Natural England Commissioned Report NECR307

Runnel Stone MCZ 2018 Survey Report

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Foreword

Natural England commission a range of reports from external contractors to provide evidence and advice to assist us in delivering our duties. The views in this report are those of the authors and do not necessarily represent those of Natural England.

Background

Following designation, Natural England started a baseline monitoring programme across all marine protected areas.

This report was commissioned as part of an inshore benthic marine survey of the Runnel Stone MCZ.

This report should be cited as:

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Natural England Project Manager – Mike Fraser, Senior Specialist
Mike.Fraser@naturalengland.org.uk

Contractor - Katie Pryor and Ed Stevens, Environment Agency

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Further information
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Runnel Stone MCZ 2018 Survey Report

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Runnel Stone MCZ 2018 Survey Report

Project Code: MB0129

Authors: K. Pryor and E. Stevens

Produced by:

Environment Agency
Estuarine and Coastal Monitoring and Assessment Service
Kingfisher House
Orton Goldhay
Peterborough
Cambridgeshire
PE2 5ZR

Email: enquiries@environment-agency.gov.uk
Website: www.gov.uk/environment-agency

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C. Miller	Natural England/Environment Agency Marine Technical Specialist
C. Trundle	Cornwall Inshore Fisheries and Conservation Authority Conservation and Research Manager

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1. Introduction

Following the introduction of the Marine and Coastal Access Act in 2009, the UK Government is creating an ecologically coherent network of Marine Conservation Zones (MCZs) in British waters. The MCZ network will exist alongside other Marine Protected Areas (MPAs), including Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs) and Ramsar sites to help conserve marine biodiversity, in particular habitats and species of national importance.

Forming part of this network, the Runnel Stone MCZ, previously named Land's End (Runnels Stone) rMCZ, was formally designated on the 17th January 2016[1]. The site has been created to protect a range of subtidal and intertidal sediments, reef features and Pink sea-fans (*Eunicella verrucosa*). Following designation, Natural England* have started a programme of monitoring and the initial datasets gathered will be used, along with all other available information, to assess the condition of the features in the site using Natural England marine condition assessment methodology. The method uses attributes set out in the site supplementary advice on conservation objectives to form an overall decision about the condition of the features, and this work will inform the assessment of specific attributes. The results from the condition assessment will inform future monitoring planning and management of the site.

*inshore Statutory Nature Conservation Body

1.1 Site Description

Located on the south Cornish coast, the Runnel Stone MCZ is an inshore site that stretches east to west from Treen Cliff/Cribba Head to Gwennap Head along the southern tip of Penwith peninsula (Figure 1). The site extends seawards in an arc, out to a distance of 3.5 km offshore, covering a total area of 20 km^2 (Natural England, 2017). The site is in an exposed location, creating a range of different habitats from soft sediment to exposed infralittoral and circalittoral rock. The infralittoral rock habitat found at the site is extremely rich in flora and fauna, supporting species such as seaweeds, mussels, limpets and barnacles. The circalittoral rock habitat also supports a range of diverse species including sea-fans, sponges and anemones (Natural England, 2017). It is described as an area of importance for migratory birds, small cetaceans and provides a prime haul-out area for grey seals.

[1] This report was produced before the Tranche 3 designation announcement on 31st May 2019 and as such all content was correct at the time of writing.

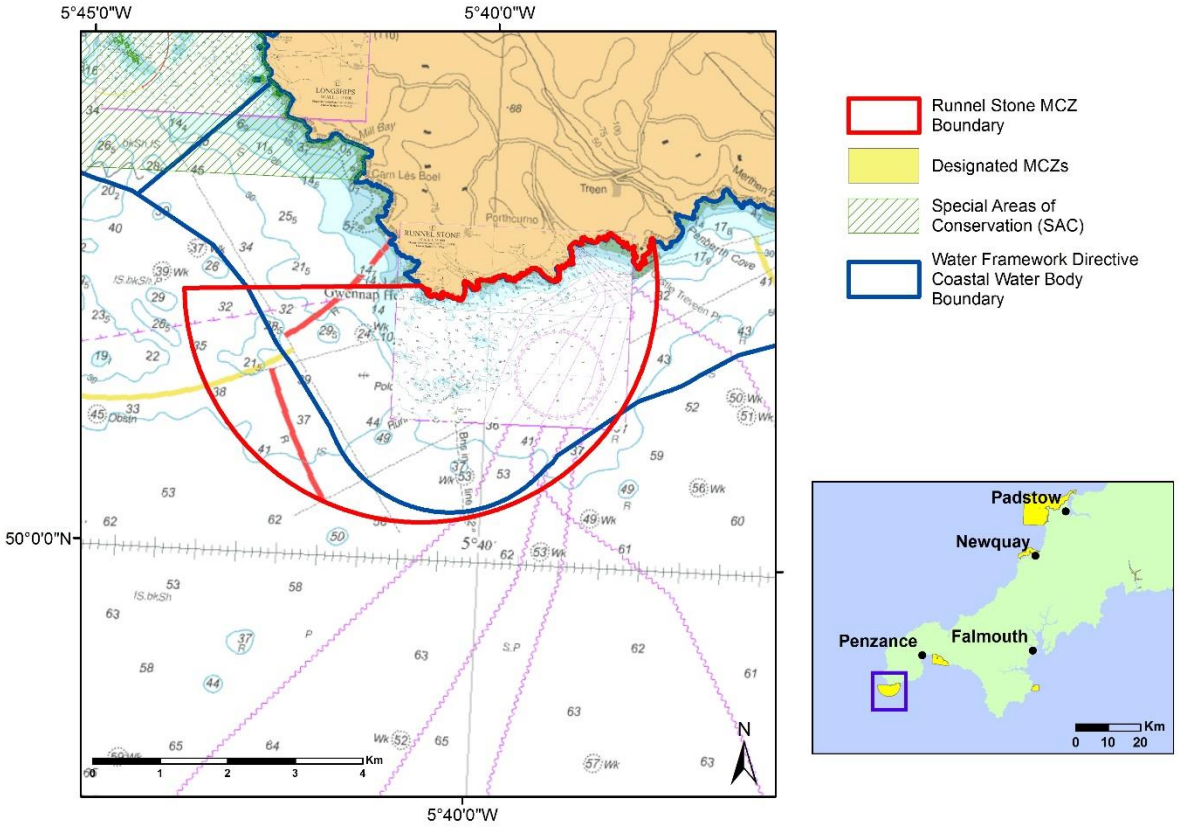

Figure 1. Location of the Runnel Stone Marine Conservation Zone (MCZ) in the context of other MCZs off the southwest of England.

The Features of Conservation Importance (FOCI) protected under the MCZ designation order are presented in Table 1, alongside the general management approach for each feature. The survey described here focuses on those features indicated by blue shading (Table 1).

Currently, the Cornwall Inshore Fisheries and Conservation Authority (CIFCA) has district wide measures in place that restrict certain fishing activities including potting, netting, trawling and dredging. The byelaw within the MCZ prohibits netting with a mesh size of less than 250 mm, this is set up to conserve sea fish, in particular European sea bass (*Dicentrarchus labrax*). A byelaw also exists which prohibits the removal of v-notched and berried lobsters (*Homarus gammarus*) and European spiny lobster (*Palinurus elephas*). Further information can be found on the CIFCA website: https://www.cornwall-ifca.gov.uk/.

Table 1. Designation status and the current General Management Approach (GMA) for the Features of Conservation Importance (FOCI) present in the Runnel Stone Marine Conservation Zone. The survey described here focuses on those features indicated by blue shading.

Feature Type	Features Present	Designated	GMA
Broadscale Habitat	High energy intertidal rock	✓	Maintain in favourable condition
	Intertidal coarse sediment	✓	Maintain in favourable condition
	Intertidal sand and muddy sand	✓	Maintain in favourable condition
	Subtidal sand	✓	Maintain in favourable condition
	Subtidal coarse sediment	✓	Maintain in favourable condition
	Moderate energy circalittoral rock	✓	Maintain in favourable condition
	High energy infralittoral rock	✓	Maintain in favourable condition
	High energy circalittoral rock	✓	Maintain in favourable condition
Species FOCI	Pink sea-fan (*Eunicella verrucosa*)	✓	Maintain in favourable condition

1.2 Survey Aim and Objectives

To undertake a survey of Runnel Stone MCZ designated features (Table 1) to obtain new evidence which can be used by Natural England, alongside all other relevant information, to detect change over time and ascribe condition to inform future monitoring and management measures.

Surveying of the Runnel Stone MCZ was delivered by both the Environment Agency and CIFCA in 2018. The Environment Agency delivered the grabbing survey (Objective 1) and CIFCA delivered the Drop Camera (DC) survey (Objective 2 and 3). Separate survey reports were written by each organisation to describe their survey activities, therefore this survey report will only focus on the grabbing part of the survey.

Objective 1 (Environment Agency):

A grab survey of subtidal sediment features within the MCZ (Table 1).

Objective 2 (Cornwall Inshore Fisheries and Conservation Authority):

A Drop Camera survey of subtidal rock features within MCZ (Table 1).

Objective 3 (Cornwall Inshore Fisheries and Conservation Authority and Environment Agency *d only*):

Video data capture of the Pink sea-fan feature to assess the following attributes from Natural England's Supplementary Advice on Conservation Objectives (Natural England, 2017):

a) Population structure – Population size is the number of individuals within a population that contribute to the species viability at a local, national and bio-geographic scale. Population size relates to the abundance of a species. It should include all the populations of a species within the site.

b) Population: recruitment and reproductive capability - Recruitment and reproductive capability reflect the health and success of the population in terms of maintaining and / or restoring numbers. A reduction in the availability of individuals able to successfully reproduce, and survival rates, may impact the overall size and age-structure of the population.

c) Presence and spatial distribution of the species - The presence describes the species occurrence, with the spatial distribution providing a more detailed overview of the location(s) and pattern of occurrence within a site. It is important to consider the various life stages of a species as this may influence its distribution. Disturbance caused by human activities should not adversely affect the species.

d) Supporting Processes: physico-chemical properties and water quality (dissolved oxygen, turbidity) - The physico-chemical properties that influence the species include salinity, pH and temperature. These abiotic factors can affect the species in different ways depending on species-specific tolerances. Temperature and salinity are closely linked and can act either alone or in combination and can ultimately determine the success of a population, most notably in coastal habitats. Changes in any of these properties, as a result of human activity, may also impact the supporting habitats and the food favoured by the species.

Dissolved Oxygen (DO) levels affect the condition and health of species. A reduction in oxygen concentration may cause some individuals of a Pink sea-fan population to die.

Water turbidity is a result of material suspended in the water, including sediment, plankton, pollution or other matter washed into the sea from land sources. In coastal environments turbidity levels can rise and fall rapidly as a result of biological (e.g. plankton blooms), physical (e.g. storm events) or human (e.g. coastal development) factors. Prolonged increases in turbidity could affect the ability of the species to feed and respire.

Incidental information may be gathered on the Sea-fan anemone (*Amphianthus dohrnii*), which occurs in association with Pink sea-fans (the Sea-fan anemone is extremely difficult to observe from video and still images).

1.3 Survey Team

The Runnel Stone MCZ grabbing survey took place between the 2nd and 5th August 2018. The survey team comprised of marine monitoring specialists from the Environment Agency. The coastal survey vessel *Solent Guardian,* staffed and operated by Briggs Marine (Figure 2, Annex 7.1), was used to conduct the survey work reported here.

Figure 2. Coastal survey vessel *Solent Guardian,* operated by Briggs Marine.

2. Survey Design and Methods

2.1 Survey Design and Planning Phase

MCZ verification surveys were undertaken by the Environment Agency in 2012 (using DC) and in 2014 (using a 0.1m^2 Mini-Hamon Grab) (Godsell *et al*., 2013 and Godsell 2014). Acoustic data covering part of the site was collected in 2008 (Evans and Colenutt, 2015). During the verification surveys, there was limited benthic sampling further offshore within the MCZ boundary. A detailed characterisation survey was deemed appropriate in order to verify the Broadscale Habitat (BSH) map produced following the verification survey (Evans and Colenutt, 2015) and provide data in areas without previous sampling.

Power analysis was not used to determine sample numbers due to limited verification benthic data which was focused inshore. A full coverage BSH map was also not available to aid station placement. A Before-After, Control-Impact approach was also not deemed suitable for this site due to the minimal fishing activity across the site (C.Trundle, CIFCA, *pers. comms*) and the close proximity of other MPAs (Land's End and Cape Bank SAC).

Instead a broad geographical spread of grab stations was deemed appropriate with station location stratified by the presence of subtidal sediment from the BSH map where this information was available. 35 Mini-Hamon Grab stations were selected in total, using a 750 m triangular grid and information from Admiralty Charts, alongside historical data from the verification survey (Figure 3). 16 stations were placed in the mapped 'A5.1 Subtidal coarse sediment' feature to verify the BSH map. Eight stations (Figure 3: LNDE04, 10, 13, 24, 25, 28, 30, and 31) were selected to re-sample 2014 verification stations.

Four stations (Figure 3: LNDE05, 11, 17, and 26) were selected for contaminants sampling by 0.1m^2 Day Grab (TBT, PAHs, PCBs and heavy metals). These stations were placed in the mapped 'A5.1 Subtidal coarse sediment' BSH feature.

Marine specialists from the EA and Natural England reviewed the plan. The following hazards were identified from the UK Hydrographic Office Admiralty Charts: rocks, wrecks and submarine cables. Sampling stations were relocated to avoid these hazards as far as possible. A 'Notification of an exempt activity form' for 'samples and investigations' was submitted to the Marine Management Organisation prior to the survey being carried out.

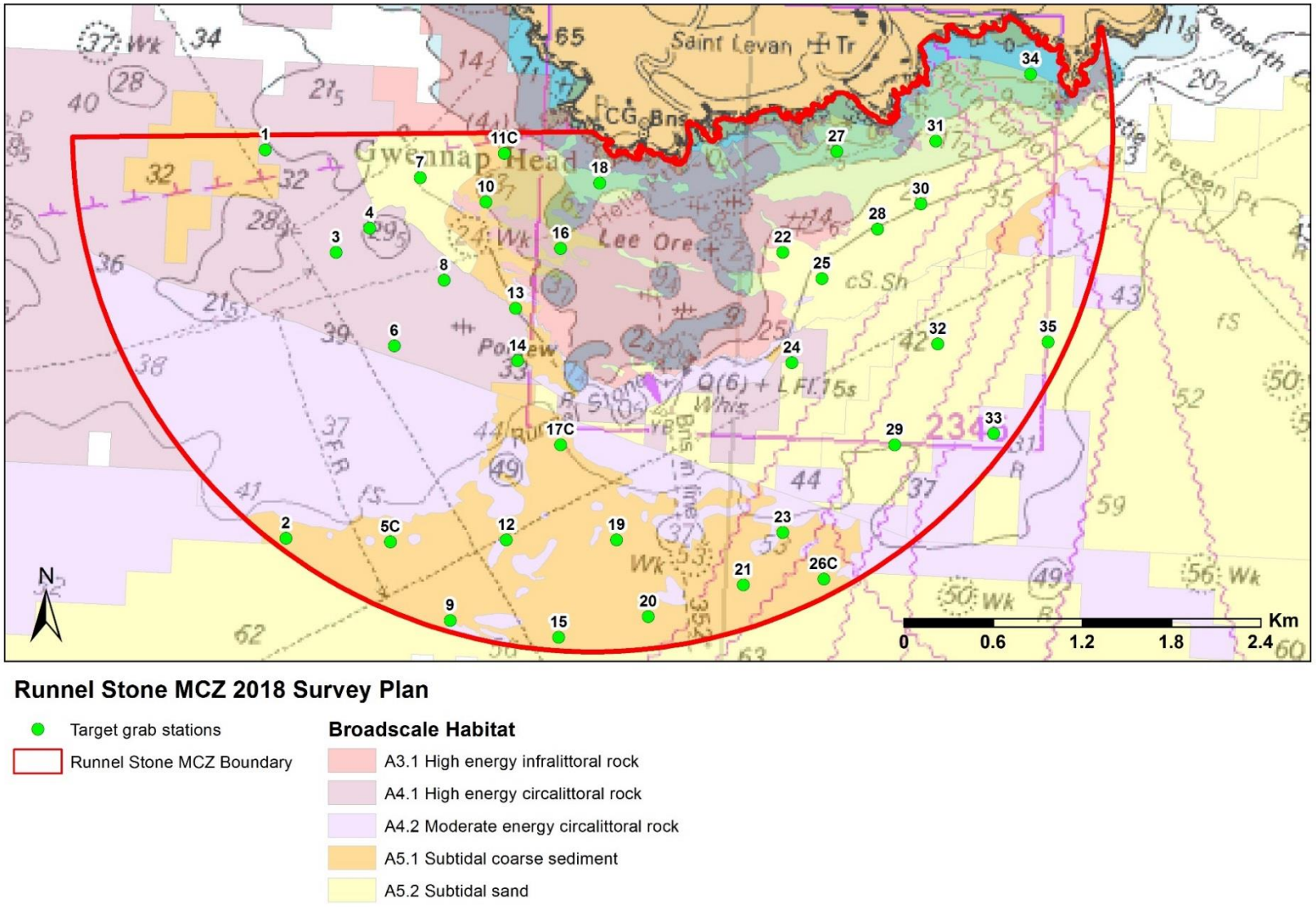

Figure 3. Runnel Stone MCZ Summer 2018 survey plan, mapped over interpreted Broadscale Habitat data (Evans and Colenutt, 2015).

2.2 Sample Collection Methodology

A Mini-Hamon Grab (Figure 4), with a sampling area of 0.1 m^2, was deployed from the stern gantry of the vessel to collect sediment from the seabed, as described by Ware and Kenny (2011). Sampling positions were recorded (fixed) using Hydropro data acquisition software when the gear contacted the seabed, with the mid-point of the vessel's stern gantry being used as the default offset for position fixing (see Annex 7.2.1 for further details).

Once recovered, the sample was emptied into a suitable container, photographed, and the sample volume measured. A minimum of three attempts was made at each station to obtain a valid grab sample before the station was abandoned. A sample volume of 5 litres was required to qualify as a valid sample. For valid samples, a small scoop was used to remove a sub-sample (approx. 500 ml) of sediment for particle size analysis (PSA). The remaining sample was washed over a 1 mm sieve to retain the faunal fraction (Figure 7), photographed and preserved with a buffered 4 % formaldehyde solution for transfer ashore to a specialist laboratory for analysis.

Samples of <5 litres were ordinarily discarded. However, when it was difficult to obtain a valid sample, a sample with <5 litres of material was retained at the discretion of the lead scientist if it was deemed representative across all attempts made at that station. If the volume of sediment collected was insufficient for faunal analysis in each grab attempt made at a particular station, a photograph was taken and, if possible, material removed for PSA. The station was then abandoned.

At four stations, additional grabs were collected to retrieve material for contaminant analyses using a 0.1m^2 Day Grab (Figure 5) and following the methodology detailed in the EA operational instruction 10_01 (Environment Agency, 2007). Surface scrapes (i.e. the recently deposited sediment) were removed from each grab to a maximum depth of 1 cm (avoiding the anoxic layer). A metal scoop was used to collect material for organic contaminant analyses and a plastic scoop for heavy metals. The remaining material was then discarded. The upper 1 cm was used as this provides a record of the most recent contaminant levels deposited in the sediment. All samples were frozen at -20°C after collection.

Figure 4. Mini-Hamon grab (left), and equipment for sieving benthic fauna samples (right)

Figure 5. Day grab for collecting contaminants samples

Sediment descriptions were recorded for each sample collected. For consistency across all the MCZ benthic habitat surveys, these were based on a pictorial field guide produced by Cefas marine sedimentologists, a modified Folk seabed sediment classification system (Long, 2006) (Figure 7) and the Wentworth Scale (Table 2).

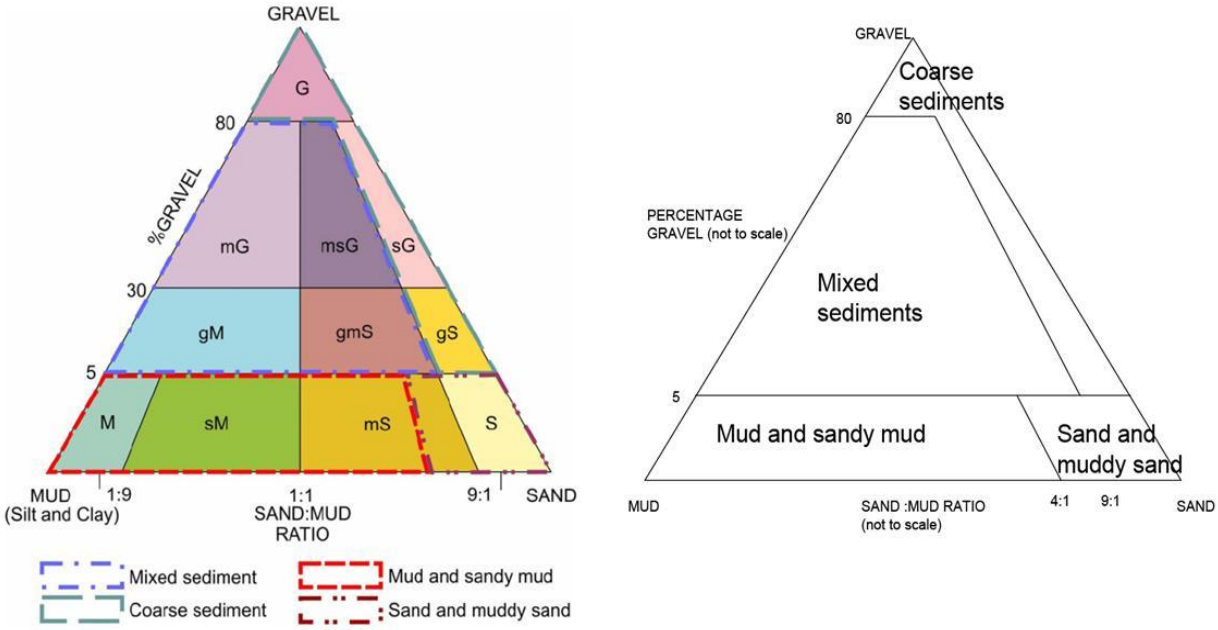

Figure 6. Simplified sediment classification of the Folk triangle for UK SeaMap (Long, 2006).

Table 2. Sediment grade terms and size limits (Wentworth, 1922).

Size	Grade Terms
> 256 mm	Boulder
> 64 - 256 mm	Cobble
4 - 64 mm	Pebble

3. Survey Narrative

Between the 26th July and 6th August 2018, the Runnel Stone MCZ survey took three 'on-task' days to complete (Table 3). Daily progress reports for each survey day are available from the Environment Agency on request.

Table 3. Summary of equipment deployments during the 2018 Runnel Stone Marine Conservation Zone survey.

Equipment	Dates	Duration
Mini-Hamon grab deployments	2nd and 4th August	Two days
Day grab deployments	5th August	One day

Environment Agency survey personnel mobilised to the survey vessel *Solent Guardian* berthed in Plymouth Yacht Haven on the 26th July before transiting to Penzance Harbour in preparation for the grabbing phase of the survey. In the afternoon repairs were required to the starboard side steering pump. On the 27th July, a southerly veering south-westerly wind with a moderate to rough sea state meant *Solent Guardian* was down-weathered for the day. No survey operations could take place. The next two days were also lost to bad weather.

On the 2nd August, *Solent Guardian* (moored in Padstow Harbour), departed at 07:00 UTC to transit to the Runnel Stone MCZ site. At 12:15 UTC Mini-Hamon grabbing operations began with nine stations yielding viable Biota and PSA samples and two additional stations yielding PSA samples only. LNDE24 was the only station from which no valid samples were taken. At 16:00 UTC a crack in the grab dampener frame was observed, halting grab operations for the day and *Solent Guardian* transited to Penzance Harbour to allow repairs to be carried out. The 3rd August was utilised for fixing the grab dampener and a staff change over.

The following morning, with a variable, light sea breeze, and smooth to slight sea state, *Solent Guardian* departed Penzance Harbour. At 09:03 UTC operations began. A total of 23 grab stations were completed, with 14 producing sediments suitable for Biota and PSA, four PSA only and five with insufficient sediment for viable samples. *Solent Guardian* ceased operations at 16:44 UTC and waited in Mounts Bay for the Penzance Harbour lock gates to open.

On the 5th August, *Solent Guardian* waited for the lock gates to open at 09:30 UTC. During this time the Mini-Hamon Grab was removed and the Day Grab rigged. With a calm sea, and light winds the contaminants sampling commenced at 11:33 UTC. All four stations were visited with viable samples recovered from each station. *Solent Guardian* transited back to Mounts Bay at 12:54 UTC and waited for the tide to access

Penzance Harbour. The vessel was alongside at 21:00 UTC. Demobilisation of survey personnel and equipment occurred the following day.

4. Data Acquisition

4.1 Sample collection summary

Samples collected during the 2018 Runnel Stone MCZ survey are summarised in Table 4.

Table 4. Summary of samples collected during the 2018 Runnel Stone Marine Conservation Zone survey.

Equipment	Data Type	No. of samples
Mini-Hamon grab	Biota and PSA	23
	PSA only	6
Day grab	Contaminants	4

To address Objective 1, viable grab samples to assess the relative extent, distribution and community composition of the sediment feature were successfully recovered from across the survey area. Viable samples for both biota and PSA were collected at 23 stations, using the Mini-Hamon Grab (Figure 7). At six stations, the quantity of sediment collected was only sufficient for PSA. Six stations (LNDE 24, LNDE21, LNDE20, LNDE19, LNDE15, and LNDE12) selected for groundtruthing yielded only discards. Additionally, samples were collected at four stations (LNDE03, 14, 25 and 31 for both particle size and sediment contaminant analyses (heavy metals, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, tributyltin) inside the MCZ boundary for background monitoring.

To address Objective 4, physico-chemical and water quality measurements were captured throughout the grabbing survey using a CTD (Conductivity, Temperature and Depth) probe.

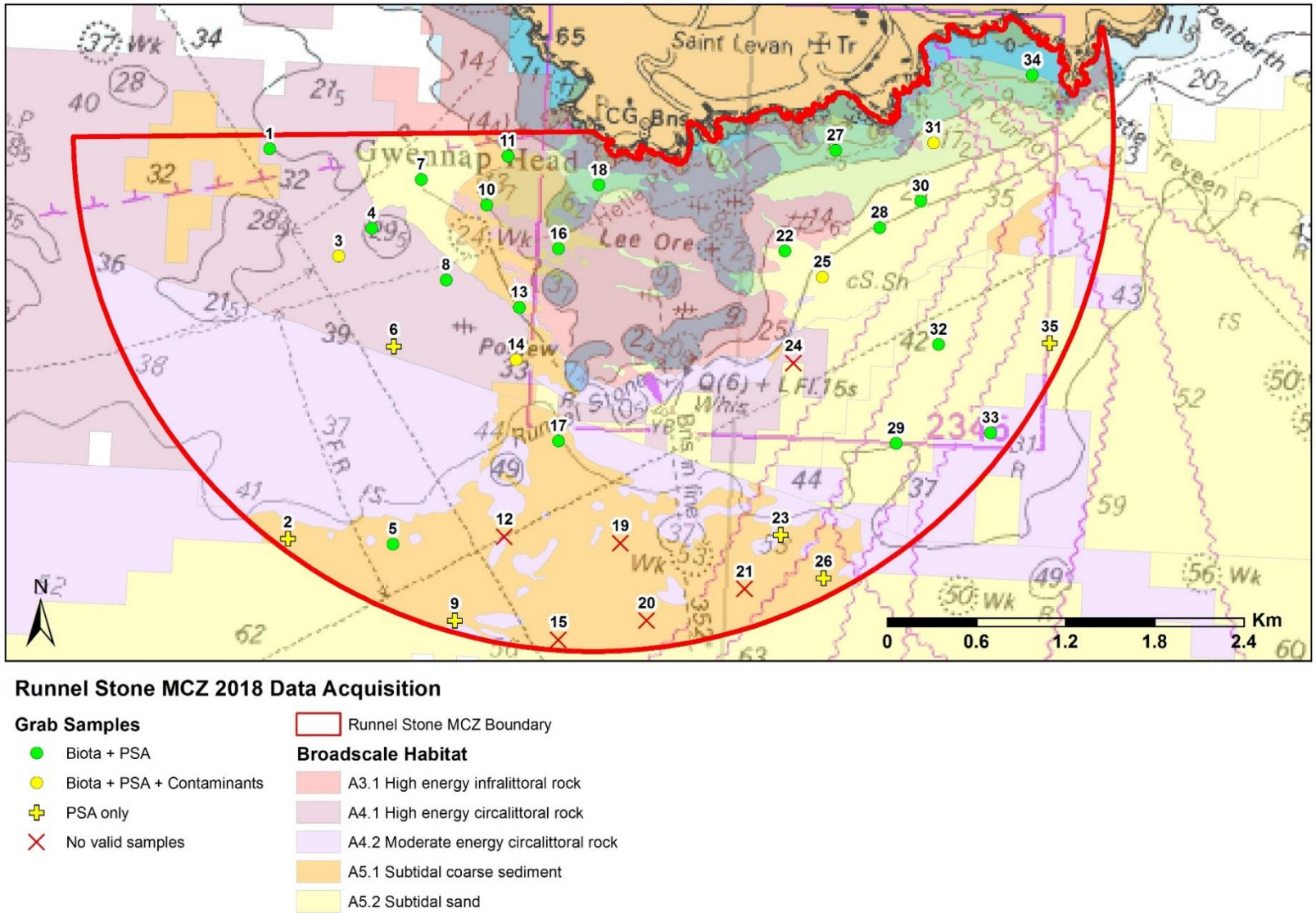

Figure 7. Runnel Stone MCZ Summer 2018 grab survey results, mapped over interpreted Broadscale Habitat data (Evans and Colenutt, 2015)

4.2 Evidence of anthropogenic activity

No evidence of anthropogenic activity was identified during the survey within the Runnel Stone MCZ.

5. References

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6. General List of Abbreviations

BSH	Broadscale Habitat
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CHP	Civil Hydrography Programme
CS	Camera Sledge
CSV	Coastal Survey Vessel
DC	Drop Video Camera
Defra	Department for Environment, Food and Rural Affairs
DG	Day Grab
EA	Environment Agency
ECMAS	Estuarine and Coastal Monitoring & Assessment Service
ENG	Ecological Network Guidance
EUNIS	European Nature Information System
FOCI	Features Of Conservation Importance
IFCA	Inshore Fisheries and Conservation Authority
MCZ	Marine Conservation Zone
MESH	Mapping European Seabed Habitats
PSA	Particle Size Analysis
REC	Regional Environmental Characterisation
RSG	Regional Stakeholder Group
SAC	Special Area of Conservation
SAD	Site Assessment Document
SNCB	Statutory Nature Conservation Body
SOP	Standard Operating Procedure
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
STR	Subsea Technology and Rentals
UTC	Coordinated Universal Time

7. Annexes

7.1 Coastal Survey Vessel General Information

Briggs Marine and Environmental Services Ltd.
Seaforth House, Seaforth Place, Burtisland, Fife, KY3 9AX.
Tel: +44(0)1592 872939
Email: marketing@briggsmarine.com
Website: www.briggsmarine.com

Solent Guardian

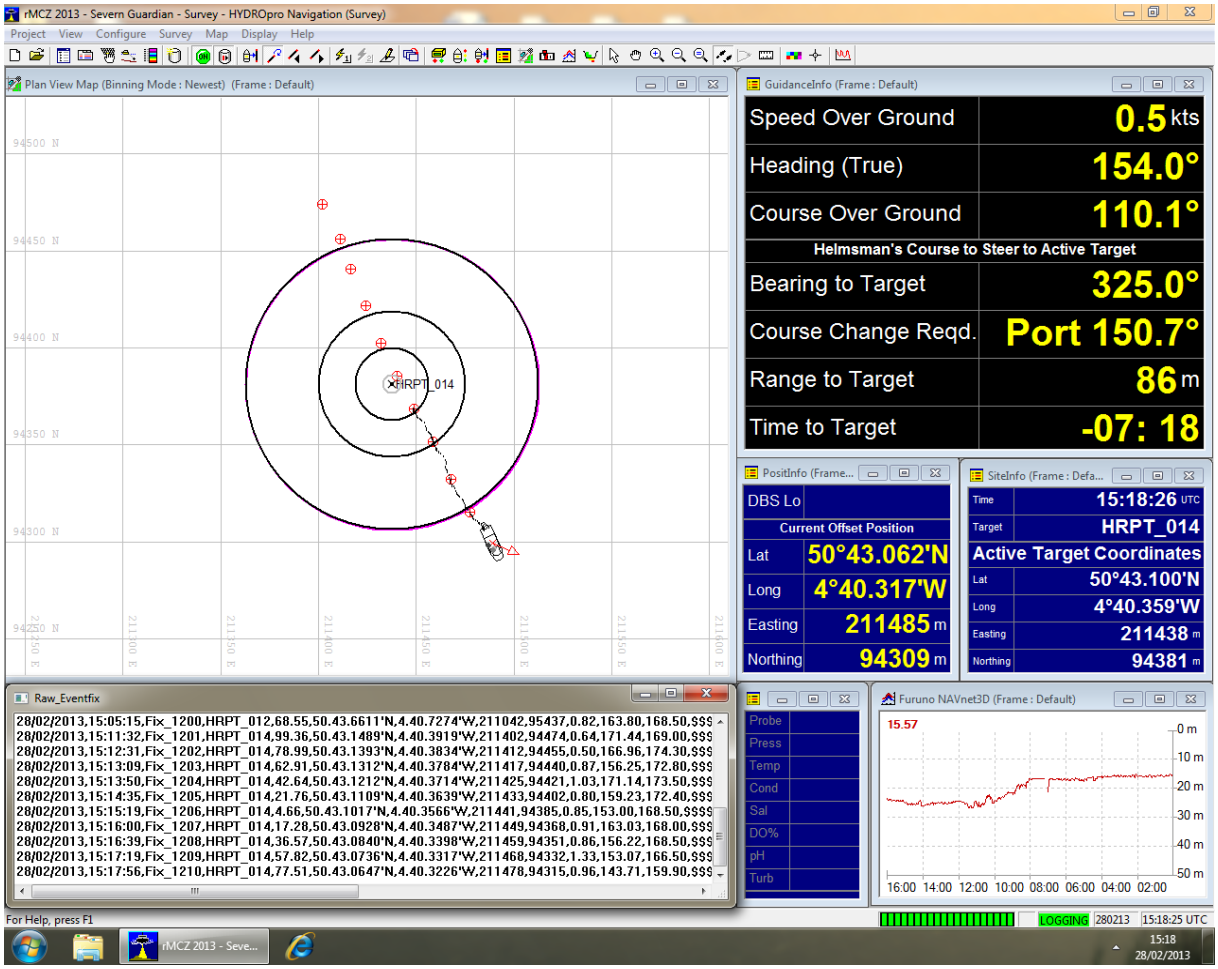
General Information
Length: 18.3 m
Beam: 6.3 m
Draft (baseline): 1.15 m
Draught (skegs): 2.2 m
Displacement (light ship): 22 T
Displacement (full load): 30 T
Service Speed: 16 knots
Maximum Speed: 18 knots

Main Equipment
Main Engines: 2 x Volvo D9-MH 261 bkW @ 2200 rpm. Twin Disc MGX-5075 integral vee-drive
Crew: 7
Scientific Officers: Up to 10
Accommodation: 3 x twin cabins and mess
Data network to share information around vessel
Wet lab/bench for processing water, sediment and ecology samples
Fridge/freezer for sample storage
Dry lab space for two computers and data processing
Large aft deck working area
A frame – 2 T SWL
Double Independent Drum Trawl Winch – 2 T SWL
Hydraulic crane

7.2 Survey Equipment

7.2.1 Navigation and Positioning

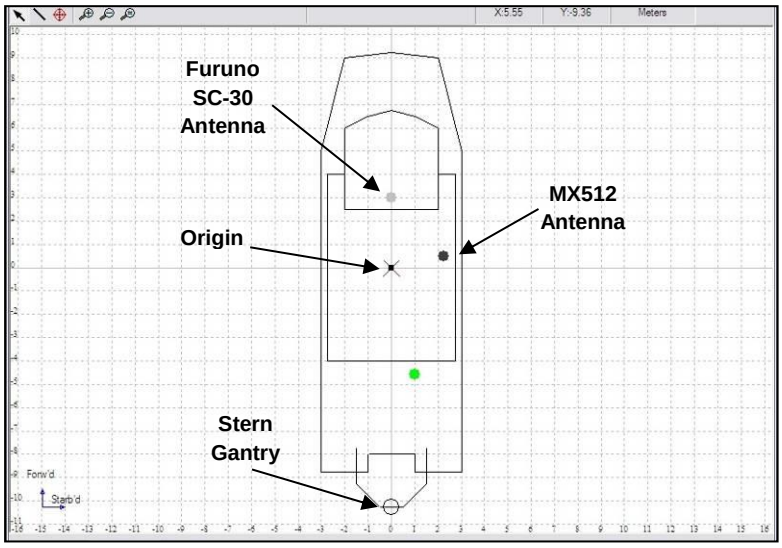
Trimble® HYDRO*pro*™ software is utilised for real-time navigation and survey data acquisition.



Trimble® HYDRO*pro*™ software screen grab displaying real-time navigation and survey data acquisition for a MCZ drop camera survey line.

Navigational and survey equipment offsets on the Coastal Survey Vessel *Solent Guardian* (Environment Agency Estuarine and Coastal Monitoring & Assessment Service).

NMEA Device	Make/Model	Offset Name	Offset (m) X (Starb'd)	Y (Forw'd)	Z +ve (Up)
Gyrocompass	Simrad Robertson RGC50	n/a	-	-	-
Navigation Echosounder	Furuno DFF1, 525ST-MSD transducer	n/a	-	-	-
Survey Echosounder	Kongsberg EA400	n/a	-	-	-
Origin	n/a	Origin	0.0	0.0	0.0
Navigation GPS (Secondary)	Furuno SC-30 DGPS	Furuno SC-30 Antenna	0.0	3.0	0.0
Survey GPS (Primary)	SIMRAD MX512 DGPS	MX512 Antenna	2.25	0.5	0.0
n/a	n/a	Sediment Grab (Stern Gantry)	0.0	-10.25	0.0



Trimble® HYDROpro™ vessel editor screen showing survey equipment offsets from the origin (Environment Agency Estuarine and Coastal Monitoring & Assessment Service).

7.3 Grab Survey Metadata

Date	Time	Sample Point	WGS84 Lat	WGS84 Long	OSGB36 Easting	OSGB36 Northing	STN No.	Hydro Pro Fix	Water Depth	Sediment Use	Sediment Volume (Litres)	Latitude (decimal degrees)	Longitude (decimal degrees)
Sampling gear = Mini-Hamon grab, sieve mesh = 1 mm													
02/08/2018	12:24	LNDE25	50°01.6881'N	5°39.5441'W	138 045	020 646	1	Fix_4295	37.7	Biota+PSA	9.6	50.02813	-5.65907
02/08/2018	12:33	LNDE22	50°01.7785'N	5°39.7686'W	137 785	020 827	2	Fix_4296	29.18	Biota+PSA	10.4	50.02965	-5.66281
02/08/2018	12:43	LNDE28	50°01.8806'N	5°39.2419'W	138 423	020 985	3	Fix_4298	34.42	Biota+PSA	11.2	50.03135	-5.65403
02/08/2018	12:52	LNDE30	50°01.9841'N	5°39.0184'W	138 699	021 164	4	Fix_4299	31.16	Biota+PSA	11.2	50.03307	-5.65031
02/08/2018	13:17	LNDE34	50°02.4608'N	5°38.4250'W	139 450	022 012	7	Fix_4302	7.63	Biota+PSA	10.4	50.04101	-5.64042
02/08/2018	13:25	LNDE31	50°02.2107'N	5°38.9626'W	138 786	021 580	8	Fix_4303	15.31	Biota+PSA	11.2	50.03685	-5.64938
02/08/2018	13:34	LNDE27	50°02.1526'N	5°39.5096'W	138 128	021 505	9	Fix_4304	13.44	Biota+PSA	9.6	50.03588	-5.65850
02/08/2018	13:44	LNDE24	50°01.3735'N	5°39.6886'W	137 844	020 072	10	Fix_4305	43.5	Empty	0	50.02289	-5.66147
02/08/2018	13:48	LNDE24	50°01.3734'N	5°39.6846'W	137 849	020 071	10	Fix_4306	43.43	Empty	0	50.02288	-5.66140
02/08/2018	13:51	LNDE24	50°01.3774'N	5°39.6817'W	137 853	020 079	10	Fix_4307	43.47	Empty	0	50.02296	-5.66136
02/08/2018	14:11	LNDE17	50°01.0500'N	5°40.9906'W	136 261	019 549	12	Fix_4309	59.05	Biota+PSA	4.8	50.01750	-5.68317
02/08/2018	14:24	LNDE23	50°00.7540'N	5°39.6897'W	137 786	018 924	13	Fix_4310	60.3	Empty	0	50.01257	-5.66150
02/08/2018	14:30	LNDE23	50°00.7493'N	5°39.7138'W	137 757	018 917	13	Fix_4311	59.26	PSA only	0.8	50.01249	-5.66190
02/08/2018	14:37	LNDE23	50°00.7724'N	5°39.6863'W	137 792	018 958	13	Fix_4312	59.73	Discarded	0	50.01287	-5.66143
02/08/2018	14:46	LNDE26	50°00.6035'N	5°39.4654'W	138 040	018 633	14	Fix_4313	62.48	Discarded	1.6	50.01007	-5.65776
02/08/2018	14:51	LNDE26	50°00.5992'N	5°39.4468'W	138 062	018 623	14	Fix_4314	61.73	Empty	0	50.00999	-5.65745
02/08/2018	14:57	LNDE26	50°00.5913'N	5°39.4395'W	138 070	018 608	14	Fix_4315	61.96	Empty	0	50.00985	-5.65733
02/08/2018	15:03	LNDE26	50°00.5970'N	5°39.4585'W	138 048	018 620	14	Fix_4316	63.03	Empty	0	50.00995	-5.65764
02/08/2018	15:13	LNDE26	50°00.6003'N	5°39.4597'W	138 047	018 626	14	Fix_4317	62.09	PSA only	1.6	50.01001	-5.65766
02/08/2018	15:27	LNDE29	50°01.0967'N	5°39.0897'W	138 534	019 524	15	Fix_4318	52.98	Discarded	3.2	50.01828	-5.65148
02/08/2018	15:32	LNDE29	50°01.1009'N	5°39.0887'W	138 535	019 532	15	Fix_4319	53.18	Discarded	0	50.01835	-5.65149
02/08/2018	15:38	LNDE29	50°01.1010'N	5°39.0901'W	138 534	019 532	15	Fix_4320	53.28	Biota+PSA	8.8	50.01835	-5.65150
02/08/2018	15:46	LNDE33	50°01.1656'N	5°38.5372'W	139 199	019 620	16	Fix_4321	47.29	Discarded	0	50.01944	-5.64229

Date	Time	Sample Point	WGS84 Lat	WGS84 Long	OSGB36 Easting	OSGB36 Northing	STN No.	Hydro Pro Fix	Water Depth	Sediment Use	Sediment Volume (Litres)	Latitude (decimal degrees)	Longitude (decimal degrees)
02/08/2018	15:51	LNDE33	50°01.1532'N	5°38.5278'W	139 209	019 596	16	Fix_4322	46.6	Empty	0	50.01922	-5.64214
04/08/2018	09:03	LNDE35	50°01.4886'N	5°38.2588'W	139 561	020 202	17	Fix_4323	53.19	Empty	0	50.02481	-5.63765
04/08/2018	09:08	LNDE35	50°01.5011'N	5°38.2544'W	139 567	020 225	17	Fix_4324	53.16	Discarded	2.4	50.02502	-5.63757
04/08/2018	09:15	LNDE35	50°01.4920'N	5°38.2524'W	139 569	020 208	17	Fix_4325	53.16	PSA only	2.4	50.02487	-5.63754
04/08/2018	09:26	LNDE33	50°01.1561'N	5°38.5609'W	139 170	019 603	18	Fix_4326	50.15	Biota+PSA	6.4	50.01927	-5.64268
04/08/2018	09:35	LNDE32	50°01.4737'N	5°38.8743'W	138 825	020 210	19	Fix_4327	52.44	Empty	0	50.02456	-5.64790
04/08/2018	09:41	LNDE32	50°01.4670'N	5°38.8781'W	138 820	020 198	19	Fix_4328	52.19	Biota+PSA	6.4	50.02445	-5.64797
04/08/2018	09:58	LNDE21	50°00.5466'N	5°39.9010'W	137 515	018 553	20	Fix_4329	66.12	Empty	0	50.00911	-5.66502
04/08/2018	10:05	LNDE21	50°00.5755'N	5°39.8918'W	137 529	018 606	20	Fix_4330	66.01	Discarded	0	50.00959	-5.66486
04/08/2018	10:11	LNDE21	50°00.5542'N	5°39.9049'W	137 511	018 567	20	Fix_4331	66.35	Discarded	0	50.00924	-5.66508
04/08/2018	10:21	LNDE20	50°00.4142'N	5°40.4426'W	136 857	018 339	21	Fix_4332	66.58	Mis-fire	0	50.00690	-5.67404
04/08/2018	11:20	LNDE20	50°00.4219'N	5°40.4254'W	136 878	018 352	21	Fix_4333	66.39	Discarded	0	50.00703	-5.67376
04/08/2018	11:27	LNDE20	50°00.4233'N	5°40.4231'W	136 881	018 355	21	Fix_4334	66.39	Discarded	0.8	50.00705	-5.67372
04/08/2018	11:34	LNDE20	50°00.4351'N	5°40.4313'W	136 872	018 377	21	Fix_4335	66.06	Discarded	1.6	50.00725	-5.67385
04/08/2018	11:44	LNDE19	50°00.6901'N	5°40.6124'W	136 679	018 860	22	Fix_4336	63.51	Mis-fire	0.8	50.01150	-5.67687
04/08/2018	11:50	LNDE19	50°00.7173'N	5°40.6103'W	136 684	018 910	22	Fix_4337	63.08	Mis-fire	1.6	50.01196	-5.67684
04/08/2018	11:57	LNDE19	50°00.6991'N	5°40.6213'W	136 669	018 877	22	Fix_4338	63.67	Discarded	0	50.01165	-5.67702
04/08/2018	12:08	LNDE15	50°00.3290'N	5°40.9332'W	136 263	018 210	23	Fix_4339	65.53	Mis-fire	0.48	50.00548	-5.68222
04/08/2018	12:14	LNDE15	50°00.3436'N	5°40.9558'W	136 237	018 239	23	Fix_4340	65.12	Empty	0	50.00573	-5.68260
04/08/2018	12:21	LNDE15	50°00.3219'N	5°40.9349'W	136 261	018 197	23	Fix_4341	65.36	Discarded	0.32	50.00536	-5.68225
04/08/2018	12:33	LNDE09	50°00.3807'N	5°41.5216'W	135 565	018 341	24	Fix_4342	63.89	PSA only	2.4	50.00634	-5.69203
04/08/2018	12:39	LNDE09	50°00.3893'N	5°41.5643'W	135 515	018 359	24	Fix_4343	63.91	Empty	0	50.00649	-5.69274
04/08/2018	12:46	LNDE09	50°00.3813'N	5°41.5476'W	135 534	018 343	24	Fix_4344	63.82	Empty	0	50.00636	-5.69246
04/08/2018	12:57	LNDE12	50°00.6930'N	5°41.2669'W	135 898	018 904	25	Fix_4345	62.16	Discarded	0.8	50.01155	-5.68778
04/08/2018	13:04	LNDE12	50°00.6809'N	5°41.2335'W	135 937	018 880	25	Fix_4346	1.62	Discarded	0.8	50.01135	-5.68722
04/08/2018	13:11	LNDE12	50°00.6739'N	5°41.2452'W	135 922	018 867	25	Fix_4347	62.15	Discarded	0.48	50.01123	-5.68742

Date	Time	Sample Point	WGS84 Lat	WGS84 Long	OSGB36 Easting	OSGB36 Northing	STN No.	Hydro Pro Fix	Water Depth	Sediment Use	Sediment Volume (Litres)	Latitude (decimal degrees)	Longitude (decimal degrees)
04/08/2018	13:42	LNDE05	50°00.6461'N	5°41.8926'W	135 147	018 854	26	Fix_4348	62.34	Biota+PSA	3.2	50.01077	-5.69821
04/08/2018	13:54	LNDE02	50°00.6505'N	5°42.4943'W	134 429	018 898	27	Fix_4349	61.62	Mis-fire	1.6	50.01084	-5.70824
04/08/2018	14:00	LNDE02	50°00.6468'N	5°42.4822'W	134 443	018 890	27	Fix_4350	62.32	PSA only	2.4	50.01078	-5.70804
04/08/2018	14:06	LNDE02	50°00.6461'N	5°42.5043'W	134 417	018 890	27	Fix_4351	62.02	Discarded	0.8	50.01077	-5.70841
04/08/2018	14:13	LNDE02	50°00.6329'N	5°42.5025'W	134 418	018 866	27	Fix_4352	62.04	Mis-fire	1.6	50.01055	-5.70837
04/08/2018	14:27	LNDE14	50°01.3315'N	5°41.2500'W	135 977	020 086	28	Fix_4353	37.08	Biota+PSA	11.2	50.02219	-5.68750
04/08/2018	14:38	LNDE06	50°01.3613'N	5°41.9258'W	135 173	020 181	29	Fix_4354	47.29	Mis-fire	0.8	50.02269	-5.69876
04/08/2018	14:44	LNDE06	50°01.3614'N	5°41.9402'W	135 156	020 182	29	Fix_4355	46.98	Empty	0	50.02269	-5.69900
04/08/2018	14:49	LNDE06	50°01.3637'N	5°41.9415'W	135 154	020 186	29	Fix_4356	47.14	PSA only	2.4	50.02273	-5.69903
04/08/2018	14:55	LNDE06	50°01.3641'N	5°41.9318'W	135 166	020 186	29	Fix_4357	47.39	Empty	0	50.02274	-5.69886
04/08/2018	15:04	LNDE08	50°01.6139'N	5°41.6655'W	135 507	020 633	30	Fix_4358	33.46	Biota+PSA	9.6	50.02690	-5.69443
04/08/2018	15:14	LNDE13	50°01.5163'N	5°41.2485'W	135 995	020 428	31	Fix_4359	33.72	Empty	0	50.02527	-5.68748
04/08/2018	15:18	LNDE13	50°01.5269'N	5°41.2459'W	135 999	020 448	31	Fix_4360	33.87	Biota+PSA	11.2	50.02545	-5.68743
04/08/2018	15:31	LNDE16	50°01.7471'N	5°41.0426'W	136 262	020 843	32	Fix_4361	20.58	Biota+PSA	4.8	50.02912	-5.68404
04/08/2018	15:43	LNDE18	50°01.9844'N	5°40.8322'W	136 535	021 271	33	Fix_4362	14.49	Biota+PSA	11.2	50.03307	-5.68054
04/08/2018	15:52	LNDE10	50°01.8906'N	5°41.4583'W	135 779	021 134	34	Fix_4363	28.13	Empty	0	50.03151	-5.69097
04/08/2018	15:58	LNDE10	50°01.8925'N	5°41.4590'W	135 779	021 137	34	Fix_4364	27.93	Biota+PSA	9.6	50.03154	-5.69098
04/08/2018	16:08	LNDE11	50°02.0733'N	5°41.3519'W	135 923	021 466	35	Fix_4365	25.76	Biota+PSA	8	50.03455	-5.68920
04/08/2018	16:16	LNDE07	50°01.9737'N	5°41.8336'W	135 339	021 310	36	Fix_4366	34.75	Biota+PSA	9.6	50.03289	-5.69723
04/08/2018	16:25	LNDE01	50°02.0571'N	5°42.6949'W	134 319	021 515	37	Fix_4367	35.15	Biota+PSA	11.2	50.03429	-5.71158
04/08/2018	16:35	LNDE03	50°01.6937'N	5°42.2812'W	134 779	020 818	38	Fix_4368	36.16	Biota+PSA	11.2	50.02823	-5.70469
04/08/2018	16:44	LNDE04	50°01.7874'N	5°42.0995'W	135 005	020 981	39	Fix_4369	34.29	Biota+PSA	11.2	50.02979	-5.70166
Sampling gear = Day Grab													
05/08/2018	11:33	LNDE31	50°02.1970'N	5°38.9597'W	138 788	021 555	40	Fix_4370	18.97	Contaminants	-	50.03662	-5.64933
05/08/2018	11:53	LNDE25	50°01.6909'N	5°39.5496'W	138 039	020 652	41	Fix_4372	39.03	Contaminants	-	50.02818	-5.65916
05/08/2018	12:19	LNDE14	50°01.3362'N	5°41.2506'W	135 976	020 095	42	Fix_4374	38.89	Contaminants	-	50.02227	-5.68751

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05/08/2018	12:40	LNDE3	50°01.6802'N	5°42.2772'W	134 783	020 792	43	Fix_4376	39.81	Contaminants	-	50.02800	-5.70462

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