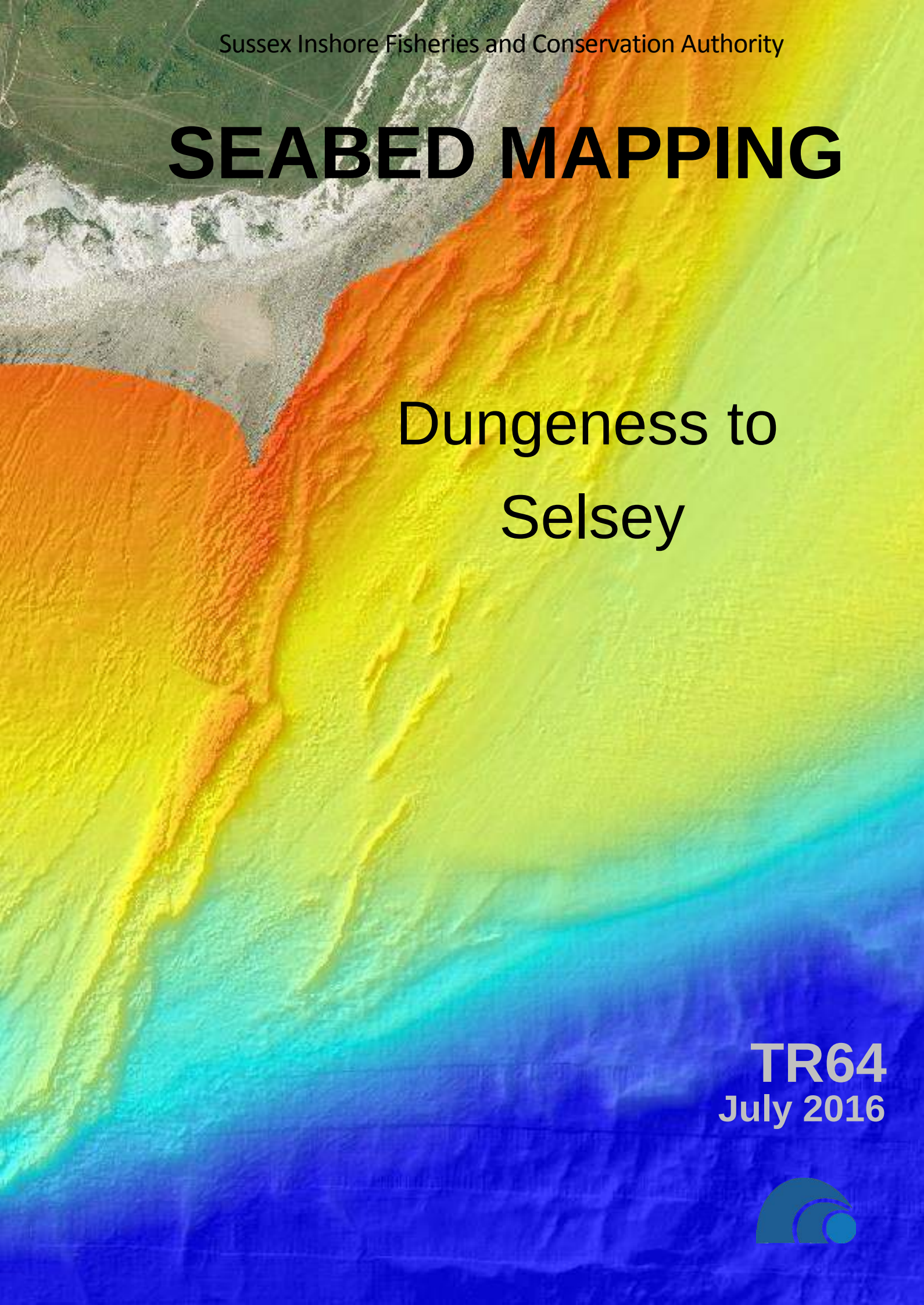
Sussex Inshore Fisheries and Conservation Authority

SEABED MAPPING

Dungeness to Selsey



TR64
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Reviewer	**Date**	**Comment**	**Version**
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Andrew Colenutt	29/07/2016	Second Version	V2

Contents

Introduction

Technological improvements in bathymetric survey equipment and the widespread introduction of multibeam echosounder systems (MBES) within the offshore survey industry have meant that it is now increasingly cost-effective to achieve 100% sea floor coverage. Although the primary purpose is generally to survey the bathymetry of the seabed, interpretation of acoustic backscatter information and groundtruthing data collected during the survey, in combination with the bathymetry, can be used to produce detailed indicative maps of other features, such as marine habitats, substrate type and anthropogenic features.

A swath bathymetry survey of the nearshore zone between Dungeness and Newhaven (Figure 1), was commissioned by the Southeast Regional Coastal Monitoring Programme, and managed by the Channel Coastal Observatory (CCO) and completed in 2013. This survey delivered 100% seafloor coverage to IHO Order 1a, along with backscatter and ground truthing sediment samples, and covered 87km^2 extending 1km offshore of the Mean Low Water contour, along this length of coast. A swath bathymetry survey of the nearshore zone between Selsey and Hove, covering 64km^2, was undertaken during 2011 (Figure 2). Unfortunately no sediment sample groundtruthing was undertaken as part of this survey and the bathymetry data was not fully processed to meet the required specification so elevations to a defined datum were not achievable; however, the positional accuracy was sufficient to enable plan shape interpretation of features. The backscatter data was available to inform interpretation of substrate and seafloor texture.

The Maritime and Coastguard Agency commissioned four Civil Hydrography Programme swath bathymetry surveys between Dungeness and Shoreham (Figure 3), which were completed in 2015. These surveys covered extensive areas offshore between 2mCD contour and 14-22km offshore; and abutted the 1km zone covered by the CCO 2013 survey. HI1477 Beachy Head to Newhaven, covering 378km^2, and HI1478 Newhaven to Shoreham, covering 383km^2. (The other two surveys are HI 1476 Hastings to Beachy Head, covering 229 km^2 and HI 1475 Dungeness to Hastings, covering 441km^2). All data collected through the National Network of Regional Coastal Monitoring Programmes and the Maritime and Coastguard Agency's Civil Hydrography Programme are collected to meet the CHP Specification, fully validated, supported with metadata, and freely available under Open Government Licence.

The notable differences in the final available datasets and the influence this has on the interpretation and derived habitat and substrate maps from these three surveys are reflected in the different confidence scores (see Annex 1).

The Sussex Inshore and Fisheries Conservation Authorities (IFCA) commissioned the CCO, to interpret the available bathymetry, backscatter and groundtruthing data to inform a range of marine conservation, planning policy and management objectives. Sussex IFCA received funding from the Environment Agency for the seabed mapping interpretation as part of their 'Sussex Coastal Habitats Inshore Pilot' (SCHIP1) project. South Downs National Park Authority also contributed funding to undertake this project element.

This report describes the methodology and interpretation of the bathymetry, backscatter and groundtruthing data to produce a series of detailed thematic maps, including surficial substrate, EUNIS marine habitats and anthropogenic features, which may be used to inform a range of coastal management, marine conservation, and planning policy objectives.

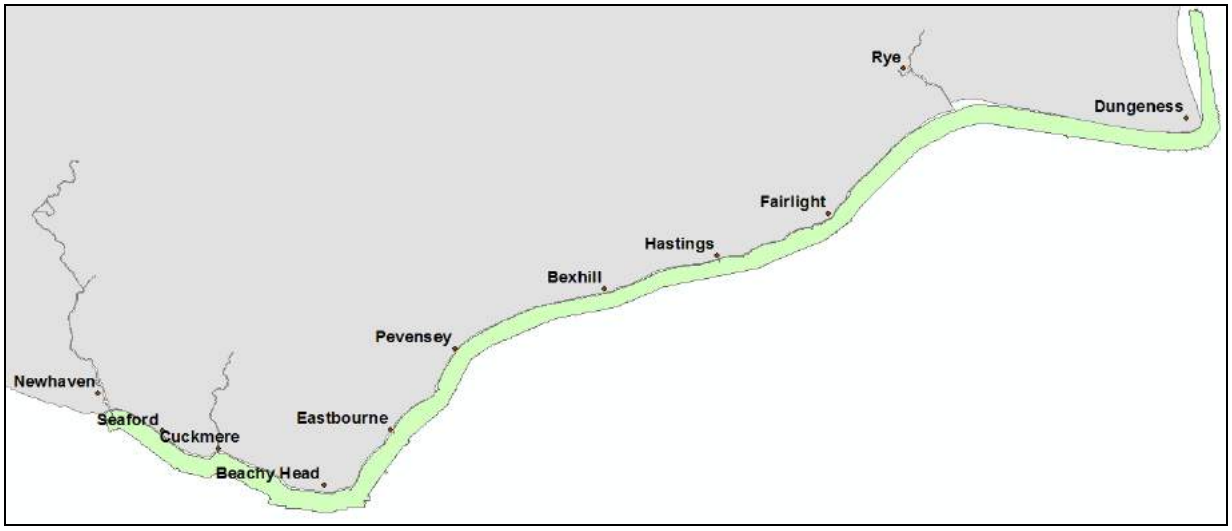


Figure 1: Survey coverage Dungeness to Newhaven (CCO survey, 2013)

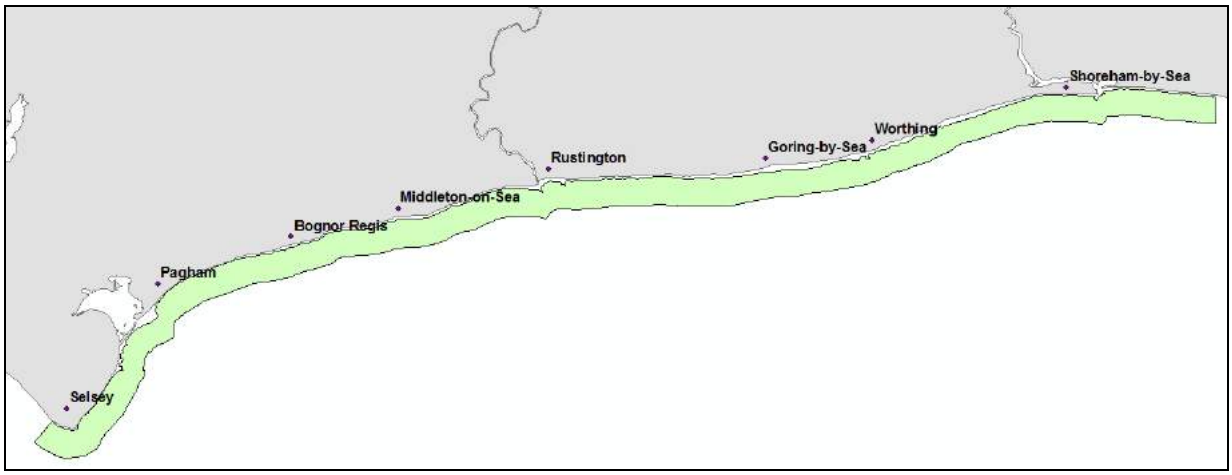


Figure 2: Survey coverage Hove to Selsey (CCO survey, 2011)

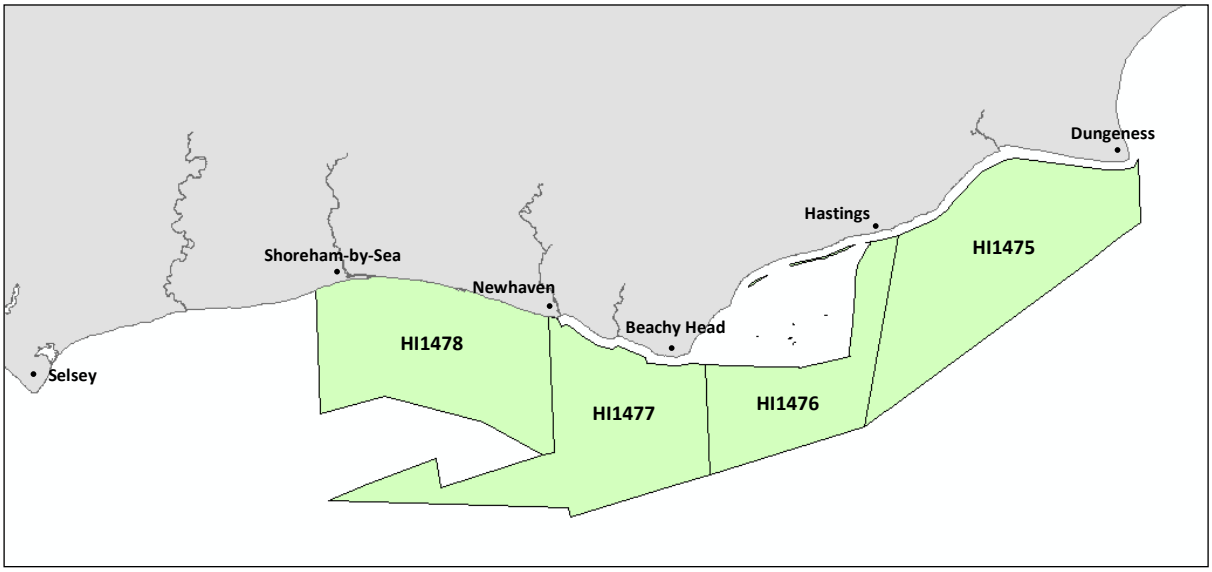


Figure 3: Survey coverage Dungeness to Shoreham-by-Sea (MCA, 2015)

Marine Habitat Classification Scheme

Marine habitats were mapped using the European Nature Information System (EUNIS) habitat types classification, as modified by the Joint Nature Conservation Committee (JNCC, see http://jncc.defra.gov.uk/pdf/04_05_introduction.pdf). EUNIS is a hierarchical classification ranging from basic descriptions (high level classifications) such as littoral rock through to very detailed descriptions (low level classifications). Up to 6 levels are defined but Levels 4-6 involve the biology and accordingly the MBES survey can be used to map to Level 3 only; nevertheless, the results of Level 3 and substrate mapping can be used by other agencies who might wish to map to a more detailed level.

Level 1 Environment (marine)

A single category is defined within EUNIS to distinguish the marine environment from terrestrial and freshwater habitats.

Level 2 Broad habitats

These are extremely broad divisions of national and international application for which EC Habitats Directive Annex I habitats (*e.g.* reefs, mudflats and sandflats not covered by seawater at low tide) are the approximate equivalent. At EUNIS Level 2, there are eight broad marine habitats classifications (Table 1).

Typical UK boundary depths	Rock	Rock and thin Sediment	Sediment
MLWS	*Littoral Rock*	*Littoral Rock and thin Sediment*	*Littoral Sediment*
	Infralittoral Rock	*Infralittoral Rock and thin Sediment*	*Sublittoral Sediment*
20m OD	*Circalittoral Rock*	*Circalittoral Rock and thin Sediment*	

Table 1: EUNIS Level 2 marine habitat classifications

Level 3 Main habitats

These serve to provide very broad divisions of national and international application which reflect major differences in biological character. They are equivalent to the intertidal Sites of Special Scientific Interest (SSSI) selection units (for designation of shores in the UK) (JNCC, 1996) and can be used as national mapping units. At EUNIS Level 3 (Table 2), the broad habitat types from EUNIS Level 2 are sub-divided further based on sediment type, wave exposure and tidal current strength.

Rock			Rock and thin Sediment			Sediment			
High energy littoral rock	*Moderate energy littoral rock*	*Low energy littoral rock*	*High energy littoral rock and thin Sediment*	*Moderate energy littoral rock and thin Sediment*	*Low energy littoral rock and thin Sediment*	*Littoral mud*	*Littoral sand*	*Littoral mixed sediment*	*Littoral coarse sediment*
High energy infralittoral rock	*Moderate energy infralittoral rock*	*Low energy infralittoral rock*	*High energy infralittoral rock and thin Sediment*	*Moderate energy infralittoral rock and thin Sediment*	*Low energy infralittoral rock and thin Sediment*	*Sublittoral mud*	*Sublittoral sand*	*Sublittoral mixed sediment*	*Sublittoral coarse sediment*
High energy circalittoral rock	*Moderate energy circalittoral rock*	*Low energy circalittoral rock*	*High energy circalittoral rock and thin Sediment*	*Moderate energy circalittoral rock and thin Sediment*	*Low energy circalittoral rock and thin Sediment*				

Table 2: EUNIS Level 3 marine habitat classifications

In the classifications, 'Rock' refers collectively to bedrock, stable and artificial substrata (concrete, wood, metal). Cobbles and pebbles with gravel and coarse sand are collectively referred to as 'Coarse Sediment'. 'Mixed Sediment' consists of mixtures of gravel, sand and mud which may contain stones and shells.

The littoral zone lies landward of Mean Low Water Springs (MLWS) with the sublittoral zone seaward of MLWS. For areas of 'Rock" or 'Rock and thin Sediment', the sublittoral zone is split into the infralittoral zone and the circalittoral zone based upon site-specific biological parameters. 'Rock and thin Sediment' is applied to areas with some thickness of surficial sediment through which the underlying bedrock geology is discernible in the bathymetry.

Habitat Mapping Methodology

Bathymetry, backscatter and groundtruthing data were used (Figure 4) to provide information for the production of maps displaying anthropogenic features (*e.g.* cables and pipelines, wrecks, trawl marks and sea defence structures), substrate type and EUNIS Level 2 and Level 3 seabed habitat maps.

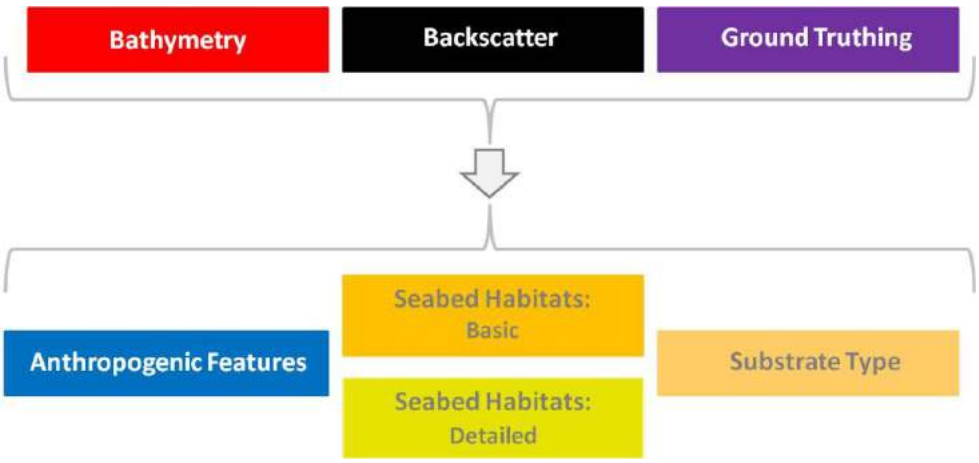


Figure 4: Seabed mapping stages

Bathymetry

The IHO Order 1a standard swath bathymetry surveys commissioned by the Southeast Regional Coastal Monitoring Programme and the Maritime & Coastguard Agency (MCA), were collected in accordance with the MCA Civil Hydrography Programme Survey Specification August 2013. The survey commenced on 20 June 2013 and was completed on 24 August 2013. Bathymetric data were acquired using a hull-mounted Kongsberg EM3002D Multibeam Echo-Sounder (MBES) for the CCO 2013 survey and a hull-mounted Konsberg Simrad EM2040D MBES for the MCA 2015 surveys. The UKHO undertook quality-control of the data and converted the processed, quality-controlled data set from WGS84/Chart Datum to OSGB/Ordnance Datum, at 1m resolution.

The bathymetry data was loaded into IVS Fledermaus version 7.3 in order to export the files as one single layer for subsequent use in ArcGIS v10.2. Figure 5 illustrates the high resolution of the bathymetry and, superimposed on aerial photography, also demonstrates the required overlap with land-based survey data thus avoiding the well-known "white ribbon" strip of seabed close to the shore where data seldom is captured. Depths in a number of the figures are colour-coded with orange colours indicating shallow depths and dark blue the deepest areas.

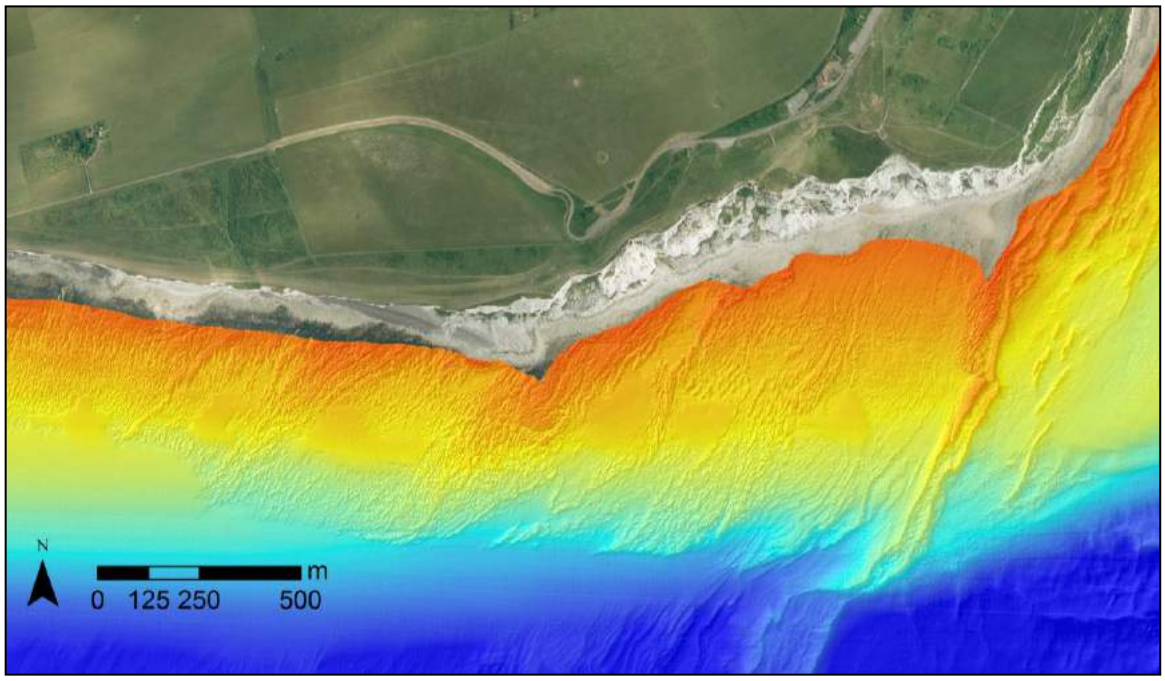


Figure 5: Bathymetry (and hillshade), Beachy Head

Hillshade

Within ARCGIS v10.2, a hillshade layer was derived which is a form of artificial sun-illumination which helps to enhance depth changes and features in the bathymetry dataset. This layer is particularly useful for displaying and enhancing areas of bedforms and seabed of variable texture where there are numerous depth changes across relatively short distances (Figure 6).

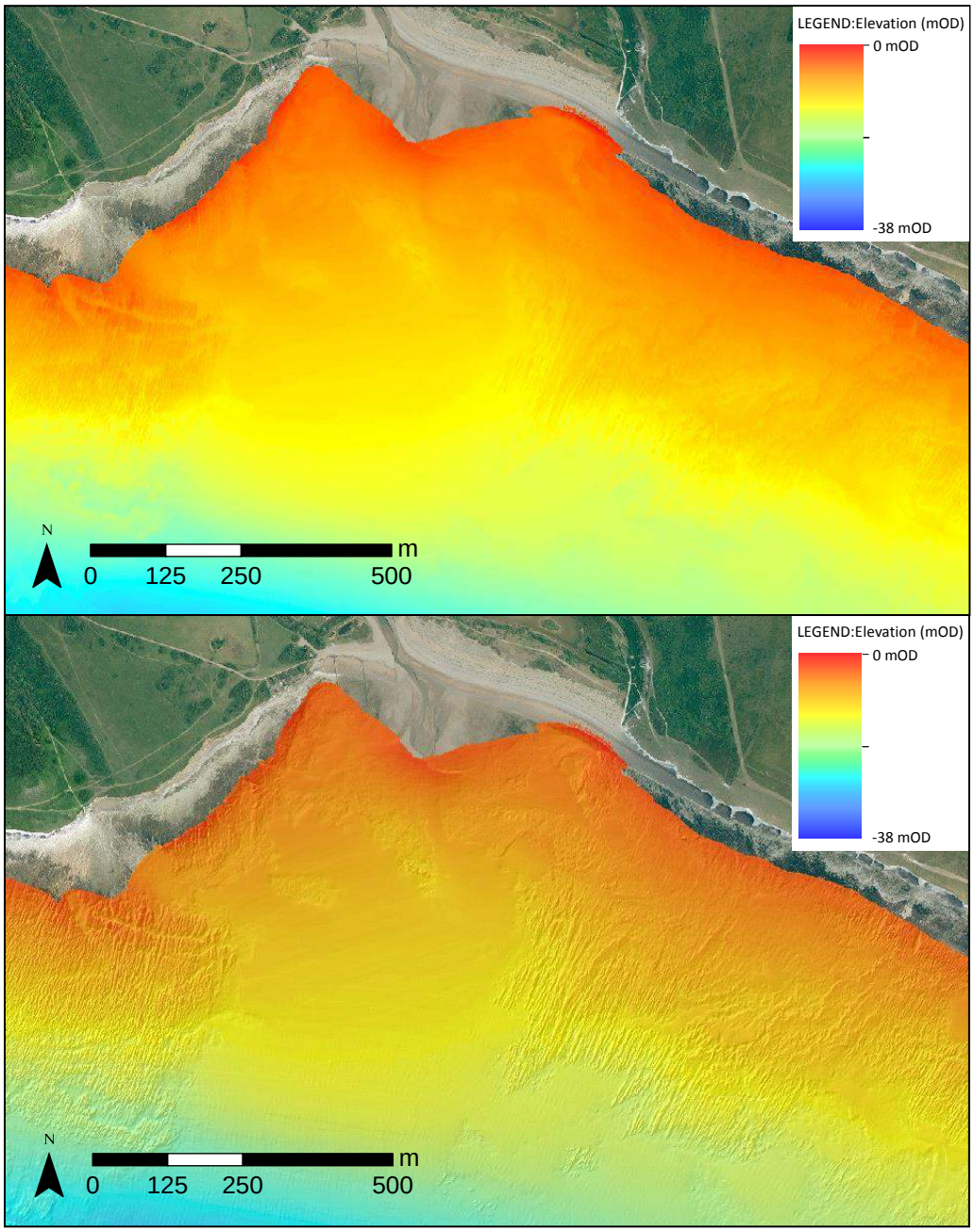


Figure 6: Bathymetry (top); bathymetry plus hillshade (bottom), Cuckmere Haven

Seabed Slope

The seabed slope map distinguishes those areas of the seabed that have a steep gradient or sharp changes in slope from those areas which are relatively flat; this aids the identification of bedrock and geological features, sedimentary bedforms and anthropogenic features (*e.g.* pipelines and channels). The seabed slope is derived within ARCGIS by calculating the slope angle of the seabed by using a central cell and comparing its value to those around it. An extensive rock platform and geological features are clearly shown in Figure 7. The colour scheme used is a classified symbology dividing the slope angles into 9 categories. Green indicates relatively flat or low angle topography, with increasing slope represented by gradation from yellow to orange, and red indicating steepest slope angles.

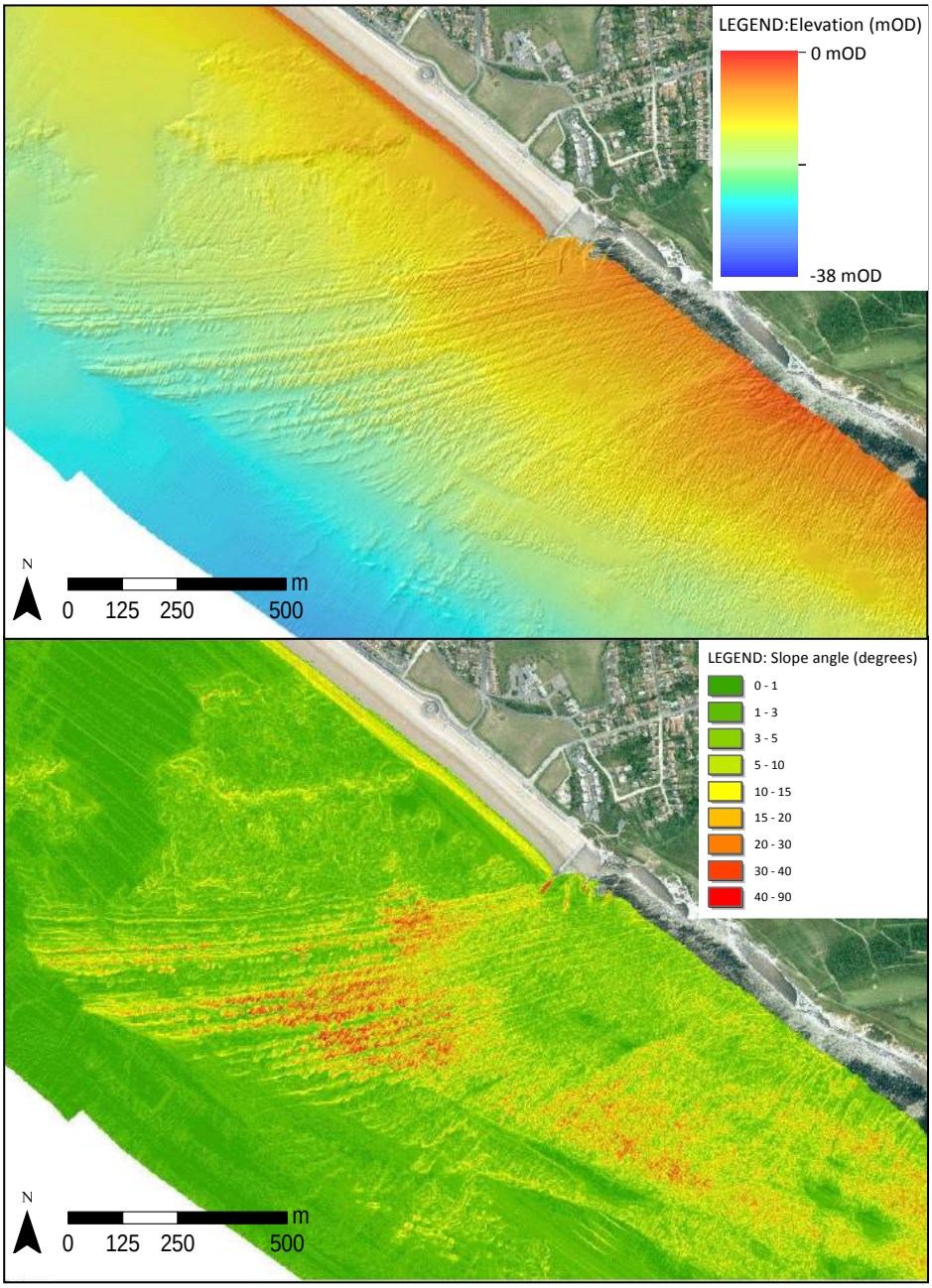


Figure 7: Bathymetry (top); Seabed slope (bottom), Seaford

Backscatter

The intensity of the return acoustic signal, termed “backscatter”, indicates the nature and relative composition of the seabed, which can provide information on the roughness and texture of the seabed substrate, and variability and changes in sediment type (Figure 8). Backscatter files were delivered by the survey contractor in a post-processed file format with the mosaiced TIFF images combined in ARCGIS to produce a single map.

Figure 8: Backscatter, Seaford

Many factors can influence backscatter intensity, for example changes in seabed slope or adjustments to survey vessel equipment configurations. It is not simply the case that a given backscatter intensity represents a defined sediment type. The backscatter data layer does not provide information as to what types of sediment the boundaries are showing – for example gravel to sand or sand to mud. To define this substrate type or marine habitat, combined analysis of bathymetry, backscatter and groundtruthing information is required. Backscatter therefore, requires expert analysis and must be viewed in combination with bathymetry and groundtruthing information to give confidence in the resulting substrate and marine habitat maps.

The importance of backscatter for substrate classification and habitat mapping can be seen by the changes in the intensity (grey scale) of the backscatter that are not visible in the bathymetry, as exemplified in Figure 9. Since the backscatter boundaries are observed across numerous survey track lines, it can be concluded that these denote a real change in seabed texture; for example, either constrained pockets of sediment within an area of exposed or outcropping bedrock, or of a different grain-size to the surrounding substrate.

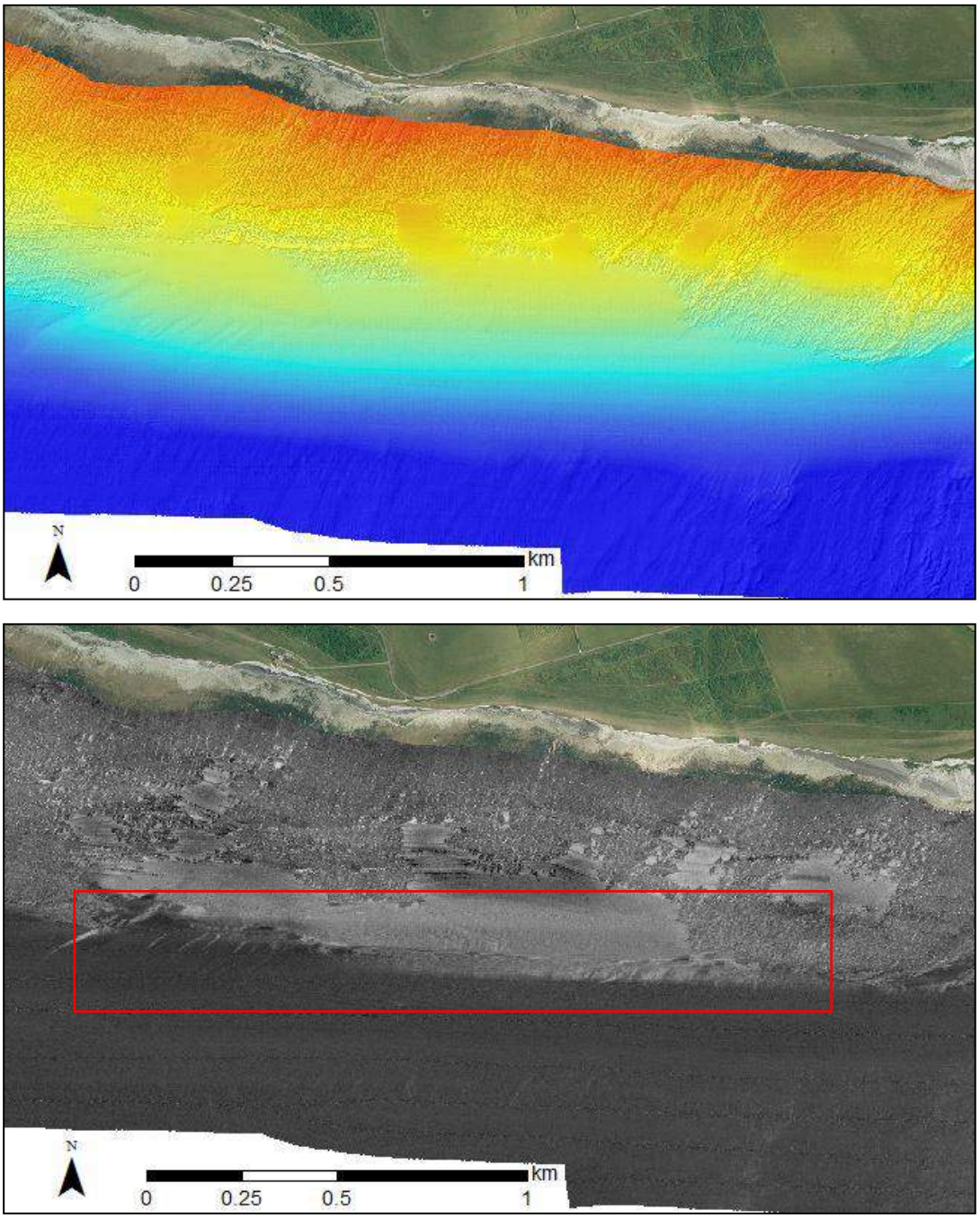
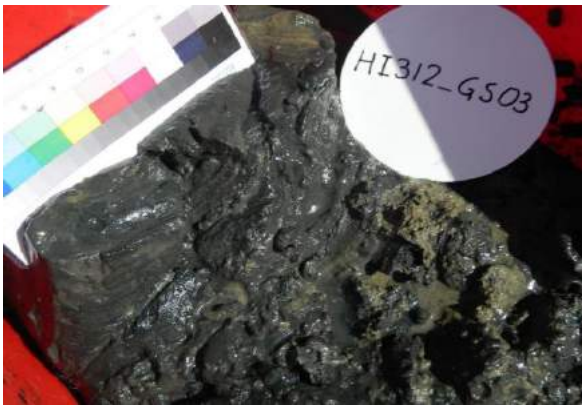


Figure 9: Bathymetry (top) and backscatter (bottom), Beachy Head

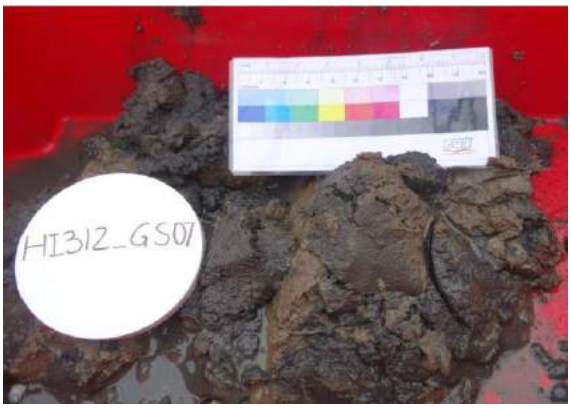
Groundtruthing

Groundtruthing data is a key requirement to enable the production of detailed substrate, marine habitat and biotope-type maps. A wide range of information can be useful, such as sediment samples, photographs and videos of seabed and features, topographic beach survey data for inter-tidal areas, nearshore marine geology maps (solid and drift) and visual dive records and observations.

Sediment samples were collected during the MCA surveys, but sample stations were offshore and not within the area to be mapped (i.e. 1km from the shoreline). 19 sediment samples were taken during the Dungeness to Newhaven survey, as per the MCA Civil Hydrography Programme Specification. Figure 10 shows some examples of the sediment types identified in the survey area.



Mud



Sandy Mud

Mixed Sediment

Coarse Sediment

Figure 10: Sediment variation in the nearshore zone: Mud, Sandy Mud, Mixed Sediment and Coarse Sediment

An assessment of sediment volume recovered from each sample also provided an indication of the thickness of sediment. This aided interpretation in areas of seabed where the surface expression of the underlying geology was spatially variable. Further substrate information was kindly provided by Sussex IFCA, Sussex Wildlife Trust, JNCC marine recorder and Sussex Seasearch.

Hydrodynamic Data

To inform the interpretation of the marine habitats within the area of interest information from the Southeast Regional Coastal Monitoring Programme's network of waverider buoys, in particular a Datawell Waverider MKIII buoy, located in Pevensey Bay, Rye Bay (Decommissioned April 2013), Seaford and 8km offshore of Littlehampton were used to assess the hydrodynamic conditions. Tidal currents were estimated from UKHO Admiralty Chart tidal diamonds. These data were collectively assessed against national indicative criteria to determine the typical hydrodynamic energy conditions within the study area.

Marine Habitat Boundaries

The littoral to sublittoral boundary was created by producing an interpreted Mean Low Water Springs (MLWS) contour through the bathymetry (values ranged across the area of interest -3.2mOD Dungeness; -3.1mOD Hastings; -2.95mOD Eastbourne; -2.72mOD Newhaven; -

3.4mOD Brighton; -3.2mOD Worthing; -3.1 Bognor Regis; -2.9mOD Selsey). The infralittoral to circalittoral boundary was taken as -20mOD and created by producing a contour in ArcGIS v10.2 using the bathymetry data.

Substrate Map

A substrate map was derived by removing the depth boundaries and the 'Rock and thin Sediment' category. Where the seabed was categorised as 'Rock and thin Sediment' it was re-classified to reflect the surficial sediment type of the thin veneer of sediment overlying the rock. The example shown in Figure 11 indicates areas of bedrock and variations in broad sediment types.

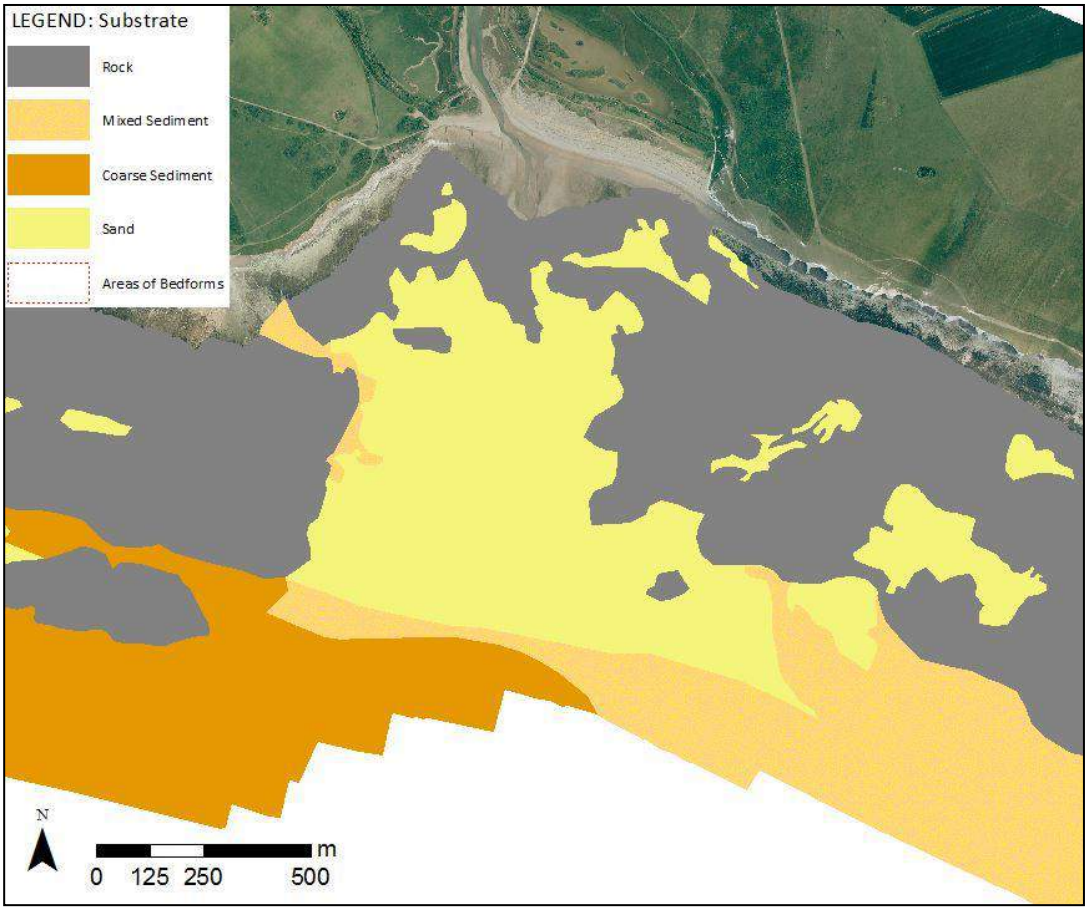


Figure 11: Substrate mapping, Cuckmere

Anthropogenic Features

Anthropogenic features were identified in the bathymetry, including a submerged surface or armoured pipeline, submerged outfalls and a number of wrecks (Figure 12). The outfalls illustrated in Figure 12 are associated with the power station on the shoreline, the western outfall is for waste water, know to anglers as 'the boil', and is armoured to stop the culverts silting up and the eastern is a cooling water intake.

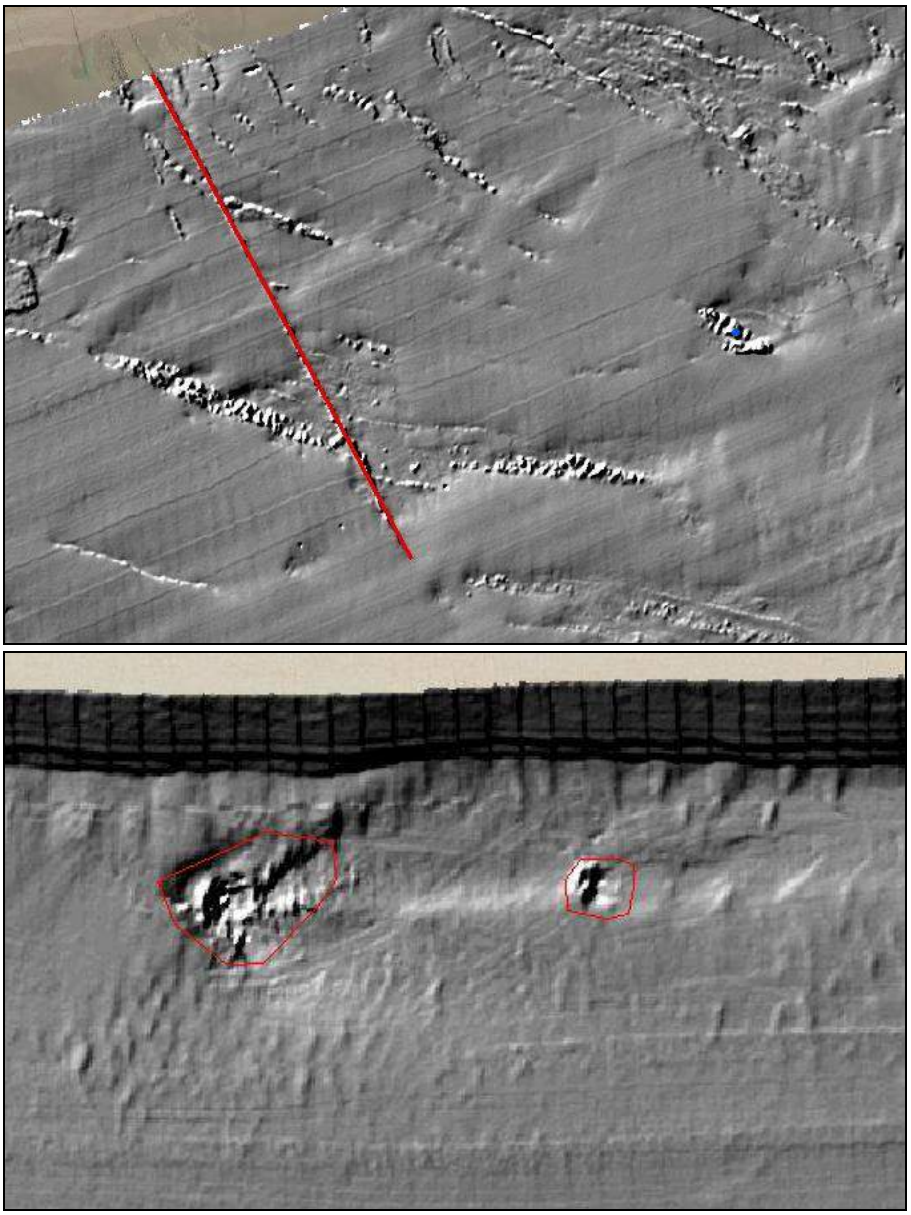


Figure 3: Anthropogenic features – pipeline (top), Bexhill and outfalls (bottom), Dungeness

A total of 38 wrecks have been identified in the Dungeness to Newhaven survey area, of which 24 were unidentified before this bathymetric survey. A further 20 wrecks within the survey area were listed by the UKHO, which were not observed in the data (i.e. wreck features have since been buried by sediment, or deteriorated to a state that they are no longer discernible or detectable at the surface or through water column analysis).

Confidence

The MESH confidence assessment tool was used to determine confidence levels in the acquired remote sensing data, groundtruthing data and the interpreted mapping and data products, so that end-users can determine their adequacy for decision-making (see http://www.searchmesh.net/Default.aspx?page=1635).

Bathymetric data collected in accordance with and achieving compliance with the MCA Civil Hydrography Programme Specification generally produces a high confidence level due to the 100% seafloor coverage and vertical and horizontal positional accuracies. The Confidence Assessment for the marine habitat mapping produced for the Southeast Regional Coastal Monitoring Programme's 2013 Dungeness to Newhaven survey, and for the MCA's 2015 HI1477 Beachy Head to Newhaven and HI1478 Newhaven to Shoreham surveys, were 86, indicating a high level of confidence in the remote sensing data acquisition, groundtruthing available and interpretation of the various datasets to generate the series of maps and datasets. Due to the issue with bathymetry elevations, and lack of synchronous sediment sampling groundtruthing for the 2011 Hove to Selsey the Confidence Assessment for the marine habitat mapping is slightly lower at 63. The full results of the confidence assessment can be found in Annex 1.

Seabed Mapping Results

All swath bathymetry data collected through the Southeast Regional Coastal Monitoring Programme are freely available, under Open Government Licence from www.channelcoast.org either as text, ascii or SD (Fledermaus) files. The EUNIS Level 3 Marine Habitat map and Substrate Type map are also available for viewing and download as shapefiles. Summary maps of:

- Bathymetry
- Backscatter
- Seabed slope
- Anthropogenic features
- EUNIS level 3 marine habitat
- Substrate

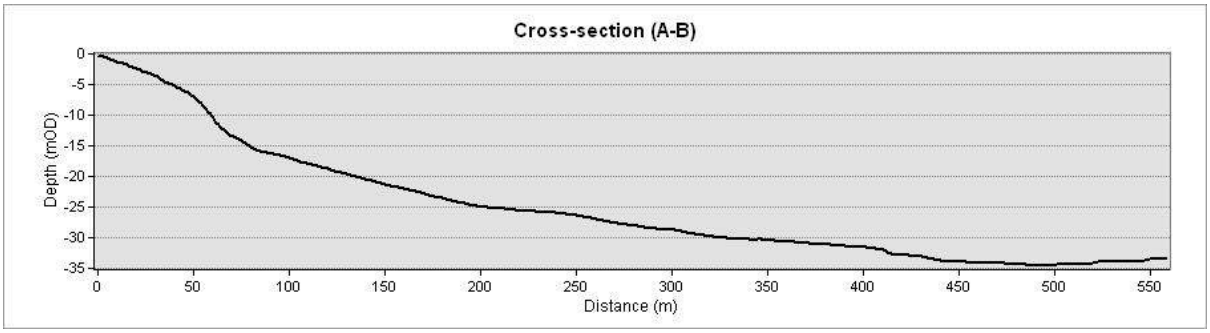
have been prepared for the following sections of coastline:

- Dungeness
- Rye Harbour
- Fairlight
- Hastings
- Bexhill
- Pevensey to Eastbourne
- Beachy Head
- Cuckmere Haven
- Seaford to Newhaven
- Peacehaven
- Brighton
- Shoreham-by-Sea
- Worthing
- Goring-by-Sea
- Littlehampton
- Bognor Regis
- Pagham to Selsey

An overview of the bathymetric features observed is provided for each geographic area, although for the Hove to Selsey frontage, due to issues with bathymetric datum elevations from the 2011 survey, the bathymetry, hilllshade and slope maps have not been presented. The surveyed area was found to contain a wide range of substrate and habitat types.

Dungeness

The seabed to the north and west of Dungeness Point is shallow and gently sloping, dominated by featureless sand; directly south of the headland in stark contrast the bathymetry descends from -5m to -25mOD over a distance of 150m, where it then remains at a relatively constant depth of -35mOD from 350m offshore (Cross-section A-B).

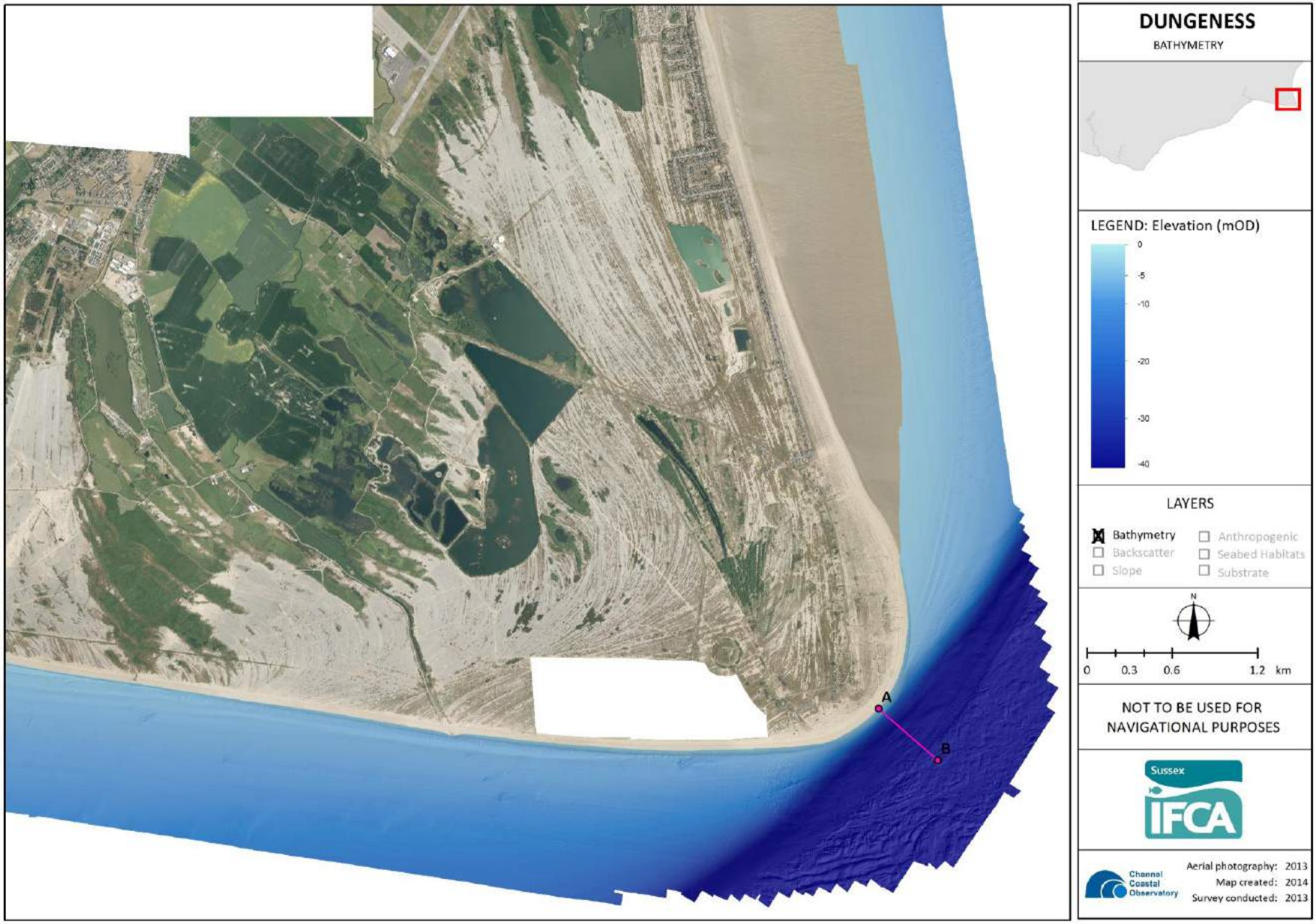


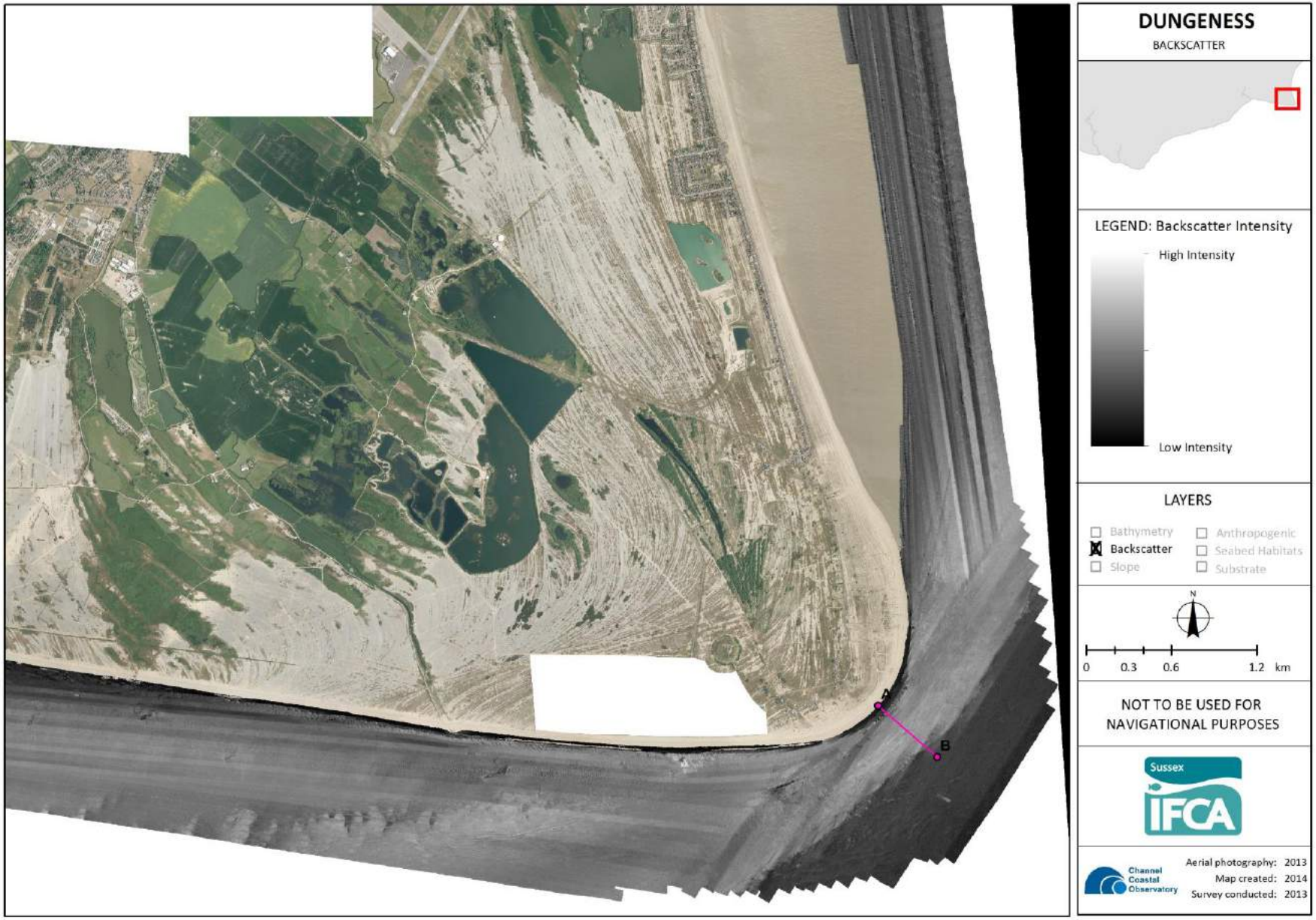
There is evidence of scouring from tidal currents along the northeast-southwest oriented break in slope and the seabed has been classified as exposed rock further seaward.

The bedforms identified to the northeast of Dungeness Point are possibly caused by waves breaking in the extensive littoral area. Due to the depth at which these bedforms are present it is likely that they indicate mobile sediment, rather than moribund features. A narrow strip of bedforms are apparent at the base of the steep bank off Dungeness Point and at the northern end of the western bank, possibly associated with slope instability or sediment mobility.

A number of wrecks have identified to the west of Dungeness. Three outfalls were also discerned, two 100m offshore at a depth of -8mOD and one 250m offshore at a depth of -13mOD. It is assumed all three outfalls are associated with the powerplant at Dungeness and the outfalls are water intakes and waste water culverts.

Directly south of Dungeness Point is one of only two circalittoral regions in the surveyed and mapped area (the other being south of Beachy Head), and is the deepest area of the surveyed area with a maximum depth of -36mOD. The circalittoral rock south of Dungeness is classed as low energy. Tidal diamonds suggest that the currents off Dungeness, both offshore and inshore, are stronger than the average for this stretch of coastline, although reaching a moderate energy level only during the peak flow on spring tides. Coupled with a relatively sheltered wave climate, this results in this area being classified as low energy. The remainder of the area is either sublittoral or littoral sand.


DUNGENESS
BATHYMETRY
LEGEND: Elevation (mOD)
0
-5
-10
-20
-30
-40
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.3 0.6 1.2 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
A
B


A
B
DUNGENESS
BACKSCATTER
LEGEND: Backscatter Intensity
High Intensity
Low Intensity
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
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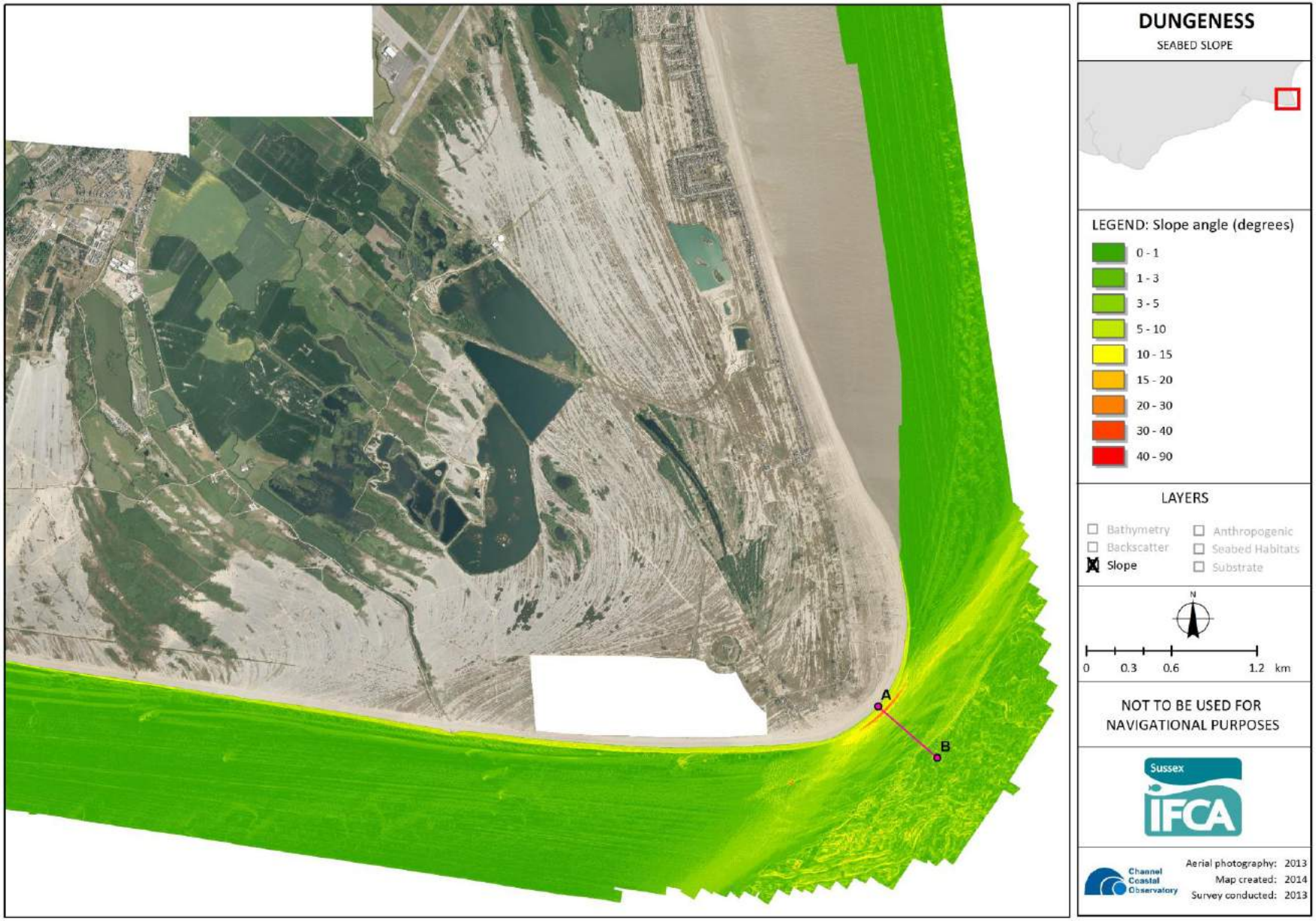
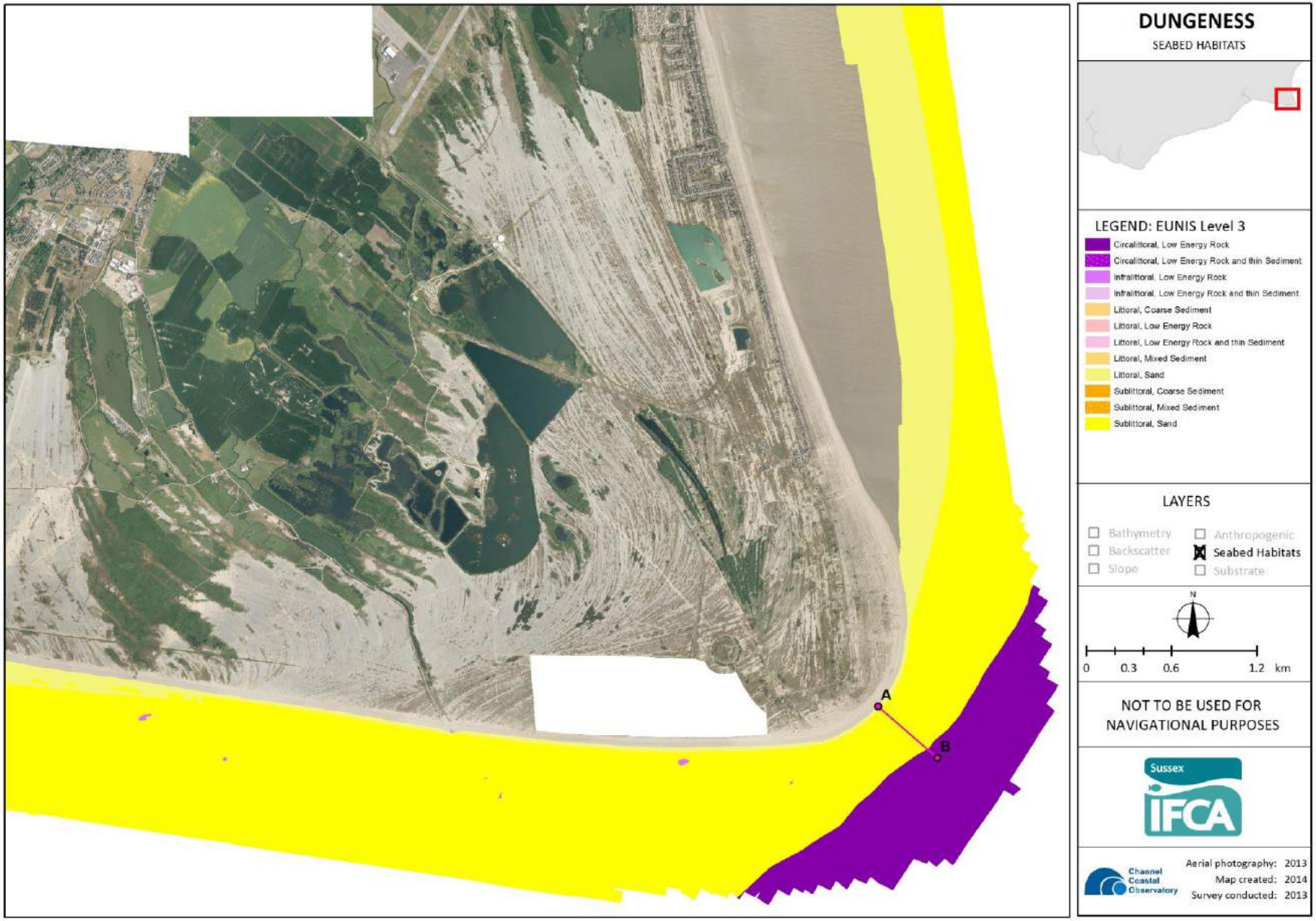
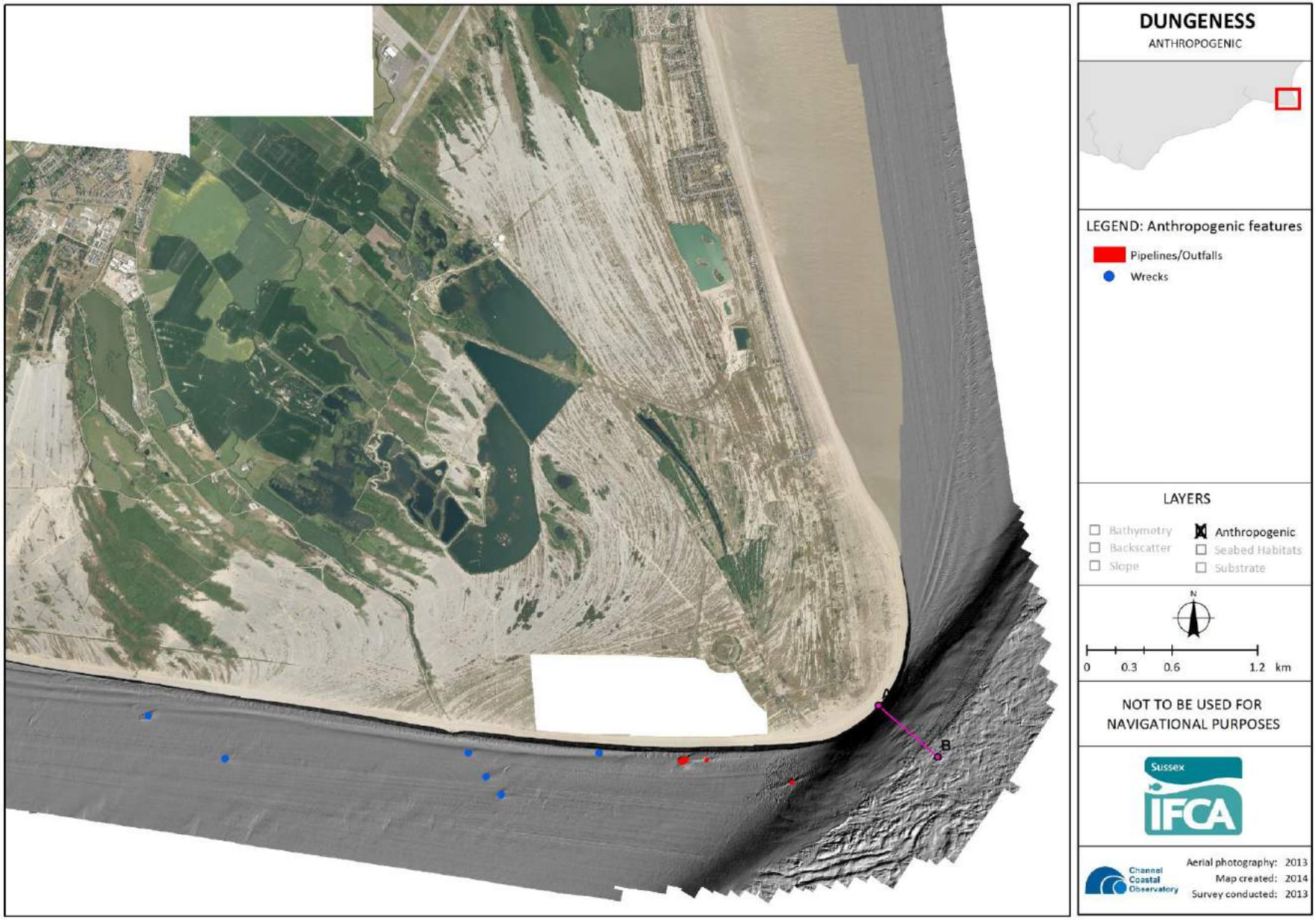
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


DUNGENESS
SEABED SLOPE
LEGEND: Slope angle (degrees)
0 - 1
1 - 3
3 - 5
5 - 10
10 - 15
15 - 20
20 - 30
30 - 40
40 - 90
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.3 0.6 1.2 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
A
B


DUNGENESS
SEABED HABITATS
LEGEND: EUNIS Level 3
Circalittoral, Low Energy Rock
Circalittoral, Low Energy Rock and thin Sediment
Infralittoral, Low Energy Rock
Infralittoral, Low Energy Rock and thin Sediment
Littoral, Coarse Sediment
Littoral, Low Energy Rock
Littoral, Low Energy Rock and thin Sediment
Littoral, Mixed Sediment
Littoral, Sand
Sublittoral, Coarse Sediment
Sublittoral, Mixed Sediment
Sublittoral, Sand
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.3 0.6 1.2 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
A
B


DUNGENESS
SUBSTRATE
LEGEND: Substrate
Rock
Mixed Sediment
Coarse Sediment
Sand
Areas of Bedforms
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.3 0.6 1.2 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
A
B

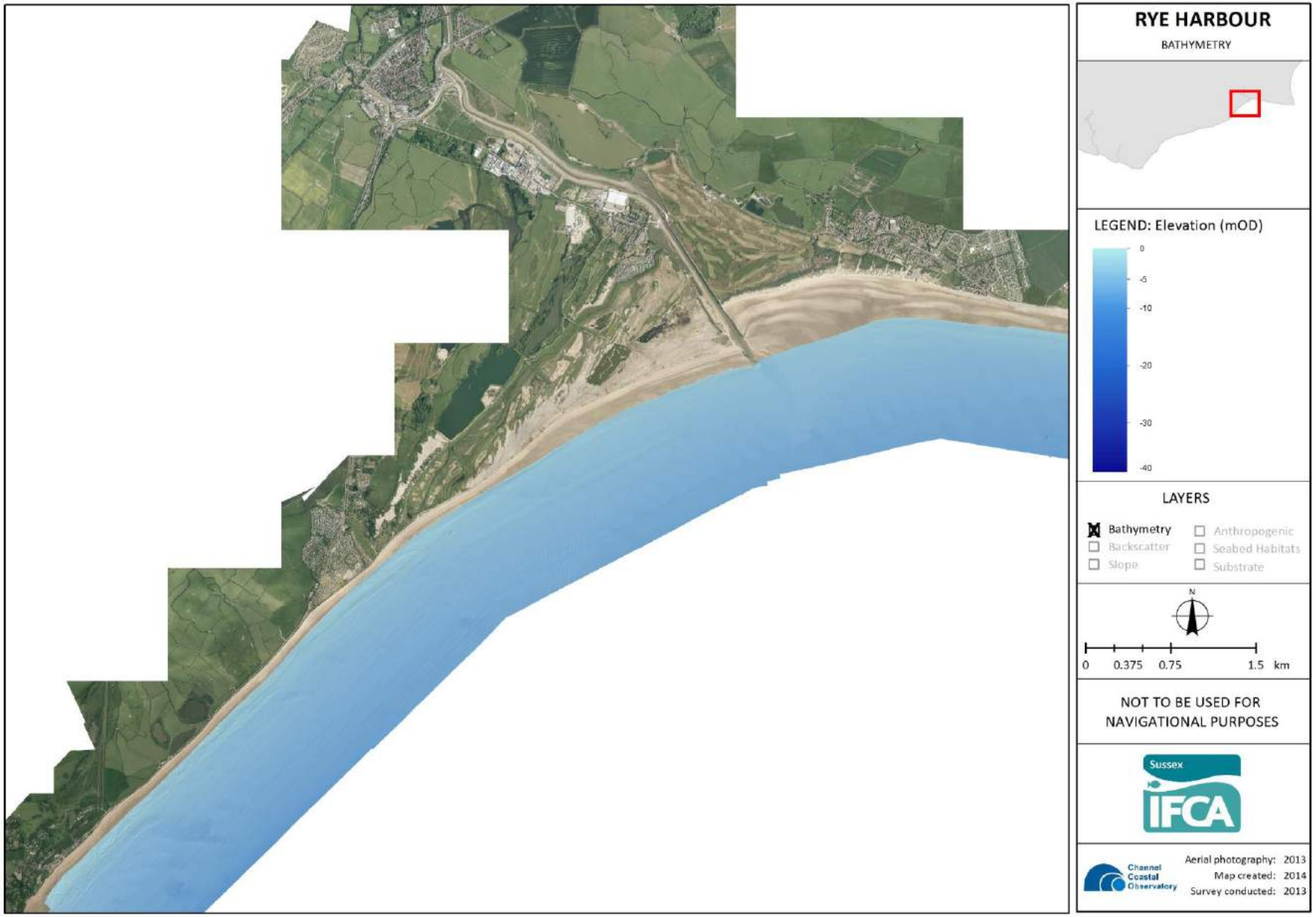

DUNGENESS
ANTHROPOGENIC
LEGEND: Anthropogenic features
Pipelines/Outfalls
Wrecks
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.3 0.6 1.2 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
A
B

Rye Harbour

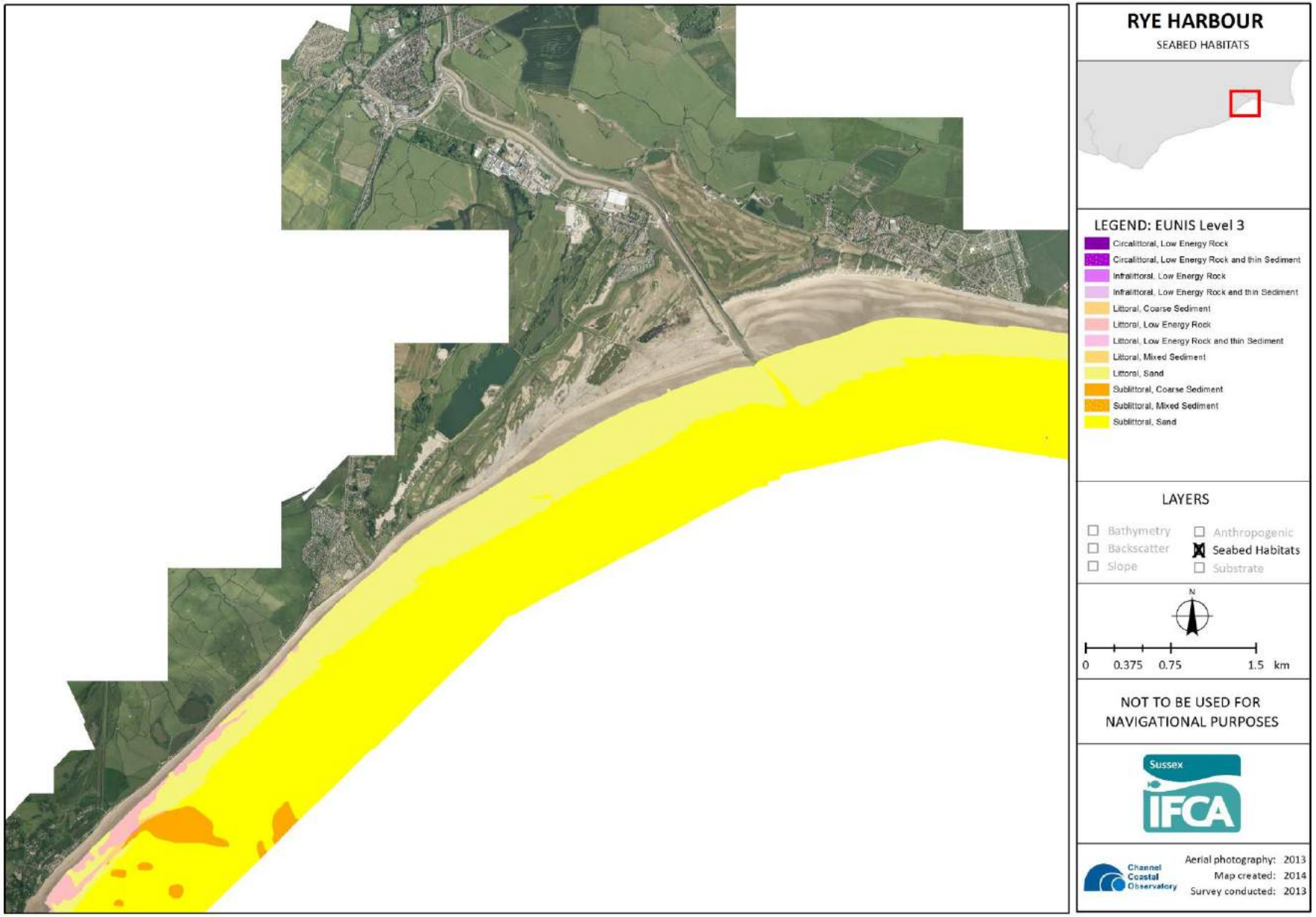
The majority of the area surrounding the entrance to Rye Harbour is characterised by flat, featureless, gently sloping sand. The entire area is shallow with a maximum depth being less than -7mOD. Small areas of rocky outcrops and coarse sediment are found in the southwest of the area. The areas of coarse sediment are found in small depressions offshore. Rock platforms have been exposed where the covering of sediment has been eroded or transported along or offshore.

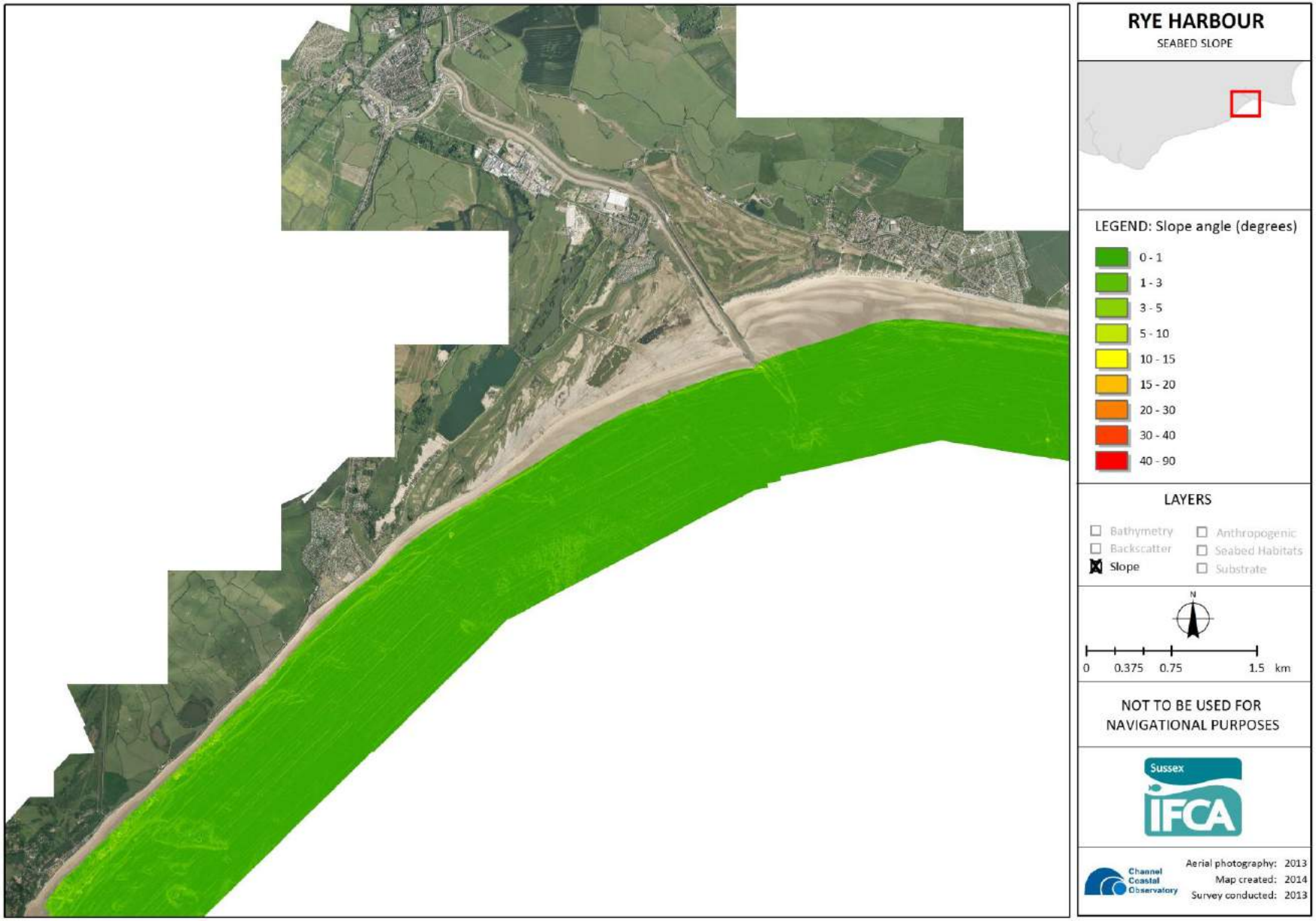
Within this area, five wrecks were identified. No anthropogenic features where discerned apart from the channel at Rye Harbour, which is between -3 to -3.5mOD.

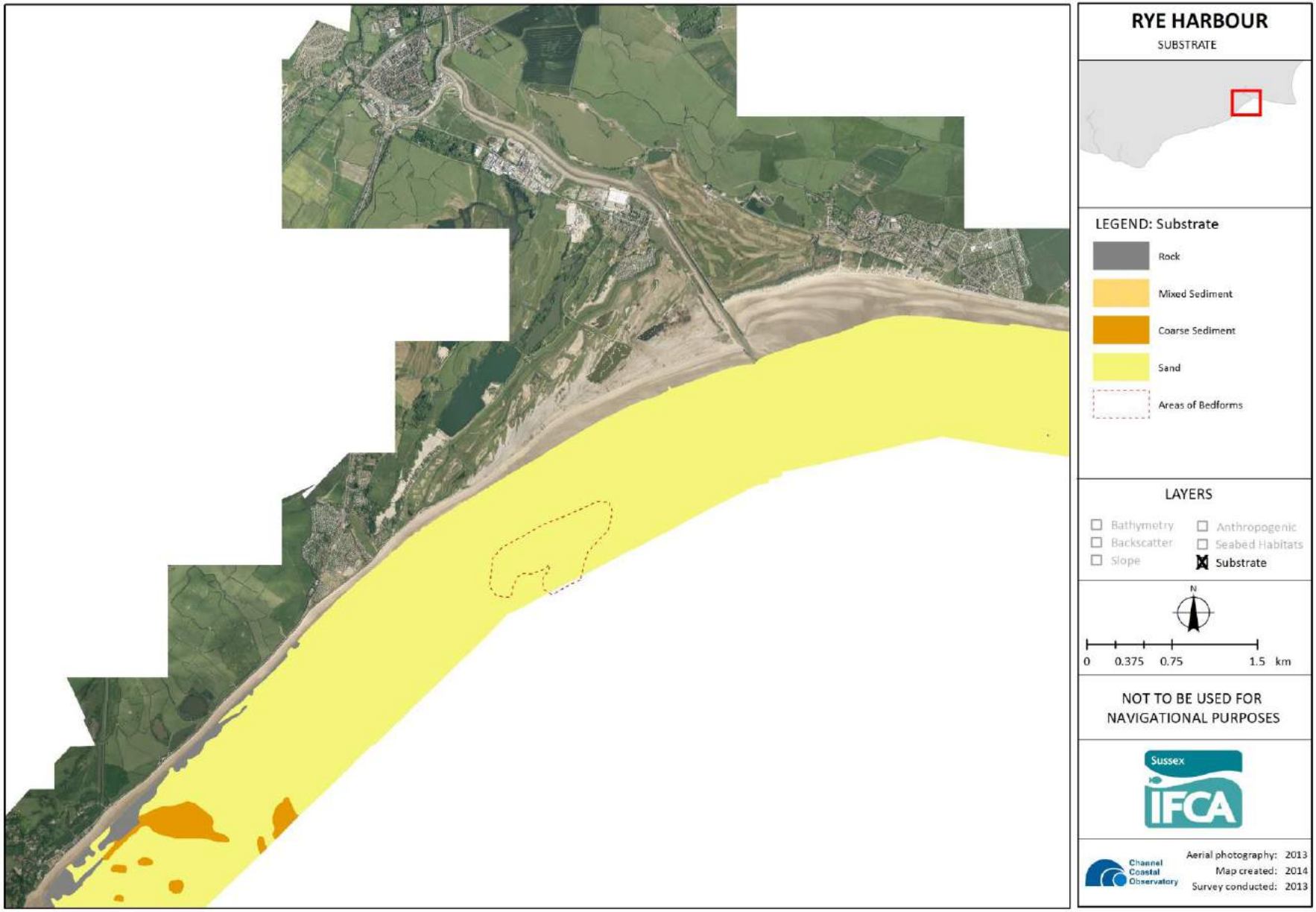
The lack of notable bedform features over the majority of such a large expanse of sediment may be evidence of low energy wave or tidal current conditions. Increased localised near-bed currents or a more substantial thickness of sediment may be factors where bedforms are evident to the west of the harbour entrance.


RYE HARBOUR
BATHYMETRY
LEGEND: Elevation (mOD)
0
-5
-10
-20
-30
-40
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.375 0.75 1.5 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


RYE HARBOUR
BACKSCATTER
LEGEND: Backscatter Intensity
High Intensity
Low Intensity
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.375 0.75 1.5 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

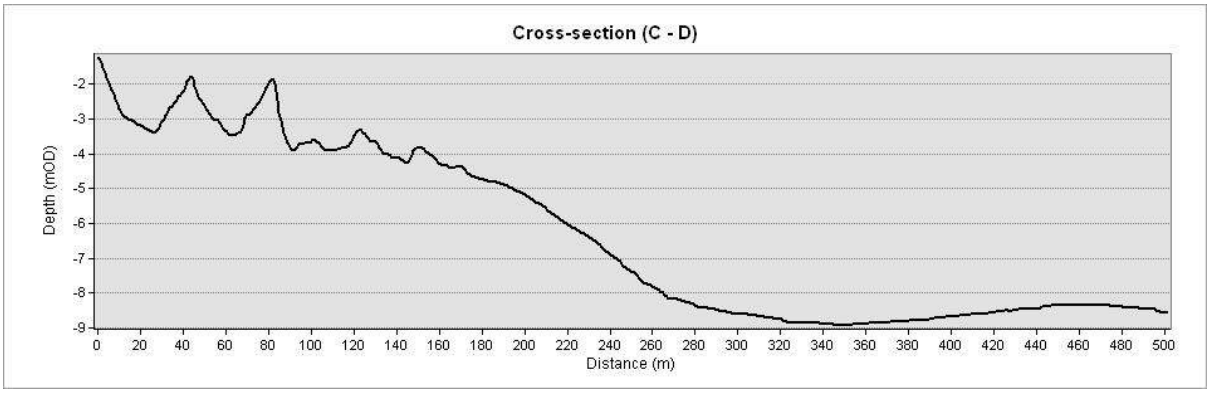

RYE HARBOUR
SEABED HABITATS
LEGEND: EUNIS Level 3
Circalittoral, Low Energy Rock
Circalittoral, Low Energy Rock and thin Sediment
Infralittoral, Low Energy Rock
Infralittoral, Low Energy Rock and thin Sediment
Littoral, Coarse Sediment
Littoral, Low Energy Rock
Littoral, Low Energy Rock and thin Sediment
Littoral, Mixed Sediment
Littoral, Sand
Sublittoral, Coarse Sediment
Sublittoral, Mixed Sediment
Sublittoral, Sand
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.375 0.75 1.5 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


RYE HARBOUR
SEABED SLOPE
LEGEND: Slope angle (degrees)
0 - 1
1 - 3
3 - 5
5 - 10
10 - 15
15 - 20
20 - 30
30 - 40
40 - 90
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.375 0.75 1.5 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


RYE HARBOUR
SUBSTRATE
LEGEND: Substrate
Rock
Mixed Sediment
Coarse Sediment
Sand
Areas of Bedforms
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.375 0.75 1.5 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

Fairlight

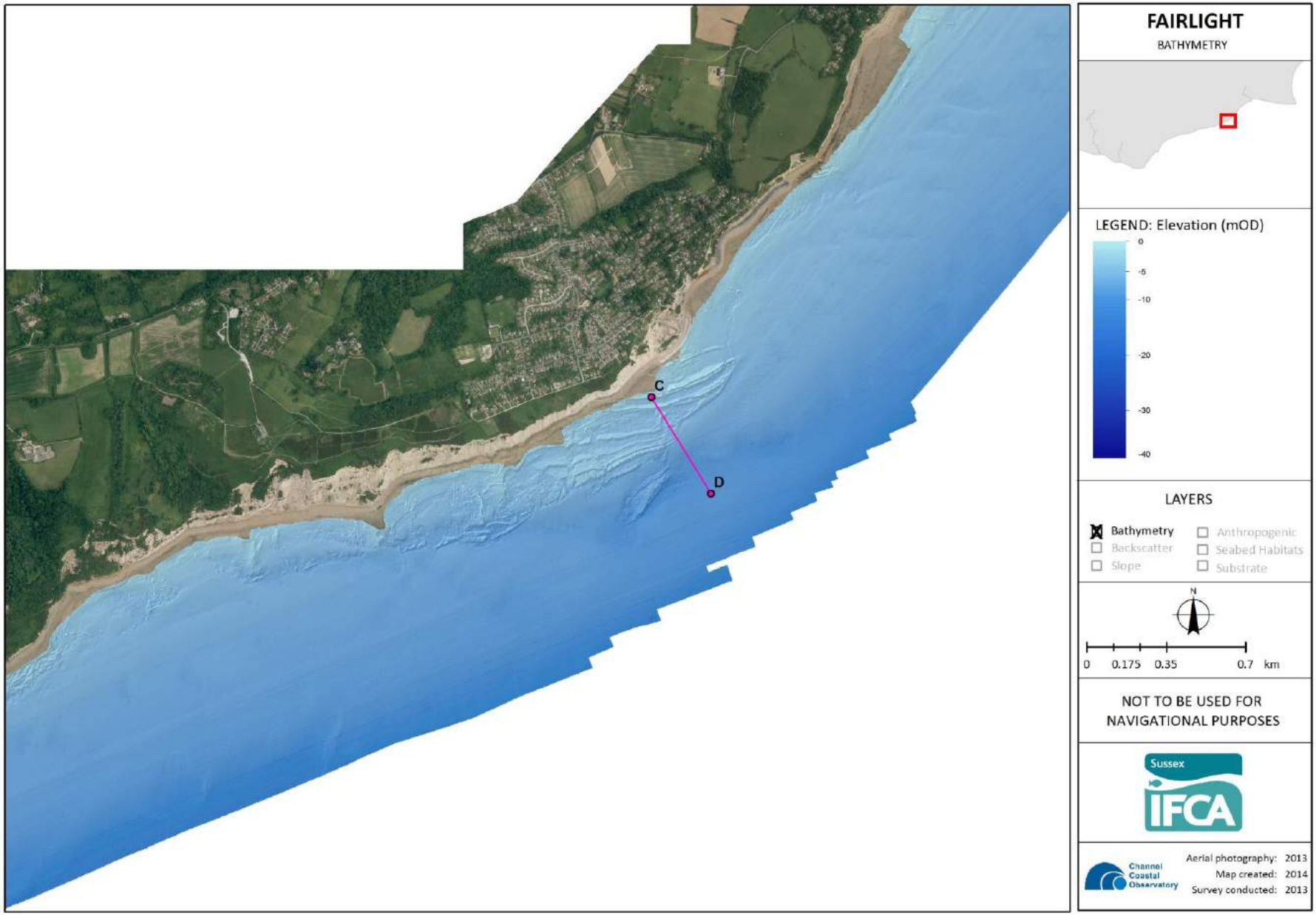
The nearshore seabed in this area is dominated by exposed bedrock with distinct shore parallel rocky outcrops south of Fairlight village. Small pocket embayments of sandy sediment occur, and in places are of sufficient thickness to mask the underlying rock platform and bedrock. Slope analysis and backscatter clearly indicates the prominence of the nearshore rock platform and steep faced bedrock features, when compared to the surrounding seabed (Cross-section C-D).

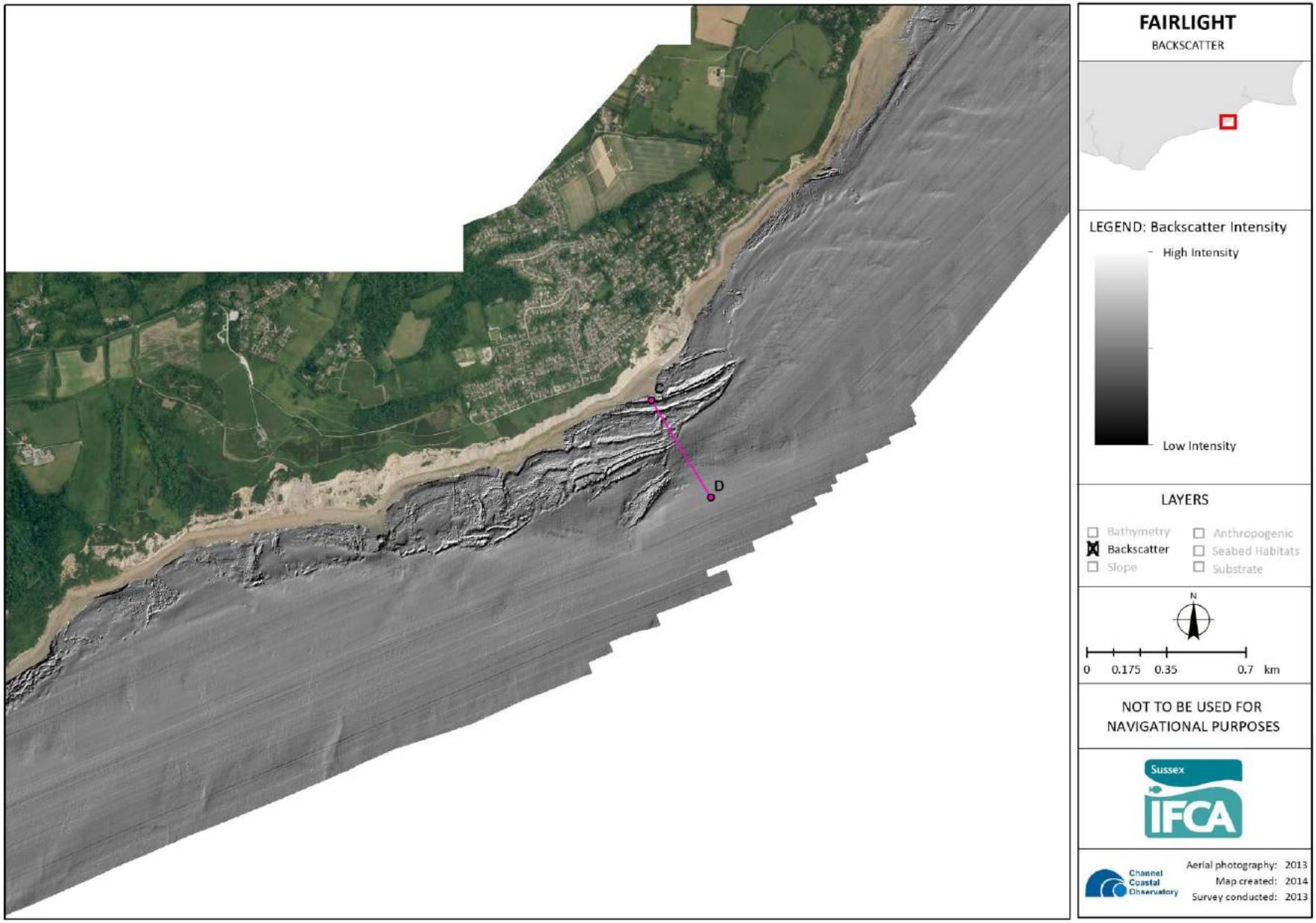


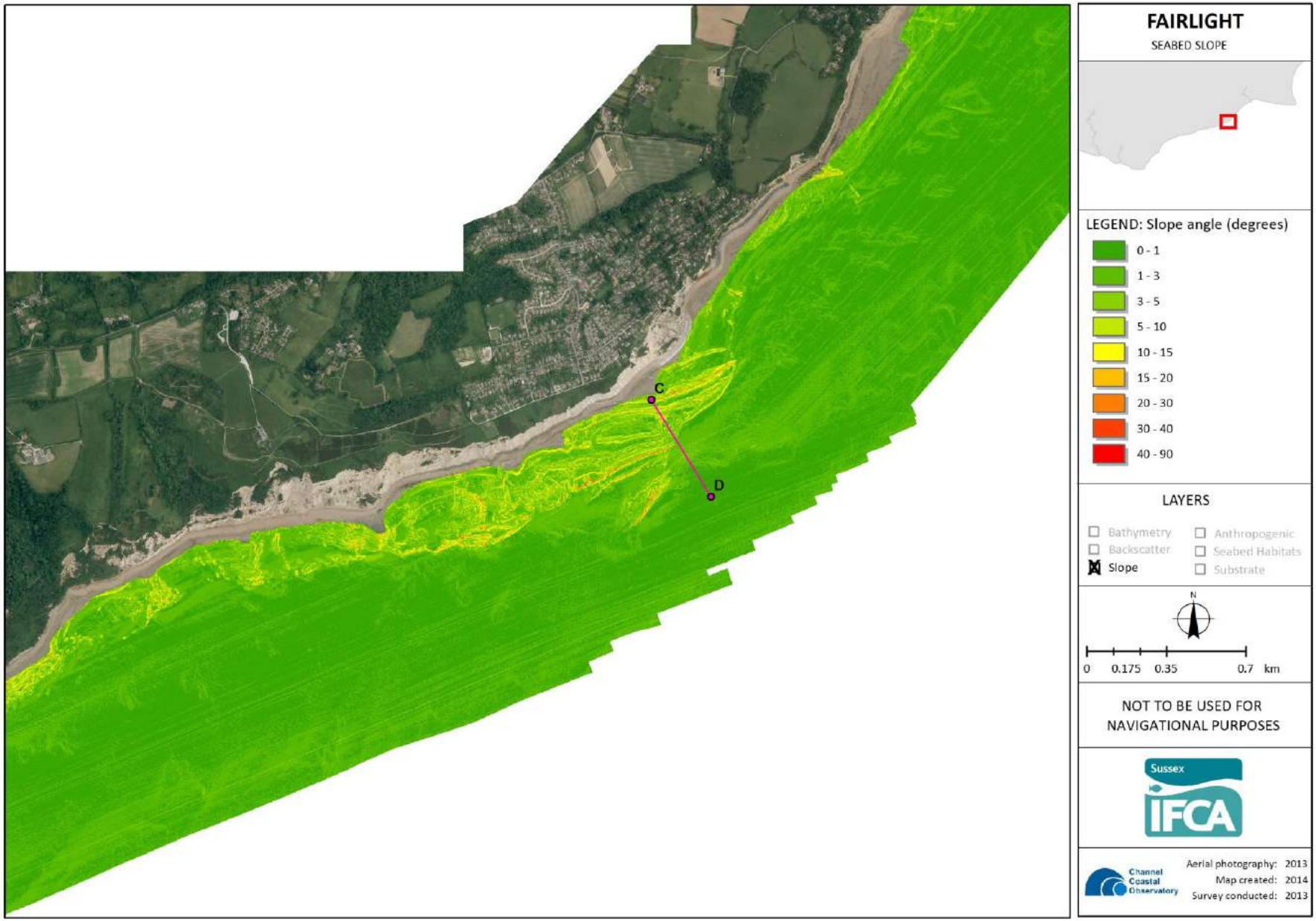
Offshore, the seabed is dominated by sandy sediment, with distinct areas of coarse sediment, apparently constrained by the underlying geology, and perhaps differential transport of the fine-grained sediments from these areas.

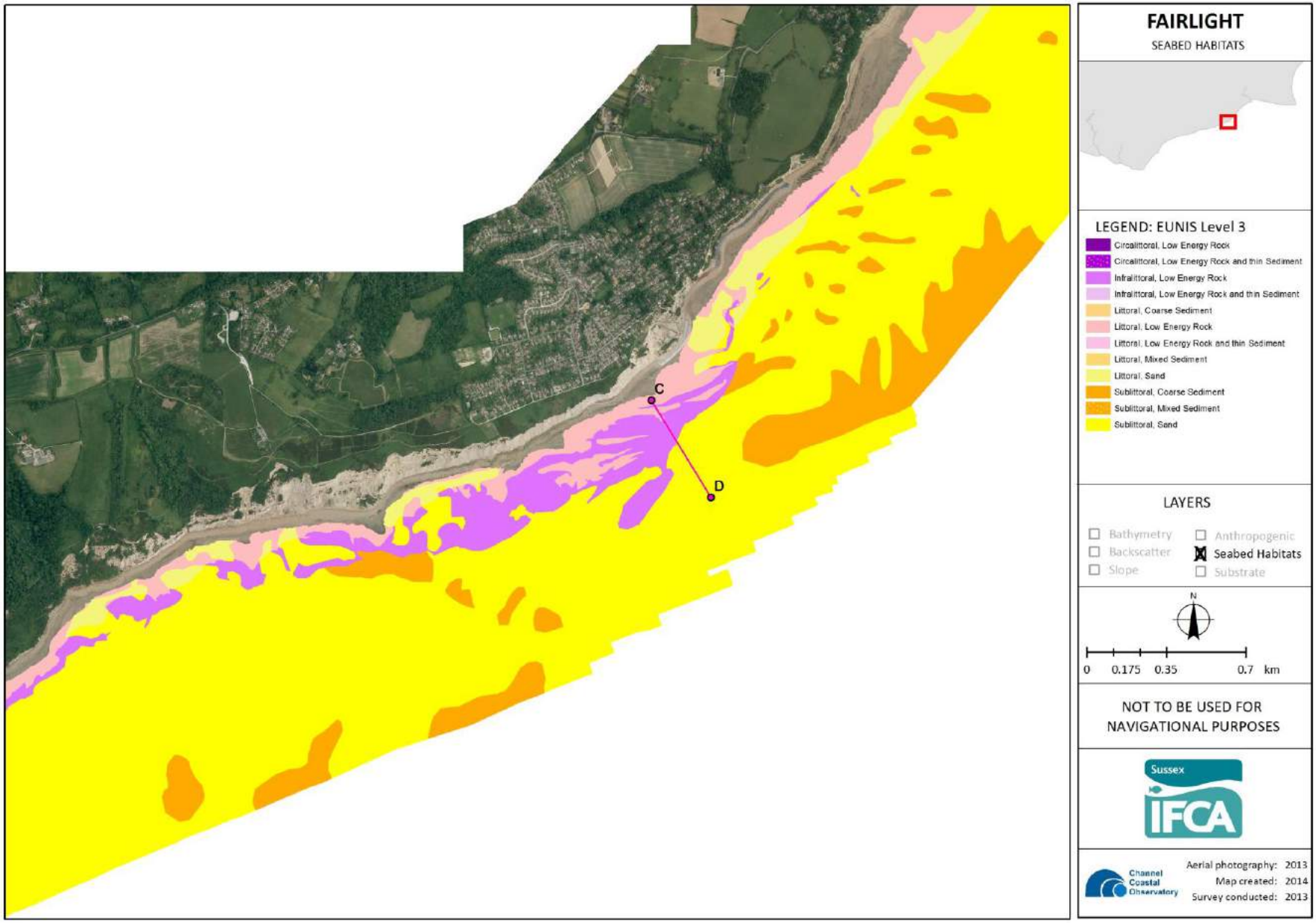
The sediments further offshore are sufficiently thick to mask the underlying geology although no bedforms are present. This indicates a lack of energy, or an insubstantial thickness of material to enable bedforms to be generated. The coastline is sheltered at Fairlight and tidal stream data indicates it is a low energy stretch of coastline.

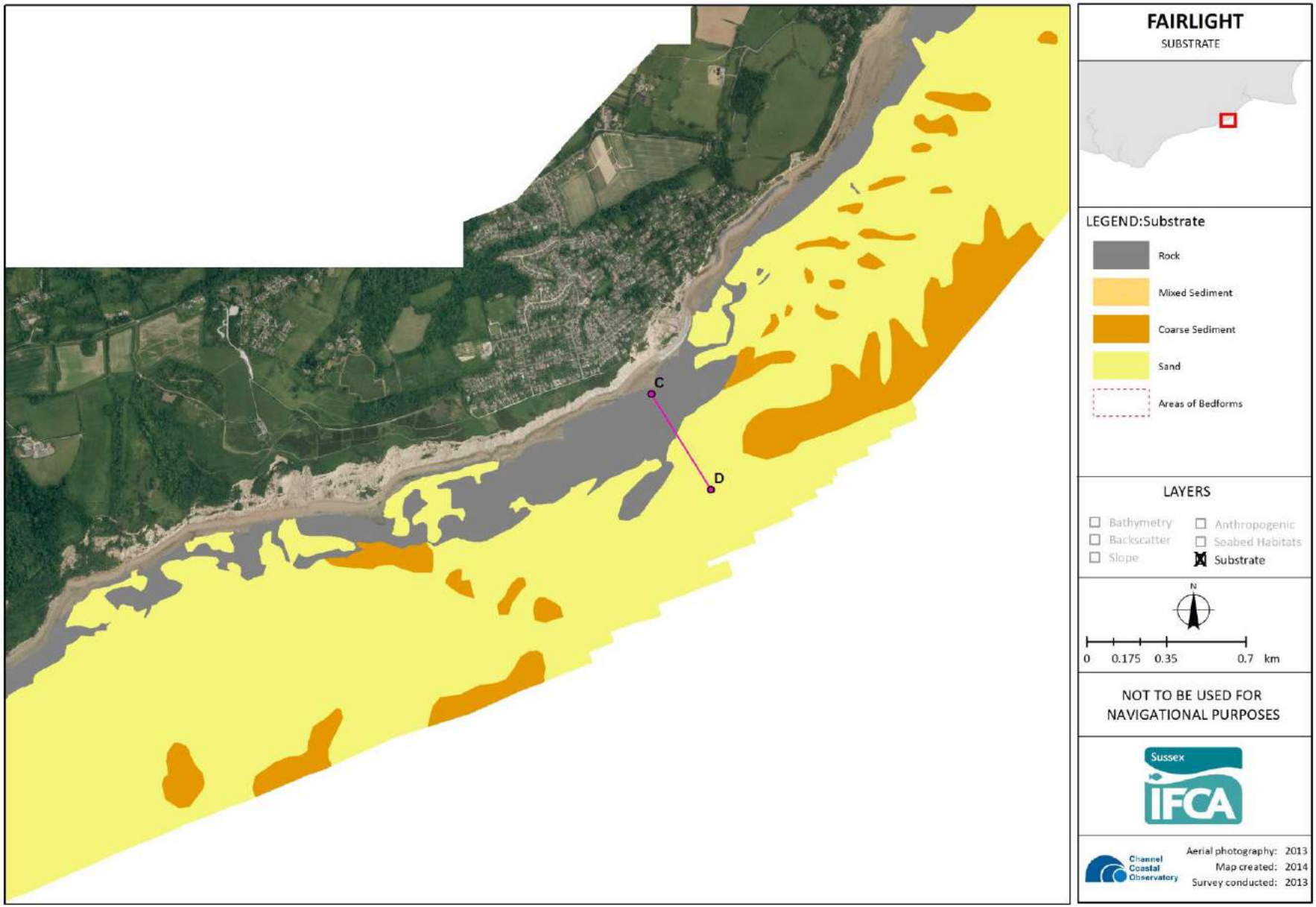
No wrecks or anthropogenic features were observed.


C
D
FAIRLIGHT
BATHYMETRY
LEGEND: Elevation (mOD)
0
-5
-10
-20
-30
-40
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.175 0.35 0.7 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


C
D
FAIRLIGHT
BACKSCATTER
LEGEND: Backscatter Intensity
High Intensity
Low Intensity
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.175 0.35 0.7 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


C
D
FAIRLIGHT
SEABED SLOPE
LEGEND: Slope angle (degrees)
0 - 1
1 - 3
3 - 5
5 - 10
10 - 15
15 - 20
20 - 30
30 - 40
40 - 90
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.175 0.35 0.7 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


C
D
FAIRLIGHT
SEABED HABITATS
LEGEND: EUNIS Level 3
Circalittoral, Low Energy Rock
Circalittoral, Low Energy Rock and thin Sediment
Infralittoral, Low Energy Rock
Infralittoral, Low Energy Rock and thin Sediment
Littoral, Coarse Sediment
Littoral, Low Energy Rock
Littoral, Low Energy Rock and thin Sediment
Littoral, Mixed Sediment
Littoral, Sand
Sublittoral, Coarse Sediment
Sublittoral, Mixed Sediment
Sublittoral, Sand
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.175 0.35 0.7 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


C
D
FAIRLIGHT
SUBSTRATE
LEGEND:Substrate
Rock
Mixed Sediment
Coarse Sediment
Sand
Areas of Bedforms
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.175 0.35 0.7 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

Hastings

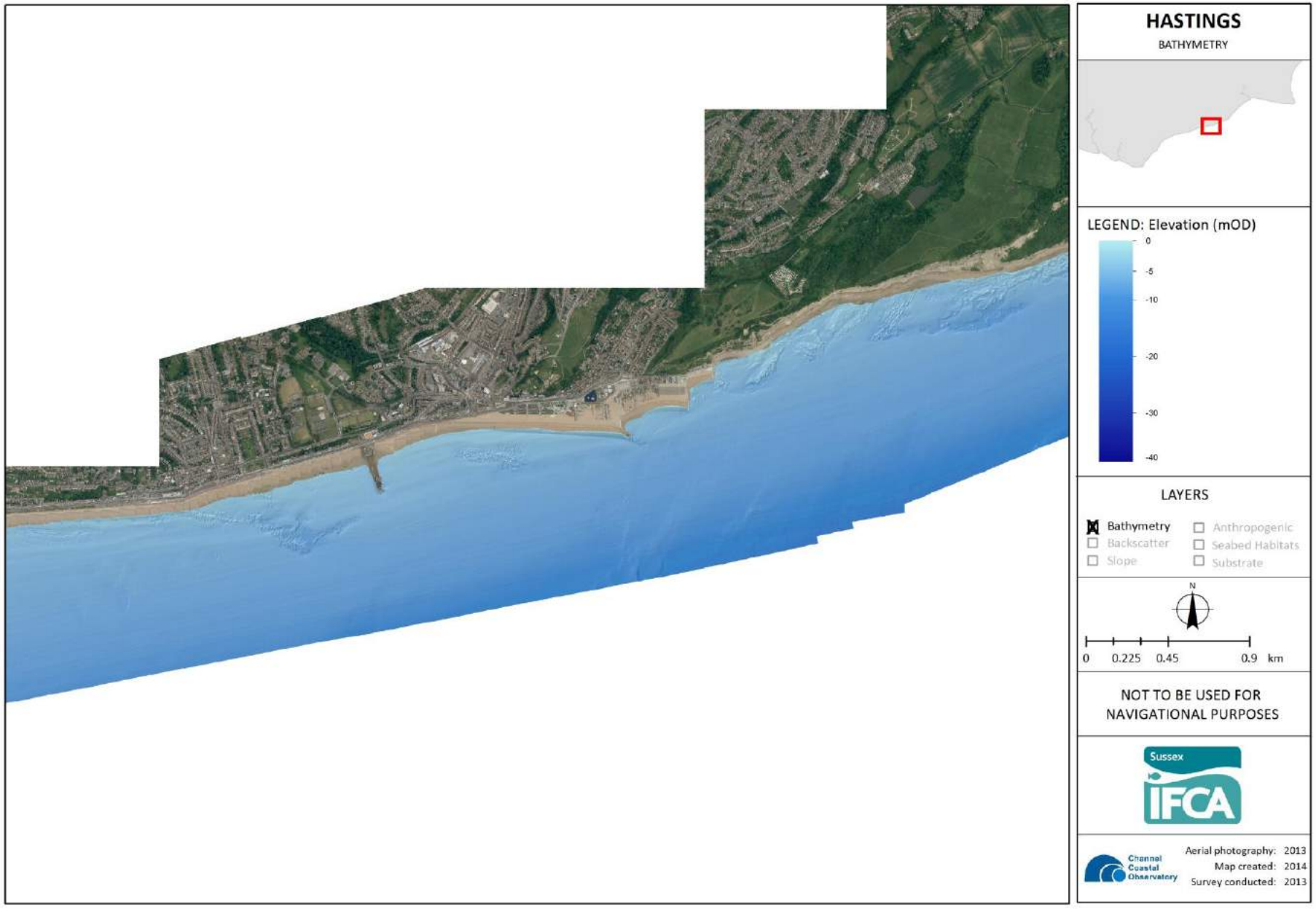
To the east of Hastings the nearshore seabed is dominated by a rock platform, rock outcrops and exposed bedrock further offshore. The substrate south of Hastings is a mixture of sand and mixed sediment, with occasional exposed areas of rock. Offshore the seabed is dominated by sediment, mainly sand with small areas of coarse sediment, potentially constrained or concentrated by the underlying geology. The seabed is shallow and gently sloping with a maximum depth at the seaward extent of -11mOD.

Distinguishing between the different rock features present and also for the presence of coastal defence structures was achieved using the slope map. The main sea defence structures identified are the rock and concrete groynes to the east of Hastings Pier.

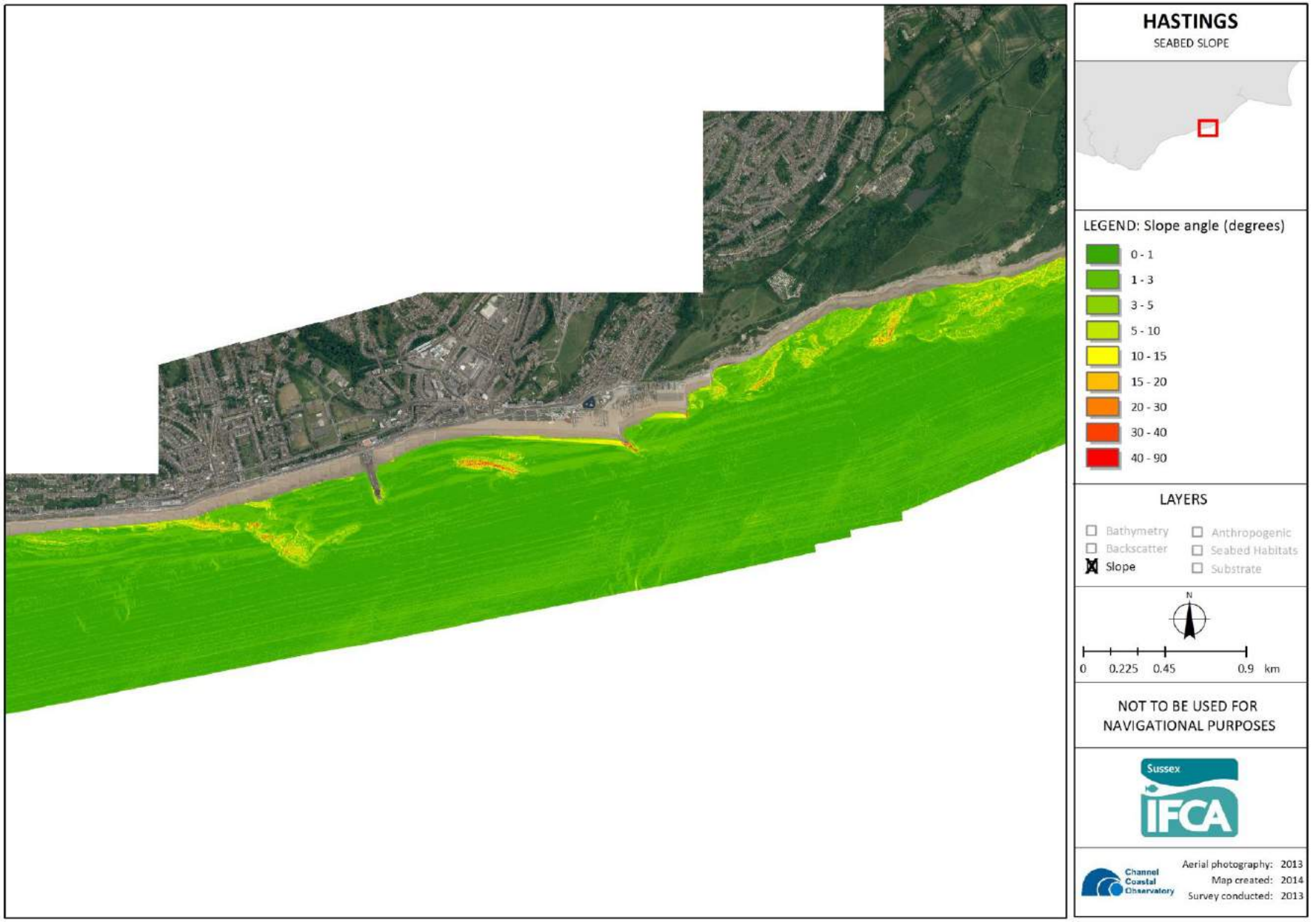
No bedforms were found.

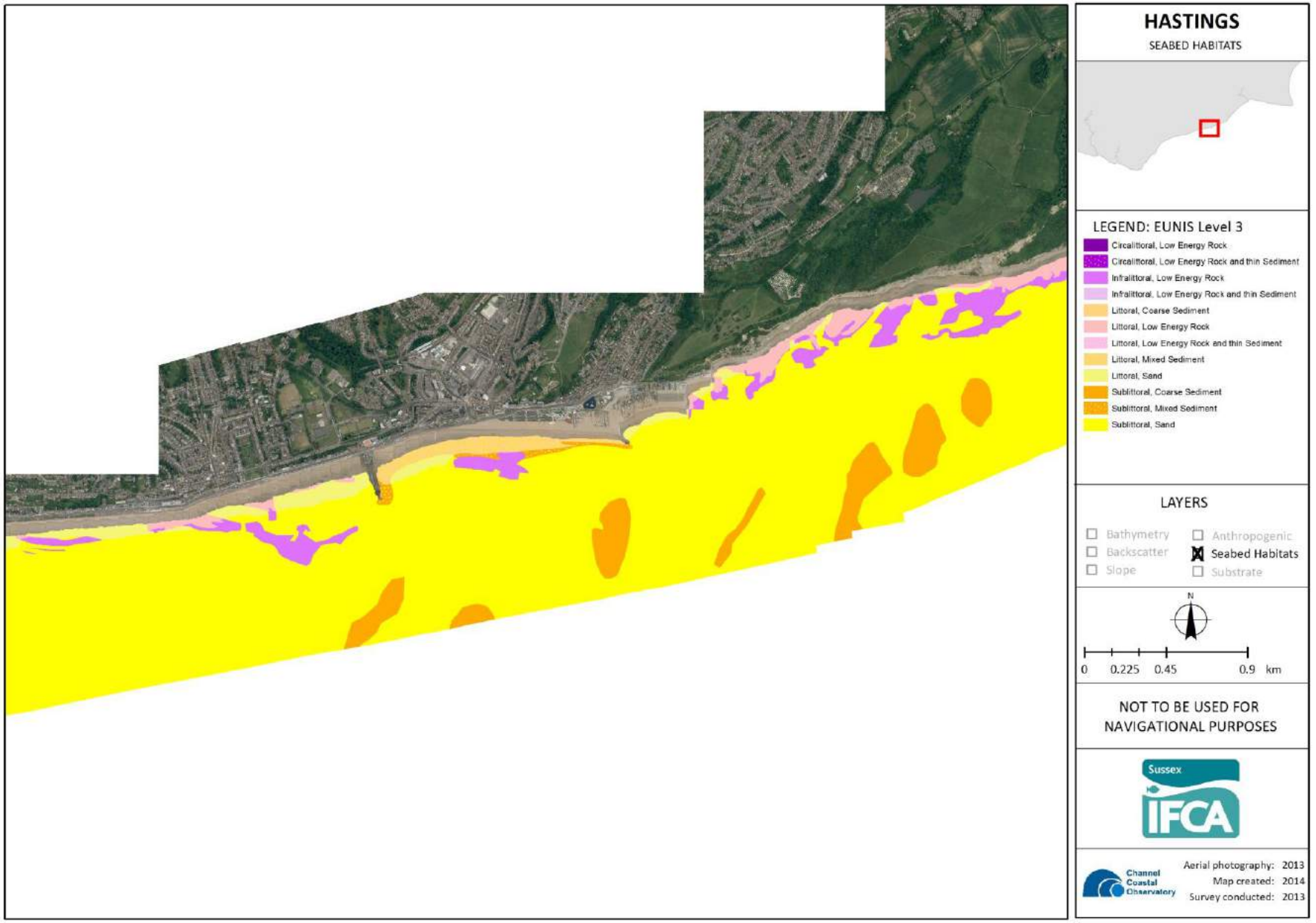
No wrecks were identified. Anthropogenic features include structural features of Hastings Pier and the seaward extents of three rock groynes.

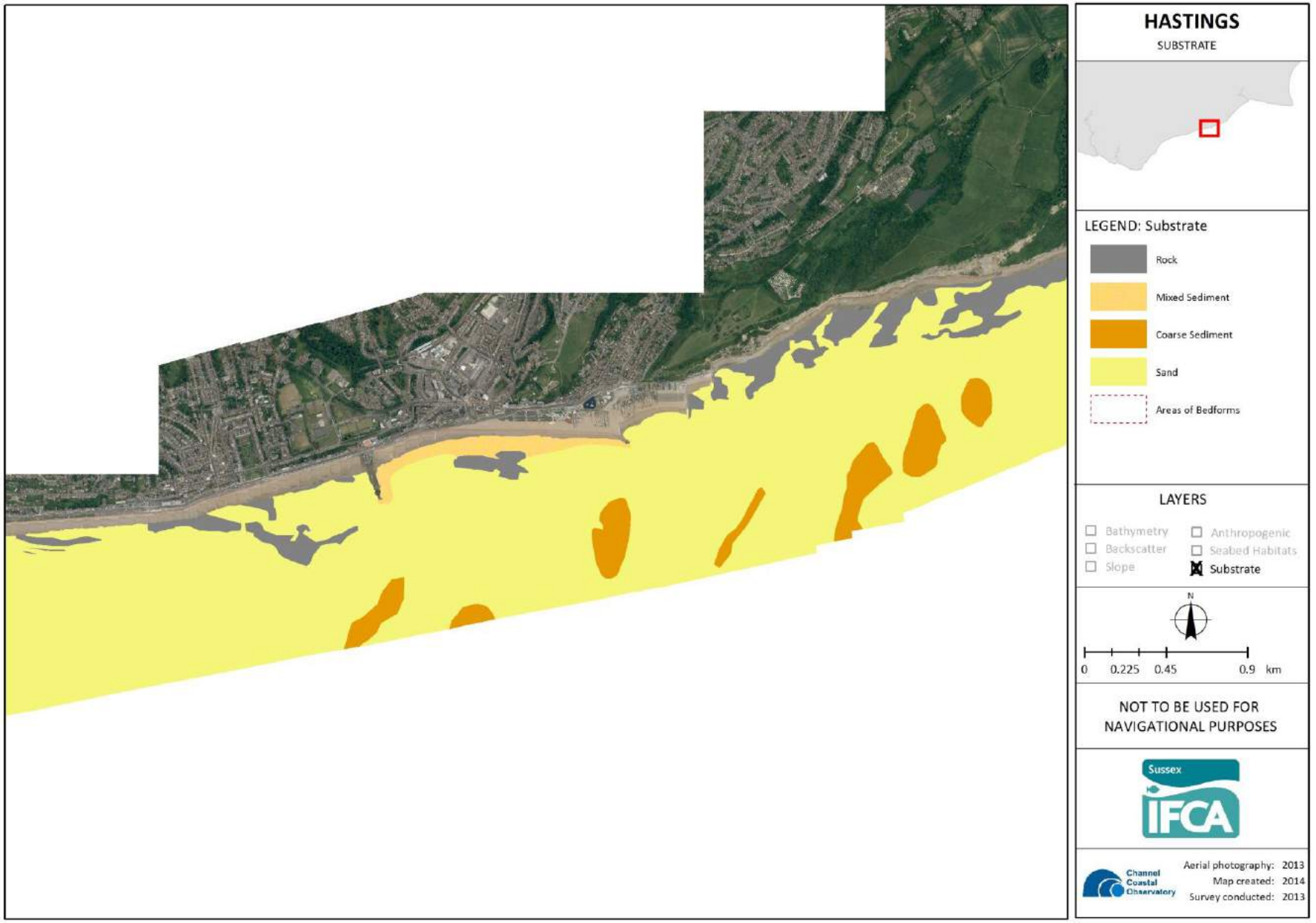
This is a low energy area, characterised by the lack of bedforms and wave and tide data. Tidal stream data offshore of Hastings indicates that the peak spring flow is classified as weak (< 1 Knot) and the shoreline is moderately exposed.

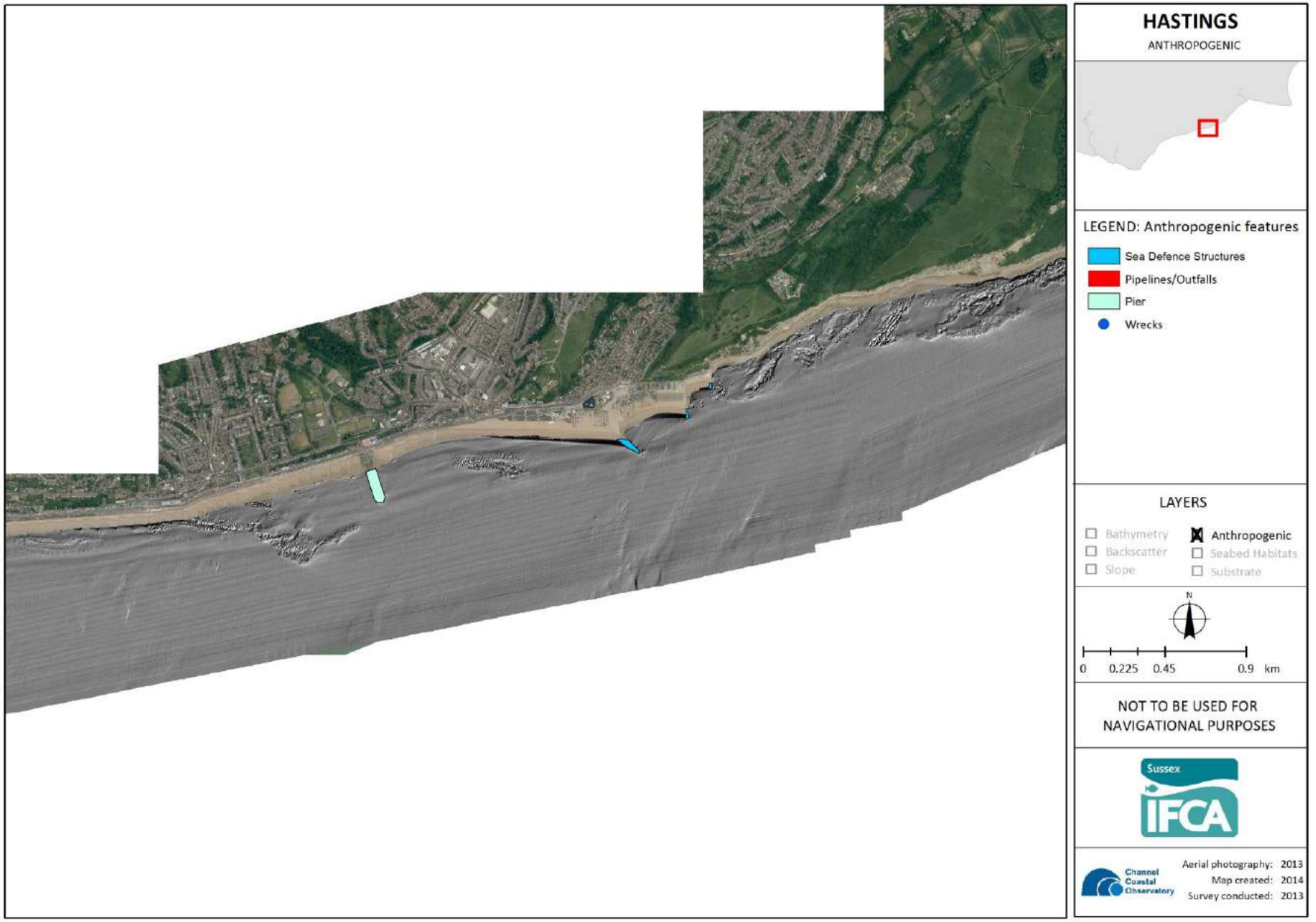

HASTINGS
BATHYMETRY
LEGEND: Elevation (mOD)
0
-5
-10
-20
-30
-40
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.225 0.45 0.9 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


HASTINGS
BACKSCATTER
LEGEND: Backscatter Intensity
High Intensity
Low Intensity
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.225 0.45 0.9 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


HASTINGS
SEABED SLOPE
LEGEND: Slope angle (degrees)
0 - 1
1 - 3
3 - 5
5 - 10
10 - 15
15 - 20
20 - 30
30 - 40
40 - 90
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.225 0.45 0.9 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


HASTINGS
SEABED HABITATS
LEGEND: EUNIS Level 3
Circalittoral, Low Energy Rock
Circalittoral, Low Energy Rock and thin Sediment
Infralittoral, Low Energy Rock
Infralittoral, Low Energy Rock and thin Sediment
Littoral, Coarse Sediment
Littoral, Low Energy Rock
Littoral, Low Energy Rock and thin Sediment
Littoral, Mixed Sediment
Littoral, Sand
Sublittoral, Coarse Sediment
Sublittoral, Mixed Sediment
Sublittoral, Sand
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.225 0.45 0.9 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


HASTINGS
SUBSTRATE
LEGEND: Substrate
Rock
Mixed Sediment
Coarse Sediment
Sand
Areas of Bedforms
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.225 0.45 0.9 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


HASTINGS
ANTHROPOGENIC
LEGEND: Anthropogenic features
Sea Defence Structures
Pipelines/Outfalls
Pier
Wrecks
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.225 0.45 0.9 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

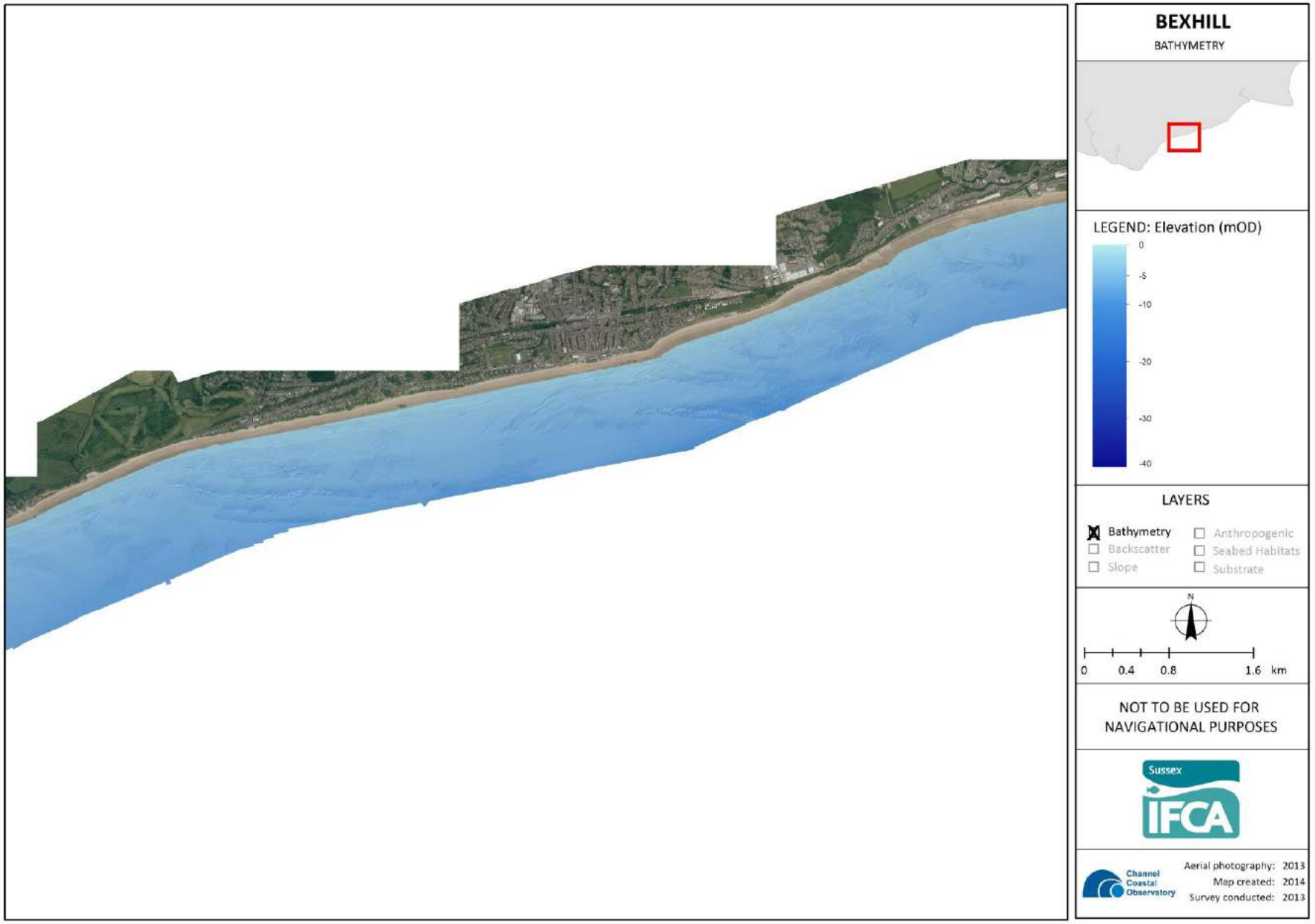
Bexhill

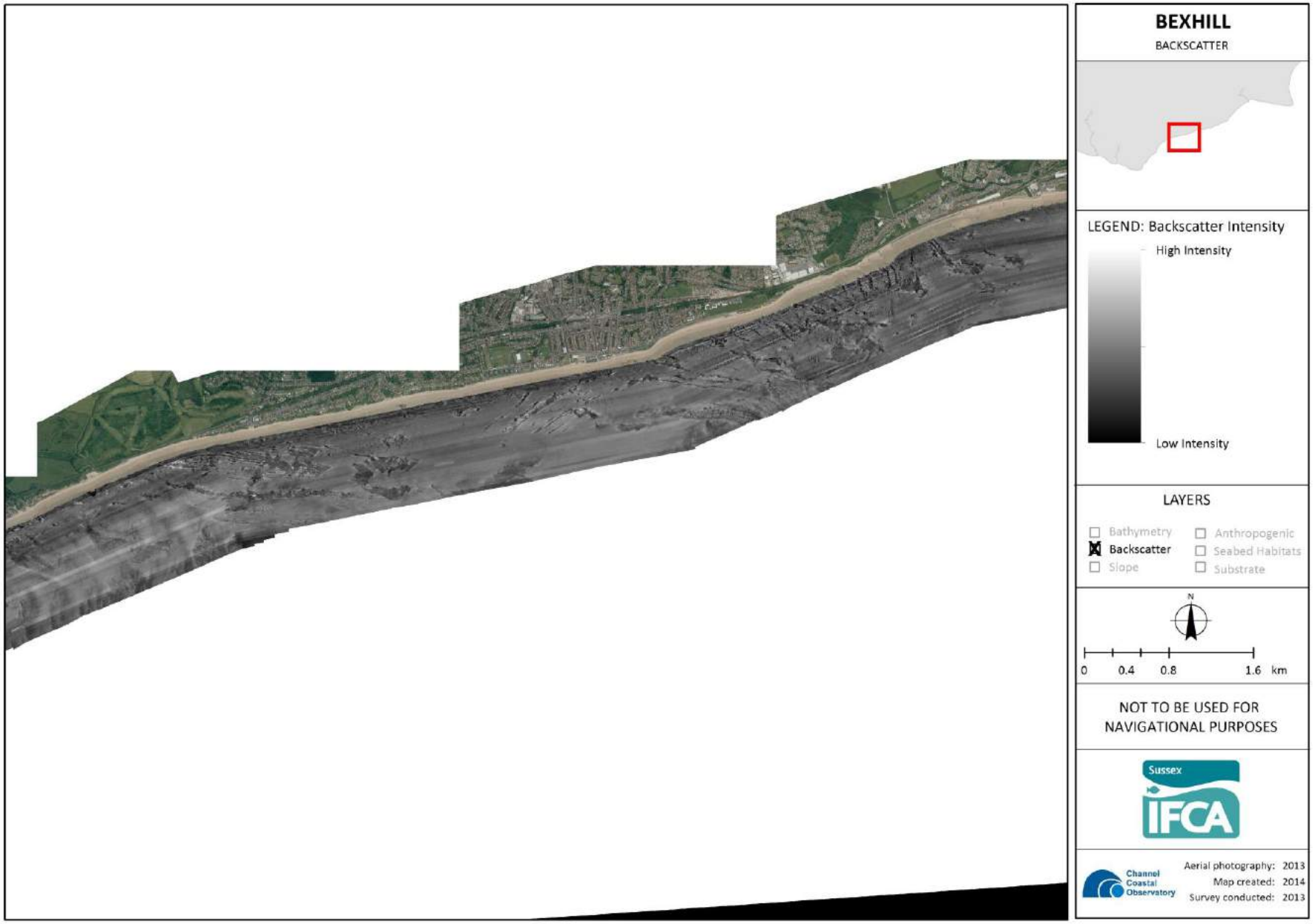
The seabed in the Bexhill area is a complex mosaic of substrate types. Throughout this shallow and gently sloping area, the underlying geology is evident including prominent shore parallel rocky outcrops, ridges and exposed areas of bedrock. There are localised patches of coarse sediment throughout the area, which may be constrained or controlled by the underlying bedrock. Majority of the area is subtidal sands although the thickness of this material appears limited as underlying geology can be discerned.

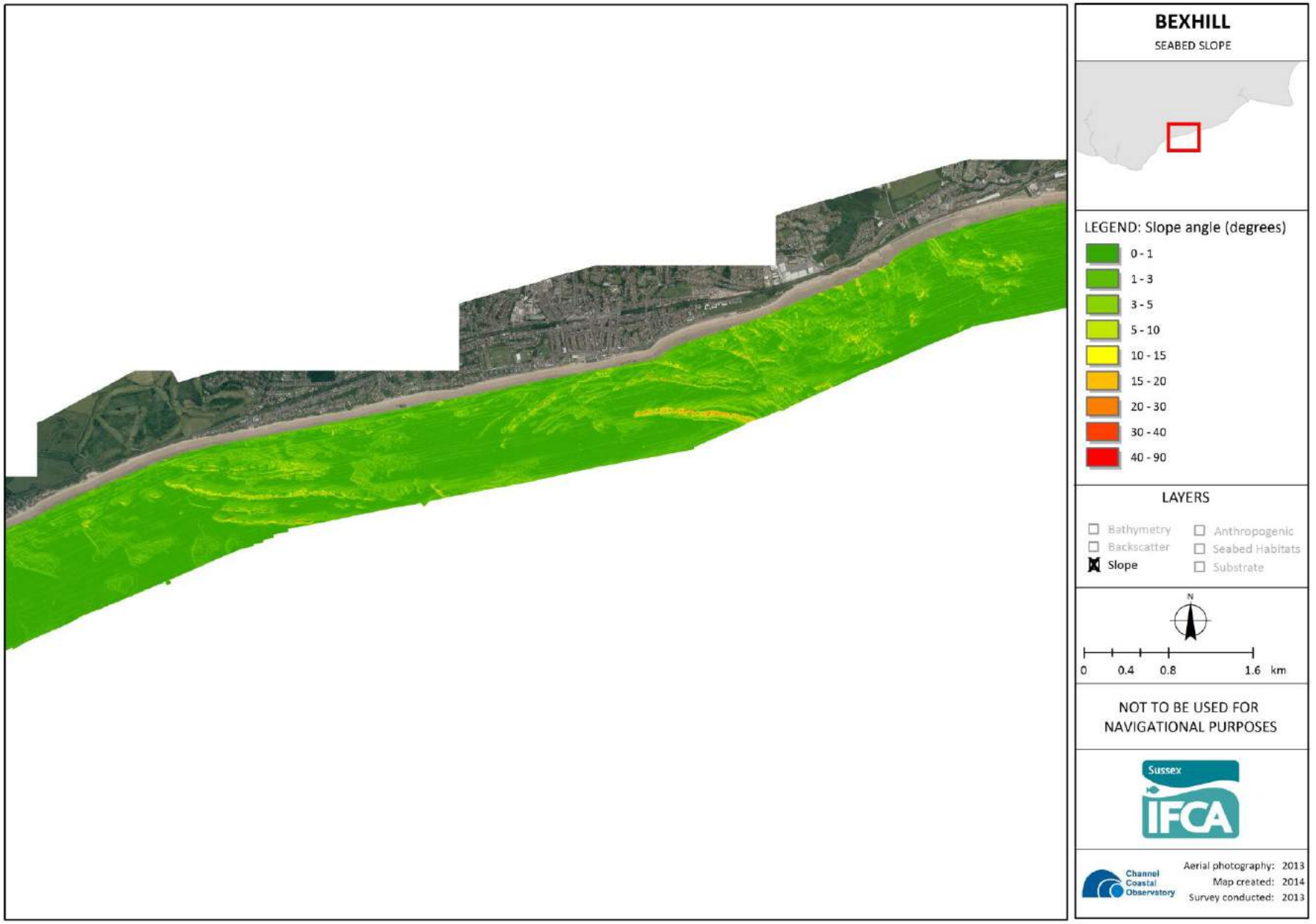
Slope analysis indicates complex and extensive geological outcrops. The variable arcuate alignments of the exposed and folded rock outcrops varies, potentially indicates faulting of the Wealden bedrock units.

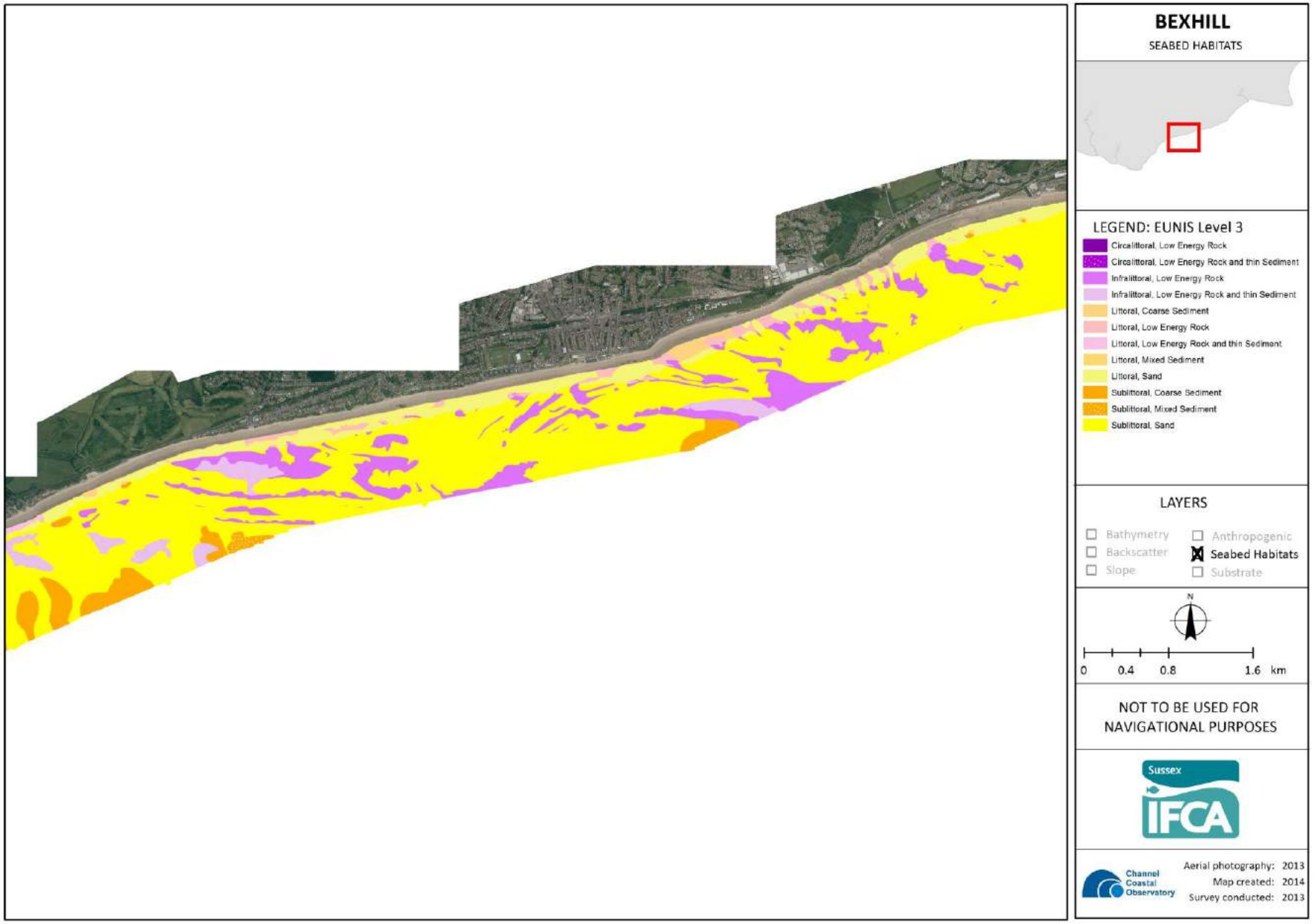
The lack of bedforms present in the surrounding featureless seabed indicates a low energy environment. Even with the potential for complex currents between the rock outcrops the tidal streams at Hastings indicating a peak flow of 1.1 knots and can be defined as generally weak.

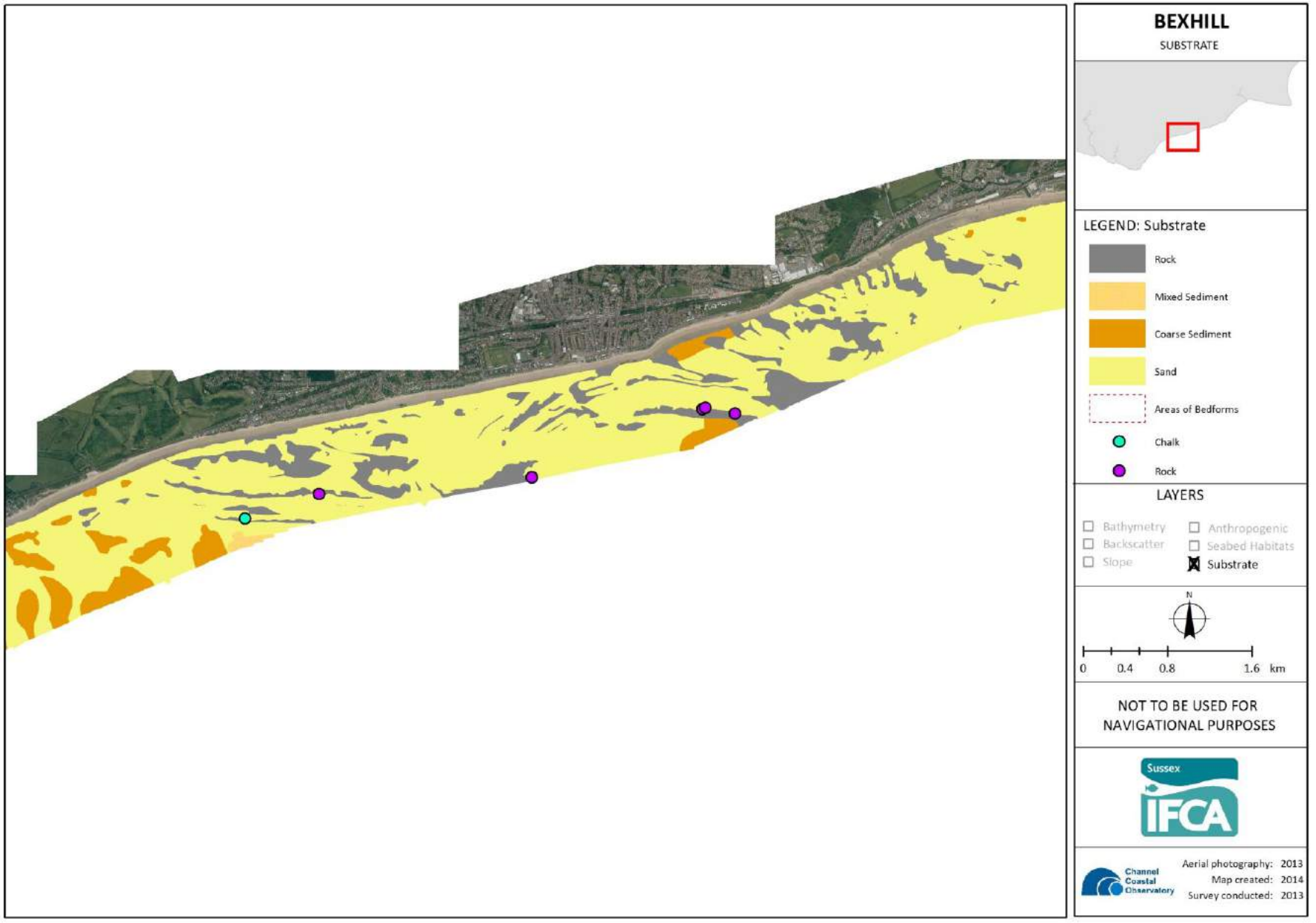
Nine wreck features are located off Bexhill and one pipeline present, 500m in length.


BEXHILL
BATHYMETRY
LEGEND: Elevation (mOD)
0
-5
-10
-20
-30
-40
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.4 0.8 1.6 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


BEXHILL
BACKSCATTER
LEGEND: Backscatter Intensity
High Intensity
Low Intensity
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.4 0.8 1.6 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


BEXHILL
SEABED SLOPE
LEGEND: Slope angle (degrees)
0 - 1
1 - 3
3 - 5
5 - 10
10 - 15
15 - 20
20 - 30
30 - 40
40 - 90
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.4 0.8 1.6 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


BEXHILL
SEABED HABITATS
LEGEND: EUNIS Level 3
Circalittoral, Low Energy Rock
Circalittoral, Low Energy Rock and thin Sediment
Infralittoral, Low Energy Rock
Infralittoral, Low Energy Rock and thin Sediment
Littoral, Coarse Sediment
Littoral, Low Energy Rock
Littoral, Low Energy Rock and thin Sediment
Littoral, Mixed Sediment
Littoral, Sand
Sublittoral, Coarse Sediment
Sublittoral, Mixed Sediment
Sublittoral, Sand
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.4 0.8 1.6 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


BEXHILL
SUBSTRATE
LEGEND: Substrate
Rock
Mixed Sediment
Coarse Sediment
Sand
Areas of Bedforms
Chalk
Rock
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.4 0.8 1.6 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


BEXHILL
ANTHROPOGENIC
LEGEND: Anthropogenic features
Pipelines/Outfalls
Wrecks
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.4 0.8 1.6 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

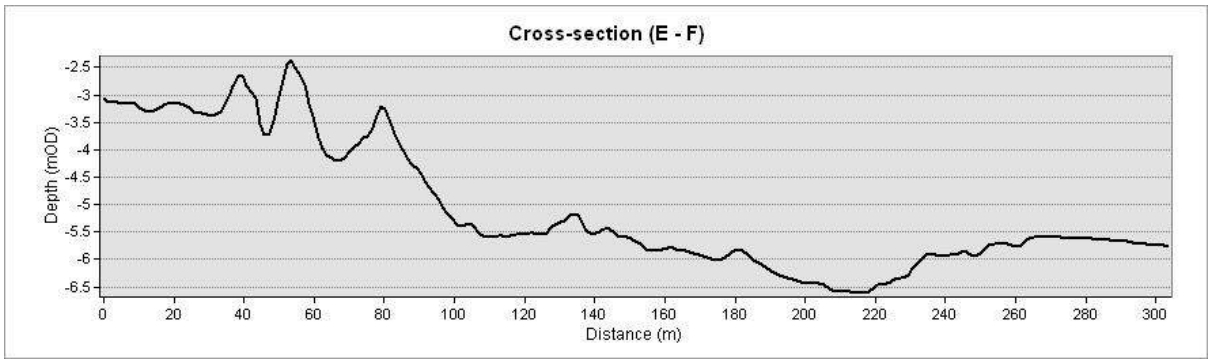
Eastbourne and Pevensey

The substrate between Bexhill and Eastbourne Pier comprises a mixture of sand, mixed and coarse sediment. There is a large area of mixed sediment offshore of Sovereign Harbour that has formed in a deeper basin with depths ranging from -6mOD to -10mOD. Although an apparent relatively substantial thickness of sediment within the deepest area of this basin a number of rock outcrops can be discerned.

The coarse sediment patches in the north are confined to shallow depressions in the seabed and constrained by the underlying bedrock, where the coarser sediment has accumulated. Apart from the area to the east of Beachy Head, where the seabed depth drops steeply, the seabed offshore is generally smooth and gently sloping. The shoreline sediment is generally sand, although the area surrounding Eastbourne Pier appears to comprise of coarser sediment.

An extensive rock platform extends north from Beach Head and has a series of shore-parallel rocky ridge outcrops close to shore. These ridges are covered by beach deposits at Eastbourne and the rock platform itself can be seen extending seawards and continuing further north towards Eastbourne Pier.

The offshore sediment is of sufficient thickness to cover the rock platform and in certain areas is actually higher in elevation than the rock platform itself (Cross-section E-F). Large pockets of sediment are evident across its surface and are of sufficient thickness to mask the underlying rock.



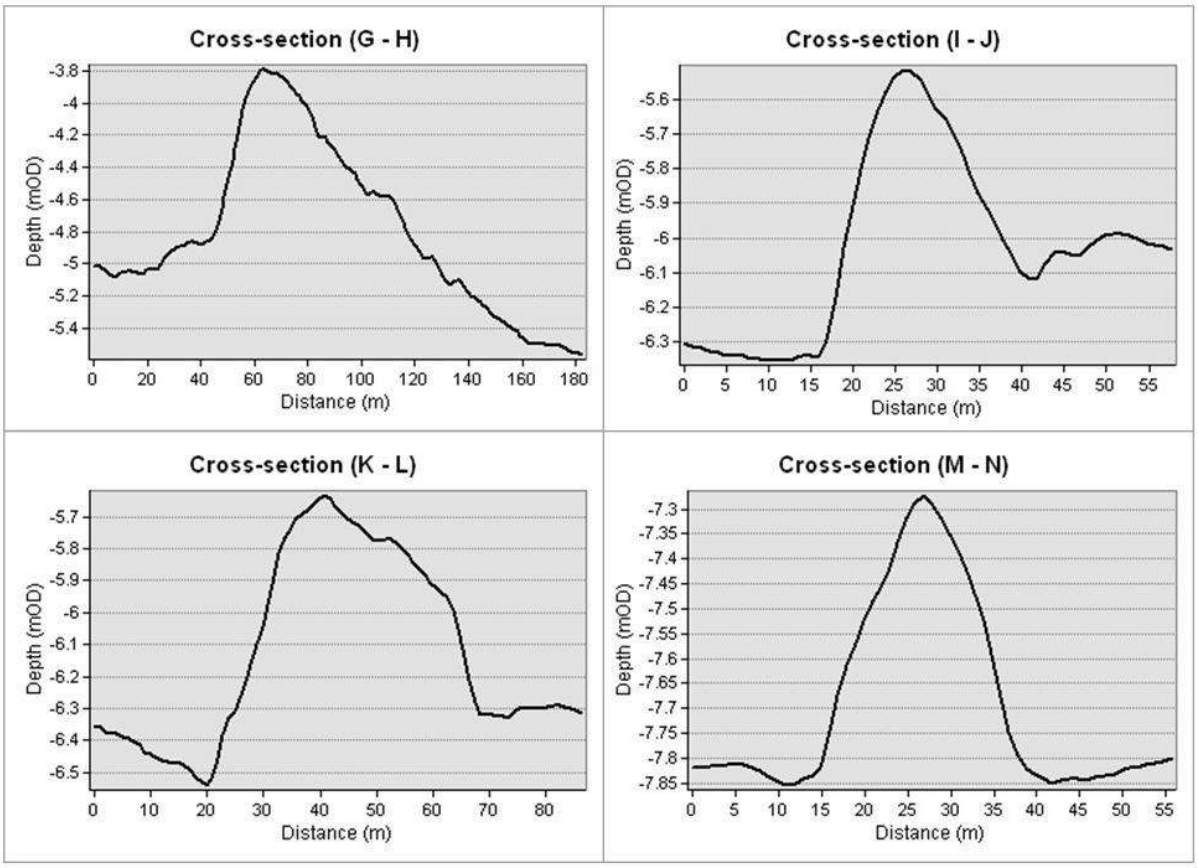
The tidal currents in the vicinity of the harbour breakwater arms may have created small-scale (0.1-0.2m) bedform features. The deeper basin to the south of Sovereign Harbour contains many small, but steep changes in elevation which have created isolated areas of bedforms. Otherwise the lack of bedforms on the surrounding sediment suggests this area is a relatively low energy environment.

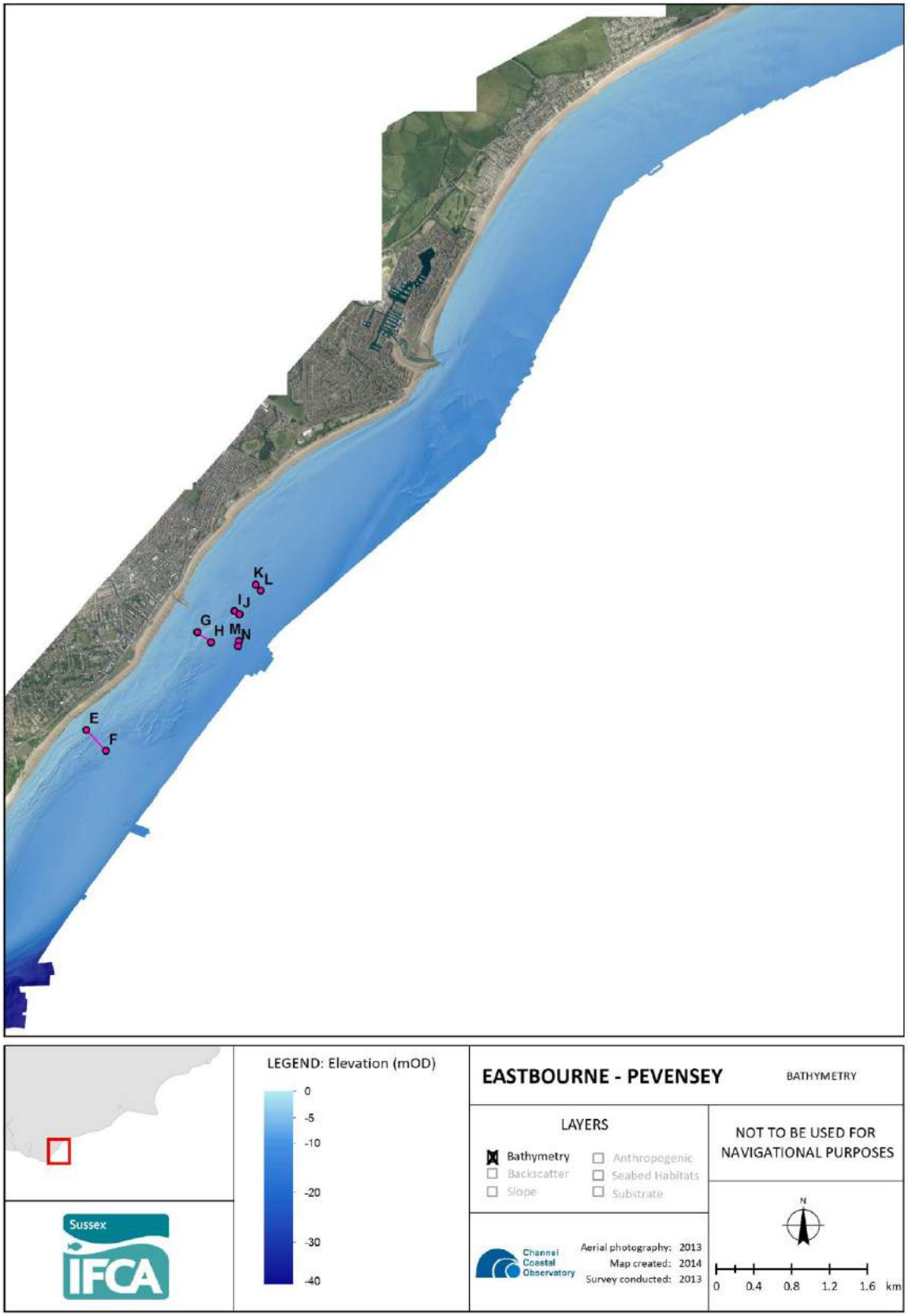
Seven wrecks were located along this stretch of coast. Anthropogenic features identified include the outline of Eastbourne Pier, dredged harbour entrance (-6mOD) at Sovereign Harbour and two large rock groynes.

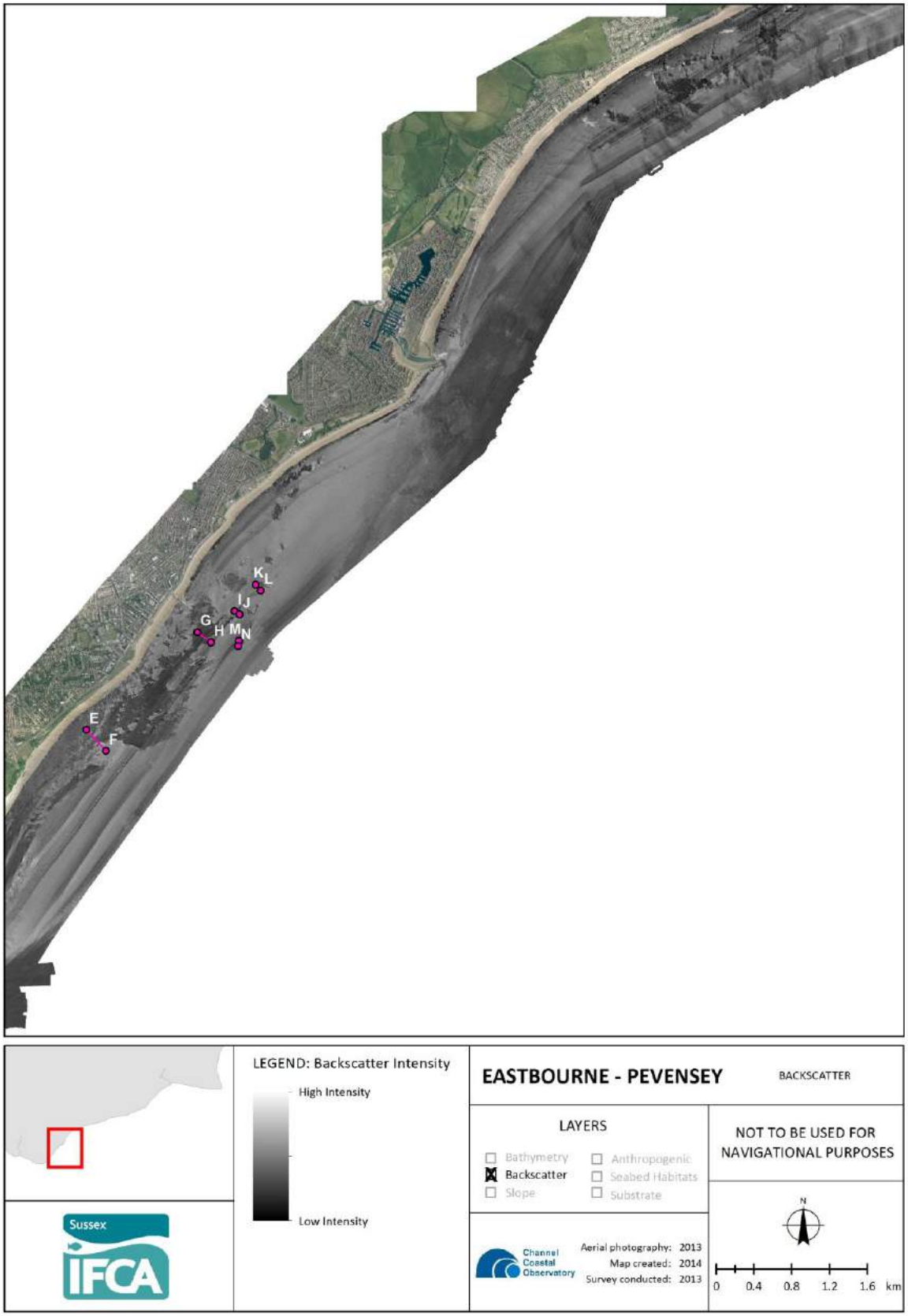
Offshore of Eastbourne Pier, there is an underlying ridge extending northeastwards from the more clearly discernible rock platform. This ridge appears to have influenced localised tidal currents and sediment transport and caused the accumulation of coarse sediment to form a sinuous, continuous, 1km long, ridge-like bedform feature (Cross-section G-H). This coarse-grained ridge is approximately 0.6 – 0.8m in height and 20-40m wide (Cross-section I-J).

To the north and east of this coarse bedform feature are two similar but isolated, sinuous ridges of coarse sediment. These sinuous features are of similar dimensions, varying between 0.4 – 0.8m in height and 20 - 40m in width (Cross-section K-L & M-N). To the north and east of these features are seabed depressions, containing coarser-grained sediments. The lack of other bedforms and that these depressions have not been infilled with sediment may suggest that these ridge deposits are potentially relic, moribund features and not currently mobile.

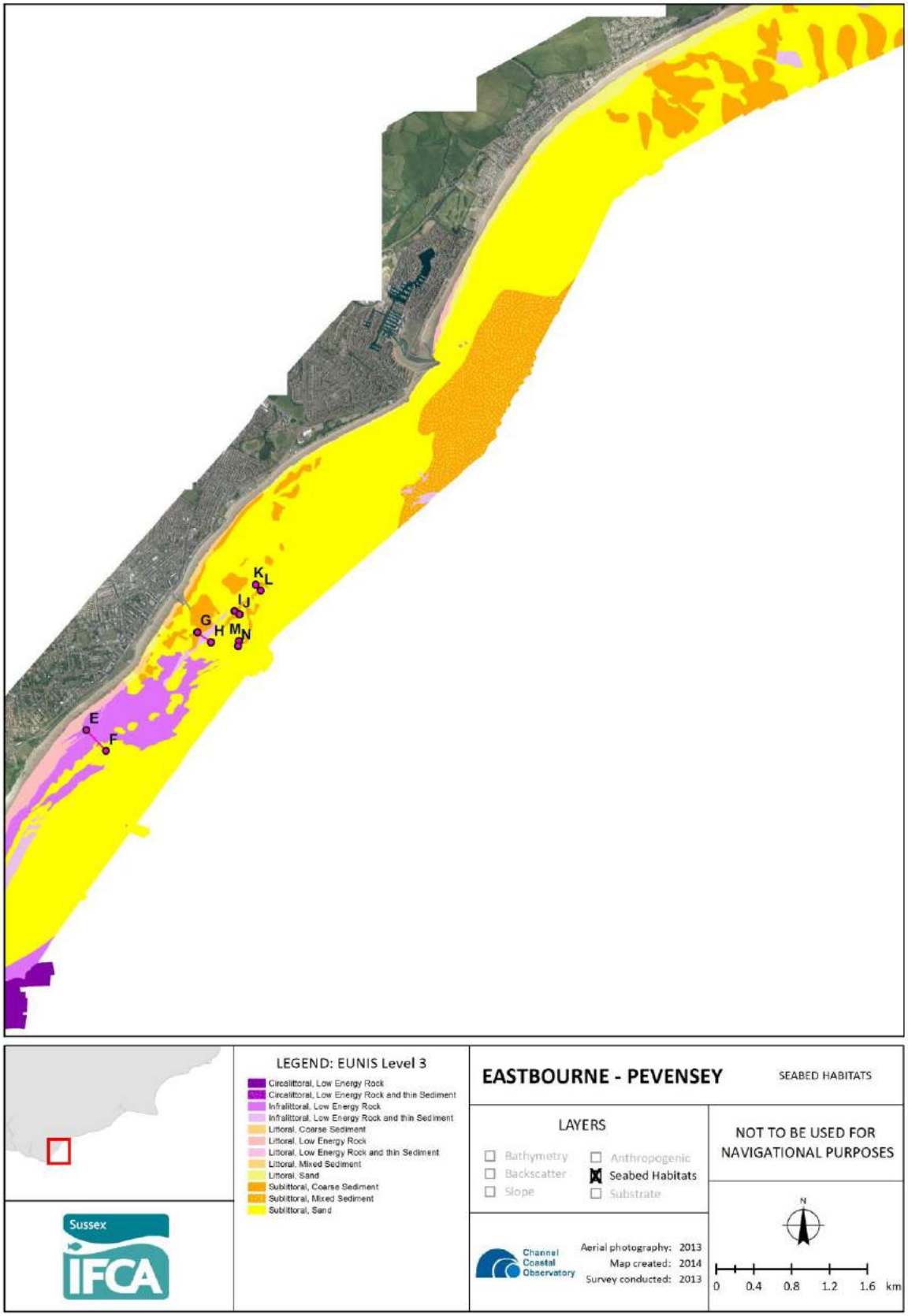
Figure 11: Close-up of coarse ridge features, Eastbourne

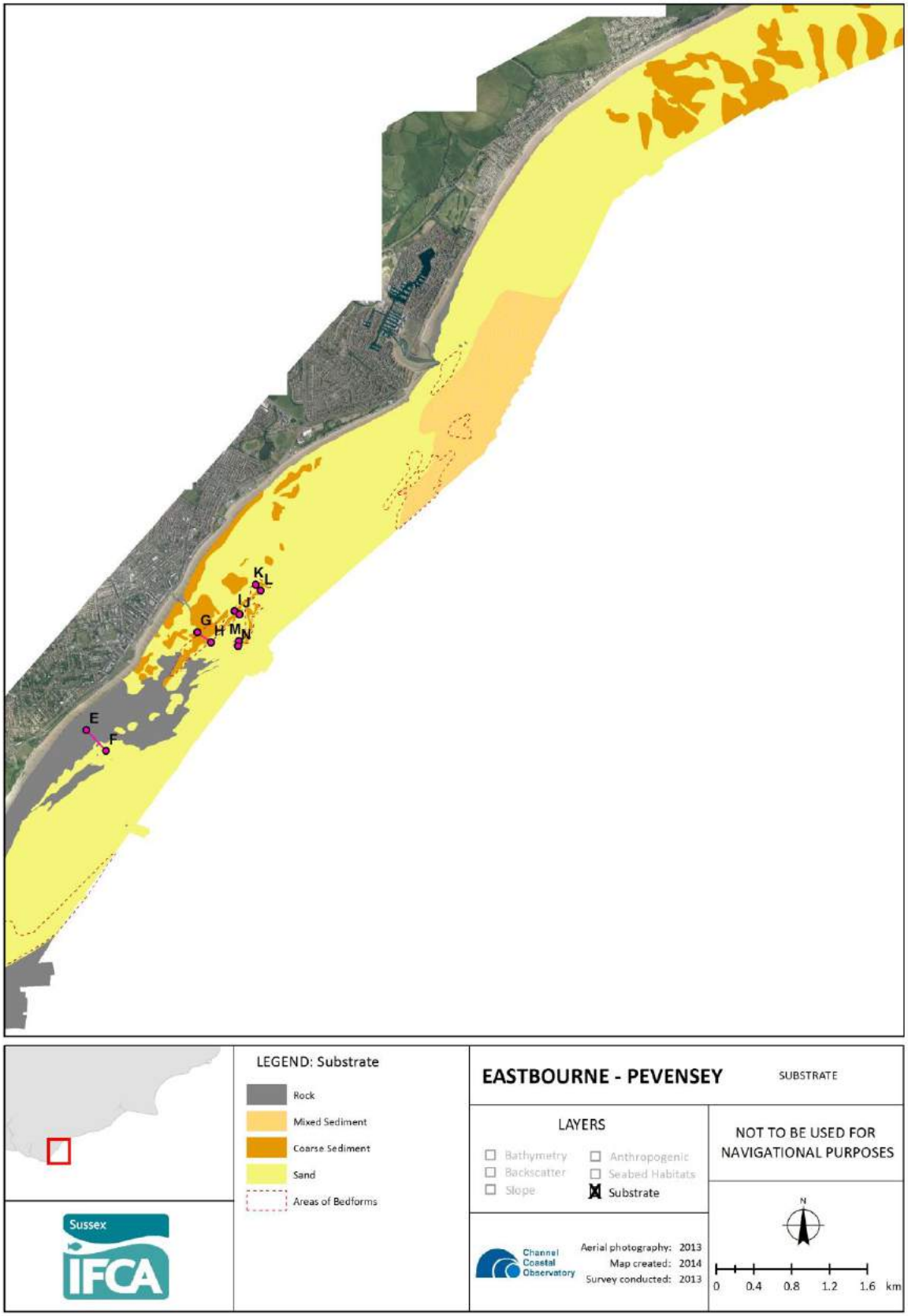

Cross-section (G - H)
Depth (mOD)
-3.8
-4
-4.2
-4.4
-4.6
-4.8
-5
-5.2
-5.4
0 20 40 60 80 100 120 140 160 180
Distance (m)
Cross-section (I - J)
Depth (mOD)
-5.6
-5.7
-5.8
-5.9
-6
-6.1
-6.2
-6.3
0 5 10 15 20 25 30 35 40 45 50 55
Distance (m)
Cross-section (K - L)
Depth (mOD)
-5.7
-5.8
-5.9
-6
-6.1
-6.2
-6.3
-6.4
-6.5
0 10 20 30 40 50 60 70 80
Distance (m)
Cross-section (M - N)
Depth (mOD)
-7.3
-7.35
-7.4
-7.45
-7.5
-7.55
-7.6
-7.65
-7.7
-7.75
-7.8
-7.85
0 5 10 15 20 25 30 35 40 45 50 55
Distance (m)

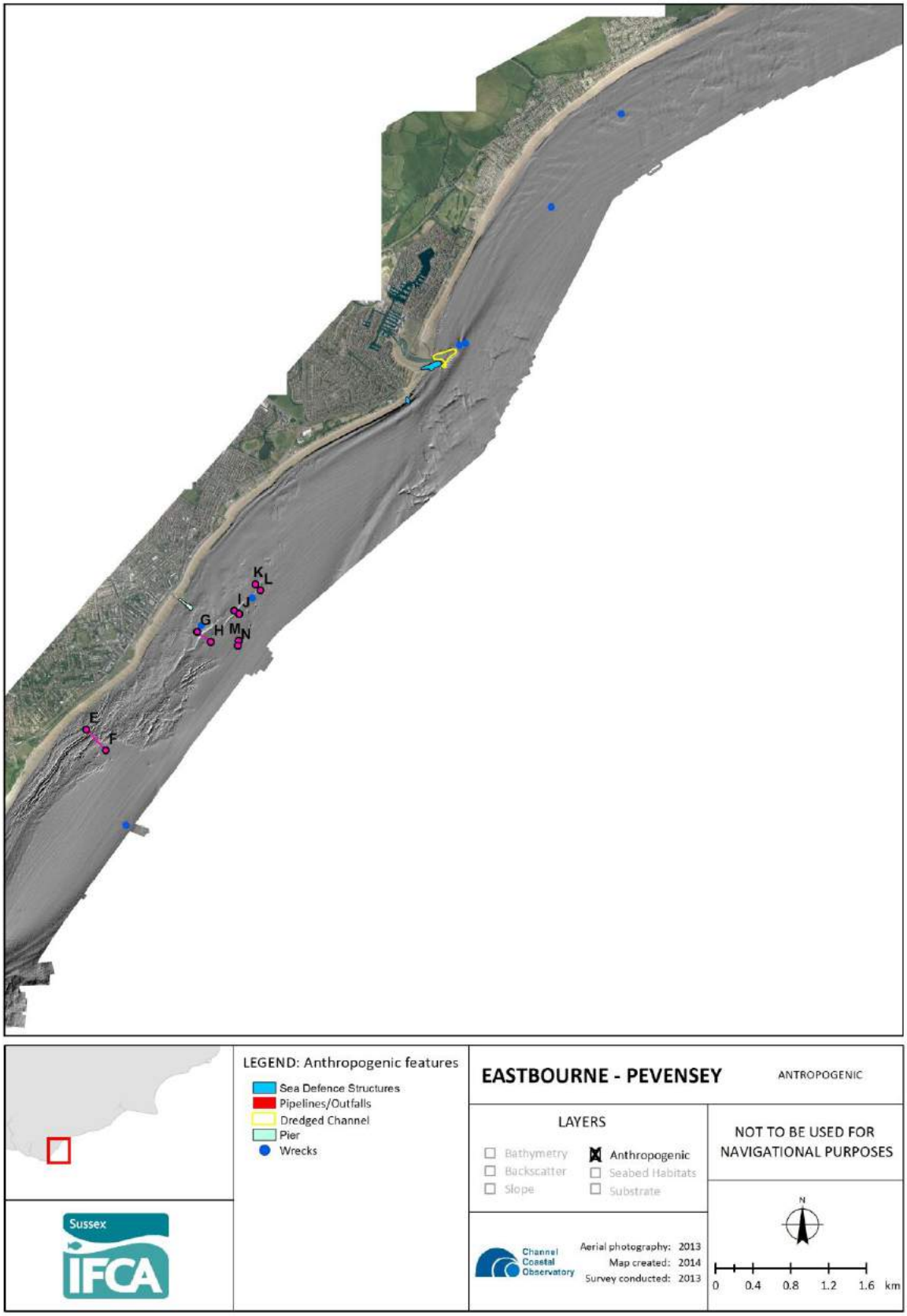

K
L
I
J
G
H
M
N
E
F
LEGEND: Elevation (mOD)
0
-5
-10
-20
-30
-40
EASTBOURNE - PEVENSEY
BATHYMETRY
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
N
0 0.4 0.8 1.2 1.6 km


K
L
I
J
G
H
M
N
E
F
LEGEND: Backscatter Intensity
High Intensity
Low Intensity
EASTBOURNE - PEVENSEY
BACKSCATTER
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
N
0 0.4 0.8 1.2 1.6 km


K
L
I
J
G
H
M
N
E
F
LEGEND: Slope angle (degrees)
0 - 1
1 - 3
3 - 5
5 - 10
10 - 15
15 - 20
20 - 30
30 - 40
40 - 90
EASTBOURNE - PEVENSEY
SEABED SLOPE
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
N
0 0.4 0.8 1.2 1.6 km

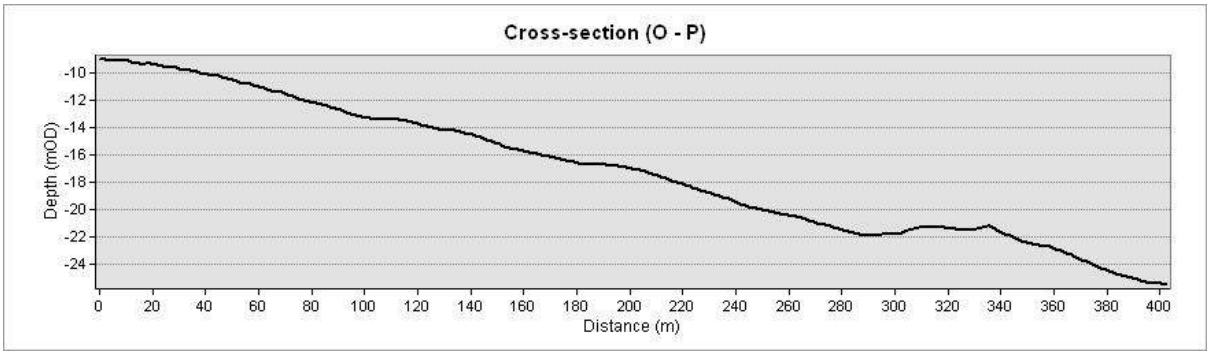

K
L
IJ
G
H
M
N
E
F
LEGEND: EUNIS Level 3
Circalittoral, Low Energy Rock
Circalittoral, Low Energy Rock and thin Sediment
Infralittoral, Low Energy Rock
Infralittoral, Low Energy Rock and thin Sediment
Littoral, Coarse Sediment
Littoral, Low Energy Rock
Littoral, Low Energy Rock and thin Sediment
Littoral, Mixed Sediment
Littoral, Sand
Sublittoral, Coarse Sediment
Sublittoral, Mixed Sediment
Sublittoral, Sand
EASTBOURNE - PEVENSEY
SEABED HABITATS
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
N
0 0.4 0.8 1.2 1.6 km


K
L
J
I
G
H
M
N
E
F
LEGEND: Substrate
Rock
Mixed Sediment
Coarse Sediment
Sand
Areas of Bedforms
EASTBOURNE - PEVENSEY
SUBSTRATE
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
N
0 0.4 0.8 1.2 1.6 km

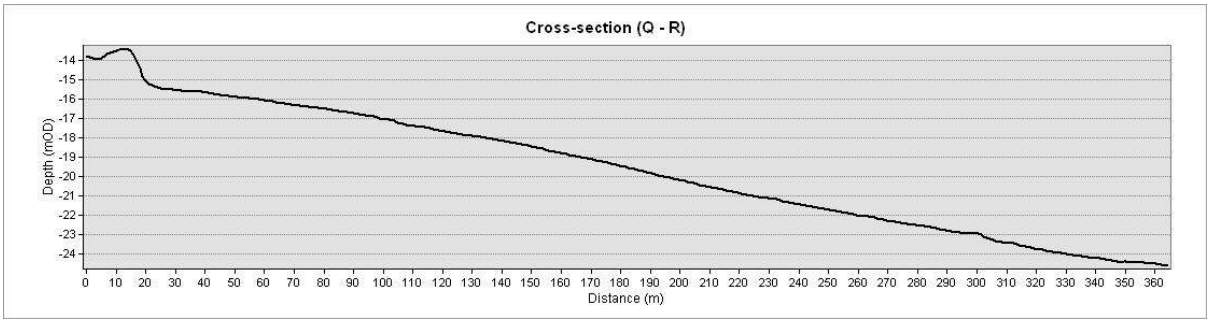

K
L
I
J
G
H
M
N
E
F
LEGEND: Anthropogenic features
Sea Defence Structures
Pipelines/Outfalls
Dredged Channel
Pier
Wrecks
EASTBOURNE - PEVENSEY
ANTROPOGENIC
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
N
0 0.4 0.8 1.2 1.6 km

Beachy Head

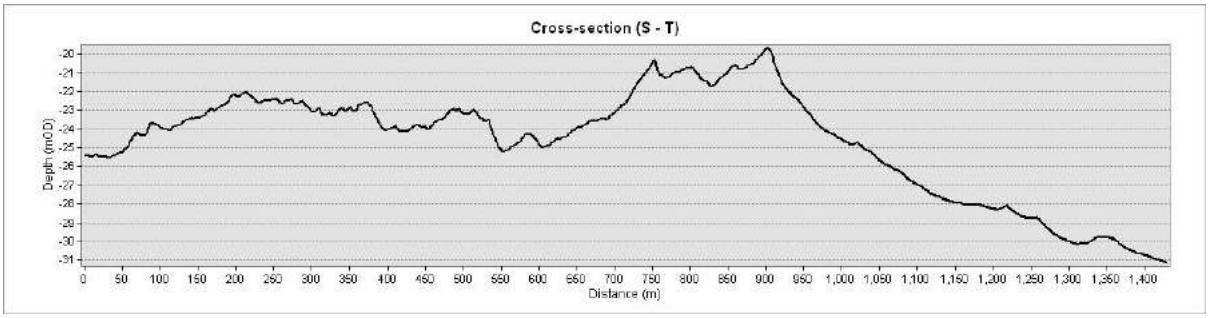
The bathymetry south of Beachy Head is highly variable. The seabed from the southeastern part of the headland drops steadily from -10mOD to -25mOD (Cross-section O-P), with a maximum depth of -36mOD. Running northeast-southwest, and approximately perpendicular to the eastern edge of the headland, is a prominent rock ridge.



To the south of the headland an extensive rock platform extends up to 800m seawards, which in places, terminates abruptly with steep 3m cliff-like faces or slopes. In other places, the edge of the visible platform is determined by the extent of a substantial bank of sloping sediment that has built up along the edge of the rock platform. The elevation and topography of the rock platform and outcrops varies south of the headland and appears to influence sediment transport and deposition. The rock platform becomes discernible further offshore beneath a thinner layer of sediment. Cross-section Q-R is an example of this with an abrupt drop off at a rock ridge and the sediment sloping from initial depths of -15mOD at the base on the rock platform to depths greater than -25mOD. This area is much deeper and has a steeper gradient compared to areas northeast of Beachy Head.



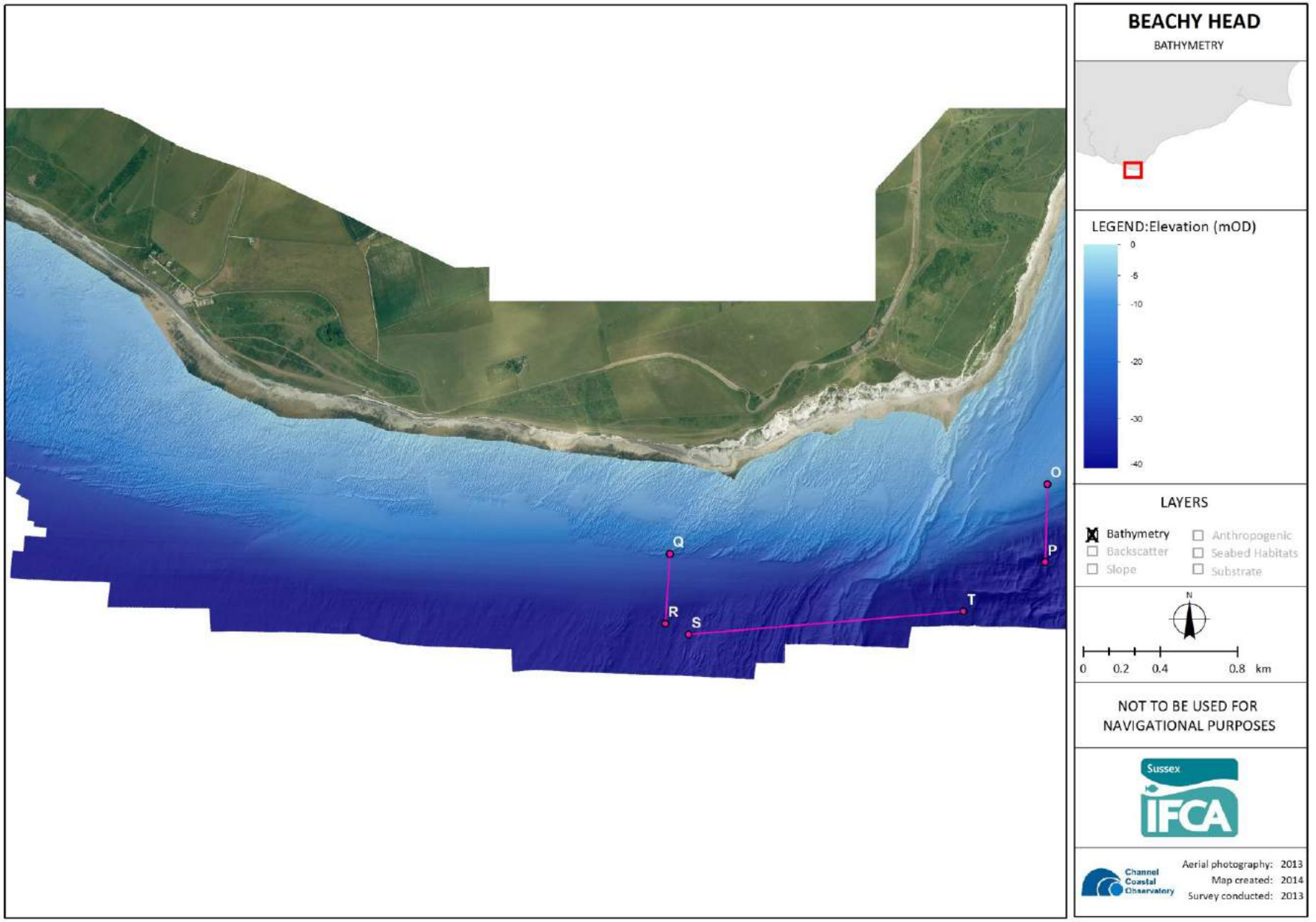
The prominent rocky ridge, mentioned above, can be identified in the slope map and extends across the entire width of the surveyed area at the eastern side of Beachy Head. This plateau runs between -19 and -21mOD and divides the deeper offshore area into two sections (Cross-section S-T). The eastern side drops steeply to depths below -30mOD and the western flank drops less steeply to -24mOD where a number of smaller ridges are exposed. These ridges are slowly covered by increasingly thicker sediment further west initially being classified as rock and thin sediment and finally coarse sediment.

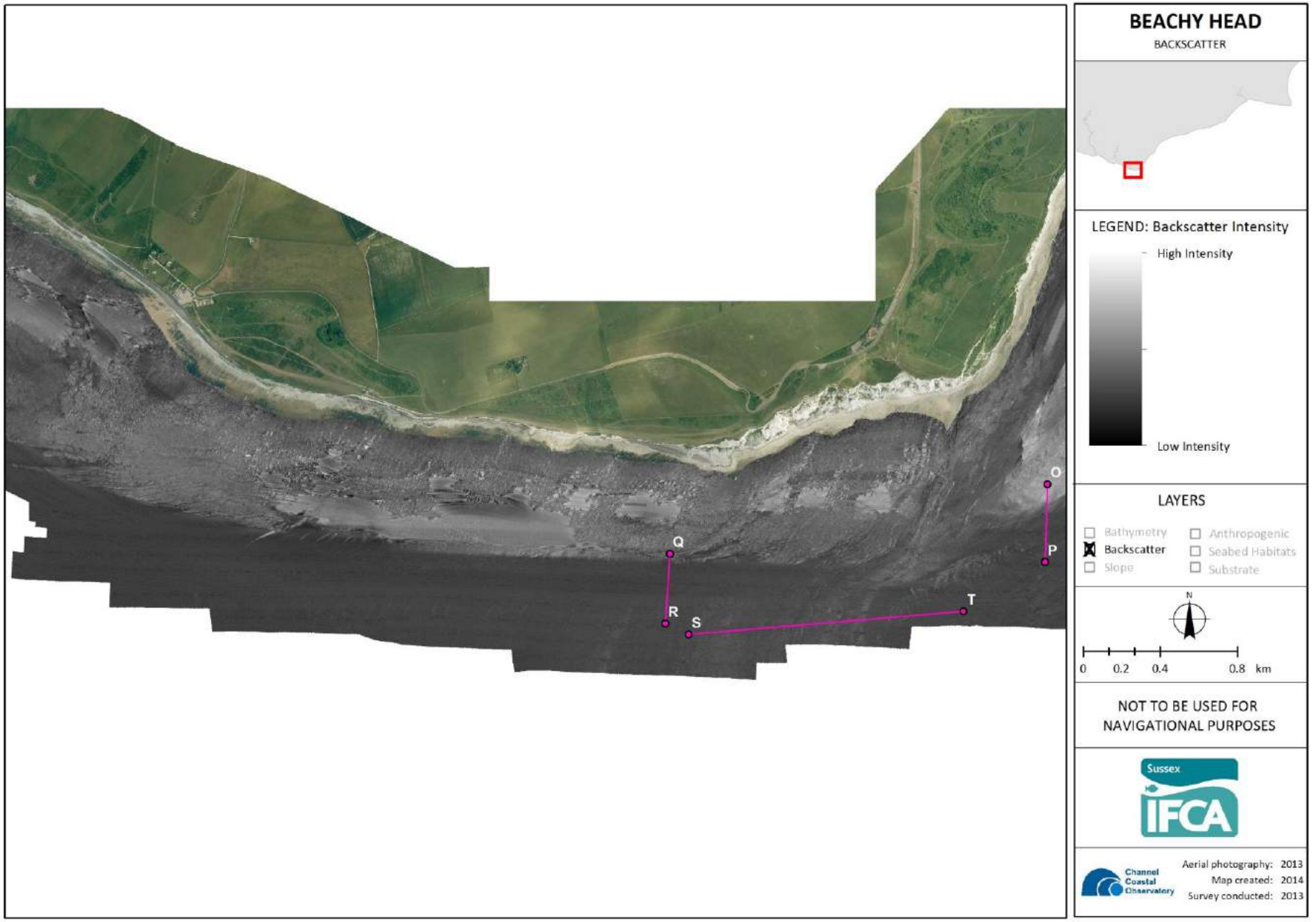


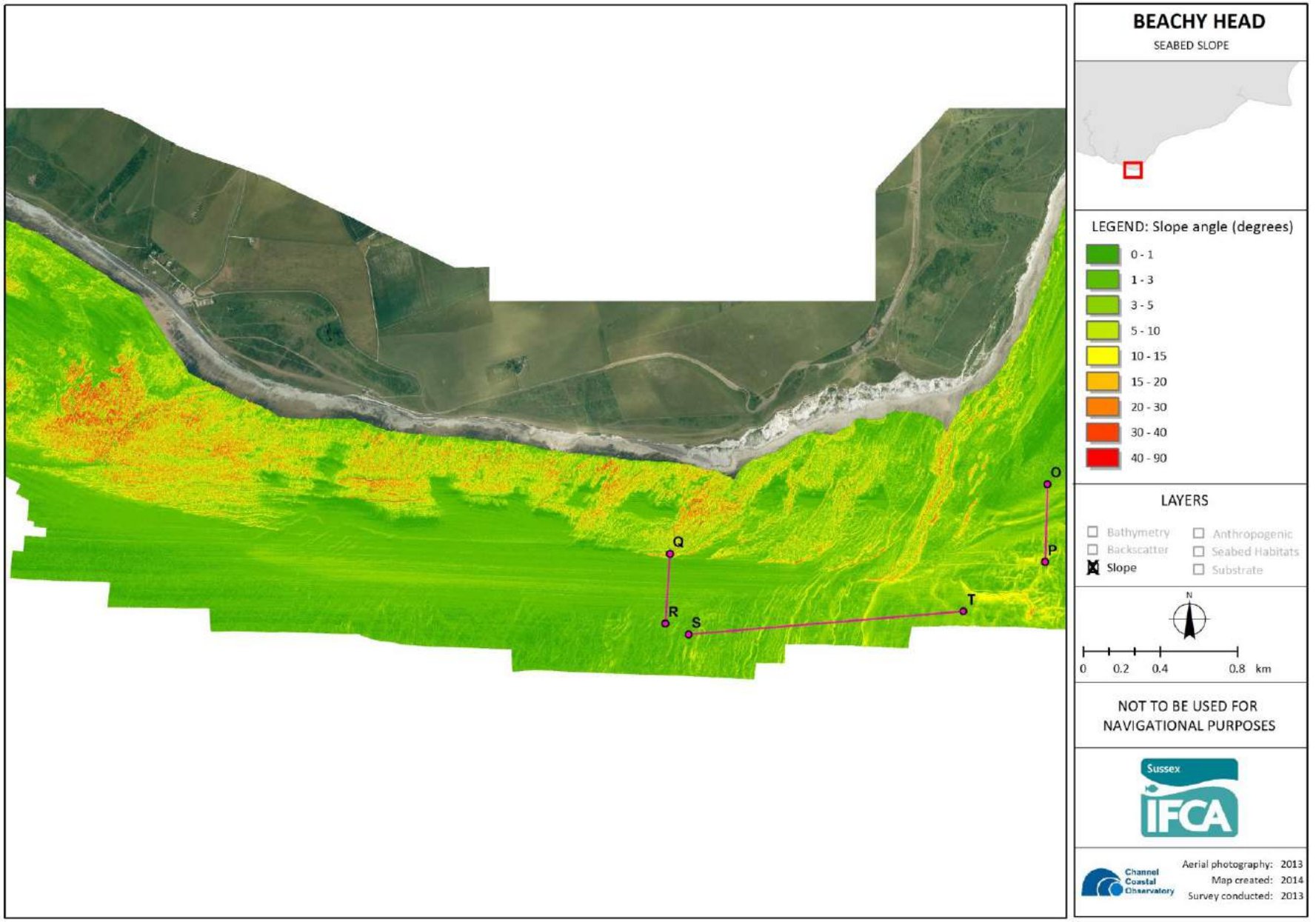
An area of rippled bedform features has been identified to the east of Beachy Head where the sandy substrate is of sufficient thickness to mask the underlying bedrock.

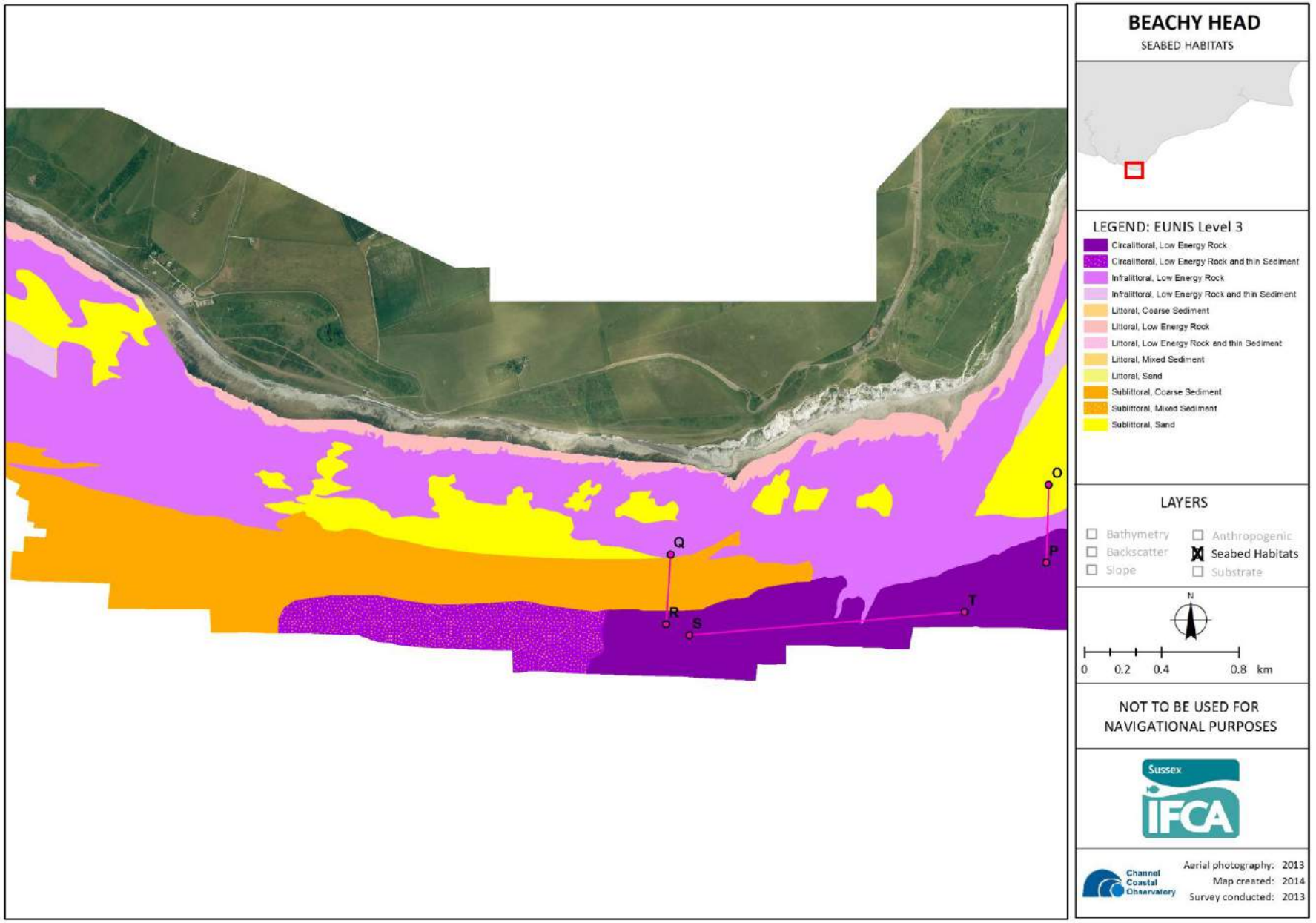
No wreck or anthropogenic features were identified.

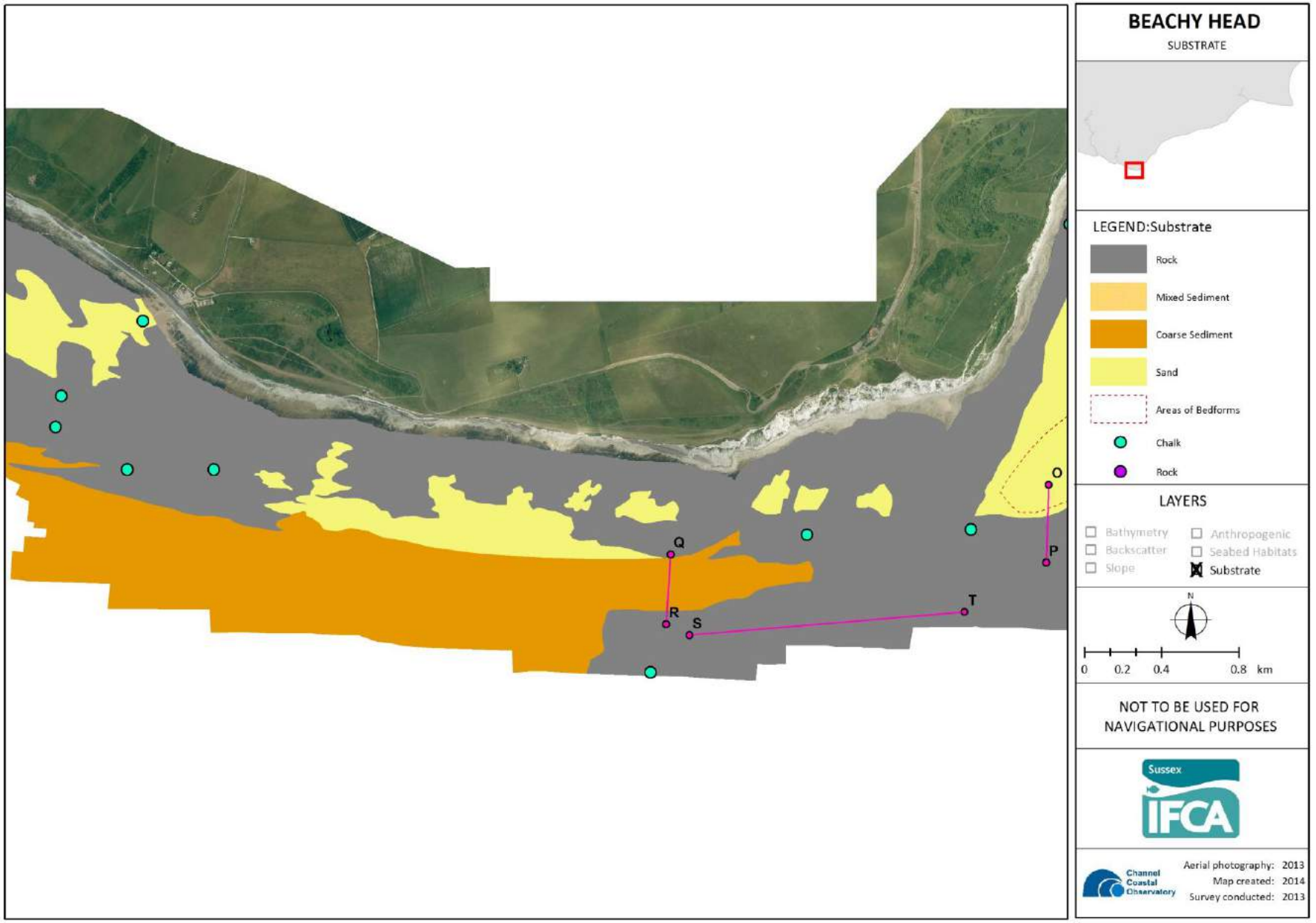
Even though there is evidence, both from the survey and tidal data, the tidal steam peaks at a moderate energy, this is only for a very short period of time during peak flow and the area is therefore still classed as low energy.


BEACHY HEAD
BATHYMETRY
LEGEND:Elevation (mOD)
0
-5
-10
-20
-30
-40
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.2 0.4 0.8 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
O
P
Q
R
S
T


BEACHY HEAD
BACKSCATTER
LEGEND: Backscatter Intensity
High Intensity
Low Intensity
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.2 0.4 0.8 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
O
P
Q
R
S
T


BEACHY HEAD
SEABED SLOPE
LEGEND: Slope angle (degrees)
0 - 1
1 - 3
3 - 5
5 - 10
10 - 15
15 - 20
20 - 30
30 - 40
40 - 90
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.2 0.4 0.8 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
O
P
Q
R
S
T

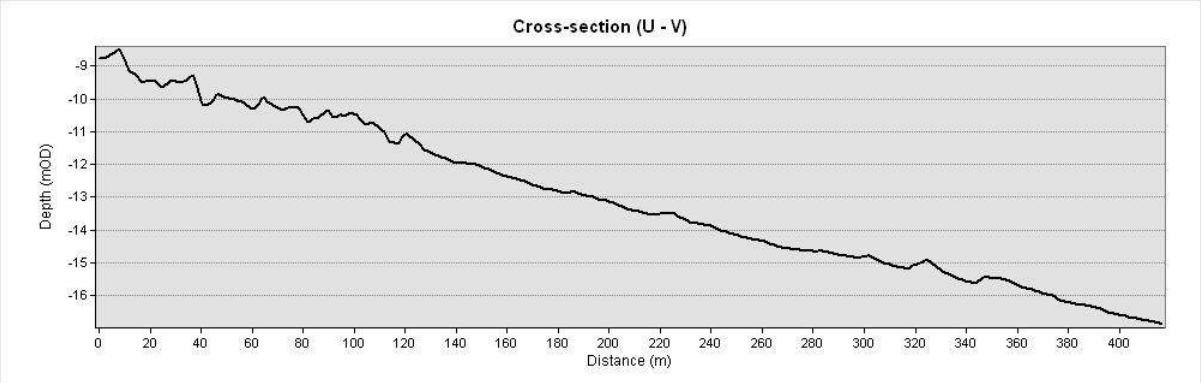

BEACHY HEAD
SEABED HABITATS
LEGEND: EUNIS Level 3
Circalittoral, Low Energy Rock
Circalittoral, Low Energy Rock and thin Sediment
Infralittoral, Low Energy Rock
Infralittoral, Low Energy Rock and thin Sediment
Littoral, Coarse Sediment
Littoral, Low Energy Rock
Littoral, Low Energy Rock and thin Sediment
Littoral, Mixed Sediment
Littoral, Sand
Sublittoral, Coarse Sediment
Sublittoral, Mixed Sediment
Sublittoral, Sand
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.2 0.4 0.8 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
O
P
Q
R
S
T


BEACHY HEAD
SUBSTRATE
LEGEND:Substrate
Rock
Mixed Sediment
Coarse Sediment
Sand
Areas of Bedforms
Chalk
Rock
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.2 0.4 0.8 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
O
P
Q
R
S
T

Cuckmere Haven

The extensive rock platform continues westwards from Beachy Head to Seaford Head, creating another complex and variable section of seabed. At the mouth of the Cuckmere River there is an expanse of sandy sediment that is of sufficient thickness to mask the underlying rock platform.

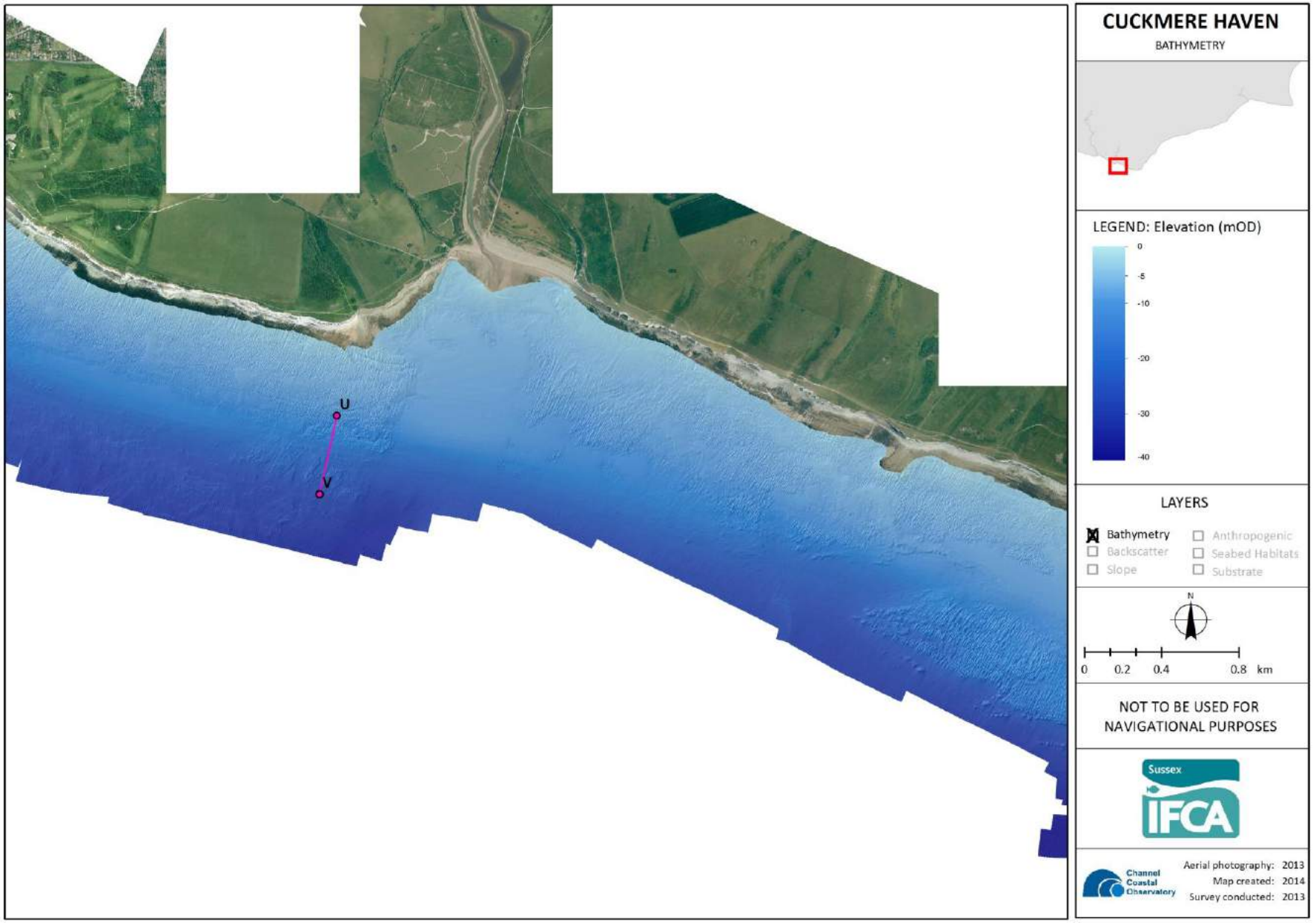
The edge of the discernible rock platform is not the seaward extent but is where the sediment is thick enough to cover the rock platform, which slopes consistently offshore (Cross-section U-V). The extent of the rock platform and areas of sloping sediments can clearly be seen using the slope map. The maximum depths in this area range from -14 to -18mOD.

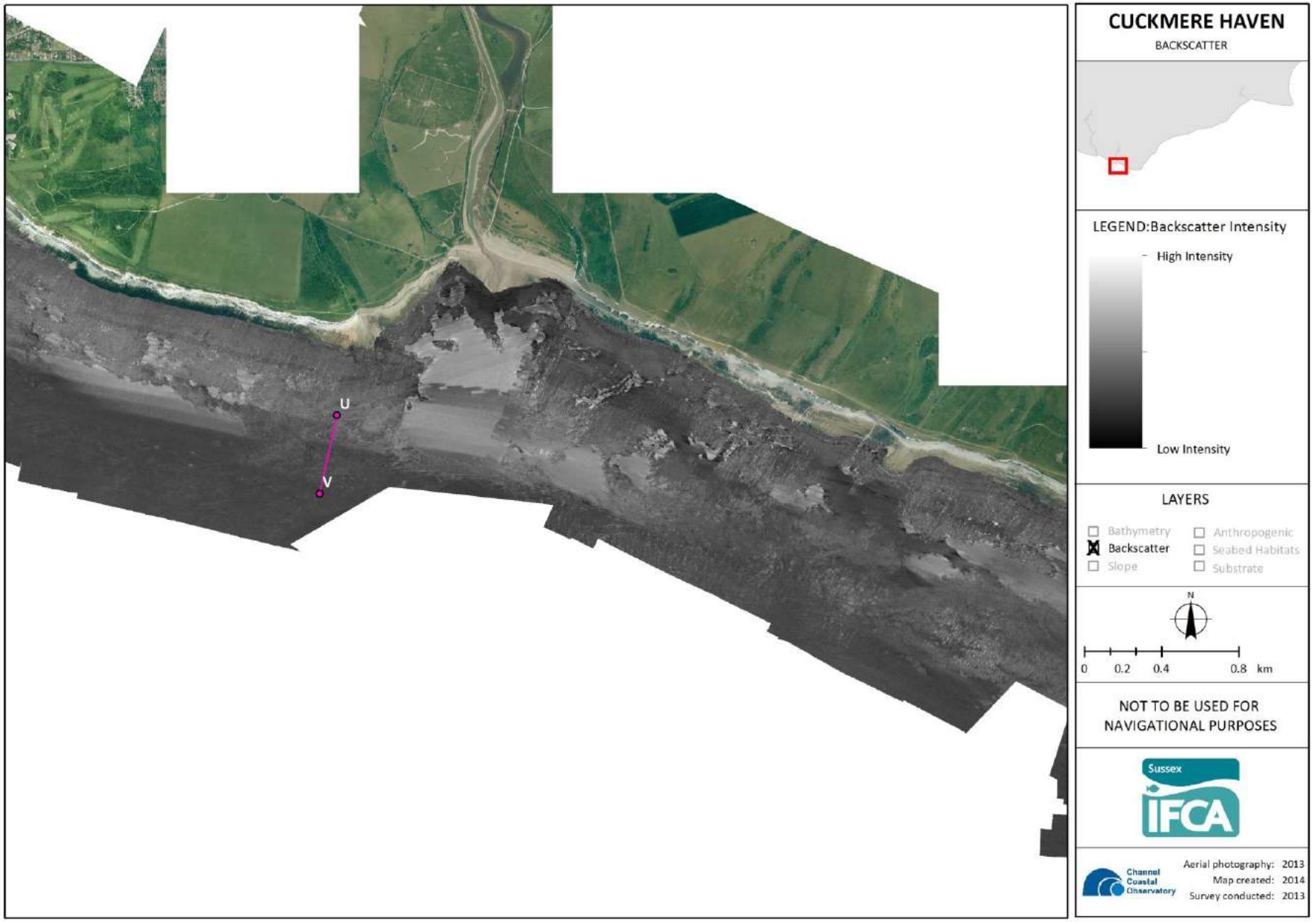


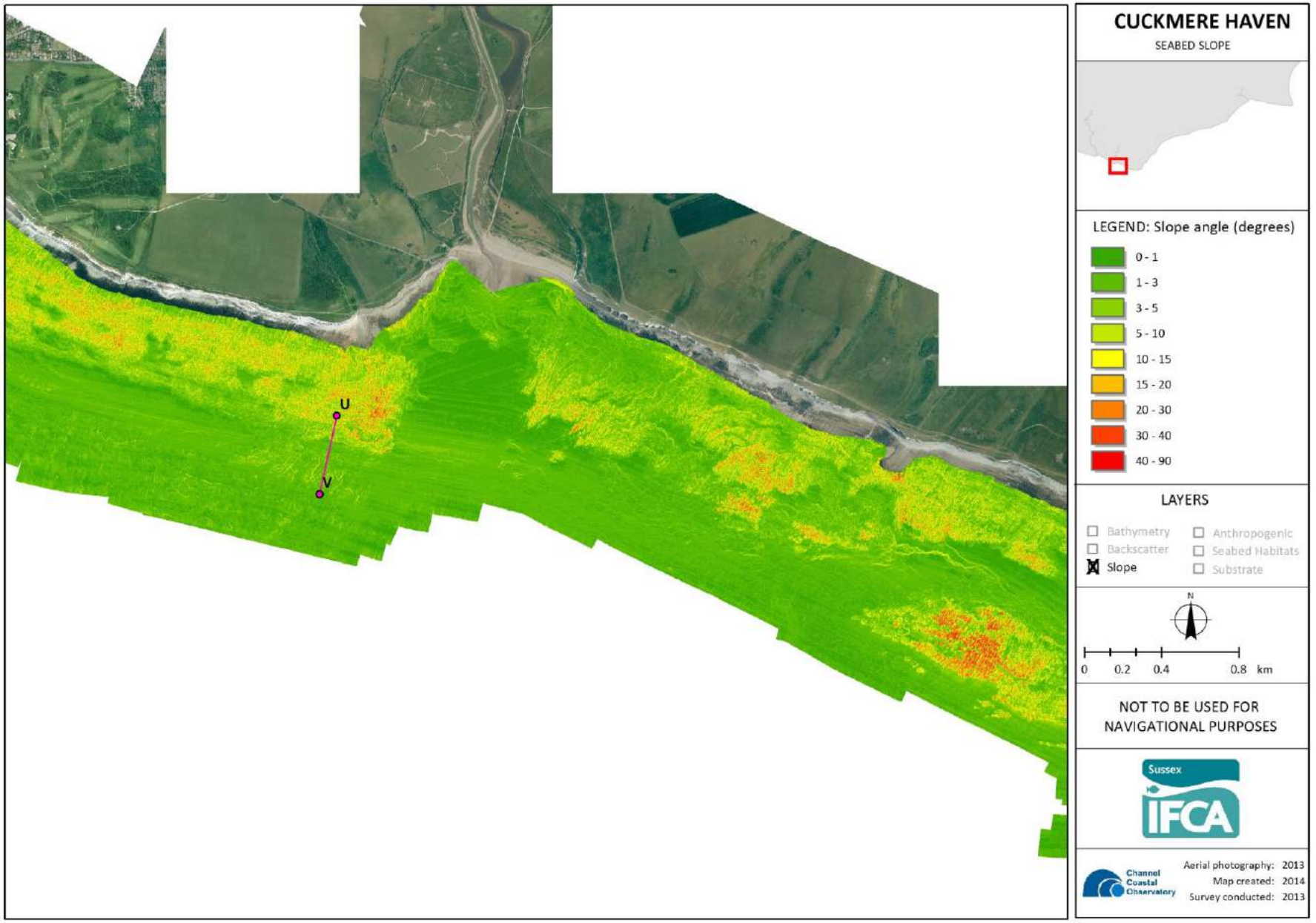
Sand is present in a number of patches and gullies on the rock platform and at the mouth of Cuckmere Haven. Further offshore there are areas of sand, mixed and coarser sediments that either have accumulated against the edge of the rock platform or cover the platform, which extends further offshore, in parts discernible through the surficial sediment. Mixed sediment extends eastwards of Cuckmere Haven towards Beachy Head but is not thick enough to mask the underlying rock platform.

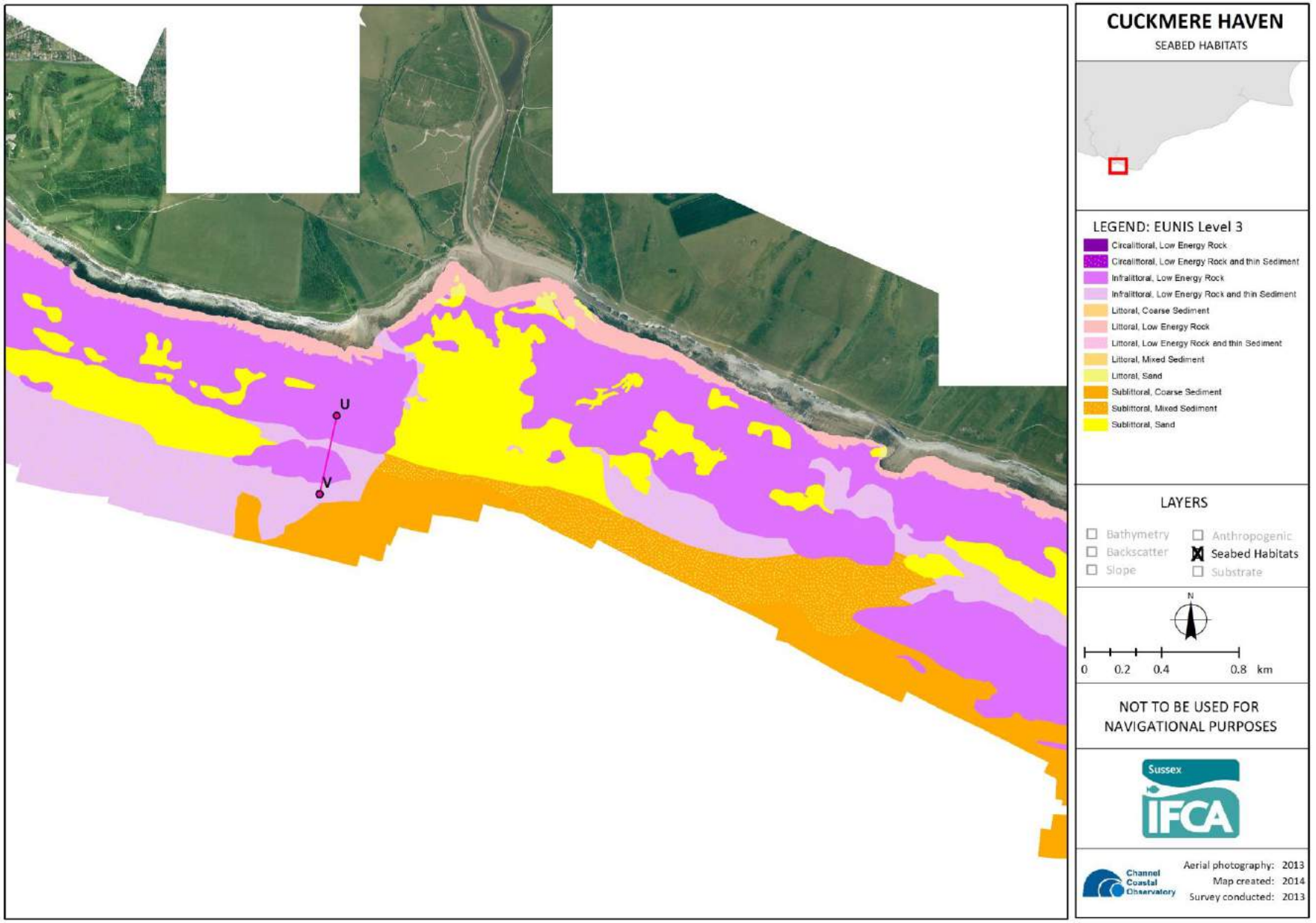
Tidal stream data shows a moderately strong current offshore during peak flow but overall can be described as weak, and therefore may explain the lack of bedforms in this area.

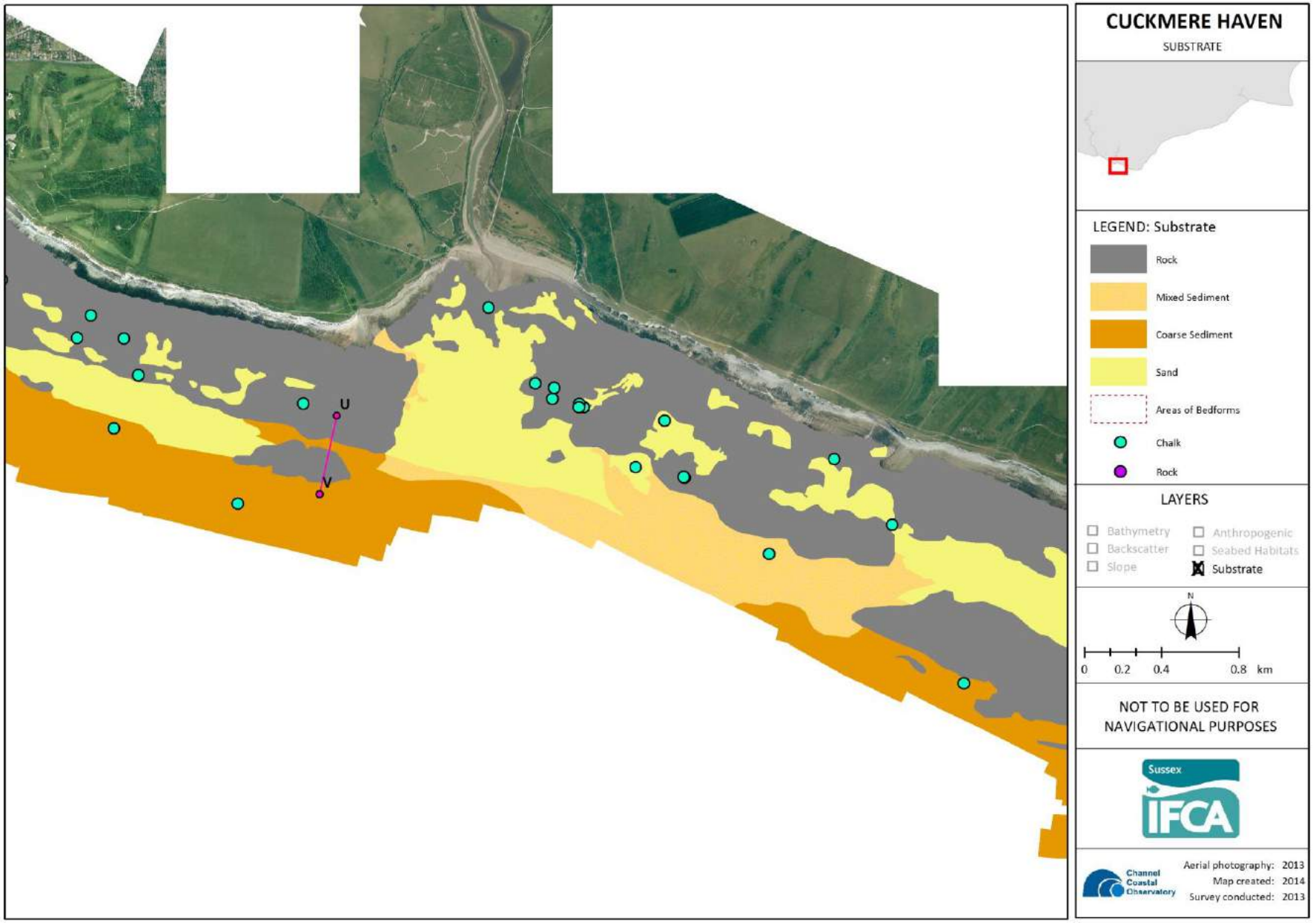
No wrecks or anthropogenic features were identified.


U
V
CUCKMERE HAVEN
BATHYMETRY
LEGEND: Elevation (mOD)
0
-5
-10
-20
-30
-40
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.2 0.4 0.8 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


U
V
CUCKMERE HAVEN
BACKSCATTER
LEGEND:Backscatter Intensity
High Intensity
Low Intensity
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.2 0.4 0.8 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


U
V
CUCKMERE HAVEN
SEABED SLOPE
LEGEND: Slope angle (degrees)
0 - 1
1 - 3
3 - 5
5 - 10
10 - 15
15 - 20
20 - 30
30 - 40
40 - 90
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.2 0.4 0.8 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


U
V
CUCKMERE HAVEN
SEABED HABITATS
LEGEND: EUNIS Level 3
Circalittoral, Low Energy Rock
Circalittoral, Low Energy Rock and thin Sediment
Infralittoral, Low Energy Rock
Infralittoral, Low Energy Rock and thin Sediment
Littoral, Coarse Sediment
Littoral, Low Energy Rock
Littoral, Low Energy Rock and thin Sediment
Littoral, Mixed Sediment
Littoral, Sand
Sublittoral, Coarse Sediment
Sublittoral, Mixed Sediment
Sublittoral, Sand
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.2 0.4 0.8 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


U
V
CUCKMERE HAVEN
SUBSTRATE
LEGEND: Substrate
Rock
Mixed Sediment
Coarse Sediment
Sand
Areas of Bedforms
Chalk
Rock
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.2 0.4 0.8 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

Newhaven to Seaford

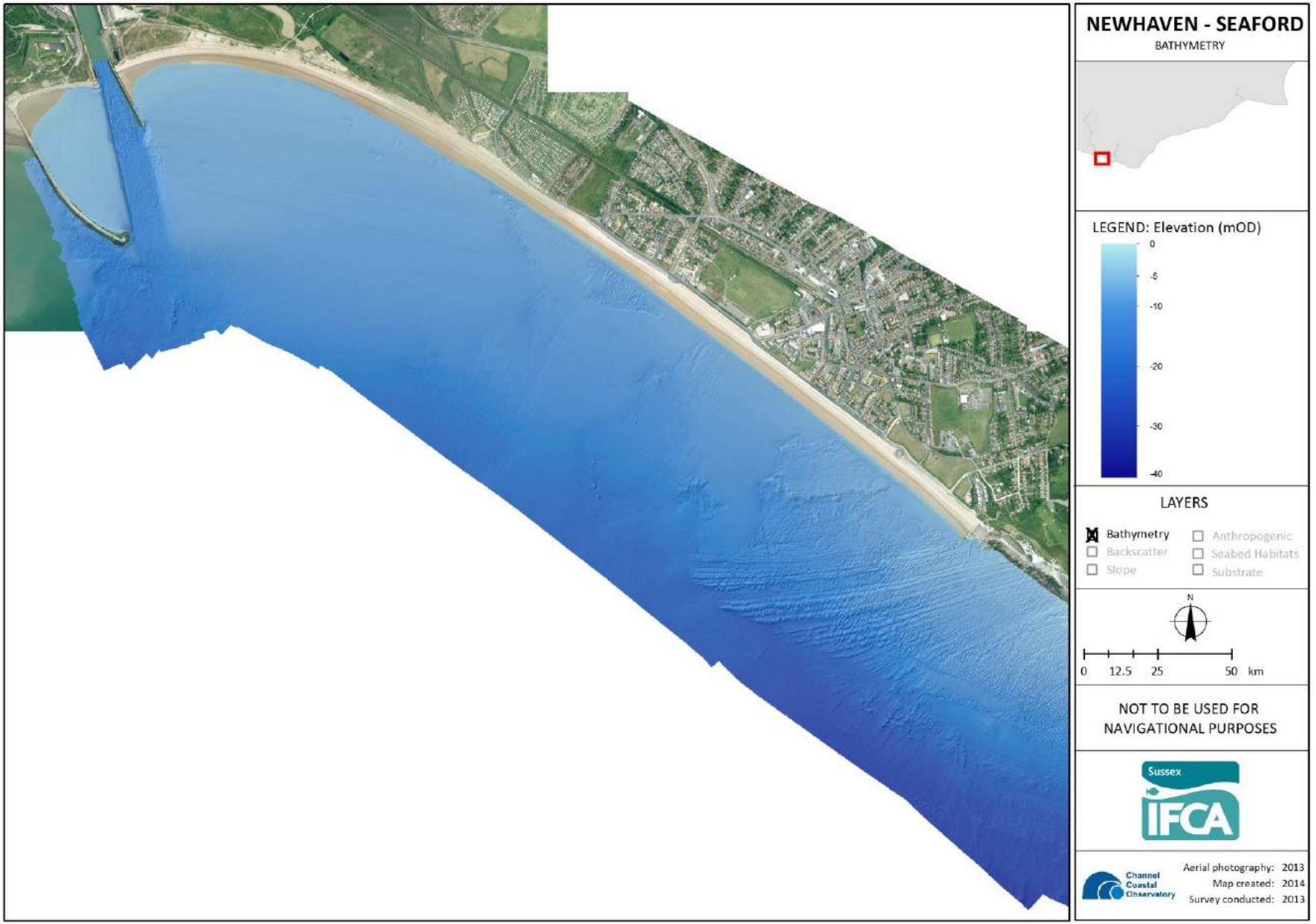
The western limit of the Seaford Head rock platform is clearly discernible in the eastern section of this area. Offshore of Seaford the seabed is dominated by gently sloping, shallow sand which gradually increases in depth from -17mOD seaward of the rock platform to -5mOD in the north of Seaford Bay. The area of managed seafront at Seaford is featureless and slopes gently offshore.

There is a gradual transition in sediment thickness from east to west. There is an expanse of flat ‘Rock and thin Sediment’ at the eastern extent, with a patch of mixed sediment at the base of the gently sloping seabed. As the seabed slopes upwards, west, along the flank of the rock platform the sediment become thick enough to mask the underlying geology.

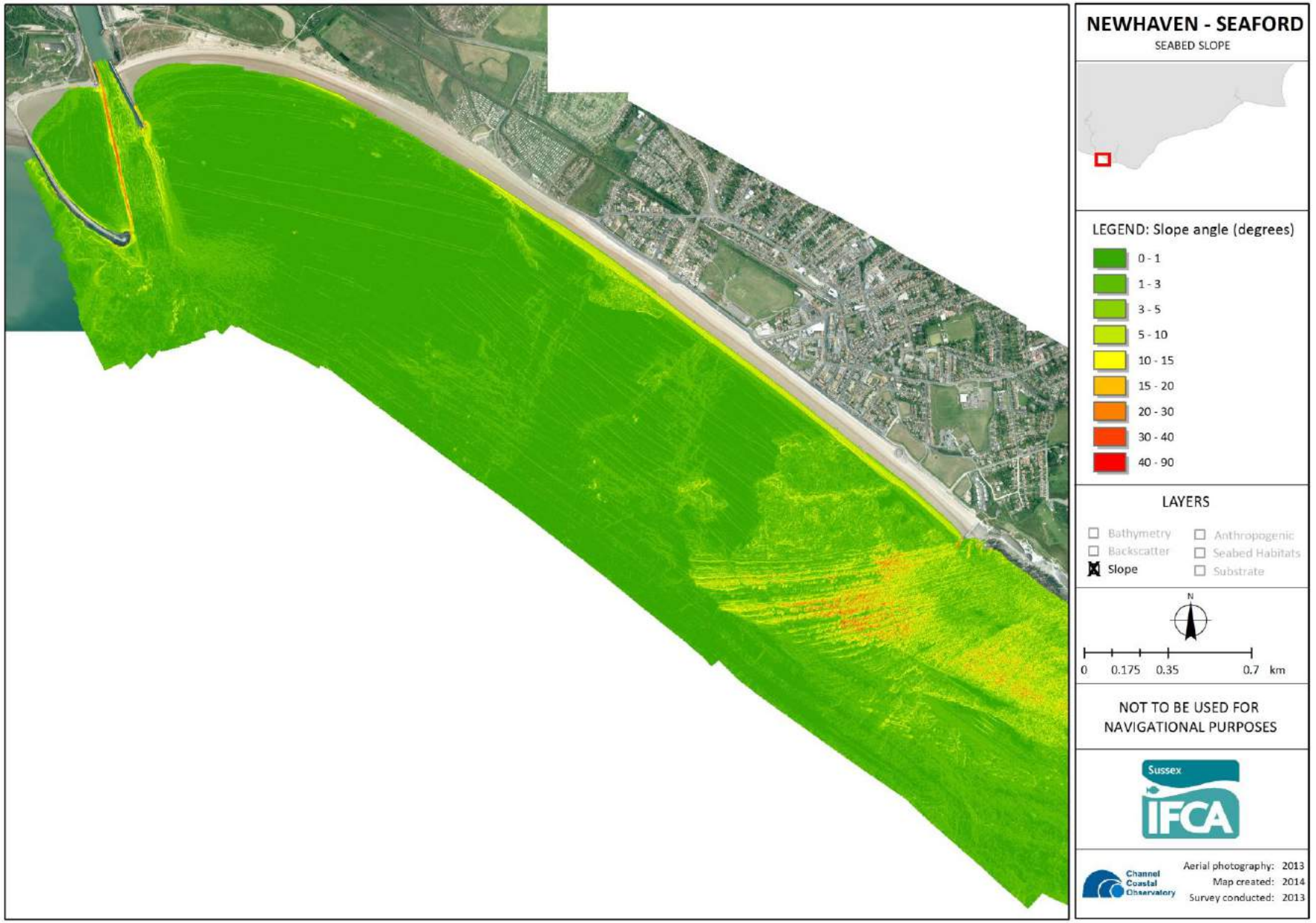
There are two prominent areas of rock and thin sediment to the west of the rock platform and one area of mixed sediment at the entrance of the dredged Newhaven Channel, both can be clearly seen as darker patches in the backscatter map. The coarse sediment has built up in a depression surrounding two rock features at the entrance to the Newhaven Channel.

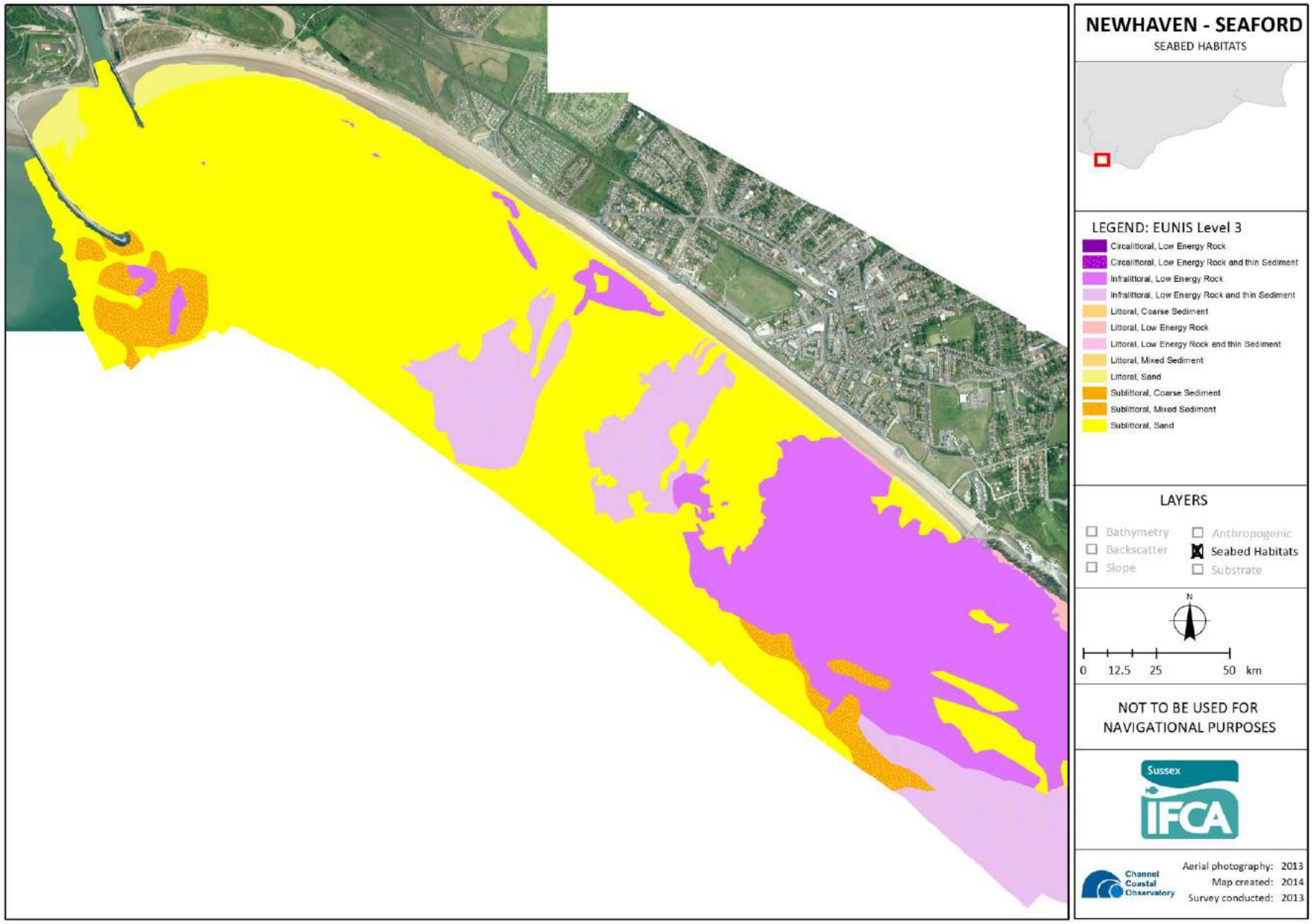
Three wrecks were located and the only anthropogenic features that are observed are scars in the Newhaven channel, which is dredged to approximately -10mOD.

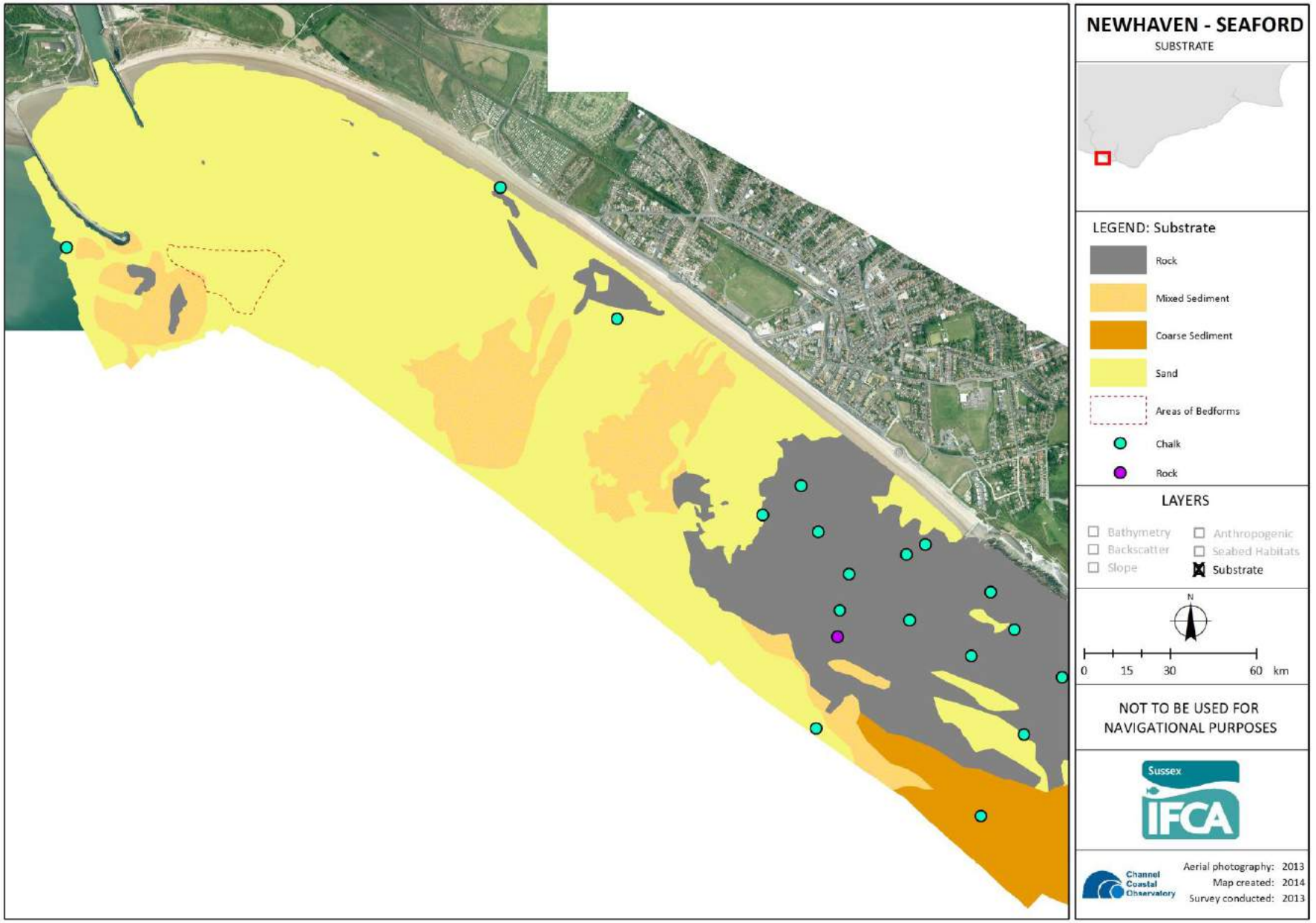
One area of bedforms was identified on the bank of the Newhaven channel entrance. These bedforms are likely to be associated with stronger currents in the dredged channel. The remaining, featureless sand seabed indicates the area is a low energy environment. Seaford Bay is sheltered and has a weak tidal stream. The Seaford Head rock platform is more exposed but there is no evidence of a prevailing moderate energy environment.

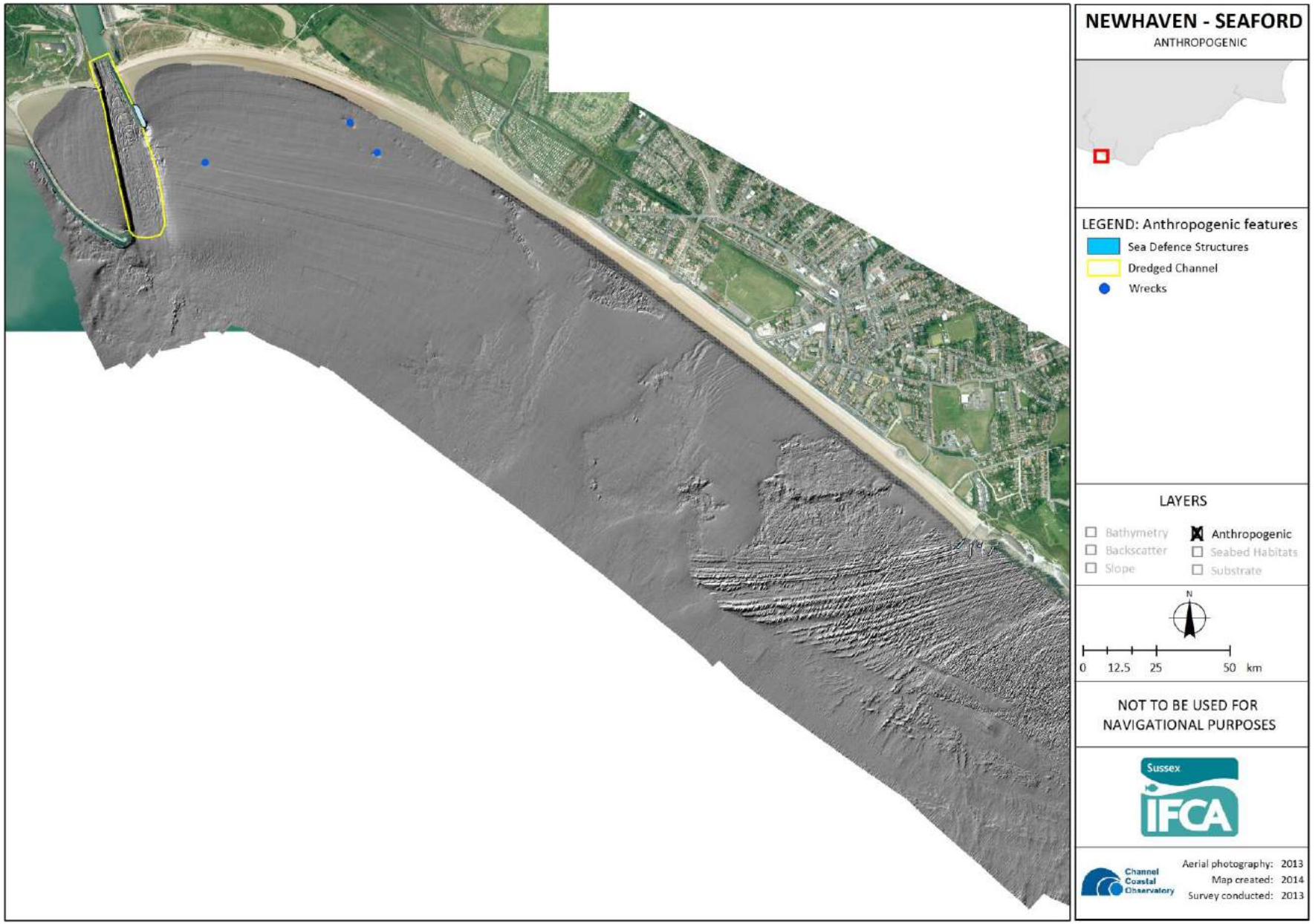

NEWHAVEN - SEAFORD
BATHYMETRY
LEGEND: Elevation (mOD)
0
-5
-10
-20
-30
-40
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 12.5 25 50 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


NEWHAVEN - SEAFORD
BACKSCATTER
LEGEND: Backscatter Intensity
High Intensity
Low Intensity
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 12.5 25 50 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2011


NEWHAVEN - SEAFORD
SEABED SLOPE
LEGEND: Slope angle (degrees)
0 - 1
1 - 3
3 - 5
5 - 10
10 - 15
15 - 20
20 - 30
30 - 40
40 - 90
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.175 0.35 0.7 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


NEWHAVEN - SEAFORD
SEABED HABITATS
LEGEND: EUNIS Level 3
Circalittoral, Low Energy Rock
Circalittoral, Low Energy Rock and thin Sediment
Infralittoral, Low Energy Rock
Infralittoral, Low Energy Rock and thin Sediment
Littoral, Coarse Sediment
Littoral, Low Energy Rock
Littoral, Low Energy Rock and thin Sediment
Littoral, Mixed Sediment
Littoral, Sand
Sublittoral, Coarse Sediment
Sublittoral, Mixed Sediment
Sublittoral, Sand
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 12.5 25 50 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

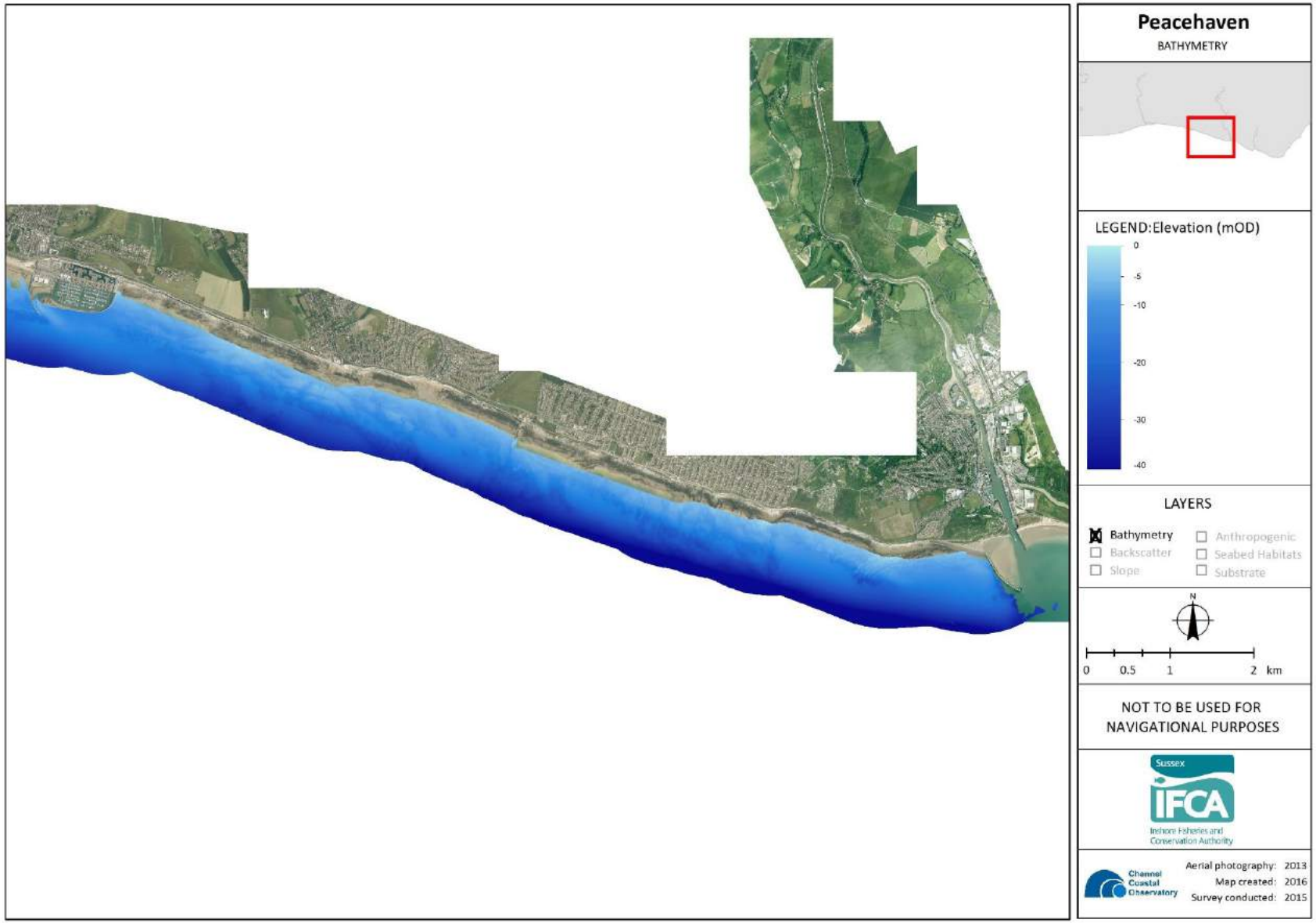

NEWHAVEN - SEAFORD
SUBSTRATE
LEGEND: Substrate
Rock
Mixed Sediment
Coarse Sediment
Sand
Areas of Bedforms
Chalk
Rock
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 15 30 60 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

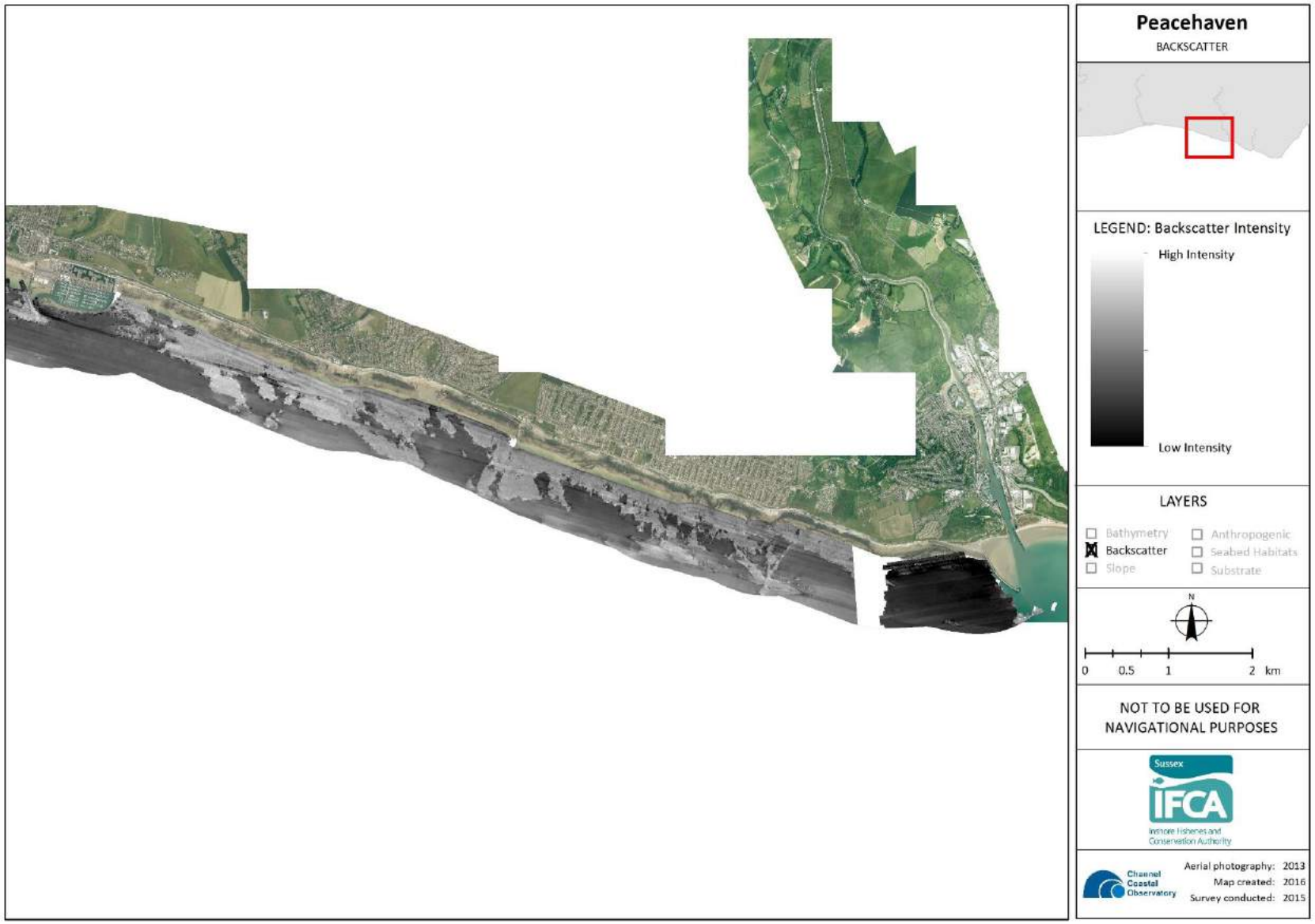

NEWHAVEN - SEAFORD
ANTHROPOGENIC
LEGEND: Anthropogenic features
Sea Defence Structures
Dredged Channel
Wrecks
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 12.5 25 50 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

Peacehaven

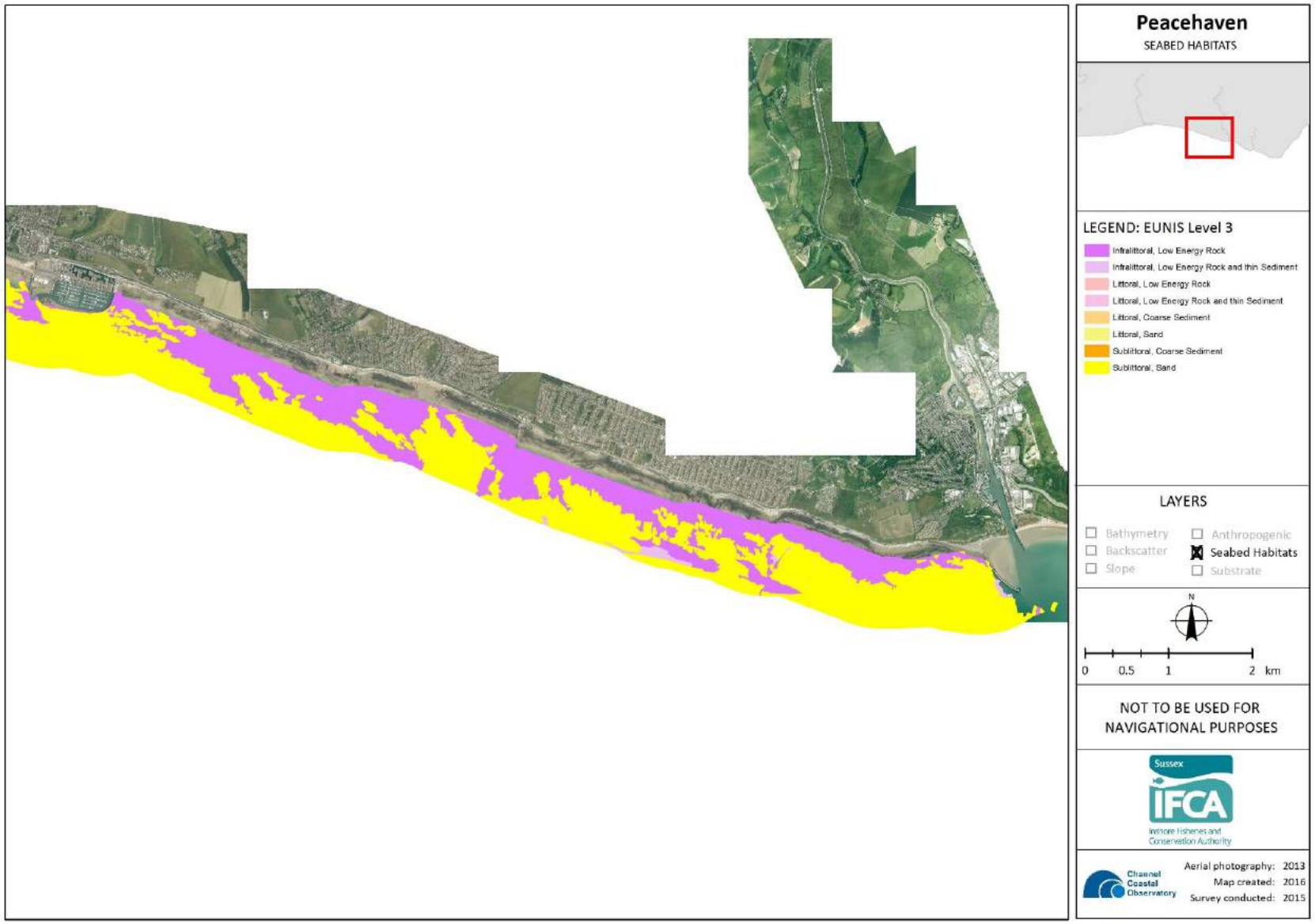
The chalk bedrock platform dominates the inter-tidal and sub-tidal zone, with distinct exposures and outcrops further offshore. Slope analysis and backscatter indicates the truncated seaward limit of the rock platform, which is marked by the approximately 1m high and steep face of the platform. Offshore, the seabed is dominated by sandy sediment, potentially constrained by the underlying geology and the seaward edge or limit of the platform.

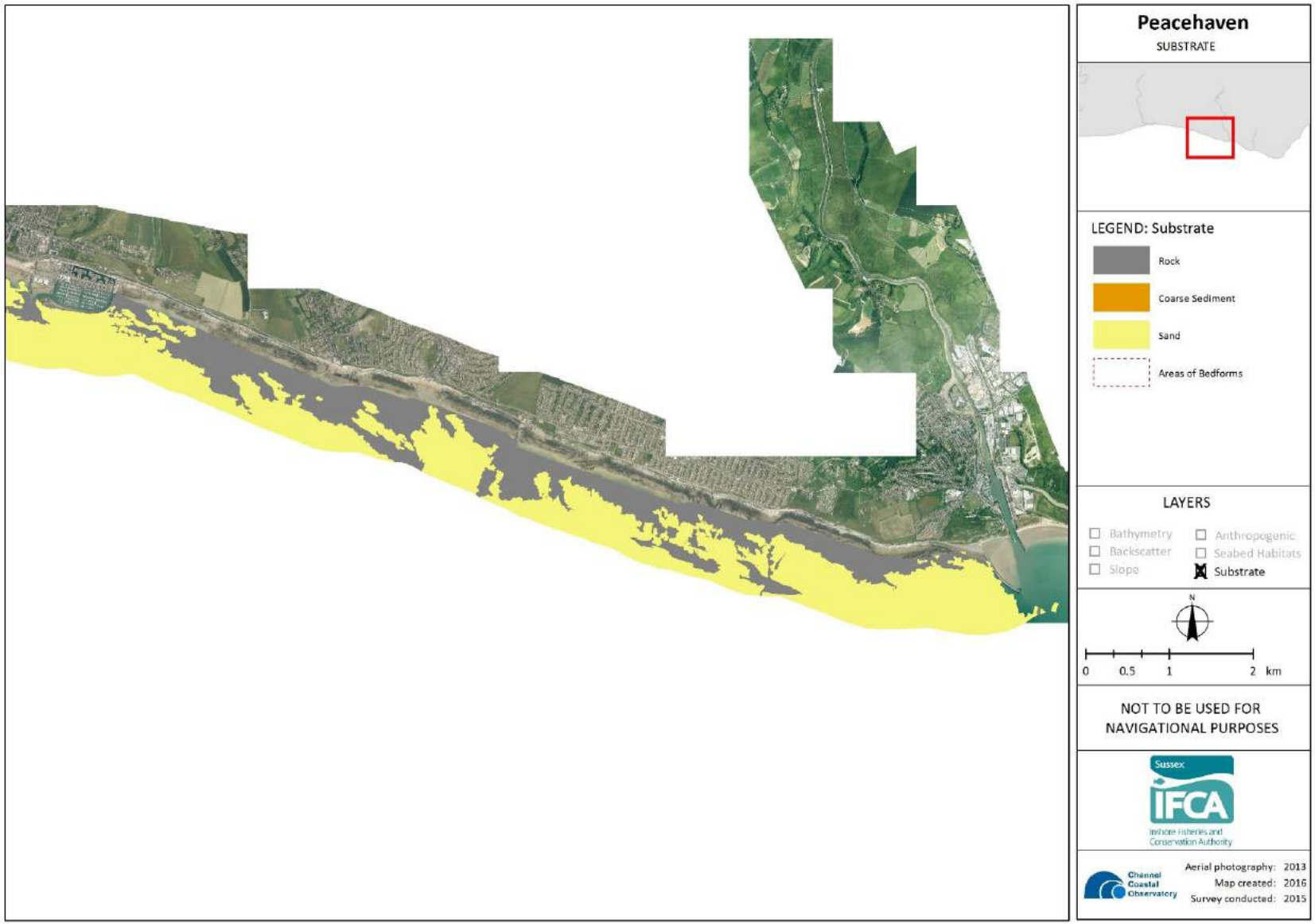
In general, where they occur, the sediments are sufficiently thick to mask the underlying geology although no bedforms are present. This indicates low tidal or wave energy conditions, or an insubstantial thickness of material to enable bedforms to be generated and sustained. No wrecks or anthropogenic features were observed.


Peacehaven
BATHYMETRY
LEGEND:Elevation (mOD)
0
-5
-10
-20
-30
-40
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.5 1 2 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Inshore Fisheries and Conservation Authority
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2016
Survey conducted: 2015


Peacehaven
BACKSCATTER
LEGEND: Backscatter Intensity
High Intensity
Low Intensity
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.5 1 2 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Inshore Fisheries and Conservation Authority
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2016
Survey conducted: 2015


Peacehaven
SEABED SLOPE
LEGEND:Slope Angle (degrees)
0 - 1
1 - 3
3 - 5
5 - 10
10 - 15
15 - 20
20 - 30
30 - 40
40 - 90
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.5 1 2 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Inshore Fisheries and Conservation Authority
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2016
Survey conducted: 2015

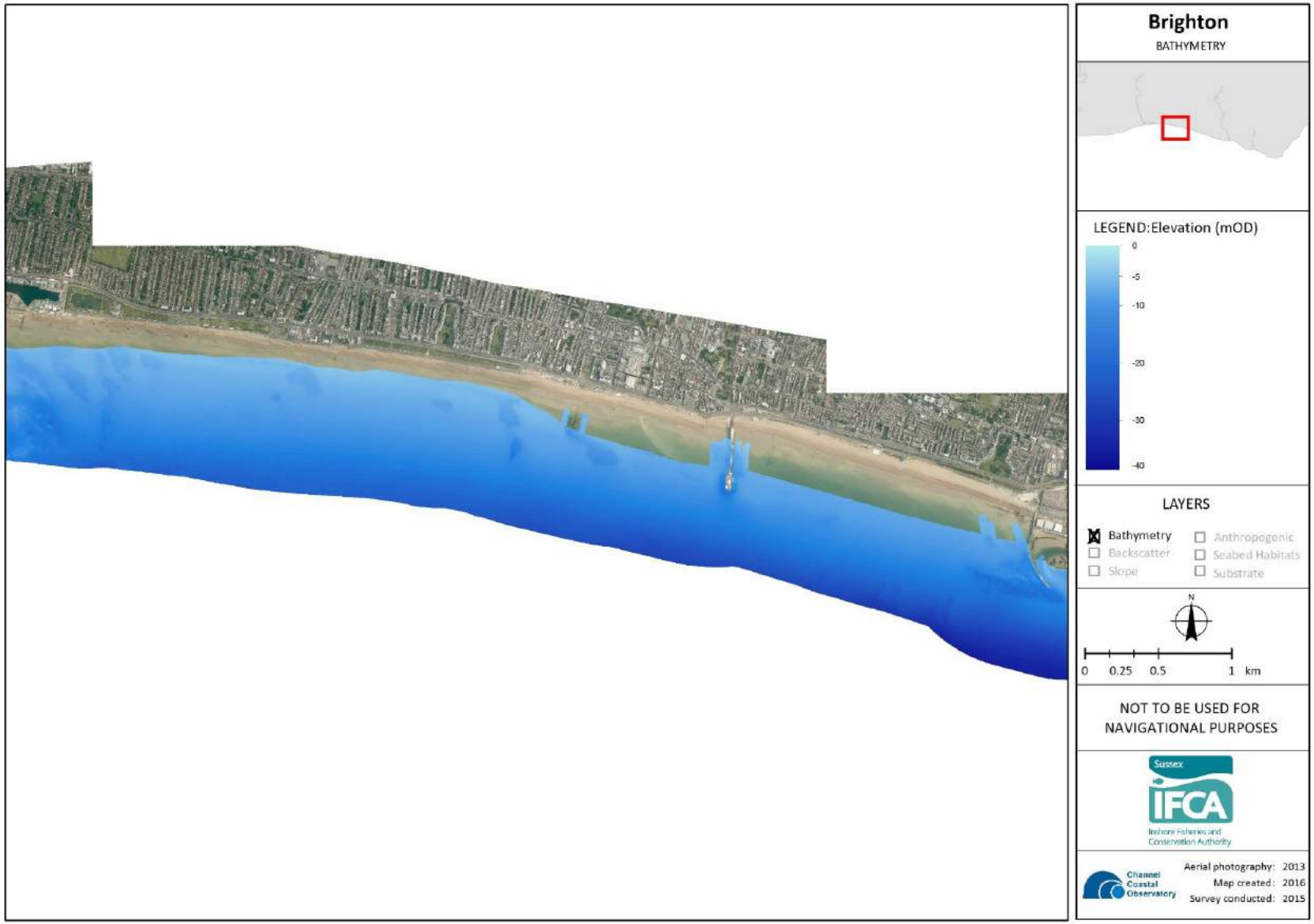

Peacehaven
SEABED HABITATS
LEGEND: EUNIS Level 3
Infralittoral, Low Energy Rock
Infralittoral, Low Energy Rock and thin Sediment
Littoral, Low Energy Rock
Littoral, Low Energy Rock and thin Sediment
Littoral, Coarse Sediment
Littoral, Sand
Sublittoral, Coarse Sediment
Sublittoral, Sand
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.5 1 2 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Inshore Fisheries and Conservation Authority
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2016
Survey conducted: 2015

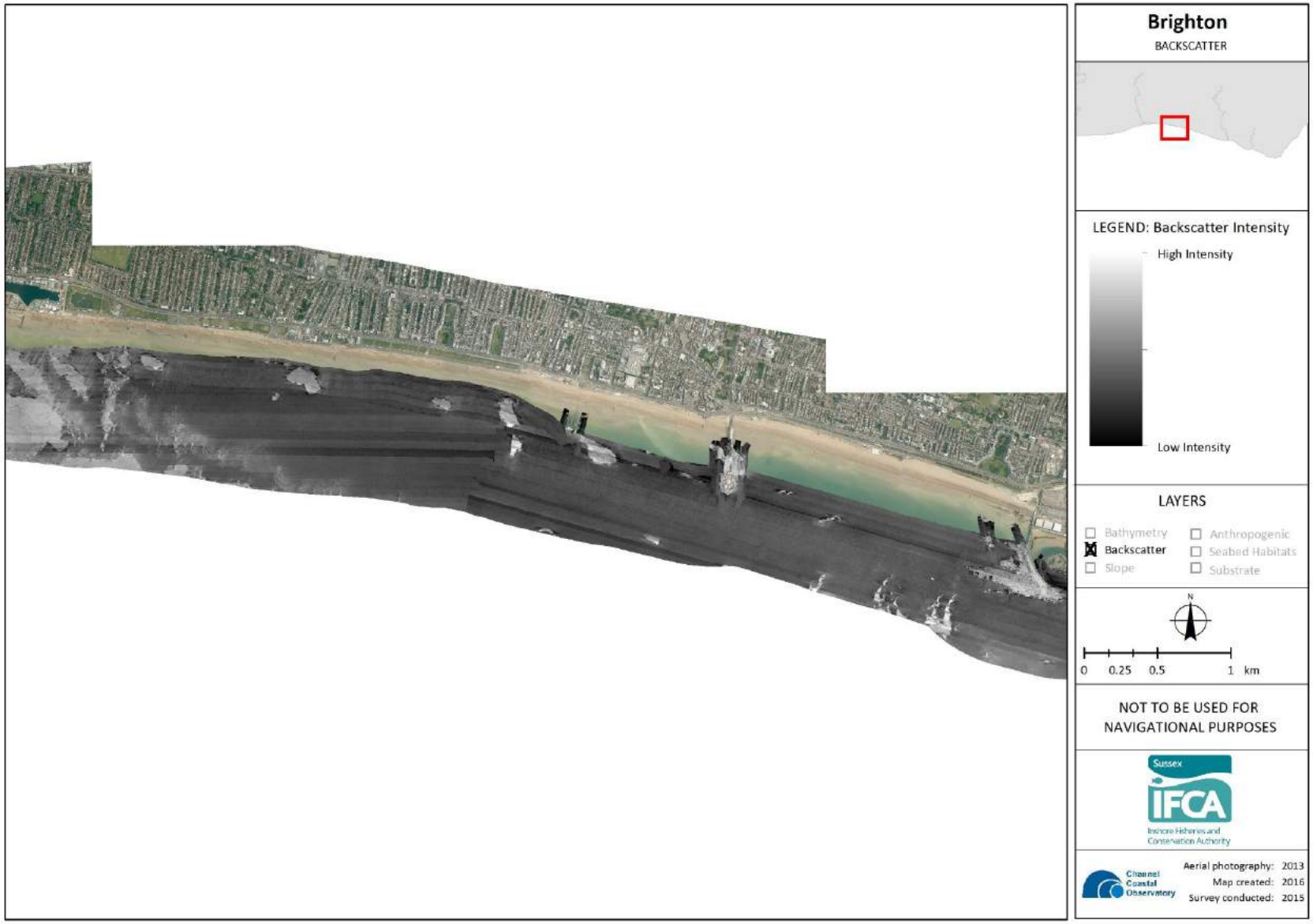

Peacehaven
SUBSTRATE
LEGEND: Substrate
Rock
Coarse Sediment
Sand
Areas of Bedforms
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.5 1 2 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Inshore Fisheries and Conservation Authority
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2016
Survey conducted: 2015

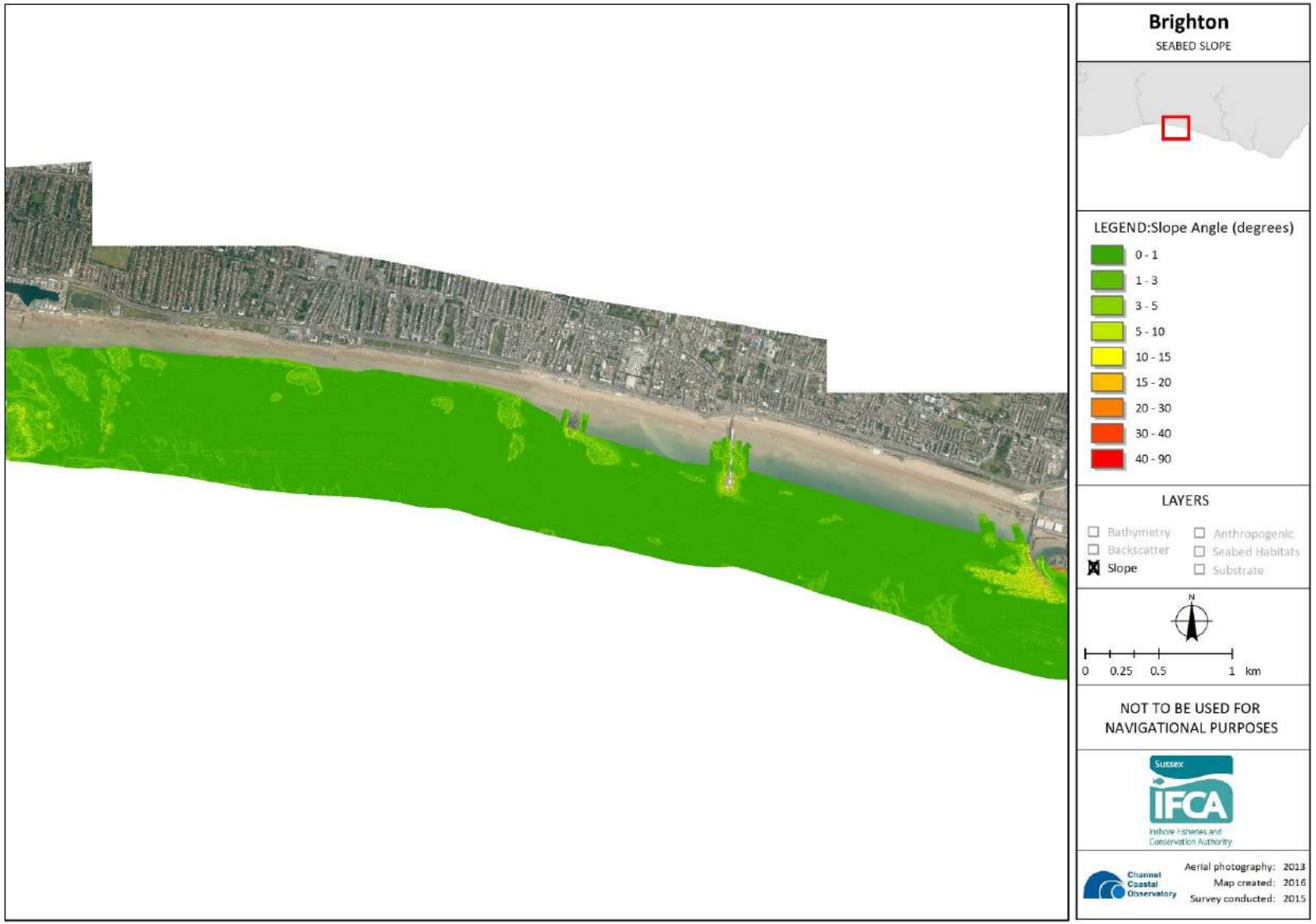
Brighton

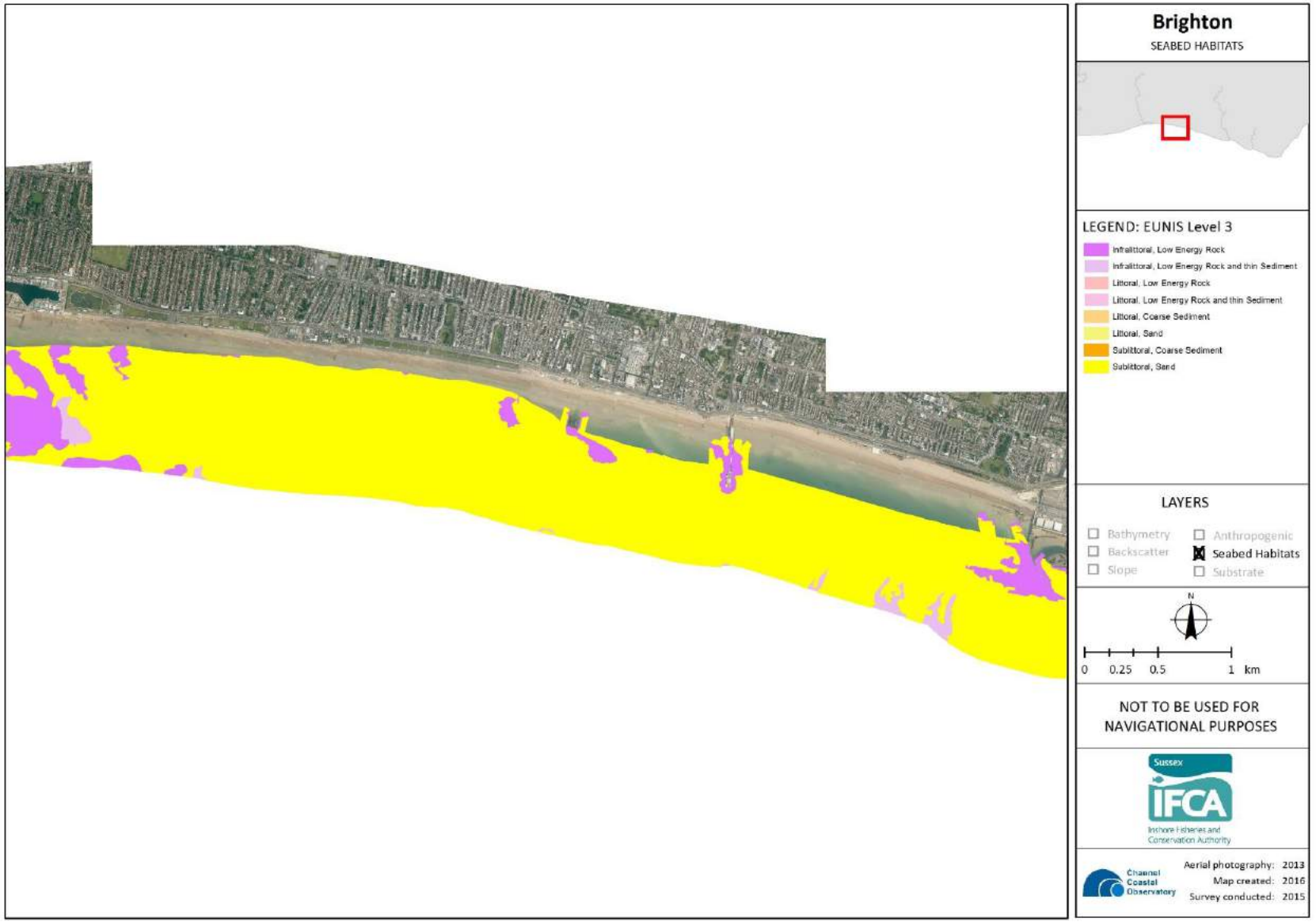
The sub-tidal zone is dominated by sandy sediment which is sufficiently thick to mask the underlying bedrock geology. No bedforms are present, indicating low tidal and wave energy levels, and/or an insubstantial thickness of material to enable bedforms to be generated.

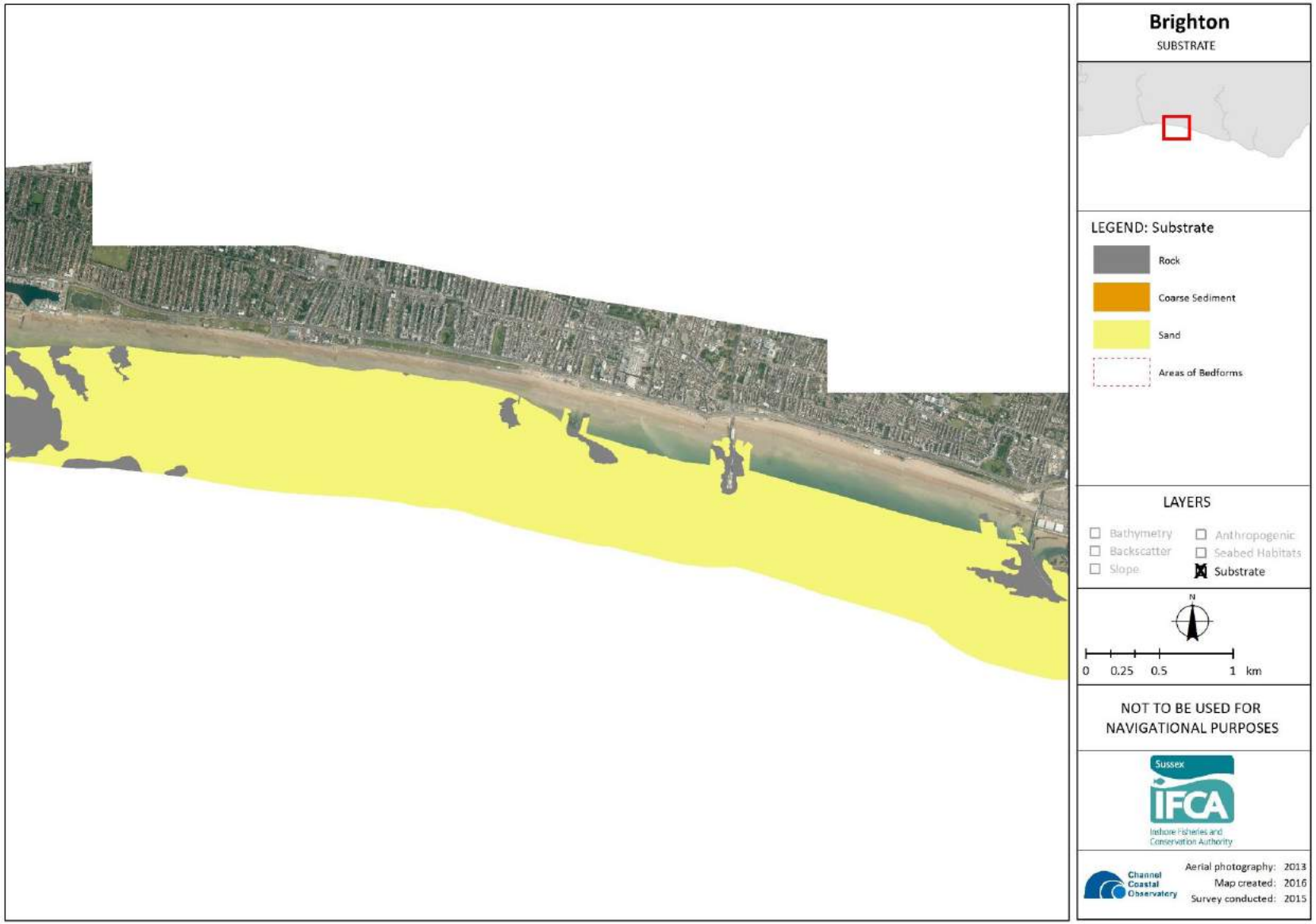
Distinct patches of exposed bedrock are evident, principally to the south of Brighton marina and around the Pier, and to the east of Shoreham harbour, which may indicate sediment transport or hydrodynamic conditions, resulting in localised scour. This is supported by the slope analysis and backscatter which clearly indicate the areas of rock. Two outfalls were observed to the west of the pier.


Brighton
BATHYMETRY
LEGEND:Elevation (mOD)
0
-5
-10
-20
-30
-40
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.25 0.5 1 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Inshore Fisheries and Conservation Authority
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2016
Survey conducted: 2015


Brighton
BACKSCATTER
LEGEND: Backscatter Intensity
High Intensity
Low Intensity
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.25 0.5 1 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Inshore Fisheries and Conservation Authority
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2016
Survey conducted: 2015


Brighton
SEABED SLOPE
LEGEND:Slope Angle (degrees)
0 - 1
1 - 3
3 - 5
5 - 10
10 - 15
15 - 20
20 - 30
30 - 40
40 - 90
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.25 0.5 1 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Inshore Fisheries and Conservation Authority
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2016
Survey conducted: 2015

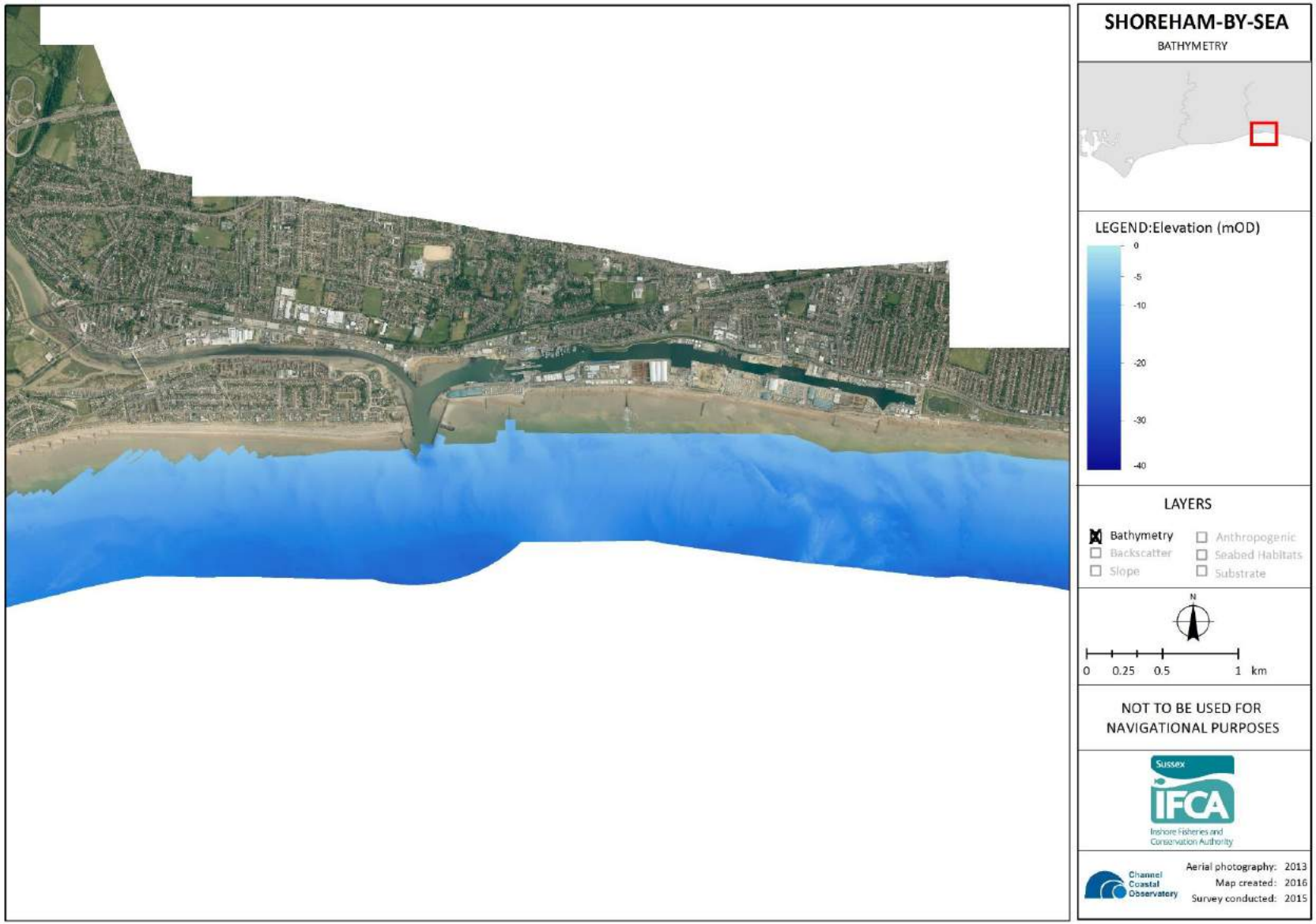

Brighton
SEABED HABITATS
LEGEND: EUNIS Level 3
Infralittoral, Low Energy Rock
Infralittoral, Low Energy Rock and thin Sediment
Littoral, Low Energy Rock
Littoral, Low Energy Rock and thin Sediment
Littoral, Coarse Sediment
Littoral, Sand
Sublittoral, Coarse Sediment
Sublittoral, Sand
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.25 0.5 1 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Inshore Fisheries and Conservation Authority
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2016
Survey conducted: 2015

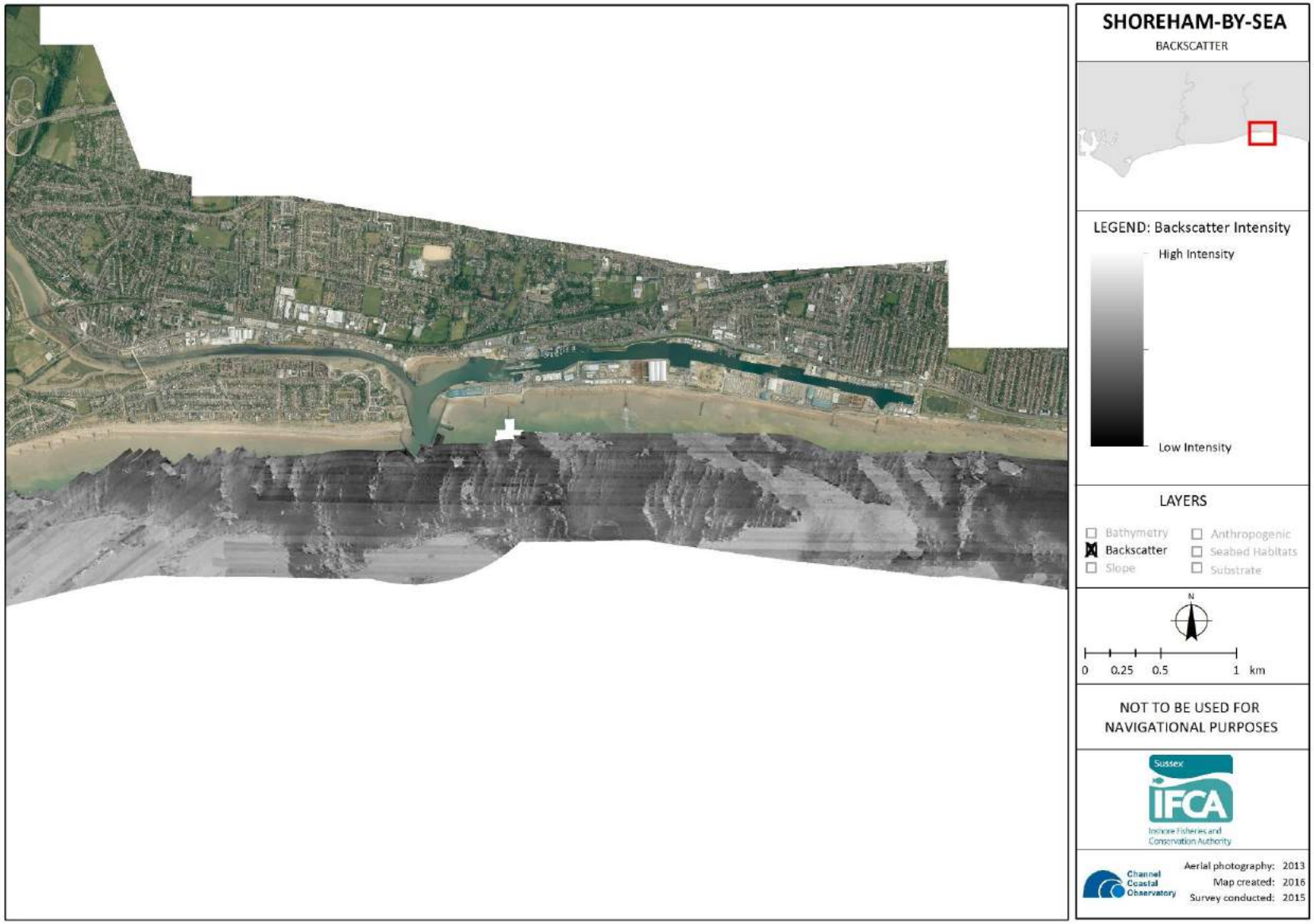

Brighton
SUBSTRATE
LEGEND: Substrate
Rock
Coarse Sediment
Sand
Areas of Bedforms
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.25 0.5 1 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Inshore Fisheries and Conservation Authority
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2016
Survey conducted: 2015

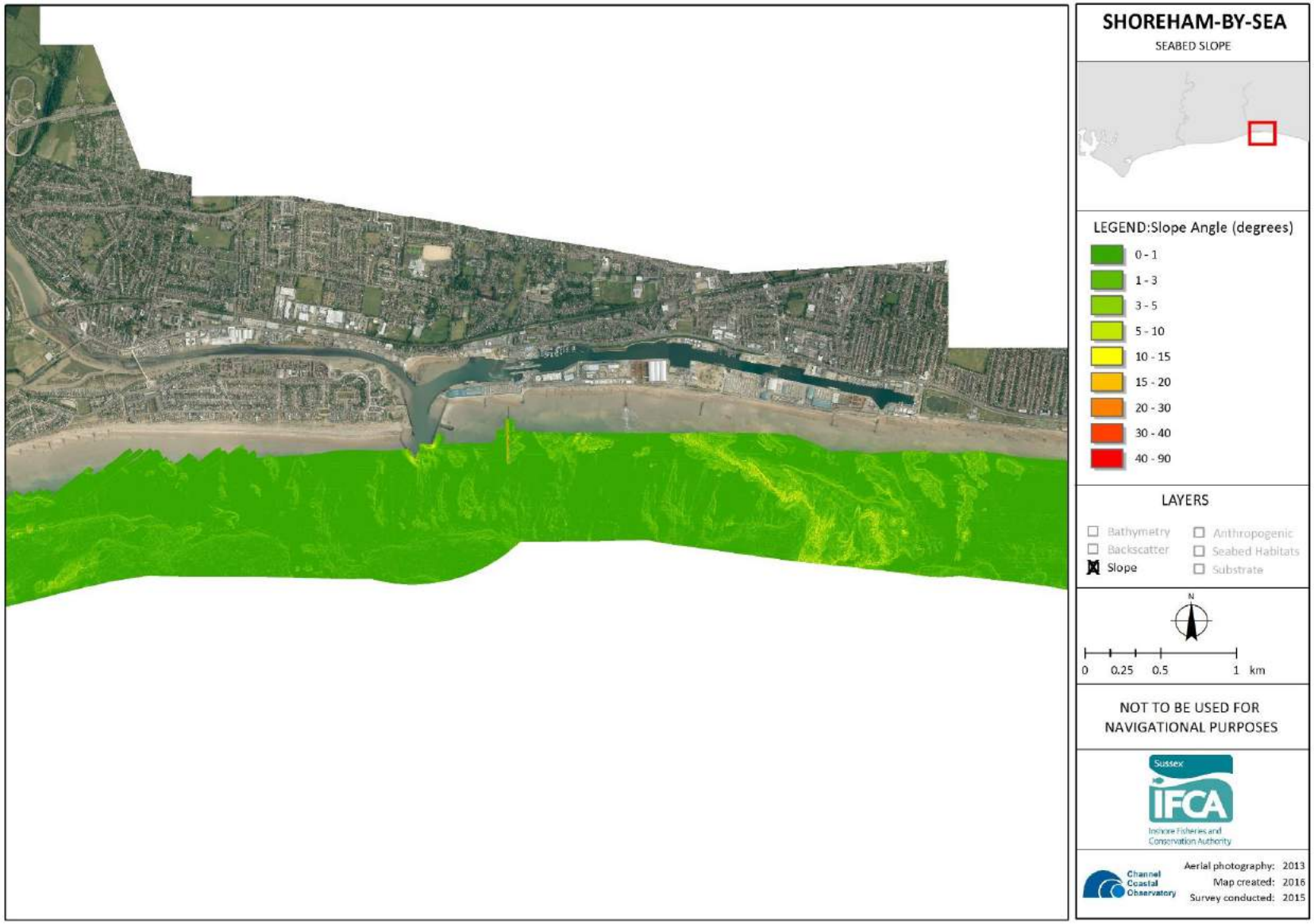
Shoreham-by-Sea

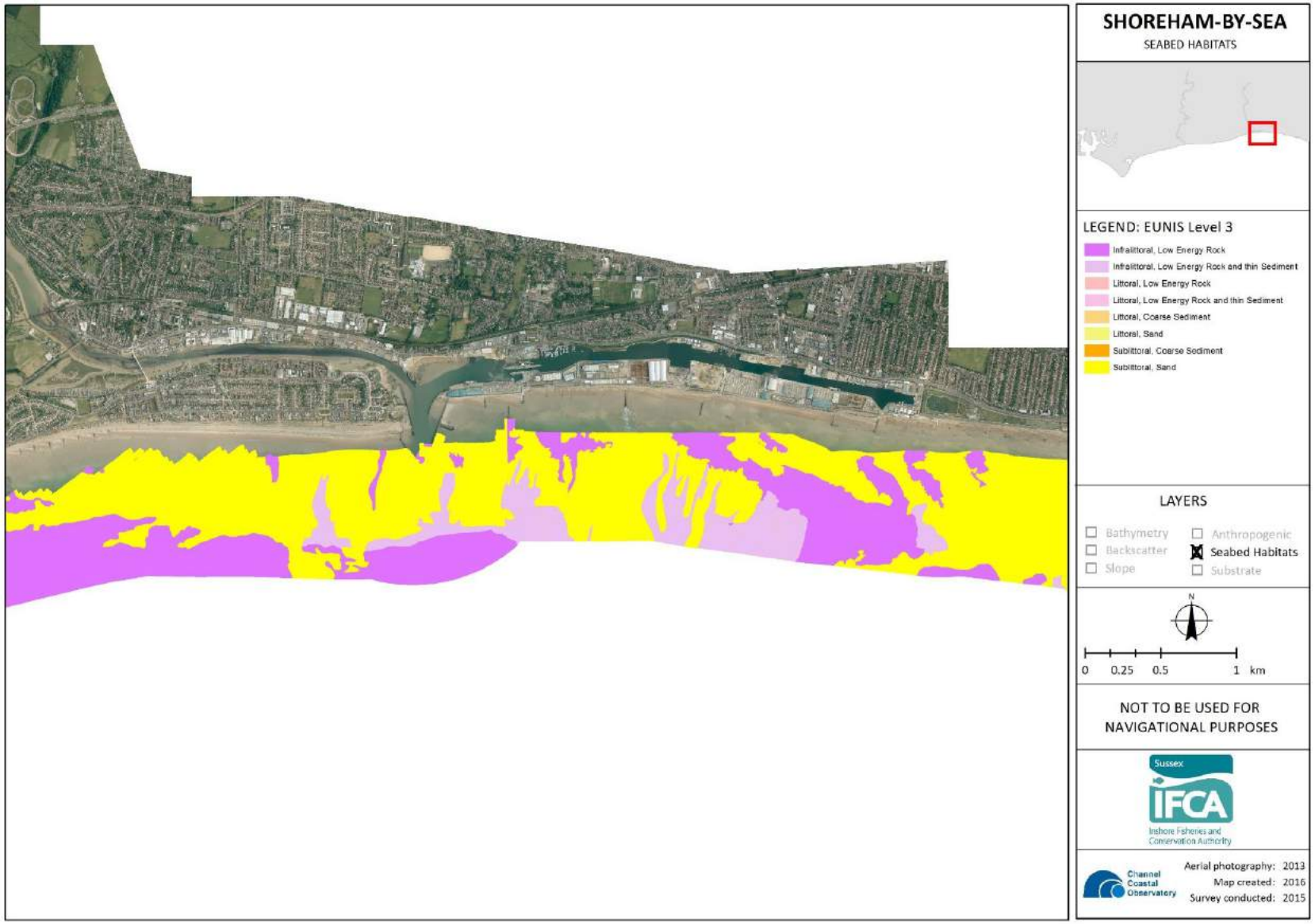
The sandy substrate in the western to central section is generally of sufficient thickness to mask the underlying rock platform and bedrock and occurs in the sub-tidal zone for the length of this area. As depths increase the thickness of sediment appears to decrease, and the underlying geology is more discernible. The distinct rocky outcrop with a northwest-southeast alignment to the east of Shoreham, and the underlying bedrock ridges are clearly evident in the backscatter and slope analysis.

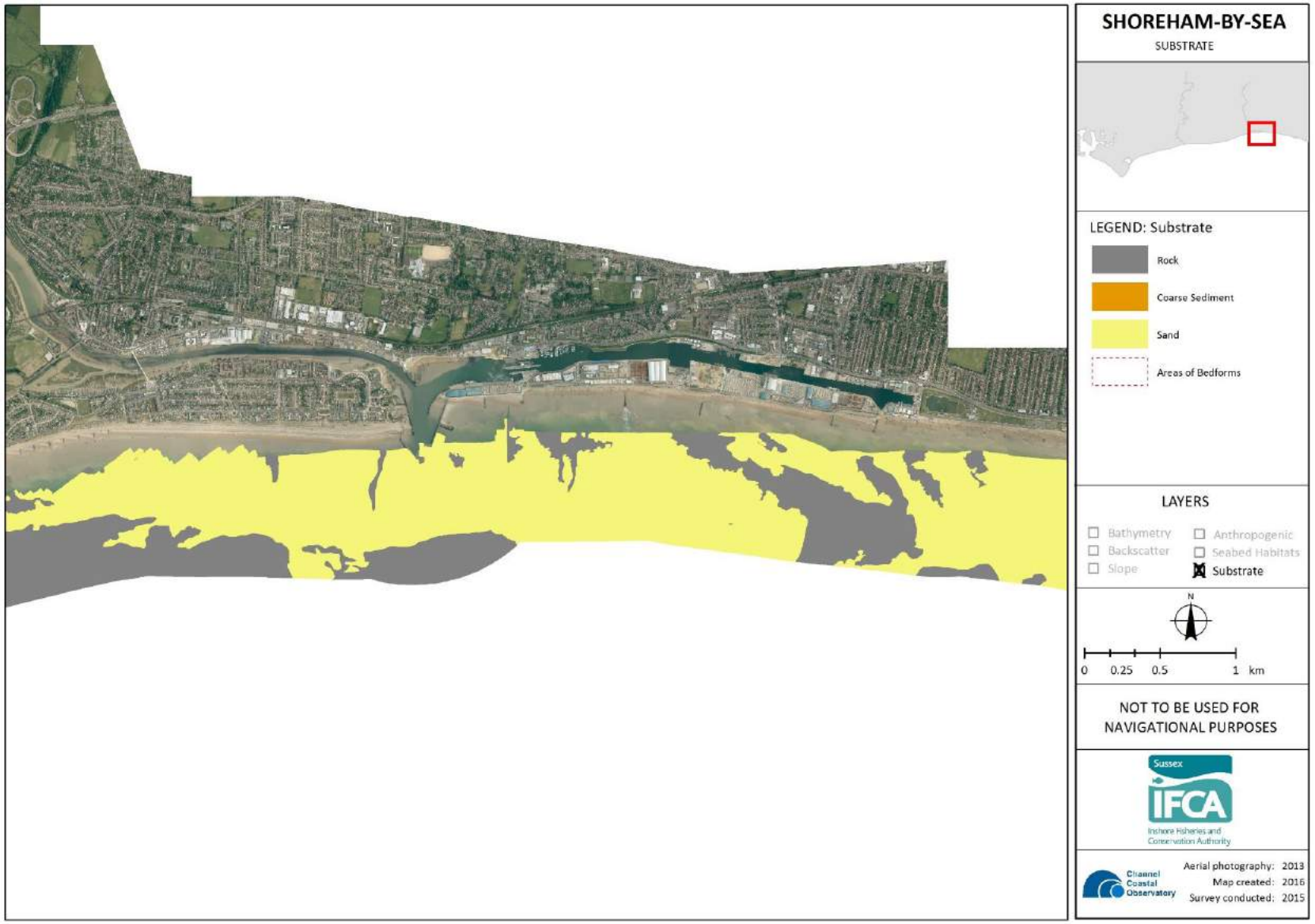
No bedforms were observed in the areas of sediment, indicating low energy wave and tidal current conditions, and/or an insubstantial thickness of material to enable bedforms to be generated. In addition to the Shoreham harbour entrance structures, a linear outfall structure was observed, to the east of the harbour entrance.


SHOREHAM-BY-SEA
BATHYMETRY
LEGEND:Elevation (mOD)
0
-5
-10
-20
-30
-40
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.25 0.5 1 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Inshore Fisheries and Conservation Authority
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2016
Survey conducted: 2015


SHOREHAM-BY-SEA
BACKSCATTER
LEGEND: Backscatter Intensity
High Intensity
Low Intensity
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.25 0.5 1 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Inshore Fisheries and Conservation Authority
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2016
Survey conducted: 2015


SHOREHAM-BY-SEA
SEABED SLOPE
LEGEND:Slope Angle (degrees)
0 - 1
1 - 3
3 - 5
5 - 10
10 - 15
15 - 20
20 - 30
30 - 40
40 - 90
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.25 0.5 1 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Inshore Fisheries and Conservation Authority
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2016
Survey conducted: 2015

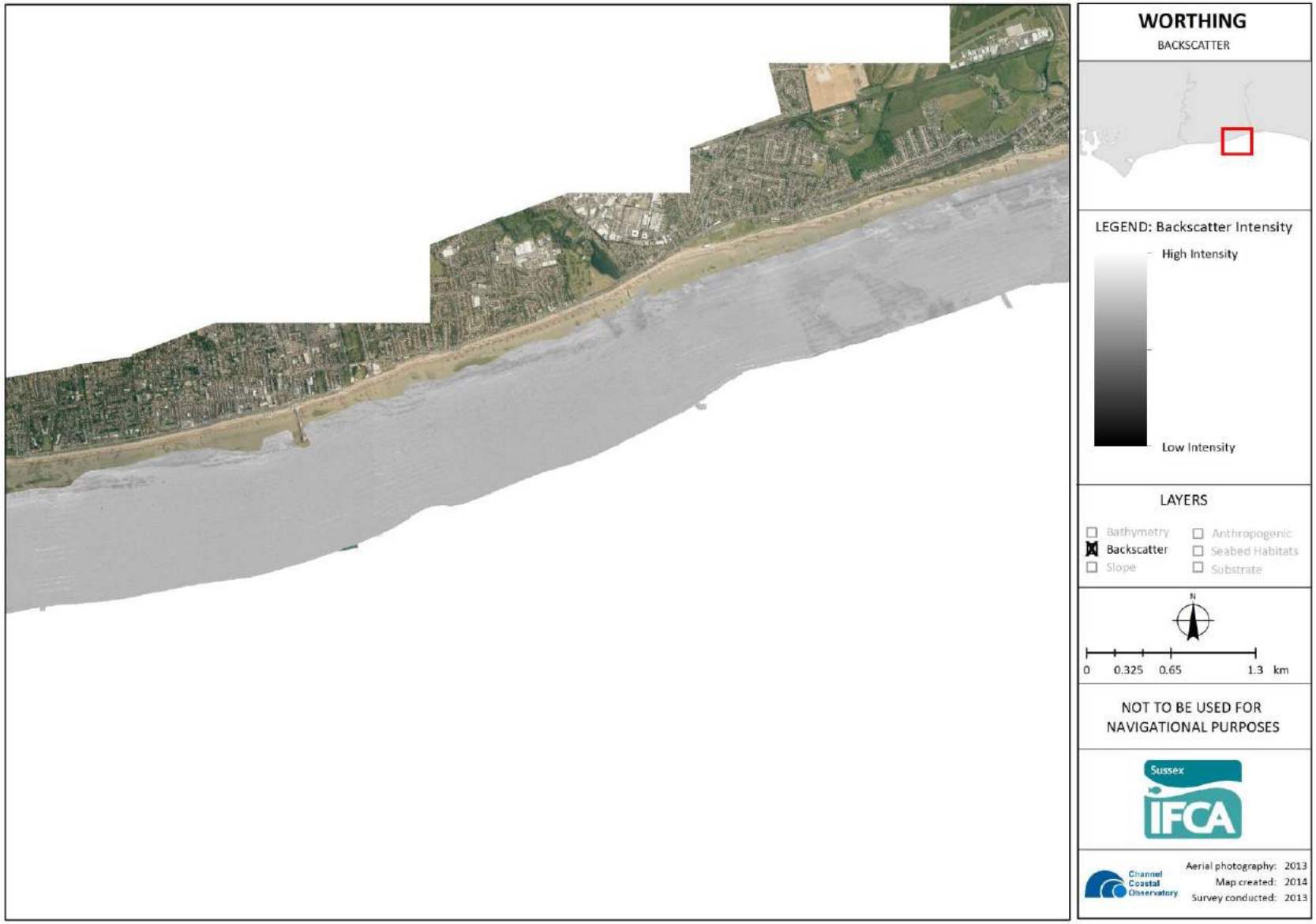

SHOREHAM-BY-SEA
SEABED HABITATS
LEGEND: EUNIS Level 3
Infralittoral, Low Energy Rock
Infralittoral, Low Energy Rock and thin Sediment
Littoral, Low Energy Rock
Littoral, Low Energy Rock and thin Sediment
Littoral, Coarse Sediment
Littoral, Sand
Sublittoral, Coarse Sediment
Sublittoral, Sand
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.25 0.5 1 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Inshore Fisheries and Conservation Authority
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2016
Survey conducted: 2015

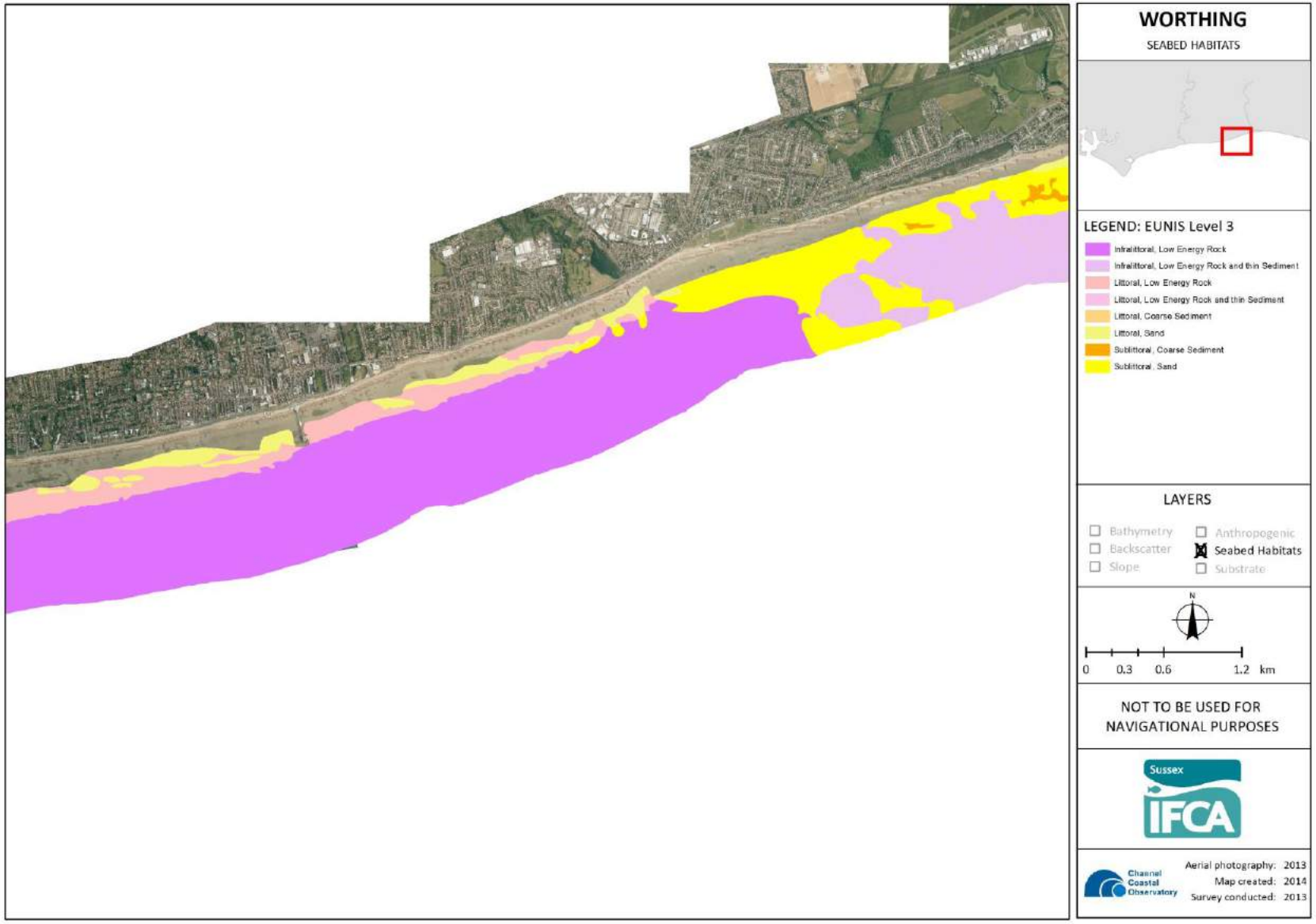

SHOREHAM-BY-SEA
SUBSTRATE
LEGEND: Substrate
Rock
Coarse Sediment
Sand
Areas of Bedforms
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.25 0.5 1 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Inshore Fisheries and Conservation Authority
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2016
Survey conducted: 2015

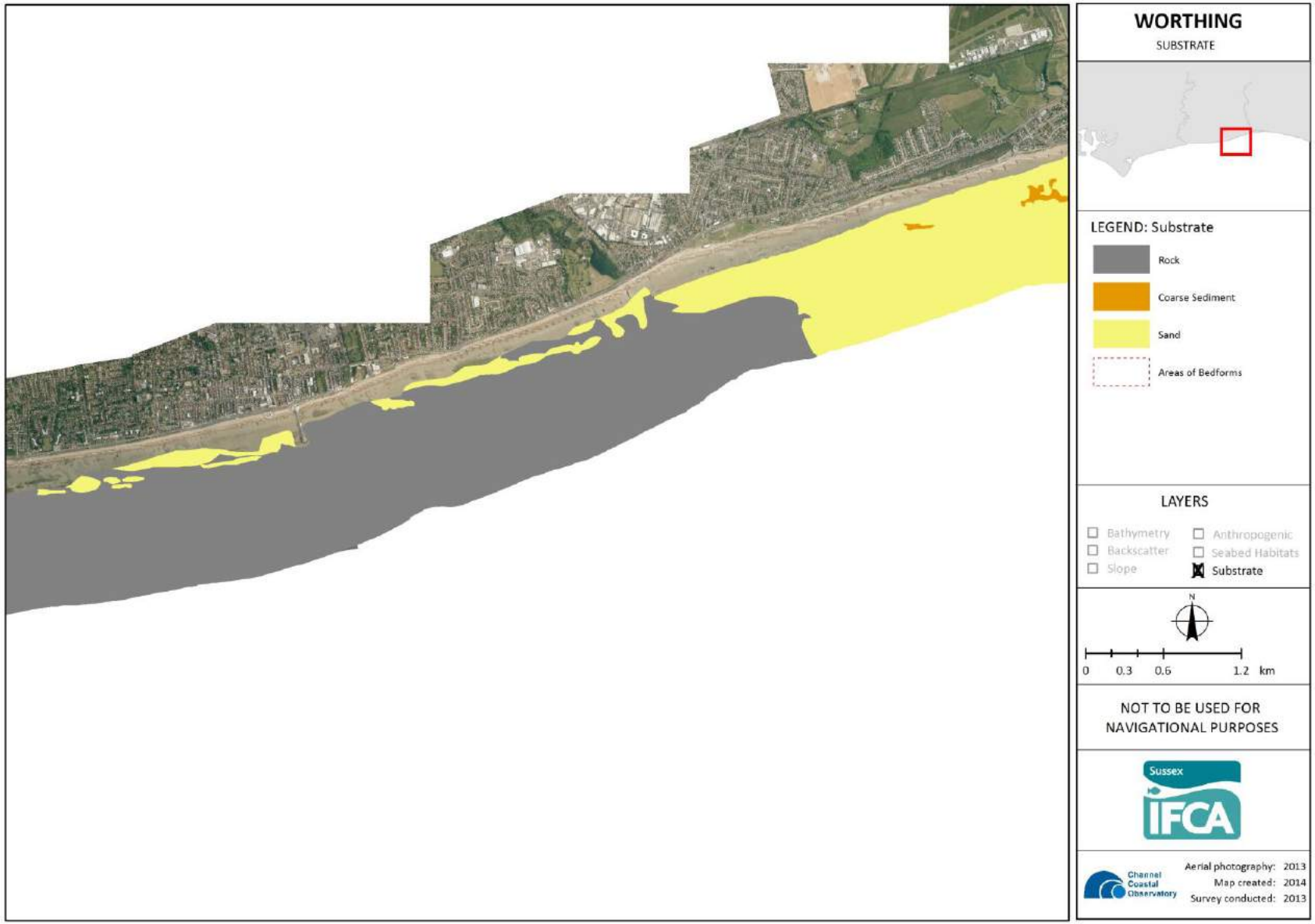
Worthing

The main feature along the Worthing frontage is the exposed extensive rock platform that extends continuously between Worthing and Bognor Regis. The sand is confined to patches nearshore, the majority of this area is in the littoral zone. The rock and thin sediment to the east is covered in a thin layer of sand, with constrained pockets of coarser sediment.

No bedforms are identified.


WORTHING
BACKSCATTER
LEGEND: Backscatter Intensity
High Intensity
Low Intensity
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.325 0.65 1.3 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

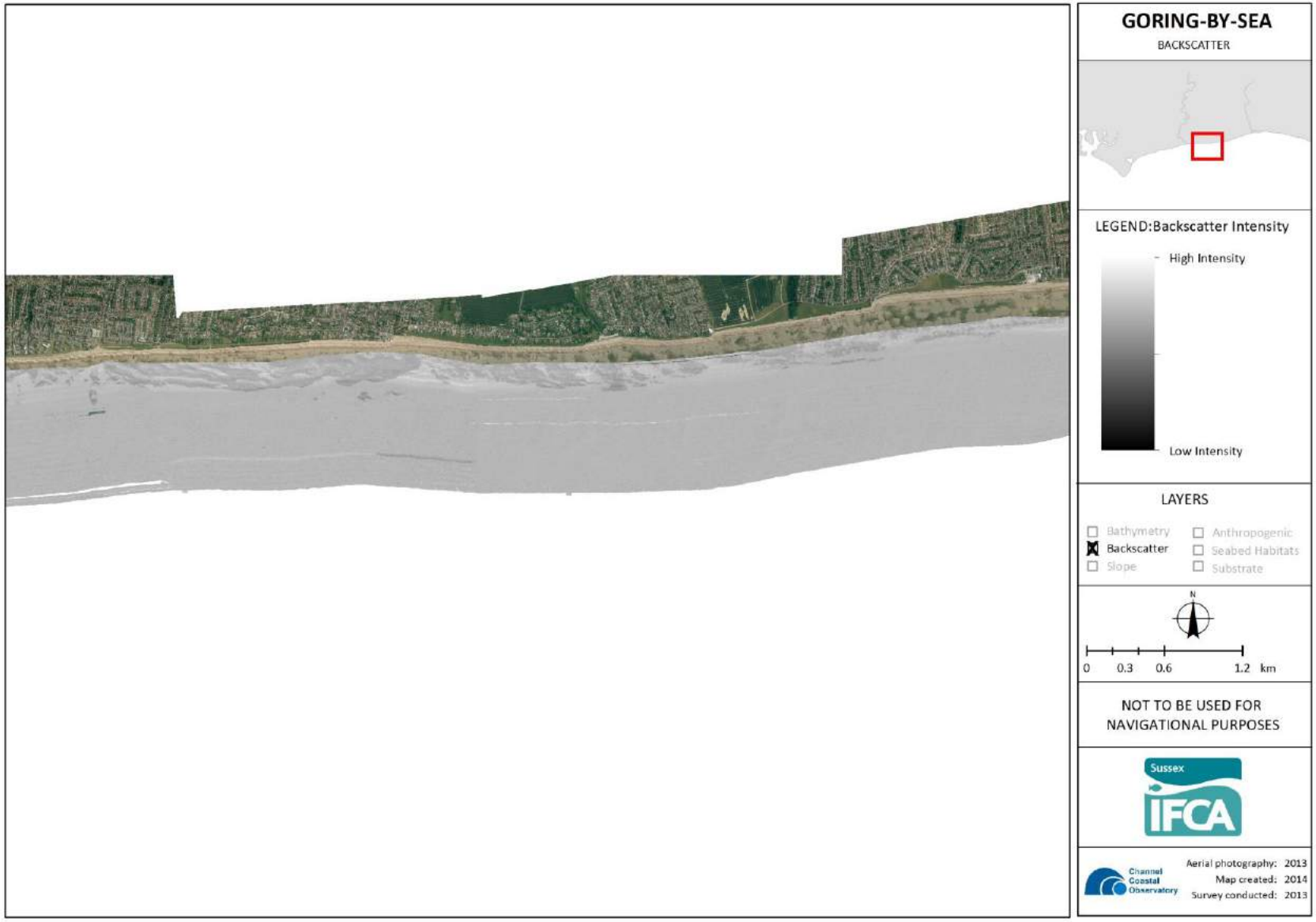

WORTHING
SEABED HABITATS
LEGEND: EUNIS Level 3
Infralittoral, Low Energy Rock
Infralittoral, Low Energy Rock and thin Sediment
Littoral, Low Energy Rock
Littoral, Low Energy Rock and thin Sediment
Littoral, Coarse Sediment
Littoral, Sand
Sublittoral, Coarse Sediment
Sublittoral, Sand
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.3 0.6 1.2 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

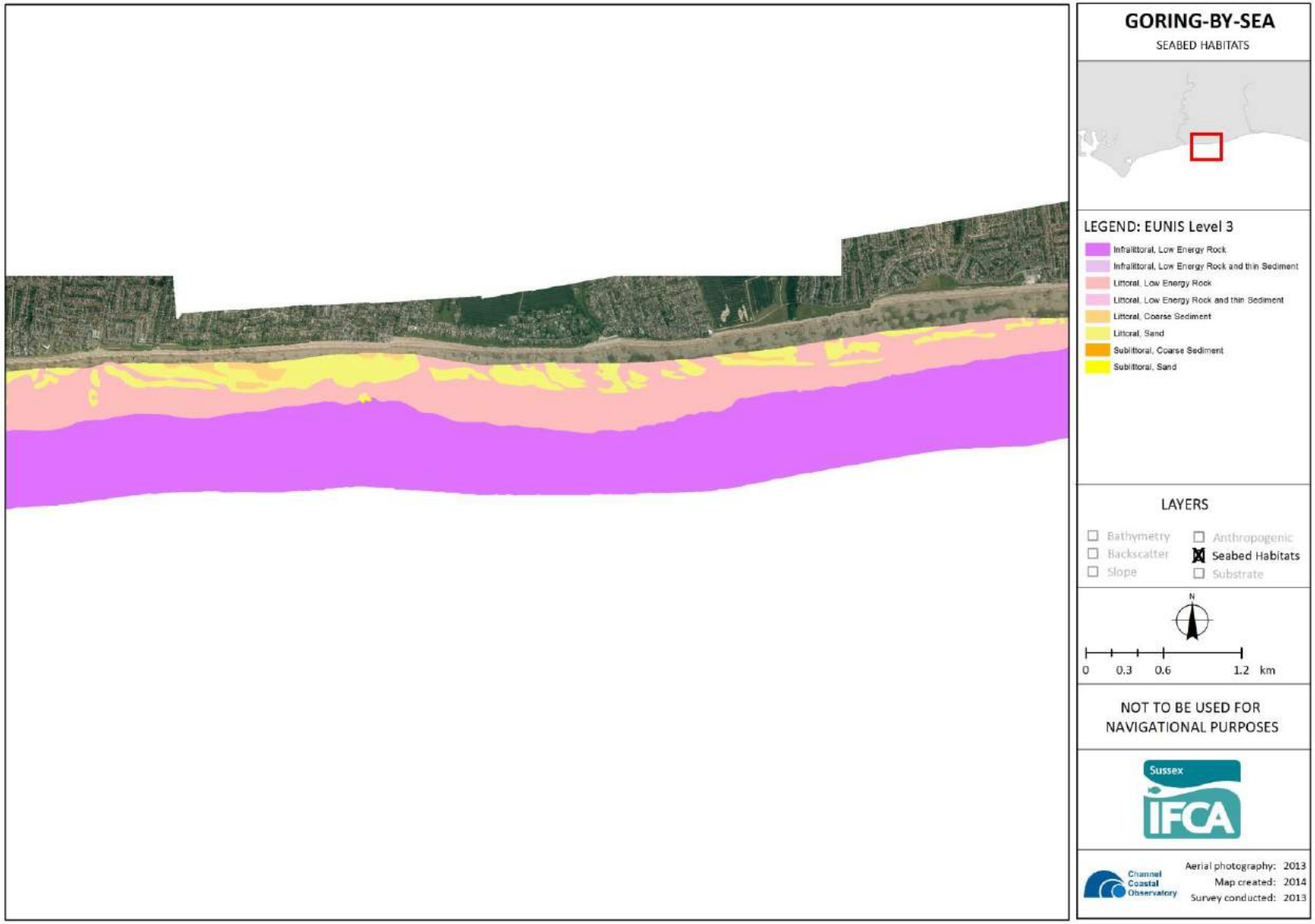

WORTHING
SUBSTRATE
LEGEND: Substrate
Rock
Coarse Sediment
Sand
Areas of Bedforms
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.3 0.6 1.2 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

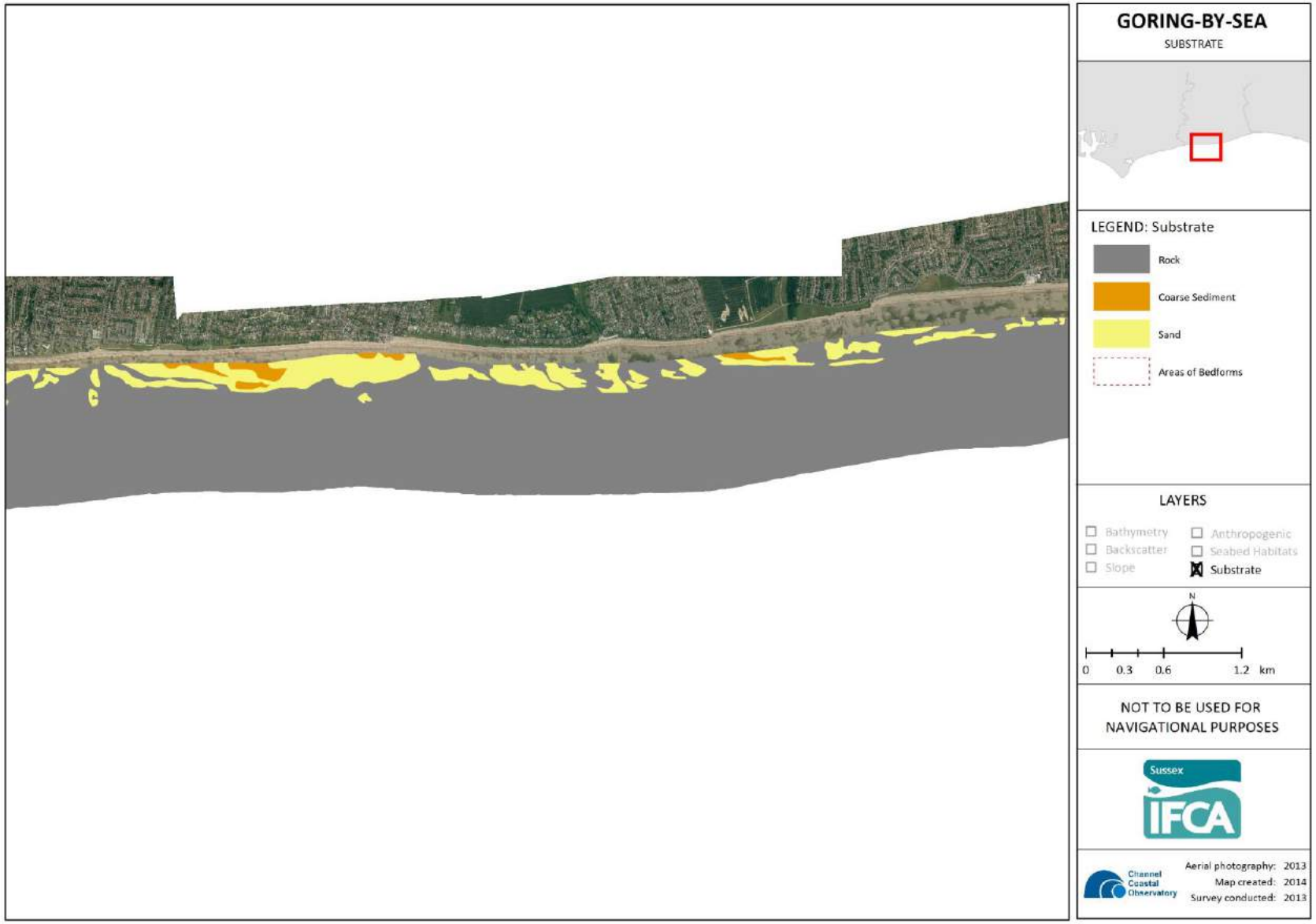
Goring-by-Sea

The rock platform extends offshore for the width of the surveyed area and continuously alongshore throughout this entire frontage. In general the toe of the beach extends offshore to a limited extent, with predominantly sand and patches of coarse sediment overlying the extensive chalk rock platform, in constrained pockets.

No bedforms identified.


GORING-BY-SEA
BACKSCATTER
LEGEND:Backscatter Intensity
High Intensity
Low Intensity
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.3 0.6 1.2 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

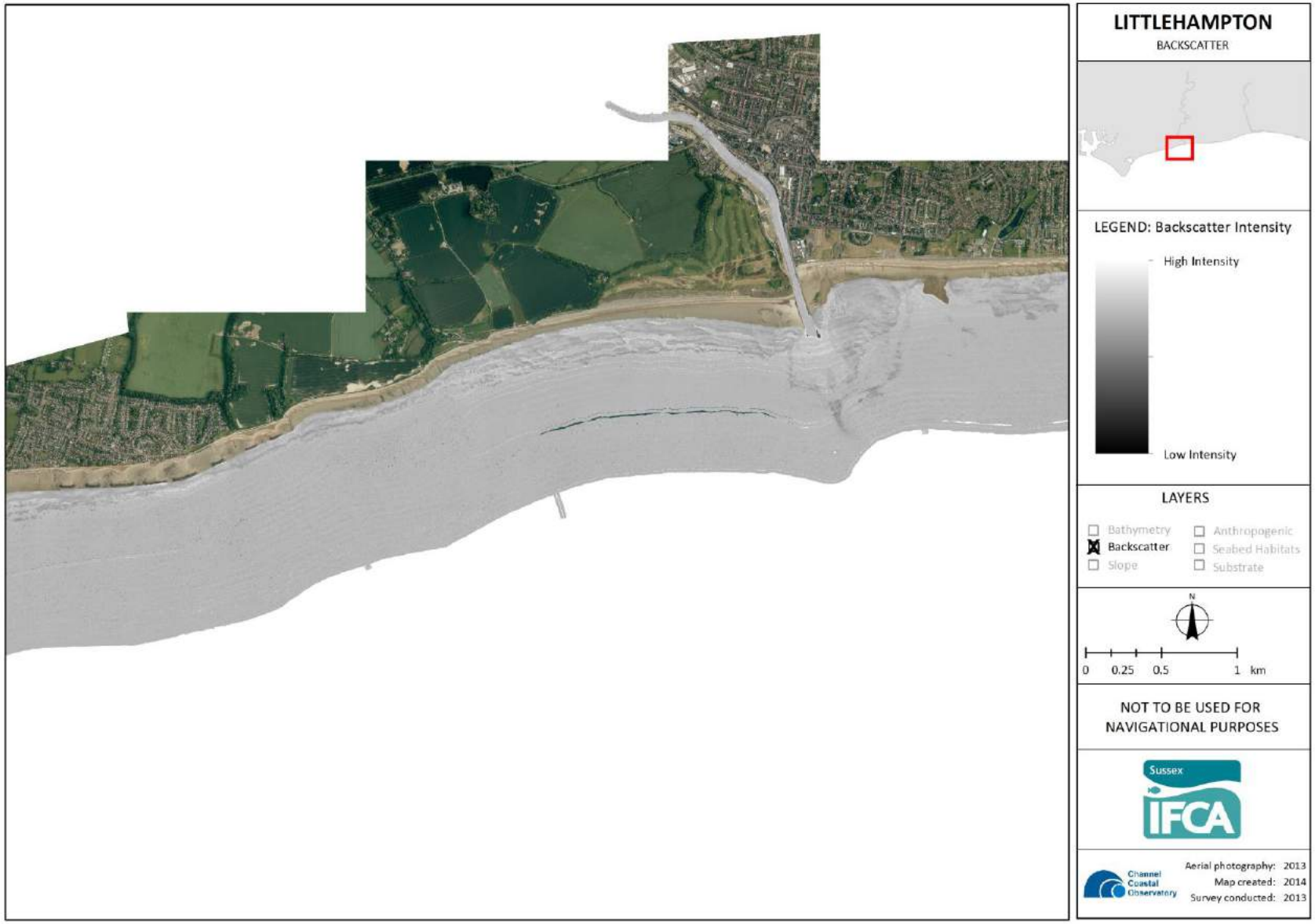

GORING-BY-SEA
SEABED HABITATS
LEGEND: EUNIS Level 3
Infralittoral, Low Energy Rock
Infralittoral, Low Energy Rock and thin Sediment
Littoral, Low Energy Rock
Littoral, Low Energy Rock and thin Sediment
Littoral, Coarse Sediment
Littoral, Sand
Sublittoral, Coarse Sediment
Sublittoral, Sand
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.3 0.6 1.2 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

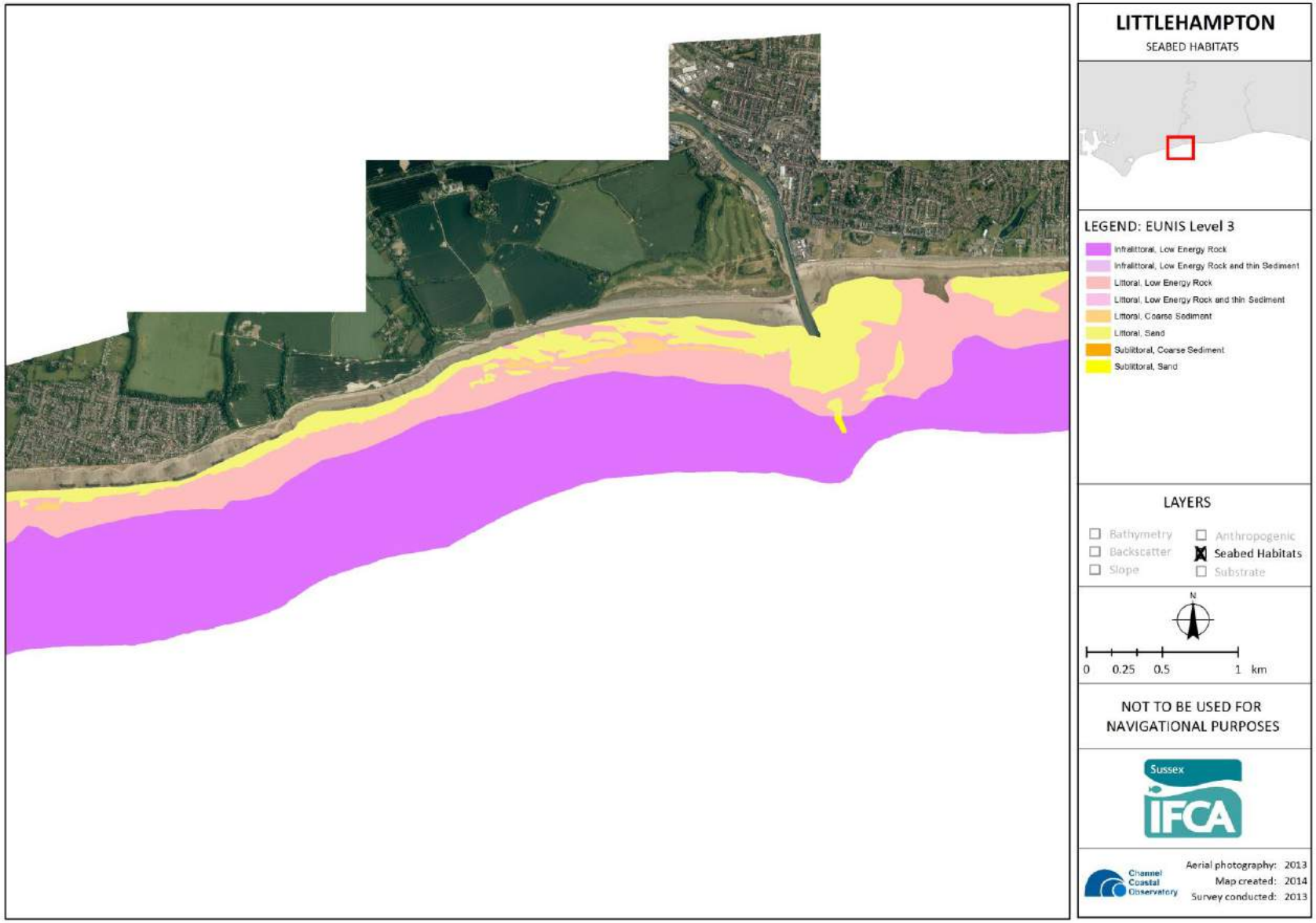

GORING-BY-SEA
SUBSTRATE
LEGEND: Substrate
Rock
Coarse Sediment
Sand
Areas of Bedforms
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.3 0.6 1.2 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

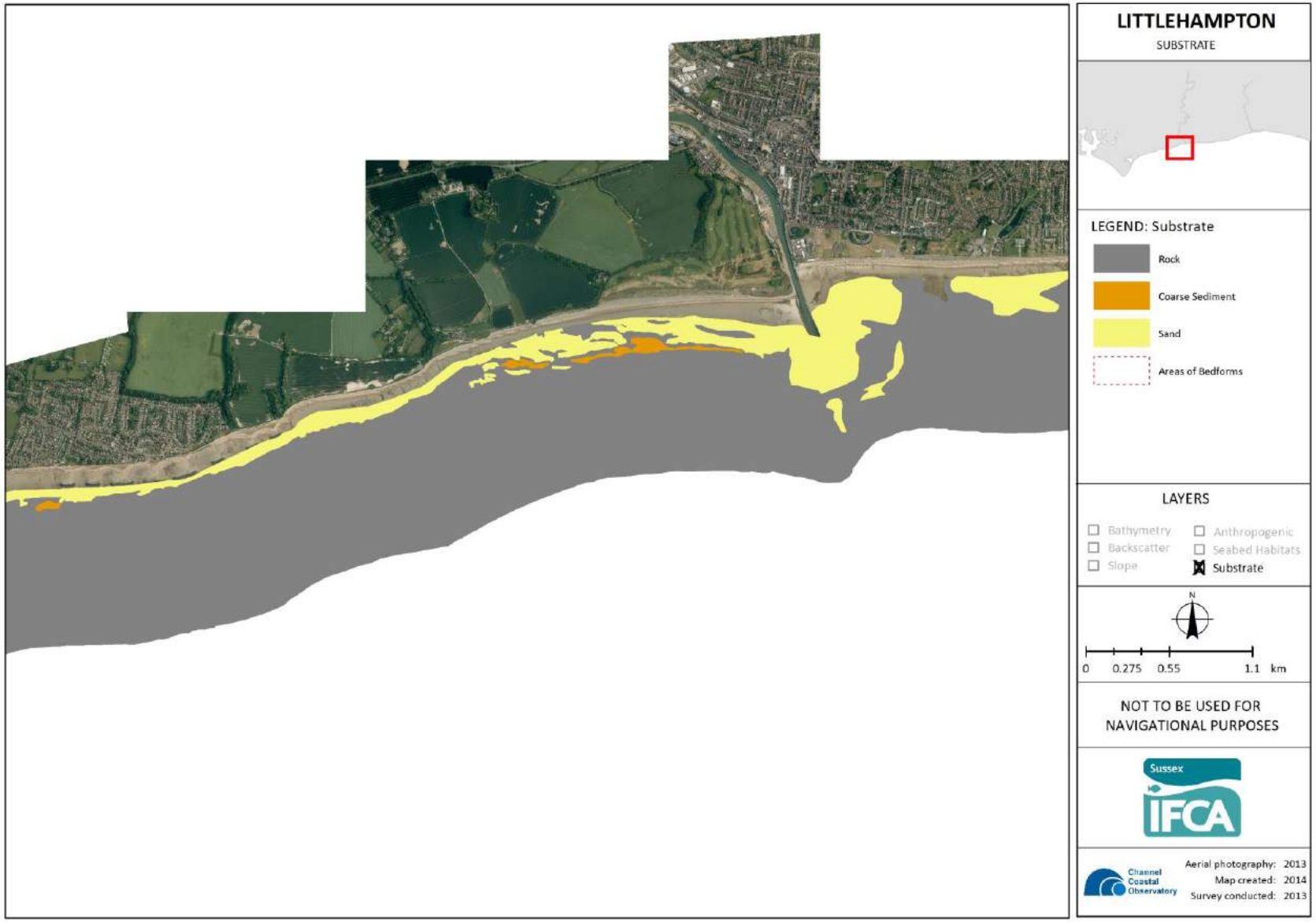
Littlehampton

The seabed continues to be dominated by the extensive chalk rock platform. The distribution of sediment overlying the platform is generally limited, although more extensive in the vicinity of the mouth of the River Arun. The sediment, predominantly sand, is constrained nearshore, with few pockets of coarser grained sediment at the seaward toe of the littoral sediment.

No bedforms identified.


LITTLEHAMPTON
BACKSCATTER
LEGEND: Backscatter Intensity
High Intensity
Low Intensity
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.25 0.5 1 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

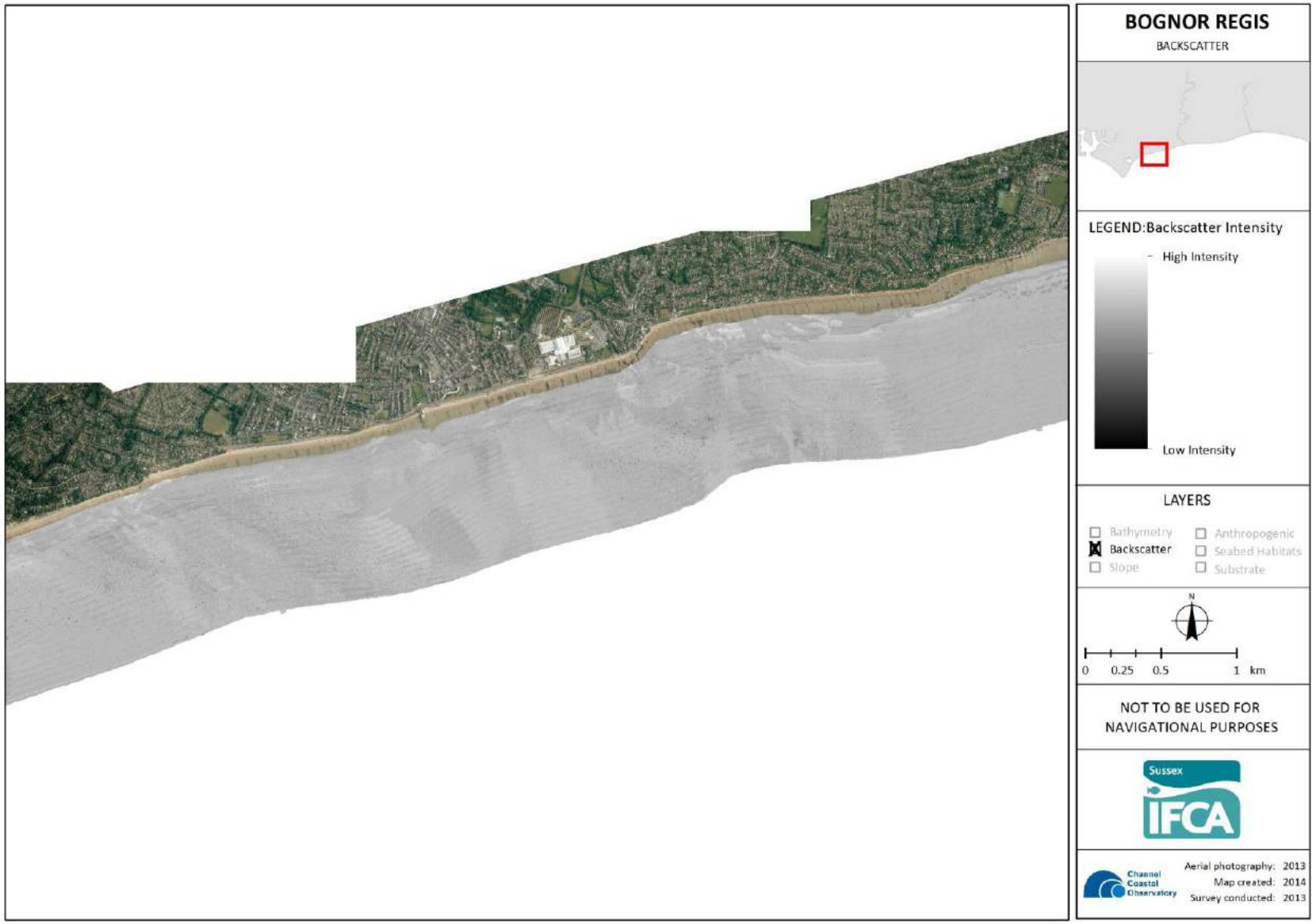

LITTLEHAMPTON
SEABED HABITATS
LEGEND: EUNIS Level 3
Infralittoral, Low Energy Rock
Infralittoral, Low Energy Rock and thin Sediment
Littoral, Low Energy Rock
Littoral, Low Energy Rock and thin Sediment
Littoral, Coarse Sediment
Littoral, Sand
Sublittoral, Coarse Sediment
Sublittoral, Sand
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.25 0.5 1 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

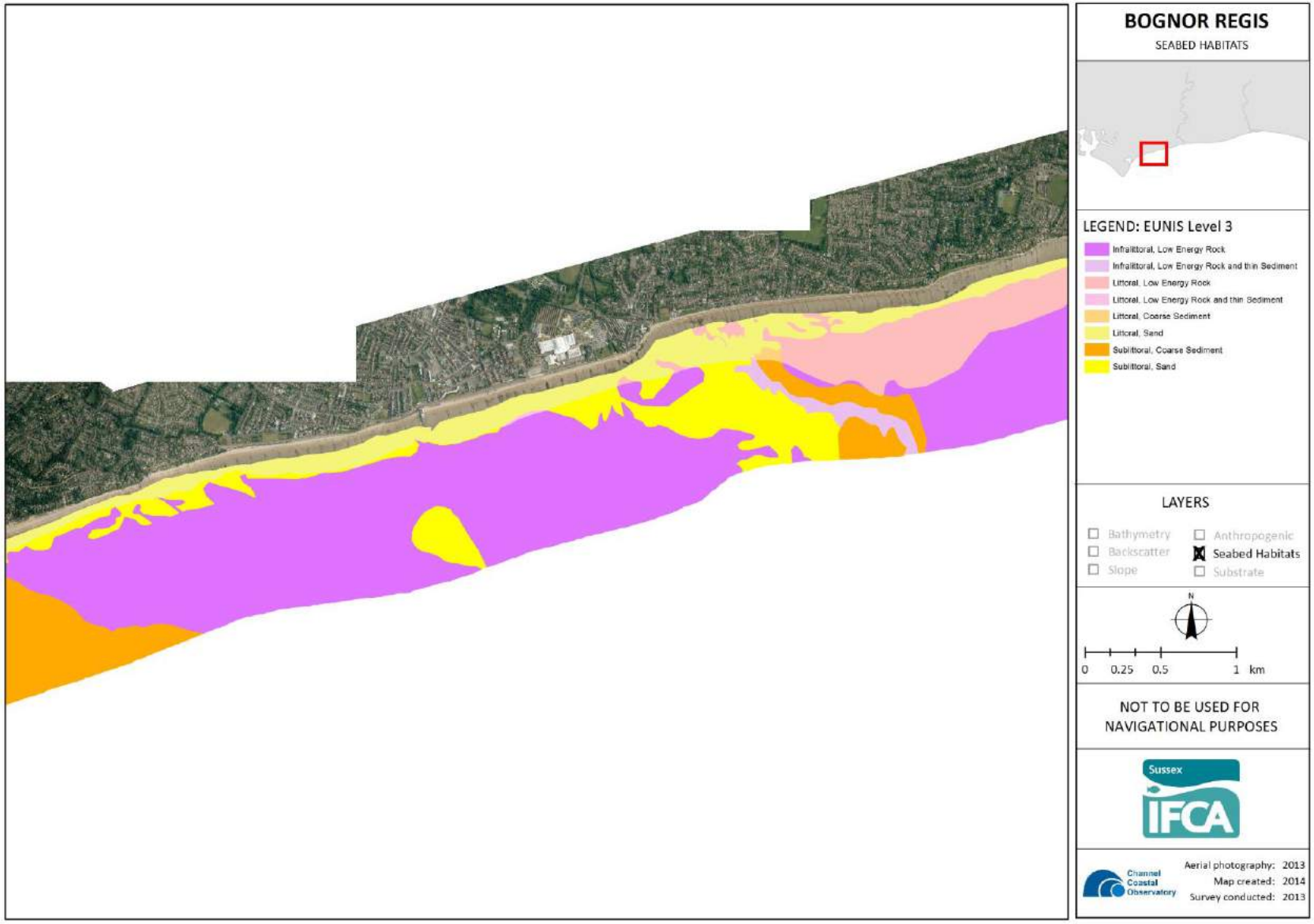

LITTLEHAMPTON
SUBSTRATE
LEGEND: Substrate
Rock
Coarse Sediment
Sand
Areas of Bedforms
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.275 0.55 1.1 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

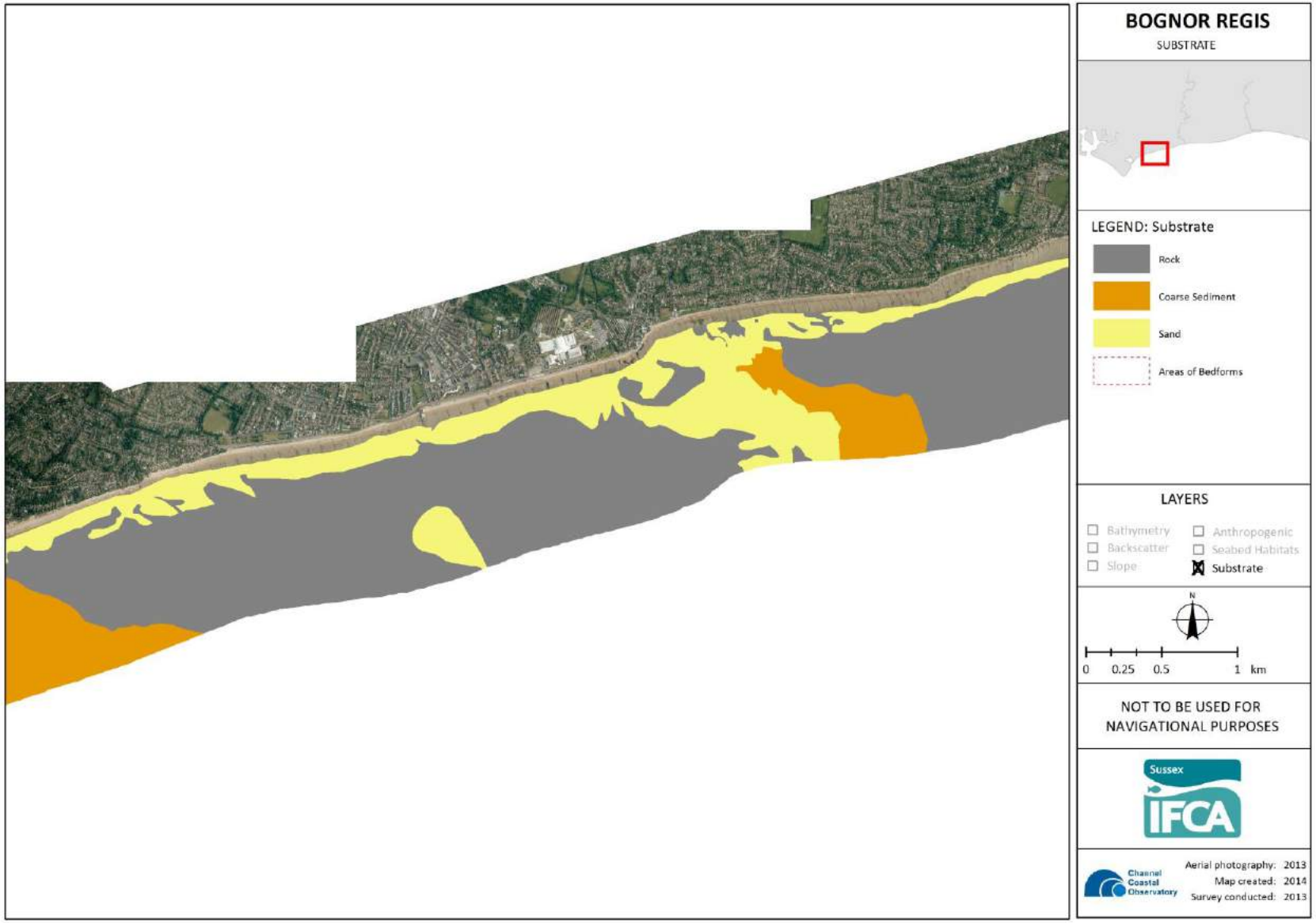
Bognor Regis

The rock platform dominates the frontage, whilst the nearshore margin or toe of the beach foreshore is comprised largely of sand and is relatively constrained in its extent. Sediment extends offshore the width of the surveyed area and is comprised of sand with an area of coarser sediment on the eastern margin. To the west of the frontage the rock platform is truncated and masked by overlying coarse grained sediment. The rock outcrop to the east appears to be a variety of areas of cobbles and boulders, thin rock outcrops and ridges breaking up the flat rock platform.

No bedforms identified.


BOGNOR REGIS
BACKSCATTER
LEGEND:Backscatter Intensity
High Intensity
Low Intensity
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.25 0.5 1 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

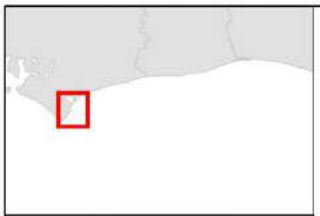

BOGNOR REGIS
SEABED HABITATS
LEGEND: EUNIS Level 3
Infralittoral, Low Energy Rock
Infralittoral, Low Energy Rock and thin Sediment
Littoral, Low Energy Rock
Littoral, Low Energy Rock and thin Sediment
Littoral, Coarse Sediment
Littoral, Sand
Sublittoral, Coarse Sediment
Sublittoral, Sand
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.25 0.5 1 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013


BOGNOR REGIS
SUBSTRATE
LEGEND: Substrate
Rock
Coarse Sediment
Sand
Areas of Bedforms
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
N
0 0.25 0.5 1 km
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

Pagham and Selsey

This is a dynamically active, complex and shallow bathymetric area, which has seen the shingle Pagham spit extend northeastward significantly over recent years, altering the tidal current and hydrodynamic interactions between Pagham harbour and offshore. The nearshore zone consists almost entirely of coarse sediment (as confirmed from extensive groundtruthing and aerial photography) although there are a small number of rock features and relatively limited patches of finer-grained sand west of Selsey Bill.

No bedforms identified.



Sussex IFCA

LEGEND: Backscatter Intensity

High Intensity

Low Intensity

PAGHAM - SELSEY BILL

BACKSCATTER

LAYERS

- ☐ Bathymetry
- ☒ Backscatter
- ☐ Slope
- ☐ Anthropogenic
- ☐ Seabed Habitats
- ☐ Substrate

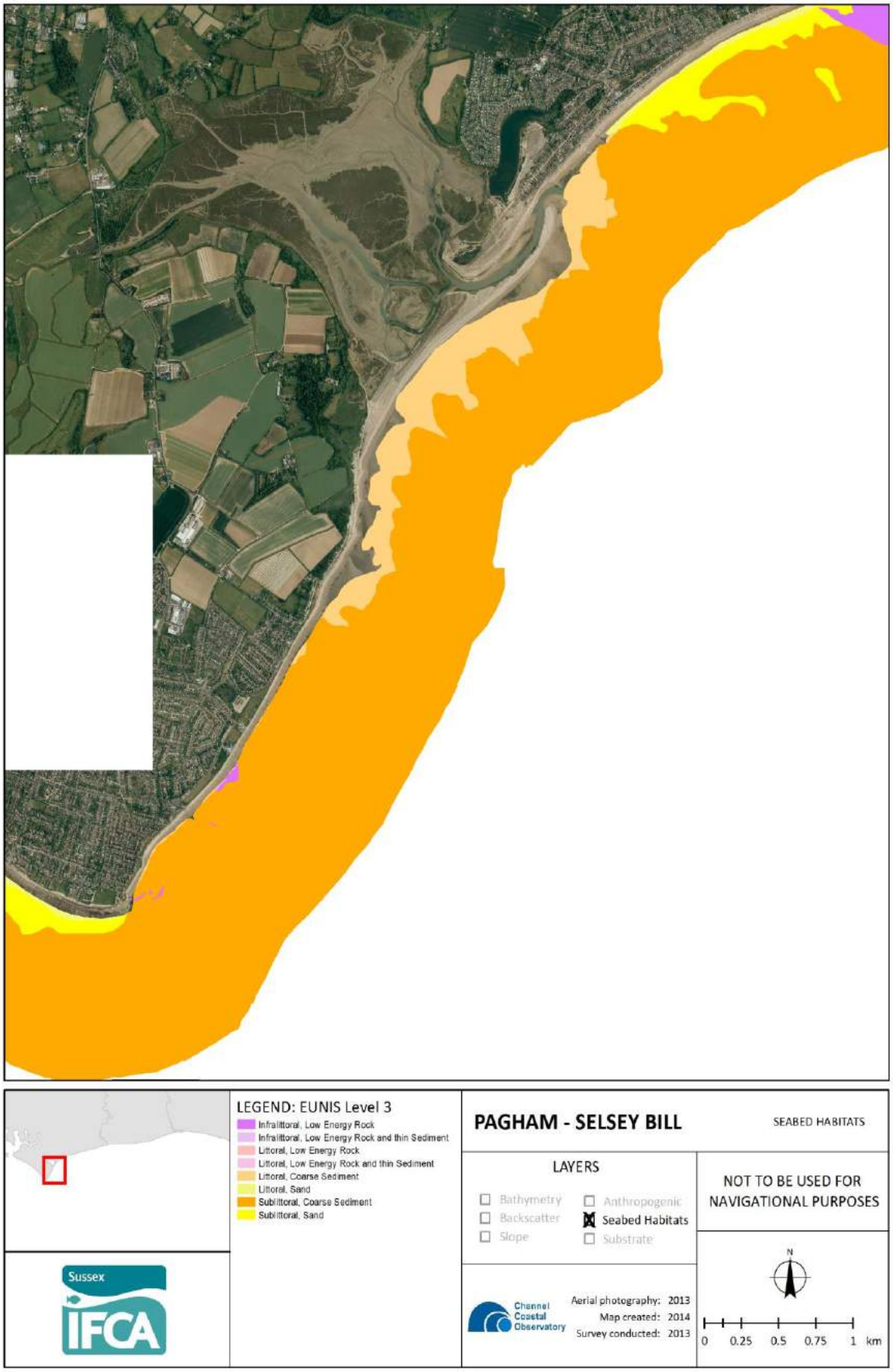
NOT TO BE USED FOR NAVIGATIONAL PURPOSES

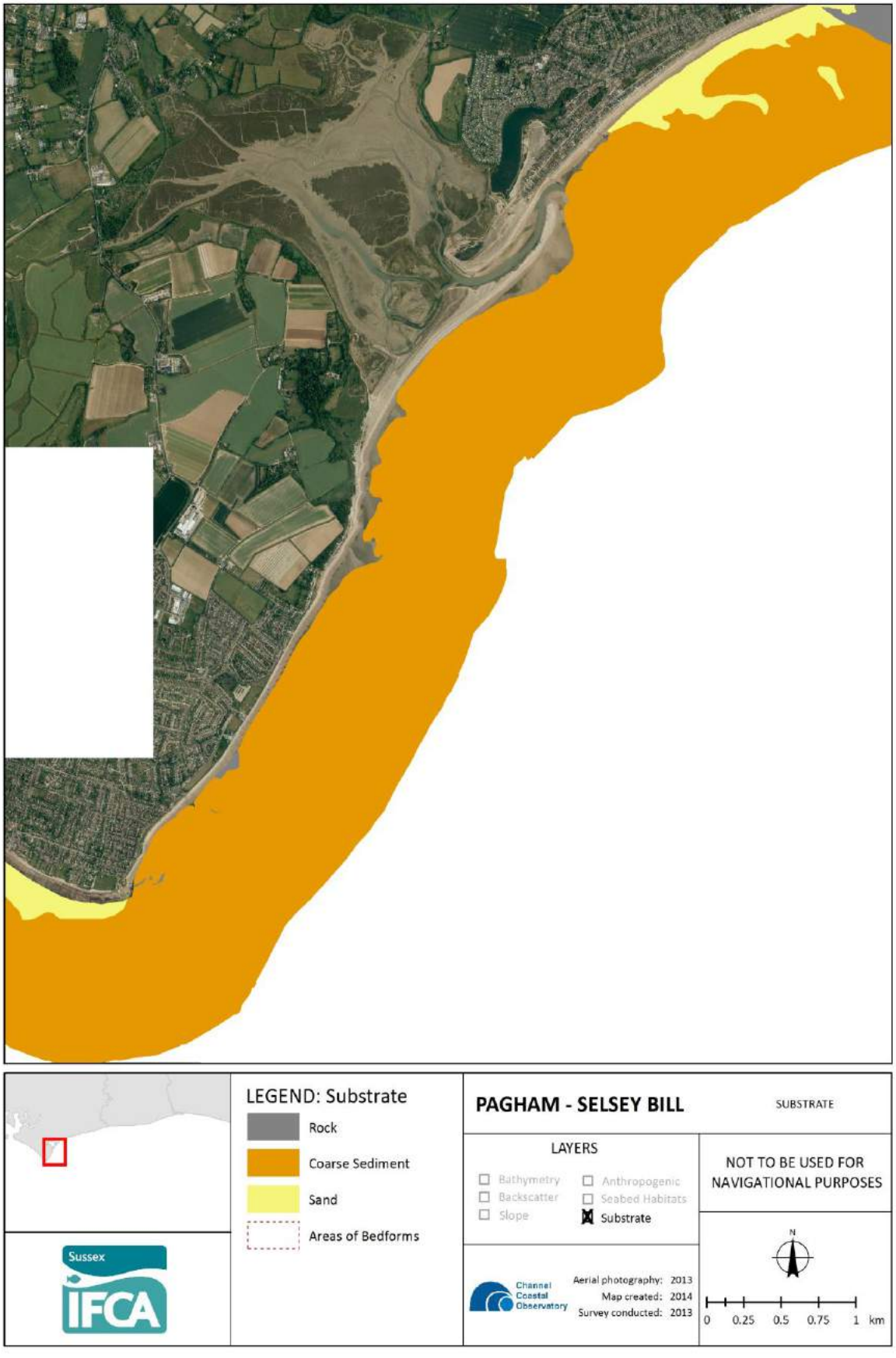
Channel Coastal Observatory

Aerial photography: 2013
Map created: 2014
Survey conducted: 2013

N

0 0.25 0.5 0.75 1 km


LEGEND: EUNIS Level 3
Infralittoral, Low Energy Rock
Infralittoral, Low Energy Rock and thin Sediment
Littoral, Low Energy Rock
Littoral, Low Energy Rock and thin Sediment
Littoral, Coarse Sediment
Littoral, Sand
Sublittoral, Coarse Sediment
Sublittoral, Sand
PAGHAM - SELSEY BILL
SEABED HABITATS
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
N
0 0.25 0.5 0.75 1 km


LEGEND: Substrate
Rock
Coarse Sediment
Sand
Areas of Bedforms
PAGHAM - SELSEY BILL
SUBSTRATE
LAYERS
Bathymetry
Backscatter
Slope
Anthropogenic
Seabed Habitats
Substrate
NOT TO BE USED FOR NAVIGATIONAL PURPOSES
Sussex IFCA
Channel Coastal Observatory
Aerial photography: 2013
Map created: 2014
Survey conducted: 2013
N
0 0.25 0.5 0.75 1 km

Acknowledgements

Data interpretation was undertaken with the support of MAREMAP programme partners, and the advice and guidance of Dr Justin Dix (University of Southampton) and Dr Tim Le Bas (NERC). Support was also provided by Erin Pettifer and Tim Dapling, Sussex IFCA, Rob Clark and Southern IFCA. Valuable groundtruthing and substrate information was kindly provided by Sussex IFCA, Sussex Wildlife Trust**,** JNCC marine recorder, Sussex Seasearch and Dan Amos, Worthing Borough Council, Southeast Regional Coastal Monitoring Programme. The MCA's Civil Hydrography Programme bathymetry data kindly provided by colleagues from the MCA hydrographic team under Open Government Licence.

Annex 1 Confidence Assessment

	Dungeness to Newhaven (CCO, 2013)	Newhaven to Shoreham (MCA, 2015)	Hove to Selsey (CCO, 2011)
Remote Technique	3	3	3
Remote Coverage	3	3	3
Remote Positioning	3	3	3
Remote Standards Applied	3	3	2
Remote Vintage	3	3	3
Biological Groundtruth Technique	2	2	1
Physical Groundtruth Technique	2	2	1
Groundtruth Positioning	3	3	1
Groundtruth Density	2	2	1
Groundtruth Standards Applied	3	3	1
Groundtruth Vintage	3	3	2
Groundtruth Interpretation	2	2	1
Remote Interpretation	3	3	3
Detail Level	1	1	1
Map Accuracy	3	3	2
Remote score	100	100	93
Groundtruth score	82	82	38
Interpretation score	75	75	58
Overall score	86	86	63

http://www.searchmesh.net/confidence/confidenceAssessment.html

Remote Techniques

An assessment of whether the remote technique(s) used to produce this map were appropriate to the environment they were used to survey. If necessary, adjust your assessment to account for technique(s) which, although appropriate, were used in deep water and consequently have a significantly reduced resolution (i.e. size of footprint):
3 = technique(s) highly appropriate
2 = technique(s) moderately appropriate
1 = technique(s) inappropriate

Remote Coverage

An assessment of the coverage of the remote sensing data including consideration of heterogeneity of the seabed. This can be simply achieved in a coverage x heterogeneity matrix, as illustrated below:

		Heterogeneity		
		Low	Moderate	High
Coverage	Poor (large gaps between swaths; Track spacing >100m)	2	1	1
	Moderate (50%; track spacing <100m)	3	2	1
	Good (100%; track spacing <50m)	3	3	3

Remote Positioning & Ground Truthing Position
An indication of the positioning method used for the remote / ground-truth data:
3 = differential GPS
2 = GPS (not differential) or other non-satellite 'electronic' navigation system
1 = chart based navigation, or dead-reckoning

Remote & Ground Truthing Standards Applied
An assessment of whether standards have been applied to the collection of the remote / ground-truth data. This field gives an indication of whether some data quality control has been carried out:
3 = remote / ground-truth data collected to approved standards
2 = remote / ground-truth data collected to 'internal' standards
1 = no standards applied to the collection of the remote / ground-truth data

Remote Vintage & Ground Truthing Vintage
An indication of the age of the remote / ground-truth data:
3 = < 5yrs old.
2 = 5 to 10 yrs old.
1 = > 10 years old

Biological Ground Truthing Technique
An assessment of whether the groundtruthing techniques used to produce this map were appropriate to the environment they were used to survey. Use scores for soft or hard substrata as appropriate to the area surveyed.

Soft substrata predominate (i.e. those having infauna and epifauna)	Hard substrata predominate (i.e. those with no infauna)
3 = infauna AND epifauna sampled AND observed (video/stills, direct human observation) 2= infauna AND epifauna sampled, but NOT observed (video/stills, direct human observation) 1 = infauna OR epifauna sampled, but not both. No observation.	3 = sampling included direct human observation (shore survey or diver survey) 2 = sampling included video or stills but NO direct human observation 1 = benthic sampling only (e.g. grabs, trawls)

Physical Ground Truthing Technique
An assessment of whether the combination of geophysical sampling techniques were appropriate to the environment they were used to survey. Use scores for soft or hard substrata as appropriate to the area surveyed.

Soft substrata predominate (i.e. gravel, sand, mud)	Hard substrata predominate (i.e. rock outcrops, boulders, cobbles)
3 = full geophysical analysis 2 = sediments described following visual inspection of grab or core samples (e.g. slightly shelly, muddy sand) 1 = sediments described on the basis of remote observation (by camera).	3 = sampling included in-situ, direct human observation (shore survey or diver survey) 2 = sampling included video or photographic observation, but NO in-situ, direct human observation 1 = samples obtained only by rock dredge

Ground Truthing Sample Density
An assessment of what proportion of the polygons or classes (groups of polygons with the same 'habitat' attribute) actually contain ground-truth data:
3 = Every class in the map classification was sampled at least 3 times
2 = Every class in the map classification was sampled
1 = Not all classes in the map classification were sampled (some classes have no ground-truth data)

Ground Truthing Interpretation
An indication of the confidence in the interpretation of the groundtruthing data. Score a maximum of 1 if physical ground-truth data but no biological ground-truth data were collected:
3 = Evidence of expert interpretation; full descriptions and taxon list provided for each habitat class
2 = Evidence of expert interpretation, but no detailed description or taxon list supplied for each habitat class
1 = No evidence of expert interpretation; limited descriptions available

Remote Interpretation
An indication of the confidence in the interpretation of the remotely sensed data. (Interpretation techniques can range from 'by eye' digitising by experts to statistical classification techniques):
3 = Appropriate technique used and documentation provided
2 = Appropriate technique used but no documentation provided
1 = Inappropriate technique used

Detail Level
The level of detail to which the 'habitat' classes in the map have been classified:
3 = Classes defined on the basis of detailed biological analysis
2 = Classes defined on the basis of major characterising species or lifeforms
1 = Classes defined on the basis of physical information, or broad biological zones

Map Accuracy
A test of the accuracy of the map:
3 = high accuracy, proven by external accuracy assessment
2 = high accuracy, proven by internal accuracy assessment
1 = low accuracy, proved by either external or internal assessment OR no accuracy assessment made