ENGLAND’S HISTORIC SEASCAPES: WITHERNSEA TO SKEGNESS PILOT STUDY

AGGREGATE LEVY SUSTAINABILITY FUND
MARINE AGGREGATES AND THE HISTORIC ENVIRONMENT

REVISED METHOD STATEMENT

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SUMMARY

The Museum of London Archaeology Service has been commissioned by English Heritage to undertake a pilot project to develop a methodology for Historic Seascape Characterisation (HSC). The aim of the project is to create a coastal, intertidal and maritime historic characterisation for a pilot area between Withernsea and Skegness, extending out to the median line with Holland. The intention of the project is to build on the methodology developed by Wessex Archaeology in their Liverpool Bay Pilot Study and trail methods that could be used in the development of a nation-wide HSC. This document outlines the process of marine characterisation as undertaken by the Museum of London Archaeology Service.

The report addresses the project aims and objectives and how they have been met. It describes and discusses the decisions made regarding the choice of baseline data for characterisation, the processing and interpretation of the various datasets to create the final character map and character areas.

This Method Statement addresses the modification and revisions made to the methodology developed by Wessex during the initial Liverpool Bay Pilot Study and should be read in conjunction with Wessex’s methodology document.
ACKNOWLEDGEMENTS

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The Museum of London Archaeology Service would like to thank the following participants for their interest in the project and contributions in our two stakeholder meetings: Andrew Barron (Environment Agency), Giles Bartlett (North Eastern Sea Fisheries Committee), Mark Bennet (Lincolnshire HER), Trevor Brigham (Humber Archaeology Partnership), Paul Bryan (Defra MFA), John Buglass (Humber Archaeology Partnership), Glyn Coppack (English Heritage East of England Regional Team), Virginia Dellino-Musgrave (English Heritage Maritime Archaeology Team), Paul Eastwood (CEFAS), Dave Evans (Humber Archaeology Partnership), Graham Fairclough (English Heritage Characterisation Team), Helen Fenwick (Hull University), Naomi Field (Lindsey Archaeology Service), Andy Hammon (English Heritage Yorkshire and the Humber Regional Team), Guy Hannaford (UK Hydrographic Office), Dave Hooley (English Heritage Characterisation Team), Laura Jackson (Lincolnshire HER), Louise Jennings (LinCS CC), Isobel Johnson (Marine Fisheries Agency), Stewart Kemsley (DCMS), Brian Kerr (EH), Tom Lane (APS Archaeology), Kevin Leahy (North Lincs Museum), Edward Lewis (Lincolnshire HER), Malcolm Lillie (Hull University), Beryl Lott (Lincs Principle Arc), Michael Meekums (Defra), Bob Moss (UK Hydrographic Office), Peter Murphy (English Heritage Maritime Archaeology Team), Sally Murray (Natural England), Mark Newman (National Trust), Adam Partington (LinCS CC), Chris Pater (English Heritage Maritime Archaeology Team), Jim Rees (CEFAS), Ian Rowlandson (North Lincs Community Archaeologist), Mark Russell (BMAPA), Alison Williams (North Lincolnshire SMR), Jim Williams (East Midlands EH) and Jenny Young (Lincs Heritage).

The Museum of London Archaeology Service would like to thank all of the organisations that have provided data for the project and advice regarding the methodological development. These include the Joint Nature Conservation Committee (JNCC), The UK Hydrographic Office (UKHO), English Heritage, East Riding of Yorkshire SMR, The Humber Archaeology Partnership, Lincolnshire HER, North Lincolnshire HER, North East Lincolnshire HER, Lindsey Archaeological Services, Landmark Mapping, SeaZone Solutions Ltd, Ordnance Survey (OS), the Environment Agency (EA), the British Geological Survey (BGS), the North Eastern Sea Fisheries Committee, CEFAS.

The characterisation work and all project reports were compiled by Jo Lyon and Audun Clark. Geomatics support and database organisation was carried out by Sarah Jones. IT support was provided by Jeremy Ottovanger. Dick Malt managed the project for MoLAS.
1 Introduction

1.1 Project background
The Museum of London Archaeology Service (hereafter referred to as MoLAS) has been commissioned by English Heritage to carry out a pilot research project to develop a methodology that builds on Wessex Archaeology’s initial pilot for extending Historic Landscape Characterisation (HLC) to the coastal, intertidal and marine zones of England. The pilot project area runs from Withernsea to Skegness, takes in the tidal extent of the Humber Estuary and extends out into the North Sea to the median line with Holland.

1.2 Project Aims
- To apply and, if necessary, develop the Wessex Archaeology Liverpool Bay methodology in a different type of coastal and marine environment (the Withernsea to Skegness and adjacent marine zone pilot area).
- To create a GIS-based characterisation of the historic and archaeological dimension in the present landscape, of the inter-tidal and marine zones of the project area to the limit of the UK Continental Shelf.
- To ensure that the historic environment GIS-database for the project area can be readily integrated with analogous databases for the natural environment.
- To create a framework of understanding which will structure and promote well-informed decision-making, relating to the sustainable management of change and conservation planning affecting the historic environment in the inter-tidal and marine zones.
- To enhance and contextualise the Maritime Record of the National Monuments Record and those County HERs impinging upon the project area, with particular regard to providing landscape-scale contextualisation of results from the Rapid Coastal Zone Assessment programme where available.
- To structure, inform and stimulate future research programmes and agendas relating to the project area.
- To improve the awareness, understanding and appreciation of the historic dimension of the project area to professional and non-professional users of the database.
- To be a demonstration project in the development of a methodology for extending HLC to the breadth of environmental and management conditions in England’s inter-tidal and marine zones and adjacent UK Continental Shelf.
1.3 Project objectives

- To deploy, assess and, as appropriate, develop the GIS-database structure created for the Liverpool Bay pilot area to enable it effectively to accommodate the distinctive qualities of the Withernsea to Skegness and adjacent marine zone pilot area, while retaining compatibility of the database with the interfacing or partly overlapping terrestrial characterisation databases.

- To produce a GIS-based HLC characterising the project area's landscapes in historic and archaeological terms, by means of:
  - Identifying and gaining access to the range of data sources relevant to understanding the historic and archaeological dimension of the project area, placing greatest emphasis on sources with consistent national coverage.
  - Using GIS polygons to define areas sharing similar historic character.
  - Defining polygons on the basis of combined shared values of dominant character attributes, with secondary attributes recorded in a consistent, structured manner.
  - Identifying trends and recurrent groupings among the attributes to define historic landscape types which will, together, encompass all of the polygons and reflect the differing historical processes in their formation.

- To record the sources and data-sets supporting each stage of the characterisation, to meet the needs of transparency and assist future updates against the initial benchmark characterisation.

- To analyse and interpret HLC to produce preliminary syntheses from it.

- To assess present uses and potential for HLC to inform sustainable management of change and spatial planning issues surrounding marine aggregates extraction in the project area.

- To assess present uses and potential for HLC to inform broader sustainable management of change, spatial planning, outreach and research programmes.

- To produce an archive and a report reviewing the methodological validation, development and practical application of HLC in this project area and assessing the benefits of extending such characterisation more widely to the historic environment in the inter-tidal and marine zones to the limit of the UK Continental Shelf.

- To disseminate information on the progress and results of the project through professional and popular publications and other media.

1.4 The final product and user interface

The final product comprises an ARCGIS project, web-pages and interactive map, a report, method statement and archive.

The web interface requires no knowledge of GIS to be able to access the characterisation. The web pages consist of a gazetteer and interactive map to allow the user to either access character areas descriptions by name or via the interactive map (see Method Statement). The pages
contain the full characterisation narratives for each different character area with multimedia images (see Method Statement).

The ArcGIS project provides access to the Characterisation_polygon layer allowing the user initially to view the project by top most, or most dominant, layer. Querying the Characterisation_polygon layer reveals the layered internal structure of the project, revealing the rationale behind the project’s basic construction. Polygons can be queried in different ways, according to the specific attributes that are of interest.

1.5 Key terms

The terminology used in this report conveys the underlying hierarchy of terms used by MoLAS in the development of the character map. The key terms are outlined here.

1.5.1 Attributes

The term attribute is used to describe the criteria that each polygon is measured and identified against. Every polygon has an attribute table and the range of different attributes that each polygon can possess in the GIS project are the same for every polygon, ie broad character type, sub character type, etc. The polygons in the GIS project are generated using the information contained in the attribute table. The attributes were chosen during initial study of all the activities/features that took place/existed in the study area. The attributes are designed to make explicit various bits of information about each feature’s character. It was really through deciding and then studying the attributes in each area that characterisation occurred.

Attribute tables were populated via automatic or manual means, depending on the type of information it was necessary to capture. Definitions of attribute types are given in Section 4.1.7.

1.5.2 Character_Areas

Character_Areas essentially represent an aggregation of similar sub-character polygons, which can be found in close spatial proximity to one another. Character_Areas are named after their topographic location or in some cases according to the predominant human uses evident in the area. The Character_Area layer is separate from the Characterisation_polygon layer and forms a contiguous layer across the pilot area.

1.5.3 Characterisation polygons

Term used throughout the project to refer collectively to the layer of sub-character polygons from which the GIS project is generated and which form the finest scale of polygonisation in the database.

1.5.4 Broad Character Type

Broad Character type is the highest level of characterisation summarisation. The Pilot Area has been split up into seven different broad character categories: Coastal industry, Offshore industry, Flood defence and reclamation, Military, Navigation, Settlement and Recreation. Detailed definitions of the different Broad Character types are provided in Section 6.3.
1.5.5 Character Type

Character Type is the intermediate level of characterisation summarisation, between Broad Character and Sub-Character type. Detailed definitions of the different Character Types are provided in Section 6.3.

1.5.6 Sub-Character Type

Sub-Character is the finest scale of characterisation and represents a character assessment based on different features or attributes identified and digitised from different map and in some cases documentary sources. It is the base map for the higher levels of characterisation. More detailed definitions of the different Sub-Character types are provided in Section 6.3.

1.6 Revisions and modifications to Wessex’s Marine HLC GIS-based methodology

This statement of revision and modification to the Method Statement written for Wessex’s pilot study conducted in 2006. This modification document should be read in conjunction with the Marine HLC GIS-based methodology document prepared by Wessex.

The structure of the report will follow that of Wessex and additional entries will only be made where the methodology has been modified or not followed. The section numbering will mirror that of the Wessex report to aid cross referencing.
## 2 Core Datasets

The following table contains the datasets used in the project.

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<th>Location</th>
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<tbody>
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<td>UKHO</td>
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</tbody>
</table>
2.1 Application of Core Datasets

All core datasets were extensively interrogated to define the overall character, character types and also shape the final character polygons. No specific shapes were derived exclusively from any one dataset but are an amalgam of data transposed into areas of human usage of the seascape as represented by the character polygons. In this respect the GIS Project represents a “new” map based on many inputs.

2.2 Base mapping

As a member of the Ordnance Survey (OS) Pan-Government agreement, English Heritage has an organisation-wide license to provide OS digital base mapping for projects funded by them. OS digital data was used for terrestrial base mapping during the project. These were loaded directly into the project.

Digital chart data was acquired through digitisation of UKHO historical and modern charts for the Humber estuary area and from SeaZone Solutions Ltd which provided the coastal and offshore base mapping and core dataset. These were loaded directly into the project after some rationalisation to select the necessary details to be displayed.

Hard copy and digital copy of the Albert Close Fishing Chart was obtained from UKHO and the digital image was geo-referenced to British National Grid (OSGB 36) at MoLAS. This map provided excellent spatial detail on historic fishing activities and favourable and unfavourable areas.

2.3 Bibliographic and other documentary sources

MoLAS performed an initial project bibliographic review to gather sources on general archaeological, historic and contemporary information on the study area. Following the bibliographic search MoLAS staff undertook visits to Hull, Lincoln and other locations to collect maps and written sources from local libraries, museum collections, record offices and archives.

2.4 Model of sea level change

A model of sea level change was not produced for the Withernsea to Skegness pilot study (see Final Report, section 4.8, for more detail). The palaeolandscape was considered when assigning attributes and where possible identified and recorded. The features of the palaeolandscape were identified from the SeaZone bathymetric data, the underlying geology and supplementary documentary sources and used predominantly to inform on the previous character of the Characterisation_polygons.
2.5 Standards

The project has followed the best practice principles proposed by Aldred and Fairclough’s *Historic Landscape Characterisation Taking Stock of the Method* (2002). This project has also built on the concept that GIS has great potential to be used not simply as a display tool but as an interpretation tool. The project has taken potential beyond idea that it can be used as a tool for producing amalgamated map overlays but that also it can be used to create a complex layered sequence of character polygons, which can be ordered in different ways depending on how the user wishes to query the database.

With regard to standards for GIS, mapping, and terminology, the Withernsea to Skegness pilot has adhered to *Guidelines for English Heritage projects involving GIS* (English Heritage 2004) and utilised EH online thesauri (*Inscription*) (see MoLAS Method Statement).

The core datasets were maintained in their original projections for the intermediary analysis period of the project and the final layers were projected in WGS_1984_UTM_Zone_31N. For more on projection see 4.1.1

2.6 Software

The characterisation process undertaken for the England’s Historic Seascapes: Withernsea to Skegness pilot study used ESRI ArcGIS 9.1, ArcINFO license level.

The multimedia component within England’s Historic Seascapes: Withernsea to Skegness pilot study offers interactive and illustrative insights into the characterisation of the modern and historic environment for the marine and maritime areas. The microsite was developed using ESRI ArcIMS and Microsoft Content Management Server 2002 SP3.
3 Approaches to Seascape Characterisation

The methodological development, analysis and trialing of previous approaches and the detailed philosophical approach to characterising coastal and marine historic seascapes are described in the main report for the project (MoLAS 2009, 28).

The approach taken by MoLAS is similar to Wessex’s ‘multi-mode’ approach, with the exception that an intermediate layering system, grouped under broad themes, was not created. An intermediate layer was created which included all the core datasets, grouped and arranged for maximum efficacy and inter-visibility. This intermediate GIS project was visually investigated and interrogated to inform on the shape and attributes of the Characterisation_polygons, which in turn informed on the shape and attributes of the Character_Area(s).

3.1 Characterisation_polygons creation and Character_Area analysis

There are broad similarities between the WA and the MOLA approach and essentially the two levels of characterisation – “Character Analysis” and “Character Area Analysis”, previously employed by Wessex, were adopted for this study. The characterisation levels were renamed, “Characterisation_polygons” and “Character_Area”, however, in order to prevent confusion with the WA method and highlight the focus of the MoLAS study on the overlapping polygon method.

The Characterisation_polygons level represents an analysis of the morphology and recorded human usage of individual areas of the seascape as informed by the underlying core datasets and other external documentary sources. The Characterisation_polygons are designed to be overlapping to enhance the depth of available characterisation and interpretation by the user. See the main report for more on this.

The polygons were created by a process of data logging, observation and interpretation of combined data sets.

The attributes which form the descriptors of these polygons fall into three sections:

- Observation of anthropogenic activity (e.g. primary intrusive activity, other use)
- Observation of natural features (e.g. morphology, location)
- Data logging (e.g. unique identification number, main informing core dataset, area)

For example, if we interrogate the Characterisation_polygons ‘Traffic control’ in the Humber Estuary mouth, the following is recorded (see Fig 1):

- Primary intrusive activity (PRI_INT_ACT) = Navigation
- MORPHOLOGY = Sandy bedded channel
- DATASOURCE = SeaZone
Interpretation of the features indicates that the primary industry at work in this polygon is navigation. The period attribute also adds to interpretation. In the MoLAS reading of period, period applies to the date of origin of the dominant features of the polygon itself, the features that have been judged to give it its dominant character. The period attribute does not describe any of the other attributes of the polygon (i.e., sea bed floor), as is often the case in the WA pilot study.

The Character_Area polygons can be understood as a summary of the underlying Characterisation_polygons. The Character_Areas were generated by first displaying the Characterisation_polygons by Broad_Character, so patterns of use could be seen across the landscape. This was then studied in conjunction with the underlying OS mapping. Character_Areas were then assigned according to Broad_Character/geographic location. The Character_Area polygons are discrete and contiguous.

3.2 Methodological practicalities

As the majority of the datasets obtained were not directly incorporated into the final analysis layers little processing was necessary to make them usable as informative resources.

No division of data, other than by source, was employed which provided the possibility of a holistic approach allowing for sequenced and layered investigation and interrogation of the spatial and historical character of each location and polygon. The Characterisation_polygons in the GIS project were constructed to be overlapping and were layered sequentially according to dominance. The location of the polygon, on the sea floor, water column or sea surface, is recorded in the attribute table of each polygon. The result is that there will be whole sequences of polygons, in any of these locations, at any one point in the project. Layering by dominance, not by location, allows dominant use to be recorded and made visible, regardless of location in sea column. This is one of the great strengths of this approach as it allows multiple human uses to be made visible in any one area/point.

External data was provided in different formats including vector data (points, polygons and polylines) and raster data (image files stored as .Tiff, .JPG, .BMP file extensions). Each dataset was maintained as an independent originator entity, projected into the necessary co-ordinate system within the intermediary GIS analysis project. The only exception to this were the...
shapefiles provided by DEAL/DTI which were directly incorporated into the final analysis Characterisation_polygons layer, as there were no copyright issues pertaining to this data.

Point data was converted into polygons, where necessary (i.e., wellheads), and buffered to 500m radius to render them visible. The radius chosen was not arbitrary but related to the official exclusion zone which surrounds them. Polyline data was present for the pipeline locations and was converted into visible polygons by applying a 100m radius buffer around the polyline.

A vector grid system was not utilised as it was deemed to represent a degradation of the accuracy of the data being presented at the fine scales available during GIS operations. The scale for viewing the project area was set at 1:1,149,441.

As there was no intermediate processing of the datasets the MoLAS methodology deviates from the Wessex methodology, obviating the need for intensive processing and reprocessing of the information layers.

### 3.3 Digitisation of UKHO charts

MoLAS undertook the digitisation of a sequence of UKHO Admiralty charts covering the Humber Estuary area. To this end AutoCAD 2005 was utilised to digitise those features deemed pertinent to the classification of seascapes character.

```
Ukho_1828_-4fathoms  ukho_1902_navigation_buoys  ukho_2006_havens
Ukho_1828_0-4fathoms  ukho_1902_navigation_lights  ukho_2006_land
Ukho_1828_breakwaters  ukho_1902_railways  ukho_2006_military
Ukho_1828_docks_piers  ukho_1902_removed_details  ukho_2006_navigation_buoys
Ukho_1828_drying  ukho_1902_restricted_area  ukho_2006_navigation_lights
Ukho_1828_ferrys  ukho_1902_routes  ukho_2006_oil
Ukho_1828_havens  ukho_1926_breakwater  ukho_2006_pipeline_discharge
Ukho_1828_land  ukho_1926_depth_-3fathoms  ukho_2006_railways
Ukho_1828_lifeboats  ukho_1926_depth_0-3fathoms  ukho_2006_removed_details
Ukho_1828_marsh  ukho_1926_docks  ukho_2006_restricted_areas
Ukho_1828_military  ukho_1926_drying  ukho_2006_routes
Ukho_1828_navigation_buoys  ukho_1926_groynes  ukho_2006_spoilground
Ukho_1828_navigation_lights  ukho_1926_havens  ukho_2006_submarine_cables
Ukho_1828_removed_details  ukho_1926_land  ukho_2006_submarine_cables_disused
Ukho_1828_routes  ukho_1926_lifeboat  ukho_2006a_depth_0m-5m
Ukho_1851-2_anchorages  ukho_1926_marshes  ukho_2006b_depth_-5m-10m
Ukho_1851-2_conjectured_railway  ukho_1926_military
Ukho_1851-2_depth_-18_feet  ukho_1926_navigation_buoys
Ukho_1851-2_depth_0-18_feet  ukho_1926_navigation_lights
Ukho_1851-2_docks_piers  ukho_1926_railway
Ukho_1851-2_drying  ukho_1926_restrictions_areas
Ukho_1851-2_embankments  ukho_1926_routes
Ukho_1851-2_havens  ukho_1926_submarine_cable
Ukho_1851-2_land  ukho_2006_bathy
Ukho_1851-2_lifeboat  ukho_2006_bathy_-10m
Ukho_1851-2_marshes  ukho_2006_bathy_-15m
Ukho_1851-2_navigation_buoys  ukho_2006_bathy_-20m
Ukho_1851-2_navigation_lights  ukho_2006_bathy_-2m
Ukho_1851-2_railways  ukho_2006_bathy_-5m
```
### Table 1 Recorded details of digitised UKHO mapping

Charts from 1828, 1851-2, 1902, 1926 and 2006 were digitised to provide time depth of changes to the landscape and seascape. A standardised nomenclature was created to ensure that the same details were recorded (where present) for each temporally distinct map and that the recorded information would be readily comparable and elucidated.

The digitised CAD files were then imported into ArcGIS and investigated in conjunction with the other core datasets.
4 GIS approach to Seascape characterisation

The following sections provide an overview of the steps taken in the construction of the Characterisation polygons layer and the Character Area layer. These layers contain the distilled, interpreted and conflated information from the core datasets and secondary digital and documentary material. The workflow presented below should provide the reader with a framework for understanding the process and enable the methodological approach to be replicated and applied elsewhere.

The description of the stages of processing are presented as generic conceptual GIS processes which should be adaptable across a wide range of GIS platforms and not restrictive to the software used for this particular project (ESRI ArcGIS 9.1). The text is written at the level appropriate to a reader familiar with GIS practices, software and terminology and a working knowledge of co-ordinate systems and transformations.

4.1 GIS workflow

All the spatial datasets used for this project were stored in personal geodatabases, in nested folder hierarchies to separate out the mapping by projection (ED50, OSGB36, WGS84 and the final layer projection UTM31N).

Personal geodatabases were utilised as they allow for up to 2 gigabytes of spatial and attribute data to be stored conveniently and also allow for additional processes and tools to be used on the data, such as the application of topological rules to ensure that the final layers conform to their stated rules.

4.1.1 Projection

Using the power of GIS it was possible, once the intermediary analysis project was set up with the final projection and co-ordinate transformations, to import the other mapping, retaining its original projection but transformed to fit the spatial projection of the final layers. All AutoCAD digitisation was done in OSGB36.

The final layers were projected into UTM31N:

WGS_1984_UTM_Zone_31N
Projection: Transverse_Mercator
False_Easting: 500000.000000
False_Northing: 0.000000
Central_Meridian: 3.000000
Scale_Factor: 0.999600
Latitude_Of_Origin: 0.000000

The Universal Transverse Mercator (UTM) coordinate system is a grid-based method of specifying locations on the surface of the Earth. It is used to identify locations on the earth, but differs from the traditional method of latitude and longitude in several respects. The UTM system is not a single map projection. The system instead employs a series of sixty zones, each of which is based on a specifically defined Transverse Mercator projection.
The UTM system divides the surface of the Earth between 80° S latitude and 84° N latitude into 60 zones, each 6° of longitude in width and centred over a meridian of longitude. Zones are numbered from 1 to 60. Zone 1 is bounded by longitude 180° to 174° W and is centred on the 177th West meridian. Zone numbering increases in an easterly direction.

Each of the 60 longitude zones in the UTM system is based on a Transverse Mercator projection, which is capable of mapping a region of large north-south extent with a low amount of distortion. By using narrow zones of 6° in width, and reducing the scale factor along the central meridian to 0.9996, (a reduction of 1:2500) the amount of distortion is held below 1 part in 1,000 inside each zone. Distortion of scale increases to 1.0010 at the outer zone boundaries along the equator.

The reduction in the scale factor along the central meridian creates two lines of true scale located approximately 180 km on either side of, and approximately parallel to, the central meridian. The scale factor is too small inside these lines and too large outside of these lines, but the overall distortion scale inside the entire zone is minimized. The UTM system is not a single map projection. The system instead employs a series of sixty zones, each of which is based on a specifically defined Transverse Mercator projection.

4.1.2 Data integrity

Prior to data processing and/or capture, all sources were assessed and checked for reliability and co-ordinate system, projection and units. The differing data sources were stored in nested folder paths to keep the distinction between projections clear and then the data was imported into the ArcGIS intermediary project for analysis.

4.1.3 Data capture

The hard copy UKHO Admiralty charts for the Humber estuary were digitised on AutoCAD tablets in point and closed polygon format. The layer system was employed to identify each classification by date of chart and by feature record (see Section 3.3 for full list). Once digitised the CAD files were imported into personal geodatabases for ease of manipulation and imported into the intermediary GIS project. Their original co-ordinate system was maintained throughout.

4.1.4 Combining datasets

As the characterisation polygons were created by two authors it was necessary to combine their efforts at periodic intervals. This was done using a custom designed tool incorporating the ‘Merge’ function of the ArcGIS Toolbox.

4.1.5 Wreck clusters

The wreck cluster polygons in the Characterisation_polygons were generated by creating a georeferenced 500m² grid in AutoCAD which was then imported into the GIS project.

A combined featureclass containing the NMR wreck data and UKHO wreck data (from SeaZone) was created through the “Select by Attributes” GIS tool and the “Merge” tool mentioned described previously. The 500m² grid was then “joined” (another GIS tool) to the combined wreck data to produce a count of wrecks within each square.

The resulting polygons were interrogated to identify those containing “wreck clusters” and those polygons lifted out and merged with the Characterisation_polygons. Wreck clusters were defined as any 500m² grid square that contained 3 or more recorded wrecks. The decision was
made to not to look at wreck densities because the vast amount of wreck data in the study area would have made the GIS project unwieldy. It was decided that the presence of 3 wrecks or more would indicate the presence of ‘wreck character’ and that this would be adequate for characterisation purposes. If it became necessary to look at wreck density as a particular focus, the characterisation project would be useful for highlighting the areas of highest potential. A separate project could then be devised to study this in more depth.

The originator NMR and SeaZone wreck data was examined in conjunction with the other originator data sources to provide the entries for the attributes of the Characterisation_polygons and the Character_Area documents.

4.1.6 Polygon rules and topology

The Characterisation_polygons were defined by the following rules:

- Overlapping polygons are allowed to provide depth of information (see section 3.1)
- No multi-part polygons were to be used
- No gaps were allowed
- Where appropriate the Project_Area provides the outer extent of the polygon
- All attributes are to be filled in where possible and “Unknown” or “NA” used for empty entries appropriately

The Character_Area polygons were defined by the following rules

- Polygons are to be discrete (No Overlaps)
- Polygons are to be contiguous (No Gaps)
- Polygons are to use the Project_Area as outer extent where appropriate
- Character_Area must cover the Characterisation_polygons
- All attributes are to be filled in where possible

Topological rules were applied using ESRI ArcCatalog 9.1 and ArcGIS to the Characterisation_polygons (No Gaps) and the Character_Area polygons (No Gaps, No Overlap and Must Be Cover By) to ensure that the spatial rules were followed and any detected errors manually corrected from within the GIS.

4.1.7 Characterisation_polygons attribute population

The main characterisation attributes were populated by manual entry. Only the automatic systems administrative fields were automated (OBJECTID, Shape, Shape_length, Shape_Area).

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Population method</th>
<th>Example of terminology</th>
</tr>
</thead>
<tbody>
<tr>
<td>OBJECTID</td>
<td>Automatically populated</td>
<td>279</td>
</tr>
<tr>
<td>SHAPE</td>
<td>Automatically populated</td>
<td>Polygon</td>
</tr>
<tr>
<td>BROAD_CHARACTER</td>
<td>Manual entry</td>
<td>Broadest level of characterisation – ie Coastal industry, Navigation, etc</td>
</tr>
<tr>
<td>CHARACTER_TYPE</td>
<td>Manual entry</td>
<td>Intermediate level of characterisation – ie Docks ports and terminals, Navigation feature</td>
</tr>
<tr>
<td>SUB_CHARACTER</td>
<td>Manual entry. Dominant primary character of area in question. Checked for</td>
<td>Finest level of characterisation and most primary attribute in this table – ie. Historic fish dock, Active</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>CHARACTER_AREA</td>
<td>Topographical location – each character area contains groups of polygons with similar attributes, ie ‘Markham’s Hole’</td>
<td></td>
</tr>
<tr>
<td>PERIOD</td>
<td>Benchmark period of origin of the area represented in the polygon, ie ‘Post medieval’</td>
<td></td>
</tr>
<tr>
<td>PR_INT_ACT</td>
<td>Primary Intrusive Activity – ie. Aggregate dredging, Maintenance dredging</td>
<td></td>
</tr>
<tr>
<td>PR_NON_INT_ACT</td>
<td>Primary Non Intrusive Activity – ie. Commercial shipping, Water sports</td>
<td></td>
</tr>
<tr>
<td>OTHER_USE</td>
<td>Other secondary seascape uses that are apparent, but are not the dominant characteristic of the polygon, ie ‘Nature reserve’</td>
<td></td>
</tr>
<tr>
<td>MORPHOLOGY</td>
<td>Form and structure of sea floor/coastal area, ie ‘Coastal plain’</td>
<td></td>
</tr>
<tr>
<td>IMPACT</td>
<td>Impact of primary activities/characteristics evident in polygon on area of coast/sea represented in polygon. Assessed broadly as High, Moderate or Low</td>
<td></td>
</tr>
<tr>
<td>PREV_CHAR</td>
<td>The previous character of the current seascape (where known), ie ‘Active historic salterns’</td>
<td></td>
</tr>
<tr>
<td>LOCATION</td>
<td>Where the polygon is physically located: Estuarine, Coastal or Sea</td>
<td></td>
</tr>
<tr>
<td>DATASOURCE</td>
<td>Where raw info used for characterisation was collected from</td>
<td></td>
</tr>
<tr>
<td>NOTES</td>
<td>More background information on the history of the polygon. Basically an expansion of information recorded in Broad_Character, Character_Type and Sub_Character</td>
<td></td>
</tr>
<tr>
<td>CONFIDENCE</td>
<td>Degree of certainly assigned to interpretation. Assessed broadly as High, Moderate or Low</td>
<td></td>
</tr>
<tr>
<td>CHECKED_BY</td>
<td>Initials of the person responsible for checking the information before</td>
<td></td>
</tr>
</tbody>
</table>
Table 2 Characterisation_polygons characterisation classification

Note that only one field for Prev_Character was included in the attribute table, as opposed to the multiple fields (i.e. Prev_Char_1, Prev_Char_2) that are used in land based HLC and the WA pilot project. The overlapping, layered approach negated the need for more than one Prev_Character field as successive changes in previous character could be accommodated in the multiple, overlapping layers and their Prev_Character fields.

The nomenclature for the characterisation attributes was allowed to develop through the course of the analysis and evolved and adapted to the strictures and information contained within the originator datasource layers. By creating an initial framework for characterisation (developed out of Wessex's work) MoLAS has been able to adjust and evolve the characterisation classification system to produce a rigorous and robust classification system during the characterisation process itself. All modifications to the character terms were retroactively implemented onto pre-existing Characterisation_polygons to ensure homogeneity of nomenclature. This ensured that the descriptions remained robust and applied equally to all similar polygons, making the Characterisation_polygons data clear, easily accessible and searchable.

Manual entry was preferred for the majority of the attributes over automatic entry as it allowed for ongoing assessment of the Characterisation_polygons nomenclature at every point of data entry. This constant assessment aided the evolutionary nature of the classification system as it was rigorously tested each time it was implemented, which helped to identify weak areas and non-viability quickly.

Due to the layered, overlapping nature of the polygons stored in the Characterisation_polygons layer it was necessary, once the Characterisation_polygons had all been generated, to arrange them into a visibility hierarchy where the SUB_CHARACTER field was used to rank the polygons into order. It was decided that the SUB_CHARACTER classifications that had the highest impact should be given the highest positions and so forth downwards. Fortuitously those polygons which had the greatest impact on the seabed, the gas installations, were also the smallest and would have been obscured by any overlying polygon.

The benefit of the overlapping, multi layered system is that, although the project is currently ranked by impact, it can be reordered quickly and simply without loss of information, according to another characteristic, such as Period, Prev_Char, etc.

The hierarchy is displayed by in Table 3 below. By applying the layering symbol hierarchy MoLAS was able to preserve the depth and breadth of data within the Characterisation_polygons while still allowing for iconic visuals of the primary dominant characteristics to be displayed at SUB_CHARACTER level. See the final report for more on the philosophy behind the layered approach.
<table>
<thead>
<tr>
<th>SUB_CHARACTER</th>
<th>Symbol Level</th>
<th>SUB_CHARACTER</th>
<th>Symbol Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Template</td>
<td>127</td>
<td>Historic haven</td>
<td>72</td>
</tr>
<tr>
<td>Wellhead</td>
<td>126</td>
<td>Modern anchorage</td>
<td>71</td>
</tr>
<tr>
<td>Active aggregate dredging zone</td>
<td>125</td>
<td>Historic drying area</td>
<td>70</td>
</tr>
<tr>
<td>Active chemical pipeline</td>
<td>124</td>
<td>Modern drying area</td>
<td>69</td>
</tr>
<tr>
<td>Active gas pipeline</td>
<td>123</td>
<td>Spoil ground</td>
<td>68</td>
</tr>
<tr>
<td>Manifold</td>
<td>122</td>
<td>Disused historic channel</td>
<td>67</td>
</tr>
<tr>
<td>Disused pipeline</td>
<td>121</td>
<td>Disused historic quarantine area</td>
<td>66</td>
</tr>
<tr>
<td>Platform</td>
<td>120</td>
<td>Active historic anchorage</td>
<td>65</td>
</tr>
<tr>
<td>Subsea structure</td>
<td>119</td>
<td>SAC</td>
<td>64</td>
</tr>
<tr>
<td>Active mixed hydrocarbon pipeline</td>
<td>118</td>
<td>Leisure beach</td>
<td>63</td>
</tr>
<tr>
<td>Active other fluid pipeline</td>
<td>117</td>
<td>Angling</td>
<td>62</td>
</tr>
<tr>
<td>Active pipeline</td>
<td>116</td>
<td>Holiday village</td>
<td>61</td>
</tr>
<tr>
<td>Active power cable</td>
<td>115</td>
<td>Nature reserve</td>
<td>60</td>
</tr>
<tr>
<td>Offshore production area</td>
<td>114</td>
<td>Holiday camp</td>
<td>59</td>
</tr>
<tr>
<td>Oil field</td>
<td>113</td>
<td>NNR</td>
<td>58</td>
</tr>
<tr>
<td>Gas field</td>
<td>112</td>
<td>SPA</td>
<td>57</td>
</tr>
<tr>
<td>Active wind farm area</td>
<td>111</td>
<td>Caravan park</td>
<td>56</td>
</tr>
<tr>
<td>Wreck cluster</td>
<td>110</td>
<td>Marina</td>
<td>55</td>
</tr>
<tr>
<td>Modern cargo dock</td>
<td>109</td>
<td>SSSI</td>
<td>54</td>
</tr>
<tr>
<td>Chemical works</td>
<td>108</td>
<td>Golf course</td>
<td>53</td>
</tr>
<tr>
<td>Modern dredged channel</td>
<td>107</td>
<td>Historic sand dunes</td>
<td>52</td>
</tr>
<tr>
<td>Warehouses</td>
<td>106</td>
<td>RAMSAR</td>
<td>51</td>
</tr>
<tr>
<td>Historic cargo dock</td>
<td>105</td>
<td>SAM</td>
<td>51</td>
</tr>
<tr>
<td>Oil storage and works</td>
<td>104</td>
<td>Submerged forest</td>
<td>50</td>
</tr>
<tr>
<td>Gas terminal and works</td>
<td>103</td>
<td>Water sports</td>
<td>50</td>
</tr>
<tr>
<td>Oil terminal and works</td>
<td>102</td>
<td>Historic canal</td>
<td>49</td>
</tr>
<tr>
<td>Dock and port related industrial area</td>
<td>101</td>
<td>Aquarium</td>
<td>48</td>
</tr>
<tr>
<td>Historic fish dock</td>
<td>100</td>
<td>Disused WWII minefield</td>
<td>47</td>
</tr>
<tr>
<td>Deep water route</td>
<td>99</td>
<td>Proposed gas pipeline</td>
<td>46</td>
</tr>
<tr>
<td>Submarine exercise area</td>
<td>98</td>
<td>Precommissioned gas pipeline</td>
<td>45</td>
</tr>
<tr>
<td>Modern channel</td>
<td>97</td>
<td>Disused WWI fort</td>
<td>44</td>
</tr>
<tr>
<td>Modern deep water anchorage</td>
<td>96</td>
<td>Disused WWII airfield</td>
<td>43</td>
</tr>
<tr>
<td>Traffic control</td>
<td>95</td>
<td>Disused WWII anti aircraft battery</td>
<td>42</td>
</tr>
<tr>
<td>Active historic channel</td>
<td>94</td>
<td>Disused WWII decoy</td>
<td>41</td>
</tr>
<tr>
<td>Coastal wreck cluster</td>
<td>93</td>
<td>Disused chemical pipeline</td>
<td>40</td>
</tr>
<tr>
<td>Maritime settlement area</td>
<td>92</td>
<td>Disused WWII barracks</td>
<td>39</td>
</tr>
<tr>
<td>Maritime conservation area</td>
<td>91</td>
<td>Military practice area</td>
<td>38</td>
</tr>
<tr>
<td>Historic maritime settlement</td>
<td>90</td>
<td>Overfalls</td>
<td>37</td>
</tr>
<tr>
<td>Eel fishing</td>
<td>89</td>
<td>Flats</td>
<td>36</td>
</tr>
<tr>
<td>Samphire picking</td>
<td>88</td>
<td>Spit</td>
<td>35</td>
</tr>
<tr>
<td>Dive site</td>
<td>87</td>
<td>Ridge</td>
<td>34</td>
</tr>
<tr>
<td>Salmon and sea trout fishing</td>
<td>86</td>
<td>Shoal</td>
<td>33</td>
</tr>
<tr>
<td>Scrap metal storage</td>
<td>85</td>
<td>Sands</td>
<td>32</td>
</tr>
</tbody>
</table>
The purpose of the Seascapes Character_Area layer is to summarise and spatially define areas where polygons of similar attributes are found in close spatial relationship (see Section 3.1). The Character_Area polygons were created using the underlying Characterisation_polygons and the originator data sources, with particular reference to the Albert Close fishing chart which contained invaluable information on named sea areas which gave historic character to the area. Local place names (eg Leman Ground), major named features (eg Bessemer gas field) or major designations (eg North Sea transport route) were used to provide the names of the Character_Areas to enhance their local applicability and conceptual lineage from the seascape itself.
The Character_Area characterisation attributes used the same structure as the Characterisation_polygons except for the following:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Population method</th>
<th>Example of terminology</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHARACTER_AREA</td>
<td>Manual entry, derived from dominant character of</td>
<td>Topographical location – each character area contains groups of polygons with similar attributes, i.e. ‘Markham’s Hole’</td>
</tr>
<tr>
<td></td>
<td>Characterisation_polygons</td>
<td></td>
</tr>
<tr>
<td>IMPACT</td>
<td>Automated entry</td>
<td>Not applicable. Spatial concept with no impact</td>
</tr>
<tr>
<td>DATASOURCE</td>
<td>Automated entry</td>
<td>Not applicable. Polygons generated by MoLAS</td>
</tr>
</tbody>
</table>

Table 4 Character_Area characterisation classification differences

Seventy Character areas were defined for the Withernsea to Skegness area (Fig 2) and these were then used to fill in the CHARACTER_AREA attribute of the Characterisation_polygons layer by use of a custom investigative GIS tool.
Fig 2 Character_Area displayed at BROAD_CHARACTER level
4.2 Metadata

Metadata was automatically generated during the course of operations by ArcGIS and can be investigated within Gis and the ArcCatalog framework. This metadata includes the co-ordinate system used, any transformations employed and all processes implemented on the feature class. The metadata standard used was UKGEMINI format.

An example of the metadata generated for the final Characterisation_polygons layer is presented below with all entries expanded to show available metadata:

4.2.1 DESCRIPTION:

**Data storage and access information**
*File name:* Characterisation_polygons  
*Type of data:* vector digital data  
*Location of the data:* \data-mwh-1\projects\LINC\1002\na\ARCGIS\UTM31N\Deliverables\MoLAS_Seascapes.mdb  
*Data processing environment:* Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 2; ESRI ArcCatalog 9.1.0.780  
*Constraints on accessing and using the data*
*Details about this document*  
*Contents last updated:* 20070316 at time 13171300  
*Who completed this document*  
*Standards used to create this document*  
*Standard name:* FGDC Content Standards for Digital Geospatial Metadata  
*Standard version:* FGDC-STD-001-1998  
*Time convention used in this document:* local time  
*Metadata profiles defining additional information*  

4.2.2 SPATIAL:

**Horizontal coordinate system**
*Projected coordinate system name:* WGS_1984_UTM_Zone_31N  
*Geographic coordinate system name:* GCS_WGS_1984  
*Details*  
*Altitude System Definition*  
*Resolution:* 0.000010  
*Encoding Method:* Explicit elevation coordinate included with horizontal coordinates

**Bounding coordinates**  
**Horizontal**  
*In decimal degrees*  
*West:* -0.924656  
*East:* 3.149396  
*North:* 54.335805  
*South:* 52.937346  
*In projected or local coordinates*  
*Left:* 244483.615883  
*Right:* 509713.846388  
*Top:* 6020884.536345
**Lineage**

**ESRI geoprocessing history**

1. **Merge**

*Date and time:* 20070307 at time 153843

*Tool location:* C:\Program Files\ArcGIS\ArcToolbox\Toolboxes\Data Management Tools.tbx\Merge

**Command issued**

Merge SC_columns_Merge_070307_Merg;'Hull_and_outwards_polygons_V2 selection' P:\LINC\1002\na\ARCGIS\UTM31N\Expo\CA_and_SC_columns.mdb\SC_columns_Merge_070307_Merg2 "BROAD_CHARACTER BROAD_CHARACTER true true false 2147483647 Text 0 0 ,First,#,SC_columns_Merge_070307_Merg,BROAD_CHARACTER,-1,-1,Hull_and_outwards_polygons_V2 selection,BROAD_CHARACTER,-1,-1;CHARACTER_TYPE

CHARACTER_TYPE true false 2147483647 Text 0 0 ,First,#,SC_columns_Merge_070307_Merg,CHARACTER_TYPE,-1,-1,Hull_and_outwards_polygons_V2 selection,CHARACTER_TYPE,-1,-1;

SUB_CHARACTER

SUB_CHARACTER true false 2147483647 Text 0 0 ,First,#,SC_columns_Merge_070307_Merg,SUB_CHARACTER,-1,-1,Hull_and_outwards_polygons_V2 selection,SUB_CHARACTER,-1,-1;CHARACTER_AREA

CHARACTER_AREA true false 2147483647 Text 0 0 ,First,#,SC_columns_Merge_070307_Merg,CHARACTER_AREA,-1,-1,Hull_and_outwards_polygons_V2 selection,CHARACTER_AREA,-1,-1;PERIOD

PERIOD true false 2147483647 Text 0 0 ,First,#,SC_columns_Merge_070307_Merg,PERIOD,-1,-1,Hull_and_outwards_polygons_V2 selection,PERIOD,-1,-1;PRI_INT_ACT

PRI_INT_ACT true false 2147483647 Text 0 0 ,First,#,SC_columns_Merge_070307_Merg,PRI_INT_ACT,-1,-1,Hull_and_outwards_polygons_V2 selection,PRI_INT_ACT,-1,-1;PRI_NON_INT_ACT

PRI_NON_INT_ACT true false 2147483647 Text 0 0 ,First,#,SC_columns_Merge_070307_Merg,PRI_NON_INT_ACT,-1,-1,Hull_and_outwards_polygons_V2 selection,PRI_NON_INT_ACT,-1,-1;

OTHER_USE

OTHER_USE true false 2147483647 Text 0 0 ,First,#,SC_columns_Merge_070307_Merg,OTHER_USE,-1,-1,Hull_and_outwards_polygons_V2 selection,OTHER_USE,-1,-1;MORPHOLOGY

MORPHOLOGY true false 2147483647 Text 0 0 ,First,#,SC_columns_Merge_070307_Merg,MORPHOLOGY,-1,-1,Hull_and_outwards_polygons_V2 selection,MORPHOLOGY,-1,-1;IMPACT

IMPACT true false 2147483647 Text 0 0 ,First,#,SC_columns_Merge_070307_Merg,IMPACT,-1,-1,Hull_and_outwards_polygons_V2 selection,IMPACT,-1,-1;PREV_CHAR

PREV_CHAR true false 2147483647 Text 0 0 ,First,#,SC_columns_Merge_070307_Merg,PREV_CHAR,-1,-1,Hull_and_outwards_polygons_V2 selection,PREV_CHAR,-1,-1;LOCATION

LOCATION true false 2147483647 Text 0 0 ,First,#,SC_columns_Merge_070307_Merg,LOCATION,-1,-1,Hull_and_outwards_polygons_V2 selection,LOCATION,-1,-1;DATASOURCE

DATASOURCE true false 2147483647 Text 0 0 ,First,#,SC_columns_Merge_070307_Merg,DATASOURCE,-1,-1,Hull_and_outwards_polygons_V2 selection,DATASOURCE,-1,-1;NOTES

NOTES true false 2147483647 Text 0 0 ,First,#,SC_columns_Merge_070307_Merg,NOTES,-1,-1,Hull_and_outwards_polygons_V2 selection,NOTES,-1,-1;CONFIDENCE

CONFIDENCE true false 2147483647 Text 0 0 ,First,#,SC_columns_Merge_070307_Merg,CONFIDENCE,-1,-1,Hull_and_outwards_polygons_V2 selection,CONFIDENCE,-1,-1;CHECKED_BY

CHECKED_BY true false 255 Text 0 0 ,First,#,SC_columns_Merge_070307_Merg,CHECKED_BY,-1,-1,Hull_and_outwards_polygons_V2 selection,CHECKED_BY,-1,-1;Shape_Length

Shape_Length true false 255 Double 0 0 ,First,#,SC_columns_Merge_070307_Merg,Shape_Length,-1,-1,Shape_Area

Shape_Area
2. Two file merger_1  
Date and time: 20070307 at time 153844  
Tool location: P:\LINC\1002\na\ARCGIS\UTM31N\Expo\New Tools.tbx\Two file merger  
Command issued  
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70307_Merg2

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Date and time: 20070307 at time 154918
Tool location: C:\Program Files\ArcGIS\ArcToolbox\Toolboxes\Data Management
Tools.tbx\CopyFeatures

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70307_Merg2
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70307_Merg2 # 0 0 0

4. Process
Date and time: 20070308 at time 165441
Tool location: C:\Program Files\ArcGIS\ArcToolbox\Toolboxes\Data Management
Tools.tbx\CopyFeatures

Command issued
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70307_Merg2
P:\LINC\1002\na\ARCGIS\CleanData.mdb\SC_columns_Merge_070307_Merg2 # 0 0 0

5. Process
Date and time: 20070313 at time 150835
Tool location: C:\Program Files\ArcGIS\ArcToolbox\Toolboxes\Data Management
Tools.tbx\CopyFeatures

Command issued
CopyFeatures "P:\LINC\1002\na\ARCGIS\UTM31N\Expo\Clean
Data\CleanData.mdb\SC_MEND_AND_DEFEND"
P:\LINC\1002\na\ARCGIS\UTM31N\Deliverables\MoLAS_Seascapes.mdb\SC_MEND_AND_DEFEND # 0 0 0

Spatial data description
Vector data information
ESRI description
Characterisation_polygons
ESRI feature type: Simple
Geometry type: Polygon
Topology: FALSE
Feature count: 1019
Spatial Index: TRUE
Linear referencing: FALSE

SDTS description
Feature class: SDTS feature type, feature count
• Characterisation_polygons: G-polygon, 1019

4.2.3 ATTRIBUTES
Details for Characterisation_polygons
Type of object: Feature Class
Number of records: 1019
### Attributes

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*Definition Source:* ESRI

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 **NOTES**
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4.3 Developing the multimedia resource

It is envisaged that the website for the ALSF English Heritage Seascapes (EHS) project will have two main components: a suite of web pages which constitute the project’s micro-site and an interactive mapping environment. The exact structure of the proposed website is unknown at present as MoLAS will not be the host.

4.3.1 Web pages

The web page examples were built using Microsoft Content Management Server 2002. This system comprises a series of templates into which content is inserted, a resource gallery into which images, downloads and so fourth may be loaded and a work flow to manage the approval and publishing process. The EHS project makes use of ‘micro site’ templates developed by the Museum System Team, which are characterized by having their own navigation, and as such can function as a stand alone site.

The main products of the project are covered in the Characterisation channel, where content is organized by the Broad Character categories. From the home page of the characterisation channel one can jump to the interactive map to see all the areas within a particular broad character. Within each channel (e.g. Offshore industry-Gas) there is a page for each zone and
from each of these it is possible to link to the interactive map to see the polygon defining the area in question.

The descriptive text for each character area was generated using a wide variety of sources, from historic written sources to point data of recorded ship losses. To clearly present this information in a standardised and accessible way the following heading were devised:

- Present Day Form
- Sea Use: Present
- Sea Use: Past
- Archaeological Potential
- Character Perceptions
- References

These headings were devised and defined by Wessex in their Method Statement. The definitions are the same for the MoLAS project as well. Please refer to the Wessex Method statement for the full definitions (WA 2006). An example Character Area document follows:

**West Sole**

The West Sole offshore character area is situated in the northern central section of the study area in the area of major gas fields of the West Sole and Amethyst fields off the east coast of East Yorkshire.

**Present Day Form**

The geology of the area comprises a complex of Jurassic and Triassic bedrock overlain by glacial till (clay, sand and gravel debris deposited from ice sheets) know as the Boulders Bank Formation. The water depth across the area varies between 20m and 35m and the maximum tidal range is 2-3m.

**Sea Use: Present**

The West Sole character area dominant character is gas related industry. It has no active aggregate extraction or wind farm industries. The West Sole field was discovered in 1965 and started production in 1983. With reserves of 60 billion cubic metres of gas and a peak production of 2.3 billion cubic metres of gas per year it is one of the southern North Sea’s major hydrocarbon fields with permanent installations both on the seabed and free standing rigs. The field is connected directly to the Easington Gas Terminal in East Yorkshire by two pipelines.

The principal fishing activity in the area is part of the Off Ground fishing area. The principal fishing activity in the area is trawling for white fish such as cod and whiting and flat fish such as sole and plaice by beam trawlers. There is also shrimp fishing for brown and pink shrimp. The area is a moderately fished offshore ground and is locally important, particularly for trawling vessels and for vessels following the more mobile fisheries, for example, pink shrimp.

Commercial shipping crosses the area on a regular basis. The fishing in the character area is limited by the number of sea bed obstructions and exclusion zones associated with gas exploitation.
Sea Use: Past

The West Sole character area has been shaped by thousands of years of dynamic sea level changes and erosion and deposition. The relatively shallow nature of the sea bed means that the area was dry land almost certainly in the Upper Palaeolithic period and at least the earlier part of the Mesolithic period. Marine traffic would have crossed this area on a regular basis from the Roman period onwards. Fishing activity would have been carried out in the area from the medieval period onwards. The Close’s Fisherman’s Chart (UKHO 1953) taken from surveys and reports from 1904 to 1925 describes the area as good ground for all kinds of fish with a stoney and sometimes catchy bottom but Trawlers and some Seine netters work it. The best months for fishing are Jan, Mar, May, June, July and Oct.

Archaeological Potential

The West Sole character area has potential for the presence of drowned land surfaces resulting from the fact that sea level has fluctuated between -120 metres and +10 metres over the past 500,000 years. From the period 500,000 BP to 22,000 BP (before present), human population levels were low, and little more than stray finds may be expected, although these may still be of considerable archaeological importance.

From 22,000 BP to 2100 BP parts of the North Sea were dry land and human population levels were higher, especially in the Mesolithic age. Finds dating to the Mesolithic have been found to a depth of 40m so any area of sea bed above that has potential for habitation. Inundation of the North Sea landscapes occurred between 10,000 and 6,000 BP and the most likely evidence for human occupation would be, therefore, Mesolithic in date. Earlier Palaeolithic occupation is less likely to be found and later Neolithic occupation is likely to have been limited to the inshore and very highest of the banks and shoals such as the Dogger Bank. The area’s position makes it a possible Upper Palaeolithic and Mesolithic habitation area.

Consequently, there is some potential for surviving evidence of human activity within the area. Over the last 6000 years (if not more), humans have used sea faring vessels and this area and may contain wrecks and related material that may lie on the sea floor or be buried beneath the sea floor. UKHO and NMR data show a total of 4 known wrecks in this area, 3 unnamed and 1 named, the Sea Gem jack up drilling rig which collapsed on 28th December 1965 with the loss of 13 lives. This is a historically significant wreck as the Sea Gem was the first rig to find offshore hydrocarbons in the UK sector in July 1965 whilst drilling in the West Sole field.

Character Perceptions

The area is perceived as an important industrial area as it contains the West Sole production field with an important legacy of this industry in the form of the wreck of the Sea Gem. It is also an offshore fishing ground with, at present, direct offshore industrial pressures from the gas fields in the area.

References

Close’s Fisherman’s Chart (UKHO 1953)
Fisheries Sensitivity Maps in British Waters (MAFF 1989)
Scandoil, North Sea Oil and Gas production Fields (Scandoil Oil and Gas Magazine online)
4.3.2 Interactive map

The Character Area documents would be made available via a microsite and interactive mapping system. The interactive map is built using ESRI’s ArcIMS9.1 application. This compliments ESRI’s ArcGIS product (which was the main GIS engine used by the project), since it is able to directly take shape files and layers from it for projection on the internet. The default ArcIMS environment has been modified to reflect the project identity and aid usability. Spurious tools have been removed, fonts sizes increased, and explicit titled buttons replace icons where appropriate.

The map is navigated in the conventional manner using the button and mouse, while enquiries about any one zone can be made by click onto the map. This action causes information about the area to be displayed in a table at the base of the screen, and if one wishes to know more a hyperlink is provided. This hyperlink links back to the CMS page for the area in question. Area searches can be conducted where the result form a number of areas will be displayed, while attribute queries will interrogate the background tables for all instances of a particular string. Rows returned in response to the latter can be clicked in order to zoom to a chosen area.
4.4 Example pages from the web enabled resource

Fig 3 'Characterisation and Mapping' website page

Fig 4 Interactive mapping with West Sole Character Area being investigated
Fig 5  West Sole character area document as it appears on the website

Fig 6  Zoomed into the interactive map
5 Relationship between character levels

The table below summarises the hierarchical relationship between ‘BROAD_CHARACTER’, ‘CHARACTER_TYPE’ and ‘SUB_CHARACTER’.

The descriptors are tied together and the SUB_CHARACTER classification directly informs on the CHARACTER_TYPE and hence the BROAD_CHARACTER. For example, SUB_CHARACTER ‘Samphire picking’ falls within CHARACTER_TYPE ‘Coastal mariculture’, which falls within BROAD_CHARACTER ‘Coastal industry’.

<table>
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<tr>
<th>BROAD_CHARACTER</th>
<th>CHARACTER_TYPE</th>
<th>SUB_CHARACTER</th>
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<td>Modern cargo dock</td>
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<td>Historic fish dock</td>
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<td>Gas terminal and works</td>
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<td>Oil terminal and works</td>
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<td>Haven</td>
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<td>Dock and port related industrial area</td>
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<td>Oil storage and works</td>
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<td>Chemical works</td>
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<td>Coastal mariculture</td>
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<tr>
<td></td>
<td>Angling</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water sports</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Holiday camp</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Caravan park</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Holiday village</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Historic canal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Historic sand dunes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aquarium</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Golf course</td>
<td></td>
</tr>
<tr>
<td>Offshore recreation</td>
<td>Dive site</td>
<td></td>
</tr>
</tbody>
</table>
6 Attribute Definitions and terminology

6.1 Attribute terminology

Where possible MoLAS has used clear and concise language in its attribute naming, terminology and definitions. It is hoped these will be understandable and/or familiar to both marine stakeholders and terrestrial stakeholders. The attribute definitions has been covered earlier in this method statement (see Section 4.1.7)

6.2 Attribute formatting

Following English Heritage’s guidelines the following formatting was followed:

- Each spatial feature was assigned a unique reference number (Automatically generated)
- All attribute names were in block capitals (Except where automatically set up by GIS).
- No spaces or exotic symbols were used in the attribute names. Underscores were used instead.
- Only where the full name would be inconveniently long were contractions used (eg PRI_INT_ACT = PRImary_INTrusive_ACTivity)

6.3 Characterisation_polygon layer attribute terminology: BROAD_CHARACTER, CHARACTER_TYPE and SUB_CHARACTER

The following tables contain the definitions of the BROAD_CHARACTER, CHARACTER_TYPE and SUB_CHARACTER classifications.

<table>
<thead>
<tr>
<th>BROAD_CHARACTER</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal industry</td>
<td>This refers to the coastal area where industrial activity is the dominant influence on the character of the seascape. This includes the docks at Immingham and Hull, historic havens coastal fisheries and mariculture and all the coastal processing industries associated with the seascape</td>
</tr>
<tr>
<td>Offshore industry</td>
<td>This refers to the offshore area where industrial activity is the dominant influence on the character of the seascape. This includes gas production in the numerous offshore fields in the southern North Sea. Aggregate dredging in 9 licensed areas and 2 active wind farms. Industrial fishing takes place throughout the area.</td>
</tr>
<tr>
<td>Flood defence and reclamation</td>
<td>Includes the large area of flood defended land around the Humber Estuary and the Historic</td>
</tr>
</tbody>
</table>
reclaimed land of the Isle of Axholme, Sunk Island and the Lincolnshire Grazing Marsh

<table>
<thead>
<tr>
<th>CHARACTER_TYPE</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Military</td>
<td>Areas used by the military (Army Navy and Air Force) for defence and operational bases. Includes military structures such as batteries, forts airfields and areas such as firing ranges and practice areas.</td>
</tr>
<tr>
<td>Navigation</td>
<td>Related to the movement of shipping over the water. The broad character includes active and historic channels and anchorages, offshore and coastal hazards and UK jurisdiction zones.</td>
</tr>
<tr>
<td>Settlement</td>
<td>Areas of the coastal zone with a built environment specifically associated with the sea. This includes historic and modern ports and havens and coastal villages.</td>
</tr>
<tr>
<td>Recreation</td>
<td>This broad character refers to activities related to pleasure or amusement but associated specifically with the sea or the coastal area. It includes designated areas such as Nature Reserves and the areas of the Lincolnshire coast given over to holiday activities.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHARACTER_TYPE</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Docks ports and terminals</td>
<td>Relates to activities transferring materials from or to the sea. This includes modern and historic cargo and fish docks and oil and gas terminals.</td>
</tr>
<tr>
<td>Haven</td>
<td>Specifically relates to historic harbours and havens.</td>
</tr>
<tr>
<td>Coastal processing industry</td>
<td>This character type relates to all docks and port related industries, oil and gas storage areas and chemical works. Historic ship breaking and coastal salt production are also included.</td>
</tr>
<tr>
<td>Coastal power generation</td>
<td>Specifically relates to coastal wind farms</td>
</tr>
<tr>
<td>Coastal mariculture</td>
<td>Relates to the coastal shellfish industry of the Humber Estuary along with bait digging in the ITZ and samphire picking on the Lincolnshire saltmarsh.</td>
</tr>
<tr>
<td>Coastal fisheries</td>
<td>Relates to all the fishing activity in the 12</td>
</tr>
<tr>
<td>Character Type</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>nautical mile limit from the coast</td>
<td></td>
</tr>
<tr>
<td>Offshore fisheries</td>
<td>Relates to all the fishing activity beyond the 12 nautical mile limit. Includes historic fisheries as defined by Close’s Fisherman’s Chart (UKHO, 1953)</td>
</tr>
<tr>
<td>Offshore mariculture</td>
<td>Relates specifically to areas defined by CEFAS as important nursery or spawning areas for a number of fish species caught in the North Sea</td>
</tr>
<tr>
<td>Aggregate</td>
<td>Includes all the licensed, active and application areas for aggregate extraction in the study area.</td>
</tr>
<tr>
<td>Wind farm</td>
<td>Includes all the licensed, active and application sites for wind farms in the study area.</td>
</tr>
<tr>
<td>Oil industry</td>
<td>Oil is minor by product of the offshore gas industry (see below)</td>
</tr>
<tr>
<td>Gas industry</td>
<td>Includes all the licensed, active and application areas for the offshore gas industry in the study area. There are more than 50 active gas fields in the study area and the character type includes all the production areas plus their associated infrastructure of sea bed structures and pipelines</td>
</tr>
<tr>
<td>Flood defended area</td>
<td>Relates to the modern flood risk area</td>
</tr>
<tr>
<td>Historic reclaimed land</td>
<td>Relates to land reclaimed in the post medieval period and that reclaimed in the medieval and earlier periods.</td>
</tr>
<tr>
<td>Military structure</td>
<td>Includes WWII anti aircraft batteries, decoys, airfields and barracks. The 2 WWI forts at the mouth of the Humber are also included.</td>
</tr>
<tr>
<td>Military area</td>
<td>Includes all military practice areas, disused minefields and offshore exercise areas.</td>
</tr>
<tr>
<td>Coastal hazard</td>
<td>Relates to modern and historic drying areas and coastal wrecks.</td>
</tr>
<tr>
<td>Seabed hazard</td>
<td>Relates to the terminology used on charts to describe the sea bed topography.</td>
</tr>
<tr>
<td>Navigation feature</td>
<td>Relates to all active and historic navigation channels, anchorages, quarantine zones and spoil grounds.</td>
</tr>
<tr>
<td>Jurisdiction area</td>
<td>This character type relates to all the UK economic and territorial zones within the study area.</td>
</tr>
</tbody>
</table>
### Maritime town and City
This character type relates to all maritime conservation and settlement areas.

### Maritime village
This character type relates specifically to historic maritime settlement often now in areas away from the sea on reclaimed land.

### Designated area
All nature reserves and categories of protected sites are included in this character type.

### Archaeological interest area
Specifically relates to the Lincolnshire coast submerged forest.

### Amusements
This character type relates to all activities to do with coastal recreation specifically the tourist industry. It includes beaches, holiday camps, marinas and other leisure related activities.

### Offshore recreation
Specifically relates to dive sites.

<table>
<thead>
<tr>
<th><strong>SUB_CHARACTER</strong></th>
<th><strong>Definition</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Modern cargo dock</td>
<td>Related to the function of ports and harbours and dock related industries and the transfer of goods via sea transport.</td>
</tr>
<tr>
<td>Historic cargo dock</td>
<td>Related to the historic function of ports (possibly now non functioning) and harbours and dock related industries and the transfer of goods via sea transport.</td>
</tr>
<tr>
<td>Historic fish dock</td>
<td>Related to the historic function of a port or harbour to a specific industry: fishing, the supply of the fleet and distribution of the catch</td>
</tr>
<tr>
<td>Gas terminal and works</td>
<td>Related to the collection, distribution and use of gas from the southern North Sea gas fields via sub-sea pipeline.</td>
</tr>
<tr>
<td>Oil terminal and works</td>
<td>Related to the collection, distribution and use of oil from tanker terminals.</td>
</tr>
<tr>
<td>Historic haven</td>
<td>Small usually non functioning harbour related to shipping activities</td>
</tr>
<tr>
<td>Warehouses</td>
<td>Port, harbour or riverside buildings used for the storage of cargo.</td>
</tr>
<tr>
<td>Dock and port related industrial area</td>
<td>Industry specifically related to the import or export of goods from a dock or port and the servicing, building and supply of vessels</td>
</tr>
<tr>
<td>Scrap metal storage</td>
<td>Port or dock related scrap metal yard sometimes related to ship breaking activities</td>
</tr>
<tr>
<td>Oil storage and works</td>
<td>Related to the collection and distribution of oil products</td>
</tr>
<tr>
<td><strong>Chemical works</strong></td>
<td>Industry associated with gas and oil terminals (see above)</td>
</tr>
<tr>
<td>--------------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Historic ship breaking area</strong></td>
<td>Defined areas (often beaches or havens) where ships were dismantled for scrap timber and metal</td>
</tr>
<tr>
<td><strong>Disused historic salterns</strong></td>
<td>Related to the production of salt from sea water salterns are found along Lincolnshire Coast at the high spring tide mark and date from the Bronze Age through to the medieval period. The process creates large mounds of discarded sand and silt.</td>
</tr>
<tr>
<td><strong>Land based wind farm</strong></td>
<td>Renewable energy, electricity producing turbines usually placed in a coastal position to maximise the use of wind power</td>
</tr>
<tr>
<td><strong>Active licensed shellfish beds</strong></td>
<td>Licensed area (NEFSC), usually in the inter tidal drying zone, for cockle, whelk etc fishing</td>
</tr>
<tr>
<td><strong>Inactive licensed shellfish beds</strong></td>
<td>Licensed area (NEFSC), usually in the inter tidal drying zone, for cockle, whelk etc fishing which has been closed due to over fishing or pollution</td>
</tr>
<tr>
<td><strong>Bait digging area</strong></td>
<td>Area, usually in the inter tidal drying zone, where digging for Lugworm and Ragworm takes place. The worms are usually used as bait by recreational fishers.</td>
</tr>
<tr>
<td><strong>Samphire picking</strong></td>
<td>Area of saltmarsh where samphire (sea asparagus) is collected for cooking – has a small commercial value.</td>
</tr>
<tr>
<td><strong>Generic coastal fishing area</strong></td>
<td>Relating to an area where inshore fishing takes place. Includes trawling, longlining and the use of static gear (potting)</td>
</tr>
<tr>
<td><strong>Generic coastal fishery</strong></td>
<td>Relating to an area where inshore fishing takes place for a particular type of fish or shellfish</td>
</tr>
<tr>
<td><strong>Sole trawling area</strong></td>
<td>Relating to an area where trawling for sole (a flatfish) takes place.</td>
</tr>
<tr>
<td><strong>Whitefish longlining</strong></td>
<td>Relating to an area where long lining takes place for whitefish (cod, haddock, whiting etc)</td>
</tr>
<tr>
<td><strong>Crab and lobster potting</strong></td>
<td>Relating to an area (usually inshore) where the use of static gear (potting) takes place for crab and lobster</td>
</tr>
<tr>
<td><strong>Salmon and sea trout fishing</strong></td>
<td>Relating to an area where fishing takes place for salmon and sea trout usually using drift nets.</td>
</tr>
<tr>
<td><strong>Eel fishing</strong></td>
<td>Relating to an area where fishing takes place for eels (usually in the rivers which empty into the Humber) using traps</td>
</tr>
<tr>
<td><strong>Crab fishery</strong></td>
<td>Relating to an area where potting (usually inshore) takes place for crabs</td>
</tr>
<tr>
<td><strong>Historic fishing ground</strong></td>
<td>Offshore area, usually named, which was</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>exploited for fish. The areas can either be generic or specific. Many historic fishing grounds are still exploited others have become unusable through over fishing or industrial activity</td>
<td></td>
</tr>
<tr>
<td>Restricted fishing area</td>
<td>Offshore area which is exploited for fish. The areas can either be generic or specific but activity is restricted because of industrial or economic exclusion zones (wind farms, gas fields etc)</td>
</tr>
<tr>
<td>Offshore fishing area</td>
<td>Offshore area, usually named, which is exploited for fish. The areas can either be generic or specific.</td>
</tr>
<tr>
<td>Lemon sole nursery area</td>
<td>Area of the North Sea defined by CEFAS as an important area for the early life cycle of the lemon sole</td>
</tr>
<tr>
<td>Sprat nursery area</td>
<td>Area of the North Sea defined by CEFAS as an important area for the early life cycle of sprat</td>
</tr>
<tr>
<td>Plaice nursery area</td>
<td>Area of the North Sea defined by CEFAS as an important area for the early life cycle of plaice</td>
</tr>
<tr>
<td>Cod nursery area</td>
<td>Area of the North Sea defined by CEFAS as an important area for the early life cycle of cod</td>
</tr>
<tr>
<td>Sandeel nursery area</td>
<td>Area of the North Sea defined by CEFAS as an important area for the early life cycle of the Sandeel</td>
</tr>
<tr>
<td>Whiting nursery area</td>
<td>Area of the North Sea defined by CEFAS as an important area for the early life cycle of the whiting</td>
</tr>
<tr>
<td>Sprat spawning area - May to August</td>
<td>Area of the North Sea defined by CEFAS as an important area in reproductive cycle (spawning) of the sprat</td>
</tr>
<tr>
<td>Herring spawning area - August to October</td>
<td>Area of the North Sea defined by CEFAS as an important area in reproductive cycle (spawning) of herring</td>
</tr>
<tr>
<td>Lemon sole spawning area - April to September</td>
<td>Area of the North Sea defined by CEFAS as an important area in reproductive cycle (spawning) of the lemon sole</td>
</tr>
<tr>
<td>Sole spawning area - March to May</td>
<td>Area of the North Sea defined by CEFAS as an important area in reproductive cycle (spawning) of sole</td>
</tr>
<tr>
<td>Sandeel spawning area November to February</td>
<td>Area of the North Sea defined by CEFAS as an important area in reproductive cycle (spawning) of the Sandeel</td>
</tr>
<tr>
<td>Licensed aggregate dredging area</td>
<td>Offshore area of the North Sea licensed by the Crown Estates for the extraction of sand and gravel from the sea floor.</td>
</tr>
<tr>
<td>Active aggregate dredging zone</td>
<td>Active dredging area within the overall area licensed by the Crown Estates for the extraction of sand and gravel from the sea floor.</td>
</tr>
<tr>
<td>Term</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------------------</td>
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</tr>
<tr>
<td>License application aggregate dredging</td>
<td>Offshore area of the North Sea defined by the Crown Estates for future extraction of sand and gravel from the sea floor.</td>
</tr>
<tr>
<td>area</td>
<td></td>
</tr>
<tr>
<td>Licensed wind farm area</td>
<td>Offshore area of the North Sea licensed by the DTI for the production of renewable energy through wind farm construction. There are currently those farms either active or under construction (round 1) and those under application (round 2).</td>
</tr>
<tr>
<td>Active wind farm area</td>
<td>Offshore area of the North Sea licensed by the DTI for the production of renewable energy through wind farm construction. Those farms either active or under construction (round 1)</td>
</tr>
<tr>
<td>Oil field</td>
<td>Specific named offshore area of the North Sea where oil has been discovered and exploited usually within one of the DTI licensed blocks</td>
</tr>
<tr>
<td>Gas field</td>
<td>Specific named offshore area of the North Sea where gas has been discovered and exploited usually within one of the DTI licensed blocks</td>
</tr>
<tr>
<td>Offshore production area</td>
<td>Specific named offshore area of the North Sea where a large gas field or more usually a group of fields has been discovered and exploited. They are usually linked by sub sea infrastructure of pipelines and wellheads</td>
</tr>
<tr>
<td>Template</td>
<td>Subsea structure associated with the gas industry. Specifically the components supporting the wellhead extraction and injection infrastructure</td>
</tr>
<tr>
<td>Subsea structure</td>
<td>Any subsea structure associated with offshore industry, navigation or remote sensing.</td>
</tr>
<tr>
<td>Wellhead</td>
<td>Subsea structure associated with the gas industry. Specifically the components supporting the wellhead drilling or extraction of gas</td>
</tr>
<tr>
<td>Platform</td>
<td>Free standing structure attached to the seafloor associated with the gas industry. The platforms are usually manned and specifically support all the operations concerned with the exploration, drilling and production of hydrocarbons</td>
</tr>
<tr>
<td>Manifold</td>
<td>Subsea or platform based structure associated with the gas industry. Specifically the components of a gas pipeline where many pipes feed into one.</td>
</tr>
<tr>
<td>Proposed gas pipeline</td>
<td>Relating to the proposed transfer of gas by pipeline usually from the North Sea to the gas terminals at Easington Dimlington and Theddlethorpe.</td>
</tr>
<tr>
<td>Active pipeline</td>
<td>Relating to the transfer of fluids and gas by pipeline usually from the North Sea to the gas.</td>
</tr>
<tr>
<td>Term</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>terminals at Easington Dimlington and Theddlethorpe.</strong></td>
<td>Pipe lines could also take mareils out to the gas fields for re - injection into the depleted fields</td>
</tr>
<tr>
<td><strong>Active gas pipeline</strong></td>
<td>Relating to the active transfer of gas by pipeline usually from the North Sea to the gas terminals at Easington Dimlington and Theddlethorpe.</td>
</tr>
<tr>
<td><strong>Active chemical pipeline</strong></td>
<td>Relating to the active transfer of chemicals (petrol etc) usually associated with coastal oil, gas and chemical works (see above)</td>
</tr>
<tr>
<td><strong>Active mixed hydrocarbon pipeline</strong></td>
<td>Relating to the proposed transfer of gas and oil by pipeline usually from the North Sea to the gas terminals at Easington Dimlington and Theddlethorpe.</td>
</tr>
<tr>
<td><strong>Active other fluid pipeline</strong></td>
<td>Relating to the active transfer of fluids such as water by pipeline.</td>
</tr>
<tr>
<td><strong>Precommissioned gas pipeline</strong></td>
<td>Relating to a built gas pipeline not yet actively transferring gas from the North Sea to the gas terminals at Easington, Dimlington and Theddlethorpe.</td>
</tr>
<tr>
<td><strong>Disused pipeline</strong></td>
<td>Relating to a decommissioned pipeline which is still in situ.</td>
</tr>
<tr>
<td><strong>Disused chemical pipeline</strong></td>
<td>Relating to a decommissioned chemical pipeline which is still in situ.</td>
</tr>
<tr>
<td><strong>Active power cable</strong></td>
<td>Relating to electricity power cables (usually subsea or sub estuarine) .</td>
</tr>
<tr>
<td><strong>Modern flood risk area</strong></td>
<td>The area of land mostly along the Humber Estuary and the Lincolnshire coast which would be inundated to the level of Mean High Water if not for the flood defences along the coast and the tidal rivers of the study area.</td>
</tr>
<tr>
<td><strong>Post medieval reclaimed land</strong></td>
<td>Land reclaimed after 1500 specifically that land associated with Isle of Axholme, Sunk Island and large areas of the Humber coastal land. Also some coastal areas of the Lincolnshire Grazing Marsh</td>
</tr>
<tr>
<td><strong>Medieval and earlier reclaimed land</strong></td>
<td>Land reclaimed before 1500 specifically that land associated with The medieval villages of Tetney, Marsh Chapel etc and the production of salt and formation of salterns.</td>
</tr>
<tr>
<td><strong>Disused WWII anti aircraft battery</strong></td>
<td>WWII coastal gun installations for the protection of the populace and industry from enemy airborne attack.</td>
</tr>
<tr>
<td><strong>Disused WWII decoy</strong></td>
<td>WWII coastal installations built to mimic other important areas such airfields or docks to divert enemy airborne attack away from the intended target. The installation a Paull on the Humber Estuary was built specifically to divert bombers</td>
</tr>
<tr>
<td><strong>Term</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>----------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>away from Hull docks</td>
<td></td>
</tr>
<tr>
<td>Disused WWI fort</td>
<td>WWI military installation located in an area to protect or defend against enemy forces or shipping. Specifically refers to the forts of Haille Sand and Bull built at the mouth of the Humber to protect Hull and shipping from surface and submarine attack.</td>
</tr>
<tr>
<td>Disused WWII airfield</td>
<td>WWII coastal bomber and fighter installations, now disused.</td>
</tr>
<tr>
<td>Disused WWII barracks</td>
<td>WWII coastal installations for housing military personnel, now disused.</td>
</tr>
<tr>
<td>Airfield</td>
<td>Active coastal airfield.</td>
</tr>
<tr>
<td>Military practice area</td>
<td>Active military practice area, Army, Navy and RAF.</td>
</tr>
<tr>
<td>RAF practice area</td>
<td>Large offshore areas where mariners are advised that RAF aircraft are likely to be operating.</td>
</tr>
<tr>
<td>Firing range</td>
<td>Coastal, inshore or offshore areas where mariners are advised that live ordnance practice takes place, specifically the Donna Nook firing range on the NE coast of Lincolnshire.</td>
</tr>
<tr>
<td>Disused WWII minefield</td>
<td>Offshore areas where mariners are advised that WWII naval mines were laid. Mines are still occasionally found in these areas.</td>
</tr>
<tr>
<td>Submarine exercise area</td>
<td>Offshore areas where mariners are advised that naval submarines are likely to be operating below the surface.</td>
</tr>
<tr>
<td>Historic drying area</td>
<td>Relating to the area of the coast which was charted (UKHO historic charts) as dry at the point of the Lowest Astronomical Tide (LAT).</td>
</tr>
<tr>
<td>Coastal wreck cluster</td>
<td>Coastal area defined in a 500m square grid that contains 3 or more wrecks. Data from NMR, UKHO and SeaZone.</td>
</tr>
<tr>
<td>Modern drying area</td>
<td>Relating to the area of the coast which is charted ( modern UKHO Admiralty) as dry at the point of the Lowest Astronomical Tide (LAT).</td>
</tr>
<tr>
<td>Knoll</td>
<td>A rounded hill or mound rising from the sea floor.</td>
</tr>
<tr>
<td>Spit</td>
<td>A section of land that extends into the sea often uncovered at low tide. A navigation hazard.</td>
</tr>
<tr>
<td>Overfalls</td>
<td>A turbulent area of the sea floor caused by strong tidal currents setting over submerged ridges. Specifically those areas off the study area coast that are remnant deposits of the Devensian terminal moraine.</td>
</tr>
<tr>
<td>Sands</td>
<td>Areas of sandy seabed in shallow water often uncovered at low tide. A navigation hazard.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Ridge and bank</td>
<td>Elevations in the sea floor either linear or over a large area.</td>
</tr>
<tr>
<td>Ridge</td>
<td>A long narrow elevation of the sea floor.</td>
</tr>
<tr>
<td>Bank</td>
<td>A large elevated area of the sea floor.</td>
</tr>
<tr>
<td>Shoal</td>
<td>A shallow place in the sea floor constituting a navigation hazard</td>
</tr>
<tr>
<td>Flats</td>
<td>Regular level areas of the sea floor, especially in the intertidal zone (e.g., tidal flats, mud flats, etc.)</td>
</tr>
<tr>
<td>Wreck cluster</td>
<td>Offshore area defined in a 500m square grid that contains 3 or more wrecks. Data from NMR, UKHO and SeaZone.</td>
</tr>
<tr>
<td>Active historic channel</td>
<td>Navigational area of the sea or estuary used in the past and which still is currently in use by modern shipping. The channel is often defined by buoyage.</td>
</tr>
<tr>
<td>Active historic anchorage</td>
<td>Area of the sea or estuary used in the past as a safe anchorage and which still is currently in use by modern shipping. The anchorages are often defined by buoyage.</td>
</tr>
<tr>
<td>Disused historic channel</td>
<td>Navigational area of the sea or estuary used in the past and which still not currently in use by modern shipping.</td>
</tr>
<tr>
<td>Traffic control</td>
<td>Points or areas in navigation channels where shipping direction and position is controlled by marine legislation or the use of pilots such as the Humber Pilot for shipping entering the Humber Estuary.</td>
</tr>
<tr>
<td>Modern channel</td>
<td>Navigational area of the sea or estuary not used in the past which is currently in use by modern shipping. The channel is often defined by buoyage.</td>
</tr>
<tr>
<td>Modern dredged channel</td>
<td>Navigational area of the sea or estuary which is currently in use by modern shipping but requires regular dredging to maintain its depth. The channel is often defined by buoyage.</td>
</tr>
<tr>
<td>Deep water route</td>
<td>Navigational area of the sea or estuary used in the past and which still is currently in use by modern shipping which often require a certain depth of water for safe passage. The channel is often defined by buoyage.</td>
</tr>
<tr>
<td>Modern anchorage</td>
<td>Area of the sea or estuary used as a safe anchorage and currently in use by modern shipping. The anchorages are often defined by buoyage.</td>
</tr>
<tr>
<td>Modern deep water anchorage</td>
<td>Area of the sea or estuary used as a safe anchorage and currently in use by modern shipping requiring a certain depth of water to...</td>
</tr>
<tr>
<td><strong>anchor safely</strong>. The anchorages are often defined by buoyage.</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td></td>
</tr>
<tr>
<td><strong>Disused historic quarantine area</strong></td>
<td>Area of the sea or estuary used in the past as a quarantine area for vessels not allowed to make landfall because of infection or disease.</td>
</tr>
<tr>
<td><strong>Spoil ground</strong></td>
<td>Area of the sea or estuary used as a dumping ground for various materials. The areas are often defined by buoyage.</td>
</tr>
<tr>
<td><strong>Exclusive economic zone</strong></td>
<td>The area of the sea over which a state (GB) has special rights over the exploration and use of marine resources. The EEZ normally extends to a distance of 200 miles from the coast but in the case of the study extends to the median line with Holland.</td>
</tr>
<tr>
<td><strong>12 nautical mile territorial sea area</strong></td>
<td>Inshore area of the sea extending 12 miles offshore regarded as sovereign territory of GB but where shipping is allowed innocent passage</td>
</tr>
<tr>
<td><strong>6 nautical mile fishery zone</strong></td>
<td>Inshore area of the sea extending 6 miles offshore regarded as sovereign territory of GB where fishing is exclusively GB based</td>
</tr>
<tr>
<td><strong>3 nautical mile territorial sea area</strong></td>
<td>Economic and territorial jurisdiction zone extending 3 miles offshore</td>
</tr>
<tr>
<td><strong>Environmental protection limit, normal baseline</strong></td>
<td>Area of protection for specific area</td>
</tr>
<tr>
<td><strong>Environmental protection limit, low water baseline</strong></td>
<td>Area of protection for specific area</td>
</tr>
<tr>
<td><strong>Maritime conservation area</strong></td>
<td>A conservation</td>
</tr>
<tr>
<td><strong>Maritime settlement area</strong></td>
<td>Xxx</td>
</tr>
<tr>
<td><strong>Historic maritime settlement</strong></td>
<td>Xxx</td>
</tr>
<tr>
<td><strong>Nature reserve</strong></td>
<td>Nature reserves are protected areas of land of importance to wildlife, flora, fauna or features of special interest. Reserves fall into different categories depending on the level of protection afforded by local laws</td>
</tr>
<tr>
<td><strong>NNR</strong></td>
<td>National Nature Reserves protected by national laws covering areas of land of importance to wildlife, flora, fauna or features of special interest.</td>
</tr>
<tr>
<td><strong>RAMSAR</strong></td>
<td>Wetlands considered internationally important under the articles of the Ramsar conference.</td>
</tr>
<tr>
<td><strong>SAC</strong></td>
<td>Special Areas of Conservation as defined by a national list of 189 habitat and 788 species types (JNCC)</td>
</tr>
<tr>
<td><strong>SSSI</strong></td>
<td>Site of Special Scientific Interest denoting a protected area such as NNR, RAMSAR, SAC or SPA</td>
</tr>
<tr>
<td><strong>SAM</strong></td>
<td>Scheduled Ancient Monument a historic or archaeological area, building or site as defined by English Heritage afforded special protection under law.</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>SPA</strong></td>
<td>Special Protection Areas strictly protected sites classified in accordance with Article 4 of EC directive on the conservation of wild birds.</td>
</tr>
<tr>
<td><strong>Submerged forest</strong></td>
<td>Relating to the area off the coast of Lincolnshire once a Neolithic land surface covered in oak forest now submerged by the sea.</td>
</tr>
<tr>
<td><strong>Leisure beach</strong></td>
<td>An area of coastal beach used for recreation such as those at Skegness, Mablethorpe and Cleethorpes</td>
</tr>
<tr>
<td><strong>Marina</strong></td>
<td>A dock area specifically for pleasure craft and yachts such as the Historic fish dock in Hull now converted to a marina</td>
</tr>
<tr>
<td><strong>Angling</strong></td>
<td>Recreational fishing either freshwater or seawater</td>
</tr>
<tr>
<td><strong>Water sports</strong></td>
<td>Sports associated with sea such as yachting, diving, waterskiing etc.</td>
</tr>
<tr>
<td><strong>Holiday camp</strong></td>
<td>Coastal area providing accommodation and entertainments</td>
</tr>
<tr>
<td><strong>Caravan park</strong></td>
<td>Coastal area for holiday caravans. The Lincolnshire coast has the biggest concentration of caravan parks in Europe.</td>
</tr>
<tr>
<td><strong>Holiday village</strong></td>
<td>Permanent holiday accommodation such as that at Humberston</td>
</tr>
<tr>
<td><strong>Historic canal</strong></td>
<td>Commercial waterway constructed in the 18th or 19th century for the transportation of goods such as the Louth canal running from Tetney lock to Louth.</td>
</tr>
<tr>
<td><strong>Historic sand dunes</strong></td>
<td>Sand dunes formed in the past now some distance from the sea such as those at Theddlethorpe</td>
</tr>
<tr>
<td><strong>Aquarium</strong></td>
<td>Recreational and education building specifically for the display of marine wildlife. Eg The Deep in Hull.</td>
</tr>
<tr>
<td><strong>Golf course</strong></td>
<td>Coastal golf course or links.</td>
</tr>
<tr>
<td><strong>Dive site</strong></td>
<td>Recognised area for diving especially on wrecks such as those off the Dowsing Shoal.</td>
</tr>
</tbody>
</table>

### 6.4 Characterisation_polygons layer attribute terminology: Other attributes

Attribute name: OBJECTID
Definition: automatically generated by GIS
Entry: auto generated by ArcGIS
Data: ‘1’–‘1019’

Attribute name: Shape
Definition: automatically generated by GIS
Entry: auto generated by ArcGIS
Data: ‘Polygon’

Attribute name: CHARACTER_AREA
Definition: Record of the CHARACTER_AREA that the polygon falls within. Will include multiple entries if the polygon inhabits multiple CHARACTER_AREAs
Entry: Populated by custom tool which attributed the name of each Character_Area polygon to all the polygons which were completely contained by, or intersected it
Sample Data: ‘Docking Shoal, Inner Dowsing, Ouse/Nene, Race Bank & North Ridge’, ‘Skegness to Wainfleet coast, Wainfleet Sand’, ‘Cleethorpes to Mablethorpe coast, Dudgeon shoals, Galleon, Inner Dowsing, Leman Ground, Ouse/Nene, Outer Dowsing navigation channel, Outer Dowsing shoals, Outer Dowsing, Ower Bank, Protector Overfalls, Saturn, Skegness & Mablethorpe coastal waters, Theddlethorpe Overfalls, Triton Knoll’, etc [Full list not recorded, see Section XXX for full list of CHARACTER_AREA names]

Attribute name: PERIOD
Definition: Benchmark period of origin of the area represented in the polygon, ie ‘Post medieval’
Entry: Manual entry from assessment of maps and documentary sources
Data:

Devensian/Holocene | Neolithic
--- | ---
Medieval | Post medieval
Modern | Prehistoric
NA

Attribute name: PRI_INT_ACT
Definition: Primary Intrusive Activity – eg. Aggregate dredging, Maintenance dredging
Entry: Manual entry from assessment of SUB_CHARACTER type and associated documentary sources
Data:

Active Dredge Zone | Historic maritime settlement
Active licensed shellfish beds | Maintenance dredging
Active shellfish beds | Maritime settlement
Aggregate extraction | Military firing range
Anchorage | Military practice area
Bait digging area | Navigation
Coastal fisheries | Processing industry
Coastal industry | Recreation
Coastal mariculture | Samphire picking
Commercial fishing | Shellfish digging
Crab Fishery | Spoil ground
Crab and lobster potting | Transport
Dock and port related industry | Trawling
Gas Terminal | Unknown
Gas industry | Wind farm
Gas terminal in southern extent
Attribute name: PRI_NON_INT_ACT
Definition: Primary None Intrusive Activity – eg. Commercial shipping, Water sports
Entry: Manual entry from assessment of SUB_CHARACTER type and associated documentary sources

Data:
- Active historic anchorage
- Angling
- Caravan parks
- Coastal fishing
- Commercial shipping
- Crab and lobster potting
- Disused WWII anti aircraft battery
- Disused WWII minefield
- Eel fishing
- Generic coastal fishing area
- Historic cargo dock
- Leisure beach
- Local shipping
- Military practice area
- Modern flood defence
- Modern passenger port
- Nature reserve
- Navigation
- Pleasure beach
- Public park
- RAF practice area
- RAF practise area
- Recreation
- Recreation designated areas
- Recreation designated zone
- Spoil ground
- Submarine exercise area
- Unknown
- Water sports
- Whitefish longlining

Attribute name: OTHER_USE
Definition: Other secondary seascape uses that are apparent, but are not the dominant characteristic of the polygon, eg ‘Nature reserve’
Entry: Manual entry. Assessment of SUB_CHARACTER type and associated documentary sources

Data:
<table>
<thead>
<tr>
<th>Attribute name: MORPHOLOGY</th>
<th>Definition: Impact of primary activities/characteristics evident in polygon on area of coast/sea represented in polygon. Assessed broadly as High, Moderate or Low</th>
<th>Entry: Manual entry, derived from study of documentary sources</th>
<th>Data:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active historic anchorage</td>
<td>Historic maritime settlement, Recreation dive site</td>
<td></td>
<td>Active historic channel, Inactive maritime settlement, Ridge</td>
</tr>
<tr>
<td>Aggregate extraction</td>
<td>Inactive licensed shellfish beds, Salmon and trout fishing, Sea</td>
<td></td>
<td>Aggregate extraction, Inactive shellfish beds, Seafront</td>
</tr>
<tr>
<td>Angling</td>
<td>Inshore fisheries, Sea</td>
<td></td>
<td>Angling, Inshore fisheries, Seafront</td>
</tr>
<tr>
<td>Channel</td>
<td>Marina, Seafront, Sea</td>
<td></td>
<td>Channel, Marina, Seafront</td>
</tr>
<tr>
<td>Coastal fisheries</td>
<td>Maritime settlement area, Seafront and marshland</td>
<td></td>
<td>Coastal fisheries, Maritime settlement area, Seafront</td>
</tr>
<tr>
<td>Coastal industry</td>
<td>Marshland, Ship repair industry</td>
<td></td>
<td>Coastal industry, Marshland, Ship repair industry</td>
</tr>
<tr>
<td>Coastal mariculture</td>
<td>Medieval reclaimed land, Shipwreck site</td>
<td></td>
<td>Coastal mariculture, Medieval reclaimed land, Shipwreck site</td>
</tr>
<tr>
<td>Coastline</td>
<td>Military firing range, Spoil ground</td>
<td></td>
<td>Coastline, Military firing range, Spoil ground</td>
</tr>
<tr>
<td>Commercial fishing</td>
<td>Military practice area, Submarine practice area</td>
<td></td>
<td>Commercial fishing, Military practice area, Submarine practice area</td>
</tr>
<tr>
<td>Conservation area</td>
<td>Modern cargo dock, Tideway</td>
<td></td>
<td>Conservation area, Modern cargo dock, Tideway</td>
</tr>
<tr>
<td>Disused WWII anti aircraft</td>
<td>Modern flood defence, Unknown</td>
<td></td>
<td>Disused WWII anti aircraft, Modern flood defence, Unknown</td>
</tr>
<tr>
<td>Disused historic quarantine area</td>
<td>Nature reserve, Water sports</td>
<td></td>
<td>Disused historic quarantine area, Nature reserve, Water sports</td>
</tr>
<tr>
<td>Eel fishing</td>
<td>Navigation, Whitefish longlining</td>
<td></td>
<td>Eel fishing, Navigation, Whitefish longlining</td>
</tr>
<tr>
<td>Gas field</td>
<td>Navigation channel, Wreck cluster</td>
<td></td>
<td>Gas field, Navigation channel, Wreck cluster</td>
</tr>
<tr>
<td>Gas industry</td>
<td>Post medieval reclaimed land</td>
<td></td>
<td>Gas industry, Post medieval reclaimed land</td>
</tr>
<tr>
<td>Gas terminal</td>
<td>Proposed wind farm, Wreck cluster</td>
<td></td>
<td>Gas terminal, Proposed wind farm, Wreck cluster</td>
</tr>
<tr>
<td>Gravel beds</td>
<td>Proposed wind farm area</td>
<td></td>
<td>Gravel beds, Proposed wind farm area</td>
</tr>
<tr>
<td>Harbour</td>
<td>RAF practise area, Wreck cluster</td>
<td></td>
<td>Harbour, RAF practise area, Wreck cluster</td>
</tr>
<tr>
<td>Historic drying area</td>
<td>Recreation</td>
<td></td>
<td>Historic drying area, Recreation</td>
</tr>
<tr>
<td>Historic fish dock</td>
<td>Recreation designated area</td>
<td></td>
<td>Historic fish dock, Recreation designated area</td>
</tr>
</tbody>
</table>

Across various marine areas and coastal features:

- **Active channel**
  - Humberhead levels

- **All offshore areas outside 12 mile limit**
  - In mega ripple area

- **Bank**
  - Inland coastal

- **Beachfront and coastal sand and gravel banks**
  - Knock

- **Beachfront and shelving coastal seabed**
  - Knoll

- **Besides gravelly sand bank**
  - Knoll and relic gravel terrace banks of Ouse/Nene palaeochannel valley

- **Besides gravelly sand bank in mega ripple area**
  - Mega ripple area

- **Besides gravelly sand banks in mega ripple area**
  - Mega ripple banks

- **Between gravelly sand banks of mega ripple area**
  - Mega ripple banks and Devensian moraine field

- **Channel**
  - Mega ripple banks and Devensian moraine field

- **Channel in the Estuarine sand and mud**
  - Mega ripple banks, gravelly sand bed

- **Cliff top**
  - Mega ripple sand bank area

- **Coast**
  - Morph: Crossing gravelly sand banks of mega ripple area

- **Coastal cliffs**
  - Mud flats

- **Coastal marshland**
  - Muddy relic palaeochannel

- **Coastal mudflats**
  - Navigation channel

- **Coastal plain**
  - Outer Dowsing relic Devensian palaeochannel

- **Coastal sand and mud**
  - Overfalls
Coastal shoals
Coastal waters channel

Coastline

Coastline and coastal waters
Coastline and estuarine sand and mud
Cromer knoll
Crosses relic Devensian moraine field and mega ripple area
Crosses relic Devensian moraine field and mega ripple area out to deepwater
Crosses relic moraine field into gravelly sand banks of mega ripple area
Crossing from relic gravel terraces into Outer Silver Pit relic palaeolake
Crossing gravel terraces and Devensian palaeochannel
Crossing gravelly sand bank
Crossing gravelly sand bank in mega ripple area
Crossing gravelly sand banks of mega ripple area
Crossing gravelly sand shoals of mega ripple area
Crossing relic Devensian moraine field and sand gravelly seabed
Crossing relic gravel terraces and Devensian Silver Pit palaeochannel
Crossing relic gravel terraces and relic Devensian palaeochannel
Crossing relic landscape of Late Devensian/Early Holocene palaeochannel and flanking gravel terrace
Crossing sand bank
Crossing sand bank in mega ripple area
Crossing sand flats

Deep water
Deep water channel
Deep water over sandy gravel beds

Devensian gravel terrace on edge of moraine field
Disused WWII anti aircraft battery
Dogger Bank. Relic gravel bank
Eroded relic landscape of the Ouse/Nene palaeochannel
Estuarine mud flats
Estuarine plain
Estuarine sand
Estuarine sand and mud
Estuarine sand and mud flats
Estuarine sandy mud

Overfalls and coastal waters
Protector overfalls, gravel terrace to west of Ouse/Nene relic palaeochannel
Relic Devensian upland landscape. Gravel terraces north of Outer Silver Pit palaeolake
Relic Ouse/Nene palaeochannel
Relic gravel terrace beside Devensian palaeochannel
Relic gravel terrace beside palaeochannel
Relic gravel terrace to east of Silver Pit palaeochannel
Relic gravel terraces and shoreward shelving seabed
Relic gravel terraces between Devensian palaeochannels
Relic gravel terraces north of Outer Silver Pit relic palaeolake now the Dogger Bank
Relic landscape of Late Devensian/Early Holocene Humber palaeochannel and flanking gravel terrace
Relic landscape of Late Devensian/Early Holocene Humber palaeochannel and flanking gravel terraces
Relic landscape of Late Devensian/Early Holocene Ouse/Nene palaeochannel and flanking gravel terrace
Relic landscape of Late Devensian/Early Holocene Ouse/Nene palaeochannel and flanking gravel terraces
Relic landscape of Late Devensian/Early Holocene Outer Silver Pit lake sourced from the ice sheet to the north.
Relic landscape of Late Devensian/Early Holocene Silver Pit palaeochannel
Relic landscape of Late Devensian/Early Holocene Silver Pit palaeochannel and flanking gravel terrace
Relic landscape of Late Devensian/Early Holocene Silver Pit palaeochannel and flanking gravel terraces

Relic landscape of Late Devensian/Early Holocene palaeochannel
Relic landscape of Late Devensian/Early Holocene palaeochannel and flanking gravel terrace
Relic landscape of Late Devensian/Early Holocene palaeochannel and flanking gravel terraces
Relic palaeochannel
Relic palaeochannel and gravel terrace
Relic palaeochannel and gravel terrace
Remnant island

Ridge
Ridge and Bank
Riverine sand and mud

Riverine sandy mud
Rough gravelly sand bank in mega ripple area
Rough gravelly sand seabed
Rough sandy seabed
Rough seabed
Sand Flats and riverside
Estuary
Estuary mouth
Estuary mouth and coastal sand flats
Estuary mouth and shelving coastal seabed
Fairly flat sandy sea bed
Flat gravelly sandy seabed
Gravel flats to east of Ouse/Nene relic palaeochannel
Gravel knoll
Gravel sand bank
Gravel sand bank Dogger Bank
Gravel sand bank in mega ripple area
Gravel shoal and sand bank
Gravel terraces on side of Silver Pit relic palaeochannel to east
Gravelly sand banks in mega ripple area
Gravelly and rocky seabed
Gravelly sand bank
Gravelly sand bank and deep water channel
Gravelly sand bank in mega ripple area
Gravelly sand banks in mega ripple area
Gravelly sand bed
Gravelly sand bed in mega ripple area
Gravelly sand bed of relic palaeochannel
Gravelly sand beds
Gravelly sand beds in mega ripple area
Gravelly sand beds of mega ripple area
Gravelly sand knoll in mega ripple area
Gravelly sand knoll in mega ripple area
Gravelly sand ridge
Gravelly sand rough seabed
Gravelly sand shoal
Gravelly sand shoal in relic Devensian moraine field
Gravelly sand shoals
Gravelly sand shoals and bank
Gravelly sandy seabed
Gravelly sandy shelving coastal seabed in estuary mouth
Harbour
Headland

Attribute name: IMPACT
Definition: Impact of primary activities/characteristics evident in polygon on area of coast/sea represented in polygon.
Entry: Manual entry, derived from study of documentary sources
Data:

High Variable
Moderate Unknown
Low NA
Attribute name: PREV_CHAR
Definition: The previous character of the current seascape (where known), ie ‘Active historic salterns’
Entry: Manual entry, derived from study of documentary sources and map regression
Data:

Active WWII airfield
Active WWII anti aircraft battery
Active WWII decoy
Active anti aircraft battery
Active historic channel
Active historic salterns
Active licensed shellfish beds
Active sluice

Airfield
Bank
Bank of Devensian Outer Silver Pit palaeochannel
Banks
Bull Sand Island
Clay extraction pits

Coastal fishing
Coastal industry
Coastal mariculture area
Coastal marsh
Crossing from gravel terraces into Outer Silver Pit palaeolake
Crossing gravel terraces and Devensian Silver Pit palaeochannel
Crossing gravel terraces and Devensian palaeochannel
Crossing gravel terraces and Outer Silver Pit palaeolake
Devensian Silver Pit palaeochannel
Devensian gravel terrace on edge of moraine field
Devensian lowland landscape. Gravel terraces north of Outer Silver Pit palaeolake
Devensian moraine field
Devensian moraine field and palaeochannels
Devensian palaeochannel
Devensian palaeochannel and flanking gravel terraces
Devensian palaeochannel and gravel terrace in eastern half
Devensian upland landscape. Gravel terraces north of Outer Silver Pit palaeolake
Fishing ground
Flats
Flood defended area

Generic coastal fishing area
Generic river fishing
Gravel terrace beside Devensian Ouse/Nene palaeochannel
Gravel terrace beside Devensian outer Silver Pit palaeolake
Gravel terrace beside Devensian palaeochannel
Gravel terrace beside palaeochannel
Gravel terrace besides Devensian palaeochannel
Gravel terrace into Outer Silver Pit palaeolake
Gravel terrace on east bank of Ouse/Nene palaeochannel
Gravel terrace to east of Late Devensian/Early Holocene Ouse/Nene palaeochannel
Gravel terrace to east of Ouse/Nene palaeochannel
Gravel terrace to east of Silver Pit palaeochannel
Gravel terrace to west of Ouse/Nene palaeochannel
Gravel terraces and Devensian palaeochannel
Gravel terraces between Devensian palaeochannels
Gravel terraces north of Outer Silver Pit palaeolake now the Dogger Bank
Historic citadel
Historic clay extraction pits

Historic coastal settlement
Historic cockling area
Historic drying area
Historic ferry port
Historic ferry route
Historic fish dock
Historic fish dock area
Historic fishing ground
Historic haven
Historic maritime settlement

Historic port
Historic shipbuilding industry

Humber palaeochannel
Island
Knoll
Land
Knoll and gravel terrace banks of Ouse/Nene palaeochannel valley

Gravel terrace beside palaeochannel

Gravel terrace besides Devensian palaeochannel

Gravel terrace into Outer Silver Pit palaeolake
Gravel terrace on east bank of Ouse/Nene palaeochannel
Gravel terrace to east of Late Devensian/Early Holocene Ouse/Nene palaeochannel
Gravel terrace to east of Ouse/Nene palaeochannel
Gravel terrace to east of Silver Pit palaeochannel
Gravel terrace to west of Ouse/Nene palaeochannel
Gravel terraces and Devensian palaeochannel
Gravel terraces between Devensian palaeochannels
Gravel terraces north of Outer Silver Pit palaeolake now the Dogger Bank
Historic citadel
Historic clay extraction pits
Historic coastal settlement
Historic cockling area
Historic drying area
Historic ferry port
Historic ferry route
Historic fish dock

Historic fish dock area

Historic fishing ground
Historic haven
Historic maritime settlement
Historic port

Historic shipbuilding industry
Humber palaeochannel
Island
Knoll
Knoll and gravel terrace banks of Ouse/Nene palaeochannel valley
Land
Late Devensian/Early Holocene Humber palaeochannel and flanking gravel terrace
Late Devensian/Early Holocene Humber palaeochannel and flanking gravel terraces
Late Devensian/Early Holocene Ouse/Nene palaeochannel and flanking gravel terrace
Late Devensian/Early Holocene Ouse/Nene palaeochannel and flanking gravel terraces
Local shipping
Maritime settlement area
Medieval reclaimed land
Ouse/Nene palaeochannel
Outer Dowsing Devensian palaeochannel
Palaeo upland. Dogger Bank
Palaeochannel
Post medieval haven
Post medieval reclaimed land
Relic landscape of Late Devensian/Early Holocene palaeochannel and flanking gravel terrace
Relic landscape of Late Devensian/Early Holocene palaeochannel and flanking gravel terraces
River channel
Shoal
Unknown
Varied: Devensian palaeo lake and palaeochannels dominate
Attribute name: LOCATION
Definition: Where the polygon is physically located: Estuarine, Coastal or Sea
Entry: Manual entry
Data:

Coastal
Coastal waters
Estuarine
Estuary mouth
Riverine
Sea
Sea & Coastal

Attribute name: DATASOURCE
Definition: Originator core dataset used for characterisation
Entry: Manual entry
Data:

UKHO, Mastermap
BMAPA
CEFAS
DEAL
Humber Management Scheme
Local dive club
Mablethorpe tourist information website
Mablethorpe town historic website
Mastermap
Mastermap, Environment Agency
Mastermap, Hull City Council Character Area Appraisal 1999 and Conservation Area Character Appraisals 2004 & 2005
Mastermap, Hull City Docklands Plan 2000
Mastermap, Hull City Plan 2000
Mastermap, Humber Estuary and Coast 1994
Mastermap, Landark, Multimap
Mastermap, Landmark
Mastermap, Multimap
Mastermap, NMR
Mastermap, NMR, Humber SMP
Mastermap, Riverhumber.co.uk
Mastermap, Riverhumber.co.uk, ABP
Mastermap, SeaZone
Mastermap, UKHO
Multimap
NESFA
NESFC
NMR
NMR, Mastermap
NMR, SeaZone, Mastermap
SeaZone
SeaZone & Admiralty chart 107 (2005)
SeaZone & OS250K mapping
SeaZone SEA_COVER and Bathymetry & personal interpretation
Attribute name: NOTES
Definition: More background information on the history of the polygon. An expansion of information previously recorded
Entry: Manual entry
Sample Data: ‘Navigation channel defined by Cardinal and Lateral buoys either side of channel.’
          ‘Firing practice area: Wainfleet Range (D308)’
          ‘3 probable remains of stranded vessels’

Attribute name: CONFIDENCE
Definition: Degree of certainly assigned to interpretation.
Entry: Manual entry
Data:
        High
        Moderate
        Low

Attribute name: CHECKED_BY
Definition: Initials of the person responsible for checking the information before final output
Entry: Manual entry
Data: ‘DM’

Attribute name: Shape_Length
Definition: automatically generated by GIS
Entry: auto generated by ArcGIS
Data: 5989.323443

Attribute name: Shape_Area
Definition: automatically generated by GIS
Entry: auto generated by ArcGIS
Data: 2854531.742205
6.5 Character_Area layer attribute terminology

The Character_Area characterisation attributes used the same structure as the Characterisation_polygons except for the following:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Population method</th>
<th>Example of terminology</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHARACTER_AREA</td>
<td>Manual entry, derived from dominant character of</td>
<td>Topographical location – each character area contains groups of polygons with similar attributes, ie ‘Markham’s Hole’</td>
</tr>
<tr>
<td></td>
<td>Characterisation_polygons</td>
<td></td>
</tr>
<tr>
<td>IMPACT</td>
<td>Automated entry</td>
<td>Not applicable. Spatial concept with no impact</td>
</tr>
<tr>
<td>DATASOURCE</td>
<td>Automated entry</td>
<td>Not applicable. Polygons generated by MoLAS</td>
</tr>
</tbody>
</table>

The only different attribute is the CHARACTER_AREA attribute:

Attribute name: CHARACTER_AREA
Definition: Topologically discrete location – each character area contains groups of polygons with similar attributes.
Entry: Generated through interpretation of the underlying Characterisation_polygons

Data:

- Alkborough to Barton Upon Humber coast: Leman
- Amethyst East: Leman Ground
- Amethyst West: Lynn
- Barton to East Halton coast: Mablethorpe to Skegness coast
- Bessemer gas field: Markham's Hole
- Blacktoft to Hessle coast: New Sand Hole
- Brigantine gas field: North Hewett
- Burnham Flats: North Sea traffic route
- Cleethorpes to Mablethorpe coast: North Sea transport route
- Cromer Knoll: Off Easington
- Docking Shoal: Off Ground
- Dogger Bank: Ouse/Nene
- Donna Nook: Outer Dogs Head
- Dudgeon shoals: Outer Dowsing
- East Halton to Immigham coast: Outer Dowsing navigation channel
- Galleon: Outer Dowsing shoals
- Haile Sand: Outer Humber Estuary
- Haile Sand Flat: Outer Silver Pit
- Hewett: Ower Bank
- Hull coast: Protector Overfalls
- Humber Estuary mouth: Race Bank & North Ridge
- Humber Gateway: Race Bank Channel
- Humber Mouth: Rough
- Indefatigable: Saturn
- Indefatigable Banks: Sheringham Shoal
- Inner Dowsing: Silver Pit
- Inner Humber Estuary: Skegness & Mablethorpe coastal waters
- Isle of Axholme: Skegness to Wainfleet coast
<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sole Pit</td>
<td>Wainfleet Sand</td>
</tr>
<tr>
<td>Spurn Point</td>
<td>Well Bank</td>
</tr>
<tr>
<td>Sunk Island coast</td>
<td>Well Bank Flats</td>
</tr>
<tr>
<td>The Binks</td>
<td>Well Hole</td>
</tr>
<tr>
<td>Theddlethorpe Overfalls</td>
<td>West Hole</td>
</tr>
<tr>
<td>Triton Knoll</td>
<td>West Sole</td>
</tr>
<tr>
<td>Valiant</td>
<td>Withersea to Spurn Point coast</td>
</tr>
</tbody>
</table>
7 Delivering the final product to NMR

Due to copyright limitations, associated with SeaZone and BGS data in particular, no data was directly reproduced from sources. Instead, all the characterisation polygons produced can be more accurately described as an amalgamation of data sources, which resulted in a new character shape derived from primary sources. Specifically, new polygon boundaries were created which took account of but did not equate with any pre-existing polygons.

Historic information obtained from local SMRs and HERs were also subject to ‘data release’ agreements. These stipulate that the information given should only be used for purposes of the Withernsea to Skegness pilot study project.

All data produced by this Seascapes project are free of any 3rd party licencing agreements and, on transfer to the NMR, are EH copyright.
8 Bibliography


CoastNET, 2003, Spatial Planning in the Coastal and Marine Environment: Next Steps to Action, Conference Briefing, 1 October 2003, SOAS, University of London.


DEFRA, 2001, Shoreline Management Plans A guide for coastal defence authorities, DEFRA

DEFRA, 2002, Safeguarding our Seas, DEFRA.

Department of the Environment, 1972, Out of Sight, Out of Mind, HMSO.


English Heritage, 1997, Archaeology Division Research Agenda, April 1997

English Heritage, 1999, A Brief for Rapid Coastal Zone Assessment Surveys, Release 2, February 1999


English Heritage, 2004, Guidelines for English Heritage projects involving GIS.


Natural Beauty: An archaeological research framework.


