RV ENDEAVOUR CRUISE CEND14/14

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

SIC: Brett Lyons

Sail: 4th July Lowestoft
Dock: 15th July Portland

LOCATION: Western English Channel, Irish Sea.

Name	Berth	Name	Berth
Brett Lyons	SIC cabin	Michelle Pond	Main Sci 6
Manuel Nicolaus	Upper Sci 1	Joanna Uzyczak	Main Sci 7
John Bignell	Upper Sci 2	Paul McIlwaine	Main Sci 8
Freya Goodsir	Main Sci 1	Larissa Calado	Lower Sci 2
Tim Bean	Main Sci 2	Fiona McNie	Lower Sci 3
Clare Askem	Main Sci 3	Simon Person*	Lower Sci 4
Kelly Bateman	Main Sci 4		
Matt Green	Main Sci 5		

See Annex 3. *Joining cruise in Fleetwood 10th July

Objectives and aims

The information generated during this cruise will be used to meet UK's obligations for reporting of contaminant and marine litter data to MERMAN and the ICES database and for subsequent assessments for OSPAR and Good Environmental Status (GES descriptors 1, 4, 8, 9 & 10) under the Marine Strategy Framework Directive (MFSD).

Specific aims:

1. To collect samples of demersal fish for chemical analysis from the Irish Sea, Celtic Sea and Western English Channel in support of the Clean Seas Environmental Monitoring Programme (CSEMP) (MSFD Descriptor 8 & 9). **Annex 1, 2 & 3**

2. To collect fish samples at CSEMP sites for fish disease biochemical markers (e.g. EROD and bile metabolites analysis) (MSFD Descriptor 8). **Annex 2**

3. To sample representative CSEMP stations using day grab, for polycyclic aromatic hydrocarbons (PAHs), trace metal contaminants, sediment particle size analysis (PSA), and benthic fauna (MSFD Descriptor 1, 4 & 8). **Annex 1, 2 & 3**

4. To conduct marine litter surveys (MSFD Descriptor 10).

5. To undertake sediment sampling as part of the SLAB5 dredge spoil monitoring project at Rame Head. **Annex 4**

6. To conduct drop camera work at the Slieve Na Griddle MCZ (West Isle of Man) to characterise sediment and habitat type. **Annex 5**

7. To conduct surveys of marine animals (birds and cetaceans) and part of the Marine Life UK observer programme. **Annex 6**

Overview

3rd July

Scientific staff boarded ship and underwent safety inductions at 18:00hrs.

4th July

Cefas Endeavour sailed from Lowestoft at 01:30hrs and headed out into southern North Sea. On route sampled water for nutrients analysis at the Outer Gabbard Smart Buoy site. Continued to steam through the English Channel, in a westerly direction for the remainder of the day. Conducted a muster and safety drill at 11:00hrs.

5th July

The Cefas Endeavour arrived at the Rame Head disposal stations at approximately 07:30hrs. The start of sediment sampling (two sediment samples per site collected using Shipek grab) was delayed by 1hr due to DP system being under repair. Between 08:30 and 12:00hrs sampled 10 sites before moving off station and into Plymouth Sound to collect Department of Environment Northern Ireland (DoENI) scientist Larissa Calado from the Mayflower Steps. It was decided to delay completing the dredge spoil sample sites until later that evening due to the number of dive boats and divers in the area. Cefas Endeavour then moved offshore to undertake a sediment and fishing stn at Eddystone Lighthouse (CSEMP 584). That evening ship returned to Rame Head and completed the outstanding dredge spoil sampling. At 22:00hrs Cefas Endeavour left stn and steamed overnight into the Celtic Sea.

6th July

Arrived at Celtic Deep CSEMP 605 stn late morning and started fishing after lunch. Three tows were conducted at CSEMP 605, before moving East to conduct two tows at the West Lundy CSEMP 604 fishing stn. After sampling was completed the Cefas Endeavour moved west to complete the Celtic Deep Temporal/Spatial sediment sampling stns. At 24:00hrs ship steamed overnight to Carmarthen Bay CSEMP 616 fishing stn.

7th July

Spent morning fishing CSEMP 616 Carmarthen Bay stn. Work completed by mid afternoon and Cefas Endeavour started an overnight passage to Cardigan Bay.

8th July

Cefas Endeavour arrived on site at approximately 04:00hrs and conducted a fishing tow before breakfast. The catch consisted of fish below expected size range for both contaminants and biomarkers analysis, so to complete the site the size of fish sampled was reduced accordingly. Fished CSEMP 654 twice more before moving on to complete two spatial and one temporal CSEMP 655 sediment stations. Moved on to fish the CSEMP 649 North Cardigan fishing stn and complete the spatial CSEMP 655 sediment stn. Cefas Endeavour moved off to Red Wharf Bay (North Anglesey).

9th July

Fishing started early at Red Wharf Bay (CSEMP 776) with fish on deck at 06:30hrs. Conducted two more tows during the morning before moving off to the Liverpool Bay TREND stn (CSEMP 715). The development of two wind farms in the area has restricted the tow options, but a clear run was available between the two wind farm restricted areas. For future reference this might only be an option if other boat traffic in the area is low. Cefas has a long-term "Chemistry Trend" sampling programme (20+ years of data) and sampling was undertaken to collect dab and plaice (1-5 group size class, 6 fish per size class). Once this sampling was completed the Cefas Endeavour moved onto sample CSEMP 715 temporal and spatial sediment stns and CSEMP 705 fishing stn. In addition to fishing at CSEMP 705, the day grab was deployed to collected 100kg sediment for a QUASIEME ring trial along with a five samples for Jon Barbers EU Deca project. On transit to Morecambe Bay the ship picked up two remaining CSEMP 715 spatial sediment stns.

10th July

At 08:00hrs the jet boat was deployed to collect MIST team member, Simon Person from Fleetwood. Once successfully onboard the Cefas Endeavour steamed out to the Morecambe Bay CSEMP 796 fishing stn. Fishing was conducted over the morning and early afternoon. A chemical spill and fire drill was conducted at 13:00hrs. Once sampling was complete at CSEMP 796, the ship steamed off to South East Isle of Man (SEIoM) CSEMP 805 fishing and sediment stns, collecting two of the five spatial grab stns on transit. Once on site at CSEMP 805 conducted sampling for both fish and sediments finishing at 22:00hrs. Moved off to St Bees and anchored overnight.

11th July

Sampled St Bees CSEMP fishing stn between 07:00hrs and 10:00hrs. Moved off to drop camera locations at the proposed Slieve Na Griddle MCZ area. Started survey at 15:00hrs, spilt shifts to allow continuous working through until 15:00hrs the following day.

12th July

Continued proposed Slieve Na Griddle MCZ drop camera survey until 15:00hrs. Moved off final site and to conduct one fishing tow for a disease survey of juvenile *Nephrops*. At 18:00hrs stream to Douglas on the Isle of Man to drop off Simon Pearson. 20:45hrs moved off stn and headed south into the Celtic Deep.

13th July

Continued transited south to conducted sediment type mapping at Celtic Deep fishing stn (CSEMP 605). Four additional spatial sediment stns were completed.

14th July

Arrived at the Lyme Bay CSEMP 584 fishing stn at 10:00hrs. A significant amount of static fishing activity (crab and lobster potting) restricted fishing areas available to us. Several fishing tows failed to generate enough samples for analysis. Ship then moved onto CSEMP spatial and temporal sediment stns within Lyme bay. Work completed by 17:00hrs.

15th July

Following a night at anchor off Portland the Cefas Endeavour berthed at approx 08:30 hrs. Scientists from both Weymouth and Lowestoft disembarked with all equipment by 12:00hrs.

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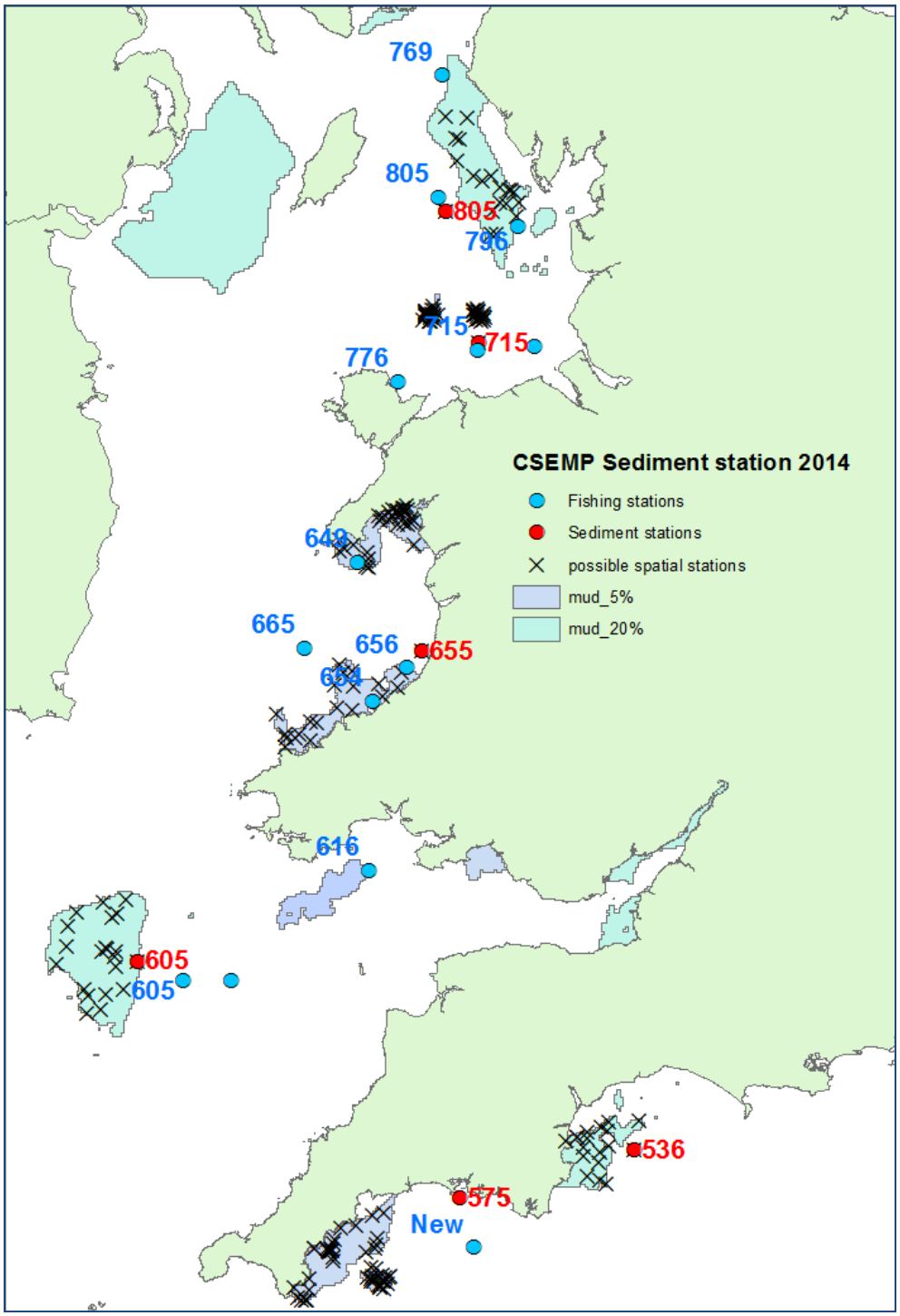
Annex 1: CSEMP fishing stn positions

CSEMP Number	Location	Mid tow Lat. Long.
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

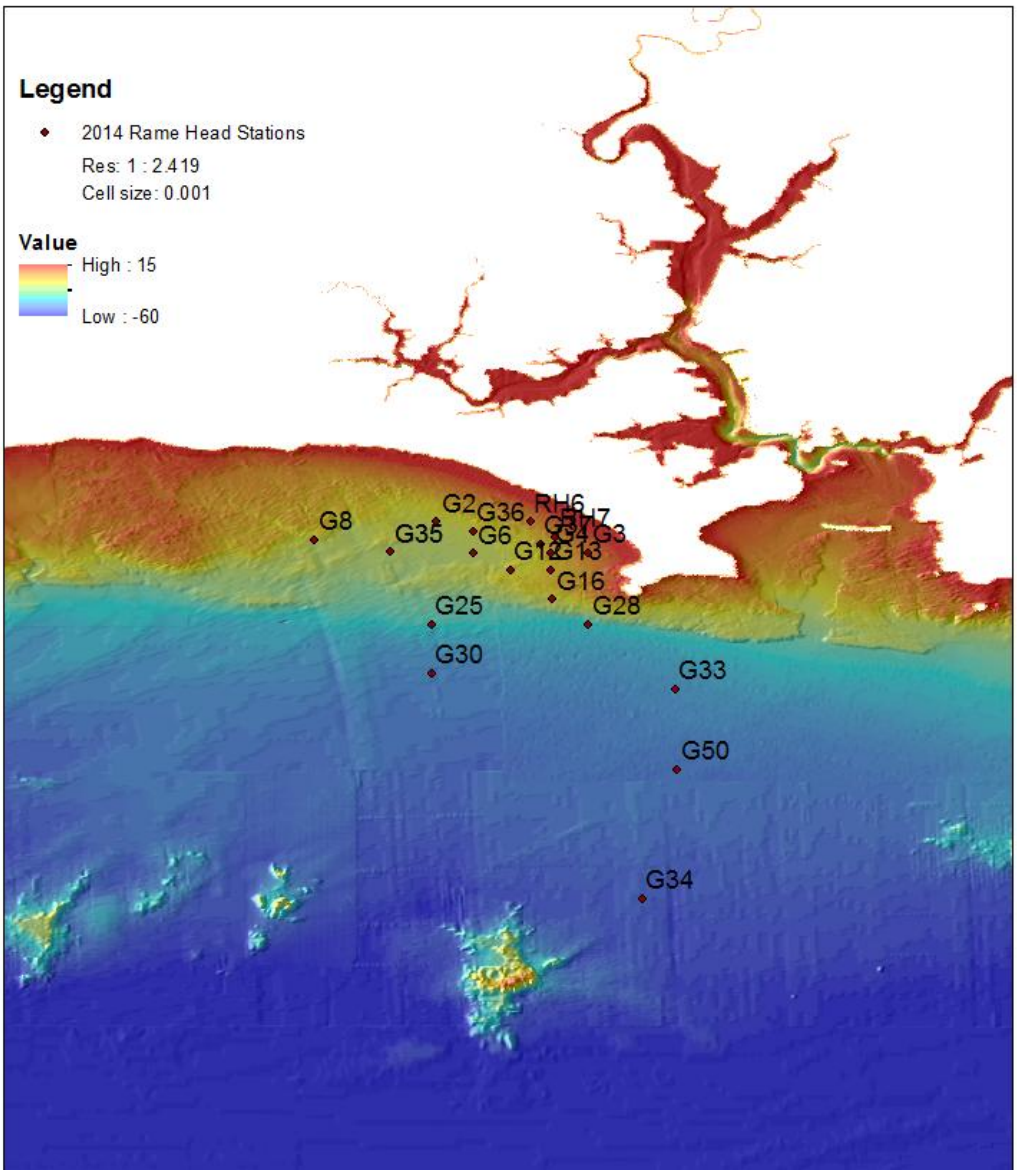
Annex 2: CSEMP fishing and temporal/spatial sediment stns



Annex 3: List of samples collected at CSEMP fishing and sediment station

CSEMP Number	Location	Biota chemistry	Sediment Chemistry	Histopathology & biomarkers
New	Off Eddystone	Yes	Yes	Yes
New	West Lundy	Yes	X	Yes
605	Celtic Deep	Yes	Yes	Yes
616	Camarthen Bay	Yes	X	Yes
649	North Cardigan Bay	Yes	X	Yes
654	South Cardigan Bay	Yes	Yes	Yes
706	Burbo Bight	Yes	X	Yes
715	Liverpool Bay	Yes	Yes	Yes
769	St Bees Head	Yes	X	Yes
776	Red Wharf Bay	Yes	X	Yes
796	Morecambe Bay	Yes	X	Yes
805	SE Isle of Man	Yes	Yes	Yes

Annex 4: SLAB5 Rame Head dredge disposal site monitoring (sediment grabs)



Annex 5: Slieve na Griddle drop camera report

The Pisces Reef Complex is located in the western Irish Sea, in the north-west mud basin and lies within the Slieve na Griddle recommended Marine Conservation Zone (rMCZ). It is approximately midway between the Isle of Man and the coast of Northern Ireland. The area consists of an extensive mud plain through which three areas of Annex I bedrock and boulder-dominated stony reef protrude (Pisces Reef area 1, 2 & 3). The average seabed depth within the site boundary is approximately 100 m with a maximum of 134 m and a minimum of 70 m at the peaks of the rocky reef outcrops. The deepest depths are within the scour pits which encircle the outcropping rocky reefs. The three extruding reefs are composed of tertiary igneous rock and boulders. They rise 15-35m above the surrounding seabed. The reef tops are composed of silty bedrock, with a patchy veneer of muddy sediment, due to sediment deposition from a localised scouring process. The area of muddy sediment around the rocky reefs supports a major *Nephrops norvegicus* fishery and a high density of *Nephrops* burrows. 14 drop camera transects, totalling a distance of 12795m, were planned and 9 successful deployments were carried out between 13:31 11/07/2014 and 13:34 12/07/2014 (Figure:).

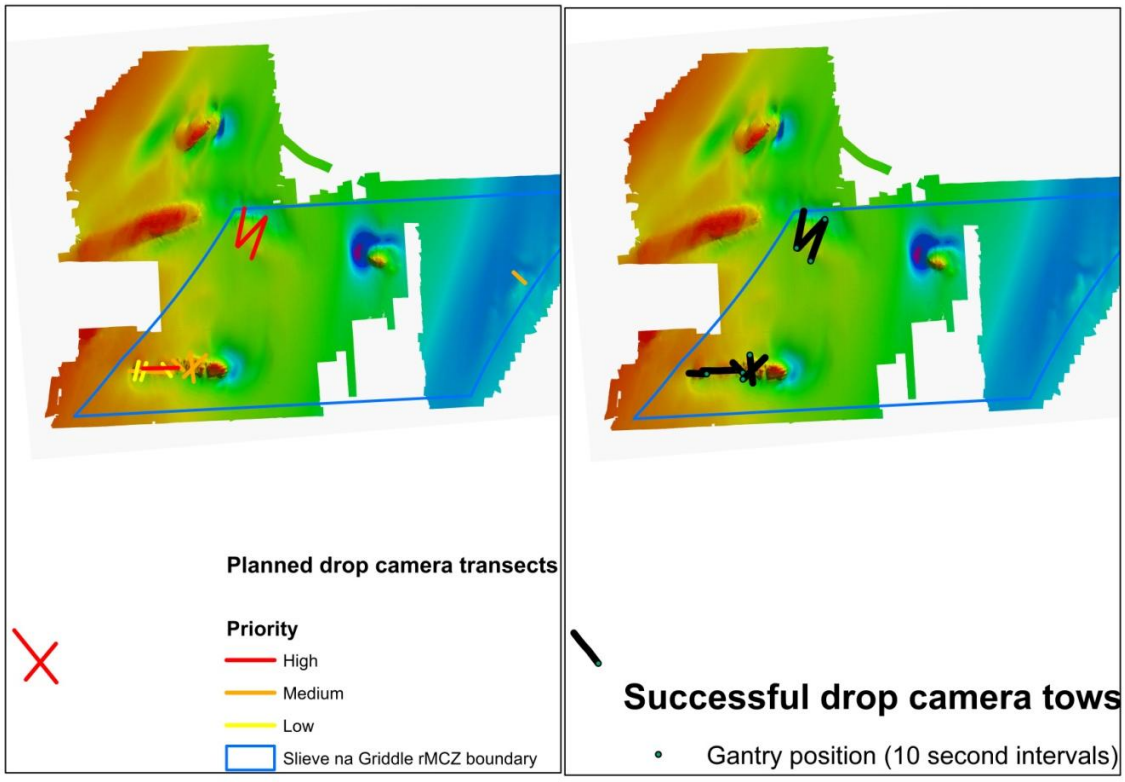


Figure: Planned and achieved drop camera tows

Preliminary results.

The majority of the drop camera tows consisted of *Nephrops* burrowed mud with occasional boulders and scoured bed rock in the areas of predicted reef. The reef features appear to be covered in mud, with *Nephrops* burrows present on and between mud smothered boulders.

Station: PR4_02

Burrowed mud with *Nephrops norvegicus*.

SNGR_CEND1414_PR4_02_STN_042_A1_017

Station: PR3_02

Burrowed mud with *Nephrops norvegicus* and occasional boulders with the Anemone *Urticina*, the Hydroid *Nemertesia* and mixed bryozoans.

SNGR_CEND1414_PR3_02_STN_049_A1_083

Annex 6: Marine life Volunteer Summary

This section provides a summary of the work undertaken by Fiona McNie, a Marine Life volunteer whose aim onboard the Cefas Endeavour is to research and record the distribution, abundance of whales, dolphins, seabirds and other marine animals observed during the cruise.

Summary report

The conditions during July 2014 have been optimal for bird and cetacean surveys, with sea states rarely going above 2 or 3, good visibility and swells between 1 – 2 metres. Cetaceans have been seen most days, and birds numbers were high, but dominated by thousands of Manx Shearwaters and Auks, with a few rarer sightings such as the Sandwich tern. Although one trip cannot provide a complete distribution map, their has certainly been some "hotspot" areas. Highest numbers of birds and cetaceans were undoubtedly in the Celtic Deep, with large numbers of Fin and other whales, large groups of Common dolphins, and Manx shearwaters. Another small hotspot was NE of the Isle of Mann where dolphin sp., minke whales and harbour porpoise were seen in a small area. This coincided with a sloped area, but the peak in sightings could equally have been due to the mirror calm conditions. This area is usually filled with Basking Sharks in July, but the Isle of Man Basking shark project has observed that they have been replaced by high numbers of Minke whales this year, probably due to the increase in phytoplankton, and reduction in zooplankton.

During the surveys, for analysis, it is essential to note all the factors which can increase or reduce the chances of spotting animals (sea state, swell, visibility, number of observers, and wind). Distance & angle of sightings from the vessel are also captured for cetaceans, as this is important information for distance sampling analysis. Marine-life data has been a significant contribution to the Joint Cetacean Protocol – an analysis of all available cetacean distribution in UK by the JNCC. Their datasets are also available for post graduate or other research studies.

There are times when work on Endeavour provides a temporary break in the marine life survey, however between 5 and 11 hrs of survey a day has still been achieved. Moments where the vessel is engaged in trawls, grabs or video tow provide an opportunity to study the birds and cetaceans more closely. It's a good time to check bird identification, for example, making sure that the Herring gulls are not the rarer Yellow legged gull! Also, transect surveys don't always allow you to see the more natural behaviours from cetaceans which we were able to observe in the Celtic Deep when common dolphins were socialising around the boat for several hours during the fish trawls.

Surveying on the Endeavour is a great opportunity for a marine life surveyor, and the opportunity to survey distribution across the North Sea, English Channel, Celtic, and Irish Seas all in one go, is truly unique. I'd like to thank all the crew and Cefas scientists for being so accommodating, and welcoming me on the vessel. Endeavour provides a great opportunity to build our understanding in bird and cetacean distributions across the UK, and I really hope I can come along again one day.

For more info visit: http://www.marine-life.org.uk/