

Outer Dowsing Offshore Wind Preliminary Environmental Information Report Volume 2, Appendix 9.3: Phase I Intertidal Survey

Date: June 2023

Outer Dowsing Document No: 6.2.9.3
Internal Reference: PP1-ODOW-DEV-CS-REP-0048

Rev: V1.0

GoBe Consultants

Outer Dowsing Offshore Wind Project – Phase I Intertidal Survey

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Date of issue: November 2022

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Report should be cited as:

“APEM (2022). Outer Dowsing Offshore Wind Project Phase I Intertidal Survey. APEM Scientific Report P00010660. GoBe Consultants, 15 November 2022, v2.1 Final, 15 pp.”

Revision and Amendment Register

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1.0	17-19/10/2022	All	All	Document Creation	SP
1.1	19/10/2022	All	All	Survey lead review	ID
1.2	20/03/2022	All	All	Final internal review	CA
1.3	11/11/2022	All	All	Client review	PN
2.0	15/11/2022	All	All	Addressing client comments	SP
2.1	15/11/2022	All	All	Final internal review	CA

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1. Introduction

As part of the Preliminary Environmental Information Report (PEIR) for the proposed onshore Export Cable Corridor (ECC) landfall location for Outer Dowsing Offshore Wind (the Project), an environmental survey was required to characterise the intertidal habitats present and inform the Environmental Impact Assessment (EIA). APEM Ltd were commissioned to conduct the intertidal habitat mapping survey at the proposed landfall location. The proposed landfall site is located at Wolla Bank on the Lincolnshire coast between Anderby Creek and Chapel St Leonards.

1.1 Scope

The aim of the survey was to determine the intertidal biotope composition, biotope distribution, extent of sub-features and notable biotopes within the ECC. Any features of conservation importance including Annex I habitats and notable species were to be delineated, with the aim of achieving 100% coverage of the shore within the survey area. Any features of nearby designated sites were also to be noted.

1.2 Survey site

The survey area is located between Anderby Creek and Chapel St Leonards on the Lincolnshire coast (Figure 1). The survey area is located within the Greater Wash Special Protection Area (SPA), designated for wildlife interest; and overlaps the Chapel Point to Wolla Bank Site of Special Scientific Interest (SSSI), designated for geological interest (see Figure 1).



Figure 1: Location of the Phase I Survey Area and Designated Sites

2. Methodology

2.1 Overview of survey design

The survey approach focused on Phase I intertidal biotope mapping based on consideration of best practice guidance including Davies *et al.* (2001), Wyn *et al.* (2006), JNCC (2010), Saunders *et al.* (2011), Noble-James *et al.* (2018) and Natural Resources Wales (2019). The survey design aimed to obtain standardised information on the presence and extent of the broad scale habitats (BSH) and habitats of conservation importance (HOCl) within the survey area including the production of biotope maps.

2.2 Phase I methodology

The Phase I survey was conducted on foot to determine the distribution and extents of biotopes, biotope complexes and lifeforms present with the aim of achieving 100% coverage of the shore within the survey area, including all soft and hard substrata. Within each distinct soft sediment habitat, *in situ* sampling was carried out by digging a 20 x 20cm area to a depth of 10cm and sieving to look for conspicuous characterising species. Sieves with 0.5mm and 1.0mm mesh were taken into the field, but initial testing with the 0.5mm mesh sieve found the mesh was too fine for the sediment to easily pass through and therefore the 1.0mm mesh was used for subsequent sampling.

Biotopes/habitats were assigned in the field according to JNCC's National Marine Habitat Classification for Britain and Ireland: Version 04.05 (Connor *et al.* 2004), Parry (2015) and the EUNIS classification system (EUNIS, 2022).

For each biotope/habitat surveyors recorded:

- Notes relating to the biotic assemblage including key taxa present, when applicable;
- Substrate type;
- Wave exposure;
- Shore type;
- Presence of surface pools;
- Anthropogenic pressures; and
- Key features of interest.

All data were recorded on Marine Nature Conservation Review (MNCR) record forms. Photographs of each habitat or feature of interest were taken and a hand-held GPS system (accuracy 3m or better) was carried throughout the survey to accurately plot waypoints of the features and biotopes to inform subsequent mapping.

2.3 Field team and equipment details

The survey was completed by a two-person survey team. The team was led by Ines Días, APEM Marine Scientist, supported by Isabel Black from APEM Marine Biolabs.

The team carried the following equipment:

- Fujifilm Finepix XP70 and Panasonic Lumix FT30 digital cameras;
- Garmin eTrex 10 handheld GPS to mark waypoints of biotope boundaries, anthropogenic pressures etc;
- A trowel for digging sediment; and
- 1.0mm and 0.5mm sieves for in-situ assessment of soft-sediment fauna.

2.4 Survey timing

The intertidal survey work was timed to coincide with low spring tides to allow the maximum extent of the shore within the survey area. The fieldwork was completed on 11th October 2022. Due to the time of low water and limitations of daylight hours, work was only possible during one low tide period. Details of survey timings in relation to tide time, height and sunrise time are provided in Table 1.

Table 1: Survey timings in relation to tide times, heights and sunrise

Date	Day	Sunrise (BST)	Sunset (BST)	Low Tide (BST)	Tide height (m)
11/10/2022	Tuesday	07:17	18:12	14:29	0.7

2.5 Health and safety

A Site Risk Assessment (SRA) was completed by the Marine Laboratory Manager (Nicola Pennisi) in advance of the survey. This SRA was reviewed and assessed by APEM's H&S Manager (Luke Teague). In addition, a daily dynamic risk assessment was carried out by the lead surveyor (Ines Días) on site prior to the commencement of any fieldwork and during the survey as required, to identify any additional H&S concerns that were not covered in the original SRA.

Primary health and safety concerns were the risk of becoming trapped by incoming tides and exposure risks. All staff wore appropriate Personal Protective Equipment (PPE) for survey work, including lifejackets and waterproofs to minimise exposure risks, and carried a field first aid kit and throw rope.

All staff were provided with the tidal information for the survey site, including the times of sunrise and sunset for each day, which were carried at all times. Check-in and out calls were

made to office-based staff at previously agreed times, coinciding with expected times of starting and completing work each day.

2.6 Biosecurity

As Invasive and Non-Native Species (INNS) are a major contributor to biodiversity loss, all necessary steps were taken to prevent the spread of such species into non-affected areas. APEM staff members have extensive knowledge of INNS and routinely work in accordance with standard good practice biosecurity measures to avoid their spread. Measures to prevent the spread and introduction of INNS were adhered to on site, including:

- Cleaning of equipment, clothes and boots before carrying out any work on site;
- When on or near water, equipment was drained after use and dried as far as possible;
- Clothes and boots were dried thoroughly at the end of the survey day.

3. Results

3.1 Health and safety incidents

There were no incidents, near misses or other health and safety issues to report under APEM's Health and Safety procedures.

3.2 Biotopes

The intertidal Phase I survey area measured approximately 1.75km in length from north to south and approximately 250m between high and low water marks. The survey area was located on an east-facing shore subject to moderate wave exposure. A total of five biotopes were recorded during the Phase I survey. These are mapped in Figure 2 and summarised in Table 2.

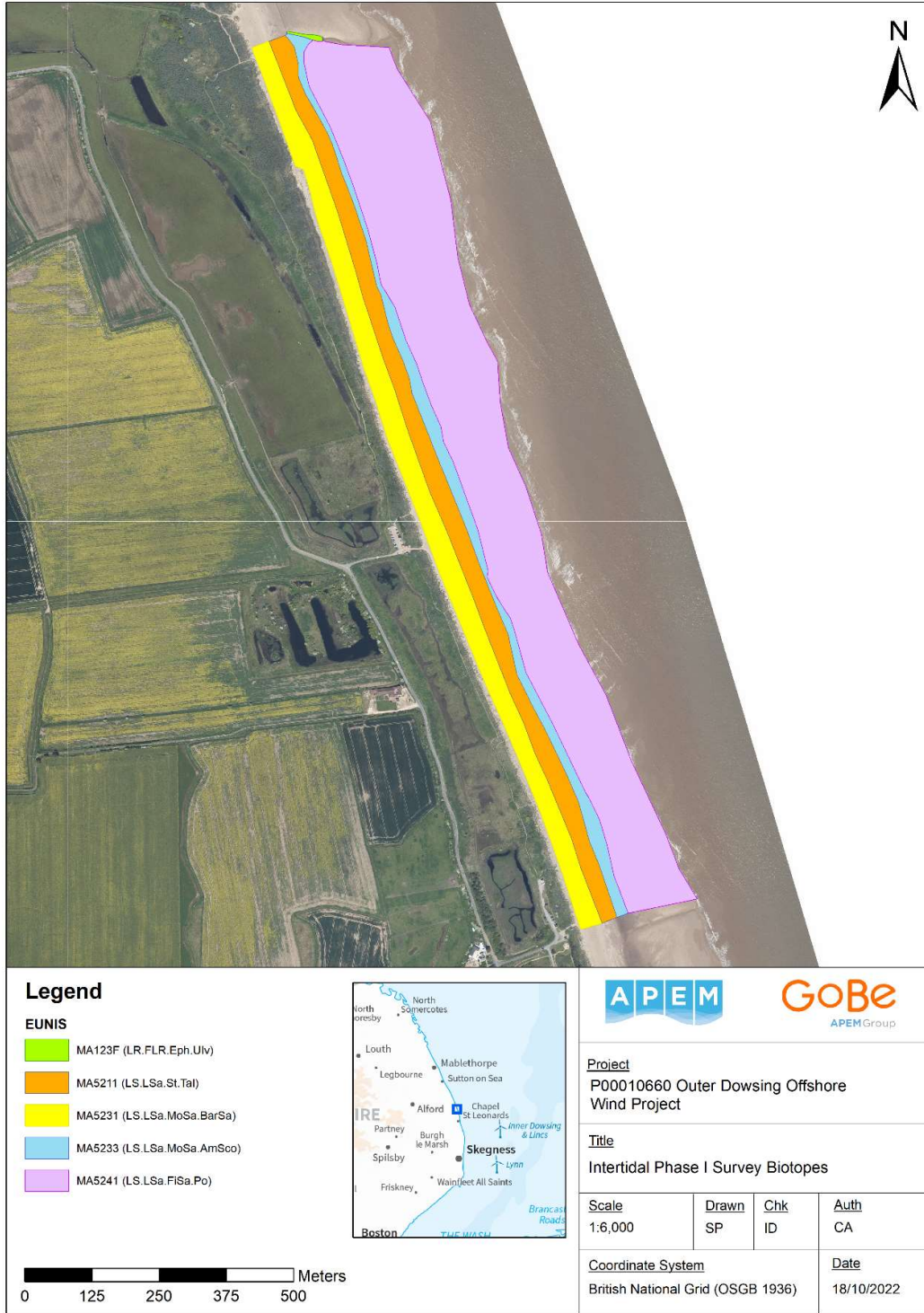


Figure 2: Distribution of biotopes recorded in the intertidal survey area

Table 2: Summary of biotopes recorded within the intertidal survey area

JNCC Code	Description	EUNIS Code
LR.FLR.Eph.Ulv	<i>Ulva</i> spp. on freshwater-influenced and/or unstable upper eulittoral rock	MA123F
LS.LSa.St.Tal	Talitrids on the upper shore and strand-line	MA5211
LS.LSa.MoSa.BarSa	Barren littoral coarse sand	MA5231
LS.LSa.MoSa.AmSco	Amphipods and <i>Scolecipis</i> spp. in littoral medium-fine sand	MA5233
LS.LSa.FiSa.Po	Polychaetes in littoral fine sand	MA5241

The uppermost part of the shore along the entire length of the survey area comprised barren sand and fine shell fragments below dune vegetation (Figure 3). This sand was above the strandline and surface digging and sieving revealed no visible fauna. It was assigned to the biotope 'barren littoral coarse sand' (LS.LSa.MoSa.BarSa; MA5231).



Figure 3: View south along the barren sand biotope (LS.LSa.MoSa.BarSa; MA5231) on the uppermost part of the shore

Immediately below the barren sand biotope was a strandline littered with washed up fronds of the bryozoan *Flustra foliacea* and larger bivalve mollusc shells (Figure 4). Sandhoppers

Talitrus saltator were present amongst the debris. The strandline itself was less than 1m in width but was situated at the top of a slope that extended 30-35m down to the middle shore along the full length of the survey area (see Figure 2). This slope had visible talitrid burrows but no other fauna was found during surface digging and *in situ* sieving. The strandline and slope were therefore assigned to the biotope 'talitrids on the upper shore and strand-line' (LS.LSa.St.Tal; MA5211).



Figure 4: View north along the strandline and slope with talitrid burrows biotope (LS.LSa.St.Tal; MA5211)

The middle shore habitat immediately below the upper shore slope featured rippled mobile sand interspersed with coarser gravel and shell fragments. This habitat included numerous drainage channels flowing from the slope above and remained partially submerged throughout the tidal cycle (Figure 5). Fauna found during *in situ* sampling in this habitat included the spionid polychaete *Scolelepis* spp. (Figure 6), the amphipod *Haustorius arenarius* and the mysid shrimp *Gastrosaccus spinifer*. This habitat was a good match for the standard description for the biotope 'Amphipods and *Scolelepis* spp. in littoral medium-fine sand' (LS.LSa.MoSa.AmSco; MA5233).



Figure 5: View north along the middle shore showing the biotope 'Amphipods and *Scolelepis* spp. in littoral medium-fine sand' (LS.LSa.MoSa.AmSco; MA5233)



Figure 6: *Scolelepis* spp. amongst coarser gravel found on the middle shore

The mid to low shore extending from the LS.LSa.MoS.a.AmSco biotope down to the low water mark comprised the largest habitat within the survey area. The substrate consisted of fine to medium sand, with occasional channels carrying runoff from the upper shore. The sand was occasionally rippled, but there were also large expanses of flat sand with surface water present in places (Figure 7). Surface digging and *in situ* sieving of sediment found the polychaetes *Nephtys* spp. and *Arenicola marina*. This habitat was assigned to the biotope 'Polychaetes in littoral fine sand' (LS.LSa.FiSa.Po; MA5241). *Lanice conchilega* tubes and *A. marina* casts (Figure 8) were recorded on the lower shore, but not with sufficient frequency (less than one per m²) to be considered as distinct biotopes. However, there were several empty *L. conchilega* tubes observed on the lower shore, suggesting this species may be present in greater abundance extending into the sublittoral.



Figure 7: View south along the mid to low shore 'Polychaetes in littoral fine sand' biotope (LS.LSa.FiSa.Po; MA5241)



Figure 8: *Lanice conchilega* tube (left) and *Arenicola marina* cast (right) observed on the lower shore within the LS.LSa.FiSa.Po habitat

On the middle shore at the northernmost extent of the survey area is the Anderby Main Drain outfall, which is a man-made structure comprised of concrete and steel pilings reinforced with rock armour at its seaward end. This structure represented the only hard substrate within the survey area, which supported an assemblage of the ephemeral green algae *Ulva* spp. and was assigned to the biotope 'Ulva spp. on freshwater-influenced and/or unstable upper eulittoral rock' (A1.451; MA123G).



Figure 9: Anderby Main Drain outfall at the northern end of the survey area

3.3 Features of designated sites

The intertidal survey area is located within the Greater Wash SPA (see Figure 1). The conservation objectives for this site are to “Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The population of each of the qualifying features; and
- The distribution of the qualifying features within the site.” (Natural England, 2016)

The qualifying features of the Greater Wash SPA are the following bird species:

- A001 red-throated diver *Gavia stellata* (non-breeding);
- A065 common scoter *Melanitta nigra* (non-breeding);
- A177 little gull *Hydrocoloeus minutus* (non-breeding);
- A191 sandwich tern *Sterna sandvicensis* (breeding);
- A193 common tern *Sterna hirundo* (breeding); and
- A195 little tern *Sternula albifrons* (breeding).

None of these species were observed during the survey, but the intertidal sediments within the survey area may constitute foraging habitats.

The southern half of the survey area overlaps the Chapel Point to Wolla Bank SSSI (see Figure 1). This SSSI is designated for its importance as a geological site for its intertidal sediments, which record the evidence of early Holocene sea level change. These features are buried beneath the foreshore and were therefore beyond the scope of the current survey.

3.4 Non-native invasive species

No non-native invasive species were observed during the survey.

3.5 Anthropogenic activity

The survey area is located between the holiday resorts of Chapel St Leonards and Anderby Creek, both of which feature caravan parks and holiday retreats, with the foreshore readily accessible to visiting tourists and local walkers.

The foreshore is subject to annual beach replenishment by the Environment Agency as part of the Lincolnshire coast flood defence strategy (Redford, 2022). This involves dredging subtidal sand for redistribution on the foreshore. During the Phase I survey the tracks of plant machinery used for this process were observed on the upper shore (Figure 10).

As noted in Section 3.2, the Anderby Main Drain outfall is located on the middle shore at the northernmost extent of the survey area, providing a source of freshwater input onto the shore.



Figure 10: Vehicle tracks along the upper shore of the survey area

4. Discussion

A total of five biotopes were identified during the phase I survey, occurring in a consistent zonation pattern from the upper to lower shore throughout the survey area. The majority of the survey area was characterised by clean, mobile sand with low faunal diversity, with the only exception being a man-made outfall structure supporting ephemeral green algae assigned to the biotope '*Ulva* spp. on freshwater-influenced and/or unstable upper eulittoral rock' (A1.451; MA123G). The upper shore was divided between 'barren littoral coarse sand' (LS.LSa.MoSa.BarSa; MA5231) above the high water mark and 'talitrids on the upper shore and strand-line' (LS.LSa.St.Tal; MA5211) extending in a slope from high water down to the mid shore.

The mid shore had a thin band of coarser, partially submerged sediment characterised as ‘amphipods and *Scolecopsis* spp. in littoral medium-fine sand’ (LS.LSa.MoSa.AmSco; MA5233). Below this, the biotope occupying most of the survey area from the mid to lower shore was ‘polychaetes in littoral fine sand’ (LS.LSa.FiSa.Po; MA5241).

The species characterising these habitats typically have opportunistic life history strategies, with short life histories, rapid maturation and extended reproductive periods. They can also withstand sediment mobility through a combination of robustness, mobility and ability to re-position themselves within the substratum. As such, they are tolerant of disturbed environments and can recover quickly. The polychaete *Nephtys* spp. also has a relatively high reproductive capacity and widespread dispersion during its lengthy larval phase and is considered likely to have a high recoverability following disturbance (MES, 2008). The foreshore is also subject to a degree of disturbance in the form of annual beach replenishment using dredged subtidal sediment as part of the local flood defence strategy.

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