THE CENTRE FOR ENVIRONMENT, FISHERIES & AQUACULTURE SCIENCE, LOWESTOFT LABORATORY, LOWESTOFT, SUFFOLK, NR33 0HT.

2010 RESEARCH VESSEL PROGRAMME
REPORT: RV ENDEAVOUR: SURVEY 12/10

STAFF:

Sally Songer (SIC)
Richard Ayers (2IC)
Matthew Sherlock (CRP)
Mary Brown
Stephen Shaw
Jonathon Ashworth
Alyson Little
Andrew Bailey
Neil Pearson (17^{th}-19^{th} July)
Andrew South (19^{th} – 31^{st} July)

Helen Walton (Exeter Student)
Meggie Hudspith (Southampton Student).

DURATION:

17^{th} July – 31^{st} July 2010

LOCALITY:

English Channel (VIId), North Sea (IVc).

PRIMARY AIMS:

1. To undertake a beam trawl survey in the southern North Sea and eastern Channel as part of an ICES co-ordinated research programme.

2. To obtain fisheries independent data on the distribution and abundance of commercial flatfish species.

3. To collect biological data, including maturity and weight at age, of commercial species, to satisfy the requirements of the EU data regulations.

4. To identify the epibenthos by-catch taken in the 4-metre beam trawl and to quantify 12 species as agreed at the Beam Trawl Working Group.

SECONDARY AIMS:

5. To sample litter on every station
6. To collect isotope samples for Simon Jennings
7. To collect live dabs for brood stock for Stuart Hetherington
8. To tag and released rays for beam trawl survival rate study for Jim Ellis
9. To collect radiological samples for Paul Rumney in VIId.

NARRATIVE:

The SIC and 2IC joined the Endeavour on the afternoon of 15 July to allow them to set up all scientific equipment on 16 July. The rest of the scientific team joined in the afternoon (1700) of 16 July. Safety inductions took place for those members of the scientific team that were in need of them once all the scientists had arrived.

The vessel sailed from Portland docks at 0600 17 July, and headed to the first survey station. En route the toolbox talk took place.

The survey commenced to the west of the Isle of Wight in proximity of Poole and Christchurch bay at prime station 44, (VIId inshore English side) at 0904. On the first station surface salinity samples were taken and bottom salinity sampled with the Niskin before the beam trawl was shot at 0921.

This first tow was used as a shake down and no problems were encountered so after its completion the Endeavour proceeded to the next survey station. During 17 July eight prime beam trawl stations were completed. All were valid. Prime 47 and Prime 24 were full benthic sorts. The last station (Prime 25) was hauled at 2036. Salinity samples and Niskin were taken after the haul was complete.

The procedure described above for Niskin and surface salinity sampling was followed on each of the remaining days of the survey. A mini CTD was used on the Niskin wire and one on the beam. Data was recorded throughout the course of each day and downloaded at the end of the last haul each evening.

On 18 July work commenced at prime station 53, west of Shoreham (VIId inshore English side) at 0535, with the trawl being shot for the first time at 0602. Nine prime beam trawl stations were completed. All were valid, and no gear damage was sustained. Prime 54 was a full benthic sort. The last station was hauled at 1639. The vessel then proceeded to steam west to hold position at prime station 22 west of the Isle of Wight for work to begin there the following morning.

On 19 July work commenced at prime station 22, (VIId English side; west of the Isle of Wight) at 0531, with the first trawl being shot at 0607. Seven prime beam trawl stations were completed. Prime 27 was a full benthic sort. The last station of the day was hauled at 1814, this was prime station 49 and was hauled after 10 minutes due to excessive amounts of static gear, shallow water and an historic wreck in the vicinity, this station was invalid. Neil Pearson, Cefas HSEQ manager, who had been carrying out an 18001 audit, then left the vessel via the Solent Racer and was replaced by Andy South at Portsmouth Harbour. The Endeavour then proceeded to the southwest approaches to hold position ready for the first station the following morning.

On 20 July work commenced at prime station 10, (VIId French side), off shore in the southwest approaches at 0539. The vessel then proceeded south into the Baie de Seine. Eight prime beam trawl stations were completed in this area. At prime station 9 the gear was hauled after 20 minutes to avoid a large catch of brittle stars.

At prime station 14 and 15 tow time was reduced to 20 minutes and the warp shortened to 3:1 to avoid a large catch of shell and gravel, which is expected in this area. Despite this, heavy catches of shell and gravel were encountered. As a consequence both stations were declared invalid as it was apparent that the gear would not have been fishing properly because of the weight in the net. These stations were not repeated as the fishing skipper was concerned about health and safety

Prime stations 6 and 7 were also fished for 20 minutes with the warp at a ratio of 3:1; both stations were valid, although 7 did contain a large volume of mud. Station 7 was a full benthic sort. This was the last station of the day and was hauled at 1801. The boat stayed in the area to begin fishing at Prime station 4 the following morning.

On 21 July work commenced at prime station 4, VIId French side, inshore, Baie de Seine at 0531. Seven prime beam trawl stations were completed, all of which were fished for 20 minutes with a warp ratio of 3:1, except prime 19 which was fished for 30 minutes with a warp ratio of 3.5:1. Prime 2 was invalid due to a large catch of shell and gravel that would have been preventing the gear from fishing properly. This station was not repeated and all other stations were fished successfully. Once the last station was complete the ship laid at anchor over night just off Le Bonne Pierre to commence fishing once more in this vicinity the next morning.

It is recommended that the Prime stations 14, 15 and 2 be assessed for their contribution to the assessment weighed against the cost and risks involved. It may be appropriate to seek other tows in the same sampling strata that would give more consistent results.

On 22 July work commenced at prime station 18, VIId French side, in shore, Baie de Seine at 0535 before heading back in towards the French coast. The vessel then worked her way eastwards along the French coast for the rest of the day. Prime station 16 was hauled early, after 20 minutes in an attempt to avoid static gear. Seven other prime beam trawl stations were completed, all of which were fished for 30 minutes with a warp ratio of 3.5:1, except for prime 29 which was fished for 20 minutes with a warp ratio of 3:1 to avoid a large catch of sand. All stations were valid and no gear damage was sustained. Station 18 was a full benthic sort.

On 23 July work commenced at prime station 36, (VIId French side), west of Bologne at 0530. Ten prime beam trawl stations were completed. Prime station 71 was fished for 20 minutes with a warp ratio of 3:1 to avoid a potential large catch of sand. Prime station 70 was fished once with a warp ratio of 3.5:1 for 30 minutes, resulting in a massive catch of brittle stars. This tow was deemed invalid and a second attempt was made slightly to the west of the original tow with a warp ratio of 3:1 and fishing for 20 minutes, a similar catch was made, again invalid, so this station was abandoned. Station 68 was hauled after 20 minutes to avoid static gear and station 95 was fished for 20 minutes with a warp ratio of 3:1 to avoid a potential large catch of sand. Station 72 was a full benthic sort.

On 24 July work commenced at prime station 75, (VIId English side), inshore, east of Dungeness at 0538. Five prime beam trawl stations were completed and 2 additional tows. All stations were fished for 30 minutes with warp at 3.5:1. All stations were valid and no gear damage was sustained. Prime 74 was a full benthic sort. A safety drill took place at 1600.

On 25 July work commenced at prime station 60, (VIId English side), just off Hastings at 0532. 6 prime beam trawl stations and 2 additional tows were completed. All stations were fished for 30 minutes with warp at 3.5:1. All stations were valid and no gear damage was sustained. The last station was hauled at 1831, and this concluded the VIId part of the survey. Station 62 was a full benthic sort. After fishing in VIId was complete the vessel proceeded to the Thames area to anchor ready to commence work of IVc the following morning.

On 26 July work commenced at prime station 92, IVc near the upper mouth of the Thames at 0549. Eight additional tows were completed. Prime station 97 was invalid on the first attempt, due to a large catch of sand and shells. The tow was repeated for 20 minutes with a warp ratio of 3:1 and this time was successful. All other stations fished successfully and no gear damage sustained. Stations 78 and 82 were full benthic sorts. After operations were complete for the evening the vessel proceeded to anchor off Orford ready to start work in this area in the morning.

On 27 July work commenced at prime station 99, IVc, east of Orford at 0542. Six additional tows were completed. All were valid and no gear damage was sustained. After work was complete on these stations, several 10 minute tows were carried out in an attempt to catch some live dabs as brood stock for BEEMS project, this was an additional aim for the survey. Once these tows were complete the vessel proceeded to the Belgian sector to commence work here the following morning.

On 28 July work commenced in the Belgian sector at 0537. Six tows were completed, all of which were fished for 30 minutes with a warp ratio of 3.5:1. All catches were valid and no gear damage was sustained. Two extra 10 minute tows were also carried out to try and collect some live dabs. The last tow was hauled at 1803.

On 29 July, five additional tows were completed just off Orford and Southwold. All stations were fished for 30 minutes with a warp ratio of 3.5:1. All were valid and no gear damage was sustained. Station 100 was a full benthic sort. After this three, 10 minute tows were carried out to again in an attempt to catch some live dabs, this was largely unsuccessful. The vessel then anchored off Southwold for the evening ready to commence work again in this area the following morning.

On 30 July, four additional tows were carried out inshore off Southwold and Lowestoft. All stations were fished for 30 minutes at a warp ratio of 3.5:1, except the last, which was fished for 20 minutes to ensure no damage was inflicted by the rough ground. All were valid. Once fishing was complete a thorough clean down of the labs was carried out. A safety drill took place at 1615.

The Endeavour docked in Lowestoft on the night time tide of 30/07/09 at the end of the survey.

RESULTS:

Primary aims.
Aim 1.

A total of 38 valid tows were completed on prime and additionally fished stations in the Eastern English Channel (VIId) English sector. In addition 1 invalid tow was carried out, this was successfully repeated (see table 1).

In the French sector 31 tows were successfully sampled. In addition 3 invalid tows were carried out, these were not repeated. In IVc 30 stations were fished successfully including 5 additional tows in the Belgian sector. No stations were invalid; one tow was invalid on the first attempt but repeated successfully.

Region	Valid 30 mins	Valid 20 mins	Invalid	Number of stations without valid result	Total tows
VIId (English)	36	2	1	1	39
VIId (French)	16	15	3	3	34
IVc	25	4	1	0	30
Total	77	21	5	4	103

Table 1. The number of valid and invalid tows fished during the survey. * IVc includes additional tows in the Belgian sector.

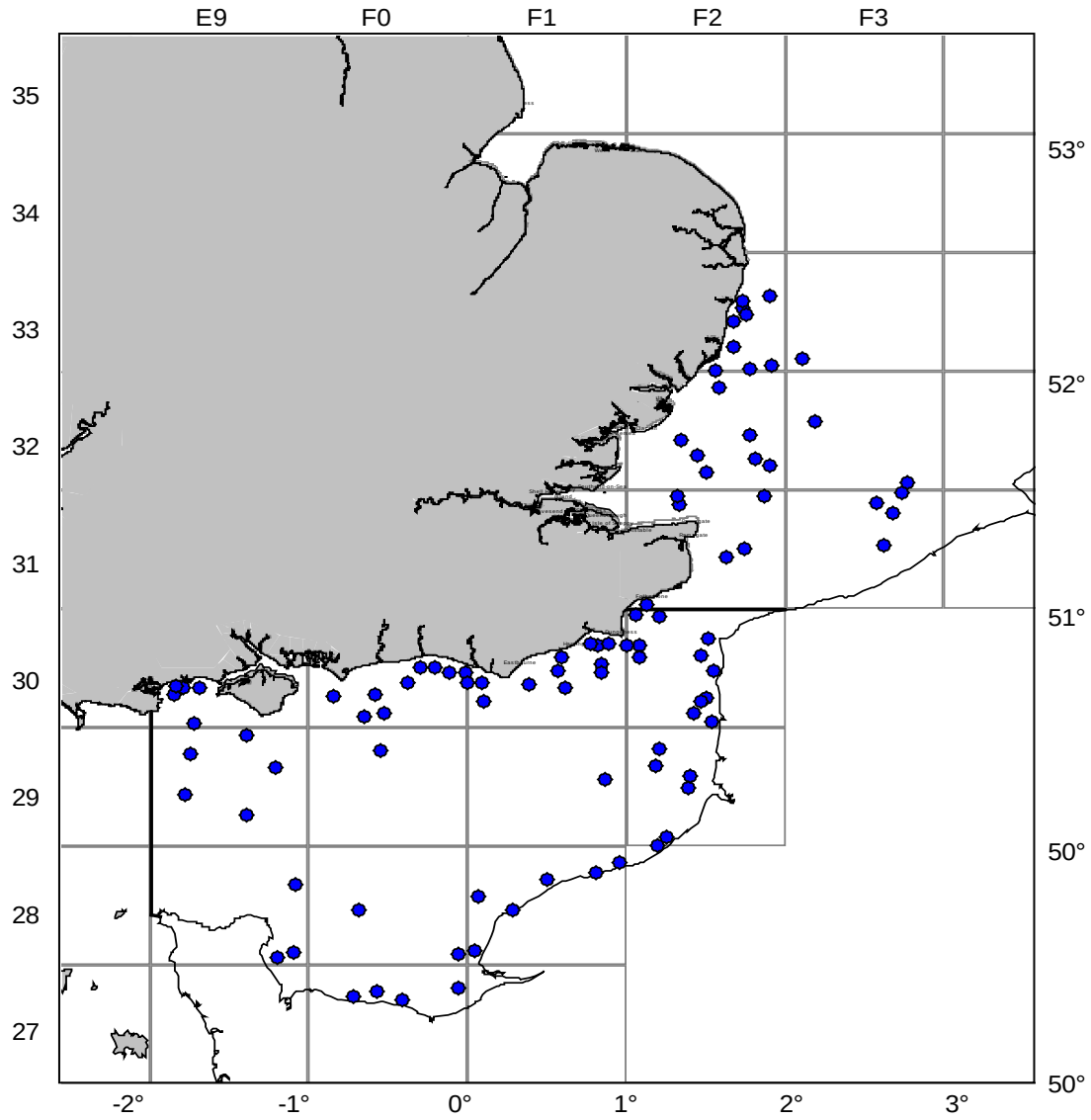


Figure 1 –Stations fished during survey.

Aims 2 & 3

All otolithed fish were measured to the whole cm below, weighed individually, sexed and assigned a sexual maturity code based on a 4-stage key if required. Table 2 shows the otoliths collected for the main commercial fish species. All non-commercial finfish by-catch caught was identified to species level, weighed and measured. In addition the following shellfish and cephalopods were also weighed and measured, cuttlefish (*Sepia officinalis*), *Alloteuthis spp, Loligo spp*, edible crab (*Cancer pagurus*), lobster (*Homarus gammarus*), scallops (*Pecten maximus*), velvet swimming crab (*Necora puber*) and spider crab (*Maia squinado*), while queen scallops (*Aequipecten opercularis*) and oysters (*Ostrea edulis*) were weighed and counted only. The numbers of individual fish measured this year for the main commercial species can be seen in Table 3.

In total 189 different species were recorded. Bubble plots of catches can be seen in Appendix 1 and some length weight plots are shown in Appendix 2.

Region	Brill	Cod	Dab	Flounder	Lemon sole	Plaice	Sole	Bass	Turbot

VIId English	13	1	250	11	23	573	285	5	6
VIId French	12	0	225	27	49	445	378	0	12
North Sea (IVc)	7	4	133	21	37	230	384	3	1
Total	32	5	608	59	109	1248	1047	8	19

Table 2. Otoliths collected from the main commercial species in each sampling region.

Species	Species code	VIId English	VIId French	IVc North Sea	Total
Brill	BLL	13	12	7	32
Cod	COD	1	0	3	4
Cuttlefish	CTC	195	481	28	704
Dab	DAB	567	455	542	1564
Flounder	FLE	32	38	28	98
Lemon Sole	LEM	50	73	53	176
Plaice	PLE	1249	1188	949	3386
Sole	SOL	292	586	807	1685
Turbot	TUR	6	13	1	20
Whiting	WHG	251	10	407	668
Velvet swimming crab	MLP	83	1002	81	1166

Table 3. Number of fish measured from the main commercial species, in each sampling region.

AIM 4:

On certain specified stations a full benthic sort was carried out to identify the numbers and weights of species encountered. In addition on all other stations benthos encountered was noted as an observation in the database at species or other taxonomic grouping. There were also 9 sentinel species that if encountered at any time on any tow, should be removed and quantified. We primarily encountered Ross Coral (*Pentapora foliacea*) and *Sabelleria spinulosa* of these species; 11 sponge crabs and 8 mantis shrimps (*Meiosquilla desmaresti*) were also caught. All 13 planned full benthic stations in VIId except station 14 which was invalid due to a large catch of sand and gravel and 3 in IVc were sampled successfully.

Secondary aims.

5. Litter was sampled on every station according to the protocol supplied

6. 1327 Isotope samples were collected for Simon Jennings.

7. 60 live dabs were collected and kept in tanks on board as brood stock for Stuart Hetherington.

8. 6 thornback rays and 1 blonde ray were tagged and released for Jim Ellis' beam trawl survival rate study.

9. 5kg of whiting, 5 kg of plaice and 75 queen scallops were collected in VIId for radiochemical analysis as requested by Paul Rumney.

Other work

Bridge logging: The additional depth feed (from the EA 600 sounder) provided during the last dry-dock was incorporated into the bridge logging software and successfully tested.

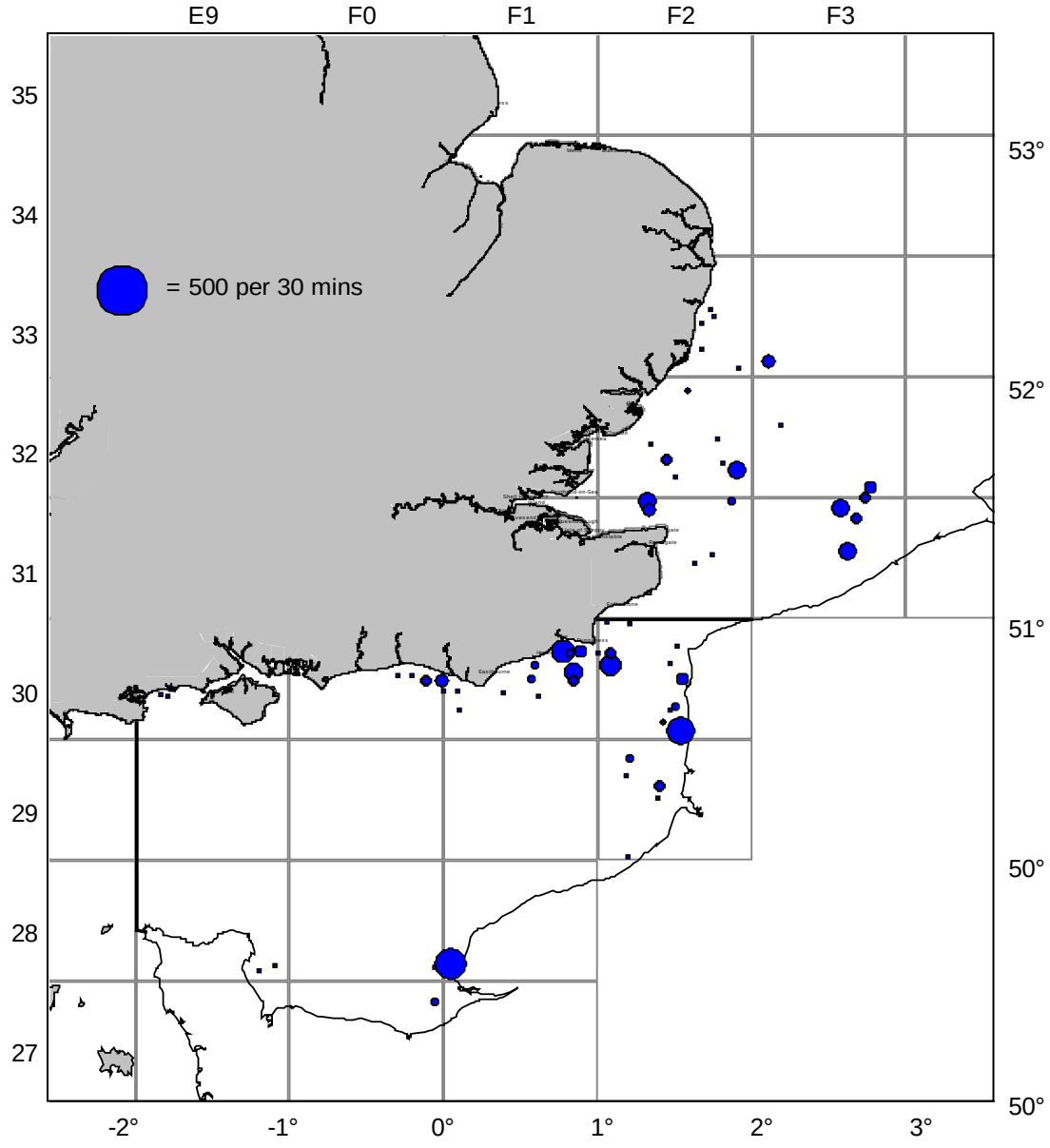
Test software was written for the DEM scale for the following cruise to assess performance during less favourable weather conditions.

The new RFID measuring board system was rolled out live successfully, it proved to be quicker to use and was unanimously agreed to be very impressive. The original 6 wands issued at the start of the trip were still in use at the end, proving the new hardware is markedly more robust than its predecessor.

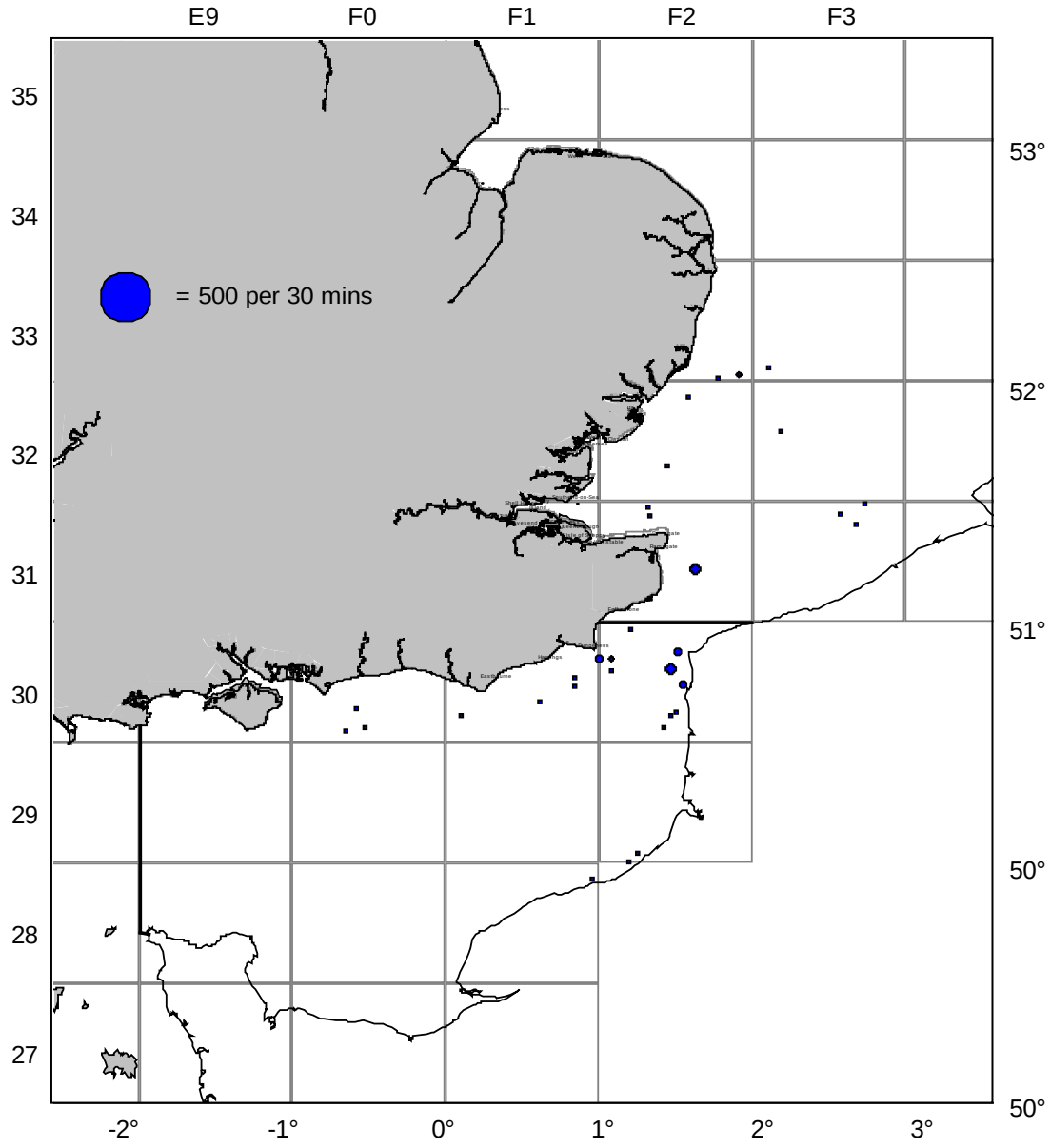
Previous problems with communications with the POLS balances were investigated and rectified, a combination of badly corroded data leads, bad connections, inconsistencies in POLS firmware and associated instructions and incorrect wiring all contributed to the issues encountered by previous trips. Once corrected, no further problems were found with POLS communication, and again, the same kit was in use at the end of the trip as at the start.

Acknowledgements
The SIC would like to offer her sincere thanks to the officers and crew of the Cefas Endeavour for their support and expertise throughout the course of the survey, without which it would not have possible.

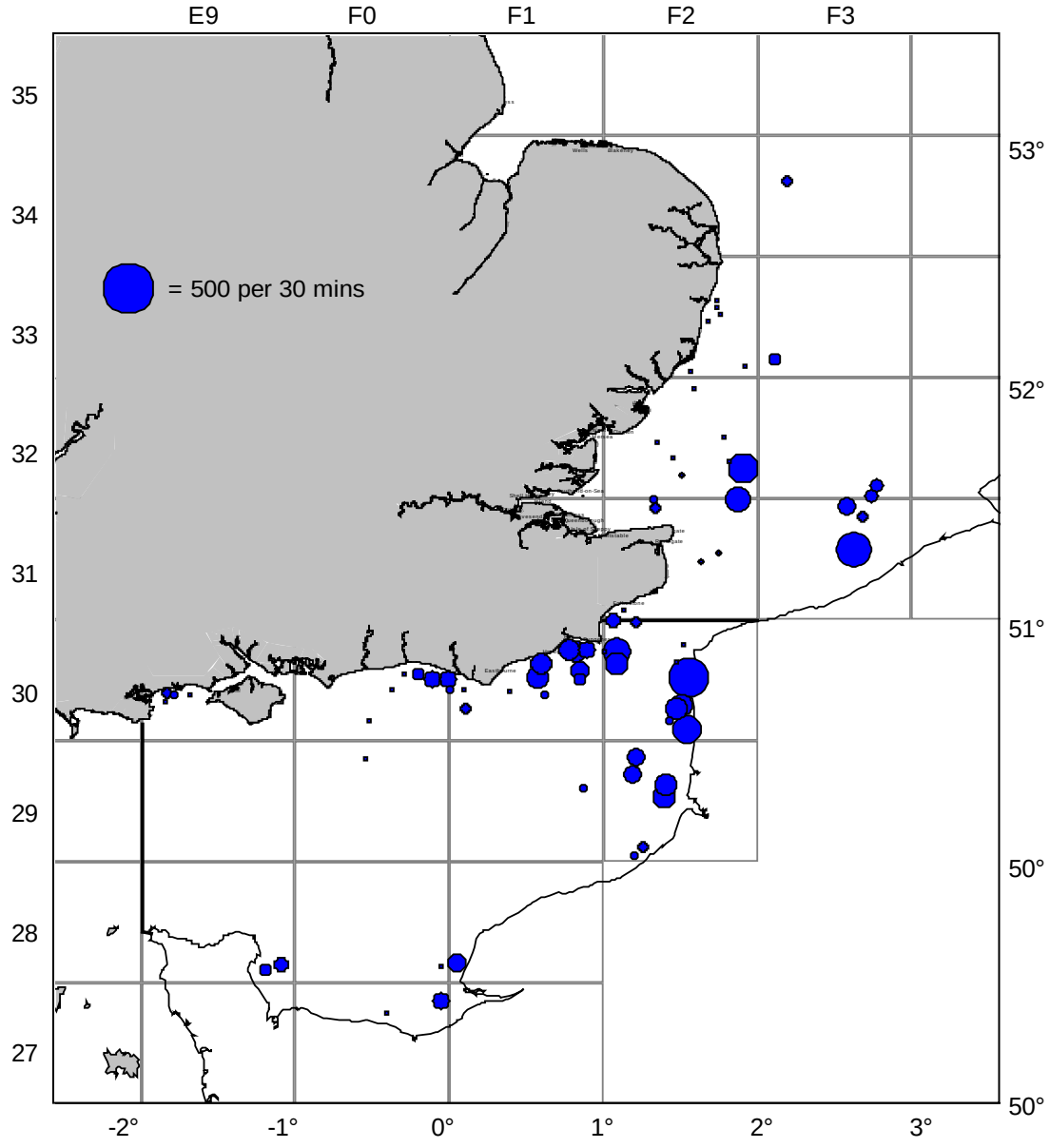
Cend 12/10 - Dab



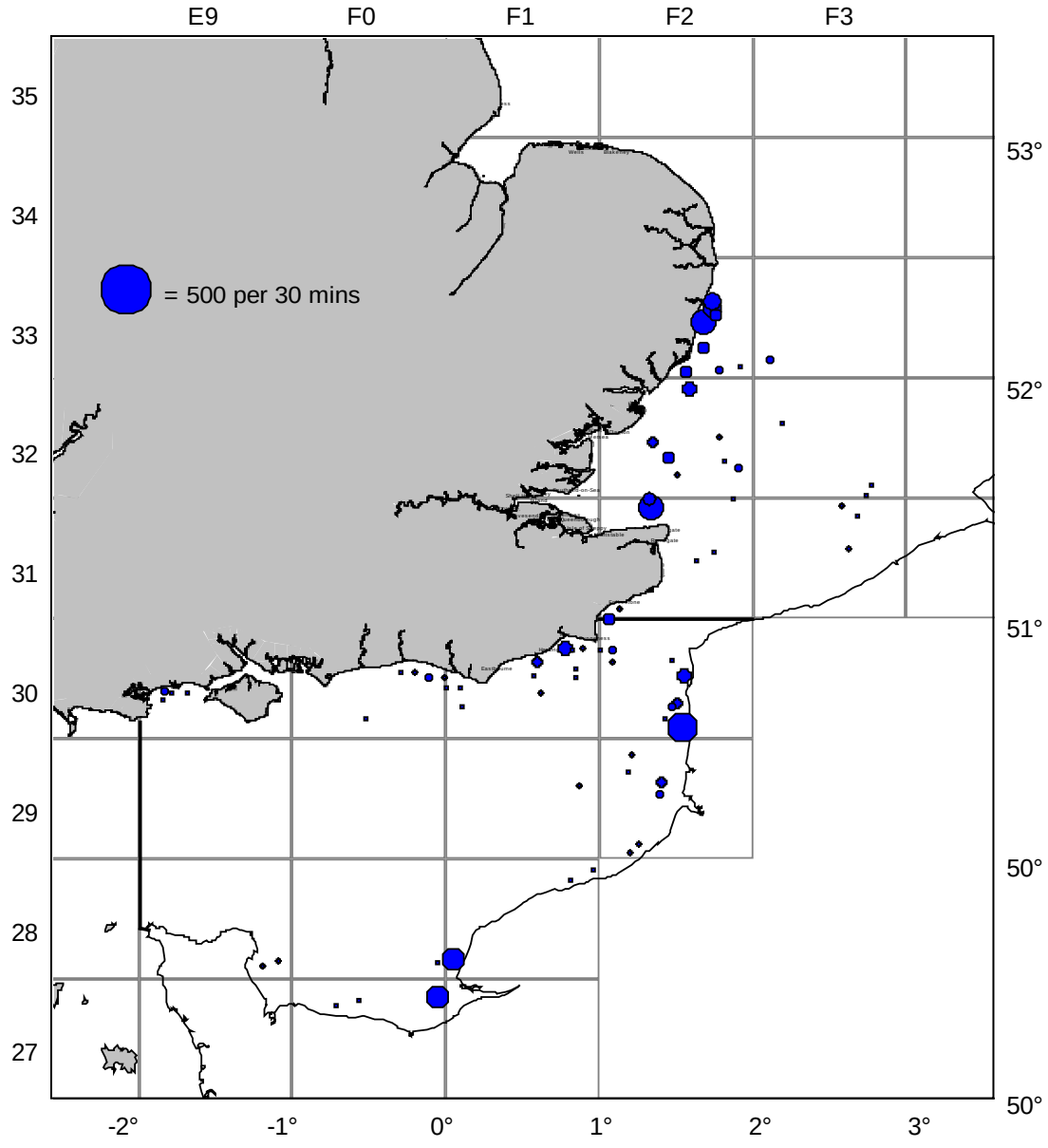
Cend 12/10 - Lemon sole



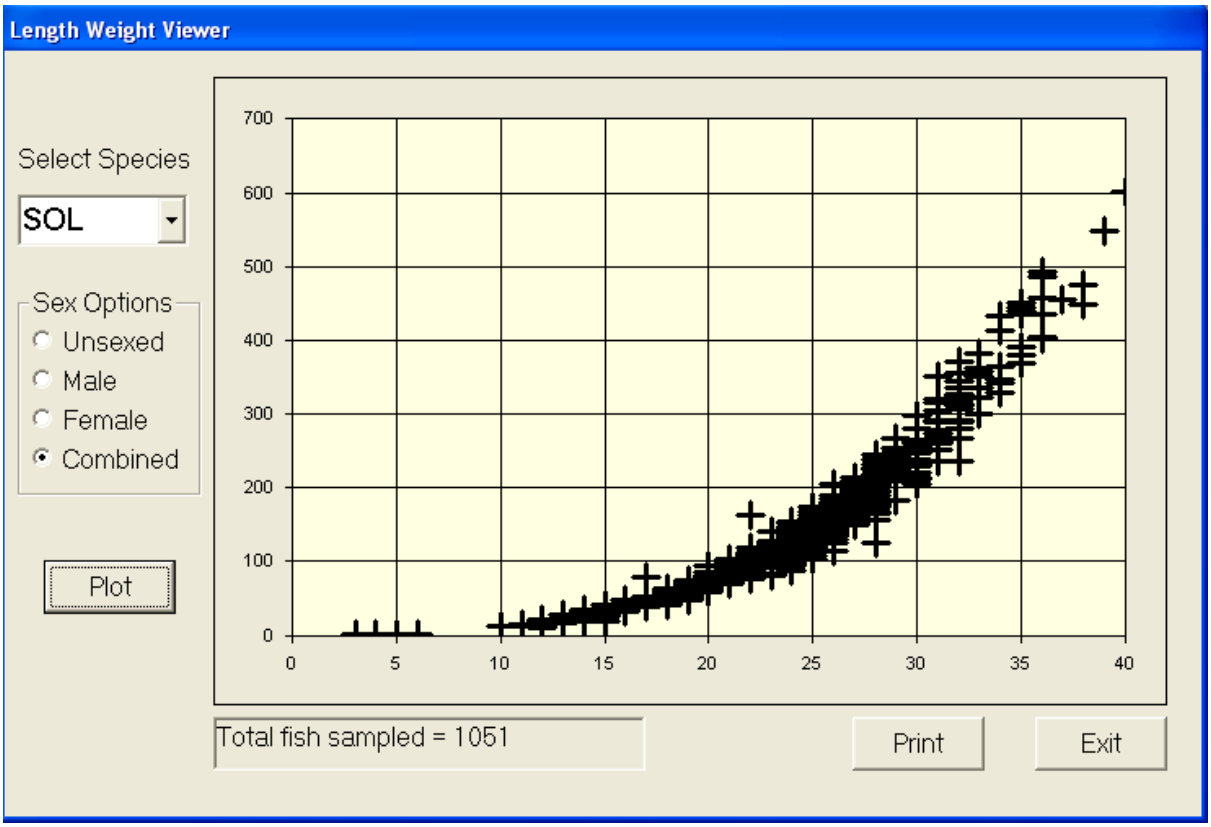
Cend 12/10 - Plaice

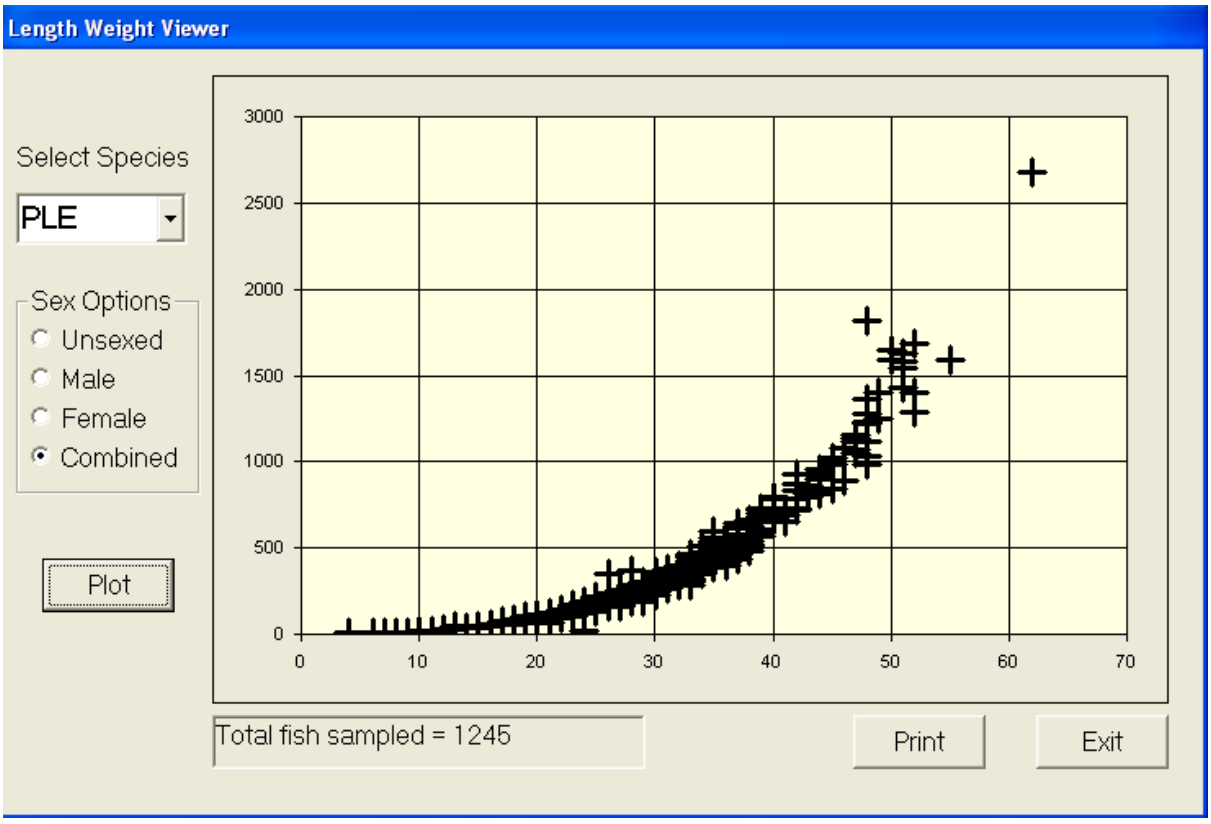


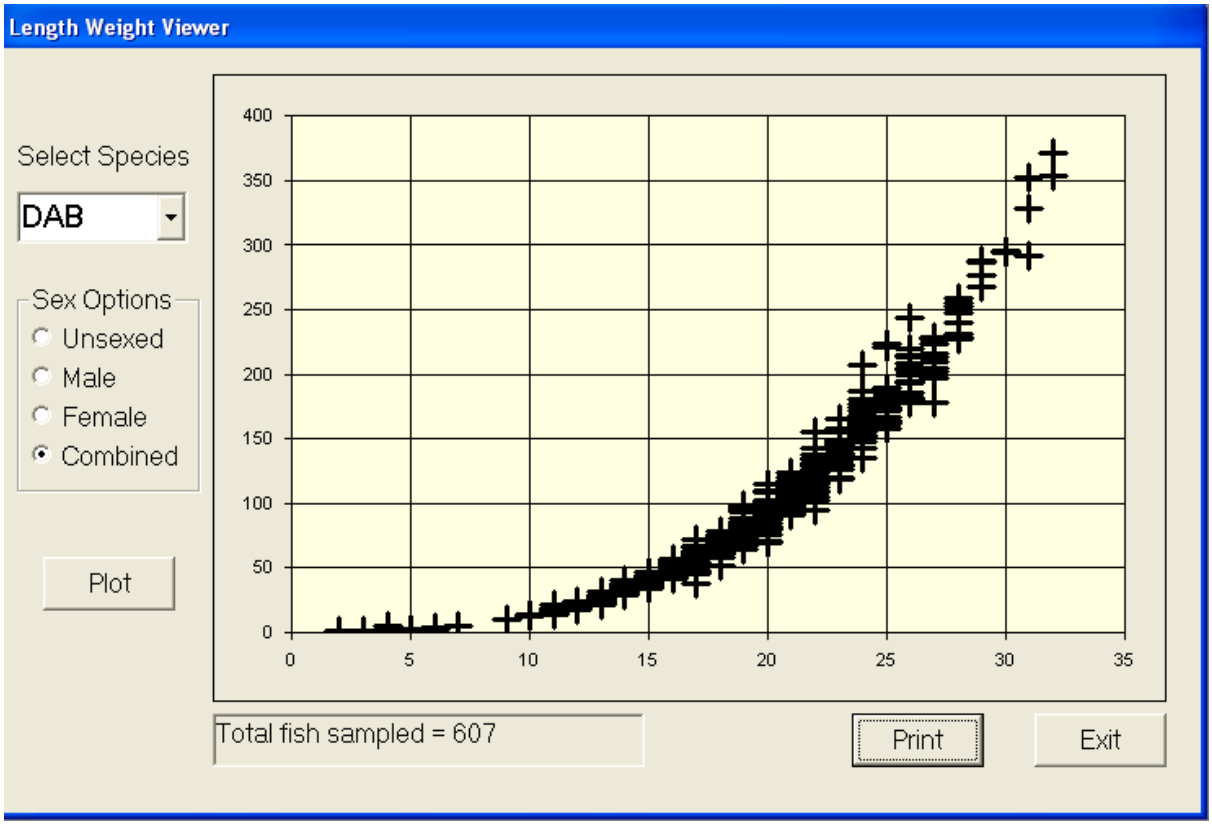
Cend 12/10 - Sole

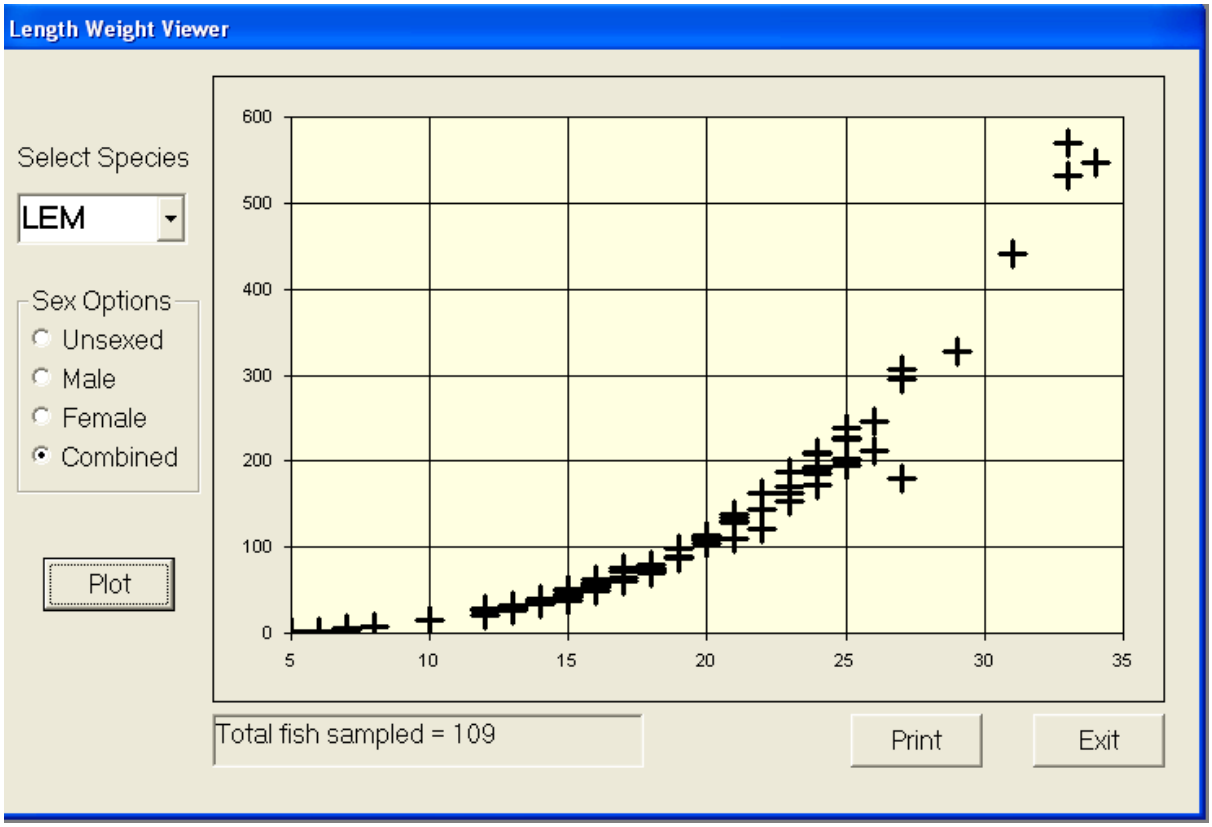


Appendix 2– length weight plots






Length Weight Viewer
Select Species
DAB
Sex Options
Unsexed
Male
Female
Combined
Plot
400
350
300
250
200
150
100
50
0
0
5
10
15
20
25
30
35
Total fish sampled = 607
Print
Exit


Length Weight Viewer
Select Species
LEM
Sex Options
Unsexed
Male
Female
Combined
Plot
600
500
400
300
200
100
0
5
10
15
20
25
30
35
Total fish sampled = 109
Print
Exit

S Songer
30/07/10

INITIALLED:

DISTRIBUTION:
Basic list +
Cruise staff
Fishing Skipper Cefas Endeavour
W Demare, Belgium
Frans v Beek, Netherlands
Joel Vigneau, France
Kent and Essex, Sussex, Southern and Eastern SFCs
DARD Northern Ireland