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Report No. 21

CEND0917 Cruise Report: North-West of Jones Bank and The Canyons Marine Conservation Zones' Monitoring Survey

Eggett, A., McBreen, F., Griffiths, Y., van Rein, H., Last, E. & Callaway, A.

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Summary

The CEND0917 cruise was undertaken from 20 May to 15 June 2017. The objective of the cruise was to undertake monitoring of North-West of Jones Bank and The Canyons Marine Conservation Zones (MCZs). The cruise also undertook the replacement of the SW Isles of Scilly Wave Rider buoy.

The aim of the survey was to acquire sentinel monitoring (Type 1 monitoring[1]) data to contribute to the development of a monitoring time-series for North-West of Jones Bank and The Canyons MCZs.

At North-West of Jones Bank MCZ a total of 71 stations were targeted, with Day Grabs and Camera Sledge transects achieved at every station and NIOZ Corer samples acquired from seven stations. Two stations were further targeted for additional Day Grab deployments, whilst the final NIOZ Corer sample was processed, to contribute to a small-scale variability study.

At The Canyons MCZ, NIOZ Corer samples were acquired from 37 stations between 200 - 400m, plus 153 drop camera transects from across the MCZ.

[1] See Kröger & Johnston (2016).

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1 Introduction and background

The Centre for Environment, Fisheries and Aquaculture Sciences (Cefas) and the Joint Nature Conservation Committee (JNCC) undertook a partnership monitoring survey to North-West of Jones Bank and The Canyons Marine Conservation Zones (MCZ) aboard *RV Cefas Endeavour* between 20 May and 15 June 2017 (CEND0917).

This report outlines the activities undertaken during this scientific cruise to the south-west of the UK continental shelf.

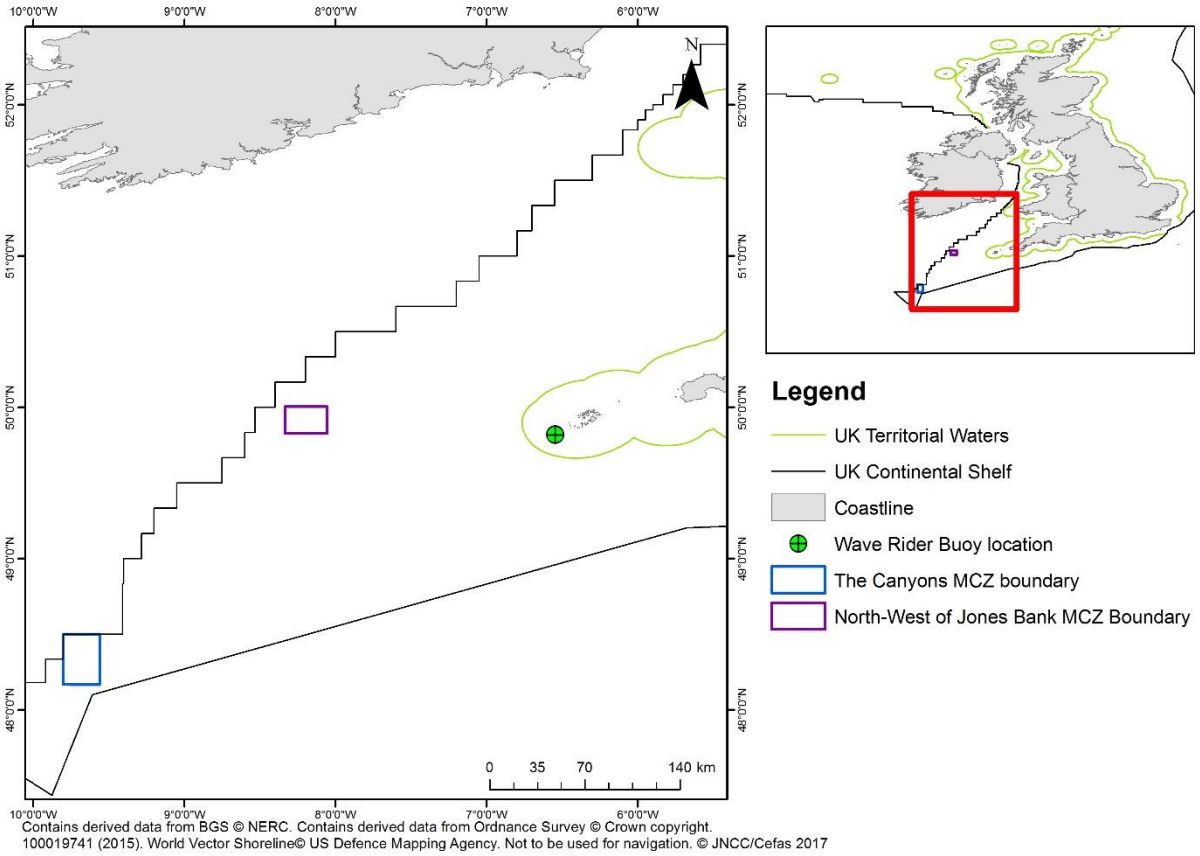

Figure 1. Overview of locations visited during CEND0917

1.1 Survey project team

The survey team for the duration of the cruise included staff from Cefas, JNCC and the National Oceanographic Centre (NOC) (Table 1).

Table 1. Survey staff for CEND0917.

Role
Across shift
Scientist-in-Charge (SIC) Data Manager Deck Scientist / JNCC lead
Day shift 12:00 – 00:00
Shift Lead Marine Instrumentation & Survey Team (MIST) trainee MIST Lead Deck Scientist

Deck Scientist Deck Scientist
Night shift 00:00 – 12:00
Benthic lead / 2IC / Shift Lead MIST trainee / Deck Scientist MIST Deck Scientist / MIST Deck Scientist Deck Scientist Deck Scientist

1.2 Site descriptions

1.2.1 North-West of Jones Bank MCZ

North-West of Jones Bank MCZ is located in the south-west approaches of the UK, approximately 165km offshore from the south-west coast of England. It is situated approximately 132km north-east of South-West Deeps (West) MCZ, and 240km north-east of The Canyons MCZ. The MCZ covers 399.14km^2 of continental shelf, of which 339.74 km^2 comprises the broadscale habitat (BSH) 'Subtidal mud'.

The remainder of the seabed within the MCZ consists of a variety of broadscale habitats, such as 'Subtidal sand', 'Subtidal mixed sediments' and 'Subtidal coarse sediment' (Figure 2). The BSH feature 'Subtidal mud' also includes the component habitat Feature of Conservation Importance (FOCI) 'Sea-Pen and Burrowing Megafauna Communities'. This FOCI comprises stable plains of fine mud, which provide a suitable habitat for burrowing animals such as Norway lobster (*Nephrops norvegicus*), the slender sea-pen (*Virgularia mirabilis*) and phosphorescent sea-pen (*Pennatula phosphorea*). All features within the MCZ have been assigned a General Management Approach (GMA) of 'Recover to Favourable Condition' (Table 2).

Table 2. Designated features and General Management Approach for North-West of Jones Bank MCZ.

Designated Features	Feature Type	General Management Approach
A5.1: Subtidal coarse sediment	Broadscale habitat	Recover to Favourable Condition
A5.2: Subtidal sand	Broadscale habitat	Recover to Favourable Condition
A5.3: Subtidal mud	Broadscale habitat	Recover to Favourable Condition
A5.4: Subtidal mixed sediments	Broadscale habitat	Recover to Favourable Condition
Sea-Pen and Burrowing Megafauna Communities	Habitat Feature of Conservation Importance	Recover to Favourable Condition

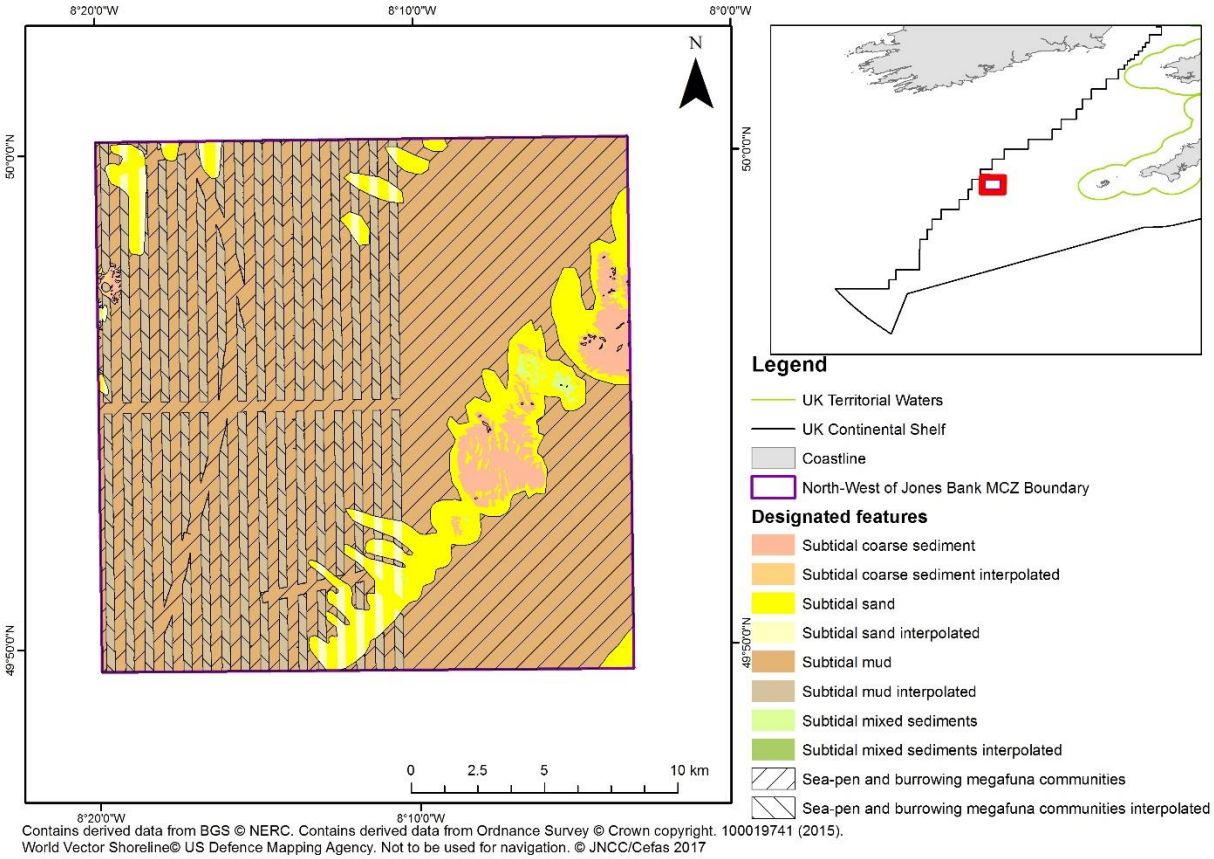

Figure 2. Designated features of North-West of Jones Bank MCZ.

1.2.2 Existing acoustic data at North-West of Jones Bank MCZ

Multibeam echosounder (MBES) bathymetry and backscatter data were collected in 2012 as part of the site verification exercise (Jones *et al* 2015). These data cover approximately 75% of North-West of Jones Bank MCZ (Figure 3) and were used in conjunction with groundtruthing data, also acquired in 2012, to produce a broadscale habitat (BSH) map, which was used to plan this survey.

1.2.3 Existing groundtruth data at North-West of Jones Bank MCZ

In 2012, groundtruthing surveys were carried out by Cefas and Gardline. A total of 44 grab samples were collected and 17 underwater video tows with still images were completed (Jones *et al* 2015). These data confirmed that the BSHs ‘Subtidal mud’, ‘Subtidal sand’, ‘Subtidal coarse sediment’ and ‘Subtidal mixed sediments’ were present (Figure 3).

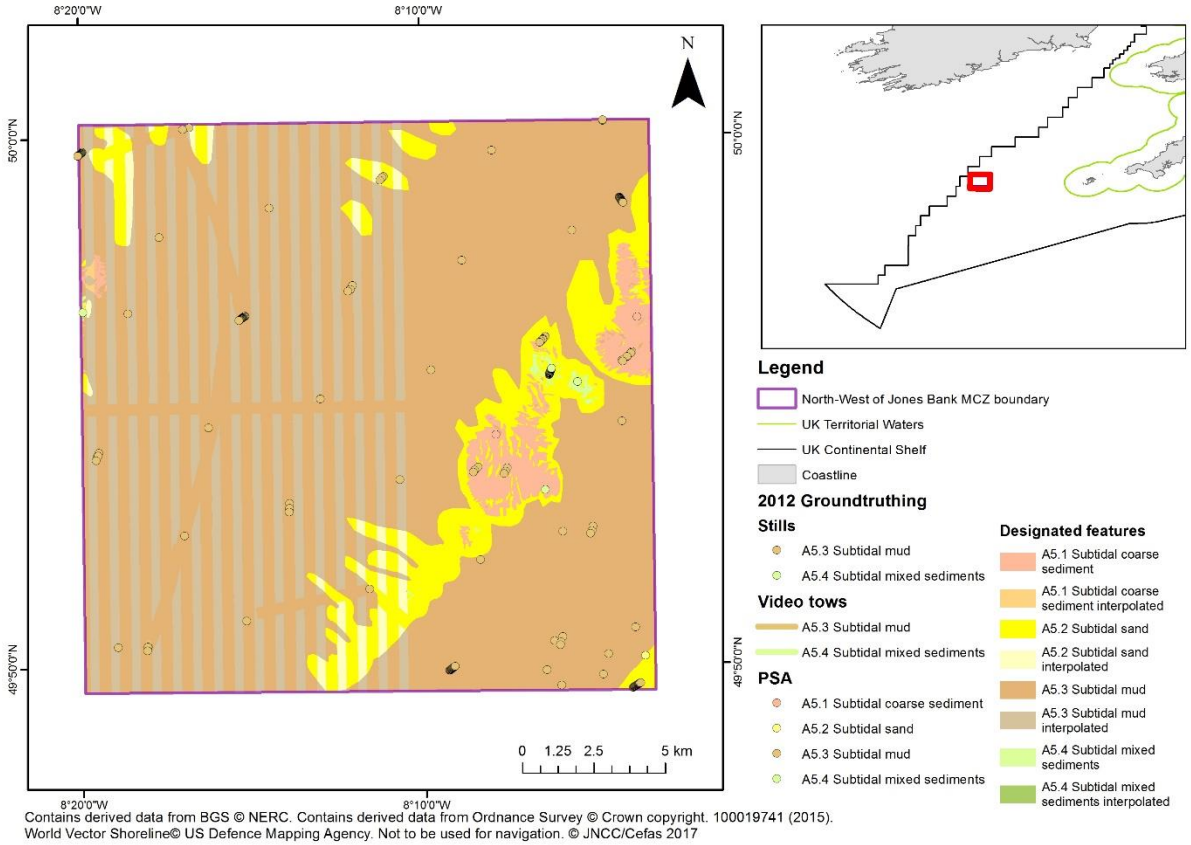

Figure 3. Location and EUNIS groups of processed groundtruthing data over the verification broadscale habitat map.

1.2.4 The Canyons MCZ

The Canyons MCZ is located in the far south-west of the UK continental shelf, more than 330km from Land's End. It encompasses 661km^2 of the continental shelf break, where the sea bed depth ranges from 100m to the oceanic abyssal plain at 2000m. The site is unique within the context of England's largely shallow territorial waters. The site comprises two canyons that incise the shelf adding to the complexity of the seafloor; Explorer Canyon to the north and Dangeard Canyon to the south. On the north wall of Explorer Canyon, living cold-water coral reef (*Lophelia pertusa*), an OSPAR Threatened and/or Declining habitat, has been observed. This is the only known example of living cold-water coral reef recorded within England's continental shelf. Other cold-water coral reefs in UK territorial waters occur along the continental shelf break off Scotland and Ireland.

The Canyons MCZ primarily comprises the 'Deep-sea bed' BSH with a small area of the 'Cold-Water Coral Reefs' habitat FOCI (Figure 4), for which the site was designated (Table 3). The 'Deep-sea bed' BSH contains a variety of substrata, including bedrock, biogenic reef, coral rubble, coarse sediment, mud and sand, which can support cold-water coral communities (*Lophelia pertusa* and *Madrepora oculata*) and a range of assemblages characterised by feather stars (*Leptometra celtica*), burrowing anemones, squat lobster (*Munida sp*.), barnacles and deep-sea sea-pens (*Kophobelemnon sp*.).

Table 3. Designated features and General Management Approach for The Canyons MCZ.

Designated Features	Feature Type	General Management Approach
A.6: Deep-sea bed	Broadscale habitat	Recover to Favourable Condition
Cold-Water Coral Reefs	Habitat Feature of Conservation Importance	Recover to Favourable Condition

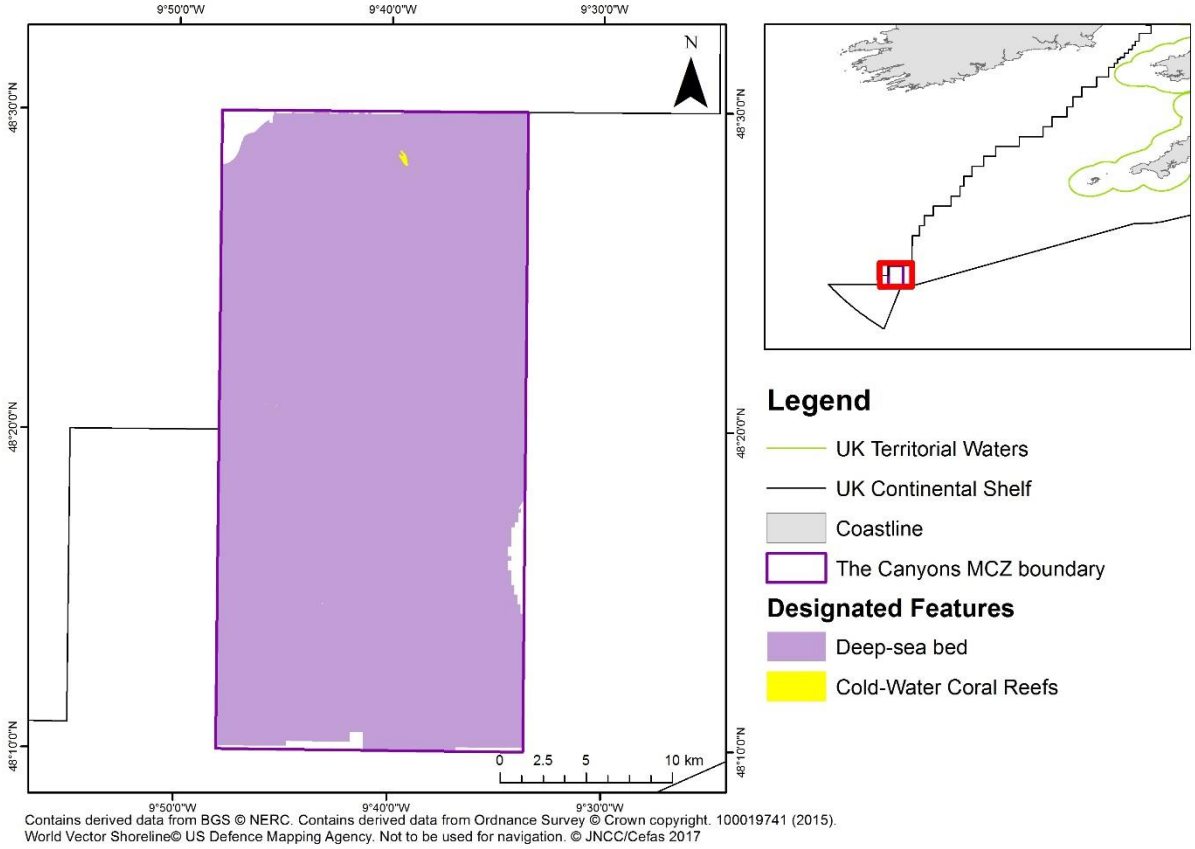

Figure 4. Designated features of The Canyons MCZ.

1.2.5 Existing acoustic data at The Canyons MCZ

Multibeam echo-sounder (MBES) bathymetry and backscatter data were collected in 2007 as part of the Mapping European Seabed Habitats (MESH) programme (Davies *et al* 2008). Further MBES data were acquired during a survey led by NOC (JC125) in 2015 (Huvenne *et al* 2015) (Figure 5).

1.2.6 Existing groundtruth data at The Canyons MCZ

Video data were acquired over a series of surveys. In 2007, the MESH programme acquired data from a drop-down video system (Davies *et al* 2008) (Figure 5). In 2014, a survey onboard the Royal Belgian Institute of Natural Sciences vessel *RV Belgica* acquired data from 13 transects, also using a drop-down video system (Van Rooij & Collart 2014). These data are currently unprocessed, but the locations were used for planning the current survey to allow potential for future temporal comparison between datasets. In 2015, survey JC125 acquired video data from two transects using ROV *Isis* deployed from *RRS James Cook*

(Huvenne *et al* 2016). These data are processed and were used for planning, but are not finalised so are not presented in this report.

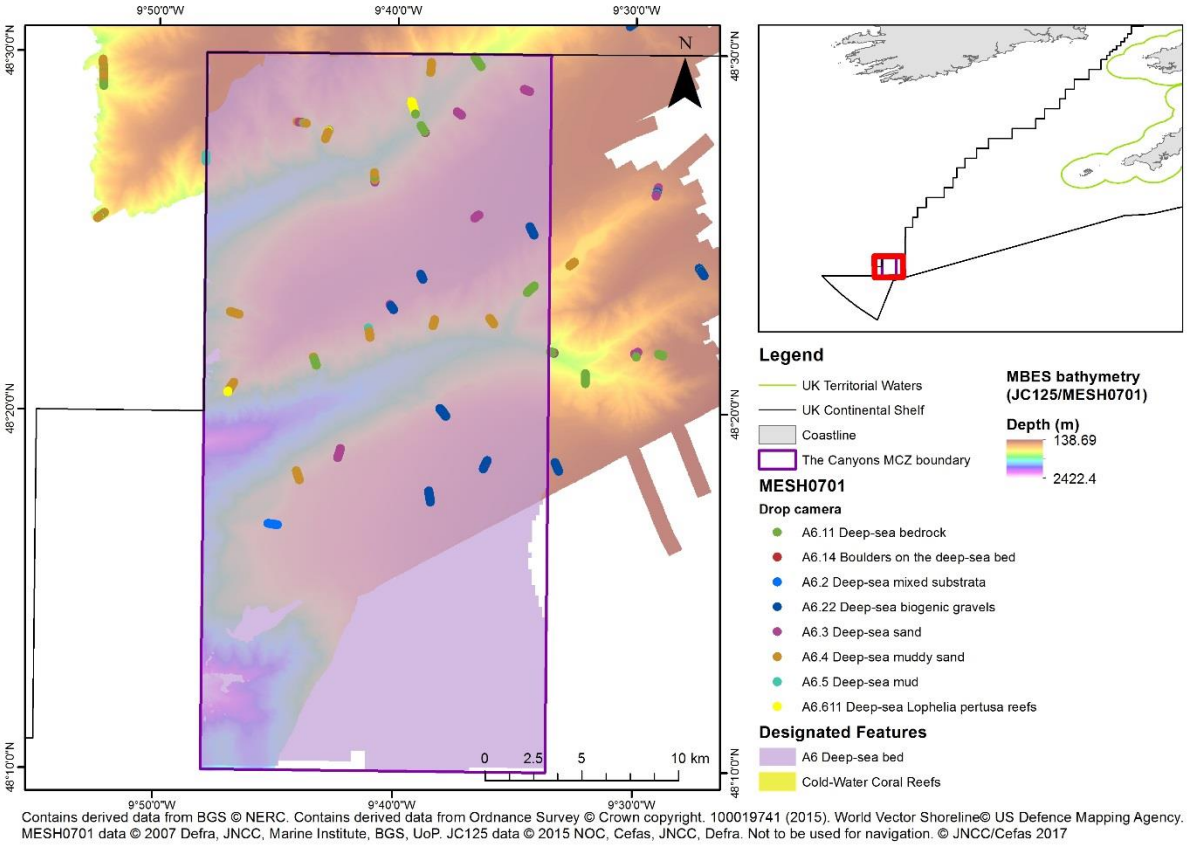

Figure 5. Designated features and EUNIS groups of previously acquired groundtruthing data overlaid on previously acquired bathymetric data.

2 Survey objectives

The aim of the survey was to acquire sentinel monitoring (Type 1 monitoring[1]) data to contribute to the development of a monitoring time-series for North-West of Jones Bank and The Canyons MCZs. The primary purpose of these data is to form the first time point of a dedicated monitoring dataset. However, this does not preclude their *ad hoc* comparison with existing data from these sites. Future monitoring and evidence gathering will be required at these sites to fully investigate and understand the long-term variability in any parameters measured.

The primary objectives of the survey are presented in Table 4. These were developed using all available evidence for each site and included an evaluation of fishing pressure and proposed management measures. Consideration was also given to the feature attributes as defined in the Conservation Objectives of each site (JNCC 2013, 2016). The survey gathered evidence which can be used to further understand the structure, function and condition of selected features against which the rate and direction of change can be inferred in the long term (i.e. sentinel or Type 1 monitoring[1]).

Table 4. Monitoring objectives for the CEND0917 survey of North-West Jones Bank and The Canyons MCZs.

CEND0917 Monitoring Objectives						
North-West of Jones Bank MCZ						
Objective	**Sub-objective**	**Priority**	**Rationale**	**Gear requirement**	**Notes**	**Achieved**
1. Collect evidence to inform Type 1 (sentinel) monitoring of the **diversity and structure of biological communities, and typical species** within the Subtidal mud feature within the North-West of Jones Bank MCZ. Key taxa: • seapens • *Nephrops norvegicus*	**1.1** Acquire quantitative macrofauna data across the Subtidal mud feature	**1**	Supply initial data point for Subtidal mud feature monitoring time-series. The data will allow characterisation of the different communities and biological traits associated with the broadscale habitat within the site	Day Grab	One Day Grab will be collected to acquire macrofauna and particle size analysis (PSA) data Another Day grab will be acquired for total organic carbon (TOC) & total organic nitrogen (TON) and PSA (2 x 5cm cores) to meet objective 2.2 Camera sledge deployment of 200m length shall be undertaken at each station Sampling stations will be allocated using a triangular systematic grid across the mud feature	Yes
	1.2. Acquire semi-quantitative epifaunal data across the Subtidal mud feature	**1**		Camera sledge (towed video and still image platform)		Yes
2. Collect evidence to inform Type 1 (sentinel) monitoring of the **extent, distribution, physical structure and organic composition** of the Subtidal mud feature within the North-West of Jones Bank MCZ	**2.1** Acquire sediment particle size data across the Subtidal mud feature	**1**	Supply initial particle size data point for Subtidal mud feature monitoring time-series to evaluate physico-chemical change across the site	Day Grab		Yes
	2.2. Acquire total organic carbon and nitrogen data across the Subtidal mud feature	**1**				Yes

3. Collect evidence to inform biogeochemical understanding of the wider regional processes and functions in the mud habitat	**3.1.** Acquire NIOZ core samples at a sub set of stations (10%) to examine biogeochemical properties	**4**	NIOZ cores will enable interrogation of the nature of carbon, determining turnover of nutrients and provide real information on the function of the assemblage	NIOZ corer	To be undertaken if time allows – operational decision to be made by SIC & JNCC lead 2 NIOZ cores to be obtained at a 10% subset of stations (7 in total)	Yes

<table>
<tr><th colspan="7">The Canyons MCZ</th></tr>
<tr><th>Objective</th><th>Sub-objectives</th><th>Priority</th><th>Rationale</th><th>Gear requirement</th><th>Design notes</th><th>Achieved</th></tr>
<tr><td rowspan="2">4. Collect evidence to inform Type 1 (sentinel) monitoring of the diversity and structure of biological communities, and typical species across the interfluves (including minimound ‘pinnacle’ features). Provide first point in a monitoring time series.
Key taxa:
seapens
Nephrops norvegicus
sponges
soft corals</td><td>4.1 Acquire quantitative macrofauna data across the canyon interfluves (NOT minimound pinnacles)</td><td>1</td><td rowspan="2">Supply initial data point for interfluve features monitoring time-series. The data will allow characterisation of the different communities and biological traits associated with the interfluve and minimound ‘pinnacles’

Analyse in conjunction with 2017 physical sediment data and broadscale habitats identified in video data to improve understanding of community distribution. This will allow greater understanding of the habitats included in the broad ‘Deep-sea bed’ protected feature, and how they are distributed</td><td>Subject to sediment type:

Primary - NIOZ corer

Reserve – mini-Hamon Grab</td><td rowspan="2">Distribute sampling systematically across site, stratifying by three criteria expected to influence community differences:
Depth (3 x 100m intervals between 200 - 500m)
Location (Dangeard and Explorer interfluves)
Feature (minimound ‘pinnacle’ or interfluve seabed)
Note: Grabs will not be acquired from minimound ‘pinnacle’ features</td><td>Yes

37/40 samples collected – remaining locations not suitable for NIOZ corer</td></tr>
<tr><td>4.2. Acquire semi-quantitative epifaunal data across the canyon interfluves (INCLUDING minimound pinnacles)</td><td>1</td><td>Drop camera frame (video and still images)</td><td>Yes</td></tr>
</table>

5. Collect evidence to inform Type 1 (sentinel) monitoring of the **extent, distribution and physical structure** of the interfluves within The Canyons MCZ. Provide first point in a monitoring time series	**5.1.** Acquire sediment particle size data across the canyon interfluves (NOT minimound 'pinnacles')	**1**	Supply initial particle size data point for interfluve features monitoring time-series. The data will allow characterisation of the different sediment types including organic content of surface sediments, at a range of depths along the two interfluve features Analyse in conjunction with 2017 biological data to improve understanding of community distribution. This will allow greater understanding of the habitats included in the broad 'Deep-sea bed' protected feature, and how they are distributed	Subject to sediment type: Primary - NIOZ corer Reserve – mini-Hamon Grab	PSA and total organic carbon and nitrogen sub-samples will be acquired from the same NIOZ core samples as the macrofauna NIOZ cores / mini-Hamon Grab (objective 4.1) Note: Grabs will not be acquired from minimound 'pinnacle' features	Yes 37/40 samples collected – remaining locations not suitable for NIOZ corer
	5.2. Acquire organic carbon and nitrogen data across the canyon interfluves (NOT minimound 'pinnacles')	**1**				
6. Collect evidence to inform Type 1 (sentinel) monitoring of the **diversity and structure of biological communities, and typical species** across the interfluves (including minimound 'pinnacle' features). Provide second or third point in a monitoring time series. Key taxa: • seapens • *Nephrops norvegicus* • sponges • soft corals	**6.1** Acquire semi-quantitative epifaunal data across the canyon interfluves (INCLUDING minimound pinnacles)	**2**	Supply second epifaunal data point for interfluve feature monitoring time-series to evaluate change in diversity and structure of epifaunal communities	Drop camera frame (video and still images)	Revisit previous transects from Belgica survey (2014) and repeat C3_7 Belgica and MESH survey (2007) transect	Yes

7. Collect evidence to inform Type 1 (sentinel) monitoring of the **diversity and structure of biological communities, and typical species** of the deeper canyon environment. Key taxa: • seapens • *Nephrops norvegicus* • sponges • soft corals	7.1. Acquire semi-quantitative epifaunal data over the deeper areas	**3**	Supply initial data point for deeper canyon environment monitoring time-series. The data will allow characterisation of the different epifaunal communities and biological traits associated with the deeper slope areas This will allow greater understanding of the habitats included in the 'Deep-sea bed' BSH protected feature, and how they are distributed	Drop camera frame (video and still images)	Distribute sampling systematically across site, stratifying by criteria expected to influence community differences. • Depth (Mid-bathyal: 900 - 1200m, Lower-bathyal: 1400 – 2100m) • Wall/Interfluve head (north/south/west) – only applicable for the Mid-bathyal	Yes – Mid-bathyal No – Lower-bathyal 15/18 planned transects completed
8. Collect evidence to inform biogeochemical understanding of deep-sea substrates in The Canyons MCZ	8.1 Acquire sediment particle size, chlorophyll, porosity, organic carbon/nitrogen (OCN) & microplastics data from a 10% subset of stations in the non-mound areas	**4**	NIOZ cores will enable interrogation of the nature of carbon, determining turnover of nutrients and provide real information on the function of the assemblage Cores acquired will be used with data acquired as part of objectives 3.1 & 4.1	NIOZ corer	To be undertaken if time allows – operational decision to be made by SIC & JNCC lead Distribute sampling using a subset of stations sampled under objectives 4.1 & 5.1, across non-mound areas. Stations assigned: Explorer 200 - 300m & 300 - 400m Dangeard 200 - 300m & 300 - 400m This objective requires the deployment of a second NIOZ core at the subset stations	Yes

3 Sample design

3.1 North-West of Jones Bank MCZ

Taxonomic richness was used for the power analysis *in lieu* of any fully developed indicator metric for change in Subtidal mud communities. To enable detection of 20% change in taxonomic richness the recommended number of grab samples to take from the Subtidal mud at North-West of Jones Bank MCZ was 71 (power 0.8, p = 0.05).

Sampling comprised a systematic 71-station triangular grid that ensured all stations were positioned in excess of 100m from the site or mud habitat boundary (Figure 6).

Video data were to be acquired via camera sledge, with a transect length of 200m at each station.

Physical samples were to be acquired using a Day Grab and NIOZ Corer. Two Day Grab samples were acquired at each of the 71 stations. Two Corer samples were to be acquired at a subset of seven stations selected at random from the 71-station grid for wider environmental monitoring.

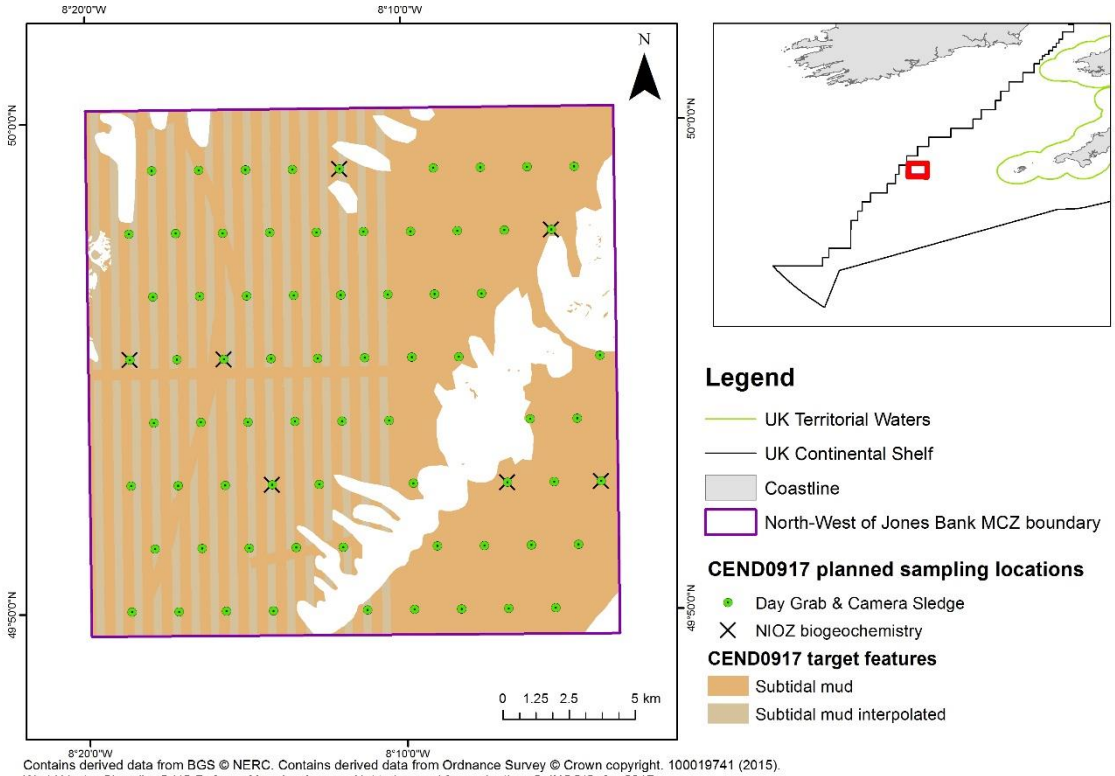

Figure 6. Location of the planned sampling stations at North-West Jones Bank MCZ during survey CEND0917.

3.2 The Canyons MCZ

Sampling in The Canyons MCZ was to be undertaken in two regions of the site; the interfluves and the deep-sea (Figure 7).

Interfluves
Sampling locations on the interfluves were stratified according to the variables which are expected to influence the biological communities present – depth, location and geomorphological feature (mini-mound vs non mini-mound).

Within each of these stratified regions, 10 independent sampling locations were randomly assigned. Sediment samples were not acquired from the mini-mound features due to potential presence of cold-water coral and presence of coarse gravelly sediments/coral rubble.

In total, 40 NIOZ Corer stations and 100 Drop Camera transects were planned within the stratified regions of the interfluves. The NIOZ Corer samples were to be acquired for analysis of macrofauna, particle size distribution, total organic carbon (TOC) and total organic nitrogen (TON).

An additional, four NIOZ Corer samples were to be collected to inform wider environmental monitoring. The Drop Camera transects were planned for a length of 200m.

An additional 13 Drop Camera transects were planned on the interfluve features to revisit historic transect locations from the Belgica survey and where the Belgica/MESH transects overlap. These transects were 0.5 – 1km in length and will provide the second or third point in a monitoring time series.

Deep-sea bed
Within the Deep-sea bed region, sampling was stratified into two regions according to the variables which are expected to influence the biological communities present:

- Mid-bathyal (600m to 1300m) – sampling within 900 - 1200m depth range, stratifying by north and south canyon wall and at the head of both interfluves
- Lower-bathyal (1300m to 2100m) – sampling within 1400 - 2000m depth range, stratifying by north and south canyon wall.

Four randomly located camera transects were planned for each of the stratified regions within the Mid- and Lower-bathyal zones. Video transects were positioned in sampling areas where the gradient of the seabed was anticipated to be <30°. The transects were to be 200m in length.

Depth boundaries were allocated to investigate changes in community between the Mid and Lower-bathyal zones. The sampling was stratified by canyon walls to allow comparison between the communities of opposing walls within comparable depth zones.

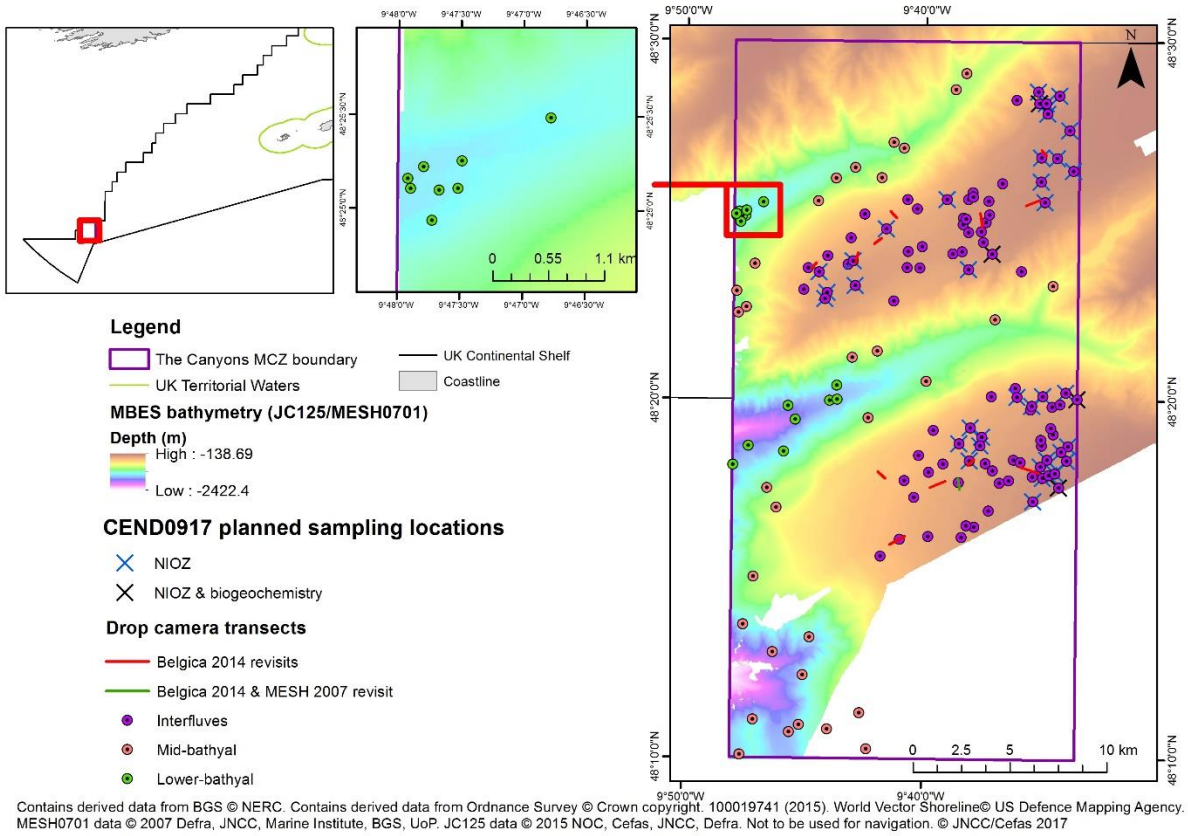

Figure 7. Location of planned sampling stations at The Canyons MCZ during CEND0917.

4 Survey narrative

All timings in GMT.

The vessel departed Lowestoft at 05:00 on 20 May 2017 and transited to the south west. The vessel sailed with only one regular bridge officer. The second officers were unfamiliar with the vessel and manoeuvring using dynamic positioning (DP) resulting in a request of time for training and familiarisation. This was combined with deployment of the CTD rosette, along with the removal and replacement of a Wave Rider buoy south of the Isles of Scilly. The deployments commenced at 16:00 on 21 May 2017 and were completed by 20:00. The vessel then transited to North-West of Jones Bank MCZ.

The vessel was on station at 04:00 on 22 May 2017 and began Day Grab (DG) operations. The use of the camera sledge (CS) was delayed until after 09:00 due to MIST lead concerns over the deployment method with new fibre-optic cable. A wet test of the CS was carried out at 10:50. The system was resting on the seabed when an alarm related to water ingress sounded on the camera system topside unit. The MIST lead advised to continue with the deployment. The equipment failed at 11:15 and was recovered to deck.

Upon recovery, the camera was transferred to the copper co-axial cable. DG deployments continued whilst the camera system was prepared. It was noticeable that the new Officer of the Watch had difficulty controlling the vessel on Dynamic positioning (DP) and positioning on station.

The CS was ready for deployment again by 19:30. During deployment the same alarm sounded. The CS was recovered before camera failure and investigation into the problem was undertaken. DG sampling continued.

Water ingress was found in the tail warp of the cable and an electronic re-termination was required. It was decided to complete DG operations and NIOZ corer stations before recommencing CS operations, due to time required for waterproof sealing compound to cure. The CS was deployed at 13:00 on 24 May 2017 and failed at the seabed. The issue was identified as tight turns on the cables, and after reconfiguration it was operational again. At 06:20 on 26 May 2017 a twist and separation of cable armour wires was noticed. CS operations ceased and NIOZ corer sampling recommenced. Upon review MIST staff were confident that the internal core was undamaged so the cable was straightened and protected with serving wire. CS operations recommenced at 12:30. CS stations were completed at 05:30 on 28 May 2017 and remaining NIOZ corer stations were targeted. All operations at North-West of Jones Bank MCZ were completed by 12:00 on 28 May 2017 and the vessel began transiting to The Canyons MCZ.

The vessel arrived at 21:30 on 28 May 2017 and commenced DC operations, these were alternated with NIOZ deployments at designated stations. During deployments, the HiPAP beacon signal was intermittent or failing. The beacons were swapped for shallower rated units and stronger signal was received. Faults were found with hired deep-water beacons and HiPAP software was not receiving attitude data. DC and NIOZ operations continued until the morning of 31 May 2017, when crossed layers were noticed on the winch barrel. The spooling gear was reset, resulting in 20 minutes wait before continuing survey.

During the morning of 3 June 2017, the vessel lost dynamic positioning heading whilst the DC was deployed and attempted to manoeuvre during recovery. This resulted in the fibre-optic cable rubbing against a block plate on the gantry. Fortunately, this was noticed at an early stage by an Able Seaman on deck and hauling was ceased until vessel was on a favourable heading. The result was damaged armour of the cable but no damage to the fibre-

optic. The cable was patched and operations continued. During 4 June 2017 deteriorating weather was forecast, and NIOZ stations were completed before the vessel headed to deeper water to reduce swell effects and survey operations were ceased at 21:00. With only DC operations remaining, survey recommenced at 22:00 on 6 June 2017. Unfortunately, water was observed on the still image camera feed at 05:30 7 June 2017. The tow was abandoned with water ingress confirmed upon recovery. The still camera unit was exchanged and ready for deployment at 06:40. Upon deployment the second still image camera failed, again due to water ingress of the housing. The still image camera was removed and the drop frame rigged to use HD video only. The DC survey continued until 10:00 on 8 June 2017 when communications with the camera were lost. A solution was found and DC operations resumed at 13:00. At around 19:30, it was noticed that the camera was being dragged forward by tidal flow in contrast to surface currents. The wire was in contact with the block plate, so the vessel manoeuvred to return wire to block, which resulted in the DC being located port side of the vessel. Attempts to change heading to bring the system to the starboard side were slow in progress but ultimately successful with gear recovered undamaged. Communications with the DC were lost again on 9 June 2017 with worsening weather on site.

Contingency work was undertaken, with a CTD rosette station targeted prior to the MIST lead coming on shift. A wreck was targeted for MBES calibration, but was not located. The MBES data were of poor quality, leading to the decision to deploy DC as ‘dead’ equipment in an area of water deeper than the fibre-optic cable length. This would enable the cable to be re-spooled (except for turns retained for safety) under tension, to remove kinks which STR postulated were increasing electrical resistance and preventing communication with the camera. DC communications were established at 2,200 m water depth and the cable was respooled without overlapping layers. This solved communication problems for the remainder of the survey. No more survey operations were achievable on 9 June 2017 due to inclement weather. Survey operations recommenced at 12:00 on 10 June 2017 and continued until a winch failure during DC recovery. A failed circuit board was replaced, and after 30 minutes downtime the gear was recovered. DC operations continued until 22:30 on 12 June 2017. During the final 24 hours, errant turns were evident on the winch barrel again. Due to remaining survey targets being in areas of shallower water, this could not be rectified a second time. The vessel began the transit back to Lowestoft at 22:30 on 12 June 2017 and docked at 11:10 on 15 June 2017.

The survey metadata are presented as a table in Appendix 2 and a summary of survey operation time is presented in Appendix 3.

4.1 Health and safety

An induction was carried out for staff that had not sailed on *RV Cefas Endeavour* within the preceding six months at 14:00 on 19 May 2017.

The first muster and safety drill was carried out at 13:00 on 20 May 2017. Both fast rescue boats were deployed and tested on 24 May 2017. Second muster and galley fire-fighting exercise took place at 11:30 on 28 May 2017, this was accompanied by a demonstration of fire-fighting equipment for science staff on the aft deck. An emergency steering drill was undertaken by the ship’s crew at 08:45 on 2 June 2017. A third muster and survival suit presentation took place at 10:30 on 10 June 2017.

5 Data acquired

Details of the vessel and the equipment used at each MCZ are outlined in Appendix 1.

5.1 North-West of Jones Bank MCZ

5.1.1 Summary

Gear type	No. of stations planned	No. of stations completed	No. of samples / transects planned	No. of samples / transects completed
Day grab	71	71	142	146
NIOZ corer	7	7	14	14
Camera sledge	71	71	71	71

5.1.2 Day Grab

Sediment samples were acquired for analysis of macrofauna, PSA and OCN from two replicates (one for macrofauna and PSA and one for chemistry) at all 71 stations, using a 0.1m^2 Day Grab. An additional two Day Grabs were acquired at two stations to contribute to a small-scale variability study.

5.1.3 Underwater Camera Sledge

Seabed imagery was also acquired from all 71 stations. Underwater visibility ranged from good to poor, depending on tow direction, tidal phase and associated current direction. Seabed imagery data were recorded at each station for the duration of time it took the sledge to travel 200m (~25 minutes).

5.1.4 NIOZ Corer

Samples were also acquired at a subset of seven stations using a 0.1m^2 NIOZ Corer. These samples were analysed for microplastics (3cm full depth metal sub-core), porosity, chlorophyll, PSA and OCN (10cm sub-core sliced at 1cm intervals to 10cm depth, then at 5cm intervals for the remaining core). A second replicate was then also processed for macrofauna, PSA and OCN, for comparison against Day Grab samples.

5.2 The Canyons MCZ

5.2.1 Summary

Gear type	No. of stations planned	No. of stations completed	No. of samples / transects planned	No. of samples / transects completed
NIOZ corer	40	37	44	41
Drop camera	155	152	155	153

5.2.2 Underwater Drop Camera

Seabed imagery was acquired from 153 transects at 152 stations. Underwater visibility ranged from good to poor, dependent on tow direction, tidal phase and associated current direction. Seabed imagery data were recorded at each station for the duration of time it took the Drop Camera to travel 200m. Some stations exhibited a change in substrata or community and were extended to capture these novel observations. The 13 repeated transects from previous surveys to the site were completed in their entirety.

5.2.3 NIOZ Corer

The 0.1m^2 NIOZ Corer was deployed at 37 stations to acquire samples for macrofauna, PSA, and OCN. A subset of four stations were targeted for biogeochemical sampling with the NIOZ Corer. These samples were analysed for microplastics (3cm full depth metal sub-core), porosity, chlorophyll, PSA and OCN (10cm diameter, full depth sub-core sliced at 1cm intervals to 10cm depth, then at 5cm intervals for the remaining core).

On occasions where a full sample was not recovered the residual sample was considered for further use as eDNA samples. Where this occurred, samples were sieved through a 1mm mesh and preserved in ethanol.

6 Preliminary results

6.1 North-West of Jones Bank MCZ

Grab samples were successfully collected and the camera sledge successfully deployed at 71 stations within North-West of Jones Bank MCZ (Figure 8). A further seven stations were successfully sampled with the NIOZ Corer.

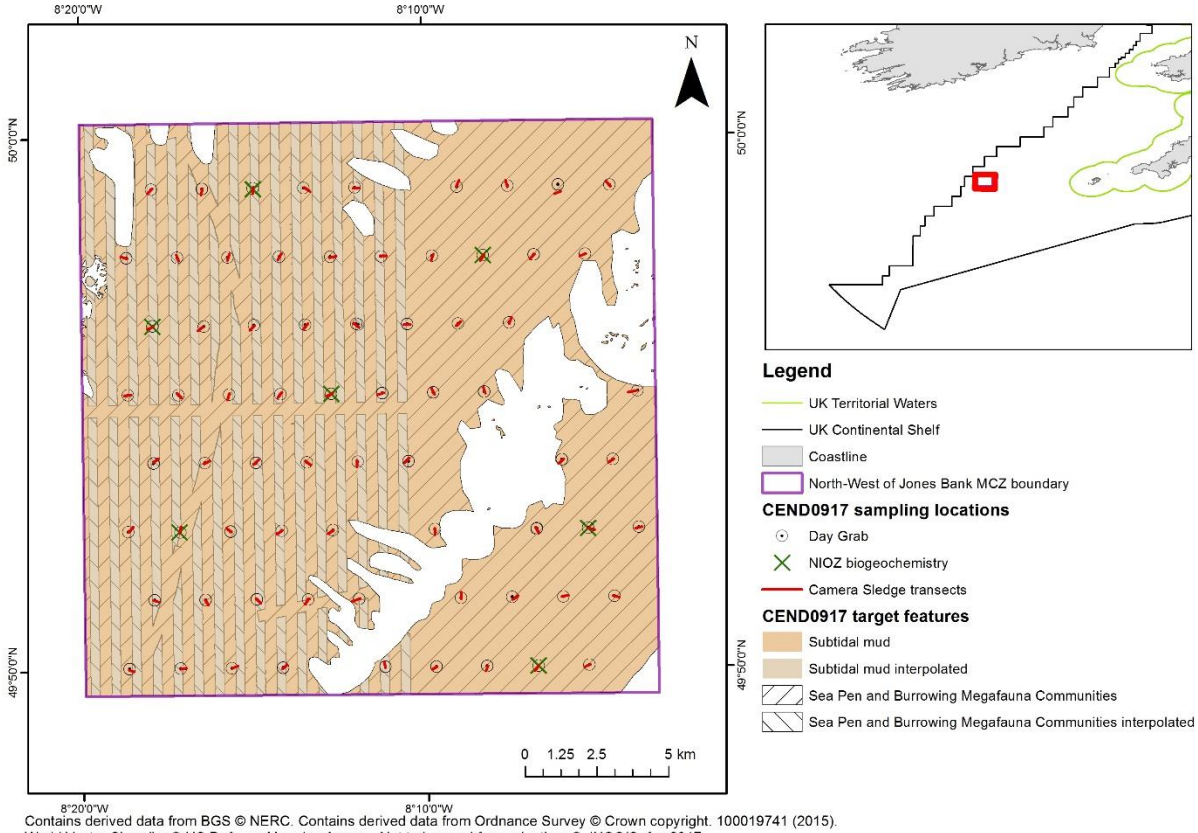

Figure 8. Location of stations successfully sampled at North-West of Jones Bank MCZ during the groundtruthing survey.

Fishing vessels were observed outside of the MCZ, and some possible trawl scars were observed during Camera Sledge operations.

6.2 The Canyons MCZ

The Drop Camera was successfully deployed at 152 stations. During the survey, it became apparent that eight stations in the north-west of the site were extremely close together, and it would be more efficient to run two extended tows that bisected each other than to repeatedly deploy over proximal stations, some of which were <200m apart. This would reduce time lost to deployment and still acquire data that would be representative of the original planned stations. Of the planned stations, only three of the revised Priority 3 stations were not sampled due to time constraints.

NIOZ corer samples were successfully collected at 37 stations within The Canyons MCZ (Figure 9).

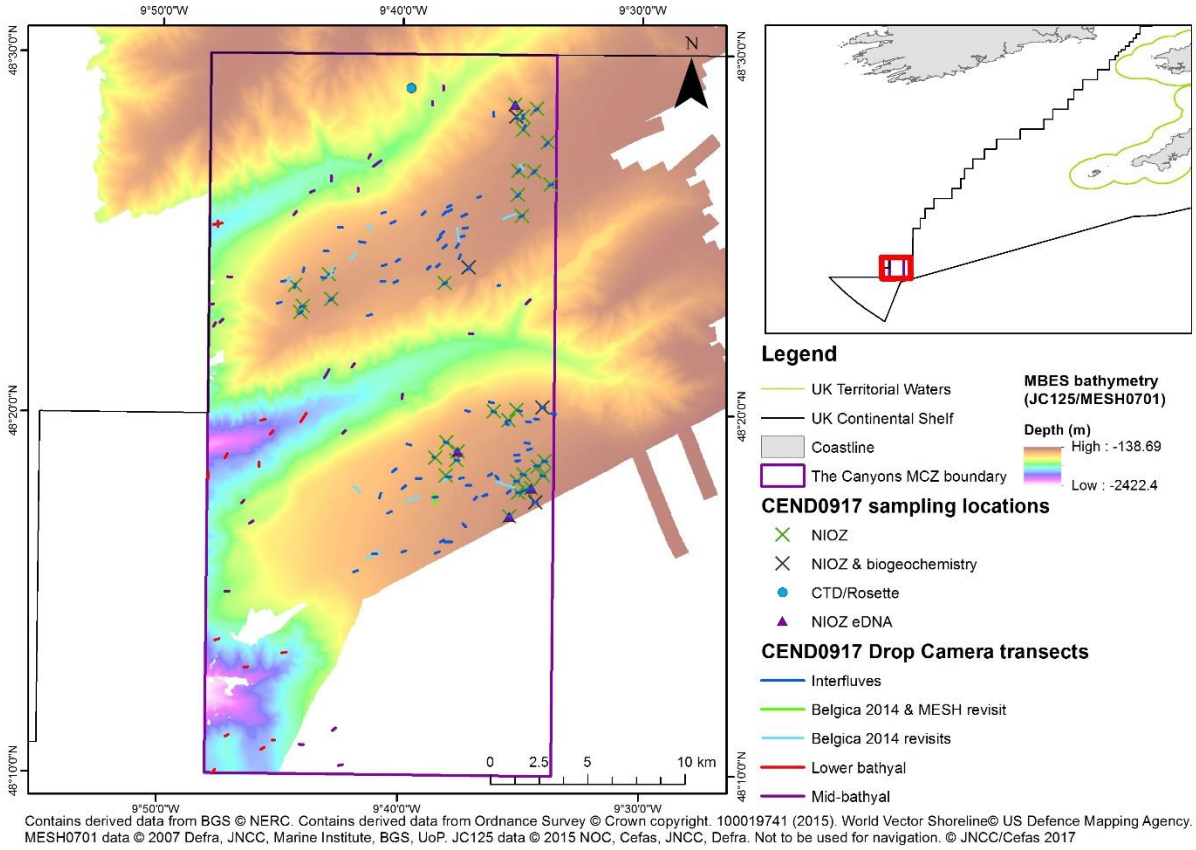

Figure 9. Location of stations successfully sampled at The Canyons MCZ during the groundtruthing survey.

Fishing vessels and litter were observed within the MCZ, in addition to some possible trawl scars and litter observed during drop frame operations. These were most evident on the forward-facing IP camera. Images from this camera were collected on an *ad hoc* basis during deployments when features or objects of interest were within view.

7 References

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Appendix 1 - Vessel information and equipment used

A1.1 *RV Cefas Endeavour*

Port of registry	Lowestoft
Length OA	73.00m (excluding stern roller)
Length extreme	73.916m
Breadth (MLD)	15.80m
Depth (MLD)	8.20m
Design draft	5.00m
Deep draught	5.50m
LBP	66.50m
Gross tonnage	2983 tonnes
Net register tonnage	894 tonnes
Net lightship	2436 tonnes
Deadweight @ 5.00 m	784 tonnes
Deadweight @ 5.50 m	1244 tonnes
Displacement @ 5.00 m	3210 tonnes
Displacement @ 5.50 m	3680 tonnes
Builder	Ferguson Shipbuilders Limited, Port Glasgow
Commissioned	2003
Communications	In port BT Tel. Cellphone Voice/Fax/Data Radio TELEX Inmarsat C Fleet 77 (Inmarsat F) and VSAT (eutelsat) internet access
Endurance	42 days
Complement	En suite accommodation for 16 crew and 19 scientists with dedicated hospital facility
Propulsion System	AC/DC Diesel Electric 3 x diesel electric AC generators, individually raft mounted 2 x tandem electric DC motors Single screw
Power generation	3240Kw
Power propulsion	2230Kw
Thrusters	Bow thruster (flush mounted azimuthing) Stern thruster (tunnel)
Trial speed	14.4 knots
Bollard pull	29 tonnes
Call sign	VQHF3
Official number	906938
MMSI	235005270
Lloyds/IMO number	9251107
Side Gantry	7.5 tonne articulated side A-frame

Stern Gantry	25 tonne stern A-frame
Winches	3 x cranes 35tM, heave compensated 2 x trawl winches 2 x drum winches, (1 double) Double barrel survey winch with motion compensation and slip rings Double barrel survey winch with slip rings Double barrel towing winch with slip rings Side-scan sonar winch with slip rings 3 x Gilson winches (one fitted to stern A-frame)
Transducers/Sea tube	Drop keel to deploy transducers outside the hull boundary layer in addition to hull mounted transducers 1.2m diameter sea tube/moon-pool
Acoustic equipment	Kongsberg Simrad: HiPAP 500 positioning sonar EK60, 38/120kHz scientific sounder EA 600, 50/200kHz scientific sounder Scanmar net mensuration system SH80 high frequency omni-directional sonar EM3002 swathe bathymetry sounder Hull mounted Scanmar fishing computer transducers
Boats	2 x 8m rigid work and rescue boats with suite of navigational equipment deployed on heave-compensated davits
Laboratories	8 networked laboratories designed for optimum flexibility of purpose 4 serviced deck locations for containerised laboratories
Special features	Dynamic positioning system Interring anti-roll system Local Area Network with scientific data management system Ship-wide general information system CCTV
Class	LRS 100A1+LMC UMS SCM CCS ICC IP ES(2) DP(CM) ICE class 2

A1.2 Survey equipment and sample processing

Physical samples were collected using a Day Grab and NIOZ Corer. Video and still imagery were acquired by Camera Sledge and Drop Camera. All gear types are described below.

A1.3 NIOZ Corer

The NIOZ Corer was deployed at North-West of Jones Bank MCZ to investigate macrofaunal, PSA and sub-surface biogeochemical properties, for comparison against samples in the wider region acquired from other national programmes. On recovery of the first sample, a photograph was taken of the undisturbed surface before the depth of sediment retained was measured and a sub-sample taken for PSA using a 5cm long, 2cm diameter core. The sample was stored in a labelled plastic bag, placed into a plastic container and frozen, ready for transfer to a laboratory at the end of the survey.

Benthic macrofauna were collected by washing the sample with sea-water over a 1mm sieve. The retained >1mm fraction was transferred to a labelled container and preserved in buffered 4% formaldehyde for later analysis. A visual assessment was made of the sediment type sampled by the Corer, and it was noted on the field records, assigning the sample to a Folk class and its equivalent EUNIS Level 3 and BSH sediment class.

The second sample was sub-sampled for biogeochemistry and microplastic analyses. The biogeochemistry sub-core was sliced at 1 cm intervals for the top 10cm, and then at 5cm intervals for the remaining sample. These slices were quartered for porosity/chlorophyll (¼)

and PSA/organic carbon and nitrogen (OCN) (¾) analyses. All sub-samples were stored in plastic bags and frozen for later analysis. The microplastics sub-core was taken using a metal corer, then bunged at either end and frozen for later analysis.

Figure 10. NIOZ corer (image © Cefas).

At North-West of Jones Bank MCZ a second deployment was made for macrofauna and PSA/OCN analyses to enable comparison against Day Grab samples, following the same on-deck protocols.

The NIOZ corer was the only gear type used to acquire physical samples at The Canyons MCZ. A subset of stations was selected to investigate wider environmental monitoring, as was undertaken at North-West of Jones Bank MCZ.

A single NIOZ Corer sample was collected at the remaining stations and processed as per the first sample outlined previously.

A selection failed samples were retained for environmental DNA (eDNA) analyses. For this, benthic macrofauna were collected by washing the sample with sea-water over a 1mm sieve. The retained >1mm fraction was transferred to a labelled container and preserved in ethanol for later analysis.

A1.4 Day Grab

A 0.1m^2 Day Grab (Figure 11) was deployed at North-West of Jones Bank MCZ. On recovery, a photograph was taken of the undisturbed surface before the depth of sediment retained was measured and a sub-sample was taken using a 5cm long, 2cm diameter core taken PSA. The sample was stored in a labelled plastic bag, placed into a plastic container and frozen ready for transfer to a laboratory on shore. Benthic macrofauna were collected by washing the sample with sea-water over a 1mm sieve. The retained >1mm fraction was transferred to a labelled container and preserved in buffered 4% formaldehyde for later analysis. A visual assessment was made of the sediment type sampled by the grab and noted on the field records, assigning the sample to a Folk class and its equivalent EUNIS Level 3 and BSH sediment class.

A second grab was taken for OCN and PSA. This grab was sub-sampled using two 5 x 2cm cores, with contents placed in a plastic bag before freezing.

Figure 11. Day grab (image © Cefas).

A1.5 Camera Sledge

The Camera Sledge (CS) was equipped with the following camera and specifications:

- Telemetry Operation over co axial cable
- 1080p high definition video camera
- 18 mega pixels underwater digital stills camera
- High power camera flash
- 20W high intensity led lights x 6
- Dual scaling subsea lasers x 2 (spaced at 250mm)
- 250khz precision altimeter
- Combined compass & depth
- Temperature sensor
- Ultra-short base length positioning beacon

Video observations were made at North-West of Jones Bank MCZ using the CS system (Figure 12). The CS was equipped with a high-definition video camera and a separate still image camera unit. Due to the use of coaxial cable the resolution of the data transferred to top side recording units was reduced to 720p. Illumination was provided by six high-intensity LED units distributed around the sledge frame to provide even light across the field of view. The camera was oriented to provide a forward oblique view of the seabed and was fitted with a two-spot (green) laser-scaling device with a distance of 25cm between the two points. Set-up and operation followed the MESH 'Recommended Operating Guidelines (ROG) for underwater video and photographic imaging techniques'[2]. All data were recorded to a computer hard drive before copying to a backup drive. A video overlay was used to provide station metadata, time, height above seabed and position (of the GPS antenna) in the recorded video image.

The CS system was towed at ~0.3 knots across the station bullring which had a radius of 100m. Still images were captured at one-minute intervals where visibility was not obscured. Additional images were captured if specific features of interest were encountered. The CS was controlled by a winch operator with sight of the video monitor.

[2] http://www.emodnet-seabedhabitats.eu/PDF/GMHM3_Video_ROG.pdf

Field notes were made during each camera deployment, noting station and sample metadata, real-time observations of substrate type and taxa, and an initial assessment of the range of BSHs that had been seen.

Figure 12. Camera Sledge video and still imaging system (image © Cefas).

A1.6 Drop Camera

The drop frame was equipped with the following camera and specifications:

- Telemetry Operation over fibre optic cable
- 1080p high definition video camera
- 720p forward facing video camera
- 18 mega pixels underwater digital stills camera
- High power camera flash
- 20W high intensity led lights x 6 (2 forward facing)
- Dual scaling subsea lasers x 2 (spaced at 250mm)
- 250khz precision altimeter
- Combined compass & depth
- Temperature sensor
- Ultra-short base length positioning beacon

Video observations were made at The Canyons MCZ using a Drop Camera (DC) system (Figure 13). The DC was equipped with a primary high-definition video camera and a separate still image camera unit. Illumination was provided by six high intensity LED units distributed around the sledge frame to provide even light across the field of view. The camera was oriented to provide a forward oblique view of the seabed and was fitted with a two-spot (green) laser-scaling device with a distance of 25cm between the two points. Set-up and operation followed the MESH 'Recommended Operating Guidelines (ROG) for underwater video and photographic imaging techniques'[3]. A second high-quality video camera (IP camera) was mounted to the front of the frame to provide an overview of the seafloor topography. High quality screen captures were taken where features, habitats or species of interest were identified. All data were recorded to a computer hard drive before copying to a backup drive. A video overlay was used to provide station metadata, time, height above seabed and position (of the GPS antenna) in the recorded video image.

[3] http://www.emodnet-seabedhabitats.eu/PDF/GMHM3_Video_ROG.pdf

The DC system was towed at ~0.3 knots across the station bullring which had a radius of 100m. Occasionally, transects were extended beyond the 200m length target if the observed environment was novel compared to previous observations. Still images were captured at one-minute intervals where visibility was not obscured. Additional images were captured if specific features of interest were encountered. The DC was controlled by a winch operator with sight of the video monitor.

The duration of repeat tows over previous surveys by the MESH programme and RV *Belgica* was determined by the length of the original tows.

Field notes were made during each camera deployment, noting station and sample metadata, real-time observations of substratum type and taxa, and an initial assessment of the range of BSHs that had been seen.

Figure 13. Drop frame camera video and still imaging system (image © Cefas).

A1.7 Camera clock synchronisations

The internal clock of the camera used on the drop frame was synchronised with GPS time. This clock creates a timestamp in the EXIF data stored in the digital image.

A1.8 Position logging software – Tower Navigation

Vessel offsets are defined from the attitude centre of the vessel – the Common Reference Point (CRP) used by the Tower CEMAP software to calculate offsets.

A1.9 GPS positions and corrections.

GPS fixes were recorded using the Tower Navigation system on *RV Cefas Endeavour*. The latitude and longitude position of the gantry from which the sampling equipment was deployed automatically compensated for the offset between the gantries and the GPS antenna.

Fixes for NIOZ Corer and Day Grab samples were referenced to the side gantry and taken at the instant the sampling gear contacted the seabed. The NIOZ Corer and Day Grab were always deployed from the side gantry and the position recorded is taken to be its true position on/above the seabed.

For the camera sledge, GPS positional fixes were taken, for both the stern gantry and the position derived from an Ultra Short Base Length (USBL) beacon attached to the sledge at

five-second intervals throughout the tow. This allowed the position of the camera system above the seabed to be cross-referenced with the time at which the still image was captured to accurately determine the position of each still image acquired during the drop camera transect. USBL positions were used by default. Where the USBL was not functioning accurately for more than 90 seconds of the video footage, the stern gantry position was used for the entire video sample.

For the Drop Camera, GPS positional fixes were taken, for both the side gantry and the position derived from an Ultra Short Base Length (USBL) beacon attached to the drop frame at five-second intervals throughout the tow. This allowed the position of the camera system above the seabed to be cross-referenced with the time at which the still image was captured to accurately determine the position of each still image acquired during the Drop Camera transect. USBL positions were used by default. Where the USBL was not functioning accurately for more than 90 seconds of the video footage, the side gantry position was used for the entire video sample.

Appendix 2 – Station metadata

A2.1 North-West of Jones Bank MCZ

Station metadata for the North-West of Jones Bank MCZ survey is provided below. All stations were sampled on survey CEND0917. Station Code is used to identify the location of the sampling station. Station Number is a sequential event number for the survey and thus changes each time a new gear is used or a new location is sampled. All times in GMT. All positions are provided in decimal degrees, Latitude / Longitude WGS84. Key: DG=Day Grab, CS= Camera Sledge, NIOZ = NIOZ Corer, SOL = Start of Line, EOL = End of Line.

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
22/05/2017	1	NWJB071	DG	130	A1	04:06:32	49.98406	-8.07571	
22/05/2017	1	NWJB071	DG	129	B1	04:17:57	49.98406	-8.07572	
22/05/2017	2	NWJB070	DG	131	A1	04:56:19	49.98435	-8.10063	
22/05/2017	2	NWJB070	DG	131	B1	05:08:00	49.98436	-8.10067	
22/05/2017	3	NWJB069	DG	132	A1	05:43:14	49.98416	-8.12520	
22/05/2017	3	NWJB069	DG	133	B1	05:52:51	49.98417	-8.12520	
22/05/2017	4	NWJB068	DG	133	A1	06:16:52	49.98398	-8.14986	
22/05/2017	4	NWJB068	DG	134	B1	06:24:29	49.98397	-8.14984	
22/05/2017	5	NWJB067	DG	132	A1	07:04:35	49.98414	-8.19947	
22/05/2017	5	NWJB067	DG	132	B1	07:14:03	49.98413	-8.19947	
22/05/2017	6	NWJB066	DG	136	A1	07:39:59	49.98412	-8.22430	
22/05/2017	6	NWJB066	DG	136	B1	07:49:02	49.98409	-8.22422	No Sample
22/05/2017	6	NWJB066	DG	135	B2	07:55:28	49.98416	-8.22427	
22/05/2017	7	NWJB065	DG	141	A1	08:25:22	49.98419	-8.24907	No Sample
22/05/2017	7	NWJB065	DG	139	A2	08:31:54	49.98415	-8.24897	No Sample
22/05/2017	7	NWJB065	DG	140	A3	08:43:24	49.98417	-8.24898	
22/05/2017	7	NWJB065	DG	140	B1	08:52:49	49.98417	-8.24899	
22/05/2017	8	NWJB064	DG	139	A1	09:18:54	49.98407	-8.27368	
22/05/2017	8	NWJB064	DG	138	B1	09:28:21	49.98408	-8.27364	
22/05/2017	9	NWJB063	DG	132	A1	10:06:37	49.98408	-8.29847	

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
22/05/2017	9	NWJB063	DG	133	B1	10:16:40	49.98407	-8.29845	
22/05/2017	10	NWJB053	DG	130	A1	11:57:30	49.96263	-8.31073	
22/05/2017	10	NWJB053	DG	129	B1	12:12:46	49.96267	-8.31070	
22/05/2017	11	NWJB054	DG	142	A1	13:04:05	49.96266	-8.28604	
22/05/2017	11	NWJB054	DG	143	B1	13:14:16	49.96269	-8.28606	
22/05/2017	12	NWJB055	DG	141	A1	13:46:49	49.96264	-8.26149	
22/05/2017	12	NWJB055	DG	143	B1	13:57:59	49.96265	-8.26150	
22/05/2017	13	NWJB056	DG	140	A1	14:27:27	49.96264	-8.23652	
22/05/2017	13	NWJB056	DG	140	B1	14:37:06	49.96265	-8.23651	
22/05/2017	14	NWJB057	DG	137	A1	15:08:41	49.96251	-8.21169	
22/05/2017	14	NWJB057	DG	137	B1	15:18:37	49.96252	-8.21170	
22/05/2017	15	NWJB058	DG	139	A1	15:47:35	49.96251	-8.18692	No Sample
22/05/2017	15	NWJB058	DG	138	A2	15:56:09	49.96250	-8.18695	
22/05/2017	15	NWJB058	DG	138	B1	16:33:34	49.96248	-8.18696	
22/05/2017	16	NWJB059	DG	137	A1	17:02:51	49.96249	-8.16223	
22/05/2017	16	NWJB059	DG	136	B1	17:12:13	49.96252	-8.16225	
22/05/2017	17	NWJB060	DG	134	A1	17:43:50	49.96252	-8.13760	
22/05/2017	17	NWJB060	DG	134	B1	17:54:26	49.96257	-8.13761	
22/05/2017	18	NWJB061	DG	131	A1	18:18:14	49.96250	-8.11283	
22/05/2017	18	NWJB061	DG	131	B1	18:27:39	49.96255	-8.11285	
22/05/2017	19	NWJB062	DG	127	A1	18:51:55	49.96260	-8.08798	
22/05/2017	19	NWJB062	DG	128	B1	19:02:04	49.96257	-8.08796	
22/05/2017	20	NWJB052	DG	133	A1	20:24:46	49.94130	-8.12517	
22/05/2017	20	NWJB052	DG	132	B1	20:36:21	49.94130	-8.12517	
22/05/2017	21	NWJB051	DG	134	A1	21:03:07	49.94116	-8.14995	
22/05/2017	21	NWJB051	DG	133	B1	21:14:27	49.94117	-8.14996	
22/05/2017	22	NWJB050	DG	136	A1	21:47:37	49.94131	-8.17468	

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
22/05/2017	22	NWJB050	DG	135	B1	21:56:51	49.94121	-8.17470	
22/05/2017	23	NWJB049	DG	139	A1	22:27:37	49.94141	-8.19930	
22/05/2017	23	NWJB049	DG	138	B1	22:48:58	49.94123	-8.19848	
22/05/2017	24	NWJB048	DG	141	A1	23:44:40	49.94134	-8.22425	
22/05/2017	24	NWJB048	DG	140	B1	23:54:12	49.94132	-8.22421	
23/05/2017	25	NWJB047	DG	141	A1	00:30:33	49.94135	-8.24901	
23/05/2017	25	NWJB047	DG	141	A2	00:37:05	49.94134	-8.24902	No Sample
23/05/2017	25	NWJB047	DG	142	B1	00:47:48	49.94134	-8.24898	No Sample
23/05/2017	25	NWJB047	DG	140	B2	00:54:27	49.94130	-8.24896	
23/05/2017	26	NWJB046	DG	144	A1	01:27:54	49.94108	-8.27338	
23/05/2017	26	NWJB046	DG	144	B1	01:37:27	49.94112	-8.27341	
23/05/2017	27	NWJB045	DG	141	A1	02:18:39	49.94128	-8.29830	
23/05/2017	27	NWJB045	DG	143	B1	02:27:16	49.94125	-8.29834	
23/05/2017	28	NWJB036	DG	144	A1	03:15:04	49.91979	-8.31061	
23/05/2017	28	NWJB036	DG	145	B1	03:24:30	49.91979	-8.31054	
23/05/2017	29	NWJB037	DG	144	A1	03:49:42	49.91966	-8.28597	
23/05/2017	29	NWJB037	DG	144	B1	03:58:14	49.91962	-8.28598	
23/05/2017	30	NWJB038	DG	142	A1	04:23:32	49.91967	-8.26134	
23/05/2017	30	NWJB038	DG	142	B1	04:33:09	49.91967	-8.26130	
23/05/2017	31	NWJB039	DG	141	A1	05:03:03	49.91959	-8.23657	
23/05/2017	31	NWJB039	DG	141	B1	05:12:12	49.91966	-8.23654	
23/05/2017	32	NWJB040	DG	138	A1	05:38:52	49.91960	-8.21179	
23/05/2017	32	NWJB040	DG	138	B1	05:48:21	49.91965	-8.21185	
23/05/2017	33	NWJB041	DG	136	A1	06:12:49	49.91965	-8.18711	
23/05/2017	33	NWJB041	DG	136	B1	06:22:30	49.91968	-8.18719	
23/05/2017	34	NWJB042	DG	133	A1	07:05:45	49.91972	-8.16241	
23/05/2017	34	NWJB042	DG	135	B1	07:14:46	49.91971	-8.16233	

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
23/05/2017	35	NWJB043	DG	131	A1	07:39:39	49.91976	-8.13765	
23/05/2017	35	NWJB043	DG	130	B1	07:49:25	49.91976	-8.13756	
23/05/2017	36	NWJB044	DG	128	A1	08:38:30	49.91967	-8.06325	No Sample
23/05/2017	36	NWJB044	DG	128	A2	08:44:55	49.91967	-8.06323	
23/05/2017	36	NWJB044	DG	128	B1	08:53:26	49.91969	-8.06328	
23/05/2017	37	NWJB035	DG	131	A1	09:21:03	49.89829	-8.07569	
23/05/2017	37	NWJB035	DG	131	B1	09:29:01	49.89826	-8.07570	
23/05/2017	38	NWJB034	DG	130	A1	09:53:15	49.89831	-8.10032	
23/05/2017	38	NWJB034	DG	127	B1	10:01:11	49.89829	-8.10041	
23/05/2017	39	NWJB033	DG	134	A1	10:43:42	49.89829	-8.17475	
23/05/2017	39	NWJB033	DG	134	B1	10:51:46	49.89828	-8.17478	
23/05/2017	40	NWJB032	DG	136	A1	11:15:20	49.89827	-8.19934	
23/05/2017	40	NWJB032	DG	136	B1	11:24:49	49.89826	-8.19934	
23/05/2017	41	NWJB031	DG	139	A1	11:54:37	49.89829	-8.22400	
23/05/2017	41	NWJB031	DG	140	B1	12:03:41	49.89829	-8.22399	
23/05/2017	42	NWJB030	DG	141	A1	12:31:03	49.89825	-8.24868	
23/05/2017	42	NWJB030	DG	142	B1	12:39:39	49.89824	-8.24870	
23/05/2017	43	NWJB029	DG	143	A1	13:03:14	49.89835	-8.27356	
23/05/2017	43	NWJB029	DG	144	B1	13:13:05	49.89838	-8.27359	
23/05/2017	44	NWJB028	DG	147	A1	13:40:58	49.89840	-8.29837	
23/05/2017	44	NWJB028	DG	145	B1	13:50:22	49.89829	-8.29845	
23/05/2017	45	NWJB019	DG	146	A1	14:29:26	49.87696	-8.31091	
23/05/2017	45	NWJB019	DG	146	B1	14:38:00	49.87697	-8.31089	
23/05/2017	46	NWJB020	DG	143	A1	15:03:37	49.87670	-8.28561	
23/05/2017	46	NWJB020	DG	142	B1	15:13:36	49.87672	-8.28562	
23/05/2017	47	NWJB021	DG	142	A1	15:37:59	49.87679	-8.26129	
23/05/2017	47	NWJB021	DG	142	B1	15:47:12	49.87682	-8.26128	

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
23/05/2017	48	NWJB022	DG	140	A1	16:32:47	49.87691	-8.23656	
23/05/2017	48	NWJB022	DG	139	B1	16:40:24	49.87692	-8.23657	
23/05/2017	49	NWJB023	DG	138	A1	17:08:06	49.87693	-8.21173	
23/05/2017	49	NWJB023	DG	136	B1	17:17:11	49.87693	-8.21175	
23/05/2017	50	NWJB024	DG	132	A1	17:52:44	49.87692	-8.16224	
23/05/2017	50	NWJB024	DG	133	B1	18:01:17	49.87692	-8.16224	
23/05/2017	51	NWJB025	DG	137	A1	18:36:18	49.87686	-8.11288	
23/05/2017	51	NWJB025	DG	136	B1	18:45:26	49.87685	-8.11287	
23/05/2017	52	NWJB026	DG	135	A1	19:15:52	49.87685	-8.08805	
23/05/2017	52	NWJB026	DG	135	B1	19:24:23	49.87683	-8.08807	
23/05/2017	53	NWJB027	DG	134	A1	19:55:32	49.87691	-8.06332	
23/05/2017	53	NWJB027	DG	135	B1	20:04:03	49.87690	-8.06332	
23/05/2017	54	NWJB018	DG	135	A1	20:34:42	49.85540	-8.07568	
23/05/2017	54	NWJB018	DG	135	B1	20:43:39	49.85538	-8.07567	
23/05/2017	55	NWJB017	DG	136	A1	21:09:10	49.85538	-8.10046	
23/05/2017	55	NWJB017	DG	136	B1	21:18:29	49.85538	-8.10044	
23/05/2017	56	NWJB015	DG	138	A1	22:10:56	49.85537	-8.14994	
23/05/2017	56	NWJB015	DG	137	B1	22:20:46	49.85537	-8.14995	
23/05/2017	57	NWJB016	DG	136	A1	22:47:14	49.85542	-8.12521	
23/05/2017	57	NWJB016	DG	136	B1	22:56:22	49.85543	-8.12522	
23/05/2017	58	NWJB014	DG	137	A1	23:42:14	49.85536	-8.19931	
23/05/2017	58	NWJB014	DG	137	B1	23:50:22	49.85533	-8.19939	
24/05/2017	59	NWJB013	DG	139	A1	00:14:00	49.85532	-8.22404	
24/05/2017	59	NWJB013	DG	139	A1	00:22:34	49.85535	-8.22409	
24/05/2017	60	NWJB012	DG	140	A1	00:46:21	49.85553	-8.24896	
24/05/2017	60	NWJB012	DG	140	B1	00:54:54	49.85549	-8.24895	
24/05/2017	61	NWJB011	DG	142	A1	01:18:22	49.85554	-8.27377	

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
24/05/2017	61	NWJB011	DG	142	B1	01:27:15	49.85552	-8.27370	
24/05/2017	62	NWJB010	DG	144	A1	01:54:57	49.85555	-8.29843	
24/05/2017	62	NWJB010	DG	143	B1	02:03:24	49.85550	-8.29843	
24/05/2017	63	NWJB001	DG	145	A1	02:35:43	49.83411	-8.31094	
24/05/2017	63	NWJB001	DG	144	B1	02:43:41	49.83407	-8.31093	
24/05/2017	64	NWJB002	DG	142	A1	03:24:33	49.83410	-8.28609	
24/05/2017	64	NWJB002	DG	143	B1	03:33:01	49.83405	-8.28608	
24/05/2017	65	NWJB003	DG	142	A1	03:57:05	49.83405	-8.26135	
24/05/2017	65	NWJB003	DG	142	A1	04:04:56	49.83401	-8.26134	
24/05/2017	66	NWJB004	DG	139	A1	04:33:10	49.83406	-8.23654	
24/05/2017	66	NWJB004	DG	139	B1	04:42:43	49.83397	-8.23652	
24/05/2017	67	NWJB005	DG	140	A1	05:17:38	49.83404	-8.18695	
24/05/2017	67	NWJB005	DG	139	B1	05:25:13	49.83400	-8.18699	
24/05/2017	68	NWJB006	DG	139	A1	05:49:57	49.83392	-8.16224	
24/05/2017	68	NWJB006	DG	139	B1	05:58:30	49.83395	-8.16229	
24/05/2017	69	NWJB007	DG	138	A1	06:25:29	49.83390	-8.13770	
24/05/2017	69	NWJB007	DG	138	B1	06:32:40	49.83392	-8.13764	
24/05/2017	70	NWJB008	DG	137	A1	07:05:25	49.83386	-8.11278	
24/05/2017	70	NWJB008	DG	138	B1	07:13:40	49.83391	-8.11274	
24/05/2017	71	NWJB009	DG	137	A1	07:57:00	49.83401	-8.08814	
24/05/2017	71	NWJB009	DG	136	B1	08:05:28	49.83396	-8.08816	
24/05/2017	72	NWJB008	NIOZ	136	A1	09:05:32	49.83398	-8.11286	No Sample
24/05/2017	72	NWJB008	NIOZ	136	A2	09:21:20	49.83394	-8.11280	
24/05/2017	72	NWJB008	NIOZ	137	B1	09:36:16	49.83394	-8.11290	
24/05/2017	73	NWJB009	CS	138	A1	11:32:05	49.83405	-8.08775	SOL
24/05/2017	73	NWJB009	CS	138	A1	11:56:10	49.83342	-8.09069	EOL
24/05/2017	74	NWJB008	CS	139	A1	12:48:51	49.83398	-8.11283	SOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
24/05/2017	74	NWJB008	CS	139	A1	13:12:26	49.83236	-8.11458	EOL
24/05/2017	75	NWJB007	CS	141	A1	14:44:25	49.83404	-8.13743	SOL
24/05/2017	75	NWJB007	CS	141	A1	15:05:21	49.83241	-8.13836	EOL
24/05/2017	76	NWJB006	CS	140	A1	17:06:57	49.83405	-8.16202	SOL
24/05/2017	76	NWJB006	CS	140	A1	17:23:48	49.83305	-8.16441	EOL
24/05/2017	77	NWJB005	CS	139	A1	17:54:10	49.83378	-8.18708	SOL
24/05/2017	77	NWJB005	CS	138	A1	18:17:11	49.83567	-8.18759	EOL
24/05/2017	78	NWJB004	CS	136	A1	19:02:27	49.83382	-8.23689	SOL
24/05/2017	78	NWJB004	CS	137	A1	19:25:33	49.83509	-8.23466	EOL
24/05/2017	79	NWJB003	CS	139	A1	20:13:50	49.83415	-8.26124	SOL
24/05/2017	79	NWJB003	CS	138	A1	20:36:47	49.83475	-8.25843	EOL
24/05/2017	80	NWJB002	CS	139	A1	21:31:09	49.83395	-8.28633	SOL
24/05/2017	80	NWJB002	CS	139	A1	21:53:30	49.83429	-8.28350	EOL
24/05/2017	81	NWJB001	CS	140	A1	22:42:43	49.83385	-8.31124	SOL
24/05/2017	81	NWJB001	CS	140	A1	23:03:22	49.83320	-8.30880	EOL
24/05/2017	82	NWJB010	CS	141	A1	23:51:22	49.85554	-8.29916	SOL
25/05/2017	82	NWJB010	CS	141	A1	00:11:28	49.85504	-8.29667	EOL
25/05/2017	83	NWJB011	CS	141	A1	00:45:51	49.85565	-8.27424	SOL
25/05/2017	83	NWJB011	CS	140	A1	01:10:58	49.85389	-8.27246	EOL
25/05/2017	84	NWJB012	CS	140	A1	01:48:52	49.85591	-8.24945	SOL
25/05/2017	84	NWJB012	CS	141	A1	02:13:53	49.85443	-8.24717	EOL
25/05/2017	85	NWJB013	CS	140	A1	03:04:40	49.85550	-8.22393	SOL
25/05/2017	85	NWJB013	CS	140	A2	04:12:57	49.85395	-8.22581	EOL
25/05/2017	86	NWJB014	CS	138	A1	04:48:05	49.85554	-8.19886	SOL
25/05/2017	86	NWJB014	CS	133	A1	05:13:00	49.85465	-8.20287	EOL
25/05/2017	87	NWJB015	CS	139	A1	05:54:39	49.85514	-8.14999	SOL
25/05/2017	87	NWJB015	CS	139	A1	06:18:57	49.85717	-8.14998	EOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
25/05/2017	88	NWJB016	CS	136	A1	07:08:32	49.85472	-8.12505	SOL
25/05/2017	88	NWJB016	CS	136	A1	07:32:57	49.85588	-8.12244	EOL
25/05/2017	89	NWJB017	CS	136	A1	08:04:49	49.85550	-8.10130	SOL
25/05/2017	89	NWJB017	CS	139	A1	08:28:59	49.85584	-8.09811	EOL
25/05/2017	90	NWJB018	CS	135	A1	08:56:12	49.85552	-8.07649	SOL
25/05/2017	90	NWJB018	CS	135	A1	09:21:09	49.85507	-8.07351	EOL
25/05/2017	91	NWJB027	CS	134	A1	09:59:42	49.87653	-8.06522	SOL
25/05/2017	91	NWJB027	CS	134	A1	10:24:46	49.87707	-8.06209	EOL
25/05/2017	92	NWJB026	CS	135	A1	11:04:52	49.87680	-8.08821	SOL
25/05/2017	92	NWJB026	CS	134	A1	11:29:54	49.87631	-8.08504	EOL
25/05/2017	93	NWJB025	CS	136	A1	13:16:52	49.87725	-8.11366	SOL
25/05/2017	93	NWJB025	CS	137	A1	13:41:47	49.87548	-8.11195	EOL
25/05/2017	94	NWJB024	CS	130	A1	14:42:19	49.87729	-8.16244	SOL
25/05/2017	94	NWJB024	CS	129	A1	15:07:20	49.87519	-8.16254	EOL
25/05/2017	95	NWJB023	CS	136	A1	15:54:01	49.87696	-8.21154	SOL
25/05/2017	95	NWJB023	CS	136	A1	16:19:01	49.87588	-8.21423	EOL
25/05/2017	96	NWJB022	CS	137	A1	16:49:42	49.87709	-8.23640	SOL
25/05/2017	96	NWJB022	CS	137	A1	17:14:42	49.87590	-8.23899	EOL
25/05/2017	97	NWJB021	CS	138	A1	17:46:18	49.87671	-8.26098	SOL
25/05/2017	97	NWJB021	CS	138	A1	18:11:08	49.87799	-8.26358	EOL
25/05/2017	98	NWJB020	CS	138	A1	18:44:23	49.87656	-8.28625	SOL
25/05/2017	98	NWJB020	CS	135	A1	19:08:57	49.87854	-8.28544	EOL
25/05/2017	99	NWJB019	CS	140	A1	19:46:34	49.87698	-8.31088	SOL
25/05/2017	99	NWJB019	CS	139	A1	20:11:35	49.87851	-8.30869	EOL
25/05/2017	100	NWJB028	CS	138	A1	21:03:52	49.89868	-8.29865	SOL
25/05/2017	100	NWJB028	CS	137	A1	21:28:08	49.89984	-8.29609	EOL
25/05/2017	101	NWJB029	CS	136	A1	22:06:57	49.89818	-8.27407	SOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
25/05/2017	101	NWJB029	CS	136	A1	22:32:04	49.89911	-8.27117	EOL
25/05/2017	102	NWJB030	CS	134	A1	23:21:21	49.89777	-8.25001	SOL
25/05/2017	102	NWJB030	CS	135	A1	23:46:35	49.89924	-8.24748	EOL
26/05/2017	103	NWJB031	CS	133	A1	00:21:13	49.89877	-8.22492	SOL
26/05/2017	103	NWJB031	CS	133	A1	00:46:13	49.89753	-8.22232	EOL
26/05/2017	104	NWJB032	CS	132	A1	01:22:35	49.89883	-8.19985	SOL
26/05/2017	104	NWJB032	CS	132	A1	01:47:45	49.89674	-8.19992	EOL
26/05/2017	105	NWJB033	CS	132	A1	02:33:50	49.89928	-8.17459	SOL
26/05/2017	105	NWJB033	CS	134	A1	02:58:56	49.89781	-8.17694	EOL
26/05/2017	106	NWJB034	CS	128	A1	03:51:41	49.89858	-8.09957	SOL
26/05/2017	106	NWJB034	CS	126	A1	04:16:51	49.89713	-8.10191	EOL
26/05/2017	107	NWJB035	CS	132	A1	04:48:54	49.89835	-8.07522	SOL
26/05/2017	107	NWJB035	CS	131	A1	05:13:49	49.89734	-8.07806	EOL
26/05/2017	108	NWJB044	CS	127	A1	05:57:05	49.91968	-8.06366	SOL
26/05/2017	108	NWJB044	CS	126	A1	06:22:20	49.91913	-8.06786	EOL
26/05/2017	109	NWJB040	NIOZ	134	A1	08:00:36	49.91973	-8.21183	
26/05/2017	109	NWJB040	NIOZ	135	B1	08:13:49	49.91974	-8.21184	No Sample
26/05/2017	109	NWJB040	NIOZ	133	B2	08:26:49	49.91974	-8.21182	
26/05/2017	110	NWJB020	NIOZ	136	A1	09:56:50	49.87683	-8.28611	No Sample
26/05/2017	110	NWJB020	NIOZ	136	A2	10:14:51	49.87684	-8.28610	
26/05/2017	110	NWJB020	NIOZ	135	B1	10:29:59	49.87684	-8.28611	
26/05/2017	111	NWJB036	CS	137	A1	12:00:20	49.91971	-8.31238	SOL
26/05/2017	111	NWJB036	CS	137	A1	12:25:57	49.91989	-8.30908	EOL
26/05/2017	112	NWJB037	CS	138	A1	13:04:12	49.92042	-8.28697	SOL
26/05/2017	112	NWJB037	CS	139	A1	13:29:02	49.91891	-8.28472	EOL
26/05/2017	113	NWJB038	CS	139	A1	14:15:54	49.92013	-8.26143	SOL
26/05/2017	113	NWJB038	CS	138	A1	14:41:00	49.91812	-8.26231	EOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
26/05/2017	114	NWJB039	CS	138	A1	15:19:20	49.92034	-8.23590	SOL
26/05/2017	114	NWJB039	CS	140	A1	15:44:10	49.91868	-8.23781	EOL
26/05/2017	115	NWJB040	CS	137	A1	16:40:46	49.91984	-8.21137	SOL
26/05/2017	115	NWJB040	CS	137	A1	17:05:38	49.91900	-8.21433	EOL
26/05/2017	116	NWJB041	CS	134	A1	17:51:03	49.91982	-8.18652	SOL
26/05/2017	116	NWJB041	CS	135	A1	18:16:08	49.91917	-8.18961	EOL
26/05/2017	117	NWJB042	CS	132	A1	18:51:29	49.91922	-8.16188	SOL
26/05/2017	117	NWJB042	CS	131	A1	19:16:12	49.92104	-8.16337	EOL
26/05/2017	118	NWJB043	CS	128	A1	20:12:54	49.91934	-8.13726	SOL
26/05/2017	118	NWJB043	CS	128	A1	20:37:02	49.92125	-8.13821	EOL
26/05/2017	119	NWJB052	CS	128	A1	21:41:04	49.94099	-8.12539	SOL
26/05/2017	119	NWJB052	CS	128	A1	22:06:13	49.94294	-8.12420	EOL
26/05/2017	120	NWJB051	CS	128	A1	22:59:44	49.94052	-8.15099	SOL
26/05/2017	120	NWJB051	CS	128	A1	23:24:38	49.94190	-8.14859	EOL
27/05/2017	121	NWJB050	CS	130	A1	00:10:57	49.94102	-8.17658	SOL
27/05/2017	121	NWJB050	CS	130	A1	00:36:04	49.94113	-8.17333	EOL
27/05/2017	122	NWJB049	CS	134	A1	01:15:57	49.94182	-8.20083	SOL
27/05/2017	122	NWJB049	CS	134	A1	01:40:57	49.94049	-8.19836	EOL
27/05/2017	123	NWJB048	CS	135	A1	02:20:35	49.94168	-8.22297	SOL
27/05/2017	123	NWJB048	CS	135	A1	02:45:01	49.94016	-8.22507	EOL
27/05/2017	124	NWJB047	CS	137	A1	03:40:04	49.94120	-8.24879	SOL
27/05/2017	124	NWJB047	CS	138	A1	04:05:00	49.93989	-8.25128	EOL
27/05/2017	125	NWJB046	CS	141	A1	04:43:03	49.94111	-8.27382	SOL
27/05/2017	125	NWJB046	CS	141	A1	05:07:57	49.93982	-8.27634	EOL
27/05/2017	126	NWJB045	CS	140	A1	05:39:31	49.94127	-8.29808	SOL
27/05/2017	126	NWJB045	CS	141	A1	06:04:31	49.94035	-8.30098	EOL
27/05/2017	127	NWJB053	CS	126	A1	07:05:34	49.96255	-8.31046	SOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
27/05/2017	127	NWJB053	CS	125	A1	07:30:29	49.96316	-8.31354	EOL
27/05/2017	128	NWJB054	CS	136	A1	08:13:31	49.96165	-8.28548	SOL
27/05/2017	128	NWJB054	CS	136	A1	08:38:30	49.96363	-8.28653	EOL
27/05/2017	129	NWJB055	CS	136	A1	09:22:43	49.96182	-8.26179	SOL
27/05/2017	129	NWJB055	CS	136	A1	09:47:41	49.96377	-8.26074	EOL
27/05/2017	130	NWJB056	CS	132	A1	10:32:27	49.96187	-8.23718	SOL
27/05/2017	130	NWJB056	CS	133	A1	10:57:33	49.96370	-8.23557	EOL
27/05/2017	131	NWJB057	CS	129	A1	11:42:40	49.96230	-8.21216	SOL
27/05/2017	131	NWJB057	CS	128	A1	12:07:12	49.96272	-8.20906	EOL
27/05/2017	132	NWJB058	CS	132	A1	12:44:17	49.96269	-8.18765	SOL
27/05/2017	132	NWJB058	CS	133	A1	13:09:01	49.96264	-8.18445	EOL
27/05/2017	133	NWJB059	CS	132	A1	13:58:32	49.96302	-8.16177	SOL
27/05/2017	133	NWJB059	CS	131	A1	14:23:27	49.96107	-8.16285	EOL
27/05/2017	134	NWJB060	CS	130	A1	15:06:02	49.96269	-8.13706	SOL
27/05/2017	134	NWJB060	CS	131	A1	15:31:01	49.96094	-8.13892	EOL
27/05/2017	135	NWJB061	CS	131	A1	16:47:02	49.96279	-8.11257	SOL
27/05/2017	135	NWJB061	CS	132	A1	17:12:00	49.96131	-8.11485	EOL
27/05/2017	136	NWJB062	CS	127	A1	17:53:13	49.96266	-8.08773	SOL
27/05/2017	136	NWJB062	CS	127	A1	18:18:07	49.96192	-8.09052	EOL
27/05/2017	137	NWJB071	CS	126	A1	18:57:24	49.98369	-8.07525	SOL
27/05/2017	137	NWJB071	CS	127	A1	19:22:18	49.98524	-8.07738	EOL
27/05/2017	138	NWJB070B	CS	127	A1	20:09:57	49.98226	-8.09960	SOL
27/05/2017	138	NWJB070B	CS	127	A1	20:35:07	49.98148	-8.10261	EOL
27/05/2017	139	NWJB069	CS	129	A1	21:25:31	49.98388	-8.12531	SOL
27/05/2017	139	NWJB069	CS	128	A1	21:50:01	49.98586	-8.12614	EOL
27/05/2017	140	NWJB068	CS	129	A1	22:46:33	49.98414	-8.15017	SOL
27/05/2017	140	NWJB068	CS	127	A1	23:11:31	49.98605	-8.14893	EOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
27/05/2017	141	NWJB067	CS	126	A1	23:56:57	49.98395	-8.20038	SOL
28/05/2017	141	NWJB067	CS	126	A1	00:21:53	49.98393	-8.19715	EOL
28/05/2017	142	NWJB066	CS	130	A1	01:33:04	49.98437	-8.22400	SOL
28/05/2017	142	NWJB066	CS	130	A1	01:58:02	49.98312	-8.22142	EOL
28/05/2017	143	NWJB065	CS	136	A1	02:40:02	49.98462	-8.24889	SOL
28/05/2017	143	NWJB065	CS	136	A1	03:04:58	49.98254	-8.24919	EOL
28/05/2017	144	NWJB064	CS	136	A1	03:50:01	49.98433	-8.27360	SOL
28/05/2017	144	NWJB064	CS	137	A1	04:15:11	49.98228	-8.27430	EOL
28/05/2017	145	NWJB063	CS	132	A1	04:49:49	49.98437	-8.29796	SOL
28/05/2017	145	NWJB063	CS	131	A1	05:14:54	49.98289	-8.30029	EOL
28/05/2017	146	NWJB065	NIOZ	139	A1	05:51:56	49.98395	-8.24894	No Sample
28/05/2017	146	NWJB065	NIOZ	139	A2	06:07:49	49.98399	-8.24895	
28/05/2017	146	NWJB065	NIOZ	139	B1	06:19:35	49.98398	-8.24896	
28/05/2017	147	NWJB045	NIOZ	139	A1	07:08:48	49.94121	-8.29846	
28/05/2017	147	NWJB045	NIOZ	139	B1	07:21:16	49.94121	-8.29846	
28/05/2017	148	NWJB060	NIOZ	131	A1	08:45:36	49.96259	-8.13757	
28/05/2017	148	NWJB060	NIOZ	131	B1	08:57:21	49.96259	-8.13756	
28/05/2017	149	NWJB026	NIOZ	132	A1	10:13:07	49.87683	-8.08807	
28/05/2017	149	NWJB026	NIOZ	133	B1	10:30:34	49.87683	-8.08806	
28/05/2017	150	NWJB026	DG	132	C1	10:43:51	49.87685	-8.08797	
28/05/2017	150	NWJB026	DG	131	D1	10:52:13	49.87680	-8.08795	
28/05/2017	151	NWJB025	DG	131	C1	11:19:19	49.87670	-8.11294	
28/05/2017	151	NWJB025	DG	131	D1	11:29:06	49.87668	-8.11295	

A2.2 The Canyons MCZ

Station metadata for The Canyons MCZ survey is provided below. All stations were sampled on survey CEND0917. Station Code is used to identify the location of the sampling station. Station Number is a sequential event number for the survey and thus changes each time a new gear is used or a new location is sampled. All times in GMT. All positions are provided in decimal degrees, Latitude / Longitude WGS84. Key: DG=Day Grab, DC= Drop Camera, CTD = CTD Rosette, NIOZ = NIOZ Corer, SOL = Start of Line, EOL = End of Line, eDNA = environmental DNA, OCN = organic carbon and nitrogen.

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
28/05/2017	152	CNYN015	DC	365	A1	22:02:10	48.47736	-9.58800	SOL
28/05/2017	152	CNYN015	DC	362	A1	22:21:16	48.47580	-9.58853	EOL
28/05/2017	153	CNYN015	NIOZ	363	A1	23:12:08	48.47696	-9.58816	No Sample
28/05/2017	153	CNYN015	NIOZ	364	A2	23:26:21	48.47696	-9.58813	No Sample, retained for eDNA
29/05/2017	153	CNYN015	NIOZ	362	A3	00:00:31	48.47692	-9.58818	Macrofauna/PSA/OCN
29/05/2017	154	CNYN011	NIOZ	327	A1	00:40:27	48.47134	-9.58742	Porosity/chlorophyll/PSA/OCN
29/05/2017	154	CNYN011	NIOZ	328	B1	01:01:09	48.47137	-9.58736	Macrofauna/PSA/OCN
29/05/2017	155	CNYN011	DC	333	A1	01:37:10	48.47222	-9.58765	SOL
29/05/2017	155	CNYN011	DC	317	A1	02:02:04	48.47019	-9.58702	EOL
29/05/2017	156	CNYN012	DC	310	A1	02:34:50	48.47232	-9.58265	SOL
29/05/2017	156	CNYN012	DC	293	A1	03:00:09	48.47022	-9.58312	EOL
29/05/2017	157	CNYN012	NIOZ	307	A1	03:48:18	48.47151	-9.58274	Macrofauna/PSA/OCN
29/05/2017	158	CNYN007	NIOZ	299	A1	04:19:11	48.47507	-9.57345	No Sample
29/05/2017	158	CNYN007	NIOZ	299	A2	04:39:00	48.47510	-9.57300	Macrofauna/PSA/OCN
29/05/2017	159	CNYN007	DC	300	A1	05:11:41	48.47548	-9.57245	SOL
29/05/2017	159	CNYN007	DC	297	A1	05:36:00	48.47429	-9.57494	EOL
29/05/2017	160	CNYN008	DC	269	A1	06:59:16	48.46739	-9.58143	SOL
29/05/2017	160	CNYN008	DC	262	A1	07:24:17	48.46542	-9.58251	EOL
29/05/2017	161	CNYN008	NIOZ	260	A1	07:46:56	48.46533	-9.58256	Macrofauna/PSA/OCN
29/05/2017	162	CNYN006	NIOZ	220	A1	08:23:08	48.45957	-9.56532	Macrofauna/PSA/OCN

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
29/05/2017	163	CNYN006	DC	220	A1	08:43:25	48.45955	-9.56534	SOL
29/05/2017	163	CNYN006	DC	221	A1	09:08:05	48.45807	-9.56749	EOL
29/05/2017	164	CNYN009	DC	210	A1	09:52:03	48.44041	-9.56174	SOL
29/05/2017	164	CNYN009	DC	212	A1	10:17:04	48.43969	-9.56467	EOL
29/05/2017	165	CNYN009	NIOZ	211	A1	10:38:24	48.44007	-9.56324	Macrofauna/PSA/OCN
29/05/2017	166	CNYN002	NIOZ	223	A1	11:16:29	48.44607	-9.57467	No Sample
29/05/2017	166	CNYN002	NIOZ	223	A2	11:42:25	48.44608	-9.57467	Macrofauna/PSA/OCN
29/05/2017	167	CNYN002	DC	222	A1	12:11:04	48.44659	-9.57380	SOL
29/05/2017	167	CNYN002	DC	224	A1	12:36:06	48.44520	-9.57612	EOL
29/05/2017	168	CNYN003	NIOZ	234	A1	13:04:00	48.44630	-9.58556	No Sample
29/05/2017	168	CNYN003	NIOZ	234	A2	13:21:23	48.44631	-9.58555	Macrofauna/PSA/OCN
29/05/2017	169	CNYN003	DC	233	A1	13:49:11	48.44695	-9.58462	SOL
29/05/2017	169	CNYN003	DC	235	A1	14:14:07	48.44549	-9.58686	EOL
29/05/2017	170	CNYN104	DC	234	A1	14:53:24	48.44958	-9.58524	SOL
29/05/2017	170	CNYN104	DC	233	A1	15:36:32	48.44690	-9.58213	EOL
29/05/2017	171	CNYN004	DC	230	A1	16:40:59	48.43571	-9.58487	SOL
29/05/2017	171	CNYN004	DC	232	A1	17:05:58	48.43436	-9.58727	EOL
29/05/2017	172	CNYN004	NIOZ	231	A1	17:23:51	48.43512	-9.58592	No Sample
29/05/2017	172	CNYN004	NIOZ	232	A2	17:36:53	48.43512	-9.58592	Macrofauna/PSA/OCN
29/05/2017	173	CNYN005	NIOZ	229	A1	18:11:21	48.42551	-9.58310	No Sample
29/05/2017	173	CNYN005	NIOZ	228	A2	18:23:36	48.42550	-9.58311	Macrofauna/PSA/OCN
29/05/2017	174	CNYN005	DC	229	A1	18:51:19	48.42579	-9.58217	SOL
29/05/2017	174	CNYN005	DC	230	A1	19:16:19	48.42495	-9.58503	EOL
29/05/2017	175	CNYN105	DC	231	A1	19:53:21	48.42664	-9.58676	SOL
29/05/2017	175	CNYN105	DC	238	A1	21:18:06	48.42394	-9.59660	EOL
29/05/2017	176	CNYN045	DC	263	A1	22:08:40	48.43446	-9.61171	SOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
29/05/2017	176	CNYN045	DC	266	A1	22:30:13	48.43385	-9.61425	EOL
29/05/2017	177	CNYN046	DC	273	A1	23:06:05	48.42620	-9.62160	SOL
29/05/2017	177	CNYN046	DC	282	A1	23:34:59	48.42516	-9.62487	EOL
30/05/2017	178	CNYN049	DC	268	A1	00:11:23	48.41981	-9.62087	SOL
30/05/2017	178	CNYN049	DC	273	A1	00:36:16	48.41957	-9.62397	EOL
30/05/2017	179	CNYN046	DC	273	A1	01:24:01	48.42617	-9.62174	SOL
30/05/2017	179	CNYN046	DC	282	A1	01:53:03	48.42508	-9.62498	EOL
30/05/2017	180	CNYN044	DC	269	A1	02:27:04	48.41612	-9.62313	SOL
30/05/2017	180	CNYN044	DC	275	A1	02:52:04	48.41561	-9.62616	EOL
30/05/2017	181	CNYN103	DC	286	A1	03:55:19	48.42013	-9.62844	SOL
30/05/2017	181	CNYN103	DC	275	A1	05:18:27	48.41333	-9.62661	EOL
30/05/2017	182	CNYN043	DC	276	A1	05:32:21	48.41241	-9.62701	SOL
30/05/2017	182	CNYN043	DC	277	A1	05:57:28	48.41065	-9.62875	EOL
30/05/2017	183	CNYN048	DC	271	A1	07:02:36	48.40743	-9.62551	SOL
30/05/2017	183	CNYN048	DC	279	A1	07:27:01	48.40557	-9.62673	EOL
30/05/2017	184	CNYN001	DC	278	A1	08:00:11	48.40205	-9.61897	SOL
30/05/2017	184	CNYN001	DC	293	A1	08:24:56	48.40044	-9.62092	EOL
30/05/2017	185	CNYN001	NIOZ	285	A1	08:50:22	48.40142	-9.61978	Porosity/chlorophyll/PSA/OCN, eDNA from residue
30/05/2017	185	CNYN001	NIOZ	284	B1	09:02:57	48.40139	-9.61983	Macrofauna/PSA/OCN
30/05/2017	186	CNYN016	NIOZ	318	A1	09:37:44	48.39414	-9.63626	Macrofauna/PSA/OCN
30/05/2017	187	CNYN016	DC	316	A1	10:03:30	48.39452	-9.63514	SOL
30/05/2017	187	CNYN016	DC	323	A1	10:28:09	48.39358	-9.63786	EOL
30/05/2017	188	CNYN050	DC	298	A1	11:03:23	48.40290	-9.63995	SOL
30/05/2017	188	CNYN050	DC	307	A1	11:28:17	48.40157	-9.64234	EOL
30/05/2017	189	CNYN060	DC	310	A1	12:03:36	48.40190	-9.64651	SOL
30/05/2017	189	CNYN060	DC	314	A1	12:28:31	48.40049	-9.64882	EOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
30/05/2017	190	CNYN041	DC	290	A1	13:14:45	48.41178	-9.63547	SOL
30/05/2017	190	CNYN041	DC	296	A1	13:39:48	48.41047	-9.63789	EOL
30/05/2017	191	CNYN055	DC	302	A1	14:18:15	48.41563	-9.63956	SOL
30/05/2017	191	CNYN055	DC	305	A1	14:43:46	48.41405	-9.64169	EOL
30/05/2017	192	CNYN047	DC	299	A1	15:23:27	48.41796	-9.63743	SOL
30/05/2017	192	CNYN047	DC	305	A1	15:51:14	48.41636	-9.63996	EOL
30/05/2017	193	CNYN054	DC	305	A1	17:04:38	48.41801	-9.63896	SOL
30/05/2017	193	CNYN054	DC	312	A1	17:29:10	48.41819	-9.64202	EOL
30/05/2017	194	CNYN058	DC	306	A1	18:08:47	48.42724	-9.63581	SOL
30/05/2017	194	CNYN058	DC	311	A1	18:34:25	48.42583	-9.63823	EOL
30/05/2017	195	CNYN042	DC	299	A1	19:14:58	48.42826	-9.63211	SOL
30/05/2017	195	CNYN042	DC	305	A1	19:40:08	48.42723	-9.63486	EOL
30/05/2017	196	CNYN051	DC	306	A1	20:22:20	48.43031	-9.63238	SOL
30/05/2017	196	CNYN051	DC	312	A1	20:47:10	48.42927	-9.63506	EOL
30/05/2017	197	CNYN017	DC	360	A1	21:30:43	48.42714	-9.65043	SOL
30/05/2017	197	CNYN017	DC	361	A1	21:55:44	48.42580	-9.65281	EOL
30/05/2017	198	CNYN063	DC	411	A1	22:46:41	48.42254	-9.67110	SOL
30/05/2017	198	CNYN063	DC	410	A1	23:14:56	48.42160	-9.67435	EOL
30/05/2017	199	CNYN067	DC	483	A1	23:56:47	48.42680	-9.67783	SOL
31/05/2017	199	CNYN067	DC	484	A1	00:21:07	48.42615	-9.68071	EOL
31/05/2017	200	CNYN059	DC	333	A1	01:06:08	48.40511	-9.66775	SOL
31/05/2017	200	CNYN059	DC	330	A1	01:31:07	48.40402	-9.67041	EOL
31/05/2017	201	CNYN053	DC	325	A1	01:56:29	48.40248	-9.67730	SOL
31/05/2017	201	CNYN053	DC	323	A1	02:21:06	48.40182	-9.68022	EOL
31/05/2017	202	CNYN056	DC	337	A1	03:10:23	48.39514	-9.66907	SOL
31/05/2017	202	CNYN056	DC	338	A1	03:35:09	48.39415	-9.67180	EOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
31/05/2017	203	CNYN057	DC	330	A1	04:05:43	48.39491	-9.67781	SOL
31/05/2017	203	CNYN057	DC	326	A1	04:30:11	48.39468	-9.68085	EOL
31/05/2017	204	CNYN064	DC	415	A1	05:08:55	48.37943	-9.68703	SOL
31/05/2017	204	CNYN064	DC	415	A1	05:33:49	48.37888	-9.69006	EOL
31/05/2017	205	CNYN106	DC	365	A1	07:13:32	48.40803	-9.69787	SOL
31/05/2017	205	CNYN106	DC	360	A1	08:03:57	48.40439	-9.70268	EOL
31/05/2017	206	CNYN019	DC	380	A1	08:52:01	48.41259	-9.69189	SOL
31/05/2017	206	CNYN019	DC	391	A1	09:16:56	48.41305	-9.69591	EOL
31/05/2017	207	CNYN112	DC	410	A1	10:43:50	48.41797	-9.68681	SOL
31/05/2017	207	CNYN112	DC	449	A1	11:32:46	48.42090	-9.69104	EOL
31/05/2017	208	CNYN061	DC	487	A1	12:24:36	48.41953	-9.70781	SOL
31/05/2017	208	CNYN061	DC	495	A1	12:48:58	48.41969	-9.71085	EOL
31/05/2017	209	CNYN070	DC	415	A1	13:40:05	48.40846	-9.71737	SOL
31/05/2017	209	CNYN070	DC	422	A1	14:04:59	48.40860	-9.72047	EOL
31/05/2017	210	CNYN052	DC	338	A1	14:48:10	48.39616	-9.71909	SOL
31/05/2017	210	CNYN052	DC	346	A1	15:13:01	48.39634	-9.72218	EOL
31/05/2017	211	CNYN020	NIOZ	351	A1	15:42:47	48.39778	-9.71683	Macrofauna/PSA/OCN
31/05/2017	212	CNYN020	DC	351	A1	16:58:05	48.39848	-9.71448	SOL
31/05/2017	212	CNYN020	DC	351	A1	17:23:01	48.39766	-9.71735	EOL
31/05/2017	213	CNYN108	DC	370	A1	18:07:32	48.40138	-9.71428	SOL
31/05/2017	213	CNYN108	DC	339	A1	19:04:43	48.39683	-9.71592	EOL
31/05/2017	214	CNYN010	NIOZ	303	A1	19:45:08	48.38627	-9.71509	Macrofauna/PSA/OCN
31/05/2017	215	CNYN010	DC	302	A1	20:18:20	48.38668	-9.71400	SOL
31/05/2017	215	CNYN010	DC	303	A1	20:43:01	48.38569	-9.71671	EOL
31/05/2017	216	CNYN018	DC	338	A1	21:28:26	48.38051	-9.73518	SOL
31/05/2017	216	CNYN018	DC	341	A1	21:52:58	48.37949	-9.73783	EOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
31/05/2017	217	CNYN018	NIOZ	339	A1	22:20:49	48.38009	-9.73625	Macrofauna/PSA/OCN
31/05/2017	218	CNYN014	NIOZ	335	A1	23:03:08	48.38304	-9.73474	Macrofauna/PSA/OCN
31/05/2017	219	CNYN014	DC	333	A1	23:38:46	48.38318	-9.73408	SOL
01/06/2017	219	CNYN014	DC	340	A1	00:03:03	48.38249	-9.73694	EOL
01/06/2017	220	CNYN065	DC	405	A1	00:43:44	48.38470	-9.74989	SOL
01/06/2017	220	CNYN065	DC	436	A1	01:08:13	48.38412	-9.75282	EOL
01/06/2017	221	CNYN068	DC	452	A1	01:41:09	48.39469	-9.74677	SOL
01/06/2017	221	CNYN068	DC	480	A1	02:06:10	48.39424	-9.74983	EOL
01/06/2017	222	CNYN111	DC	418	A1	02:43:51	48.39677	-9.74236	SOL
01/06/2017	222	CNYN111	DC	439	A1	03:32:21	48.39372	-9.74635	EOL
01/06/2017	223	CNYN013	DC	383	A1	04:20:44	48.39332	-9.74015	SOL
01/06/2017	223	CNYN013	DC	375	A1	04:45:25	48.39131	-9.74082	EOL
01/06/2017	224	CNYN069	DC	415	A1	05:18:49	48.40082	-9.73419	SOL
01/06/2017	224	CNYN069	DC	401	A1	05:43:59	48.39878	-9.73506	EOL
01/06/2017	225	CNYN013	NIOZ	382	A1	06:11:03	48.39259	-9.74030	Macrofauna/PSA/OCN
01/06/2017	226	CNYN091	DC	485	A1	08:00:48	48.26091	-9.69518	SOL
01/06/2017	226	CNYN091	DC	495	A1	08:25:13	48.26023	-9.69805	EOL
01/06/2017	227	CNYN110	DC	450	A1	09:04:28	48.26613	-9.68971	SOL
01/06/2017	227	CNYN110	DC	416	A1	10:46:09	48.27018	-9.67856	EOL
01/06/2017	228	CNYN092	DC	428	A1	11:24:01	48.26857	-9.68189	SOL
01/06/2017	228	CNYN092	DC	435	A1	11:49:59	48.26854	-9.68514	EOL
01/06/2017	229	CNYN083	DC	372	A1	13:04:04	48.27031	-9.66167	SOL
01/06/2017	229	CNYN083	DC	384	A1	13:29:00	48.26962	-9.66461	EOL
01/06/2017	230	CNYN084	DC	333	A1	14:20:05	48.26990	-9.63864	SOL
01/06/2017	230	CNYN084	DC	334	A1	14:45:00	48.26918	-9.64159	EOL
01/06/2017	231	CNYN082	DC	321	A1	15:31:15	48.27532	-9.63557	SOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
01/06/2017	231	CNYN082	DC	333	A1	15:56:11	48.27433	-9.63823	EOL
01/06/2017	232	CNYN081	DC	314	A1	16:48:35	48.27439	-9.63016	SOL
01/06/2017	232	CNYN081	DC	324	A1	17:28:44	48.27435	-9.63516	EOL
01/06/2017	233	CNYN072	DC	299	A1	18:13:16	48.28152	-9.62034	SOL
01/06/2017	233	CNYN072	DC	303	A1	18:38:24	48.28305	-9.62250	EOL
01/06/2017	234	CNYN101	DC	364	A1	19:33:51	48.29678	-9.64270	SOL
01/06/2017	234	CNYN101	DC	355	A1	20:34:00	48.29187	-9.64142	EOL
01/06/2017	235	CNYN086	DC	354	A1	21:26:23	48.29514	-9.64038	SOL
01/06/2017	235	CNYN086	DC	365	A1	21:52:01	48.29509	-9.64357	EOL
01/06/2017	236	CNYN107	DC	383	A1	22:34:11	48.29570	-9.65155	SOL
02/06/2017	236	CNYN107	DC	404	A1	00:10:33	48.29269	-9.66234	EOL
02/06/2017	237	CNYN094	DC	422	A1	00:43:33	48.28837	-9.67206	SOL
02/06/2017	237	CNYN094	DC	428	A1	01:08:23	48.28745	-9.67483	EOL
02/06/2017	238	CNYN093	DC	464	A1	01:40:15	48.29667	-9.67955	SOL
02/06/2017	238	CNYN093	DC	462	A1	02:05:00	48.29454	-9.68058	EOL
02/06/2017	239	CNYN113	DC	501	A1	03:05:47	48.29698	-9.69332	SOL
02/06/2017	239	CNYN113	DC	526	A1	03:58:00	48.29995	-9.69852	EOL
02/06/2017	240	CNYN095	DC	454	A1	04:41:04	48.30820	-9.66895	SOL
02/06/2017	240	CNYN095	DC	457	A1	05:05:57	48.30657	-9.67164	EOL
02/06/2017	241	CNYN096	DC	417	A1	05:36:19	48.30032	-9.66224	SOL
02/06/2017	241	CNYN096	DC	422	A1	06:01:09	48.29882	-9.66486	EOL
02/06/2017	242	CNYN098	DC	399	A1	06:56:21	48.30374	-9.65171	SOL
02/06/2017	242	CNYN098	DC	409	A1	07:20:59	48.30374	-9.65527	EOL
02/06/2017	243	CNYN097	DC	479	A1	08:04:33	48.31902	-9.65888	SOL
02/06/2017	243	CNYN097	DC	500	A1	08:30:00	48.31976	-9.66188	EOL
02/06/2017	244	CNYN031	DC	395	A1	09:38:01	48.31335	-9.64228	SOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
02/06/2017	244	CNYN031	DC	398	A1	09:49:46	48.31378	-9.64362	EOL
02/06/2017	245	CNYN031	NIOZ	392	A1	10:16:09	48.31324	-9.64188	Macrofauna/PSA/OCN
02/06/2017	246	CNYN032	NIOZ	398	A1	10:53:56	48.32046	-9.63419	Macrofauna/PSA/OCN
02/06/2017	247	CNYN032	DC	393	A1	11:31:02	48.32021	-9.63291	SOL
02/06/2017	247	CNYN032	DC	403	A1	11:56:03	48.32076	-9.63592	EOL
02/06/2017	248	CNYN034	DC	362	A1	12:54:23	48.31611	-9.62520	SOL
02/06/2017	248	CNYN034	DC	373	A1	13:20:33	48.31648	-9.62841	EOL
02/06/2017	249	CNYN034	NIOZ	365	A1	13:48:33	48.31623	-9.62628	No Sample, retained for eDNA
02/06/2017	249	CNYN034	NIOZ	366	A2	14:13:16	48.31623	-9.62631	Macrofauna/PSA/OCN
02/06/2017	250	CNYN038	NIOZ	359	A1	15:04:45	48.31230	-9.62713	Macrofauna/PSA/OCN
02/06/2017	251	CNYN038	DC	360	A1	16:41:51	48.31235	-9.62837	SOL
02/06/2017	251	CNYN038	DC	356	A1	17:05:50	48.31215	-9.62539	EOL
02/06/2017	252	CNYN109	DC	359	A1	17:48:45	48.30576	-9.63173	SOL
02/06/2017	252	CNYN109	DC	357	A1	18:46:27	48.30225	-9.63664	EOL
02/06/2017	253	CNYN035	DC	358	A1	19:38:06	48.30462	-9.63095	SOL
02/06/2017	253	CNYN035	DC	363	A1	20:04:55	48.30462	-9.63433	EOL
02/06/2017	254	CNYN035	NIOZ	363	A1	20:34:01	48.30514	-9.63450	Macrofauna/PSA/OCN
02/06/2017	255	CNYN085	DC	339	A1	21:24:37	48.30412	-9.62228	SOL
02/06/2017	255	CNYN085	DC	345	A1	21:49:23	48.30390	-9.62533	EOL
02/06/2017	256	CNYN088	DC	315	A1	22:31:41	48.30066	-9.61720	SOL
02/06/2017	256	CNYN088	DC	324	A1	22:56:46	48.30069	-9.62032	EOL
02/06/2017	257	CNYN079	DC	300	A1	23:25:33	48.29557	-9.61290	SOL
02/06/2017	257	CNYN079	DC	297	A1	23:50:13	48.29408	-9.61499	EOL
03/06/2017	258	CNYN078	DC	287	A1	00:13:54	48.29672	-9.60611	SOL
03/06/2017	258	CNYN078	DC	291	A2	02:29:50	48.29583	-9.60886	EOL
03/06/2017	259	CNYN071	DC	298	A1	03:21:56	48.30618	-9.60273	SOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
03/06/2017	259	CNYN071	DC	298	A1	03:46:31	48.30518	-9.60529	EOL
03/06/2017	260	CNYN074	DC	292	A1	04:17:59	48.30527	-9.60007	SOL
03/06/2017	260	CNYN074	DC	285	A1	04:42:19	48.30371	-9.59814	EOL
03/06/2017	261	CNYN073	DC	259	A1	05:17:21	48.29848	-9.58970	SOL
03/06/2017	261	CNYN073	DC	262	A1	05:42:11	48.29717	-9.59195	EOL
03/06/2017	262	CNYN102	DC	257	A1	06:58:03	48.29969	-9.58657	SOL
03/06/2017	262	CNYN102	DC	285	A1	08:50:00	48.30255	-9.59990	EOL
03/06/2017	263	CNYN026	DC	242	A1	09:26:52	48.28640	-9.58883	SOL
03/06/2017	263	CNYN026	DC	248	A1	09:51:57	48.28639	-9.59198	EOL
03/06/2017	264	CNYN026	NIOZ	245	A1	10:11:18	48.28640	-9.59015	No Sample, retained for eDNA
03/06/2017	264	CNYN026	NIOZ	244	A2	10:29:09	48.28641	-9.59015	Macrofauna/PSA/OCN
03/06/2017	265	CNYN028	NIOZ	218	B1	11:13:25	48.29306	-9.57215	No Sample
03/06/2017	265	CNYN028	NIOZ	217	B2	11:26:27	48.29308	-9.57217	Macrofauna/PSA/OCN
03/06/2017	265	CNYN028	NIOZ	216	A1	11:45:09	48.29306	-9.57212	Porosity/chlorophyll/PSA/OCN, eDNA from residue
03/06/2017	266	CNYN028	DC	212	A1	12:18:42	48.29309	-9.57106	SOL
03/06/2017	266	CNYN028	DC	221	A1	12:43:27	48.29308	-9.57418	EOL
03/06/2017	267	CNYN030	DC	231	A1	13:29:33	48.29943	-9.57381	SOL
03/06/2017	267	CNYN030	DC	239	A1	13:54:19	48.29952	-9.57690	EOL
03/06/2017	268	CNYN030	NIOZ	233	A1	14:15:43	48.29947	-9.57510	No Sample
03/06/2017	268	CNYN030	NIOZ	233	A2	14:32:20	48.29949	-9.57509	Macrofauna/PSA/OCN
03/06/2017	269	CNYN029	NIOZ	241	A1	15:05:03	48.29868	-9.57926	No Sample
03/06/2017	269	CNYN029	NIOZ	242	A2	15:18:58	48.29866	-9.57926	Macrofauna/PSA/OCN
03/06/2017	270	CNYN029	DC	238	A1	16:41:37	48.29880	-9.57818	SOL
03/06/2017	270	CNYN029	DC	245	A1	17:07:37	48.29827	-9.58136	EOL
03/06/2017	271	CNYN021	DC	244	A1	17:35:06	48.29754	-9.58242	SOL
03/06/2017	271	CNYN021	DC	250	A1	18:01:16	48.29737	-9.58573	EOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
03/06/2017	272	CNYN021	NIOZ	248	A1	18:21:09	48.29743	-9.58408	No Sample
03/06/2017	272	CNYN021	NIOZ	247	A2	18:33:29	48.29744	-9.58410	Macrofauna/PSA/OCN
03/06/2017	273	CNYN025	NIOZ	261	A1	19:04:47	48.30271	-9.58493	Macrofauna/PSA/OCN
03/06/2017	274	CNYN025	DC	259	A1	19:35:11	48.30274	-9.58399	SOL
03/06/2017	274	CNYN025	DC	266	A1	20:01:11	48.30279	-9.58723	EOL
03/06/2017	275	CNYN023	DC	258	A1	20:40:01	48.30570	-9.57930	SOL
03/06/2017	275	CNYN023	DC	264	A1	21:06:06	48.30598	-9.58254	EOL
03/06/2017	276	CNYN023	NIOZ	261	A1	21:29:41	48.30581	-9.58054	No Sample
03/06/2017	276	CNYN023	NIOZ	259	A2	21:42:59	48.30582	-9.58055	No Sample
03/06/2017	276	CNYN023	NIOZ	261	A3	21:56:37	48.30580	-9.58055	Macrofauna/PSA/OCN
03/06/2017	277	CNYN022	NIOZ	233	A1	22:36:36	48.30547	-9.56691	Macrofauna/PSA/OCN
03/06/2017	278	CNYN022	DC	228	A1	23:04:41	48.30534	-9.56563	SOL
03/06/2017	278	CNYN022	DC	237	A1	23:29:42	48.30566	-9.56878	EOL
03/06/2017	279	CNYN024	DC	244	A1	23:59:54	48.31198	-9.56464	SOL
04/06/2017	279	CNYN024	DC	251	A1	00:24:40	48.31216	-9.56772	EOL
04/06/2017	280	CNYN024	NIOZ	248	A1	00:45:52	48.31206	-9.56607	Macrofauna/PSA/OCN
04/06/2017	281	CNYN027	NIOZ	251	A1	01:23:33	48.30959	-9.57086	No Sample
04/06/2017	281	CNYN027	NIOZ	251	A2	01:37:04	48.30960	-9.57085	Macrofauna/PSA/OCN
04/06/2017	282	CNYN027	DC	248	A1	02:06:04	48.30980	-9.56954	SOL
04/06/2017	282	CNYN027	DC	256	A1	02:31:03	48.30992	-9.57322	EOL
04/06/2017	283	CNYN076	DC	283	A1	03:27:50	48.31237	-9.58317	SOL
04/06/2017	283	CNYN076	DC	286	A1	03:52:51	48.31211	-9.58622	EOL
04/06/2017	284	CNYN077	DC	285	A1	04:27:31	48.31508	-9.58376	SOL
04/06/2017	284	CNYN077	DC	290	A1	04:53:06	48.31485	-9.58696	EOL
04/06/2017	285	CNYN075	DC	278	A1	05:24:36	48.31792	-9.57510	SOL
04/06/2017	285	CNYN075	DC	280	A1	05:49:56	48.31731	-9.57814	EOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
04/06/2017	286	CNYN080	DC	287	A1	07:02:17	48.32038	-9.57676	SOL
04/06/2017	286	CNYN080	DC	290	A1	07:27:37	48.32063	-9.57994	EOL
04/06/2017	287	CNYN087	DC	322	A1	08:00:01	48.33019	-9.57600	SOL
04/06/2017	287	CNYN087	DC	328	A1	08:25:01	48.33054	-9.57909	EOL
04/06/2017	288	CNYN090	DC	321	A1	09:07:35	48.33143	-9.57062	SOL
04/06/2017	288	CNYN090	DC	326	A1	09:32:17	48.33174	-9.57367	EOL
04/06/2017	289	CNYN039	DC	357	A1	10:05:28	48.33386	-9.55853	SOL
04/06/2017	289	CNYN039	DC	349	A1	10:31:08	48.33416	-9.56171	EOL
04/06/2017	290	CNYN040	DC	385	A1	11:22:31	48.33689	-9.56610	SOL
04/06/2017	290	CNYN040	DC	384	A1	11:47:49	48.33699	-9.56924	EOL
04/06/2017	291	CNYN040	NIOZ	384	A1	12:15:52	48.33693	-9.56765	Porosity/chlorophyll/PSA/OCN
04/06/2017	291	CNYN040	NIOZ	384	B1	12:40:53	48.33695	-9.56765	Macrofauna/PSA/OCN
04/06/2017	292	CNYN037	DC	362	A1	13:28:02	48.33520	-9.58258	SOL
04/06/2017	292	CNYN037	DC	371	A1	13:53:27	48.33561	-9.58568	EOL
04/06/2017	293	CNYN037	NIOZ	371	A1	14:19:17	48.33564	-9.58577	Macrofauna/PSA/OCN
04/06/2017	294	CNYN036	NIOZ	350	A1	14:56:30	48.33091	-9.59136	Macrofauna/PSA/OCN
04/06/2017	295	CNYN036	DC	348	A1	16:40:38	48.33095	-9.59034	SOL
04/06/2017	295	CNYN036	DC	355	A1	17:05:48	48.33038	-9.59338	EOL
04/06/2017	296	CNYN033	NIOZ	390	A1	17:41:16	48.33493	-9.60161	Macrofauna/PSA/OCN
04/06/2017	297	CNYN155	DC	1464	A1	20:25:21	48.22287	-9.74382	SOL
04/06/2017	297	CNYN155	DC	1439	A1	20:55:21	48.22243	-9.74747	EOL
06/06/2017	298	CNYN089	DC	342	A1	22:31:16	48.32881	-9.59123	SOL
06/06/2017	298	CNYN089	DC	351	A1	22:51:21	48.32939	-9.59310	EOL
06/06/2017	299	CNYN033	DC	388	A1	23:28:13	48.33463	-9.60041	SOL
06/06/2017	299	CNYN033	DC	397	A1	23:53:13	48.33511	-9.60333	EOL
07/06/2017	300	CNYN100	DC	443	A1	00:35:24	48.33889	-9.60191	SOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
07/06/2017	300	CNYN100	DC	462	A1	01:00:17	48.33943	-9.60488	EOL
07/06/2017	301	CNYN099	DC	433	A1	01:39:43	48.33485	-9.61838	SOL
07/06/2017	301	CNYN099	DC	449	A1	02:03:58	48.33540	-9.62130	EOL
07/06/2017	302	CNYN127	DC	981	A1	03:50:42	48.37084	-9.61654	SOL
07/06/2017	302	CNYN127	DC	945	A1	04:14:51	48.37092	-9.61921	EOL
07/06/2017	303	CNYN066	DC	524	A1	05:17:41	48.39346	-9.59791	SOL
07/06/2017	303	CNYN066	DC	478	A1	05:29:42	48.39330	-9.59966	EOL
07/06/2017	304	CNYN130	DC	1103	A1	08:07:58	48.34286	-9.66505	SOL
07/06/2017	304	CNYN130	DC	1094	A1	08:32:23	48.34051	-9.66542	EOL
07/06/2017	305	CNYN131	DC	950	A1	10:35:10	48.28337	-9.76791	SOL
07/06/2017	305	CNYN131	DC	880	A2	15:02:28	48.28232	-9.77043	EOL
07/06/2017	306	CNYN153	DC	1697	A1	17:10:00	48.31235	-9.78803	SOL
07/06/2017	306	CNYN153	DC	1742	A1	17:40:04	48.31453	-9.78621	EOL
07/06/2017	307	CNYN126	DC	1021	A1	19:54:00	48.35375	-9.71614	SOL
07/06/2017	307	CNYN126	DC	1140	A1	20:50:41	48.34980	-9.71952	EOL
07/06/2017	308	CNYN129	DC	852	A1	22:14:05	48.35660	-9.69865	SOL
07/06/2017	308	CNYN129	DC	927	A1	22:38:59	48.35494	-9.70039	EOL
08/06/2017	309	CNYN133	DC	1055	A1	00:29:21	48.32566	-9.70446	SOL
08/06/2017	309	CNYN133	DC	1036	A1	00:54:07	48.32416	-9.70654	EOL
08/06/2017	310	CNYN148	DC	1598	A1	03:33:57	48.33365	-9.73155	SOL
08/06/2017	310	CNYN148	DC	1558	A1	04:34:01	48.32944	-9.73554	EOL
08/06/2017	311	CNYN125	DC	1024	A1	07:34:26	48.37655	-9.79017	SOL
08/06/2017	311	CNYN125	DC	1012	A1	07:59:07	48.37513	-9.79239	EOL
08/06/2017	312	CNYN124	DC	966	A1	09:12:04	48.38367	-9.79669	SOL
08/06/2017	312	CNYN124	DC	1018	A1	09:39:42	48.38327	-9.80007	EOL
08/06/2017	313	CNYN123	DC	917	A1	11:55:28	48.39617	-9.78424	SOL

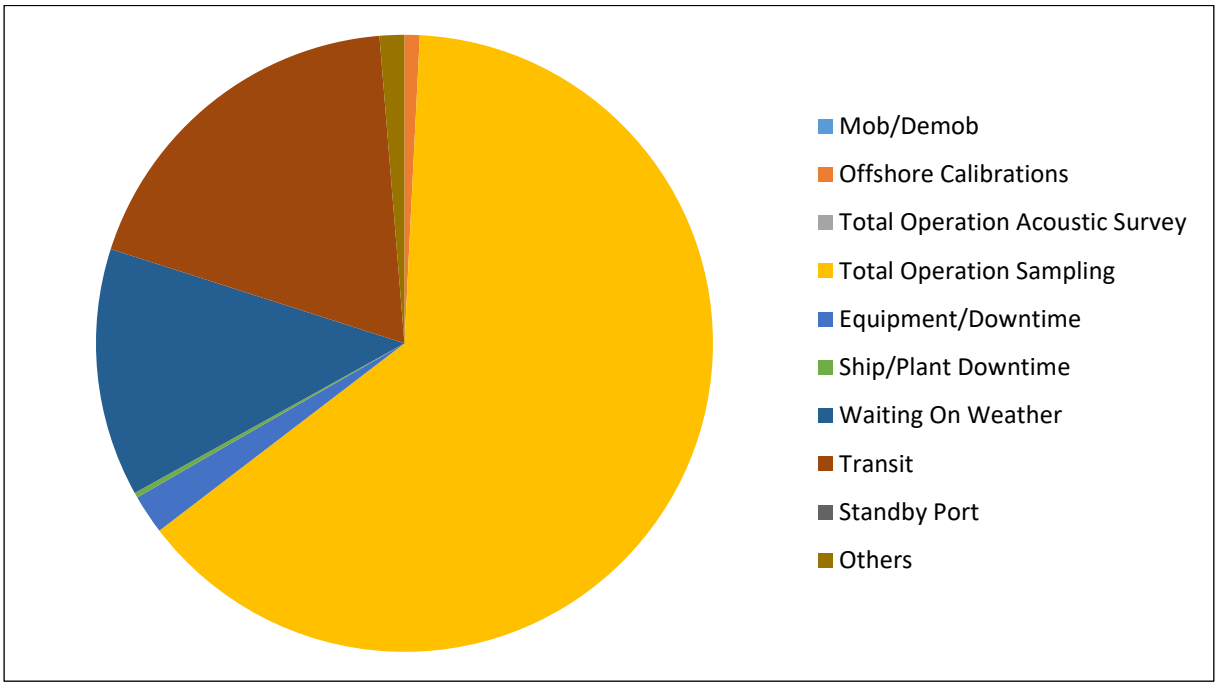
Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
08/06/2017	313	CNYN123	DC	947	A1	12:20:04	48.39622	-9.78735	EOL
08/06/2017	314	CNYN162	DC	1437	A1	13:50:56	48.42099	-9.79137	SOL
08/06/2017	314	CNYN162	DC	1475	A1	14:41:47	48.42031	-9.79766	EOL
08/06/2017	315	CNYN163	DC	1456	A1	17:00:06	48.42200	-9.79449	SOL
08/06/2017	315	CNYN163	DC	1444	A1	17:40:41	48.41933	-9.79412	EOL
09/06/2017	317	CNYN118	DC	1115	A1	02:32:11	48.43651	-9.72772	SOL
09/06/2017	317	CNYN118	DC	1094	A1	02:58:31	48.43552	-9.73054	EOL
09/06/2017	318	CTD1	CTD	648	A1BOT	08:48:51	48.48419	-9.66059	Chlorophyll/salinity/Suspended Particulate Matter (SPM)
09/06/2017	318	CTD1	CTD	647	A1MID	09:04:40	48.48418	-9.66063	Chlorophyll/salinity/SPM
09/06/2017	318	CTD1	CTD	646	A1SUR	09:09:01	48.48427	-9.66062	Chlorophyll/salinity/SPM
09/06/2017	319	NA	DC	2644	A1	17:26:01	48.23944	-9.89802	SOL
09/06/2017	319	NA	DC	2628	A1	19:13:00	48.23939	-9.89391	EOL
10/06/2017	320	CNYN161	DC	1497	A1	13:10:17	48.16836	-9.79277	SOL
10/06/2017	320	CNYN161	DC	1495	A1	13:36:40	48.16656	-9.79465	EOL
10/06/2017	321	CNYN136	DC	1157	A1	22:44:18	48.18016	-9.73168	SOL
10/06/2017	321	CNYN136	DC	1193	A1	23:09:07	48.18022	-9.73479	EOL
11/06/2017	322	CNYN137	DC	883	A1	00:27:04	48.17106	-9.70442	SOL
11/06/2017	322	CNYN137	DC	925	A1	00:52:11	48.17056	-9.70744	EOL
11/06/2017	323	CNYN135	DC	871	A1	02:02:08	48.18802	-9.70942	SOL
11/06/2017	323	CNYN135	DC	898	A1	02:27:09	48.18672	-9.71171	EOL
11/06/2017	324	CNYN158	DC	1426	A1	03:51:27	48.18205	-9.75155	SOL
11/06/2017	324	CNYN158	DC	1458	A1	04:06:52	48.18198	-9.75344	EOL
11/06/2017	325	CNYN160	DC	1577	A1	05:42:58	48.17885	-9.75849	SOL
11/06/2017	325	CNYN160	DC	1598	A1	06:07:17	48.17772	-9.76094	EOL
11/06/2017	326	CNYN159	DC	1476	A1	07:40:22	48.18452	-9.78371	SOL
11/06/2017	326	CNYN159	DC	1442	A1	07:59:18	48.18378	-9.78580	EOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
11/06/2017	327	CNYN154	DC	1602	A1	10:21:48	48.21591	-9.77033	SOL
11/06/2017	327	CNYN154	DC	1654	A1	10:45:58	48.21557	-9.77330	EOL
11/06/2017	328	CNYN156	DC	1399	A1	13:21:30	48.22873	-9.79064	SOL
11/06/2017	328	CNYN156	DC	1467	A1	13:46:29	48.22809	-9.79354	EOL
11/06/2017	329	CNYN134	DC	1056	A1	15:26:18	48.25085	-9.78401	SOL
11/06/2017	329	CNYN134	DC	1104	A1	15:49:59	48.25081	-9.78702	EOL
11/06/2017	330	CNYN132	DC	1070	A1	17:13:02	48.29173	-9.77604	SOL
11/06/2017	330	CNYN132	DC	1034	A1	17:38:23	48.29298	-9.77439	EOL
11/06/2017	331	CNYN151	DC	1598	A1	18:51:21	48.30255	-9.79944	SOL
11/06/2017	331	CNYN151	DC	1644	A1	19:31:31	48.30592	-9.79944	EOL
11/06/2017	332	CNYN152	DC	1410	A1	21:13:49	48.30860	-9.76416	SOL
11/06/2017	332	CNYN152	DC	1460	A1	21:39:05	48.31067	-9.76414	EOL
11/06/2017	333	CNYN150	DC	1809	A1	23:24:25	48.32364	-9.75669	SOL
11/06/2017	333	CNYN150	DC	1745	A1	23:49:22	48.32520	-9.75461	EOL
12/06/2017	334	CNYN146	DC	1582	A1	02:01:26	48.33051	-9.76020	SOL
12/06/2017	334	CNYN146	DC	1561	A1	02:26:25	48.32989	-9.76323	EOL
12/06/2017	335	CNYN122	DC	1008	A1	04:23:35	48.37314	-9.79681	SOL
12/06/2017	335	CNYN122	DC	1018	A1	04:48:29	48.37496	-9.79524	EOL
12/06/2017	336	CNYN119	DC	924	A1	07:14:48	48.42516	-9.74182	SOL
12/06/2017	336	CNYN119	DC	941	A1	07:39:26	48.42673	-9.73985	EOL
12/06/2017	337	CNYN121	DC	1142	A1	09:19:14	48.44092	-9.71577	SOL
12/06/2017	337	CNYN121	DC	1200	A1	09:49:10	48.44340	-9.71582	EOL
12/06/2017	338	CNYN120	DC	907	A1	11:07:43	48.43606	-9.69722	SOL
12/06/2017	338	CNYN120	DC	912	A1	11:32:43	48.43803	-9.69724	EOL
12/06/2017	339	CNYN114	DC	961	A1	12:37:03	48.45351	-9.68857	SOL
12/06/2017	339	CNYN114	DC	999	A1	13:01:58	48.45173	-9.69022	EOL

Date	Station Number	Station Code	Gear Code	Water depth (m)	Attempt	Time	Latitude	Longitude	Comment
12/06/2017	340	CNYN116	DC	1118	A1	14:03:19	48.45068	-9.68118	SOL
12/06/2017	340	CNYN116	DC	1073	A2	15:05:27	48.44791	-9.68673	EOL
12/06/2017	341	CNYN115	DC	1037	A1	16:55:32	48.47826	-9.64599	SOL
12/06/2017	341	CNYN115	DC	1029	A1	17:20:59	48.47643	-9.64587	EOL
12/06/2017	342	CNYN117	DC	927	A1	18:23:45	48.48561	-9.63848	SOL
12/06/2017	342	CNYN117	DC	963	A1	18:48:34	48.48353	-9.63843	EOL
12/06/2017	343	CNYN062	DC	449	A1	19:43:48	48.47355	-9.60332	SOL
12/06/2017	343	CNYN062	DC	418	A1	20:09:53	48.47138	-9.60321	EOL
12/06/2017	344	CNYN128	DC	832	A1	21:32:16	48.38693	-9.57677	SOL
12/06/2017	344	CNYN128	DC	905	A1	22:07:41	48.38484	-9.57988	EOL
12/06/2017	342	CNYN117	DC	927	A1	18:23:45	48.48561	-9.63848	SOL
12/06/2017	342	CNYN117	DC	963	A1	18:48:34	48.48353	-9.63843	EOL
12/06/2017	343	CNYN062	DC	449	A1	19:43:48	48.47355	-9.60332	SOL
12/06/2017	343	CNYN062	DC	418	A1	20:09:53	48.47138	-9.60321	EOL
12/06/2017	344	CNYN128	DC	832	A1	21:32:16	48.38693	-9.57677	SOL
12/06/2017	344	CNYN128	DC	905	A1	22:07:41	48.38484	-9.57988	EOL
12/06/2017	343	CNYN062	DC	449	A1	19:43:48	48.47355	-9.60332	SOL
12/06/2017	343	CNYN062	DC	418	A1	20:09:53	48.47138	-9.60321	EOL
12/06/2017	344	CNYN128	DC	832	A1	21:32:16	48.38693	-9.57677	SOL
12/06/2017	344	CNYN128	DC	905	A1	22:07:41	48.38484	-9.57988	EOL
12/06/2017	342	CNYN117	DC	927	A1	18:23:45	48.48561	-9.63848	SOL

Appendix 3 – Summary of Survey Operations

Overall proportions of survey operations are illustrated below.



Cefas

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