

R/V Dana

Cruise 08/2020

"DK IBTS 3Q 2020"



Vessel: R/V DANA

Cruise dates (planned): 28/7 – 14/8 2020

Cruise number: 08/20

Cruise name: DK IBTS 3Q 2020

Port of departure:	Hirtshals	Date:	28 July
Port of return:	Hirtshals	Date:	14 August
Other ports:	Esbjerg	Date and justification:	5 August: Scheduled exchange of scientific staff and crew

Participants

Leg 1: Hirtshals – Esbjerg		
Name	Institute	Function and main tasks
Helle Rasmussen	DTU Aqua, Monitoring	Cruise leader, Fish lab
Maria Jarnum	DTU Aqua, Monitoring	Technician, Fish lab
Per Christensen	DTU Aqua, Monitoring	Technician, Fish lab
Flemming Thaarup	DTU Aqua, Monitoring	Technician, Fish lab
Jan W. Thomsen	DTU Aqua, Monitoring	Technician, Fish lab
Christian Petersen	DTU Aqua, Monitoring	Technician, CTD, Maintenance
Peter Munk	DTU Aqua, Oceans and Arctic	Scientist, Fish eggs and larvae
Nathan Gravier	DTU Aqua	Scientist, Jellyfish

Leg 2: Esbjerg – Hirtshals		
Name	Institute	Function and main tasks
Kai Wieland	DTU Aqua, Monitoring	Cruise leader, Fish lab
Stina Hansen	DTU Aqua, Monitoring	Technician, Fish lab
Tom Svoldgaard	DTU Aqua, Monitoring	Technician, Fish lab
Anne-Mette Kroner	DTU Aqua, Monitoring	Technician, Fish lab
Mads Jensen	DTU Aqua, Monitoring	Technician, Fish lab
Christian Petersen	DTU Aqua, Monitoring	Technician, CTD, Maintenance
Bastian Huwer	DTU Aqua	Scientist, Fish eggs and larvae
Nathan Gravier	DTU Aqua	Scientist, Jellyfish

Objectives

The survey is part of the 3rd quarter International Bottom Trawl Survey (IBTS) in the North Sea, which is coordinated by the ICES International Bottom Trawl Survey Working Group and has been conducted with standard fishing gear in the 3rd quarter since 1991.

The IBTS aims to provide ICES assessment and science groups with consistent and standardised data for examining spatial and temporal changes in (a) the distribution and relative abundance of fish and fish assemblages; and (b) of the biological parameters of commercial fish species for stock assessment purposes. The main objectives in the 3rd quarter IBTS are to:

- To determine the distribution and relative abundance of pre-recruits of the main commercial species (cod, haddock, whiting, Norway pout, saithe, herring, sprat, and mackerel) with a view of deriving recruitment indices;
- To monitor changes in the stocks of commercial fish species independently of commercial fisheries data;
- To monitor the distribution and relative abundance of all fish species and selected invertebrates;
- To collect data for the determination of biological parameters for selected species;
- To collect hydrographical and environmental information.
- To collect information of the amount and distribution of marine litter

The area to be covered by Denmark with RV Dana in the 3rd quarter 2020 was allocated during the IBTS Working Group meeting in April 2020. Technical details are described in the current version of the survey manual (ICES 2015. Manual for the International Bottom Trawl Surveys. Series of ICES Survey Protocols. SISP 10-IBTS IX. 86 pp.). Collection of information on the trawl setting and retrieval duration of the standard 30 minute tows which has been started in 2018 based on a request by the ICES IBTSWG was continued to supplement the existing international data set.

Additional midwater sampling with a MIK net for fish larvae and jellyfish was conducted during night.

Itinerary

R/V Dana left Hirtshals on Tuesday 28th July at 11:05 local time. The field work started in the western Skagerrak (Fig. 1). The vessel stayed in the port of Esbjerg on Wednesday 5th August from 9:30 to 12:15 for a scheduled exchange of scientific staff and crew.. R/V Dana returned to Hirtshals on Friday 14th August at 8:45 local time.

Rough weather conditions delayed the sampling progress in the northeastern part of the survey area during the beginning of the survey whereas favorable weather conditions prevailed thereafter and in particular during the 2nd cruise leg (Fig. 2).

Achievements

The working area consisted of 47 ICES statistical rectangles located in the Skagerrak and the North Sea and in 7 of these rectangles two stations were planned (Fig. 1).

The following activities were carried out:

54 valid standard trawl hauls with a GOV 36/47 (chalut á Grande Overture Verticale), all hauls were carried with the standard groundgear A (see IBTS Manual for specifications) and with 60 m sweeps. In all of hauls Vonin flyers were used replacing the standard kite.

54 CTD profiles (with additional sensors for dissolved oxygen, fluorescence and turbidity) at standard GOV stations.

Additional three so-called 0-minute and one 15-min experimental GOV tow were carried

out adjacent to the standard 30-minute tow in rectangle 39F6. This was done in order to supplement an existing international data set for analyzing the effect of tow duration on catch rates of demersal fish species.

Results

Routine sampling

The trawl parameters for the standard tows (Vertical net opening and door spread) as monitoring with a Scanmar system were in the range or close to the suggested limits specified in the IBTS manual in most cases (Fig. 3). A brand new polyethylene (PE) GOV trawl was used which showed some deviations from the net geometry observed with an older PE GOV applied in the past two years during the first part of the survey. The reasons that the two PE GOV's are obviously not identical although delivered from the same company could not be resolved. The remaining deviations from the theoretical values for door spread and in particular net opening from flume tank experiments can likely be attributed to the high sensibility of the GOV to current effects and bottom type. Sensors for wing spread have not been available on this survey.

In total, 77 different species of fish, cephalopods and crustaceans were found in catches. The total weight of the catches from the 58 tows has been 32 tons (Tab. 1). Total catch and species richness in the standard tows ranged from 26 kg to 3.7 tons and from 12 to 33 different fish and IBTS invertebrate species, and high and species-rich catches were predominantly recorded in the southern and southwestern part of the survey area (Fig. 4).

Length measurements were made for all commercial and non-commercial fish species. Sharks, skates and rays and selected shellfish species were measured separately by sex (length composition and weight). Single fish data (length, weight, sex and maturity) and otoliths were collected for the main commercial species (cod, haddock, whiting, Norway pout, saithe, herring, sprat, mackerel and plaice) as well as for hake in order to fulfil requirements of the national DCF (Data Collection Framework of the European Union) sampling requirements (Tab. 2). The preliminary abundance indices for the main commercial species indicate that e.g. whiting but also mackerel and plaice were widely distributed in the survey area whereas cod was quite rare and it appears noteworthy that only very few 0-group cod was caught (Tab. 3).

Catch and species composition for the experimental tows (Fig. 6, Tab. 4) will further be analyzed in combination with the international data collected on this issue in the previous years.

Total 'fishing' time and additional time the trawl was on the bottom outside the nominal tow duration of the 30 min standard tows ranged from 9 to 19 min and 4 to 9 min, respectively, of which total fishing time is positively correlated to depth, and winch speed during deployment and retrieval amounted to about 0.9 and 1.1 m/s on average (Fig. 5).

Marine litter was recorded in each GOV catch using four main categories: plastic, glass, metals and miscellaneous, which were subdivided in several minor categories to meet the request by the IBTS Working Group. The total amount of marine litter was 14.3 kg.

Temperature, salinity and dissolved oxygen content at surface and bottom were extracted from the CTD profiles for storage in the institute's fish data base. The temperature and salinity values will be submitted to the ICES DATRAS database together with the GOV catch

results and measurements of surface and bottom currents (speed and direction) at the trawl stations to DATRAS, and the complete CTD profiles will be submitted to the ICES hydrographical data center.

Additional activities

Selected fish and squid species collections were taken for education and open ship arrangements at DTU Aqua.

Results of the plankton sampling conducted during night will be reported later somewhere else.

Others

A cruise summary report has been delivered online to

http://seadata.bsh.de/csr/online/V1_index.html.

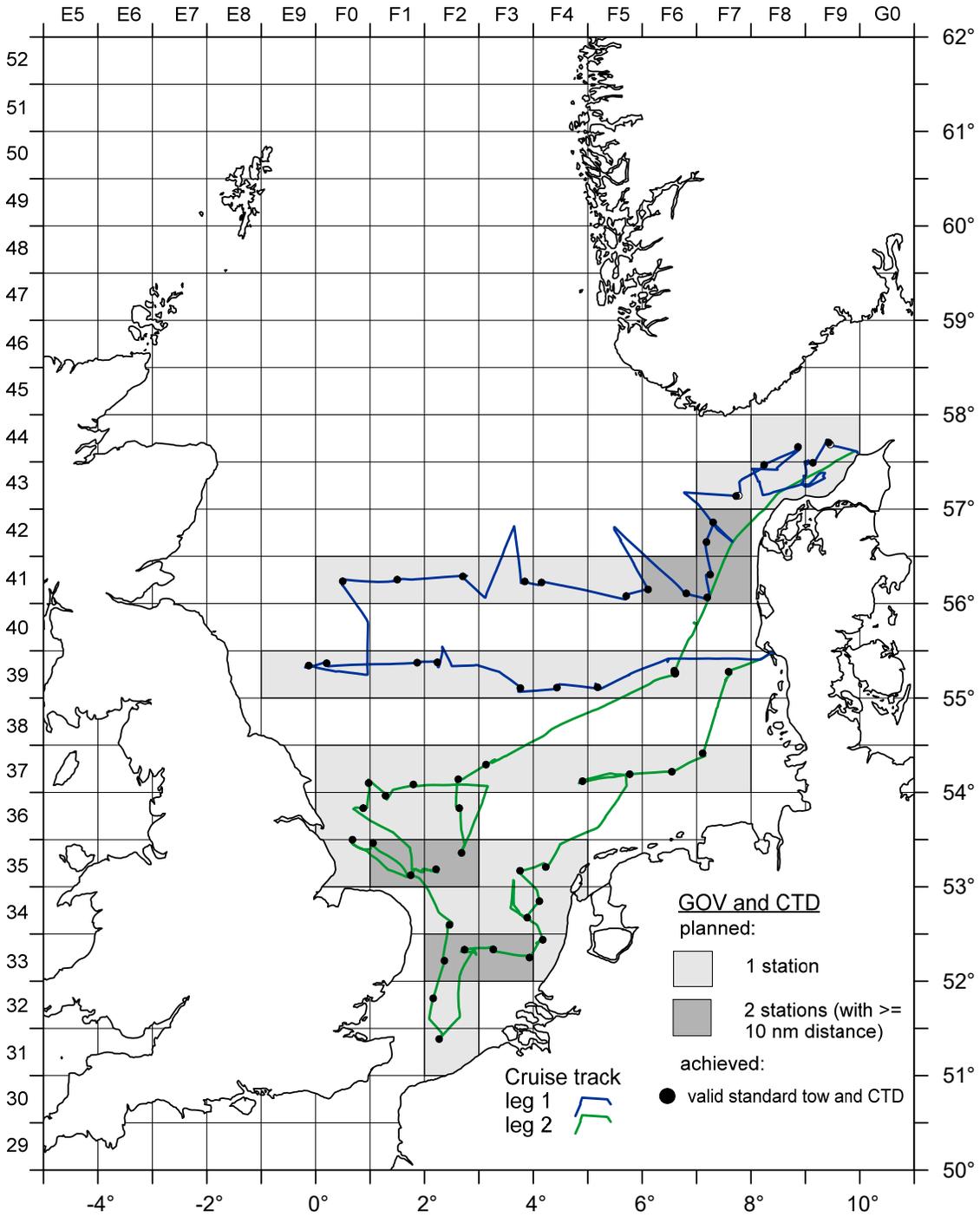


Fig. 1: Survey map with cruise track and sampling locations, Dana DK IBTS 3Q 2020.

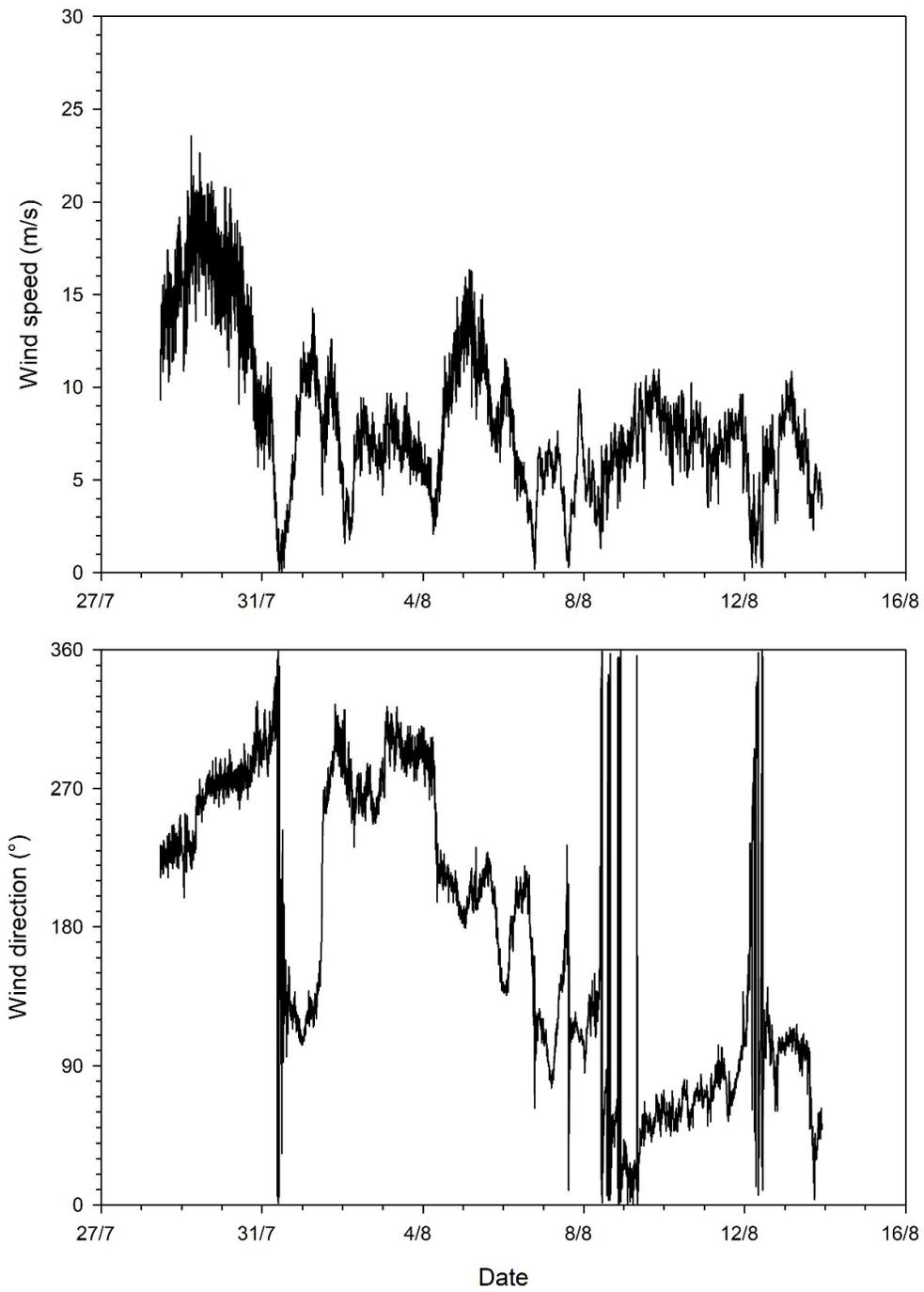


Fig. 2. Wind speed (m/s) and wind direction (°) recorded along the cruise track, Dana DK IBTS 3Q 2020.

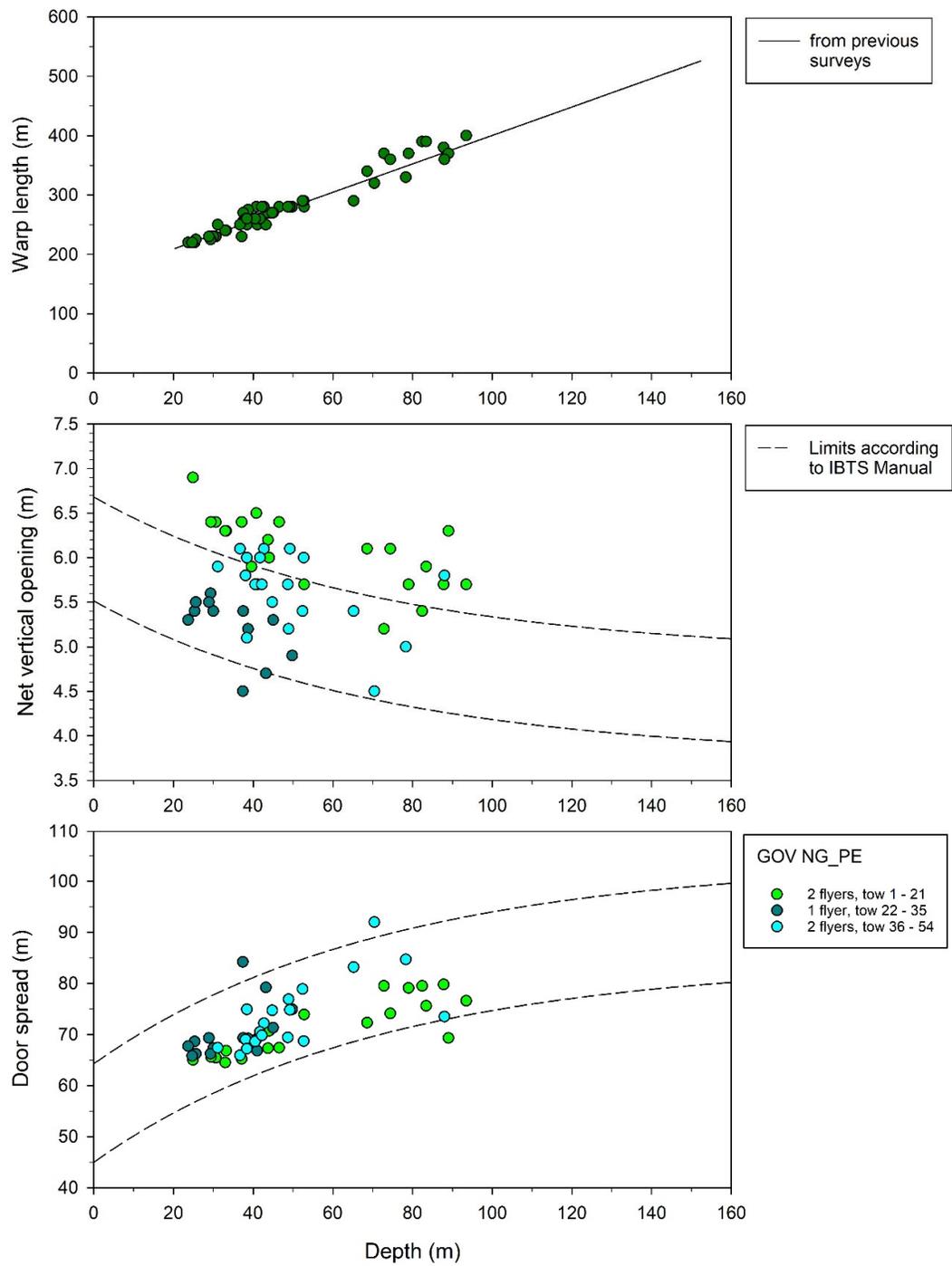


Fig. 3: Warp length, net opening and door spread in relation to depth, Dana DK IBTS 3Q 2020.

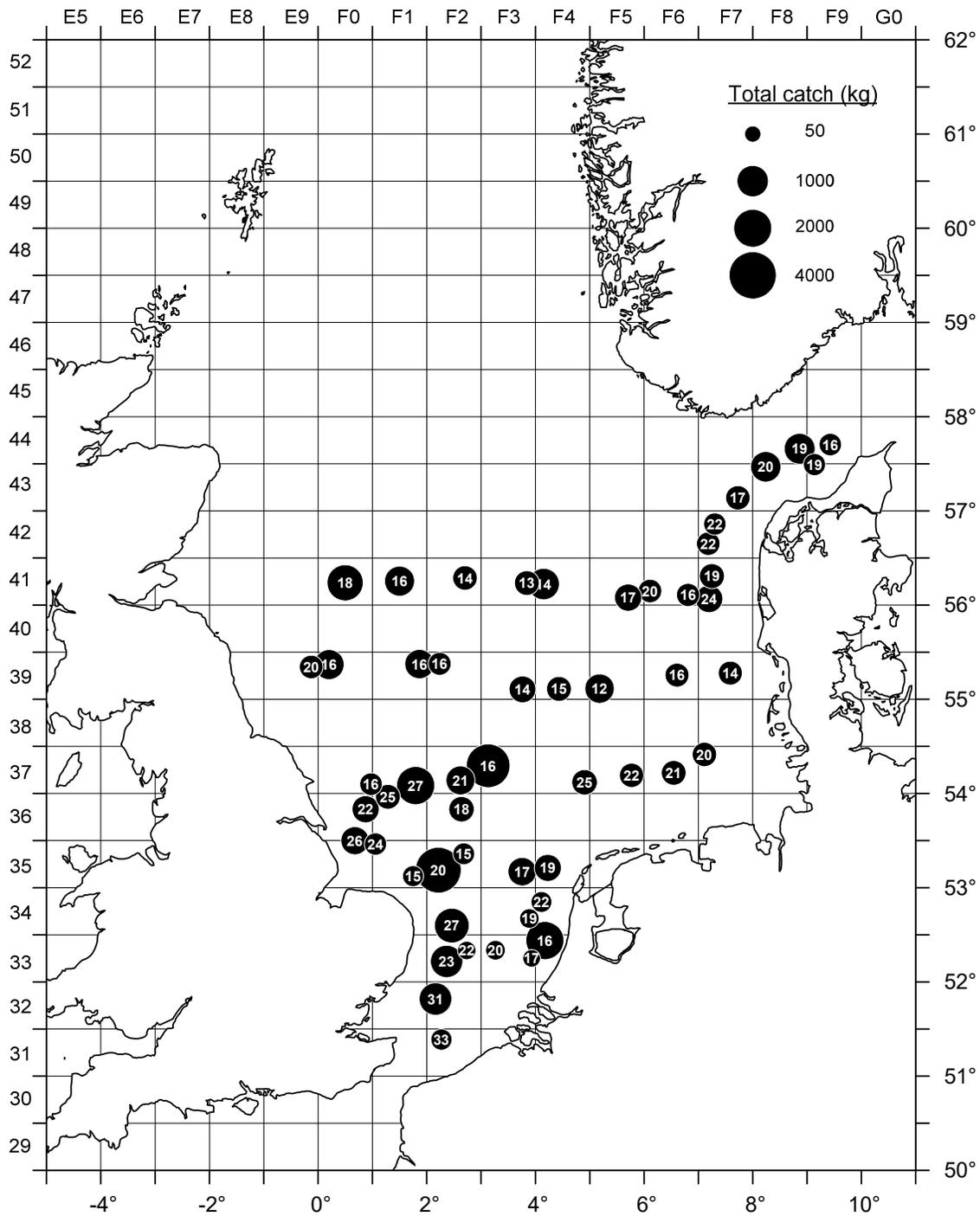


Fig. 4: Total catch (symbols) and species richness (numbers), Dana DK IBTS 3Q 2020.

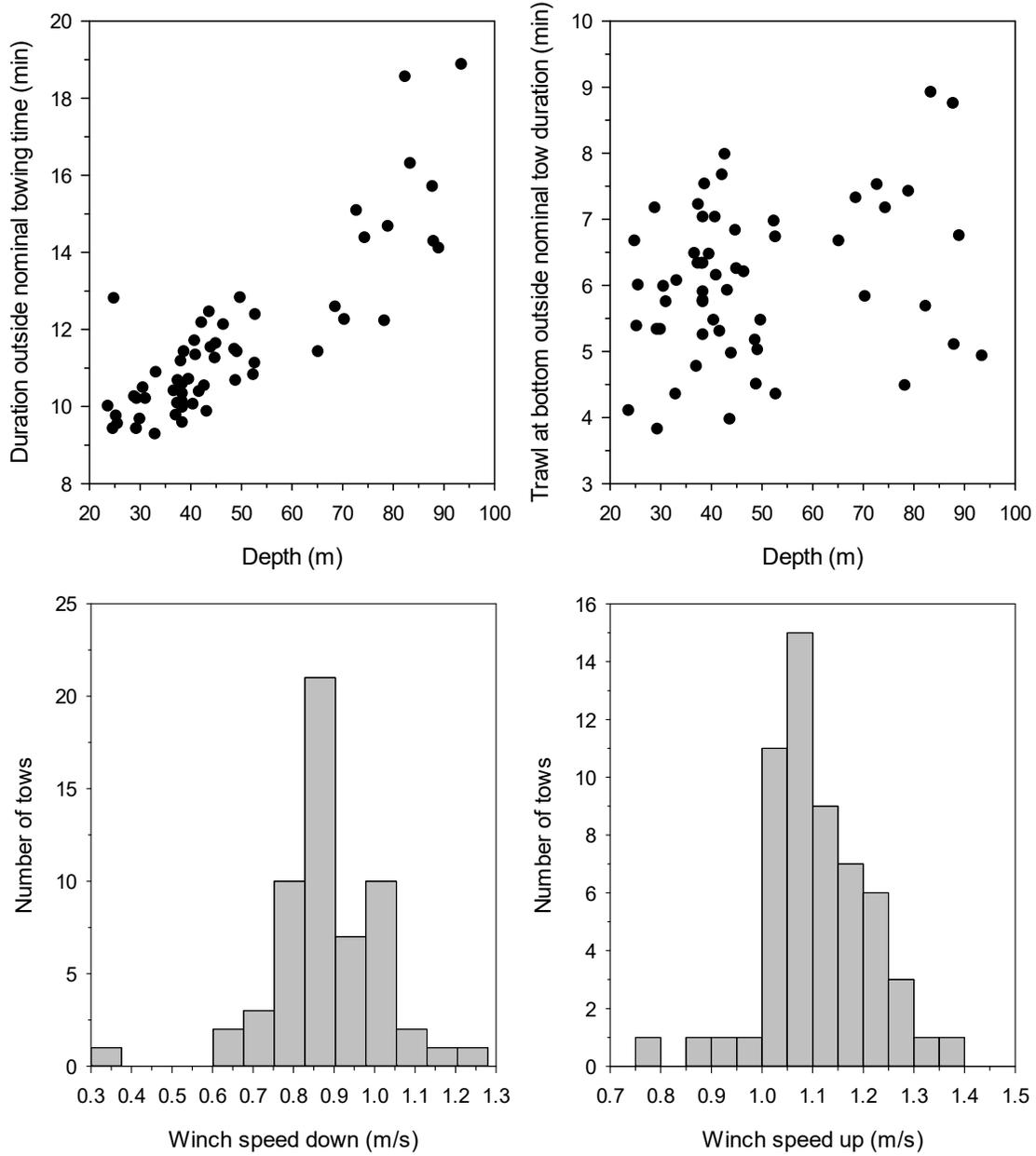


Fig. 5: Fishing times outside the nominal tow duration and winch speeds during descend and ascent, Dana DK IBTS 3Q 2020.

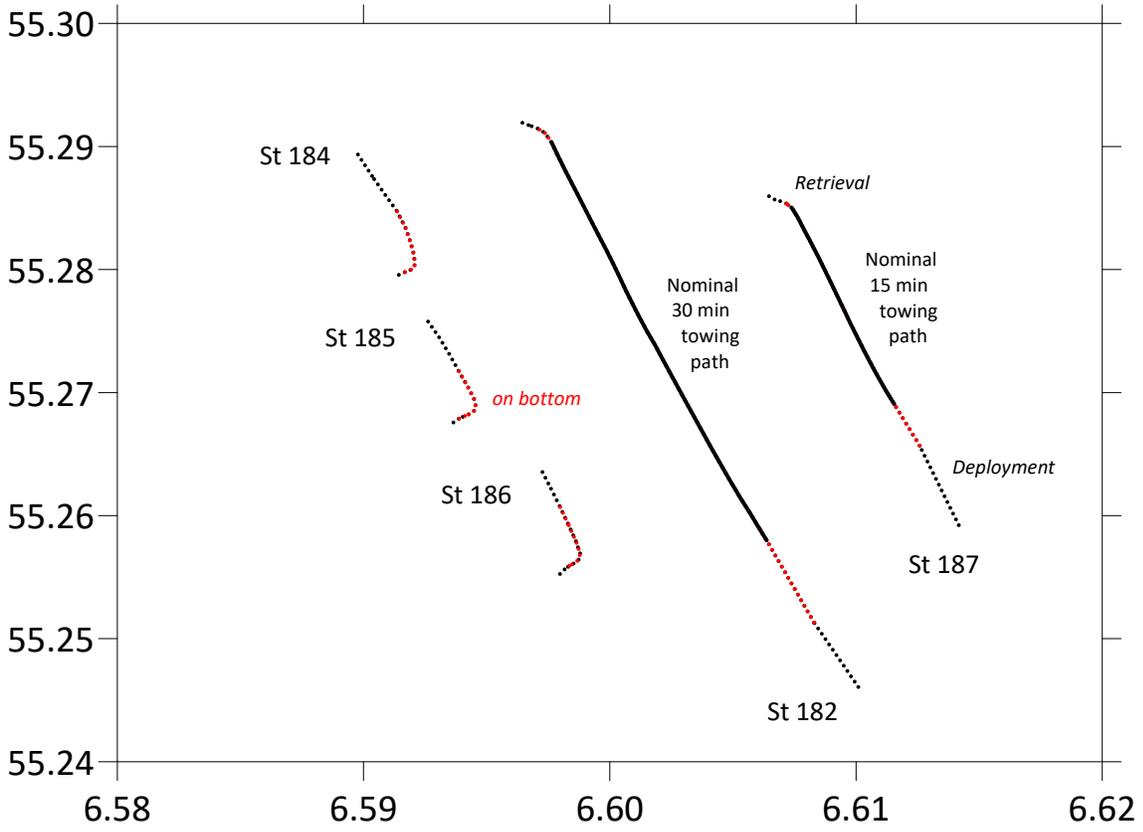


Fig. 6: Towing tracks of the experimental 0- and 15-min tow in rectangle 39F6, Dana DK IBTS 3Q2020.

Tab. 1: Species list, Dana DK IBTS 3Q 2020 (L: total length in cm below (fish); ML: mantle length (cephlapods); CPL or CPW: carapace length or width (crustaceans)).

Latin name	English name	Danish name	Weight (kg)	Number	L _{min} (cm)	L _{max} (cm)	Remark
<i>Aequipecten opercularis</i>	Queen scallop	Jomfruøsters	0.307	5	-	-	
<i>Agonus cataphractus</i>	Pogge	Panser ulk	0.106	7	9.0	15.0	
<i>Alloteuthis subulata</i>	European common squid	Dværgblæksprutte	31.792	6643	2.0	14.0	ML
<i>Amblyraja radiata</i>	Starry ray	Tærbe	5.060	12	11.0	45.0	
<i>Ammodytes marinus</i>	Lesser sandeel	Tobis-hav	2.463	174	4.5	21.0	
<i>Anarhichas lupus</i>	Catfish	Stribet havkat	3.840	1	74.0	74.0	
<i>Arnoglossus laterna</i>	Scaldfish	Tungehvarre	0.828	68	7.0	14.0	
<i>Buglossidium luteum</i>	Solenette	Glastunge	1.290	137	6.0	14.0	
<i>Callionymus lyra</i>	Common dragonet	Stribet fløjfisk	6.940	156	9.0	25.0	
<i>Callionymus reticulatus</i>	Reticulated dragonet	Kortfinnet fløjfisk	0.018	2	10.0	15.0	
<i>Cancer pagurus</i>	Edible crab	Taskekrabbe	78.137	181	5.1	20.0	CPW
<i>Chelidonichthys cuculus</i>	Red gurnard	Tværstribet knurhane	1.514	13	19.0	26.0	
<i>Chelidonichthys lucerna</i>	Tub gurnard	Rød knurhane	20.539	63	19.0	51.0	
<i>Clupea harengus</i>	Herring	Sild	1597.168	51484	6.5	32.0	
<i>Dicentrarchus labrax</i>	Bass	Havbars	7.138	7	35.0	58.0	
<i>Echiichthys vipera</i>	Lesser weever	Fjæsing lille	35.969	1877	5.0	17.0	
<i>Eledone cirrhosa</i>	Horned octopus	Eledone Blæksprutte	0.935	1	-	-	
<i>Enchelyopus cimbrius</i>	Four-bearded rockling	Firetrådet havkvabbe	5.226	148	13.0	25.0	
<i>Engraulis encrasicolus</i>	Anchovy	Ansjos	0.461	16	13.0	19.0	
<i>Entelurus aequoreus</i>	Snake pipefish	Snippe	0.072	6	30.0	46.0	
<i>Eutrigla gurnardus</i>	Grey gurnard	Grå knurhane	939.987	15459	12.0	35.0	
<i>Gadus morhua</i>	Cod	Torsk	275.231	800	11.0	90.0	
<i>Galeorhinus galeus</i>	Tope	Gråhaj	298.562	27	38.0	157.0	
<i>Glyptocephalus cynoglossus</i>	Witch	Skærising	0.400	2	28.0	31.0	
<i>Gymnammodytes semisquamatus</i>	Smoothed sandeel	Tobis-nøgen	17.637	1116	14.5	20.5	
<i>Helicolenus dactylopterus</i>	Blackbelly rosefish	Blåkjæft	1.198	17	14.0	18.0	
<i>Hippoglossoides platessoides</i>	American plaice	Håising	101.339	2229	10.0	27.0	
<i>Homarus gammarus</i>	European lobster	Almindelig hummer	22.497	43	4.5	14.6	CPL
<i>Hyperoplus lanceolatus</i>	Greater sandeel	Tobiskonge	136.874	4479	13.5	33.0	
<i>Illex coindetii</i>	Southern shortfin squid	Illex coindetii	4.620	60	8.0	24.0	ML
<i>Limanda limanda</i>	Common dab	Ising	3393.237	57386	5.0	32.0	
<i>Lithodes maja</i>	Norway king crab	Troldekrabbe	0.490	2	7.5	9.5	CPW
Loliginidae		Loliginidae	103.090	1963	2.0	26.0	ML
<i>Loligo forbesii</i>	Northern squid	Loligo forbesii	32.346	566	3.0	30.0	ML
<i>Loligo sp</i>	Loligo sp	Loligo forbesii/vulgaris	1.554	558	2.0	5.0	ML
<i>Loligo vulgaris</i>	European squid	Loligo vulgaris	0.255	1	18.0	18.0	ML
<i>Lophius piscatorius</i>	Monk	Havtaske	3.704	6	16.0	46.0	
<i>Lycodes gracilis</i>	Vahls eelpout	Ålebromse	0.044	2	15.0	16.0	
<i>Maja squinado</i>	Common spider crab	Ederkoppekrabbe	1.362	2	12.0	12.9	CPL
<i>Melanogrammus aeglefinus</i>	Haddock	Kuller	3861.604	52716	8.0	42.0	
<i>Merlangius merlangus</i>	Whiting	Hvilling	11895.768	177535	4.0	40.0	
<i>Merluccius merluccius</i>	Hake	Kulmule	118.256	82	17.0	103.0	
<i>Microstomus kitt</i>	Lemon sole	Rødtunge	222.968	1904	11.0	33.0	
<i>Molva molva</i>	Ling	Lange	6.050	7	45.0	68.0	
<i>Mullus surmuletus</i>	Striped red mullet	Stribet (rød) Mulle	44.650	501	13.0	30.0	
<i>Mustelus asterias</i>	Starry smooth-hound	Stjernehaj	105.443	58	52.0	105.0	
<i>Mustelus mustelus</i>	Smooth hound	Galthaj	62.604	30	59.0	125.0	
<i>Myoxocephalus scorpius</i>	Bull rout	Ulk	1.087	15	12.0	23.0	
<i>Myxine glutinosa</i>	Hagfish	Slimål	0.048	1	-	-	
<i>Nephrops norvegicus</i>	Norway lobster	Jomfruhummer	16.397	438	2.1	5.5	CPL
<i>Pecten maximus</i>	Great scallop	Stor kammusling	0.077	1	-	-	
<i>Platichthys flesus</i>	Flounder	Skrubbe	4.827	17	24.0	36.0	
<i>Pleuronectes platessa</i>	Plaice	Rødspætte	410.142	2974	11.0	55.0	
<i>Pollachius virens</i>	Saithe	Sej	4.568	3	26.0	77.0	
<i>Pomatoschistus sp</i>	Sand gobies	Sand kutlinger	0.004	3	4.0	6.0	
<i>Raja brachyura</i>	Blonde ray	Blond rokke	9.494	6	46.0	82.0	
<i>Raja clavata</i>	Thornback ray	Sømrække	49.200	31	22.0	86.0	
<i>Raja montagui</i>	Spotted Ray	Storpletet Rokke	7.715	14	20.0	49.0	
<i>Rossia macrosoma</i>	Stout bobtail squid	Ross's blæksprutte	0.038	4	-	-	
<i>Sardina pilchardus</i>	Pilchard	Sardin	51.064	551	14.0	25.0	
<i>Scomber scombrus</i>	Mackerel	Makrel	1537.486	11431	8.0	43.0	
<i>Scophthalmus maximus</i>	Turbot	Pighvarre	23.952	27	17.0	58.0	
<i>Scophthalmus rhombus</i>	Brill	Slethvarre	10.640	14	21.0	46.0	
<i>Scyliorhinus canicula</i>	Lesser-spotted dogfish	Småpletet rødhaj	261.844	531	16.0	67.0	
<i>Sepia officinalis</i>	Common cuttlefish	Sepiablæksprutte	1.199	5	9.0	14.0	
<i>Solea solea</i>	Sole	Tunge	6.036	68	15.0	34.0	
<i>Spondyliosoma cantharus</i>	Black sea bream	Havrude	0.250	1	24.0	24.0	
<i>Sprattus sprattus</i>	Sprat	Brisling	4726.151	373253	3.0	14.5	
<i>Squalus acanthias</i>	Spurdog	Pighaj	17.526	6	46.0	109.0	
<i>Taurulus bubalis</i>	Sea scorpion	Langtornet ulk	0.375	6	14.0	20.0	
<i>Todaropsis eblanae</i>	Lesser flying squid	Todaropsis eblanae	0.377	4	9.0	17.0	ML
<i>Trachinus draco</i>	Greater weever fish	Fjæsing	49.130	265	16.0	40.0	
<i>Trachurus trachurus</i>	Horse mackerel	Hestemakrel	1377.969	22505	2.0	39.0	
<i>Trisopterus esmarkii</i>	Norway pout	Sperling	1.641	227	3.0	18.0	
<i>Trisopterus luscus</i>	Bib	Skægtorsk	3.549	59	10.0	23.0	
<i>Trisopterus minutus</i>	Poor-cod	Glyse	11.696	501	6.0	22.0	
<i>Zeus faber</i>	John dory	Sct. Peter fisk	1.448	6	21.0	26.0	

Tab. 2: Number of single fish data (length, individual weight, and sex; maturity for herring, sprat and hake) and samples for ageing (hake: not read), Dana DK IBTS 3Q 2020.

Species	Total
Herring (<i>Clupea harengus</i>)	485
Sprat (<i>Sprattus sprattus</i>)	220
Cod (<i>Gadus morhua</i>)	138
Haddock (<i>Melanogrammus aeglefinus</i>)	290
Whiting (<i>Merlangius merlangus</i>)	577
Saithe (<i>Pollachius virens</i>)	3
Norway pout (<i>Trisopterus ermarkii</i>)	13
Mackerel (<i>Scomber scombrus</i>)	340
Plaice (<i>Pleuronectes platessa</i>)	694
Hake (<i>Merluccius merluccius</i>)	65
Sum:	2825

Tab. 4: Comparison of catch composition of experimental tows with the standard tow in 39F6, Dana DK IBTS 3Q 2020.

3Q2020	39F6	Station 182 (standard tow)				Station 184 (zero-minute tow)				Station 185 (zero-minute tow)				Station 186 (zero-minute tow)				Station 187 (15-minute tow)				
		Group	Species	W (kg)	N	L _{min}	L _{max}	W (kg)	N	L _{min}	L _{max}	W (kg)	N	L _{min}	L _{max}	W (kg)	N	L _{min}	L _{max}	W (kg)	N	L _{min}
Pelagic fish	Mackerel	55.016	387	24.0	35.0	16.300	114	23.0	33.0	0.914	6	23.0	27	13.100	100	23	34.0	81.545	551	24.0	30	
Demersal gadoids	Whiting	2.260	34	9.0	24.0	0.182	2	21.0	24.0	0.111	2	18.0	21.0	6.860	89	17.0	26.0	0.865	12	18.0	24.0	
	Haddock	0.029	1	14.0	14																	
Flatfish	Solenette	0.011	3	6.0	8.0					0.003	1	6.0	6.0									
	Common dab	136.711	2080	12.0	26.0	19.859	288	12.0	23.0	22.618	329	11.0	28.0	22.920	363	11.0	25.0	62.777	1013	11.0	25.0	
	Plaice	18.060	132	14.0	55.0	2.384	14	15.0	33.0	4.520	29	15.0	33.0	3.780	24	18.0	34.0	8.340	60	15.0	34.0	
	Brill									0.700	1	36.0	36									
Other demersal fish	Horse mackerel	2.432	43	3.0	27.0	0.002	3	2.0	4.0	0.004	3	3.0	5.0	0.179	6	4.0	25.0	0.007	6	4.0	5.0	
	Grey gurnard	6.585	133	13.0	24.0	0.942	17	14.0	25.0	0.618	15	15.0	19.0	3.012	52	14.0	23.0	6.109	129	13.0	23.0	
	Tub gurnard	1.149	4	24.0	35.0									0.120	1	22.0	22.0					
	Common dragonet	0.025	1	18.0	18					0.023	1	18.0	18					0.031	1	17.0	17	
	Striped red mullet	0.473	2	21.0	29.0									0.473	5	19.0	22.0					
	Greater sandeel	0.199	6	21.0	25.5	0.468	14	20.5	25.5	0.169	5	21.0	25.5	1.251	38	20.5	28.0					
	Lesser-spotted dogfish													0.442	1	46.0	46.0					
Crustaceans	Edible crab	2.830	4	11.3	18.2	0.207	1	12.0	12.0	0.900	2	14.3	16.1	0.739	1	16.4	16.4	0.442	2	8.8	12.9	
	European lobster													0.684	1	10.3	10.3	0.772	1	10.3	10.3	
Molluscs	European common squid	0.712	249	3.0	5.0	0.042	18	2.0	4.0	1.202	367	3.0	6.0	0.018	7	3.0	5.0	2.152	689	3.0	7.0	
	Northern squid	0.907	9	8.0	19.0	0.053	2	7.0	8.0	0.029	1	8.0	8.0	0.646	5	8.0	21.0					
	Lesser flying squid	0.264	2	15.0	17.0																	
	Total pelagic fish	55.016	387	24.0	35.0	16.300	114	23.0	33.0	0.914	6	23.0	27.0	13.100	100	23.0	34.0	81.545	551	24.0	30.0	
	Total demersal fish	167.934	2439	3.0	55.0	23.837	338	2.0	33.0	28.766	386	3.0	36.0	38.595	578	4.0	34.0	78.129	1221	4.0	34.0	
	Total number of pelagic fish taxa		1				1				1				1				1			
	Total number demersal fish taxa		11				6				9				9				6			
						pel. fish	29.6	29.4			1.7	1.5			23.8	25.8			148.2	142.1	% of standard tow	
						dem. fish	14.2	13.9			17.1	15.8			23.0	23.7			46.5	50.1	% of standard tow	