Ecosystem survey 2019 R/V Johan Hjort part 1

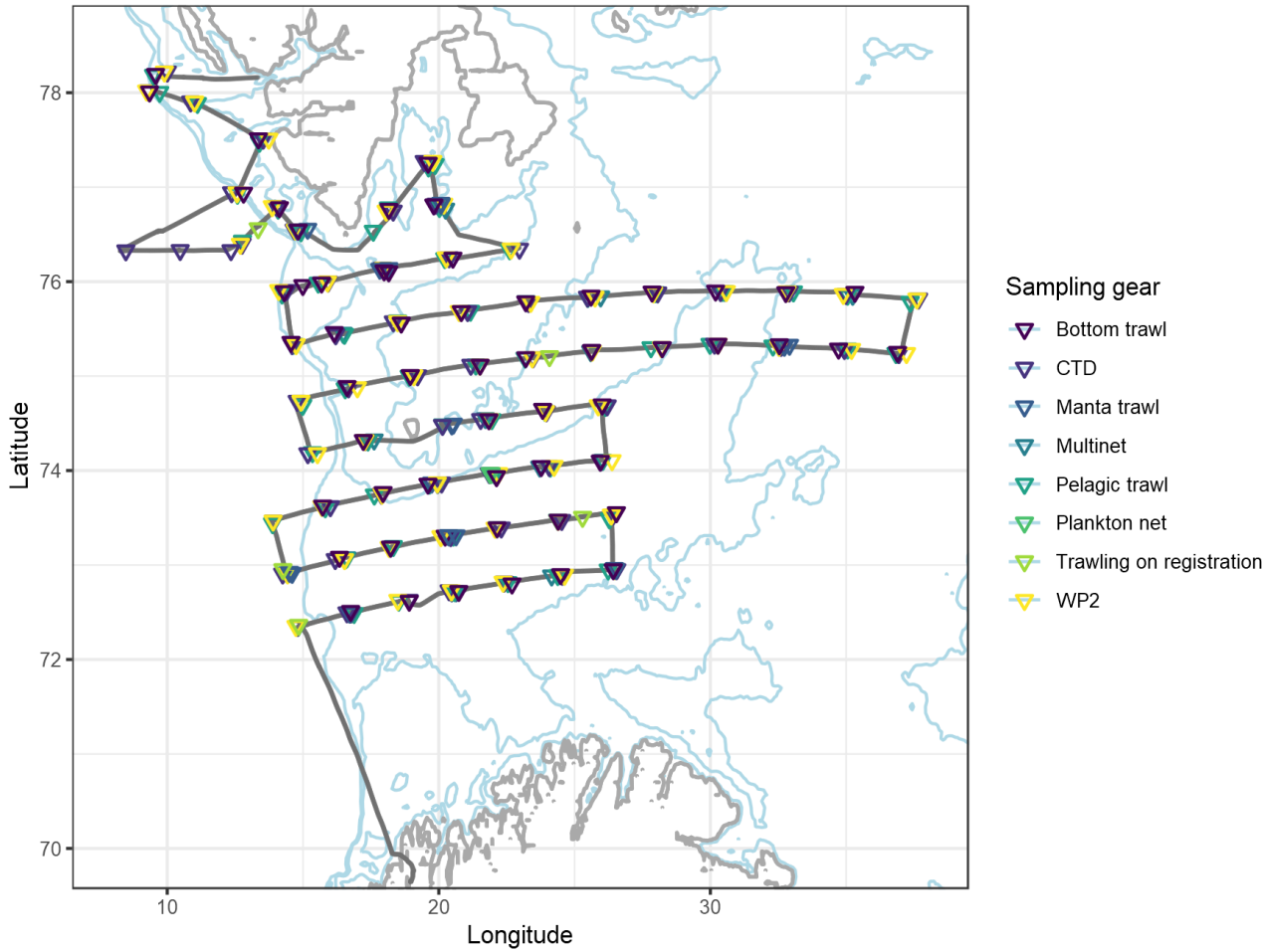
Report generated by: Johanna Fall

07/02/2020

Contents

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:

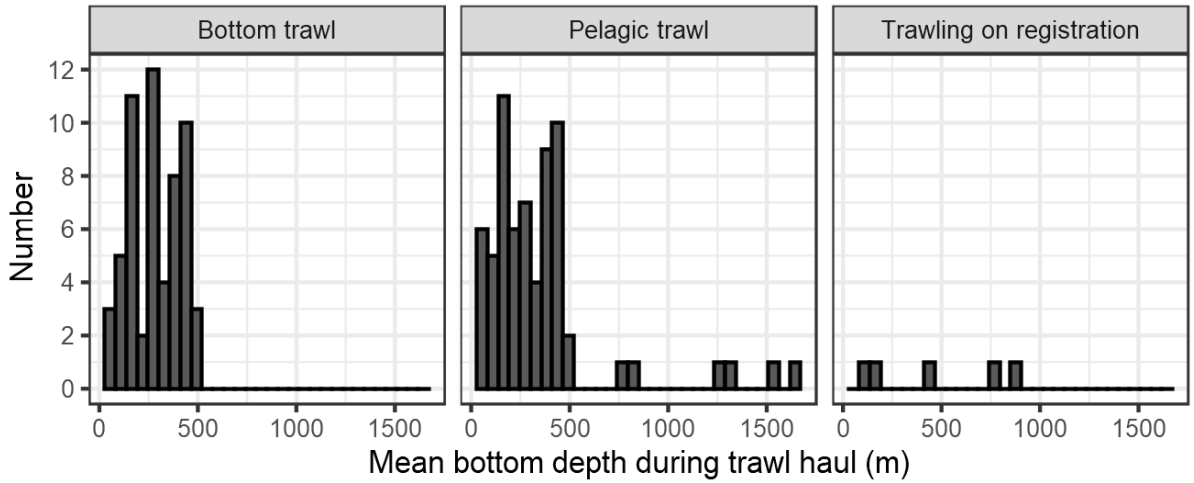


Sampling depth for trawl hauls

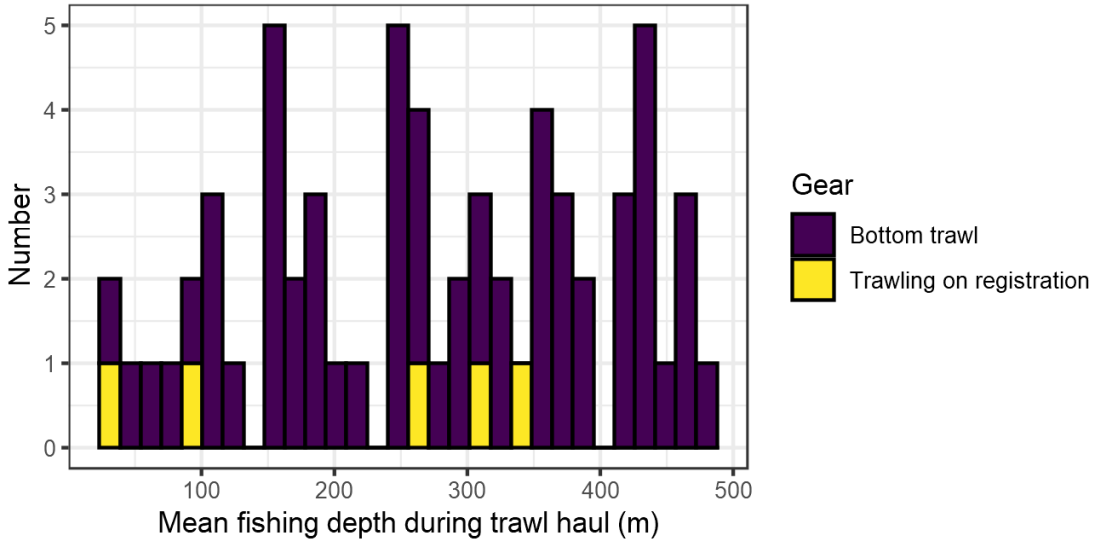
128 trawl hauls were taken during the survey, of which 58 were bottom trawl, 66 pelagic trawl, and 5 were trawling on registration. The trawl hauls covered a total distance of 323.3 km (174.6 nmi).

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)

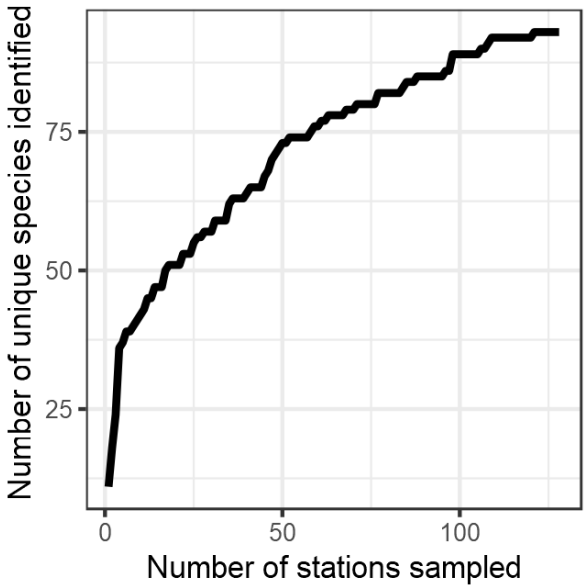


Catch rates - biomass and number per nautical mile trawled for species registered in Sea2Data

Species diversity

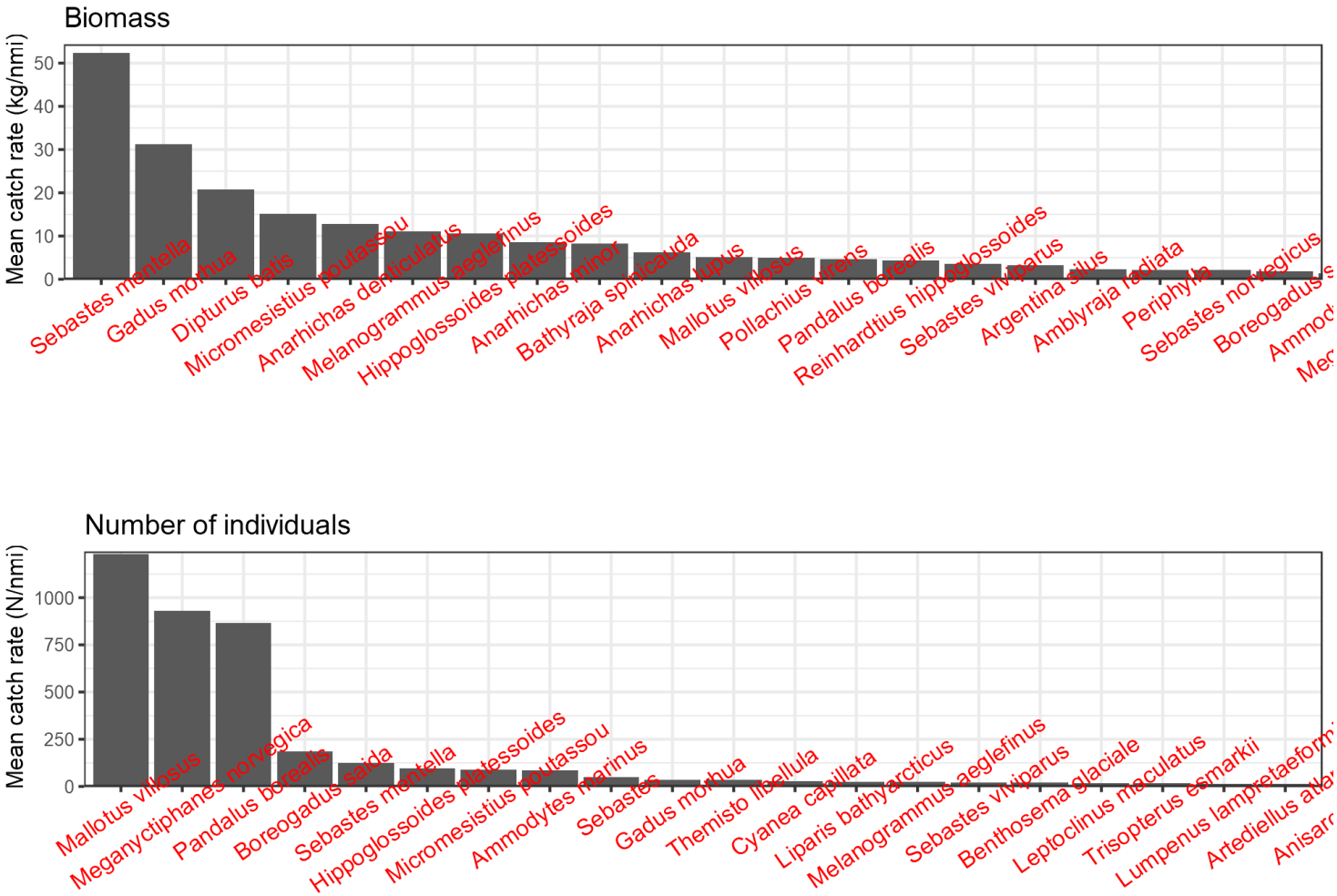
A total of 93 species were registered in Sea2Data during the survey.

Number of species identified versus the number of stations sampled

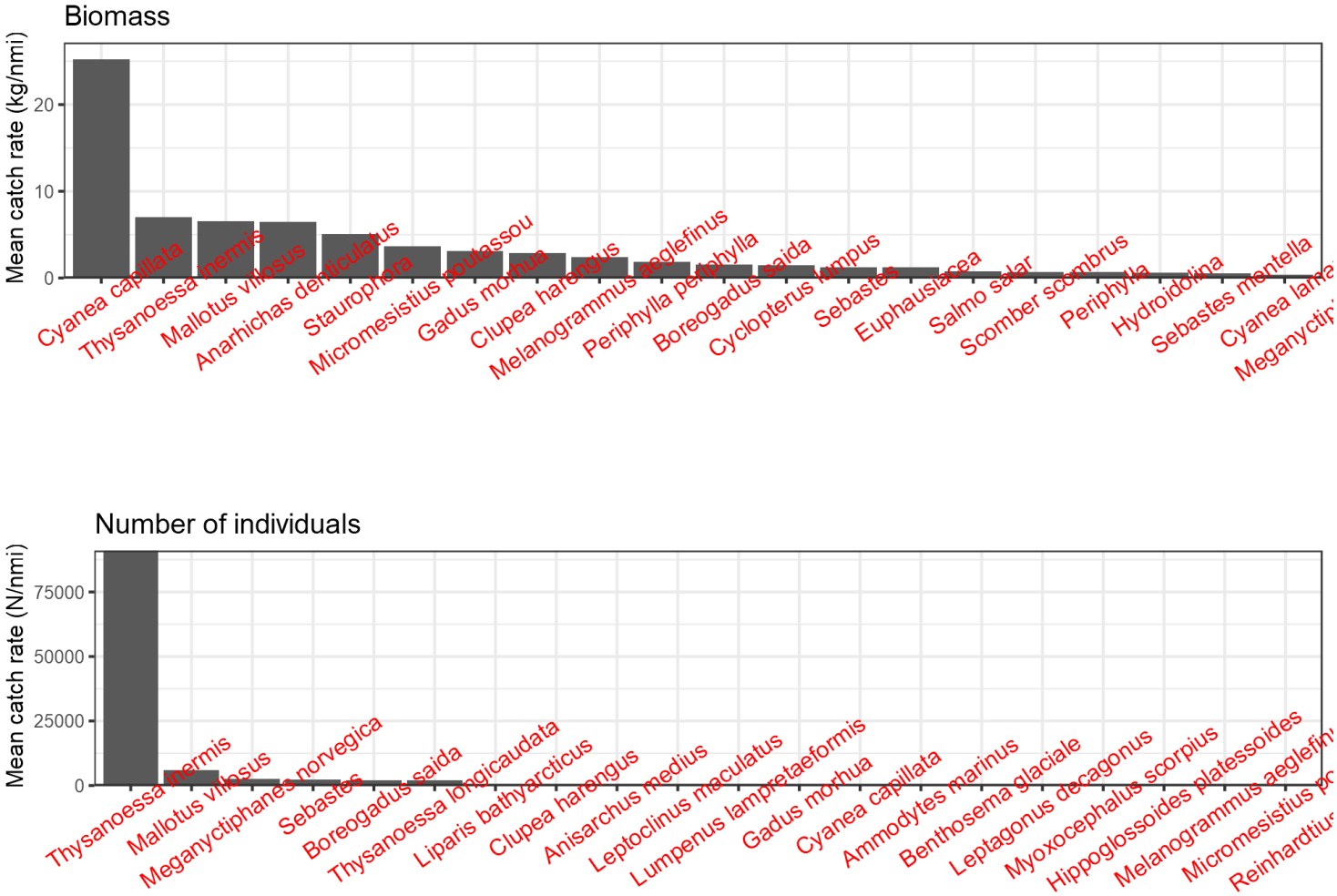


Average catch rate by species for the 20 species with highest catch rates

Bottom trawl

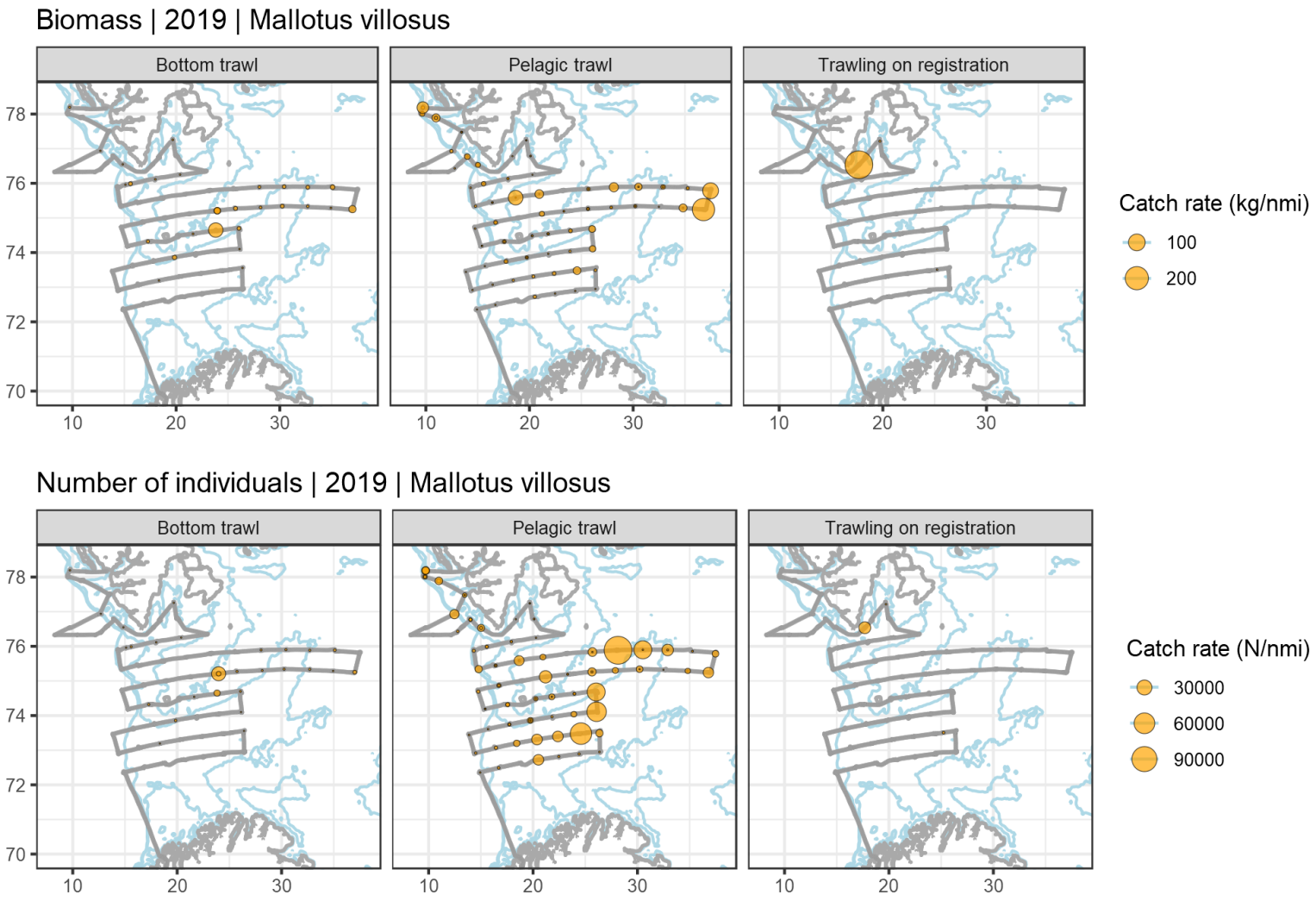


Pelagic trawl

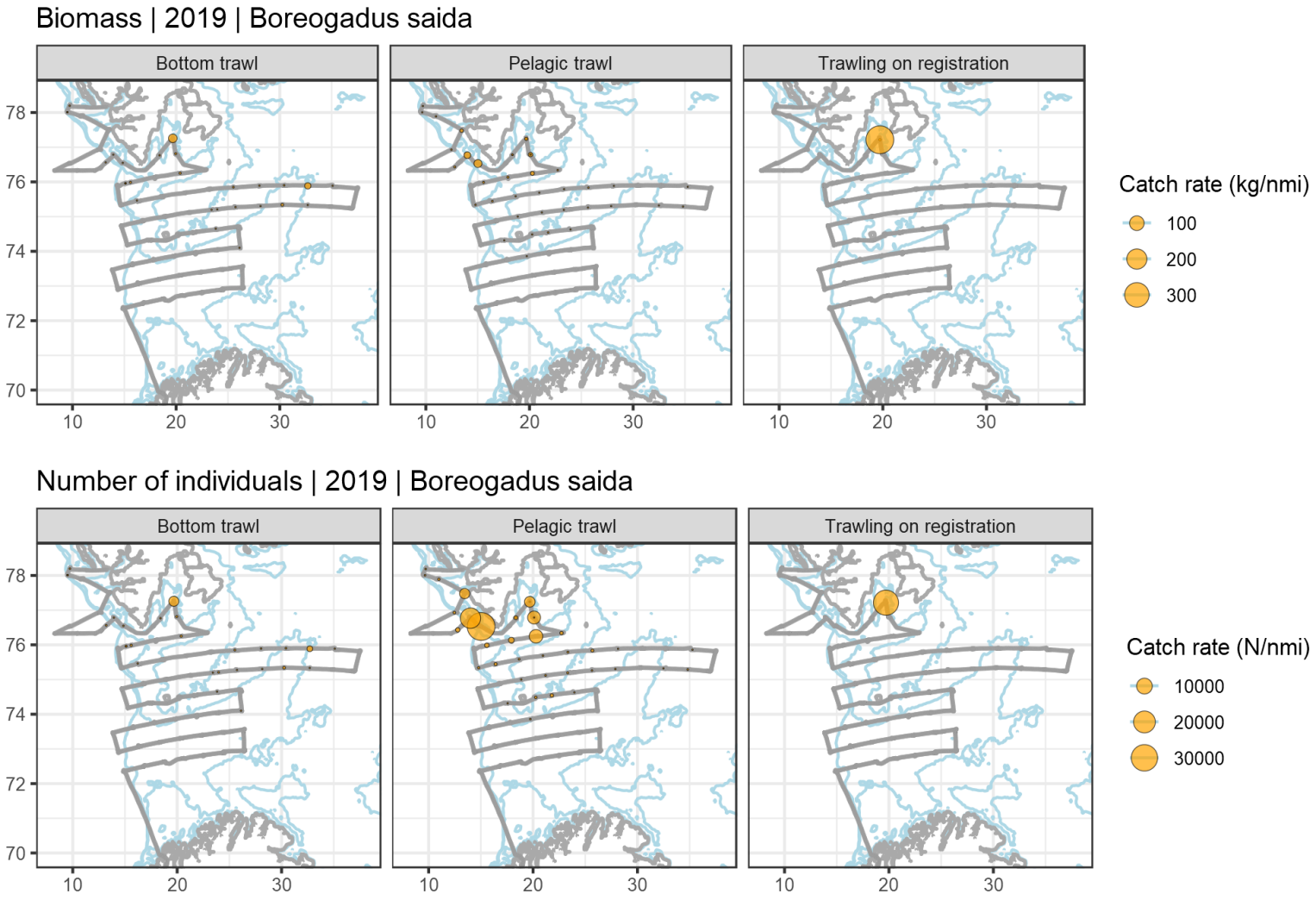


Spatial variation in catches of common species

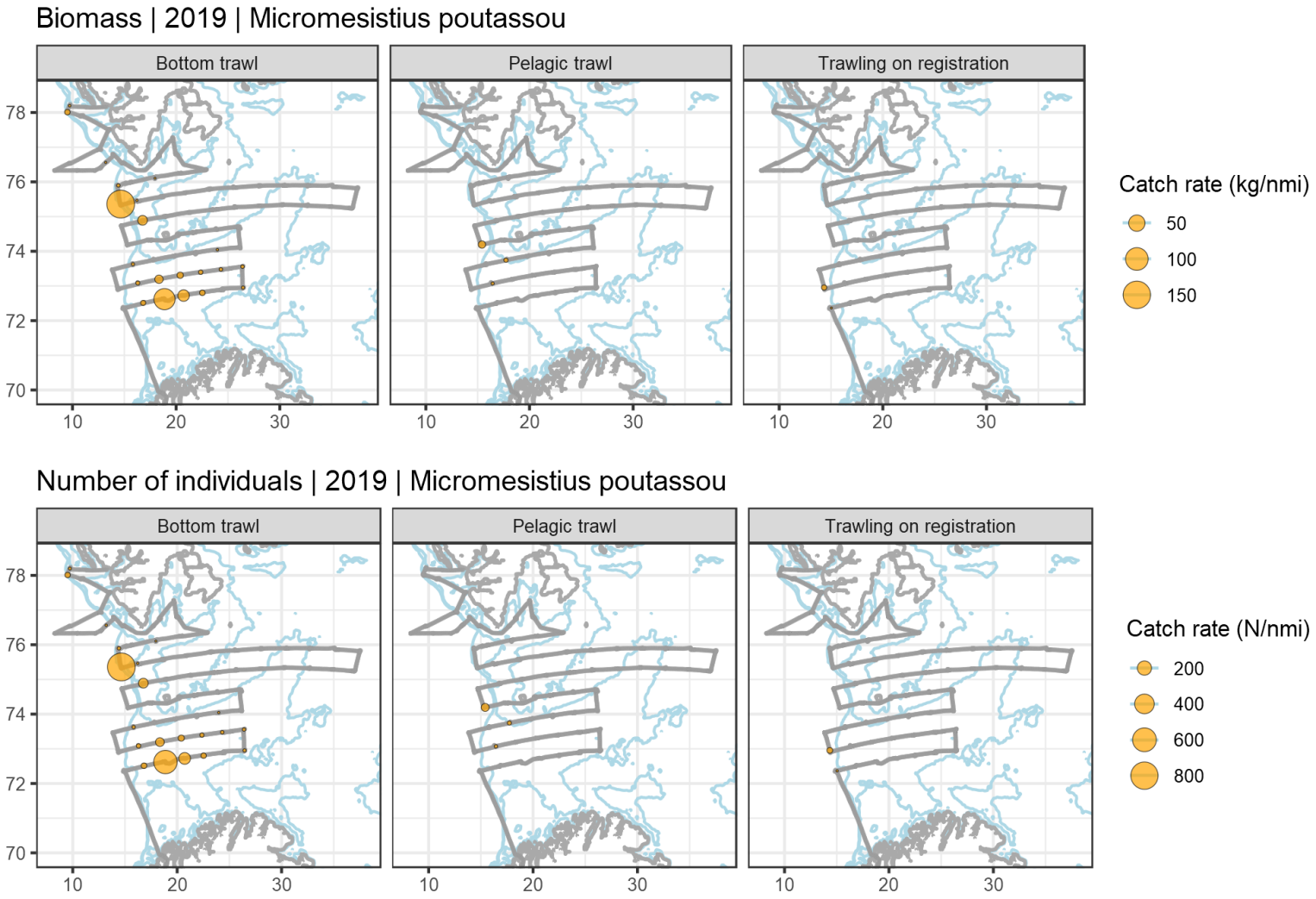
Capelin



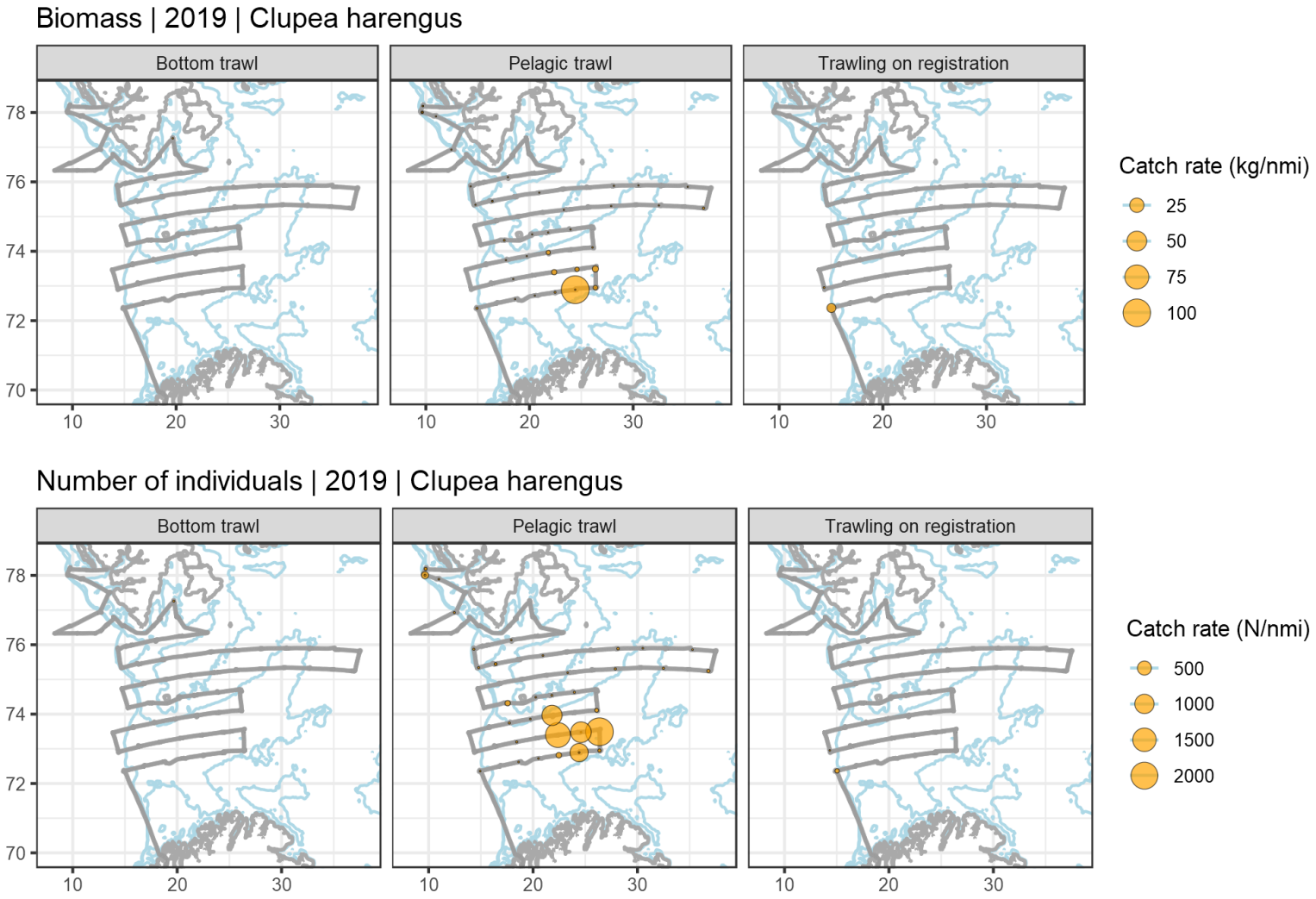
Polar cod


Biomass | 2019 | Boreogadus saida
Bottom trawl
Pelagic trawl
Trawling on registration
78
76
74
72
70
10
20
30
Catch rate (kg/nmi)
100
200
300
Number of individuals | 2019 | Boreogadus saida
Bottom trawl
Pelagic trawl
Trawling on registration
78
76
74
72
70
10
20
30
Catch rate (N/nmi)
10000
20000
30000

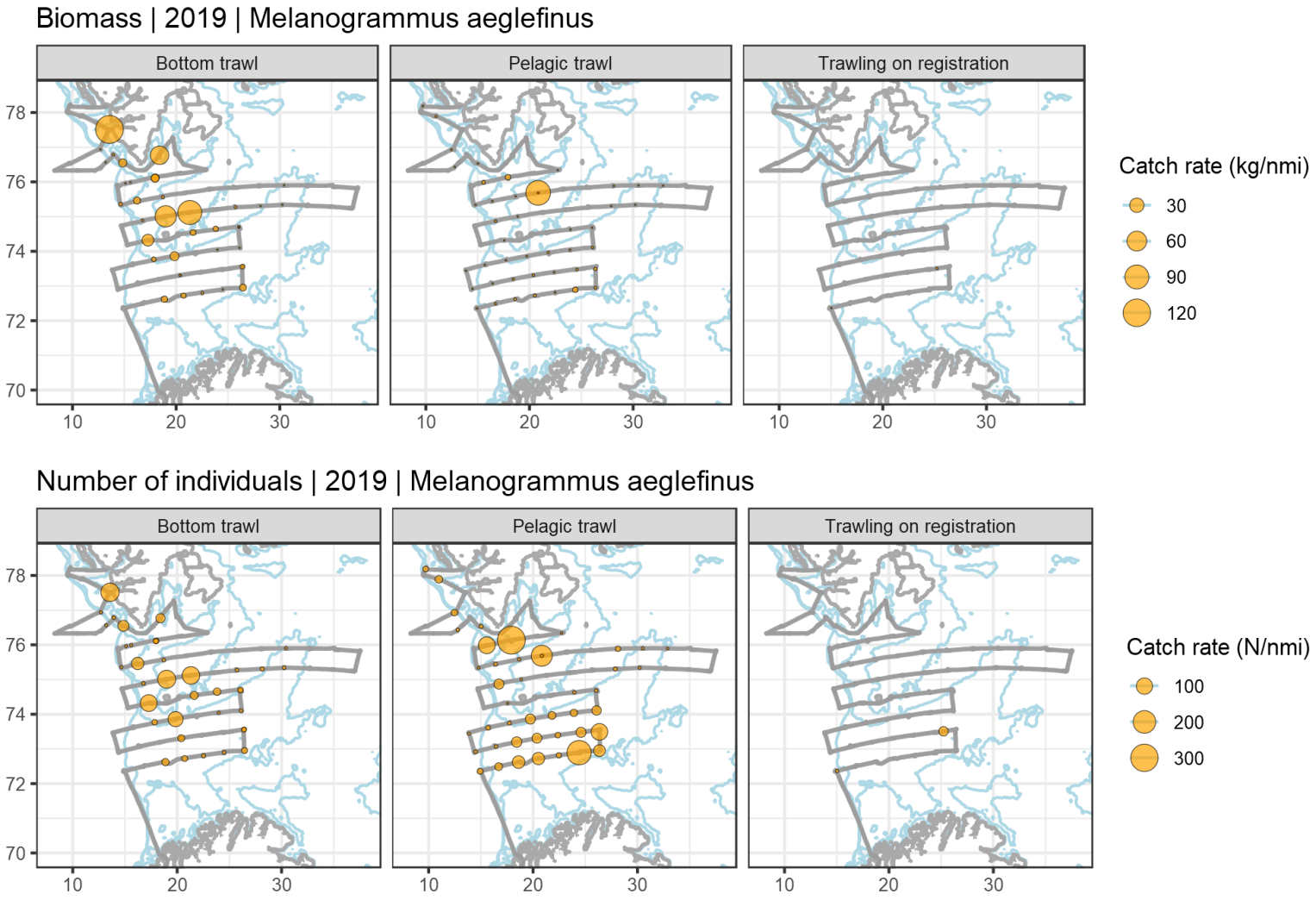
Blue whiting



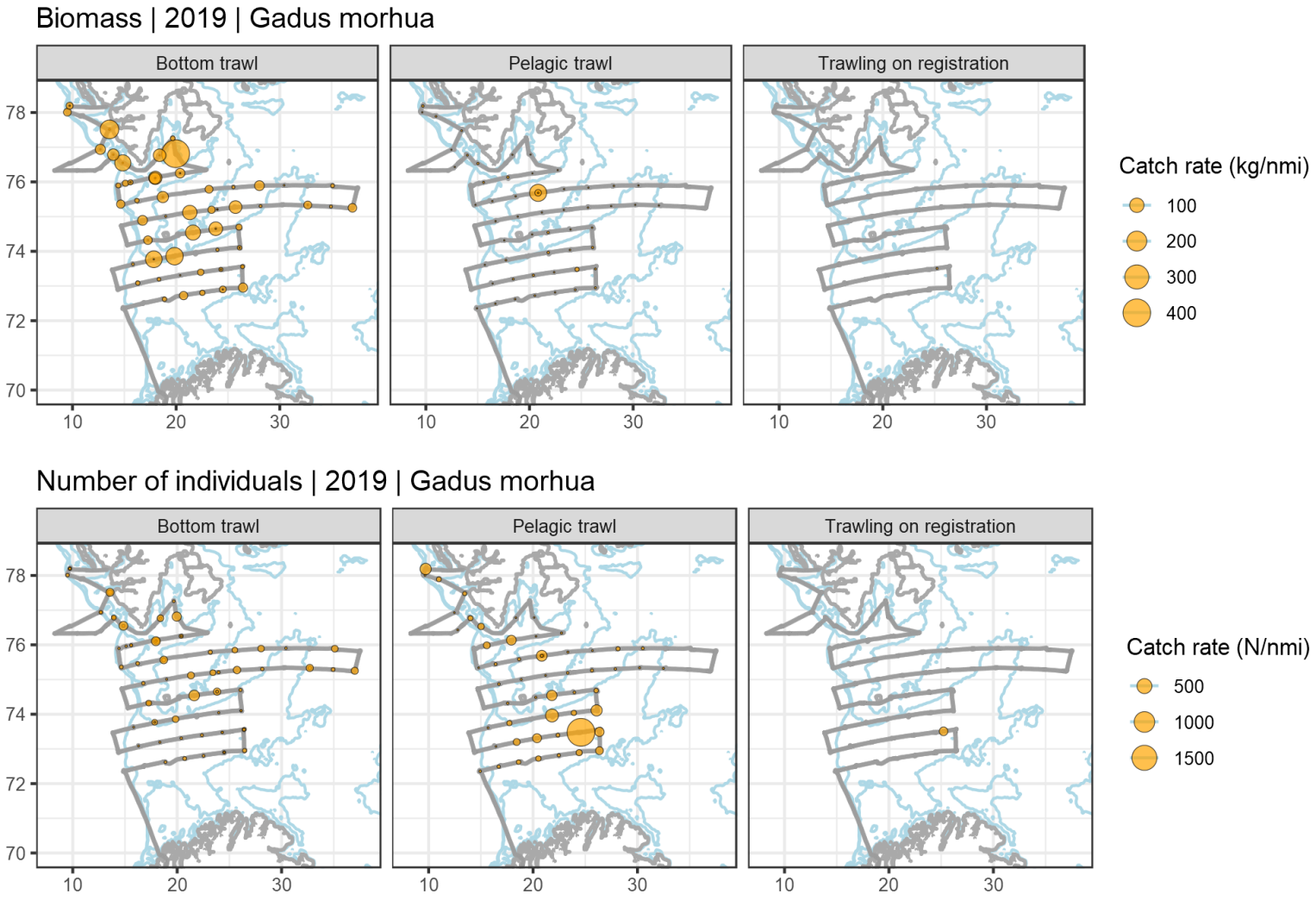
Herring


Biomass | 2019 | Clupea harengus
Bottom trawl
Pelagic trawl
Trawling on registration
78
76
74
72
70
10
20
30
Catch rate (kg/nmi)
25
50
75
100
Number of individuals | 2019 | Clupea harengus
Bottom trawl
Pelagic trawl
Trawling on registration
78
76
74
72
70
10
20
30
Catch rate (N/nmi)
500
1000
1500
2000

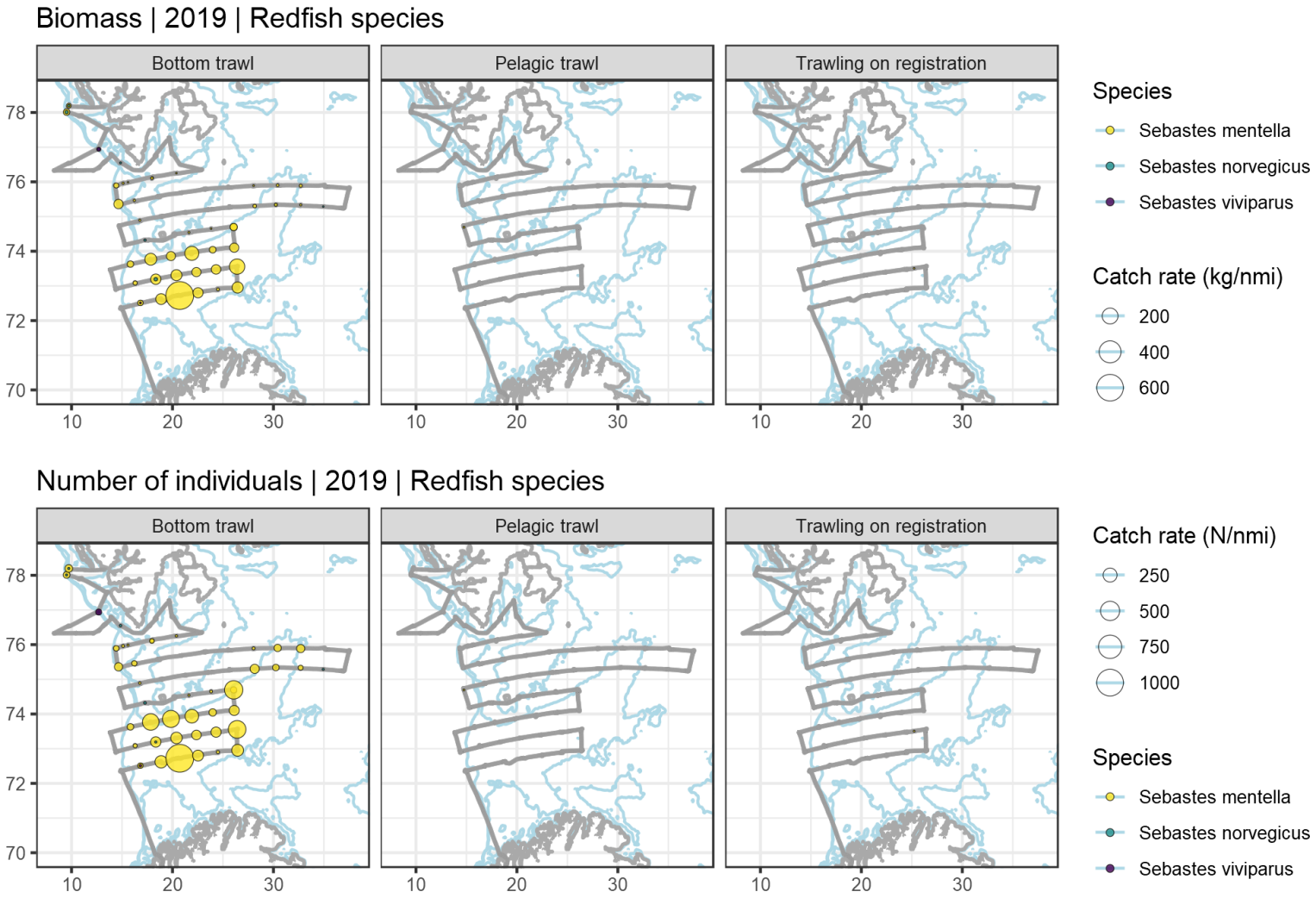
Haddock


Biomass | 2019 | Melanogrammus aeglefinus
Bottom trawl
Pelagic trawl
Trawling on registration
78
76
74
72
70
10
20
30
Catch rate (kg/nmi)
30
60
90
120
Number of individuals | 2019 | Melanogrammus aeglefinus
Bottom trawl
Pelagic trawl
Trawling on registration
78
76
74
72
70
10
20
30
Catch rate (N/nmi)
100
200
300

Cod

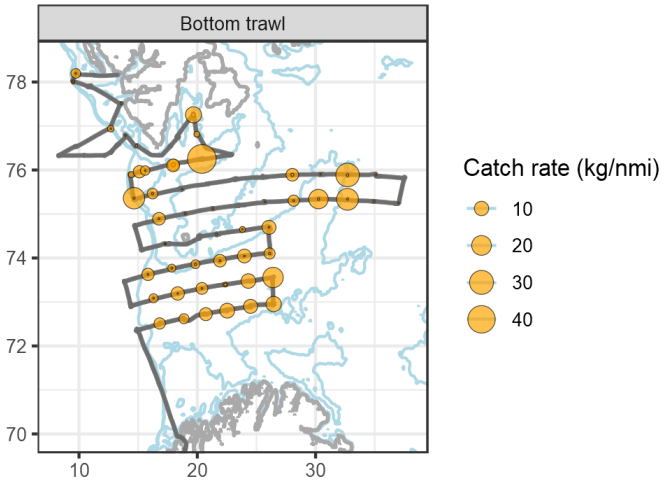

Biomass | 2019 | Gadus morhua
Bottom trawl
Pelagic trawl
Trawling on registration
78
76
74
72
70
10
20
30
Catch rate (kg/nmi)
100
200
300
400
Number of individuals | 2019 | Gadus morhua
Bottom trawl
Pelagic trawl
Trawling on registration
Catch rate (N/nmi)
500
1000
1500

Redfish

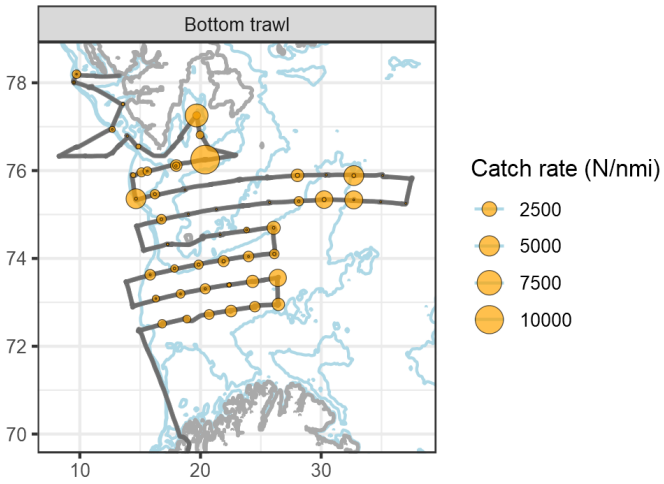

Biomass | 2019 | Redfish species
Bottom trawl
Pelagic trawl
Trawling on registration
78
76
74
72
70
10
20
30
Species
Sebastes mentella
Sebastes norvegicus
Sebastes viviparus
Catch rate (kg/nmi)
200
400
600
Number of individuals | 2019 | Redfish species
Bottom trawl
Pelagic trawl
Trawling on registration
Catch rate (N/nmi)
250
500
750
1000
Species
Sebastes mentella
Sebastes norvegicus
Sebastes viviparus

Deep-water shrimp

Biomass | 2019 | Pandalus borealis

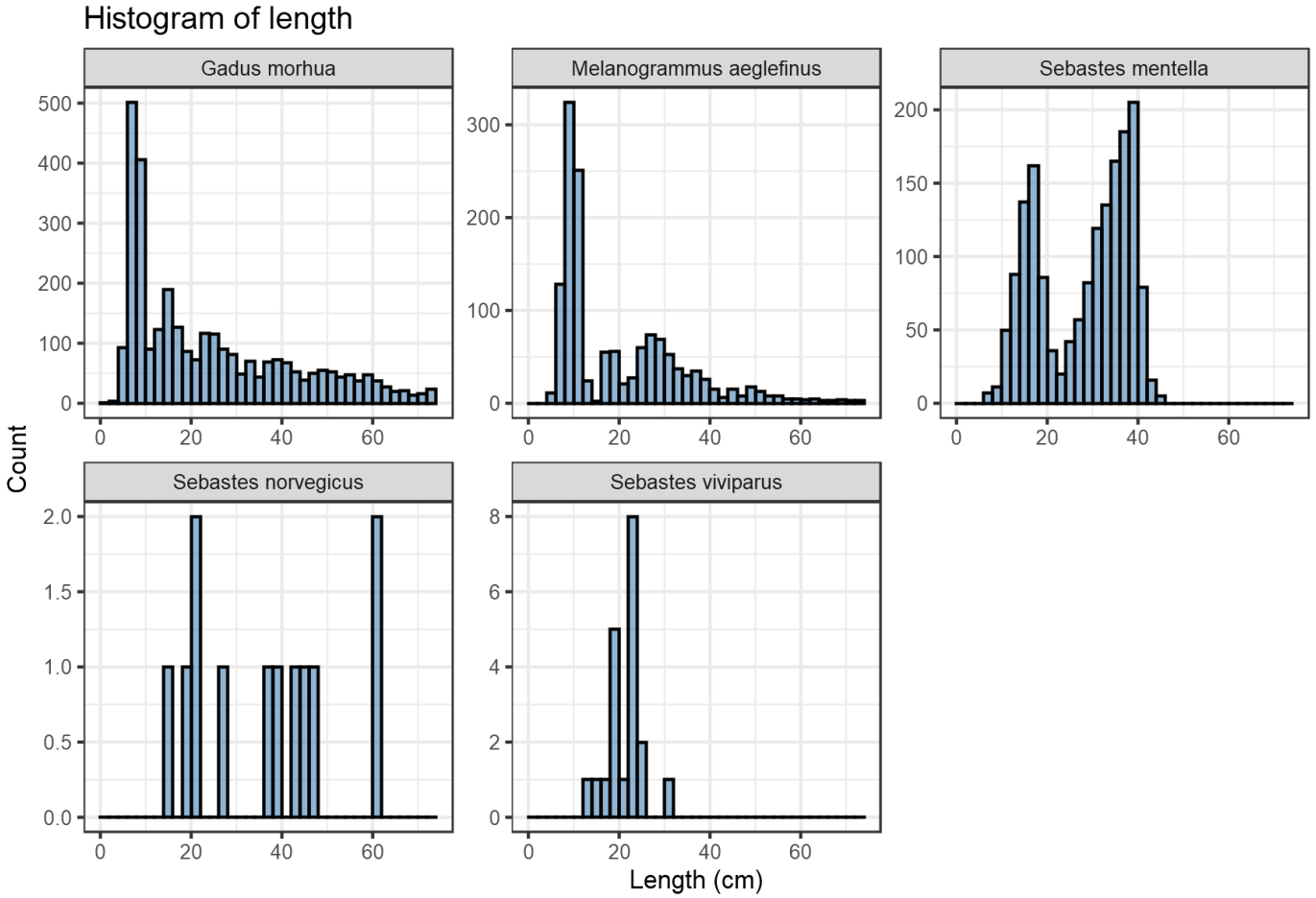


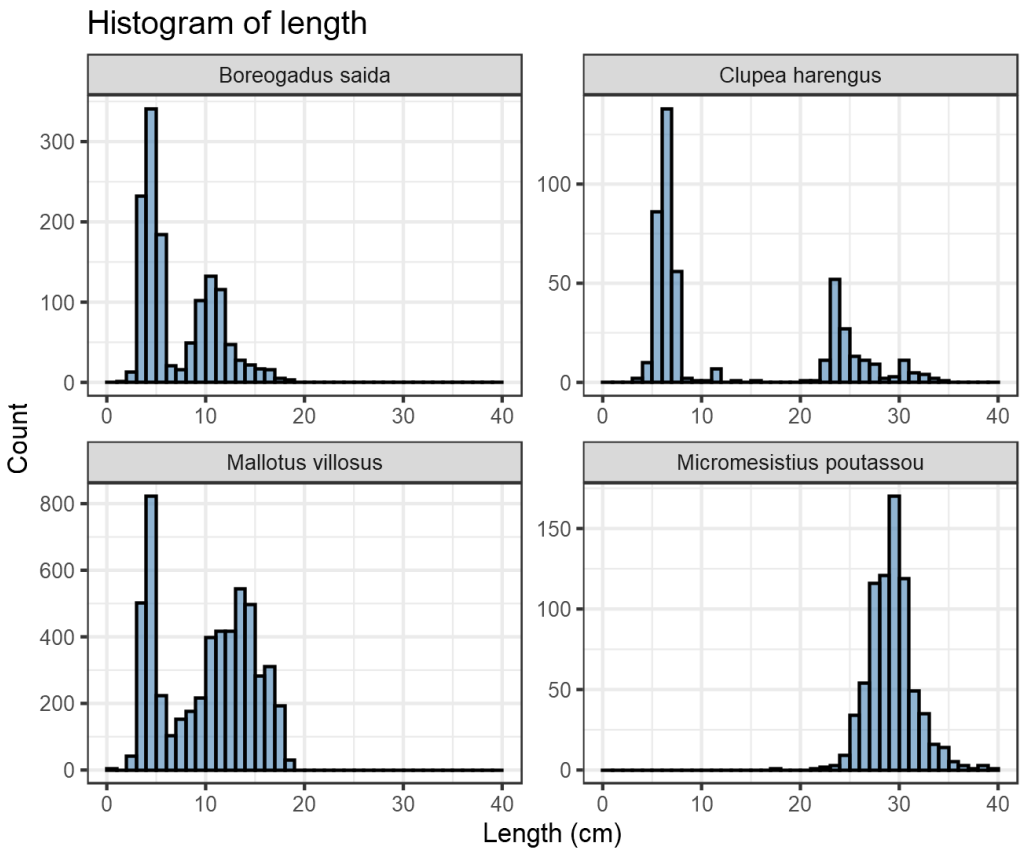
Number of individuals | 2019 | Pandalus borealis



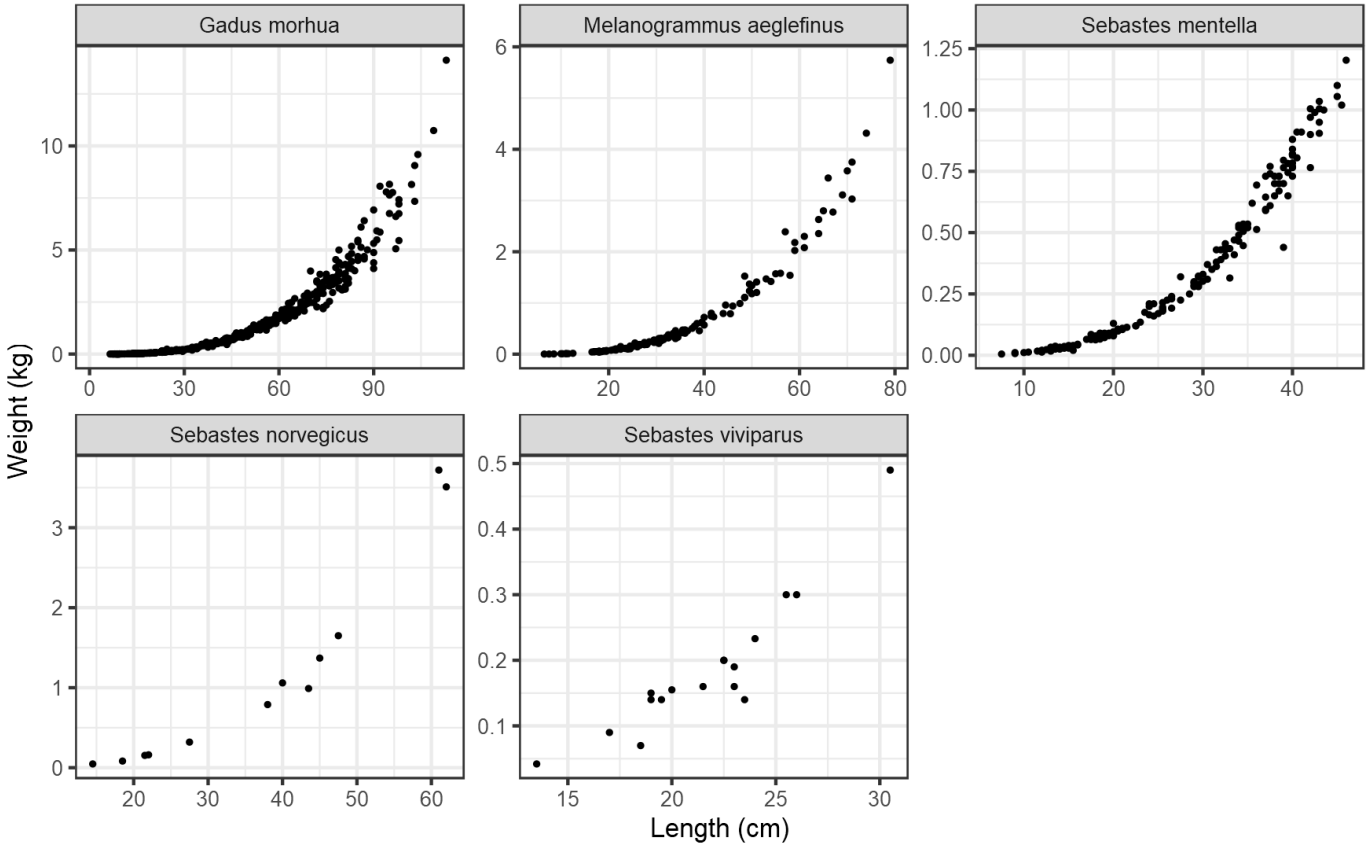
Length distributions

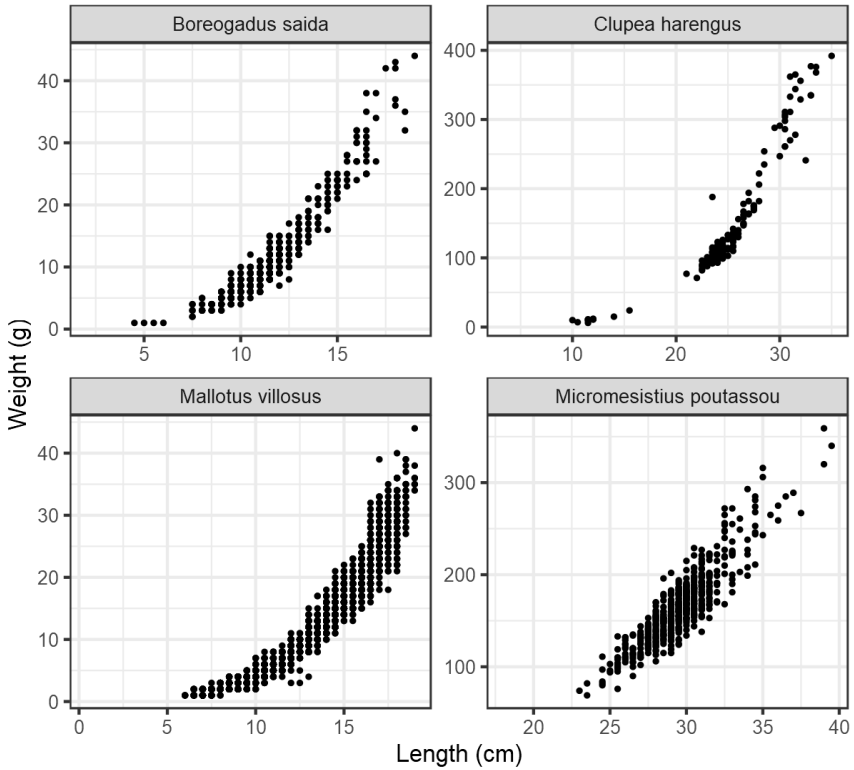
The following figures shows the length distribution of individuals sampled during the survey.



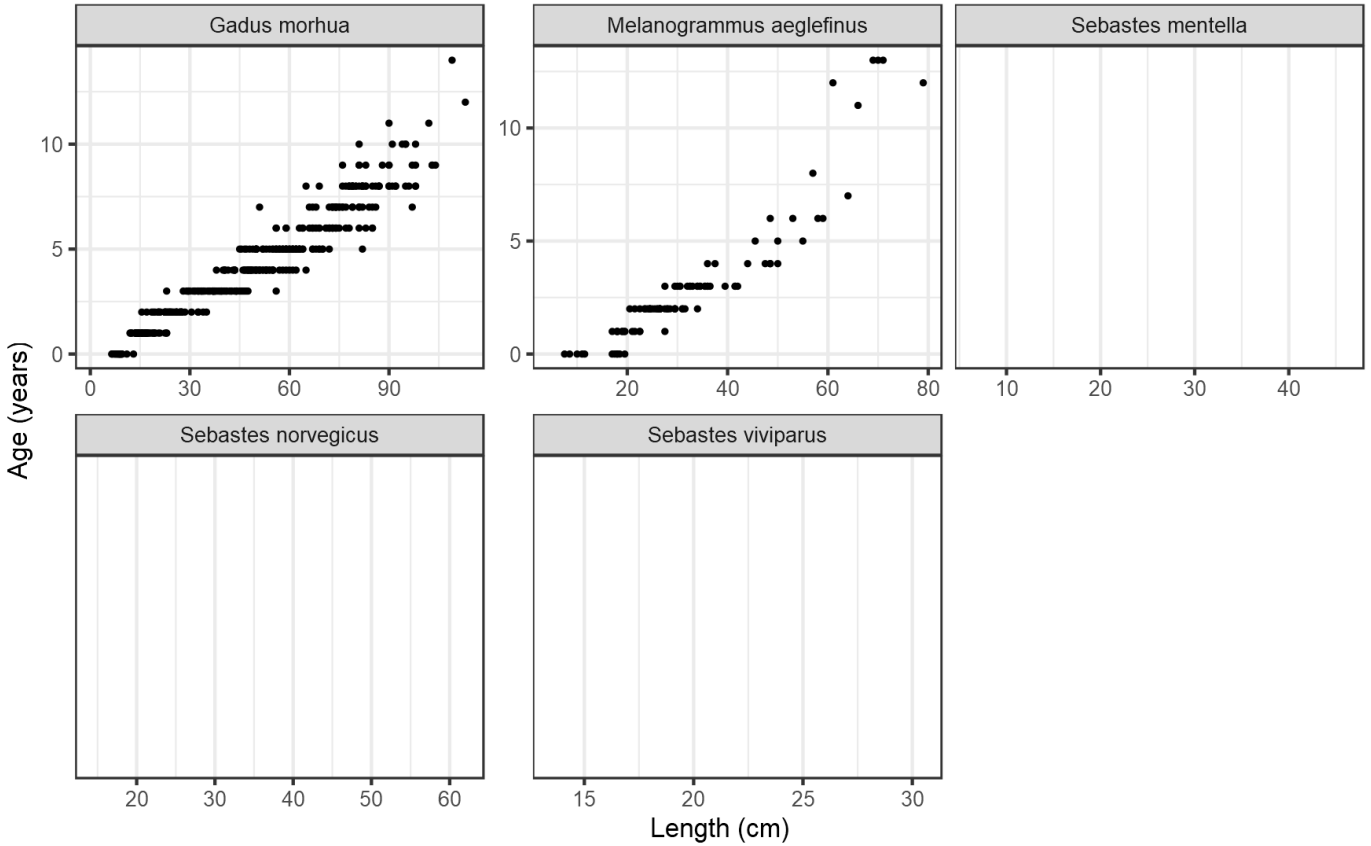

Histogram of length
Boreogadus saida
Clupea harengus
Mallotus villosus
Micromesistius poutassou
Count
Length (cm)
0
100
200
300
50
400
600
800
150
10
20
30
40

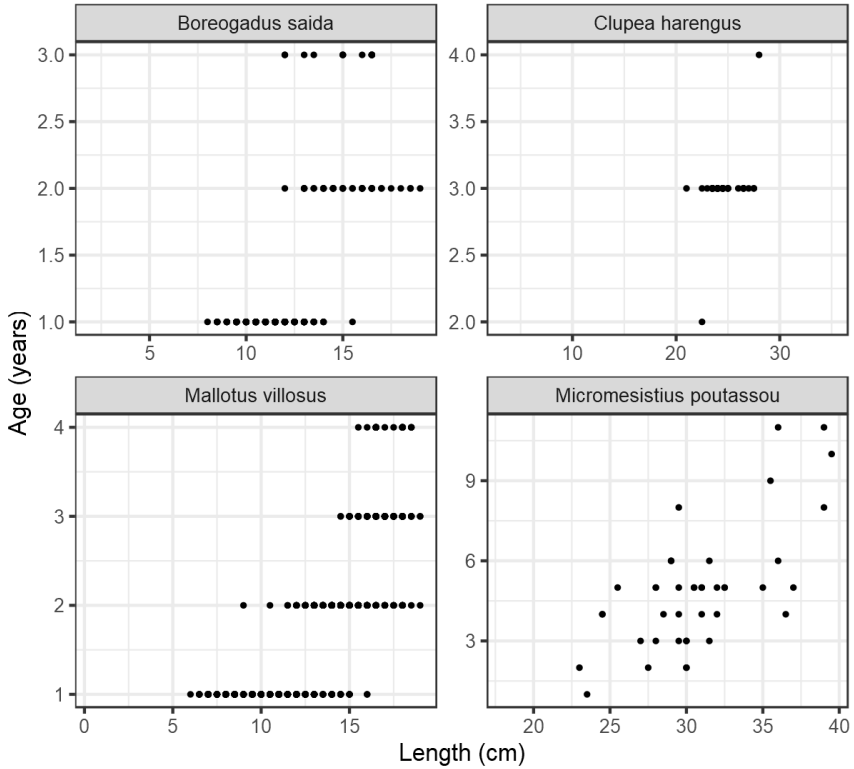
Length-weight relationships




Boreogadus saida
Clupea harengus
Mallotus villosus
Micromesistius poutassou
Weight (g)
Length (cm)

Length-age relationships





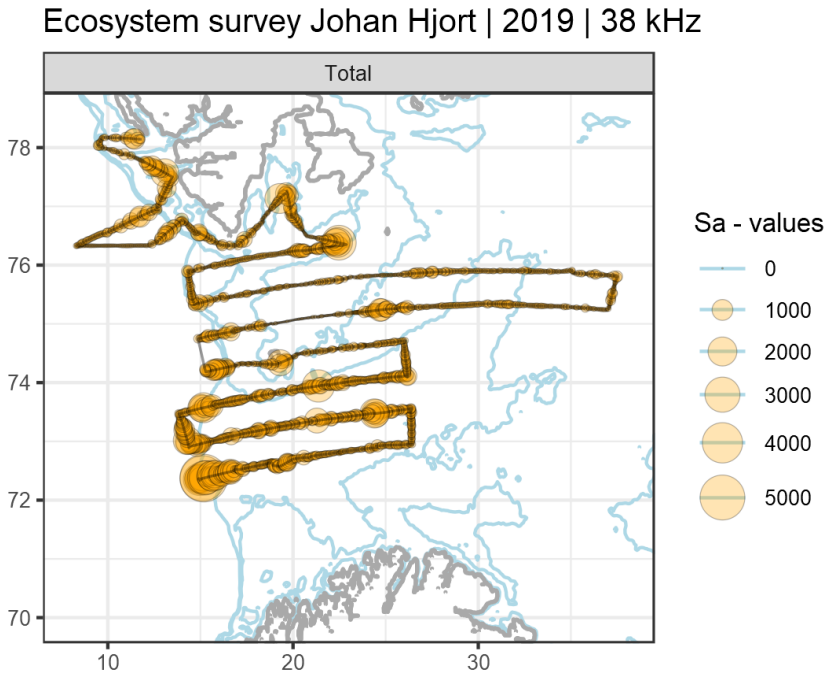
Acoustic registrations

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

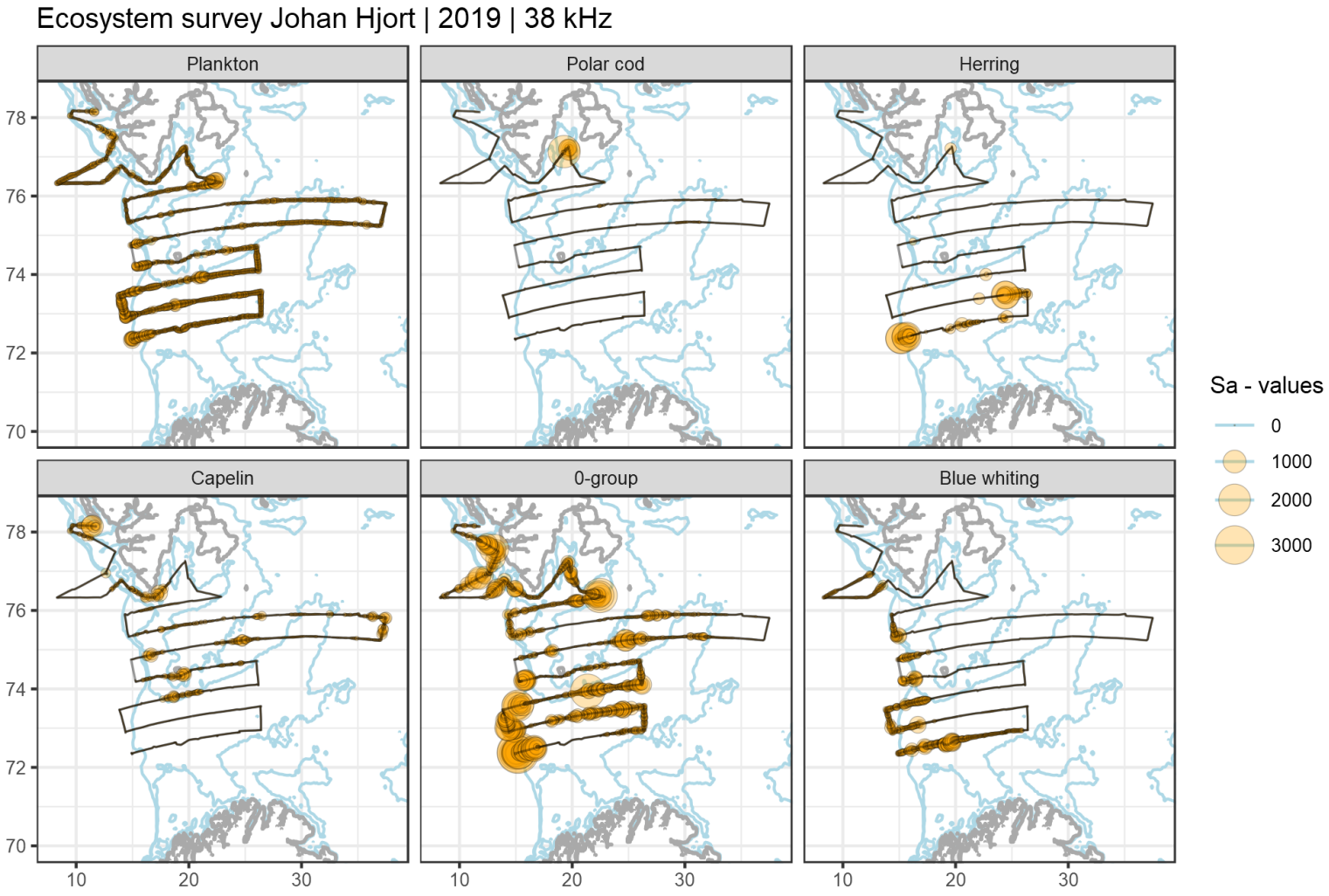
Example echograms

Depth-integrated acoustic backscatter

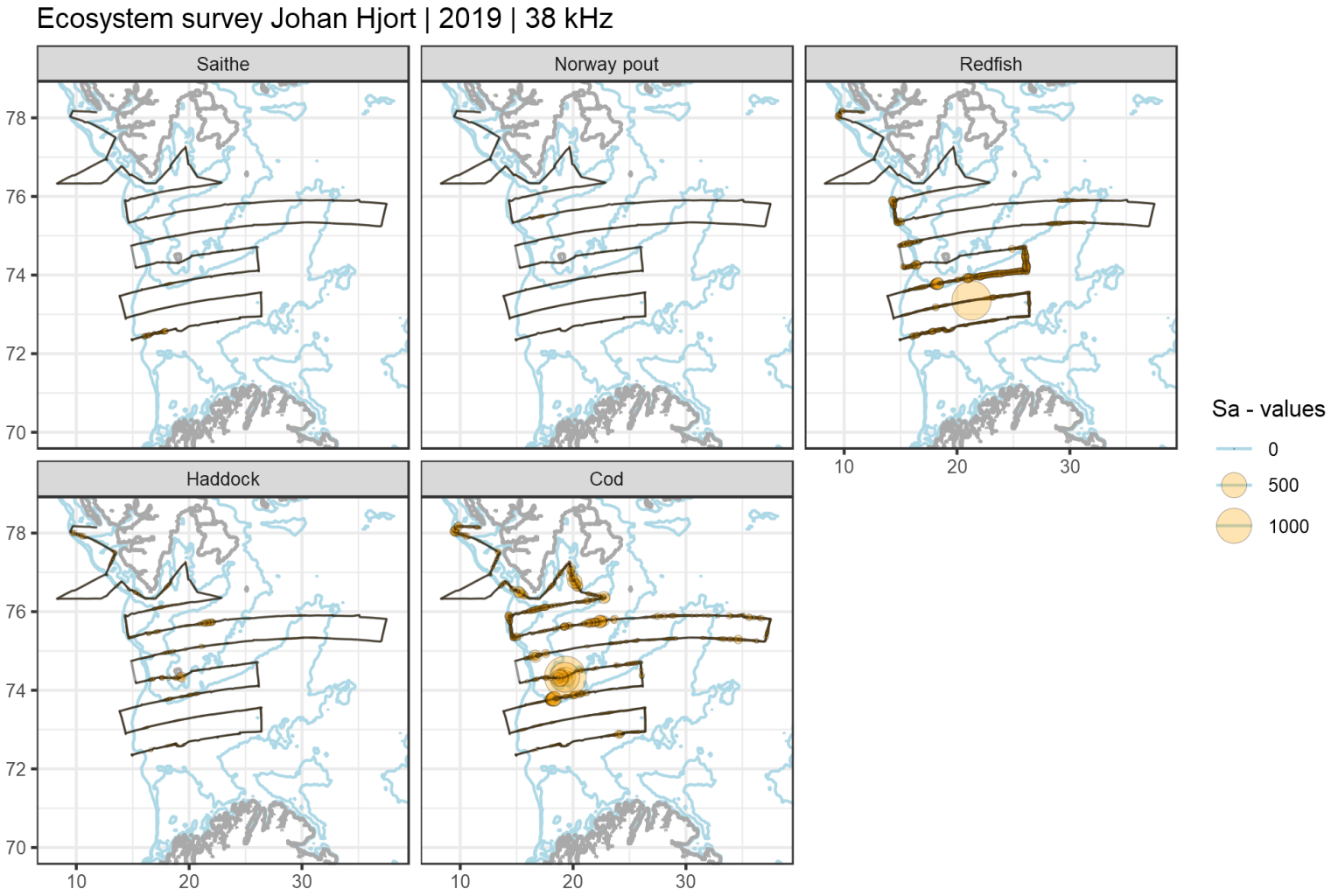
Total backscatter



Pelagic species

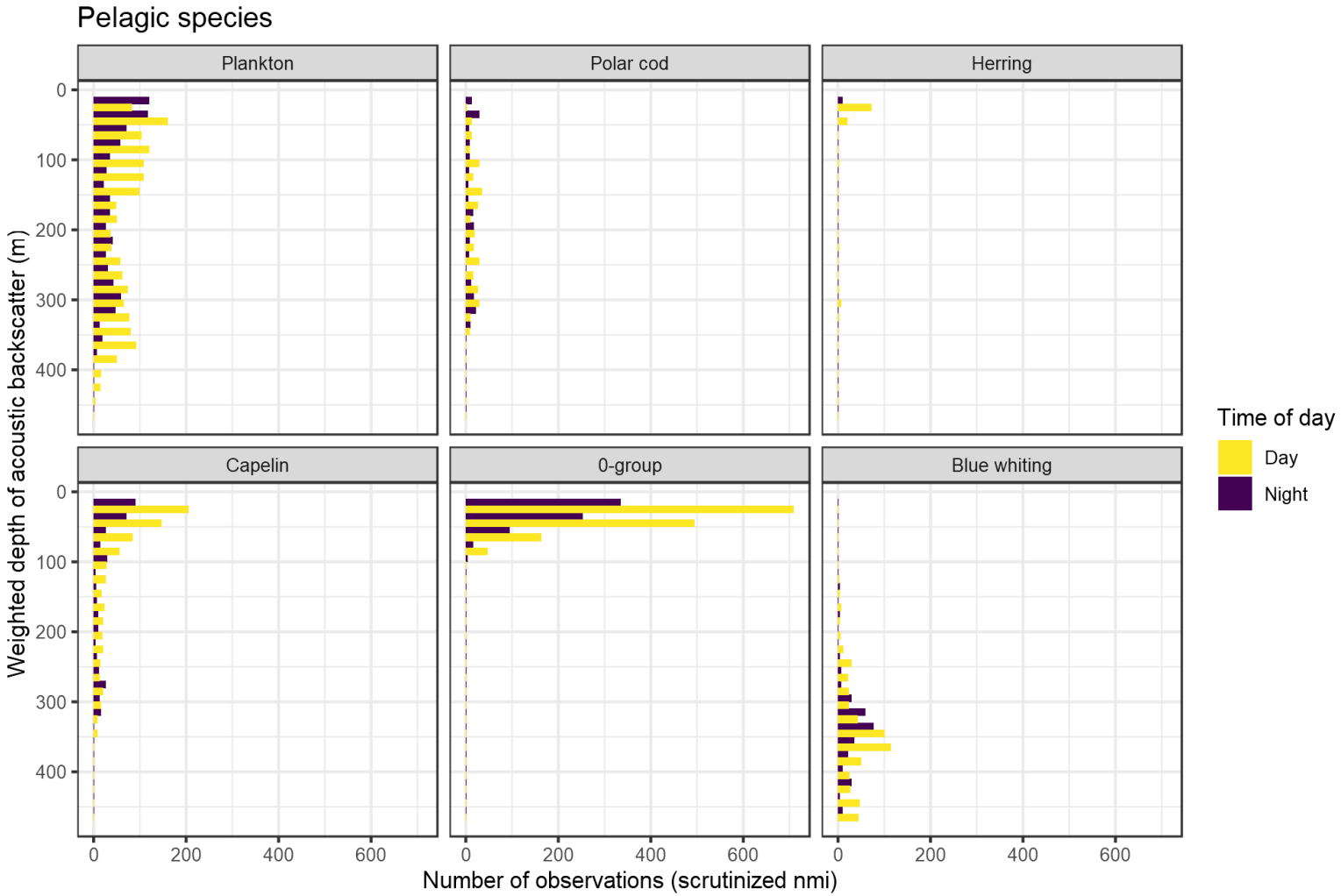


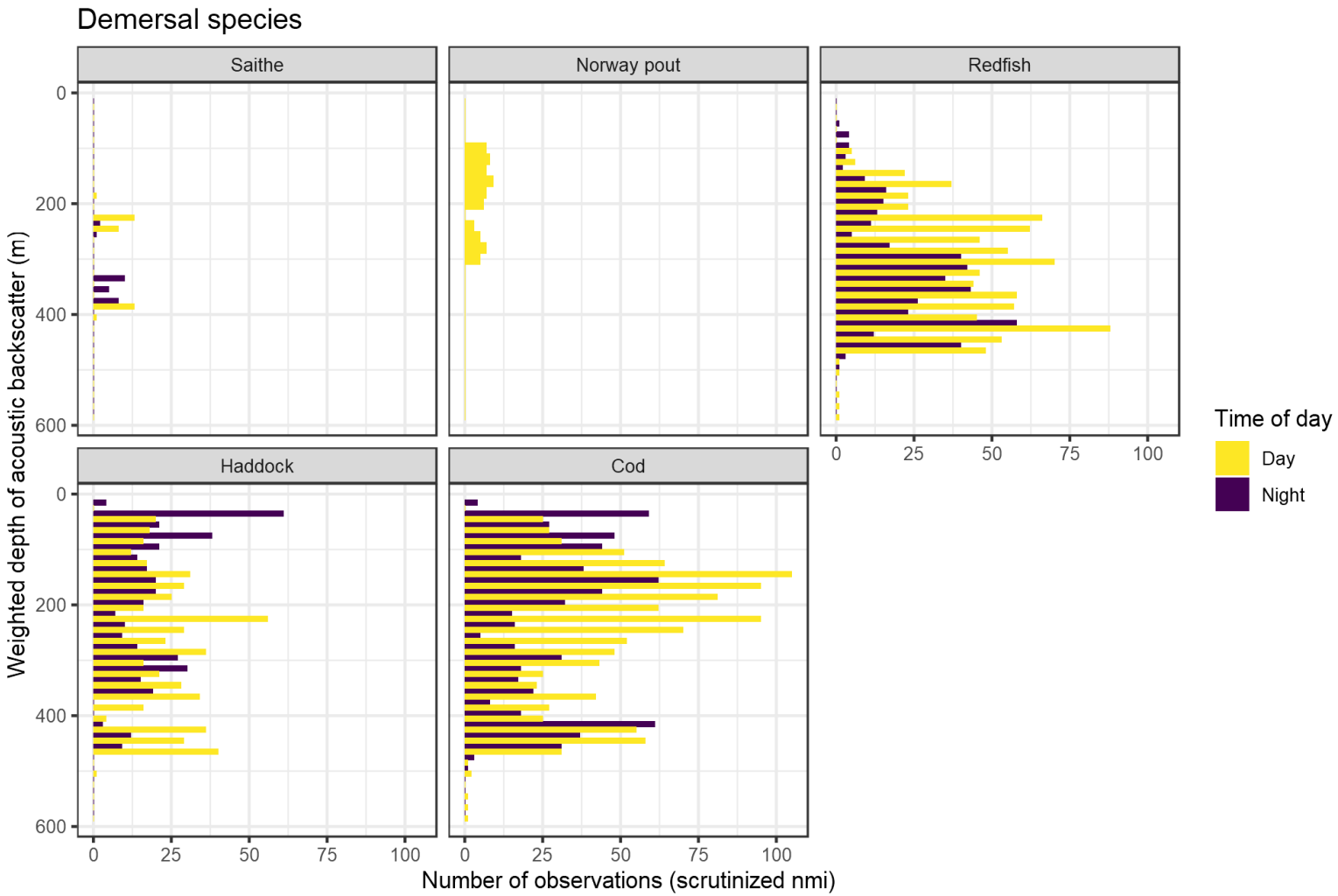
Demersal species



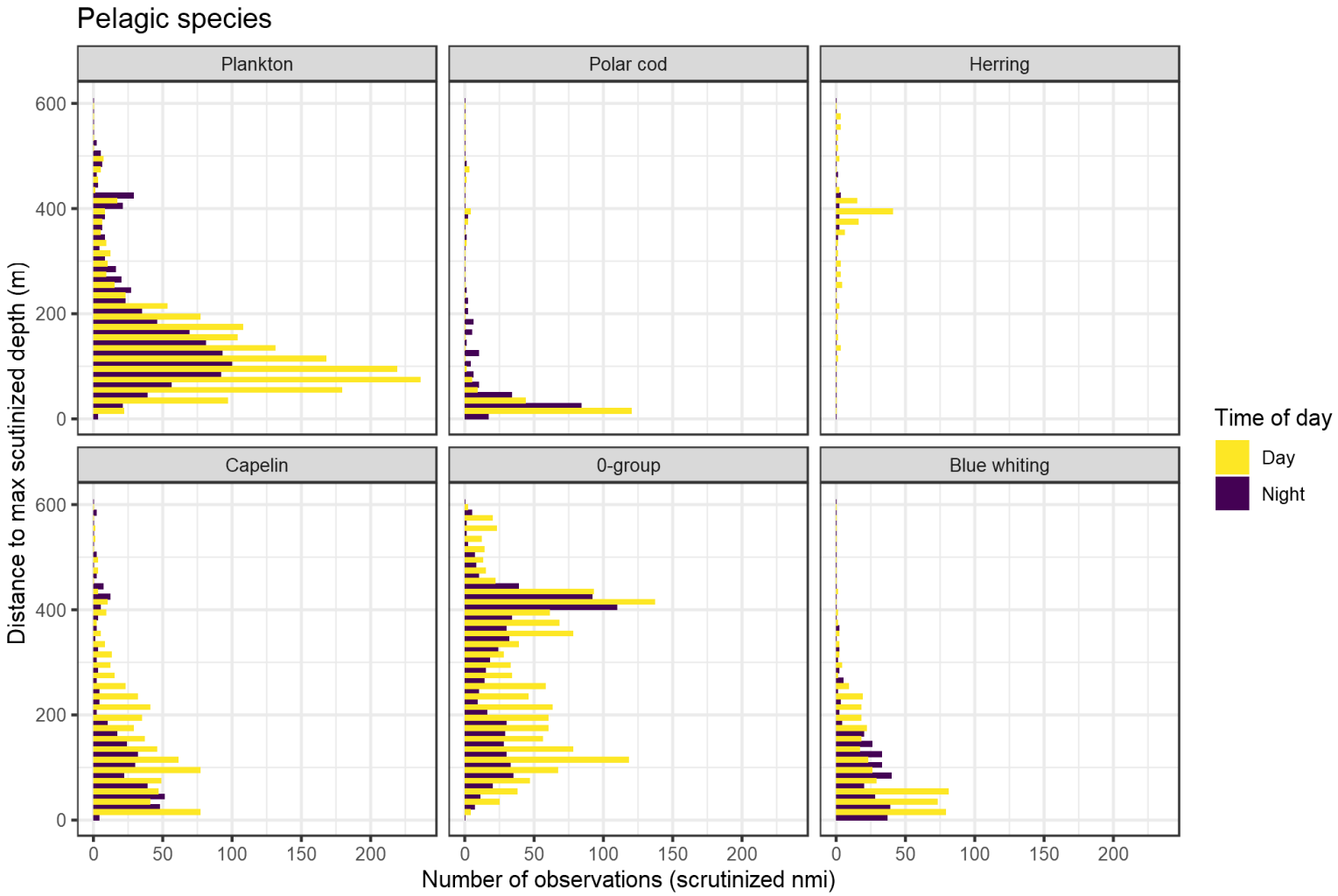
Acoustic backscatter in depth channels

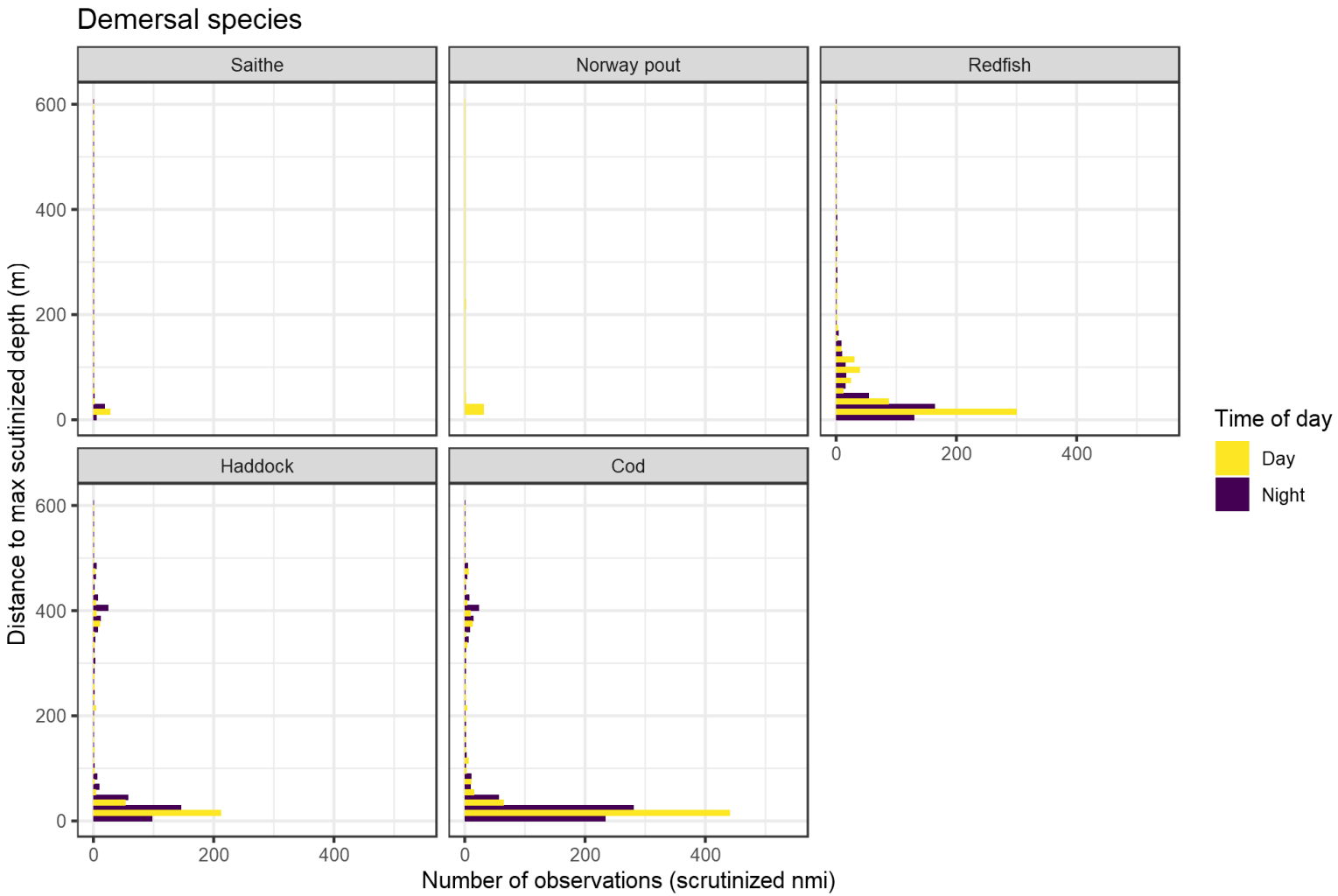
Distance from the surface to weighted depth of acoustic registrations




Demersal species
Saithe
Norway pout
Redfish
Haddock
Cod
Weighted depth of acoustic backscatter (m)
0
200
400
600
0
25
50
75
100
Number of observations (scrutinized nmi)
Time of day
Day
Night

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

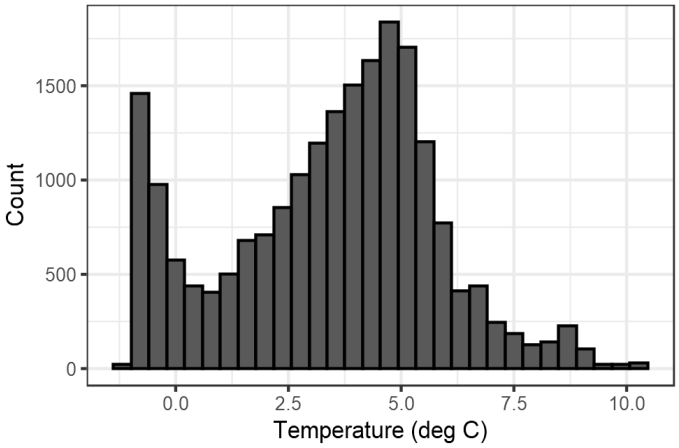


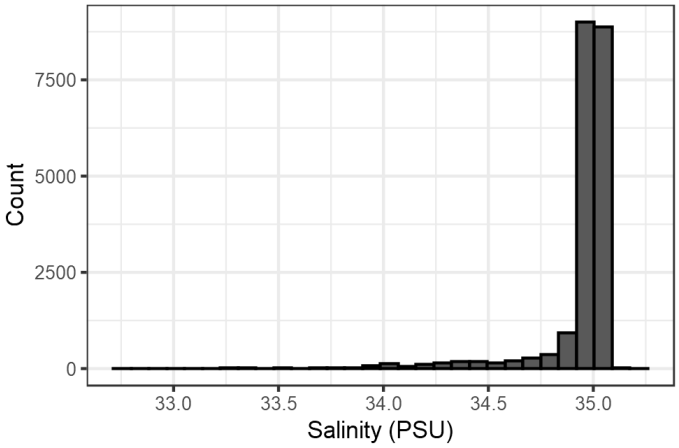

Demersal species
Saithe
Norway pout
Redfish
Haddock
Cod
Distance to max scutinized depth (m)
Number of observations (scrutinized nmi)
0
200
400
600
Time of day
Day
Night

CTD

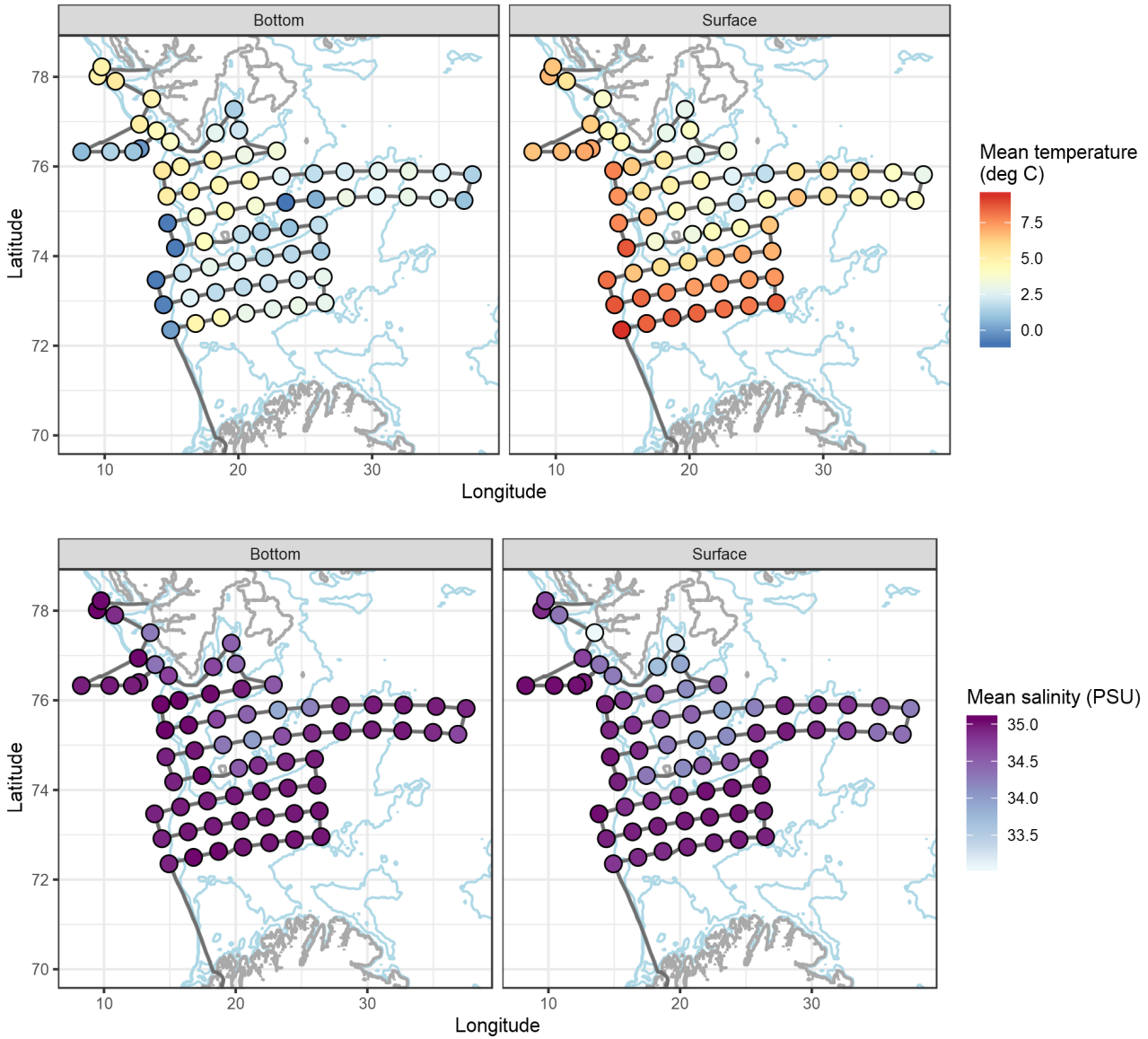
Summary of measurements

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

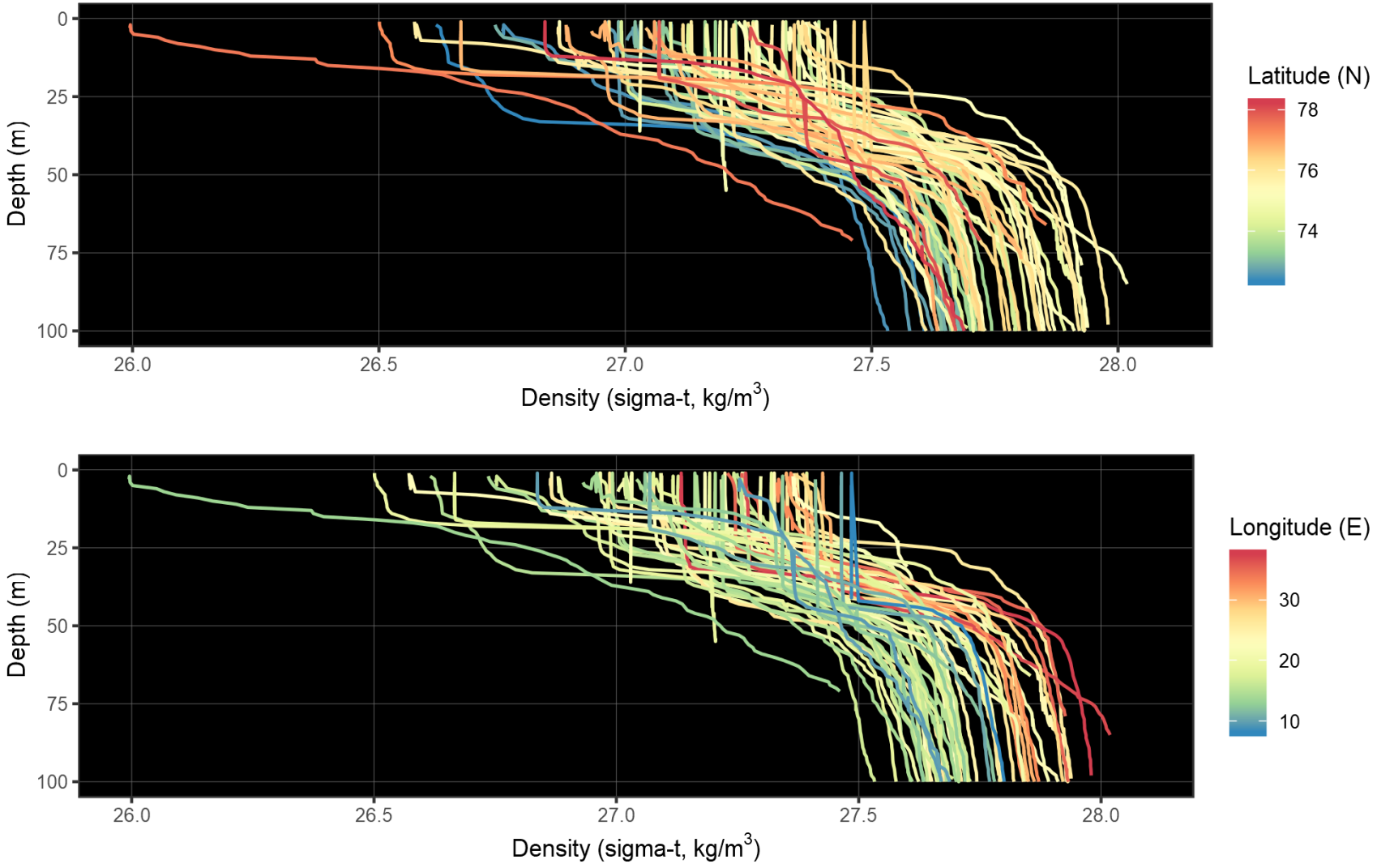




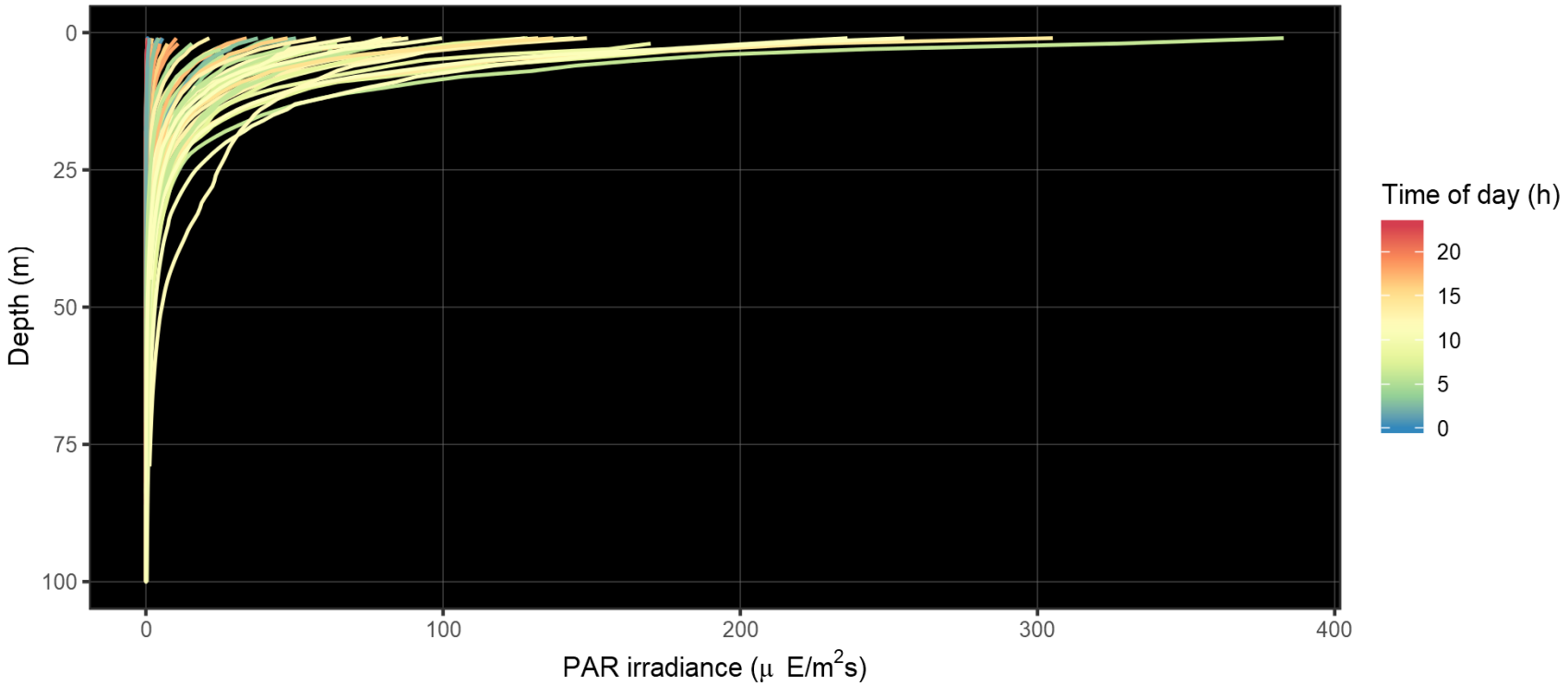
Variation in temperature and salinity with bathymetry and geographical location



Density in the water column



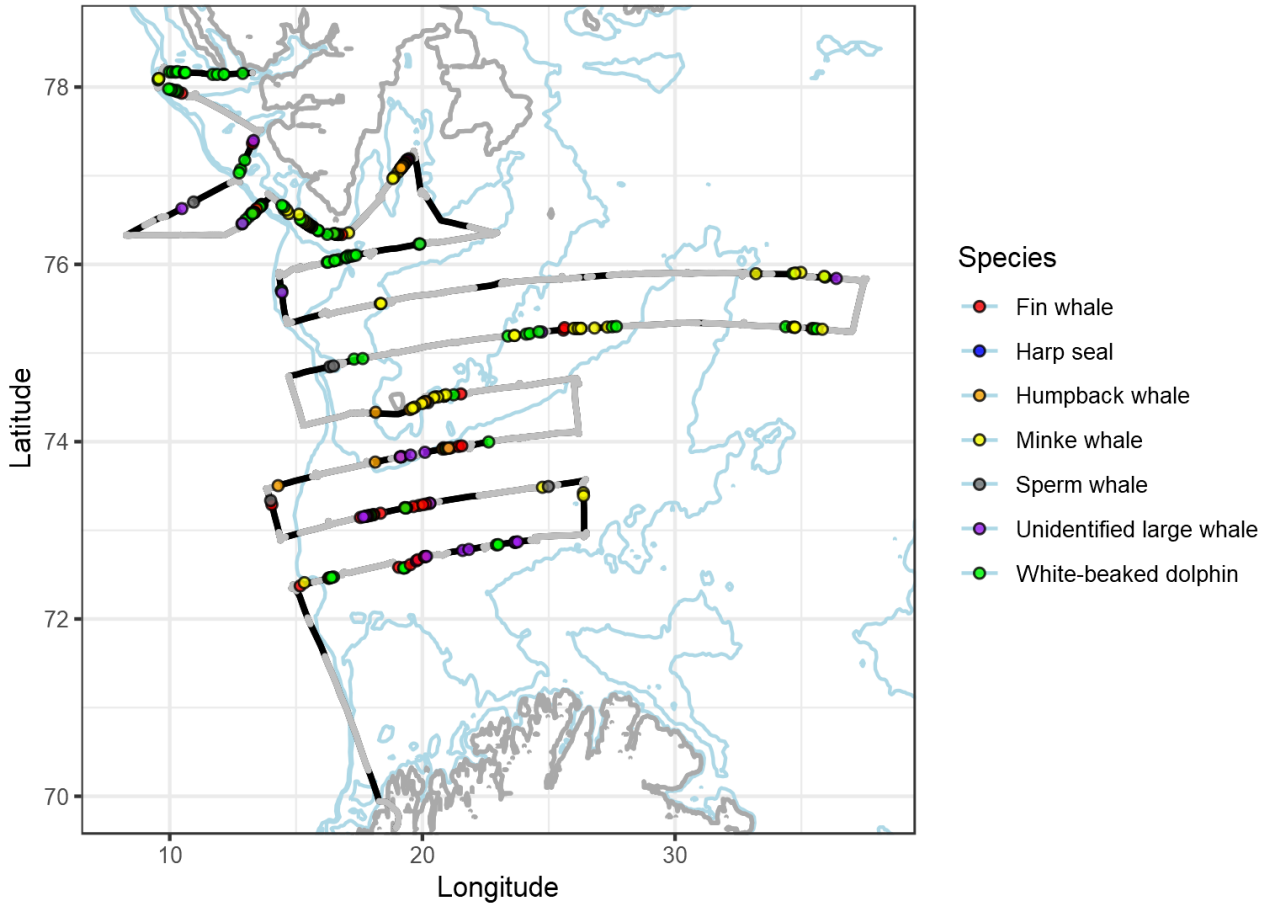
Light in the water column



Whales

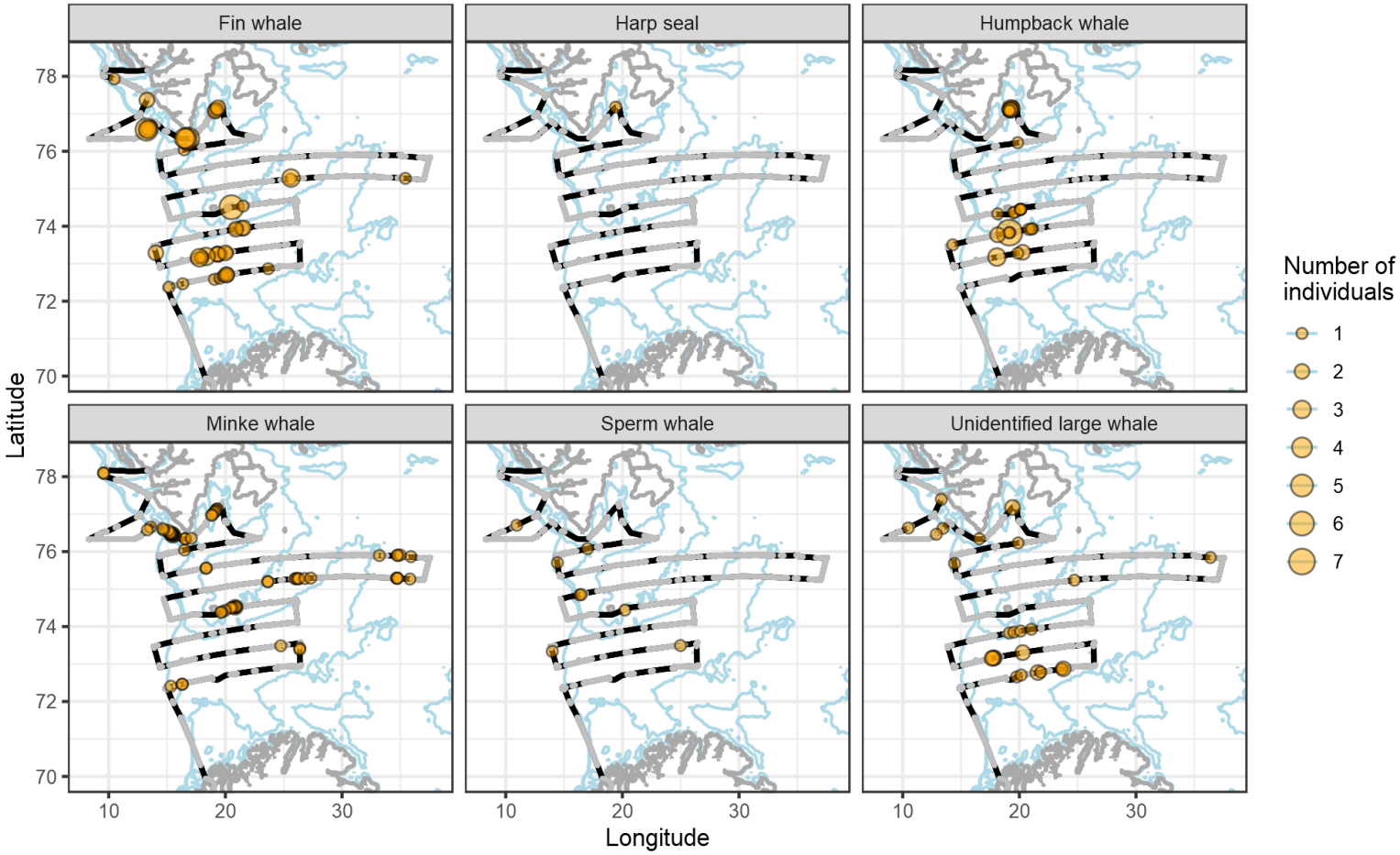
Positions of sightings by species

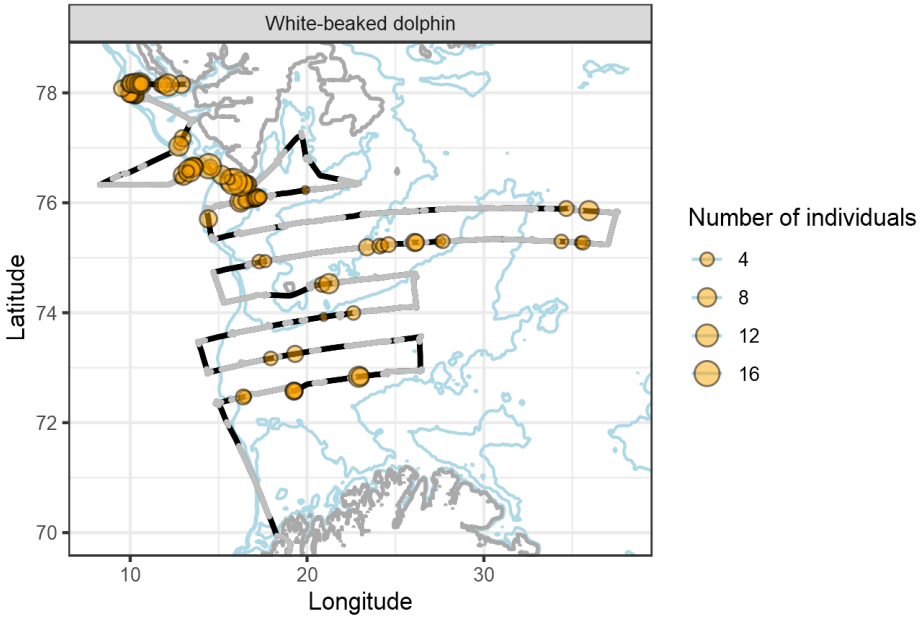
This figure shows presence/absence sightings of whales and seals along the cruise track. The cruise track colour indicates whether the observers have been on watch (black) or off watch (grey).



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).





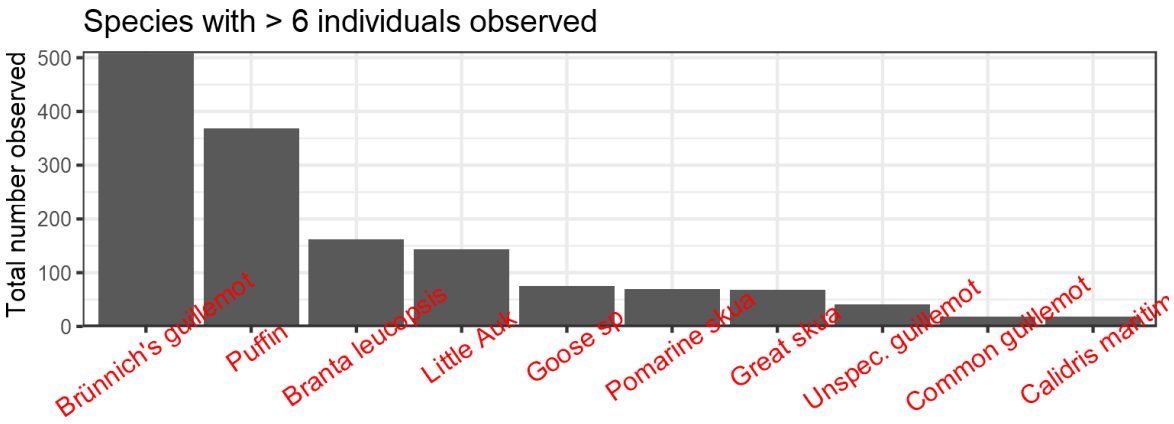
Seabirds (non ship followers)

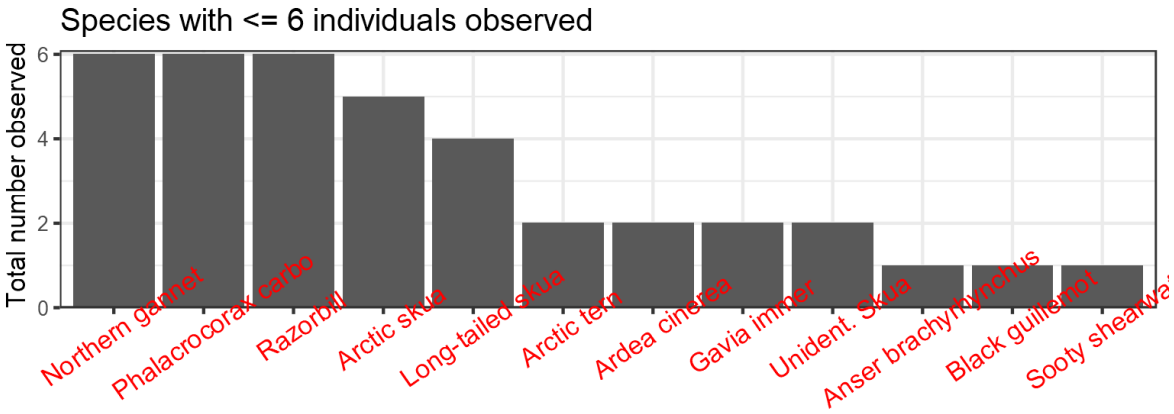
- NB work to generalise this code -

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.

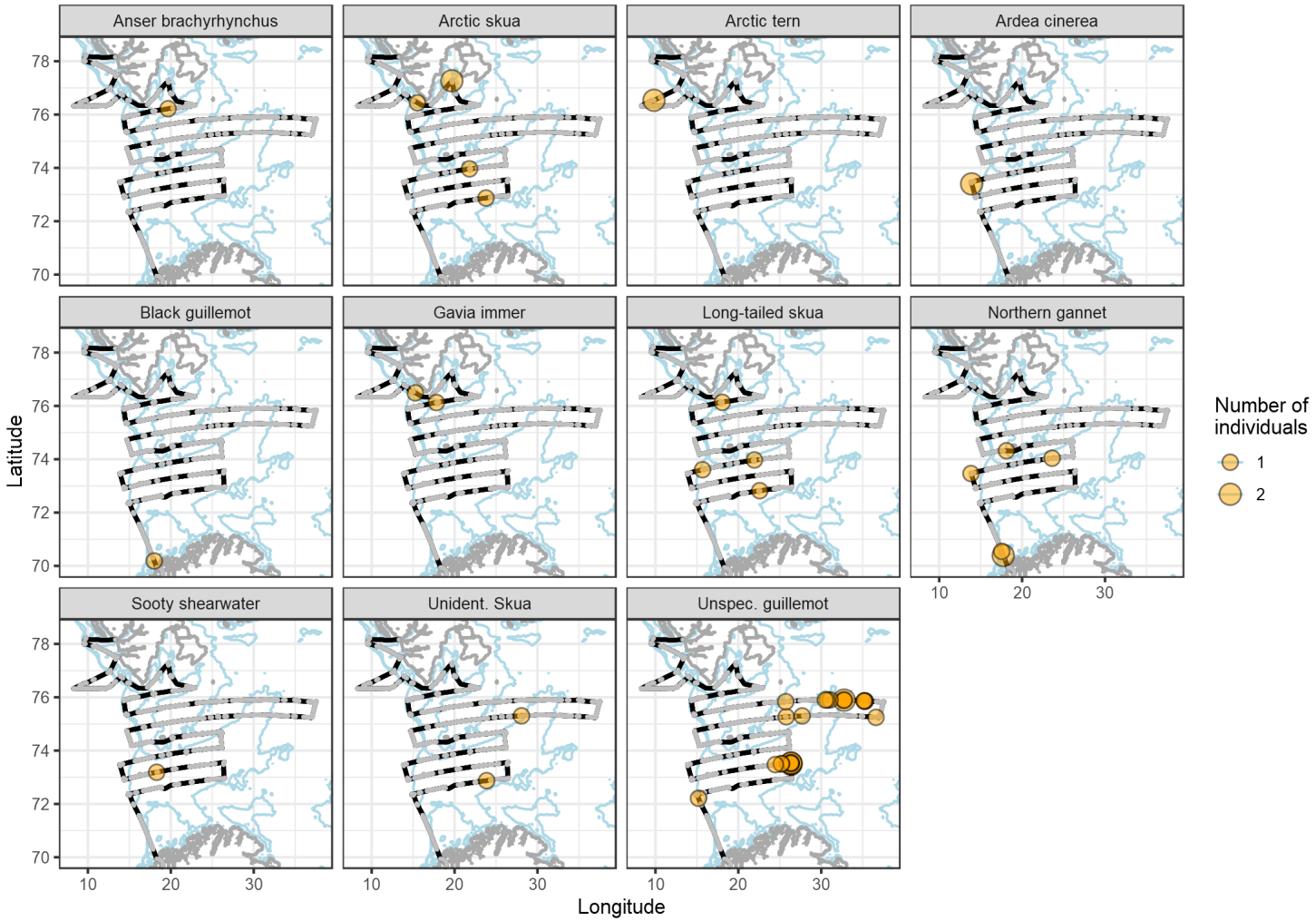
6 species were observed only once: Anser brachyrhynchus, Arctic tern, Ardea cinerea, Black guillemot, Goose sp, Sooty shearwater.

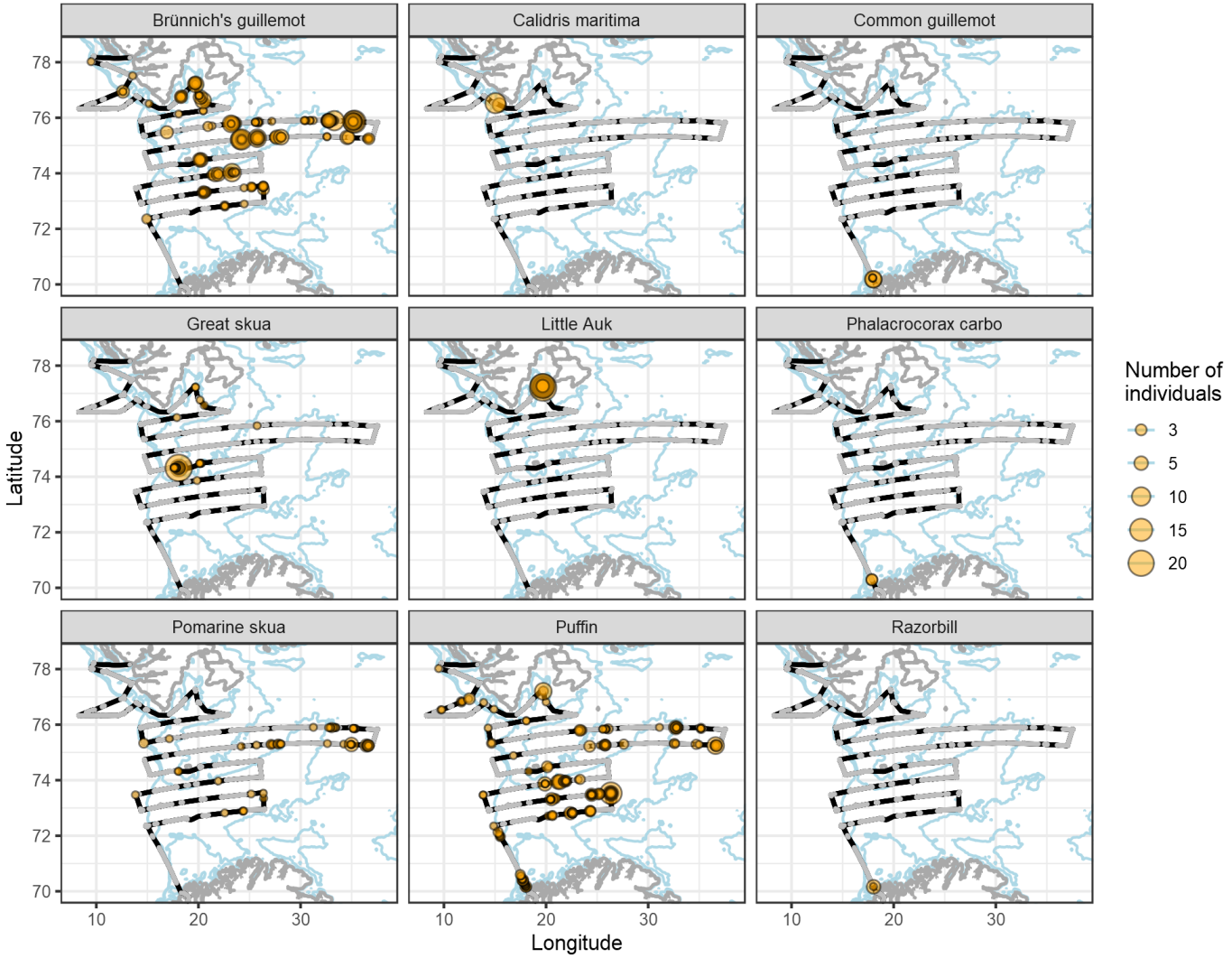

Species with > 6 individuals observed
Total number observed
500
400
300
200
100
0
Brünnich's guillemot
Puffin
Branta leucopsis
Little Auk
Goose sp.
Pomarine skua
Great skua
Unspec. guillemot
Common guillemot
Calidris maritim

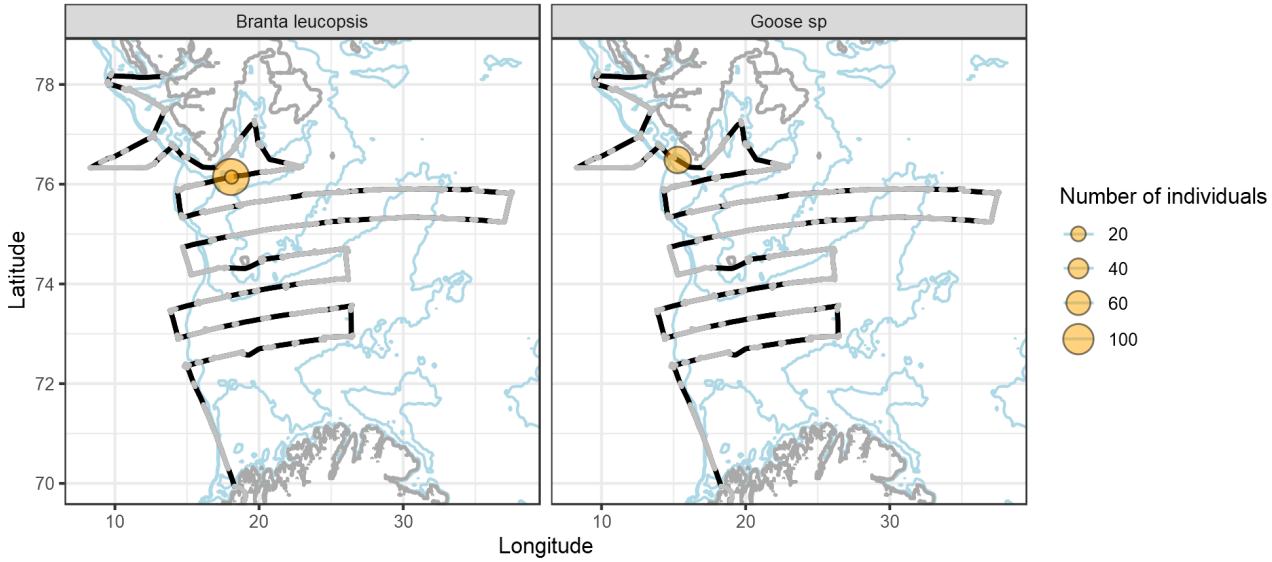

Species with <= 6 individuals observed
Total number observed
6
4
2
0
Northern gannet
Phalacrocorax carbo
Razorbill
Arctic skua
Long-tailed skua
Arctic tern
Ardea cinerea
Gavia immer
Unident. Skua
Anser brachyrhynchus
Black guillemot
Sooty shearwa

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-




Brünnich's guillemot
Calidris maritima
Common guillemot
Great skua
Little Auk
Phalacrocorax carbo
Pomarine skua
Puffin
Razorbill
Latitude
Longitude
78
76
74
72
70
10
20
30
Number of individuals
3
5
10
15
20


Branta leucopsis
Goose sp
Latitude
Longitude
78
76
74
72
70
10
20
30
Number of individuals
20
40
60
100