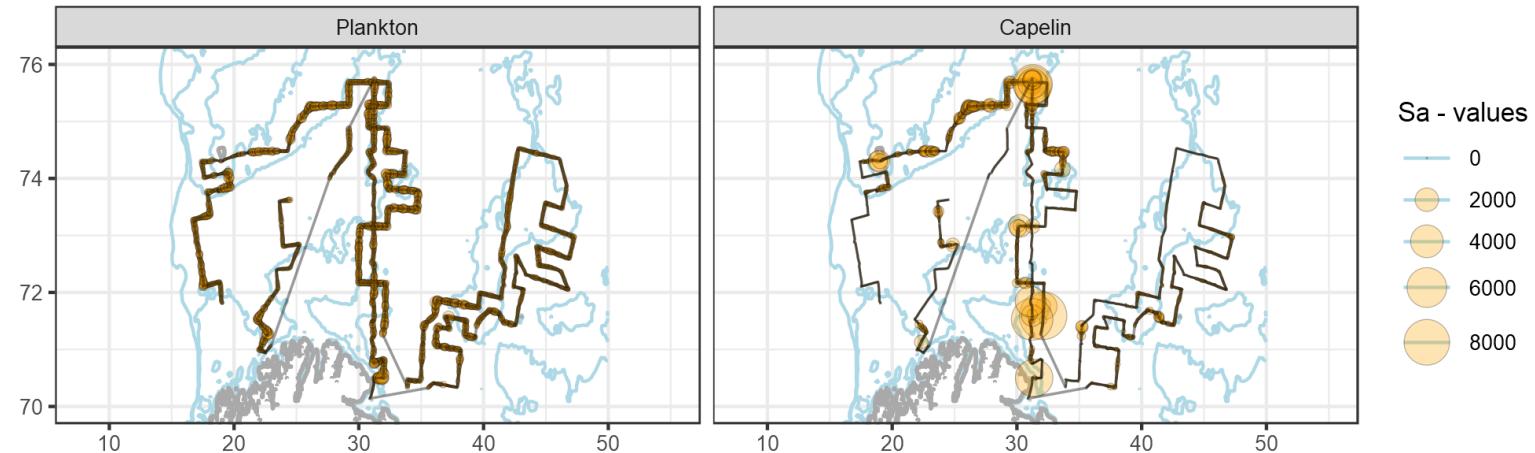
#### Depth-integrated acoustic backscatter

##### Total backscatter



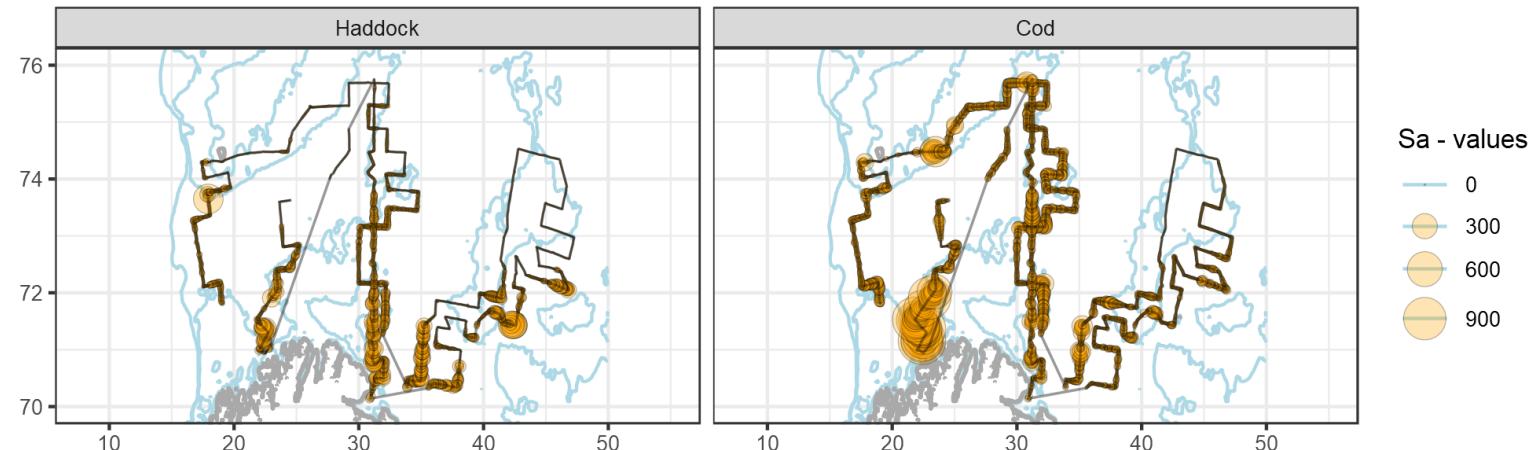
### Pelagic species

Winter survey Johan Hjort | 2020 | 38 kHz



### Demersal species

Winter survey Johan Hjort | 2020 | 38 kHz



**Acoustic backscatter in depth channels**

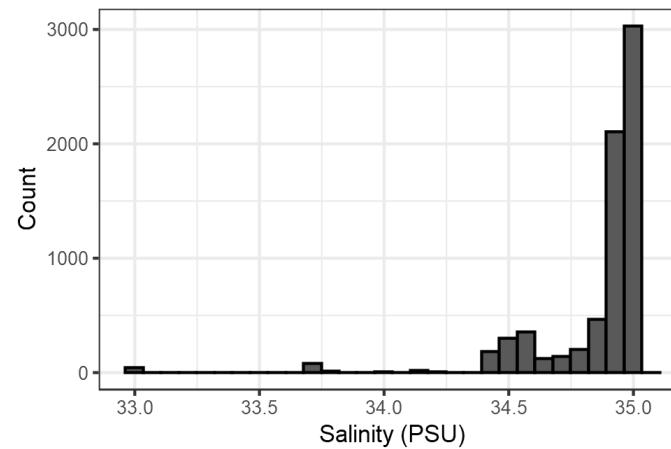
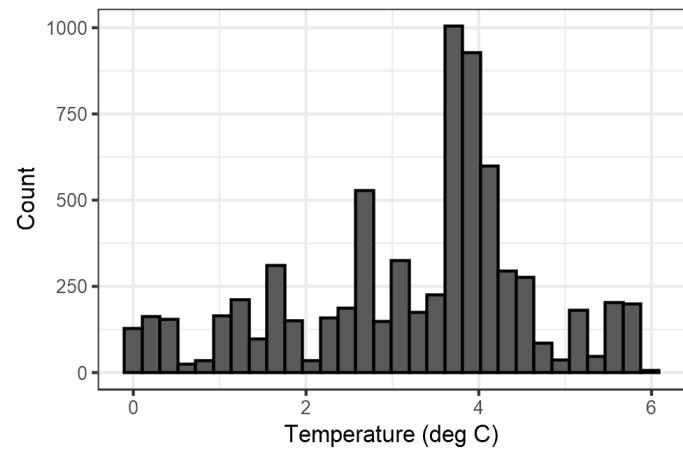
Distance from the surface to weighted depth of acoustic registrations

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

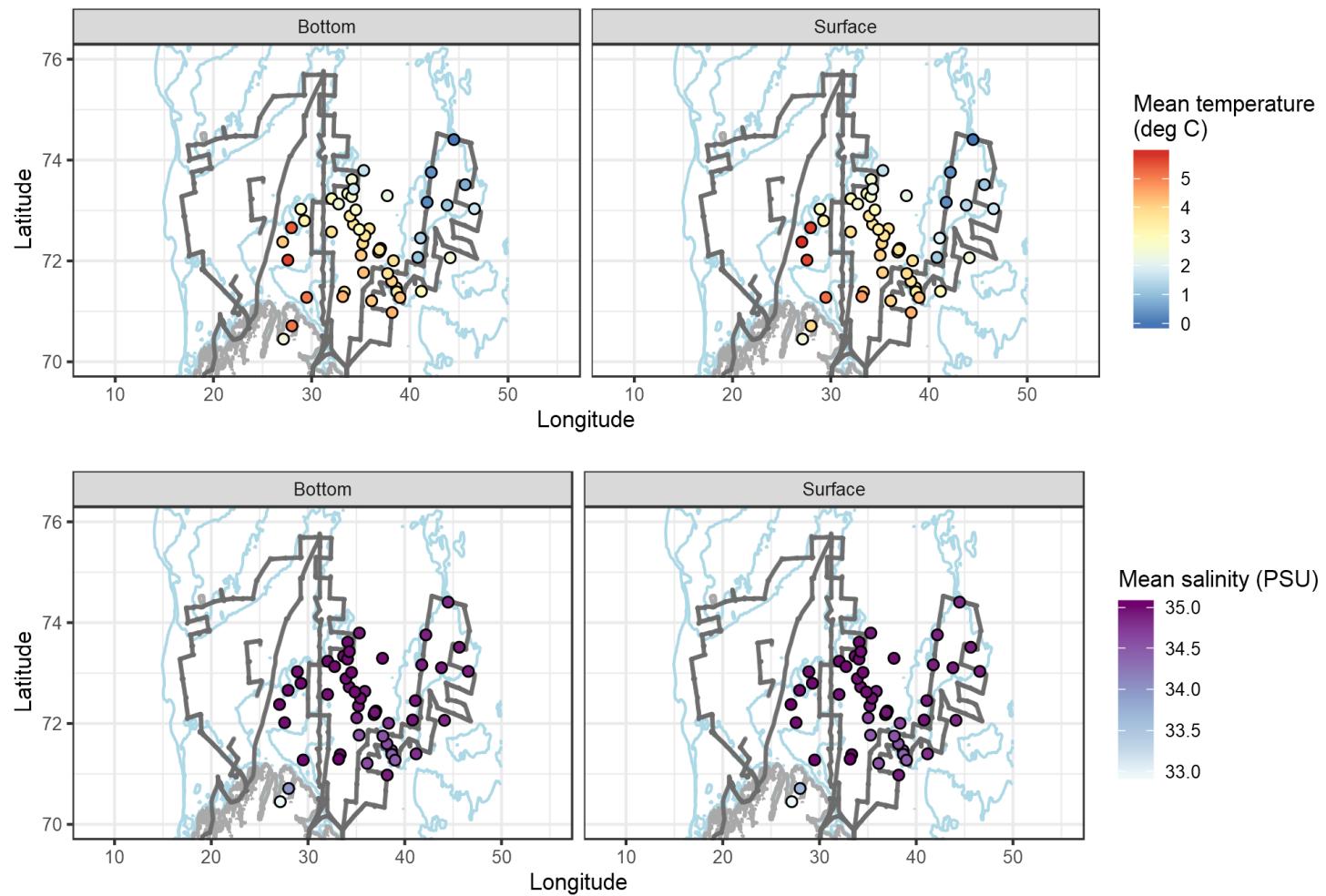
# CTD

## Summary of measurements

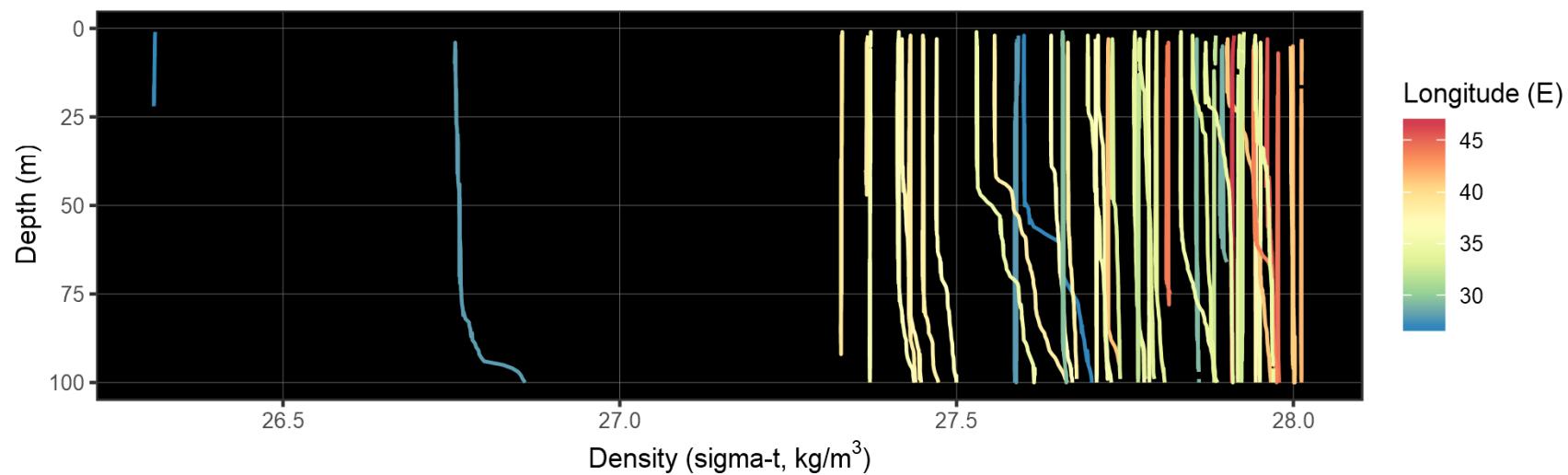
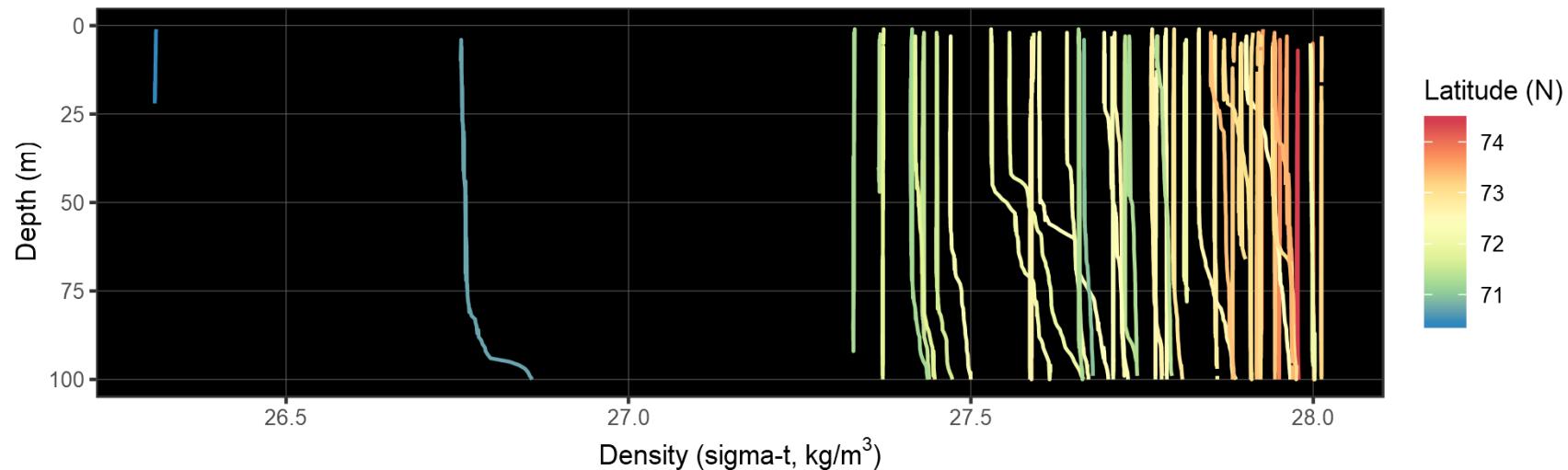
50 CTD casts were done during the survey, covering a total depth of 7.1 km.



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



### Density in the water column



## Light in the water column

