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**Intertidal survey of proposed LAL cable landing at
Cleve Hill, September 2004.**

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Centre for Marine And Coastal Studies
CMACS Ltd.
C/o Port Erin Marine Laboratory
Port Erin
Isle of Man IM9 6JA

Tel: 01624 831 018
Fax: 01624 831 043

Introduction

It is presently anticipated that the main power cable or cables to shore from the proposed LAL offshore windfarm be laid up the beach in the general area of Cleve Marshes. Provisional cable routes were provided to CMACS Ltd by the client, and intertidal surveys of the area carried out following consultation with the owner of the area, Kent Wildlife Trust, and English Nature.

Background information for the area

Invertebrate communities have recently been summarised for the Medway, Swale and North Kent Marshes estuary system (Worsfold et al, 2004). Of 426 stations known to have been surveyed quantitatively, 352 (82%) were assigned to the biotope LMU.Smu.HedMac (*Hediste* and *Macoma balthica* on littoral sandy muds, now referred to as LS.LMu.MEst.HedMac), including those stations closest to the study area.

Mussel beds, though not described in any detail in Worsfold et al (2004), which concentrates more on infauna, are well known to be present in the area, and were noted in preliminary observations of the area by RPS Plc and CMACS Ltd.

Beds of the eelgrass *Zostera* spp were also known to be present in the area. In recent years *Zostera* beds on the Southern shore of the Thames Estuary appear only to have been reported from near Hoo Marina in the Medway and at Cleve Marshes in the Swale (Irving, 1998), although a number of other smaller beds were previously found in and around the Medway estuary (Wyer et al, 1977). They are relatively small in both number and extent compared to beds on the north Shore (Wyer et al, 1977 and Irving, 1998). Wyer et al (1977) found both *Zostera marina* and *Zostera noltii* at Cleve Marshes, although only the dwarf eelgrass *Zostera noltii* was mentioned by Irving (1998).

The Kent Wildlife Trust was contacted and permission obtained for a walk-over survey. CMACS was told by Kent Wildlife Trust that digging/destructive sampling was not permitted without specific consent from English Nature. Since English Nature had already requested that the survey concentrate on mapping the *Zostera* beds and mussel beds rather than a detailed classification of biotopes such consent was not sought at the time. Although the removal of sediment and biological samples is required for detailed biotope classification, all biotopes in the area were mapped as far as possible by visual inspection.

Survey Methods

Surveys of the main biotope boundaries were carried out using a Garmin GPS system with a quoted accuracy of +/- 10m. Preliminary observations on the site were made from public rights of way prior to the survey, and local knowledge was sought in order to identify potential hazards. The survey was carried out on the morning of Tuesday 28th September, on a moderately large spring tide (predicted low water 0.9m for Whitstable 07:20), by a pair of experienced intertidal biologists.

Biotopes are here described according to the most recent classification available (Connor et al, 2004). Most older work has used the biotope classification version 97.06 (Connor et al, 1997).

Results

Names and descriptive notes of the biotopes found are given in Table 1, while the distribution of the biotopes is given in Figure 1.

In this survey, areas within/adjacent to the mussel beds appeared to very closely match the biotope LMU.Smu.HedMac (*Hediste* and *Macoma balthica* on littoral sandy muds), identified as widespread in the area by Worsfold et al (2004). Substantial areas of muddy sands to the east were likely to be a very similar biotope, but appeared on this visit to have a higher proportion of lugworm *Arenicola marina*, and were thus tentatively classed as the LS.LSa.MuSa.MacAre (*Macoma balthica* and *Arenicola marina* in littoral muddy sand).

The *Zostera* beds match the biotope LS.LMp.LSgr.Znol (*Zostera noltii* beds in littoral muddy sand). *Zostera marina* was not observed on this occasion, though the composition of the bed was not surveyed in detail. In general, the condition of the *Zostera* appeared good, with little evidence of seasonal die-back.

The mussel beds most closely match the biotope LS.LBR.LMus.Myt.Sa (Mussel *Mytilus edulis* beds on littoral sand).

The main other feature noted was a bank of shells raised approximately half metre above the surrounding area, which was present virtually all the way along the northern (i.e. seaward) edge of the mussel bed and muddy sand biotopes; this shell bank was partially submerged even at low tide on the day in question. The shells were mainly mussels, cockles, oysters, with some sand gaper *Mya arenaria*. There were also a few dead *Mya* shells on the finger-like protrusion of mussels. Since the surveyors were not allowed to dig it was not possible to determine the presence or distribution of live *Mya*, but it is often abundant in biotopes such as LMU.Smu.HedMac (Connor et al, 1997) so is likely to be widespread in the area.

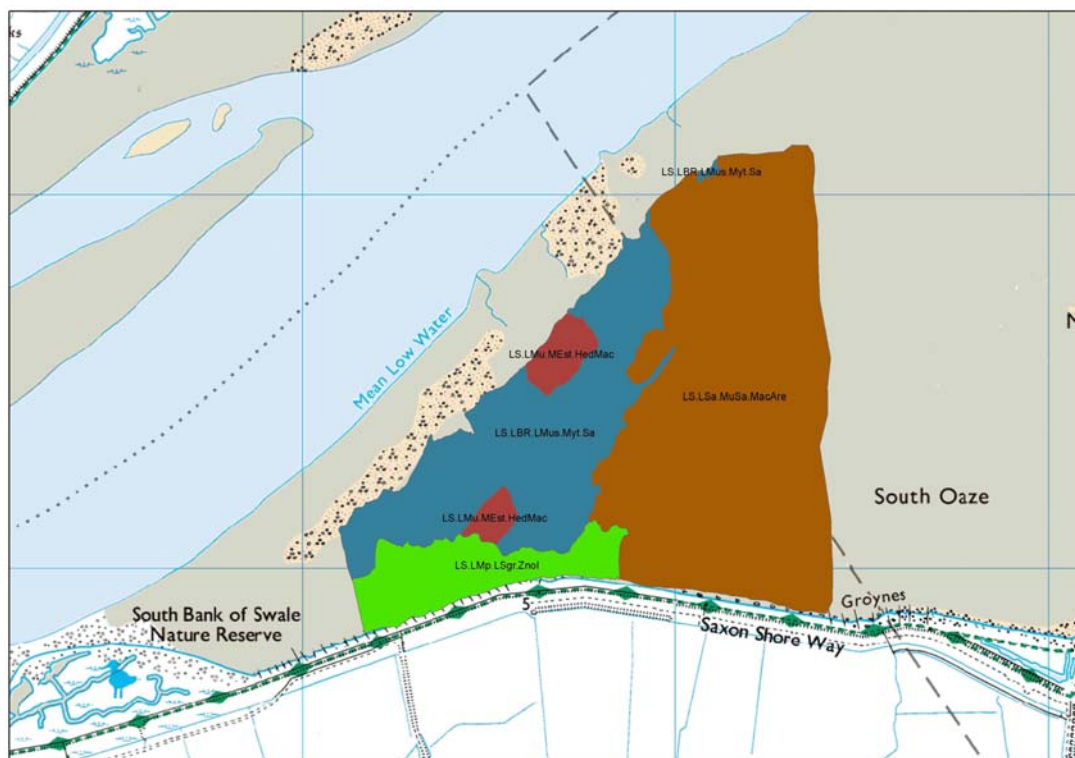


Figure 1– biotope map of the area around the proposed intertidal cable route. This product has been derived in part from material obtained from the UK Hydrographic Office with the permission of the Controller of Her Majesty’s Stationery Office and UK Hydrographic Office (www.ukho.gov.uk). © British Crown and SeaZone Solutions Ltd, 2004. All rights reserved. Data Licence No. 122004.001. NOT TO BE USED FOR NAVIGATION.

Table 1 – list of biotopes found during the intertidal survey with, descriptive notes

Biotope Code and Name	Additional notes
LS.LSa.MuSa.MacAre <i>Macoma balthica</i> and <i>Arenicola marina</i> in littoral muddy sand.	<i>Arenicola marina</i> casts were abundant throughout most of this area, <i>Corophium volutator</i> and <i>Hydrobia ulvae</i> common near the top of the shore. <i>Mya arenaria</i> likely to be present judging by the number of dead shells in the area.
LS.LMu.MEst.HedMac <i>Hediste</i> and <i>Macoma balthica</i> in littoral sandy mud.	
LS.LMp.LSgr.Znol <i>Zostera noltii</i> beds in littoral muddy sand	More or less continuous cover of quite dense <i>Zostera noltii</i> in most places, but becoming patchy to the east.
LS.LBR.LMus.Myt.Sa Mussel <i>Mytilus edulis</i> beds	The mussels are actually quite sparse, generally attached to exposed banks of cockle <i>Cerastoderma edulis</i> shells. Mussel beds also contain a few slipper limpet (<i>Crepidula fornicata</i>), also whelk

on littoral sand	<p><i>(Buccinum undatum)</i> shells (none alive).</p> <p>In the middle of the mussel bed were patches of mud devoid of mussels and <i>Zostera</i>. This mud contains <i>Arenicola marina</i>, <i>Corophium volutator</i> and <i>Hydrobia ulvae</i>.</p> <p>Small shallow pools around mussel beds contain erect bryozoans, hydroids and a few sand mason, <i>Lanice conchilega</i>, especially near the smaller patch on the cable route. This small mussel patch also contains a few oysters <i>Crassostrea gigas</i>.</p>
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