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

2015 RESEARCH VESSEL PROGRAMME
REPORT: RV ENDEAVOUR: SURVEY 16/15

STAFF:
Jo Smith (SIC)
Richard Ayers (2IC)
Ian Holmes
Gary Burt
Mary Brown
Charlotte Jennings
Alice Megaw (Student – St Andrews University)
Katherine Maltby (Student – Exeter University)
Paul Gardiner
Georgina Greenhalgh (17 – 24 July)
Sally Songer (24 July – 31July)

DURATION:
18th – 30th July 2015

LOCALITY:
Eastern English Channel (VIId), Southern 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 4m beam trawl and to quantify species as agreed at the Beam Trawl Working Group (WGBEAM).

SECONDARY AIMS:

5. To sample litter caught in the beam trawl on every station
6. To collect berried crabs and lobsters for brood stock
7. To collect live crabs and starfish for Yarmouth Sea Life centre
8. To collect one water sample per day for nutrient analysis for Naomi Greenwood
9. To tag and release smooth hounds and rays
10. To collect biological samples on dogfish
11. To collect live and dead hermits in whelks
12. To collect and filter a water sample in the vicinity of the West Gabbard SMART buoy for Elisa Capuzzo
13. To test and trial new EDC software

NARRATIVE: (ALL TIMES ARE GMT)

The SIC (Joanne Smith), 2IC (Richard Ayers), Ian Holmes, Paul Gardiner and Alice Megaw travelled from Lowestoft to Portland, joining the Cefas Endeavour (CEND) on the afternoon of 16 July. The following day was spent setting up the EDC kit, testing the new software and unpacking the gear to check that everything was present. The rest of the scientific crew joined the vessel at 1600hrs on 17 July and inductions were given for those needing them at 1730hrs that day.

The vessel sailed from Portland at 05:00 on the morning of the 18 July, heading to the first survey station (Prime 47). En-route to this position, the toolbox talk and scientist safety briefing took place. The vessel stood by to respond to a mayday at 10:25, but no assistance was required from CEND. An emergency muster and lifeboat drill was held at 1200hrs.

The survey commenced with a shakedown ESM2 logger with niskin bottle being deployed at prime station 47 in the English sector of VIId, east of Portland. This was followed by shakedown beam trawl tow (beam number 4) at the same position to fully test the gear deployment and the on-board fish sampling systems. All equipment was working well so we continued with the days fishing completing prime station 45, 43, 44, 42 and 23. The following day (19 July) a total of four stations in the English and two in the French sector were completed. Prime station 26 was fished for 20 minutes due to a history of brittle stars, however there was no problem with the catch so it may be possible to fish it for the full 30 minutes next year. The remaining five stations were fished for the full 30 minutes and were all completed successfully.

Once the day's fishing was complete CEND steamed south overnight, to begin operations the following morning at prime station 8 in the French sector of VIId near Barfleur. A total of 7 prime stations were fished successfully during the day.

Two, Pink Spotted Hawk moths ***Agrius cingulata*** (Figure 1) were caught in the net at prime station 8, a species from America, rarely seen in Europe. The relevant organisations were informed of these sightings.

Figure 1 Image of Pink Spotted Hawk moths ***Agrius cingulata***

Seven fishing stations were successfully fished on 21 July. Prime Station 19 was fished slightly north of the tow to avoid static gear (still within 1 NM range). A man overboard drill was carried out at 1345hrs, with both rescue boats launched successfully.

The survey continued east along the French coast sampling another 14 stations between 22–23 July. Prime station 76 was fished for 20 minutes due to static gear. The final station of the day put us at the same position of a channel swimmer, Clarissa Bruce (Figure 2). Given that she was sister to one of the scientists (Mary Brown) on board, CEND moved to a safe but close distance to allow us to show our support.

Figure 2 Images of channel swimmer Clarissa Bruce

This completed the French sector of this survey, with the vessel steaming overnight to prime station 49, south of Portsmouth. Fishing began in the English sector on 24 July completing prime stations 50, 51, 27, 52, 53 and 55. Prime station 49 could not be fished due to static gear and prime station 27 was reduced to 20 minutes due to large expected by-catch of brittlestars. At around 1700hrs the vessel ceased work and proceeded to Shoreham where a small boat transfer of scientific staff was carried out.

Fishing continued on the morning of 25 July on prime station 55 with 9 stations fished successfully. Prime station 58 was abandoned and prime 56 was reduced to 20 minutes both due to static gear.

The following day four fishing stations were successfully fished, three trial stations and one core station. The trial stations, were sampled mid channel in ICES rectangle 29F0 to give Cefas a clearer picture of fish population structure in an area poorly sampled by the core survey. These tows replaced the recently dropped Shingle Bank stations (prime stations 200-203) which no longer required fishing. Fishing was ceased at 1500hrs due to unexpected strong southerly winds.

Work recommenced the following morning and continued throughout the day with 7 stations sampled despite the unfavourable weather conditions. This completed the stations in the English Channel.

Six stations were completed on the 28 July, two in the southern North Sea and four off the coast of Belgium. The Belgian tows yielded the usual catches of flatfish seen in previous years.

CEND then steamed to the North Sea and completed 2 further days work, completing 13 fishing stations, 4 nutrient water stations and a collection of 1 chlorophyll water sample near the West Gabbard SMART buoy (Additional aim 13). On 29 July at 1200hrs an emergency galley fire drill was undertaken and all went well.

This completed the North Sea part of the grid and the survey ended at approximately1030hrs on 30 July, whereupon staff took the afternoon to clean up and demob. As all the survey aims had been completed and the clean-up operation were well underway, the decision was taken at 1430hrs to book a pilot for the evening tide. At approximately 1600hrs the CEND responded to a mayday call to assist the vessel Lampookie, which was without propulsion. The Lampookie was taken under tow until Lowestoft lifeboat could take over the tow close to the harbour.

CEND finally docked at 1945hrs in Lowestoft. All scientific staff stayed aboard overnight, enabling unloading to take place early the following morning.

RESULTS:

Primary aims.

Aim 1.
The survey gear was the standard 4m-beam trawl number 4, with chain mat, flip-up ropes and a 40mm cod-end liner. Beam trawl number 1 was on-board as a spare but not needed during the survey.

A SAIV Micro CTD was attached to the headline on the trawl in order to allow us to record temperature and salinity at each station. In addition, surface and bottom water samples and an ESM2 logger profile was taken twice daily

A typical station consisted of deployment of the 4m beam trawl with mini CTD from the starboard winch. The beam was towed for 30 minutes at a warp ratio of 3.5:1 unless the ground was known to yield an unmanageable by-catch, in which case the warp and tow time were shortened to 3:1 and 20 minutes respectively, or if a strong tide was running in which case the warp ratio was increased to 4:1 to ensure that the gear was settled on the seabed. All fish and selected commercial shellfish were identified to species, weighed and measured with large catches of an individual species being sub-sampled. All catch details and sample data were entered directly into the Electronic Data Capture (EDC) system and uploaded directly into the Fishing Survey System (FSS). Station details were manually entered into the FSS using information collected from the Transas bridge logging system and bridge logbook.

A total number of 7 stations were reduced to 20 minute tows due to either static gear or history of large by-catches. Figure 3 shows the beam trawl station positions on the survey and Table 1 shows the number of gear deployments undertaken on the survey. Table 2 shows the species caught on the survey and the number of valid tows where they were caught.

Region	Valid 30 minutes	Valid 20 minutes	Invalid	Abandoned due to static gear	Total Valid tows
VIId (English)	29	3	0	1	32
VIId (French)	29	1	0	1	30
IVc	11	3	0	0	14
Total	69	7	0	2	76

Table 1 The number of valid and invalid tows fished during the survey.

Species	Stations	Species	Stations
Acanthocardia aculeata	1	Acanthochitona crinatus	1
Aequipecten opercularis	37	Agonus cataphractus	49
Alcyonidium diaphanum	64	Alcyonium digitatum	49
Alcyonium glomeratum	4	Alpheus macrocheles	1
Ammodytidae	1	Anemone unidentified	30
Anseropoda placenta	17	Aphia minuta	1
Aphrodite aculeata	26	Archidoris pseudoargus	14
Arnoglossus laterna	27	Ascidiacea	33
Aspitrigla (chelidonichthys) cuculus	26	Assorted rocks	49
Asterias rubens	76	Asteroidea	1
Atelycyclus rotundatus	4	Belone belone	1
Blennius ocellaris	2	Botryllus schlosseri	4
Broken shell	12	Buccinum undatum	30
Buglossidium luteum	47	Callionymus lyra	66
Cancer pagurus	55	Carcinus maenas	1
Cellariidae	1	Chaetopterus tubes	24
Chartella spp	1	Chlamys varia	1
Chlorophyceae	10	Ciliata mustela	2
Cliona celata	1	Clupea harengus	1
Crangon allmanni	1	Crangon crangon	10
Crepidula fornicata	5	Crossaster papposus	20
Ctenolabrus rupestris	2	Cuttle eggs	25
Dicentrarchus labrax	1	Diplecogaster bimaculata	2
Dogfish egg cases	15	Dromia personata	7
Ebalia spp	1	Ebalia tuberosa	1
Echiichthys (trachinus) vipera	34	Echinocardium cordatum	1
Echinocardium spp	16	Eledone cirrhosa	2
Epibenthic mixture	67	Eupagurus / pagurus in adamsia	11
Eupagurus / pagurus in buccinum	23	Eupagurus / pagurus in suberites	5
Eurynome aspersa	2	Eutrigla (chelidonicthys) gurnardus	13
Filograna implexa	1	Flustra foliacea	41
Fucus spp	13	Fucus vesiculosus	7
Gadus morhua	2	Gaidropsarus spp	1
Gaidropsarus vulgaris	1	Galathea spp	5
Glycymeris glycymeris	6	Gobius niger	5
Gobius paganellus	3	Goneplax rhomboides	3
Henricia oculata	9	Hinia (nassarius) reticulatua	4
Hippocampus hippocampus	8	Holothuroidea	7
Homarus gammarus	4	Hyas araneus	2
Hyas coarctatus	13	Hydroida (order)	55
Hyperoplus lanceolatus	5	Inachus dorsettensis	5
Inachus leptochirus	1	Inachus spp	23
Ischnochitonidae	2	Labrus bergylta	2
Labrus mixtus (l. Bimaculatus)	1	Laetmonice (hermione) histrix	3
Laminaria spp	10	Lampetra fluviatilis	1
Limanda limanda	44	Limidae	1
Liocarcinus depurator	31	Liocarcinus marmoreus	2
Liocarcinus pusillus	3	Loliginidae	1
Loligo (alloteuthis) subulata	38	Loligo forbesi	1
Lophius piscatorius	4	Macropodia rostrata	1
Macropodia spp	15	Macropodia tenuirostris	2
Maja squinado	86	Majidae	1
Merlangius merlangus	29	Metridium senile	6
Microchirus variegatus	13	Microstomus kitt	26
Molgulidae	6	Mollusca-bivalvia	7
Mullus surmuletus	9	Mustelus asterias	18
Myoxocephalus scorpius	8	Mytilus edulis	1
Mytylidae (mollusca)	1	Necora puber	81
Nemertesia antennina	12	Nemertesia ramosa	2
Nereis spp	1	Nudibranchia	6
Ophiocomina nigra	2	Ophiothrix fragilis	19
Ophiura albida	3	Ophiura ophiura	28
Ophiuridae	2	Orcinus orca	4
Ostrea edulis	4	Ostreidae	5
Pachymatisma johnstonia	4	Paguridae	10
Palaemon serratus	3	Pandalus borealis	1
Pandalus montagui	5	Pandalus spp	2
Pecten maximus	9	Pegusa (solea) lascaris	14
Pennatula phosphorea	1	Pentapora foliacea	10
Phaeophyceae	20	Philine aperta	4
Pholis gunnellus	4	Pilumnus hirtellus	6
Pilumnus spinifer	2	Pisa armata	10
Pisidia longgicornis	8	Platichthys flesus	14
Pleuronectes platessa	112	Polybius (liocarcinus) holsatus	48
Polychaeta	3	Polymastiidae	2
Pomatoschistus spp	20	Porifera	29
Portunidae	2	Psammechinus miliaris	56
Raja brachyura	5	Raja clavata	86
Raja microocellata	1	Raja montagui	11
Raja undulata	15	Raspailia spp	6
Rhodophyceae	15	Rissoides (meiosquilla) desmaresti	1
Sabellaria spinulosa	4	Scophthalmus maximus (psetta maxima)	17
Scophthalmus rhombus	16	Scyliorhinus canicula	65
Securiflustra securifrons	1	Sepia officinalis	34
Sepia orbignyana	57	Sepiola atlantica	14

Sipunculidae	2	Solea solea	64
Solenidae	1	Spatangus purpureus	3
Spondyliosoma cantharus	6	Squid eggs	2
Styela clava	6	Styelidae	1
Suberites spp	11	Symphodus (crenilabrus) balloni	4
Symphodus (crenilabrus) melops	1	Syngnathus acus	4
Syngnthidae	1	Taurulus bubalis	1
Tethya aurantia	14	Trachinus draco	8
Trachurus trachurus	5	Trigla (chelidonichthys) lucerna	36
Trigloporus (chelidonichthys) lastoviza	18	Trisopterus luscus	40
Trisopterus minutus	26	Tritonia hombergi	2
Trochidae	1	Tubeworms	1
Tubularia spp	7	Ulva lactuca	4
Urticina (tealia) felina	10	Whelk eggs	9
Xantho pilipes	1	Zeugopterus (phrynorhombus) regius	10
Zeugopterus punctatus	2	Zeus faber	4

Table 2: List of species caught during the survey and number of stations at which they were recorded.

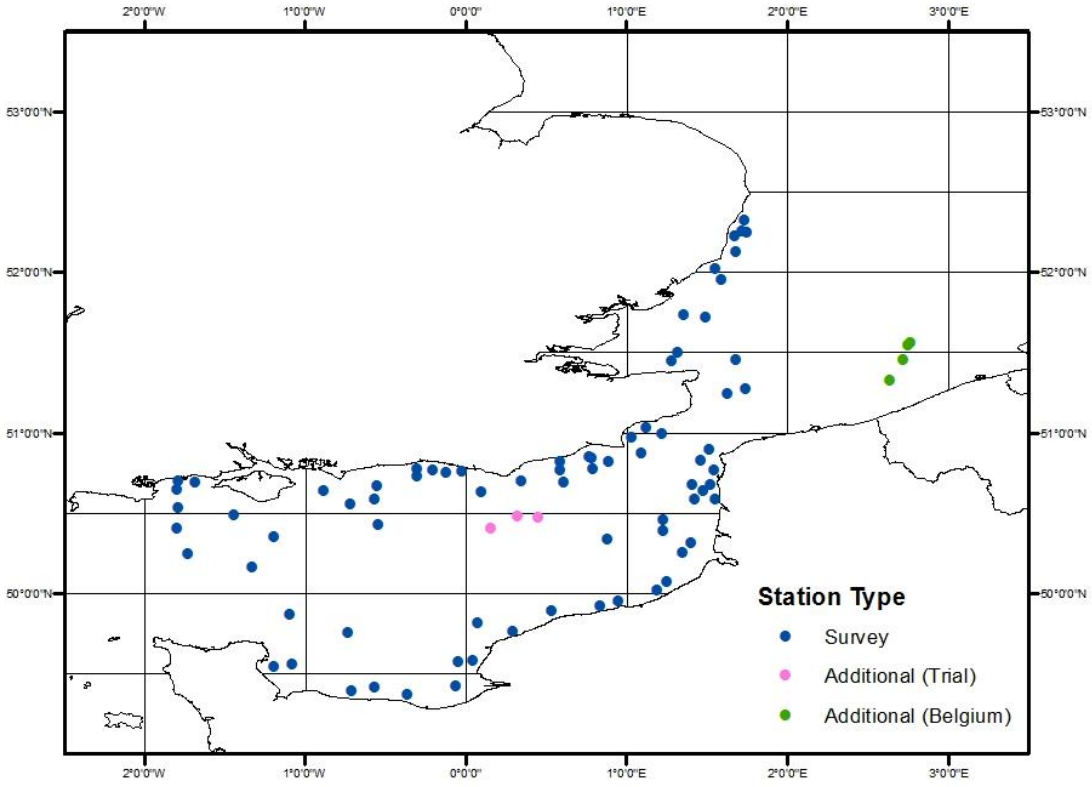


Figure 3 Core & additional stations fished during 2015 survey

Aims 2 & 3.

All otolithed fish were measured to the whole cm below, weighed individually, sexed and given a sexual maturity code. Table 3 shows the numbers of otoliths collected for the main commercial fish species. All non-commercial finfish by-catch caught were identified to species level, weighed and measured. In addition the following shellfish and cephalopods were also weighed and measured whenever they were present in the catch, cuttlefish (*Sepia officinalis*), *Alloteuthis spp, Loligo spp*, edible crab (*Cancer pagurus*), lobster (*Homarus gammarus*), scallops (*Pecten maximus*), velvet swimming crab (*Necora puber*), crawfish (*Palinurus elephas)* and spider crab (*Maia squinado*), while queen scallops (*Aequipecten opercularis*), Octopus (*Octopodidae)* and oysters (*Ostrea edulis*) were weighed and counted.

The numbers of individual fish measured this year for the main commercial species can be seen in Table 4 and the total catch weight of the main commercial species can be seen in Table 5. In total 183 different species were recorded.

Region	Brill	Cod	Dab	Flounder	Lemon sole	Plaice	Sole	Whiting	Turbot
VIId English	2	4	32	9	14	812	189	51	8
VIId French	27	2	47	29	37	862	160	98	13
North Sea (IVc)	3	0	30	30	22	66	219	44	1
Total	32	6	109	68	73	1740	568	193	22

Table 3 Otoliths collected from the main commercial species by strata.

Region	Brill	Cod	Dab	Flounder	Lemon sole	Plaice	Sole	Whiting	Turbot
VIId English	2	4	255	9	18	2491	358	469	8
VIId French	27	2	459	29	54	2544	627	567	14
North Sea (IVc)	3	0	290	30	66	70	1127	160	1
Total	32	6	1004	68	138	5105	2112	1196	23

Table 4 Number of fish measured from the main commercial species by strata.

	Weight in Kg						
	2015	2014	2013	2012	2011	2010	2009
Plaice	1028	1389	866	728	859	722	628
Sole	166	241	175	154	167	184	343
Dab	72	110	132	91	115	104	149
Lemon Sole	20	39	38	47	66	18	42
Cuttlefish	105	51	55	100	61	122	93
Flounder	16	62	36	37	49	27	107
Whiting	89	41	20	26	45	53	55
Brill	14	12	15	3	24	14	9
Turbot	15	11	11	18	23	19	8
Bass	1	10	3	1	13	5	10
Cod	10	20	3	13	4	1	31

Table 5 Comparison of catch weight (kg) for the main commercial species over the last 7 surveys (2009-2015).

Plaice

Overall catch number and weight of plaice was slightly lower than 2014, with catches higher in the English VIId sector but lower in French VIId sector and the Southern North Sea (Figure 12). Catch weight was 26 percent less than previous year, however 2014 was an exceptionally high year for plaice. However, compared to the average historic catch rates (2009 – 2013 (761 kg)) plaice was 35 percent higher (1028 kg). Recruited plaice were most abundant off Hastings, Brighton (VIId English sector) & Dieppe, Boulogne (VIId French sector) (Figure 6). Pre-recruit plaice were most abundant off Dieppe and Boulogne (VIId French sector) (Figure 8).

Sole

The catch weight of sole was also lower this year (31 percent), however catch numbers were higher (2 percent) than in 2014.This is a clear indication of larger numbers of pre-recruit sole being caught on the survey and this was clearly observed in the North Sea (prime 103). Pre-recruit and recruit sole were most abundant off Boulogne (VIId French sector) and Southwold (Southern North Sea) (Figure 9). Recruited sole were also seen in high numbers off Margate in the Southern North Sea (Figure 7).

Other species

Catches of whiting and cuttlefish were exceptionally high this year, with brill and turbot also seeing slight increases in catch numbers compared to 2014. Catches of dab, lemon sole, flounder, and cod decreased compared to 2014 but were all within the expected range of the last five years. It should be noted that from this year on, cuttlefish will be recorded as two species CTC *(Sepia officinalis)* and SEO *(Sepia orbignyana)*. Our knowledge of these cephalopods has increased and we can now distinguish between *Sepia officinalis* (CTC) and *Sepia orbignyana* (SEO), in previous years the two were grouped under CTC. However, for the purpose of this report the two have been grouped under the title of cuttlefish.

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 observed was recorded by species or other taxonomic grouping. There were 9 sentinel species that if encountered at any time on any tow, were removed and quantified. Of these we primarily encountered Ross Coral (Pentapora foliacea); Sabelleria spinulosa; sponge crabs and mantis shrimps. All 12 full benthic stations in VIId and 3 in IVc were sampled successfully.

Secondary aims

Aim 5

Litter was collected and recorded in line with the protocol provided on every valid beam trawl station. The pie chart below shows the relative commonality of the main types of litter encountered.

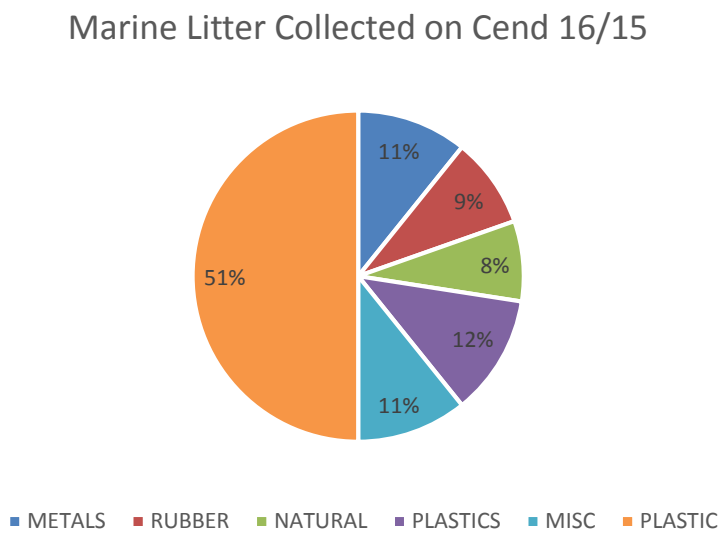


Figure 4 Percentage of marine litter collected in the beam trawl

Aim 6 No live berried spider crab were collected for return to the lab for brood stock.

Aim 7 Live specimens were collected for Yarmouth Sea Life centre.

Aim 8 Water samples for nutrient analysis were collected in line with the supplied protocol (Naomi Greenwood – Cefas Lowestoft).

Aim 9 Three undulate rays and one starry smooth hound were tagged and released (Tag numbers E694322, E694321, E694320 & E694319).

Aim 10 Biological samples were carried on 165 dogfish (Jim Ellis – Cefas Lowestoft).

Aim 11 Hermits in whelks were collect at stations where possible (Vlad Laptikhovsky – Cefas Lowestoft).

Aim 12 A water sample was collected for chlorophyll analysis 500m from the West Gabbard Smart buoy (Elisa Capuzzo – Cefas Lowestoft).

Aim 13 The new EDC system was fully tested with minor issues resolved on-board. Overall the new system implementation was a great success.

Aim 14 Additional length weight information was collected on seven individuals (3 Goldsinny Wrasse *(Ctenolabrus rupestris)*, 2 Baillon wrasse *(Symphodus bailloni)*, 1 Garfish *(Belone bellone)* and 1 Butterfish (*Pholis gunnellus)* (Joana Silva – Cefas Lowestoft).

Acknowledgements

As SIC of this survey I would like to offer my 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 been possible to achieve the survey aims. I would also like to thank everyone on board for creating a welcoming and happy atmosphere aboard the vessel and always being prepared to go the extra mile. I would also like to thank our two students (Figure 5) who joined us for the survey, they were a great strength to the team and will always be welcome back.

Figure 5 Students Alice and Katherine

J Smith (SIC)
7/8/2015

INITIALLED: I D Holmes

DISTRIBUTION:
Survey staff
S Kupschus
Cefas Fisheries surveys SICs/2ICs
Cefas Trim
P&O Maritime - Pinbush
Fishing Skipper/Master Cefas Endeavour
K Moreau, Belgium
Joel Vigneau, France
Kent and Essex, Sussex, Southern and Eastern IFCAs

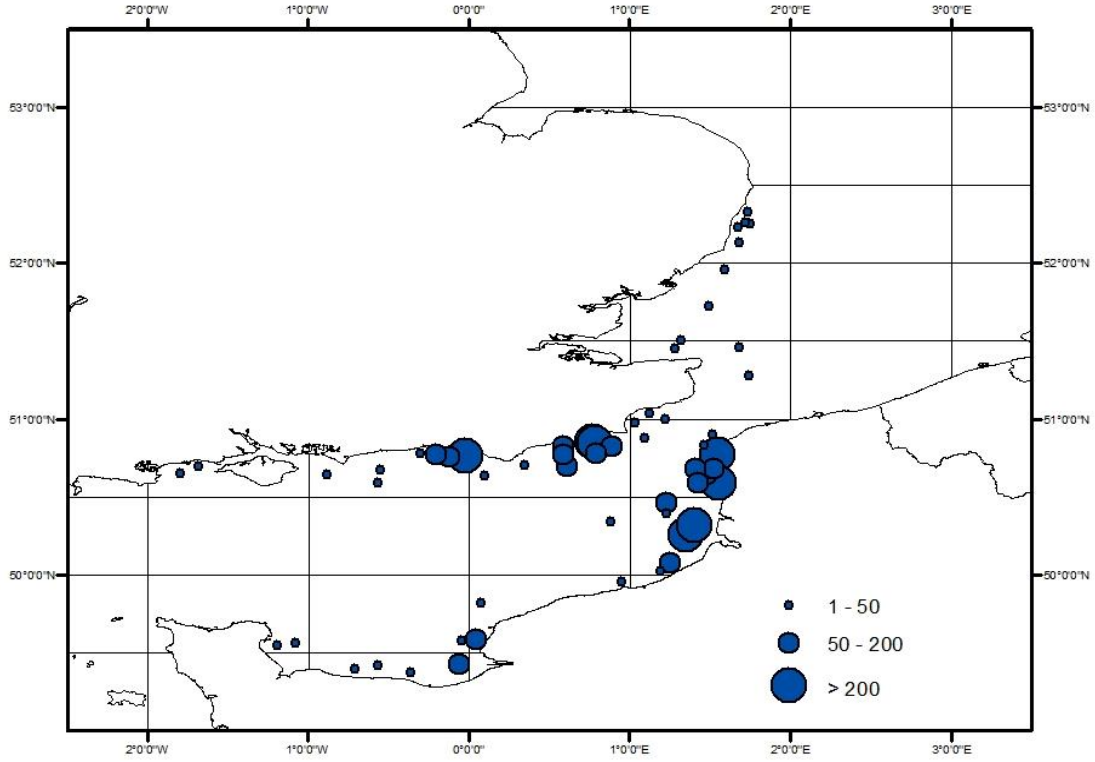


Figure 6 Abundance (number caught per 30 minute tow) of recruited (>21 cm TL) plaice

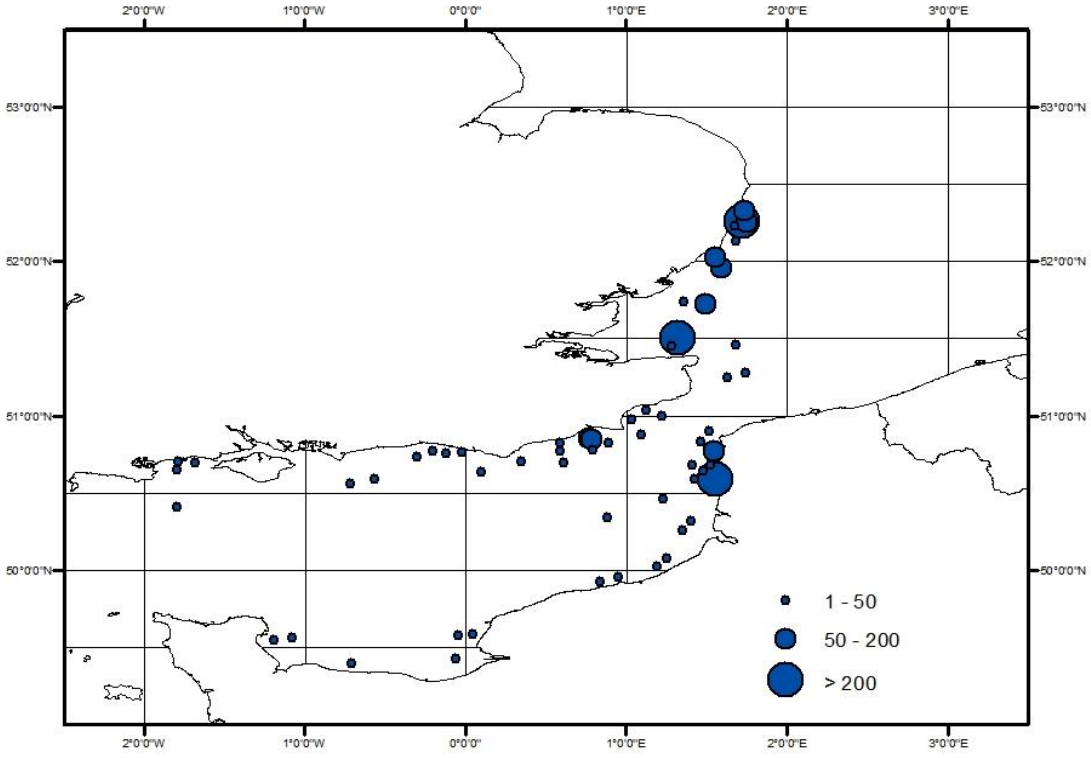


Figure 7 Abundance (number caught per 30 minute tow) of recruited (>21 cm TL) sole

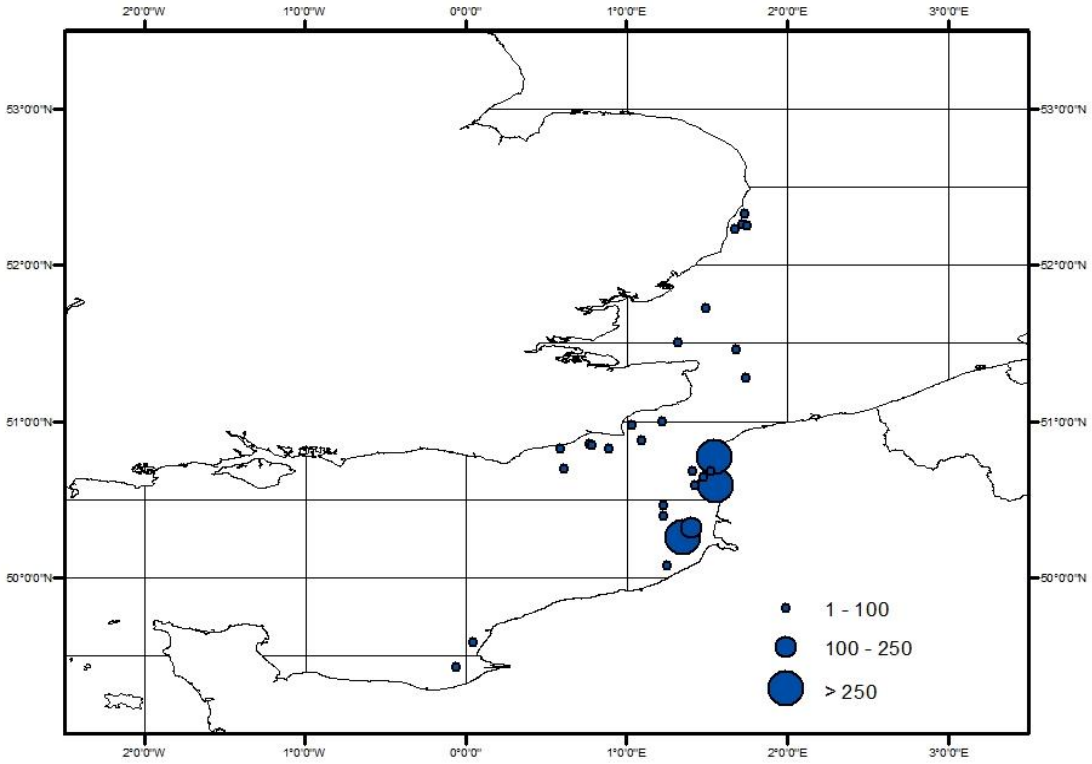


Figure 8 Abundance (number caught per 30 minute tow) of pre-recruit (<21 cm TL) plaice

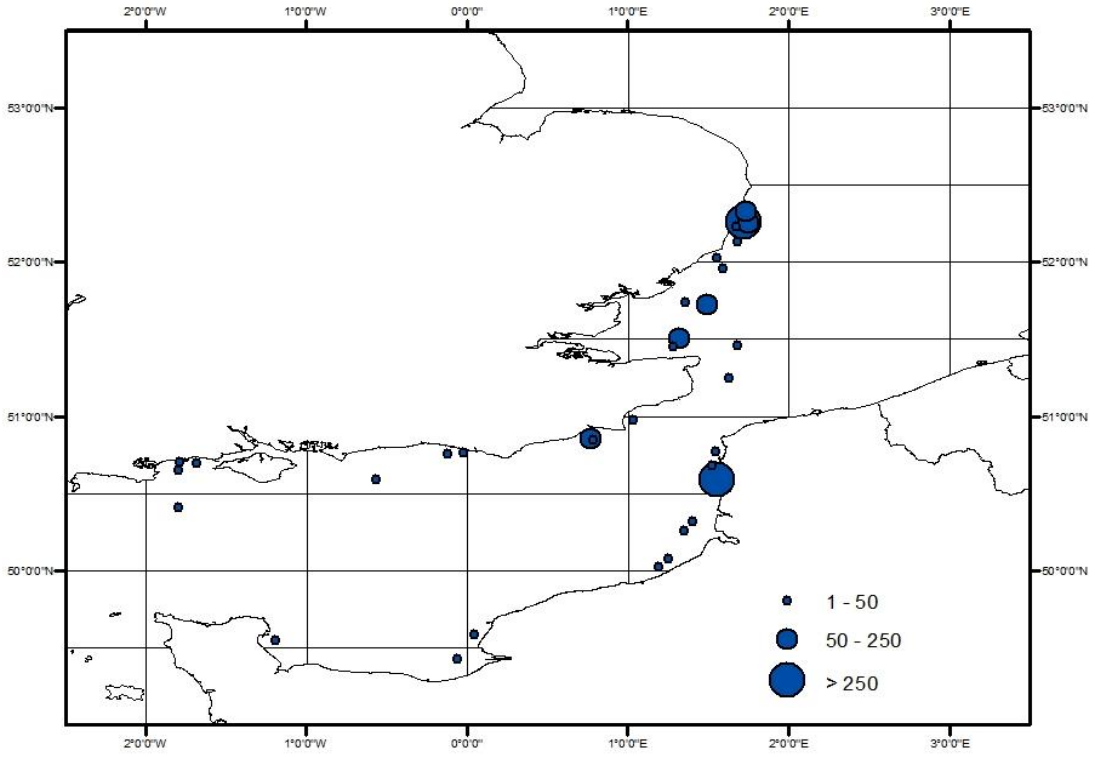


Figure 9 Abundance (number caught per 30 minute tow) of pre-recruit (<21 cm TL) sole

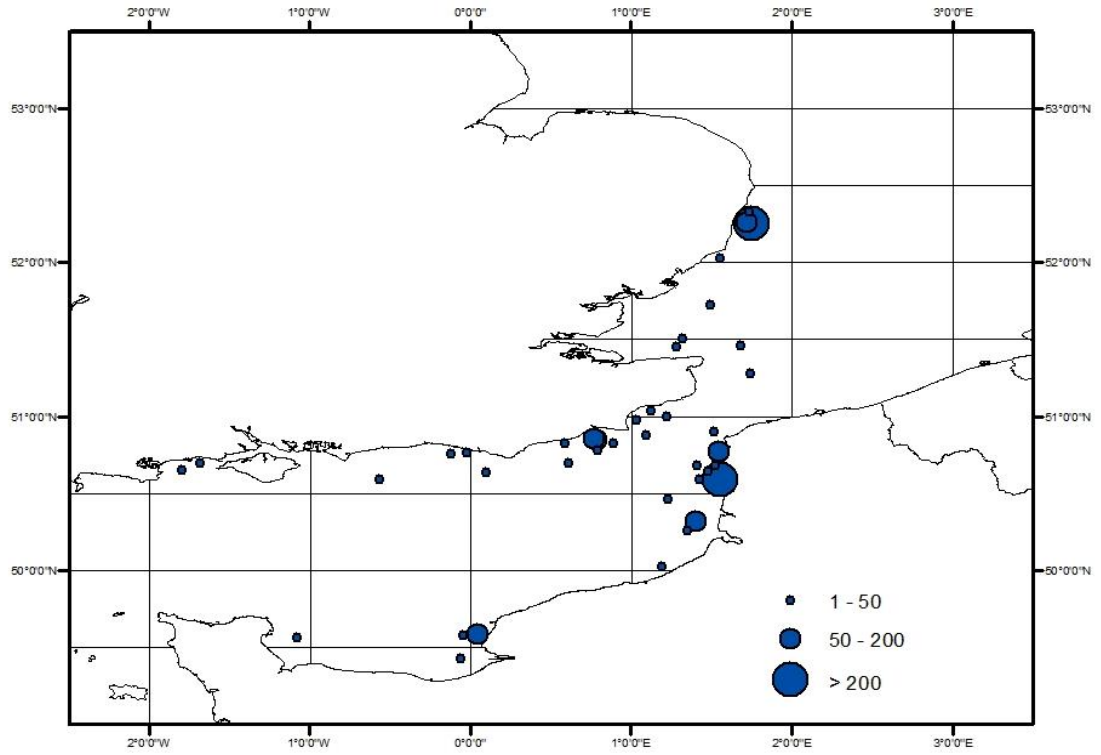


Figure 10 Abundance (number caught per 30 minute tow) of Dab

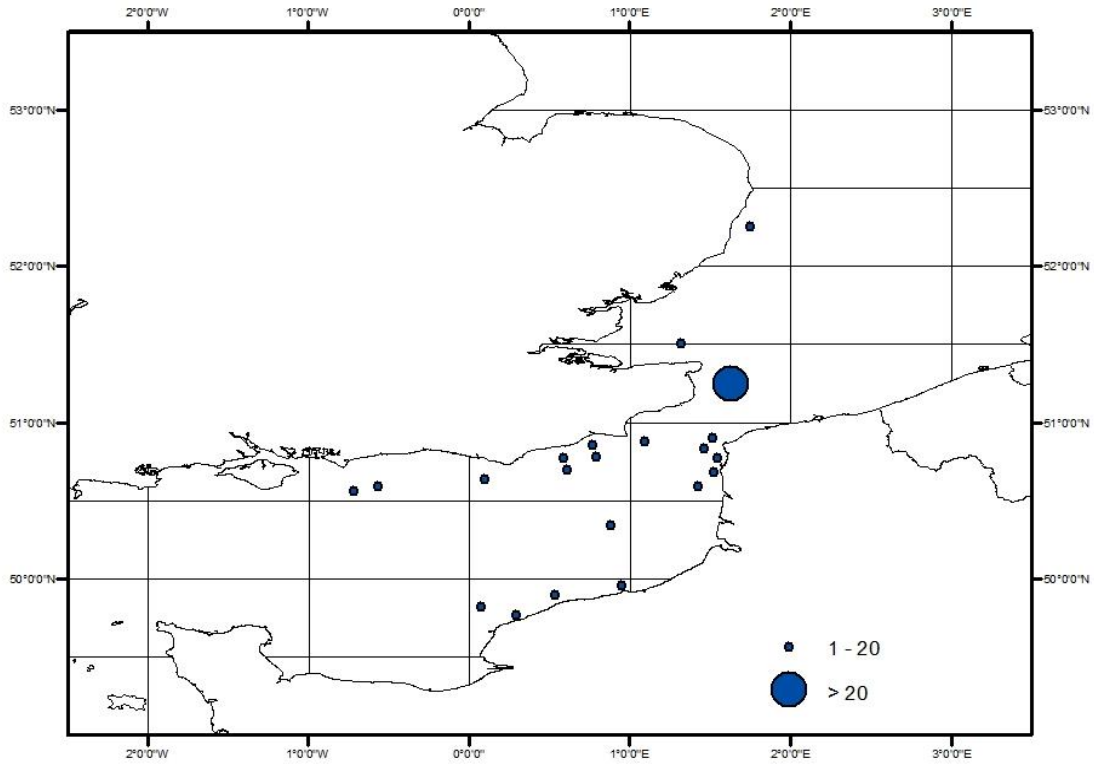
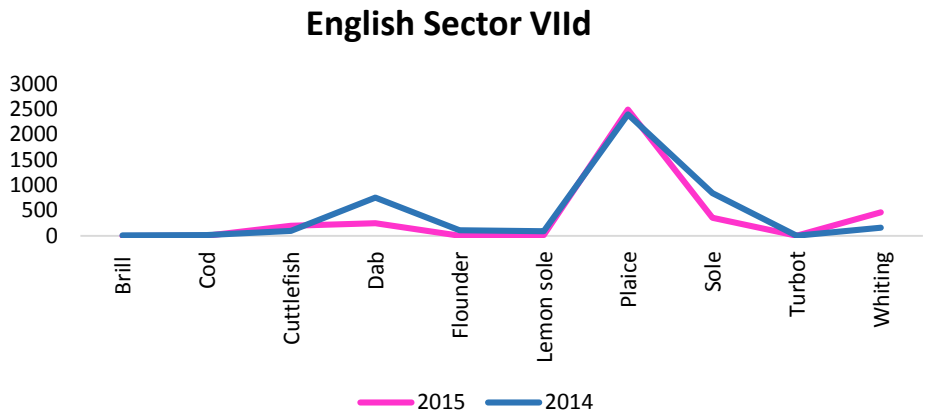
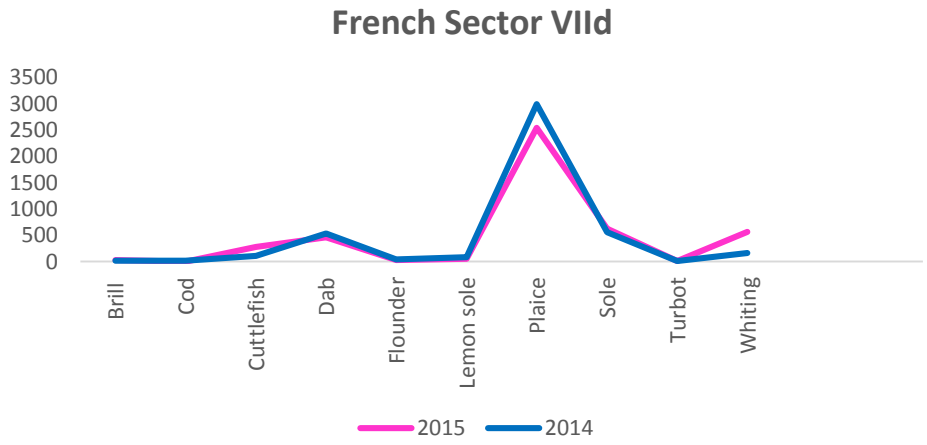


Figure 11 Abundance (number caught per 30 minute tow) of Lemon sole





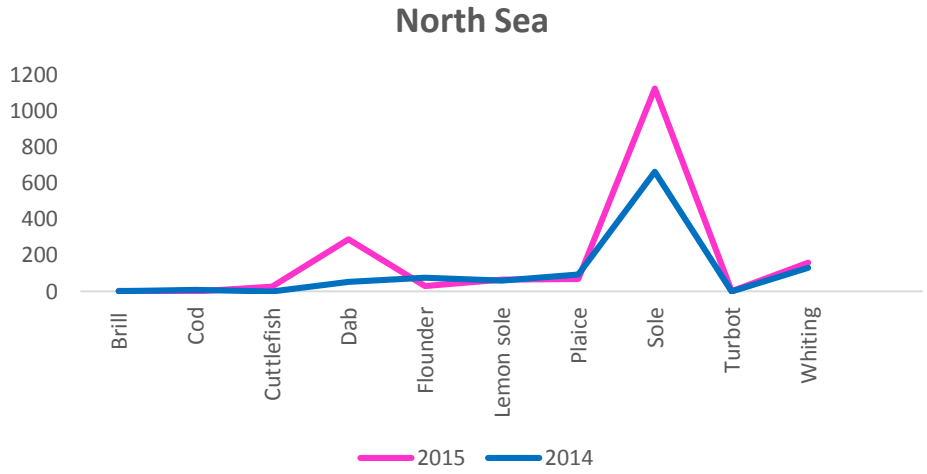


Figure 12 Comparisons of numbers caught of the main commercial species by sector

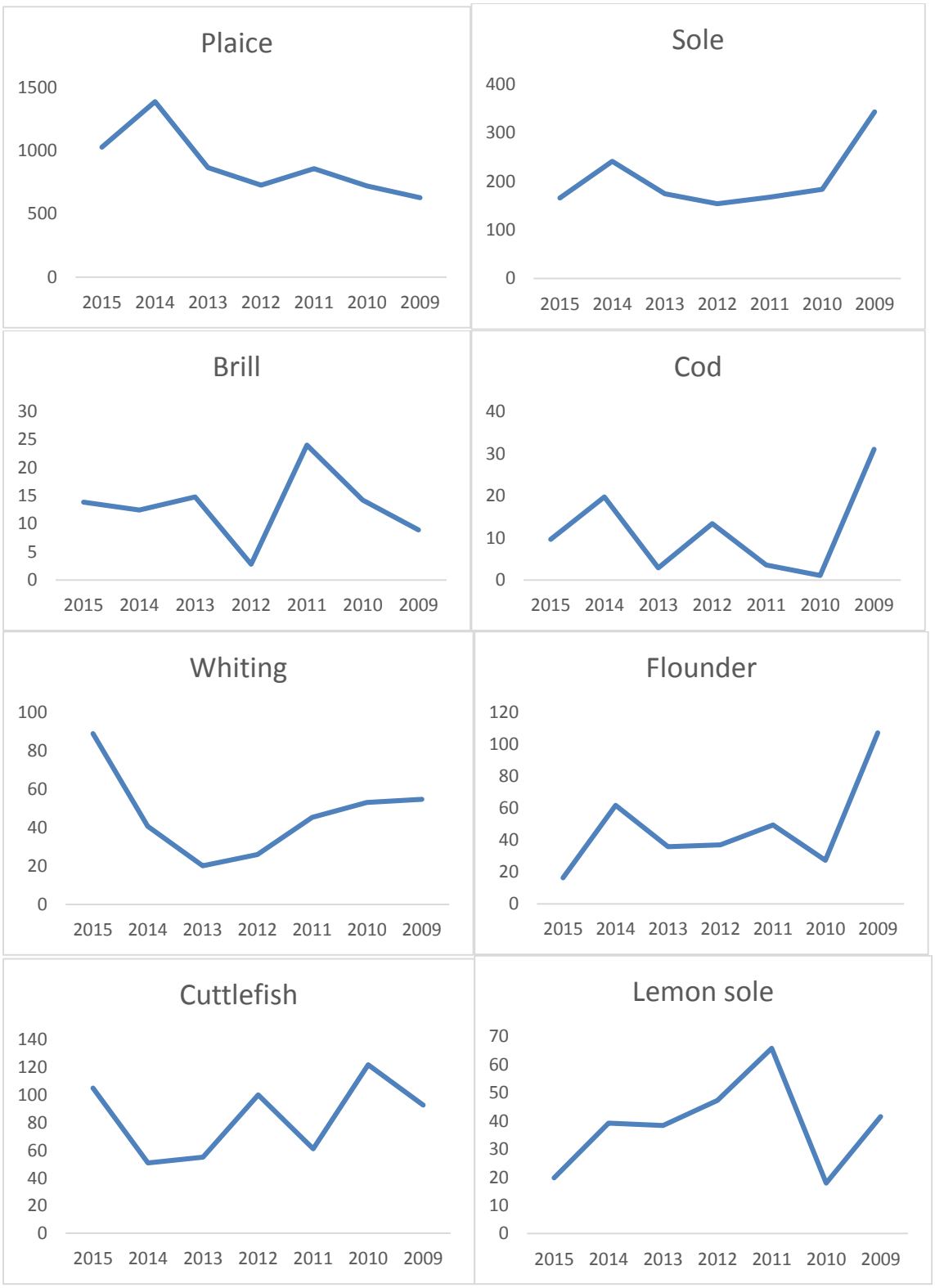


Figure 13 Comparison of total weight of commercial species caught between 2009 - 2015