

**DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS.
CEFAS LOWESTOFT LABORATORY, LOWESTOFT, SUFFOLK,
ENGLAND.**

PROGRAMME: RV ENDEAVOUR; CRUISE REPORT 10B / 09

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DURATION: 21st June – 10th July 2009

LOCATION: Clyde, North Sea and English Channel and Irish Sea.

AIMS:

1. To collect samples of demersal fish for chemical analysis from the Irish Sea, North Sea and Eastern English Channel in support of the Clean Seas Environmental Monitoring Programme (CSEMP).
2. To collect fish samples at CSEMP sites for fish disease (e.g. liver cancer prevalence).

3. To collect fish samples at CSEMP sites for biochemical markers (e.g. EROD and bile metabolites analysis).
4. To sample representative CSEMP stations using grab and beam trawl for trace metal contaminants, sediment particle size analysis, PAHs and benthic fauna.
5. To trial the proposed redesign of the CSEMP. Sediment samples will be collected using a day grab for benthos, trace metals, organics and chlorophyll. Water samples will be collected for nutrients and chlorophyll.
6. To collect bulk water samples for radio-nuclide analysis in the Irish Sea.
7. To collect samples of cod when available for population structuring of cod around the UK.

Overview

Cruise 10A/09 sailed from Lowestoft on 15th June and berthed at Hartlepool on Sunday 21st June. Scientific staff arrived at the ship on Sunday 21st June. An induction course was conducted on the evening of 21st June. RV *Endeavour* then left Hartlepool on the morning of 22nd June and sailed to CSEMP stations off the Tees and Amble to take samples under aims 1, 2, and 3. RV *Endeavour* then proceeded to the Dogger Bank where samples were taken at the six CSEMP stations in this region under aims 1,2 and 3. Further sampling took place at CSEMP stations as RV *Endeavour* steamed south to the Humber, Wash, Gabbard then through the Dover Straits to Rye bay and Newhaven. On the 1st July RV *Endeavour* berthed in Portland for one tide to change staff and remove samples to the Weymouth Laboratory and replenish liquid nitrogen. RV *Endeavour* then sailed to Lyme Bay, sampling for aims 1, 2 and 3 and then west to Lands End and onwards to Liverpool Bay sampling *en route* at Lundy, Carmarthen Bay and Cardigan Bay. On July 5th staff boarded the RV *Endeavour* from Holyhead to undertake a 24hr multibeam survey for the JNCC. After which the RV *Endeavour* steamed into Liverpool Bay for further sampling under aims 1, 2, 3 and 4, sites included; Burbo Bight, Red Wharf Bay, Liverpool Bay (including trend samples), Morecambe Bay, SE Isle of Man and Dundrum Bay. Throughout the sampling in the Irish Sea water samples were taken for aim 6. After completing the sampling of stations in the Irish Sea the ship then steamed south and samples were collected as part of the

CSEMP re-design programme at stations along the South West coast under aim 5. RV *Endeavour* docked in Portland on the 11th July.

A list of CSEMP stations for the sampling of fish is given in **Appendix 1** and **Appendix 2** below. Additional information on cruise outputs relating to specific projects including water analysis for caesium and tritium (**Appendix 3**), dab chemistry (**Appendix 4**) cod population surveys (**Appendix 5**) and litter surveys (**Appendix 6**) are provided below.

Policy drivers

The data generated during this cruise will be used to meet obligations for reporting of contaminant data to MERMAN and the ICES database along with subsequent assessment under Charting Progress and OSPAR. In addition, it fulfils Defra obligations to the OSPAR JAMP. It will also provide baseline data for defining descriptors of Good Environmental Status under the Marine Strategy Framework Directive (MFSD).

Daily Cruise Log

All times are BST unless otherwise stated

Sunday 21st June

The RV *Endeavour* sailed from Hartlepool 24:00hrs and headed out to the first sampling station "Off Tees" CSEMP 294.

Monday 22nd June

Endeavour arrived was positioned on site (CSEMP fishing stn 294) and deployed Granton trawl at 9:00hrs. Off Tees has been designated a "super hit" fishing station for 2009 and approx 225 fish (size stratified groups 0-14cm; 14-19cm, 19-24cm and 24cm+) were sampled for a full external disease and histopathological assessment. Liver samples (chemical analysis), fin clips (population genetics) and otoliths (age data) were also taken for each individual fish. The standards suite of cellular biomarkers (from this point forward referred to as the CSEMP cellular biomarker suite) and stomach contents analysis was carried out on 20 fish (10 male: 10 female) within the size range 19-24cm). Fishing was completed by 19:15hrs and sample dissection and processing completed by 20:00hrs. The Endeavour then proceeded to steam over night to the next CSEMP fishing stn 245 (Amble).

Tuesday 23rd June

RV *Endeavour* fished with the Granton trawl from 08:00 hrs – 12:00hrs at the CSEMP fishing stn 245 (Amble). Material was collected from dab enabling a full external and histopathological disease record, CSEMP cellular biomarker suite and whole dab samples collected for tissue chemistry. Whiting (ca 100) were assessed for external disease and cod samples collected for a collaborative project with Dr Clive Fox (NERC, see appendix 5). Over lunch the RV *Endeavour* steamed north towards the Farne Deep where again the Granton trawl was deployed (13:00hrs). Fishing was generally poor and samples were only collected from whiting (external disease record) dab (21 for whole body chemistry), shrimp (crustacean CRL research) and cod (Defra CODEND). At approximately 17:30hrs the RV *Endeavour* steamed offshore towards CSEMP 283 (NE Dogger).

Wednesday 24th June

Fishing commenced using the Granton trawl at the CSEMP fishing station 283 (N.E. Dogger). Two hauls provided material for a full dab external and histopathological disease record, CSEMP cellular biomarker suite and whole dab samples collected for tissue chemistry. 30 dab livers were also sampled for Laser Capture Microscope Dissection (LCMD). At approximately 10:00hrs the RV *Endeavour* streamed towards North Dogger and one haul provided material a full dab external and histopathological disease record along with whole samples collected for tissue chemistry. Thirty dab livers were also sampled for LCMD. The RV *Endeavour* then proceeded to West Dogger and sampled the CSEMP 285 sediment station. Two hauls were then undertaken at CSEMP 286 to provided material for a full dab external and histopathological disease record along with whole samples collected for tissue chemistry. In addition, 30 dab livers were sampled for LCMD.

Thursday 25th June

RV *Endeavour* was stationed on the Central Dogger station (CSEMP 287) overnight. Three hauls were undertaken at first light, which provided material for a full dab external and histopathological disease record along with whole samples collected for tissue chemistry. In addition, 30 dab livers were also sampled for LCMD. The RV *Endeavour* then stream out to a nephrops fishing station and conducted one haul. While no nephrops were caught, cod (9) were taken for the Defra CODEND contract. The RV *Endeavour* then steamed to the Off Humber fishing station (CSEMP 346), numbers of dab per haul (3) were low, so only 1x25 were collected for whole tissue chemistry. The ship then proceeded to undertake day grabbing at the CSEMP sediment station 345.

Friday 26th June

Fishing started early with a 05:00 tow at the nephrops fishing station sampled the previous day. The early morning trawl (x2) proved a success and sufficient samples were collected. A sub-sample of the catch were placed in aerated tanks so they could be transported live back to the Weymouth lab for a series of disease trials. The RV *Endeavour* then steamed west towards the CSEMP Off Flamborough fishing station (344). Three hauls were undertaken which provided material for a full dab external and histopathological disease record along with whole samples collected for tissue chemistry.

Saturday 27th June

The RV *Endeavour* fished the Inner Wash CSEMP station (386) post breakfast. We conducted 4, 30 minute tows and caught a wide selection of fish and crustaceans. Material (histology) was sampled from pink shrimp and edible crab. After lunch the RV *Endeavour* steamed north to fish the Humber CSEMP station 377. A new commercial tow was used approx. 2 miles south of the original CSEMP station (due to heavy damage sustained by the net in previous years). Three tows were conducted and 30 flounder were sampled for histopathology, plasma, bile and liver. In addition, 1x25 flounder were collected for whole body chemistry along with 2x25 dab.

Sunday 28th June

The RV *Endeavour* fished the Indefatigable CSEMP station 387 just after breakfast. The site fished extremely well and as a consequence towing times were reduced from 30 minutes to 20 minutes and then finally 10 minutes for the last two hauls. Trawls were mainly composed of plaice and small dab. Due to the small size of fish available those sampled for biomarkers were generally below (male dab 18-20cm) the standard size collected. In addition, 20 plaice were also sampled for histology and 2-25 whole dab were collected for tissue chemistry. An external dab disease record was also collected. The ship then steamed to Smith Knoll and fished two of the trend stations, catch sizes were extremely poor and sampling was halted after two trawls on the second site.

Monday 29th June

Pre breakfast sampling was undertaken for sediments at Outer Gabbard CSEMP 475, after which, the RV *Endeavour* steamed to the CSEMP fishing strn 476. Fishing at the out Gabbard was extremely poor and as a result only 1 x

25 sample of dab being sampled for whole body chemistry. However, additional samples of bib (5) and cod were collected. The RV *Endeavour* then steamed into the English Channel to pick up a series of CSEMP sediment redesign sites.

Tuesday 30th June

Fishing commenced at 5:40 am at the Inner Rye Bay fishing station, CSEMP 486. Two tows were conducted before breakfast and enough fish were collected to conduct a full external dab fish disease assessment along with 50 samples taken for histology and biomarkers. 2 x 25 whole dab were also collected for chemical analysis. The RV *Endeavour* the proceeded to New Haven CSEMP 494 where 4 trawls were undertaken. Samples were collected for whole body chemistry 2 x 25 dab and 50 dab for histology/biomarkers. In addition, 17 samples of eels were collected for shipping back to Weymouth for sampling (EU ELIAD project). The ship then proceeded west towards Weymouth, picking up CSEMP re-design sediment sites along the way.

Wednesday 1st July

RV *Endeavour* steamed into Portland harbour and was alongside at 8:00am. Liquid nitrogen supplies were replenished and nephrops and eel samples were transported back to the Weymouth laboratory. The RV *Endeavour* sailed again at 19:30hrs and headed into Lyme bay to conduct sediment and benthic sampling.

Thursday 2nd July

The Cefas Endeavour starting fished the Inner Lyme Bay CSEMP 534 station at 06:15hrs. Three tows were conducted before breakfast with enough fish collected to conduct a full external dab fish disease assessment along with 50 samples taken for histology and biomarkers. 2 x 25 whole dab were also collected for chemical analysis. The RV *Endeavour* then steamed west to Eddystone, CSEMP 584. Two tows were conducted and samples collected for dab chemistry (2x25) and histopathology. In addition, an external disease record was taken for whiting. The RV *Endeavour* then steamed west around into the Celtic sea. During the passage a pod of common dolphins were spotted (approx 30) off Cape Cornwall. A sightings form was submitted to <http://www.seawatchfoundation.org.uk/sightingsform.php>.

Friday 3rd July

The RV *Endeavour* steamed to Celtic Deep and carried out a sediment sampling station at 05:00hrs. She then steamed east to the West Lundy fishing station, CSEMP 604. A single trawl was under taken and red mullet and dragonets were collected for histopathology. Hake and whiting were also collected and screened for an external disease record. The ship then steamed north-east into Camarthen Bay, CSEMP 616. Dab were collected for an external disease assessment along with 50 samples taken for histology and biomarkers. In addition, 2 x 25 whole dab were also collected for chemical analysis.

Saturday 4th July

The Endeavour fished South Cardigan Bay, CSEMP station 654 and Inner Cardigan Bay, CSEMP 655 as part of a dab disease-age cohort analysis project (Super Hit site). Approx. 200 fish were collected for a full external and histopathological assessment. In addition individual liver samples were collected from each fish for analytical chemistry. Following the CSEMP fishing station the RV *Endeavour* moved onto the CSEMP sediment station 655. After which she steamed to finish the disease-age cohort analysis project at North Cardigan Bay. Water samples (2 x 25L; 1 x 1L) were collected on transit for radiochemical analysis (Appendix 3).

Sunday 5th July

Fishing started at Red Wharf Bay CSEMP 776 at 06:15. Three hauls were sufficient to collect enough dab for an external disease assessment along with 50 samples taken for histology and biomarkers. In addition, 2 x 25 whole dab were collected for chemical analysis. Scallops (30) were also sampled for organ histopathology. Water samples (2 x 25L; 1 x 1L) were collected on transit for radiochemical analysis (Appendix 3). Following the completion of the fishing station the RV *Endeavour* steamed around Holyhead to collect staff from the harbour pilot boat. The RV *Endeavour* then undertook a 24hr multi beam survey for JNCC.

Monday 6th July.

The JNCC multi beam survey was completed by 14:00hrs and the RV *Endeavour* steamed east to the Liverpool Bay CSEMP station 715. Four hauls were undertaken and sufficient fish were collected for a full dab external disease assessment along with 50 samples taken for histology and biomarkers. In addition, 2 x 25 whole dab were collected for chemical analysis. Following the completion of the fishing station the RV *Endeavour* sampled the CSEMP

715 sediment station. Water samples (2 x 25L; 1 x 1L) were collected on transit for radiochemical analysis (Appendix 3).

Tuesday 7th July.

The Liverpool Bay Chemistry Trend station was sampled at 06:15hrs and plaice (size classes 2-6), dab (size classes 1-5) and whiting (size classes 2-5) collected for chemical analysis. The RV *Endeavour* then steamed east to Burbo Bight, CSEMP 706. Four hauls were undertaken and fish collected for a full external dab disease assessment along with 50 samples taken for histology and biomarkers. In addition, 2 x 25 whole dab were sampled for chemical analysis. The RV *Endeavour* then steamed north to Morecambe Bay, CSEMP 796 and again completed a full disease, histopathology and chemistry sampling hit. Water samples (2 x 25L; 1 x 1L) were collected on transit for radiochemical analysis (Appendix 3).

Wednesday 8th July.

The RV *Endeavour* sampled the South-East Isle of Man CSEMP 805 fishing station at 06:15. Three hauls were undertaken and sufficient fish were collected for a full dab external disease assessment along with 50 samples taken for histology and biomarkers. In addition, 2 x 25 whole dab were collected for chemical analysis. The RV *Endeavour* then sailed to St Bees, CSEMP 769 and fished it as part of a dab disease-age cohort analysis project (Super Hit site). Approx. 200 fish were collected for a full external and histopathological assessment. In addition individual liver samples were collected from each fish for analytical chemistry. Water samples (2 x 25L; 1 x 1L) were collected on transit for radiochemical analysis (Appendix 3).

Thursday 9th July

The RV *Endeavour* fished the Outer Dundrum Bay CSEMP 805 fishing station at 08:00hrs. Two hauls produced a small number of fish. Dab were collected for whole body chemistry (1x25) and both nephrops and dragonets were sampled for histopathology. The RV *Endeavour* then steamed into the Inner Dundrum Bay tow and conducted one tow. However, insufficient fish were caught for analysis to be undertaken. The RV *Endeavour* then steamed south to complete water sampling stations (Appendix 3) and then on towards the CSEMP redesign stations west of the Isles of Silly.

Friday 10th July

RV *Endeavour* conducted CSEMP sediment station redesign surveys west of the Isles of Silly, before heading east after lunch towards Portland.

Saturday 11th July

RV *Endeavour* docks on Portland (approx. 9:00hrs)

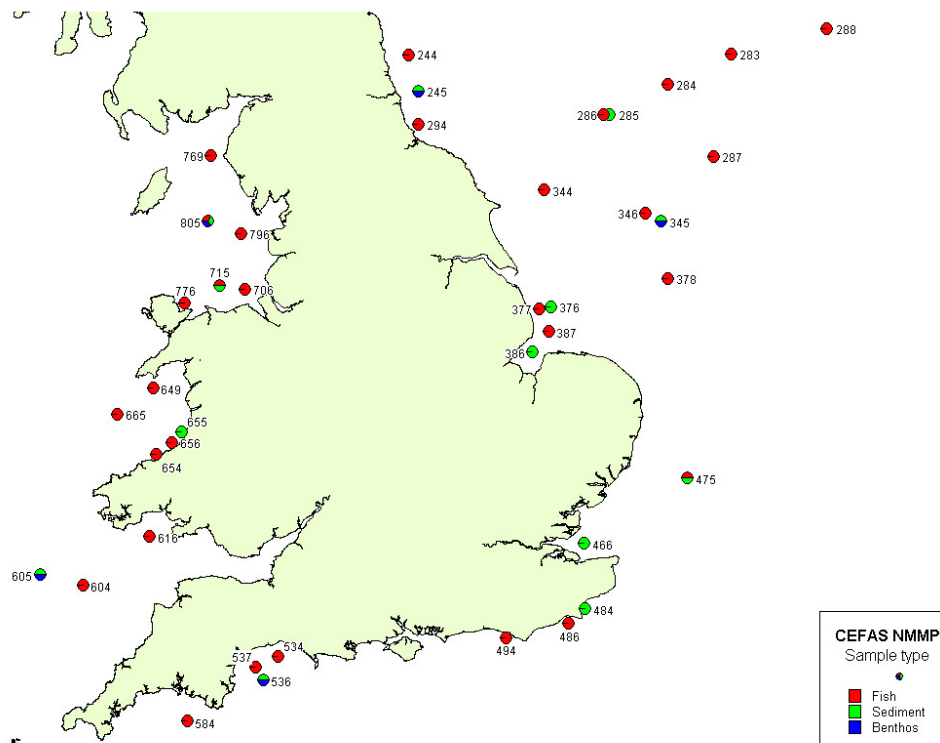
Additional Information

APPENDIX 1: CSEMP fishing stations

CSEMP Number	Location	Mid tow Lat. Long.
Using old NMMP numbering		
244	Amble	55 16.01 N 01 15.26 W
243	Farne	55 29.71 N 01 07.59 W
283	North East Dogger	55 18.05 N 02 53.82 E
284	North Dogger	55 04.08 N 02 05.40 E
286	West Dogger	54 46.76 N 01 17.69 E
287	Central Dogger	54 30.00 N 02 42.53 E
294	Tees Bay	54 45.25 N 01 08.31 W
344	Off Flamborough	54 14.72 N 00 29.91 E
346	Off Humber	54 03.92 N 01 47.46 E
377	Humber	53 19.37 N 00 25.47 E
378	Indefatigable Bank	53 33.40 N 02 04.92 E
387	Wash	53 08.50 N 01 33.30 E
475	Outer Gabbard	52 01.86 N 02 06.57 E
486	Rye Bay	50 46.74 N 00 46.83 E
New	Off Newhaven	50 45.59 N 00 00.00 E
New	Lyme Bay	50 36.86 N 02 55.82 W
New	Off Eddystone	50 06.44 N 04 06.06 W
New	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
656	Inner Cardigan Bay	52 18.00 N 04 16.35 W
665	Outer Cardigan Bay	52 23.76 N 04 53.72 W

706	Burbo Bight	53 28.24 N 03 20.47 W
715	Liverpool Bay	53 28.32 N 03 41.91 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
815	Outer Dundrum Bay	54 04.81 N 05 37.29 W
Trend	Smith's Knoll	52 48.67 N 02 45.33 E
Trend	Alternative Smith' Knoll	52 43.91 N 02 27.51 E
Trend	Smith's Knoll Bank	52 46.48 N 02 17.25 E
Trend	Liverpool Bay	53 23.76 N 03 37.55 W

APPENDIX 2: Map of CSEMP stations



APPENDIX 3: Water sampling stations sampled as part of the Irish Sea caesium and tritium water-sampling programme END10B/09. 2x25L carboys and 1x1L

Contract	Latitude (D.DM)	Latitude (DD)	Longitude (D.DM)	Longitude (DD)	Station code	Crusie Code
AE001	52.20.360	52.33933	04.20.614 W	-4.3435667	8	END 10B/09
AE001	52.56.900	52.94833	04.51.528 W	-4.8588	12	END 10B/09
AE001	53.29.800	53.49666	05.02.500 W	-5.0416667	13	END 10B/09
AE001	53.51.041	53.85068	05.10.986 W	-5.1831	14	END 10B/09
AE001	54.05.178	54.0863	05.31.487 W	-5.5247833	15	END 10B/09
AE001	54.14.706	54.2451	04.55.605 W	-4.92675	20	END 10B/09
AE001	54.42.924	54.7154	04.09.317 W	-4.1552833	22	END 10B/09
AE001	54.41.320	54.68866	03.45.686 W	-3.7614333	23	END 10B/09
AE001	54.36.345	54.60575	03.52.863 W	-3.88105	24	END 10B/09
AE001	54.26.331	54.42885	03.41.702 W	-3.6950333	26	END 10B/09
AE001	54.16.891	54.28151	03.29.621 W	-3.4936833	28	END 10B/09
AE001	53.59.561	53.99268	04.26.829 W	-4.44715	30	END 10B/09
AE001	53.47.600	53.79333	04.08.817 W	-4.14695	31	END 10B/09
AE001	53.37.265	53.62108	03.37.675 W	-3.6279167	32	END 10B/09
AE001	53.44.875	53.74791	03.44.335 W	-3.7389167	33	END 10B/09
AE001	53.55.452	53.9242	03.50.993 W	-3.8498833	34	END 10B/09
AE001	54.03.892	53.06486	03.49.446 W	-3.8241	35	END 10B/09
AE001	53.57.842	53.96403	03.34.237 W	-3.5706167	40	END 10B/09
AE001	53.54.916	53.91526	03.15.704 W	-3.2617333	42	END 10B/09
AE001	53.34.875	53.58125	03.22.084 W	-3.3680667	44	END 10B/09
AE001	53.24.141	53.40235	03.38.951 W	-3.6491833	50	END 10B/09
AE001	53.30.813	53.51355	04.15.632 W	-3.2605333	53	END 10B/09
AE001	52.58.614	52.9769	05.21.569 W	-5.3594833	55	END 10B/09
AE001	52.33.038	52.55063	05.49.469 W	-5.8244833	56	END 10B/09
AE001	52.09.645	52.16075	06.06.863 W	-6.1143833	57	END 10B/09
AE001	52.01.746	52.0291	06.17.253 W	-6.28755	58	END 10B/09

APPENDIX 4: Samples of dab for chemical analysis were collected when caught in sufficient numbers (i.e. 50) and appropriate size at all CSEMP sites. This amounted to 27 stations (see appendix 1) and coincided with sites where fish were caught for biological effects and fish disease studies. All samples were frozen and stored at -20 C. for chemical analysis at the Lowestoft Laboratory. The results will be used to meet obligations for reporting of contaminant data to MERMANT and the ICES database and subsequent assessment for Charting Progress and OSPAR. In addition it fulfils Defra obligations to the OSPAR JAMP.

Notably this year, fishing in Cardigan Bay was very poor with no fish available of the appropriate size class at both the Inner and South Cardigan Bay sites, and only one batch of 25 fish collected from the North Cardigan Bay site.

Samples of plaice and dab in five consecutive length stratified groups were collected for trend purposes from Liverpool Bay. For whiting only four consecutive length stratified groups were collected. No fish were collected from the Smith's Knoll trend site. All samples were frozen and stored at -20 C. for chemical analysis at the Lowestoft Laboratory.

CSEMP Number	Location	Date	Mid tow Lat. Long.	Dab sampled	Size range cm.	Comments
244	Amble	23.06.09	55 16.01 N 01 15.26 W	2 x 25	17-20	
243	Farne	23.06.09	55 29.71 N 01 07.59 W	1 x 25	19-22	Trawled several times very few dab
283	North East Dogger	24.06.09	55 18.05 N 02 53.82 E	2 x 25	20-23	
284	North Dogger	24.06.09	55 04.08 N 02 05.40 E	2 x 25	20-23	
286	West Dogger	24.06.09	54 46.76 N 01 17.69 E	2 x 25	20-23	
287	Central Dogger	25.06.09	54 30.00 N 02 42.53 E	2 x 25	21-24	
294	Tees Bay	22.06.09	54 45.25 N 01 08.31 W	2 x 25	20-23	
344	Off Flamborough	26.06.09	54 14.72 N 00 29.91 E	2 x 25	19-22	
346	Off Humber	25.06.09	54 03.92 N 01 47.46 E	1 x 25	19-22	
377	Outer Humber	27.06.09	53 19.37 N 00 25.47 E	2 x 25	21-24	
378	Indefatigable Bank	28.06.09	53 33.40 N 02 04.92 E	2 x 25	19-22	
387	Inner Wash	27.06.09	53 08.50 N 01 33.30 E	1 x 23	20-24	Only 23 available after several tows
475	Outer	29.06.09	52 01.86 N	2 x 25	19-22	

CSEMP Number	Location	Date	Mid tow Lat. Long.	Dab sampled	Size range cm.	Comments
	Gabbard		02 06.57 E			
486	Rye Bay	30.06.09	50 46.74 N 00 46.83 E	2 x 25	19-22	
494	Off Newhaven	30.06.09	50 45.59 N 00 00.00 E	2 x 25	18-21	
534	Inner Lyme Bay	1.07.09	50 36.86 N 02 55.82 W	2 x 25	17-20	
584	South Eddystone	2.07.09	50 06.44 N 04 06.06 W	2 x 25	17-20	
604	West Lundy	3.07.09	51 09.79 N 05 26.67 W	No fish		Damaged net – aborted
605	Celtic Deep	n/a	51 10.29 N 05 43.75 W	Not fished		
616	Camarthen Bay	3.07.09	51 32.82 N 04 35.13 W	2 x 25	19-22	
649	North Cardigan Bay		52 42.44 N 04 32.29 W	1 x 25	18-22	Extended size range as unusually, insufficient fish
654	South Cardigan Bay	4.07.09	52 10.90 N 04 29.87 W	No fish		Unusually, dab all too small
656	Inner Cardigan Bay	4.07.09	52 18.00 N 04 16.35 W	No fish		Unusually, dab all too small
665	Outer Cardigan Bay	n/a	52 23.76 N 04 53.72 W	Not fished		
706	Burbo Bight	7.07.09	53 28.24 N 03 20.47 W	2 x 25	18-21	
715	Liverpool Bay	6.07.09	53 28.32 N 03 41.91 W	2 x 25	20-23	
769	St Bees Head	8.07.09	54 30.71 N 03 47.63 W	2 x 25	19-22	
776	Red Wharf Bay	5.07.09	53 22.46 N 04 12.84 W	2 x 25	21-24	
796	Morecambe Bay	7.07.09	53 55.31 N 03 23.23 W	2 x 25	21-24	
805	SE Isle of Man	8.07.09	54 03.36 N 03 52.47 W	2 x 25	17-20	

CSEMP Number	Location	Date	Mid tow Lat. Long.	Dab sampled	Size range cm.	Comments
815	Outer Dundrum Bay	9.07.09	54 04.81 N 05 37.29 W	1 x 25	14-17	
	Inner Dundrum Bay	9.07.09		1 x 25	14-17	Combine with Outer – close proximity
Trend	Smith's Knoll	28.06.09	52 48.67 N 02 45.33 E	No fish		
Trend	Alternative Smith' Knoll	28.06.09	52 43.91 N 02 27.51 E	No fish		
Trend	Smith's Knoll Bank	n/a	52 46.48 N 02 17.25 E	Not fished		
Trend	Liverpool Bay	7.07.09	53 23.76 N 03 37.55 W	Plaice – groups 2-6 Dab groups 1-5 Whiting groups 2-5		

Appendix 5: Opportunistic sampling of cod for otolith analysis.

SAMS, Cefas, FRS, AFBI are involved in a NERC/Defra funded project under the Sustainable Marine Bioreosources program. The project (Population structuring of cod around the UK: scale, mechanisms and dynamics) will be using a variety of techniques including particle track modelling, genetics and otoliths analysis to examine movements of cod through the egg, larval, settlement and post-settlement stages. The overall aim is to better understand how local population dynamics interact between stocks and management units. At the request of SAMS juvenile cod were collected, where available, frozen whole for subsequent despatch to SAMS Laboratory. The juvenile cod otoliths will be analysed using laser-ICPMS which shows how the elemental signature changes along the otolith axis from the core to the outer region. Changes in elemental composition along this track may give insights into transport from the larval to post-settlement stages. In total, 123 cod were sampled all from North Sea locations.

Appendix 6: Observations of litter were made at each of the sites trawled on the cruise. At some locations the trawl was only deployed once, at other locations the trawl was deployed two or more times but litter items were only recorded from the first two trawls. All items were described along with their size. An overview is shown below; sites where more than 5 items per trawl were observed were Central Dogger, Inner Wash, Rye Bay, Inner Lyme Bay, Camarthen Bay, North Cardigan Bay, Liverpool Bay, Burbo Bight and Morecambe Bay. Notably, as seen in previous years the hot spot for litter was North Cardigan Bay where 84 items of litter were recorded in two tows. Of all the items collected 81% were either polythene, plastic or polypropylene in nature. The data collected here will be added to the existing eight-year data set for these sites and used for reporting eg Charting Progress and towards strategy building for MSFD.

Location	CSEMP Stn	Tows per stn	Total Number items	Nos pieces plastic
Tees Bay	294	2	8	3
Amble	244	2	3	1
Farne	243	2	4	4
NE Dogger	283	2	4	4
North Dogger	284	1	2	1
West Dogger	286	2	8	4
Central Dogger	287	2	14	11
Silver Pit	n.a.	1	2	2
Off Humber	346	1	3	3
OFF Flamborough	344	2	1	1
Inner Wash	387	2	11	6
Outer Humber	377	2	1	1
Indefatigable Bankl	378	2	1	1
Outer Gabbard	475	1	2	1
Rye Bay	486	2	13	9
Off Newhaven	494	2	4	3
Inner Lyme Bay	534	2	18	12
South Eddystone	584	2	5	5
West Lundy	604	1	2	1
Camarthen Bay	616	2	10	9
South cardigan Bay	654	2	8	7
Inner Cardigan Bay	656	2	4	3
North Cardigan Bay	649	2	84	81
Red Wharfe Bay	776	2	7	6
Liverpool Bay	715	2	13	10
Burbo Bight	706	2	10	7
Morecambe Bay	796	1	5	4
SE Isle of Mann	805	2	8	5
St Bees	769	2	1	1
Dundrum Bay	815	2	2	2

