

**2007 RESEARCH VESSEL SURVEY REPORT:
CEFAS ENDEAVOUR 5/07**

(PROVISIONAL: not to be quoted without prior reference to the author)

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DURATION: 17 March – 30 April 2007

LOCATION: Western Channel Portland to Scilly Isles in UK, French and Channel Island waters.

AIMS:

1. To carry out a stratified random design beam trawl survey of the western Channel for stock assessment purposes using two standardized 4m beam trawls in order to obtain information on:
 - a) Distribution, size composition and abundance of all fish species caught.
 - b) Age – length distribution of selected species.
 - c) Distribution of fish in relation to their environment.
 - d) Distribution of macrobenthos.
 - e) Surface and bottom temperature and salinity data using CTD.
 - f) Length weight & maturity information using individual fish measurements, in support of the EU Data Regulation.
2. To collect acoustic seabed data using QTC View and Multibeam sonar, and to collect fisheries acoustic data using multi-frequency splitbeam echosounder. An attempt will be made to use this data to determine habitats and the scale at which these vary.
3. To tag large adult sole with data storage tags in order to determine the seasonal patterns of migration.

NARRATIVE:

Three scientists joined Cefas Endeavour on 15 March 2007 to liaise with the ships crew with regards to repairing the surveys beam trawls whilst the ship was in dock the following day. Work was undertaken on the gear and the beams were repaired to the necessary high standard required for this survey. Beam 1 was fitted to the starboard side and fitted with the 40mm blinder (Gearcode 101530403). The port beam (Beam 2) was fished using just the commercial 80mm codend supplied by the manufacturer (Gearcode 101530502). The remaining scientific staff met Cefas Endeavour at 17:00 on 16 March, and plans were made for sailing.

With weather reports suggesting inclement weather was imminent, it was decided to begin the survey around the Scilly Isles in order to get the exposed stations completed before the weather hit. We therefore sailed from Swansea at 13:00 on 17 March 2007 with the aim of reaching the Scilly Isles by first light on 18 March to commence the survey. On route we undertook a shake down tow off Trevoise Head, to make sure the fishing gear was to our satisfaction.

Due to strong winds and heavy seas the Endeavour was some way off our proposed starting point by first light on 18 March. With worsening weather forecast the plans were changed and the survey began in sheltered waters of Mounts Bay at 13:35, before progressing to inshore stations near Falmouth in winds gusting up to 65 knots, where a total of 6 stations were fished.

With continuing northwesterly gale force 9's to storm force 10's predicted the survey continued easterly along the south coast of England. Eight stations were fished on 19 March and 9 stations were fished on the following day (one of these being invalid) before fishing for sole to tag throughout the evening of 20 March. The weather then improved and allowed the survey to venture further offshore, with 5 mid-channel stations fished on 21 March before completing the exposed stations near Lands End, and those around the Scilly Isles on 22 March (8 stations).

The survey progressed east on 23 March through 7 mid-channel stations into French waters. The westerly stations off the coast of France were completed on 24 March, but this included 3 occurrences of gear damage. All cases of damage were due to rocks entering the net and creating a hole in the codend, and this led to one station being called invalid as both codends were affected. The evening of 24 March was spent fishing for sole to tag on the Langoustine Bank. The eastern side of the French grid was fished over the next 3 days and serious problems were encountered due to the vast amount of static gear deployed in the area. Three stations were dropped due to pots covering the area, 2 were dropped as they were in too shallow water and 2 were dropped because they were in restricted areas. Due to the random design of the survey, each dropped station was replaced with another within the same sector, but not all of the replacements were fishable themselves. Sector 11 (fig. 1) was particularly problematic and nearly every inshore station was unfishable. Most of the replacement stations in this area were further offshore and therefore achievable, but will potentially add bias to the results. In total only 8 stations were fished in sector 11, where we had originally intended to complete 9.

The survey continued mid-channel off Start Point and moved inshore on 28 March, before heading east to pick up the stations between Brixham and Portland on 29 March. This left two offshore stations that were completed on the 30th before cleaning up, picking up the pilot at 14:00 and proceeding to dock in Portland at approx 15:00.

For plot showing which stations were fished each day see fig. 3.

RESULTS FOR MAIN AIMS:

A total of 81 survey stations were sampled with 79 valid tows for each of the two gears. Table 1 indicates the number of samples collected by stratum. Strata 4,5,10 and 11 (fig. 1) were sampled more intensively than other strata as they are thought to contain the main fishing grounds of the French and UK fleets exploiting Dover sole in division VIII. Location of the stations fished in 2007 and their validity are shown in fig 2.

Figures 4 to 6 show the spatial distribution of sole, plaice and monkfish from this years survey. It can be seen that sole were reasonably widespread throughout the survey area (fig. 4), except in the southwest region. This roughly corresponds to the results obtained

from the equivalent 2006 survey (appendix 1). Fig. 5 shows that plaice were mostly caught in the northern area of the survey grid, and in particular just off Start Point, whereas monkfish were widely and evenly distributed throughout the entire survey area (fig. 6).

Length distributions for sole, plaice and monkfish are shown in Fig. 7. From these plots it can be seen that catches of sole (total = 275 fish), plaice (total = 323 fish) and monk (total = 178 fish) were spread over a wide range of lengths, but no sole under 19cm were encountered. These length distributions are comparable to the results from 2006 (appendix 1) with the exception of a few smaller plaice caught in 2007, and one big monkfish caught in 2006. The numbers of otoliths and associated biological information taken are indicated in Table 2. Otoliths were taken in three strata, these being; UK inshore, French inshore and mid-channel.

The tagging operations carried out at night were a success, with all 80 data storage tags being attached to sole and released near the location of capture. Of these tags, 7 were released off Start Point in the evening of the 20th, with the other 73 being released on the Langoustine bank during the evening of the 24th.

Acoustic ground discrimination data were recorded continuously with QTC View software using the Simrad EA600 single beam hydrographic sounder (at 50kHz). The data will be processed and split into acoustically distinct seabed classes in Lowestoft. Multibeam data, recording both backscatter and 3 dimensional swathe bathymetry of the seabed, were also collected both on station and between stations, using a dual head Simrad EM3000 multibeam sonar. Recording failed at 3 of the survey stations due to bad weather and at a further 5 deep water stations (>100m). The multibeam sonar proved a useful tool to explore the seabed *in situ* and identify suitable trawling grounds in previously unsampled hard-ground areas with high risk of gear damage. The on-station seabed data will be worked up at Lowestoft providing detailed information on the seabed bathymetry and (from the backscatter) substrate hardness and roughness. A combination of the two above seabed mapping tools could be used to determine the type and boundaries of seabed habitats.

Fisheries acoustic data were also continuously collected at three operating frequencies (38, 120 and 200kHz), using the Simrad EK60 split beam sounder. Post processing was undertaken on the 38kHz frequency only, which is considered to be the standard operating frequency for fisheries acoustic surveys. The 120kHz echogram was scrutinised in parallel with the 38kHz data to aid identification of echo targets and bad data regions. Echograms were scrutinised and acoustic marks of pelagic species and plankton were selected. These data will be the first in a time series of fisheries acoustics of the region. Due to bad weather the newly installed 200kHz sounder could not be calibrated, but the recorded data can be used once calibration has been completed.

ADDITIONAL AIMS:

A Niskin water sampler was usually deployed 3 times a day, with an attached CTD to give sound velocity profiles with which to calibrate the acoustic equipment onboard.

Length frequency information for spider crabs were collected and all spider crabs caught were measured.

Shell samples were collected for microchemistry analysis at most of the stations and frozen immediately.

Sea water samples were successfully collected at 10 locations for radiological analysis.

Table 1. Stations achieved per stratum in 2007.

Sector	Required Number	Valid stations achieved
1	5	5
2	5	5
3	5	5
4	10	10
5	8	9
6	5	5
7	5	5
8	5	4
9	5	5
10	9	9
11	9	8
12	5	4
13	5	5
Total	81	79

Table 2. Number of otoliths and associated biological information collected in 2007.

	F	M	U
Brill	4	5	
Cod	6	1	
Sea Bass	2	10	
Haddock	28	21	
Hake	26	22	3
Lemon sole	65	76	
Megrim	48	8	
Monkfish	85	78	3
Red mullet	52	41	1
Plaice	197	74	
Sole	153	99	
Turbot	2	1	
Monkfish (black bellied)	1		
Whiting	79	44	
Total	748	480	7

Fig 1.

Westerly beam trawl strata

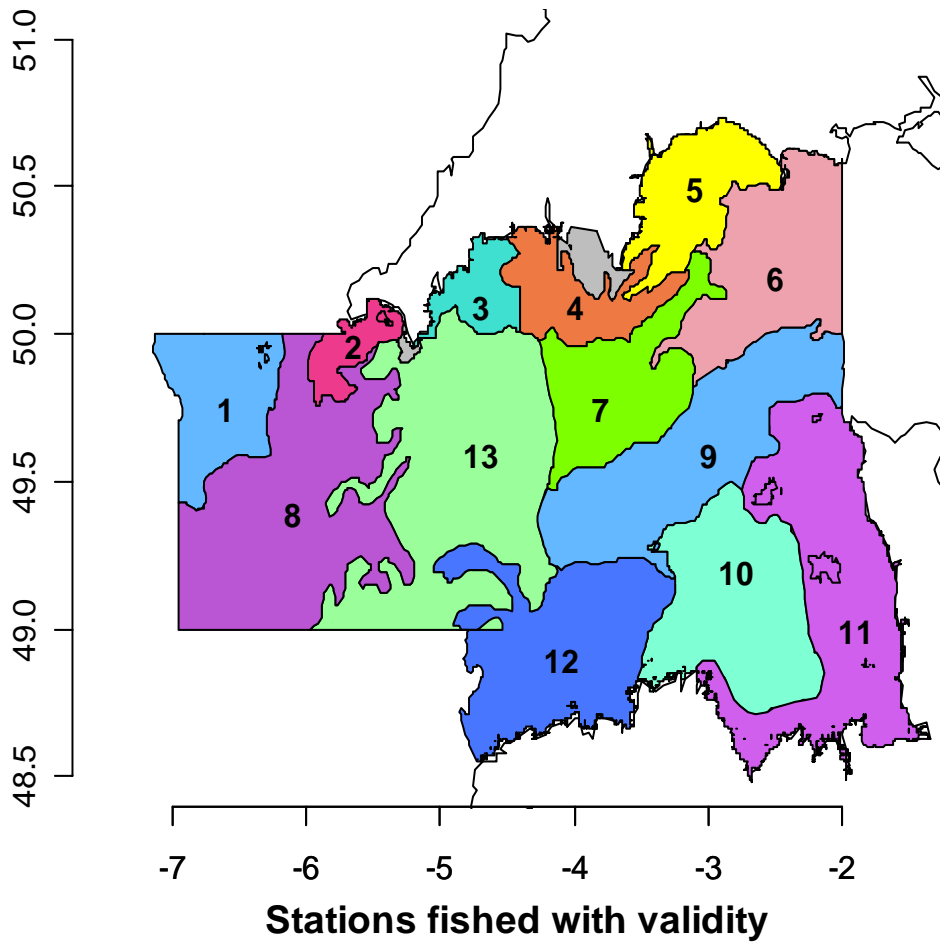


Fig 2.

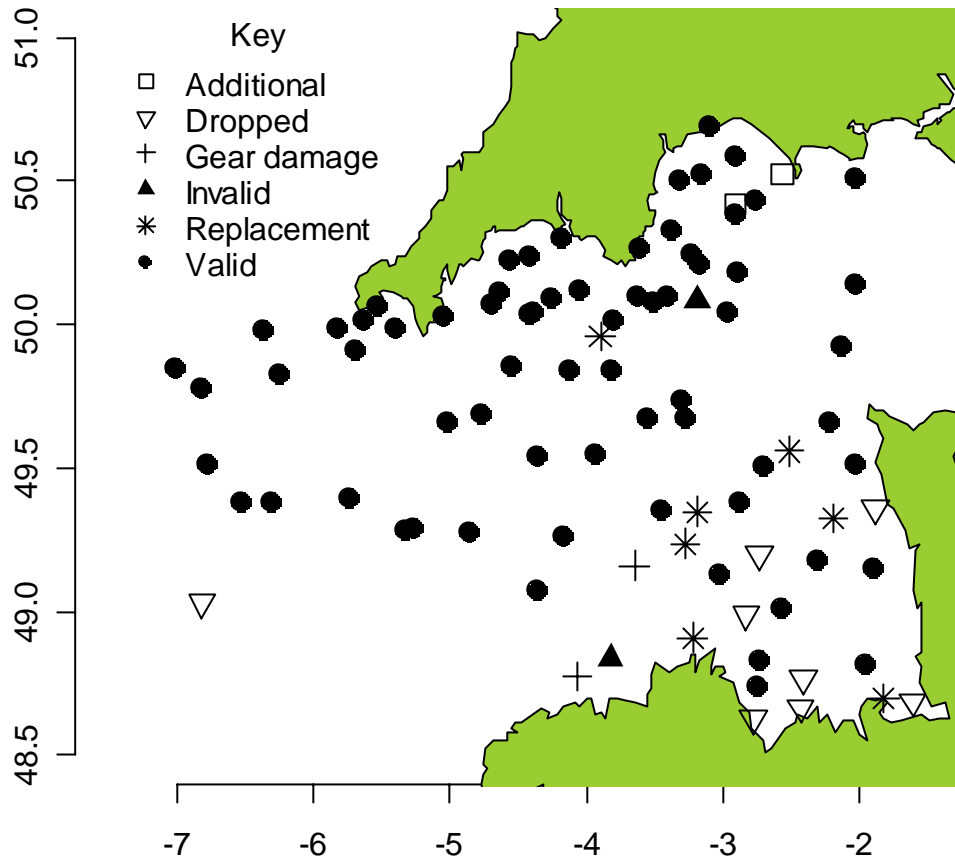


Fig 3.

Fishing Station route per day

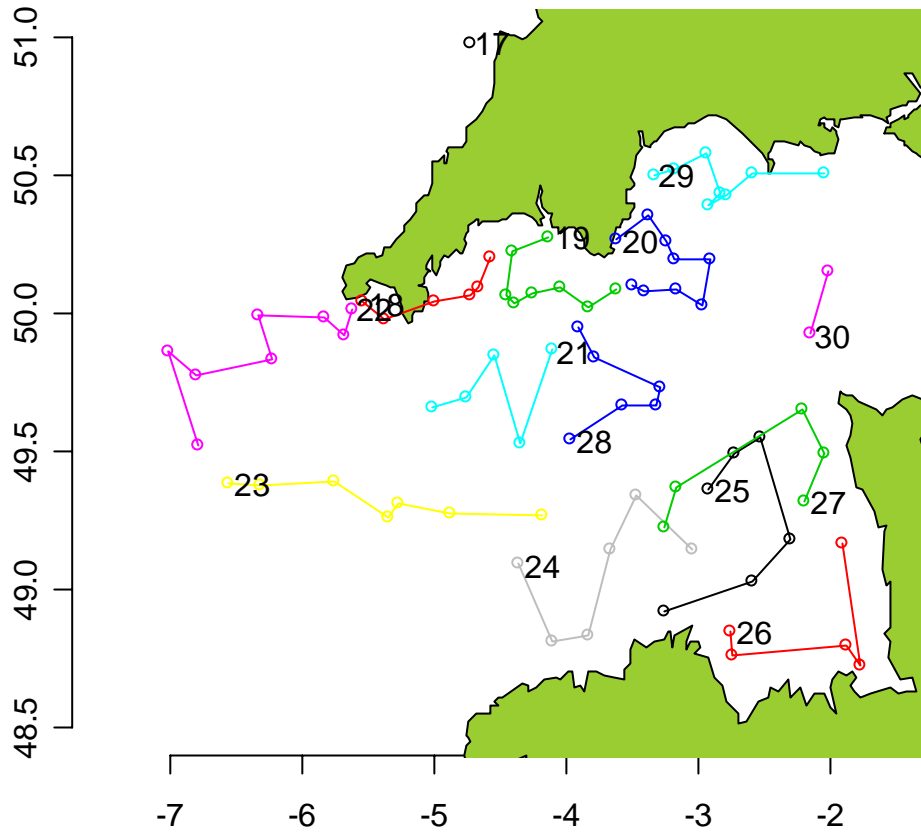


Fig 4.

Distribution of sole from CEND 5/07 (log scale)

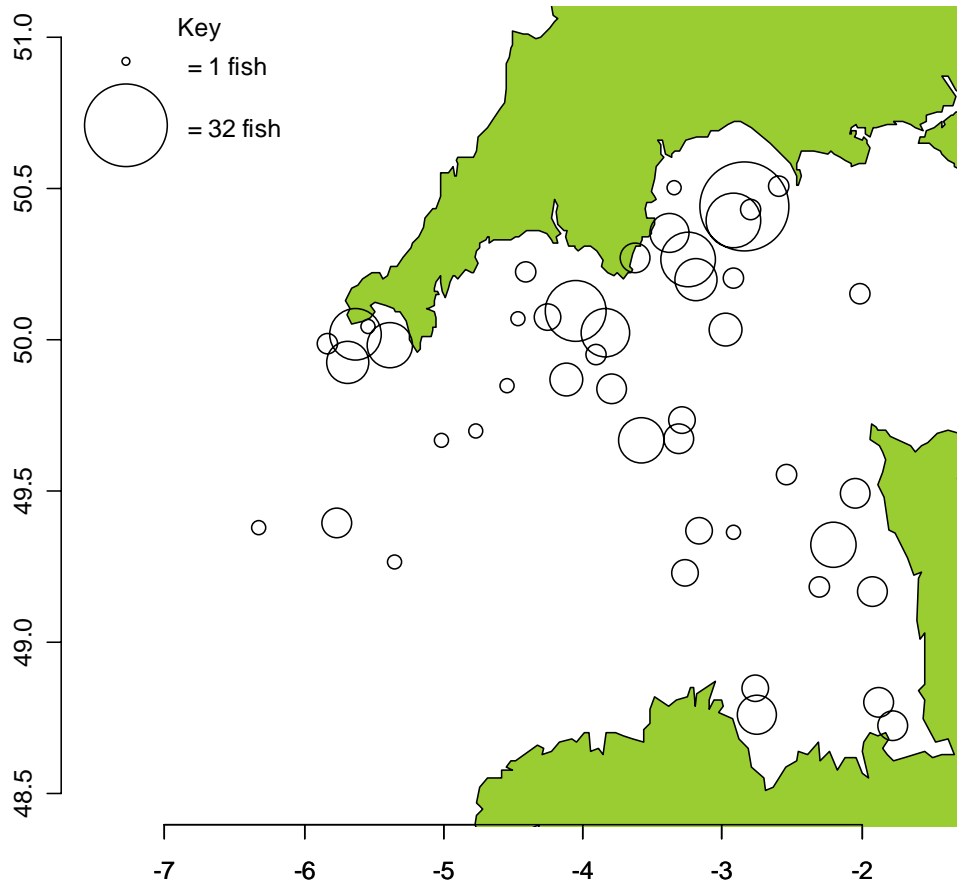


Fig 5.

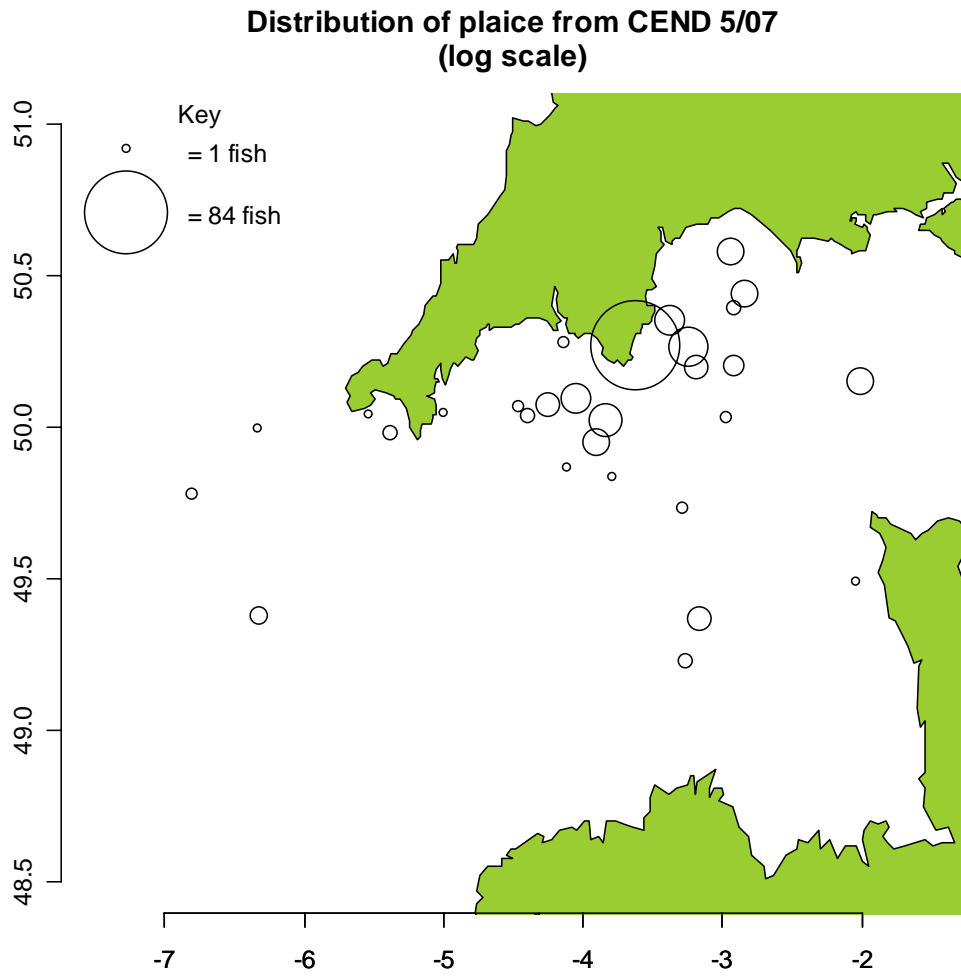


Fig 6.

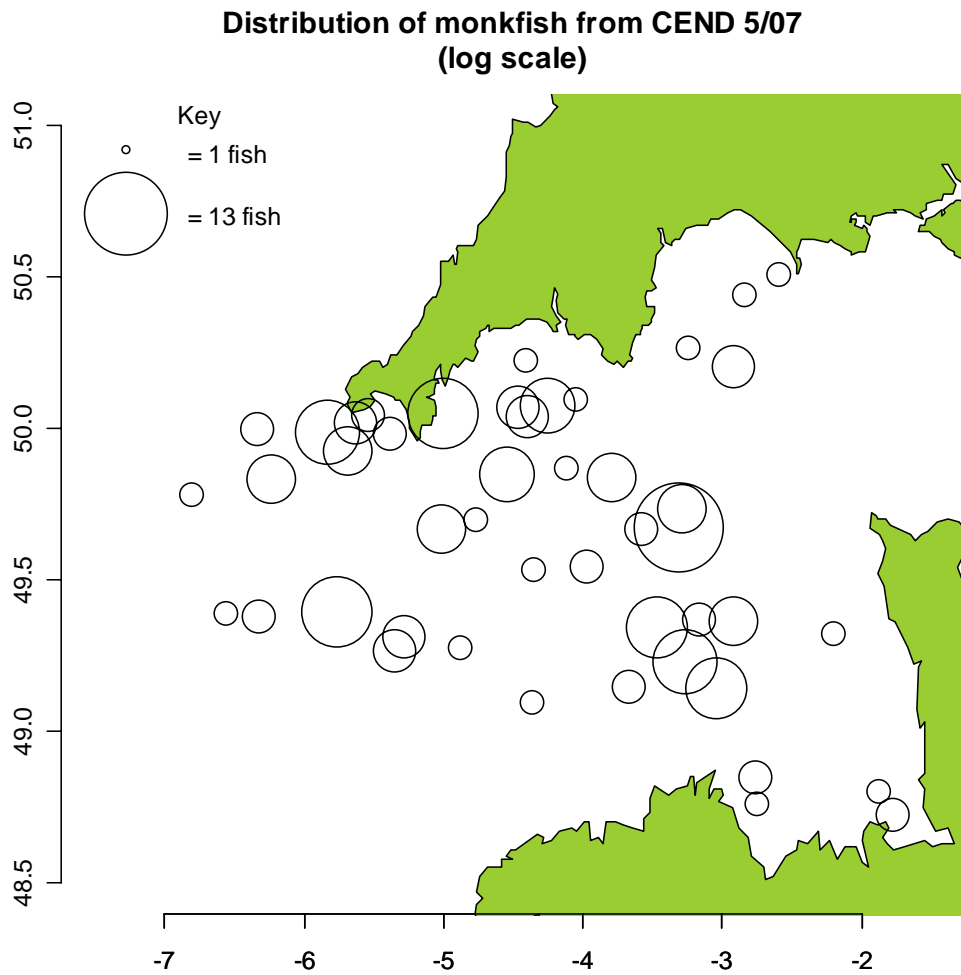
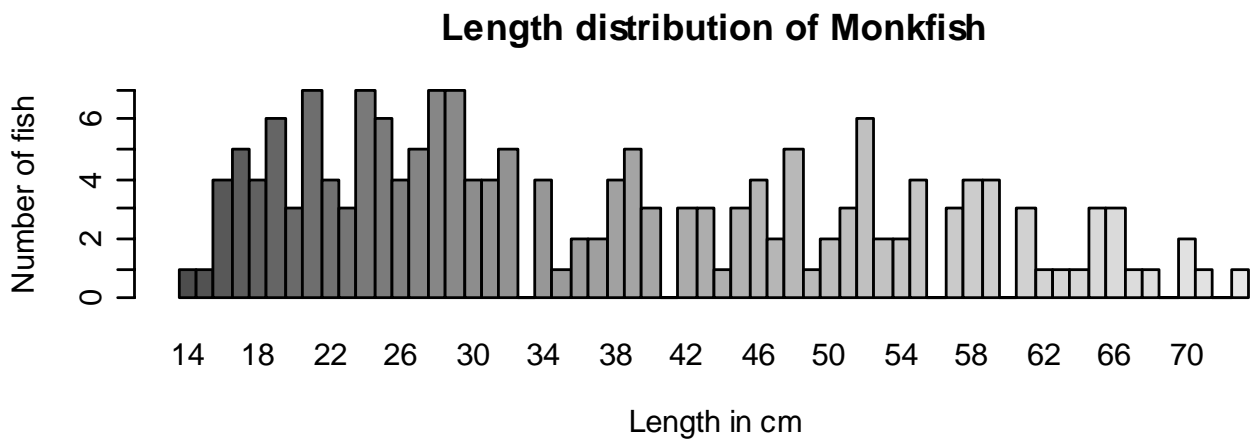
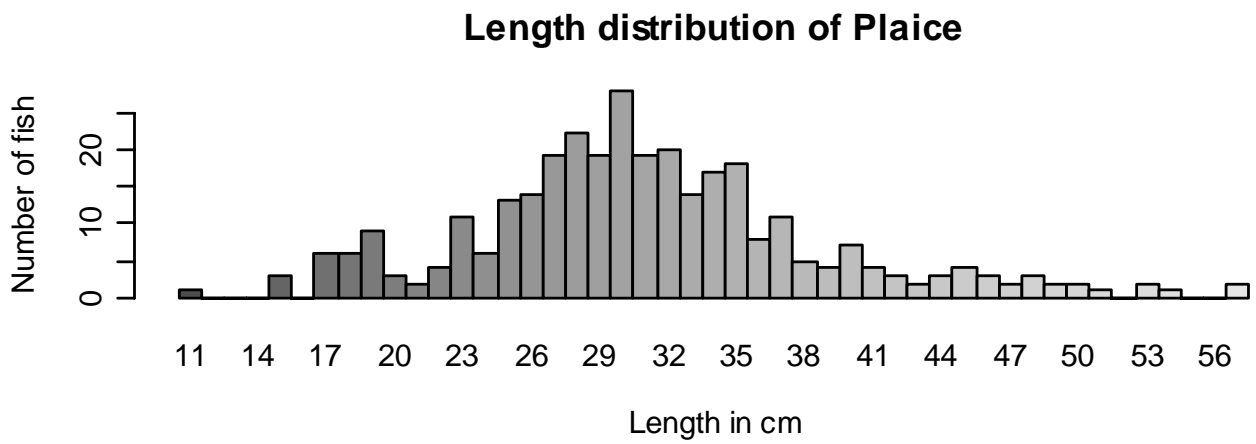
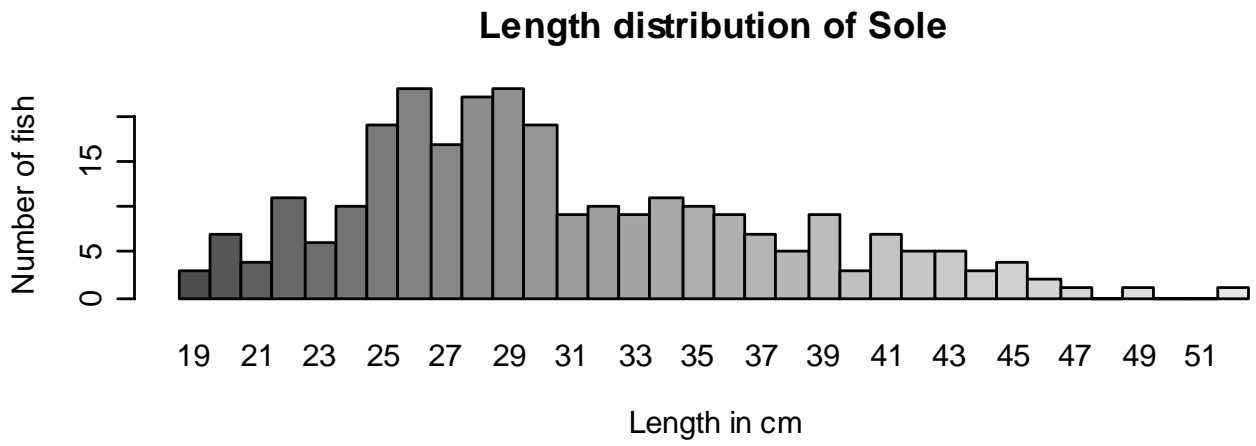
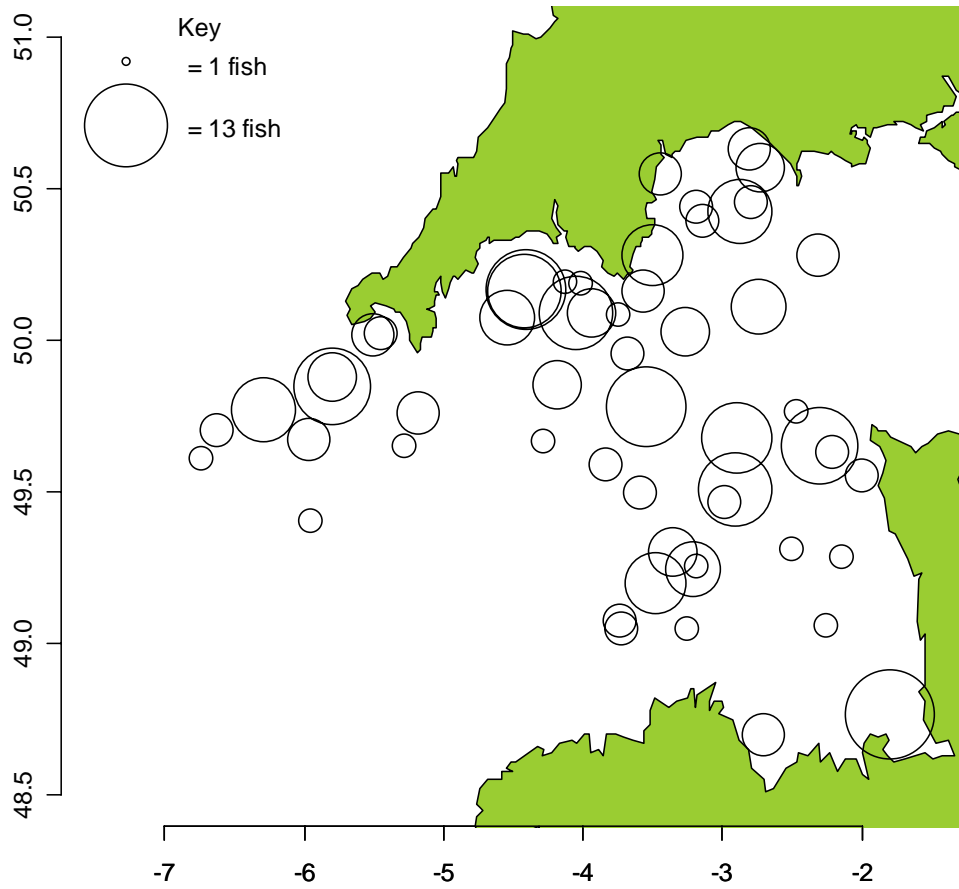


Fig 7.

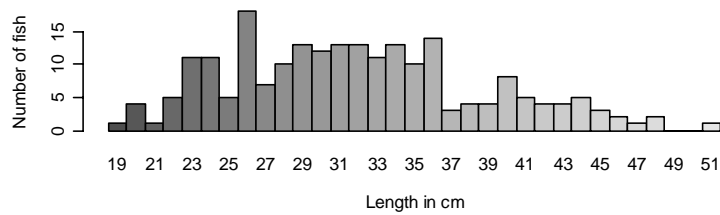


Appendix. – Results for the westerly beam trawl survey 2006.

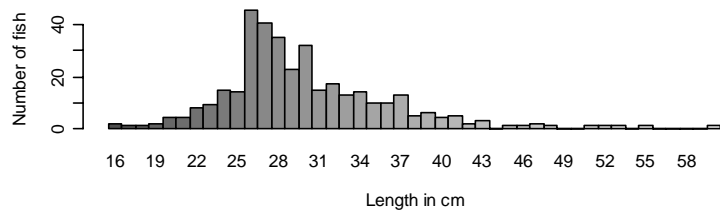
**Distribution of sole from CEND 8/06
(log scale)**



Length distribution of Sole



Length distribution of Plaice



Length distribution of Monkfish

