Centre for Environment Fisheries & Aquaculture Science

Cefas

RESEARCH VESSEL SURVEY REPORT

RV CEFAS ENDEAVOUR
Survey: C END 11 – 2018

Clean Seas Environmental Monitoring Programme (CSEMP) Western Channel, Irish Sea

STAFF:

Name	Role
Manuel Nicolaus	SIC
Alex Callaway	2SIC
John Bignell	Deck Master
Matthew Green	Fish Disease
Paul Nelson	Data
Michelle Stone	Fish Disease
Caroline Daumich	Fish Disease
Niall O'Rahelly	Fish Disease

Name	Berth
Sara Stones	Sediment
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Oliver Twigge	Water sampling
Josie Russel	Litter
Stephen Shaw	Fisheries Liaison

Staff joined during survey: John Bignell and Matthew Green on the 2nd July; Stephen Shaw on the 5th July

DURATION: 1st July from Lowestoft (10:00 High Tide) - 11th July in Fowey.

LOCATION: Western English Channel, Irish Sea.

AIMS: The information generated during this survey will be used to meet UK's obligations for reporting of contaminant, eutrophication and marine litter data to MERMAN and the ICES database and for subsequent assessments for OSPAR and Good Environmental Status (GES descriptors 1, 4, 5, 8, 9 & 10) assessment. After discussions with EA and NRW staff a coordinated approach is being taken to help deliver additional EQSD requirements for the EA and NRW.

Specific aims:

1. To collect samples of demersal fish for chemical analysis from the Irish Sea, Celtic Sea and Western English Channel (Table 1; Figure 1) in support of the Clean Seas Environmental Monitoring Programme (CSEMP) (OSPAR Common indicator and UK specific Indicator assessments).

2. To collect fish samples at CSEMP sites for fish disease biochemical markers (e.g. EROD and Bile metabolites analysis and AChE) (UK specific Indicator Assessments).

3. To sample representative CSEMP stations (Table 1; Figure 1) using day grab, for Polycyclic aromatic hydrocarbons (PAHs), trace metal contaminants, organic contaminants (PCBs, PBDEs and HBCD), sediment particle size analysis (PSA) and marine litter (OSPAR) Common indicator and UK specific Indicator assessments).

4. To conduct marine litter surveys (OSPAR Common indicator and UK specific Indicator assessments) by collecting benthic litter information from the trawls and collecting sediment samples for litter analysis.

5. To conduct surveys of marine animals (birds and cetaceans) and as part of the Sea Watch programme.

6. To collect water conductivity, temperature and depth information, and Plankton community information to provide additional knowledge on Eutrophication levels (OSPAR Common indicator and UK specific Indicator assessments).

7. Collect Fin clip samples for Cardiff University for eDNA analysis of fish and invertebrates

8. Water sampling to assess harmful algal blooms using a taw net

9. Zooplankton sample at Gabbard

10. To collect additional fish for the EA and NRW for a comparison study of contaminant concentrations between whole fish, and fish muscle and liver only.

11. Collect stomach content data of the first 20 dab at each fishing station

Table 1. Positions of sampling stations

A: CSEMP fishing stations positions

CSEMP Number	Location	Mid tow Lat. Long.
534	Inner Lyme Bay	50 36.86 N 02 55.82 W
584	Off Eddystone	50 06.44 N 04 06.06 W
604	West Lundy	51 09.79 N 05 26.67 W
605	Celtic Deep	51 10.29 N 05 43.75 W
616	Camarthen Bay	51 32.82 N 04 35.13 W
649	North Cardigan Bay	52 42.44 N 04 32.29 W
654	South Cardigan Bay	52 10.90 N 04 29.87 W
706	Burbo Bight	53 28.24 N 03 20.47 W
715	Liverpool Bay	53 28.32 N 03 41.91 W
Trend_Liv	Liverpool Bay Trend	53 23.76 N 03 41.50 W
769	St Bees Head	54 30.71 N 03 47.63 W
776	Red Wharf Bay	53 22.46 N 04 12.84 W
796	Morecambe Bay	53 55.31 N 03 23.23 W
805	SE Isle of Man	54 03.36 N 03 52.47 W

B: CSEMP sediment stations

Latitude	Longitude	grouping	July_2018
-3.1217	50.43	CSEMP536	536
-4.1622	50.295	CSEMP575	575
-6	51.25	CSEMP605	605
-4.175	52.3583	CSEMP655	655
-3.6917	53.5	CSEMP715	715
-3.8333	54	CSEMP805	805
-3.51864	50.4794	536	536_1
-3.3907	50.4864	536	536_2
-3.33851	50.3272	536	536_3
-3.30106	50.308	536	536_4
-3.42341	50.4207	536	536_5
-5.03464	50.13879	575	575_1
-4.66144	50.16509	575	575_2
-4.9246	50.0888	575	575_3
-4.7833	50.21509	575	575_4
-4.92378	50.15438	575	575_5

-4.63349	50.01404	585	585_1
-4.59983	50.01662	585	585_2
-4.70992	50.00313	585	585_3
-4.68267	50.0177	585	585_4
-4.71266	50.01191	585	585_5
-6.17964	51.3	605	605_1
-6.18724	51.3063	605	605_2
-6.48421	51.251	605	605_3
-6.133	51.2704	605	605_4
-6.407	51.3928	605	605_5
-4.16649	52.8457	655	655_1
-4.61133	52.29819	655	655_2
-4.46528	52.71517	655	655_3
-4.6411	52.79411	655	655_4
-4.25126	52.8703	655	655_5
-3.97687	53.60896	715	715_1
-3.95482	53.61389	715	715_2
-3.97566	53.61827	715	715_3
-3.97078	53.62299	715	715_4
-3.94896	53.6356	715	715_5
-3.42177	54.0624	805	805_1
-3.40721	54.0611	805	805_2
-3.65172	54.3461	805	805_3
-3.79349	54.3553	805	805_4
-3.38928	54.0529	805	805_5

Need to sample 3 stations of the grouping section; priority will be given to blue labelled stations, but if they can't be sampled due to obstructions then the green labelled ones can be sampled instead.

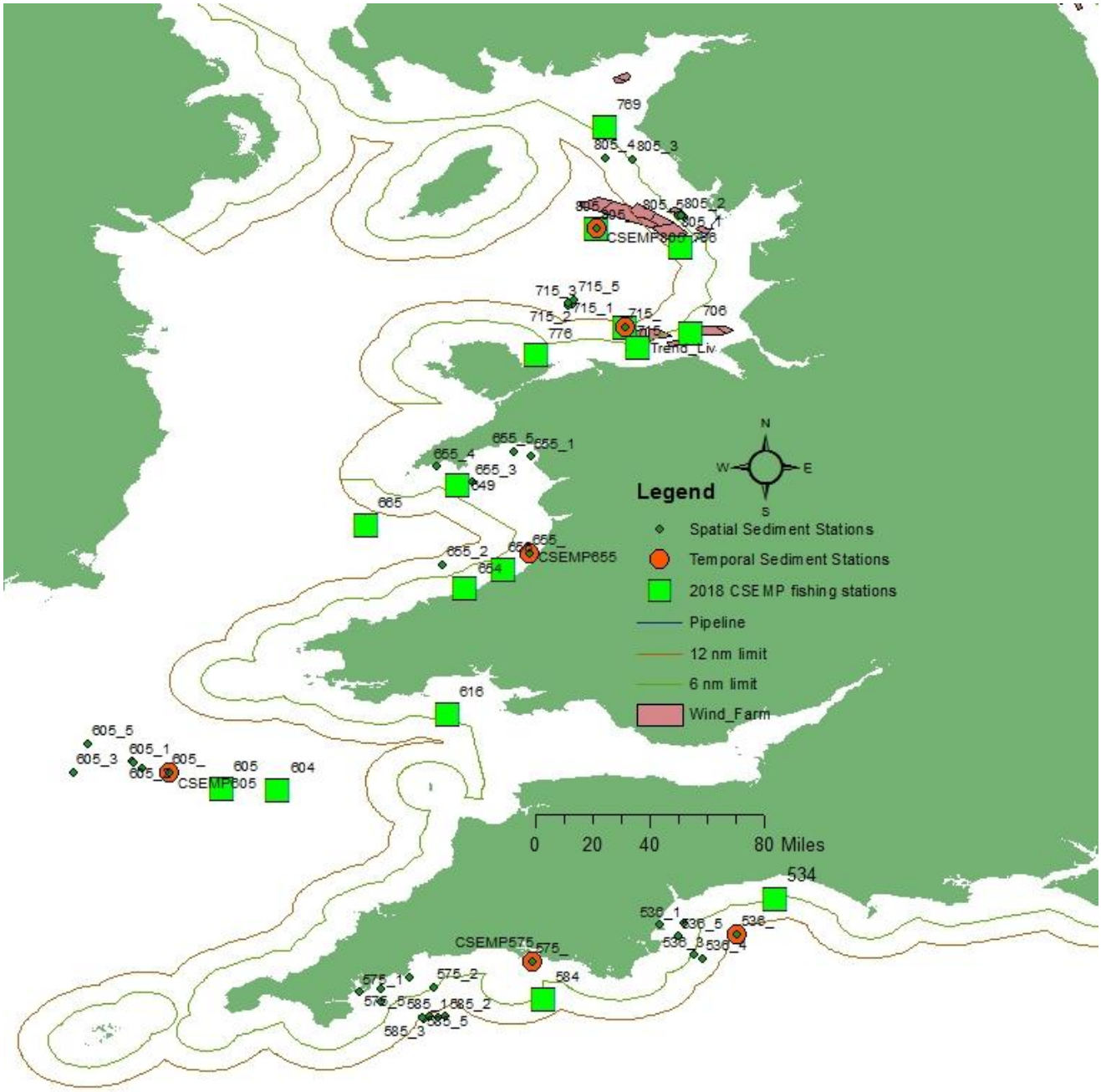

Figure 1. CSEMP fishing and temporal/spatial sediment stations

NARRATIVE:

30th June: 11 staff joined the RV Cefas Endeavour between 15:00 on the 30th June and 08:30 on the 1st July.

1st July: It was a sunny and calm day. At 08:30 an induction was carried out by the safety office, which was attended by all required scientists. We left Lowestoft harbour around 9:30 and made our way towards the Gabbard water sampling station (CTD, chlorophyll and dissolved oxygen sampling). We had a drill at 10:10 which included to go to your specific muster station and discuss what steps everyone would take during an abandon ship drill. Then we had lunch at 12:00 (jacket potato with various sides), followed by a tool box talk that answered the SIC's query about the missing plankton nets. We arrived at the Gabbard water sampling station at 13:00. That concluded the operations for the day and we made our way through the English Channel towards the Inner Lyme Bay fishing station.

2nd July: The weather looked great for another great day of activities. Beautiful sunshine and hardly a cloud in the sky. There were only small ripples around us. We arrived at the Inner Lyme Bay fishing station at 07:45. Before this, at 07:10, the master informed me that sadly the turbo charger from one of the engines broke overnight, which meant that our power was limited, which affected our speed.
At 08:30 we had a detailed tool box talk, about the fishing activities, led by the Master and Bosun. The SIC and the deck-master also introduced the activities that will happen in the lab to the crew. We arrived at the Inner Lyme Bay fishing station at 08:45 and started the first tow at 9:23. As the single-net drum was broken, we had to use the split net drum, which meant that it was more difficult to keep the net-lines level when shooting and hauling. At 13:34 was a fire alarm sound indicating issues with a Bottle compartment, but it was only a false alarm. Nevertheless, it meant that the hauling operation had to be stopped to investigate. As soon as this was sorted we could keep on hauling in, but the double net drum caused further issues as the metal latch between the drums was hocking to the buoys. In total, we towed 4 times today, giving us a decent number of dab (2X25 for Chemistry and 40 for Biomarker/fish disease). After the fishing activities were finished, we carried out a CTD and collected bottom dissolved oxygen and chlorophyll from the surface (4m). The headline net ripped slightly again, but the crew fixed it in no-time.
The crew did a man over board drill and tested the work boats between 18:00 and 19:00. It was arranged to pick up two scientists from Bridport harbour at 19:15. Everyone was back on board at 19:35. We reached the first sediment station at 22:00.

3rd July: We finished the 4 grab stations (CSEMP 536, 536_2, 536_3 and 536_4) at 01:12. We could not sample the intended 536_1 as it was too close to shore. We started fishing South Eddystone (CSEMP 584) at 06:08 (trawl on the bottom) under calm conditions (0.5-1m swell). At 7:48, I was informed that the pressure unit of the freezer broke overnight meaning that the temperatures went above 0˚C. It was back to -16 ˚C by the time the engineer informed me about it. The weather picked up slightly over the day. By 13:30 we had 1-1.5m swell. We towed South Eddystone (CSEMP 584) 5 times and got 25 dab for chemistry and 9 dab for the EA for our comparison study. We only caught 16 additional dab for biological effects analysis and fish disease screening. We

tried to deploy the ESM2 Logger, but the wire counter on the CTD wire was broken, making it impossible to measure the length of cable out. As we did not want the ESM2 logger to hit the bottom we had to abandon the sample collection for bottom dissolved oxygen, chlorophyll and other oceanographic parameters. Fishing for today finished at 13:37. We made our way to our first grab station (CSEMP 575). We grabbed the spatial stations 575_2, 575_4 and 575_3 by 20:30. To preserve time and ensuring we arrive at the Carmarthen Bay fishing site before noon on the 4th July, we had to leave the other 3 spatial stations to the end of the survey (585_3, 585_1 and 585_2). On a very positive note, the freezer and broken CTD-wire display unit were fixed by the engineers. This will allow us to collect the relevant samples at the next fishing site (Camarthen Bay) for chlorophyll, dissolved oxygen and other oceanographic parameters.

4th July — The day begun slightly misty with a swell of roughly 1m. At 7:00 we were still making our war to the Carmarthen Bay fishing station. We reached the site at 11:00. We started fishing at 11:20 and finished, after 3 tows, at 15:52. We caught 50 dab for chemical analysis and an additional 25 for a comparison study with NRW. We also caught an additional 50 dab for fish disease and biological effects assessments. All fish were processed by 19:00. Between tow 2 and 3 we carried out a CTD sample. Then we made our way to Cardigan Bay where we have 4 grabbing and 2 fishing stations.

5th July — We arrived at the first grabbing station at 02:15 and finished all 3 of them (655_5_08, 655_5_03 and 655_05_04) overnight by 04:30. Then we made our way to the first fishing station (South Cardigan Bay), which we started fishing at 05:50. We completed 4 tows here and caught 50 dab for chemical analysis plus an additional 9 for NRW to carry out a comparison study. We also caught another 50 dab for biomarker and fish disease assessment. We finished fishing SC Bay at 10:30 and made our way to the CSEMP 655 grabbing station. During the transit to the crew and a select group of scientists (6 in total) participated in a fire drill exercise. This finished before lunch. At 12:10 we reached our grabbing station. After we collected the relevant sediment for metal, PSA, organics and litter particle analysis, we made our way to Aberystwyth to pick up a scientist via small boat transfer. This was completed by 13:45. Then we made our way to the North Cardigan Bay fishing station. During the transit, the HM Coastguard carried out an emergency exercise with their helicopter, using the RV Cefas Endeavour as a platform. The winchman lowered himself onto the vessel and touched down. Then he was collected again. This happened between 15:10 and 15:45. We reached the fishing station at 16:00 and started trawling at 16:26. We finished fishing after 2 tows at 18:22. And carried out a CTD shortly after. At 19:00 we made our way to the grabbing stations 715_4, 715_2, 715_3.

6th July: — We reached the first grabbing station 715_3 at 03:11 and finished grabbing station 715_2 at 3:53. In between we grabbed station 715_4. We then made our way to the Red Wharf Bay fishing site, which we reached at 05:45. The first tow started at 06:04. We carried out a CTD after the second tow at 09:15. We caught enough dab for chemical analysis (50 plus 9 for NRW) and fish disease and biomarker screening (additional 50). We finished Red Wharf Bay at 10:29 and made our way to the Liverpool Bay fishing station (CSEMP 715). Just before lunch time I received an email from NRW granting me a license to collect relevant sediment samples in Cardigan Bay. Sadly, this came 36 hours too late, but the master and I had initial discussions to possibly collect them on the way back (time permitting). We started trawling the Liverpool Bay station

at 12:37 and finished at 15:10. Between trawl one and two we collected the sediment samples at the CSEMP grabbing station 715. We also collected a CTD sample here. At 15:30 it became apparent that there was some damage on the net and to preserve time I made the decision to move to the next fishing station, while the crew fixed the trawling gear. We reached the Liverpool Bay trend fishing site at 16:30 and collected a CTD sample. We started fishing the Liverpool Bay trend station at 16:55 and finished fishing the Liverpool Bay trend station at 18:19. We caught all required fish here. Sadly, the cod end ripped during the last tow and had to be replaced with a new one. We anchored at 19:30 for the night.

7th July: We left the anchorage point at 04:00 and made our way to the Burbo Bight fishing station. We started trawling there at 05:54 and finished fishing there at 08:40 after 3 tows. Then we carried out a CTD and made our way to the Morecambe Bay (CSEMP 796) fishing site. We reached the Morecambe Bay fishing station at 11:45 and carried out a CTD. Due to some static gear and various cables it took some scouting until we found a safe towline. We started trawling at 12:43. We towed here three times and finished at 14:09. We collected the required dab for chemistry, fish disease and biomarker screening. Then we made our way to the South-East Isle of Man fishing station. The windfarms caused some issues to get there as fast as possible. We reached the SEIOM station at 18:38 and carried out 1 tow. We caught 50 fish for chemical analysis. As it was already so late in the day we could not process any more fish in the lab and scan them for fish disease and collect the relevant samples for biomarker analysis (staff already worked their allocated hours for the day). I hope to come back to this station tomorrow on the transit south after we fished St Bees Head.

8th July: Overnight, we collected relevant sediment samples at the sediment stations 805, 805_1, 805_2 and 805_3. Then we made our way north to the St. Bees fishing station. We started fishing here at 05:53 under calm weather conditions. We towed here 4 times and collected the relevant information with a CTD. We collected sufficient fish for chemical analysis back in the laboratory and to carry out a fish disease screening. We also collected enough fish for a biological effects study. We finished fishing St. Bees Head at 10:23 and made our way to the SEIOM fishing station. During the roughly 30nm steam the scientists processed the fish. We reached the SEIOM fishing station at 13:28 and towed here twice. We also carried out a CTD between tow 1 and 2. We left the SEIOM fishing site at 15:45.

9th July: Overnight, we collected some of the outstanding sediment stations in Cardigan Bay (655_4 and 655_3), we missed earlier on in the survey due to the license not being received in time. Sadly, we could not retrieve a sample at 655_4, due to the sediment being too gravelly. As we only had limited time, we could not go to station 655_5. We reached the Celtic deep fishing station at 12:45 and fished here twice. We only caught two dab that were not within the required size range. I therefore abandoned the station at 14:50, and we made our way to the first sediment station called CSEMP 605. We reached the station at 16:30 and grabbed here 3 times. Then we made our way to the next sediment stations (605_1, 605_2 and 605_3). We finished grabbing at 19:45. Then we made our way to the last fishing station (West Lundy-CSEMP 604).

10th July: Overnight, we made our way from the last sediment station to the West Lundy (CSEMP 604) fishing station. We started fishing at 06:01 (trawl on the bottom). We towed here five times and carried out a CTD after tow one. The net was torn really bad after tow

three (10:17) and had to be mended until 14:00. We shot again straight after the net was fixed, and started trawling at 14:19 for tow number 4. We finished here at 16:00. Then we started to steam towards the remaining grab stations.

11th July: We started grabbing at 08:00 and finished the remaining grabbing stations (585_3, 585_1 and 585_2) at 09:45. Then we made our way to meet the Pilot boat just outside Fowey at 12:00. We docked around 15:00.

RESULTS:

Dab were caught at 13 out of 14 fishing stations (not at Celtic Deep or CSEMP 605; Table 2). In total, we trawled 45 times using the Granton GOV trawl. We could take back 50 dab to the Cefas Laboratory for chemical analysis from 11 stations (aim 1 and 2) and 25 dab from one station (South Eddystone; breakdown in table 2). Additionally, from the Liverpool Bay trend station, we could take back whiting, dab and plaice from various size categories (Table 2). Fish disease, biomarker and stomach content analysis could be carried out at 12 stations (aim 2 and 11; Liverpool Bay trend is not sampled for biomarkers, fish disease and stomach content and we did not get any dab at the Celtic Deep station).

In total, we screened 776 dab for 14 different fish diseases that could be detected by visual examination (Table 3). 430 times did they occur in the 776-sampled dab. The most abundant occurrence was *Lepeophtheirus sp.* (a sea louse; 153 occurrences). A breakdown of the fish disease observations can be seen in table 3.

Table 4 gives an overview of the 237 stomachs (3 were not recorded) that were sampled for content at 13 fishing stations.

At 13 fishing stations, we collected water conductivity, temperature and depth information, and Plankton community information to provide additional knowledge on Eutrophication (aim 6; in table 5 labelled ESM2).

29 sediment stations were sampled, but only 28 stations were sampled successfully (aim 3). A breakdown on what was collected where can be seen in table 6. The one station that was sampled unsuccessfully was 655_4. Time restraints due to the change in survey time and getting the required license not in time to meet the new survey time made it impossible to reach the sediment station 655_5.

Litter was also collected during each of the 45 fishing tows (aim 4). In total, we collected 225 litter items. 12 tows did not have any litter in them, while one tow at Carmarthen Bay had 47 litter items in the trawl. Figure 2 provides a percentage overview of the items collected.

We collected fin clips/ tissues from 67 fish and invertebrates for eDNA assessment by Cardiff University (aim 7).

Survey aim 10 was also achieved. Table 2 gives an overview of stations, where additional dab were collected for the EA and NRW for the comparison study later in the laboratory.

Three survey aims were not achieved, which was survey aim 5 (the surveying of marine animals (birds and cetaceans) as part of the Sea Watch programme), survey aim 8 (Water sampling to assess harmful algal blooms using a taw net) and survey aim 9 (the collection of a zooplankton sample at the West Gabbard station). The reason why survey aim 5 was not achieved was, because of the alteration of the survey time (6 days forward) which the external providers could not accommodate in time. The reason why survey aim 8 was not achieved, was because the required equipment was not provided by the relevant person requesting the work. The reason why survey aim 9 was not achieved, was because the ring net was not on board as indicated on the gear list.

Table 2. Overview of fish that were collected at each station for the various parameters

Date	Location	CSEMP code	Mid tow Lat decimal	Mid tow lon decimal	Fish numbers for Chemical analysis	Dab numbers for Biomarker analysis; Fish Disease (FD)
02/07/18	Inner Lyme Bay	CSEMP 534	50.601133	-2.922842	50 dab	20 for EROD, BILE and AChE; additional 20 for FD
03/07/18	Off Eddystone	CSEMP 584	50.098283	-4.147990	25 dab +9 for EA	20 for EROD, BILE and AChE20; no additional for FD
04/07/18	Camarthen Bay	CSEMP 616	51.533511	-4.573789	50 dab +9 for NRW	20 for EROD, BILE and AChE20 ; additional 60 for FD
05/07/18	South Cardigan Bay	CSEMP 654	52.204304	-4.467688	50 dab +9 for NRW	20 for EROD, BILE and AChE20, but small; additional 30 for FD
05/07/18	North Cardigan Bay	CSEMP 649	52.711642	-4.536292	50 dab +9 for NRW	20 for EROD, BILE and AChE20; additional 30 for FD
06/07/18	Red Wharf Bay	CSEMP 776	53.353244	-4.122772	50 dab +9 for NRW	20 (but 4 males short) for EROD, BILE and AChE, additional 50 for FD
06/07/18	Liverpool Bay	CSEMP 715	53.497767	-3.738450	50 dab +9 for EA	20 for EROD, BILE; and AChE; additional 60 for FD
06/07/18	Liverpool Bay Trend	Trend_Liv	53.406842	-3.647500	5 size classes* (2-6*) X6 plaice, 2 Size classes* (2;3*) X dab (2 and 3 for EA) 5 size classes* (1-5*) X6 dab and 4 size classes* (2-5*)X 6 whiting 1 size class* (6*) X 4 whiting	Not required as sampled at Liverpool Bay
07/07/18	Burbo Bight	CSEMP 706	53.464722	-3.384889	50 dab +9 for EA	20 for EROD, BILE; and AChE; additional 60 for FD
07/07/18	Morecambe Bay	CSEMP 796	53.942094	-3.351017	50 dab +9 for EA	20 for EROD, BILE; and AChE; additional 60 for FD
07/07/18	SE Isle of Man	CSEMP 805	54.059033	-3.842683	50 dab	20 for EROD, BILE; and AChE; additional 60 for FD
08/07/18	St Bees Head	CSEMP 769	54.497725	-3.780908	50 dab +9 for EA	20 for EROD, BILE; and AChE; additional 50 for FD
09/07/18	Celtic Deep	CSEMP 605	51.171500	-5.729200	None	None

10/07/18	West Lundy	CSEMP 604	51.168767	-5.423010	50 dab	20 for EROD, BILE; and AChE; additional 60 for FD

*Size Classes length (cm)

1 13-15.4
2 15.5-18.4
3 18.5-21.9
4 22.0-25.9
5 26.0-30.9

Table 3. Observed occurrences of 14 different fish disease in a total of 776 dab

Lymphocystis	Skin Ulcer	epidermal hyperplasia/papilloma	hyperpigmentation	liver disease - nodule/tumour	X-cell gill lesions	Stephanostomum sp	Lepeophtheirus sp.	Acanthochondria sp.	Nematodes	Glugea sp	Lateral lipoidosis	Skeletal deformity	fin rot/erosion
1	**23**	**13**	**98**	**10**	**0**	**17**	**153**	**10**	**23**	**67**	**3**	**1**	**11**

Table 4. Stomach content analysis at up to 20 fish from 13 sampling sites

CSEMP ST. NO.	Length (cm)	Weight (g)	SEX	STOMACH ANALYSIS; fullness from 0=empty to 4=full
534	23.3	148.6	F	Pagurus sp x2, Digested matter, 2
534	21.4	100.6	F	Decapoda (possibly Liocarcinus sp.and Upogebia sp.), Pagurus sp., 1
534	22.6	128.1	F	Decapod chela, digested matter, 2
534	20.8	91.2	F	Decapoda fragment, 1
534	21.8	108	F	Bivalve, Philina?, 2
534	23.5	138.2	F	Pagurus sp. Decapod fragments, 1
534	22.6	126.7	F	Cephalopada (possibly Sepia sp.), Polycheta fragments, Sabella pavonia, decapoda fragments, Liocarcinus sp., 1
534	23.8	124.5	F	Pagurus sp., Decapoda fragments, Digested matter, 2
534	22.2	108.4	F	Ensis, Brittle star fragments, Decapoda fragments, Eggs, 2
534	22	118.9	F	Decapoda fragments, Philina? , Pagurus sp., Digested matter, 1
534	22.5	122.2	M	Decapoda fragments, Otolith, 3

534	22.4	100.6	M	Decapoda fragments, digested matter, 2
534	20.1	89.5	M	Decapoda fragments, 2
534	21.2	98.7	M	Decapoda fragments, digested matter, 2
534	20.8	91.9	M	Digested matter, Pagurus sp., Nematoda, 2
534	20.2	93.8	M	Pagurus fragments, Cepholopoda fragments, 2
534	20.4	90.4	M	Decapoda fragments, Otolith, 1
534	21.4	100.4	M	Decapoda fragments, digested matter, 2
534	21.6	118.1	M	Decapoda fragments, polychete fragmetns, 1
534	20	82.2	M	Digested matter, 2
584	24.6	156	F	Decapoda fragments, digested matter, 3
584	24	149.8	F	Nudibranch, coryphella (x2 species), Chlamys sp. , digested matter, 1
584	24.2	162.8	F	Sabella sp., digested matter, Chlamys sp., 2
584	23.5	108.7	F	Decapoda fragmetns, polychete fragments, digested amtter, 1
584	22	107.1	F	Digested matter, 2
584	22.3	118.1	F	Sabella sp. Digested matter, 2
584	22.9	128.8	F	Macropodia, Hydrozoa, digested matter, 3
584	20.2	92	F	Digested matter, 1
584	21.2	101.4	F	Pagurus sp. , 2
584	20.4	89.2	F	Digested matter, 3
584	21	89.6	M	small cysts, digested matter, 1
584	20.4	89.8	M	Hydroza, decapoda claw, digested matter., 2
584	20.9	94.8	M	Cysts, digested matter, 2
584	21.9	117.8	M	Hydrozoa, Amphipoda x3, digested matter, 2
584	21	99.1	M	Sabella sp. Digested matter, 2
584	20.6	88	M	Decapoda fragments, digested matter, 1
616	24	128.6	M	Abra sp., digested matter, 3
616	20.1	86	M	Abra sp., Ophiura albida, 3
616	23.4	117.5	M	Abra sp., digested matter, 1
616	20	66	M	Abra sp., Ophiura albida, Digested matter, 3
616	21.6	98.3	M	Abra sp., digested matter, 3
616	20.1	75.8	M	OPHIUROIDEA fragments, Abra sp., Corystes cassivelinus, DECAPODA fragments, Digested matter, 2
616	20.1	78.7	M	Abra sp., Ophiuira albida, POLYCHAETA sp. Digested matter, 3
616	23.5	126.5	M	Abra sp., Ophiura albida, Digested matter, 3
616	20.5	90.2	M	Abra sp., Corystes cassivelinus, Ophiura albida, Digested matter, 2
616	21.8	112	M	Abra sp., Ophiura albida, Ophiocomina nigra, 2
616	23.5	132.3	F	Brittlestar fragments, Polychaete fragments, Ophiura ophiura, Digested matter, 3
616	22.6	116.3	F	Abra sp., Ophiura albida, Digested matter, 3
616	22.4	124	F	Brittlestar fragments, DECAPODA fragments, Abra sp., Digested matter, 2
616	24	150.8	F	Cysts, DECAPODA fragments, Corystes cassivelinus, Liocarcinus sp., Abra sp., Ophiura albida, Digested matter, 3
616	21	105.6	F	Abra sp., Ophiura albida, 3
616	22.3	116	F	Abra sp., digested matter, 3
616	23.5	136.8	F	Abra sp., Corystes cassivelinus, Brittlestar fragments, Digested matter, 3

616	23.4	110	F	Brittlestar fragments, Digested matter, 2
616	23.6	146.5	F	Brittlestar fragments, Digested matter, 1
616	22.1	99.7	F	Abra sp., digested matter, 1
654	20.8	102.6	F	NEMATODA, Digested matter, 1
654	22.5	125	F	Liocarcinus sp., Digested Matter, 2
654	20	90.2	M	Empty, 0
654	24.8	162.2	F	Empty, 0
654	22.3	125.9	F	Cysts, Digested matter, 1
654	19.1	66.4	F	Digested matter, 1
654	20.4	81.9	F	DECAPODA fragments, Digested matter, 2
654	17.7	56.7	F	DECAPODA fragments, Nucula sp., Digested matter, 2
654	19.3	56.8	M	Empty, 0
654	19	76.8	F	Liocarcinus sp., Digested Matter, 3
654	18.9	64.6	F	DECAPODA fragments, Nucula sp., AMPHIPODA, Digested matter, 2
654	18.4	59.3	M	DECAPODA fragments, 1
654	18.1	59.5	F	DECAPODA fragments, Digested matter, 1
654	17.6	55.5	M	Bivalve fragments, Digested matter, 1
654	17.2	50.7	M	DECAPODA fragments, Nucula sp., HYDROZOA, Digested matter, 1
654	17	49.8	M	DECAPODA fragments, Nucula sp., Digested matter, 2
654	17	41.1	M	Nucula sp., Bivalve fragments, Digested matter, 1
654	17	55	M	Parchment worm, Digested matter, 2
654	18.1	59.1	M	AMPHIPODA spp., Digested matter, 1
654	15.6	37.9	M	DECAPODA fragments, 1
649	24	139.4	F	DECAPODA fragments, Digested matter, 2
649	23.8	131.5	F	DECAPODA fragments, Bivalve fragments, Digested matter, 1
649	22.6	101.1	F	Empty, 0
649	24	145.2	F	DECAPODA fragments, Digested matter, 2
649	22.3	109.9	F	Empty, 0
649	22.6	131.8	F	DECAPODA fragments, Digested matter, 2
649	21	106.1	F	DECAPODA fragments, 3
649	23	120.6	F	Digested matter, 1
649	20.6	79.3	F	DECAPODA fragments, Digested matter, 1
649	20.6	98.8	F	DECAPODA fragments, Digested matter, 3
649	19.6	72.6	M	DECAPODA fragments, Digested matter, 1
649	18	59.7	M	DECAPODA fragments, Hydrozoa, Digested matter, 1
649	19.2	73.8	M	Cysts, DECAPODA fragments, 2
649	17.5	50.5	M	Turitella sp., Nucula sp., 1
649	15.9	40.1	M	AMPHIOPODA spp., DECAPODA fragments, Abra sp., 1
649	15.1	32.5	M	Pycnogonid, AMPHIPODA spp., NEMATODA, Digested matter, 2
649	17	46.6	M	Digested matter, 1
649	17	45.8	M	DECAPODA fragments, 1
649	16.2	38.2	M	Empty, 0
649	15.1	36.2	M	HYDROZOA, Bivalve fragments, Gastropod opercula, Digested matter, 1

776	22	126.5	F	Lagis sp., Sabellaria sp., Digested matter, 1
776	24	171.6	F	Digested matter, 1
776	21.4	101.3	F	Lagis sp., Digested matter, 1
776	22.4	145.3	F	Sabellaria sp., OPHIUROIDEA fragments, Egg masses, 3
776	23.8	65.8	F	Digested matter, 1
776	23.5	141.6	F	Sabellaria sp., Bivalve mollusc muscle fragments, Digested matter, 1
776	21.8	133.1	F	Bivalve mollusc muscle fragments, Digested matter, 3
776	22.2	146.9	F	Cysts, Bivalve mollusc muscle fragments, Sabellaria sp., 2
776	23.8	150.8	F	Bivalve mollusc muscle fragments, Sabellaria sp., Digested matter, 2
776	20.7	115.9	F	Sabellaria sp., Bivalve mollusc muscle fragments, Digested matter, 2
776	19.7	96.4	M	Bivalve mollusc muscle fragments, 2
776	22.7	137.2	M	Bivalve mollusc muscle fragments, 2
776	19.7	106.6	M	Bivalve mollusc muscle fragments, Sabellaria sp., Digested matter, 1
776	19.2	71.4	M	Sabellaria sp., Digested matter, 2
776	24.4	103.3	M	Ophiothrix fragilis, Digested matter, 1
776	20.4	82.4	M	Sabellaria sp., Liocarcinus sp., Digested matter, 1
776	19	80.8	M	Egg masses, Abra sp., Sabellaria sp., Digested matter, 3
776	22.6	133.9	F	Sabellaria sp., OPHIUROIDEA fragments, 2
776	20.8	130.9	F	Bivalve mollusc muscle fragments, Sabellaria sp., Egg masses, Digested matter, 3
776	21.2	115.4	F	Egg masses, Digested matter, 2
715	20	75.1	M	Bivalve shell fragments, digested matter, 1
715	20	90	M	Cysts, Sabellaria sp. AMPHAPODA, Bivalve fragments, digested matter, 3
715	19.7	85.7	M	DECAPODA fragments, Sabellaria sp. Digested matter, 2
715	24.4	136.2	F	Urchin fragments, DECAPODA juvinile, digested matter, 2
715	20.8	88.3	M	Bivalve shell fragments, Sabellaria sp., digested matter, 3
715	20.5	92	M	Sabellaria sp., DECAPODA fragments, digested matter, 1
715	20.2	80.6	M	digested matter, Bivalve fragments, 1
715	19.7	80.2	M	DECAPODA fragments, AMPHIPODA sp., digested matter, 2
715	19.7	82.6	M	Sabellaria sp., Bivalve shess fragments, AMPHIPODA sp., digested matter, 3
715	19.5	76.3	M	Sabellaria sp., Bivalve shess fragments, digested matter, 2
715	21	109.8	M	DECAPODA, Sabellaria sp., Bivalve sp., digested matter, 2
715	22.1	113.7	F	Hyalinoecia tubicola, SCAPHOPDA, Bivalve shell fragments., digested matter, 1
715	21.3	114.4	F	Abra sp., AMPHIPODA spp., digested matter, 1
715	21.2	100.9	F	DECAPODA fragments, AMPHIPODA sp., digested matter, 1
715	19.3	85	F	Sabellaria sp., Abra sp., digested matter, 1
715	21.5	103.3	F	Abra sp., Ophuria ophuria, sabellaria sp., digested matter, 2
715	20.4	93.5	F	Cysts, Lagis koneni, Bivalve shall fragments, AMPHIPODA sp., digested matter, 2
715	22	105.3	F	AMPHIPODA spp., NEMATODA, ISOPODA sp., Abra sp., Sabellaria sp., digested matter, 1
715	25.6	167.7	F	Cysts, Bivalve shell fragments, AMPHIPODA spp., digested matter, 2
715	24.8	151.9	F	Cysts, Bivalve fragments, digested matter, 1
706	21.8	111.8	M	Bivalve shell fragments, Digested matter, 1
706	20	77.6	M	Cysts, 0
706	20.3	75.1	M	Empty, 0

706	20.1	74.5	M	Bivalve shell fragments, Digested matter, 2
706	20.2	80.6	M	Ophicomina nigra, 1
706	19.6	81.5	M	Cysts, Digested matter, 1
706	20.3	84.7	M	Bivalve shell fragments, Digested matter, 1
706	20.1	68.7	M	Empty, 0
706	21.5	98.5	M	Empty, 0
706	19.2	72.9	M	Polynices sp., Polychate fragments, Bivalve shell fragments, Pagurus sp., Digested matter, 2
706	21.3	105.1	F	Empty, 0
706	22.1	117.5	F	Cysts, Bivalve shell fragments, Digested matter, 2
706	20.2	85.4	F	Empty, 0
706	20.3	95.5	F	Digested matter, 2
706	24.4	156.2	F	Cysts, 0
706	23	131.6	F	AMPHIPODA spp., ISOPODA sp., Digested matter, 1
706	21.4	97.5	F	Empty, 0
706	24.3	134.8	F	Bivalve shell fragments, Mysid shrimps, Digested matter, 2
706	23.5	149.3	F	Brittlestar fragments, Digested matter, 1
706	22.1	112.6	F	Liocarcinus sp., Digested matter, 2
796	20.1	76.2	F	Galathowenia sp., Digested matter, 1
796	20.2	82.1	F	OPHIUROIDEA sp., Bivalve shell fragments, Digested matter, 1
796	20.2	85.8	F	Bivalve shell fragments, OPHIUROIDEA fragments, Digested matter, 1
796	19.8	81.1	F	Corbula sp., Bivalve shell fragments, Digested matter, 2
796	21	89.4	F	Lagis koreni, Galathowenia sp., Bivalve shell fragments, Digested matter, 1
796	20.8	99.6	F	Bivalve shell fragments, OPHIUROIDEA fragments, Digested matter, 1
796	19.8	82.8	F	AMPHIPODA spp., Bivalve shell fragments, OPHIUROIDEA fragments, Corbula sp., HYDROZOA, Digested matter, 3
796	21.2	98.2	F	Corbula sp., Philine sp., OHIUROIDEA fragments, Digested matter, 2
796	22.8	118.7	F	DECAPODA fragments, OPHIUROIDEA fragments, Bivalve shell fragments, 1
796	20.3	88.4	F	Lagis koreni, Galathowenia sp., Bivalve shell fragments, Digested matter, 1
796	16.6	46.4	M	OPHIUROIDEA fragments, POLYCHAETA fragments, 1
796	18.2	68.6	M	NA, NA
796	17	51.2	M	NA, NA
796	17	48.2	M	NA, NA
796	15.4	42.1	M	NA, NA
796	20.4	76.7	M	Digested matter, 1
796	18	61.1	M	Ensis sp., HYDROZOA, Digested matter, 1
796	17.5	57	M	Bivalve shell fragments, OPHIUROIDEA fragments, HYDROZOA, Urchin spines, Digested matter, 3
796	18.1	55.3	M	Lagis koreni, OPHIUROIDEA fragments, Digested matter, 1
796	17	52.6	M	Bivalve shell fragments, DECAPODA fragments, POLYCHAETA fragments, Digested matter, 2
769	21	89.7	F	Bivalve shell fragments, Digested matter, 2
769	20.2	73.3	M	Galathowenia sp., Lagis koreni, Bivalve shell fragments, Digested matter, 2
769	20	80.9	F	Bivalve shell fragments, Corbula sp., Digested matter, 2
769	22.2	129.7	F	Bivalve shell fragments, Digested matter, 3
769	24.2	149.9	F	Philine sp., DECAPODA fragments, Urchin fragments, 2

769	22.3	100.9	F	Empty, 0
769	20.6	94.4	F	Terebellidae sp., DECAPODA fragments, Philine sp., Urchin fragments, OPHIUROIDEA fragments, Digested matter, 2
769	20.1	76.9	F	Digested matter, 1
769	20.7	73.1	F	Empty, 0
769	19.5	86.1	F	Lagis koreni, POLYCHAETA fragments, Caprella sp., Digested matter, 2
769	20.3	94	F	Sabellaria sp., Corbula sp., Digested matter, 1
769	20.3	89.6	M	OPHIUROIDEA fragments, Corbula sp., Sabellaria sp., Digested matter, 3
769	19	65.4	M	Caprella sp., Cirripedia sp., Galathowenia sp., 2
769	17.7	59.1	M	Liocarcinus sp., DECAPODA fragments, Digested matter, 3
769	19	73.7	M	Empty, 0
769	16.3	41.8	M	Sabellaria sp., OPHIUROIDEA fragments, Digested matter, 1
769	19.2	76.3	M	Galathea sp., AMPHIPODA sp., Corbula sp., HYDROZOA, 1
769	17	47.4	M	DECAPODA fragments. Digested matter, 2
769	18.3	55.9	M	Sabella sp., Bivalve shell fragments, Corbula sp., DECAPODA fragments, AMPHIPODA sp., Digested matter, 2
769	18	65	M	Bivalve shell fragments, Urchin fragments, POLYCHAETA fragments, Digested matter, 2
805	20.5	93.7	M	OPHIUROIDEA fragments, DECAPODA fragments, Sabellaria sp., Corbula sp., Digested matter, 1
805	20	95	M	Sabellaria sp., DECAPODA fragments, Digested matter, 3
805	20	81.8	M	Sabellaria sp., Lagis koreni, Digested matter, 2
805	20	75.2	M	Sabellaria sp., Digested matter, 1
805	20.3	79	M	Ensis sp., Urchin fragments, Sabellaria sp., Digested matter, 2
805	21.8	124.4	F	Urchin fragments, Sabellaria sp., Bivalve muscle fragments, Digested matter, 3
805	24	132	F	Philine sp., Sabellaria sp., Digested matter, 1
805	20.2	83	F	Sabellaria sp., Digested matter, 2
805	20.8	99.7	F	DECAPODA fragments, Sabellaria sp., Ensis sp., Urchin fragments, Digested matter, 3
805	20.1	67.6	F	Empty, 0
805	21.5	107.8	F	Sabellaria sp., Digested matter, 2
805	23.6	153.4	F	Sabellaria sp., Bivalve shell fragments, AMPHIPODA sp., Digested matter, 3
805	20	90.5	M	Sabellaria sp., Digested matter, 3
805	20.6	92.8	F	Sabellaria sp., Digested matter, 2
805	20	82.6	F	Sabellaria sp., Lagis koreni, DECAPODA fragments, Digested matter, 3
805	20.1	85.7	M	Sabellaria sp., DECAPODA fragments, Digested matter, 1
805	21.1	96.6	M	Ophiura albida, Sabellaria sp., Digested matter, 2
805	19.6	73.7	M	Bivalve shell fragments, Sabellaria sp., DECAPODA fragments, Digested matter, 2
805	19.2	63.7	M	Bivalve shell fragments, Sabellaria sp., Digested matter, 1
805	23.5	139.3	F	DECAPODA sp., 1
604	20.2	87.2	M	Pagurus sp.,, 1
604	22.9	118.5	F	Urchin fragments, OPHIUROIDEA fragments, 2
604	24	144.8	F	Bivalve shell fragments, Echinocyamus pusillus, Urchin fragments, Digested matter, 2
604	21.2	89.9	F	Urchin fragments, OPHIUROIDEA fragments, Digested matter, 2
604	20.1	80.5	F	Urchin fragments, OPHIUROIDEA fragments, Digested matter, 2
604	20.1	76	M	NEMATODA, Bivalve shell fragments, Digested matter, 2

604	20	71.3	M	Urchin fragments, OPHIUROIDEA fragments, Digested matter, 2
604	20.2	79.1	M	Bivalve shell fragments, Digested matter, 1
604	22	93.9	F	DECAPODA fragments, AMPHIPODA sp., Bivalve shell fragments, Digested matter, 3
604	22	129.9	F	NEMATODA, POLYCHAETA fragments, OPHIUROIDEA fragments, Bivalve shell fragments, Echinocyamus pusillus, AMPHIPODA sp., Digested matter, 1
604	20	81.5	F	AMPHIPODA spp., Echinocyamus pusillus, Bivalve shell fragmenst, Digested matter, 2
604	22.7	120.1	F	Pagurus sp., Urchin fragments, OPHIUROIDEA fragments, Digested matter, 3
604	20.6	78.2	F	Bivalve shell fragments, OPHIUROIDEA fragments, Echinocyamus pusillus, AMPHIPODA sp., Lagis koreni, Digested matter, 2
604	20	71.8	M	CNIDARIA sp., Echinocyamus pusillus, Bivalve shell fragments, OPHIUROIDEA fragments, AMPHIPODA sp., Digested matter, 3
604	20.2	79.1	M	Bivalve shell frgaments, POLYCHAETA fragments, OPHIUROIDEA fragments, Echinocyamus pusillus, Digested matter, 2
604	21	74.3	M	Bivalve shell fragments, OPHIUROIDEA fragments, AMPHIPODA sp., Digested matter, 2
604	20.3	85.3	M	NEMATODA, Urchin fragments, Digested matter, 2
604	18.8	67.1	M	OPHIUROIDEA fragments, Bivalve shell fragments, POLYCHAETA fragments, Digested matter, 3
604	21	97.5	F	AMPHIPODA sp., Echinocyamus pusillus, OPHIUROIDEA fragments, Urchin fragments, Bivalve shell fragments, Digested matter, 3
604	20	74	M	NEMATODA, Pagurus sp., Echinocyamus pusillus, AMPHIPODA spp., Bivalve shell fragments, POLYCHAETA fragments, OPHIUROIDEA fragments, Digested matter, 2

Table 5. Samples collected using the ESM2 logger and a Niskin bottle

Station Name	Water Depth (m)	Date	Time Sampled
GABBARDSB2	46	01/07/2018	12:31
536 (LYME BAY)	33	02/07/2018	14:26
584 (OFF EDDYSTONE)	64	03/07/2018	11:05
616 (CAMARTHEN BAY)	33	04/07/2018	12:48
654 (SOUTH CARDIGAN BAY)	36	05/07/2018	08:33
649 (NORTH CARDIGAN BAY)	44	05/07/2018	17:47
776 (RED WHARF)	16	06/07/2018	08:11
715 (LIVERPOOL BAY)	35	06/07/2018	12:45
715 (LIVERPOOL BAY TREND)	13	06/07/2018	15:35
706 (BURBO BIGHT)	20	07/07/2018	08:07
796 (Morecambe Bay)	21	07/07/2018	10:58
769 (ST BEES HEAD)	35	08/07/2018	05:58
805 (SOUTH EAST ISLE OF MAN)	39	08/07/2018	13:30
604 (WEST LUNDY)	75	10/07/2018	06:19

Table 6. Breakdown of samples collected at CSEMP sediment stations using a day grab for various assessments

STATION	ANALYSIS	Replicate Attempt	No Sample	Water Depth (m)	Date	Time Sampled	Latitude DD	Longitude DD
536	PSA/Metals	A1	FALSE	45	02/07/2018	20:59	50.4299594	-3.120216
536	Organics	A1	FALSE	45	02/07/2018	20:59	50.4299594	-3.120216
536	PSA/Metals	B1	FALSE	45	02/07/2018	21:06	50.4299567	-3.12023
536	Organics	B1	FALSE	45	02/07/2018	21:06	50.4299567	-3.12023
536	Microplastic	C1	FALSE	45	02/07/2018	21:14	50.4299583	-3.120201
536	Eco-Tox Vial	C1	FALSE	45	02/07/2018	21:14	50.4299583	-3.120201
536_2	PSA/Metals	A1	FALSE	22	02/07/2018	22:31	50.486692	-3.388337
536_2	Organics	A1	FALSE	22	02/07/2018	22:31	50.486692	-3.388337
536_3	PSA/Metals	A1	FALSE	49	02/07/2018	23:42	50.3273792	-3.338283
536_3	Organics	A1	FALSE	49	02/07/2018	23:42	50.3273792	-3.338283
536_4	PSA/Metals	A1	FALSE	48	03/07/2018	00:12	50.3082365	-3.300629
536_4	Organics	A1	FALSE	48	03/07/2018	00:12	50.3082365	-3.300629
575	No sample	A1	TRUE	33	03/07/2018	14:29	50.2949783	-4.162217
575	No sample	A2	TRUE	33	03/07/2018	14:33	50.2949941	-4.162077
575	PSA/Metals	A3	FALSE	33	03/07/2018	14:37	50.2950059	-4.16198
575	Organics	A3	FALSE	33	03/07/2018	14:37	50.2950059	-4.16198
575	No sample	B1	TRUE	33	03/07/2018	14:44	50.2950134	-4.161982
575	No sample	B2	TRUE	33	03/07/2018	14:47	50.2950132	-4.161979
575	PSA/Metals	B3	FALSE	33	03/07/2018	14:51	50.295024	-4.1619
575	Organics	B3	FALSE	33	03/07/2018	14:51	50.295024	-4.1619
575	Microplastic	C1	FALSE	33	03/07/2018	14:57	50.2949204	-4.161864
575	Eco-Tox Vial	C1	FALSE	33	03/07/2018	14:57	50.2949204	-4.161864
575_2	PSA/Metals	A1	FALSE	59	03/07/2018	17:12	50.1651073	-4.661835
575_2	Organics	A1	FALSE	59	03/07/2018	17:12	50.1651073	-4.661835
575_4	No sample	A1	TRUE	28	03/07/2018	17:57	50.2150637	-4.783706
575_4	PSA/Metals	A2	FALSE	28	03/07/2018	18:00	50.2151802	-4.783678
575_4	Organics	A2	FALSE	28	03/07/2018	18:00	50.2151802	-4.783678
575_3	PSA/Metals	A1	FALSE	60	03/07/2018	19:17	50.0888928	-4.924799
575_3	Organics	A1	FALSE	60	03/07/2018	19:17	50.0888928	-4.924799
655_5_08	No sample	A1	TRUE	25	05/07/2018	01:17	52.2434965	-4.605544
655_5_08	PSA/Metals	A2	FALSE	25	05/07/2018	01:19	52.2437469	-4.605387
655_5_08	Organics	A2	FALSE	25	05/07/2018	01:19	52.2437469	-4.605387
655_5_03	PSA/Metals	A1	FALSE	34	05/07/2018	02:02	52.3240522	-4.687781
655_5_03	Organics	A1	FALSE	34	05/07/2018	02:02	52.3240522	-4.687781
655_05_04	PSA/Metals	A1	FALSE	17	05/07/2018	03:31	52.2838468	-4.30619
655_05_04	Organics	A1	FALSE	17	05/07/2018	03:31	52.2838468	-4.30619
655	PSA/Metals	A1	FALSE	27	05/07/2018	11:24	52.3585927	-4.175212
655	Organics	A1	FALSE	27	05/07/2018	11:24	52.3585927	-4.175212
655	PSA/Metals	B1	FALSE	27	05/07/2018	11:30	52.3585947	-4.175217
655	Organics	B1	FALSE	27	05/07/2018	11:30	52.3585947	-4.175217

	655	Microplastic	C1	FALSE	27	05/07/2018	11:36	52.3585967	-4.175217
	655	Eco-Tox Vial	C1	FALSE	27	05/07/2018	11:36	52.3585967	-4.175217
715_3		No sample	A1	TRUE	38	06/07/2018	02:11	53.6179976	-3.975001
715_3		PSA/Metals	A2	FALSE	38	06/07/2018	02:20	53.6185247	-3.975842
715_3		Organics	A2	FALSE	38	06/07/2018	02:20	53.6185247	-3.975842
715_4		PSA/Metals	A1	FALSE	43	06/07/2018	02:34	53.6230852	-3.970796
715_4		Organics	A1	FALSE	43	06/07/2018	02:34	53.6230852	-3.970796
715_2		No sample	A1	TRUE	41	06/07/2018	02:49	53.6142252	-3.954737
715_2		PSA/Metals	A2	FALSE	41	06/07/2018	02:53	53.613882	-3.954742
715_2		Organics	A2	FALSE	41	06/07/2018	02:53	53.613882	-3.954742
	715	PSA/Metals	A1	FALSE	34	06/07/2018	12:57	53.500109	-3.691945
	715	Organics	A1	FALSE	34	06/07/2018	12:57	53.500109	-3.691945
	715	PSA/Metals	B1	FALSE	34	06/07/2018	13:03	53.500439	-3.691775
	715	Organics	B1	FALSE	34	06/07/2018	13:03	53.500439	-3.691775
	715	Microplastic	C1	FALSE	34	06/07/2018	13:09	53.4999971	-3.691954
	715	Eco-Tox Vial	C1	FALSE	34	06/07/2018	13:09	53.4999971	-3.691954
	805	PSA/Metals	A1	FALSE	43	07/07/2018	19:29	53.999766	-3.833493
	805	Organics	A1	FALSE	43	07/07/2018	19:29	53.999766	-3.833493
	805	PSA/Metals	B1	FALSE	43	07/07/2018	19:35	53.9997696	-3.8335
	805	Organics	B1	FALSE	43	07/07/2018	19:35	53.9997696	-3.8335
	805	Microplastic	C1	FALSE	43	07/07/2018	19:40	53.9997698	-3.83349
	805	Eco-Tox Vial	C1	FALSE	43	07/07/2018	19:40	53.9997698	-3.83349
805_2		PSA/Metals	A1	FALSE	25	07/07/2018	22:26	54.0610014	-3.40709
805_2		Organics	A1	FALSE	25	07/07/2018	22:26	54.0610014	-3.40709
805_1		PSA/Metals	A1	FALSE	25	07/07/2018	23:04	54.0623499	-3.421599
805_1		Organics	A1	FALSE	25	07/07/2018	23:04	54.0623499	-3.421599
805_3		PSA/Metals	A1	FALSE	31	08/07/2018	01:13	54.3460227	-3.651352
805_3		Organics	A1	FALSE	31	08/07/2018	01:13	54.3460227	-3.651352
655_4		No sample	A1	TRUE	23	08/07/2018	23:39	52.7942344	-4.641015
655_4		No sample	A2	TRUE	23	08/07/2018	23:41	52.7940431	-4.641143
655_4		No sample	A3	TRUE	23	08/07/2018	23:48	52.7942127	-4.641404
655_3		No sample	A1	TRUE	28	09/07/2018	00:42	52.7149269	-4.465332
655_3		PSA/Metals	A2	FALSE	28	09/07/2018	00:48	52.7152647	-4.465474
655_3		Organics	A2	FALSE	28	09/07/2018	00:48	52.7152647	-4.465474
	605	PSA/Metals	A1	FALSE	100	09/07/2018	15:35	51.2498362	-6.000379
	605	Organics	A1	FALSE	100	09/07/2018	15:35	51.2498362	-6.000379
	605	PSA/Metals	B1	FALSE	100	09/07/2018	15:42	51.2500778	-5.999841
	605	Organics	B1	FALSE	100	09/07/2018	15:42	51.2500778	-5.999841
	605	Microplastic	C1	FALSE	100	09/07/2018	15:49	51.2497272	-5.99984
	605	Eco-Tox Vial	C1	FALSE	100	09/07/2018	15:49	51.2497272	-5.99984
605_1		PSA/Metals	A1	FALSE	110	09/07/2018	16:53	51.3001179	-6.179812
605_1		Organics	A1	FALSE	110	09/07/2018	16:53	51.3001179	-6.179812
605_2		PSA/Metals	A1	FALSE	116	09/07/2018	17:11	51.3063672	-6.18747
605_2		Organics	A1	FALSE	116	09/07/2018	17:11	51.3063672	-6.18747
605_3		PSA/Metals	A1	FALSE	123	09/07/2018	18:37	51.2509203	-6.484174

605_3	Organics	A1	FALSE	123	09/07/2018	18:37	51.2509203	-6.484174
585_3	PSA/Metals	A1	FALSE	80	11/07/2018	07:02	50.003152	-4.710122
585_3	Organics	A1	FALSE	80	11/07/2018	07:02	50.003152	-4.710122
585_4	No sample	A1	TRUE	80	11/07/2018	07:31	50.0174724	-4.682256
585_4	PSA/Metals	A2	FALSE	80	11/07/2018	07:36	50.0174364	-4.682307
585_4	Organics	A2	FALSE	80	11/07/2018	07:36	50.0174364	-4.682307
585_2	PSA/Metals	A1	FALSE	78	11/07/2018	08:15	50.0165648	-4.60022
585_2	Organics	A1	FALSE	78	11/07/2018	08:15	50.0165648	-4.60022

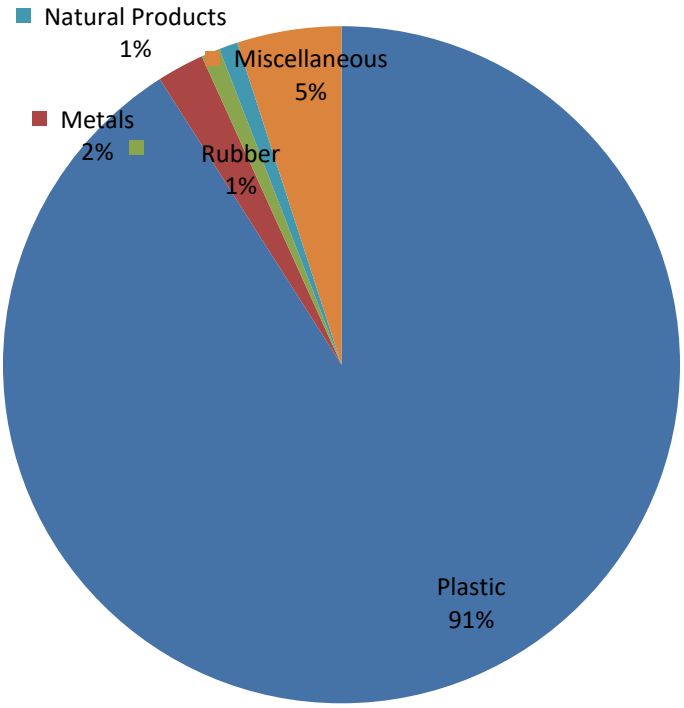

Figure 3. Benthic litter items (N=225) collected during 45 fishing tows using a Granton trawl

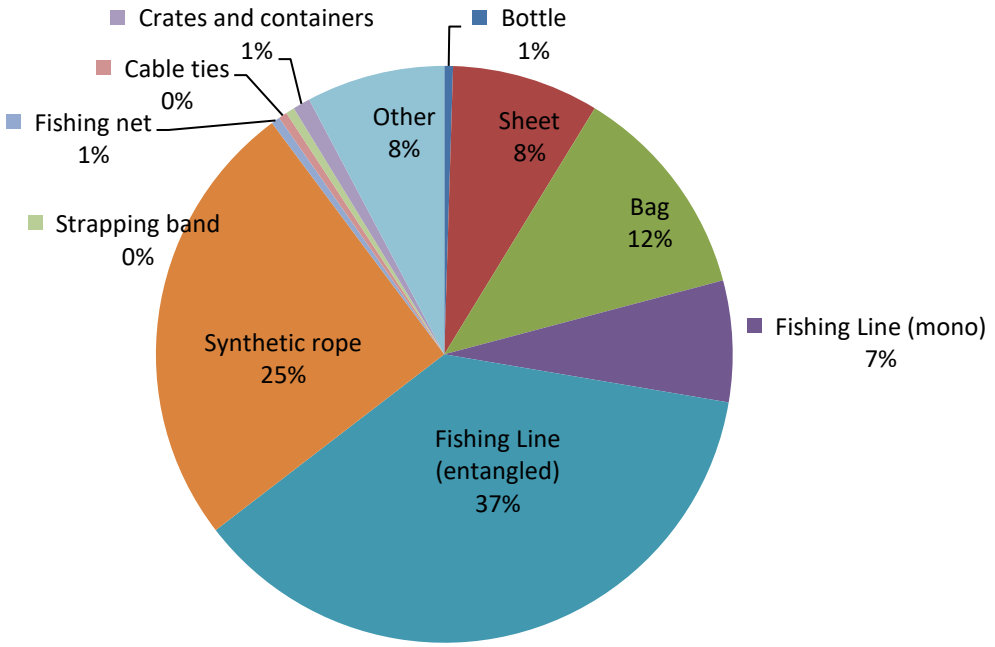

Figure 4: Break down of plastic items (N=205) which made up the 91% of total litter items

E. E. Manuel Nicolaus (Cefas)
Scientist in Charge
Date: 17/07/2018

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