

RESEARCH VESSEL SURVEY REPORT

RV CEFAS ENDEAVOUR Survey: C END 19 - 2021.

STAFF:

Name	Role	Shift
Daniel Wood	SIC	06:00 – 18:00
Sara Stones	2IC	06:00 – 18:00
Martin Clifffen	Data Manager	06:00 – 18:00
Josh Tate	JNCC Client Representative	06:00 – 18:00
Hayden Close	Day Shift Lead	12:00 – 24:00
Stef Bolam	Chemical Lead, Benthic Scientist	12:00 – 24:00
Axa Molina-Ramirez	Marine Operations Technician	12:00 – 24:00
Briony Silburn	Biogeochemistry	12:00 – 24:00
Freya Mickleburgh	Survey Scientist	12:00 – 24:00
Paul McIlwaine	Night Shift Lead	00:00 – 12:00
Dave Sivyer	Biogeochemistry	00:00 – 12:00
Brian Goodsir-Thompson	Marine Operations Technician	00:00 – 12:00
Peter Hamstead	Survey Staff	00:00 – 12:00
Joe Ribeiro	Survey Staff	00:00 – 12:00
John Sperry	MBES Processing	00:00 – 12:00

DURATION:

28th November 2021 – 20th December 2021

LOCATION: North Sea

Berwick to St Marys MCZ

Fulmar MCZ

Warp SmartBuoy

Dowsing SmartBuoy

Gabbard SmartBouy

AIMS:

Berwick to St Marys MCZ

Fulmar MCZ

Blue Carbon

Added Value

Warp SmartBuoy
Dowsing SmartBuoy
Gabbard SmartBouy

NARRATIVE:

The survey at MPA Fulmar was carried out between 30 November – 19 December 2021 on the RV Cefas Endeavour cruise CEND1921.

All times are UTM. Survey equipment and consumables were mobilised in advance of sailing.

Sunday 28th November 2021

All survey staff boarded the vessel at 09:00, PCR tests were carried out, and staff isolated in cabins awaiting results.

Monday 29th November 2021

Isolation continued until all PCR results were returned negative. At 16:00 the all clear was given, staff were allowed out of cabins.

Tuesday 30th November 2021

Inductions for all joining staff were at 08:30 – 10:50, split into smaller groups to enable social distancing procedures to be followed.

A fire drill and muster was carried out at 11:30, the muster station was relocated to back deck, for this exercise to better allow for social distancing.

Mobbing activities continued, and all equipment was stowed.

Pilot came aboard at 15:30, RV Endeavour successfully set sail and transited down to warp smart buoy.

Two underway water samples were successfully collected.

Wednesday 1st December 2021

A timed arrival for warp smart buoy at 06:00. A CTD rosette was collected before to sample bottom and surface water. Oxygen, salinity, chlorophyll, nutrients and SPM water samples were collected for analysis.

Warp smart buoy and noise landers were recovered onboard, a new smart buoy and noise lader replaced them.

Another CTD rosette was collected and sampled for the same analysis as the first.

Poor weather forecast dictated the decision to transit to Wash CTD site. Two hourly underway water samples were collected along the way.

Thursday 2nd December

Poor weather overnight slowed down transit. 01:00 – 08:00 was spent waiting on weather to continue transit.

Arrival at Wash CTD site was at 06:00. A CTD rosette was deployed to sample bottom and surface water.

Oxygen, salinity, chlorophyll, nutrients and SPM water samples were collected for analysis.

Transit to Humber CTD site, collecting hourly underway water samples during transit.

Arrived at 18:00. A CTD rosette was deployed to sample bottom and surface water. Oxygen, salinity, chlorophyll, nutrients and SPM water samples were collected for analysis.

Friday 3rd December

Arrived at Berwick at 08:30, some time was spent to get the deck ready for MPA survey. This could not be done during transit due to poor weather.

Camera sledge toolbox completed for Night shift.

Camera sledge attempted, abandoned due to poor visibility.

Day grab toolbox completed for Night shift

One successful day gab collected and processed.

Nioz toolbox talk completed for day shift.

Nioz coring carried out at priority one sites until 00:00. 18 samples were collected over 6 stations.

Saturday 4th December

Camera sledge attempted, abandoned due to poor visibility.

Day grabs continued until 10:00, completing all priority one day grab sampling. 40 samples collected over 20 stations.

Camera sledge attempted at 10:30, abandoned due to poor visibility.

Setup deck for Nioz coring to resume at 12:00. One blue carbon station complete, including CTD deployment.

Sunday 5th December

Toolbox talk for NIOZ operations for Night shift.

Poor weather stopped operations at 01:00, a force 9 gale came through, attempts to hold station were carried out hourly from 13:00.

It was suitable to resume day grab operations at 18:00, toolbox talk for day grab completed for day shift. 8 day grab stations completed.

Monday 6th December

Continued with day grab stations until 11:00. The swell had calmed down to allow for SPI camera deployments. This commenced after lunch at 12:00. During the second deployment the umbilical for the external camera unmounted, it is being investigated to whether this can be fixed onboard. SPI deployments continuing without the external camera. All SPI camera stations complete at XX

Tuesday 7th December

Started work at Blue Carbon priority 1 site with CTD rosette for water sampling followed by NIOZ coring at XX
All Blue carbon priority one sites completed

Day grab for BTSM before weather rolled in at 14:00

Transit North to get some shelter from Southerly storm Barra.

Wednesday 8th December

Sheltering from storm Barra in the mouth of the Firth of Forth.

08:00 transit south to see if weather suitable to continue survey work.

Resumed working at 14:18, picked up some of the remaining day grab stations during the transit south.

Completed all triplicate NIOZ cores for macrofauna at 22:34, caught up with outstanding sieving during transit to remaining day grab stations.

Thursday 9th December

Remaining six day grabs collected from outside the MCZ boundary. As it was still too early for the weather window for safe transit to Flumar MCZ it was decided to test deploy the HAPS corer, a blue carbon priority one site was chosen as best place for comparison.

Nine separate cores were collected for analysis in total, eight to mimic a blue carbon suite of samples, and an additional core for macrofauna/PSA.

Following this successful HAPS deployment, it was decided to wet test the SPI camera following its repair, this was also successful.

We departed for Fulmar MCZ at 10:00.

The transit time was used to catch up on data and a deep clean of the laboratory areas.

Friday 10th December

Arrived safely at Fulmar MCZ, the weather is worse than expected and is slowing us down, but we are progressing and still able to work.

We have had a few issues with the camera sledge but are working hard to resolve.

Day grabs are being collected in the mean time.

Saturday 11th December

The weather has improved significantly since yesterday and we have made steady progress with the day grabs at Fulmar, 33 stations complete, 3 of which have been triplicate reps.

Yesterday's camera issues have been resolved, but water ingress was noticed in the early hours this morning.

The camera has been swapped out with the backup, 9 successful camera rows have been completed so far and we are now collecting grabs and cameras at each station we visit.

Sunday 12th December

We're making good progress at Fulmar, with 7 day grabs remaining.

The camera sledge is now working reliably and 20 stations have been completed.

The forecast is due to pick up tomorrow evening, camera sledges are planned until a point where it is no longer safe to deploy.

We don't expect to be able to work safely at Fulmar for a couple of days, so plan to transit south to Dowsing and change the smart buoy. We will transit back to Fulmar as soon as the weather improves.

A bomb search drill took place at 11:00, all on shift scientists were involved with a detailed search of the boat, this was a good experience for newer seagoers to get to know less known areas of the vessel.

Monday 13th December

All planned day grabs at Fulmar were completed in the early hours of the morning, and we started to collect the remaining camera sledge stations. The swell built up to a point where it was no longer safe to deploy the camera sledge at 04:30, the long range forecast doesn't have a workable weather window until Wednesday 15th December. It was decided to make best use of time by transiting to Dowsing to carry out the noise lander and wave rider service.

Tuesday 14th December

We arrived at Dowsing just after midnight.

As the smart buoy work can only be carried out during daylight hours, we multi-beamed the last known position of a noise lander which was not found during the August servicing.

On the first line there was success, and a shadow could be seen of the correct dimensions of the lander and clump weight holding it in position.

At first light the existing wave rider and noise landers were successfully recovered, and we began to grapple for the, hopefully located, missing lander. After a few unsuccessful attempts we recovered some old fishing gear, what we suspect was tangled into the lander.

At 11:30 we made the decision that as we still hadn't successfully recovered the noise lander, we would leave it, mark its suspected position, and move on to deploying the new wave rider and noise lander at a safe distance away.

We finished deployments and began the transit back to Fulmar shortly after 3pm.

Wednesday 15th December

Arrived back to Fulmar at 08:00, after an assessment of the weather and a toolbox talk the first camera sledge was deployed at 08:50.

Three successful stations were surveyed before the swell picked up to a point where it was no longer safe to deploy.

Weather downtime from 12:00 – 15:45

Sledge operations resumed with a careful watch on weather.

At 20:30 a system warning was received on the topside unit. The camera was recovered to the deck. On inspection of the cable there was damage to the fibre cable. Unfortunately it cannot be used for the remainder of the survey.

Survey operations moved to the added value stations while the coaxial wire was installed.

Thursday 16th December

At 0200 upon deployment of the second Nioz core of the first Added Value station there was a major mechanical failure of the coring winch. Following the investigation it was deemed that it was no longer safe to use.

This means that for the remainder of the survey we cannot deploy anything other than the CTD rosette or the plankton ring net from the side gantry.

The camera sledge coaxial installation was complete at 08:00 so after breakfast the camera sledge operations resumed.

Discussions were had about the remainder of the survey time, and what this realistically means for survey delivery.

It was decided that camera stations would be completed at Fulmar MCZ, including a number of repeats to aim to capture video and stills with better visibility than the original. A number of CTD rosettes would be collected at camera station locations to get some data to support the proof of concept for new laboratory methods.

All added value and remaining blue carbon stations cannot be achieved on this survey.

Friday 17th December

Progress continued with the camera sledges throughout the day with good progress being made. The additional four CTD stations were collected successfully.

Saturday 18th December

The final camera station was completed at 04:40 and the steam to Gabbard SmartBuoy began.

During the transit scientists tidied up the laboratory areas, and packed all sampling equipment away ready for demob activities.

Sunday 19th December

Arrived at Gabbard at 08:00 and carried out a CTD water sample.

The smart buoy was then recovered and the replacement deployed. A final CTD rosette was sampled and a plankton ring net sample collected.

The recovered SmartBuoy was stripped down and cleaned during the tranist back to Lowestoft.

Pilot boarded at 20:00 to take us through the bridge.

RESULTS:

All SmartBuoys, landers and wave riders serviced and replaced as required.

Sample details	Number of samples / containers returning
Infauna Samples Berwick to St Mary's MCZ	Total: 131
Infauna Samples Fulmar MCZ	Total: 70
Particle Size Samples Berwick to St Mary's MCZ	Total: 124
Sediment Samples Fulmar MCZ	Total: 69
Blue Carbon sediment core samples	Total: 112
OCN, isotopes	Take a subsample from PSA (above)
Chlorophyll/porosity	Total 72
PAH	Total 70
Lead/thorium	Total 69
Microplastics	Total 4
Salinity bottles	See log sheets in box with bottles for sample numbers
Nutrients	See log sheets in nutrients box for sample numbers
SPM	See log sheets in nutrients box for sample numbers
Chlorophyll	See log sheets in nutrients box for sample numbers
DIC/DOC (mercuric chloride, 0.0128g/l)	See log sheets in bottle box for sample numbers
PIC/POC	See log sheets in nutrients box for sample numbers
Dissolved Oxygen	See log sheets in nutrients box for sample numbers
Porewater Nutrients	Total 59
Gabbard Plankton	Total 1

Sara Stones
2nd Scientist in Charge
20th December 2021

DISTRIBUTION:

BODC
AWSM