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Monitoring, assessment and reporting of UK benthic habitats: A rationalised list

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Amendments were made to this report in November 2014, Chapter 7 (Table 2) and Appendices 1 and 2. Hyperlinks have also been updated.

Summary

The UK has responsibilities under a number of different legislative obligations to survey and monitor marine biodiversity across UK waters, and to assess and report on the conservation status of this biodiversity. Such assessments will provide evidence on the state of biodiversity both within Marine Protected Areas (MPAs) and across the wider UK marine environment and identify where progress is being made in its protection.

Each obligation has a defined list of benthic habitats to monitor, assess and report on. For the purposes of this exercise, these habitats are referred to as 'listed habitats'. These listed habitats include narrowly-defined habitat types, broadly defined habitat 'complexes' which are composed of other habitat sub-types, and more broadly defined and spatially wide ranging habitats known as 'broad-scale', or 'predominant' habitats.

By considering the overlaps and nesting of listed habitats, it is possible to reduce the number of 'unique' habitat types. The aim of this work was to generate a rationalised list of benthic habitats which represents the minimum number of habitats for which we require information to complete the assessments and reports required under different obligations. The rationalised list was generated by considering the relationships between the listed habitats in terms of their component EUNIS habitat types and biotopes, removing any duplications or overlaps between habitats on different lists, and identifying where aggregation of information on habitats could be used to streamline our assessment and reporting requirements.

The resultant list (Table 2) details 76 habitats which can be used as the main reference list of habitats for monitoring, assessment and reporting purposes by the Statutory Nature Conservation Bodies (SNCBs) and other nature conservation agencies as required.

Although the number of habitats has not reduced significantly from the original list of 97 habitats, due to the complex relationships between the listed habitats, the rationalised list provides a useful starting point for marine advice, monitoring and assessment work going forward. Adaptations to the list to meet differing project requirements are expected. It is also recommended that the list is used to provide consistency across the nature conservation agencies, particularly the SNCBs, on the relationships between listed habitats. Integration with other similar products should be undertaken to maintain this consistency.

Contents

1 Introduction

The UK has responsibilities under a number of different legislative obligations to survey and monitor marine biodiversity across UK waters, and to assess and report on the conservation status of this biodiversity. Such assessments will provide evidence on the state of biodiversity both within Marine Protected Areas (MPAs) and across the wider UK marine environment and identify where progress is being made in its protection. Monitoring and assessment of biodiversity is key to the long-term conservation of habitats and species as it will provide the necessary evidence to support timely and effective advice for management.

For benthic habitats the key marine biodiversity obligations include the:

- Convention on Biological Diversity (1992);
- OSPAR Convention (1992);
- EC Habitats Directive (1992);
- EC Birds Directive (2009);
- Marine Strategy Framework Directive (MSFD) (2008);
- Water Framework Directive (WFD) (2000);
- Marine and Coastal Access Act 2009;
- Marine (Scotland) Act 2010;
- Marine Act (Northern Ireland) 2013;
- Natural Environment and Rural Communities Act 2006;
- Nature Conservation (Scotland) Act 2004; and
- Wildlife and Natural Environment Act (Northern Ireland) 2011.

Nearly all of these obligations have a defined list of benthic habitats to assess and report on (Table 1). For the purposes of this paper, these habitats are referred to as 'listed habitats'. These listed habitats include narrowly-defined habitat types, broadly defined habitat 'complexes' which are composed of other habitat sub-types, and more broadly defined and spatially wide ranging habitats known as 'broad-scale', or 'predominant' habitats.

Table 1. Obligations and their associated listed habitats.

Obligation	Name of habitat list	Original source
Convention on Biological Diversity	N/A	
OSPAR Convention	OSPAR threatened and/or declining habitats	OSPAR List of threatened and/or declining species and habitats (OSPAR Agreement 2008-6)
EC Habitats Directive	Natural habitat types of Community Interest (Annex I)	Annex I of Council Directive 92/43/EEC
EC Birds Directive	N/A	
Marine Strategy Framework Directive (MSFD)	Special habitats[1]	MSFD Advice Manual and Background Document on Biodiversity, Annex 8.6
	Predominant habitats	
Water Framework Directive (WFD)	N/A	

[1] The term 'special' in the MSFD is used for habitats listed for protection under Community legislation or international agreements. Special habitats in the UK have therefore been identified from the OSPAR List of threatened and/or declining species and habitats and the Habitats Directive Annex I list.

Obligation	Name of habitat list	Original source
Marine and Coastal Access Act 2009	Habitat Features of Conservation Importance (FOCI)[2]	Ecological Network Guidance, section 4.2[3]
	Broad-scale habitats	
Marine (Scotland) Act 2010	MPA Search Features	Scotland's Nature Conservation Strategy[4]
	Priority Marine Features (PMFs)	
Marine Act (Northern Ireland) 2013	Priority Marine Feature habitats	This list is still in development[5]
Natural Environment and Rural Communities Act 2006	Habitats of Principal Importance[6]	Section 41 list for England and Section 42 list for Wales – taken from the UK List of Priority Species and Habitats under the UK Biodiversity Action Plan
Nature Conservation (Scotland) Act 2004	Habitats of Principal Importance	Scottish Biodiversity List - taken from the UK List of Priority Species and Habitats from the UK Biodiversity Action Plan
Wildlife and Natural Environment Act (Northern Ireland) 2011	Northern Ireland Priority habitats[7]	Northern Ireland Priority habitats - taken from the UK List of Priority Species and Habitats from the UK Biodiversity Action Plan

[2] FOCI are classified as habitats on the OSPAR List of threatened and/or declining species and habitats, and the revised UK list of priority species and habitats (UK BAP).
[3] Only those FOCI for which MPAs are to be designated are listed in section 4.2. Habitats known to be sufficiently conserved under the EC Habitats Directive, or not known to occur in the area covered by the regional MCZ projects are excluded.
[4] Features which are formally protected by the designation order for a Nature Conservation MPA in Scotland may include the features which drove selection of the MPA (MPA search features) and other features which would also benefit from spatial measures and which are necessary for coherence. MPA search features are a subset of a wider list of Priority Marine Features (PMFs) developed by SNH and JNCC to help target marine nature conservation under Scotland's Nature Conservation Strategy. The PMF list was developed by considering habitats and species on the Habitats Directive, Wildlife and Countryside Act 1981, UKBAP, Scottish Biodiversity Strategy and OSPAR lists.
[5] The NI PMF list is still in development and as such these habitats have not been included within the rationalised list as yet. However many of them are likely to match habitats listed under other legislative instruments such as the OSPAR list and habitats of principal importance.
[6] Habitats of principal importance are habitats which in the Secretary of State's opinion are of principal importance for the purpose of conserving biodiversity as listed on the Section 41 list for England, Section 42 list for Wales and Scottish Biodiversity list for Scotland. These habitats have been identified from the revised UK List of Priority Species and Habitats under the UK Biodiversity Action Plan, now succeeded by the the UK Post-2010 Biodiversity Framework.
[7] Northern Ireland priority habitats are the NI equivalent of the habitats of principal importance (HPI) in England, Wales and Scotland. For ease of use of terminology they have been referred to as HPIs in this document.

2 Aims

Currently there is a large burden (both in terms of time, cost and data collation) associated with carrying out status assessments of marine biodiversity, and it is acknowledged that monitoring all marine habitats is impractical in terms of the time and resources required. In order to improve the assessment process, better inform management, and create a more even and efficient use of resources, it is necessary to ascertain if and how each obligation's requirements for habitat monitoring and assessment can be better aligned.

There are many similarities across the obligations in terms of the specific habitat types which they cover, with some habitats covered by multiple obligations. Alignment can therefore be made through the overlapping monitoring and assessment requirements for these habitats. However, there are also differences across the obligations, with different levels of biological and physical classification being used to define the listed habitat types. For example, under the Habitats Directive, the feature '*Estuaries'* is listed for protection, but this habitat is physiographic in nature and represents a habitat complex which may contain other physiographic or biologically defined habitat types such as *Intertidal mudflats* or *Seagrass beds,* which are listed under other obligations. In this way, many of the listed habitat types are nested within others (e.g. *Sabellaria spinulosa reefs* are a component of the Annex I habitat type '*Reefs*'). Therefore, this nesting of habitat types may mean that an assessment of the more broadly defined habitats can be completed as a result of the aggregation of assessment results from their component habitat types.

By considering these overlaps and nesting of habitats, it is possible to reduce the number of 'unique' habitat types. The aim of this work was to generate a rationalised list of benthic habitats which represents the minimum number of habitats for which we require information to complete the assessments and reports required under different obligations. This will help us to reduce the time and resource requirements of biodiversity monitoring, and work towards a harmonised and streamlined approach to biodiversity status assessments.

3 Types of relationships between listed habitats

The listed habitat types vary, such that their definitions can range from very broad to very detailed. The relationships between listed habitats described above can be separated into three types:

1. Listed habitat X is *equivalent to* listed habitat Y (i.e. the definitions and descriptions for the listed habitats are the same) (Diagram A, Figure 1);
2. Listed habitat X *contains* the listed habitat Y (i.e. the listed habitat is only known to occur within one other listed habitat type) (Diagram B, Figure 1); or
3. Listed habitat X *may contain* the listed habitat Y (i.e. (Diagram C, Figure 1) (i.e. the listed habitat is known to occur in more than one other listed habitat type).

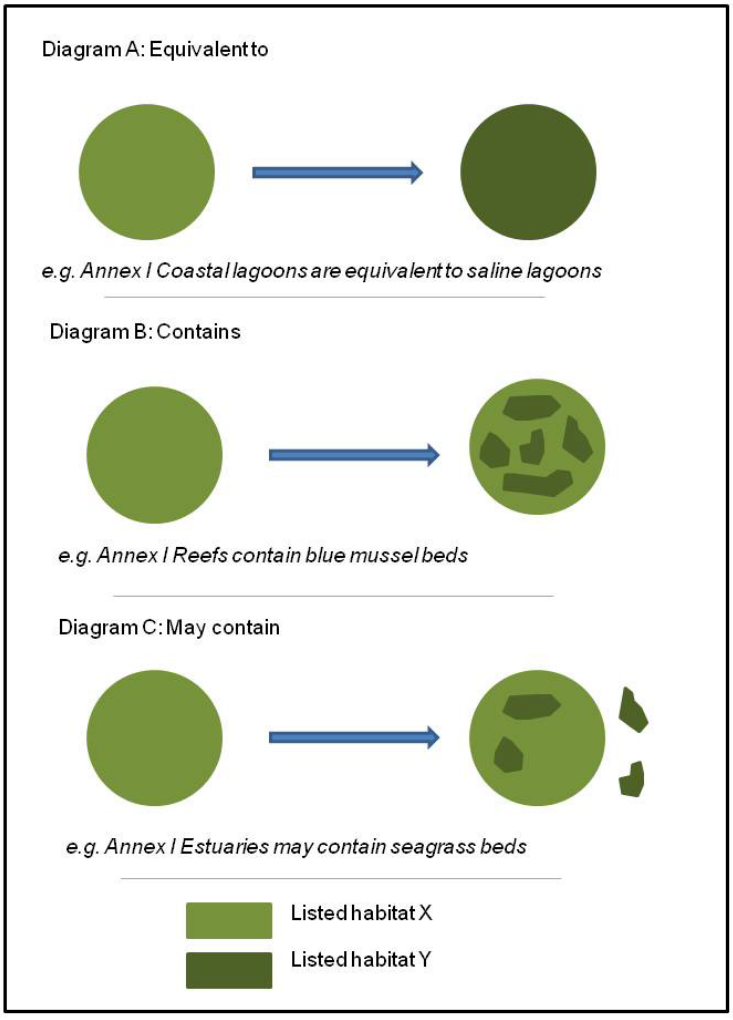

Figure 1. Types of relationships between listed habitats (reproduced from Natural England and JNCC (2010)).

Figure 1 gives examples of these relationships and the identification of these relationships is useful to determine where there are direct overlaps between listed habitats (equivalent to), where there may be nesting of habitats (contain, may contain), or whether the habitat is unique for a specific obligation. However, due to the complexities of many of the habitats, ascertaining these relationships is not always a simple process, and therefore a more rigorous method was needed for the rationalised list.

4 Using the EUNIS habitat classification scheme

Relationships can also be identified between listed habitats and habitat types and biotopes in the EUNIS habitat classification scheme. The EUNIS habitat classification scheme (European Environment Agency 2008) comprises over a thousand biotope-based habitats nested over multiple scales and provides full benthic habitat coverage for the marine environment. The classification is presented in hierarchical format (Figure 2), and through a series of habitat matrices. It comprises:

Level 1: Environment (marine) – A single category;
Level 2: Broad habitat types – Broad divisions of national and international application;
Level 3: Habitat complexes – Broad divisions of national and international application which reflect major differences in biological character;
Level 4: Biotope complexes – Groups of biotopes with similar overall physical and biological character; and
Level 5&6: Biotopes and sub-biotopes - Distinguished by their different dominant species or suites of conspicuous species.

The nesting of biotopes in the EUNIS classification is illustrated in a EUNIS structure diagram, developed by Connor *et al* (2004), which shows how the more detailed level 4-6 biotopes and sub-biotopes nest into the broader level 1-3 habitat types.

This scheme provides a more useful format to compare the listed habitats, by 'mapping' them into the classification based on their corresponding EUNIS habitat types and biotopes. Most marine habitats can be mapped across multiple levels of the EUNIS classification scheme (although gaps in this scheme do exist, most notably for deep sea habitats). The predominant and broad-scale habitats generally equate to Level 3 habitats, whilst the other listed habitats are mainly composed of biotope complexes and biotopes at levels 4 or 5, which nest into the broader level 1-3 habitats.

This classification mapping has already largely been completed in a habitat correlation table (Connor *et al*, 2007) and work is currently in progress by JNCC to publish an update which includes the Priority Marine Feature and Search Feature listed habitats and updates the UK BAP habitats to the Habitats of Principal Importance. As part of this update the associated EUNIS habitat types and biotopes for each listed habitat have been extracted from this correlation table and are listed in Appendix 2.

The classification mapping methodology does have some limitations. Whilst the EUNIS habitat classification scheme is the best available, it should be noted that the data that underlie it are not uniform or complete. Data availability and resolution tends to degrade with distance from the well-studied coastal habitats. Studies of the offshore and deep-sea environments are limited; consequently the EUNIS classification scheme is currently undergoing review and refinement in these areas.

In addition, the relationships between listed habitat types and EUNIS classes can be ambiguous, mainly due to some listed habitat types being very broad in character, poorly defined, or representing topographic and/or physiographic features rather than 'habitat types'. The greatest incongruence is between the EUNIS biotope-based definitions and physiographic definitions. For example an Annex I physiographic 'complex' habitat such as Large shallow inlets and bays may comprise a mosaic of habitats such as Annex I habitats (e.g. *Mudflats and sandflats*, *Sandbanks*, *Reefs*), and other listed habitats (e.g. *Seagrass beds*, *Coastal saltmarsh*), and therefore multiple EUNIS habitat types and biotopes could be associated with the physiographic habitat. In comparison, other habitats such as intertidal

Mytilus edulis beds on mixed and sandy sediments are defined mainly by very specific EUNIS habitat types and biotopes.

With this in mind, it should also be noted that the EUNIS classification cannot wholly define each listed habitat. The presence of a listed habitat's corresponding EUNIS habitat types and biotopes in a particular marine site does not necessarily mean the presence of that listed habitat. Again, this is especially the case for physiographically defined habitats, where it is the overall physiographic feature that defines the habitat alongside the associated habitat types and biotopes. It is also the case for many habitats which have a non-biological element to their definition, such as topography or bathymetry. E.g. for Annex I sandbanks, the relevant habitat types and biotopes should occur on elevated, elongated, rounded or irregular topographic features in water depth ≤20m. Other listed habitats have also been specifically defined by their extent or density, such as cold-water coral reefs or deep sea sponge aggregations, mainly to enable protection of good quality habitats.

As such the approach of 'mapping' the habitats into the classification does have limitations. However, it was recognised that the EUNIS classification scheme was the best method available to establish the relationships between listed habitats, since it provides a 'common language' for recognising the differences in marine communities making up the listed habitats, and is a European-wide hierarchical system which can be flexible and adaptable for different purposes.

The listed habitats were therefore 'mapped' into the classification. This mapping highlighted the more narrowly/biologically defined habitats, because they map into the classification at Levels 4-6, compared with the more broadly/physically defined habitats, which map into the classification at Levels 2-3. This made it possible to determine where habitats nested into other listed habitats and where other overlaps between the listed habitats occurred.

Ascertaining these overlaps provides an indication of where data collected on the more narrowly defined habitats could be aggregated to provide assessment information on the more broadly defined habitats. Using this bottom-up approach will ensure that the detail of narrowly defined habitats is not missed where it is needed, but will also focus future monitoring and assessment work by minimising the number of habitats we need to gather data and information to complete the assessments and reports required under different obligations.

Figure 2. Demonstration of the nesting of biotopes in the EUNIS habitat classification, e.g. the level 5 biotope 'A1.111 - Mytilus edulis and barnacles on very exposed eulittoral rock' (highlighted), is a sub-type of the more broadly defined level 2 habitat type 'A1 – Littoral rock and other hard substrata' (also highlighted).

5 Generating a rationalised list of benthic habitats

The rationalisation exercise aimed to remove any overlaps or duplications between habitats on different lists and identify where aggregation of data and information on specific habitats could be used to streamline our assessment and reporting requirements. The following method was used for the habitat rationalisation, following a step-by-step process (see also Figures 3 and 4):

1. All habitats with an assessment and reporting requirement were collated into one list (see Appendix 1).

2. For each listed habitat, the corresponding EUNIS habitat types and biotopes were identified in the EUNIS structure diagram (Figure 5).

3. Where the corresponding EUNIS habitat types and biotopes of a listed habitat fully covered the range of biotopes in the classification at a certain EUNIS level, the listed habitat was mapped up to the next EUNIS level, until the broadest possible level was reached (Figure 6). This makes it easier to see which habitats are more narrowly defined, because their corresponding biotopes are limited to levels 4-6, whereas broadly-defined habitats directly map to, or can be mapped up to, the broader EUNIS levels 2-3.

   Example – The level 4 biotope '*A1.32 - Fucoids in variable salinity',* has 7 lower level 5 biotopes nested into it. *Estuarine rocky habitats* correlate with all 7 of these biotopes, and as such can be mapped up to level 4. However, *Estuarine rocky habitats* do not correlate with all the level 4 biotopes nested into '*A1.3 - Low energy littoral rock*,' so it cannot be mapped up further to level 3.

4. Listed habitats that mapped to EUNIS levels 4-6 were then included on the rationalised list (Table 2) to ensure all narrowly defined habitats were included. If there was a complete overlap with another listed habitat at this level, one was removed from the list (see step 8).

   Example – *Littoral chalk communities* maps to EUNIS level 5 and as such is included on the list.

5. Listed habitats that mapped to EUNIS level 3 were included on the rationalised list, unless there was a direct overlap with other listed habitats, in which case the more narrowly defined of these habitats were included on the list.

   Example – *Littoral rock and biogenic reef* overlaps at EUNIS level 3 with *High energy, Moderate energy* and *Low energy intertidal rock*. The latter habitats are more narrowly defined due to being broken down by energy levels and therefore are included on the list whilst the habitat *Littoral rock and biogenic reef* is not included on the list.

6. Listed habitats that mapped to EUNIS level 2 were excluded since they were composed of multiple lower level habitat types/biotopes making up other listed habitats. These lower level listed habitats were already included on the rationalised list from steps 4 and 5.

   Example - Annex I *Reef* (bedrock, stony and biogenic subtypes) maps to EUNIS level 2 and is a broadly defined habitat composed of a number of habitat sub-types which are listed individually under other obligations. As such, the more narrowly defined habitats such as *High energy*, *Moderate energy* and *Low energy intertidal, infralittoral* and

circalittoral rock, plus biogenic reef habitats, are included on the list and will provide relevant data and information for Annex I *Reef,* which is excluded from the list.

7. Where a listed habitat had a non-biological element to its definition, and could not therefore overlap completely with other listed habitats, this was also included on the list.

   Example – Annex I *Sandbanks slightly covered by seawater all of the time* are composed of other listed habitats on the rationalised list such as *Maerl beds* and *Shallow sublittoral sand*s. However, since the definition of Annex I *Sandbanks* requires them to be elevated and in water depth ≤20m, inclusion of these other listed habitats would not be enough to adequately represent Annex I *Sandbanks*, so it is included on the rationalised list.

8. During the step-by-step process, where overlaps of biotopes were identified for habitats on different lists, a check was made to see if both listed habitats were composed of identical biotopes. If this was the case, one habitat was removed from the rationalised list to avoid duplication.

   Example – *Coastal saltmarshes* (HPI) and *Coastal saltmarshes and saline reedbeds* (broad-scale habitat) both map to A2.5, therefore the former was excluded from the list.

9. During the step-by-step the process, where only a few component biotopes overlapped between habitats on different lists, both habitats were kept on the rationalised list to ensure the detail was not missed.

   Example – *Tide-swept channels* and *Tide-swept algal communities* share a number of biotopes. However *Tide-swept channels* also include circalittoral rock biotopes not included in *Tide swept algal communities*, and therefore both habitats are included on the list.

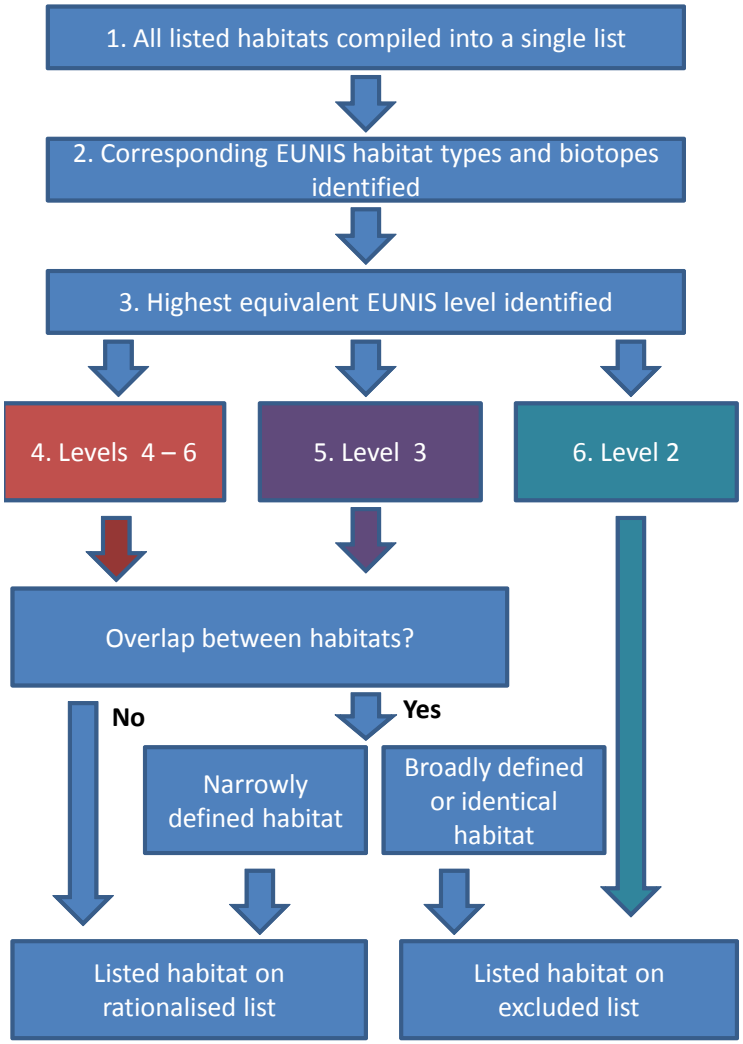

Figure 3. Flow chart of the rationalisation method.

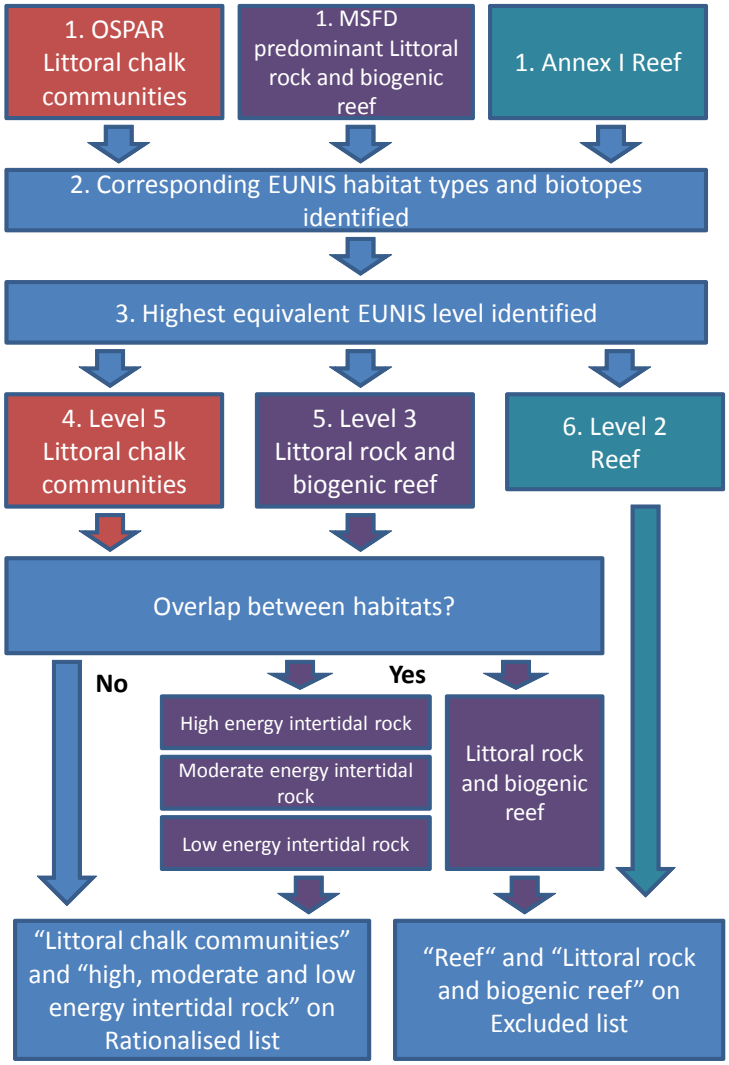

Figure 4. Flow chart of the rationalisation method using examples of listed habitats.

N.B. In both Figures: Numbers relate to the step numbers detailed in section 5.

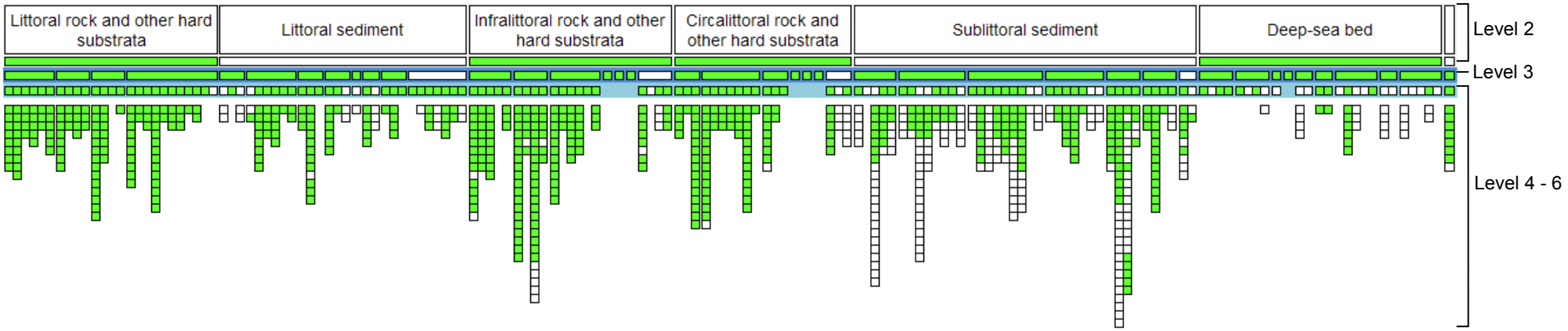

Figure 5. The EUNIS structure diagram, illustrating the different levels and hierarchy of the EUNIS classification. Each block represents a EUNIS habitat type or biotope, from level 2 – 6. Blocks representing the corresponding habitat types and biotopes of all listed habitats have been highlighted in green. This illustrates that nearly all habitat types and biotopes in the classification represent, or are a component part of, a listed habitat.

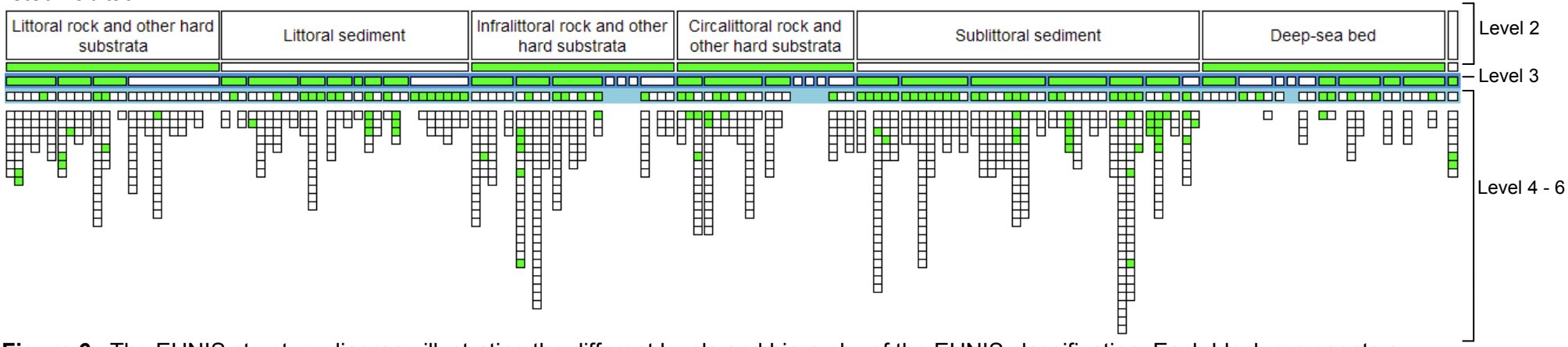

Figure 6. The EUNIS structure diagram, illustrating the different levels and hierarchy of the EUNIS classification. Each block represents a EUNIS habitat type or biotope, from level 2 – 6. Blocks representing the corresponding habitat types and biotopes of all listed habitats at the broadest equivalent EUNIS level have been highlighted in green. This makes it easier to identify the more narrowly defined habitats, since they don't map into the classification until levels 4 – 6, compared with the more broadly defined habitats, which map into the classification at Levels 2-3.

6 Results

The representation of listed habitats within the EUNIS habitat classification is illustrated in Figure 5, and indicates near-complete coverage of EUNIS habitat types and biotopes. This demonstrates how well the listed habitats represent the UK's marine benthic habitat diversity. However, the EUNIS classification does not provide a definitive representation of all UK marine benthic habitats and as such there may be gaps in coverage of benthic habitat diversity.

Figure 6 illustrates the representation of listed habitats within the EUNIS classification at the broadest equivalent EUNIS levels, in so far as the corresponding biotopes to the listed habitats can be aggregated up. This shows that many of these occur at, or can be aggregated up to, the broader EUNIS level 2 and 3 habitats. For example the broad-scale habitat '*High energy intertidal rock'* is equivalent to the level 3 EUNIS habitat type A1.1, and the corresponding biotopes of the HPI '*Coastal saltmarsh'* can be aggregated up to the level 3 EUNIS habitat type A2.5. This means data and information on just the broader EUNIS habitat types and biotopes would be adequate to enable an assessment to be undertaken of these listed habitats. Alternatively, data on the more detailed corresponding EUNIS habitat types and biotopes could also be aggregated together to produce this assessment.

However, Figure 6 also demonstrates that there are a large number of listed habitats whose corresponding biotopes occur at, or can only be aggregated up to, EUNIS levels 4 and 5. For example the OSPAR habitat '*Modiolus modiolus beds*' are composed only of EUNIS level 5 biotopes, and the corresponding biotopes of the Search Feature '*Tide-swept algal communities*' can only be aggregated up to level 4 EUNIS habitat types. This means data and information would be needed on these more detailed EUNIS habitat types and biotopes in order to produce an assessment of these listed habitats.

In addition, the diversity of the Annex I physiographic habitats is so great that it is difficult to define where they overlap with other listed habitats. Therefore the majority of these have been included on the rationalised list.

The resultant rationalised list includes 76 habitats where monitoring information is required to meet assessment and reporting requirements (Table 2). The number of habitats has not reduced significantly from the original list of 97 habitats (Appendix 1), due to the complex relationships between the listed habitats. Where listed habitats are not included on the rationalised list, the reason for their exclusion is detailed in Table 3.

In order to evaluate the ability of the rationalised list of habitats to meet the needs of the JNCC-led UK Marine Biodiversity Monitoring R&D Programme, an analysis was also carried out to compare the rationalised list to those habitats which were identified as requiring monitoring as part of the programme. In 2010, the Marine Biodiversity Monitoring Programme Board endorsed an approach to benthic habitats monitoring which stated that monitoring of habitats should cover all listed habitats (e.g. OSPAR threatened and/or declining habitats, Habitats Directive Annex I habitats, Habitats of Principal Importance) and all EUNIS level 3 habitats. This selection was made to ensure that full UK benthic habitat coverage was gained and that all habitats listed for conservation importance were also covered, so as to meet the holistic requirements of the programme.

The results of this analysis show that the rationalised list of habitats provides almost full coverage of the EUNIS level 3 habitat types and also covers all of the listed habitats. The only gaps in coverage at EUNIS level 3 are within the deep sea and the 'features of...' habitats within the classification system (i.e. EUNIS codes A2.8, A4.7 and A5.7). In terms of addressing these gaps in coverage, the deep sea habitats can be added as required,

following updates to the deep sea classification which is currently in progress. A further analysis can then be done of the rationalised list to remove any overlaps which have arisen as a result of the inclusion of these new, more detailed deep sea habitat types. The ‘features of...’ EUNIS level 3 habitat types are a collection of biotopes which do not form a logical structure within the classification and are also duplicated and/or covered by the inclusion of other broadscale or listed habitats on the rationalised list.

Therefore, no additional habitat types need to be added to the list at this time to meet the needs of the UK Marine Biodiversity Monitoring R&D programme. The list can therefore be used as it is as the basis of this programme of work going forward, although it is recognised that the habitat types presented on the rationalised list may need to be split down further by the SNCBs for practical monitoring purposes.

7 Implications and future work

The results of this work indicate there are still a significant number of habitats for which information is required to meet assessment and reporting requirements. However, it also details where there are specific duplications and overlaps between the lists to reduce this requirement to the extent possible. Additionally, there are no significant gaps in coverage for monitoring purposes, once deep sea biotopes and habitat types have been developed further.

The rationalised list therefore provides a useful starting point for marine advice, monitoring and assessment work going forward by minimising the amount of data and evidence required from monitoring programmes to implement the various legislative obligations. However, whilst data collection could be minimised, there is still a requirement to produce an assessment against each of the listed habitat types and as such, any habitats on the 'excluded list' must be taken into consideration for monitoring and assessment programmes to ensure that the data collected will be adequate to produce these assessments. The process of completing these assessments will vary by agency, but this product is based on the concept that collection of condition data at the biotope level could be aggregated together to produce an overall assessment of the different listed habitats. Therefore this method needs to be considered prior to data collection to ensure the data will be suitable for these purposes.

It is also important to bear in mind the caveats of the approach. Not all habitats can be defined wholly by their corresponding EUNIS habitat types and biotopes, and as such the use of the rationalised list for monitoring and assessment must also take this into account. Data collection should ideally include a record of, or be driven by, the listed habitat types present to ensure that any use of the data is relevant to specific habitat types. For example, biotope data for tide-swept habitats collected at a site around a headland will not be of relevance to the assessment of the Habitat of Principal Importance 'tide-swept channels' since it does not meet the physiographic element of this habitat definition.

Current marine biodiversity monitoring and assessment obligations and processes are complex and elucidating the relationships between them is difficult. However, all obligations are generally seeking to move towards clean, safe, productive, healthy and biologically diverse oceans and seas by providing robust information to allow effective marine management. Effective harmonisation across obligations would allow data to be more easily used to fulfil many requirements and would reduce the confusion of stakeholders and managers. It would also reduce the resource burden on those organisations tasked with undertaking data collection and assessments.

JNCC recommend that this rationalised list of habitats is adopted as the main reference list of habitats. This will contribute to work underway across the SNCBs and other nature conservation agencies to streamline resource requirements and harmonise the assessment and reporting against various obligations. Adaptations to the list to meet differing project requirements are expected, and the list should be subject to update and modification when/if:

- additional habitat lists are produced;
- updates to the habitat classification are completed; or
- sub-types of habitats are further defined.

Centralising and maintaining the data available for this rationalised list of benthic habitat types would greatly reduce the data collation burden involved in undertaking assessments at all scales for these features. JNCC and the other Statutory Nature Conservation Bodies

should aim to recommend potential systems and processes for the establishment and maintenance of centralised spatial data sets for each benthic habitat type on the rationalised list. Utilising these sorts of systems will provide easier access to data to enable us to report directly on listed habitats, or to aggregate habitat data to report on more broadly defined habitats.

It is also recommended that the list is used to provide consistency across the nature conservation agencies, particularly the SNCBs, on the relationships between listed habitats. Integration with other similar products should be undertaken to maintain this consistency.

Table 2. Rationalised list of habitats for marine habitat assessment and reporting**.**

Listed habitats are those listed under the EC Habitats Directive under Annex I (Annex I), the OSPAR List of Threatened and/or Declining Species and Habitats (OSPAR), the section 41 list, section 42 list, Scottish biodiversity list and Northern Ireland Strategy as Habitats of Principal Importance/Priority Habitats (HPI), the Ecological Network Guidance as Features of Conservation Importance (FOCI) and Broad-scale habitats (Broad-scale), the MSFD as Predominant habitats (Predominant) and the Scottish MPA Site Selection Guidelines as Search Features (SF) and Priority Marine Features (PMF). NB Those listed as OSPAR and Annex I are also MSFD special habitats.

Listed habitat name	Corresponding EUNIS biotopes (broadest level)[8]	Priority habitat list[9]
Annual vegetation of drift lines	A2.511, A2.515	Annex I
Atlantic salt meadows (*Glauco-puccinellietalia maritimae*)	A2.521, A2.531, A2.535, A2.536, A2.537, A2.538, A2.53A, A2.53B, A2.541, A2.542, A2.545, A2.548, A2.556, A2.557	Annex I
Blue mussel beds	A2.212, A2.721, (A3.361 – PMF only), A5.625	HPI, PMF, SF, FOCI
Carbonate mounds	A6.75	OSPAR, PMF, SF
Coastal (saline) lagoons	A3.34, A5.21, A5.31, A5.41, A5.54	Annex I, FOCI
Coastal saltmarshes and saline reedbeds	A2.5	Broad-scale
Cold-water coral reefs	A5.631, A6.611	OSPAR, HPI, PMF
Coral gardens	A6.1, A6.2, A6.3, A6.4, A6.5, A6.7, A6.8, A6.9	OSPAR, PMF, SF, FOCI
Deep sea sponge aggregations	A6.62	OSPAR, HPI, PMF, SF, FOCI
Estuaries	A1.32, A2.2222, A2.31, A2.32, A2.41, A2.5, A3.36, A5.22, A5.32, A5.42	Annex I
Estuarine rocky habitats	A1.32, A1.45, A3.321, A3.322, A3.323, A3.361	HPI, FOCI
File/flame shell beds	A5.434	HPI, PMF, SF, FOCI

[8] It should be noted that some of these listed habitats cannot be defined by these corresponding biotopes alone, since some habitats also have a non-biological element to their definition. However, the detail of this is not provided in this document.
[9] Some listed habitats detailed here are also sub-types of Annex I habitats. The sub-types have not been identified here due to the complexity of these relationships, but it should be noted that these relationships exist.

Listed habitat name	Corresponding EUNIS biotopes (broadest level)	Priority habitat list
Fragile sponge and anthozoan communities on subtidal rocky habitats / Northern seafan and sponge communities	A4.12, A4.131, A4.133, A4.211	HPI, PMF, SF, FOCI
Horse mussel beds	A5.621, A5.622, A5.623, A5.624	OSPAR, HPI, PMF, SF, FOCI
Inshore deep mud with burrowing heart urchins (*Brissopsis lyriferai*)	A5.363	PMF, SF
Intertidal chalk/Littoral chalk communities	A1.126, A1.2143, A1.441, B3.114, B3.115	OSPAR, HPI, FOCI
Intertidal mudflats	A2.24, A2.3	OSPAR, HPI, PMF
Intertidal *Mytilus edulis* beds on mixed and sandy sediments	A2.7211, A2.7212	OSPAR
Intertidal boulder communities	A1.2142, A3.2112	HPI, FOCI
Kelp beds	A3.113, A3.115, A3.1151, A3.1152, A3.2122, A3.2141, A3.2142, A3.2143, A3.2144	PMF
Kelp and seaweed communities on sublittoral sediment	A5.52	PMF, SF
Large Shallow Inlets and Bays	A1.15, A1.3, A2.24, A2.33, A2.42, A2.5, A3.22, A3.31, A3.32, A4.251, A5.341. A5.342, A5.343, A5.344, , A5.5213, A5.5214, A5.522, A5.523, A5.524, A5.525, A5.526, A5.527, A5.528, A5.53, A5.613, A5.621, A5.623, A5.624	Annex I
Maerl beds	A5.51	OSPAR, HPI, PMF, SF, FOCI
Maerl or coarse shell gravel with burrowing sea cucumbers (*Neopentadactyla mixta*)	A5.144	PMF, SF
Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)	A2.527	Annex I
Mudflats and sandflats not covered by seawater at low tide	A2.2, A2.3, A2.6, A2.85	Annex I
Mud habitats in deep water	A5.35, A5.36, A5.37, A5.7211	HPI, FOCI
Musculus discors beds	A4.242	HPI
Offshore deep seas muds	A5.35, A5.36, A5.37, A6.5	PMF, SF
Offshore subtidal sands and gravels	A5.14, A5.15, A5.25, A5.26, A5.27, A5.44, A5.45, A6.2, A6.3, A6.4	PMF, SF
Ostrea edulis beds	A5.435	OSPAR, PMF, SF, FOCI
Peat and clay exposures (with piddocks)	A1.127, A1.223, A4.231	HPI, FOCI

Sabellaria alveolata reefs	A2.71, A5.612	HPI, FOCI
Sabellaria spinulosa reefs	A4.22, A5.611	OSPAR, HPI, FOCI
Listed habitat name	**Corresponding EUNIS biotopes (broadest level)**	**Priority habitat list**
Salicornia and other annuals colonising mud and sand	A2.51B, A2.551, A2.553, A2.558	Annex I
Sandbanks which are slightly covered by sea water all the time.	A5.12, A5.13, A5.14, A5.21, A5.22, A5.23, A5.24, A5.25, A5.26, A5.51, A5.53	Annex I
Seagrass beds	A2.61, A5.53	HPI, PMF, SF, FOCI
Sea loch egg wrack beds (*Ascophyllum nodosum)*	A1.325	PMF, SF
Seamounts/seamount communities	A6.72	OSPAR, HPI, PMF, SF
Seapen and burrowing megafauna communities / burrowed mud	A5.361, A5.362	OSPAR, PMF, SF
Serpula vermicularis reefs	A5.613	HPI, PMF, SF
Shallow tideswept coarse sands with burrowing bivalves	A5.133	PMF, SF
Spartina swards (*Spartinion maritimae)*	A2.554	Annex I
Submarine structures made by leaking gases/Carbonate reefs	A5.711, A5.712	Annex I, HPI
Submerged or partially submerged sea caves	A1.44, A3.71, A4.71	Annex I,
Subtidal chalk	A3.2113, A3.217, A4.23	HPI, FOCI
Sheltered muddy gravels	A2.41, A2.42, A5.431, A5.432, A5.433, A5.435	HPI, FOCI
Tide-swept channels	A1.15, A3.212, A3.213, A3.22, A4.11, A4.25, A5.5211	HPI, FOCI
Tide-swept algal communities	A1.15, A3.126, A3.213, A3.22	PMF, SF
Zostera beds	A2.611, A5.533	OSPAR
High energy intertidal rock	A1.1	Broad-scale
Moderate energy intertidal rock	A1.2	Broad-scale
Low energy intertidal rock	A1.3	Broad-scale
High energy infralittoral rock	A3.1	Broad-scale
Moderate energy infralittoral rock	A3.2	Broad-scale
Low energy infralittoral rock	A3.3	Broad-scale
High energy circalittoral rock	A4.1	Broad-scale
Moderate energy circalittoral rock	A4.2	Broad-scale
Low energy circalittoral rock	A4.3	Broad-scale
Intertidal coarse sediment	A2.1	Broad-scale
Intertidal mixed sediments	A2.4	Broad-scale

Shallow sublittoral coarse sediment	A5.11, A5.12, A5.13, A5.14	MSFD Predominant
Shallow sublittoral sand	A5.21, A5.22, A5.23, A5.24, A5.25, A5.26	MSFD Predominant
Listed habitat name	**Corresponding EUNIS biotopes (broadest level)**	**Priority habitat list**
Shallow sublittoral mud	A5.31, A5.32, A5.33, A5.34, A5.35, A5.36	MSFD Predominant
Shallow sublittoral mixed sediments	A5.41, A5.42, A5.43, A5.44	MSFD Predominant
Shelf sublittoral coarse sediment	A5.15	MSFD Predominant
Shelf sublittoral sand	A5.27	MSFD Predominant
Shelf sublittoral mud	A5.37	MSFD Predominant
Shelf sublittoral mixed sediments	A5.45	MSFD Predominant
Subtidal macrophyte-dominated sediment	A5.5	Broad-scale
Upper bathyal sediment	A6	MSFD Predominant
Lower bathyal sediment	A6	MSFD Predominant
Upper bathyal rock and biogenic reef	A6	MSFD Predominant
Lower bathyal rock and biogenic reef	A6	MSFD Predominant
Abyssal sediment	A6	MSFD Predominant
Abyssal rock and biogenic reef	A6	MSFD Predominant

Table 3. Habitats excluded from the rationalised habitats list for marine habitat assessment and reporting.

Listed habitat exclusion	**Corresponding EUNIS biotopes (broadest level)[10]**	**Priority habitat list[11]**	**Reason for exclusion**
Coastal saltmarsh	A2.5	HPI	Corresponding biotopes overlap completely with Coastal saltmarshes and saline reedbeds
Cymodocea meadows	A5.531	OSPAR	Does not occur in UK waters
Low or variable salinity habitats	A3.32, A3.34, A3.36, A5.31	SF	Corresponding biotopes overlap with estuaries, large shallow inlets and bays, estuarine rocky habitats and coastal lagoons.

[10] It should be noted that some of these listed habitats cannot be defined by these corresponding biotopes alone, since some habitats also have a non-biological element to their definition. However, the detail of this is not provided in this document.
[11] Some listed habitats detailed here are also sub-types of Annex I habitats. The sub-types have not been identified here due to the complexity of these relationships, but it should be noted that these relationships exist.

Oceanic ridges with hydrothermal vents/fields	A6.94	OSPAR	Does not occur in UK waters
Listed habitat exclusion	**Corresponding EUNIS biotopes (broadest level)**	**Priority habitat list**	**Reason for exclusion**
Reefs (Bedrock, stony and biogenic)	A1, A2.7, A2.83, A3, A4, A5.6, A6.1, A6.21, A6.23, A6.6, A6.7, A6.8, A6.9, B3.1, B3.11	Annex I	Corresponding biotopes overlap with high, moderate and low energy intertidal rock, high, moderate and low energy infralittoral rock, high, moderate and low energy circalittoral rock, etc. and a number of biogenic habitats (eg fragile sponge and anthozoan communities)
Subtidal sands and gravels	A5.1, A5.2	HPI, FOCI	Corresponding biotopes overlap with shallow sublittoral coarse sediment, shelf sublittoral coarse sediment, shallow sublittoral sand and shelf sublittoral sand
Subtidal mixed muddy sediments	A5.4	HPI	Corresponding biotopes overlap with Shallow sublittoral mixed sediments and Shelf sublittoral mixed sediments.
Intertidal sand and muddy sand	A2.2	Broad-scale	Corresponding biotopes overlap with mudflats and sandflats not covered by seawater at low tide
Intertidal mud	A2.3	Broad-scale	Corresponding biotopes overlap with mudflats and sandflats not covered by seawater at low tide and intertidal mudflats
Intertidal biogenic reefs	A2.7	Broad-scale	Corresponding biotopes overlap with listed biogenic reef habitats
Intertidal sediments dominated by aquatic angiosperms	A2.6	Broad-scale	Corresponding biotopes overlap with mudflats and sandflats not covered by seawater at low tide, large shallow inlets and bays, and estuaries
Littoral sediment	A2.1, A2.2, A2.3, A2.4, A2.5, A2.6, A2.81, A2.82, A2.84, A2.85, A2.86, A2.87	MSFD Predominant	Corresponding biotopes overlap with intertidal coarse sediment and intertidal mixed sediments
Littoral rock and biogenic reef	A1.1, A1.2, A1.3, A1.4, A2.7, A2.83	MSFD Predominant	Corresponding biotopes overlap with high energy, moderate energy and low energy intertidal rock, and biogenic reef sub-types
Shallow sublittoral rock and biogenic reef	A3.1, A3.2, A3.3, A3.7, A4.11, A4.12, A4.13, A4.21, A4.22, A4.23, A4.24, A4.25, A4.31, A5.61, A5.62	MSFD Predominant	Corresponding biotopes overlap with high, moderate and low energy infralittoral rock, High, Moderate and Low energy circalittoral rock and biogenic reef sub-types

Shelf sublittoral rock and biogenic reef	A4.12, A4.27, A4.33, A5.63	MSFD Predominant	Corresponding biotopes overlap with high, moderate and low energy infralittoral rock, High, Moderate and Low energy circalittoral rock and biogenic reef sub-types
Subtidal biogenic reefs	A5.6	Broad-scale	Corresponding biotopes overlap with biogenic reef sub-types
Subtidal coarse sediment	A5.1	Broad-scale	Corresponding biotopes overlap with shallow sublittoral coarse sediment and shelf sublittoral coarse sediment
Listed habitat name	**Corresponding EUNIS biotopes (broadest level)[12]**	**Priority habitat list[13]**	**Reason for exclusion**
Subtidal sand	A5.2	Broad-scale	Corresponding biotopes overlap with Shallow sublittoral sand and Shelf sublittoral sand
Subtidal mud	A5.3	Broad-scale	Corresponding biotopes overlap with Shallow sublittoral mud and Shelf sublittoral mud
Subtidal mixed sediments	A5.4	Broad-scale	Corresponding biotopes overlap with Shallow sublittoral mixed sediments and Shelf sublittoral mixed sediments
Deep-sea bed	A6	Broad-scale	Corresponding biotopes overlap with Upper bathyal sediment, Lower bathyal sediment, Upper bathyal rock and biogenic reef, Lower bathyal rock and biogenic reef, Abyssal sediment and Abyssal rock and biogenic reef

[12] It should be noted that some of these listed habitats cannot be defined by these corresponding biotopes alone, since some habitats also have a non-biological element to their definition. However, the detail of this is not provided in this document.
[13] Some listed habitats detailed here are also sub-types of Annex I habitats. The sub-types have not been identified here due to the complexity of these relationships, but it should be noted that these relationships exist.

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9 Glossary

Annex I habitats: Natural habitat types of community interest whose conservation requires the designation of Special Areas of Conservation, listed in Annex I of the EC Habitats Directive.

Biotope: The physical habitat with its associated, distinctive biological communities. A biotope is the smallest unit of a habitat that can be delineated conveniently and is characterised by the community of plants and animals living there (for example, deep sea, *Lophelia pertusa* reef) (Anon 2001). Usually, several biotopes will constitute an ecosystem.

Broad-scale habitats: Groups of benthic habitats, categorised by a shared set of ecological requirements, included for protection within MPAS under the Marine Conservation Zone project in order to capture the coarse biological and physical diversity of the seabed.

Convention on Biological Diversity (CBD): An international legally-binding treaty with three main goals: conservation of biodiversity; sustainable use of biodiversity; fair and equitable sharing of the benefits arising from the use of genetic resources. Its overall objective is to encourage actions which will lead to a sustainable future.

EC Birds Directive: The Council Directive 79/409/EEC on the conservation of wild birds (PDF 209KB) (the 'Birds Directive') provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. Through this Directive, the European Community meets its obligations for bird species under the Bern Convention and Bonn Convention.

EC Habitats Directive: The EC Habitats Directive (Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora) aims to promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species at a favourable conservation status, introducing robust protection for those habitats and species of European importance.

Ecological Network Guidance (ENG): Natural England and the Joint Nature Conservation Committee's (JNCC) statutory advice on what is needed to achieve the goals set out in the Marine and Coastal Access Act 2009 and associated policy to establish an ecologically coherent network of Marine Protected Areas (MPAs).

EUNIS: A European habitat classification system developed by the European Topic Centre on Biological Diversity, covering all types of habitats from natural to artificial, terrestrial to freshwater and marine.

Features of conservation importance (FOCI): Habitats and species which are rare, threatened or declining in our waters, identified from the OSPAR List of Threatened and/or Declining Species and Habitats, the UK List of Priority Species and Habitats (UK BAP) and Schedule 5 of the Wildlife and Countryside Act for protection within MPAs under the Marine Conservation Zone project.

Good Environmental Status (GES): the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations.

Habitat: the place where an organism lives, as characterised by the physical features. For example rocky reefs, sandbanks and mud holes all provide particular habitats that are

occupied by animals or algae adapted to live in or on one of them but probably cannot thrive, or even survive in the others (Anon 2001).

Habitats of Principal Importance: Habitats which in the Secretary of State's opinion are of principal importance for the purpose of conserving biodiversity as listed on the Section 41 list for England, Section 42 list for Wales and Scottish Biodiversity list for Scotland.

Listed habitats: Benthic habitats listed for protection as a result of legislative and policy instruments due to their special scientific or biodiversity interest.

Marine Conservation Zone (MCZ): A type of MPA to be designated under the Marine and Coastal Access Act. MCZs will protect nationally important marine wildlife, habitats, geology and geomorphology and can be designated anywhere in English and Welsh inshore and UK offshore waters.

Marine Protected Area (MPA) Network: A system of individual MPAs operating cooperatively and synergistically, at various spatial scales, and with a range of protection levels, in order to fulfil ecological aims more effectively and comprehensively than individual sites could acting alone. The system will also display social and economic benefits, though the latter may only become fully developed over long time frames as ecosystems recover (IUCN-WCPA 2008).

Marine Protected Area (MPA): A generic term to cover all marine areas that are 'A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values' (Dudley 2008). MPAs may vary in their objectives, design, management approach or name (e.g. marine reserve, sanctuary, marine park) (IUCN-WCPA 2008).

Monitoring: The regular and systematic collection of environmental and biological data by agreed methods and to agreed standards. Monitoring provides information on current status, trends and compliance with respect to declared standards and objectives (Anon 2001).

OSPAR habitats: Marine habitats listed on the OSPAR List of Threatened and/or Declining Species and Habitats (Reference Number: 2008-6).

OSPAR MPA: An area within the OSPAR maritime area for which protective, conservation, restorative or precautionary measures, consistent with international law have been instituted for the purpose of protecting and conserving species, habitats, ecosystems or ecological processes of the marine environment (OSPAR 2003).

OSPAR: The Convention for the Protection of the Marine Environment of the North-East Atlantic (http://www.ospar.org).

Predominant habitats: The predominant seabed and water column types in UK waters, included for protection under the MSFD due to the crucial role they play in ecological functioning of the UK's marine ecosystems.

Priority Habitats: Types of habitat which in the Department of the Environment's [Northern Ireland] opinion are of principal importance for the purpose of conserving biodiversity.

Priority Marine Feature (PMF): A focussed list of habitats and species of conservation importance in the seas around Scotland which support the three pillar approach to conserving Scotland's marine natural heritage in response to the Marine (Scotland) Act 2010.

Search Feature: A subset of PMFs used to underpin the selection of Nature Conservation MPAs in Scottish waters.

Special Areas of Conservation (SAC): Protected sites designated under the European Habitats Directive for species and habitats of European importance, as listed on Annex I and II of the Directive.

Special habitats: Marine habitats recognised or identified under Community legislation (the Habitats Directive and the Birds Directive) or international conventions as being of special scientific or biodiversity interest, as listed for the Marine Strategy Framework Directive.

UK Biodiversity Action Plan (UK BAP): The UK BAP is the Government's response to the Convention on Biological Diversity (CBD) signed in 1992. The UK BAP includes a number of specific plans for species and habitats afforded priority conservation action.

Appendix 1 - Marine habitats for which the UK has marine biodiversity assessment and reporting responsibilities

Table 4.1. Listed marine habitat name and reporting responsibilities for said habitat.
✓* indicates a habitat FOCI which was excluded from the Ecological Network Guidance because they were known to be sufficiently conserved under the EC Habitats Directive, or were not known to occur in the area covered by the regional MCZ projects.
✓** indicates a Habitat of Principal Importance or Priority Habitat which is country-specific and is therefore not on every national list.

Listed habitat name	EC Habitats Directive Annex I[14]	Habitats of Principal Importance[15]	OSPAR	ENG FOCI	MSFD Special Habitat	Scottish Priority Marine Feature	Scottish MPA Search Feature	Broad-scale Habitat	Predominant Habitat
Annual vegetation of drift lines	✓				✓				
Atlantic salt meadows	✓				✓				
Blue mussel (*Mytilus edulis)* beds		✓		✓		✓	✓		
Intertidal Mytilus edulis beds on mixed and sandy sediments			✓	✓	✓				
Carbonate mounds and associated communities		✓	✓	✓*	✓	✓	✓		
Carbonate reefs		✓							
Coastal/Saline lagoons	✓	✓		✓*	✓				
Coastal saltmarsh		✓		✓*					
Cold water coral reefs/*Lophelia pertusa* reefs		✓**	✓	✓	✓	✓			
Coral gardens			✓	✓	✓	✓	✓		
Deep-sea sponge aggregations/communities		✓**	✓	✓	✓	✓	✓		
Estuaries	✓								
Estuarine rocky habitats		✓		✓					
File/flame shell beds		✓**		✓		✓	✓		
Fragile sponge and anthozoan communities on subtidal rocky habitats/Northern seafan and sponge communities		✓		✓		✓	✓		
Horse mussel (M*odiolus modiolus)* beds		✓	✓	✓	✓	✓	✓		
Inshore deep mud with burrowing heart urchins						✓	✓		
Intertidal chalk/Littoral chalk communities		✓	✓	✓	✓				
Intertidal mudflats		✓	✓	✓*	✓	✓			
Intertidal underboulder communities		✓		✓					
Kelp beds						✓			
Kelp and seaweed communities on sublittoral sediment						✓	✓		

[14] Some listed habitats detailed here are also sub-types of Annex I habitats. The sub-types have not been identified here due to the complexity of these relationships, but it should be noted that these relationships exist.
[15] Habitats of principal importance are updates to the UKBAP habitats under the Natural Environment and Rural Communities Act 2006 in England and Wales, and the Nature Conservation (Scotland) Act 2004 in Scotland. Priority Habitats are the equivalent for Northern Ireland under the Wildlife and Natural Environment Act (Northern Ireland) 2011. These do not have a timetabled assessment and reporting cycle, but there are requirements to keep these lists under review and update lists as appropriate.

Listed habitat name	EC Habitats Directive Annex I	Habitats of Principal Importance	OSPAR	ENG FOCI	MSFD Special Habitat	Scottish Priority Marine Feature	Scottish MPA Search Feature	Broad-scale Habitat	Predominant Habitat
Large Shallow Inlets and Bays	✓				✓				
Low or variable salinity habitats						✓	✓		
Maerl beds		✓	✓	✓	✓	✓	✓		
Maerl or coarse shell gravel with burrowing sea cucumbers						✓	✓		
Mediterranean and thermo-Atlantic *halophilous* scrubs	✓				✓				
Mudflats and sandflats not covered by seawater at low tide	✓				✓				
Mud habitats in deep water		✓		✓					
Musculus discors beds		✓**							
Oceanic ridges with hydrothermal vents/fields			✓	✓*					
Offshore deep sea muds						✓	✓		
Ostrea edulis beds			✓	✓	✓	✓	✓		
Peat and clay exposures (with piddocks)		✓		✓					
Reefs	✓				✓				
Sabellaria alveolata reefs		✓		✓					
Sabellaria spinulosa reefs		✓**	✓	✓	✓				
Salicornia and other annuals colonising mud and sand	✓				✓				
Sandbanks which are slightly covered by sea water all the time	✓				✓				
Seagrass beds		✓		✓		✓	✓		
Sea loch egg wrack beds						✓	✓		
Seamounts/ Seamount communities		✓**	✓	✓*	✓	✓	✓		
Seapen and burrowing megafauna communities/ Burrowed mud			✓	✓	✓	✓	✓		
Serpulid reefs		✓**		✓*		✓			
Shallow tideswept coarse sands with burrowing bivalves						✓	✓		
Sheltered muddy gravels		✓		✓					
Spartina swards	✓				✓				
Submarine structures made by leaking gases	✓				✓	✓			
Submerged or partially submerged sea caves	✓				✓				
Subtidal chalk		✓		✓					
Subtidal mixed muddy sediments		✓**							
Subtidal sands and gravels		✓		✓					
Offshore subtidal sands and gravels						✓	✓		
Tide-swept algal communities						✓	✓		
Tide-swept channels		✓		✓					
Zostera beds			✓						

Listed habitat name		EC Habitats Directive Annex I	Habitats of Principal Importance	OSPAR	ENG FOCI	MSFD Special Habitat	Scottish Priority Marine Feature	Scottish MPA Search Feature	Broad-scale Habitat	Predominant Habitat
Littoral rock and biogenic reef	High energy intertidal rock								✓	
	Moderate energy intertidal rock								✓	
	Low energy intertidal rock								✓	✓
	Intertidal biogenic reefs								✓	
Littoral sediment	Intertidal coarse sediment								✓	
	Intertidal sand and muddy sand								✓	
	Intertidal mud								✓	
	Intertidal mixed sediments								✓	✓
	Coastal saltmarshes and saline reedbeds								✓	
	Intertidal sediments dominated by aquatic angiosperms								✓	
Shallow sublittoral rock and biogenic reef	High energy infralittoral rock								✓	
	Moderate energy infralittoral rock								✓	
	Low energy infralittoral rock								✓	
	High energy circalittoral rock								✓	✓
	Moderate energy circalittoral rock								✓	
	Low energy circalittoral rock								✓	
	Subtidal biogenic reefs								✓	
Shallow sublittoral coarse sediment	Subtidal coarse sediment									✓
Shelf sublittoral coarse sediment									✓	✓
Shallow sublittoral sand	Subtidal sand									✓
Shelf sublittoral sand									✓	✓
Shallow sublittoral mud	Subtidal mud									✓
Shelf sublittoral mud									✓	✓

Listed habitat name		EC Habitats Directive Annex I	Habitats of Principal Importance	OSPAR	ENG FOCI	MSFD Special Habitat	Scottish Priority Marine Feature	Scottish MPA Search Feature	Broad-scale Habitat	Predominant Habitat
Shallow sublittoral mixed sediments	Subtidal mixed sediments									✓
Shelf sublittoral mixed sediments									✓	✓
Shelf sublittoral rock and biogenic reef	Subtidal biogenic reefs								✓	✓
Subtidal macrophyte-dominated sediment									✓	
Upper bathyal sediment	Deep-sea bed									✓
Lower bathyal sediment										✓
Upper bathyal rock and biogenic reef									✓	✓
Lower bathyal rock and biogenic reef										✓
Abyssal sediment										✓
Abyssal rock and biogenic reef										✓

Appendix 2 - Corresponding EUNIS habitat types and biotopes of listed habitats

Note - a degree of caution should be used in applying the EUNIS correlations in the tables in this Annex. There is not always a clear relationship between habitats in different classification schemes as there can be subtle differences between individual habitat definitions. These tables include all UK and non-UK biotopes.

In addition, for the most up-to-date relationships between habitats please refer to the source data: the EUNIS habitat correlation table, as the habitat relationships in this Annex are only current as of December 2010.

Table 5.1. EC Habitats Directive Annex I

Annex I Habitats Non-Physiographic	Relation to EUNIS	EUNIS Habitat Code
Annual vegetation of drift lines		A2.511, A2.512, A2.515, A2.531C
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)		A2.521, A2.53, A2.531, A2.535, A2.536, A2.537, A2.538, A2.53A, A2.53B, A2.54, A2.541, A2.542, A2.545, A2.546, A2.547, A2.548, A2.556, A2.557
Mediterranean and thermo-Atlantic halophilous scrubs		A2.527
Mudflats and sandflats not covered by seawater at low tide	> / ?<	A2.2, A2.22, A2.23, A2.24, A2.25, A2.3, A2.31, A2.32, A2.33, A2.34, A2.4, A2.6, A2.85, A2.86
Reefs	> / ?> / < / ?	A1, A1.1, A1.11, A1.12, A1.13, A1.14, A1.15, A1.2, A1.21, A1.22, A1.23, A1.3, A1.31, A1.32, A1.33, A1.34, A1.4, A1.41, A1.42, A1.43, A1.45, A1.46, A1.47, A1.48, A1.49, A1.4A, A2.7, A2.71, A2.72, A2.83, A3, A3.1, A3.11, A3.12, A3.13, A3.14, A3.15, A3.2, A3.21, A3.22, A3.23, A3.24, A3.3, A3.31, A3.32, A3.33, A3.34, A3.35, A3.36, A3.4, A3.5, A3.6, A3.72, A3.73, A4, A4.1, A4.11, A4.12, A4.13, A4.2, A4.21, A4.22, A4.23, A4.24, A4.25, A4.26, A4.27, A4.3, A4.31, A4.32, A4.33, A4.4, A4.5, A4.6, A4.72, A4.73, A5.6, A5.61, A5.62, A5.63, A6.1, A6.11, A6.12, A6.13, A6.14, A6.21, A6.23, A6.6, A6.61, A6.62, A6.7, A6.8, A6.9, B3.1, B3.11
Salicornia and other annuals colonising mud and sand		A2.51B, A2.55, A2.551, A2.5513, A2.553, A2.558
Sandbanks which are slightly covered by sea water all the time	? Sub-types, if in <20m depth, potentially occur within Annex I type	A5.11, A5.12, A5.13, A5.14, A5.21, A5.22, A5.23, A5.24, A5.25, A5.26, A5.51, A5.53
Spartina swards		A2.554, A2.555

Annex I Habitats Non-Physiographic	Relation to EUNIS	EUNIS Habitat Code
Submarine structures made by leaking gases	<	A5.711, A5.712
Submerged or partially submerged sea caves	<	A1.44, A3.71, A4.71[16]

Annex I Habitats Physiographic	Relation to Annex I	EUNIS Habitat Code
Estuaries	Typical of	A1.32, A1.321, A1.322, A1.323, A1.324, A1.326, A1.327,A2.12, A2.2222, A2.31, A2.311, A2.312, A2.313, A2.32, A2.321, A2.322, A2.3221, A2.3222, A2.3223, A2.323, A2.324, A2.325, A2.3251, A2.41, A2.411, A2.4111, A2.4112, A2.4113, A2.4114, A2.4115, A2.5, A3.36, A3.361, A3.362, A2.363, A5.22, A5.221, A5.222, A5.223, A5.32, A5.321, A5.322, A5.323, A5.324, A5.325, A5.326, A5.327, A5.42, A5.421, A5.422
Large Shallow Inlets and Bays	Typical of	A1.15, A1.151, A1.152, A1.153, A1.3, A1.31, A1.311, A1.312, A1.3121, A1.3122, A1.313, A1.3131, A1.3132, A1.314, A1.3141, A1.3142, A1.315, A1.3151, A1.316, A1.325, A2.24, A2.241, A2.242, A2.243, A2.244, A2.33, A2.42, A2.421, A2.421, A2.5, A3.22, A3.221, A3.222, A3.224, A3.225, A3.31, A3.311, A3.312, A3.3121, A3.3122, A3.3123, A3.313, A3.3131, A3.3132, A3.3133, A3.3134, A3.314, A3.315, A3.32, A3.321, A3.322, A3.323, A4.251, A4.2511, A4.2512, A5.341. A5.342, A5.343, A5.344, A5.5123, A5.5214, A5.522, A5.523, A5.524, A5.525, A5.526, A5.527, A5.528, A5.53, A5.531, A5.5311, A5.5312, A5.5313, A5.53131, A5.53132, A5.532, A5.5321, A5.5322, A5.533, A5.5331, A5.613, A5.621, A5.623, A5.624
Coastal lagoons	Typical of	A3.34, A3.341, A3.342, A3.343, A3.344, A5.21, A5.31, A5.41, A5.5343, A5.54, A5.541, A5.542

[16] If any subtype of A3.71 or A4.71 occurs outside caves it corresponds to Reef habitat

Table 5.2. OSPAR List of Threatened and/or Declining Species and Habitats

OSPAR Priority Habitat	Relation to EUNIS	EUNIS Habitat Code
Carbonate mounds	=	A6.75
Coral gardens	OSPAR type may occur within	A6.1, A6.2, A6.3, A6.4, A6.5, A6.7, A6.8, A6.9
Cymodocea meadows (not in UK waters)	=	A5.531
Deep-sea sponge aggregations	=	A6.62
Intertidal mudflats	=	A2.3, A2.31, A.311, A2.312, A2.313, A2.32, A2.321, A2.322, A2.3221, A2.3222, A2.3222, A2.3223, A2.323, A2.324, A2.325, A2.3251, A2.33
Intertidal *Mytilus edulis* beds on mixed and sandy sediments	>	A2.7211, A2.7212
Littoral chalk communities	May occur in OSPAR type	A1.126, A1.2143, A1.441, B3.114[17], B3.115
Lophelia pertusa reefs	>	A5.631, A6.611
Maerl beds	=	A5.51, A5.511, A5.5111, A5.5112, A5.512, A5.513, A5.514, A5.515
Modiolus modiolus beds	>	A5.621, A5.622, A5.623, A5.624
Oceanic ridges with hydrothermal vents/fields (not in UK waters)	?=	A6.94
Ostrea edulis beds	=	A5.435
Sabellaria spinulosa reefs	>	A4.22, A4.221, A4.2211, A4.2212, A5.611
Seamounts	>[18]	A6.72
Sea-pen and burrowing megafauna communities	=>	A5.361, A5.3611, A5.362
Zostera beds	>	A2.611, A2.6111, A2.612, A5.533, A5.5331, A5.545

[17] EUNIS codes prefixed with 'B' are Coastal habitats
[18] All sub-types relevant when occurring on a seamount (rather than a knoll or bank)

Table 5.3. Habitats of Principal Importance for England, Wales and Scotland and Northern Ireland Priority Habitats

Habitat of Principal Importance/Priority Habitat	Relation to EUNIS	EUNIS Habitat Code
Blue mussel beds on sediment	>	A2.212, A2.721, A2.7211, A2.7212, A2.7213, A3.361, A5.625
Carbonate mounds	=	A6.75
Carbonate reefs	>	A5.711, A5.7111, A5.7112, A5.712
Coastal saltmarsh	>	A2.5, A2.511, A2.514, A2.515, A2.516, A2.517, A2.518, A2.519, A2.51A, A2.51B, A2.521, A2.527, A2.531, A2.535, A2.536, A2.537, A2.538, A2.539, A2.53A, A2.53B, A2.541, A2.542, A2.545, A2.548, A2.551, A2.5512, A2.5513, A2.553, A2.554, A2.5541, A2.5542, A2.5543, A2.556, A2.557, A2.558
Cold-water coral reefs	>	A5.631, A6.611
Deep-sea sponge communities	=	A6.62
Estuarine rocky habitats	>	A1.32, A1.321, A1.322, A1.323, A1.324, A1.325, A1.326, A1.327, A3.321, A3.322, A3.323
File shell beds	=	A5.434
Fragile sponge and anthozoan communities on subtidal rocky habitats	>	A4.121, A4.131, A4.1311, A4.1312, A4.133, A4.211, A4.2111, A4.2112
Intertidal chalk	May occur in HPI type	A1.126, A1.2143, A1.441
Intertidal mudflats	>	A2.24, A2.241, A2.242, A2.243, A2.244, A2.245, A2.3, A2.31, A2.311, A2.312, A2.313, A2.32, A2.321, A2.322, A2.3221, A2.3222, A2.3223, A2.323, A2.324, A2.325, A2.3251, A2.33
Intertidal unboulder communities	>	A1.2142, A3.2112
Maerl beds	=	A5.51, A5.511, A5.5111, A5.5112, A5.512, A5.513, A5.514
Modiolus modiolus beds	>	A5.621, A5.622, A5.623, A5.624
Mud habitats in deep water	>	A5.35, A5.351, A5.352, A5.353, A5.354, A5.3541, A5.355, A5.36, A5.361, A5.3611, A5.362, A5.363, A5.37, A5.371, A5.372, A5.373, A5.374, A5.3741, A5.375, A5.376, A5.377, A5.7211
Musculus discors beds (Wales only)	=	A4.242
Peat and clay exposures	>	A1.127, A1.223, A4.231
Sabellaria alveolata reefs	?=	A2.71, A2.711, A5.612
Sabellaria spinulosa reefs	=	A5.611
Saline lagoons	Typical of	A3.34, A3.341, A3.342, A3.343, A3.344, A5.11, A5.21, A5.31, A5.41, A5.54, A5.541, A5.542

Habitat of Principal Importance/Priority Habitat	Relation to EUNIS	EUNIS Habitat Code
Seagrass beds	>	A2.61, A2.611, A2.6111, A2.614, A5.53, A5.533, A5.5331, A5.5343, A5.545
Seamount communities	=	A6.72, A6.721, A6.722, A6.723, A6.724, A6.725, A6.7251
Serpulid reefs	=	A5.613
Sheltered muddy gravels	May occur in HPI type	A2.41, A2.411, A2.4111, A2.4112, A2.4113, A2.4114, A2.4115, A2.42, A2.421, A5.431, A5.432, A5.433, A5.435
Subtidal mixed muddy sediments (Wales only)	May occur in HPI type	A5.4
Sublittoral sands and gravels	>	A5.1, A5.12, A5.13, A5.131, A5.132, A5.133, A5.134, A5.135, A5.136, A5.137, A5.14, A5.141, A5.142, A5.143, A5.144, A5.145, A5.15, A5.151, A5.152, A5.2, A5.22, A5.221, A5.222, A5.223, A5.23, A5.231, A5.232, A5.233, A5.234, A5.24, A5.241, A5.242, A5.243, A5.244, A5.25, A5.251, A5.252, A5.26, A5.261, A5.262, A5.27, A5.271, A5.272
Subtidal chalk	May occur in HPI type	A3.2113, A3.217, A4.23, A4.231, A4.232, A4.233
Tide swept channels		A1.15, A1.151, A1.152, A1.153, A3.212, A3.2121, A3.2122, A3.213, A3.2131, A3.2132, A3.22, A3.221, A3.222, A3.223, A3.224, A3.225, A4.11, A4.111, A4.112, A4.1121, A4.1122, A4.25, A4.251, A4.2511, A4.2512, A5.5211

Table 5.4. Features of Conservation Interest (FOCI), English inshore and English, Welsh and Northern Irish offshore waters

Features of Conservation Importance (Habitats)	Relationship to EUNIS	EUNIS Habitat Code
Blue mussel beds		A2.212, A2.721, A2.7211, A2.7212, A2.7213, A5.625
Intertidal *Mytilus edulis* beds on mixed and sandy sediments		A2.7211, A2.7212
Carbonate mounds	=	A6.75
Coastal saltmarsh	=	A2.5, A2.511, A2.514, A2.515, A2.516, A2.517, A2.518, A2.519, A2.51A, A2.51B, A2.521, A2.527, A2.531, A2.535, A2.536, A2.537, A2.538, A2.539, A2.53A, A2.53B, A2.541, A2.542, A2.545, A2.548, A2.551, A2.5512, A2.5513, A2.553, A2.554, A2.5541, A2.5542, A2.5543, A2.556, A2.557, A2.558
Cold-water coral reefs		A5.631, A6.611
Coral gardens	=	A6.1, A6.2, A6.3, A6.4, A6.5, A6.7, A6.8, A6.9
Deep-sea sponge aggregations		A6.62, A6.621
Estuarine rocky habitats	>	A1.32, A1.321, A1.322, A1.323, A1.324, A1.325, A1.326, A1.327, A1.45, A1.451, A1.452, A2.431
File shell beds	=	A5.434
Fragile sponge & anthozoan communities on subtidal rocky habitats	>	A4.131, A4.1311, A4.1312, A4.133, A4.211, A4.2111, A4.2112
Intertidal underboulder communities	>	A1.2142, A3.2112
Intertidal mudflats	>	A2.24, A2.241, A2.242, A2.243, A2.244, A2.245, A2.3, A2.31, A2.311, A2.312, A2.313, A2.32, A2.321, A2.322, A2.3221, A2.3222, A2.3223, A2.323, A2.324, A2.325, A2.3251, A2.33
Littoral chalk communities	May occur in FOCI type	A1.126, A1.2143, A1.441, B3.114[19], B3.115
Maerl beds	=	A5.51, A5.511, A5.5111, A5.5112, A5.512, A5.513, A5.514
Modiolus modiolus beds	>	A5.621, A5.622, A5.623, A5.624
Mud habitats in deep water	>	A5.35, A5.351, A5.352, A5.353, A5.354, A5.3541, A5.355, A5.36, A5.361, A5.3611, A5.362, A5.363, A5.37, A5.371, A5.372, A5.373, A5.374, A5.3741, A5.375, A5.376, A5.377, A5.7211
Sea-pen and burrowing megafauna communities	=>	A5.361, A5.3611, A5.362

[19] EUNIS codes prefixed with 'B' are Coastal habitats`

Features of Conservation Importance (Habitats)	Relationship to EUNIS	EUNIS Habitat Code
Oceanic ridges with hydrothermal vents (not in UK waters)	?=	A6.94
Ostrea edulis beds	=	A5.435
Peat and clay exposures	>	A1.127, A1.223, A4.231
Sabellaria alveolata reefs	?=	A2.71, A2.711, A5.612, A5.611
Sabellaria spinulosa reefs	=	A5.611
Saline lagoons	Typical of	A3.34, A3.341, A3.342, A3.343, A3.344, A5.11, A5.21, A5.31, A5.41, A5.54, A5.541, A5.542
Seagrass beds	>	A2.61, A2.611, A2.6111, A2.616, A5.53, A5.533, A5.5331, A5.5343, A5.545
Sheltered muddy gravels	May occur in FOCI type	A2.41, A2.411, A2.4111, A2.4112, A2.4113, A2.4114, A2.4115, A2.42, A2.421, A5.431, A5.432, A5.433, A5.435
Subtidal chalk	May occur in FOCI type	
Subtidal sands and gravels	>	A5.1, A5.12, A5.13, A5.131, A5.132, A5.133, A5.134, A5.135, A5.136, A5.137, A5.14, A5.141, A5.142, A5.143, A5.144, A5.145, A5.15, A5.151, A5.152, A5.2, A5.22, A5.221, A5.222, A5.223, A5.23, A5.231, A5.232, A5.233, A5.234, A5.24, A5.241, A5.242, A5.243, A5.244, A5.25, A5.251, A5.252, A5.26, A5.261, A5.262, A5.27, A5.271, A5.272
Tide-swept channels		A1.15, A1.151, A1.152, A1.153, A3.212, A3.2121, A3.2122, A3.213, A3.2131, A3.2132, A3.22, A3.221, A3.222, A3.223, A3.224, A3.225, A4.11, A4.111, A4.112, A4.1121, A4.1122, A4.25, A4.251, A4.2511, A4.2512, A5.5211

Table 5.5. MSFD Special Habitats

MSFD Special Habitat	Relation to EUNIS	EUNIS Habitat Code
Annual vegetation of drift lines		A2.511, A2.512, A2.515, A2.531C
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)		A2.521, A2.53, A2.531, A2.535, A2.536, A2.537, A2.538, A2.53A, A2.53B, A2.54, A2.541, A2.542, A2.545, A2.546, A2.547, A2.548, A2.556, A2.557
Coastal lagoons	Typical of	A5.31, A5.41, A5.5343, A5.54, A5.541, A5.542
Large shallow inlets and bays	Typical of	A1.15, A1.151, A1.152, A1.153, A1.3, A1.31, A1.311, A1.312, A1.3121, A1.3122, A1.313, A1.3131, A1.3132, A1.314, A1.3141, A1.3142, A1.315, A1.3151, A1.316, A1.325, A2.24, A2.241, A2.242, A2.243, A2.244, A2.33, A2.42, A2.421, A2.421, A3.22, A3.221, A3.222, A3.224, A3.225, A3.31, A3.311, A3.312, A3.3121, A3.3122, A3.3123, A3.313, A3.3131, A3.3132, A3.3133, A3.3134, A3.314, A3.315, A3.32, A3.321, A3.322, A3.323, A4.251, A4.2511, A4.2512, A5.341. A5.342, A5.343, A5.344, A5.5123, A5.5214, A5.522, A5.523, A5.524, A5.525, A5.526, A5.527, A5.528, A5.53, A5.531, A5.5311, A5.5312, A5.5313, A5.53131, A5.53132, A5.532, A5.5321, A5.5322, A5.533, A5.5331, A5.613, A5.621, A5.623, A5.624
Mediterranean and thermo-Atlantic halophilous scrubs		A2.527
Mudflats and sandflats not covered by seawater at low tide	> / ?<	A2.2, A2.22, A2.23, A2.24, A2.25, A2.3, A2.31, A2.32, A2.33, A2.34, A2.4, A2.6, A2.85, A2.86
Reefs	> / ?> / < / ?	A1, A1.1, A1.11, A1.12, A1.13, A1.14, A1.15, A1.2, A1.21, A1.22, A1.23, A1.3, A1.31, A1.32, A1.33, A1.34, A1.4, A1.41, A1.42, A1.43, A1.45, A1.46, A1.47, A1.48, A1.49, A1.4A, A2.7, A2.71, A2.72, A2.83, A3, A3.1, A3.11, A3.12, A3.13, A3.14, A3.15, A3.2, A3.21, A3.22, A3.23, A3.24, A3.3, A3.31, A3.32, A3.33, A3.34, A3.35, A3.36, A3.4, A3.5, A3.6, A3.72, A3.73, A4, A4.1, A4.11, A4.12, A4.13, A4.2, A4.21, A4.22, A4.23, A4.24, A4.25, A4.26, A4.27, A4.3, A4.31, A4.32, A4.33, A4.4, A4.5, A4.6, A4.72, A4.73, A5.6, A5.61, A5.62, A5.63, A6.1, A6.11, A6.12, A6.13, A6.14, A6.21, A6.23, A6.6, A6.61, A6.62, A6.7, A6.8, A6.9, B3.1, B3.11
Salicornia and other annuals colonising mud and sand		A2.51B, A2.55, A2.551, A2.5513, A2.553, A2.558
Sandbanks which are slightly covered by seawater all the time	? Sub-types, if in <20m depth, potentially occur within Annex I type	A5.11, A5.12, A5.13, A5.14, A5.21, A5.22, A5.23, A5.24, A5.25, A5.26, A5.51, A5.53
Spartina swards		A2.554, A2.555

MSFD Special Habitat	Relation to EUNIS	EUNIS Habitat Code
Submarine structures made by leaking gases	<	A5.711, A5.712
Submerged or partially submerged sea caves	<	A1.44, A3.71, A4.71[20]
Littoral chalk communities	May occur in OSPAR type	A1.126, A1.2143, A1.441, B3.114[21], B3.1158
Intertidal mudflats	=	A2.3
Zostera beds	>	A2.611, A2.612, A5.533, A5.545
Intertidal *Mytilus edulis* beds on mixed and sandy sediments	>	A2.7211, A2.7212
Sabellaria spinulosa reefs	>	A4.22, A5.611
Sea-pen and burrowing megafauna communities	=>	A5.361, A5.362
Ostrea edulis beds	=	A5.435
Maerl beds	=	A5.51
Modiolus modiolus beds	>	A5.621, A5.622, A5.623, A5.624
Coral gardens	MSFD Special habitat type may occur within	A6.1, A6.2, A6.3, A6.4, A6.5, A6.7, A6.8, A6.9
Lophelia pertusa reefs	>	A5.631, A6.611
Deep-sea sponge aggregations	=	A6.62
Seamounts	>[22]	A6.72
Carbonate mounds	=	A6.75
Oceanic ridges with hydrothermal vents/fields	?=	A6.94

[20] If any subtype of A3.71 or A4.71 occurs outside caves it corresponds to Reef habitat
[21] EUNIS codes prefixed with 'B' are Coastal habitats
[22] All sub-types relevant when occurring on a seamount (rather than a knoll or bank)

Table 5.6. Priority Marine Features (PMF), Scotland *(Search Features are marked SF)

Priority feature name	Specific important biotopes and species included within this (common name)	Relationship	EUNIS Feature
Blue mussel beds (SF)	*Mytilus edulis* beds on littoral sediments	>	A2.212, A2.721, A3.361, A5.625
	Mytilus edulis and *Fabricia sabella* in littoral mixed sediment		
	Mytilus edulis beds on sublittoral sediment		
	Mytilus edulis beds on reduced salinity infralittoral rock		
Burrowed mud (SF)	Seapen and burrowing megafauna in circalittoral fine mud	>	A5.361, A5.362
	Burrowing megafauna and *Maxmuelleria lankesteri* in circalittoral mud		
	Tall seapen		
	Mud burrowing amphipod		
	Fireworks anemone		
Carbonate mound communities (SF)	Carbonate mound communities	=	A6.75
Cold water coral reefs	Coral reefs	>	A5.63, A5.631, A6.611
Coral gardens (SF)	Coral gardens	<	A6
Deep sea sponge aggregations (SF)	Deep sea sponge aggregations	=	A6.62
Flame shell beds (SF)	*Limaria hians* beds in tide-swept sublittoral muddy mixed sediment	=	A5.434
Horse mussel beds (SF)	*Modiolus modiolus* beds with *Chlamys varia*, sponges, hydroids and bryozoans on slightly tide-swept very sheltered circalittoral mixed substrata	>	A5.621, A5.622, A5.623, A5.624
	Modiolus modiolus beds with fine hydroids and large solitary ascidians on very sheltered circalittoral mixed substrata		
	Modiolus modiolus beds with hydroids and red seaweeds on tide-swept circalittoral mixed substrata		
	Modiolus modiolus beds on open coast circalittoral mixed sediment		
Inshore deep mud with burrowing heart urchins (SF)	*Brissopsis lyrifera* and *Amphiura chiajei* in circalittoral mud	=	A5.363
Intertidal mudflats	Littoral mud	>	A2.3

Priority feature name	Specific important biotopes and species included within this (common name)	Relationship	EUNIS Feature
Kelp and seaweed communities on sublittoral sediment (SF)	Kelp and seaweed communities on sublittoral sediment[23]	=	A5.52, A5.521, A5.522, A5.523, A5.524, A5.525, A5.527
Low or variable salinity habitats (SF)	Faunal communities on variable or reduced salinity infralittoral rock	>	A3.32, A3.34, A3.341, A3.342, A3.343, A3.344, A3.36, A5.31,
	Kelp in variable or reduced salinity		
	Submerged fucoids, green or red seaweeds (low salinity infralittoral rock)		
	Sublittoral mud in low or reduced salinity (lagoons)		
	Bird's nest stonewort		
	Baltic stonewort		
	Small brackish water snail		
	Foxtail stonewort		
Maerl beds (SF)	Maerl beds	=	A5.51, A5.511, A5.5111, A5.5112, A5.512, A5.513
Maerl or coarse shell gravel with burrowing sea cucumbers (SF)	*Neopentadactyla mixta* in circalittoral shell gravel or coarse sand	=	A5.144
Native Oysters (SF)	*Ostrea edulis* beds on shallow sublittoral muddy mixed sediment	>	A5.435
	Native oyster		
Northern seafan and sponge communities (SF)	*Caryophyllia smithii* and *Swiftia pallida* on circalittoral rock	>	A4.12, A4.133, A4.211
	Mixed turf of hydroids and large ascidians with *Swiftia pallida* and *Caryophyllia smithii* on weakly tide-swept circalittoral rock		
	Deep sponge communities (circalittoral)		
	Northern sea fan		
Offshore deep sea muds[24] (SF)	*Ampharete falcata* turf with *Parvicardium ovale* on cohesive muddy sediment near margins of deep stratified seas	>	A5.35, A5.351, A5.352, A5.353, A5.354, A5.355, A5.36, A5.361, A5.362, A5.37, A5.371, A5.372, A5.375, A5.376, A5.377, A6.5
	Foraminiferans and *Thyasira* sp. in deep circalittoral fine mud		
	Levinsenia gracilis and *Heteromastus filifirmis* in offshore circalittoral mud and sandy mud		

[23] The following sub-biotopes of 'Kelp and seaweed communities on sublittoral sediments' are specifically excluded: 'Mats of *Trailliella* on infralittoral muddy gravel' and 'Filamentous green seaweeds on low salinity Infralittoral mixed sediment or rock'.

[24] In addition to the continental shelf biotopes listed, the PMF also includes Atlantic and Arctic influenced offshore deep sea muds occurring on and off the continental slope.

Priority feature name	Specific important biotopes and species included within this (common name)	Relationship	EUNIS Feature
	Paramphinome jeffreysii, *Thyasira* spp. and *Amphiura filiformis* in offshore circalittoral sandy mud		
Offshore subtidal sands and gravels[25] (SF)	*Glycera lapidum*, *Thyasira* spp. and *Amythasides macroglossus* in offshore gravelly sand	>	A5.14, A5.141, A5.142, A5.143, A4.144, A5.145, A5.15, A5.151, A5.152, A5.25, A5.251, A5.252, A5.26, A5.261, A5.262, A5.27, A5.271, A5.272, A5.44, A5.45, A6.2, A6.3, A6.4
	Hesionura elongata and *Protodorvillea kefersteini* in offshore coarse sand		
	Echinocyamus pusillus, *Ophelia borealis* and *Abra prismatica* in circalittoral fine sand		
	Abra prismatica, *Bathyporeia elegans* and polychaetes in circalittoral fine sand		
	Maldanid polychaetes and *Eudorellopsis deformis* in offshore circalittoral sand or muddy sand		
	Owenia fusiformis and *Amphiura filiformis* in offshore circalittoral sand or muddy sand		
Seagrass beds (SF)	*Zostera noltii* beds in littoral muddy sand	>	A2.6111, A5.5331, A5.5343
	Zostera marina/*angustifolia* beds on lower shore or infralittoral clean or muddy sand		
	Ruppia maritima in reduced salinity infralittoral muddy sand		
Sea loch egg wrack beds (SF)	*Ascophyllum nodosum* ecad *mackaii* beds on extremely sheltered mid eulittoral mixed substrata	=	A1.325
Seamount communities (SF)	Seamount communities	=	A6.72
Serpulid aggregations	*Serpula vermicularis* reefs on very sheltered circalittoral muddy sand[26]	=	A5.613
Shallow tideswept coarse sands with burrowing bivalves (SF)	*Moerella spp.* with venerid bivalves in infralittoral gravelly sand	=	A5.133
Submarine structures made by leaking gases	Submarine structures made by leaking gases	>	A5.71, A5.711, A5.712
Tide-swept algal communities (SF)	Fucoids in tide-swept conditions	>	A1.15, A3.126, A3.213, A3.22, A3.221, A3.222, A3.223
	Halidrys siliquosa and mixed kelps on tide-swept infralittoral rock with coarse sediment		
	Kelp and seaweed communities in tide-swept sheltered conditions[27]		
	Laminaria hyperborea on tide-swept, infralittoral mixed substrata		

[25] In addition to the continental shelf biotopes listed, the PMF also includes Atlantic and Arctic influenced offshore subtidal sands and gravels occurring on and off the continental slope.
[26] As well as the serpulid reefs biotope this PMF specifically includes smaller aggregations of *Serpula vermicularis.*
[27] The following sub-biotopes of 'Kelp and seaweed communities in tideswept sheltered conditions' are specifically excluded: '*Laminaria saccharina* with foliose red seaweeds and ascidians on sheltered tide-swept Infralittoral rock'; and 'Filamentous red seaweeds, sponges and *Balanus crenatus* on tide-swept variable-salinity Infralittoral rock'.

Table 5.7. Broad-scale Habitats (BSH), Ecological Network Guidance, English inshore and English, Welsh and Northern Irish offshore waters

Broad-scale habitat types	EUNIS habitat code
High energy intertidal rock	A1.1
Moderate energy intertidal rock	A1.2
Low energy intertidal rock	A1.3
Intertidal coarse sediment	A2.1
Intertidal sand and muddy sand	A2.2
Intertidal mud	A2.3
Intertidal mixed sediments	A2.4
Coastal saltmarshes and saline reedbeds	A2.5
Intertidal sediments dominated by aquatic angiosperms	A2.6
Intertidal biogenic reefs	A2.7
High energy infralittoral rock[28]	A3.1
Moderate energy infralittoral rock	A3.2
Low energy infralittoral rock	A3.3
High energy circalittoral rocks[29]	A4.1
Moderate energy circalittoral rock	A4.2
Low energy circalittoral rock	A4.3
Subtidal coarse sediment	A5.1
Subtidal sand	A5.2
Subtidal mud	A5.3
Subtidal mixed sediments	A5.4
Subtidal macrophyte-dominated sediment	A5.5
Subtidal biogenic reefs	A5.6
Deep-sea bed	A6

[28]Infralittoral rock includes habitats of bedrock, boulders and cobbles which occur in the shallow subtidal zone and typically support seaweed communities. The upper limit is marked by the top of the kelp zone whilst the lower limit is marked by the lower limit of kelp growth or the lower limit of dense seaweed growth.

[29] Circalittoral rock is characterised by animal dominated communities (a departure from the algae dominated communities in the infralittoral zone). The depth at which the circalittoral zone begins is directly dependent on the intensity of light reaching the seabed; in highly turbid conditions, the circalittoral zone may begin just below water level.

Table 5.8. Predominant Habitats, ICG-COBAM sub-divisions, Marine Strategy Framework Directive, UK

Predominant habitat types	EUNIS habitat code
Littoral rock and biogenic reef	A1.1, A1.2, A1.3, A1.4, A2.7, A2.83
Littoral sediment	A2.1, A2.2, A2.3, A2.4, A2.5, A2.6, A2.81, A2.82, A2.84, A2.85, A2.86, A2.87
Shallow sublittoral rock and biogenic reef	A3.1, A3.2, A3.3, A3.7, A4.11, A4.12, A4.13, A4.21, A4.22, A4.23, A4.24, A4.25, A4.31, A5.61, A5.62
Shallow sublittoral coarse sediment	A5.11, A5.12, A5.13, A5.14
Shallow sublittoral sand	A5.21, A5.22, A5.23, A5.24, A5.25, A5.26
Shallow sublittoral mud	A5.31, A5.32, A5.33, A5.34, A5.35, A5.36
Shallow sublittoral mixed sediments	A5.41, A5.42, A5.43, A5.44
Shelf sublittoral rock and biogenic reef	A4.12, A4.27, A4.33, A5.63
Shelf sublittoral coarse sediment	A5.15
Shelf sublittoral sand	A5.27
Shelf sublittoral mud	A5.37
Shelf sublittoral mixed sediments	A5.45
Upper bathyal sediment	A6
Lower bathyal sediment	A6
Upper bathyal rock and biogenic reef	A6
Lower bathyal rock and biogenic reef	A6
Abyssal sediment	A6
Abyssal rock and biogenic reef	A6