Hampshire & Wight Trust for MARITIME Archaeology

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UNIVERSITY OF SOUTHAMPTON AND NATURAL ENVIRONMENT RESEARCH COUNCIL

Englands Historic Seascapes

Solent and Isle of Wight & Adjacent Marine Zone Pilot Area

Technical Report

Report prepared for:
English Heritage

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Contents

i. Acknowledgements

Solent Seascapes is a project funded by English Heritage through the Aggregates Levy Sustainability Fund.
The Solent and Isle of Wight Pilot, one of four concurrent Seascapes Pilot Projects, has been undertaken by the Hampshire & Wight Trust for Maritime Archaeology, Bournemouth University and Southampton University.
Principal project staff involved were Nicola Goodwyn and Julie Satchell (HWTMA), Olivia Merritt (BU) and Fraser Sturt, Justin Dix and Graeme Earl (SU).

ii. List of Figures

iii. List of Tables

1. Introduction

The England's Historic Seascapes: Solent and Wight Pilot Project has been funded through the Aggregates Levy Sustainability Fund (ALSF) through English Heritage. This is one of four concurrent Pilot Projects *(Figure 1.1)* that has sought to build on an initial pilot undertaken for the Liverpool Bay area.

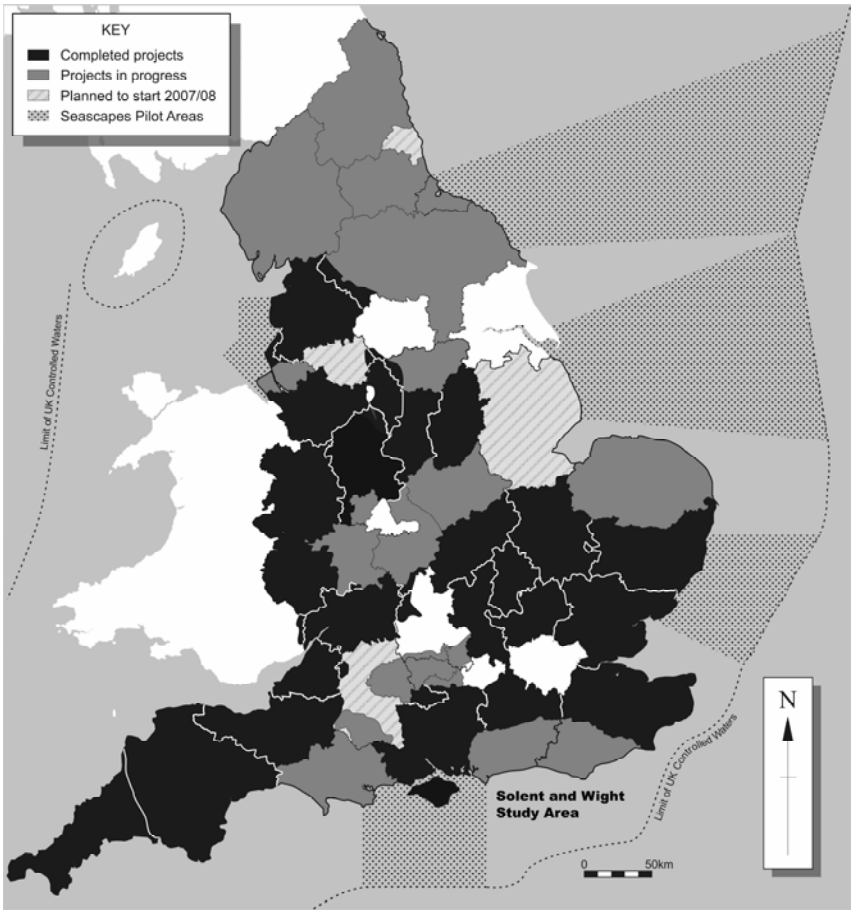

Figure 1.1 Image showing location of all Seascapes Pilot Projects (EH, 2007)

The application of principles of Historic Landscape Characterisation (HLC) to the marine zone faces interesting challenges due to the inherent differences in the environments. This has required the development, testing and refinement of the Seascapes methodology. Seascapes, is funded through the Aggregates Levy Sustainability Fund, and has the potential to aid marine spatial planning decisions in the future.

The project has assessed and interpreted available digital datasets for the marine zone to produce an area based characterisation. This approach takes a holistic view of the historic environment to provide context for the often 'point-based' datasets available for the marine zone. The resulting product is designed to help manage

change in the marine historic environment through understanding past and current uses of the sea.

This Technical Report presents detail of the methods and results of the Solent Seascapes Project and includes a full assessment of project challenges and issues for consideration for Marine Historic Landscape Characterisation. It should be read alongside the project's Non-Technical Report 'Solent & Isle of Wight Seascapes: why, how and what for explained'. The Non-Technical report presents information on the Solent area, principles of HLC and its application to the marine zone, it also highlights the results of the project and focuses on a range of case studies for the application and use of Solent Seascapes.

2. Project Aims and Objectives

The Seascapes project Aims and Objectives were set by English Heritage in the document 'England's Historic Seascapes: Solent and Isle of Wight Pilot Area – A brief to extend the application of Historic Landscape Characterisation to England's Inter-tidal and Marine Zones and Adjacent UK Continental Shelf'. They are outlined in full below to provide the content in which the project was undertaken.

2.1 Project Aims

- To apply and develop the new Liverpool Bay methodology in a different type of coastal and marine environment (the Solent, Isle of Wight and adjacent marine zone pilot area)

- To created a Geographic Information System (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 Historic Landscape Characterisation (HLC) to the breadth of environmental and management conditions in England's inter-tidal and marine zones and adjacent UK continental Shelf

2.2 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 Solent and Isle of Wight project 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 a 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 different 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 the HLC to produce preliminary syntheses from it

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

- To assess present uses and potential for the HLC in informing 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

2.3 Additional Project Objectives as defined by the Project Team

- Provide a wealth of available advice on all aspects of the maritime, inter-tidal and terrestrial historic environment through members of staff based at all three organisations.
- Utilise the extensive experience of the HWTMA in the research, interpretation and analysis of the maritime archaeological resource of the Solent and Wight area.
- Maximise the potential for the utilisation of relevant environmental datasets where they can provide additional information for marine HLC through the input from staff at the University of Southampton with particular expertise in these fields.
- Improve the application of historical navigational charts as a tool for data gathering through the input from staff at Bournemouth University with particular expertise in this area.

3. Data Acquisition & Approach

The acquisition and assessment of available data for the marine zone in the study area *(Figure 3.1)* formed a large part of the early stages of the project. This section outlines the results of data gathering and assessment. Following this work character types and sub-types were developed which provided the framework for the development of a multi-level approach.

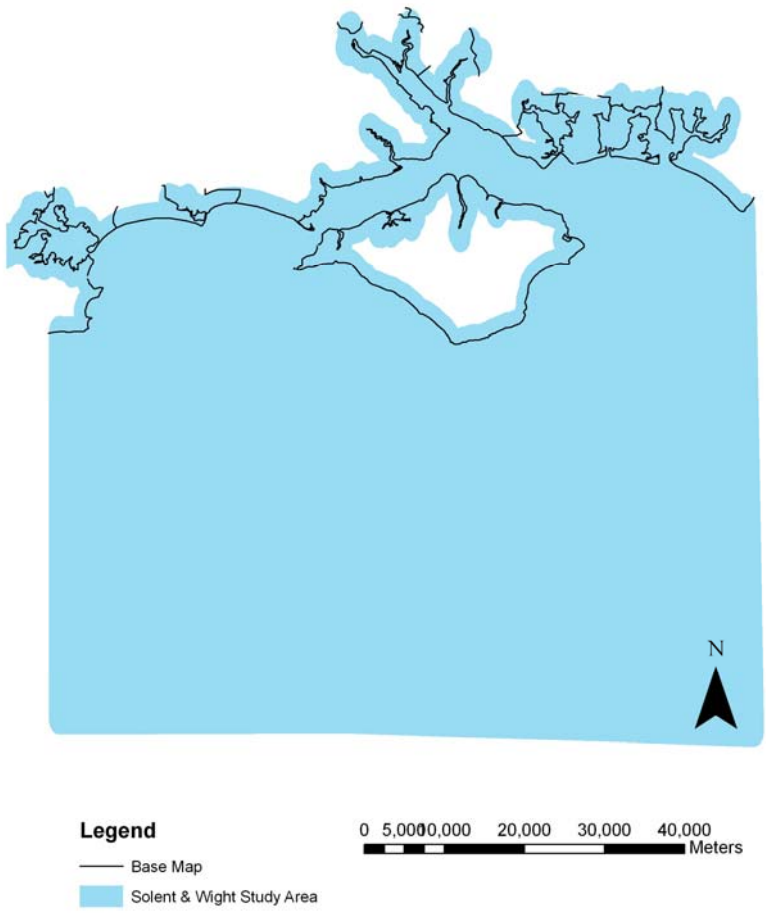

Figure 3.1 – Image showing the extent of the Seascapes Study area (HWTMA, BU, SU, EH, 2007)

3.1 Data Gathering

Initial project data gathering focused on the acquisition of key sources and the assessment of a broad range of other data sets available in the Solent and Sea Wight Areas. See appendix 10.1 for a full list of all data sources consulted for the project. Issues concerning the availability of marine datasets are considered in section 6, however, it is worth stressing here that the time which some datasets took to acquire did have a bearing on the project programming.

3.2 Data Assessment

3.2.1 Digital Data

All data was transformed into British National Grid co-ordinates (OSGB 1936) prior to querying data in the GIS application. The OSGB 1936, co-ordinate systems was used as it is compatible with terrestrial HLC, and would thus facilitate a seamless overlap between land and sea.

The key digital data sources for the Seascapes project can be split into broad types:

- Historic Environment Data – from Historic Environment Record offices (HER's)/ Sites and Monument Record offices (SMR's)/ National Monument Record (NMR), terrestrial HLC, some borehole and core information and information derived from archaeological investigation reports.
- SeaZone Hydrospatial data – largely concerned with modern sea use and licensing.
- Natural environment data – habitat mapping and nature designations taken from digitised polygonal data provided by JNCC, Natural England and CEFAS.
- Geology and sedimentary information – British Geological Survey (BGS) data.
- Other data sources – including information such as polygonal data from the Navigational Hazards Project.

Each dataset was assessed for suitability to contribute based on a number of factors:

- Source and accuracy of the dataset;
- Coverage of the marine zone;
- Level of detail of the dataset;
- Relevance to the marine zone;
- Format, whether is it digitised polygonal or point data;
- Relevance to the character of the region; and
- Compatibility with existing HLC

Those datasets that were unreliable, or didn't have the level of detail required were not directly incorporated into the GIS, they were assessed for their relevance to HLC, in particular whether they reflected current or past human activity or use in the marine zone. This resulted in some information from datasets being incorporated later into character descriptions, others were either discarded or substituted where possible. Where an alternative polygonal dataset could not be substituted, as in the case of wrecks, point datasets were queried in GIS, buffered to suitable limits, and incorporated into the GIS based characterisation. When considering the NMR, HER and SMR monument point data, these were used as a reference to validate polygon datasets and, in the characterisation of the sub-layers and within the full top-level polygon descriptions.

The main challenge of including both marine and terrestrial datasets in this type of characterisation project was incompatibility, especially of datasets tailored exclusively

to these areas. Further issues, directly related to incorporating specific marine datasets into the characterisation were:

- Coverage - there are often gaps in marine datasets; for example in the borehole data.
- Detail - the level of detail that could be relevant for HLC in marine data was often found to be of poor resolution, particularly when compared with terrestrial datasets.
- Accuracy – these problems were an issue for marine data: i.e. datasets from seazone are tailored to navigation and marine planning and lack archaeological consideration. Historic environment data in point based form - the NMR and SMR/HER's maritime data consisted primarily of point data, this was often the most useful data in terms of HLC, however, current levels of knowledge of the marine resource meant that utilising it as the basis for characterisation was often difficult.

These challenges were considered by the project team and were used to help develop methods for processing marine data to enable its most effective use for HLC.

Furthermore, from an archaeological perspective, the state of the archaeological resource for the marine zone differed from the well-established and developed terrestrial archaeological record. The terrestrial archaeological record has been extensively mapped within the development of multiple research frameworks, whereas, the marine archaeological record has as yet to be catalogued as extensively.

The result was a baseline dataset which mainly consisted of examples that are available in all areas offshore of England. However, some datasets are more specific to the Solent area. See appendix 10.2 for list of sources used for Characterisation.

It was immediately evident that the submerged prehistoric landscape resource of the area was not well represented in the available digital datasets (if at all). This issue was addressed through work undertaken by the University of Southampton (see 3.2.2).

3.2.1.1 NMR/ HER data

The NMR and HER point data was used as visual, spatial and information reference when constructing the final broad character polygons. The digital polygonal data from Hampshire County's investigation, which plotted the positions of saltern deposits in the coastal and intertidal areas, was used to directly feed into the seabed surface and coastal GIS sub-levels of Seascapes.

The NMR wreck data points were loaded into the GIS and then overlaid with Seazone wreck points. The duplicate points identified within the NMR dataset were removed in favour of the more accurately charted Seazone wreck points. These two datasets were then combined into one wreck layer and underwent the GIS reclassification, selection, and unioning process.

3.2.1.2 Terrestrial HLC

The existing HLC polygons were loaded into the GIS, those either located partially or entirely within the 2km landward buffer zone, were retained. Those polygons identified as relating to the marine/coastal area such as 'marinas' were then queried out and exported into another layer, while other non-relevant polygons such as 'field systems' were discarded. The final HLC layers that were fed into the GIS selection and unioning process (see section 4), consisted of relevant marine/coastal features located within the 2km landward buffer zone.

3.2.1.3 Seazone data

The SeaZone Hydrospatial dataset is widely acknowledged as one of the most comprehensive available in terms of modern sea use. The following main data types from the Seazone data set were used:

- Activity License region
- Depth Areas region
- Aquaculture region
- Transportation region
- Constructions region
- Installations region
- Obstruction points
- Wreck points

The activity license region layer provided a vast amount of the data required to inform on modern use of all areas of the coastal and marine zones. Notably, it contained locations of: military practice areas; aggregate dredging; maintenance dredging and capital dredging areas; dumping grounds, dock areas, dry docks, ferry routes, submarine cables (full list is in the reclassification table 10.4). These categories formed some of the most intrusive and frequently featured activities within the Solent.

The Seazone depth areas region dataset was used to the define extents of sandbank areas. Any feature with a depth area between 2-5m was selected and exported to form the sandbanks layer. These areas were checked by referring to navigational charts and OS maps showing intertidal areas.

The aquaculture region dataset defined fishing grounds, however in the Solent, it only identified one lobster fishing ground. The remaining fishing areas were found in the Activity License areas.

Transportation region data charted the presence of navigational buoys/signals, dock areas, anchorages and ferry routes.

The construction region dataset contained the locations of Marinas and Harbour facilities, together with groynes; sea walls and other shoreline defence constructions such as rip rap.

Installations region data was key to identifying primarily industrial activities in the nearshore and offshore areas. It recorded the presence of oil installations, offshore platforms, fishing installations, wind farms, and navigation structures such as the Nab tower.

The wreck point dataset was used as a base on to which other wreck data from the NMR was added. In dealing with this dataset it was easy to divide the points into historic wrecks (primarily designated protected wrecks), dive sites (cross referenced from various local diving guides and sources), and other unidentified wrecks. The points were buffered by 200m or by their designated exclusion zones, and then merged together to form one layer within which they retain their identity and character.

Similarly, when processing the obstructions & piles dataset, each obstruction was also buffered by 200m (as these could be unidentified wrecks or hulks) and piles by 50m. The piles were exported into a separate layer and both layers were then merged.

When the data was selected and unioned using GIS, the polygons were not merged but 'unioned' therefore retained there own attributes, classifications, and geographic extents. These features were used to help develop and refine the classifications for broad character type, and sub character type categories and subsequently underwent the selection and unioning process.

3.2.1.4 Natural environment data

The Solent coast has many natural designations and outstanding natural features which have influenced human action. Therefore it was considered vital that these datasets be included in the characterisation process. The majority of this coastal and marine habitat data was gathered from the Joint Nature Conservancy (JNCC), further data was downloaded from the MAGIC database which included various useful environmental datasets from Natural England and CEFAS.

The range of environmental datasets utilised and their sources:
MAGIC datasets

- Natural England
    - Coastal and Floodplain Grazing areas: data is based on a habitat inventory of lowland grassland areas.
    - Coastal Sand Dunes: The data is based on the original paper inventory Sand Dune Vegetation Survey of Great Britain – Part 1 England; Radley G.P. 1994.

The coastal and floodplain grazing dataset represented the lowland grassland areas of the coastal and intertidal areas of England. The areas mapped contained data on grazing areas and the locations of both modern and ancient river courses. Those polygons located within the Solent and Wight study area were selected in the GIS and

then reclassified and unioned. These areas were reclassified as 'coastal floodplain' and 'grazing' sub character types accordingly in order to reflect the character of the coastal and intertidal zones within seascapes.

Similarly the coastal sand dunes dataset represented the positions of sand dunes along the coastal and intertidal regions of England. This dataset provided detail on the physical character of the modern coastal and intetidal zones of the seascapes area. Those polygons located within the Solent and Wight study area were selected in the GIS and then unioned. The sand dunes did not require any reclassification, as they represented an existing sub character type.
Both the dunes and grazing areas form a major part of the 'Natural Landscape' broad character type.

- CEFAS :
    - Bivalve mollusc harvesting area classification zones: Vector dataset based on shellfish classification areas. Scale 1:25,000.

The bivalve mollusc harvesting dataset charted the locations of shellfishing areas within the intertidal and marine zone of England. These polygons represented areas of modern cultural activity. Those located within the study area were selected out and included into the seascapes GIS. The geometry of this dataset required some repair prior to its analysis in the GIS, reclassification and database linking. The repairs ensured the data was accurate and upgraded to the required standard for GIS analysis.

JNCC Datasets
(Owned by Natural England but provided by JNCC)

RAMSAR: designated areas of Wetland under the Convention on Wetlands of International Importance Scale: 1:1250 to 1:1000 as per the main reference source, OS MasterMap.

SAC: A Special Area of Conservation (SAC) is the land designated under Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora. Scale: 1:1250 to 1:1000 as per the main reference source, OS MasterMap.

SPA: Special Protection Areas (SPA) is land designated under Directive 79/409 on the Conservation of Wild Birds. Scale: 1:1250 to 1:1000 as per the main reference source, OS MasterMap.

The RAMSAR dataset charted specific wetland areas considered worthy of protection under the above convention. These polygons represented an important part of the character of coastal and intertidal areas of the study area and were reclassified and included in the Seascapes GIS.

SPA, SAC polygonal datasets were also integral to seascapes characterisation as they represented designated areas of special protection due to rare wildlife habitats. Data which fitted the Solent and Wight study area was selected out from this UK wide

resource, and then incorporated into the Seascapes GIS. These designated areas made up a large part of the 'Natural Landscape' broad character type by charting features such as: mudflat and saltmarsh areas, grazing, and wetland areas. These areas were primarily limited to defining the character of coastal and some intertidal areas.

British Geological Survey (BGS)

- Geology of the seabed.

This polygonal digital dataset was loaded into ArcGIS and was used as a visual reference when constructing the character levels. The data provided by BGS on the sediments that comprise the seabed was useful in assessing the character of this area. This data set provided one of the few available area based datasets relevant to the seabed rather than the sea surface. The polygonal data from this resource was not directly transposed into the GIS, however, it was consulted for the development of character areas.

3.2.1.5 Other available data sets

Historic Chart data – this dataset was made available by Hampshire County Council who had commissioned the digitising of areas of the coastline from historic charts to add to their knowledge of coastal change.

Salterns Polygons – again made available from Hampshire County Council this dataset highlighted coastal areas utilised for saltmaking.

Navigational Hazards Digitised polygons from this Bournemouth University project were both used as a visual reference and as a base to help derive the final seascapes top-level polygons.

OS tiles were also used as a visual reference for constructing top level character areas in addition to aiding the development of the final area names.

3.2.2 Developing a submerged landscape digital dataset

For the majority of coastal and shelf areas of the UK the submerged, and more specifically sub-seabed, pre-historic and historic non-shipwreck archaeology represents a potential rather than a reality. This has significant implications for the implementation of maritime HLC. Within the Liverpool Bay study (Wessex Archaeology, 2005) the decision was made to engage with this potential through use of models of past sea-level intersected with modern bathymetry. This classified the current bathymetry into a series of 'last exposed' date regions. As Wessex Archaeology (2005) noted, this method creates some significant interpretive problems that need to be critically considered prior to their use within HLC.

The generation of HLC 'date region' polygons through intersection of predicted sea-level altitudes with modern bathymetry inevitably involves data creation for areas where none exists. A huge interpretive leap has to be made in order to assume that today's sea-floor is the same as all past landsurfaces that may have been submerged. Ironically this leap denies us an understanding of the variable characteristics (the energy and erosions rates) of open water and coastal areas. Thus, rather than helping us to build an understanding of variability in seascape

character, imposed sea-level models serve to homogenise and remove character – an act directly opposed to the goals of the seascapes project.

Given the above argument, the Solent Seascapes project chose to engage with this topic through integration of all available data pertaining to known submerged landscape fragments. A deliberate decision was made not to use this data as a basis for interpolation or modelling. The brief given for the Seascapes project had encouraged us to focus on mapping current and past landscape use and character as known. This has clear precedent within terrestrial HLC where buried landsurfaces are only noted where they have been revealed through erosion and anthropogenic activity.

This decision to rely on verifiable data limited the sources within the Solent region to: exposed submerged forests, logged sedimentary cores and geophysical data. These data were also considered be variable in their reliability. In particular physical observation and recording of a submerged forest or a sedimentary core is considered more reliable than an interpretation of a geophysical survey. As such, the nature of the observation (physical or geophysical) was noted for all datasets compiled.

Collection of data gained from cores was greatly aided through access to English Heritages off-shore peat database. This provides a record of all known organic horizons currently logged. These data were extracted from the English Heritage database, augmented through a literature search and re-organised to enable integration with the reclassification process described in section 4 below. This saw the creation of spreadsheet within which the following fields were populated:

ID	- Numerical Identifier for each core
Site Name	- Area specific site name
Site Name ii	- Location specific site name
X	- Coordinate in OSGB
Y	- Coordinate in OSGB
Z	- depth below sea-level (Newlyn)
Level	- Solent Seascapes 'Level'
Date	- Radiocarbon Date
Delta 13	- Delta 13 error
Calibrated Date Mean cal. BP	- Calibrated Men cal. BP date (using Oxcal version 4.0)
Deposit Description	- Sedimentary classification
EH Record ID	- ID from EH peat database (if appropriate)
Author	- Author from text (if appropriate)
Year	- Year of text publication
Publication	- Journal Title (if appropriate)
Title	- Article/Book Title
Number	- Relevant Page Numbers

Whilst the final fields relating to source publication data were not strictly required for the characterisation process, their inclusion was felt important to allow for verification of character description.

Once created the above data set was imported into ArcGIS as a point file. Given that the Seascapes project stipulated a polygonal output these points had to be transformed. In the above argument it was stated that we had chosen not to interpolate this data set. As such, the transformation of point data into polygon data was achieved through a 'buffer' command. The diameter of these buffers was set at two meters. Two meters was felt to be appropriate as it represents a reasonable area over which similar deposits might be found. It is of course possible that each core might relate to a more substantial subsurface layer, however, without further work it is impossible to prove. Buried peat horizons are subject to compaction, deformation and erosion that means they often do not form the neat horizontal layers we might wish for. The data obtained from the cores can thus be seen to have been dealt conservatively. However, given the large size of the final characterisation polygons this was not felt to be a problem, as their presence would be included within a much wider area than the 2m buffered polygon represented.

The geophysical data were dealt with in a similarly conservative manner. Here the results of survey work undertaken by one of the authors (Dix) revealed potential buried landsurfaces within the Solent channel system (see figure 3.2 below). The geophysical data was processed in order to produce a series of points relating to geophysical contacts that might represent buried land surfaces. Importantly these data revealed instances of stratigraphic layering. As such the source table for point data relating to the geophysical survey included the following:

X - Coordinate in OSGB
Y - Coordinate in OSGB
Z1 - First depth at which buried landsurface was indicated
Z2 - Second depth
Z3 - Third depth
Z4 - Fourth depth
Z5 - Fifth depth
Z6 - Sixth depth

This allowed for multiple depth recordings at a single x,y location. Once again this generated a point data cloud which had to be transformed into a polygonal form. Given the close spacing of the geophysical readings the decision was taken to digitise around the survey points to create polygons of buried landsurface potential (in accordance with terrestrial HLC practice for tying points of interest together (Rippon 2004). A spatial join function was then carried out to tie the point data attributes listed above to the new larger polygons.

Data from both core and geophysical observations were then unioned together to create a single submerged landscape shapefile (Figure 3.2). Two new columns were

added to the database file attached to this shapefile to distinguish between polygons derived from physical observation and those from geophysical observation.

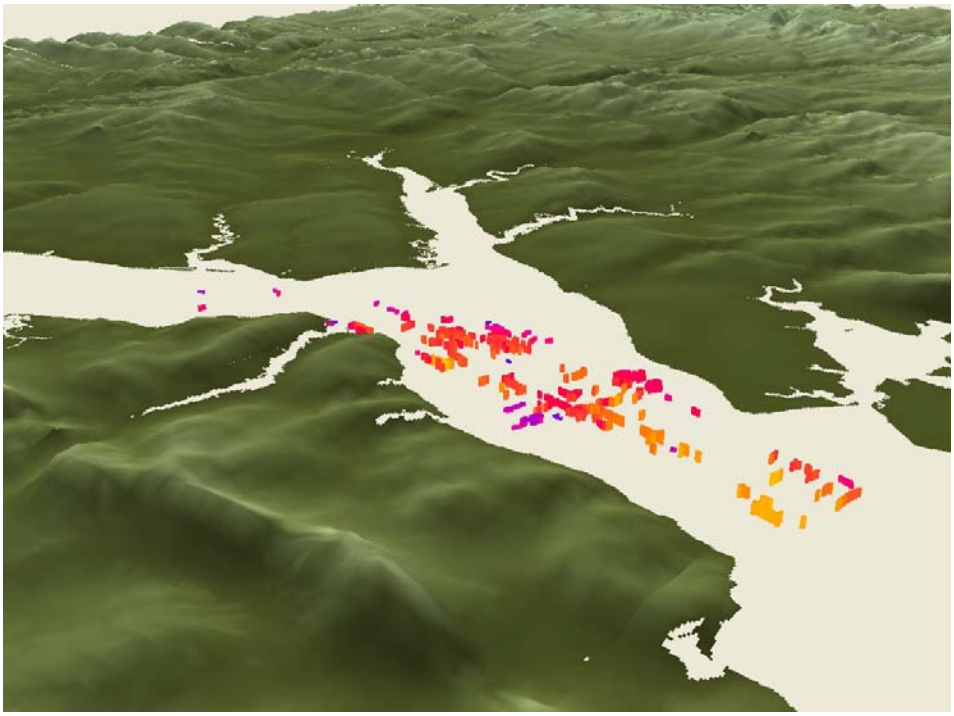

Figure 3.2. Image showing the distribution of points derived from geophysical survey (with multiple depths) relating to buried landsurfaces in the Solent region. This data represents the collation of over a decade of Chirp geophysical survey in the Solent region by the School of Ocean and Earth Science at the University of Southampton. The data is stored at the NOC and can be accessed by contacting Dr Justin Dix (SU).

The final shapefile that resulted from the above process is felt to be an accurate representation of our current knowledge of submerged landscape features within the Solent region. However, the conservative nature of the data collection has meant that in some areas locations of high potential (but no known material) have been ignored. This is problematic as survey and recording in the inter-tidal and offshore zone is not as comprehensive as could be wished for. However, it is believed that the above method conforms to the spirit of the Seascapes project, created a manageable (and not overly homogenising) and informative dataset.

3.2.3 Summary of Data Assessment

From the large numbers of datasets assessed the most relevant had now been selected out. During research it became clear that there are other sources of data in the marine zone often derived from research from a broad range of disciplines, however, much of this data is not available in digital format, or hasn't even been plotted spatially. These types of secondary sources are often from the period pre-dating the wide availability of computers and the collection of digital data. Some of

this data could be relevant for the Seascapes project but would require substantial time and effort to digitise. Where significant archaeological investigations had been undertaken within areas this was noted for reference in text based descriptions developed for the project (See section 5.3).

3.3 Development of Character Types

Assessment of the data enabled the development of the Broad Character, Character Type and Sub-Character distinctions for the Solent region. See appendix 10.2 for details of all Broad Character, Character Types and Sub-Character.

The Liverpool Bay categories were used as a base into which further categories relevant to the Solent and Wight region were added i.e. the Broad Characters of: Engineering, Natural Landscape, and Historical Maritime Significance.

- The 'Engineering' category is representative of coastal and marine defensive engineering measures, and has enabled the incorporation of types of coastal defence structures such as sea walls, groynes, and breakwaters which frequently feature within the coastal and intertidal zones.
- The Historical Maritime Significance character category allowed submerged landscape features to be recognised as cultural features, rather than part of the natural environment as in the Liverpool Bay categories.
- The Natural Landscape category took into account the types of environmental conditions that had been formed either as a result of coastal and marine processes such as saltmarsh formations, or as a result of windborne deposition such as sand dunes, or areas suitable for cattle grazing. The recording of these natural conditions are vital as they inform us on areas offering past and present optimum conditions for human habitation and cultural activity along the coast, factors which feed into the assessment of historic character.

3.4 Multi level Approach for Data Expression

The project team spent time considering the options for the expression of available data for the marine zone in terms of characterisation. This investment of time has been necessary due to the challenges of using the HLC methodology created from the terrestrial zone at sea.

3.4.1 One Seascape or Many Seascapes?

Due to the multi layered nature of the marine environment utilising only the modern surface expression of human activity does not represent the full historic character within the marine zone, which can be very different on the surface to on the seabed. This is compounded by the fact that many of the historic assets in the marine zone have no water surface expression at all. So, to directly transform the terrestrial methodology to the marine zone and only consider the sea surface would be a

misrepresentation of the historic environment. The marine zone is characterised by multiple dimensions, characterised by different types of activity.

The project team felt strongly that developing a way to express the multi-faceted nature of the marine historic environment would be key to a successful characterisation. It was also considered essential that the project provide a comprehensive marine zone resource that would benefit the end-users by giving them a complete picture of the character and uses of all levels of the offshore and coastal zones of the Solent and Wight area. The product also needed to accurately represent these maritime-related areas, in order for it to be of use in marine planning. Some of the principle considerations taken onboard while developing the Solent Seascapes methodology included:

3.4.1.1 The nature of modern marine activity – The range of activities carried out in the marine zone varies enormously in scale and impact and can include large aggregate extraction zones right down to localised windsurfing in the coastal zone. It is clear that these activities affect the marine environment at different scales, particularly in terms of characterising them within the modern Seascape. The dichotomy between intrusive commercial extraction of seabed deposits and ephemeral leisure based surface activities is significant; however, HLC in the marine zone has to be able to incorporate these into character interpretations.

It is clear that some activities are confined to the sea surface, while others impact from the surface all the way to the sub-surface deposits. Modern use of the marine zone takes advantage of the many dimensions of the environment for their assets, whether they are economic, physical or cultural; it follows logically that the consideration of the historic character of the marine zone should also recognise the unique elements of these dimensions.

3.4.1.2 Recognising landscape transformation - the whole of the Solent and Sea Wight areas have undergone radical transformation through successive phases of sea-level change (Figure 3.3). During the interglacial periods of the Middle and Upper Pleistocene the climate was warm enough to accommodate early human settlers, and the Solent region has been recorded as containing more Palaeolithic sites than anywhere else in the country (Wymer 1999).

Throughout the Holocene, the geomorphological evolution of the coastline has been dominated by a net sea level rise over a down warping land mass (Tomalin 2000). Human populations continued to exploit the marine and later the maritime resources in the area, leaving occupation evidence in the form of stone tools, hearths and food remains.

The changing sea levels and available land mass has had a dramatic effect on the land and sea scapes of the region.

Figure 3.3 Figure showing the 'Old Solent River' (HWTMA)

These changes have provided a legacy of preserved prehistoric submerged landscapes in the Solent region. The recognition of these archaeologically important landscapes led to the development of the digital dataset to represent them (outlined in section 3.2.2).

Most importantly the recognition of a number of potential prehistoric submerged landscapes in the Solent, broadly dating to the Mesolithic, Neolithic and Bronze Age add even further dimensions to the marine zone in terms of characterisation.

3.4.2 Multi level solution

In order to best represent the full dimension of the marine zone and elements relating to its historic character it was felt that a multi-level approach was most appropriate for the marine environment.

Four levels were considered for characterisation:

- Coastal
- Sea Surface
- Seabed surface (incorporating the water column)
- Seabed sub-surface

This approach required all selected data sources to be characterised and the levels at which they should be represented recorded. Data contained within each level was assessed both by its attributes and by visual analysis and then reclassified into the relevant seascapes broad types, character types, and sub character types. The reclassification process involved creating a table which contained the original designations and corresponding seascapes character designations and multi-level categories. The process of reclassification is demonstrated for the licenced dredging area polygons from Seazone activity licence dataset in the diagram in Figure 3.4 (below).

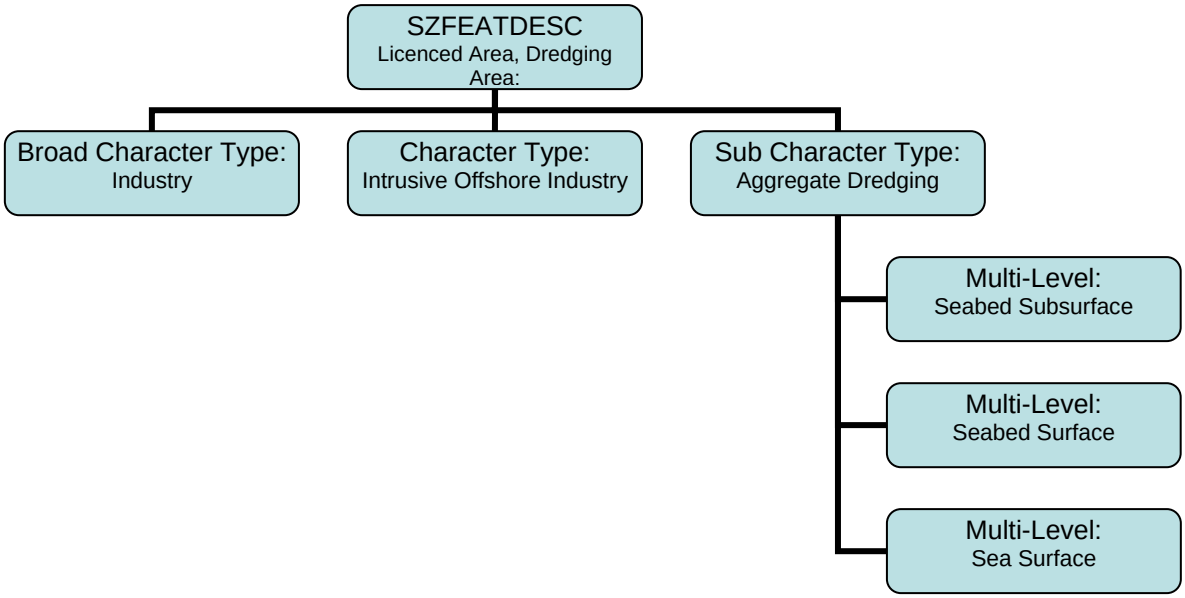

Figure 3.4. Diagram illustrating the relationship between character classifications and Seascapes multi levels (HWTMA, BU, SU, EH, 2007)

The mechanisms for data-basing and manipulating the information were developed in response to the need for this multi level approach. A table demonstrating the reclassification of data for the multi level approach is included with this report as appendix 10.4.

3.5 Assessing Data for Characterisation: Datasets within multi-levels.

A total of eight Broad Character types with associated character and sub character types were developed:

- Navigation
- Industry
- Recreation
- Natural Landscape
- Settlement
- Military
- Engineering
- Historical Maritime Significance

3.5.1. Navigation

Navigation comprised one of the largest broad character categories with the highest volume of sub character types (See list below). *Navigational features* and *activity* were found mostly in the Seazone datasets, primarily the licenced areas which showed things like anchorage areas, restricted areas, caution areas, channels and turning areas marked by bouys. The depth region data from Seazone contained features like shipping channels, waterways, and sandbanks. Seazone, NMR, and

UKHO, wreck and obstruction data was used to identify the locations of these features and integrate them into the seascapes methodology. Seazone transportation data was used to identify shipping routes and ferry crossings. Terrestrial HLC polygons indicated cliffed areas, which were also translated into areas hazardous to navigation.

Navigation Features

- Active Historical channel
- Active modern channel
- Active Historical channel
- Disused historical channel
- Disused buried historical channel
- Bridge

Navigation Activity

- Historical anchorage in disused buried channel
- Historical anchorage
- Historical anchorage in active historical channel
- Historical anchorage in active modern channel
- Disused historical anchorage
- Modern Anchorage
- Waterway
- Historical canal
- Historical port quarantine area
- Ferry
- Cable Ferry
- Restricted area
- Navigational Hazard
- Submerged rock
- Wreck
- Obstruction
- Sandbanks
- Caution area
- Cliffs

3.5.2. Industry

Industry was the most involved of the broad characters to compile. Maritime Related Industrial impacts were sub-divided into *intrusive* and *non-intrusive* industries, *fisheries and mariculture*, and the nearshore categories of *Ports, docks, and harbours*, and *coastal industry.* Industry related features and activities were found mostly in the Seazone datasets, primarily the licenced areas which showed descignations such as dredging areas, dumping grounds, fishing and shellfishing areas. Seazone constructions and installations data contained information on oil installations, submarine cables, and power station complexes. Seazone transportation data was used to identify commercial shipping activity. Terrestrial HLC

polygons indicated coastal industries such as tank farms, quarries, and reservoirs. Magic database provided polygons of designated shellfishing zones.

Intrusive Offshore Industry
- Aggregate dredging
- Capital dredging
- Maintenance dredging
- Oil and gas field
- Dumping ground
- Pipeline
- Oil terminal

Non-intrusive Offshore Industry
- Fishing area
- Shellfishing area
- Commercial shipping
- Submarine cable

Ports, Docks, and Harbours
- Dock and port related industry
- Shipbuilding yard
- Boatbuilding yard

Fisheries and Mariculture
- Modern fisheries
- Historic fisheries

Coastal Industry
- Reservoir
- Quarry
- Tank Farm
- Container Depot
- Power Station
- Renewable energy installations
- Gas works
- Modern industry
- Timber Yard
- Kiln
- Warehouse
- Brickworks
- Sewage works
- Old works
- Pottery works
- Saltworks
- Quayside Development
- Osier beds
- Watercress beds

3.5.3. Recreation

Recreation comprised one of the smaller broad character groups and was subdivided into two character types: *coastal* and *offshore* (See list below). Leisure related activities were identified within the Seazone datasets, terrestrial HLC, and local knowledge and guides. The Seazone licenced areas showed designations such as windsurfing areas. Seazone transportation data was used to identify sailing/yachting areas. Constructions and installation polygons from Seazone contained the locations of piers, jetties, and marinas. Terrestrial HLC polygons indicated popular coastal recreation sites i.e. beaches, piers, sports grounds and golf courses.
Seazone, NMR and UKHO wreck point data was used to locate popular wreck dive sites. Local diver knowledge and published guides were consulted to verify and cross reference these points.

Coastal Recreation

- Coastal golf course
- Coastal recreation
- Coastal parkland
- Coastal way
- Marine reserve
- Marina
- Marine Lake
- Beach
- Seaside entertainment
- Protected recreation area
- Sailing area
- Piers, jetties and wharfs
- Sports ground

Offshore Recreation

- Leisure fishing area
- Dive site

3.5.4. Natural Landscape

The Natural Landscape broad character category primarily reflected marine related physical environmental conditions of the intertidal and coastal areas. Often these conditions had been formed either as a result of natural coastal and marine processes such as saltmarsh formation, or as a result of windborne deposition such as sand dunes. Much of this data was derived from the SAC, SPA, RAMSAR designated areas provided by the JNCC, and also the MAGIC database downloads of coastal floodplain grazing areas and sand dunes. Terrestrial HLC polygons provided polygonal data on intertidal mudflat, saltmarsh, and lagoon areas, as well as coastal concentrations of woodlands, and heathlands (see below list).

Intertidal Environment

- Mudflats
- Saltmarsh area

- Coastal floodplain
- Lagoon
- Shingle

Coastal Environment

- Coastal floodplain
- Sand Dunes
- Heathland
- Grazing
- Ponds
- Woodlands
- Wetlands
- Landslip

Offshore Environment

- Subtidal sands

3.5.5. Settlement

The Settlement broad character category represented features in coastal areas associated directly with permanent modern human occupation. Terrestrial HLC polygons provided polygonal data on towns, airfields, field systems (see below). Likewise Seazone installations and constructions datasets highlighted features such as lifeboat and coastguard stations.

Coastal Settlement

- Reclaimed land
- Historic town
- Airfield
- Coastal settlement
- Modern field systems
- Historic field systems
- Coastal village

Maritime Safety

- Coastguard Installation
- Navigation aid
- Lifeguard Area
- Lifeboat stations

3.5.6. Military

Maritime related military activity and installations were sub-divided into *Coastal* and *Naval activity*. Military related features were found mainly in the Seazone datasets, primarily the licenced areas which showed military practice areas. Terrestrial HLC polygons indicated coastal features and installations such as Naval dockyards, military bases, and other defence structures.

Coastal Military

- Military practice area
- Military area
- Army base
- Military Defence area
- Military Fort

Naval Activity

- Naval Dockyard
- Navy Base

3.5.7. Engineering

The engineering broad character type is largely representative of coastal and marine defensive engineering measures, and has enabled the incorporation of common types of defence structures such as sea walls, groynes, and breakwaters which frequently feature within the coastal and intertidal zones.

Coastal defence

- Coastal Defence
- Sea wall
- Groyne

Harbour Defence

- Breakwater

3.5.8. Historical Maritime Significance

The Historical Maritime Significance broad character category was subdivided into *historic wrecks*, *submerged landscapes*, and *prehistoric landsurfaces*, in order to distinguish known archaeological features and historically significant submerged vessels and other underwater cultural heritage (UCH). The Seazone wreck point data was used to select protected wreck sites, and the relevant exclusion zone buffer was applied, these formed the historic wrecks category. Submerged prehistoric features and settlement polygonal data was derived from data provided by the University of Southampton.

Historic Wreck

- Wreck

Submerged Landscapes

- Submerged Prehistoric settlement

Prehistoric land surface

- Peat bed
- Submerged forest
- Palaeochannel

4. Data Processing

4.1 Database

The GIS data submitted are structured within a single geodatabase. This serves as a portable solution and adopts an industry standard methodology. Data from the geodatabase could be readily migrated to platform and software independent datafiles for archiving as required; following ADS accepted standards for deposit.

4.2 Reclassification

The process of characterisation was based on a protracted and considered period of analysis. All of the available data sources were examined in their original form, using the extensive analytical abilities integral to GIS alongside other forms of analysis. This initial evaluation of the data and exploration of the apparent land characterisations was a key part of the analytical process. Subsequent to this a series of reclassified summaries was produced to assist in the evaluation, development and finalisation of these classifications. This process of data aggregation was deliberately automated in order to provide for a reproducible strategy. However, the results of this aggregation have been used as only one input type within the characterisation process.

The technical implementation defined by the project focuses on a reproducible set of methodologies. Our aim has been to provide an approach that could (a) very rapidly be applied to new areas and datasets and (b) allow rapid and semi-automated updating of HLC datasets following enhancements to the original datasets. This implementation made use of a set of standardised reclassification tables associated with each of the data sources employed within the classification process. Since many of these sources are likely to be common across the UK it is envisaged that these reclassification tables may act as an initial stage in subsequent maritime HLC work. Similarly the reclassification and other processes may provide an efficient model for similar activities elsewhere.

The reclassification tables associate specific field values within given datasets with an HLC category, and subcategory, as shown in Table 4.1 below.

Source	Attribute	Assignment	SUB_CHAR	Column Level
Coastal_and_Floodplain_grazing_cut	PRIHABTXT	Coastal and floodplain grazing marsh	Coastal Floodplain	Coastal
coastal_sand_dunes_v1_cut	PRIHABTXT	Coastal sand dunes	Sand Dunes	Seabed surface
coastal_sand_dunes_v1_cut	PRIHABTXT	Coastal sand dunes	Sand Dunes	Seabed subsurface
sublandscapes	PERIOD_TY	Prehistoric	Submerged Landscape	Seabed subsurface

Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Coastal Floodlplain	Coastal Floodplain	Coastal

Table 4.1 Reclassification Table used to process the GIS datasets.

By linking these reclassification tables to imported GIS datasets it is possible automatically to extract maritime datasets of relevance to HLC for further analysis. In addition to this, the use of a reclassification database has allowed the implementation of a multi-layered system, where a classification may be different depending upon the level being considered. The reclassification tables were produced during a comprehensive appraisal of the data available. The results of this were saved within a single Access Database table (see 10.4 below). This table records the input dataset and then maps native classifications, via a designated field, to an assigned HLC sub-character type. Thus, taking the IOW_MHLC data source as an example the Sub_Type attribute provided a mapping between the imported IOW_MHLC shapefile with its attribute data and our Seascapes sub-characterisation, in turn associated with a seascape level. Such a data structure allows new data to be loaded very easily as and when changes occur, and also provides for easy creation of multi-level characterisation within a simple data structure.

In order for the mapping of the data reclassification table to the input data source to be completed all of the input shapefiles were joined to appropriate subsets of the reclassification table. Standard SQL database queries extracted data relevant to specified data sources and these subsets, at a given column level, were then linked within the GIS. The Jet database support within ArcGIS makes such a connection easy to replicate and other GIS support similar database independent and proprietary connection protocols.

The linked shapefile and database themes were structured to allow easy union combination of related data to create single themes grouped by seascape level. Such a Boolean approach produces a visual summary that can be easily queried, symbolised and updated. The summary themes are a useful adjunct to analytical methods integral to GIS work. A secondary benefit of this method has been that a notional hierarchy of reclassification values has been generated. When unioning the different selected elements of the shape files a master database of all associated attributes is created. This means that a single polygon within a shape file might have multiple characteristics. For example, within the sea-subsurface layer it is possible that a polygon might contain evidence for a submerged landscape as well current oyster fishery activities.

By maintaining attribute data from all contributing data sources it is thus possible to acknowledge multiple uses of the same space – a very significant problem within the implementation of maritime HLC, common to land HLC implementations. Given the goals and scope of the Solent Seascapes project it was decided that current anthropogenic activity ought always to be used as the overriding character type, with

all other data serving to further inform the derived description. Although it is not intended for this hierarchy to act as the defining factor in negotiations between multiple categories, it was felt prudent to provide a single hierarchy acting as a frame of reference. Such a hierarchy also permits ready comparison with and integration of alternative maritime HLC approaches employed elsewhere. Furthermore, if at any point it should be decided that there is a more appropriate way of hierarchically organising the data, a simple reorganisation of the hierarchy of the final shape files can be carried out.

4.3 Unioning

In order to produce the distinct seascape coverages (defined as Column Level in the table above) acting as primary input to the maritime HLC analysis, it was necessary in each case to collapse the input data to a single theme. As discussed above the Boolean union command, common to all GIS platforms, was employed to perform this collapsing of discrete data. The result was in all cases a complex, highly filleted and subdivided polygonal surface. Each polygon was in turn associated to a one to many degree with the attribute information in the form of HLC categories. This complex GIS surface did not constrain the final HLC coverage. However, this amalgamation of the varied data sources in a wholly reproducible, logical fashion allowed a standardised approach to be pursued.

The reproducible aspect of this approach was encouraged by the use of predefined GIS scripts and of database queries. It was felt that the integration of data provided such a pivotal background to the characterisation process that failure accurately to demonstrate the genesis of our summaries was not acceptable. The Seascapes project is tied to a GIS approach to landscape. As such it requires an analytically robust approach to data. Without this it was felt that the characterisation process itself would be of limited use. GIS offers an excellent tool for critical combination of spatial and attribute information, rather than the automated aggregation that might otherwise be seen to result from such work. If the GIS is not used to its full and intended potential within this context then the resulting maritime HLC polygons, and their associated attributes cannot be supported. Clearly characterisation cannot proceed in a methodological bubble, but similarly the HLC must fit with the locus (and with the acknowledged inherent biases and flaws) of GIS based work.

4.4 GIS

The GIS submitted is structured around the four layers discussed above and below. Metadata has been provided in a UKGEMINI format, as .xml files stored within the project geodatabase.

5. Solent Seascapes Results

This section examines the multi-levels of characterised and processed data. The approach to the four sub-layers is presented along with details of the top-level Seascapes layer and associated multi-media elements.

5.1 Creating Multi-level Seascapes

The collation and processing phases of the data highlighted the large amount of data to be integrated within the Seascapes characterisation. The division of data into sub-layers facilitated the interpretation of the multiple characters of each marine area. The character attributes from each layer have been combined as an overall characterisation, which has been linked to a top layer of character polygons. Each sub-layer had undergone the GIS unioning process and therefore retained each sub-character's coverage attributes and physical definitions. The top level has been derived as a result of a holistic analysis of the sub-layers both individually and collectively.

Although the creation of multi-levels reduced the overlap between areas of differing character it was still necessary to develop a character hierarchy to negotiate this situation if and when it did occur within each level. Therefore, when forced to produce a hierarchy, the following criteria were used to assess each character type. Precedence depended upon one main factor: the presence of anthropogenic activity, which always dominated an environmental feature. Where two environmental or similarly anthropogenic features conflicted, the modern aspect took precedence.

The available datasets for the marine zone are high in number, but low in quality and coverage in terms of historic characterisation. As a result the data processing provided polygonised sub-layers that were often 'patchy' in terms of coverage, but remained true to the data source from which they had been acquired. The project team made a decision to take this honest approach to the available data and characterised the actual polygons of data that were available in the four sub-layers. This preserved real boundaries and distinctions. Although a number of these boundaries are subject to copyright restrictions, this approach enables a best-practice approach to data use and derivation through the production of data which has not been unnecessarily manipulated to evade copyright restrictions and which contain no overlaps within a single data layer. This follows best practice which recognises that in constructing an efficient topology it is essential that there are no overlapping polygons when applying an appropriate arc node topology (Wheatley & Gillings, 2002). Also see section 6 for discussion of data copyright and standards issues.

The sub-layers of the Characterisation can be utilised by English Heritage who hold the appropriate data licences. By retaining the resolution of available data within the sub-layers this means they can be queried for a variety of management issues, rather than just in relation to broad issues of historic character. This will enhance the 'best-value' aspects of Seascapes in terms of integration into Marine Spatial Planning.

The following sections demonstrate the range and extent of characterisation within each of the Seascapes layers, and the application of the multi-level characterisations in to the top-level characterisation.

5.1.1 Seabed sub-surface

After analysis and selection of the relevant datasets, the final seabed sub-surface level *(Figure 5.1)*, contained data from a number of sources that included: shellfish harvesting, terrestrial HLC polygons, Seazone licensed dredging areas and installations such as submerged cables, submerged landscapes, sand dunes and Ramsar areas.

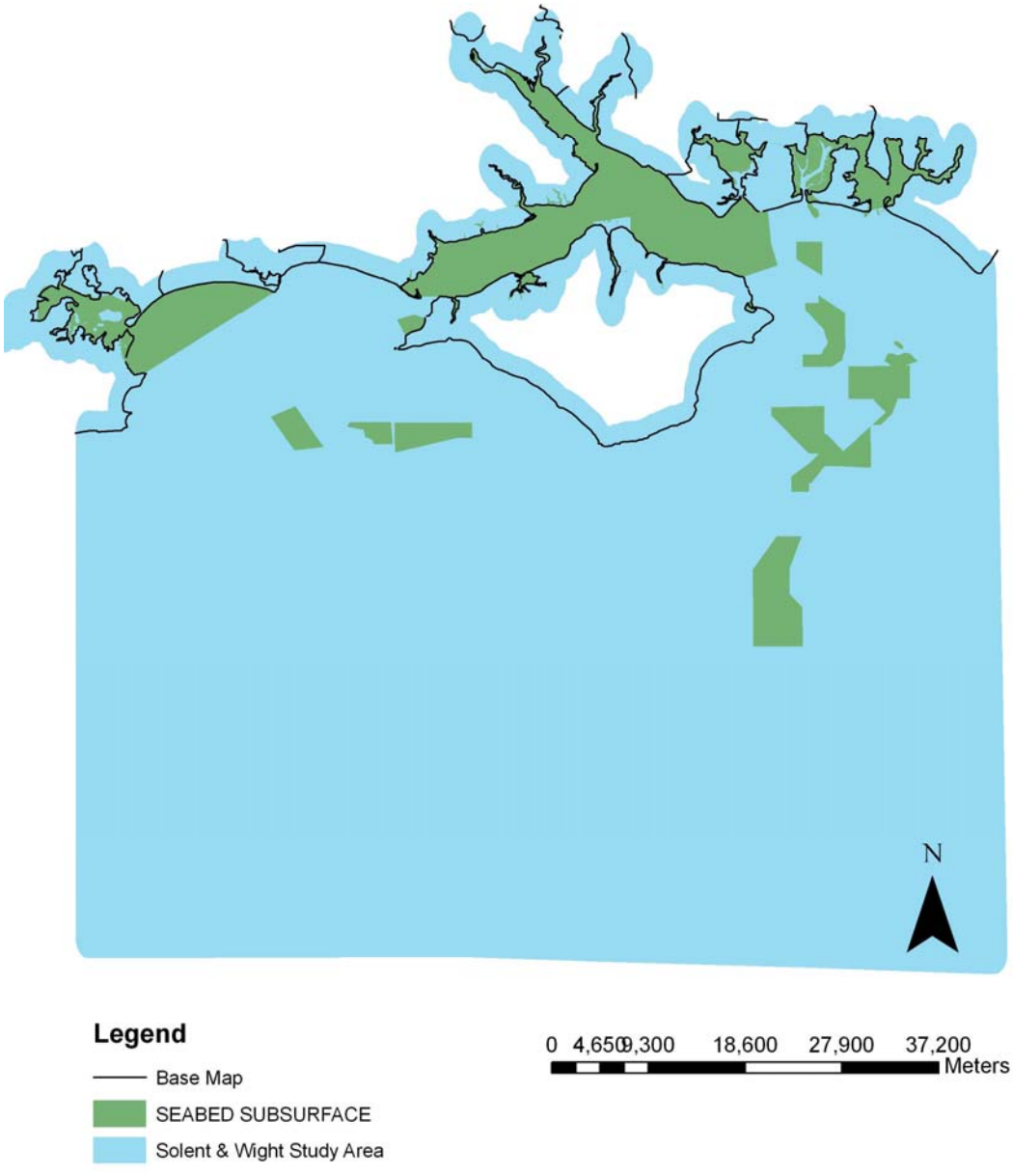

Figure 5.1 Polygonised seabed sub-surface layer (HWTMA, BU, SU, EH, 2007)

5.1.2 Seabed surface

After analysis and selection of the relevant datasets, the final seabed surface level *(Figure 5.2)*, contained data from a number of sources that included: Seazone, UKHO, and NMR wrecks and obstructions, Seazone licensed dredging areas and installations, anchorages, intertidal sandbanks and mudflats, sand dunes, fisheries, salterns and saltmarsh, coastal engineering constructions, and coastal floodplain areas.

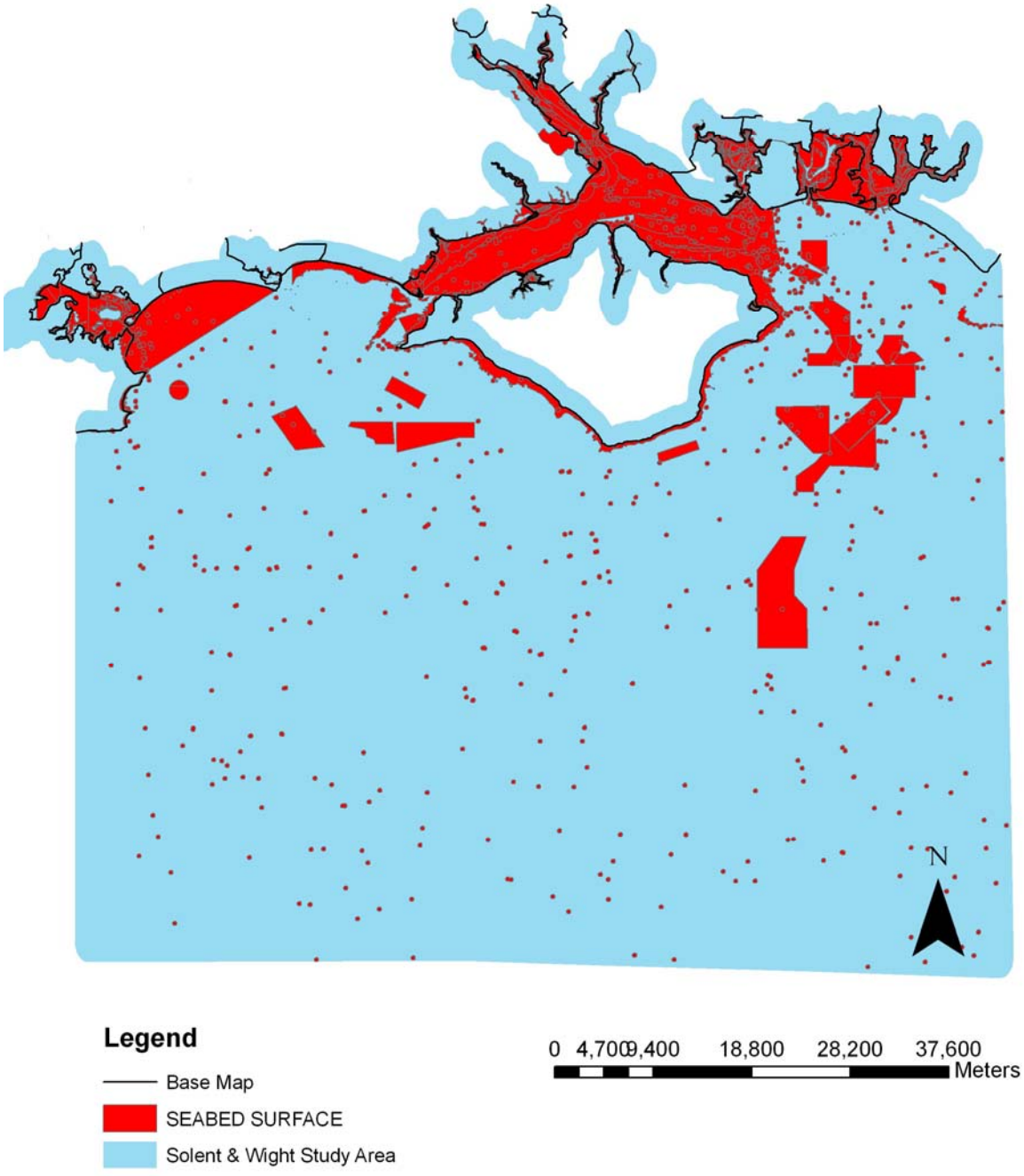

Figure 5.2 Polygonised seabed surface layer (HWTMA, BU, SU, EH, 2007)

5.1.3 Sea surface

After analysis and selection of the relevant datasets, the final sea surface level *(Figure 5.3)*, contained data from a number of sources that included:

Terrestrial HLC polygons, designated Ramsar, SAC, SPA areas, and Seazone licensed areas, construction, installation, and transportation areas. From this data it was possible to produce the most extensive character layer, which covered the entire study area.

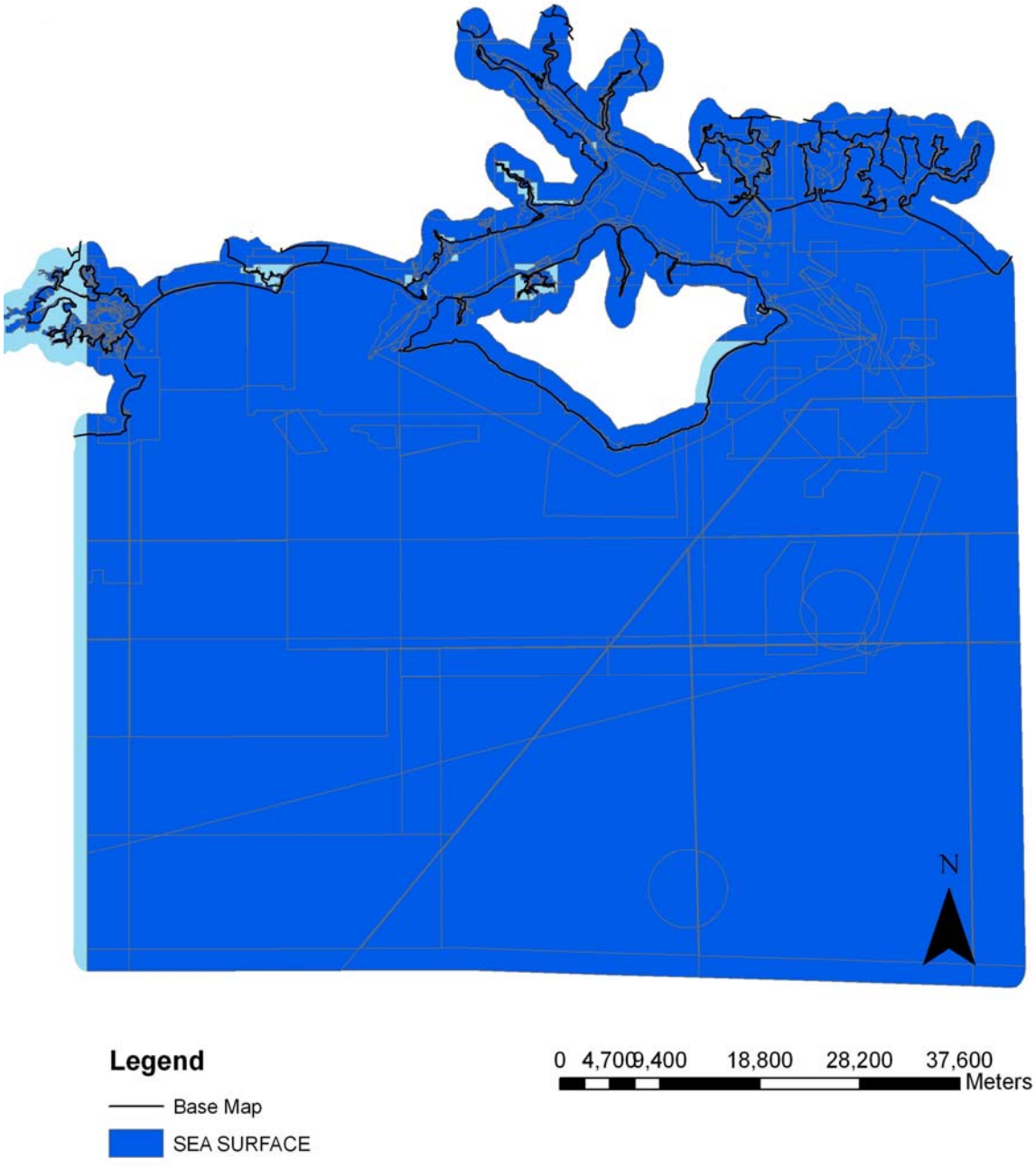

Figure 5.3 Polygonised sea-surface layer (HWTMA, BU, SU, EH, 2007)

5.1.4 Coastal

After analysis and selection of the relevant datasets, the final coastal level *(Figure 5.4)*, contained data from a number of sources that included:
Terrestrial HLC coastal polygons, designated Ramsar, SAC, SPA areas, and Seazone licensed areas, construction, installation, and transportation areas, sand dunes, and coastal floodplain areas.

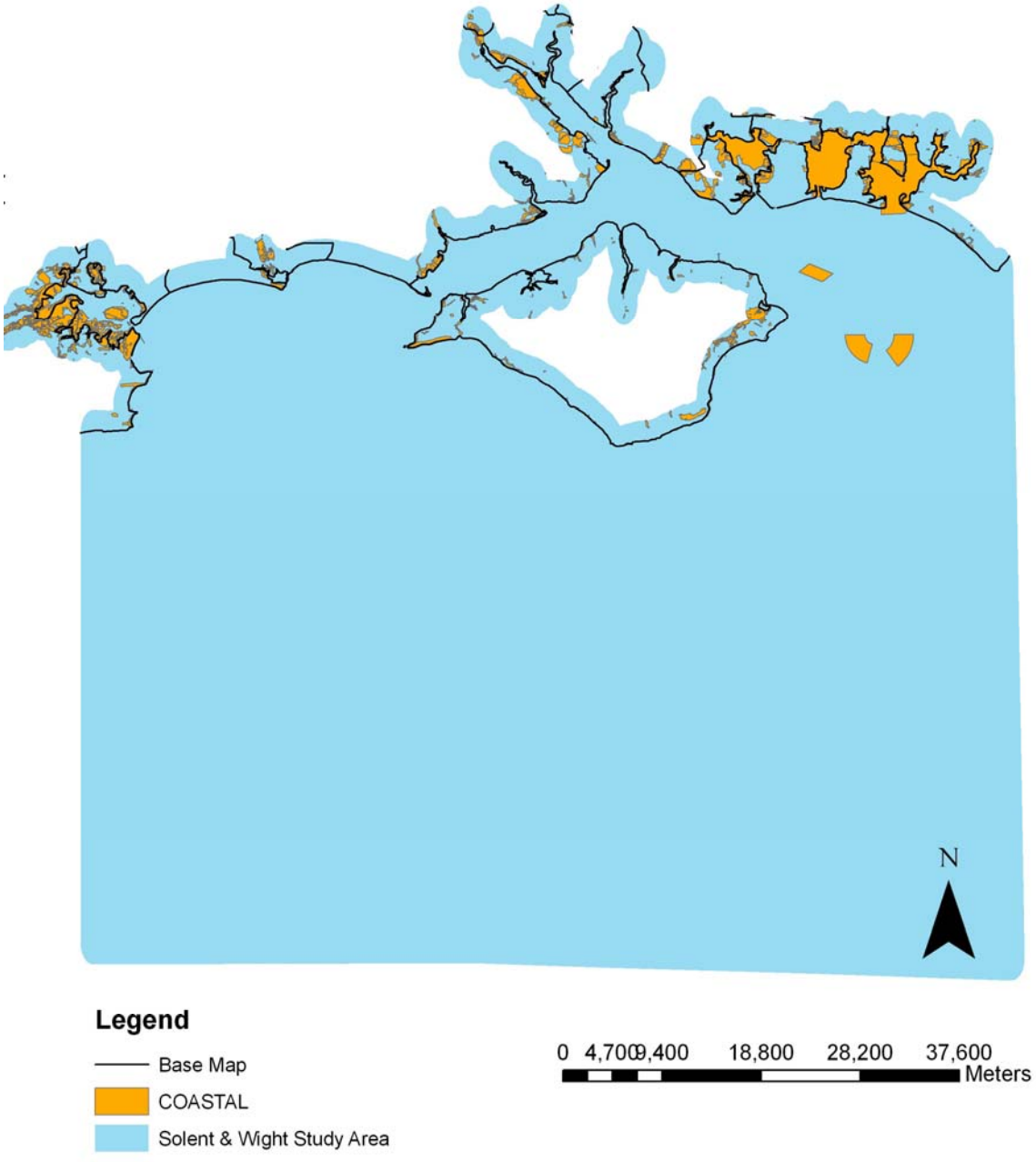

Figure 5.4 Polygonised coastal layer (HWTMA, BU, SU, EH, 2007)

5.2 Creating Top Level Character Polygons

The creation of top level polygons enabled the drawing through of character features from all levels, especially those occurring coincidentally in one or more levels. As stated the creation of a 'top-layer' with only a single character attribute led to difficult questions over the prioritisation of a certain level of the Seascape or a certain activity. This had the potential to led to the creation of so many small polygons that the top level becomes a 'jigsaw' rather than taking a broader look at Character areas and trends. A range of options for the creation of a top-layer were trialled, these considered:

- Giving priority to the most visible and currently active Sea surface layer
- Grading of dominant activities through the assessment of how many of the sub-layers they were represented in
- Giving priority to historically significant data
- Giving priority to activities which impact potential archaeological assets

After careful consideration a decision was made that the creation of 'hierarchy' between the Seascapes levels was not possible, or desirable. The scarcity of meaningful data in terms of historic characterisation was one of the primary factors for this. While appreciating that HLC is an expression of character based on the current state of knowledge, the situation in the marine zone makes the ascribing of character based on fragmentary data potentially dangerous at this stage. This is particularly pertinent considering the intended use of Seascapes for Marine Spatial Planning and the acknowledged tendency for boundaries on a map to become fixed once they are released into the public, management and research communities.

In recognition of this a system was devised that presented the known character of the sub-layers through a top-level character area polygon without the need to prioritise one activity over another *(Figure 5.5)*.

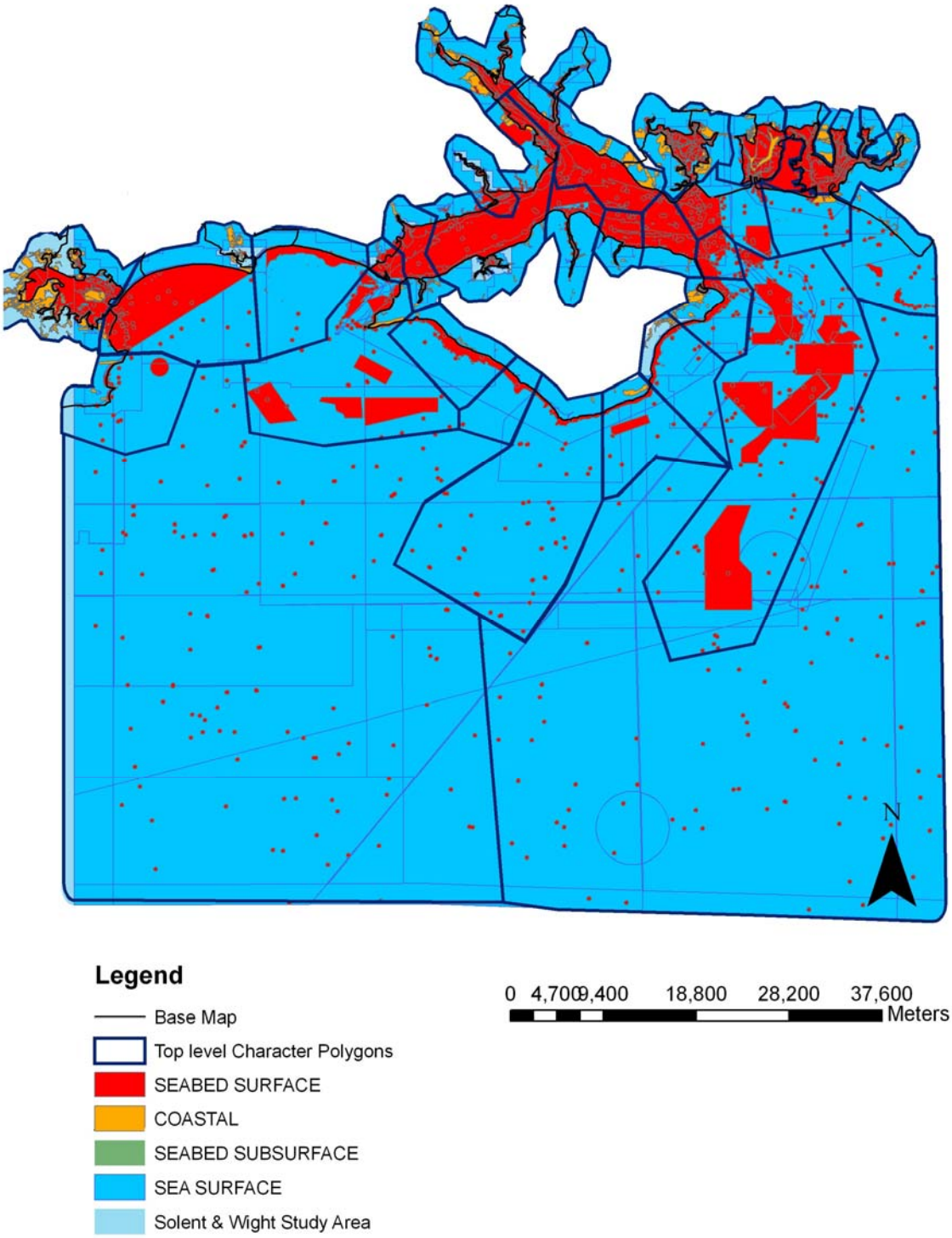

Figure 5.5. All sub-levels displayed holistically beneath Solent and Wight top level character polygons (HWTMA, BU, SU, EH, 2007).

The top-level Character Area polygons *(Figure 5.6)* were derived through subjective visual and GIS analysis of the character polygons within each sub-level. This drew on both cultural activity and evidence and environmental facets of the Study Area. This

was done by looking at key features such as ports, harbours, maritime related industry, and key landmarks in the Solent's cultural landscape within the context of the Character Types within the four sub-layers. Inevitably natural environmental features and resources have affected the cultural landscape of the area. Therefore in coastal and intertidal zones, where no anthropogenic activity was present, these features were used to distinguish Character Areas. Where an overlap of anthropogenic character types occurred, the most modern was considered dominant. Furthermore, where an overlap of equally modern anthropogenic character types occurred, the most intrusive or significant in terms of defining character was drawn through to form the top level character polygon.

A set of environmental character polygons produced during the ALSF funded Navigational Hazards Project (BU), which are based on broad trends in seabed sediments and bathymetry, were used to help derive top-level Character Areas. These polygons were further refined and adapted where necessary to reflect character trends in the Solent and Sea Wight.

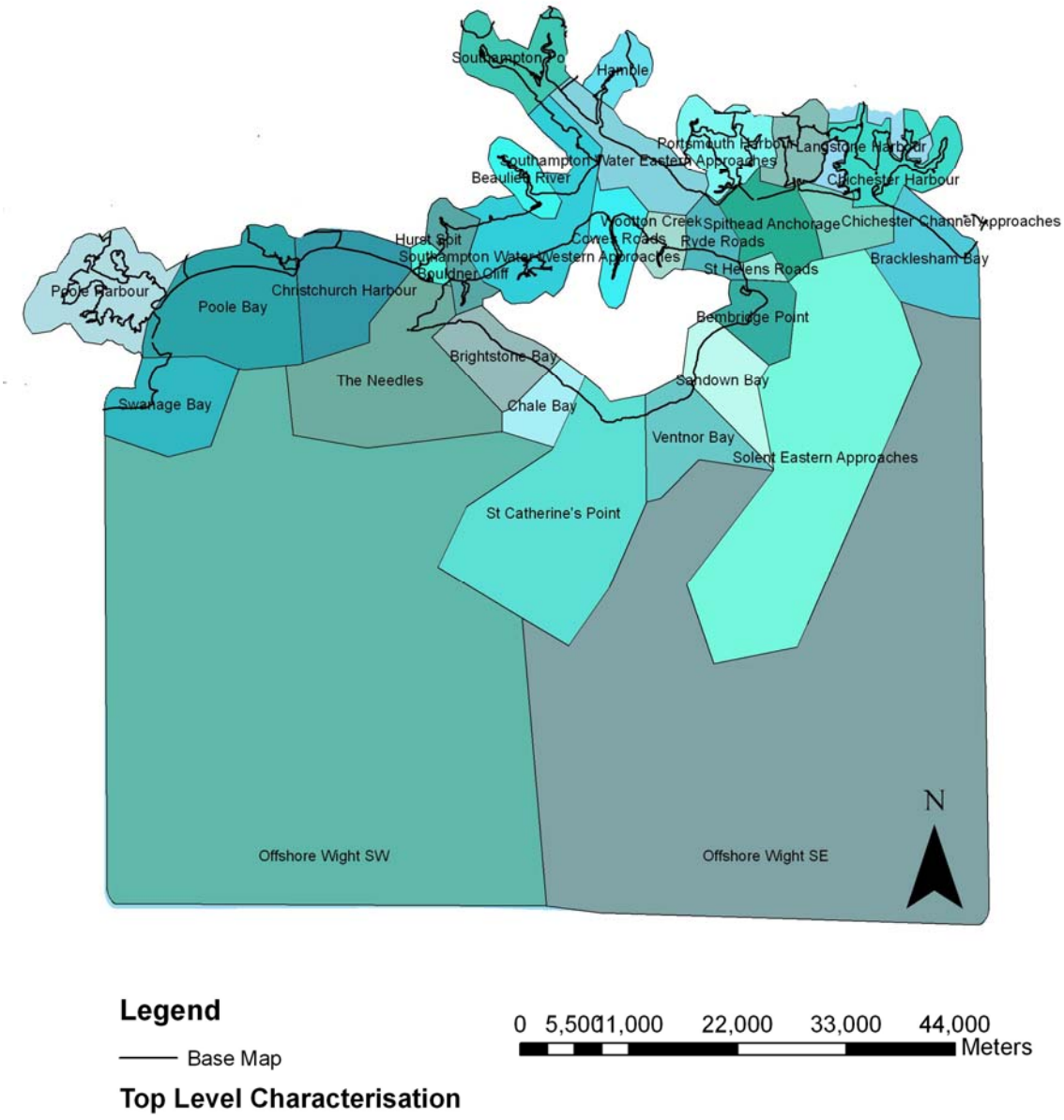

Figure 5.6 The Solent and Wight top-level Character Areas (HWTMA, BU, SU, EH, 2007)

5.2.1 Character descriptions

The Character descriptions for the top-level areas have been structured to allow the inclusion of information on all four of the Seascapes sub-layers. The GIS has been used to query the nature of the underlying layers. As a result the full descriptions (See appendix 10.5 for a complete example) are all based around the model of:

- Area Summary – short text description highlighting significant character (based on cultural, physical, and environmental information from sub-layers)
- Sea surface – summary description of Character Types within the area

- Seabed surface - summary description of Character Types within the area
- Seabed sub-surface - summary description of Character Types within the area
- Coastal - summary description of Character Types within the area
- Archaeological potential – brief review of current state of knowledge

This approach provides a method of delivering descriptive detail of the character of an area that is as true to the currently available data as possible. Inevitably some descriptions are brief due to the available data, particularly in the offshore zone. These areas serve to highlight the need for the acquisition of data relevant to the marine historic environment.

The decision to include a section titled 'Archaeological Potential' is recognition of the limitations of the currently available data relating to the marine historic resource. This section allows for a summary of the types of marine historic landscape features and sites that are known in the area 'flags up' what should be expected in the future. This section does not ascribe value judgements of potential or significance, it is designed to provide an easily accessible 'signposting' of issues that should be considered within the area.

This approach was developed in recognition that the 'top-level' Character Areas and associated descriptions are designed to be widely available to the public, managers and regulators. By including a section on archaeological potential it means that there is no possibility that the current 'lack of data' in the marine zone, as reflected in the available sub-layer polygons, can be interpreted as a 'lack of historic environment resource'. See appendix 10.5 for an example of a full character description.

5.3 Integrating multi media elements

The character descriptions of each area are joined to the polygons within the top-level map. These polygons are designed to provide English Heritage with a flexible maritime historic landscape characterisation of the Solent and Wight region that can be freely disseminated. As this will be the 'public face' of the Solent and Wight Seascapes an accessible method for use has been designed.

The top-level Character Area descriptions have been imported into a desk-top publishing package which has allowed a colourful format to be developed. For each Character Area a number of photographs have been included to provide an important visual representation of an area. Inevitably most people will recognise images of the sea surface Seascape, however, where possible images which reflect the sub-layer Seascapes have been included. See appendix 10.5 for an example of a full character description.

Also included in these Character Area files are a range of references which signpost a range of publications and websites which can be accessed to find out more about each area.

6. Data Copyright & Standards

The licensing of raw digital data purchased for the project was defined by the data providers. The key data providers included Seazone Solutions Ltd., British Geological Survey, English Heritage and the Historic Environment Records held by counties and unitary authorities bordering the Solent Seascapes area.

The four sub-layers upon which the Seascapes interpretation displayed via the top-level characterisation was based, contain reclassified but non-derived original datasets. Although the data has been restructured into separate layers with different attributes to the original raw data, no attempts to change the shape of the polygons have been attempted. As Seazone Hydrospatial data appears in all four of the sub-layers, these layers may only be provided to organisations with a suitable license for that data.

The copyright issues surrounding the manipulation, reproduction and transfer of licensed digital data to English Heritage are currently not clearly defined. Consultation has therefore been sought with *Seazone Solutions Ltd.* to ensure that no copyright regulations are infringed upon during the project development.

Based on the wide range of knowledge and experience within the project team, it has been agreed that any re-interpretation of data under supplier copyright would produce a misrepresentation of baseline marine data. The anticipated application of Seascapes is that it will be used alongside baseline datasets, rather than attempting to replace them. The polygons within the four sub-layers therefore remain under the copyright of the data suppliers.

In some parts of the Study Area the top-level characterisation has been adapted from data provided under English Heritage copyright (Navigational Hazards Polygons), therefore producing a dataset which is free of copyright restrictions from external data suppliers and can be freely distributed and developed as an online resource.

6.2 Data Standards

Strict data standards have been applied to the manipulation of raw data during the Seascapes project. The resulting GIS has been developed taking into account the following parameters:

- Data has been produced using ArcINFO 9.1 and supplied as an ESRI geodatabase with associated .mxd file.
- All non spatial data recorded about any features has been recorded as attributes in line with the recommendations made in English Heritages *Guidelines for English Heritage Project involving GIS* (Froggatt, 2004).
- All spatial relationships are topologically clean and correct following the guidelines defined in English Heritages *Guidelines for English Heritage Project involving GIS* (Froggatt, 2004).

- Has been supplied to be viewed at 1:50,000 with a Spatial Resolution where possible of 25m.
- All data has been supplied in a British National Grid projection due to the combination of coastal and marine data and the coverage of the study area which includes an onshore buffer and extends to cover UK waters only.
- The Metadata has been supplied in UKGEMINI format delivered as .xml files within the project geodatabase. UK GEMINI Discovery Metadata Standard is a defined element set for describing geo-spatial, discovery level metadata within the United Kingdom. It is derived and therefore compliant with ISO 19115 Geographic Information – Metadata and the UK Government Metadata Standard (eGMS).

6.3 Data transformation through Seascapes

Although the one of the key purposes of Seascape characterisations is to provide a basis for better informing the marine industry, its other objectives include:

- The development of the GIS-database structure created for the Liverpool Bay pilot area to enable it effectively to accommodate the distinctive qualities of the Solent and Isle of Wight project 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 a 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 different 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 the HLC to produce preliminary syntheses from it
- To assess present uses and potential for the HLC in informing sustainable management of change and spatial planning issues surrounding marine aggregates extraction in the project area
- To assess present uses and potential for the HLC in informing 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
- It is also recognised to be an ideal educational resource for informing the general public on the historical character of their local environment.

The Solent Seascapes has therefore been development as a product on two levels.

- The complete set of data levels includes a top-level characterisation of the marine historic environment and four sub-layers containing re-classified raw data.

- The top-level characterisation can be used for outreach and education, providing the overall characterisation of each marine area. This layer can be freely disseminated.

The multi-level approach adopted for the Solent and Wight Pilot Area for the sub-layers recognises the need for the marine historic environment to be characterised on multiple levels. The sub-layers contain the reclassified original data on which the overall character of each area was based. The attributes within the sub-layers contain the broad character, character type and sub-character of each of the polygons. For areas where the data overlaps, multiple characters are listed within the intersections.

No transformation has been applied to the original data within these layers as best practice in GIS dictates that where possible datasets should be derived rather than created. Therefore, the characterisation of each layer has been brought together in the top-layer character descriptions, rather than developing a hand-drawn characterisation for each of the sub-layers.

The manipulation of baseline datasets for the sole purpose of avoiding copyright infringements produces a misrepresentation of that data and was therefore considered by project staff to be an inappropriate approach to the method development.

6.4 Data Transfer and Delivery

The transfer of data to the client is defined by copyright issues arising from the project. The top layer characterisation has been developed with the aim of enabling unlimited dissemination, as a CD-ROM or to be developed as an on-line resource.

The top layer characterisation has therefore been delivered both as an ArcGIS geodatabase feature class with character descriptions joined to each polygon. In

addition, the top-layer has also been utilised to provide a publicly accessible product in an open access web based platform which could be easily hosted on the English Heritage website if required. The character description pages have been delivered as pdf documents to reduce the file sizes.

As the four sub-layers each contain data protected by copyright, these will be transferred to English Heritage as part of the final product although their use will be restricted to users with a Seazone Hydrospatial user license. This approach was agreed with English Heritage during the project development as the predicted application of the sub-layers was for use by English Heritage staff for maritime project management and to advise stakeholders during the marine planning process.

6.5 Future updating

The long-term applicability of the Seascapes concept is reliant on the system being easily updated when new datasets become available. The Solent Seascapes approach to data has been designed to ensure that updates can easily be incorporated in the future.

The development of a script for the reclassification of the raw datasets proved very successful. The script was based around a conversion table which translated the polygon attributes into their equivalent sub-character, character and broad character types. This approach could be applied to other areas with the integration of any additional data types into the character table. There are further details on the incorporation of new data and up-dates in section 4.2.

The use of purposed designed scripts within the GIS means that these can be 're-run' in the future incorporating new data. This will amend the Seascapes sub-layers. To keep the Seascapes product up to date the top-level descriptions will need to be reviewed if new data in the sub-layers reveals previously unrecorded Character Types. However, by keeping separate sections for each sub-layer within the top level descriptions this means that only a single section of text may need to be revised.

7. Project Assessment Against Aims and Objectives

This section provides an assessment of the success of the project in meeting the aims and objectives as set out by English Heritage. Text in italics indicates the aims and objectives as outlined within the project tender.

7.1 Assessment against Aims

7.1.1 To apply and develop the new Liverpool Bay methodology in a different type of coastal and marine environment (the Solent, Isle of Wight and adjacent marine zone pilot area)

The Solent and Isle of Wight area is ideal for trialling the Seascapes methodology, the diversity of it's economic, cultural and natural resources means that it is densely used. This has led to high levels of survey and data gathering in the marine zone. There will be few areas of UK waters with such available datasets, however, the appropriateness of these datasets to historic characterisation has proved to be questionable (see sections 3 and 8).

During the project the methodology used for Liverpool Bay was developed. This involved the creation of a multi-level Seascapes (sections 4 and 5). As outlined in correspondence from English Heritage the project scope was only to 'refine' the approach used in Liverpool Bay, this wasn't a chance to take a totally new approach to Characterisation in the marine zone. Within this scope the Solent project has achieved the aim of applying and developing the Liverpool Bay methodology in a different coastal and marine environment.

7.1.2 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 achieve this aim the multi-level approach to Seascapes was developed (sections 4 and 5). This approach seeks to best reflect the relevant available data for the marine zone, while staying within the principles developed for terrestrial HLC. These primarily included the inclusion of time depth in the formulation of the character of the seascape whilst maintaining an holistic representation of the modern area.

7.1.3 To ensure that the historic environment GIS-database for the project area can be readily integrated with analogous databases for the natural environment

Data structure and integrity has been central to the approach taken in the Solent. The development of the project database and GIS is in line with all accepted standards for data inter-operability. While the projects underlying layers are subject to Seazone copyright, most government agencies using this detailed level of data will have such licensing in place. The top-level of the Characterisation is copyright free and can be utilised and distributed freely to any agency, group, organisation or members of the public.

This top-level can be distributed as a shape file for direct integration into GIS systems or used through the 'front-end' product which has been created in an open access web based platform.

7.1.4 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

The approach developed during this project recognised the need for the use of the Seascapes product within management frameworks. Creating sub-layers based on available raw data and a method that can be relatively easily updated will allow the product to be kept relevant for informed decision-making.

7.1.5 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

The contextualisation achieved through the project has involved the creation of top-level Character Areas that can be used along side HER's. However, as discussed in section 8 the current resolution and coverage of marine data means that this contextualisation is relatively 'coarse'. This should improve in the future when further data relating to the marine historic environment becomes available. But in the short-term the Seascapes characterisation adds a more holistic view of the known resource.

7.1.6 To structure, inform and stimulate future research programmes and agendas relating to the project area

The project has certainly highlighted the limitations of the currently available data within the marine zone in relation to the historic environment. This is the situation in the Solent and Sea Wight area which is one of the most densely used and surveyed areas of UK waters. The Seascapes product can be used to highlight areas where baseline data is required, and though analysis of the data which is available within each Character Area begin to stimulate research into the presence of certain Character or Sub Character Types within each area.

7.1.7 To improve the awareness, understanding and appreciation of the historic dimension of the project area to professional and non-professional users of the database

The project has successfully delivered a highly accessible 'front-end' version of Seascapes which will be available to a professional and non-professional audience.

7.1.8 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

The Solent and Wight Seascapes product has developed the application of HLC to the marine zone within the Project scope provided by English Heritage. Further review of the application of Historic Landscape Characterisation in the marine zone is included in section 8.1.

7.2 Assessment against Objectives

7.2.1 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 Solent and Isle of Wight project area while retaining compatibility of the database with the interfacing or partly overlapping terrestrial characterisation databases

The project team feels that the approach taken provides and honest reflection of the available data from the Solent area which has been used when developing the methodology used for Liverpool Bay. Terrestrial HLC, where available, has been considered when developing Character Areas.

7.2.2 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 a 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 different historical processes in their formation*

The Solent and Wight project has delivered on all these objectives which form the core elements of the Characterisation.

7.2.3 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

Section 4 of this report outlines the approach to data processing and management. Ensuring compliance with all relevant data standards and use has been maintained

throughout the project and the need for future updates has been incorporated within the methodology (see section 6.5).

7.2.4 To analyse and interpret the HLC to produce preliminary syntheses from it
The top-layer Character Area descriptions and associated images and links act as a synthesis of current knowledge in relation to the individual areas.

7.2.5 To assess present uses and potential for the HLC in informing sustainable management of change and spatial planning issues surrounding marine aggregates extraction in the project area
7.2.6 To assess present uses and potential for the HLC in informing broader sustainable management of change, spatial planning, outreach and research programmes
Both of the above objectives have been addressed through the projects Non-Technical Report 'Solent Seascapes: how, why and what for explained'.

7.2.7 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
This report fulfils this objective. Section 8 deals with the review of the methodology and challenges of extending HLC to the marine zone.

7.2.8 To disseminate information on the progress and results of the project through professional and popular publications and other media
A project website has been in place since early in the project (www.solentseascapes.org.uk). This holds information about the project and will host copies of available reports once agreed with EH. During the project a brief report for the Marine ALSF publication has also been produced.

The 'Open Access' version of the Seascapes product which is the multi-media product and includes the top level character areas, full area descriptions and a copy of the Non-Technical Report 'Solent Seascapes: how, why and what for explained is designed for release via the internet and can be made available immediately.

7.3 Assessment against Additional Objectives

7.3.1 Provide a wealth of available advice on all aspects of the maritime, inter-tidal and terrestrial historic environment through members of staff based at all three organisations.
7.3.2 Utilise the extensive experience of the HWTMA in the research, interpretation and analysis of the maritime archaeological resource of the Solent and Wight area.
7.3.3 Maximise the potential for the utilisation of relevant environmental datasets where they can provide additional information for marine HLC through the input from staff at the University of Southampton with particular expertise in these fields.

7.3.4 Improve the application of historical navigational charts as a tool for data gathering through the input from staff at Bournemouth University with particular expertise in this area.

The achievement of the above objectives has been achieved through drawing on the combined experience of the organisations and individuals involved in the project. It is clear that knowledge of the local area and experience of dealing with marine data is key to providing an accurate characterisation of an area. This is particularly evident when assessing the types of digital data commonly available as many do not really express anything significant in relation to the historic character of an area.

Key inputs from project team members has included:

- Olivia Merritt's experience with the Liverpool Bay Pilot project enabled some of the challenges and issues which arose from that project to be tackled from an early stage of the Solent Project.
- The database and GIS experience of Graeme Earl and Fraser Sturt for the development of a method which enables the expression of multi level seascapes in a format which is transparent, repeatable and can be updated.
- HWTMA, Justin Dix and Fraser Struts knowledge of and research into submerged prehistoric landscapes of the region
- Julie Satchell's knowledge of the marine historic resource of the Solent area.

8. Project review

This section outlines the principle challenges faced during the Solent and Isle of Wight Pilot Project. It presents an analysis and review of working with available marine datasets, the application of HLC to the marine zone and potential considerations for the future.

It is understood that English Heritage will now undertake a review of the results of all five pilot projects that have been carried around the English coast. The following review provides a candid appraisal of the experiences with the Solent Seascapes project, aimed at informing the review process.

8.1. Application of HLC at sea

8.1.1 Conceptual Differences

The project report from the Liverpool Bay Pilot Project raises some of the challenges faced in the application of the principles of Historic Landscape Characterisation to the marine zone (Wessex Archaeology, 2004). These challenges were, again, keenly felt during the development of the Solent Seascapes Pilot Project. It is clear that there are some fundamental difference between the environments that affects the application of HLC at sea.

Clark et al (2004) state that:

> "The principles behind historic characterisation are simple….. and are about being comprehensive, not selective (leaving no 'grey areas'), and viewing areas rather than individual sites. HLC is concerned with the commonplace and the locally distinctive and, through identifying and analysing time-depth, it expresses the dynamic nature of towns and countryside" (pg 6).

This statement is key to highlighting how it is difficult to directly transfer the process of terrestrial HLC to the marine zone. There are vast areas of the marine environment for which we have little or no data concerning the marine historic resource, or modern sea use – this means that 'grey areas' are inevitable. This is not a reflection that the HLC methodology is not a sound way of characterising the marine historic environment when there is data available to use for it. It is simply recognising that our knowledge of the marine environment does not, at present, allow the production of total (or even close) coverage for data relevant to the historic character of the area.

Table 8.1 summarises some of the challenges for the application of HLC principles in the marine zone.

Guiding HLC Principles	Application in the marine zone
Present not past: it is the present-day landscape that is the main object of study Landscape as history not geography: the most important characteristic of landscape is its time-depth; change and earlier landscapes exist in the present landscape	Much of the present day seascape is the sea surface, this is a largely homogenous plain on which modern maritime activities take place. Very few historic features are visible on this 'plain' beyond the near shore zone, most are resident on the seabed. The huge transformation of the Solent seascapes area due to Holocene sealevel rise means that the whole area was once entirely different in character. A direct translation of these HLC principles would result in 'marine activity mapping' rather than recognition of large elements of the cultural character of an area.
Landscape not sites: HLC-based research and understanding are concerned with area not point data	There is very little mapped cultural heritage data for the marine zone. Much of the point data are wrecks which are randomly scattered due a range of factors including environment, but are often war losses. Very little information on vast areas of submerged landscape deposits exists. While understanding that HLC is about 'areas' not 'points', it is however, necessary to have some data on which to base area characterisation.
All aspects of the landscape, no matter how modern, are treated as part of	Due to the physical nature of the marine zone many aspects of 'landscape' are either

landscape character, **not just 'special' areas** Semi-natural and living features (woodland, land cover, hedges etc.) are as much a part of landscape character as archaeological features; **human landscape – bio-diversity is a cultural phenomenon**	hidden, buried or submerged. These fundamental environmental differences mean HLC principles must be adapted to suit.
Characterisation of landscape is a matter of **interpretation not record, perception not facts;** understand 'landscape' as an idea, not purely as an objective thing **People's views:** it is important to consider collective and public perceptions of landscape alongside more expert views Landscape is and always has been dynamic: **management of change, not preservation** is the aim	Popular perceptions of the marine zone are often limited to shipwrecks, ignoring the vast submerged prehistoric landscape evidence: Although coastal areas and near shore seamarks provoke strong public recognition relating to the maritime character of these areas. The vast offshore marine zone often provides scarce public reaction, and few clues to character perception. Therefore, it should be considered whether in areas where there are gaps in both data and public perceptions, these areas should remain blank, even though a complete picture of landscape character coverage is not achieved.
HLC maps and text should be easy to understand, **jargon free** and **easily accessible** to users	This point applies directly to the marine zone. All HLC products should be accessible. Methods of highlighting the state of our current knowledge in the marine zone should be included in HLC text.
HLC results should be **integrated** into other environmental and heritage management records (e.g. SMRs or HERs)	There is a dearth of heritage based area data in the marine zone. HLC does provide an opportunity to feed into broader marine spatial planning initiatives. However, due to our lack of knowledge within the zone these characterisations should be integrated with care.

Table 8.1. Table demonstrating challenges faced when applying HLC in the marine zone

8.1.2 Developing Seascapes

The multi dimensional nature of the marine environment must be given careful consideration in relation to HLC. Partly as a consequence of the availability, large quantity of relevant data in the marine zone, and also in recognition of the multi dimensional nature of the marine environment the four layered approach to Seascapes was developed for the Solent and Wight Area. This allowed the structuring and integration of data derived from different sources within the characterisation and provided a way of dividing and clarifying the extensive amount of data gathered.

It is felt that the multiple levels of the marine environment do not easily transpose into the HLC methodology developed for the terrestrial zone. While on land there is

primarily one 'present day' landscape. This is not the same at sea where three different landscapes are present concurrently into which modern (and historic) activity is relevant at different scales.

The lack of recognisable boundaries within the marine environment, beyond administrative boundaries protected by strict copyright, limits the scope for applying the HLC approach of digitising character polygons by studying the patterns of field systems and development areas. The digitisation or manipulation of protected data will be seen either as a breach of copyright or a misrepresentation of baseline datasets.

A decision was made to consider the intertidal areas as both part of the marine zone and where appropriate, as an extension of the terrestrial area. The multi-level approach enabled existing terrestrial HLC in the intertidal zones to be reclassified and incorporated into relevant levels. Additionally, areas that included sub character types such as 'sandbanks' and 'mudflats' were categorised into 'seabed surface' and 'seabed subsurface' levels accordingly. This approach allows the intertidal areas to be recognised as the complex, multi-faceted environments they are; in some cases both a drowned landscape as well as a part of the seabed. This approach is markedly different from terrestrial HLC; where intertidal sand and shingle features are grouped under the Broad character of 'Coastal'.

Uncertainty surrounding approaches to mapping archaeological potential limit the scope for developing new methodologies and extrapolating areas from point data. This is particularly applicable to the mapping of prehistoric landscapes as areas. The modelling of these landscapes would require a separate research initiative and a development of a methodology which still lies several years down the line. Defining the boundaries of these landscapes without further research would be seen as a breach of the project team's academic integrity.

This is a challenge for adapting the HLC methodology, and review of the Pilot Projects should consider whether it is actually desirable to continue to directly transpose the principles of terrestrial HLC into an environment to which, in their current form, they may not be suited.

8.1.3 Channelling Development

From the outset the aims and objective of the Seascapes Pilot set quite a narrow range in which the concept of HLC could be transposed to the marine zone. It appears that this is in contrast to terrestrial HLC where "English Heritage has always emphasised diversity of method and flexibility. In part this is a consequence of the differing capacities, data sources and requirements of the host organisations,…." (Clark et al pg 5). With the Seascapes projects it was made quite clear that there was only scope to 'refine' the methodology as developed for the Liverpool Bay project rather than to take a new approach to the development of the methodology.

As a consequence it is felt that the output produced for the Solent, while being a valid trial of the application as developed for Liverpool Bay, has been channelled into being both 'like terrestrial HLC' and 'like Liverpool Bay methodology'.

8.2. Marine data

The current availability, coverage and quality of marine digital datasets were a challenge for the Solent and Wight Seascapes Pilot. These issue, and others concerning copyright will require attention prior to being able to achieve the full potential of HLC in the marine zone.

8.2.1 Coverage

The issues of coverage of data within the marine zone can be summarised into:

- Archaeological datasets, when they do exist are fragmentary
- Archaeological data is focused on the foreshore and in shipwreck databases
- Existing data on shipwrecks is biased to areas where survey and modern activity takes place and is not representative of the actual distribution of losses
- Submerged prehistoric landscapes - Although research in this field is developing, at present the distribution and resolution of available data is not high enough to produce a meaningful characterisation
- The marine environment has a lack of recognisable boundaries compared to the terrestrial environment – there are no field systems at sea
- When large datasets exist they are often of little relevance to the historic character of an area or modern activity – a good example of this are military practice areas, which cover large areas, but are little used, if at all
- Available datasets are biased to focus on modern industry

While the Solent holds many datasets that other areas might not, it is still the case that our knowledge of the marine historic environment and currently available mapping mean that the final product is very broad based and there is a need to enhance this further through refinements due to available data.

8.2.2 Knowledge of marine datasets

While the available data for the marine area remains so fragmentary, un-related to the marine historic resource and dispersed between holding institutions the requirement to be familiar with marine datasets and the area that they cover is essential.

Key aspects to consider in terms of the review of implementation of Marine HLC are:

- The need to understand marine data, its limitations and expression in the modern environment
- The need to understand the marine environment and marine archaeology
- The need to be familiar with the area in order to recognise the significance of data
- The need to understand the current bias within marine datasets
- The ability to transpose available digital data using appropriate GIS methods.

8.2.3 Copyright

Issues surrounding access to, use and derivation of data in terms of copyright have been an influencing factor on the development of the Solent and Wight Seascapes product.

Key considerations in this area are:

- Marine digital data is often under strict copyright which means it can't be put on-line or freely distributed to non-license holders
- Much data within the marine zone is subject to copyright or intellectual property restrictions
- Attempting to get round copyright restrictions by manipulating copyright data is in conflict with established data standards due to:
  - The ethics of manipulating data just to avoid copyright
  - Best practice dictates that data should be derived and not drawn

  (Wheatley, D. and Gillings, M. 2002)
- Datasets provided by some organisations do not conform to best practice

Dealing with Copyright and data standards:
The issues surrounding copyright will need to be addressed in order to develop a long term methodology for Seascapes characterisation. The third 'Project Teams' meeting revealed that several methods had been applied to work around copyright, including gridding, "rough" digitisation and producing data which may only be used alongside their respective data licenses. English Heritage will therefore have to weigh up whether the redrawing or deforming of baseline data reflects best practice in terms of data production or whether the original polygons will be maintained for management purposes (with the long term support of the data providers) and only the top-layer characterisation will be made available to the wider users.

8.3. Assessment of Seascapes multi-level approach

The development of a multi level approach to seascapes is just one solution to the application of HLC in the marine zone. This approach has some distinct advantages and also poses some challenges:

Advantages:

- Reduces overlaps between data
- Data is clearer
- Facilitates interpretation and characterisation

The reduction in data overlap and the construction of a comprehensive database of all significant maritime and related character areas is a result of the development of multi-levels. The final Seascapes database retains all primary, secondary, and other character designations for each dataset. This holistic multi-level approach to

Seascapes will fulfil the needs of the end-user by providing a complete representation of the character of the coastal and marine zone.

For example: when a developer plans to erect an offshore windfarm installation near Bembridge Point, just off the Isle of Wight, archaeological curators can read the seascapes character description for the top level character polygon (Figure 8.1). From the top level description and map, s/he can tell that the area is characterised by a sheltered harbour, concentrations of shipwrecks, submerged rock ledges and shoals, sand spits, and is a popular marine recreation area. It is also described as comprising a number of military structures. This also highlights that there is potential to impact marine cultural heritage, both in the form of shipwrecks and submerged landscapes.

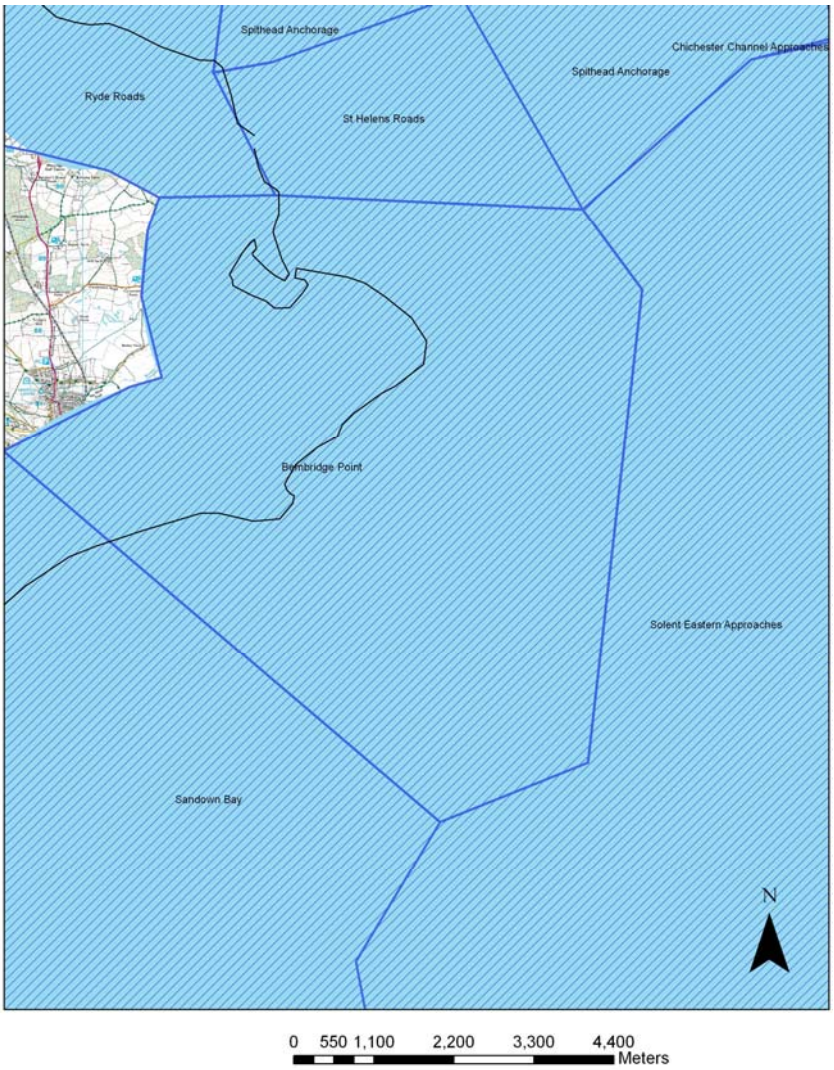

Figure 8.1 Top level character polygon of Bembridge Point area.(HWTMA, BU, SU, EH, 2007).

However, after additionally consulting and querying the sub-levels of Seascapes (Figure 8.2), it can be ascertained that the area poses quite a high risk hazard to navigation, due to its extensive sandbanks, obstructions, and submerged rock ledges, features which a windfarm could take advantage of for placing turbines. Additional considerations are flagged up through the sub-layers which show shipping routes close to the area and the presence of a number of shipwrecks. Therefore, the sub-level data provides an in depth picture of the areas of the Solent and Wight.

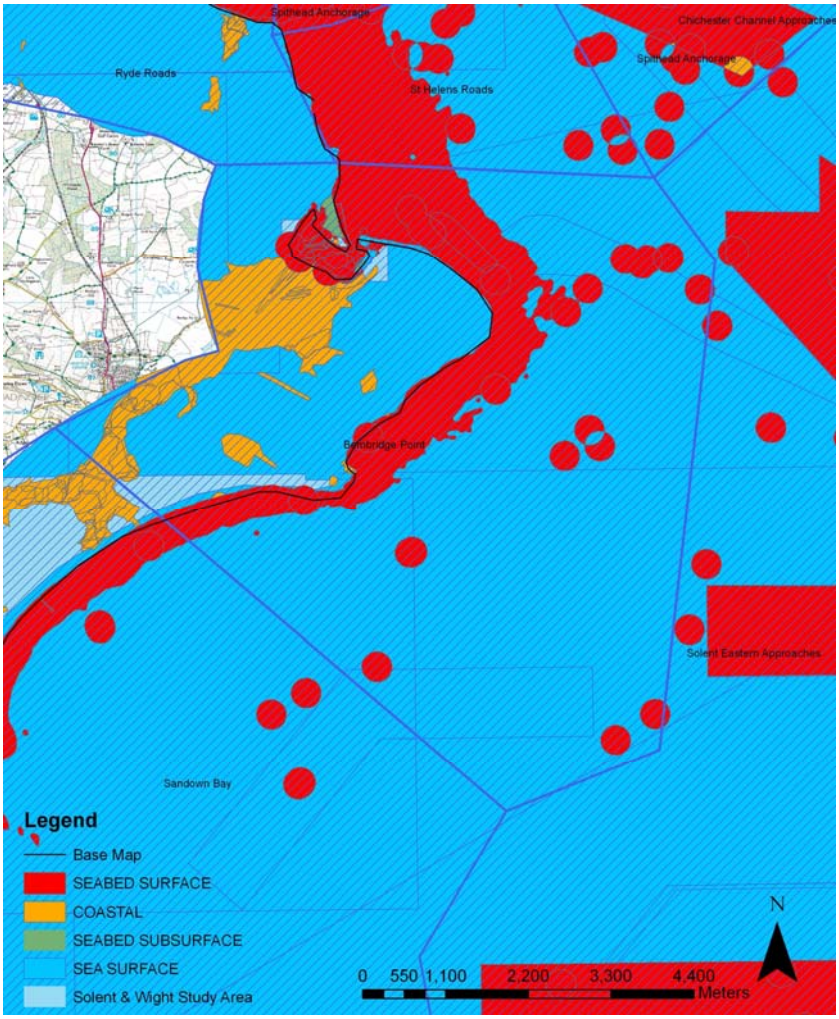

Figure 8.2 Multi-levels of Seascapes character areas for Bembridge Point area.(HWTMA, BU, SU, EH, 2007).

Challenges:

- Doesn't entirely remove overlaps in busy areas of activity
- Still have to deal with hierarchy

Data overlaps and hierarchies:

One of the areas where further work is needed is in the balance between the weighting of significance in terms of which level or activity should take precedence

over another. For instance should an activity that affects all the seascape levels, such as aggregate dredging dominate the expression of broad character over elements such as submerged prehistoric landscapes which are more archaeologically significant and also stretch over a considerable area.

The presence of numerous overlaps within a single layer is not considered best practice within the GIS community as it limits the scope for spatial querying and analysis of the data. The problem of overlapping datasets was already present within some of the raw data integrated within the system, therefore carrying the overlaps through into the project sub-layers. The consequences of having overlapping data will need to be considered during the Seascapes review.

8.4 Archaeological potential

Although the HLC model requires an assessment of archaeological potential to be undertaken as part of the characterisation, this can currently only be founded on a qualitative assessment of fragmentary archaeological evidence, this becomes increasingly vague the further away we get from the coast. The Solent Seascapes project has used a combination of the currently available data, results of research projects and accumulated knowledge of the local area to develop broad statements in terms of archaeological potential. Examples include:

> "The archaeology of this area is dominated by the shipwreck resource. However, the potential for the survival of submerged prehistoric landscapes should be highlighted. Such deposits can reveal important evidence of sea level and climate change and the development of Britain as an island."

To refine our ability (as a profession) to determine archaeological potential for material to exist and survive within seabed sediments will require extensive future investment in the gathering of baseline data on which to develop and refine quantative modelling. Study of the known archaeology of an area alongside variables which affect site formation will help develop predictive techniques and abilities. A number of recent ALSF funded projects have begun to test and demonstrate the use of a range of techniques and approaches to better predict archaeological potential e.g Re-assessment of the archaeological potential of Continental Shelves (Southampton University), Submerged Palaeo-Arun & Solent Rivers:Reconstruction of Prehistoric Landscapes (Imperial College), 3D Seismics for Mitigation Mapping of the Southern North Sea (University of Birmingham), Enhancing our Understanding: Navigational Hazards and Enhancing our Understanding: Shipwreck Importance (Bournemouth University)**.** Encouraging results from these projects are demonstrating how this field may develop in the future and how this data will be of particular relevance to marine HLC.

However, at present we are largely reliant on currently available shipwreck data, which is biased by the demands of hydrographic survey and evidence for submerged landscapes remains which is limited and fragmentary. It was due to these factors that

the sections on archaeological potential were considered essential for inclusion with the character area descriptions, however, it must be noted that these sections may need revision in the future to maintain accuracy.

8.5 Contribution to License Applications

The multi-level Seascapes database will provide a much needed additional tool which will allow heritage managers and licensing agencies to assess site data within a broader context within which detailed conditions can be formulated.

8.5.1 Environmental Assessments

HLC does not replace the need for detailed consideration of the marine historic environment during the Environmental Assessment Process. Seascapes provides an alternative method of considering the boarder historic landscape, as it can work at many scales it would be possible for an EIA to develop a more detailed characterisation for a particular area.

8.5.2 Spatial Planning

The government has made a firm commitment to the development of marine spatial planning and has been assessing the implementation of this, as part of this process a MSP pilot project was undertaken in the Irish Sea (www.jncc.gov.uk/page-1541). Through the proposed Marine Bill and associated consultations it is clear that the development of spatial, inter-operable data sets is key to providing integrated marine spatial planning. The historic environment must play a key role alongside other marine issues and stakeholders in this emerging management structure for the marine zone. Seascapes can help facilitate the integration of historic environment data through providing a spatial approach.

8.5.3 Informing Management Plans

Although the offshore zone is not well covered in terms of management frameworks, this situation improves closer to the shore in coastal, intertidal and estuarine environments. A range of planning and management approaches have been developed for a variety of specific concerns. Seascapes is well placed to add an enhanced marine heritage dimension to such plans, many of which are subject to review and revision processes that provides an opportunity to include new or updated knowledge or understanding to future decision making.

9. References

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10. Appendices

10.1 List of Commonly Available Data Sources Consulted

Data group	Format	Datasets	Supplier
Admiralty charts	digital	Bathymetry, navigational hazards, navigational channels	Seazone Solutions Ltd.
Offshore Installations	digital	Oil and Gas Licensed areas, dredging areas, Military Practice Areas, dumping grounds	Seazone Solutions Ltd.
Wrecks and obstructions	digital	Wrecks and obstructions	Seazone Solutions Ltd.
Historic maps	digital	1st Edition, 2nd Edition and modern Ordnance Survey maps	English Heritage
Site and Monument records	digital	NMR and HER records	NMR, local County Council SMR officers (including Dorset RCZA)
Historical charts	Paper based/digital	Navigational features, offshore development, intertidal peat beds	UKHO archives, NMM
Seismic data	digital	Bathy, sub-bottom	Southampton University/ Justin Dix
Fisheries data	digital	Fishing grounds, fishing snags	JNCC, Kingfisher charts, NMR
Seabed sediments	digital	Sediment type and stability model	BGS
Offshore solid geology	digital		BGS
Morphology	digital	Coastal morphology	FutureCoast
Palaeo-environmental data	digital	Peat beds, palaeo-channels,	HWTMA, Southampton University
Tidal range	Digital	Sea level model	DTI
Sea level index points	documented	Sea level model	Various
Currents	digital	Sediment stability model	Southampton University, SCOPAC
Navigational Hazards ALSF project	digital	Navigational hazards	Bournemouth University
Terrestrial HLC	Digital	HLC	SMR/HER's
Saltern Polygons	Digital	Saltern Areas	SMR/HER's
Shellfishing polygons	Digital	Bivalve mollusc harvesting area classification zones	Magic database: Natural England
SPA	Digital	SPA	JNCC
RAMSAR	Digital	RAMSAR	JNCC
SAC	Digital	SAC	JNCC

Paleoenvironmental data		Peat-beds/ paleo-channels	Southampton University
Coastal and floodplain grazing	Digital	Grazing Areas	Magic database: Natural England
Coastal sand dunes	Digital	Sand Dunes	Magic database: Natural England
Heritage Coasts	Digital	Heritage Coast	Natural England
Ancient Woodland	Digital	Ancient Woodland	Magic database: Natural England Natural England

10.2 List of Data Sources Used for Seascapes

Data group	Format	Datasets	Supplier
Admiralty charts	digital	Bathymetry, navigational hazards, navigational channels	Seazone Solutions Ltd.
Offshore Installations	digital	Oil and Gas Licensed areas, dredging areas, Military Practice Areas, dumping grounds	Seazone Solutions Ltd.
Wrecks and obstructions	digital	Wrecks and obstructions	Seazone Solutions Ltd.
Historic maps	digital	1st Edition, 2nd Edition and modern Ordnance Survey maps	English Heritage
Site and Monument records	digital	NMR and HER records	NMR, local County Council SMR officers (including Dorset RCZA)
Historical charts	Paper based/digital	Navigational features, offshore development, intertidal peat beds	UKHO archives, NMM
Fisheries data	digital	Fishing grounds, fishing snags	JNCC, Kingfisher charts, NMR
Palaeo-environmental data	digital	Peat beds, palaeo-channels,	HWTMA, Southampton University
Navigational Hazards ALSF project	digital	Navigational hazards	Bournemouth University
Terrestrial HLC	Digital	HLC	SMR/HER's
Saltern Polygons	Digital	Saltern Areas	SMR/HER's
Shellfishing polygons	Digital	Bivalve mollusc harvesting area classification zones	Magic database: Natural England
SPA	Digital	SPA	JNCC
RAMSAR	Digital	RAMSAR	JNCC
SAC	Digital	SAC	JNCC
Paleoenvironmental data		Peat-beds/ paleo-channels	Southampton University
Coastal and	Digital	Grazing Areas	Magic database: Natural

floodplain grazing			England
Coastal sand dunes	Digital	Sand Dunes	Magic database: Natural England
Heritage Coasts	Digital	Heritage Coast	Natural England

10.3 Full List Characterisation list

Broad Character	Character Type	Sub Character	Sea Surface	Sea bed Surface	Seabed Sub-surface	Coastal
NAVIGATION	Navigation Feature	Active historical channel	1			
NAVIGATION	Navigation Feature	Active modern channel	1			
NAVIGATION	Navigation Feature	Disused historical channel	1			
NAVIGATION	Navigation Feature	Disused buried historical channel	1			
NAVIGATION	Navigation Feature	Bridge	1	1		1
NAVIGATION	Navigation Activity	Historical anchorage in disused buried channel	1			
NAVIGATION	Navigation Activity	Historical anchorage	1			
NAVIGATION	Navigation Activity	Historical anchorage in active historical channel	1			
NAVIGATION	Navigation Activity	Historical anchorage in active modern channel	1			
NAVIGATION	Navigation Activity	Disused historical anchorage	1			
NAVIGATION	Navigation Activity	Modern Anchorage	1	1		
NAVIGATION	Navigation Activity	Waterway	1			
NAVIGATION	Navigation Activity	Historical canal	1			
NAVIGATION	Navigation Activity	Historical port quarantine area	1			
NAVIGATION	Navigation Activity	Ferry	1			
NAVIGATION	Navigation Activity	Cable Ferry	1	1		
NAVIGATION	Navigation Activity	Restricted area	1	1		
NAVIGATION	Navigational Hazard	Submerged rock	1			
NAVIGATION	Navigational Hazard	Wreck		1		
NAVIGATION	Navigational Hazard	Obstruction		1		
NAVIGATION	Navigational Hazard	Sandbanks	1	1		
NAVIGATION	Navigational Hazard	Caution area	1			
NAVIGATION	Navigational Hazard	Cliffs	1	1		
INDUSTRY	Intrusive offshore industry	Aggregate dredging	1	1	1	
INDUSTRY	Intrusive offshore industry	Capital dredging	1	1	1	
INDUSTRY	Intrusive offshore industry	Maintenance dredging	1	1	1	
INDUSTRY	Intrusive offshore industry	Oil and gas field			1	
INDUSTRY	Intrusive offshore industry	Dumping ground		1		

INDUSTRY	Intrusive offshore industry	Pipeline		1	1	
INDUSTRY	Intrusive offshore industry	Oil terminal		1		
INDUSTRY	Non-intrusive offshore industry	Fishing area	1	1	1	
INDUSTRY	Non-intrusive offshore industry	Shellfishing area	1	1	1	
INDUSTRY	Non-intrusive offshore industry	Commercial shipping	1			
INDUSTRY	Non-intrusive offshore industry	Submarine cable		1		
INDUSTRY	Non-intrusive offshore industry	Offshore recreation	1			
INDUSTRY	Ports, docks and harbours	Dock and port related industry	1			1
INDUSTRY	Ports, docks and harbours	Shipbuilding yard				1
INDUSTRY	Ports, docks and harbours	Boatbuilding yard				1
INDUSTRY	Fisheries and Mariculture	Modern fisheries	1	1	1	1
INDUSTRY	Fisheries and Mariculture	Historic fisheries	1	1	1	1
INDUSTRY	Coastal Industry	Reservoir				1
INDUSTRY	Coastal Industry	Quarry				1
INDUSTRY	Coastal Industry	Tank Farm				1
INDUSTRY	Coastal Industry	Container Depot				1
INDUSTRY	Coastal Industry	Power Station				1
INDUSTRY	Coastal Industry	Renewable energy installations				1
INDUSTRY	Coastal Industry	Gas works				1
INDUSTRY	Coastal Industry	Modern industry				1
INDUSTRY	Coastal Industry	Timber Yard				1
INDUSTRY	Coastal Industry	Kiln				1
INDUSTRY	Coastal Industry	Warehouse				1
INDUSTRY	Coastal Industry	Brickworks				1
INDUSTRY	Coastal Industry	Sewage works				1
INDUSTRY	Coastal Industry	Old works				1
INDUSTRY	Coastal Industry	Pottery works				1
INDUSTRY	Coastal Industry	Saltworks		1		1
INDUSTRY	Coastal Industry	Quayside Development				1
INDUSTRY	Coastal Industry	Osier beds				1
INDUSTRY	Coastal Industry	Watercress beds				1
RECREATION	Coastal Recreation	Coastal golf course				1
RECREATION	Coastal Recreation	Coastal recreation				1
RECREATION	Coastal Recreation	Coastal parkland				1
RECREATION	Coastal Recreation	Coastal way				1
RECREATION	Coastal Recreation	Marine reserve				1
RECREATION	Coastal Recreation	Marina	1			1
RECREATION	Coastal Recreation	Marine Lake				1

RECREATION	Coastal Recreation	Beach				1
RECREATION	Coastal Recreation	Seaside entertainment				1
RECREATION	Coastal Recreation	Protected recreation area				1
RECREATION	Coastal Recreation	Sailing area	1			
RECREATION	Coastal Recreation	Piers, jetties and wharfs	1	1		1
RECREATION	Coastal Recreation	Sports ground				1
RECREATION	Offshore Recreation	Leisure fishing area	1	1	1	1
RECREATION	Offshore Recreation	Dive site		1		
NATURAL LANDSCAPE	Intertidal Environment	Mudflats		1	1	
NATURAL LANDSCAPE	Intertidal Environment	Saltmarsh area		1	1	
NATURAL LANDSCAPE	Intertidal Environment	Coastal floodplain		1	1	1
NATURAL LANDSCAPE	Intertidal Environment	Lagoon		1	1	1
NATURAL LANDSCAPE	Coastal Environment	Coastal floodplain	1	1		1
NATURAL LANDSCAPE	Offshore Environment	Subtidal sands		1	1	
NATURAL LANDSCAPE	Coastal Environment	Sand Dunes		1	1	
NATURAL LANDSCAPE	Coastal Environment	Heathland				1
NATURAL LANDSCAPE	Coastal Environment	Grazing				1
NATURAL LANDSCAPE	Coastal Environment	Ponds				1
NATURAL LANDSCAPE	Coastal Environment	Woodlands				1
NATURAL LANDSCAPE	Coastal Environment	Wetlands				1
NATURAL LANDSCAPE	Coastal Environment	Landslip	1			1
NATURAL LANDSCAPE	Coastal Environment	Reclaimed Land		1		1
NATURAL LANDSCAPE	Intertidal Environment	Shingle		1	1	
SETTLEMENT	Coastal Settlement	Reclaimed land				1
SETTLEMENT	Coastal Settlement	Historic town				1
SETTLEMENT	Coastal Settlement	Airfield				1
SETTLEMENT	Coastal Settlement	Coastal settlement				1
SETTLEMENT	Coastal Settlement	Modern field systems				1
SETTLEMENT	Coastal Settlement	Historic field systems				1
SETTLEMENT	Coastal Settlement	Coastal village				1
SETTLEMENT	Maritime Safety	Coastguard Installation				1
SETTLEMENT	Maritime Safety	Navigation aid				1
SETTLEMENT	Maritime Safety	Lifeguard Area				1
SETTLEMENT	Maritime Safety	Lifeboat stations				1
MILITARY	Coastal Military	Military practice area	1			1
MILITARY	Coastal Military	Military area				1

MILITARY	Coastal Military	Army base				1
MILITARY	Coastal Military	Military Defence area				1
MILITARY	Coastal Military	Military Fort				1
MILITARY	Naval Activity	Naval Dockyard				1
MILITARY	Naval Activity	Navy Base				1
ENGINEERING	Coastal Defence	Coastal defence	1			1
ENGINEERING	Harbour Defence	Breakwater	1			
ENGINEERING	Coastal Defence	Sea wall	1	1		1
ENGINEERING	Coastal Defence	Groyne	1			
HISTORICAL MARITIME SIGNIFICANCE	Historic Wreck	Wreck		1	1	
HISTORICAL MARITIME SIGNIFICANCE	Submerged Landscapes	Submerged Prehistoric settlement			1	
HISTORICAL MARITIME SIGNIFICANCE	Prehistoric land surface	Peat bed			1	
HISTORICAL MARITIME SIGNIFICANCE	Prehistoric land surface	Submerged forest			1	
HISTORICAL MARITIME SIGNIFICANCE	Prehistoric land surface	Palaeochannel			1	

10.4 Data Reclassification table

Source	Attribute	Assignment	SUB_CHAR	ColumnLevel
Coastal_and_Floodplain_grazing_cut	PRIHABTXT	Coastal and floodplain grazing marsh	Coastal Floodplain	Coastal
coastal_sand_dunes_v1_cut	PRIHABTXT	Coastal sand dunes	Sand Dunes	Seabed surface
coastal_sand_dunes_v1_cut	PRIHABTXT	Coastal sand dunes	Sand Dunes	Seabed subsurface
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Coastal Floodlplain	Coastal Floodplain	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Grazing	Grazing	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Coastal Slope	Cliffs	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Landslip	Cliffs	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Landslip	Cliffs	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Landslip	Cliffs	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Landslip	Cliffs	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Landslip	Cliffs	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Landslip	Cliffs	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Landslip	Cliffs	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Landslip	Cliffs	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Harbours	Dock and port related industry	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Harbours	Dock and port related industry	Sea surface
IOW_MHLC	IOW_MHLC.Sub_Type	Reclaimed Land	Dock and port related industry	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Ferry Terminus	Ferry	Sea surface
IOW_MHLC	IOW_MHLC.Sub_Type	Grazing Marsh	Grazing	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Marinas	Marina	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Marinas	Marina	Sea surface
IOW_MHLC	IOW_MHLC.Sub_Type	Battery	Military Defence area	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Fort	Military Fort	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Fort	Military Fort	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Fort	Military Fort	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Fort	Military Fort	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Fort	Military Fort	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Intertidal Mud	Mudflats	Seabed surface
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Marinas	Marina	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Intertidal Mud	Mudflats	Seabed subsurface
IOW_MHLC	IOW_MHLC.Sub_Type	Osier Beds	Osier beds	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Osier Beds	Osier beds	Coastal

IOW_MHLC	IOW_MHLC.Sub_Type	Ponds	Ponds	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Quayside Development	Quayside Development	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Reclaimed Land	Reclaimed Land	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Reclaimed Land	Reclaimed Land	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Reclaimed Land	Reclaimed Land	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Reclaimed Land	Reclaimed Land	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Reservoirs and Water Pumping	Reservoir	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Reservoirs and Water Pumping	Reservoirs	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Reservoirs and Water Pumping	Reservoirs	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Reservoirs and Water Pumping	Reservoirs	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Artificial Pond	Saltmarsh Area	Seabed subsurface
IOW_MHLC	IOW_MHLC.Sub_Type	Salt Marsh	Saltmarsh area	Seabed surface
IOW_MHLC	IOW_MHLC.Sub_Type	Salt Marsh	Saltmarsh area	Seabed subsurface
IOW_MHLC	IOW_MHLC.Sub_Type	Saltern	Saltworks	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Saltern	Saltworks	Seabed surface
IOW_MHLC	IOW_MHLC.Sub_Type	Intertidal Sand & Shingle	Sand Dunes	Seabed surface
IOW_MHLC	IOW_MHLC.Sub_Type	Intertidal Sand & Shingle	Sand Dunes	Seabed subsurface
IOW_MHLC	IOW_MHLC.Sub_Type	Sand Dunes	Sand Dunes	Seabed surface
IOW_MHLC	IOW_MHLC.Sub_Type	Sand Dunes	Sand Dunes	Seabed subsurface
IOW_MHLC	IOW_MHLC.Sub_Type	Sewage and Water Treatment	Sewage works	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Sewage and Water Treatment	Sewage works	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Valley Floor Woodlands	Woodlands	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Valley Floor Woodlands	Woodlands	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Valley Floor Woodlands	Woodlands	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Valley Floor Woodlands	Woodlands	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Valley Floor Woodlands	Woodlands	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Valley Floor Woodlands	Woodlands	Coastal
IOW_MHLC	IOW_MHLC.Place	West of Corf Farm	Ancient field systems	Coastal
IOW_MHLC	IOW_MHLC.Place	Yar Bridge	Bridge	Coastal
IOW_MHLC	IOW_MHLC.Place	RNLI Yard	Lifeboat Station	Coastal
IOW_MHLC	IOW_MHLC.Sub_Type	Enclosed Pastures &	Modern field systems	Coastal

IOW_MHLC	IOW_MHLC.Place	Meadows Folly Works	Modern Field systems	Coastal
IOW_MHLC	IOW_MHLC.Place	Medina Waterfront, West Cowes	Modern Field systems	Coastal
IOW_MHLC	IOW_MHLC.Place	West of Clarence Road	Modern field systems	Coastal
IOW_MHLC	IOW_MHLC.Place	Bembridge Embankment	Reclaimed Land	Coastal
IOW_MHLC	IOW_MHLC.Place	Bembridge Embankment	Reclaimed Land	Coastal
IOW_MHLC	IOW_MHLC.Place	N. of Saltern Wood	Saltworks	Coastal
IOW_MHLC	IOW_MHLC.Place	N. of Saltern Wood	Saltworks	Seabed surface
IOW_MHLC	IOW_MHLC.Place	St Helens Duver (S.Part)	Sand Dunes	Coastal
IOW_MHLC	IOW_MHLC.Place	North of Ashlake Copse	Woodland	Coastal
Ramsar_cut	SITE_NAME	Solent & Southampton Water	Active modern channel	Sea surface
Ramsar_cut	SITE_NAME	Chichester and Langstone Harbours	Dock and port related industry	Coastal
Ramsar_cut	SITE_NAME	Chichester and Langstone Harbours	Dock and port related industry	Sea surface
Ramsar_cut	SITE_NAME	Poole Harbour	Dock and port related industry	Coastal
Ramsar_cut	SITE_NAME	Poole Harbour	Dock and port related industry	Sea surface
Ramsar_cut	SITE_NAME	Portsmouth Harbour	Dock and port related industry	Coastal
Ramsar_cut	SITE_NAME	Portsmouth Harbour	Dock and port related industry	Sea surface
Ramsar_cut	SITE_NAME	Dorset Heathlands	Heathland	Coastal
SAC_Cut	SITE_NAME	Solent Maritime	Active modern channel	Sea surface
SAC_Cut	SITE_NAME	South Wight Maritime	Active modern channel	Sea surface
SAC_Cut	SITE_NAME	St Albans Head to Durlston Head	Active modern channel	Sea surface
SAC_Cut	SITE_NAME	Isle of Portland to Studland Cliffs	Cliffs	Coastal
SAC_Cut	SITE_NAME	Isle of Wight Downs	Cliffs	Coastal
SAC_Cut	SITE_NAME	Dorset Heaths	Heathland	Coastal
SAC_Cut	SITE_NAME	Dorset Heaths (Purbeck & Wareham) & Studland	Heathland	Coastal

		Dunes		
		Solent & Isle of Wight		
SAC_Cut	SITE_NAME	Lagoons	Lagoon	Sea surface
SAC_Cut	SITE_NAME	Briddlesford Copses	Woodland	Coastal
Salterns_Polygons	CLASSIFICA	BUILDING	Saltworks	Seabed surface
Salterns_Polygons	CLASSIFICA	BUILDING	Saltworks	Coastal
Salterns_Polygons	CLASSIFICA	FARM	Saltworks	Seabed surface
Salterns_Polygons	CLASSIFICA	FARM	Saltworks	Coastal
Salterns_Polygons	CLASSIFICA	HOUSE	Saltworks	Coastal
Salterns_Polygons	CLASSIFICA	HOUSE	Saltworks	Seabed surface
Salterns_Polygons	CLASSIFICA	POND BAY	Saltworks	Seabed surface
Salterns_Polygons	CLASSIFICA	POND BAY	Saltworks	Coastal
Salterns_Polygons	CLASSIFICA	QUAY	Saltworks	Coastal
Salterns_Polygons	CLASSIFICA	QUAY	Saltworks	Seabed surface
Salterns_Polygons	CLASSIFICA	ROAD	Saltworks	Coastal
Salterns_Polygons	CLASSIFICA	ROAD	Saltworks	Seabed surface
Salterns_Polygons	CLASSIFICA	SALT BATHS	Saltworks	Coastal
Salterns_Polygons	CLASSIFICA	SALT BATHS	Saltworks	Seabed surface
Salterns_Polygons	CLASSIFICA	SALT WORKS	Saltworks	Coastal
Salterns_Polygons	CLASSIFICA	SALT WORKS	Saltworks	Seabed surface
Salterns_Polygons	CLASSIFICA	salt works	Saltworks	Coastal
Salterns_Polygons	CLASSIFICA	salt works	Saltworks	Seabed surface
Salterns_Polygons	CLASSIFICA	SALTERN	Saltworks	Coastal
Salterns_Polygons	CLASSIFICA	SALTERN	Saltworks	Seabed surface
seazone_sandbanks1	SZFEATDESC	Depth area	Sandbanks	Seabed surface
seazone_sandbanks1	SZFEATDESC	Depth area	Sandbanks	Sea surface
Shellfish_reclass	SUB_CHAR	Oyster fishing	Oyster fishing	Seabed surface
Shellfish_reclass	SUB_CHAR	Oyster fishing	Oyster fishing	Seabed subsurface
Shellfish_reclass	SUB_CHAR	Oyster fishing	Oyster fishing	Sea surface
		Solent & Southampton		
SPA_cut	SITE_NAME	Water	Active modern channel	Sea surface
		Chichester and	Dock and port related	
SPA_cut	SITE_NAME	Langstone Harbours	industry	Coastal
		Chichester and	Dock and port related	
SPA_cut	SITE_NAME	Langstone Harbours	industry	Sea surface
			Dock and port related	
SPA_cut	SITE_NAME	Poole Harbour	industry	Coastal
			Dock and port related	
SPA_cut	SITE_NAME	Poole Harbour	industry	Sea surface

SPA_cut	SITE_NAME	Portsmouth Harbour	Dock and port related industry	Coastal
SPA_cut	SITE_NAME	Portsmouth Harbour	Dock and port related industry	Sea surface
SPA_cut	SITE_NAME	Dorset Heathlands	Heathland	Coastal
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Licenced Area, Dredging Area	Aggregate dredging	Seabed surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Licenced Area, Dredging Area	Aggregate dredging	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Licenced Area, Dredging Area	Aggregate dredging	Seabed subsurface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Shoreline construction, breakwater	Breakwater	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Ferry route, cable ferry	Cable ferry	Seabed surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Ferry route, cable ferry	Cable ferry	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Obstruction, snag/stump	Caution area	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Shoreline construction, rip rap	Coastal defence	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Shoreline construction, rip rap	Coastal defence	Coastal
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Production/storage area, stockpile	Container depot	Coastal
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Hulk	Dangerous wreck in shallow water (0-10mts)	Seabed surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Berth	Dock and port related industry	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Dock area	Dock and port related industry	Coastal
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Dock area	Dock and port related industry	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Dock area, non-tidal (wet dock)	Dock and port related industry	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Dock area, non-tidal (wet dock)	Dock and port related industry	Coastal
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Dry dock	Dock and port related industry	Coastal

szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Dry dock	Dock and port related industry	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Harbour facility	Dock and port related industry	Coastal
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Harbour facility	Dock and port related industry	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Dumping ground	Dumping ground	Seabed surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Fishing facility, fishing stake	Fishing area	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Fishing facility, fishing stake	Fishing area	Seabed surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Fishing facility, fishing stake	Fishing area	Seabed subsurface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Fishing ground	Fishing area	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Fishing ground	Fishing area	Seabed surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Fishing ground	Fishing area	Seabed subsurface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Marine farm/culture	Fishing area	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Marine farm/culture	Fishing area	Seabed surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Marine farm/culture	Fishing area	Seabed subsurface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Shoreline construction, groyne (groin)	Groyne	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Dredged area	Maintenance dredging	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Dredged area	Maintenance dredging	Seabed surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Dredged area	Maintenance dredging	Seabed subsurface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Dredged area	Maintenance dredging	Coastal
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Dredged area	Maintenance dredging	Sea surface
szSE_ACTIVITY_LICENCE_region_P	SZFEATDESC	Small craft facility	Marina	Coastal

roj szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Small craft facility	Marina	Sea surface
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Military practice area	Military practice area	Sea surface
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Anchorage area	Modern anchorage	Seabed surface
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Anchorage area	Modern anchorage	Sea surface
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Production/storage area	Modern Industry	Coastal
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Production/storage area, factory area	Modern Industry	Coastal
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Pontoon	Obstructions in shallow water	Sea surface
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Offshore Installation	Oil and gas field	Seabed subsurface
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Offshore platform	Oil and gas field	Seabed subsurface
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Production/storage area, refinery area	Oil terminal	Seabed surface
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Shoreline construction, pier (jetty)	Piers, jetties and wharfs	Coastal
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Shoreline construction, pier (jetty)	Piers, jetties and wharfs	Sea surface
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Shoreline construction, pier (jetty)	Piers, jetties and wharfs	Seabed surface
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Shoreline construction, promenade pier	Piers, jetties and wharfs	Coastal
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Shoreline construction, promenade pier	Piers, jetties and wharfs	Sea surface
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Shoreline construction, promenade pier	Piers, jetties and wharfs	Seabed surface
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Shoreline construction, wharf (quay)	Piers, jetties and wharfs	Coastal
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Shoreline construction, wharf (quay)	Piers, jetties and wharfs	Sea surface
szSE_ACTIVITY_LICENCE_region_P roj	SZFEATDESC	Shoreline construction, wharf (quay)	Piers, jetties and wharfs	Seabed surface

szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Pipeline area	Pipeline	Seabed subsurface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Pipeline area	Pipeline	Seabed surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Production/storage area, power station are	Power station	Coastal
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Production/storage area, quarry	Quarry	Coastal
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Restricted area	Restricted area	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Shoreline construction, sea wall	Sea wall	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Shoreline construction, sea wall	Sea wall	Seabed surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Shoreline construction, sea wall	Sea wall	Coastal
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Marine farm/culture, oysters/mussels	Shellfishing area	Sea surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Marine farm/culture, oysters/mussels	Shellfishing area	Seabed surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Marine farm/culture, oysters/mussels	Shellfishing area	Seabed subsurface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Cable area	Submarine cable	Seabed surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Cable area, power line	Submarine cable	Seabed surface
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Production/storage area, tank farm	Tank farm	Coastal
szSE_ACTIVITY_LICENCE_region_Proj	SZFEATDESC	Production/storage area, timber yard	Timber yard	Coastal
szSE_AQUACULTURE_region_Proj	SZFEATDESC	Fishing ground	Fishing area	Sea surface
szSE_AQUACULTURE_region_Proj	SZFEATDESC	Fishing ground	Fishing area	Seabed surface
szSE_AQUACULTURE_region_Proj	SZFEATDESC	Fishing ground	Fishing area	Seabed subsurface
szSE_TRANSPORTATION_region	SZFEATDESC	Fairway	Active modern channel	Sea surface
szSE_TRANSPORTATION_region	SZFEATDESC	Airport/airfield	Airfield	Coastal
szSE_TRANSPORTATION_region	SZFEATDESC	Airport/airfield	Airfield	Coastal
szSE_TRANSPORTATION_region	SZFEATDESC	Airport/airfield	Airfield	Coastal
szSE_TRANSPORTATION_region	SZFEATDESC	Ferry route, cable ferry	Cable ferry	Seabed surface
szSE_TRANSPORTATION_region	SZFEATDESC	Ferry route, cable ferry	Cable ferry	Sea surface

szSE_TRANSPORTATION_region	SZFEATDESC	Caution area	Caution area	Sea surface
szSE_TRANSPORTATION_region	SZFEATDESC	Precautionary area	Caution area	Sea surface
szSE_TRANSPORTATION_region	SZFEATDESC	Berth	Dock and port related industry	Coastal
szSE_TRANSPORTATION_region	SZFEATDESC	Dock area	Dock and port related industry	Coastal
szSE_TRANSPORTATION_region	SZFEATDESC	Dock area	Dock and port related industry	Sea surface
szSE_TRANSPORTATION_region	SZFEATDESC	Dock area, non-tidal (wet dock)	Dock and port related industry	Coastal
szSE_TRANSPORTATION_region	SZFEATDESC	Dock area, non-tidal (wet dock)	Dock and port related industry	Sea surface
szSE_TRANSPORTATION_region	SZFEATDESC	Small craft facility	Marina	Coastal
szSE_TRANSPORTATION_region	SZFEATDESC	Small craft facility	Marina	Sea surface
szSE_TRANSPORTATION_region	SZFEATDESC	Anchor berth	Modern anchorage	Seabed surface
szSE_TRANSPORTATION_region	SZFEATDESC	Anchor berth	Modern anchorage	Sea surface
szSE_TRANSPORTATION_region	SZFEATDESC	Anchorage area	Modern anchorage	Seabed surface
szSE_TRANSPORTATION_region	SZFEATDESC	Anchorage area	Modern anchorage	Sea surface
szSE_TRANSPORTATION_region	SZFEATDESC	Pilot boarding place, boarding by pilot-cruising vessel	Piers, jetties and wharfs	Coastal
szSE_TRANSPORTATION_region	SZFEATDESC	Pilot boarding place, boarding by pilot-cruising vessel	Piers, jetties and wharfs	Sea surface
szSE_TRANSPORTATION_region	SZFEATDESC	Pilot boarding place, boarding by pilot-cruising vessel	Piers, jetties and wharfs	Seabed surface
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Shoreline construction, breakwater	Breakwater	Sea surface
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Shoreline construction	Coastal defence	Sea surface
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Shoreline construction	Coastal defence	Coastal
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Shoreline construction, rip rap	Coastal defence	Coastal
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Shoreline construction, rip rap	Coastal defence	Sea surface
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Dry dock	Dock and port related industry	Coastal
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Dry dock	Dock and port related industry	Sea surface

szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Shoreline construction, groyne (groin)	Groyne	Sea surface
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Mooring/Warping facility, dolphin	Piers, jetties and wharfs	Coastal
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Mooring/Warping facility, dolphin	Piers, jetties and wharfs	Sea surface
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Mooring/Warping facility, dolphin	Piers, jetties and wharfs	Seabed surface
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Shoreline construction, pier (jetty)	Piers, jetties and wharfs	Coastal
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Shoreline construction, pier (jetty)	Piers, jetties and wharfs	Sea surface
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Shoreline construction, pier (jetty)	Piers, jetties and wharfs	Seabed surface
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Shoreline construction, promenade pier	Piers, jetties and wharfs	Coastal
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Shoreline construction, promenade pier	Piers, jetties and wharfs	Sea surface
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Shoreline construction, promenade pier	Piers, jetties and wharfs	Seabed surface
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Shoreline construction, wharf (quay)	Piers, jetties and wharfs	Coastal
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Shoreline construction, wharf (quay)	Piers, jetties and wharfs	Sea surface
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Shoreline construction, wharf (quay)	Piers, jetties and wharfs	Seabed surface
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Shoreline construction, sea wall	Sea wall	Sea surface
szSO_CONSTRUCTIONS_region_Pr	SZFEATDESC	Shoreline construction, sea wall	Sea wall	Seabed surface
szSO_INSTALLATIONS_region_Pr	SZFEATDESC	Fishing facility, fishing stake	Fishing area	Sea surface
szSO_INSTALLATIONS_region_Pr	SZFEATDESC	Fishing facility, fishing stake	Fishing area	Seabed subsurface
szSO_INSTALLATIONS_region_Pr	SZFEATDESC	Fishing facility, fishing stake	Fishing area	Seabed surface
szSO_INSTALLATIONS_region_Pr	SZFEATDESC	Marine farm/culture	Fishing area	Sea surface
szSO_INSTALLATIONS_region_Pr	SZFEATDESC	Marine farm/culture	Fishing area	Seabed surface
szSO_INSTALLATIONS_region_Pr	SZFEATDESC	Marine farm/culture	Fishing area	Seabed subsurface

szSO_INSTALLATIONS_region_Pr	SZFEATDESC	Offshore Installation	Oil and gas field	Seabed subsurface
szSO_INSTALLATIONS_region_Pr	SZFEATDESC	Offshore Installation	Oil and gas field	Seabed subsurface
szSO_INSTALLATIONS_region_Pr	SZFEATDESC	Offshore platform	Oil and gas field	Seabed subsurface
szSO_INSTALLATIONS_region_Pr	SZFEATDESC	Pipeline area	Pipeline	Seabed subsurface
szSO_INSTALLATIONS_region_Pr	SZFEATDESC	Pipeline area	Pipeline	Seabed surface
szSO_INSTALLATIONS_region_Pr	SZFEATDESC	Marine farm/culture, oysters/mussels	Shellfishing area	Sea surface
szSO_INSTALLATIONS_region_Pr	SZFEATDESC	Marine farm/culture, oysters/mussels	Shellfishing area	Seabed surface
szSO_INSTALLATIONS_region_Pr	SZFEATDESC	Marine farm/culture, oysters/mussels	Shellfishing area	Seabed subsurface
szSO_OBSTRUCTIONS_point_Proj	SZFEATDESC	Obstruction	Caution area	Seabed surface
szSO_OBSTRUCTIONS_point_Proj	SZFEATDESC	Obstruction	Caution area	Sea surface
szSO_OBSTRUCTIONS_point_Proj	SZFEATDESC	Obstruction, foul area	Caution area	Seabed surface
szSO_OBSTRUCTIONS_point_Proj	SZFEATDESC	Obstruction, foul area	Caution area	Sea surface
szSO_OBSTRUCTIONS_point_Proj	SZFEATDESC	Obstruction, foul ground	Caution area	Seabed surface
szSO_OBSTRUCTIONS_point_Proj	SZFEATDESC	Obstruction, snag/stump	Caution area	Seabed surface
szSO_OBSTRUCTIONS_point_Proj	SZFEATDESC	Pile	Obstructions in shallow water	Sea surface
szSO_OBSTRUCTIONS_point_Proj	SZFEATDESC	Pile	Obstructions in shallow water	Seabed surface
szSO_OBSTRUCTIONS_point_Proj	SZFEATDESC	Pile, post	Obstructions in shallow water	Sea surface
szSO_OBSTRUCTIONS_point_Proj	SZFEATDESC	Pile, post	Obstructions in shallow water	Seabed surface
szSO_OBSTRUCTIONS_point_Proj	SZFEATDESC	Pile, post	Obstructions in shallow water	Sea surface
szSO_OBSTRUCTIONS_point_Proj	SZFEATDESC	Pile, post	Obstructions in shallow water	Seabed surface
szSO_OBSTRUCTIONS_point_Proj	SZFEATDESC	Pile, tripodal	Obstructions in shallow water	Sea surface
szSO_OBSTRUCTIONS_point_Proj	SZFEATDESC	Pile, tripodal	Obstructions in shallow water	Seabed surface
WestSuss_MHLC	WestSuss_MHLC.SUBCHAR	Cliffs & Beaches	Cliffs	Coastal
WestSuss_MHLC	WestSuss_MHLC.SUBCHAR	Marinas	Marina	Coastal
WestSuss_MHLC	WestSuss_MHLC.SUBCHAR	Marinas	Marina	Sea surface
WestSuss_MHLC	WestSuss_MHLC.SUBCHAR	Mudflats	Mudflats	Seabed surface
WestSuss_MHLC	WestSuss_MHLC.SUBCHAR	Mudflats	Mudflats	Seabed subsurface
WestSuss_MHLC	WestSuss_MHLC.SUBCHAR	Ponds	Ponds	Coastal

WestSuss_MHLC	WestSuss_MHLC.SUBCHAR	Reservoirs	Reservoir	Coastal
WestSuss_MHLC	WestSuss_MHLC.SUBCHAR	Marsh Salt	Saltmarsh area	Seabed surface
WestSuss_MHLC	WestSuss_MHLC.SUBCHAR	Marsh Salt	Saltmarsh area	Seabed subsurface
WestSuss_MHLC	WestSuss_MHLC.SUBCHAR	Salt marsh	Saltmarsh area	Seabed surface
WestSuss_MHLC	WestSuss_MHLC.SUBCHAR	Salt Marsh	Saltmarsh area	Seabed subsurface
WestSuss_MHLC	WestSuss_MHLC.SUBCHAR	Shingle & dunes	Sand dunes	Seabed surface
WestSuss_MHLC	WestSuss_MHLC.SUBCHAR	Shingle & dunes	Sand dunes	Seabed subsurface
WestSuss_MHLC	WestSuss_MHLC.SUBCHAR	Watercress Beds	Watercress beds	Coastal
WestSuss_MHLC	WestSuss_MHLC.SUBCHAR	Creeks & fleets	Waterway	Coastal
WestSuss_MHLC	WestSuss_MHLC.SUBCHAR	Fresh Water	Reclaimed land	Coastal
IOW_HLC	Sub_Type	Artificial Pond	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Battery	Military Defence area	Coastal
IOW_HLC	Sub_Type	Coastal Slope	Cliffs	Coastal
IOW_HLC	Sub_Type	Enclosed Pastures & Meadows	Ancient field systems	Coastal
IOW_HLC	Sub_Type	Ferry Terminus	Ferry	Coastal
IOW_HLC	Sub_Type	Fort	Military Fort	Coastal
IOW_HLC	Sub_Type	Grazing Marsh	Grazing	Coastal
IOW_HLC	Sub_Type	Grazing Marsh	Reclaimed Land	Coastal
IOW_HLC	Sub_Type	Harbours	Dock and port related industry	Coastal
IOW_HLC	Sub_Type	Intertidal Mud	Mudflats	Seabed surface
IOW_HLC	Sub_Type	Intertidal Sand & Shingle	Sand Dunes	Seabed surface
IOW_HLC	Sub_Type	Landslip	Cliffs	Coastal
IOW_HLC	Sub_Type	Landslip	Landslip	Coastal
IOW_HLC	Sub_Type	Landslip	Woodlands	Coastal
IOW_HLC	Sub_Type	Marinas	Marina	Coastal
IOW_HLC	Sub_Type	Marine Industry	Bridge	Coastal
IOW_HLC	Sub_Type	Marine Industry	Lifeboat Station	Coastal
IOW_HLC	Sub_Type	Marine Industry	Modern Field systems	Coastal
IOW_HLC	Sub_Type	Marine Industry	Modern Field systems	Coastal
IOW_HLC	Sub_Type	Marine Industry	Modern Field systems	Coastal
IOW_HLC	Sub_Type	Marine Industry	Reclaimed Land	Coastal
IOW_HLC	Sub_Type	Marine Industry	Reclaimed Land	Coastal
IOW_HLC	Sub_Type	Marine Industry	Saltworks	Coastal
IOW_HLC	Sub_Type	Marine Industry	Sand Dunes	Seabed surface
IOW_HLC	Sub_Type	Marine Industry	Woodland	Coastal
IOW_HLC	Sub_Type	Osier Beds	Osier beds	Coastal

IOW_HLC	Sub_Type	Osier Beds	Osier beds	Coastal
IOW_HLC	Sub_Type	Ponds	Ponds	Coastal
IOW_HLC	Sub_Type	Quayside Development	Quayside Development	Coastal
IOW_HLC	Sub_Type	Reclaimed Land	Dock and port related industry	Coastal
IOW_HLC	Sub_Type	Reclaimed Land	Reclaimed Land	Coastal
IOW_HLC	Sub_Type	Reclaimed Land	Reclaimed Land	Coastal
IOW_HLC	Sub_Type	Reclaimed Land	Reclaimed Land	Coastal
IOW_HLC	Sub_Type	Reclaimed Land	Reclaimed Land	Coastal
IOW_HLC	Sub_Type	Reservoirs and Water Pumping	Reservoir	Coastal
IOW_HLC	Sub_Type	Reservoirs and Water Pumping	Reservoirs	Coastal
IOW_HLC	Sub_Type	Reservoirs and Water Pumping	Reservoirs	Coastal
IOW_HLC	Sub_Type	Reservoirs and Water Pumping	Reservoirs	Coastal
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface

IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Salt Marsh	Saltmarsh Area	Seabed surface
IOW_HLC	Sub_Type	Saltern	Saltworks	Coastal
IOW_HLC	Sub_Type	Sand Dunes	Sand Dunes	Seabed surface
IOW_HLC	Sub_Type	Sand Dunes	Sand Dunes	Seabed surface
IOW_HLC	Sub_Type	Sand Dunes	Sand Dunes	Seabed surface

IOW_HLC	Sub_Type	Sewage and Water Treatment	Sewage Works	Coastal
IOW_HLC	Sub_Type	Sewage and Water Treatment	Sewage works	Coastal
IOW_HLC	Sub_Type	Sewage and Water Treatment	Sewage works	Coastal
IOW_HLC	Sub_Type	Sewage and Water Treatment	Sewage works	Coastal
IOW_HLC	Sub_Type	Valley Floor Woodlands	Valley Floor Woodlands	Coastal
IOW_HLC	Sub_Type	Valley Floor Woodlands	Valley Floor Woodlands	Coastal
IOW_HLC	Sub_Type	Valley Floor Woodlands	Valley Floor Woodlands	Coastal
IOW_HLC	Sub_Type	Valley Floor Woodlands	Valley Floor Woodlands	Coastal
IOW_HLC	Sub_Type	Valley Floor Woodlands	Valley Floor Woodlands	Coastal
IOW_HLC	Sub_Type	Valley Floor Woodlands	Valley Floor Woodlands	Coastal
Designated_Wrecks	SZLABEL	HMS POMONE	Designated Historic Wreck	Seabed surface
Designated_Wrecks	SZLABEL	HMS ASSURANCE	Designated Historic Wreck	Seabed surface
Designated_Wrecks	SZLABEL	SWASH CHANNEL BN	Designated Historic Wreck	Seabed surface
Designated_Wrecks	SZLABEL	HMS INVINCIBLE	Designated Historic Wreck	Seabed surface
Designated_Wrecks	SZLABEL	HMSM A1	Designated Historic Wreck	Seabed surface
Designated_Wrecks	SZLABEL	HMS HAZARDOUS	Designated Historic Wreck	Seabed surface
Designated_Wrecks	SZLABEL	MARY ROSE	Designated Historic Wreck	Seabed surface
Designated_Wrecks	SZLABEL	GRACE DIEU	Designated Historic Wreck	Seabed surface
obs_Buffer_Project	SZFEATURE	WRECKS	Obstructions	Seabed surface
obs_Buffer_Project	SZFEATURE	OBSTRN	Obstructions	Seabed surface
obs_Buffer_Project	SZFEATURE	PILPNT	Obstructions	Seabed surface
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Marinas	Marina	Sea surface
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Military Defence area	Military Defence area	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Military Fort	Military Fort	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Modern Fisheries	Modern Fisheries	Sea surface
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Modern Fisheries	Modern Fisheries	Seabed surface
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Modern Fisheries	Modern Fisheries	Seabed subsurface

Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Mudflats	Mudflats	Seabed surface
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Mudflats	Mudflats	Seabed subsurface
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Ponds	Ponds	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Reclaimed Land	Reclaimed Land	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Reclaimed Land	Reclaimed Land	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Reclaimed Land	Reclaimed Land	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Reservoir	Reservoir	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Saltmarsh area	Saltmarsh area	Seabed surface
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Saltmarsh area	Saltmarsh area	Seabed subsurface
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Saltworks	Saltworks	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Saltworks	Saltworks	Seabed surface
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Sand Dunes	Sand Dunes	Seabed surface
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Sand Dunes	Sand Dunes	Seabed subsurface
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	wetlands	Wetlands	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Wetlands	Wetlands	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Wetlands	Wetlands	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Wetlands	Wetlands	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Wetlands	Wetlands	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Valley floor woodland	Woodlands	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Valley floor woodland	Woodlands	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Valley floor woodland	Woodlands	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Valley floor woodland	Woodlands	Coastal
Hamp_MHLC	Hamp_MHLC.SUB_CHAR	Valley floor woodlands	Woodlands	Coastal
submergedpoint_Buffer	obstype	direct from core	Submerged Landscape	Seabed subsurface
submergedpoint_Buffer	obstype	direct from core	Submerged Landscape	Seabed subsurface
osgbwrckpoints_Clip	SZFEATURE	WRECKS	Wreck	Seabed surface
osgbwrckpoints_Clip	SZFEATURE	Des_WRC	Designated Wreck	Seabed surface
osgbwrckpoints_Clip	SZFEATURE	Dive_si	Dive site	Seabed surface
OBS_ONLY	SZFEATDESC	Obstruction	Obstruction	Seabed surface
PIIPOSTONLY	SZFEATURE	PILPNT	Post	Seabed surface

10.5 Example of a complete Seascapes Top Level Character Area Description, attached to the multi-media product.

Langstone Harbour

Summary Description
Langstone Harbour is the central of the three major harbours of the Eastern Solent. Lying to the east of Portsmouth modern activity is dominated by vessel activity from fishing, military training and pleasure craft. In the inter tidal margins and beneath the current water level the remains of many archaeological sites are preserved, these include prehistoric forest remains and peat deposits, a wealth of stone tools finds, bronze age settlement and burial remains, Roman pottery and salt working evidence, saxon watercraft and fishing related structures and a number of more modern shipwreck sites.

Sea Surface

The Harbour encompasses some 23km^2 and is situated between Portsea and Hayling Islands. Activity on the sea surface is dominated by commercial shipping. The presence of two aggregates wharves: Kendall's Wharf and Bedhampton Wharf, within the harbour, make it a busy commercial area. The entire inlet is designated for use as a military practice area, and consequently features frequent naval vessels and activity. A small local fleet of commercial fishing vessels still operates out of the port, providing local industry. A local ferry crossing connects the mainland to Hayling Island.
The harbour is a popular site for marine recreation activities, most notably sailing, windsurfing, and water-skiing.

Seabed Surface

The entrance to Langstone Harbour has two long curving shingle spits. East Winner, an offshore sand bank at the mouth of Langstone and Chichester Harbours has been dredged for aggregate extraction (Future Coast, 2002). Within the Harbour itself there are very extensive intertidal mudflats and salt marshes, especially surrounding the numerous small islets. The sediments become sandier near the mouth of the inlet. These extensive sandbanks: East Sinah Sands and Sword Bank, Mallard Sands, and East Winner, are considered high risk navigational hazards (hazards report).
The intertidal morphology of the harbour consequently means it contains extensive shellfish resources, primarily oyster beds. Salt extraction for the salt making industry is evident in the presence of numerous salterns. Commercial fishing is represented in the Bass nursery areas. The whole harbour area has been designated as a Site of Specific Scientific Interest (SSSI), Special Protection Area (SPA), and a RAMSAR designated area.
The presence of the strong sea wall structure provides defence against erosion and further inundation, however is contributing to the process of coastal squeeze.
There are at least 23 wreck sites located in the harbour, resulting in high levels of diving activity.

Seabed Subsurface

Dredging?
Two small relict submerged forests have been recorded (Allen and Gardiner, 2000). The Portsmouth-Arundel canal was cut through the northern part of the harbour in 1822, and was later abandoned.

Coastal

The commercial concrete harbour constructions are the most visible features of the coastal zone, and provide facilities for commercial activity. However, large areas of the harbour are un-developed and form important natural habitats, there are four designated nature reserves in the harbour:

- Farlington Marshes
- RSPB
- Kench Local Nature Reserve

West Hayling (Oysterbeds)
Reclaimed land.

Archaeological Potential

The potential of the intertidal and seabed surfaces for the preservation and recovery of archaeological material has long been recognised (Allen and Gardiner, 2000). Langstone Harbour also has the advantage of being less industrialized with fewer naval installations than its neighbouring Portsmouth Harbour.

When describing the archaeological potential of the harbour, the impact of eustatic and sea level change on human activity and use of marine resources, should be considered. Ancient exploitation of seascape resources were similar to modern, with evidence of fishing, shellfish harvesting, birdlife, recovery of salt, and the use of the creeks and channels as anchorages.

Archaeological investigations of the Langstone Harbour area from the 1970s- present (refs) have revealed a rich resource. Specific flintwork areas dating from the Palaeolithic to the Late Bronze-Age have been recorded. The archaeological data implies the area had been dryland until at least the middle Bronze-Age. The two relict submerged forests identified revealed radiocarbon dates of ca. 3350-2910 cal BC (Allen and Gardiner, 2000).

The principle activities noted around the shallow harbour during the Iron Age and Roman periods were salt production, brick making, oyster farming, and fishing. A Roman road to the north of Langstone featured sporadic villas but no major waterfront development has yet been identified. It was a site of a Roman crossing point to Hayling Island, the remains of this causeway can be seen.

Some of the most notable archaeological features of the harbour include: the Long Island Anglo-Saxon logboat, the impressive Sinah Circle stake structure, thought to have been an Oyster farm installation, and a Bronze-Age causeway, recently excavated at the northern point of harbour.

References

Defra, 2002. Futurecoast: Shoreline Behaviour Study. Unpublished CD Rom. Halcrow Group Ltd.

Allen, M.J. and Julie Gardiner, 2000. *Our Changing Coast: A survey of the intertidal archaeology of Langstone Harbour, Hampshire*. York: CBA research report:124.

Tweed, R *'A History of Langstone Harbour and Its Environs in the County of Hampshire'*

Links

Shoreline Behaviour Study - http://www.defra.gov.uk/environ/fcd/futurecoast.htm.

Solent Forum - http://www.solentforum.hants.org.uk/forum/intro.html:

Sediment Transportation database - http://www.scopac.org.uk/

Hampshire and Wight Trust for Maritime Archaeology - http://www.hwtma.org.uk/

Langstone Sailing Club - http://www.langstonesc.org.uk/

Langstone Harbour Board - http://www.langstoneharbour.org.uk/

RSPB Langstone Harbour Nature Reserve - http://www.rspb.org.uk/reserves/guide/l/langstoneharbour/index.asp

Portsmouth and Langstone Sailing Association - http://www.plsa.org.uk/cgi/page.pl?page=index

Tudor Sailing Club - http://www.tudorsailing.org.uk/Homepage/Home.htm

HWTMA Photo Number	LLB03 – B22
Character Area	Langstone Harbour
Description	Langstone Harbour Inter-tidal environment where logboat was discovered.
Photographer:	Julie Satchell
Date Photographed:	September 2003

IoE number:	135395
Character Area:	Langstone Harbour & Ap-proaches
Description:	Langstone – Watermill & wind-mill
Photographer:	Mr Glyn Edmunds EFIAP,AMPA,ARPS
Date Photographed:	25 October 1999
Date listed:	21 July 1975
Date of last amendment:	06 February 1984
Grade	II

HWTMA Photo Number	LML – B20
Character Area	Langstone Harbour
Description	Langstone Harbour - Milton Lock remains in foreground
Photographer:	Julie Satchell
Date Photographed:	2002