Creating a composite OSPAR threatened and/or declining habitat map for the UK

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1 Introduction

This document describes the procedure used to create a composite polygon dataset for the UK showing habitats on the OSPAR list of threatened and/or declining species and habitats. The aim of this work is to create a map that contains the best available information on OSPAR habitats at any position in UK waters. This dataset is required for, among other things, assessments of the UK network of marine protected areas and marine spatial planning.

1.1 Specification for end product

The aim is to produce a single map layer containing a combination of pre-existing habitat datasets, displaying the best quality OSPAR habitat data at any position. The process must be:

- Repeatable
- Transparent
- Easy to explain and understand
- As objective as possible
- Fully documented
- Appropriate for OSPAR habitats
- Appropriate for the UK, intertidal and subtidal areas

For locations where OSPAR habitat data is present there should be one or more[1] polygons describing the habitat. It is not possible to create a map showing the presence and extent of OSPAR habitats everywhere on the UK seabed because there are many areas that have not yet been surveyed; therefore a lack of data does not always indicate a lack of habitat.

OSPAR habitats are listed in Table 1 and describe a range of habitat types – some are defined by a single species, e.g. *Ostrea edulis* beds, and some are large topographic features, e.g. Seamounts. Therefore a method was chosen that can be flexible enough to choose data based on its ability to describe a wide range of feature types.

Table 1: OSPAR habitats that occur in the UK. One OSPAR habitat is not included in this list because it does not occur in the UK: *Cymodocea* meadows.

OSPAR threatened and/or declining habitats in UK waters	
Littoral chalk communities	Maerl beds
Intertidal *Mytilus edulis* beds on mixed and sandy sediments	Sea-pen and burrowing megafauna communities
Intertidal mudflats	*Lophelia pertusa* reefs
Zostera beds	Coral gardens
Ostrea edulis beds	Deep-sea sponge aggregations
Modiolus modiolus horse mussel beds	Carbonate mounds
Sabellaria spinulosa reefs	Seamounts

1.2 Data sources

The data used to create the final product is a combination of habitat maps created as a result of surveys for a range of different purposes between 1983 and 2015. Through JNCC's obligations to assess and report on benthic habitats at a UK scale, it has copies of the majority of the seabed habitat maps that exist for the UK. These are at a variety of spatial scales and describe habitats and biotopes at different levels of details; they have also been produced using a variety of methods.

[1] Some OSPAR habitats may overlaps, see Section 3.1 for more information.

1.2.1 Translation from EUNIS

The majority of habitat maps that JNCC have copies of have been originally mapped in or translated to the European Nature Information System (EUNIS) habitat classification (European Environment Agency, 2007). EUNIS is the European standard for classifying terrestrial and marine habitats, and the marine part is almost identical to the Britain and Ireland Marine Habitat Classification (Connor *et al.*, 2004). This hierarchical system assigns codes of letters and numbers to describe habitats at varying levels of accuracy.

An equivalency table is available (JNCC, 2010) which shows the relationship between EUNIS and OSPAR habitat types. Based on this table, polygons labelled with EUNIS codes that are wholly included within the definition of OSPAR habitats were extracted from each of 92 EUNIS habitat maps.

1.2.2 Non-EUNIS data

There is a small amount of data that has not yet been translated to EUNIS because:
1. Coral Gardens: there are not yet EUNIS habitat codes that correspond to thishabitat.
2. Seamounts: these are large topographic features. There are only three in the UK and they are unchanging in extent.
3. Other habitats: these are either awaiting translation to EUNIS or the data is too vague and/or missing metadata so a translation to EUNIS has not possible.

1.2.3 Wales

Natural Resources Wales (NRW) (the Countryside Council for Wales pre-2013) maintains responsibility for OSPAR habitat datasets in Welsh waters. Therefore, the procedure described in the following sections is not applicable to Welsh territorial waters. Data received from NRW is spliced in at the end.

1.3 Previous work

Since 2010, JNCC has produced a polygon layer of OSPAR habitats to contribute to the annual reporting to the OSPAR Biodiversity Committee. In some places maps overlap; therefore decisions had to be made about which maps to use in the case of overlaps. For habitat maps that were translated from EUNIS, the map with the highest MESH confidence* score was used.

The MESH confidence assessment is a way of qualitatively scoring a habitat map based on the quality of (i) remote sensing data, (ii) ground-truthing data and (iii) data interpretation. These are assessed using 15 criteria, which are scored and combined to provide a score between 0 and 100. This score is not a probability, rather it is a qualitative indication of the confidence one can have in the map. To read more about the MESH confidence assessment method, see MESH Project (2008).

1.4 Justification for a new combination procedure

For the 2014 version of composite OSPAR habitat map, a new procedure for assessing confidence and combining the various datasets was produced based on the following points:

1. The MESH confidence assessment method used to make decisions about overlapping data is not tailored to assess a map's ability to distinguish habitats of a certain level of detail; it is a more generic assessment that could be applied to a wide variety of maps. The process was originally designed to encourage best practice in habitat mapping by highlighting the factors that affect the quality of maps. At the time of development the focus was on a broad application to historic maps as recent

survey data made up a smaller proportion of the total. The result is that the MESH confidence score is not equivalent to a map's ability to predict the correct OSPAR habitat.
2. Although the MESH confidence assessment is quite easy to understand, it takes some time to understand it. Therefore, users who are short of time may not develop a full understanding of the level of confidence in the data. A common misconception has been that the percentage score represents the likelihood of finding a particular habitat at that location.
3. For the reasons described above and others, a new, simpler but more relevant confidence assessment method was developed in autumn 2013 by JNCC to produce the 2013 version of the combined EUNIS level 3 map integrating data from field surveys and EUSeaMap. For consistency, this new approach for the composite OSPAR habitat map was designed to follow a simpler approach.

2 Three-step confidence assessment

2.1 Summary

The term "confidence" with regards to habitat maps can have many meanings and therefore should be qualified whenever it is used. Confidence is a term sometimes applied to the accuracy/uncertainty of the map based on external validation (testing the map with ground-truthing data that were not used in the map-making). This can be a very useful statistic but presents some challenges: data for validation are likely to be scarce, and the difference in spatial scales between a validation point (e.g. grab sample) and the map polygons means that mis-matches may be very common in spatially heterogeneous areas such as habitat mosaics.

The MESH confidence assessment delivers a confidence score that indicates the quality of the process used to make a biotope map and explains the relative reliability of different maps. However, because it refers to the mapping process as a whole, it does not give an indication of the probability (or likelihood) of any of the habitat classes in the map being present on the seabed at any location.

As a compromise between these alternatives, and to address the points in the previous section, a new confidence assessment was developed that produces a qualitative score indicating the likelihood of a particular habitat being correctly mapped within a study area. This was achieved by considering each of the MESH confidence criteria together with other factors affecting map quality and choosing those likely to have the greatest effect on the overall accuracy of the habitat assignments. Therefore, contrary to the 15 criteria used in the MESH confidence assessment method, a new confidence assessment method was developed with only three criteria:
1. Remote sensing coverage
2. Amount of sampling
3. Distinctness of class boundaries

Remote sensing coverage and *amount of sampling* are similar to the MESH criteria *remote sensing coverage* and *ground truthing density*, the former being deemed the most important factor in accurately delineating the class boundaries and the latter being the most important factor in accurately assigning the habitat type to each remotely sensed class. The *distinctness of class boundaries* criterion is not solely based on the techniques used to make the map and therefore does not have an equivalent in the MESH confidence assessment. It is rather a feature of the data and the particular habitats it has surveyed, which is considered to have a large influence on the quality of the final map.

The three-step confidence assessment can be represented as a simple decision tree, in which the second and third questions depend on the answers to the previous questions and the final score is a sum of the points awarded for each criterion (Figure 1, see and Table 2 for more details on how each criterion is assessed). The final score will range between 0 and 4 with 4 representing the 'best' type of map. Note, however, that this is a qualitative assessment, therefore a score of 4 does not equate to a perfect or 100 % accurate map. The combinations of scores that can possibly result in each final score are shown in Table 3.

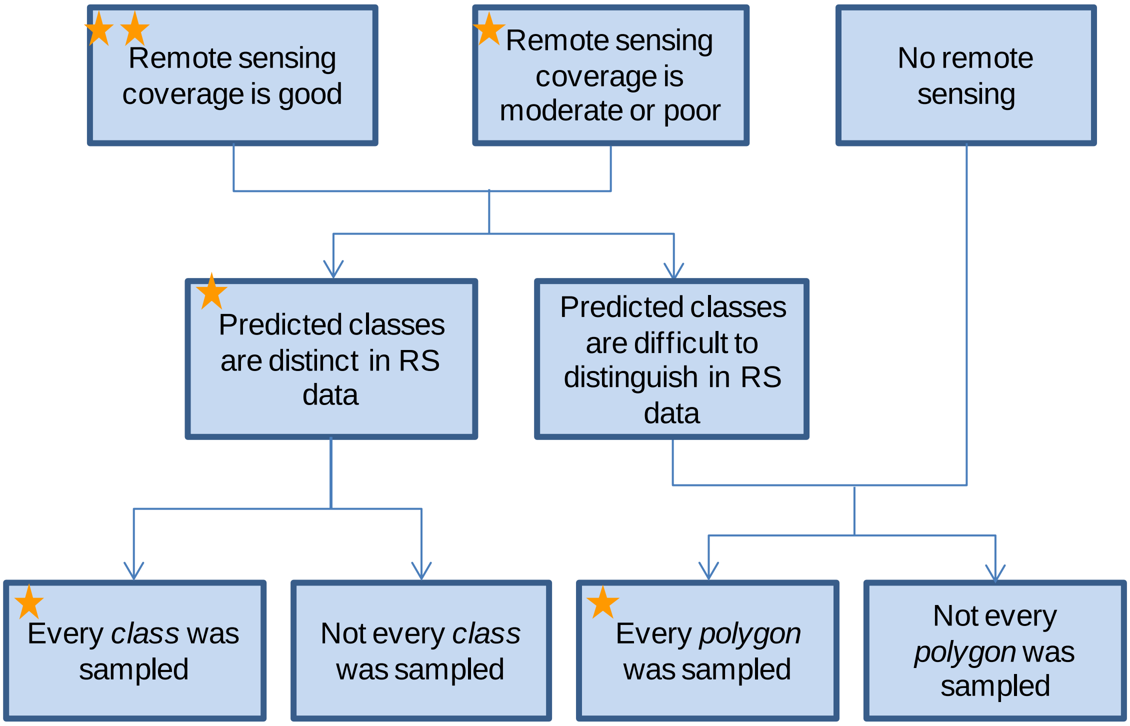


Figure 1: three-step confidence decision tree; the assessor starts at the top and follows the arrows. Stars/points are awarded according to the answers given and the final score is the sum of the stars/points.

Table 2: guidance on the application of the three-step confidence assessment method in scoring OSPAR habitat data.

Name of criterion	Possible scores	Description	Application
Remote sensing coverage	0, 1 or 2	How much of the habitat in the study area is covered by remote sensing? 2 points: coverage is good 1 point: coverage is moderate or poor 0 points: no remote sensing used Remote sensing techniques include multi-beam or single beam echo sounder, side-scan sonar and aerial photography, among others.	There is some ambiguity in the amount of remote sensing that classes as "good" (2 points) and "moderate or poor" (1 point). This is to allow an element of expert judgement, based on the homogeneity of the seabed, the remote sensing technique used, whether the survey was inter-tidal or sub-tidal and any other factors considered relevant. A suggested rule of thumb is that over around 90% coverage is "good".
Distinctness of class boundaries	0 or 1	This question is specific to the habitat and is only answered if there is remote sensing data (i.e. if question one scores 1 or 2). How easy is it to distinguish the OSPAR habitat in remote sensing data? 1 point: it is possible to distinguish the habitat in remote sensing data 0 points: the habitat is not usually possible to detect in remote sensing data. (For this process the decision of whether each habitat is distinguishable in remote sensing data is derived from UK work to create a marine strategy framework directive indicator for habitat extent and distribution.)	The score for this criteria is based on the habitat and should be assigned according to this table, unless there is more study-specific information: Littoral chalk communities 1 Intertidal Mytilus edulis beds on mixed and sandy sediments 1 Intertidal mudflats 1 Zostera beds 1 Ostrea edulis beds 1 Modiolus modiolus horse mussel beds 1 Sabellaria spinulosa reefs 1 Maerl beds 1 Sea-pen and burrowing megafauna communities 0 Lophelia pertusa reefs 1 Coral gardens 0 Deep-sea sponge aggregations 0 Carbonate mounds 1 Seamounts 1
Amount of sampling	0 or 1	Was there an adequate amount of sampling to identify every polygon of the habitat?	"almost every" is included here to allow the use of expert judgement in awarding a point for sampling.

	If the habitat is distinguishable in remote sensing data (i.e. if question 2 scores 1) and if there is any remote sensing data (i.e. if question one scores 1 or 2): 1 point: every/almost every OSPAR habitat type in the map was sampled. 0 points: not every OSPAR habitat type in the map was sampled. If the habitat is not distinguishable in remote sensing data (i.e. if question 2 scores 0) and/or if there was no remote sensing (i.e. if question one scores 0): 1 point: every/almost every OSPAR habitat polygon in the map was sampled. 0 points: not every OSPAR habitat polygon in the map was sampled. Sampling techniques include grab sampling, photos, videos, shore survey and diver observation, among others.	This question is more difficult for inter-tidal maps, as a surveyor can see a larger area around him/her. Therefore some judgement may be required about whether the density of sampling was adequate.

Table 3: all combinations of scores that are possible under the three-step scheme. Maps with equal scores are therefore assumed to have roughly similar levels of confidence, regardless of the route through the decision tree.

Score	Remote sensing coverage	Distinctness of class boundaries	Amount of sampling
4	★★	★	★
3	★★	★	
	★★		★
	★	★	★
2	★★		
	★	★	
	★		★
1	★		
			★
0			

2.2 Application

The three-step confidence assessment was designed to be applicable to the range of habitats listed on the OSPAR threatened and/or declining list. It also contains some flexibility to allow some expert judgement to be used. . However, the quantity of survey maps to assess necessitated a rule-based approach to be developed to obtain scores for the majority of the maps. Newly acquired maps, on the other hand, were assessed one-by-one according to the general guidelines in Table 2.

JNCC used the following rules to assess the majority of older survey-derived habitat maps, many of which already had MESH confidence scores:

1. *Remote sensing coverage* was originally derived from the MESH RemoteCoverage criterion; therefore the following correspondence was used:
   0 stars if MESH RemoteCoverage = 0
   1 star if MESH RemoteCoverage = 1 or 2
   2 stars if MESH RemoteCoverage = 3
2. *Distinctness of classes* was based on the habitat in question, according to the scoring listed in Table 2.
3. *Amount of sampling* was originally derived from the MESH GTDensity criterion, therefore the following correspondence was used:
   0 stars if MESH GTDensity = 0 or 1
   1 star if MESH GTDensity = 2 or 3
   This was followed by a re-assessment of this score for maps where the predicted habitat was deemed difficult to distinguish, as in these cases every polygon must be sampled to gain a point (see Figure 1).

For a description of the MESH criteria RemoteCoverage and GTDensity, see MESH Project (2008).

3 New procedure for combining maps

The new procedure for selecting the best map where two maps overlap follows a five-stage decision tree (Figure 2). The majority of the maps are sorted at stage 3, which is based on the three-step confidence assessment method. This is applied to all habitats in all datasets.

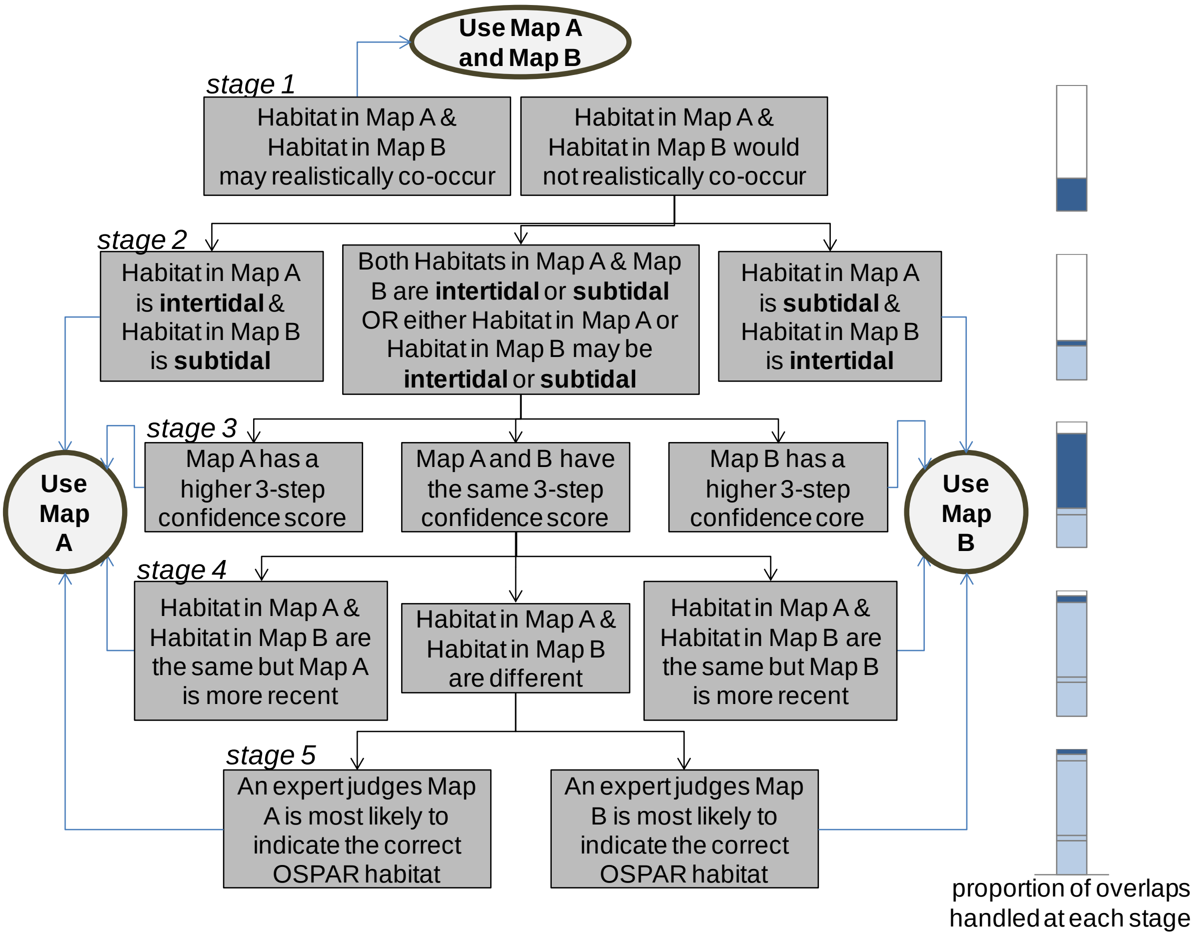
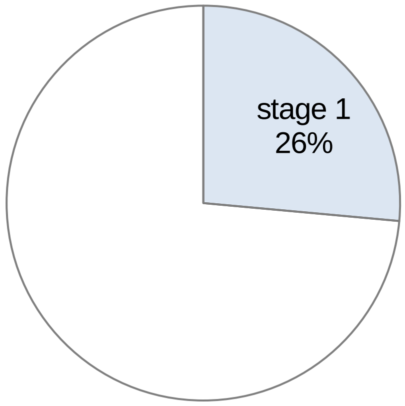


Figure 2: decision tree for the assessment of which of two overlapping habitat maps to use.

3.1 Stage 1: allowable habitat overlaps



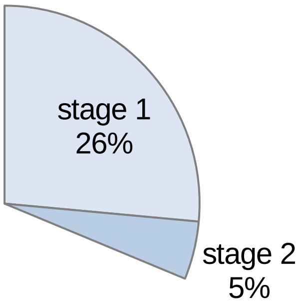
50 of 189 overlaps allowed in this stage
26 % of overlaps handled in total

Based on the habitat definitions, there are some which may feasibly overlap in reality. These are:

- *Zostera* beds & Intertidal mudflats
- Carbonate mounds & Coral gardens
- *Lophelia pertusa* reefs & Carbonate mounds
- Seamounts & *Lophelia pertusa* reefs
- Seamounts & Coral gardens
- Seamounts & Deep-sea sponge aggregations

More than a quarter of the overlaps were allowable overlaps; therefore these were not removed.

3.2 Stage 2: intertidal or subtidal

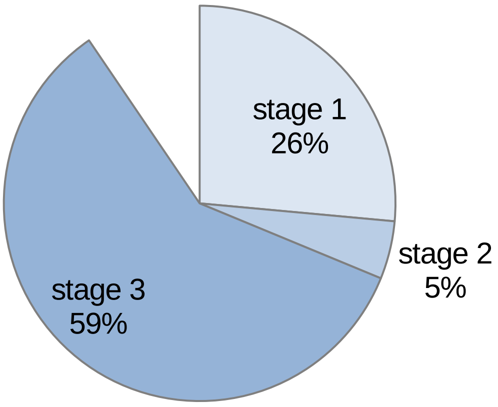


9 of 189 overlaps removed in this stage

31 % of overlaps handled in total

Stage 2 removes subtidal habitats that overlap intertidal habitats – without regard for the confidence scores. This is due to the assumption that the positioning of the intertidal data is likely to be roughly correct because intertidal maps are generally at a more detailed spatial scale than subtidal data.

3.3 Stage 3: three-step confidence assessment

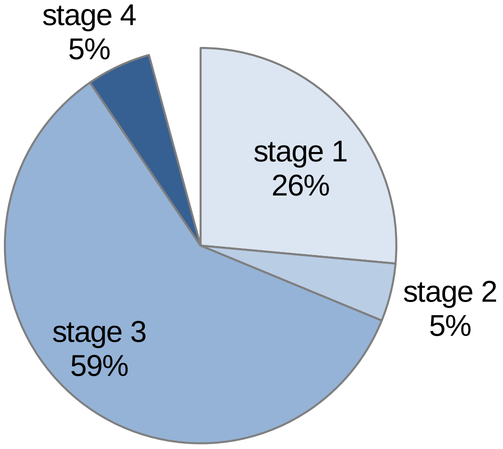


112 of 189 overlaps removed in this stage

90 % of overlaps handled in total

The three-step confidence assessment method described in Section 2 is used in stage 3 of the decision tree and removes the majority of the overlaps by favouring the map with the highest score.

3.4 Stage 4: same habitat, different vintage

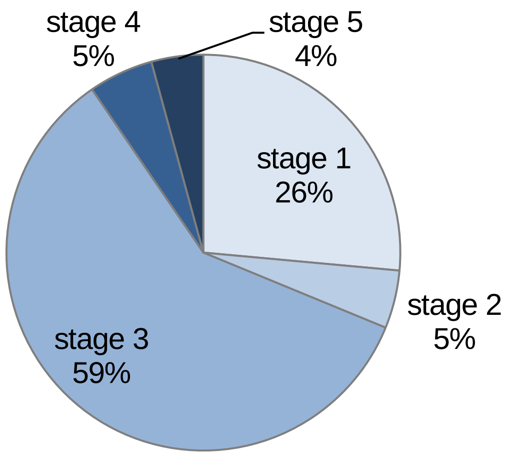


10 of 189 overlaps removed in this stage

96 % of overlaps handled in total

Of the 18 remaining overlaps with the same confidence scores, the majority were showing the same habitat. For these overlaps, the map with the most recent survey end date was selected.

3.5 Stage 5: expert judgement and additional information

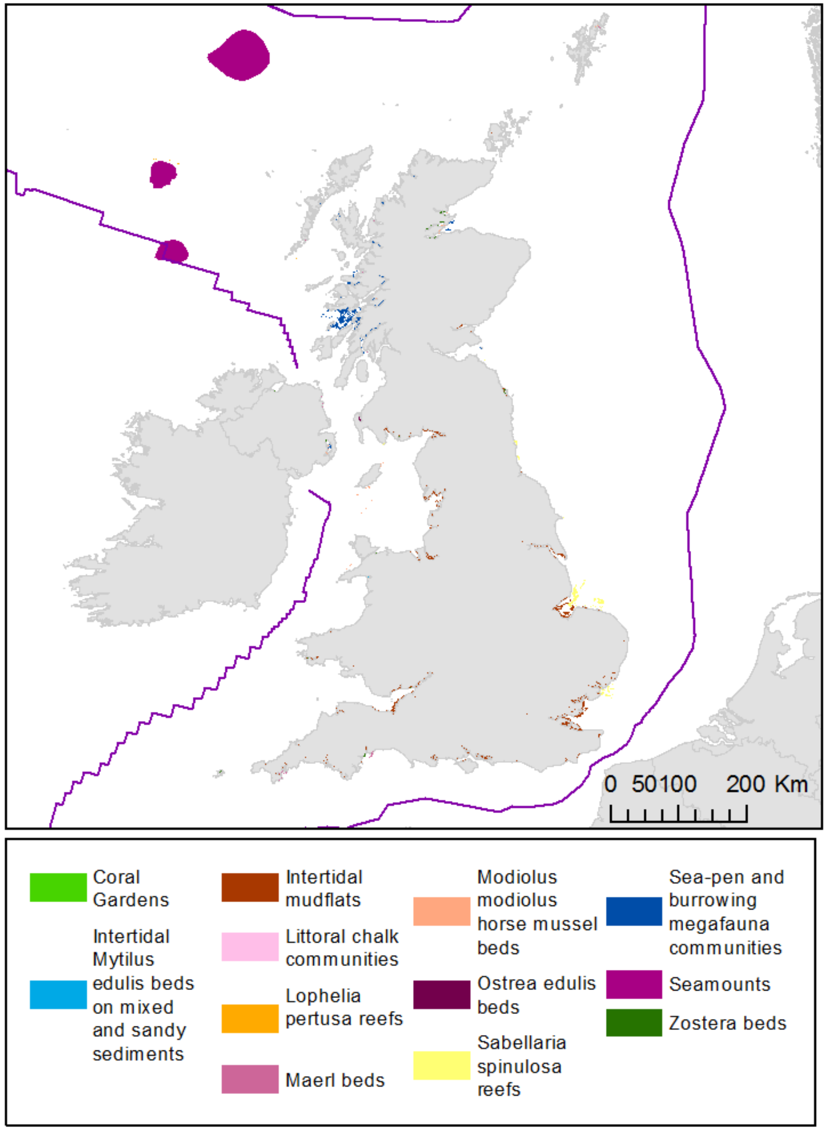


8 of 189 overlaps removed in this stage
100 % of overlaps handled in total

By stage 5, 96 % of overlaps had been resolved, leaving just 8 pairs of overlapping maps with identical confidence scores. Additional information (where available and relevant) and expert judgement were used to decide which map to clip using factors such as vintage, the relative level of spatial detail and/or the survey techniques. All cases and the reasons for the final decision were recorded and are listed with justifications in Appendix 1.

4 Final product

The final product (Figure 3) is a vector feature class GIS layer with an associated attribute table as described in Appendix 2, which follows the OSPAR habitat data exchange format (OSPAR, 2011). There is an accompanying spreadsheet containing metadata on each of 95 the input datasets.



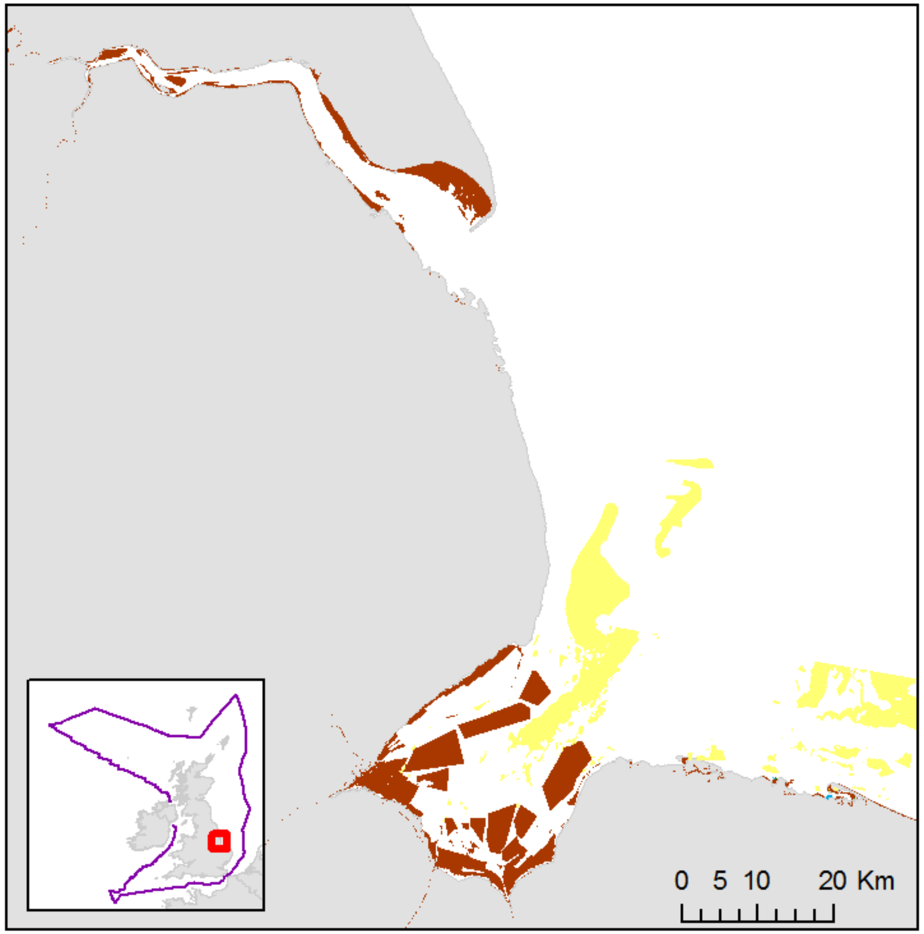


Figure 3: Left: OSPAR habitat data for the UK. Right: OSPAR habitat data in the Wash and the Humber Estuary. The legend applies to both figures.

5 Evaluation of new approach

5.1 Benefits

The procedure described in Section 3 addresses many of the issues described in Section 1.4:

1. The three-step confidence assessment method has been specifically developed to score a map's ability to map OSPAR habitats.

2. The three-step confidence assessment method is based on only three criteria, and is scored out of four, making it simpler to understand for those who are short on time.

3. The procedure used to create the final product is very similar to that used in the creation of a combined EUNIS level 3 survey/modelled habitat map for the UK.

5.2 Limitations

JNCC want to highlight the many limitations associated with the approach to deriving this product, including:

1. The variety of datasets that form the composite map mean that maps will usually vary in terms of one or more of the following ways:
    a. Spatial scales – this may cause confusion where is not clear whether a particular extent is a result of the resolution of the data or the actual habitat extent.
    b. Temporal scales – this is a particular issue for more ephemeral habitats such as *Sabellaria spinulosa* reefs.
    c. Survey techniques – different survey techniques are appropriate for mapping different habitats. The confidence assessment scores the amount of remote sensing and ground-truthing samples but not the suitability of the methods.

2. Three of the OSPAR habitats were deemed not to have a distinguishable remote sensing signature (see Table 2); this means that in the absence of a dense network of sampling locations, it may be difficult to accurately map the extent of these habitats: sea-pen and burrowing megafauna communities, Deep-sea sponge aggregations and coral gardens.

3. The map is incomplete and shows no indication of where OSPAR habitats have been found not to occur. Therefore it not possible to know the difference between areas that have not been surveyed and areas that have been surveyed and found no OSPAR habitats present.

6 Further Updates

The 2014 version (current version) of this UK-wide extent map of OSPAR habitats was created for the annual reporting of OSPAR habitat data collation to the OSPAR Biodiviersity Committee, in March 2015.

This datasets is updated annually in December; however, interim versions may be produced according to needs of various requirements, including assessments such as Article 17 conservation assessments (2013 and every six years), Marine Strategy Framework Directive assessments (every six years after 2012), analysis of MPA networks and monitoring.

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Appendix 1: Actions taken for overlapping studies with the same confidence scores

Table 4: A list of overlapping mapping studies with identical scores in the three-step confidence assessment. These overlaps were resolved by expert judgement in stage 5 (see Section 3.5). The globally unique identifier (GUI) and habitat type in the data chosen to win in each situation is in column 1 ('GUI & habitat of chosen data'). The reason for each judgement is given in colum 4 ('Justification'). A hyphen ('-') in column 3 ('3-step confidence score') indicates that a confidence score has not been calculated for either of the maps. This is usually due to the survey report and/or metadata not being available.

GUI & habitat of chosen data	GUI & habitat of loosing data	3-step conf score	Justification
GB000245 Intertidal mudflats	GB001070 Intertidal mudflats	-	Choice is rather arbitrary because the habitat types agree, but GB000245 was chosen because it has more complete metadata, which can link it to the original report
GB001104 Intertidal *Mytilus edulis* beds on mixed and sandy sediment	GB000255 *Zostera* beds	4	GB001104 was chosen because it is more recent and GB000255 was digitised from a paper map which may have resulted in inprecise positioning of boundaries.
GB100029 Sea-pen and burrowing megafauna communities	GB000258 Maerl beds	3	Maps are quite similar, but GB100029 was chosen as it is more recent.
GB000259 *Zostera* beds	GB000258 Maerl beds	3	The conflicting data are from the same study so it was difficult to decide; however there was only a small area of overlap. GB000259 was chosen rather arbitrarily.
GB000372 Intertidal mudflats	GB000282 Intertidal mudflats	1	Maps are from the same study and the habitat types agree therefore it was an arbitrary choice
GB000646 Maerl beds	GB000646 *Modiolus modiolus* horse mussel beds	1	Maps are from the same study and the overlapping area is only a sliver therefore it was an arbitrary choice
GB100002 Maerl beds	GB100003 Maerl beds	3	Maps are from the same study and the habitat types agree therefore it was an arbitrary choice
GB100003 Maerl beds	GB100004 Maerl beds	3	maps are from the same study and the habitat types agree therefore it was an arbitrary choice
GB001070	GB000317	-	Only one 60m overlap (plus two slivers) – GB001070 was chosen due to extreme age of GB000317. Metadata on survey strategies in GB001070 scant.

Appendix 2: Format for attribute table

Table 5: The attribute table format is equivalent to the data exchange format for OSPAR habitat data (OSPAR, 2011). In the 'Obligation' column, M stands for mandatory and O stands for optional.

Field name	Field type	Obligation	Description	Guidance
GUI	Text (17)	M	Globally Unique ID for each dataset.	"**OSPARHab**" **+ year + 2-letter country code** (corresponding to ISO 3166-1) **+ 1 alpha/numeric digit** (different for each dataset) **+ "v" + version of dataset**, e.g. if the Netherlands supplied 2 datasets, they may be called OSPARHab2010NL1v1 and OSPARHab2010NL2v1.
RecordKey	Long integer (Precision 8)	M	Unique key for each habitat record.	E.g. 1, 2, 3, 4, 5, 6……….through to 99999999.
HabType	Text (60)	M	OSPAR threatened and/or declining habitat.	• **Carbonate mounds** • **Coral Gardens** • ***Cymodocea* meadows** • **Deep-sea sponge aggregations** • **Intertidal *Mytilus edulis* beds on mixed and sandy sediments** • **Intertidal mudflats** • **Littoral chalk communities** • ***Lophelia pertusa* reefs** • **Maerl beds** • ***Modiolus modiolus* horse mussel beds** • **Oceanic ridges with hydrothermal vents/fields** • ***Ostrea edulis* beds** • ***Sabellaria spinulosa* reefs** • **Seamounts** • **Sea-pen and burrowing megafauna communities** • ***Zostera* beds**

Field name	Field type	Obligation	Description	Guidance
HabSubType	Text (60)	M	Sub-type of OSPAR threatened and/or declining habitat.	• For HabType = *Zostera* beds: either "***Zostera marina* beds**" or "***Zostera noltii* beds**" or "**Unknown**" • For HabType = Intertidal mudflats: either "**Marine intertidal mudflats**" or "**Estuarine intertidal mudflats**" or "**Unknown**" • For HabType = *Sabellaria spinulosa* reefs: either "***Sabellaria spinulosa* reefs on rock**" or "***Sabellaria spinulosa* reefs on mixed (sediment) substrata**" or "**Unknown**" • For all other habitats: "**Not Applicable**"
HabStatus	Text (20)	M	Presence or absence of habitat. This field is to allow for changes in distribution over time, where a habitat may have existed in the past but is no longer present. The original record indicating the presence of the habitat in the past should remain in the dataset.	• **Present** • **Absent [GUI-RecordKey of original record]** E.g. if the original record has GUI = OSPARUK1 and RecordKey = 23, enter "Absent OSPARUK1-23" in a new record.
Certainty	Text (9)	M	Gives an indication of the certainty of identification of the habitat type (HabType).	• **Certain** (habitat matches the definition, and there is documentary/visual evidence that this habitat does exist/had existed previously) • **Uncertain** (habitat is known to exist/had existed, but there is no documentary/visual evidence) • **Unknown**
Determiner	Text (254)	M	Name of person or organisation that identified the habitat.	Free text; e.g. JNCC
DetDate	Date	M	Date of identification of the habitat.	All dates must be supplied as text in the format **YYYY-MM-DD** (ISO date format); text format is required because Excel does not recognise dates before 1900-01-01 in date format.
SurveyKey	Text (30)	O	Unique key to divide up the dataset in any way you wish (e.g. representing real separate surveys, different	Each SurveyKey must have an associated record in the Survey Level Metadata table (see Section 2).

Field name	Field type	Obligation	Description	Guidance
			survey techniques, data from different sources, museum collections, databases etc.). SurveyKey links to the Survey Level Metadata table (see Section 2), where survey details are described in full.	
StartDate	Text (10)	M	Date the habitat was first recorded at this location.	All dates must be supplied as text in the format **YYYY-MM-DD** (ISO date format); text format is required because Excel does not recognise dates before 1900-01-01 in date format.
EndDate	Text (10)	M	Date the habitat was last recorded at this location.	
DateType	Text (2)	M	A one or two character code that identifies the type of dates used in StartDate and EndDate. Explicitly stating the code avoids any ambiguity, which might lead to subtly different interpretations.	• **D** Dates specified to the nearest day. • **DD** Dates specified to a number of days. • **O** Dates specified to the nearest month (first day of the month to the last day of the month). • **OO** Dates specified to a range of months (first day of the start month to the last day of the end month). • **Y** Dates specified to the nearest year (first day of the year to the last day of the year). • **YY** Dates specified to a range of years. • **-Y**Only EndDate to the nearest year known (leave StartDate blank). • **ND** or **U** 'No date' or 'unknown'. Enter the date the dataset was compiled in EndDate and leave StartDate blank.
PlaceName	Text (254)	O	Name of place referred to in reference to the feature e.g. on a chart or in a report.	Free text; e.g. "Darwin Mounds"
DataOwner	Text (254)	M	Name of person or organisation that own the data.	Free text; e.g. "JNCC"
Accuracy	Long integer	M	Spatial positioning accuracy of data points/polygons.	Value in metres; e.g. "10" means the given position of the habitat is accurate to ± 10 metres.
[Optional extra fields]	-	O	Add any other data you would like to record; a description of these field(s) is then to be given in the Dataset Level Metadata form (see Section 2). Please add as many fields as you like to display extra information you may possess.	Please keep field names to ≤ 10 characters and free of spaces, to allow import into GIS software. e.g. field name = "Salinity", "Comments", "HabDescrip", "Depth", etc.

Appendix 3: Version Control

BUILD STATUS:

Version	Date	Author	Reason/Comments
0.1	05/12/2013	Helen Ellwood	To describe the process used to create the 2013 UK composite OSPAR habitat map.
0.2	10/06/2015	Graeme Duncan	Minor edits to pictures etc to bring the document up to date.
1.0	11/06/2015	Graeme Duncan	Changes made reflecting comments and alterations by Helen Ellwood

DISTRIBUTION:

Copy	Version	Issue Date	Issued To
0.1	0.1	18/02/2014	Internal – Natalie Askew
0.2	0.2	10/06/2015	Internal – Helen Ellwood
1.0	1.0	11/06/2015	Public - Online