
DTU Aqua - Cruise report

Danish Sole Survey 4Q 2024

SG25

Denmark

From 03-11-2024 to 22-11-2024

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Cruise summary

General information

<i>Cruise</i>	Danish Sole Survey
<i>Cruise leader</i>	Marie Storr-Paulsen
<i>Research vessel(s)</i>	SG25
<i>Year and quarter</i>	4Q 2024
<i>Country</i>	Denmark

Participants and time

Trip no.	Start date and time	End date and time	Ship
2	03-11-2024 17:00	07-11-2024 00:00	SG25
4	10-11-2024 16:00	14-11-2024 02:00	SG25
6	18-11-2024 17:00	22-11-2024 06:00	SG25

Name	Institute	Function tasks	Leg
Niels Lyse	DTU-Aqua	Cruise-leader	1
Gert	DTU-Aqua	Skipper	1
Peter Vingaard	DTU-Aqua	Bestman	1
Niels Lyse	DTU-Aqua	Cruise-leader	2
Sebastian Kjelstrup	DTU-Aqua	Bestman	2

Introduction

The “Tunge Survey” (Sole Survey) is an annual survey carried out every autumn in the Kattegat, Skagerrak and Western Belt area. The purpose of the cruise is to provide CPUE data for sole. The results are used for maintaining a time series used in the annually assessment of sole from Kattegat. From 2016 and onwards the survey is carried out by a commercial fishing vessel and the research vessel “Havfisken” owned by DTU Aqua. The gear used is a demersal otter trawl.

Gear

Trawl: Twin “Icelandic-sole-trawl” with 140 mm mesh and rockhopper type ground gear with 150 mm rubber discs. Mesh size in the cod end: 55 mm stretch mesh Otter boards: 66' “Thyborøn”. Warp: 13 mm.

The otter boards are mounted directly on the tips of the wings without bridles. Wing spread (otter board spread) is app. 44 m.

Trawl procedure

Towing time is 30 min.

Before 2016 the towing time was 60 min but towing time down to 20 min has been accepted if no circumstances disqualified the haul.

In 2016 towing time was reduced to 30 min on 25% of the traditional stations and in 2017 the towing time was reduced to 30 on 50% of the stations. Towing time was 30 min on all new stations in Jammerbugt and Storebælt.

Towing speed: 2.5 kn. over the seabed.

Hauls start: when the trawl is considered going stable on the bottom.

Haul end: when hauling starts.

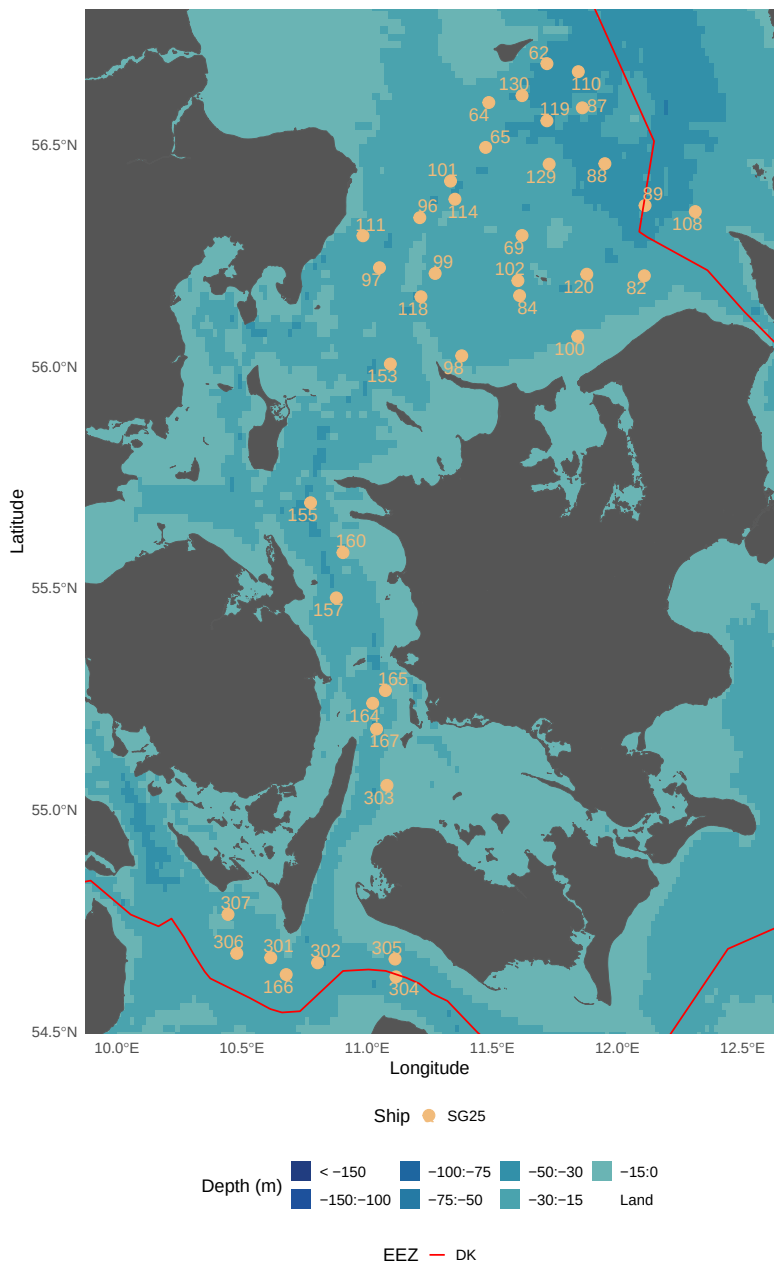
Warp length: The depth varies from station to station and so does the warp length. The warp length was recorded at each station in 2004 and this warp length is used at the station in 2005 and onwards.

Each station is fished in the same direction each year if wind and current allows.

Fishing takes place only during night time from app. 5 pm to 7 am.

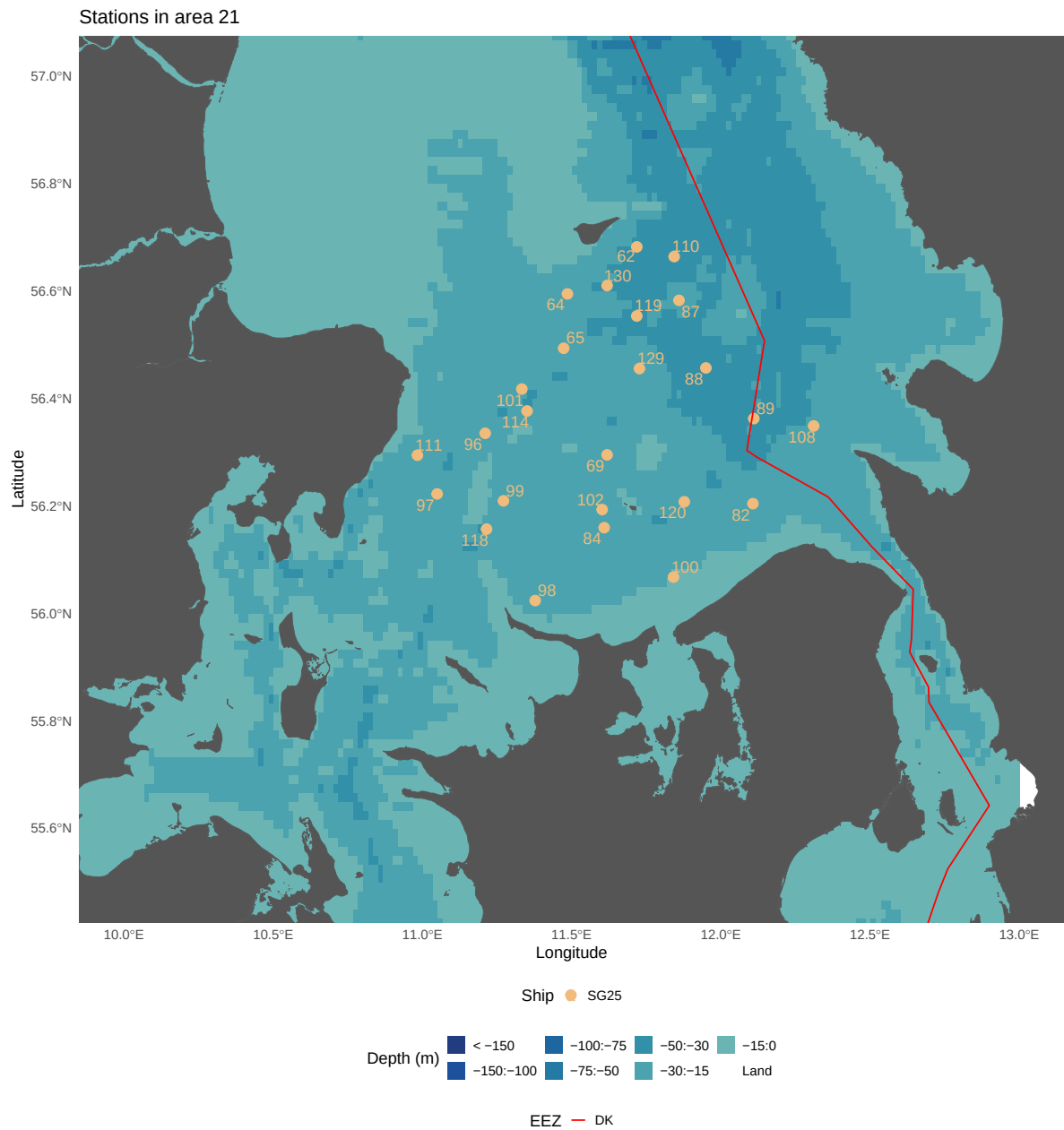
Stations

40 hauls were conducted during the survey. The positions of all hauls are presented in the map in Fig. 1 and hauls per ICES area are plotted in the maps in Fig. 2-3.



Stations by ICES area

Area 21

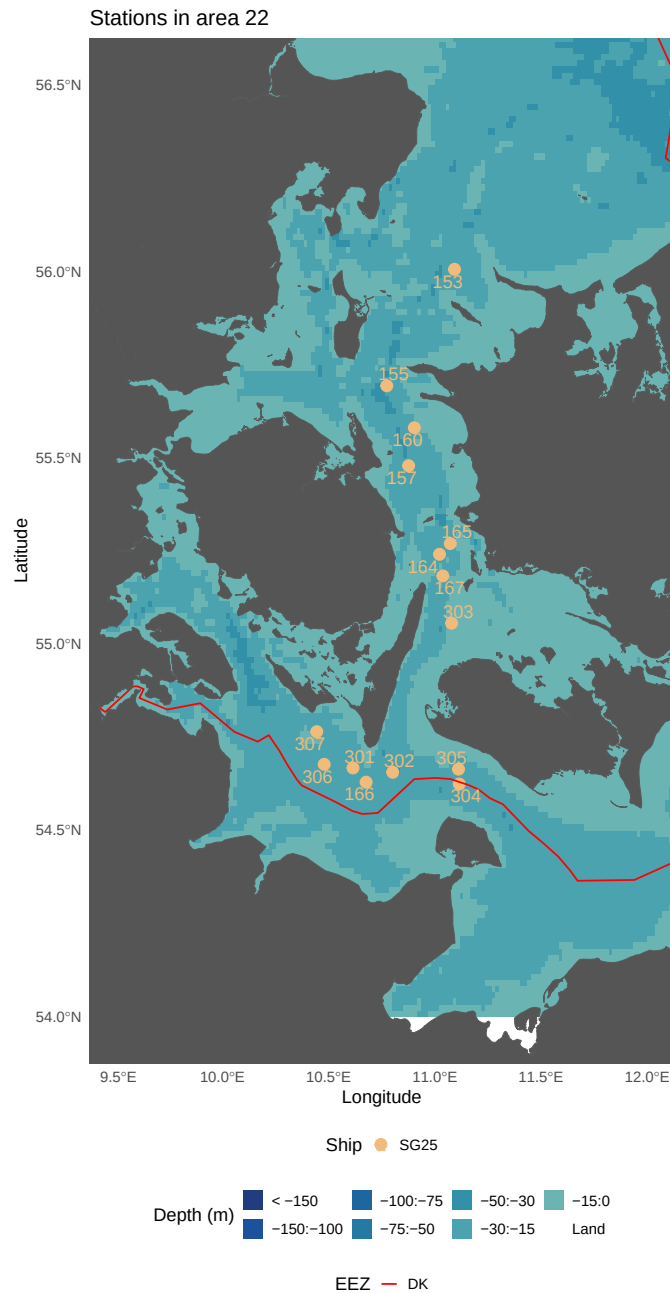


Area: 21, Geartype: DTU55, GearQuality: V

Station Name	Latitude dec.	Longitude dec.	Latitude deg.	Longitude deg.	Ship
62	56.682483	11.718216	56.40.9490 N	011.43.0930 E	SG25
64	56.594916	11.485900	56.35.6950 N	011.29.1540 E	SG25

Station Name	Latitude dec.	Longitude dec.	Latitude deg.	Longitude deg.	Ship
65	56.493716	11.473250	56.29.6230 N	011.28.3950 E	SG25
69	56.295166	11.618800	56.17.7100 N	011.37.1280 E	SG25
82	56.204366	12.107433	56.12.2620 N	012.06.4460 E	SG25
84	56.159600	11.608983	56.09.5760 N	011.36.5390 E	SG25
87	56.582966	11.859616	56.34.9780 N	011.51.5770 E	SG25
88	56.457050	11.949750	56.27.4230 N	011.56.9850 E	SG25
89	56.362750	12.110266	56.21.7650 N	012.06.6160 E	SG25
96	56.335316	11.210216	56.20.1190 N	011.12.6130 E	SG25
97	56.222450	11.049200	56.13.3470 N	011.02.9520 E	SG25
98	56.023916	11.377816	56.01.4350 N	011.22.6690 E	SG25
99	56.209550	11.271566	56.12.5730 N	011.16.2940 E	SG25
100	56.067583	11.841166	56.04.0550 N	011.50.4700 E	SG25
101	56.417766	11.333016	56.25.0660 N	011.19.9810 E	SG25
102	56.193300	11.602216	56.11.5980 N	011.36.1330 E	SG25
108	56.349083	12.311000	56.20.9450 N	012.18.6600 E	SG25
110	56.664466	11.843516	56.39.8680 N	011.50.6110 E	SG25
111	56.294500	10.983150	56.17.6700 N	010.58.9890 E	SG25
114	56.376950	11.350616	56.22.6170 N	011.21.0370 E	SG25
118	56.156983	11.214800	56.09.4190 N	011.12.8880 E	SG25
119	56.553733	11.718166	56.33.2240 N	011.43.0900 E	SG25
120	56.207850	11.877416	56.12.4710 N	011.52.6450 E	SG25
129	56.455883	11.727066	56.27.3530 N	011.43.6240 E	SG25
130	56.610450	11.618750	56.36.6270 N	011.37.1250 E	SG25

Area 22



Area: 22, Geartype: DTU55, GearQuality: V

Station Name	Latitude dec.	Longitude dec.	Latitude deg.	Longitude deg.	Ship
153	56.005350	11.092500	56.00.3210 N	011.05.5500 E	SG25
155	55.692683	10.773783	55.41.5610 N	010.46.4270 E	SG25
157	55.478183	10.876583	55.28.6910 N	010.52.5950 E	SG25

Station Name	Latitude dec.	Longitude dec.	Latitude deg.	Longitude deg.	Ship
160	55.580116	10.903333	55.34.8070 N	010.54.2000 E	SG25
164	55.240466	11.021966	55.14.4280 N	011.01.3180 E	SG25
165	55.269166	11.072683	55.16.1500 N	011.04.3610 E	SG25
166	54.628900	10.676400	54.37.7340 N	010.40.5840 E	SG25
167	55.182483	11.037583	55.10.9490 N	011.02.2550 E	SG25
301	54.666983	10.614700	54.40.0190 N	010.36.8820 E	SG25
302	54.655400	10.801866	54.39.3240 N	010.48.1120 E	SG25
303	55.055483	11.079100	55.03.3290 N	011.04.7460 E	SG25
304	54.623766	11.115133	54.37.4260 N	011.06.9080 E	SG25
305	54.663850	11.111300	54.39.8310 N	011.06.6780 E	SG25
306	54.676700	10.478933	54.40.6020 N	010.28.7360 E	SG25
307	54.764483	10.444016	54.45.8690 N	010.26.6410 E	SG25

Handling of the catch

After each haul the catch is sorted by species and weighed to nearest 0.1 kg and the number of specimens recorded. Most fish species are measured as total length (TL) to 1.0 cm below. Norway lobster is measured in mm carapace length.

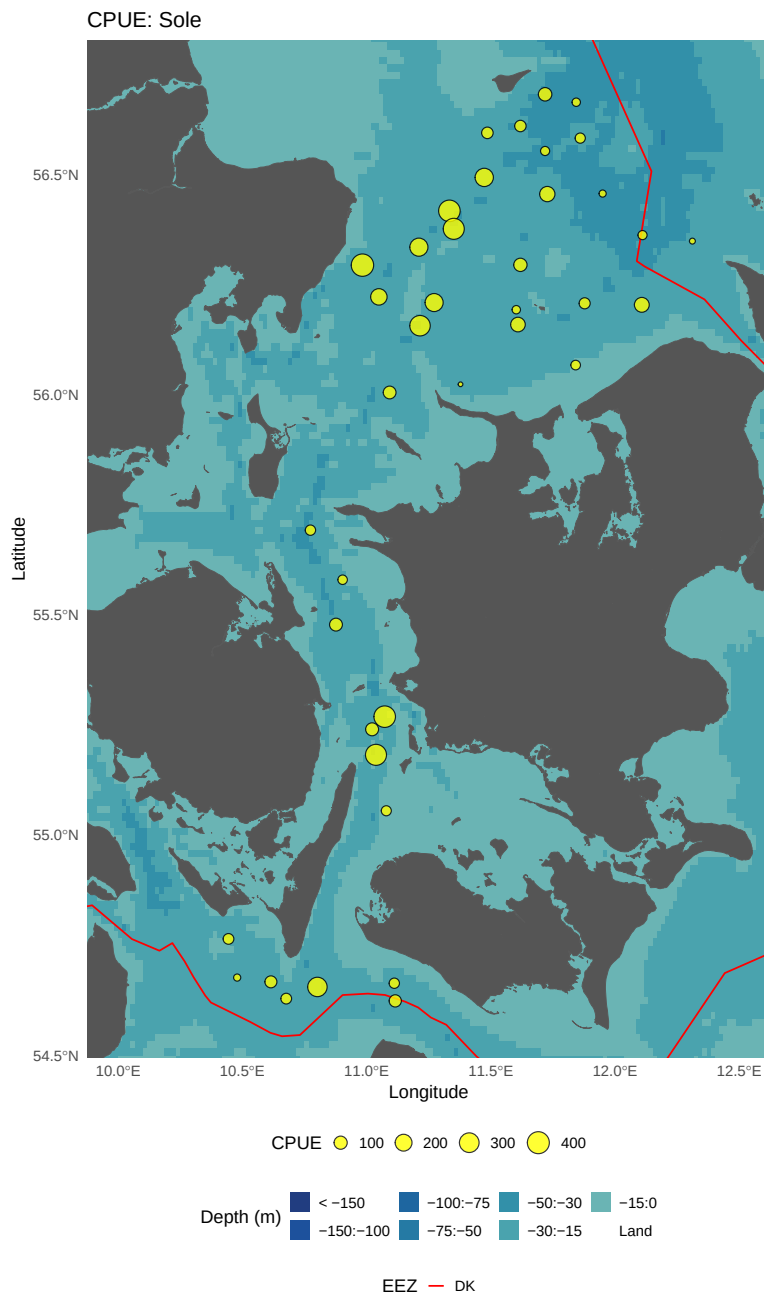
Processing of the results

CPUE

CPUE for sole, cod, plaice and Norway lobster is estimated as mean catch (kg or numbers) per hour with Standard Error based on the Standard Stations (i.e. not including the stations in Jammerbugt and Storebælt).

CPUE is in the following map estimated with the equation:

$$CPUE_{station} = \frac{\sum Sole_{station}}{FishingTime_{station}} * 60$$



Biomass and abundance

The traditional survey area has been stratified in ICES squares (Fig 3, Table 4).

Biomass and abundance estimates is obtained by applying the swept area method (estimated trawling speed * wing spread * trawling time) using the recorded speed, wing spread and trawling time and the stratum area as weighting factor. The catchability coefficient is assumed to be 1.0.

All catches are standardized to 1 km² swept prior to further calculations.

Over all S.E. is estimated using the stratum area as weighting factor. In strata with one haul only STD=biomass (or abundance).

Catch

The total catch of all species, cod, plaice and sole are presented below. The total catch per species per ICES area are presented in table 1-2.

	Weight (kg)	Number
<i>Total catch</i>	11178.4	173832
<i>Cod</i>	65.7	505
<i>Plaice</i>	2054.8	38151
<i>Sole</i>	361.2	2636

Sole

Total kgs of sole caught: 361

Total number of sole measured: 2606

Total number of sole otoliths collected: 515

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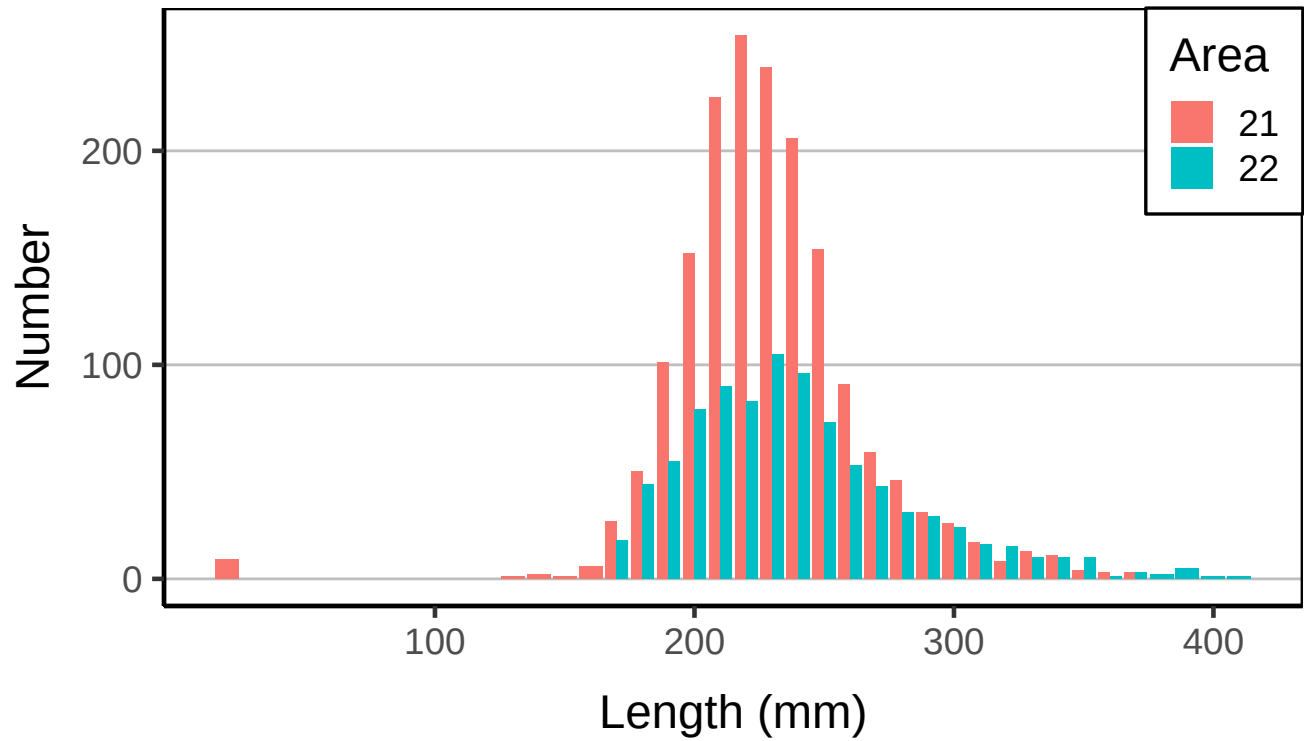


Figure 1: Length distribution per area for sole, Sole Survey 2024