



The Marine Life Information Network[®] for Britain and Ireland (*MarLIN*)

**Development of a marine sensitivity mapping database and GIS
integration. Stage 1. Review of current habitat and species
information**

Contract no. FC 73-02-245

Report to Cyngor Cefn Gwlad Cymru / Countryside Council for Wales

Harvey Tyler-Walters

Olwen Ager

Keith Hiscock

December 2002

Reference:

Tyler-Walters, H., Ager, O.E.D. & Hiscock, K., 2002. *Development of a marine sensitivity mapping database and GIS integration. Stage 1. Review of current habitat and species information.* Report to Cyngor Cefn Gwlad Cymru / Countryside Council for Wales from the Marine Life Information Network (*MarLIN*). Plymouth: Marine Biological Association of the UK. [Contract no. FC 73-02-245]

Development of a marine sensitivity mapping database and GIS integration. Stage 1. Review of current habitat and species information.

Contents

1. AIMS AND BACKGROUND TO CONTRACT	9
2. TIMETABLE	9
3. METHODOLOGY	9
4. RESULTS	10
4.1. Introduction	10
4.2. Existing gaps in knowledge concerning sensitivity and recoverability of key marine species and biotopes	10
4.2.1 Current <i>MarLIN</i> species Key Information reviews	10
4.2.2 Existing gaps concerning sensitivity and recoverability of key marine species.....	15
4.2.3 Current <i>MarLIN</i> biotope Key Information reviews.....	20
4.2.4 Existing gaps concerning sensitivity and recoverability of key marine biotopes.....	23
4.2.5 Existing gaps concerning sensitivity and recoverability information.....	23
4.3. The extent to which spatial and temporal factors have been taken into account in existing sensitivity and recoverability assessments.....	25
4.3.1 Spatial factors	25
4.3.2 Temporal factors.....	25
4.3.3 Relevance of <i>MarLIN</i> ‘Environmental factors’ and ‘Key information fields’ to assessing spatial and temporal change.....	26
4.4. Environmental factors used for sensitivity assessment by SensMap, <i>MarLIN</i> and the UK Marine SACs project.....	27
4.4.1 Environmental factors	27
4.4.2 Maritime activities and their associated environmental factors	27
4.5. Extending species and biotope sensitivity assessments to the biotope complex, habitat complex and ‘lifecycle’ levels.....	30
4.5.1 Introduction	30
4.5.2 Combining sensitivity (=intolerance) and recoverability	31
4.5.3 Assessing sensitivities at the biotope complex, ‘lifecycle’ and habitat complex levels	32
5. CONCLUSIONS.....	33
6. ACKNOWLEDGEMENTS	34
7. REFERENCES	34
8. APPENDICES	37

Development of a marine sensitivity mapping database and GIS integration. Stage 1. Review of current habitat and species information.

Contract specification

A thorough but concise review of current sensitivity data is needed, to identify remaining gaps in knowledge, especially in relation to key species and habitats. A review of any temporal and spatial influence of factors on species and biotope sensitivity will be required and, in addition, a methodology for translating the sensitivity of species and biotopes to more aggregated levels, including biotope complex, 'lifeform' and habitat complex will be required. The objectives of the contract are:

- i) review existing gaps in knowledge concerning sensitivity and recoverability of key marine species and habitats, including BAP habitats and species and nationally rare and scarce species or habitats;
- ii) review the extent to which spatial and temporal factors have been taken into account in existing sensitivity and recoverability assessments and where absent how best to incorporate them;
- iii) identify common environmental factors used for sensitivity assessment by SensMap, *MarLIN* and the UK Marine SACs project and highlight different factors where present, and
- iv) develop a draft protocol for extending species and biotope sensitivity assessments to the biotope complex, habitat complex and 'lifeform' levels, taking into account the SensMap approach.

List of Figures

Figure 1. The number of researched biotope Key Information reviews within Annex I habitats..... 22

List of Tables

Table 1. Key Information reviews completed by <i>MarLIN</i> . Priority 1 species, designated or listed under statute or convention.	12
Table 2. UK Biodiversity Action Plan Species of Conservation Concern present in Welsh waters.....	14
Table 3. Keystone, characterizing and representative species for which <i>MarLIN</i> full Key Information reviews have been prepared.	15
Table 4. Keystone and important characterizing species not yet researched by <i>MarLIN</i> and known to be present in Welsh waters.....	19
Table 5. The number of <i>MarLIN</i> researched biotope Key Information reviews and represented biotopes within BAP habitat and species reviews.	21
Table 6. Biotopes considered in the UK Marine SACs habitat reviews that have been researched or represented by <i>MarLIN</i>	22
Table 7. Comparison between environmental factors used to assess sensitivity by <i>MarLIN</i> , SensMap, and the UK Marine SACs project.	29
Table 8. Combining 'intolerance' and 'recoverability' to identify 'sensitivity'.....	31

List of Appendices

Appendix 1.	Biology and Sensitivity Key Information reviews – priority and terminology.....	37
Appendix 2.	Key Information reviews and basic information completed by <i>MarLIN</i>	43
Appendix 3.	Species selected as indicative of the sensitivity of the biotopes researched by <i>MarLIN</i>	65
Appendix 4.	Complete list of <i>MarLIN</i> researched and represented biotopes at November 2002.....	79
Appendix 5.	The marine natural heritage importance of the <i>MarLIN</i> researched biotopes.....	91
Appendix 6.	The number of <i>MarLIN</i> researched biotope Key Information reviews and represented biotopes within BAP habitat and species reviews.....	103
Appendix 7a.	Nationally rare and scarce biotopes in the <i>MarLIN</i> database.....	107
Appendix 7b.	Nationally scarce biotope complexes in the <i>MarLIN</i> database.....	111
Appendix 7c.	Nationally rare biotopes in the <i>MarLIN</i> database	113
Appendix 8.	Biotopes considered in the UK Marine SACs habitat reviews that have been researched or represented by <i>MarLIN</i>	117
Appendix 9.	Researched biotopes Key Information within ‘lifeforms’	119
Appendix 10.	Comparison of biotopes of Welsh interest (supplied by CCW) with full list of biotopes taken from Connor <i>et al</i> (1997a, b) and biotopes researched or represented by <i>MarLIN</i>	123
Appendix 11.	Species biology and sensitivity key information (September 1999 onwards).....	141
Appendix 12.	Biotope biology and sensitivity key information (May 2000 onwards).....	147
Appendix 13.	Maritime and coastal activities to environmental factors matrix.....	151
Appendix 14.	List of maritime and coastal activities and their definitions used by <i>MarLIN</i>	153

The Marine Life Information Network[®] for Britain and Ireland (*MarLIN*)
Development of a marine sensitivity mapping database and GIS integration.
Stage 1. Review of current habitat and species information.

Executive summary

Information to support sensitivity assessment is being collected by the Marine Life Information Network for Britain and Ireland (*MarLIN*) and *MarLIN* has published a series of sensitivity (intolerance) and recovery reviews. Biological and sensitivity information from *MarLIN* and other sources could be used to derive sensitivity and recovery assessments for mapping. The *MarLIN* research forms the largest body of collated knowledge on marine species and habitat sensitivity in the UK. It is, therefore, the best source of information to use for mapping sensitivity of seabed species and biotopes using a scientific approach.

Stage 1 of this sensitivity mapping project aimed to identify existing gaps in knowledge concerning the biology and sensitivity of marine species and habitats and identify a unified approach to develop a sensitivity mapping database.

The report outlines a review of the coverage of Key Information reviews prepared by the *MarLIN* programme compared to Welsh interest species and biotopes, the biotope classification for Britain and Ireland, Annex I habitats of the Habitats Directive, priority BAP species and habitats, and nationally rare and scarce species and biotopes. In addition, the *MarLIN* and SensMap approaches to sensitivity assessment were compared and a draft protocol for the derivation of the sensitivities of biotope complexes and higher hierarchical units in the biotope classification proposed.

The project has:

- identified a few gaps in our coverage of the present MNCR biotope classification;
- identified a list of keystone or important characterizing species that require additional research;
- developed Key Information reviews of species and biotopes, and a subsequent sensitivity assessment rationale that incorporates considerations of spatial, seasonal and temporal factors where information allows;
- demonstrated that the *MarLIN* list of environmental factors include all of the environmental factors addressed by the SensMap programme and the UK Marine SACs project;
- developed an ‘activities to factors matrix’ that addresses the majority of the activities identified by the SensMap programme except activities associated with oil spill clean-up;
- proposed a non numerical approach to the combination of intolerance and recoverability and suggested that biotope sensitivities are the most practical unit for the derivation of the sensitivities of biotope complexes, ‘lifeforms’ and habitat complexes, and
- suggested that, when combining biotope sensitivities to derive the sensitivities of higher hierarchical units in the biotope classification, the highest or worst-case sensitivity should be reported, in agreement with the SensMap report.

The Marine Life Information Network[®] for Britain and Ireland (*MarLIN*)
Development of a marine sensitivity mapping database and GIS integration.
Stage 1. Review of current habitat and species information

1. Aims and background to contract

The project aims to identify existing gaps in knowledge and identify a unified approach to develop a sensitivity mapping database.

The sensitivity of an individual (or individual colony) of a species or a biotope, biotope complex, 'lifeform', or habitat complex, can be defined as the combined appraisal of its level of intolerance to an external factor and the longer term implications of this in terms of recovery.

A theoretical model (SensMap) for assessing and mapping the sensitivity of marine habitats and species to maritime activities has been developed by the Countryside Council for Wales (CCW) and partners under the European Union INTERREG programme. The model proposes a methodology for Marine Intertidal Phase 1 and broad-scale subtidal habitat maps to be produced according to the sensitivity of biotopes and species to activities as diverse as oil spills to bird watching. Sensitivity to activities can be assessed against a list of specific factors relating to those activities. If linked to information on the distribution and location of coastal activities, the likely vulnerability of sensitive species could also be mapped. A combination of vulnerability and conservation importance would highlight those biotopes and species in most need of attention and conservation action could then be prioritized.

Information to support sensitivity assessment is being collected by the Marine Life Information Network for Britain and Ireland (*MarLIN*). *MarLIN* has published a series of sensitivity (intolerance) and recovery reviews. Biological and sensitivity information from *MarLIN* and other sources could be used to derive sensitivity and recovery assessments for mapping. This body of research will be used for sensitivity mapping, as it forms the largest body of collated knowledge on marine species and habitat sensitivity in the UK.

2. Timetable

The work was undertaken between 28 October and 20 December 2002 according to the following timetable.

- i) Produce draft report by 6 December.
- ii) Comments received from CCW Nominated officer by 16 December.
- iii) Produce final report by 20 December and submit on CD-ROM and as Adobe Portable Document Format.

3. Methodology

The development of the *MarLIN* approach to sensitivity assessment and the biology and sensitivity key information reviews of species and biotopes have been undertaken in projects that were jointly funded by the Department for Environment, Food and Rural Affairs (Defra), English Nature (EN) and Scottish Natural Heritage (SNH). In addition, this report has considered work undertaken by the UK Marine SACs project and the SensMap programme.

The development of standard criteria and definitions, sensitivity and recoverability assessment scales and the sensitivity assessment rationale of the *MarLIN* programme are detailed in Hiscock *et al.* (1999), Tyler-Walters & Jackson (1999), Tyler-Walters *et al.* (2001) and on the *MarLIN* Web site (www.marlin.ac.uk). The development of the SensMap approach to sensitivity assessment is detailed by Cooke & McMath (2000) and McMath *et al.* (2000). No attempt has been made to reproduce their information here, except by way of explanation. The reader should refer to the above texts for detailed information. A summary of key terms and components of the Key Information research is provided in Appendix 1.

The *MarLIN* programme has prepared biology and sensitivity key information reviews of numerous species and biotopes. The results of the programme are summarized in the text while the complete lists of species and biotopes have been included as appendices. The MNCR biotope classification published by Connor *et al.*, (1997a, b) is used as the standard reference for biotopes throughout the report.

The review undertaken here has adopted the following methods:

- i) **Review existing gaps in knowledge.** A review is first given of the structure of *MarLIN* biotope and species Key Information reviews and the information currently researched. ‘Species of conservation concern’ and interest biotopes present in Wales are listed and those reviewed by *MarLIN* identified. Species not researched by *MarLIN* are identified as gaps in information.
- ii) **Extent to which spatial and temporal factors have been taken into account.** The relevant sections of the species and biotope Key Information reviews were collated and the utility of the information in relation to sensitivity mapping reviewed.
- iii) **Identify common environmental factors used for sensitivity assessment by SensMap, MarLIN and the UK Marine SACs project and highlight different factors.** The environmental factors and the maritime activities addressed by the different programmes were compared and gaps identified.
- iv) **Develop a draft protocol for extending sensitivity assessments to the biotope complex, habitat complex and lifeform levels.** The proposed *MarLIN* approach to combining sensitivity and recoverability for mapping and the use of biotope sensitivities to derive the sensitivity of higher hierarchical units in the biotope classification were discussed, with reference to the SensMap approach.

In order to establish what gaps there are in species researched that should be identified as of conservation concern, the list of ‘Marine Species of Conservation Concern in Welsh waters’ prepared by CCW and extracted from a list maintained by JNCC, was used. In order to establish what gaps there are in biotopes researched, the biotopes researched by *MarLIN* were compared with the nationally rare and scarce biotopes listed in the biotope classification, the list of biotopes of ‘Welsh interest’ provided by CCW, lists of ‘lifeforms’ in the SensMap report, and habitats identified under the UK Marine SACs project, UK Biodiversity Action Plan (BAP), and Annex I of the Habitat Directive.

4. Results

4.1. Introduction

A description of the content of *MarLIN* Biology and Sensitivity Key Information Reviews and the *MarLIN* database is given in Appendices 2-10.

4.2. Existing gaps in knowledge concerning sensitivity and recoverability of key marine species and biotopes

4.2.1 Current *MarLIN* species Key Information reviews

At the end of November 2002 the *MarLIN* Web site biology and sensitivity key information database contained full Key Information reviews of 149 species and basic information on an additional 280 species. A complete list of the species information at the end of November 2002 is shown in Appendix 2. Full key information reviews of important marine species listed under national legislation or international conventions are shown in Table 1. The full Key Information reviews include:

- 35 species listed under international conventions or national legislation;
- of which 29 are UK Biodiversity Action Plan (BAP) species, 12 are nationally rare and 5 are nationally scarce species;
- all the benthic marine species that are subject to Species Action Plans under the UK BAP (UK Biodiversity Group, 1998), and
- 96 keystone or representative species.

The only BAP Species Action Plan species not fully researched is *Styela gelatinosa* for which the literature was very limited and only basic information could be completed. *Styela gelatinosa* is not recorded in Wales.

Full Key Information reviews have also been completed for keystone or characteristic species of the following priority BAP habitat action plans:

- *Sabellaria alveolata* reefs;
- *Sabellaria spinulosa* reefs;
- Seagrass beds (*Zostera marina* and *Z. noltii*);
- *Modiolus modiolus* beds;
- Maerl beds (*Phymatolithon calcareum*, *Lithothamnion corallioides*, and *Lithothamnion glaciale*), and
- Saline lagoons (including all six marine species included in separate ‘species statements’).

The full Key Information reviews are augmented by the basic information pages. Basic information pages were completed for an additional 280 species as shown in Appendix 1 and included:

- 23 species designated or listed under statute or international convention, all of which are UK BAP species;
- 18 nationally rare and 28 nationally scarce species;
- 110 keystone, representative or characteristic species;
- 20 marine species likely to be affected by climate change;
- 4 non-native or climate change species, and
- 44 educational information species.

Overall, we have at least basic information on all the marine invertebrate species listed on the UK BAP ‘long list’ of species of conservation concern with the present exceptions of the bryozoan *Lophopus crystallinus* and the pseudoscorpion *Neobisium maritimum*.

The list of marine species of conservation concern (UK BAP) present in Welsh waters is shown in Table 2. We have completed 5 full Key Information reviews on these species and have basic information on 33 of species listed.

Table 1. Key Information reviews completed by *MarLIN*. Priority 1 species, designated or listed under statute or convention.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Tentacled lagoon worm	<i>Alkmaria romijni</i>	1,4	*	*					Scarce	None	Refereed
Sea fan anemone	<i>Amphianthus dohrnii</i>	1,6	*						Rare	None	Complete
Lagoon sandworm	<i>Armandia cirrhosa</i>	1,4	*	*					Rare	None	Refereed
Knotted wrack	<i>Ascophyllum nodosum</i> (*)	1,2	*	*					Widespread	None	Refereed
Fan Mussel	<i>Atrina fragilis</i>	1,6	*	*		*			Scarce	None	Refereed
DeFolin's lagoon snail	<i>Caecum armoricum</i>	1,4	*	*					Rare	Insufficiently known	Refereed
A hydroid	<i>Clavopsella navis</i>	1,4	*	*					Rare	None	Refereed
Edible sea urchin	<i>Echinus esculentus</i>	1,2				*			Widespread	Lower Risk (LR/nt)	Refereed
Ivell's sea anemone	<i>Edwardsia ivelli</i>	1,4	*	*					Rare	Data deficient	Complete
Pink sea fan	<i>Eunicella verrucosa</i>	1,6	*	*					Scarce	Vulnerable (VU A1d)	Complete
The tall sea pen	<i>Funiculina quadrangularis</i>	1	*						Not available	None	Complete
Lagoon sand shrimp	<i>Gammarus insensibilis</i>	1,4	*	*					Scarce	None	Refereed
Giant goby	<i>Gobius cobitis</i>	1,4		*					Rare	None	Complete
Couch's goby	<i>Gobius couchi</i>	1,4		*					Rare	None	Complete
Sunset cup coral	<i>Leptopsammia pruvoti</i>	1,4,6	*						Rare	None	Complete
Maerl	<i>Lithothamnion corallioides</i>	1,2	*		*				Not available	None	Refereed
Maerl	<i>Lithothamnion glaciale</i>	1,2	*						Not available	None	Complete
Horse mussel	<i>Modiolus modiolus</i>	1,2,6	*						Not available	None	Basic
Starlet sea anemone	<i>Nematostella vectensis</i>	1,4	*	*					Scarce	Vulnerable (VU A1ce)	Complete
Dog whelk	<i>Nucella lapillus</i>	1,2	*						Not available	None	Complete

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

(* = the *Ascophyllum nodosum* review included *Ascophyllum nodosum* ecad *mackaii*)

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Table 1 (continued). Key Information reviews completed by MarLIN. Priority 1 species, designated or listed under statute or convention.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Native oyster	<i>Ostrea edulis</i>	1,2	*						Not available	None	Complete
European spiny lobster	<i>Palinurus elephas</i>	1,3,6	*						Not available	None	Complete
Lagoon snail	<i>Paludinella litorina</i>	1,4	*	*					Rare	None	Refereed
Common piddock	<i>Pholas dactylus</i>	1						*	Not available	None	Refereed
Maerl	<i>Phymatolithon calcareum</i>	1,2,6	*		*				Not available	None	Refereed
Common goby	<i>Pomatoschistus microps</i>	1						*	Widespread	None	Complete
Sand goby	<i>Pomatoschistus minutus</i>	1						*	Widespread	None	Complete
Honeycomb worm	<i>Sabellaria alveolata</i>	1,2	*						Not available	None	Refereed
Ross worm	<i>Sabellaria spinulosa</i>	1,2	*						Not available	None	Refereed
Serpulid tube worm	<i>Serpula vermicularis</i>	1,2	*						Not available	None	Complete
Lagoon sea slug	<i>Tenellia adspersa</i>	1,4	*	*					Rare	None	Refereed
Northern hatchet shell	<i>Thyasira gouldi</i>	1,4	*	*					Rare	None	Complete
Looping snail	<i>Truncatella subcylindrica</i>	1,4	*						Rare	Rare	Refereed
Common eelgrass	<i>Zostera marina</i>	1	*					*	Not available	None	Refereed
Dwarf eelgrass	<i>Zostera noltii</i>	1,4	*						Scarce	None	Complete

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Table 2. UK Biodiversity Action Plan Species of Conservation Concern present in Welsh waters. Marine mammals and reptiles are omitted. The soft coral listed as *Parerythropodium corallioides* is now known to be *Alcyonium hibernicum* (McFadden, 1999).

Common Name	Scientific name	Review Type	Review Status
A hydroid	<i>Aglaophenia kirchenpaueri</i>	Basic	Signed-off and On-line
Trumpet anemone	<i>Aiptasia mutabilis</i>	Basic	Signed-off and On-line
Pink sea fingers	<i>Alcyonium hibernicum</i>	Basic	Signed-off and On-line
Tentacled lagoon worm	<i>Alkmaria romijni</i>	Full	Refereed and Updated
A bryozoan	<i>Amathia pruvoti</i>	None	
Sea fan anemone	<i>Amphianthus dohrnii</i>	Full	Refereed and Updated
A sea anemone	<i>Anemonactis mazeli</i>	Basic	Signed-off and On-line
A red seaweed	<i>Anotrichium barbatum</i>	Basic	Signed-off and On-line
Glaucus pimplet	<i>Anthopleura thallia</i>	Basic	Signed-off and On-line
An amphipod	<i>Apherusa ovalipes</i>	None	
A sponge	<i>Axinella damicornis</i>	Basic	Completed
Scarlet and gold star coral	<i>Balanophyllia regia</i>	Basic	Signed-off and On-line
A sea slug	<i>Caloria elegans</i>	Basic	Signed-off and On-line
A brown alga	<i>Carpomitra costata</i>	Basic	Signed-off and On-line
Southern cup coral	<i>Caryophyllia inornata</i>	Basic	Completed
A red seaweed	<i>Cruoria cruoriaeformis</i>	None	
A sea slug	<i>Doris sticta</i>	Basic	Signed-off and On-line
Sponge crab	<i>Dromia personata</i>	Basic	Signed-off and On-line
Edible sea urchin	<i>Echinus esculentus</i>	Full	Refereed and Updated
A sea anemone	<i>Edwardsia timida</i>	Basic	Signed-off and On-line
A red seaweed	<i>Gelidiella calciola</i>	None	
A red seaweed	<i>Gigartina pistillata</i>	None	
Blue spot slug	<i>Greilada elegans</i>	Basic	Signed-off and On-line
A sea anemone	<i>Halcampoides elongatus</i>	Basic	Signed-off and On-line
A hydroid	<i>Hartlaubella gelatinosa</i>	Basic	Signed-off and On-line
A sea slug	<i>Hero formosa</i>	Basic	Signed-off and On-line
A seahorse	<i>Hippocampus ramulosus</i>	None	
Carpet coral	<i>Hoplanguia durotrix</i>	Basic	Signed-off and On-line
A gastropod	<i>Jordaniella truncatula</i>	None	
Maerl	<i>Lithothamnion corallioides</i>	Full	Refereed and Updated
A mantis shrimp	<i>Meiosquilla desmaresti</i>	None	
A sea squirt	<i>Molgula oculata</i>	None	
A hydroid	<i>Obelia bidentata</i>	Basic	Signed-off and On-line
Yellow skirt slug	<i>Okenia elegans</i>	Basic	Signed-off and On-line
A hydroid	<i>Ophelia bicornis</i>	None	
A brittlestar	<i>Ophiopsila annulosa</i>	None	
Peacocks tail	<i>Padina pavonica</i>	Basic	Signed-off and On-line
Yellow cluster anemone	<i>Parazoanthus axinellae</i>	Basic	Signed-off and On-line
An amphipod	<i>Pectenogammarus planicrurus</i>	Basic	Signed-off and On-line
Maerl	<i>Phymatolithon calcareum</i>	Full	Refereed and Updated
A sea squirt	<i>Polysyncraton lacezei</i>	None	
A red seaweed	<i>Pterosiphonia pennata</i>	None	
A sea squirt	<i>Pycnoclavella aurilucens</i>	None	
A red seaweed	<i>Schmitzia hiscockiana</i>	None	

Table 2 (continued). UK Biodiversity Action Plan Species of Conservation Concern present in Welsh waters. Marine mammals and reptiles are omitted. The soft coral listed as *Parerythropodium corallioides* is now known to be *Alcyonium hibernicum* (McFadden, 1999).

Common Name	Scientific name	Review Type	Review Status
A sponge	<i>Stella grubii</i>	None	
A sponge	<i>Stylostichon dives</i>	None	
A hydroid	<i>Tamarisca tamarisca</i>	Basic	Signed-off and On-line
A sponge	<i>Tethyspira spinosa</i>	None	
Thumbnail crab	<i>Thia scutellata</i>	Basic	Signed-off and On-line
A sea slug	<i>Trapania maculata</i>	Basic	Signed-off and On-line
A sea slug	<i>Tritonia nilsodhneri</i>	Basic	Signed-off and On-line
Penny weed	<i>Zanardinia prototypus</i>	Basic	Signed-off and On-line

4.2.2 Existing gaps concerning sensitivity and recoverability of key marine species

Keystone, characterizing and representative species

The *MarLIN* database now contains full Key Information review on all of the marine BAP species, except *Styela gelatinosa* and many of the keystone or characteristic species of BAP Habitat Action Plans. In addition, the *MarLIN* programme has prepared full Key Information reviews on many keystone, and characterizing species, and representatives of the major groups of marine benthic species (Table 3.).

The representative species include many key or characterizing species of important marine benthic habitats and/or have been used in the biotope Key Information reviews (see below) to ‘represent’ the sensitivity of similar species. Appendix 3 lists the species used to indicate biotope sensitivity and their community importance in the biotope Key Information reviews.

Table 3. Keystone, characterizing, and representative species for which *MarLIN* full Key Information reviews have been prepared.

Group	Scientific name	Common Name	Review Status
Porifera			
	<i>Halichondria bowerbanki</i>	Bowerbank's halichondria	Signed-off and On-line
	<i>Halichondria panicea</i>	Breadcrumb sponge	With Referee
Cnidaria – Hydroids			
	<i>Clavopsella navis</i>	A hydroid	Refereed and Updated
	<i>Cordylophora caspia</i>	A hydroid	Signed-off and On-line
	<i>Nemertesia ramosa</i>	A hydroid	Refereed
Cnidaria – Corals			
	<i>Alcyonium digitatum</i>	Dead men's fingers	Refereed and Updated
	<i>Eunicella verrucosa</i>	Pink sea fan	Signed-off and On-line
	<i>Funiculina quadrangularis</i>	The tall sea pen	Signed-off and On-line
	<i>Virgularia mirabilis</i>	A sea pen	Signed-off and On-line
Cnidaria – Anemones			
	<i>Amphianthus dohrnii</i>	Sea fan anemone	Refereed and Updated
	<i>Edwardsia ivelli</i>	Ivell's sea anemone	Refereed and Updated
	<i>Leptopsammia pruvoti</i>	Sunset cup coral	Refereed
	<i>Metridium senile</i>	Plumose anemone	Signed-off and On-line
	<i>Nematostella vectensis</i>	Starlet sea anemone	Refereed
	<i>Protanthea simplex</i>	Sealoch anemone	Refereed
	<i>Urticina felina</i>	Dahlia anemone	Refereed and Updated

Table 3 (continued). Keystone, characterizing, and representative for which *MarLIN* full Key Information reviews have been prepared (continued).

Group	Scientific name	Common Name	Review Status
Annelida – Polychaetes			
	<i>Alkmaria romijni</i>	Tentacled lagoon worm	Refereed and Updated
	<i>Aphelochaeta marioni</i>	A bristleworm	Refereed and Updated
	<i>Arenicola marina</i>	Blow lug	Refereed and Updated
	<i>Armandia cirrhosa</i>	Lagoon sandworm	Refereed and Updated
	<i>Capitella capitata</i>	A polychaete	Signed-off and On-line
	<i>Hediste diversicolor</i>	Ragworm	Signed-off and On-line
	<i>Lanice conchilega</i>	Sand mason	Signed-off and On-line
	<i>Magelona mirabilis</i>	A polychaete	Refereed
	<i>Nephtys hombergii</i>	A catworm	Signed-off
	<i>Polydora ciliata</i>	A bristleworm	With Referee
	<i>Pomatoceros triqueter</i>	A tubeworm	Signed-off
	<i>Sabellaria alveolata</i>	Honeycomb worm	Refereed and Updated
	<i>Sabellaria spinulosa</i>	Ross worm	Refereed and Updated
	<i>Serpula vermicularis</i>	Serpulid tube worm	Signed-off and On-line
	<i>Spio filicornis</i>	A bristleworm	Signed-off and On-line
	<i>Spiophanes bombyx</i>	A bristleworm	Signed-off and On-line
Crustacea – Barnacles			
	<i>Balanus crenatus</i>	An acorn barnacle	Refereed and Updated
	<i>Chthamalus montagui</i>	Montagu’s stellate barnacle	Refereed and Updated
	<i>Chthamalus stellatus</i>	Poli’s stellate barnacle	Refereed and Updated
	<i>Semibalanus balanoides</i>	An acorn barnacle	Refereed and Updated
Crustacea – Amphipods			
	<i>Bathyporeia pelagica</i>	An amphipod	With Referee
	<i>Gammarus insensibilis</i>	Lagoon sand shrimp	Refereed and Updated
	<i>Gammarus salinus</i>	A gammarid shrimp	Signed-off and On-line
	<i>Hyale prevostii</i>	An amphipod	Refereed and Updated
	<i>Jassa falcata</i>	An amphipod	Refereed and Updated
	<i>Talitrus saltator</i>	A sand hopper	Signed-off and On-line
Crustacea - Isopods			
	<i>Eurydice pulchra</i>	An isopod	Signed-off and On-line
Crustacea – Decapods			
	<i>Callinassa subterranea</i>	A burrowing mud shrimp	With Referee
	<i>Liocarcinus depurator</i>	Harbour crab	With Referee
	<i>Neomysis integer</i>	An opossum shrimp	Signed-off and On-line
	<i>Pisidia longicornis</i>	Long-clawed porcelain crab	Signed-off and On-line
Mollusca – Gastropods			
	<i>Caecum armoricum</i>	DeFolin’s lagoon snail	Refereed and Updated
	<i>Crepidula fornicata</i>	Slipper limpet	Refereed and Updated
	<i>Helcion pellucidum</i>	Blue – rayed limpet	Refereed and Updated
	<i>Hydrobia ulvae</i>	Laver spire shell	Refereed and Updated
	<i>Lacuna vincta</i>	Banded chink shell	Refereed and Updated
	<i>Littorina littorea</i>	Common periwinkle	Refereed and Updated
	<i>Nucella lapillus</i>	Dog whelk	Signed-off and On-line
	<i>Paludinella litorina</i>	Lagoon snail	Refereed and Updated
	<i>Patella vulgata</i>	Common limpet	Refereed and Updated
	<i>Philine aperta</i>	A sea slug	Signed-off and On-line
	<i>Tenellia adpersa</i>	Lagoon sea slug	Refereed and Updated
	<i>Truncatella subcylindrica</i>	Looping snail	Refereed and Updated

Table 3 (continued). Keystone, characterizing, and representative species for which *MarLIN* full Key Information reviews have been prepared (continued).

Group	Scientific name	Common Name	Review Status
Mollusca – Bivalves			
	<i>Abra alba</i>	A bivalve	Signed-off and On-line
	<i>Atrina fragilis</i>	Fan Mussel	Refereed and Updated
	<i>Cerastoderma edule</i>	Common cockle	With Referee
	<i>Cerastoderma glaucum</i>	Lagoon cockle	Refereed and Updated
	<i>Ensis spp.</i>	Razor shell	Refereed and Updated
	<i>Macoma balthica</i>	Baltic tellin	Refereed and Updated
	<i>Modiolus modiolus</i>	Horse mussel	Signed-off and On-line
	<i>Mya arenaria</i>	Sand gaper	Refereed and Updated
	<i>Mytilus edulis</i>	Common mussel	Refereed and Updated
	<i>Ostrea edulis</i>	Native oyster	Signed-off and On-line
	<i>Pecten maximus</i>	Great scallop	Signed-off
	<i>Pholas dactylus</i>	Common piddock	Refereed and Updated
	<i>Thyasira gouldi</i>	Northern hatchet shell	Refereed
	<i>Venerupis senegalensis</i>	Pullet carpet shell	With Referee
	<i>Fabulina fabula</i>	A bivalve	Signed-off and On-line
Brachiopoda			
	<i>Neocrania anomala</i>	A brachiopod	Signed-off and On-line
Bryozoa			
	<i>Bugula turbinata</i>	A bryozoan	Signed-off and On-line
	<i>Conopeum reticulum</i>	A bryozoan	Signed-off and On-line
	<i>Electra pilosa</i>	A sea mat	With KH
	<i>Flustra foliacea</i>	Hornwrack	Signed-off and On-line
	<i>Pentapora fascialis</i>	Ross	Refereed and Updated
	<i>Umbonula littoralis</i>	An encrusting bryozoan	Refereed and Updated
Echinodermata			
	<i>Antedon bifida</i>	Rosy feather-star	Signed-off and On-line
	<i>Asterias rubens</i>	Common starfish	Refereed and Updated
	<i>Brissopsis lyrifera</i>	A heart urchin	With Referee
	<i>Amphiura chiajei</i>	A brittle star	With Referee
	<i>Henricia oculata</i>	Bloody Henry starfish	Refereed and Updated
	<i>Amphiura filiformis</i>	A brittle-star	Signed-off and On-line
	<i>Ophiothrix fragilis</i>	Common brittle star	Refereed and Updated
	<i>Echinocardium cordatum</i>	Sea potato	Refereed and Updated
	<i>Echinus esculentus</i>	Edible sea urchin	Refereed and Updated
	<i>Psammechinus miliaris</i>	Green sea urchin	Refereed
	<i>Neopentadactyla mixta</i>	Gravel sea cucumber	Refereed and Updated
Chordata - Sea squirts			
	<i>Asciadiella scabra</i>	A sea squirt	Signed-off and On-line
	<i>Botryllus schlosseri</i>	Star ascidian	Signed-off and On-line
	<i>Ciona intestinalis</i>	A sea squirt	Refereed and Updated
	<i>Clavelina lepadiformis</i>	Light bulb sea squirt	Signed-off and On-line
	<i>Molgula manhattensis</i>	Sea grapes	Signed-off and On-line
	<i>Morchellium argus</i>	A colonial tunicate	With Referee
Chordata - Fish			
	<i>Gobius cobitis</i>	Giant goby	With Referee
	<i>Gobius couchi</i>	Couch's goby	With Referee
	<i>Pomatoschistus microps</i>	Common goby	With Referee
	<i>Pomatoschistus minutus</i>	Sand goby	With Referee

Table 3 (continued). Keystone, characterizing, and representative species for which *MarLIN* full Key Information reviews have been prepared (continued).

Group	Scientific name	Common Name	Review Status
Rhodophycota - red algae			
	<i>Rhodothamniella floridula</i>	A red seaweed	Signed-off and On-line
	<i>Ahnfeltia plicata</i>	A red seaweed	Signed-off and On-line
	<i>Ceramium nodulosum</i>	A red seaweed	Signed-off and On-line
	<i>Chondrus crispus</i>	Carragheen	Signed-off and On-line
	<i>Corallina officinalis</i>	Coral weed	Refereed and Updated
	<i>Delesseria sanguinea</i>	Sea beech	Refereed and Updated
	<i>Furcellaria lumbricalis</i>	A red seaweed	Signed-off and On-line
	<i>Lithophyllum incrustans</i>	An encrusting coralline alga	Refereed and Updated
	<i>Lithothamnion corallioides</i>	Maerl	Refereed and Updated
	<i>Lithothamnion glaciale</i>	Maerl	Signed-off and On-line
	<i>Palmaria palmata</i>	Dulse	Refereed and Updated
	<i>Phymatolithon calcareum</i>	Maerl	Refereed and Updated
Chromophycota - brown algae			
	<i>Alaria esculenta</i>	Dabberlocks	Refereed and Updated
	<i>Ascophyllum nodosum</i>	Knotted wrack	Refereed and Updated
	<i>Chorda filum</i>	Sea lace or Dead man's rope	Signed-off and On-line
	<i>Fucus ceranoides</i>	Horned wrack	Refereed and Updated
	<i>Fucus distichus</i>	A brown seaweed	Refereed and Updated
	<i>Fucus serratus</i>	Toothed wrack	Refereed and Updated
	<i>Fucus spiralis</i>	Spiral wrack	Refereed and Updated
	<i>Fucus vesiculosus</i>	Bladder wrack	With Referee
	<i>Halidrys siliquosa</i>	Sea oak	With KH
	<i>Himanthalia elongata</i>	Sea thong	Refereed and Updated
	<i>Laminaria digitata</i>	Oarweed	Signed-off and On-line
	<i>Laminaria hyperborea</i>	Tangle or cuvie	Refereed
	<i>Laminaria saccharina</i>	Oarweed	Refereed
	<i>Pelvetia canaliculata</i>	Channelled wrack	Refereed and Updated
	<i>Saccorhiza polyschides</i>	Furbelows	With Referee
Chlorophycota - green algae			
	<i>Cladophora rupestris</i>	A green seaweed	Signed-off and On-line
	<i>Enteromorpha intestinalis</i>	Gut weed	Signed-off and On-line
Vascular plants			
	<i>Zostera marina</i>	Common eelgrass	Refereed and Updated
	<i>Zostera noltii</i>	Dwarf eelgrass	Signed-off and On-line

While *MarLIN* has made major in-roads into assessing the sensitivities of many keystone, characterizing or representative species there are undoubtedly gaps in the research, primarily due to the time constraints and the focus of the past contract work. Other keystone or important characterizing species that may require research are shown in Table 4. Table 4 lists species that are known to be important in marine benthic communities or that are important characterizing species in the description of biotopes under the biotopes classification (Connor *et al.*, 1997a, b). Species listed are ones that are additional to those currently used to identify sensitivity of biotopes, which are dominant or abundant in biotopes and for which it is believed there would be sufficient information to research a full review.

Nationally rare and scarce species

The *MarLIN* database contains full Key Information reviews on only 17 nationally rare or scarce species (see above) and basic information on another 46 species out of the 172 nationally rare and scarce species listed by Connor & Hill (1998; as amended in 2002).

Table 4. Keystone and important characterizing species not yet researched by *MarLIN* and known to be present in Welsh waters.

Probable community importance	Species name	Common name
Important characterizing	<i>Aequipecten opercularis</i>	Queen scallop
Important characterizing	<i>Alcyonidium diaphanum</i>	A gelatinous bryozoan
Important characterizing	<i>Ampelisca brevicornis</i>	An amphipod
Important characterizing	<i>Ampharete falcata</i>	A polychaete
Important characterizing	<i>Anomia ephippium/Pododesmus patelliformis</i> (nomenclature issue)	A saddle oyster
Important characterizing	<i>Bifurcaria bifurcata</i>	A brown alga
Important characterizing	<i>Blidingia minima</i>	A green alga
Important other	<i>Carcinus maenas</i>	Common shore crab
Important characterizing	<i>Chaetopterus variopedatus</i>	Parchment worm
Important characterizing	<i>Cirratulus cirratus</i>	A polychaete
Important characterizing	<i>Corbula gibba</i>	Basket shell
Important characterizing	<i>Corophium volutator.</i>	An amphipod
Important characterizing	<i>Corynactis viridis</i>	Jewel anemone
Important other	<i>Crangon crangon</i>	A shrimp
Important characterizing	<i>Cryptopleura ramosa</i>	A red alga
Important characterizing	<i>Dendrodoa grossularia</i>	Baked-bean sea squirt
Important characterizing	<i>Gasterosteus aculeatus</i>	Three-spined stickleback
Key functional	<i>Gibbula cineraria</i>	Grey top shell
Key structural	<i>Halidrys siliquosa</i>	Sea oak
Important characterizing	<i>Harmothoe imbricata</i>	A scale worm
Key structural	<i>Hiatella arctica</i>	A bivalve mollusc
Important characterizing	<i>Holothuria forskali</i>	Cotton spinner
Important characterizing	<i>Hymeniacidon perleve</i>	A sponge
Important other	<i>Idotea pelagica</i>	An isopod
Important characterizing	<i>Leathesia difformis</i>	A brown seaweed
Important characterizing	<i>Lichina pygmaea</i>	A lichen
Important characterizing	<i>Littorina neglecta</i>	A periwinkle
Key functional	<i>Littorina obtusata</i>	Flat periwinkle
Important characterizing	<i>Mastocarpus stellatus</i>	False Irish moss
Important characterizing	<i>Melinna palmata</i>	A polychaete
Important characterizing	<i>Myxicola infundibulum</i>	A fan worm
Important characterizing	<i>Nemertesia antennina</i>	A hydroid
Important characterizing	<i>Nephrops norvegicus</i>	Norway lobster
Important characterizing	<i>Nucula nitidosa</i>	A bivalve
Key functional	<i>Osilinus lineatus</i>	Toothed top shell
Important structural	<i>Osmundia pinnatifida</i>	Pepper dulse
Important characterizing	<i>Pecten maximus</i>	Great/king scallop
Important characterizing	<i>Pectenogammarus planicrurus</i>	An amphipod
Important characterizing	<i>Porphyra umbilicalis.</i>	Laver
Important structural	<i>Prasiola stipitata</i>	A green alga
Important characterizing	<i>Scalebregma inflatum</i>	A polychaete
Important characterizing	<i>Scolopos armiger</i>	A polychaete
Important characterizing	<i>Scrobicularia plana</i>	Peppery furrow shell
Important characterizing	<i>Sertularia cupressina</i>	A hydroid
Important characterizing	<i>Spisula elliptica</i>	A bivalve
Important characterizing	<i>Suberites carnosus</i>	A sponge
Important characterizing	<i>Tubificoides sp.</i>	A polychaete
Important characterizing	<i>Tubularia indivisa</i>	A hydroid
Important characterizing	<i>Ulothrix flacca</i>	A green alga
Important characterizing	<i>Ulva lactuca</i> (pending taxonomic revision)	Sea lettuce
Important characterizing	<i>Urospora wormskioldii</i>	A green alga
Important characterizing	<i>Verrucaria maura</i>	A lichen
Important characterizing	<i>Verrucaria mucosa</i>	A lichen

More nationally rare and scarce species may be the subject of research. However, in *MarLIN*'s experience it is usually very difficult to prepare a full Key Information review on nationally rare or scarce species since they are, by their very nature, often poorly studied. Where the information on an important characterizing or keystone species is inadequate to complete a full Key Information review, the relevant or available information is included in the supporting information for the biotope Key Information review.

4.2.3 Current *MarLIN* biotope Key Information reviews

At the end of November 2002 the *MarLIN* Web site biology and sensitivity key information database contained full Key Information reviews of 117 biotopes. These biotopes are representative of an additional 157 biotopes. The *MarLIN* database base therefore, contains biology and sensitivity Key Information relevant to 274 biotopes included in the MNCR biotope classification (Connor *et al.*, 1997a, b). A complete list of the biotope Key Information reviews and their 'represented' biotopes at the end of November 2002 is shown in Appendix 4. The biotopes researched were identified as important within the interest features of Annex I habitats of the Habitats Directive and/or within UK BAP habitats. The marine natural heritage importance of the biotopes researched is shown in Appendix 5.

Biodiversity Action Plan habitats

The researched biotope Key Information reviews include examples of all the marine UK BAP habitats and several coastal BAP habitats. They are listed in full in Appendix 5, listed by BAP habitat in Appendix 6 and summarized in Table 5 below.

The only BAP habitats for which no biotopes have been researched are:

- coastal sand dunes;
- coastal vegetated shingle;
- machair;
- oceanic seas, and
- offshore shelf sediment.

The coastal BAP habitats above are outside the remit the *MarLIN* programme, which prioritises marine benthic species and habitat and the biotope classification does not yet include many offshore biotopes.

Nationally rare and scarce habitats

Connor *et al.* (1997a, b) provides the national status of many but not all biotopes in the biotope classification. The *MarLIN* database includes biotope Key Information reviews of:

- 24 nationally scarce biotopes, which represent another 23 nationally scarce biotopes, and
- 13 nationally rare biotopes, which represent another 13 nationally rare biotopes.

The nationally rare and scarce biotopes, and their status (researched or represented) are listed in Appendix 7a-d. Several biotope complexes are listed as nationally rare or scarce, while the national status of their component biotopes differs or is not available. For example, the biotope complex 'Littoral *Sabellaria* (honeycomb worm) reefs' (MLR.Sab) is listed as nationally rare but consists of a single biotope which is listed as nationally scarce. Nationally rare and scarce biotope complexes and the status of their component biotopes (researched or represented) are also shown in Appendix 7a-d.

All the nationally scarce biotope have been researched or are represented by other biotopes but following national rare biotopes are not:

- *Sargassum muticum* in eulittoral rockpools LR.FK.Sar
- Hydroids, ephemeral seaweeds and *Littorina littorea* in shallow eulittoral mixed substrata pools LR.Rkp.H

However, LR.Rkp.H is to be discontinued in the forthcoming revision of the biotopes classification.

Table 5. The number of *MarLIN* researched biotope Key Information reviews and represented biotopes within BAP habitat and species reviews.

UK BAP (Habitat)	No. Researched (represented)
Species action plan	
<i>Ascophyllum nodosum</i> ecad. <i>mackii</i> beds	1
Priority BAP habitat	
Coastal and floodplain grazing marsh	2(1)
Coastal saltmarsh	3(1)
Coastal sand dunes	0
Coastal vegetated shingle	0
Littoral and sublittoral chalk	6(2)
<i>Lophelia pertusa</i> reefs	1
Machair	0
Maerl beds	2(4)
Maritime cliff and slopes	3(8)
<i>Modiolus modiolus</i> beds	1(3)
Mud habitats in deep water	9(2)
Mudflats	2(10)
Reedbeds	1
<i>Sabellaria alveolata</i> reefs	1
<i>Sabellaria spinulosa</i> reefs	2
Saline lagoons	36(29)
Seagrass beds	2
<i>Serpula vermicularis</i> reefs	1
Sheltered muddy gravels	5
Sublittoral sands and gravels	9(7)
Tidal rapids	3
Broad BAP habitat	
Inshore sublittoral rock	56
Inshore sublittoral sediment	43
Littoral rock	24(42)
Littoral sediment	9(15)
Oceanic seas	0
Offshore shelf rock	1
Offshore shelf sediment	0
Supralittoral rock	3(8)
Supralittoral sediment	1

Annex I habitats of the Habitats Directive

The researched biotopes prioritized habitats included within agreed interest features of Annex I habitats in the seas around England and Scotland. The Annex I habitats that include researched biotopes are shown in Appendix 5 and the number of researched biotopes within each Annex I habitat is shown in Figure 1. Please note that more than one biotope may occur in more than one Annex I habitat. The numbers shown in Figure 1 are augmented by the represented biotopes.

UK Marine SACs habitats

The UK Marine SACs project commissioned reviews of the biology and sensitivity of numerous marine habitats (see below for discussion). Due to the similarity in our research priorities, i.e. Annex I habitats, there is considerable similarity between *MarLIN*'s research coverage and the UK Marine SACs programme. The researched and represented biotopes included in the *MarLIN* database and considered under the UK Marine SACs programme are shown in Appendix 8 and summarised in Table 6 below.

Appendix 8 demonstrates that we have researched many of the biotopes addressed under the UK Marine SACs project.

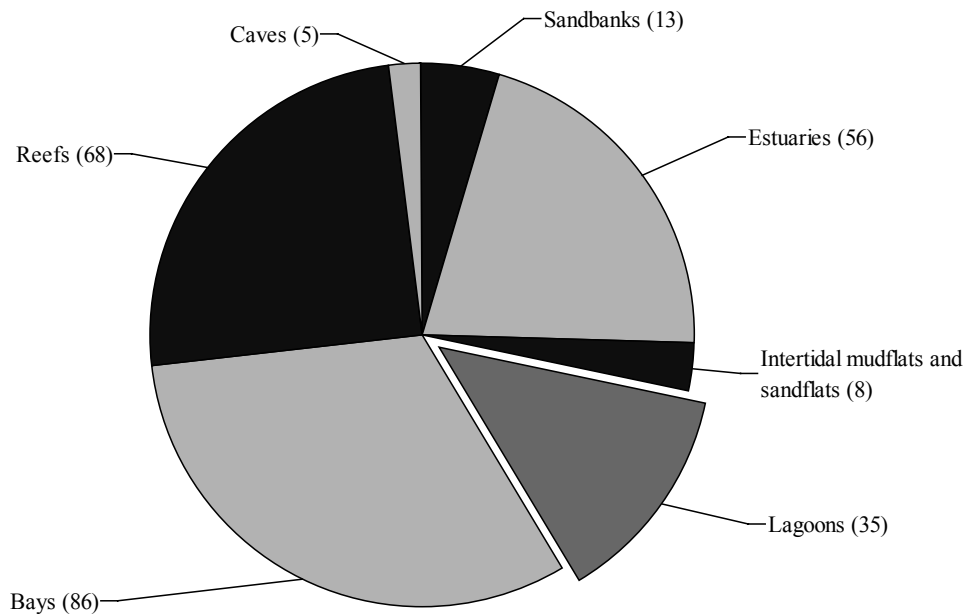


Figure 1. The number of researched biotope Key Information reviews within Annex I habitats.

Table 6. Biotopes considered in the UK Marine SACs habitat reviews that have been researched or represented by *MarLIN*.

UK Marine SAC	Number Researched (represented)
<i>Zostera</i> biotopes	2
Intertidal Sand and Mudflats & Subtidal Mobile Sandbanks	10(17)
Sea Pens and Burrowing Megafauna	5(2)
Subtidal Brittlestar Beds	1(1)
Maerl	2(4)
Intertidal Reef Biotopes	19(45)
Infralittoral Reef Biotopes with Kelp Species	12(29)
Circolittoral Faunal Turfs	14(20)
Biogenic reefs	4(1)

Lifeforms

The biotope Key Information reviews included in the ‘lifeforms’ identified by SensMap (McMath *et al.*, 2000) are listed in Appendix 9. In order to accommodate researched biotope Key Information reviews, ‘reedbeds’ and ‘soft rock communities’ were added as ‘lifeforms’. It can be seen that the *MarLIN* database includes numerous examples of biotopes within the listed ‘lifeforms’ and include examples of all the ‘lifeforms’ listed by the SensMap report (McMath *et al.*, 2000).

4.2.4 Existing gaps concerning sensitivity and recoverability of key marine biotopes

MNCR biotope classification

The number of researched biotope Key Information reviews and the biotopes they represent are compared with the full biotope classification (Connor *et al.*, 1997a, b) and the list of biotopes of Welsh interest in Appendix 10.

The *MarLIN* database contains at least one biotope Key Information review for every biotope complex in the biotope classification and often more. Although we have only researched two examples of saltmarsh biotopes, these biotopes are outside our expertise and more rightly fall under terrestrial biology.

Welsh interest biotopes

The list of Welsh interest biotopes includes 301 biotopes of which 243 are included in the MNCR biotope classification (Connor *et al.*, 1997a, b). The additional 58 Welsh biotopes seem to be specific additions to the classification, presumably to accommodate regional variation in marine habitats. The *MarLIN* database includes:

- biotope Key Information reviews of 72 of the Welsh interest biotopes, which
- represent another 118 Welsh interest biotopes.

The following 12 Welsh interest biotopes are neither researched or represented:

- LR.Rkp.FK.Sar - *Sargassum muticum* in eulittoral rockpools
- LR.Rkp.H - Hydroids, ephemeral seaweeds and *Littorina littorea* in shallow eulittoral mixed substrata pools
- LMU.Sm.NVC SM12 - Rayed *Aster tripolium*
- LMU.Sm. NVC SM8 - *Salicornia* spp.
- LMX.MytFab - *Mytilus edulis* and *Fabricia sabella* in poorly-sorted muddy sand or muddy gravel shores
- LMX.Mare - *Mya arenaria* and polychaetes in muddy gravel shores
- MIR.KR.Ldig - *Laminaria digitata* on moderately exposed or tide-swept sublittoral fringe rock
- SCR.BrAs.NeoPro.Den - *Neocrania anomala*, *Dendrodoa grossularia* and *Sarcodictyon roseum* on reduced or low salinity circalittoral rock
- IGS.Mrl.Phy - *Phymatolithon calcareum* maerl beds in infralittoral clean gravel or coarse sand
- IGS.FaS.ScupHyd - *Sertularia cupressina* and *Hydrallmania falcata* on tide-swept sublittoral cobbles or pebbles in coarse sand
- CMX.SpiMx - *Sabellaria spinulosa* and *Polydora* spp. on stable circalittoral mixed sediment
- CMX.ModHo - Sparse *Modiolus modiolus*, dense *Cerianthus lloydii* and burrowing holothurians on sheltered circalittoral stones and mixed sediment

However, LMX.Mare and LR.Rkp.H were omitted since they are to be discontinued in the current revision of the biotope classification. Although IGS.Mrl.Phy is not researched, its sub-biotope IGS.Mrl.Phy.Hec is researched and is probably representative. The saltmarsh NVC communities are also poorly represented in the *MarLIN* database but were not considered to be relevant to the programme as a whole.

4.2.5 Existing gaps concerning sensitivity and recoverability information

The above exposition demonstrates that the *MarLIN* database includes biology and sensitivity information of a large number of keystone, characterizing, and representative marine species and the majority of the important marine biotopes. When taken together with the representative biotopes the *MarLIN* database contains biology and sensitivity information of relevance to most of the marine benthic habitats in the seas of England, Scotland and Wales.

Information resources in Plymouth

The *MarLIN* Key Information reviews have synthesized information from a wide variety of sources, including review journals, the scientific literature, grey literature and specific reports. The Key Information reviews present the best available scientific information on the species or biotopes concerned. Emphasis has been given to direct evidence of environmental affect and subsequent recovery, wherever possible.

The *MarLIN* programme draws on the information resources of the National Marine Biological Library (NMBL), Plymouth. The NMBL is a specialist marine biology library with a huge collection of otherwise unavailable grey literature and archive material. The *MarLIN* database presently contains over 3200 bibliographic entries to information used to complete the full Key Information reviews.

The Key Information reviews have benefited from input for marine biologists resident at the Marine Biological Association of the UK (MBA), as well as external experts and referees.

UK Marine SACs project

The UK Marine SACs project provides a major source of information on the biology and sensitivity of important marine habitats in the UK. The UK Marine SACs project commissioned ‘overviews of the dynamic and sensitivity characteristics for conservation and management of marine SACs’ of the major marine habitats by expert marine biologists as well as reviews of the likely impacts from specific marine sectors. The relevant UK Marine SACs reviews are listed below.

Reviews of the ‘dynamic and sensitivity characteristics for conservation and management of marine SACs’:

- Biogenic reefs
- Circalittoral Faunal Turfs
- Infralittoral Reef Biotopes with Kelp Species
- Intertidal Reef Biotopes
- Intertidal Sand and Mudflats & Subtidal Mobile Sandbanks
- Maerl
- Sea Pens and Burrowing Megafauna
- Subtidal Brittlestar Beds
- *Zostera* biotopes

The above reviews are augmented by:

- Marine habitat reviews - A summary of ecological requirements and sensitivity characteristics for conservation management of marine SACs
- Good practice guidelines for ports and harbours operating within or near UK European marine sites
- Guidelines for managing the collection of bait and other shoreline animals within UK European marine sites
- A review of the effects of fishing within UK European marine sites
- Guidelines for managing water quality impacts within UK European marine sites
- A review of the effects of recreation interactions within UK European marine sites
- Guidelines on the impact of aggregate extraction on European marine sites
- Investigating and managing water quality impacts in saline lagoons

The above reviews have proven to be an invaluable source of information for the assessment of the sensitivity of several groups of biotopes.

Dealing with gaps in information

The UK Marine SACs project reviews (listed above) provided detailed information to support our sensitivity assessments, although they often did not contain enough information for all the environmental factors considered. But in several cases there was not enough information on the species biology to complete a full Key information review or the communities ecology was poorly studied. Wherever possible the community ecology has been inferred from survey data and descriptions of the habitat and the general biology or similar communities and associated species. In all cases, the inferences used are clearly stated.

For example, there was not enough information on the gaping file shell *Limaria hians* to complete a full Key Information review. The relevant information on distribution, habitat, recruitment, and reproduction were incorporated into the biotope review of *Limaria hians* beds. In addition, much of the information on ecological relationships and habitat complexity was derived from survey data, species lists and descriptions of the habitat.

Other examples where information was deficient or the ecology or the community was poorly studied included:

- *Beggiatoa* spp. on anoxic mud;
- faunal turf communities, especially erect bryozoan or sponge dominated communities;
- *Ocnus planci* aggregation on sheltered sublittoral muddy sediment, and
- *Musculus discors* beds on moderately exposed circalittoral rocks.

In many cases information on tolerance to chemical contamination has proved to be difficult to obtain. Information from experimental studies is often readily available but only for species that lend themselves to experimentation (e.g. easy to obtain and maintain in captivity). In addition, the relevance of experimental studies to the natural environment is often unclear. By necessity, inferences have been made for groups of species (e.g. mussels, polychaetes, hydroids and bryozoans), usually with low confidence.

The *MarLIN* approach to sensitivity assessment includes an assessment of the level of evidence and hence confidence, for each sensitivity assessment (see Tyler-Walters *et al.*, 2001). In summary, where evidence on the sensitivity or recoverability is derived from direct experimentation or studies of species and habitats then 'high' to 'moderate' confidence is given in the assessment. If sensitivity and recoverability assessments are based on the biological characteristics of the species or habitats alone then 'low' confidence is reported, while 'very low' confidence is reported if the assessments are based on informed judgement alone.

Therefore, each sensitivity assessment is 'tagged' with an assessment of the level of evidence on which the assessment is based. In addition, the evidence used to make the assessment is summarized in an explanation or 'rationale' that accompanies the assessment.

4.3. The extent to which spatial and temporal factors have been taken into account in existing sensitivity and recoverability assessments

4.3.1 Spatial factors

Spatial environmental factors are those that vary from site-to-site and that determine the presence and abundance of a species and which biotope develops at a site. Most spatial environmental factors will vary only within a limited range and the continued presence of the same biotopes and dominant species at the same location over many years is evidence that species and biotopes tolerate variation within normal limits of such factors as seawater temperature, salinity, suspended sediment concentration and strength of wave action.

The species and biotope Key Information (see Appendices 11 and 12 respectively for the list of fields) reviews address spatial factors in the form of habitat preferences. Restrictions on recruitment and hence recovery caused by geographical or hydrographical isolation are addressed wherever possible.

4.3.2 Temporal factors

Some species vary in abundance with time and the species composition of biotopes may vary without them becoming a different biotope. It is important to identify what those changes are likely to be so that increases

or decreases in abundance of species alone or of species in a biotope can be ascribed to natural variability or to variability brought about by an extreme but natural event or to human activity. For instance, the abundance of foliose algae varies with time of year (see Hiscock, 1986) and a low abundance or absence of some species is to be expected during winter. Some species, such as the light bulb sea squirt *Clavelina lepadiformis*, appear in large amounts in one year but may be virtually absent in another and this seems to be natural variability. Some sea slugs may go 'missing' for several decades before re-appearing. An exceptionally cold winter may result in mortality of a wide range of species (see Crisp, 1964). Information on such seasonal or long-term natural fluctuations is descriptive and is included under the 'Reproduction and longevity' fields for species reviews and in the 'Seasonal /temporal changes' field in biotope reviews.

Where relevant or where information allows, potential successional change is also addressed. In addition, seasonal and longer-term change in recruitment of species and of dominant or important characterizing species in biotopes is addressed under 'Recruitment processes' whilst temporal change in biotopes is addressed under 'Time for community to reach maturity'.

Spatial, seasonal and temporal change is therefore factored into the sensitivity assessment of biotopes as a matter of course. However, seasonal and long term changes in marine benthic communities, especially subtidal communities, are poorly studied. As above, the level of information available on particular communities varies and hence the confidence in our recoverability assessments vary accordingly.

Overall, information on seasonal and long term change was researched or inferred from similar communities for all but three of the 117 biotopes researched.

4.3.3 Relevance of *MarLIN* 'Environmental factors' and 'Key information fields' to assessing spatial and temporal change

The Key Information fields included in the species Key Information reviews are shown in Appendix 7. Spatial factor such as distribution, abundance, and habitat preferences are included, along with issues relevant to reproduction such as reproductive season, age at maturity, fecundity, reproductive type, larval dispersal range and settlement period (month or season).

A species ability to recover from destruction of the population is dependent on its ability to recruit and recolonize the habitat. Recoverability from environmental factors that reduce viability (low sensitivity) is primarily dependent on the species ability to regrow and regenerate. Therefore, more key information fields were required to assess recoverability from factors to which the species is highly sensitive than those to which it had a low sensitivity.

The Key information fields that affect temporal change and that are used to assess recoverability from environmental factors at different levels of sensitivity include:

- Abundance;
- Size at maturity;
- Growth rate;
- Mobility;
- Distribution;
- Life span;
- Age at maturity;
- Generation time;
- Reproductive type;
- Reproductive frequency;
- Fecundity;
- Larval settling time, and
- Dispersal potential.

In assessing likely recoverability, potential larval dispersal and recruitment ability often differ from effective dispersal and recruitment and are often limited by hydrographic regimes that are difficult to assess. Restrictions on recruitment and hence recovery caused by geographical or hydrographical isolation are addressed wherever possible. Information on reproduction, fecundity and dispersal capabilities of many marine species is poorly studied. It often proved necessary to make inferences on the likely recruitment of a chosen species from information on similar species or reproduction in its group as a whole. For example, recruitment in brooding bryozoans (e.g. *Parasmittina trispinosa*) may be inferred from studies of recruitment of fouling species such as *Bugula* spp, while recruitment in hydroids may be inferred from studies of *Obelia* spp., *Nemertesia* spp. or hydroids as a group, depending on the species of interest.

Precedence was given to direct evidence on the recruitment or recovery of species, or groups of species, from experimental studies, colonization or artificial habitats and long term studies of recovery after environmental perturbation, e.g. the recovery of intertidal populations after oil spills.

4.4. Environmental factors used for sensitivity assessment by SensMap, MarLIN and the UK Marine SACs project

4.4.1 Environmental factors

The *MarLIN* and SensMap programme both assess sensitivity to environmental factors. Natural events and anthropogenic activities affect marine habitats and species by causing a change to the environmental factors to which the species or habitats are normally exposed. If this change in the environmental factor is outside the tolerance limits of the species or habitat then ‘damage’ may occur.

The SensMap list of factors is divided into Primary, Secondary and Tertiary factors. The SensMap Tertiary categories are more precise for physical disturbance, synthetic compounds, hydrocarbon contaminants, and nutrient enrichment in particular. Whilst some of the detailed categories listed by SensMap might be difficult to find information for, many do give the sort of precision needed when dealing with specific pollutants or types of disturbance. Currently, *MarLIN* specifies the category of disturbance, heavy metal, chemical contaminant, or oil type for which evidence has been found in the sensitivity assessment but it is not possible to access information directly from a search for a specific detailed category, although searches could be developed.

The environmental factors used by *MarLIN*, the Secondary factors used by SensMap and the factors listed by the UK Marine SACs project are compared in Table 7. The differences between the lists are predominantly minor and based mainly on terminology. All the factors included in the SensMap programme and the UK Marine SAC project are addressed by the environmental factors used within the *MarLIN* programme.

4.4.2 Maritime activities and their associated environmental factors

Coastal and environmental regulators and managers are concerned primarily with the management, control, or operation of ‘activities’. Therefore, an ‘activities to factors’ matrix was developed to indicate those environmental factors that were likely to change due to specified maritime and coastal activities. A similar approach is used by the SensMap programme (McMath *et al.*, 2000; Section 4, Appendix 3).

The ‘activities to factors’ matrix (Appendix 13) was derived from the Marine Conservation Handbook (Eno, 1991) as amended by Cooke & McMath (2000) and discussion with the Marine Habitats Team (JNCC), and the *MarLIN* Biology and Sensitivity Key Information Sub-programme Technical Management Group. Wherever possible the list of activities and environmental factors was in agreement with the guidance provided on marine candidate SACs by English Nature, under Regulation 33 of the ‘The Conservation (Natural Habitats, &c.) Regulations 1994’ (SI 1994/2716), and further guidance provided by Joint Nature Conservation Committee to OSPAR (the Oslo and Paris Convention for the Protection of the Marine Environment of the North-east Atlantic).

The maritime and coastal activities identified for the *MarLIN* programme are shown in Appendix 14. The list should not be regarded as definitive or exhaustive. A comprehensive list would be too long to be practicable. Therefore, many of the activities listed represent classes or groups of activities. Each of the activities shown in the matrix and the types of activity that they are used to represent in Britain and Ireland are defined.

The ‘activities to factors’ matrix was developed to contribute a search tool for species or biotopes sensitive to specific maritime activities. The ‘activities to factors’ matrix is duplicated within the *MarLIN* database. The search tool allows the user to select a specific maritime activity (e.g. scallop dredging) to identify environmental factors likely to change as a result of that activity, and hence, species or biotopes that have been assessed as sensitive (high, intermediate or low) to that environmental factor.

Although the formats differ, the majority of the primary, secondary and tertiary activities identified by the SensMap programme (see McMath *et al.*, 2000; Section 4, Appendix 1) are included in the *MarLIN* definition of activities (Appendix 14). However, the following activities are not defined in the *MarLIN* list.

Oil spill clean-up:

- *bioremediation,*
- *burning at sea,*
- *burning of vegetation,*
- *cutting of vegetation,*
- *high pressure ambient water temperature flushing,*
- *hot water flushing,*
- *low pressure ambient water temperature flushing,*
- *mechanical removal of residual smaller volumes of oil,*
- *natural recovery*
- *physical bulk oil removal at sea,*
- *physical bulk oil removal on shore*
- *warm water flushing*
- *shoreline cleaning agents,*
- *sinking,*
- *vehicles and personnel*

Table 7. Comparison between environmental factors used to assess sensitivity by *MarLIN*, SensMap, and the UK Marine SACs project.

<i>MarLIN</i> environmental factors		SensMap Report secondary environmental factors		UK Marine SAC environmental factors	
Physical	Substratum loss	Changes to geo-morphology	Substrate	Physical	Removal of substratum
	Smothering				
	Suspended sediment				
	Desiccation		Humidity		Increase in exposure/desiccation
	Changes in emergence regime		Emergence Regime		
	Changes in water flow rate		Tidal Flow		Water movement/ Hydrophysical regime
	Changes in wave exposure	Wave Exposure			
	Noise disturbance	Noise & visual disturbance	Noise		Physical disturbance/damage
	Visual presence		Visual		
	Physical disturbance / abrasion	Physical disturbance	Entanglement		
			Collision		
	Amputation				
	Displacement				
Changes in temperature	Changes to water properties	Temperature	Temperature		
Changes in turbidity		Turbidity	Water clarity		
		Light			
Chemical	Synthetic compound contamination	Changes to environmental quality	Polychlorinated biphenyls (PCBs)	Chemical	
			Organophosphate Biocides		
			Organochlorine Biocides		
			Other Synthetic Biocides		
			Other Synthetic Organic Compounds		
			Inorganic Oxidising Agents		
	Heavy metal contamination		Inorganic Reducing Agents	Heavy metals	
	Hydrocarbon contamination		Metals		
	Radionuclide contamination		Oil & Petrochemicals	Oil	
	Changes in nutrient levels		Oil Cleaning Agents		
			Radionuclides		
Nutrients		Nutrients			
Changes in salinity	Changes to water properties	Organic carbon	Red tides		
		Algal toxins			
Changes in oxygenation		Salinity	Salinity		
Biological	Direct changes to trophic structure	Dissolved Oxygen	Oxygen		
		Introduction of microbial pathogens / parasites		Pathogens/parasites/ disease	
		Introduction of non-native species	Addition of biota	Non-native species	
		Extraction of target species	Removal of target biota	Harvesting of species	
Extraction of non-target species			Removal of predators		

4.5. Extending species and biotope sensitivity assessments to the biotope complex, habitat complex and 'lifeform' levels

4.5.1 Introduction

Before discussing an approach to the assessment of the sensitivity of biotope complex, 'lifeforms' and habitat complexes it is necessary to briefly review the similarities and differences of the SensMap and *MarLIN* approaches. The *MarLIN* and SensMap teams met in September 1998 to discuss similarities of approach and the early draft version of the SensMap approach (Cooke & McMath, 2000) was important in the development of the *MarLIN* approach to biotope sensitivity assessment.

Both approaches:

- assume that the sensitivity and recoverability of a biotope are dependant on the sensitivity and recoverability of the component species;
- realise the need to identify species indicative of biotope sensitivity depending on their community importance;
- assess sensitivity (=intolerance) of species to a change in environmental factors and their subsequent recoverability;
- have developed the links between maritime and coastal activities and environmental factors, and
- have developed a systematic and transparent approach to sensitivity assessment.

However:

- SensMap defines sensitivity to mean a combined intolerance and recoverability, while *MarLIN* defines sensitivity *sensu stricto* as the intolerance of a habitat or species to environmental change;
- SensMap gives a numerical score to intolerance and recoverability but *MarLIN* ranks sensitivity (=intolerance) against clear definitions or scales using systematic decision trees;
- SensMap derives an overall score of sensitivity from intolerance and recoverability that is then ranked to derive a rank for mapping;
- *MarLIN* presents sensitivity (=intolerance) and recoverability separately;
- SensMap assesses sensitivity to different levels of impact whereas *MarLIN* adopted standard benchmark levels of impact against which to assess sensitivity;
- SensMap provides the facility to assess the sensitivity to multiple simultaneous environmental factors resultant from an activity to provide an average intolerance and overall sensitivity;
- *MarLIN* provides the facility to search for species or habitats sensitive to changes in environmental factors by activity.

The two approaches are very similar, and the definition of 'sensitivity' (used by *MarLIN*) is essentially synonymous with the definition of 'intolerance' used by SensMap. The most significant difference between the approaches is the use of numerical scores and their subsequent combination using a formula by SensMap.

Numerical scores were not adopted by *MarLIN* because:

- it was felt that scores were essentially qualitative estimates and could not be subject to quantitative analysis, and
- numerical values are prone to inappropriate use by outside agencies.

In addition, the information available on the impact of change of environmental factors is rarely precise enough to apportion sensitivity on more than the three point scale of sensitivity (=intolerance) used by *MarLIN*. The authors consider that the decision tree approach used by *MarLIN* is systematic, transparent and practical.

A simple decision tree is used to determine the overall sensitivity of the biotope from the sensitivities of the species indicative of biotope sensitivity. The decision tree weights the assessment in favour of 'keystone' or

‘important characterizing’ species, which is achieved numerically in the SensMap approach. The decision tree approach also provides flexibility when combining the species sensitivities to derive biotope sensitivities. The sensitivity of a keystone species may vary depending on the habitat and hence biotope being assessed. For example, common mussel beds are likely to be more sensitive to the effects of increased wave action in sheltered, sedimentary biotopes than in deep circalittoral rock biotopes. The *MarLIN* approach allows variation in sensitivity within habitat to be taken into account, while retaining its transparency, since the evidence used to assess sensitivity is presented on-line in the rationale attached to each sensitivity assessment.

A numerical approach may appear to lend itself to automation in a computer-based system but decision trees can also be automated in the form of a table or array (e.g. by using the ‘Select ...Case’ method in Visual Basic).

4.5.2 Combining sensitivity (=intolerance) and recoverability

The *MarLIN* programme uses a *sensu stricto* definition of ‘sensitivity’, while SensMap and other reports use a more broad sense (*sensu lato*) definition. The definition of ‘sensitivity’ that is used in the Marine Stewardship Report (Defra, 2002), and which was developed as part of the Review of Marine Nature Conservation differs from that used in the *MarLIN* programme. The Review of Marine Nature Conservation (see Laffoley *et al.*, 2000) defined ‘sensitivity’ as follows.

"A very sensitive habitat or species is one that is very easily adversely affected by external factors arising from human activities and is expected to recover over a very long period or not at all. A sensitive habitat or species is one that is easily affected by a human activity, and is expected to only recover over a long period."

The JNCC Marine Habitats Team also suggested a single ‘sensitivity’ rank (*sensu lato*) as part of JNCC's advice to OSPAR for the identification of priority species. While the *MarLIN* definition of sensitivity is strictly correct, the broader definition conveys a general level of understanding to a wider audience.

MarLIN realises that for the practical application of sensitivity information in a map-based system, the *MarLIN* sensitivity and recoverability scores must be combined in order to give a single overall assessment of the likely damage to the habitat or species.

The broad definition would require *MarLIN* to combine ‘sensitivity’ (=intolerance) and ‘recoverability’ into a single score. This would have considerable benefits for those involved in environmental protection who do not want too many steps in their interpretation of likely damage to species or biotopes.

MarLIN proposes to adopt the term ‘intolerance’ for the present assessments of sensitivity (*sensu stricto*), and to use the rationale shown in Table 8 to combine ‘intolerance’ and ‘recoverability’ into an overall ‘sensitivity’ rank (*sensu lato*). The rationale used in Table 8 takes into account the fact that, while many sensitive habitats and species that will be adversely affected even destroyed, by an activity or event, such effects ‘matter’ to the continued survival of that feature if it does not have the potential to recover.

Table 8. Combining ‘intolerance’ and ‘recoverability’ to identify ‘sensitivity’.

		Recoverability					
		None	Very low	Low	Moderate	High	Very high / Immediate
Intolerance	High	Extremely High	Very High	High	Medium	Low	Very low
	Intermediate	Very High	High	Medium	Low	Very low	Very low
	Low	High	Medium	Low	Low	Very low	Not sensitive
	Not sensitive	NS	NS	NS	NS	NS	NS

NS = Not sensitive

4.5.3 Assessing sensitivities at the biotope complex, 'liform' and habitat complex levels

The SensMap report (McMath *et al.*, 2000) suggests that following approaches for the derivation of the sensitivity of biotope complexes, 'liform' or habitat complexes.

Where information on the sensitivity of biotopes exists:

- i) a mean sensitivity of a geographically refined list of component biotopes, taking biotope areas into consideration; or
- ii) the highest sensitivity of a geographically refined list of component biotopes can be used.

Alternatively, where no biotope sensitivity information exists:

- iii) the sensitivity of the biotope complex or 'liform' can be derived in the same manner as biotopes themselves, by identification of species indicative of sensitivity.

The first proposal would require an accurate knowledge of the extent of the component biotopes in order to weight the mean sensitivity. The extent of biotopes may change over time. The authors also feel that a mean sensitivity could potentially underestimate sensitivity.

The second proposal agrees with present thinking by *MarLIN*. Reporting the highest sensitivity of the component biotopes is simple and practical but does not detract from the information on the sensitivity of the component biotopes since, in any computer-based system, the information for the derivation of sensitivity is directly available. Reporting the highest or worst-case sensitivity may exaggerate overall sensitivity. But the authors of this report consider that the worst-case scenario fulfils the aims of coastal sensitivity mapping, i.e. to identify or 'flag' potential impacts and areas where special care or management may be required. Reporting the worst case sensitivity can also be applied with equal transparency to all levels of the biotope hierarchy, biotope complex, 'liform' or habitat complex.

In the absence of biotope sensitivity information, it may be possible to assess the sensitivity of biotope complexes based on the sensitivity of their component species (the third proposal). *MarLIN* has researched two biotope complexes, pioneer saltmarsh (LMU.Sm) and muddy sand shores (LMS.MS), as separate entities. However, no species indicative of sensitivity were identified since the biotope complexes encompassed a wide range of biotopes of different community composition. Similarly, the chosen 'represented' (see Appendix 1 for definition) biotopes were grouped by their similarity in species composition ('keystone' and 'important characterizing') as well as by habitat. It was found that while biotopes within a biotope complex shared a similar habitat, they often did not share 'important characterizing' or characterizing species. The difference in the general ecology and species composition of the component biotopes is likely to increase further up the biotope hierarchy, e.g. at the 'liform' or habitat complex level. Therefore, biotope sensitivities are probably the most practical units for the derivation of the sensitivities of biotope complexes, 'liforms', or habitat complexes.

Overall, the authors of this report would like to endorse the second proposal suggested in the SensMap report. The biotope sensitivities determined within the *MarLIN* programme could easily be linked to geographically refined lists of biotopes to produce overall sensitivities. A computer-based mapping system would allow the users to interrogate sensitivity maps of, for example biotope complexes or 'liforms', to display the list of component biotopes and their sensitivities. Where a geographical area contains sensitive biotopes of very limited extent, their sensitivities may be 'flagged' by means of target noting.

The above approach is presently under development by the *MarLIN* programme and is awaiting discussion with our Sensitivity Mapping Advisory Group and ratification by our Biology and Sensitivity Technical Management Group. It should be noted that the UK biotope classification is currently under revision by the Marine Habitats Team at JNCC. The revision may change the distribution of biotopes between biotope complexes so that the third approach may become more viable.

5. Conclusions

The Biology and Sensitivity Key Information Sub-programme of *MarLIN*, under funding by Defra, EN and SNH, has prepared biotope Key Information reviews of 117 important marine benthic habitats in the seas of England and Scotland. In the process, *MarLIN* has prepared species Key Information review on numerous keystone, important characterizing, or representative species. In the context of this report, we have:

- identified a few gaps in our coverage of the present MNCR biotope classification;
- identified a list of keystone or important characterizing species that require additional research;
- developed Key Information reviews of species and biotopes and a subsequent sensitivity assessment rationale that incorporates considerations of spatial, seasonal and temporal factors where information allows;
- demonstrated that the *MarLIN* list of environmental factors include all of the environmental factors addressed by the SensMap programme and the UK Marine SACs project;
- developed an ‘activities to factors’ matrix which addresses the majority of the activities identified by the SensMap programme except activities associated with oil spill clean-up;
- proposed a non numerical approach to the combination of intolerance and recoverability and suggested that biotope sensitivities are the most practical unit for the derivation of the sensitivities of biotope complexes, ‘lifeforms’ and habitat complexes; and
- suggested that when combining biotope sensitivities to derive the sensitivities of higher hierarchical units in the biotope classification, the highest or worst-case sensitivity should be reported, in agreement with the SensMap report.

6. Acknowledgements

The Biology and Sensitivity Key Information Sub-programme was developed under core funding from the Department for Environment, Food and Rural Affairs (Defra), with additional funding directed at biotope research from English Nature (EN) and Scottish Natural Heritage (SN).

About ten other organizations, including CCW, have contributed significant funding to the *MarLIN* programme.

7. References

- Brazier, D.P. & Connor, D.W. (2nd edn.), 1999. Relationship between Annex I marine habitats of the EC Habitats Directive and the MNCR BioMar marine biotope classification. *Joint Nature Conservation Committee, Peterborough*. [JNCC Marine Information Notes, no. 8].
- Cooke, A., & McMath, M., 2000. SENS MAP: Development of a protocol for assessing and mapping the sensitivity of marine species and benthos to maritime activities. *Countryside Council for Wales, Bangor, CCW Marine Report: 98/6/1*, (2000, Working draft).
- Connor, D.W. & Hill, T.O., 1998. *Marine Nature Conservation Review natural heritage assessment protocol*. Version 98.01. (Unpublished report.) Peterborough: Joint Nature Conservation Committee.
- Connor, D.W., Brazier, D.P., Hill, T.O., & Northen, K.O., 1997a. Marine Nature Conservation Review: marine biotope classification for Britain and Ireland. Volume 1. Littoral biotopes. Version 97.06. *Joint Nature Conservation Committee, Peterborough, JNCC Report*, no. 229.
- Connor, D.W., Dalkin, M.J., Hill, T.O., Holt, R.H.F. & Sanderson, W.G., 1997b. Marine Nature Conservation Review: marine biotope classification for Britain and Ireland. Volume 2. Sub-littoral biotopes. Version 97.06. *Joint Nature Conservation Committee, Peterborough, JNCC Report*, no. 230.
- Crisp, D.J. (ed.), 1964. The effects of the severe winter of 1962-63 on marine life in Britain. *Journal of Animal Ecology*, **33**, 165-210.
- Defra (Department for Environment, Food and Rural affairs), 2002. *Safeguarding our seas. A strategy for the conservation and sustainable development of our marine environment*. London: Department for Environment, Food and Rural affairs.
- Eno, N.C., 1991. *Marine Conservation Handbook*, 2nd ed. Peterborough: English Nature.
- Hiscock, K., Jackson, A. & Lear, D., 1999. Assessing seabed species and ecosystem sensitivities: existing approaches and development. *Report to the Department of Environment, Transport and the Regions for the Marine Life Information Network (MarLIN), Marine Biological Association of the United Kingdom, Plymouth*. [MarLIN Report no. 1., June 2001 edition.]
- Hiscock, S. 1986. Skomer Marine Nature Reserve subtidal monitoring project. Algal results. August 1984 to February 1986. *Nature Conservancy Council, Peterborough, CSD Report* no. 620.
- Howson, C.M. & Picton, B.E., (ed.) 1997. *The species directory of the marine fauna and flora of the British Isles and surrounding seas*. Belfast and Ross-on-Wye: Ulster Museum and Marine Conservation Society.
- Jones, L.A., Hiscock, K. & Connor, D.W., 2000. Marine habitat reviews. A summary of ecological requirements and sensitivity characteristics for the conservation and management of marine SACs. *Joint Nature Conservation Committee, Peterborough. (UK Marine SACs Project Report)*.
- Laffoley, D.A., Connor, D.W., Tasker, M.L. & Bines, T., 2000. *Nationally important seascapes, habitats and species. A recommended approach to their identification, conservation and protection*. pp. 17. Peterborough: English Nature.
- McFadden, C.S., 1999. Genetic and taxonomic relationships among northeastern Atlantic and Mediterranean populations of the soft coral *Alcyonium corallioides*. *Marine Biology*, **133**, 171-184.
- McMath, A., Cooke, A., Jones, M., Emblow, C.S., Wyn, G., Roberts, S., Costello, M.J., Cook, B. & Sides, E.M., 2000. Sensitivity mapping of inshore marine biotopes in the southern Irish Sea (SensMap): Final report. *Report by the Countryside Council for Wales (CCW), Ecological Consultancy Services Ltd*

(Ecoserve), *Dúchas, the Heritage Service*, 116 pp. [Maritime Ireland /Wales INTERREG Reference no. 21014001].

Tyler-Walters, H. & Jackson, A., 1999. Assessing seabed species and ecosystems sensitivities. Rationale and user guide. *Report to the Department of the Environment Transport and the Regions from the Marine Life Information Network (MarLIN), Marine Biological Association of the United Kingdom, Plymouth.* [MarLIN Report no. 4, June 2001 edition.]

Tyler-Walters, H., Hiscock, K., Lear, D.B. & Jackson, A., 2001. Identifying species and ecosystem sensitivities. *Report to the Department for Environment, Food and Rural Affairs from the Marine Life Information Network (MarLIN), Marine Biological Association of the United Kingdom, Plymouth.* Contract CW0826. [Final Report.]

UK Biodiversity Group, 1998. *UK Biodiversity Group Tranche 2 Action Plans - vol. V: maritime species and habitats.* Peterborough: English Nature.

Appendix 1. *MarLIN* Biology and Sensitivity Key Information reviews – priority and terminology.**Introduction**

The full (as opposed to the much briefer ‘basic’) Biology and Sensitivity Key Information reviews (hereafter “full Key Information” reviews when referring to those for species and/or biotopes) are designed to be read by a wide audience, from environmental managers and nature conservation agency staff to marine scientists and members of the public. Therefore, the writing style was kept concise, yet accurate and the text kept to a minimum. To ensure that the Key Information reviews were unambiguous and understandable by a wide audience all specific terms used were defined in pop-up on-line glossaries. A full glossary of scientific terms was also provided on-line. The following design constraints should be noted:

- the Key Information reviews were designed to support environmental management and protection;
- the reviews target the ‘Key Information’ required to assess the sensitivity and recoverability of a species or biotope to environmental perturbation;
- the reviews are based on available scientific information, collated by the *MarLIN* team using the resources of the National Marine Biological Library at Plymouth;
- the reviews use defined categories (Key Information fields, words or terms with associated on-line glossaries) to produce concise, targeted information;
- although concise and key worded, the quality and accuracy of the information was paramount;
- all references made in the text are listed, in short format, at the bottom of each page and the full reference is displayed on the Web site via a pop-up browser window or in the on-line bibliography;
- the Key Information reviews are made available to a wide audience through the World Wide Web and were, therefore, designed to be viewed on the Web site, however
- the reviews are not designed to be complete scientific monographs on the species or biotope concerned.

The Key Information collated for species differed from that collated for biotopes, with a greater emphasis on the ecology and community function in the biotope reviews. Therefore, reviews of the biology and sensitivity of species (hereafter ‘species Key Information reviews’) and biotopes (hereafter ‘biotope Key Information reviews’) differ in their information content.

Species Key Information fields

The species Key Information reviews addressed the following subject areas:

- basic information;
- taxonomy and identification;
- general biology (adult and larval/juvenile);
- habitat preferences and distribution;
- reproduction and longevity;
- sensitivity and recoverability, and
- marine natural heritage importance.

In addition ‘basic information’ reviews were compiled for species to compliment the biotope Key Information reviews, for species of conservation concern (e.g. rare and scarce or BAP species), for species exemplary of major benthic marine invertebrate groups, species characteristic of marine habitats, or for educational reasons. Where there was inadequate time or information to complete a full Key Information review of an important characterizing, representative or keystone species, basic information was prepared.

Species Basic Information provides:

- species and common names;
- an image (where available);
- taxonomy (phylum and class);
- recorded distribution in the Britain and Ireland;
- habitat;
- description;
- additional information, including important characteristics that distinguish the species from similar species, and
- marine natural heritage importance, i.e. why the species ‘matters’.

Biotope Key Information fields

The biotope Key Information reviews addressed the following subject areas:

- basic information;
- biotope classification;
- ecological relationships;
- seasonal and longer term changes;
- habitat complexity;
- productivity;
- recruitment processes;
- time for community to reach maturity;
- habitat preferences and distribution;
- species composition;
- sensitivity and recoverability, and
- marine natural heritage importance.

Where relevant, the biotope Key Information review links directly to the Marine Environmental Resource Mapping and Information Database (MERMAID).

Prioritization

Priority was given to marine habitats, biotopes and species that:

- the UK Government has management responsibilities or obligations for under international conventions and directives including protected species and BAP listed species;
- have been identified in European workshops as threatened or requiring documentation;
- are subject to national regulations;
- contribute to national nature conservation initiatives;
- are surrogates for the condition of other habitats, biotopes or species;
- are indicators of threatening processes;
- are at high risk of impact due to their sensitivity or vulnerability, or
- are nationally rare or scarce, and
- are ‘keystone’ or characteristic species of a habitat or biotope.

Species

The *MarLIN* programme has focussed research on marine benthic species. Commercially exploited and other pelagic fish species were the subject of sensitivity research by the Centre for Environment, Fisheries and Aquaculture Science and the Fisheries Research Services of the Scottish Executive. Similarly, seabirds were already the subject of significant studies into their sensitivity, especially to oil spills.

Over 8,500 marine species have been recorded around the seas of the British Isles and Ireland (Howson & Picton, 1997). It was obvious that such a large number of species could not be researched. Therefore, it was decided to prioritize species research.

Full Key Information reviews were restricted to high priority species, i.e. species known to be in decline, at high risk of environmental impact, protected under several conventions or statutes, ‘keystone’, and representative or characteristic of a habitat or biotope. The list of species to be researched was derived using the priorities listed in Table App.1/1.

Table App.1/1. Criteria used to identify priority species for Biology and Sensitivity Key Information research.

Priority	Reason for inclusion	
1	Listed under National legislation, in one of the Annexes to the Habitats Directive, a keystone, representative or characteristic species of a Habitats Directive Annex I habitat, a UK Biodiversity Action Plan species or species included within Habitats Action Plans, or species listed as Critical, Endangered, Vulnerable or at Low Risk under the IUCN Red list of Threatened Animals	
2	‘Keystone’	‘Keystone’ species. (A species that, through its predatory activities or by mediating competition between prey species maintains community composition and structure. The term is also applied here to species which provide a distinctive habitat and whose loss would therefore lead to the disappearance of the associated community.)
2	Representative	Representative of species in a biotope, i.e. a surrogate for biotope sensitivity, includes characterizing species and exemplary species.
3	Exploited	Commercially important species
3	Indicator	Species indicative of threatening activities.
4	Rare or scarce	Nationally rare or scarce
5	Non-native	Alien or non-native species
6	Climate change	Species likely to change distribution due to climate change
R	Research	Species or group of species important in trial research, e.g. cephalopods.
E	Education	Commonly known or encountered species.

In biotope Key Information research, species may be chosen to ‘represent’ the sensitivity of a benthic marine invertebrate group. For example, the bryozoans *Bugula turbinata* and *Flustra foliacea* may be used to ‘represent’ the sensitivity of erect bryozoans in the absence of other species research, and would be considered ‘exemplary’ species in this context.

Species indicative of biotope sensitivity

The *MarLIN* and SensMap approach to biotope sensitivity assessment both assume that the biotope sensitivity is dependent on the sensitivity of the biotope’s component species. In addition, both approaches identify species from which to derive (or indicate) biotope sensitivity. The *MarLIN* and SensMap teams met in September 1998 to discuss similarities of approach and the early draft version of the SensMap approach

(Cooke & McMath, 2000) was important in the development of the *MarLIN* approach to biotope sensitivity assessment.

Both approaches identify, ‘keystone structural’, ‘keystone functional’, and ‘important characterizing’ species. In addition, *MarLIN* includes ‘important structural’, ‘important functional’ and ‘important other’ species. *MarLIN* definitions are shown in Table App.1/2. A detailed explanation is provided in McMath *et al.* (2000) and Tyler-Walters *et al.* (2001).

Table App.1/2. Selection criteria for species used to indicate sensitivity. The criteria are used to decide which species best represent the sensitivity of a biotope or community as a whole.

	Species used to indicate sensitivity
Rank	Criteria
Key structural	The species provides a distinct habitat that supports an associated community. Loss/degradation of this species population would result in loss/degradation of the associated community.
Key functional	The species maintains community structure and function through interactions with other members of that community (for example, predation, grazing, and competition). Loss/degradation of this species population would result in rapid, cascading changes in the community.
Important characterizing	The species is/are characteristic of the biotope (dominant, highly faithful and frequent) and are important for the classification of that biotope. Loss/degradation of these species populations could result in loss of that biotope.
Important structural	The species positively interacts with the key or characteristic species and is important for their viability. Loss/degradation of these species would likely reduce the viability of the key or characteristic species. For example, these species may prey on parasites, epiphytes or disease organisms of the key or characteristic species.
Important functional	The species is/are the dominant source of organic matter or primary production within the ecosystem. Loss/ degradation of these species could result in changes in the community function and structure.
Important other	Additional species that do not fall under the above criteria but where present knowledge of the ecology of the community suggests they may affect the sensitivity of the community.

In the majority of cases, several species indicative of sensitivity were identified, and researched together with the biotope Key Information. In a small number of cases, no additional species research was carried out for a biotope, usually because there was inadequate information on the species required to complete a full Key Information review. In which case basic information alone was prepared and relevant information of the biology or ecology of the species included in the biotope Key Information review.

In a few cases, biotope Key Information reviews were prepared based on the biotope complex as a whole, for example, LMS.MS and LMU.Sm, because the biotope complexes encompassed several different biotopes and it was inappropriate to identify species indicative of sensitivity. In a minority of cases no additional species research was carried out because of time constraints (see below) and relevant information written into the biotope Key Information review. For example, full species Key Information reviews of the common reed *Phragmites australis* and common saltmarsh grass *Potamogeton pectinatus* were not prepared for their relevant biotopes (IMU.NVC S4 and IMU.NVC A12 respectively) since the relevant literature was extensive and outside the expertise of the *MarLIN* team.

Priority biotopes

The MNCR biotope classification (Connor *et al.*, 1997a, b) identifies over 270 separate biotopes, 370 if sub-biotopes are included. Therefore, it was obvious that not all of the biotopes listed by Connor *et al.* (1997a, b) could be completed within the time available for the contract. Therefore, priority was given to important biotope complexes, biotopes and species included in the interest features of Annex I habitats of the Habitats Directive, or within the UK Biodiversity Action Plan of the seas around England and Scotland. A preliminary list of important biotopes was provided by EN and SNH but this list was still extensive.

Representative biotopes

In order to produce an achievable list of biotopes for research, a sub-set of 120 biotopes was identified by the MarLIN team to 'represent' the sensitivity of other biotopes. A biotope was chosen as 'representative' of one of more other biotopes if the 'representative' biotope:

- occurred in similar habitats;
- was populated by similar functional groups of organisms, and
- was populated by the same (or functionally similar) species indicative of sensitivity as the biotope(s) they were chosen to represent.

The 'representative' biotopes were researched as single entities. The list of biotopes represented by the researched biotope is clearly shown on the biotope Key Information Web pages.

Full Key Information review status

The Key Information reviews are subject to internal quality control procedures (see Tyler-Walters *et al.*, 2001). Reviews are prepared by the data research staff and edited by Dr Keith Hiscock, Programme Director before they are corrected and placed on-line. The Programme Directors' Key Information reviews are edited by the Senior Data Researcher. Key Information reviews are placed on-line in this 'draft' form, ready to be sent to one and occasionally two referees. The Web pages clearly state that 'This information is not refereed'. Reviews are then updated in light of the referees comments. The referee is identified on the final version of the Key Information review.

The 'review status' in the Tables and Appendices included in this report indicates the reviews' stage in the quality control procedures as follows:

- 'Signed-off and on-line' - the review has been signed-off by Dr Hiscock (or Dr Tyler-Walters), the comments addressed, and the draft review has been placed on-line;
- 'With referee' - the signed-off review has been sent to a referee;
- 'Refereed' - referees comments have been received, acknowledged and filed but not yet addressed; and
- 'Refereed and updated' - the referees changes and comments have been addressed, checked, and the referees name indicated on the revised, final on-line copy.

Appendix 2a. Key Information reviews completed by MarLIN. Priority 1 species, designated or listed under statute or convention.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Tentacled lagoon worm	<i>Alkmaria romijni</i>	1,4	*	*					Scarce	None	Refereed
Sea fan anemone	<i>Amphianthus dohrnii</i>	1,6	*						Rare	None	Complete
Lagoon sandworm	<i>Armandia cirrhosa</i>	1,4	*	*					Rare	None	Refereed
Knotted wrack	<i>Ascophyllum nodosum</i> (*)	1,2	*	*					Widespread	None	Refereed
Fan Mussel	<i>Atrina fragilis</i>	1,6	*	*		*			Scarce	None	Refereed
DeFolin's lagoon snail	<i>Caecum armoricum</i>	1,4	*	*					Rare	Insufficiently known	Refereed
A hydroid	<i>Clavopsella navis</i>	1,4	*	*					Rare	None	Refereed
Edible sea urchin	<i>Echinus esculentus</i>	1,2				*			Widespread	Lower Risk (LR/nt)	Refereed
Ivell's sea anemone	<i>Edwardsia ivelli</i>	1,4	*	*					Rare	Data deficient	Complete
Pink sea fan	<i>Eunicella verrucosa</i>	1,6	*	*					Uncommon	Vulnerable (VU A1d).	Complete
The tall sea pen	<i>Funiculina quadrangularis</i>	1	*						Not available	None	Complete
Lagoon sand shrimp	<i>Gammarus insensibilis</i>	1,4	*	*					Scarce	None	Refereed
Giant goby	<i>Gobius cobitis</i>	1,4		*					Rare	None	Complete
Couch's goby	<i>Gobius couchi</i>	1,4		*					Rare	None	Complete
Sunset cup coral	<i>Leptopsammia pruvoti</i>	1,4,6	*						Rare	None	Complete
Maerl	<i>Lithothamnion corallioides</i>	1,2	*		*				Not available	None	Refereed
Maerl	<i>Lithothamnion glaciale</i>	1,2	*						Not available	None	Complete
Horse mussel	<i>Modiolus modiolus</i>	1,2,6	*						Not available	None	Basic
Starlet sea anemone	<i>Nematostella vectensis</i>	1,4	*	*					Scarce	Vulnerable (VU A1ce)	Complete
Dog whelk	<i>Nucella lapillus</i>	1,2	*						Not available	None	Complete

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

(* = review includes *Ascophyllum nodosum* ecad *mackaii*)

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2a (continued). Key Information reviews completed by MarLIN. Priority 1 species, designated or listed under statute or convention.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Native oyster	<i>Ostrea edulis</i>	1,2	*						Not available	None	Complete
European spiny lobster	<i>Palinurus elephas</i>	1,3,6	*						Not available	None	Complete
Lagoon snail	<i>Paludinella litorina</i>	1,4	*	*					Rare	None	Refereed
Common piddock	<i>Pholas dactylus</i>	1						*	Not available	None	Refereed
Maerl	<i>Phymatolithon calcareum</i>	1,2,6	*		*				Not available	None	Refereed
Common goby	<i>Pomatoschistus microps</i>	1						*	Widespread	None	Complete
Sand goby	<i>Pomatoschistus minutus</i>	1						*	Widespread	None	Complete
Honeycomb worm	<i>Sabellaria alveolata</i>	1,2	*						Not available	None	Refereed
Ross worm	<i>Sabellaria spinulosa</i>	1,2	*						Not available	None	Refereed
Serpulid tube worm	<i>Serpula vermicularis</i>	1,2	*						Not available	None	Complete
Lagoon sea slug	<i>Tenellia adspersa</i>	1,4	*	*					Rare	None	Refereed
Northern hatchet shell	<i>Thyasira gouldi</i>	1,4	*	*					Rare	None	Complete
Looping snail	<i>Truncatella subcylindrica</i>	1,4	*						Rare	Rare	Refereed
Common eelgrass	<i>Zostera marina</i>	1	*					*	Not available	None	Refereed
Dwarf eelgrass	<i>Zostera noltii</i>	1,4	*						Scarce	None	Complete

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2b. Key Information reviews completed by *MarLIN*. Priority 2 species, keystone, representative or characterizing species.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
A bivalve	<i>Abra alba</i>	2							Widespread	None	Complete
A red seaweed	<i>Ahnfeltia plicata</i>	2							Widespread	None	Complete
Dabberlocks	<i>Alaria esculenta</i>	2							Not available	None	Refereed
Dead men's fingers	<i>Alcyonium digitatum</i>	2							Widespread	None	Refereed
A brittlestar	<i>Amphiura chiajei</i>	2							Not available	None	Complete
A brittlestar	<i>Amphiura filiformis</i>	2							Not available	None	Complete
Rosy feather-star	<i>Antedon bifida</i>	2							Not available	None	Complete
A bristleworm	<i>Aphelochaeta marioni</i>	2							Not available	None	Refereed
Blow lug	<i>Arenicola marina</i>	2							Widespread	None	Refereed
A sea squirt	<i>Ascidella scabra</i>	2							Widespread	None	Complete
Common starfish	<i>Asterias rubens</i>	2							Widespread	None	Refereed
An acorn barnacle	<i>Balanus crenatus</i>	2							Widespread	None	Refereed
An amphipod	<i>Bathyporeia pelagica</i>	2							Not available	None	Complete
Star ascidian	<i>Botryllus schlosseri</i>	2							Widespread	None	Complete
A heart urchin	<i>Brissopsis lyrifera</i>	2							Not available	None	Complete
A bryozoan	<i>Bugula turbinata</i>	2							Not available	None	Complete
A burrowing mud shrimp	<i>Callianassa subterranea</i>	2							Not available	None	Complete
A bristleworm	<i>Capitella capitata</i>	2							Widespread	None	Complete
A red seaweed	<i>Ceramium nodulosum</i>	2							Widespread	None	Complete
Common cockle	<i>Cerastoderma edule</i>	2,3							Widespread	None	Complete
Lagoon cockle	<i>Cerastoderma glaucum</i>	2							Not available	None	Refereed

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2b (continued). Key Information reviews completed by MarLIN. Priority 2 species, keystone, representative or characterizing species.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Carrageen	<i>Chondrus crispus</i>	2							Widespread	None	Complete
Sea lace or Dead man's rope	<i>Chorda filum</i>	2							Not available	None	Complete
Montagu's stellate barnacle	<i>Chthamalus montagui</i>	2							Widespread	None	Complete
Poli's stellate barnacle	<i>Chthamalus stellatus</i>	2							Widespread	None	Complete
A sea squirt	<i>Ciona intestinalis</i>	2							Not available	None	Refereed
A green seaweed	<i>Cladophora rupestris</i>	2							Not available	None	Complete
Light bulb sea squirt	<i>Clavelina lepadiformis</i>	2							Widespread	None	Complete
A bryozoan	<i>Conopeum reticulum</i>	2							Not available	None	Complete and
Coral weed	<i>Corallina officinalis</i>	2							Widespread	None	Refereed
A hydroid	<i>Cordylophora caspia</i>	2							Not available	None	Complete and
Slipper limpet	<i>Crepidula fornicata</i>	2,5							Not available	None	Refereed
Sea beech	<i>Delesseria sanguinea</i>	2							Widespread	None	Complete
Sea potato	<i>Echinocardium cordatum</i>	2							Not available	None	Refereed
A sea mat	<i>Electra pilosa</i>	2							Not available	None	Complete
Razor shell	<i>Ensis spp.</i>	2							Not available	None	Complete
Gut weed	<i>Enteromorpha intestinalis</i>	2							Common	None	Complete and
An isopod	<i>Eurydice pulchra</i>	2							Not available	None	Complete and
A bivalve	<i>Fabulina fabula</i>	2							Widespread	None	Complete and
Hornwrack	<i>Flustra foliacea</i>	2							Not available	None	Complete and
Horned wrack	<i>Fucus ceranoides</i>	2							Not available	None	Refereed
A brown seaweed	<i>Fucus distichus</i>	2							Not available	None	Refereed

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2b (continued). Key Information reviews completed by MarLIN. Priority 2 species, keystone, representative or characterizing species.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Toothed wrack	<i>Fucus serratus</i>	2							Not available	None	Refereed
Spiral wrack	<i>Fucus spiralis</i>	2							Not available	None	Refereed
Bladder wrack	<i>Fucus vesiculosus</i>	2							Widespread	None	Complete
A red seaweed	<i>Furcellaria lumbricalis</i>	2							Not available	None	Complete and
A gammarid shrimp	<i>Gammarus salinus</i>	2							Not available	None	Complete and
Bowerbank's halichondria	<i>Halichondria bowerbanki</i>	2							Not available	None	Complete and
Breadcrumb sponge	<i>Halichondria panicea</i>	2							Not available	None	Complete
Sea oak	<i>Halidrys siliquosa</i>	2							Not available	None	Complete
Ragworm	<i>Hediste diversicolor</i>	2							Widespread	None	Complete
Blue – rayed limpet	<i>Helcion pellucidum</i>	2							Not available	None	Refereed
Sea thong	<i>Himantalia elongata</i>	2							Not available	None	Refereed
An amphipod	<i>Hyale prevostii</i>	2							Not available	None	Refereed
Laver spire shell	<i>Hydrobia ulvae</i>	2							Not available	None	Refereed
An amphipod	<i>Jassa falcata</i>	2							Not available	None	Refereed
Banded chink shell	<i>Lacuna vincta</i>	2							Not available	None	Refereed
Oarweed	<i>Laminaria digitata</i>	2							Widespread	None	Complete
Tangle or cuvie	<i>Laminaria hyperborea</i>	2							Widespread	None	Complete
Oarweed	<i>Laminaria saccharina</i>	2							Widespread	None	Complete
Sand mason	<i>Lanice conchilega</i>	2							Not available	None	Complete and
Harbour crab	<i>Liocarcinus depurator</i>	2							Not available	None	Complete

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2b (continued). Key Information reviews completed by MarLIN. Priority 2 species, keystone, representative or characterizing species.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Encrusting corallines	<i>Lithophyllum incrustans</i>	2							Widespread	None	Complete
Common periwinkle	<i>Littorina littorea</i>	2							Widespread	None	Complete
Baltic tellin	<i>Macoma balthica</i>	2							Widespread	None	Refereed and
A bristleworm	<i>Magelona mirabilis</i>	2,3							Widespread	None	Refereed
Plumose anemone	<i>Metridium senile</i>	2							Widespread	None	Complete and
Sea grapes	<i>Molgula manhattensis</i>	2							Widespread	None	Complete and
A colonial tunicate	<i>Morchellium argus</i>	2							Not available	None	Complete
Sand gaper	<i>Mya arenaria</i>	2							Widespread	None	Refereed
Common mussel	<i>Mytilus edulis</i>	2,3							Widespread	None	Complete
A hydroid	<i>Nemertesia ramosa</i>	2							Not available	None	Complete
A brachiopod	<i>Neocrania anomala</i>	2							Not available	None	Complete
An opossum shrimp	<i>Neomysis integer</i>	2							Not available	None	Complete and
Gravel sea cucumber	<i>Neopentadactyla mixta</i>	2							Not available	None	Refereed
A catworm	<i>Nephtys hombergii</i>	2							Not available	None	Complete
Common brittlestar	<i>Ophiothrix fragilis</i>	2							Not available	None	Complete
Dulse	<i>Palmaria palmata</i>	2,3							Widespread	None	Refereed
Common limpet	<i>Patella vulgata</i>	2							Widespread	None	Refereed
Channelled wrack	<i>Pelvetia canaliculata</i>	2							Not available	None	Refereed
Ross	<i>Pentapora fascialis</i>	2							Not available	None	Refereed
A sea slug	<i>Philine aperta</i>	2							Not available	None	Complete

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2b (continued). Key Information reviews completed by *MarLIN*. Priority 2 species, keystone, representative or characterizing species.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Long-clawed porcelain crab	<i>Pisidia longicornis</i>	2							Widespread	None	Complete
A bristleworm	<i>Polydora ciliata</i>	2							Not available	None	Complete
Sealoch anemone	<i>Protanthea simplex</i>	2							Not available	None	Complete
Green sea urchin	<i>Psammechinus miliaris</i>	2							Not available	None	Complete
A red seaweed	<i>Rhodothamniella floridula</i>	2							Uncommon	None	Complete
Furbelows	<i>Saccorhiza polyschides</i>	2							Not available	None	Complete
An acorn barnacle	<i>Semibalanus balanoides</i>	2							Widespread	None	Refereed
A bristleworm	<i>Spio filicornis</i>	2							Not available	None	Complete
A bristleworm	<i>Spiophanes bombyx</i>	2							Not available	None	Complete
A sand hopper	<i>Talitrus saltator</i>	2							Widespread	None	Complete
An encrusting bryozoan	<i>Umbonula littoralis</i>	2							Widespread	None	Refereed
Dahlia anemone	<i>Urticina felina</i>	2							Widespread	None	Complete
Pullet carpet shell	<i>Venerupis senegalensis</i>	2							Not available	None	Complete
A sea pen	<i>Virgularia mirabilis</i>	2							Not available	None	Complete

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2c. Key Information reviews completed by MarLIN. Research only species.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Little squid	<i>Alloteuthis media</i>	R							Not available	None	Complete
European common squid	<i>Alloteuthis subulata</i>	R							Not available	None	Complete
North Atlantic octopus	<i>Bathypolypus arcticus</i>	R							Not available	None	Complete
Curled octopus	<i>Eledone cirrhosa</i>	R							Not available	None	Complete
Bloody Henry starfish	<i>Henricia oculata</i>	R							Not available	None	Refereed
Broadtail shortfin squid	<i>Illex coindetii</i>	R							Not available	None	Complete
Long finned squid	<i>Loligo forbesii</i>	R							Not available	None	Complete
Common squid	<i>Loligo vulgaris</i>	R							Not available	None	Complete
Common octopus	<i>Octopus vulgaris</i>	R							Not available	None	Complete
Stout bobtail	<i>Rossia macrosoma</i>	R							Not available	None	Complete
Elegant cuttlefish	<i>Sepia elegans</i>	R							Not available	None	Complete
Common cuttlefish	<i>Sepia officinalis</i>	R							Not available	None	Complete
Pink cuttlefish	<i>Sepia orbigniana</i>	R							Not available	None	Complete
Common bobtail	<i>Sepietta oweniana</i>	R							Not available	None	Complete
Little cuttlefish	<i>Sepiola atlantica</i>	R							Not available	None	Complete
Dwarf bobtail	<i>Sepiola rondeletii</i>	R							Not available	None	Complete
Lesser flying squid	<i>Todaropsis eblanae</i>	R							Not available	None	Complete

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2d. Basic information researched by MarLIN. Priority 1 species, designated or listed under statute or convention.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Trumpet anemone	<i>Aiptasia mutabilis</i>	1,4	*						Scarce	None	Basic
Red sea fingers	<i>Alcyonium glomeratum</i>	1,6	*						Not available	None	Basic
A red seaweed	<i>Anotrichium barbatum</i>	1,4	*						Rare	None	Basic
Scarlet and gold star coral	<i>Balanophyllia regia</i>	1,6	*				*	*	Scarce	None	Basic
Southern cup coral	<i>Caryophyllia inornata</i>	1,4					*		Rare	None	Basic
Devonshire cup-coral	<i>Caryophyllia smithii</i>	1,2,4	*				*		Not available	None	Basic
Basking shark	<i>Cetorhinus maximus</i>	1	*	*			*		Not available	Vulnerable	Basic
Leatherback turtle	<i>Dermochelys coriacea</i>	1	*	*	*		*	*	Not available	Critically Endangered	Basic
Skate	<i>Dipturus batis</i>	1	*						Not available	Endangered	Basic
Carpet coral	<i>Hoplangia durotrix</i>	1,4					*		Rare	None	Basic
Foxtail stonewort	<i>Lamprothamnium papulosum</i>	1,2,4		*					Scarce	Vulnerable	Basic
A cold water coral	<i>Lophelia pertusa</i>	1,2	*		*		*		Not available	None	Basic
Killer whale	<i>Orcinus orca</i>	1	*	*	*	*		*	Not available	Lower risk (LR/cd)	Basic
Fireworks anemone	<i>Pachycerianthus multiplicatus</i>	1,4	*						Scarce	None	Basic
Purple sea urchin	<i>Paracentrotus lividus</i>	1,3,4,6	*						Scarce	None	Basic
Cluster anemone	<i>Parazoanthus anguicomus</i>	1	*						Not available	None	Basic
Yellow cluster anemone	<i>Parazoanthus axinellae</i>	1,4	*						Scarce	None	Basic
Harbour porpoise	<i>Phocoena phocoena</i>	1	*	*	*	*	*	*	Not available	Insufficiently known	Basic
Common reed	<i>Phragmites australis</i>	1,2	*						Widespread	None	Basic

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2d (continued). Basic information researched by *MarLIN*. Priority 1 species, designated or listed under statute or convention.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Worm anemone	<i>Scolanthus callimorphus</i>	1,4	*						Rare	None	Basic
Northern sea urchin	<i>Strongylocentrotus droebachiensis</i>	1,4,6	*						Rare	None	Basic
A sea squirt	<i>Styela gelatinosa</i>	1	*						Not available	None	Basic
Bottle-nosed dolphin	<i>Tursiops truncatus</i>	1	*	*	*	*	*		Not available	Data deficient	Basic
Trembling sea mat	<i>Victorella pavida</i>	1,4	*	*					Rare	None	Basic

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2e. Basic information researched by *MarLIN*. Priority 2 species, keystone, representative or characterizing species.

Common Name	Scientific name	Priority	UK BAP	W&CAct	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Beadlet anemone	<i>Actinia equina</i>	2							Widespread	None	Basic
A bryozoan	<i>Alcyonidium diaphanum</i>	2							Not available	None	Basic
An amphipod	<i>Ampelisca brevicornis</i>	2							Not available	None	Basic
Wolf fish or Catfish	<i>Anarhichas lupus</i>	2,6							Not available	None	Basic
Snakelocks anemone	<i>Anemonia viridis</i>	2							Widespread	None	Basic
Icelandic cyprine	<i>Arctica islandia</i>	2							Not available	None	Basic
A sea squirt	<i>Asciidiella aspersa</i>	2							Not available	None	Basic
A bivalve	<i>Astarte sulcata</i>	2							Not available	None	Basic
A cushion star	<i>Asterina gibbosa</i>	2							Widespread	None	Basic
A branching sponge	<i>Axinella dissimilis</i>	2							Not available	None	Basic
A barnacle	<i>Balanus perforatus</i>	2,6							Not available	None	Basic
White Piddock	<i>Barnea candida</i>	2							Not available	None	Basic
A brown seaweed	<i>Bifurcaria bifurcata</i>	2,6							Not available	None	Basic
A green seaweed	<i>Blidingia minima</i>	2							Not available	None	Basic
A colonial sea squirt	<i>Botrylloides leachi</i>	2							Not available	None	Basic
Common whelk	<i>Buccinum undatum</i>	2							Widespread	None	Basic
A bryozoan	<i>Bugula flabellata</i>	2							Not available	None	Basic
Painted top shell	<i>Calliostoma zizyphinum</i>	2							Not available	None	Basic
A lichen	<i>Caloplaca marina</i>	2							Not available	None	Basic
Edible crab	<i>Cancer pagurus</i>	2							Not available	None	Basic
Common shore crab	<i>Carcinus maenas</i>	2							Not available	None	Basic
Daisy Anemone	<i>Cereus pedunculatus</i>	2							Not available	None	Basic
A tube anemone	<i>Cerianthus lloydii</i>	2							Not available	None	Basic

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2e (continued). Basic information researched by MarLIN. Priority 2 species, keystone, representative or characterizing species.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
A tube worm	<i>Chaetopterus variopedatus</i>	2							Not available	None	Basic
A bristleworm	<i>Cirratulus cirratus</i>	2							Not available	None	Basic
Club-headed hydroid	<i>Clava multicornis</i>	2							Not available	None	Basic
Velvet horn	<i>Codium tomentosum</i>	2							Not available	None	Basic
Basket shell	<i>Corbula gibba</i>	2							Not available	None	Basic
An amphipod	<i>Corophium volutator</i>	2							Not available	None	Basic
Jewel anemone	<i>Corynactis viridis</i>	2,6							Not available	None	Basic
Masked crab	<i>Corystes cassivelaunus</i>	2							Not available	None	Basic
Common sun star	<i>Crossaster papposus</i>	2							Not available	None	Basic
A red seaweed	<i>Cryptopleura ramosa</i>	2							Not available	None	Basic
Baked bean ascidian	<i>Dendrodoa grossularia</i>	2							Not available	None	Basic
A brown seaweed	<i>Dictyopteris membranacea</i>	2,6							Not available	None	Basic
Lesser gooseberry sea squirt	<i>Distomus variolosus</i>	2							Not available	None	Basic
A red seaweed	<i>Drachiella spectabilis</i>	2							Not available	None	Basic
A sea mat	<i>Electra crustulenta</i>	2							Not available	None	Basic
A bristleworm	<i>Eteone longa</i>	2							Not available	None	Basic
A bryozoan	<i>Eucratea loricata</i>	2							Not available	None	Basic
Green-leaf worm	<i>Eulalia viridis</i>	2							Not available	None	Basic
Grey top shell	<i>Gibbula cineraria</i>	2							Not available	None	Basic
Flat top shell	<i>Gibbula umbilicalis</i>	2							Not available	None	Basic
Angular crab	<i>Goneplax rhomboides</i>	2							Not available	None	Basic

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2e (continued). Basic information researched by MarLIN. Priority 2 species, keystone, representative or characterizing species.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
A hydroid	<i>Hartlaubella gelatinosa</i>	2,4							Rare	None	Basic
Great spider crab	<i>Hyas araneus</i>	2							Not available	None	Basic
A hydroid	<i>Kirchenpaueria pinnata</i>	2							Not available	None	Basic
A sea cucumber	<i>Labidoplax media</i>	2							Not available	None	Basic
A bristleworm	<i>Lagis koreni</i>	2							Not available	None	Basic
A lichen	<i>Lichina pygmaea</i>	2							Not available	None	Basic
Common sea slater	<i>Ligia oceanica</i>	2							Not available	None	Basic
Gaping file shell	<i>Limaria hians</i>	2							Not available	None	Basic
Rough periwinkle	<i>Littorina saxatilis</i>	2							Not available	None	Basic
A red seaweed	<i>Lomentaria articulata</i>	2							Not available	None	Basic
A starfish	<i>Luidia ciliaris</i>	2							Not available	None	Basic
A fanworm	<i>Manayunkia aestuarina</i>	2							Not available	None	Basic
Spiny starfish	<i>Marthasterias glacialis</i>	2							Not available	None	Basic
A red seaweed	<i>Mastocarpus stellatus</i>	2							Not available	None	Basic
Small periwinkle	<i>Meloharphe neritoides</i>	2							Not available	None	Basic
Rugose squat lobster	<i>Munida rugosa</i>	2,3							Not available	None	Basic
Green crenella	<i>Musculus discors</i>	2							Widespread	None	Basic
Blunt gaper	<i>Mya truncata</i>	2							Not available	None	Basic
A fanworm	<i>Myxicola infundibulum</i>	2							Not available	None	Basic
Velvet fiddler crab	<i>Necora puber</i>	2,3							Not available	None	Basic
Sea beard	<i>Nemertesia antennina</i>	2							Not available	None	Basic
Norway lobster	<i>Nephrops norvegicus</i>	2,3							Not available	None	Basic

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2e (continued). Basic information researched by *MarLIN*. Priority 2 species, keystone, representative or characterizing species.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
A catworm	<i>Nephtys incisa</i>	2							Not available	None	Basic
A bristle worm	<i>Notomastus latericeus</i>	2							Not available	None	Basic
A bivalve	<i>Nucula nitidosa</i>	2							Not available	None	Basic
A lichen	<i>Ochrolechia parella</i>	2							Not available	None	Basic
A sea cucumber	<i>Ocnus planci</i>	2							Not available	None	Basic
Black brittlestar	<i>Ophiocomina nigra</i>	2							Not available	None	Basic
A brittlestar	<i>Ophiura albida</i>	2							Not available	None	Basic
Thick top shell	<i>Osilinus lineatus</i>	2							Not available	None	Basic
Pepper dulse	<i>Osmundea pinnatifida</i>	2							Not available	None	Basic
A tube worm	<i>Owenia fusiformis</i>	2							Not available	None	Basic
A cockle	<i>Parvicardium ovale</i>	2							Not available	None	Basic
China limpet	<i>Patella ulyssiponensis</i>	2							Not available	None	Basic
Sea gherkin	<i>Pawsonia saxicola</i>	2							Not available	None	Basic
Great scallop	<i>Pecten maximus</i>	2,3							Not available	None	Basic
An amphipod	<i>Pectenogammarus planicrurus</i>	2,4							Scarce	None	Basic
Phosphorescent sea pen	<i>Pennatula phosphorea</i>	2							Not available	None	Basic
American piddock	<i>Petricola pholadiformis</i>	2							Not available	None	Basic
Sea bristletail	<i>Petrobius maritimus</i>	2							Not available	None	Basic
A red seaweed	<i>Phycodrys rubens</i>	2							Not available	None	Basic
Flounder	<i>Platichthys flesus</i>	2							Not available	None	Basic
A red seaweed	<i>Polyides rotundus</i>	2							Not available	None	Basic
Fennel pondweed	<i>Potamogeton pectinatus</i>	2							Not available	None	Basic

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2e (continued). Basic information researched by MarLIN. Priority 2 species, keystone, representative or characterizing species.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Common saltmarsh grass	<i>Puccinellia maritima</i>	2							Not available	None	Basic
A bristleworm	<i>Pygospio elegans</i>	2							Not available	None	Basic
Sea ivory	<i>Ramalina siliquosa</i>	2							Not available	None	Basic
Beaked tasselweed	<i>Ruppia maritima</i>	2							Not available	None	Basic
Peacock worm	<i>Sabella pavonina</i>	2							Not available	None	Basic
Wireweed	<i>Sargassum muticum</i>	2,5							Not available	None	Basic
Peppery furrow shell	<i>Scrobicularia plana</i>	2							Not available	None	Basic
A serpulid tubeworm	<i>Spirorbis spirorbis</i>	2							Not available	None	Basic
A bivalve	<i>Spisula elliptica</i>	2							Not available	None	Basic
A sponge	<i>Suberites carnosus</i>	2							Not available	None	Basic
A sponge	<i>Suberites ficus</i>	2							Not available	None	Basic
A sponge	<i>Suberites massa</i>	2							Not available	None	Basic
Northern sea fan	<i>Swiftia pallida</i>	2,6							Not available	None	Basic
Common tortoiseshell limpet	<i>Tectura testudinalis</i>	2,6							Not available	None	Basic
A bivalve	<i>Tellimya ferruginosa</i>	2							Not available	None	Basic
Black shields	<i>Tephromela atra</i>	2							Widespread	None	Basic
Sea lettuce	<i>Ulva lactuca</i>	2							Not available	None	Basic
A lichen	<i>Verrucaria maura</i>	2							Not available	None	Basic
A lichen	<i>Verrucaria mucosa</i>	2							Not available	None	Basic
A lichen	<i>Xanthoria parietina</i>	2							Widespread	None	Basic

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2f. Basic information researched by *MarLIN*. Priority 4 species, nationally rare or scarce species.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Cranch's spider crab	<i>Achaeus cranchii</i>	4							Scarce	None	Basic
A sea slug	<i>Aeolidiella sanguinea</i>	4							Rare	None	Basic
A hydroid	<i>Aglaophenia kirchenpaueri</i>	4							Scarce	None	Basic
A sea slug	<i>Aeolidiella sanguinea</i>	4							Rare	None	Basic
Pink sea fingers	<i>Alcyonium hibernicum</i>	4							Scarce	None	Basic
A spoon worm	<i>Amalosoma eddystonense</i>	4							Scarce	None	Basic
A sea anemone	<i>Anemonactis mazeli</i>	4							Scarce	None	Basic
A sea anemone	<i>Arachnanthus sarsi</i>	4							Rare	None	Basic
A sea slug	<i>Atagema gibba</i>	4							Rare	None	Basic
A sea slug	<i>Caloria elegans</i>	4							Scarce	None	Basic
Latticed corklet	<i>Cataphellia brodricii</i>	4							Scarce	None	Basic
A hermit crab	<i>Clibanarius erythropus</i>	4							Rare	None	Basic
An amphipod	<i>Corophium lacustre</i>	4							Scarce	None	Basic
A sea slug	<i>Doris sticta</i>	4							Scarce	None	Basic
Sponge crab	<i>Dromia personata</i>	4							Scarce	None	Basic
A sea anemone	<i>Edwardsia timida</i>	4							Scarce	None	Basic
A barnacle	<i>Elminius modestus</i>	4							Not available	None	Basic
A sea anemone	<i>Halcampoides elongatus</i>	4							Rare	None	Basic
A sea slug	<i>Hero formosa</i>	4							Scarce	None	Basic

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2f (continued). Basic information researched by *MarLIN*. Priority 4 species, nationally rare or scarce species.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
A hydroid	<i>Laomedea angulata</i>	4							Scarce	None	Basic
A sea anemone	<i>Mesacmaea mitchellii</i>	4							Scarce	None	Basic
A hydroid	<i>Obelia bidentata</i>	4							Rare	None	Basic
Yellow skirt slug	<i>Okenia elegans</i>	4							Scarce	None	Basic
A sea slug	<i>Stiliger bellulus</i>	4							Rare	None	Basic
A hydroid	<i>Tamarisca tamarisca</i>	4							Scarce	None	Basic
A sea slug	<i>Trapania maculata</i>	4							Rare	None	Basic
A sea slug	<i>Trapania pallida</i>	4							Scarce	None	Basic
A sea slug	<i>Tritonia nilsodhneri</i>	4							Scarce	None	Basic
A bryozoan	<i>Turbicellepora magnicostata</i>	4							Rare	None	Basic
Penny weed	<i>Zanardinia prototypus</i>	4							Scarce	None	Basic
A sponge	<i>Adreus fascicularis</i>	4,6							Rare	None	Basic
Glaucus pimplet	<i>Anthopleura thallia</i>	4,6							Scarce	None	Basic
A sea cucumber	<i>Cucumaria frondosa</i>	4,6							Scarce	None	Basic
Blue spot slug	<i>Greilada elegans</i>	4,6							Rare	None	Basic
Peacocks tail	<i>Padina pavonica</i>	4,6							Scarce	None	Basic

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2g. Basic information researched by *MarLIN*. Priority 5, non-native species.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Harpoon weed	<i>Asparagopsis armata</i>	5,6							Not available	None	Basic
Portuguese oyster	<i>Crassostrea gigas</i>	5							Not available	None	Basic
A sea squirt	<i>Perophora japonica</i>	5							Not available	None	Basic

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2h. Basic information researched by MarLIN. Priority 6, species sensitive to climate change.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Gem anemone	<i>Aulactinia verrucosa</i>	6							Not available	None	Basic
Trigger fish	<i>Balistes carolinensis</i>	6							Not available	None	Basic
Deeplet sea anemone	<i>Bolocera tuediae</i>	6							Not available	None	Basic
A brown seaweed	<i>Carpomitra costata</i>	6							Not available	None	Basic
A sponge	<i>Ciocalypta penicillus</i>	6							Not available	None	Basic
Lumpsucker	<i>Cyclopterus lumpus</i>	6							Not available	None	Basic
Bryer's nut crab	<i>Ebalia tumefacta</i>	6							Not available	None	Basic
Red starfish	<i>Echinaster sepositus</i>	6							Not available	None	Basic
Yellow feathers	<i>Gymnangium montagui</i>	6							Not available	None	Basic
Cotton spinner	<i>Holothuria forskali</i>	6							Not available	None	Basic
Arch-fronted swimming crab	<i>Liocarcinus arcuatus</i>	6							Not available	None	Basic
Wrinkled swimming crab	<i>Liocarcinus corrugatus</i>	6							Not available	None	Basic
Northern stone crab	<i>Lithodes maia</i>	6							Not available	None	Basic
A red seaweed	<i>Odonthalia dentata</i>	6							Not available	None	Basic
Bristly crab	<i>Pilumnus hirtellus</i>	6							Not available	None	Basic
Leopard-spotted goby	<i>Thorogobius ephippiatus</i>	6							Not available	None	Basic
Bottle-brush hydroid	<i>Thuiaria thuja</i>	6							Not available	None	Basic
Black faced blenny	<i>Tripterygion delaisi</i>	6							Not available	None	Basic
Montagu's crab	<i>Xantho incisus</i>	6							Not available	None	Basic
John dory	<i>Zeus faber</i>	6							Not available	None	Basic

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2i. Basic information researched by MarLIN. Priority E, species information prepared for educational pages.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Cloak anemone	<i>Adamsia carciniopados</i>	E							Not available	None	Basic
Red speckled anemone	<i>Anthopleura ballii</i>	E							Not available	None	Basic
Sea mouse	<i>Aphrodita aculeata</i>	E							Not available	None	Basic
A crab	<i>Bathynectes longipes</i>	E							Not available	None	Basic
A fanworm	<i>Bispira volutacornis</i>	E							Not available	None	Basic
Parasitic anemone	<i>Calliactis parasitica</i>	E							Not available	None	Basic
A red seaweed	<i>Catenella caespitosa</i>	E							Not available	None	Basic
Rock cook	<i>Centrolabrus exoletus</i>	E							Not available	None	Basic
Goldsinny	<i>Ctenolabrus rupestris</i>	E							Not available	None	Basic
Football sea squirt	<i>Diazona violacea</i>	E							Not available	None	Basic
Lesser weever fish	<i>Echiichthys vipera</i>	E							Not available	None	Basic
A zoanthid sea anemone	<i>Epizoanthus couchii</i>	E							Widespread	None	Basic
A sea anemone	<i>Halcampa chrysanthellum</i>	E							Not available	None	Basic
Herring-bone hydroid	<i>Halecium halecinum</i>	E							Not available	None	Basic
Thick-lipped dogwhelk	<i>Hinia incrassata</i>	E							Not available	None	Basic
Netted dog whelk	<i>Hinia reticulata</i>	E							Not available	None	Basic
Common lobster	<i>Homarus gammarus</i>	E							Not available	None	Basic
A sea anemone	<i>Hormathia coronata</i>	E							Not available	None	Basic
A hydroid	<i>Hydractinia echinata</i>	E							Not available	None	Basic
Ballan wrasse	<i>Labrus bergylta</i>	E							Not available	None	Basic

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2i (continued). Basic information researched by MarLIN. Priority E, species information prepared for educational pages.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
A bivalve mollusc	<i>Lasaea adansoni</i>	E							Not available	None	Basic
Shore clingfish	<i>Lepadogaster lepadogaster</i>	E							Not available	None	Basic
Flying crab	<i>Liocarcinus holsatus</i>	E							Not available	None	Basic
Marbled swimming crab	<i>Liocarcinus marmoreus</i>	E							Not available	None	Basic
Shanny	<i>Lipophrys pholis</i>	E							Not available	None	Basic
Flat periwinkle	<i>Littorina obtusata</i>	E							Not available	None	Basic
Common spider crab	<i>Maja squinado</i>	E							Not available	None	Basic
Sunfish	<i>Mola mola</i>	E							Not available	None	Basic
Hermit crab	<i>Pagurus bernhardus</i>	E							Not available	None	Basic
Hermit crab	<i>Pagurus prideaux</i>	E							Not available	None	Basic
Tompot blenny	<i>Parablennius gattorugine</i>	E							Not available	None	Basic
A burrowing sea anemone	<i>Peachia cylindrica</i>	E							Not available	None	Basic
Chalice sponge	<i>Phakellia ventilabrum</i>	E							Not available	None	Basic
A sea anemone	<i>Phellia gausapata</i>	E							Not available	None	Basic
A red seaweed	<i>Polysiphonia lanosa</i>	E							Not available	None	Basic
Broad-clawed porcelain crab	<i>Porcellana platycheles</i>	E							Not available	None	Basic
Purple laver	<i>Porphyra umbilicalis</i>	E							Not available	None	Basic
A sea anemone	<i>Sagartiogeton undatus</i>	E							Not available	None	Basic
Small-spotted catshark	<i>Scyliorhinus canicula</i>	E							Not available	None	Basic

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 2i (continued). Basic information researched by MarLIN. Priority E, species information prepared for educational pages.

Common Name	Scientific name	Priority	UK BAP	W&C Act	Hab. Dir.	NI Act	CITES	Berne	Nat. status	Red list (IUCN)	Completion
Purple heart urchin	<i>Spatangus purpureus</i>	E							Not available	None	Basic
Orange sea grapes	<i>Stolonica socialis</i>	E							Not available	None	Basic
Great pipefish	<i>Syngnathus acus</i>	E							Not available	None	Basic
Thumbnail crab	<i>Thia scutellata</i>	E							Not available	None	Basic
By-the-wind-sailor	<i>Velella velella</i>	E							Not available	None	Basic

Legend:

UK BAP = UK Biodiversity Action Plan; W&C Act = Wildlife & Conservation Act (1981); Hab. Dir. = EC Habitat Directive; NI Act = Wildlife (NI) Order 1985; CITES = CITES Convention; Berne = Berne Convention; Nat. Status = National Status; Completion = status of the Key Information review.

Prioritization criteria (see text for details): 1 = Statute, Habitats Directive Annex, Red list; UK BAP; 2 = Key, Representative/ Important characterizing; 3 = Exploited; 4 = Nationally rare or scarce; 5 = Non-native; 6 = Climate change; R = Research; E = Education.

Appendix 3. Species selected as indicative of the sensitivity of the biotopes researched by MarLIN. For each species the type of information review is given, i.e. Full = a full biology and sensitivity key information review has been completed, while Basic = basic information only. Not all the species information is on-line at the time of writing.

Biotope name	Code	Community Importance	Species	Review type
<i>Abra alba</i> , <i>Nucula nitida</i> and <i>Corbula gibba</i> in circalittoral muddy sand or slightly mixed sediment	CMS.AbrNucCor	Important characterizing	<i>Lagis koreni</i>	Basic
		Important characterizing	<i>Nephtys hombergii</i>	Full
		Important characterizing	<i>Corbula gibba</i>	Basic
		Important characterizing	<i>Abra alba</i>	Full
		Important characterizing	<i>Nucula nitidosa</i>	Basic
		Important other	<i>Echinocardium cordatum</i>	Full
<i>Amphiura filiformis</i> and <i>Echinocardium cordatum</i> in circalittoral clean or slightly muddy sand	CMS.AfilEcor	Key functional	<i>Amphiura filiformis</i>	Full
		Key functional	<i>Echinocardium cordatum</i>	Full
		Important structural	<i>Callianassa subterranea</i>	Full
<i>Serpula vermicularis</i> reefs on very sheltered circalittoral muddy sand	CMS.Ser	Key structuring	<i>Serpula vermicularis</i>	Full
<i>Virgularia mirabilis</i> and <i>Ophiura</i> spp. on circalittoral sandy or shelly mud	CMS.VirOph	Important characterizing	<i>Virgularia mirabilis</i>	Full
		Important characterizing	<i>Amphiura filiformis</i>	Full
		Important other	<i>Pecten maximus</i>	Full
<i>Beggiatoa</i> spp. on anoxic sublittoral mud	CMU.Beg	Important characterizing	<i>Beggiatoa</i> spp.	None
<i>Brissopsis lyrifera</i> and <i>Amphiura chiajei</i> in circalittoral mud	CMU.BriAchi	Key functional	<i>Brissopsis lyrifera</i>	Full
		Important characterizing	<i>Amphiura chiajei</i>	Full
		Important other	<i>Calocaris macandreae</i>	Basic
		Important other	<i>Nephrops norvegicus</i>	Basic
Seapens and burrowing megafauna in circalittoral soft mud	CMU.SpMeg	Key functional	<i>Callianassa subterranea</i>	Full
		Important characterizing	<i>Virgularia mirabilis</i>	Full
		Important functional	<i>Liocarcinus depurator</i>	Full
		Important functional	<i>Amphiura filiformis</i>	Full
Foraminiferans and <i>Thyasira</i> sp. in deep circalittoral soft mud	COS.ForThy	Important characterizing	Foraminifera	None
		Important characterizing	<i>Thyasira</i> sp.	None
		Important functional	Polychaeta	N/A
<i>Styela gelatinosa</i> and other solitary ascidians on very sheltered deep circalittoral muddy sediment	COS.Sty	Key structuring	<i>Pseudamussium septemradiatum</i>	None
		Key functional	<i>Asterias rubens</i>	Full
		Important characterizing	<i>Styela gelatinosa</i>	Basic
		Important characterizing	<i>Abra alba</i>	Full
		Important characterizing	<i>Ascidrella scabra</i>	Full
		Important characterizing	<i>Metridium senile</i>	Full

Biotope name	Code	Community Importance	Species	Review type
Bugula spp. and other bryozoans on vertical moderately exposed circalittoral rock	CR.Bug	Important characterizing	<i>Bugula turbinata</i>	Full
		Important characterizing	<i>Bugula flabellata</i>	Basic
		Important characterizing	<i>Bugula plumosa</i>	Basic
		Important structural	<i>Clavelina lepadiformis</i>	Full
		Important structural	<i>Halichondria panicea</i>	Full
		Important structural	<i>Morchellium argus</i>	Full
		Important structural	<i>Nemertesia ramosa</i>	Full
		Important functional	<i>Asterias rubens</i>	Full
		Important functional	<i>Echinus esculentus</i>	Full
Caves and overhangs (deep)	CR.Cv	Important characterizing	<i>Alcyonium glomeratum</i>	Basic
		Important characterizing	<i>Leptopsammia pruvoti</i>	Full
		Important characterizing	<i>Caryophyllia smithii</i>	Basic
<i>Halichondria bowerbanki</i> , <i>Eudendrium arbusculum</i> and <i>Eucreatea loricata</i> on reduced salinity tide-swept circalittoral mixed substrata	ECR.HbowEud	Important characterizing	<i>Alcyonidium diaphanum</i>	Basic
		Important characterizing	<i>Metridium senile</i>	Full
		Important characterizing	<i>Halichondria bowerbanki</i>	Full
		Important structural	<i>Asciidiella scabra</i>	Full
		Important structural	<i>Balanus crenatus</i>	Full
		Important structural	<i>Asterias rubens</i>	Full
<i>Pomatoceros triqueter</i> , <i>Balanus crenatus</i> and bryozoan crusts on mobile circalittoral cobbles and pebbles	ECR.PomByC	Important characterizing	<i>Pomatoceros triqueter</i>	Full
		Important characterizing	<i>Balanus crenatus</i>	Full
<i>Alaria esculenta</i> on exposed sublittoral fringe bedrock	EIR.Ala	Key structuring	<i>Alaria esculenta</i>	Full
		Important characterizing	<i>Corallina officinalis</i>	Full
Foliose red seaweeds on exposed or moderately exposed lower infralittoral rock	EIR.FoR	Important characterizing	<i>Lithophyllum incrustans</i>	Full
		Important characterizing	<i>Delesseria sanguinea</i>	Full
		Important other	<i>Alcyonium digitatum</i>	Full
		Important other	<i>Calliostoma zizyphinum</i>	Basic
		Important other	<i>Clavelina lepadiformis</i>	Full
		Important other	<i>Echinus esculentus</i>	Full
		Important other	<i>Nemertesia antennina</i>	Basic
		Important other	<i>Urticina felina</i>	Full

Biotope name	Code	Community Importance	Species	Review type
<i>Laminaria hyperborea</i> forest with a faunal cushion (sponges and polyclinids) and foliose red seaweeds on very exposed upper infralittoral rock	EIR.LhypFa	Key structuring	<i>Laminaria hyperborea</i>	Full
		Important characterizing	<i>Alcyonium digitatum</i>	Full
		Important characterizing	<i>Botryllus schlosseri</i>	Full
		Important characterizing	<i>Delesseria sanguinea</i>	Full
		Important characterizing	<i>Halichondria panicea</i>	Full
		Important characterizing	<i>Urticina felina</i>	Full
		Important structural	<i>Echinus esculentus</i>	Full
<i>Laminaria hyperborea</i> with dense foliose red seaweeds on exposed infralittoral rock.	EIR.LhypR	Key structuring	<i>Laminaria hyperborea</i>	Full
		Key functional	<i>Echinus esculentus</i>	Full
		Key functional	<i>Helcion pellucidum</i>	Full
		Important characterizing	<i>Delesseria sanguinea</i>	Full
<i>Laminaria saccharina</i> and/or <i>Saccorhiza polyschides</i> on exposed infralittoral rock	EIR.LsacSac	Key structuring	<i>Laminaria saccharina</i>	Full
		Key structuring	<i>Saccorhiza polyschides</i>	Full
		Important functional	<i>Echinus esculentus</i>	Full
		Important functional	<i>Lithophyllum incrustans</i>	Full
Sponge crusts and anemones on wave-surged vertical infralittoral rock	EIR.SCAN	Key structuring	<i>Alcyonium digitatum</i>	Full
		Key functional	<i>Echinus esculentus</i>	Full
		Key structuring	<i>Laminaria hyperborea</i>	Full
		Key structuring	<i>Metridium senile</i>	Full
		Important functional	<i>Asterias rubens</i>	Full
		Important other	<i>Botryllus schlosseri</i>	Full
		Important other	<i>Halichondria panicea</i>	Full
Barnacles and <i>Patella</i> spp. on exposed or moderately exposed, or vertical sheltered, eulittoral rock	ELR.BPat	Key structuring	<i>Patella vulgata</i>	Full
		Key structuring	<i>Semibalanus balanoides</i>	Full
		Important functional	<i>Nucella lapillus</i>	Full
<i>Corallina officinalis</i> on very exposed lower eulittoral rock	ELR.Coff	Key structuring	<i>Corallina officinalis</i>	Full
		Important functional	<i>Idotea pelagica</i>	Basic
		Important functional	Gammaridae	N/A
<i>Fucus distichus</i> and <i>Fucus spiralis</i> f. <i>nana</i> on extremely exposed upper shore rock	ELR.Fdis	Key structuring	<i>Fucus distichus</i>	Full
		Key structuring	<i>Fucus spiralis</i>	Full

Biotope name	Code	Community Importance	Species	Review type
<i>Himanthalia elongata</i> and red seaweeds on exposed lower eulittoral rock	ELR.Him	Important characterizing	<i>Patella vulgata</i>	Full
		Important characterizing	<i>Semibalanus balanoides</i>	Full
		Important characterizing	<i>Himanthalia elongata</i>	Full
		Important characterizing	<i>Palmaria palmata</i>	Full
		Important characterizing	<i>Chondrus crispus</i>	Full
		Important characterizing	<i>Corallina officinalis</i>	Full
		Important other	<i>Mytilus edulis</i>	Full
		Important other	<i>Nucella lapillus</i>	Full
<i>Mytilus edulis</i> and barnacles on very exposed eulittoral rock	ELR.MytB	Key structuring	<i>Mytilus edulis</i>	Full
		Key functional	<i>Patella vulgata</i>	Full
		Key structuring	<i>Semibalanus balanoides</i>	Full
		Important functional	<i>Nucella lapillus</i>	Full
		Important other	<i>Corallina officinalis</i>	Full
		Important other	<i>Palmaria palmata</i>	Full
<i>Fabulina fabula</i> and <i>Magelona mirabilis</i> with venerid bivalves in infralittoral compacted fine sand	IGS.FabMag	Important characterizing	<i>Fabulina fabula</i>	Full
		Important characterizing	<i>Magelona mirabilis</i>	Full
		Important other	<i>Chamelea gallina</i>	None
<i>Halcampa chrysanthellum</i> and <i>Edwardsia timida</i> on sublittoral clean stone gravel	IGS.HalEdw	Important characterizing	<i>Halcampa chrysanthellum</i>	Basic
		Important characterizing	<i>Edwardsia timida</i>	Basic
Dense <i>Lanice conchilega</i> and other polychaetes in tide-swept infralittoral sand	IGS.Lcon	Key structuring	<i>Lanice conchilega</i>	Full
		Important characterizing	<i>Arenicola marina</i>	Full
		Important other	<i>Abra alba</i>	Full
<i>Lithothamnion glaciale</i> maerl beds in tide-swept variable salinity infralittoral gravel	IGS.Lgla	Key structuring	<i>Lithothamnion glaciale</i>	Full
		Important functional	<i>Ophiothrix fragilis</i>	Full
		Important functional	<i>Psammechinus miliaris</i>	Full
<i>Nephtys cirrosa</i> and <i>Bathyporeia</i> spp. in infralittoral sand	IGS.NcirBat	Important characterizing	<i>Bathyporeia pelagica</i>	Full
		Important characterizing	<i>Nephtys cirrosa</i>	Basic
<i>Neomysis integer</i> and <i>Gammarus</i> spp. in low salinity infralittoral mobile sand	IGS.NeoGam	Important characterizing	<i>Gammarus salinus</i>	Full
		Important characterizing	<i>Gammarus zaddachi</i>	Basic
		Important characterizing	<i>Neomysis integer</i>	Full
<i>Phymatolithon calcareum</i> maerl beds with hydroids and echinoderms in deeper infralittoral clean gravel or coarse sand	IGS.Phy.HEc	Key structuring	<i>Phymatolithon calcareum</i>	Full
		Important characterizing	<i>Neopentadactyla mixta</i>	Full
		Important characterizing	<i>Nemertesia ramosa</i>	Full
<i>Capitella capitata</i> in enriched sublittoral muddy sediments	IMS.Cap	Key functional	<i>Capitella capitata</i>	Full

Biotope name	Code	Community Importance	Species	Review type
<i>Echinocardium cordatum</i> and <i>Ensis</i> spp. in lower shore or shallow sublittoral muddy fine sand.	IMS.EcorEns	Key functional	<i>Echinocardium cordatum</i>	Full
		Key functional	<i>Ensis</i> spp.	Full
		Important characterizing	<i>Liocarcinus depurator</i>	Basic
<i>Macoma balthica</i> and <i>Abra alba</i> in infralittoral muddy sand or mud	IMS.MacAbr	Key functional	<i>Macoma balthica</i>	Full
		Key functional	<i>Abra alba</i>	Full
		Important characterizing	<i>Lagis koreni</i>	Basic
		Important characterizing	<i>Nephtys hombergii</i>	Full
		Important functional	<i>Echinocardium cordatum</i>	Full
		Important functional	<i>Fabulina fabula</i>	Full
		Important other	<i>Crangon crangon</i>	Basic
<i>Ruppia maritima</i> in reduced salinity infralittoral muddy sand	IMS.Rup	Key structuring	<i>Ruppia maritima</i>	Basic
		Key structuring	<i>Ruppia cirrhosa</i>	Basic
		Important functional	<i>Gammarus</i> spp.	N/A
		Important functional	<i>Hydrobia ulvae</i>	Full
		Important other	<i>Pomatoschistus minutus</i>	Full
		Important other	<i>Cerastoderma glaucum</i>	Full
<i>Zostera marina/angustifolia</i> beds in lower shore or infralittoral clean or muddy sand	IMS.Zmar	Key structuring	<i>Zostera marina</i>	Full
		Important structural	<i>Hydrobia ulvae</i>	Full
		Important structural	<i>Lacuna vincta</i>	Full
<i>Aphelochaeta marioni</i> and <i>Tubificoides</i> spp. in variable salinity infralittoral mud	IMU.AphTub	Key structuring	<i>Polydora ciliata</i>	Full
		Important characterizing	<i>Aphelochaeta marioni</i>	Full
		Important other	<i>Hydrobia ulvae</i>	Full
		Important other	<i>Hediste diversicolor</i>	Full
		Important other	<i>Lanice conchilega</i>	Full
<i>Arenicola marina</i> and synaptid holothurians in extremely shallow soft mud.	IMU.AreSyn	Important characterizing	<i>Arenicola marina</i>	Full
		Important characterizing	<i>Labidoplax media</i>	Basic
		Important characterizing	<i>Leptosynapta bergensis</i>	None
<i>Limnodrilus hoffmeisteri</i> , <i>Tubifex tubifex</i> and <i>Gammarus</i> spp. in low salinity infralittoral muddy sediment	IMU.LimTtub	Key functional	<i>Limnodrilus hoffmeisteri</i>	Basic
		Key functional	<i>Tubifex tubifex</i>	Basic
		Important other	<i>Gammarus</i> spp.	Basic

Biotope name	Code	Community Importance	Species	Review type
<i>Potamogeton pectinatus</i> community	IMU.NVC_A12	Key structuring	<i>Potamogeton pectinatus</i>	Basic
		Important functional	<i>Gammarus salinus</i>	Full
		Important functional	<i>Gammarus insensibilis</i>	Full
		Important functional	<i>Hydrobia ulvae</i>	Full
		Important other	<i>Conopeum reticulum</i>	Full
		Important other	<i>Cordylophora caspia</i>	Full
		Important other	<i>Neomysis integer</i>	Full
		Important other	<i>Pomatoschistus minutus</i>	Full
<i>Phragmites australis</i> swamp and reed beds	IMU.NVC_S4	Key structuring	<i>Phragmites australis</i>	Basic
		Important functional	<i>Gammarus insensibilis</i>	Full
		Important functional	<i>Gammarus salinus</i>	Full
		Important functional	<i>Hydrobia ulvae</i>	Full
		Important other	<i>Neomysis integer</i>	Full
<i>Ocnus planci</i> aggregations on sheltered sublittoral muddy sediment	IMU.Ocn	Important characterizing	<i>Ocnus planci</i>	Basic
<i>Philine aperta</i> and <i>Virgularia mirabilis</i> in soft stable infralittoral mud	IMU.PhiVir	Important characterizing	<i>Philine aperta</i>	Full
		Important characterizing	<i>Virgularia mirabilis</i>	Full
		Important other	<i>Amphiura filiformis</i>	Full
<i>Polydora ciliata</i> in variable salinity infralittoral firm mud or clay	IMU.PolVS	Key functional	<i>Polydora ciliata</i>	Full
Semi-permanent tube-building amphipods and polychaetes in sublittoral mud or muddy sand	IMU.TubeAP	Key functional	<i>Spiophanes bombyx</i>	Full
		Key functional	<i>Polydora ciliata</i>	Full
		Important characterizing	<i>Ampelisca</i> spp.	N/A
		Important characterizing	<i>Corophium</i> spp.	N/A
		Important characterizing	<i>Haploops tubicola</i>	None
<i>Crepidula fornicata</i> and <i>Aphelocheata marioni</i> in variable salinity infralittoral mixed sediment	IMX.CreAph	Important characterizing	<i>Aphelocheata marioni</i>	Full
		Important characterizing	<i>Crepidula fornicata</i>	Full
Filamentous green seaweeds on low salinity infralittoral mixed sediment or rock	IMX.FiG	Key structuring	<i>Arenicola marina</i>	Full
		Key structuring	<i>Chaetomorpha linum</i>	Basic
		Key structuring	<i>Enteromorpha intestinalis</i>	Full
		Important characterizing	<i>Gasterosteus aculeatus</i>	Basic
		Important characterizing	<i>Neomysis integer</i>	Full
		Important functional	<i>Mytilus edulis</i>	Full
		Important functional	<i>Asterias rubens</i>	Full
<i>Limaria hians</i> beds in tide-swept sublittoral muddy mixed sediment	IMX.Lim	Key structuring	<i>Limaria hians</i>	Basic

Biotope name	Code	Community Importance	Species	Review type
Laminaria saccharina, Chorda filum and filamentous red seaweeds on sheltered infralittoral sediment	IMX.LsacX	Important characterizing	<i>Chorda filum</i>	Full
		Important characterizing	<i>Laminaria saccharina</i>	Full
		Important functional	<i>Asterias rubens</i>	Full
		Important other	<i>Arenicola marina</i>	Full
Mytilus edulis beds on variable salinity infralittoral mixed sediment	IMX.MytV	Key structuring	<i>Mytilus edulis</i>	Full
		Important functional	<i>Asterias rubens</i>	Full
		Important functional	<i>Nucella lapillus</i>	Full
Ostrea edulis beds on shallow sublittoral muddy sediment	IMX.Ost	Key structuring	<i>Ostrea edulis</i>	Full
Polydora ciliata, Mya truncata and solitary ascidians in variable salinity infralittoral mixed sediment.	IMX.PolMtru	Important characterizing	<i>Aphelocheata marioni</i>	Full
		Important characterizing	<i>Mya arenaria</i>	Full
		Important characterizing	<i>Mya truncata</i>	Basic
		Important characterizing	<i>Polydora ciliata</i>	Full
		Important other	<i>Ascidella scabra</i>	Full
		Important other	<i>Molgula manhattensis</i>	Full
Venerupis senegalensis and Mya truncata in lower shore or infralittoral muddy gravel	IMX.VsenMtru	Important characterizing	<i>Venerupis senegalensis</i>	Full
		Important other	<i>Arenicola marina</i>	Full
		Important other	<i>Littorina littorea</i>	Full
		Important other	<i>Mya truncata</i>	Basic
Alcyonium digitatum with a bryozoan, hydroid and ascidian turf on moderately exposed vertical infralittoral rock	IR.AlcByH	Key structuring	<i>Alcyonium digitatum</i>	Full
		Important characterizing	<i>Clavelina lepadiformis</i>	Full
		Important characterizing	<i>Halichondria panicea</i>	Full
		Important characterizing	<i>Nemertesia ramosa</i>	Full
Burrowing amphipods and Eurydice pulchra in well-drained clean sand shores	LGS.AEur	Important characterizing	<i>Bathyporeia pelagica</i>	Full
		Important characterizing	<i>Eurydice pulchra</i>	Full
Dense Lanice conchilega in tide-swept lower shore sand	LGS.Lan	Key structuring	<i>Lanice conchilega</i>	Full
		Important characterizing	<i>Cerastoderma edule</i>	Full
		Important characterizing	<i>Nephtys cirrosa</i>	Basic
		Important characterizing	<i>Nephtys hombergii</i>	Full
Pectenogammarus planicrurus in mid shore well-sorted gravel or coarse sand	LGS.Pec	Important characterizing	<i>Pectenogammarus planicrurus</i>	Basic
Talitrid amphipods in decomposing seaweed on the strand-line	LGS.Tal	Important characterizing	<i>Talitrus saltator</i>	Full
Zostera noltii beds in upper to mid shore muddy sand	LMS.Znol	Key structuring	<i>Zostera noltii</i>	Full
		Important functional	<i>Hydrobia ulvae</i>	Full
		Important functional	<i>Littorina littorea</i>	Full
		Important other	<i>Arenicola marina</i>	Full
		Important other	<i>Cerastoderma edule</i>	Full

Biotope name	Code	Community Importance	Species	Review type
<i>Hediste diversicolor</i> and <i>Macoma balthica</i> in sandy mud shores	LMU.HedMac	Important characterizing	<i>Hediste diversicolor</i>	Full
		Important characterizing	<i>Macoma balthica</i>	Full
		Important other	<i>Aphelochaeta marioni</i>	Full
		Important other	<i>Cerastoderma edule</i>	Full
<i>Puccinellia maritima</i> saltmarsh community	LMU.NVC_SM13	Key structuring	<i>Puccinellia maritima</i>	Basic
		Important characterizing	<i>Armeria maritima</i>	Basic
		Important characterizing	<i>Glaux maritima</i>	None
		Important characterizing	<i>Limonium vulgare</i>	None
		Important characterizing	<i>Plantago maritima</i>	None
<i>Corallina officinalis</i> and coralline crusts in shallow eulittoral rockpools.	LR.Cor	Key structuring	<i>Corallina officinalis</i>	Full
		Important characterizing	<i>Lithophyllum incrustans</i>	Full
		Important structural	<i>Gibbula cineraria</i>	Basic
		Important structural	<i>Hyale prevostii</i>	Full
		Important structural	<i>Littorina littorea</i>	Full
Green seaweeds (<i>Enteromorpha</i> spp. and <i>Cladophora</i> spp.) in upper shore rockpools	LR.G	Key structuring	<i>Cladophora rupestris</i>	Full
		Key structuring	<i>Enteromorpha intestinalis</i>	Full
		Important characterizing	<i>Tigriopus fulvus</i>	None
		Important other	<i>Littorina saxatilis</i>	Basic
		Important other	<i>Littorina littorea</i>	Basic
Overhangs and caves	LR.Ov	Important characterizing	<i>Morchellium argus</i>	Full
		Important structural	<i>Botryllus schlosseri</i>	Full
		Important structural	<i>Umbonula littoralis</i>	Full
<i>Rhodothamniella floridula</i> in upper littoral fringe soft rock caves	LR.RhoCv	Important characterizing	<i>Rhodothamniella floridula</i>	Full
Yellow and grey lichens on supralittoral rock	LR.YG	Important characterizing	<i>Caloplaca marina</i>	Basic
		Important characterizing	<i>Ochrolechia parella</i>	Basic
		Important characterizing	<i>Ramalina siliquosa</i>	Basic
		Important characterizing	<i>Tephromela atra</i>	Basic
		Important characterizing	<i>Xanthoria parietina</i>	Basic
Erect sponges, <i>Eunicella verrucosa</i> and <i>Pentapora fascialis</i> on slightly tide-swept moderately exposed circalittoral rock.	MCR.ErSEun	Key structuring	<i>Eunicella verrucosa</i>	Full
		Important characterizing	<i>Axinella dissimilis</i>	Basic
		Important characterizing	<i>Pentapora fascialis</i>	Full

Biotope name	Code	Community Importance	Species	Review type
Faunal and algal crusts, <i>Echinus esculentus</i> , sparse <i>Alcyonium digitatum</i> and grazing-tolerant fauna on moderately exposed circalittoral rock	MCR.FaAIC	Key functional	<i>Echinus esculentus</i>	Full
		Important characterizing	<i>Alcyonium digitatum</i>	Full
		Important other	<i>Lithophyllum incrustans</i>	Full
		Important other	<i>Parasmittina trispinosa</i>	None
		Important other	<i>Pomatoceros triqueter</i>	Full
<i>Flustra foliacea</i> and other hydroid/bryozoan turf species on slightly scoured circalittoral rock or mixed substrata	MCR.Flu	Important characterizing	<i>Bugula turbinata</i>	Full
		Important characterizing	<i>Flustra foliacea</i>	Full
		Important characterizing	<i>Nemertesia ramosa</i>	Full
		Important functional	<i>Echinus esculentus</i>	Full
		Important other	<i>Alcyonium digitatum</i>	Full
		Important other	<i>Halichondria panicea</i>	Full
		Important other	<i>Molgula manhattensis</i>	Full
<i>Modiolus modiolus</i> beds with hydroids and red seaweeds on tide-swept circalittoral mixed substrata	MCR.ModT	Key structuring	<i>Modiolus modiolus</i>	Full
		Important characterizing	<i>Alcyonium digitatum</i>	Full
		Important characterizing	<i>Ophiothrix fragilis</i>	Full
		Important functional	<i>Echinus esculentus</i>	Full
		Important other	<i>Delesseria sanguinea</i>	Full
<i>Molgula manhattensis</i> and <i>Polycarpa</i> spp. with erect sponges on tide-swept moderately exposed circalittoral rock	MCR.MolPol	Key structuring	<i>Molgula manhattensis</i>	Full
		Important characterizing	<i>Alcyonium digitatum</i>	Full
		Important characterizing	<i>Flustra foliacea</i>	Full
		Important characterizing	<i>Nemertesia ramosa</i>	Full
		Important characterizing	<i>Urticina felina</i>	Full
<i>Musculus discors</i> beds on moderately exposed circalittoral rock	MCR.Mus	Important characterizing	<i>Musculus discors</i>	Basic
<i>Mytilus edulis</i> beds with hydroids and ascidians on tide-swept moderately exposed circalittoral rock	MCR.MyTHAs	Key structuring	<i>Mytilus edulis</i>	Full
		Important functional	<i>Asterias rubens</i>	Full
		Important other	<i>Alcyonium digitatum</i>	Full
		Important other	<i>Balanus crenatus</i>	Full
		Important other	<i>Urticina felina</i>	Full
<i>Ophiothrix fragilis</i> and/or <i>Ophiocomina nigra</i> beds on slightly tide-swept circalittoral rock or mixed substrata	MCR.Oph	Key structuring	<i>Ophiothrix fragilis</i>	Full
		Important characterizing	<i>Alcyonium digitatum</i>	Full
		Important functional	<i>Asterias rubens</i>	Full
		Important characterizing	<i>Urticina felina</i>	Full

Biotope name	Code	Community Importance	Species	Review type
Piddocks with a sparse associated fauna in upward-facing circalittoral very soft chalk or clay	MCR.Pid	Key structuring	<i>Pholas dactylus</i>	Full
		Key functional	<i>Polydora ciliata</i>	Full
		Important characterizing	<i>Halichondria panicea</i>	Full
		Important characterizing	<i>Urticina felina</i>	Full
<i>Polydora</i> sp. tubes on upward-facing circalittoral soft rock	MCR.Pol	Key structuring	<i>Polydora ciliata</i>	Full
<i>Sabellaria spinulosa</i> crusts on silty turbid circalittoral rock	MCR.Sspi	Key structuring	<i>Sabellaria spinulosa</i>	Full
		Important characterizing	<i>Urticina felina</i>	Full
		Important functional	<i>Ophiothrix fragilis</i>	Full
<i>Urticina felina</i> on sand-affected circalittoral rock	MCR.Urt	Key structuring	<i>Balanus crenatus</i>	Full
		Key structuring	<i>Pomatoceros triqueter</i>	Full
		Important characterizing	<i>Alcyonium digitatum</i>	Full
		Important characterizing	<i>Nemertesia ramosa</i>	Full
		Important characterizing	<i>Urticina felina</i>	Full
		Important structural	<i>Flustra foliacea</i>	Full
<i>Halidrys siliquosa</i> and mixed kelps on tide-swept infralittoral rock with coarse sediment.	MIR.HalXK	Important characterizing	<i>Halidrys siliquosa</i>	Full
		Important structural	<i>Aglaophenia pluma</i>	Basic
		Important structural	<i>Botryllus schlosseri</i>	Full
		Important structural	<i>Chondrus crispus</i>	Full
		Important structural	<i>Delesseria sanguinea</i>	Full
		Important structural	<i>Furcellaria lumbricalis</i>	Full
		Important structural	<i>Laminaria saccharina</i>	Full
<i>Laminaria digitata</i> on moderately exposed sublittoral fringe rock	MIR.Ldig.Ldig	Key structuring	<i>Laminaria digitata</i>	Full
		Key structuring	<i>Lithophyllum incrustans</i>	Full
		Important characterizing	<i>Palmaria palmata</i>	Full
		Important functional	<i>Patella vulgata</i>	Full
<i>Laminaria digitata</i> and piddocks on sublittoral fringe soft rock	MIR.Ldig.Pid	Key structuring	<i>Laminaria digitata</i>	Full
		Key structuring	<i>Pholas dactylus</i>	Full
		Key functional	<i>Polydora ciliata</i>	Full
		Important characterizing	<i>Palmaria palmata</i>	Full

Biotope name	Code	Community Importance	Species	Review type
Grazed <i>Laminaria hyperborea</i> with coralline crusts on infralittoral rock	MIR.LhypGz	Key structuring	<i>Laminaria hyperborea</i>	Full
		Key functional	<i>Echinus esculentus</i>	Full
		Important characterizing	<i>Delesseria sanguinea</i>	Full
		Important characterizing	<i>Lithophyllum incrustans</i>	Full
		Important other	<i>Alcyonium digitatum</i>	Full
		Important other	<i>Antedon bifida</i>	Full
		Important other	<i>Urticina felina</i>	Full
<i>Laminaria saccharina</i> , <i>Chorda filum</i> and dense red seaweeds on shallow unstable infralittoral boulders or cobbles	MIR.LsacChoR	Key structuring	<i>Laminaria saccharina</i>	Full
		Important characterizing	<i>Chorda filum</i>	Full
		Important characterizing	<i>Lithophyllum incrustans</i>	Full
		Important other	<i>Delesseria sanguinea</i>	Full
<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock	MIR.PolAhn	Important characterizing	<i>Ahnfeltia plicata</i>	Full
		Important characterizing	<i>Chondrus crispus</i>	Full
		Important characterizing	<i>Furcellaria lumbricalis</i>	Full
		Important characterizing	<i>Polyides rotundus</i>	Basic
		Important other	<i>Urticina felina</i>	Full
<i>Sabellaria spinulosa</i> with kelp and red seaweeds on sand-influenced infralittoral rock	MIR.SabKR	Key structuring	<i>Sabellaria spinulosa</i>	Full
		Important characterizing	<i>Delesseria sanguinea</i>	Full
		Important characterizing	<i>Laminaria hyperborea</i>	Full
		Important characterizing	<i>Lithophyllum incrustans</i>	Full
		Important characterizing	<i>Urticina felina</i>	Full
Barnacles and fucoids (moderately exposed shores)	MLR.BF	Key structuring	<i>Ascophyllum nodosum</i>	Full
		Key structuring	<i>Semibalanus balanoides</i>	Full
		Key structuring	<i>Fucus serratus</i>	Full
		Key functional	<i>Patella vulgata</i>	Full
		Important other	<i>Hyale prevostii</i>	Full
<i>Enteromorpha</i> spp. on freshwater-influenced or unstable upper eulittoral rock	MLR.Ent	Important characterizing	<i>Enteromorpha intestinalis</i>	Full
		Important characterizing	<i>Porphyra</i> spp.	Basic
Underboulder communities	MLR.Fser.Fser.Bo	Important characterizing	<i>Botryllus schlosseri</i>	Full
		Important characterizing	<i>Pisidia longicornis</i>	Full
		Important characterizing	<i>Umbonula littoralis</i>	Full
<i>Mytilus edulis</i> and <i>Fucus vesiculosus</i> on moderately exposed mid eulittoral rock	MLR.MytFves	Key structuring	<i>Mytilus edulis</i>	Full
		Important structural	<i>Fucus vesiculosus</i>	Full
		Important functional	<i>Littorina littorea</i>	Full
		Important functional	<i>Nucella lapillus</i>	Full
		Important functional	<i>Patella vulgata</i>	Full

Biotope name	Code	Community Importance	Species	Review type
<i>Rhodothamniella floridula</i> on sand-scoured lower eulittoral rock	MLR.Rho	Important characterizing	<i>Rhodothamniella floridula</i>	Full
		Important functional	<i>Patella vulgata</i>	Full
		Important other	<i>Fucus serratus</i>	Full
<i>Ceramium</i> sp. and piddocks on eulittoral fossilised peat	MLR.RPid	Important characterizing	<i>Barnea candida</i>	Basic
		Important characterizing	<i>Ceramium nodulosum</i>	Full
		Important characterizing	<i>Enteromorpha intestinalis</i>	Full
		Important characterizing	<i>Petricola pholadiformis</i>	Basic
<i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock	MLR.Salv	Key structuring	<i>Sabellaria alveolata</i>	Full
		Important structural	<i>Fucus serratus</i>	Full
		Important functional	<i>Littorina littorea</i>	Full
<i>Antedon</i> spp., solitary ascidians and fine hydroids on sheltered circalittoral rock	SCR.AntAsH	Important characterizing	<i>Antedon bifida</i>	Full
		Important characterizing	<i>Ciona intestinalis</i>	Full
		Important characterizing	<i>Clavelina lepadiformis</i>	Full
		Important characterizing	<i>Nemertesia ramosa</i>	Full
<i>Neocrania anomala</i> and <i>Protanthea simplex</i> on very sheltered circalittoral rock	SCR.NeoPro	Important characterizing	<i>Ciona intestinalis</i>	Full
		Important characterizing	<i>Neocrania anomala</i>	Full
		Important characterizing	<i>Protanthea simplex</i>	Full
<i>Suberites</i> spp. and other sponges with solitary ascidians on very sheltered circalittoral rock	SCR.SubSoAs	Key structuring	<i>Suberites carnosus</i>	Basic
		Important characterizing	<i>Ciona intestinalis</i>	Full
		Important characterizing	<i>Clavelina lepadiformis</i>	Full
		Important characterizing	<i>Nemertesia antennina</i>	Basic
<i>Ascophyllum nodosum</i> with epiphytic sponges and ascidians on variable salinity infralittoral rock	SIR.AscSAs	Key structuring	<i>Ascophyllum nodosum</i>	Full
		Important structural	<i>Fucus serratus</i>	Full
		Important characterizing	<i>Ciona intestinalis</i>	Full
		Important characterizing	<i>Halichondria panicea</i>	Full
<i>Cordylophora caspia</i> and <i>Electra crustulenta</i> on reduced salinity infralittoral rock	SIR.CorEle	Important characterizing	<i>Cordylophora caspia</i>	Full
		Important characterizing	<i>Electra crustulenta</i>	Basic
		Important structural	<i>Balanus crenatus</i>	Full
Mixed fucoids, <i>Chorda filum</i> and green seaweeds on reduced salinity infralittoral rock	SIR.FChoG	Important characterizing	<i>Chorda filum</i>	Full
		Important characterizing	<i>Fucus serratus</i>	Full
		Important characterizing	<i>Fucus vesiculosus</i>	Full
<i>Hartlaubella gelatinosa</i> and <i>Conopeum reticulum</i> on low salinity infralittoral mixed substrata	SIR.HarCon	Key structuring	<i>Balanus crenatus</i>	Full
		Key structuring	<i>Hartlaubella gelatinosa</i>	Basic
		Important characterizing	<i>Conopeum reticulum</i>	Full

Biotope name	Code	Community Importance	Species	Review type
<i>Laminaria saccharina</i> park on very sheltered lower infralittoral rock	SIR.Lsac.Pk	Key structuring	<i>Echinus esculentus</i>	Full
		Important characterizing	<i>Ciona intestinalis</i>	Full
		Important characterizing	<i>Laminaria saccharina</i>	Full
		Important characterizing	<i>Lithophyllum incrustans</i>	Full
		Important characterizing	<i>Ophiothrix fragilis</i>	Full
<i>Laminaria saccharina</i> , foliose red seaweeds, sponges and ascidians on tide-swept infralittoral rock	SIR.Lsac.T	Key structuring	<i>Laminaria saccharina</i>	Full
		Important characterizing	<i>Delesseria sanguinea</i>	Full
		Important functional	<i>Halichondria panicea</i>	Full
		Important other	<i>Botryllus schlosseri</i>	Full
<i>Laminaria saccharina</i> on reduced or low salinity infralittoral rock	SIR.LsacRS	Key structuring	<i>Asterias rubens</i>	Full
		Key structuring	<i>Balanus crenatus</i>	Full
		Key structuring	<i>Laminaria saccharina</i>	Full
		Key functional	<i>Psammechinus miliaris</i>	Full
		Important structural	<i>Asciidiella scabra</i>	Full
		Important other	<i>Ceramium nodulosum</i>	Full
		Important other	<i>Clavelina lepadiformis</i>	Full
		Important other	<i>Halichondria panicea</i>	Full
		Important other	<i>Mytilus edulis</i>	Full
		Important other	<i>Pomatoceros triqueter</i>	Full
Important other	<i>Ulva lactuca</i>	Basic		
<i>Mytilus edulis</i> beds on reduced salinity tide-swept infralittoral rock	SIR.MytT	Key structuring	<i>Asterias rubens</i>	Full
		Key structuring	<i>Mytilus edulis</i>	Full
		Important functional	<i>Balanus crenatus</i>	Full
		Important other	<i>Halichondria panicea</i>	Full
<i>Polyides rotundus</i> and/or <i>Furcellaria lumbricalis</i> on reduced salinity infralittoral rock	SIR.PolFur	Important characterizing	<i>Furcellaria lumbricalis</i>	Full
		Important characterizing	<i>Polyides rotundus</i>	Basic
		Important other	<i>Clavelina lepadiformis</i>	Full
		Important other	<i>Ciona intestinalis</i>	Full
<i>Ascophyllum nodosum</i> on very sheltered mid eulittoral rock.	SLR.Asc	Key structuring	<i>Ascophyllum nodosum</i>	Full
		Key functional	<i>Patella vulgata</i>	Full
		Important functional	<i>Hyale prevostii</i>	Full
		Important functional	<i>Semibalanus balanoides</i>	Full
<i>Ascophyllum nodosum</i> ead mackaii beds on extremely sheltered mid eulittoral mixed substrata	SLR.AscX.mac	Key structuring	<i>Ascophyllum nodosum</i>	Full
		Important characterizing	<i>Hyale prevostii</i>	Full
		Important characterizing	<i>Littorina littorea</i>	Full

Biotope name	Code	Community Importance	Species	Review type
Barnacles and <i>Littorina littorea</i> on unstable eulittoral mixed substrata	SLR.BLlit	Important characterizing	<i>Littorina littorea</i>	Full
		Important characterizing	<i>Semibalanus balanoides</i>	Full
<i>Fucus ceranoides</i> on reduced salinity eulittoral rock	SLR.Fcer	Key structuring	<i>Fucus ceranoides</i>	Full
		Key functional	<i>Littorina littorea</i>	Full
		Important characterizing	<i>Enteromorpha intestinalis</i>	Full
		Important other	<i>Semibalanus balanoides</i>	Full
<i>Fucus vesiculosus</i> on mid eulittoral mixed substrata	SLR.FvesX	Important characterizing	<i>Fucus vesiculosus</i>	Full
		Important other	<i>Littorina littorea</i>	Full
		Important other	<i>Semibalanus balanoides</i>	Full
		Important other	<i>Patella vulgata</i>	Full

Appendix 4. Complete list of *MarLIN* researched and represented biotopes at November 2002. Researched biotopes are shown in bold.

LITTORAL ROCK (and other hard substrata)

LICHENS AND ALGAL CRUSTS

Biotope name		Biotope code
Chrysophyceae on vertical upper littoral fringe soft rock.		LR.L.Chr
Represents:	<i>Blidingia</i> spp. on vertical littoral fringe soft rock.	LR.L.L.Bli
	<i>Ulothrix flacca</i> and <i>Urospora</i> spp. on freshwater-influenced vertical littoral fringe soft rock.	LR.L.Ulo.Uro
Yellow and grey lichens on supralittoral rock.		LR.L.YG
Represents:	<i>Prasiola stipitata</i> on nitrate-enriched supralittoral or littoral fringe rock.	LR.L.Pra
	<i>Verrucaria maura</i> on littoral fringe rock.	LR.L.Ver
	<i>Verrucaria maura</i> and <i>Porphyra umbilicalis</i> on very exposed littoral fringe rock.	LR.L.Ver.Por
	<i>Verrucaria maura</i> and sparse barnacles on exposed littoral fringe rock.	LR.L.Ver.B
	<i>Verrucaria maura</i> on moderately exposed to very sheltered upper littoral fringe rock.	LR.L.Ver.Ver

EXPOSED LITTORAL ROCK (mussel and barnacle shores)

Biotope name		Biotope code
<i>Mytilus edulis</i> and barnacles on very exposed eulittoral rock.		ELR.MB.MytB
Barnacles and <i>Patella</i> spp. on exposed or moderately exposed, or vertical sheltered eulittoral rock.		ELR.MB.Bpat
Represents:	<i>Chthamalus</i> spp. on exposed upper eulittoral rock.	ELR.MB.Bpat.Cht
	Barnacles and <i>Lichina pygmaea</i> on steep exposed upper eulittoral rock.	ELR.MB.Bpat.Lic
	<i>Catenella caespitosa</i> on overhanging, or shaded vertical, upper eulittoral rock.	ELR.MB.Bpat.Cat
	Barnacles, <i>Patella</i> spp. and <i>Fucus vesiculosus</i> f. <i>linearis</i> on exposed eulittoral rock.	ELR.MB.Fvesl
	<i>Semibalanus balanoides</i> on exposed or moderately exposed, or vertical sheltered, eulittoral rock.	ELR.MB.Bpat.Sem
<i>Fucus distichus</i> subsp. <i>anceps</i> and <i>Fucus spiralis</i> f. <i>nana</i> on extremely exposed upper eulittoral rock.		ELR.FR.Fdis
<i>Corallina officinalis</i> on very exposed lower eulittoral rock.		ELR.FR.Coff
<i>Himantalia elongata</i> and red seaweeds on exposed lower eulittoral rock.		ELR.FR.Him
Represents:	Mixed red seaweeds on moderately exposed lower eulittoral rock.	MLR.R.XR
	<i>Palmaria palmata</i> on very to moderately exposed lower eulittoral rock.	MLR.R.Pal
	<i>Mastocarpus stellatus</i> and <i>Chondrus crispus</i> on very to moderately exposed lower eulittoral rock.	MLR.R.Mas
	<i>Osmundea (Laurencia) pinnatifida</i> and <i>Gelidium pusillum</i> on moderately exposed mid eulittoral rock.	MLR.R.Osm

MODERATELY EXPOSED LITTORAL ROCK (barnacle and furoid shores)

Biotope name		Biotope code
Barnacles and furoids (moderately exposed shores).		MLR.BF
Represents:	<i>Pelvetia canaliculata</i> and barnacles on moderately exposed littoral fringe rock.	MLR.BF.PelB
	<i>Fucus vesiculosus</i> and barnacle mosaics on moderately exposed mid eulittoral rock.	MLR.BF.FvesB
	<i>Fucus serratus</i> on moderately exposed lower eulittoral rock.	MLR.BF.Fser
	<i>Fucus serratus</i> and red seaweeds on moderately exposed lower	MLR.BF.Fser.R

Biotope name		Biotope code
	eulittoral rock.	
	Dense <i>Fucus serratus</i> on moderately exposed to very sheltered lower eulittoral rock.	MLR.BF.Fser.Fser
	<i>Fucus serratus</i> and piddocks on lower eulittoral soft rock.	MLR.BF.Fser.Pid
	<i>Pelvetia canaliculata</i> on sheltered littoral fringe rock.	SLR.F.Pel
	<i>Fucus spiralis</i> on moderately exposed to very sheltered upper eulittoral rock.	SLR.F.Fspi
	<i>Fucus vesiculosus</i> on sheltered mid eulittoral rock.	SLR.F.ves
	<i>Fucus serratus</i> on sheltered lower eulittoral rock.	SLR.F.Fserr
	<i>Fucus serratus</i> , sponges and ascidians on tide-swept lower eulittoral rock.	SLR.F.Fserr.T
	<i>Fucus serratus</i> and large <i>Mytilus edulis</i> on variable salinity lower eulittoral rock.	SLR.F.Fserr.VS
<i>Fucus serratus</i> and under-boulder fauna on lower eulittoral boulders.		MLR.BF.Fser.Fser.Bo
Represents:	<i>Laminaria digitata</i> and under-boulder fauna on sublittoral fringe boulders.	MIR.KR.Ldig.Ldig.Bo
<i>Ceramium</i> sp. and piddocks on eulittoral fossilised peat.		MLR.R.RPid
<i>Rhodothamniella floridula</i> on sand-scoured lower eulittoral rock.		MLR.Eph.Rho
<i>Enteromorpha</i> spp. on freshwater influenced or unstable upper eulittoral rock.		MLR.Eph.Ent
Represents:	<i>Porphyra purpurea</i> or <i>Enteromorpha</i> spp. on sand-scoured mid to lower eulittoral rock.	MLR.Eph.EntPor
	Ephemeral green and red seaweeds on variable salinity or disturbed eulittoral mixed substrata.	SLR.FX.EphX
<i>Mytilus edulis</i> and <i>Fucus vesiculosus</i> on moderately exposed mid-eulittoral rock).		MLR.MF.MytFves
Represents:	<i>Mytilus edulis</i> beds on eulittoral mixed substrata.	SLR.Mx.MytX
	<i>Mytilus edulis</i> , <i>Fucus serratus</i> and red seaweeds on moderately exposed lower eulittoral rock.	MLR.MF.MytFR
	<i>Mytilus edulis</i> and piddocks on eulittoral firm clay.	MLR.MF.Myt.Pid
<i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock.		MLR.Sab.Salv

SHELTERED LITTORAL ROCK (fucoïd shores)

Biotope name		Biotope code
<i>Ascophyllum nodosum</i> on very sheltered mid eulittoral rock.		SLR.F.Asc
Represents:	<i>Ascophyllum nodosum</i> on full salinity mid eulittoral rock.	SLR.F.Asc.Asc
	<i>Ascophyllum nodosum</i> , sponges and ascidians on tide-swept mid eulittoral rock.	SLR.F.Asc.T
	<i>Ascophyllum nodosum</i> and <i>Fucus vesiculosus</i> on variable salinity mid eulittoral rock.	SLR.F.Asc.VS
<i>Ascophyllum nodosum</i> ead <i>mackaii</i> beds on extremely sheltered mid eulittoral mixed substrata.		SLR.FX.AscX.mac
<i>Fucus ceranoides</i> on reduced salinity eulittoral rock.		SLR.F.Fcer
Represents:	<i>Fucus ceranoides</i> on reduced salinity mixed substrata.	SLR.FX.FcerX
	<i>Fucus ceranoides</i> and <i>Enteromorpha</i> spp. on low salinity infralittoral rock.	SIR.Lag.FcerEnt
<i>Fucus vesiculosus</i> on mid eulittoral mixed substrata.		SLR.FX.FvesX
Represents:	<i>Ascophyllum nodosum</i> on mid eulittoral mixed substrata.	SLR.FX.AscX
	<i>Fucus serratus</i> on lower eulittoral mixed substrata.	SLR.FX.FserX
	<i>Fucus serratus</i> with sponges, ascidians and red seaweeds on tide-swept lower eulittoral mixed substrata.	SLR.Fx.FserX.T
Barnacles and <i>Littorina littorea</i> on unstable eulittoral mixed substrata.		SLR.FX.BLlit

LITTORAL ROCK (other)

Biotope name		Biotope code
Green seaweeds (<i>Enteromorpha</i> spp. and <i>Cladophora</i> spp.) in upper shore rockpools.		LR.Rkp.G
<i>Corallina officinalis</i> and coralline crusts in shallow eulittoral rockpools.		LR.Rkp.Cor
Represents:	Seaweeds in sediment (sand or gravel)-floored eulittoral rockpools.	LR.Rkp.SwSed
	Coralline crusts and <i>Paracentrotus lividus</i> in shallow eulittoral rockpools.	LR.Rkp.Cor.Par
	<i>Bifurcaria bifurcata</i> in shallow eulittoral rockpools.	LR.Rkp.Co.Bif
	<i>Cystoseira</i> spp. in shallow eulittoral rockpools.	LR.Rkp.Co.Cys
Overhangs and caves		LR.Ov
Represents:	Sponges and shade tolerant red seaweeds on overhanging lower shore bedrock.	LR.Ov.SR
	Sponges, bryozoans and ascidians on deeply overhanging lower shore bedrock.	LR.Ov.SByAs
<i>Rhodothamniella floridula</i> in littoral fringe soft rock caves.		LR.Ov.RhoCv

LITTORAL SEDIMENTS

LITTORAL GRAVELS AND SANDS

Biotope name		Biotope code
Barren coarse sand shores.		LGS.S.BarSnd
Represents:	Barren shingle or gravel shores	LGS.Sh.BarSh
<i>Pectenogammarus planicrurus</i> in mid shore well-sorted gravel or coarse sand.		LGS.Sh.Pec
Talitrid amphipods in decomposing seaweed on the strandline.		LGS.S.Tal
Burrowing amphipods and <i>Eurydice pulchra</i> in well-drained clean sand shores.		LGS.S.Aeur
Represents:	Burrowing amphipods and polychaetes in clean sand shores.	LGS.S.AP
	Burrowing amphipods and polychaetes (often with <i>Arenicola marina</i>) in clean sand shores.	LGS.S.AP.P
	Burrowing amphipods <i>Pontocrates</i> spp. and <i>Bathyporeia</i> spp. in lower shore clean sand.	LGS.S.Ap.Pon
	Oligochaetes in reduced or low salinity gravel or coarse sand shores.	LGS.Est.Ol
Dense <i>Lanice conchilega</i> in tide-swept lower shore sand.		LGS.S.Lan

LITTORAL MUDDY SANDS

Biotope name		Biotope code
Muddy sand shores.		LMS.MS
Represents:	<i>Bathyporeia</i> spp. and <i>Corophium</i> spp. in upper shore slightly muddy fine sands.	LMS.MS.BatCor
	Polychaetes and <i>Cerastoderma edule</i> in fine sand and muddy sand shores.	LMS.MS.PCer
	<i>Macoma balthica</i> and <i>Arenicola marina</i> in muddy sand shores.	LMS.MS.Mac.Are
<i>Zostera noltii</i> beds in upper to mid shore muddy sand.		LMS.Zos.Znol

LITTORAL MUDDS

Biotope name		Biotope code
<i>Puccinella maritima</i> saltmarsh community		LMU.Sm (low mid) (NVC SM13)
Represents:	Saltmarsh (drift-line)	LMU.Sm (drift-line)
<i>Salicornia</i> sp. pioneer saltmarsh		LMU.Sm (NVC SM8)
<i>Hediste diversicolor</i> and <i>Macoma balthica</i> in sandy mud shores.		LMU.Smu.HedMac
Represents:	<i>Hediste diversicolor</i> , <i>Macoma balthica</i> , and <i>Arenicola marina</i> in muddy sand or sandy mud shores.	LMU.Smu.HedMac.Are
	<i>Hediste diversicolor</i> , <i>Macoma balthica</i> and <i>Pygospio elegans</i> in sandy mud shores.	LMU.Smu.HedMac.Pyg

	<i>Hediste diversicolor</i> , <i>Macoma balthica</i> and <i>Mya arenaria</i> in sandy mud shores.	LMU.Smu.HedMac.Mare
	<i>Hediste diversicolor</i> and <i>Scrobicularia plana</i> in reduced salinity mud shores.	LMU.Mu.HedScr
	<i>Hediste diversicolor</i> and <i>Streblospio shrubsolii</i> in sandy mud or soft mud shores.	LMU.Mu.HedStr
	<i>Hediste diversicolor</i> and oligochaetes in low salinity mud shores.	LMU.Mu.HedOl

INFRALITTORAL ROCK (and other hard substrata)

8. EXPOSED INFRALITTORAL ROCK

Biotope name		Biotope code
<i>Alaria esculenta</i> on exposed sublittoral fringe rock.		EIR.KfaR.Ala
Represents:	<i>Alaria esculenta</i> , <i>Mytilus edulis</i> and coralline crusts on very exposed sublittoral fringe bedrock.	EIR.KfaR.Ala.Myt
	<i>Alaria esculenta</i> and <i>Laminaria digitata</i> on exposed sublittoral fringe bedrock.	EIR.KfaR.Ala.Ldig
	<i>Alaria esculenta</i> forest with dense anemones and sponge crusts on extremely exposed infralittoral bedrock.	EIR.KfaR.AlaAnSC
<i>Laminaria hyperborea</i> forest with a faunal cushion (sponges and polyclinids) and foliose red seaweeds on very exposed infralittoral rock.		EIR.KfaR.LhypFa
<i>Laminaria hyperborea</i> with dense foliose red seaweeds on exposed infralittoral rock.		EIR.KfaR.LhypR
Represents:	<i>Laminaria hyperborea</i> with dense foliose red seaweeds on exposed upper infralittoral rock.	EIR.KfaR.LhypR.Ft
	<i>Laminaria hyperborea</i> with dense foliose red seaweeds on exposed lower infralittoral rock.	EIR.KfaR.LhypR.Pk
	Mixed <i>Laminaria hyperborea</i> and <i>Laminaria ochroleuca</i> forest on exposed infralittoral rock.	EIR.KfaR.LhypR.Loch
	<i>Laminaria hyperborea</i> park/forest and foliose red seaweeds with diverse fauna on tide-swept infralittoral rock.	MIR.KR.LhypT
	<i>Laminaria hyperborea</i> and foliose red seaweeds on moderately exposed infralittoral rock.	MIR.KR.Lhyp
	<i>Laminaria hyperborea</i> forest with dense foliose red seaweeds on moderately exposed upper infralittoral rock.	MIR.KR.Lhyp.Ft
	<i>Laminaria hyperborea</i> park and foliose red seaweeds on moderately exposed lower infralittoral rock.	MIR.KR.Lhyp.Pk
	<i>Laminaria hyperborea</i> forest, foliose red seaweeds, and a diverse fauna on tide-swept upper infralittoral rock.	MIR.KR.Lhyp.TFt
	<i>Laminaria hyperborea</i> park with hydroids, bryozoans, and sponges on tide-swept lower infralittoral rock.	MIR.KR.Lhyp.TPk
	Mixed <i>Laminaria hyperborea</i> and <i>Laminaria ochroleuca</i> forest on moderately exposed infralittoral rock.	MIR.KR.Lhyp.Loch
<i>Laminaria saccharina</i> and/or <i>Saccorhiza polyschides</i> on exposed infralittoral rock.		EIR.KfaR.LsacSac
Foliose red seaweeds on exposed or moderately exposed lower infralittoral rock.		EIR.KfaR.FoR
Represents:	Foliose red seaweeds with dense <i>Dictyota dichotoma</i> and/or <i>Dictyopteris membranacea</i> on exposed lower infralittoral rock.	EIR.KfaR.FoR.Dic
	Foliose seaweeds and coralline crusts in surge gully entrances.	EIR.SG.FoSwCC
Sponge crusts and anemones on wave-surged vertical infralittoral rock.		EIR.SG.SCAAn
Represents:	Sponge crusts and anemones and <i>Tubularia indivisa</i> in shallow infralittoral surge gullies.	EIR.SG.SCAAn.Tub
	Sponge crusts and ascidians on wave-surged vertical infralittoral rock.	EIR.SG.SCAs
	<i>Dendrodoa grossularia</i> and <i>Clathrina coriacea</i> on wave-surged vertical infralittoral rock.	EIR.SG.SCAs.DenCla

Biotope name		Biotope code
	Sponge crusts, colonial (polyclonid) ascidians and a bryozoan/hydrozoan turf on wave-surfed vertical or overhanging infralittoral rock.	EIR.SG.SCAs.ByH
	Sponge crusts on extremely wave-surfed infralittoral cave or gulley walls.	EIR.SG.SC

MODERATELY EXPOSED INFRA-LITTORAL ROCK

Biotope name		Biotope code
<i>Laminaria digitata</i> on moderately exposed sublittoral fringe rock.		MIR.KR.Ldig.Ldig
Represents:	<i>Laminaria digitata</i> , ascidians and bryozoans on tide-swept sublittoral fringe bedrock.	MIR.L.dig.T
	Fucoids and kelps in deep eulittoral rockpools.	LR.Rkp.FK
<i>Laminaria digitata</i> and piddocks on sublittoral fringe soft rock.		MIR.KR.Ldig.Pid
<i>Sabellaria spinulosa</i> with kelp and red seaweeds on sand-influenced infralittoral rock.		MIR.SedK.SabKR
Grazed <i>Laminaria hyperborea</i> with coralline crusts on infralittoral rock		MIR.LhypGz
Represents:	<i>Echinus</i> , brittlestars and coralline crusts on grazed infralittoral rock.	SIR.K.EchBriCC
	Sparse <i>Laminaria hyperborea</i> and dense <i>Paracentrotus lividus</i> on exposed infralittoral limestone.	EIR.KfaR.LypPar
	Grazed <i>Laminaria hyperborea</i> with coralline crusts on infralittoral rock.	MIR.Gzk.LhypGz
	Grazed <i>Laminaria hyperborea</i> forest with coralline crusts on upper infralittoral rock.	MIR.Gzk.LhypGz.Ft
<i>Laminaria saccharina</i>, <i>Chorda filum</i> and dense red seaweeds on shallow unstable infralittoral boulders and cobbles.		MIR.SedK.LsacChoR
Represents:	Ephemeral red seaweeds and kelps on tide-swept mobile infralittoral cobbles.	MIR.SedK.EphR
	Mixed kelps with scour-tolerant and opportunistic foliose red seaweeds on scoured or sand-covered infralittoral rock.	MIR.SedK.XKscrR
	<i>Saccorhiza polyschides</i> and other opportunistic kelps on disturbed upper infralittoral rock.	MIR.SedK.Sac
<i>Halidrys siliquosa</i> and mixed kelps on tide-swept infralittoral rock with coarse sediment.		MIR.SedK.HalXX
<i>Polyides rotundus</i>, <i>Ahnfeltia plicata</i>, and <i>Chondrus crispus</i> on sand-covered infralittoral rock.		MIR.SedK.PolAhn

SHELTERED INFRA-LITTORAL ROCK

Biotope name		Biotope code
<i>Laminaria saccharina</i> park on very sheltered lower infralittoral rock.		SIR.K.Lsac.Pk
Represents:	Mixed kelps <i>Laminaria hyperborea</i> and <i>Laminaria saccharina</i> on sheltered infralittoral rock.	SIR.K.LypLsac.
	Mixed kelps <i>Laminaria hyperborea</i> and <i>Laminaria saccharina</i> forest on sheltered upper infralittoral rock.	SIR.K.LhypLsac.Ft
	Mixed kelps <i>Laminaria hyperborea</i> and <i>Laminaria saccharina</i> park on sheltered lower infralittoral rock.	SIR.K.LhypLsac.Pk
	<i>Laminaria saccharina</i> on very sheltered infralittoral rock.	SIR.K.Lsac.
	<i>Laminaria saccharina</i> and <i>Laminaria digitata</i> on sheltered sublittoral fringe rock.	SIR.K.Lsac.Ldig
	<i>Laminaria saccharina</i> forest on very sheltered upper infralittoral rock.	SIR.K.Lsac.Ft
	Sparse <i>Laminaria saccharina</i> with <i>Codium</i> spp. and sparse red seaweeds on heavily silted very sheltered infralittoral rock. *	SIR.K.Lsac.Cod
<i>Laminaria saccharina</i>, foliose red seaweeds, sponges and ascidians on tide-swept infralittoral rock.		SIR.K.Lsac.T
<i>Laminaria saccharina</i> on reduced salinity infralittoral rock.		SIR.K.LsacRS
Represents:	Sparse <i>Laminaria saccharina</i> with dense filamentous red seaweeds,	SIR.K.LsacRS.FiR

Biotope name		Biotope code
	sponges and <i>Balanus crenatus</i> on tide-swept variable salinity infralittoral rock.	
	<i>Laminaria saccharina</i> and <i>Psammechinus miliaris</i> on slightly reduced salinity grazed infralittoral rock.	SIR.K.LsacRS.Psa
	<i>Laminaria saccharina</i> with <i>Phyllophora</i> spp. and filamentous green seaweeds on reduced or low salinity infralittoral rock.	SIR.K.LsacRS.Phy
<i>Mytilus edulis</i> beds on reduced salinity tide-swept infralittoral rock.		SIR.EstFa.MytT
<i>Cordylophora caspia</i> and <i>Electra crustulenta</i> on reduced salinity infralittoral rock.		SIR.EstFa.CorEle
<i>Hartlaubella gelatinosa</i> and <i>Conopeum reticulum</i> on low salinity infralittoral mixed substrata.		SIR.EstFa.HarCon
Mixed fucoids, <i>Chorda filum</i> and green seaweeds on reduced salinity infralittoral rock.		SIR.Lag.FChoG
<i>Ascophyllum nodosum</i> with epiphytic sponges and ascidians on variable salinity infralittoral rock.		SIR.Lag.AscSAs
<i>Polyides rotundus</i> and/or <i>Furcellaria lumbricalis</i> on reduced salinity infralittoral rock.		SIR.Lag.PolFur

INFRALITTORAL ROCK (other)

Biotope name		Biotope code
<i>Alcyonium digitatum</i> and a bryozoan, hydroid and ascidian turf on moderately exposed vertical infralittoral rock.		IR.FaSwV.AlcBytH
Represents:	<i>Corynactis viridis</i> , <i>Metridium senile</i> and <i>Alcyonium digitatum</i> on exposed or moderately exposed vertical infralittoral rock.	IR.FaSwV.CorMetAlc
	<i>Hiatella arctica</i> , bryozoans and ascidians on vertical infralittoral soft rock.	IR.FaSwV.AlcByH.Hia
	<i>Alcyonium digitatum</i> with dense <i>Tubularia indivisa</i> and anemones on strongly tide-swept circalittoral rock.	ECR.Alc.AlcTub
	<i>Alcyonium digitatum</i> with massive sponges (<i>Cliona celata</i> and <i>Pachymatisma johnstonia</i>) and <i>Nemertesia antennina</i> on moderately tide-swept exposed circalittoral rock.	ECR.Alc.AlcMaS
	<i>Alcyonium digitatum</i> with <i>Securiflustra securifrons</i> on weakly tide-swept or scoured moderately exposed circalittoral rock.	ECR.Alc.AlcSec
	<i>Alcyonium digitatum</i> , <i>Pomatoceros triqueter</i> , algal and bryozoan crusts on vertical exposed circalittoral rock.	ECR.Alc.AlcC
	Coralline crusts, <i>Parasmittina trispinosa</i> , <i>Caryophyllia smithii</i> , <i>Haliclona viscosa</i> , polyclinids and sparse <i>Corynactis viridis</i> on very exposed circalittoral rock.	ECR.Efa.CCParCar
	<i>Corynactis viridis</i> and a crisiid/ <i>Bugula/Cellaria</i> turf on steep or vertical exposed circalittoral rock.	ECR.Efa.CoCri
	<i>Balanus crenatus</i> and <i>Tubularia indivisa</i> on extremely tide-swept circalittoral rock.	ECR.BS.BalTub
	<i>Tubularia indivisa</i> , sponges and other hydroids on tide-swept circalittoral bedrock.	ECR.BS.TubS
	<i>Balanus crenatus</i> , <i>Halichondria panicea</i> and <i>Alcyonidium diaphanum</i> on extremely tide-swept sheltered circalittoral rock.	ECR.BS.BalHpan
	Cushion sponges, hydroids and ascidians on very tide-swept sheltered circalittoral rock.	ECR.BS.CuSH

CIRCALITTORAL ROCK (and other hard substrata)**EXPOSED CIRCALITTORAL ROCK**

Biotope name		Biotope code
<i>Pomatoceros triqueter</i>, <i>Balanus crenatus</i> and bryozoan crusts on mobile circalittoral cobbles and pebbles.		ECR.Efa.PomByC
Represents:	<i>Balanus crenatus</i> and/or <i>Pomatoceros triqueter</i> with spirorbid worms and coralline crusts on severely scoured infralittoral rock.	EIR.SG.CC
	<i>Balanus crenatus</i> and/or <i>Pomatoceros triqueter</i> with spirorbid worms and coralline crusts on severely scoured vertical infralittoral rock.	EIR.SG.CC.BalPom
	Coralline crusts and crustaceans on mobile boulders and cobbles in surge gullies.	EIR.SG.CC.Mob
<i>Halichondria bowerbanki</i>, <i>Eudendrium arbusculum</i> and <i>Eucratea loricata</i> on reduced salinity tide-swept circalittoral mixed substrata.		ECR.BS.HbowEud

MODERATELY EXPOSED CIRCALITTORAL ROCK

Biotope name		Biotope code
Erect sponges, <i>Eunicella verrucosa</i> and <i>Pentapora foliacea</i> on slightly tide-swept moderately exposed circalittoral rock.		MCR.Xfa.ErSEun
Represents:	<i>Phakellia ventilabrum</i> and axinellid sponges on deep exposed circalittoral rock.	MCR.Xfa.PhaAxi
	Cushion sponges (<i>Polymastia boletiformis</i> , <i>Tethya</i>), stalked sponges, <i>Nemertesia</i> spp. and <i>Pentapora foliacea</i> on moderately exposed circalittoral rock.	MCR.Xfa.ErSPbolSH
	Erect sponges and <i>Swiftia pallida</i> on slightly tide-swept moderately exposed circalittoral rock.	MCR.Xfa.ErSSwi
<i>Flustra foliacea</i> and other hydroid/bryozoan turf species on slightly scoured circalittoral rock or mixed substrata.		MCR.ByH.Flu.
Represents:	Sparse sponges, <i>Nemertesia</i> spp., <i>Alcyonidium diaphanum</i> and <i>Bowerbankia</i> spp. on circalittoral mixed substrata.	MCR.ByH .SnmAdia
	<i>Flustra foliacea</i> on slightly scoured silty circalittoral rock or mixed substrata	MCR.ByH.Flu .Flu.
	<i>Flustra foliacea</i> with hydroids, bryozoans and sponges on slightly tide-swept circalittoral mixed substrata.	MCR.ByH.Flu .HbyS
	<i>Sertularia argentea</i> , <i>S. cupressina</i> and <i>Hydrallmania falcata</i> on tide-swept circalittoral cobbles and pebbles.	MCR.ByH.Flu .SerHyd.
	<i>Haliclona oculata</i> and <i>Flustra foliacea</i> with a rich faunal turf on tide-swept sheltered circalittoral boulders or cobbles.	MCR.ByH.Flu .Hocu.
<i>Urticina felina</i> on sand-affected circalittoral rock.		MCR.ByH.Urt.
Represents:	<i>Urticina felina</i> on sand-scoured circalittoral rock.	MCR.ByH.Urt.Urt.
	<i>Urticina felina</i> and <i>Ciocalypa penicillus</i> on sand-covered circalittoral rock.	MCR.ByH.Urt .Cio.
<i>Sabellaria spinulosa</i> crusts on silty turbid circalittoral rock.		MCR.Csab.Sspi
<i>Mytilus edulis</i> beds with hydroids and ascidians on tide-swept moderately exposed circalittoral rock.		MCR.M .MytHAs
<i>Musculus discors</i> beds on moderately exposed circalittoral rock.		MCR.M.Mus
<i>Modiolus modiolus</i> beds with hydroids and red seaweeds on tide-swept circalittoral mixed substrata.		MCR.M.ModT
Represents:	<i>Modiolus modiolus</i> beds with <i>Chlamys varia</i> , sponges, hydroids and bryozoans on slightly tide-swept very sheltered circalittoral mixed substrata.	SCR.Mod .ModCvar
	<i>Modiolus modiolus</i> beds with fine hydroids and large solitary ascidians on very sheltered circalittoral mixed substrata.	SCR.Mod. ModHAs
	<i>Modiolus modiolus</i> beds on circalittoral mixed sediment.	CMX.ModMx

Biotope name		Biotope code
<i>Ophiothrix fragilis</i> and/or <i>Ophiocomina nigra</i> beds on slightly tide-swept circalittoral rock or mixed substrata.		MCR.Bri.Oph
Represents:	<i>Ophiopholis aculeata</i> beds on slightly tide-swept circalittoral rock or mixed substrata.	MCR.Bri.Oph .Oacu
Faunal and algal crusts, <i>Echinus esculentus</i>, sparse <i>Alcyonium digitatum</i>, and grazing-tolerant fauna on moderately exposed circalittoral rock.		MCR.GzFa .FaAIC
Represents:	Faunal and algal crusts, <i>Echinus esculentus</i> , sparse <i>Alcyonium digitatum</i> , <i>Abietinaria abietina</i> , and other grazing-tolerant fauna on moderately exposed circalittoral rock.	MCR.GzFa .FaAIC.Abi
<i>Molgula manhattensis</i> and <i>Polycarpa</i> spp. with erect sponges on tide-swept moderately exposed circalittoral rock.		MCR.As.MolPol
Represents:	<i>Stolonica socialis</i> and/or <i>Polyclinum aurantium</i> with <i>Flustra foliacea</i> on slightly sand-scoured tide-swept moderately exposed circalittoral rock.	MCR.As.Sto.Paur
	Dense ascidians, bryozoans and hydroids on a crust of <i>Sabellaria spinulosa</i> on tide-swept circalittoral rock.	MCR.As.MolPol.Sab
Piddocks with a sparse associated fauna in upward-facing circalittoral very soft chalk or clay.		MCR.SfR.Pid
<i>Polydora</i> sp. tubes on upward-facing circalittoral soft rock.		MCR.SfR.Pol

SHELTERED CIRCALITTORAL ROCK

Biotope name		Biotope code
<i>Antedon</i> spp., solitary ascidians and fine hydroids on sheltered circalittoral rock.		SCR.BrAs.AntAsH
<i>Suberites</i> spp. and other sponges with solitary ascidians on very sheltered circalittoral rock.		SCR.BrAS.SubSoAs
Represents:	Solitary ascidians, including <i>Ascidia mentula</i> and <i>Ciona intestinalis</i> , on very sheltered circalittoral rock.	SCR.BrAS.Amen.Cio
	Large <i>Metridium senile</i> and solitary ascidians on grazed very sheltered circalittoral rock.	SCR.BrAS.AmenCio.Met
	<i>Ascidiella aspersa</i> on sheltered circalittoral rocks on muddy sediment.	SCR.BrAS.Aasp
<i>Neocrania anomala</i> and <i>Protanthea simplex</i> on very sheltered circalittoral rock.		SCR.BrAs.NeoPro
Represents:	Brachiopods, calcareous tubeworms (<i>Placostegus tridentatus</i> , <i>Hydroides</i>) and sponges on variable salinity circalittoral rock.	SCR.BrAs.NeoPro.CaTw

CIRCALITTORAL ROCK (other)

Biotope name		Biotope code
<i>Bugula</i> spp. and other bryozoans on vertical moderately exposed circalittoral rock.		CR.FaV.Bug
Represents:	<i>Antedon bifida</i> and a bryozoan/hydroid turf on steep or vertical circalittoral rock.	CR.FaV.Ant
Caves and overhangs (deep)		CR.Cv
Represents:	Sponges, cup corals and <i>Parerythropodium coralloides</i> on shaded or overhanging circalittoral rock.	CR.Cv.Scup

CIRCALITTORAL OFFSHORE ROCK (AND OTHER HARD SUBSTRATA)

Biotope name		Biotope code
<i>Lophelia</i> reefs.		COR.Lop

SUBLITTORAL SEDIMENTS

INFRALITTORAL GRAVELS AND SANDS

Biotope name		Biotope code
<i>Phymatolithon calcareum</i> maerl beds with hydroids and echinoderms in deeper infralittoral clean gravel or coarse sand.		IGS.Mrl.Phy.HEc
Represents:	<i>Phymatolithon calcareum</i> maerl beds with red seaweeds in shallow infralittoral clean gravel or coarse sand.	IGS.Mrl.Phy.R
	<i>Lithothamnion corallioides</i> maerl beds on infralittoral muddy gravel.	IMX.Mrl.Mx.Lcor
	<i>Lithothamnion fasciculatum</i> maerl beds with <i>Chlamys varia</i> on infralittoral sandy mud or mud.	IMX.MrlMx.Lfas
	<i>Lithothamnion dentatum</i> maerl beds on infralittoral muddy sediment.	IMX.MrlMx.Lden
<i>Lithothamnion glaciale</i> maerl beds in tide-swept variable salinity infralittoral gravel.		IGSMrl.Lgla
<i>Halocampa chrysanthellum</i> and <i>Edwardsia timida</i> on sublittoral clean stone gravel.		IGS.FaG.HalEdw
<i>Nephtys cirrosa</i> and <i>Bathyporeia</i> spp. in infralittoral sand.		IGS.FaS.NcirBat
Represents:	Sparse fauna in infralittoral mobile clean sand.	IGS.FaS.Mob
Dense <i>Lanice conchilega</i> and other polychaetes in tide-swept infralittoral sand.		IGS.FaS.Lcon
<i>Fabulina fabula</i> and <i>Magelona mirabilis</i> with venerid bivalves in infralittoral compacted fine sand.		IGS.FaS .FabMag
Represents:	<i>Spisula elliptica</i> and venerid bivalves in infralittoral clean sand or shell gravel.	IGS.FaG.Sell
<i>Neomysis integer</i> and <i>Gammarus</i> spp. in low salinity infralittoral mobile sand.		IGS.EstGS.NeoGam
Represents:	<i>Nephtys cirrosa</i> and fluctuating salinity-tolerant fauna in reduced salinity infralittoral mobile sand.	IGS.EstGS.Ncir
	Sparse fauna in reduced salinity infralittoral mobile sand.	IGS.EstGS.MobRS

CIRCALITTORAL GRAVELS AND SANDS

Biotope name		Biotope code
Venerid bivalves in circalittoral coarse sand or gravel.		CGS.Ven
Represents:	<i>Neopentadactyla mixta</i> and venerid bivalves in circalittoral shell gravel or coarse sand.	CGS.Ven.Neo
	Venerid bivalves and <i>Branchiostoma lanceolatum</i> in circalittoral coarse sand with shell gravel.	CGS.Ven.Bra

INFRALITTORAL MUDDY SANDS

Biotope name		Biotope code
<i>Zostera marina/angustifolia</i> beds in lower shore or infralittoral clean or muddy sand.		IMS.Sgr.Zmar
<i>Ruppia maritima</i> in reduced salinity infralittoral muddy sand.		IMS.Sgr.Rup
<i>Echinocardium cordatum</i> and <i>Ensis</i> sp. in lower shore or shallow sublittoral muddy fine sand.		IMS.FaMS.EcorEns
<i>Macoma balthica</i> and <i>Abra alba</i> in infralittoral muddy sand or mud.		IMS.FaMS.MacAbr
<i>Capitella capitata</i> in enriched sublittoral muddy sediments.		IMS.FaMS.Cap

CIRCALITTORAL MUDDY SANDS

Biotope name		Biotope code
<i>Abra alba</i>, <i>Nucula nitida</i> and <i>Corbula gibba</i> in circalittoral muddy sand or slightly mixed sediment.		CMS.AbrNucCor
<i>Amphiura filiformis</i> and <i>Echinocardium cordatum</i> in circalittoral clean or slightly muddy sand.		CMS.AfilEcor

<i>Virgularia mirabilis</i> and <i>Ophiura</i> spp. on circalittoral sandy or shelly mud.		CMS.VirOph
Represents:	<i>Virgularia mirabilis</i> and <i>Ophiura</i> spp. with hydroids and ascidians on circalittoral sandy or shelly mud with shells or stones.	CMS.VirOph.HAs
<i>Serpula vermicularis</i> reefs on very sheltered circalittoral muddy sand.		CMS.Ser

INFRALITTORAL MUDDS

Biotope name		Biotope code
<i>Potamogeton pectinatus</i> community.		IMU.Ang .NVC A12
<i>Phragmites australis</i> swamp and reed beds.		IMU.Ang .NVC S4
Semi-permanent tube-building amphipods and polychaetes in sublittoral mud or muddy sand.		IMU.MarMu .TubeAP
<i>Arenicola marina</i> and synaptid holothurians in extremely shallow soft mud.		IMU.MarMu .AreSyn
<i>Philine aperta</i> and <i>Virgularia mirabilis</i> in soft stable infralittoral mud.		IMU.MarMu .PhiVir
<i>Ocnus planci</i> aggregations on sheltered sublittoral muddy sediment.		IMU.MarMu .Ocn
<i>Polydora ciliata</i> in variable salinity infralittoral firm mud or clay.		IMU.EstMu .PolVS
<i>Aphelocheata marioni</i> and <i>Tubificoides</i> spp. in variable salinity infralittoral mud.		IMU.EstMu .AphTub
Represents:	<i>Nephtys hombergii</i> and <i>Tubificoides</i> spp. in variable salinity infralittoral soft mud.	IMU.EstMu.NhomTub
	Infralittoral fluid mobile mud.	IMU.EstMu.MobMud
	<i>Capitella capitata</i> and <i>Tubificoides</i> spp. in reduced salinity infralittoral muddy sediment.	IMU.EstMu.CapTub
	<i>Tubificoides</i> spp. in reduced salinity infralittoral muddy sediment.	IMU.EstMu.Tub
<i>Limnodrilus hoffmeisteri</i>, <i>Tubifex tubifex</i> and <i>Gammarus</i> spp. in low salinity infralittoral muddy sediment.		IMU.EstMu.Lim.Ttub

CIRCALITTORAL MUDDS

Biotope name		Biotope code
<i>Brissopsis lyrifera</i> and <i>Amphiura chiajei</i> in circalittoral mud.		CMU.BriAchi
Seapens and burrowing megafauna in circalittoral soft mud.		CMU.SpMeg
Represents:	Seapens, including <i>Funiculina quadrangularis</i> , and burrowing megafauna in undisturbed circalittoral soft mud.	CMU.SpMeg.Fun
<i>Beggiatoa</i> spp. on anoxic sublittoral mud.		CMU.Beg

INFRALITTORAL MIXED SEDIMENT

Biotope name		Biotope code
<i>Laminaria saccharina</i>, <i>Chorda filum</i> and filamentous red seaweeds on sheltered infralittoral sediment.		IMX.KSwMx.LsacX
Represents:	Mats of <i>Trailiella</i> on infralittoral muddy gravel.	IMX.KSwMx.Tra
	Loose-lying mats of <i>Phyllophora crispa</i> on infralittoral muddy sediment.	IMX.KSwMx.Pcri
Filamentous green seaweeds on low salinity infralittoral mixed sediment or rock.		IMX.KSwMx.FiG
<i>Ostrea edulis</i> beds on shallow sublittoral muddy sediment.		IMX.Oy.Ost
<i>Venerupis senegalensis</i> and <i>Mya truncata</i> in lower shore or infralittoral muddy gravel.		IMX.FaMx.VsenMtru
Burrowing anemones in sublittoral muddy gravel.		IMX.FaMx.An
<i>Limaria hians</i> beds in tide-swept sublittoral muddy mixed sediment.		IMX.FaMx.Lim
<i>Crepidula fornicata</i> and <i>Aphelocheata marioni</i> in variable salinity infralittoral mixed sediment.		IMX.EstMx.CreAph

Biotope name	Biotope code
<i>Mytilus edulis</i> beds in variable salinity infralittoral mixed sediment.	IMX.EstMx.MytV
<i>Polydora ciliata</i> , <i>Mya truncata</i> and solitary ascidians in variable salinity infralittoral mixed sediment.	IMX.EstMx.PolMtru

CIRCALITTORAL OFFSHORE SEDIMENTS

Biotope name	Biotope code
<i>Ampharete falcata</i> turf with <i>Parvicardium ovale</i> on cohesive muddy very fine sand near margins of deep stratified seas.	COS.AmpPar
Foramaniferans and <i>Thyasira</i> sp. in deep circalittoral soft mud.	COS.ForThy
<i>Styela gelatinosa</i> and other solitary ascidians on sheltered deep circalittoral muddy sediment.	COS.Sty

Appendix 5. The marine natural heritage importance of the *MarLIN* researched biotopes. UK BAP = UK Biodiversity Action Plan. Reefs, caves, sandflats, sandbanks, bays, estuaries, and lagoons refer to the relevant Annex I habitats of the Habitats Directive.

Habitat Name	Biotope code	EC Habitats Directive	Reefs	Caves	Sandflats	Sandbanks	Bays	Estuaries	Lagoons	UK BAP	UK BAP Habitat	National Status
Venerid bivalves in circalittoral coarse sand or gravel	CGS.Ven	●				●	●	●		●	Sublittoral sands and gravel	Not available
<i>Abra alba</i> , <i>Nucula nitida</i> and <i>Corbula gibba</i> in circalittoral muddy sand or slightly mixed sediment	CMS.AbrNucCor	●					●			●	Mud habitats in deep water	Not available
<i>Amphiura filiformis</i> and <i>Echinocardium cordatum</i> in circalittoral clean or slightly muddy sand	CMS.AfilEcor	●					●					Not available
<i>Serpula vermicularis</i> reefs on very sheltered circalittoral muddy sand	CMS.Ser	●	●				●			●	<i>Serpula vermicularis</i> reefs	Rare
<i>Virgularia mirabilis</i> and <i>Ophiura</i> spp. on circalittoral sandy or shelly mud	CMS.VirOph	●					●			●	Mud habitats in deep water	Common
<i>Beggiatoa</i> spp. on anoxic sublittoral mud	CMU.Beg	●					●		●	●	Saline lagoons, Mud habitats in deep water	Not available
<i>Brissopsis lyrifera</i> and <i>Amphiura chiajei</i> in circalittoral mud	CMU.BriAchi	●					●			●	Mud habitats in deep water	Not available
Seapens and burrowing megafauna in circalittoral soft mud	CMU.SpMeg	●					●			●	Mud habitats in deep water	Not available
<i>Lophelia</i> reefs	COR.Lop	●	●							●	<i>Lophelia pertusa</i> reefs, Offshore shelf rock (broad habitat statement)	Not available
<i>Ampharete falcata</i> turf with <i>Parvicardium ovale</i> on cohesive muddy very fine sand near margins of deep stratified seas	COS.AmpPar									●	Mud habitats in deep water	Scarce
Foraminiferans and <i>Thyasira</i> sp. in deep circalittoral soft mud	COS.ForThy									●	Mud habitats in deep water	Not available
<i>Styela gelatinosa</i> and other solitary ascidians on very sheltered deep circalittoral muddy sediment	COS.Sty									●	Mud habitats in deep water	Rare
<i>Bugula</i> spp. and other bryozoans on vertical moderately exposed circalittoral rock.	CR.Bug	●	●	●			●					Not available
Caves and overhangs (deep)	CR.Cv	●	●	●			●					Scarce
<i>Halichondria bowerbanki</i> , <i>Eudendrium arbusculum</i> and <i>Eucratea loricata</i> on reduced salinity tide-swept circalittoral mixed substrata	ECR.HbowEud	●	●				●					Rare
<i>Pomatoceros triquetus</i> , <i>Balanus crenatus</i> and bryozoan crusts on mobile circalittoral cobbles and pebbles	ECR.PomByC	●	●									Not available

Habitat Name	Biotope code	EC Habitats Directive	Reefs	Caves	Sandflats	Sandbanks	Bays	Estuaries	Lagoons	UK BAP	UK BAP Habitat	National Status
<i>Alaria esculenta</i> on exposed sublittoral fringe bedrock	EIR.Ala	●	●							●	Inshore sublittoral rock (broad habitat statement)	Widespread
Foliose red seaweeds on exposed or moderately exposed lower infralittoral rock	EIR.FoR	●	●				●			●	Inshore sublittoral rock (broad habitat statement)	Not available
<i>Laminaria hyperborea</i> forest with a faunal cushion (sponges and polyclinids) and foliose red seaweeds on very exposed upper infralittoral rock	EIR.LhypFa	●	●				●			●	Inshore sublittoral rock (broad habitat statement)	Uncommon
<i>Laminaria hyperborea</i> with dense foliose red seaweeds on exposed infralittoral rock.	EIR.LhypR	●	●				●			●	Inshore sublittoral rock (broad habitat statement)	Not available
<i>Laminaria saccharina</i> and/or <i>Saccorhiza polyschides</i> on exposed infralittoral rock	EIR.LsacSac	●	●							●	Inshore sublittoral rock (broad habitat statement)	Not available
Sponge crusts and anemones on wave-surged vertical infralittoral rock	EIR.SCAN	●	●	●			●			●	Inshore sublittoral rock (broad habitat statement)	Not available
Barnacles and <i>Patella</i> spp. on exposed or moderately exposed, or vertical sheltered, eulittoral rock	ELR.BPat	●	●				●	●	●	●	Saline lagoons, Littoral rock (broad habitat statement)	Widespread
<i>Corallina officinalis</i> on very exposed lower eulittoral rock	ELR.Coff	●	●							●	Littoral rock (broad habitat statement)	Scarce
<i>Fucus distichus</i> and <i>Fucus spiralis</i> f. <i>nana</i> on extremely exposed upper shore rock	ELR.Fdis	●	●							●	Littoral rock (broad habitat statement)	Rare
<i>Himantalia elongata</i> and red seaweeds on exposed lower eulittoral rock	ELR.Him	●	●				●			●	Littoral rock (broad habitat statement)	Common
<i>Mytilus edulis</i> and barnacles on very exposed eulittoral rock	ELR.MytB	●	●				●			●	Littoral rock (broad habitat statement)	Common
<i>Fabulina fabula</i> and <i>Magelona mirabilis</i> with venerid bivalves in infralittoral compacted fine sand	IGS.FabMag	●				●	●	●		●	Sublittoral sands and gravels, Inshore sublittoral sediment (broad habitat statement)	Not available

Habitat Name	Biotope code	EC Habitats Directive	Reefs	Caves	Sandflats	Sandbanks	Bays	Estuaries	Lagoons	UK BAP	UK BAP Habitat	National Status
<i>Halcampa chrysanthellum</i> and <i>Edwardsia timida</i> on sublittoral clean stone gravel	IGS.HalEdw	●					●			●	Sublittoral sands and gravels, Inshore sublittoral sediment (broad habitat statement)	Scarce
Dense <i>Lanice conchilega</i> and other polychaetes in tide-swept infralittoral sand	IGS.Lcon	●				●	●	●		●	Sublittoral sands and gravels, Inshore sublittoral sediment (broad habitat statement)	Not available
<i>Lithothamnion glaciale</i> maerl beds in tide-swept variable salinity infralittoral gravel	IGS.Lgla	●				●	●		●	●	Maerl beds, Saline lagoons, Sublittoral sands and gravels, Inshore sublittoral sediment (broad habitat statement)	Scarce
<i>Nephtys cirrosa</i> and <i>Bathyporeia</i> spp. in infralittoral sand	IGS.NcirBat	●				●	●	●		●	Sublittoral sands and gravels, Inshore sublittoral sediment (broad habitat statement)	Not available
<i>Neomysis integer</i> and <i>Gammarus</i> spp. in low salinity infralittoral mobile sand	IGS.NeoGam	●				●		●		●	Sublittoral sands and gravels, Inshore sublittoral sediment (broad habitat statement)	Not available
<i>Phymatolithon calcareum</i> maerl beds with hydroids and echinoderms in deeper infralittoral clean gravel or coarse sand	IGS.Phy.HEc	●				●	●			●	Maerl beds, Sublittoral sands and gravels, Inshore sublittoral sediment (broad habitat statement)	Uncommon

Habitat Name	Biotope code	EC Habitats Directive	Reefs	Caves	Sandflats	Sandbanks	Bays	Estuaries	Lagoons	UK BAP	UK BAP Habitat	National Status
<i>Capitella capitata</i> in enriched sublittoral muddy sediments	IMS.Cap	●				●	●	●	●	●	Saline lagoons, Inshore sublittoral sediment (broad habitat statement)	Not available
<i>Echinocardium cordatum</i> and <i>Ensis</i> spp. in lower shore or shallow sublittoral muddy fine sand.	IMS.EcorEns	●				●	●			●	Inshore sublittoral sediment (broad habitat statement)	Uncommon
<i>Macoma balthica</i> and <i>Abra alba</i> in infralittoral muddy sand or mud	IMS.MacAbr	●				●	●	●		●	Inshore sublittoral sediment (broad habitat statement)	Not available
<i>Ruppia maritima</i> in reduced salinity infralittoral muddy sand	IMS.Rup	●				●		●	●	●	Saline lagoons, Inshore sublittoral sediment (broad habitat statement)	Uncommon
<i>Zostera marina/angustifolia</i> beds in lower shore or infralittoral clean or muddy sand	IMS.Zmar	●			●	●	●	●	●	●	Seagrass beds, Saline lagoons, Inshore sublittoral sediment (broad habitat statement)	Uncommon
<i>Aphelochaeta marioni</i> and <i>Tubificoides</i> spp. in variable salinity infralittoral mud	IMU.AphTub	●						●		●	Inshore sublittoral sediment (broad habitat statement)	Not available
<i>Arenicola marina</i> and synaptid holothurians in extremely shallow soft mud.	IMU.AreSyn	●					●		●	●	Saline lagoons Inshore sublittoral sediment (broad habitat statement)	Not available
<i>Limnodrilus hoffmeisteri</i> , <i>Tubifex tubifex</i> and <i>Gammarus</i> spp. in low salinity infralittoral muddy sediment	IMU.LimTtub	●						●		●	Inshore sublittoral sediment (broad habitat statement)	Not available
<i>Potamogeton pectinatus</i> community	IMU.NVC_A12	●							●	●	Saline lagoons, Inshore sublittoral sediment (broad habitat statement)	Scarce

Habitat Name	Biotope code	EC Habitats Directive	Reefs	Caves	Sandflats	Sandbanks	Bays	Estuaries	Lagoons	UK BAP	UK BAP Habitat	National Status
<i>Phragmites australis</i> swamp and reed beds	IMU.NVC_S4	●							●	●	Reedbeds, Saline lagoons Coastal saltmarsh	Scarce
<i>Ocnus planci</i> aggregations on sheltered sublittoral muddy sediment	IMU.Ocn	●					●			●	Inshore sublittoral sediment (broad habitat statement)	Rare
<i>Philine aperta</i> and <i>Virgularia mirabilis</i> in soft stable infralittoral mud	IMU.PhiVir	●					●		●	●	Saline lagoons, Mud habitats in deep water Inshore sublittoral sediment (broad habitat statement)	Uncommon
<i>Polydora ciliata</i> in variable salinity infralittoral firm mud or clay	IMU.PoIVS	●						●		●	Inshore sublittoral sediment (broad habitat statement)	Not available
Semi-permanent tube-building amphipods and polychaetes in sublittoral mud or muddy sand	IMU.TubeAP	●					●			●	Inshore sublittoral sediment (broad habitat statement)	Not available
Burrowing anemones in sublittoral muddy gravel	IMX.An	●					●	●		●	Sheltered muddy gravels, Inshore sublittoral sediment (broad habitat statement)	Not available
<i>Crepidula fornicata</i> and <i>Aphelocheata marioni</i> in variable salinity infralittoral mixed sediment	IMX.CreAph	●						●	●	●	Saline lagoons, Sheltered muddy gravels Inshore sublittoral sediment (broad habitat statement)	Not available
Filamentous green seaweeds on low salinity infralittoral mixed sediment or rock	IMX.FiG	●						●	●	●	Saline lagoons, Inshore sublittoral sediment (broad habitat statement)	Scarce
<i>Limaria hians</i> beds in tide-swept sublittoral muddy mixed sediment	IMX.Lim	●					●			●	Inshore sublittoral sediment (broad habitat statement)	Scarce

Habitat Name	Biotope code	EC Habitats Directive	Reefs	Caves	Sandflats	Sandbanks	Bays	Estuaries	Lagoons	UK BAP	UK BAP Habitat	National Status
<i>Laminaria saccharina</i> , <i>Chorda filum</i> and filamentous red seaweeds on sheltered infralittoral sediment	IMX.LsacX	●					●	●	●	●	Saline lagoons, Inshore sublittoral sediment (broad habitat statement)	Not available
<i>Mytilus edulis</i> beds on variable salinity infralittoral mixed sediment	IMX.MytV	●	●				●	●		●	Inshore sublittoral sediment (broad habitat statement)	Uncommon
<i>Ostrea edulis</i> beds on shallow sublittoral muddy sediment	IMX.Ost	●					●	●		●	Sheltered muddy gravels, Inshore sublittoral sediment (broad habitat statement)	Scarce
<i>Polydora ciliata</i> , <i>Mya truncata</i> and solitary ascidians in variable salinity infralittoral mixed sediment.	IMX.PolMtru	●						●		●	Sheltered muddy gravels, Inshore sublittoral sediment (broad habitat statement)	Not available
<i>Venerupis senegalensis</i> and <i>Mya truncata</i> in lower shore or infralittoral muddy gravel	IMX.VsenMtru	●					●	●	●	●	Saline lagoons, Sheltered muddy gravels, Inshore sublittoral sediment (broad habitat statement)	Scarce
<i>Alcyonium digitatum</i> with a bryozoan, hydroid and ascidian turf on moderately exposed vertical infralittoral rock	IR.AlcByH	●	●				●			●	Littoral and sublittoral chalk, Inshore sublittoral rock (broad habitat statement).	Common
Burrowing amphipods and <i>Eurydice pulchra</i> in well-drained clean sand shores	LGS.AEur	●			●		●			●	Littoral sediment (broad habitat statement)	Common
Barren coarse sand shores	LGS.BarSnd	●			●		●	●		●	Littoral sediment (broad habitat statement)	Common
Dense <i>Lanice conchilega</i> in tide-swept lower shore sand	LGS.Lan	●			●		●	●		●	Littoral sediment (broad habitat statement)	Uncommon
<i>Pectenogammarus planicrurus</i> in mid shore well-sorted gravel or coarse sand	LGS.Pec	●					●				Littoral sediment (broad habitat statement)	Scarce

Habitat Name	Biotope code	EC Habitats Directive	Reefs	Caves	Sandflats	Sandbanks	Bays	Estuaries	Lagoons	UK BAP	UK BAP Habitat	National Status
Talitrid amphipods in decomposing seaweed on the strand-line	LGS.Tal	●			●		●	●	●	●	Saline lagoons, Supralittoral sediment (broad habitat statement),	Widespread
Muddy sand shores	LMS.MS	●			●		●	●	●	●	Saline lagoons, Mudflats, Littoral sediment (broad habitat statement)	Common
<i>Zostera noltii</i> beds in upper to mid shore muddy sand	LMS.Znol	●			●		●	●	●	●	Seagrass beds, Saline lagoons, Littoral sediment (broad habitat statement)	Scarce
<i>Hediste diversicolor</i> and <i>Macoma balthica</i> in sandy mud shores	LMU.HedMac	●			●			●		●	Mudflats, Littoral sediment (broad habitat statement)	Common
<i>Puccinellia maritima</i> saltmarsh community	LMU.NVC_SM13	●						●	●	●	Coastal and floodplain grazing marsh, Coastal saltmarsh, Saline lagoons Littoral sediment (broad habitat statement)	Not available
Pioneer saltmarsh	LMU.Sm	●						●		●	Coastal and floodplain grazing marsh, Coastal saltmarsh, Littoral sediment (broad habitat statement)	Not available
Chrysophyceae on vertical upper littoral fringe soft rock	LR.Chr	●	●				●			●	Littoral and sublittoral chalk, Maritime cliff and slopes, Supralittoral rock (broad habitat statement)	Rare
<i>Corallina officinalis</i> and coralline crusts in shallow eulittoral rockpools	LR.Cor	●	●				●	●	●	●	Saline lagoons, Littoral rock (broad habitat statement)	Widespread

Habitat Name	Biotope code	EC Habitats Directive	Reefs	Caves	Sandflats	Sandbanks	Bays	Estuaries	Lagoons	UK BAP	UK BAP Habitat	National Status
Green seaweeds (<i>Enteromorpha</i> spp. and <i>Cladophora</i> spp.) in upper shore rockpools	LR.G	●	●				●	●		●	Littoral rock (broad habitat statement), Supralittoral rock (broad habitat statement)	Widespread
Overhangs and caves	LR.Ov	●	●	●			●	●		●	Littoral rock (broad habitat statement)	Scarce
<i>Rhodothamniella floridula</i> in upper littoral fringe soft rock caves	LR.RhoCv	●	●	●			●	●		●	Littoral and sublittoral chalk, Maritime cliffs and slopes, Littoral rock (broad habitat statement)	Rare
Yellow and grey lichens on supralittoral rock	LR.YG	●	●				●	●	●	●	Maritime cliff and slopes, Saline lagoons, Supralittoral rock (broad habitat statement) Littoral rock (broad habitat statement)	Widespread
Erect sponges, <i>Eunicella verrucosa</i> and <i>Pentapora fascialis</i> on slightly tide-swept moderately exposed circalittoral rock.	MCR.ErSEun	●	●				●					Not available
Faunal and algal crusts, <i>Echinus esculentus</i> , sparse <i>Alcyonium digitatum</i> and grazing-tolerant fauna on moderately exposed circalittoral rock	MCR.FaAIC	●	●				●					Not available
<i>Flustra foliacea</i> and other hydroid/bryozoan turf species on slightly scoured circalittoral rock or mixed substrata	MCR.Flu	●	●				●					Not available
<i>Modiolus modiolus</i> beds with hydroids and red seaweeds on tide-swept circalittoral mixed substrata	MCR.ModT	●	●				●			●	<i>Modiolus modiolus</i> beds, Tidal rapids	Uncommon
<i>Molgula manhattensis</i> and <i>Polycarpa</i> spp. with erect sponges on tide-swept moderately exposed circalittoral rock	MCR.MolPol	●	●				●					Uncommon
<i>Musculus discors</i> beds on moderately exposed circalittoral rock	MCR.Mus	●	●				●					Uncommon
<i>Mytilus edulis</i> beds with hydroids and ascidians on tide-swept moderately exposed circalittoral rock	MCR.MytHAs	●	●				●	●				Not available
<i>Ophiothrix fragilis</i> and/or <i>Ophiocomina nigra</i> beds on slightly tide-swept circalittoral rock or mixed substrata	MCR.Oph	●	●			●	●					Widespread

Habitat Name	Biotope code	EC Habitats Directive	Reefs	Caves	Sandflats	Sandbanks	Bays	Estuaries	Lagoons	UK BAP	UK BAP Habitat	National Status
Piddocks with a sparse associated fauna in upward-facing circalittoral very soft chalk or clay	MCR.Pid	●	●				●	●		●	Littoral and sublittoral chalk, Littoral rock (broad habitat statement)	Scarce
<i>Polydora</i> sp. tubes on upward-facing circalittoral soft rock	MCR.Pol	●	●				●			●	Littoral and sublittoral chalk, Littoral rock (broad habitat statement)	Not available
<i>Sabellaria spinulosa</i> crusts on silty turbid circalittoral rock	MCR.Sspi	●	●				●			●	<i>Sabellaria spinulosa</i> reefs	Not available
<i>Urticina felina</i> on sand-affected circalittoral rock	MCR.Urt	●	●	●			●	●				Not available
<i>Halidrys siliquosa</i> and mixed kelps on tide-swept infralittoral rock with coarse sediment.	MIR.HalXK	●	●				●		●	●	Saline lagoons, Inshore sublittoral rock (broad habitat statement)	Not available
<i>Laminaria digitata</i> on moderately exposed sublittoral fringe rock	MIR.Ldig.Ldig	●	●				●	●	●	●	Saline lagoons, Inshore sublittoral rock (broad habitat statement)	Widespread
<i>Laminaria digitata</i> and piddocks on sublittoral fringe soft rock	MIR.Ldig.Pid	●	●				●	●		●	Littoral and sublittoral chalk	Scarce
Grazed <i>Laminaria hyperborea</i> with coralline crusts on infralittoral rock	MIR.LhypGz	●	●				●			●	Inshore sublittoral rock (broad habitat statement)	Not available
<i>Laminaria saccharina</i> , <i>Chorda filum</i> and dense red seaweeds on shallow unstable infralittoral boulders or cobbles	MIR.LsacChoR	●	●							●	Sublittoral sands and gravels, Inshore sublittoral rock (broad habitat statement)	Not available
<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock	MIR.PolAhn	●	●				●			●	Inshore sublittoral rock (broad habitat statement)	Uncommon
<i>Sabellaria spinulosa</i> with kelp and red seaweeds on sand-influenced infralittoral rock	MIR.SabKR	●	●							●	<i>Sabellaria spinulosa</i> reefs, Inshore sublittoral rock (broad habitat statement)	Not available
Barnacles and fucoids (moderately exposed shores)	MLR.BF		●				●	●		●	Littoral rock (broad habitat statement)	Widespread

Habitat Name	Biotope code	EC Habitats Directive	Reefs	Caves	Sandflats	Sandbanks	Bays	Estuaries	Lagoons	UK BAP	UK BAP Habitat	National Status
<i>Enteromorpha</i> spp. on freshwater-influenced or unstable upper eulittoral rock	MLR.Ent	●	●				●	●	●	●	Saline lagoons, Littoral rock (broad habitat statement)	Uncommon
Underboulder communities	MLR.Fser.Fser.Bo	●	●				●	●		●	Littoral rock (broad habitat statement)	Common
<i>Mytilus edulis</i> and <i>Fucus vesiculosus</i> on moderately exposed mid eulittoral rock	MLR.MytFves	●	●				●	●		●	Littoral rock (broad habitat statement)	Scarce
<i>Rhodothamniella floridula</i> on sand-scoured lower eulittoral rock	MLR.Rho	●	●				●	●	●	●	Saline lagoons, Littoral rock (broad habitat statement)	Uncommon
<i>Ceramium</i> sp. and piddocks on eulittoral fossilised peat	MLR.RPid	●	●				●	●		●	Littoral rock (broad habitat statement)	Rare
<i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock	MLR.Salv	●	●				●	●		●	<i>Sabellaria alveolata</i> reefs, Littoral rock (broad habitat statement)	Scarce
<i>Antedon</i> spp., solitary ascidians and fine hydroids on sheltered circalittoral rock	SCR.AntAsH	●	●				●					Uncommon
<i>Neocrania anomala</i> and <i>Protanthea simplex</i> on very sheltered circalittoral rock	SCR.NeoPro	●	●				●					Uncommon
<i>Suberites</i> spp. and other sponges with solitary ascidians on very sheltered circalittoral rock	SCR.SubSoAs	●	●				●					Not available
<i>Ascophyllum nodosum</i> with epiphytic sponges and ascidians on variable salinity infralittoral rock	SIR.AscSAs	●	●						●	●	Saline lagoons, Inshore sublittoral rock (broad habitat statement)	Rare
<i>Cordylophora caspia</i> and <i>Electra crustulenta</i> on reduced salinity infralittoral rock	SIR.CorEle	●	●					●		●	Inshore sublittoral rock (broad habitat statement)	Rare
Mixed fucoids, <i>Chorda filum</i> and green seaweeds on reduced salinity infralittoral rock	SIR.FChoG	●	●						●	●	Saline lagoons, Inshore sublittoral rock (broad habitat statement)	Scarce
<i>Hartlaubella gelatinosa</i> and <i>Conopeum reticulum</i> on low salinity infralittoral mixed substrata	SIR.HarCon	●	●				●			●	Inshore sublittoral rock (broad habitat statement)	Rare

Habitat Name	Biotope code	EC Habitats Directive	Reefs	Caves	Sandflats	Sandbanks	Bays	Estuaries	Lagoons	UK BAP	UK BAP Habitat	National Status
<i>Laminaria saccharina</i> park on very sheltered lower infralittoral rock	SIR.Lsac.Pk	●	●				●	●	●	●	Saline lagoons, Inshore sublittoral rock (broad habitat statement)	Uncommon
<i>Laminaria saccharina</i> , foliose red seaweeds, sponges and ascidians on tide-swept infralittoral rock	SIR.Lsac.T		●				●	●	●	●	Tidal rapids, Saline lagoons, Inshore sublittoral rock (broad habitat statement)	Scarce
<i>Laminaria saccharina</i> on reduced or low salinity infralittoral rock	SIR.LsacRS	●	●				●	●	●	●	Saline lagoons, Inshore sublittoral rock (broad habitat statement)	Not available
<i>Mytilus edulis</i> beds on reduced salinity tide-swept infralittoral rock	SIR.MytT	●	●					●		●	Tidal rapids, Inshore sublittoral rock (broad habitat statement)	Scarce
<i>Polyides rotundus</i> and/or <i>Furcellaria lumbricalis</i> on reduced salinity infralittoral rock	SIR.PolFur	●	●						●	●	Saline lagoons, Inshore sublittoral rock (broad habitat statement)	Rare
<i>Ascophyllum nodosum</i> on very sheltered mid eulittoral rock.	SLR.Asc	●	●				●	●	●	●	Saline lagoons, Littoral rock (broad habitat statement)	Widespread
<i>Ascophyllum nodosum</i> ecad <i>mackaii</i> beds on extremely sheltered mid eulittoral mixed substrata	SLR.AscX.mac	●	●				●		●	●	Saline lagoons, <i>Ascophyllum nodosum</i> ecad <i>mackaii</i> beds, Littoral rock (broad habitat statement)	Scarce
Barnacles and <i>Littorina littorea</i> on unstable eulittoral mixed substrata	SLR.BLlit	●	●				●	●	●	●	Saline lagoons, Littoral rock (broad habitat statement)	Rare
<i>Fucus ceranoides</i> on reduced salinity eulittoral rock	SLR.Fcer	●	●					●	●	●	Saline lagoons, Littoral rock (broad habitat statement)	Scarce
<i>Fucus vesiculosus</i> on mid eulittoral mixed substrata	SLR.FvesX	●	●				●	●	●	●	Saline lagoons, Littoral rock (broad habitat statement)	Common

Appendix 6. The number of *MarLIN* researched biotope Key Information reviews and represented biotopes within BAP habitat and species reviews.

UK BAP (Habitat)	Researched biotopes included	Represented biotopes included	No. Researched (represented)
Species action plan			
<i>Ascophyllum nodosum</i> ecad. mackii beds	SLR.AscX.mac		1
Priority BAP habitat			
Coastal and floodplain grazing marsh	LMU.Sm (low mid) (NVC SM13), LMU.Sm (NVC SM8)	LMU.Sm (drift-line)	2(1)
Coastal saltmarsh	IMU.Ang.NVC_S4, LMU.Sm (low mid) (NVC SM13), LMU.Sm	LMU.Sm (drift-line)	3(1)
Coastal sand dunes			0
Coastal vegetated shingle			0
Littoral and sublittoral chalk	IR.AlcByH, LR.RhoCv, MCR.Pid, MCR.Pol, MIR.Ldig.Pid, LR.Chr	LR.Bli, LR.UloUro	6(2)
<i>Lophelia pertusa</i> reefs	COR.Lop		1
Machair			0
Maerl beds	IGS.Lgla, IGS.Phy.HEc	IGS.Phy.R, IMX.Lcor, IMX.Lfas, IMX.Lden	2(4)
Maritime cliff and slopes	LR.YG, LR.Chr, LR.RhoCv	LR.L, LR.Pra, LR.Ver, LR.Ver.Por, LR.Ver.B, LR.Ver.Ver, LR.Bli, Lr.UloUro,	3(8)
<i>Modiolus modiolus</i> beds	MCR.ModT	SCR.ModCvar, SCR.ModHAs, CMX.ModMx	1(3)
Mud habitats in deep water	CMS.AbrNucCor, CMS.VirOph, CMU.Beg, CMU.BriAchi, CMU.SpMeg, COS.AmpPar, COS.ForThy, COS.Sty, IMU.PhiVir	CMS.VirOph.Has, CMU.SpMeg.Fun,	9(2)
Mudflats	LMS.MS, LMU.HedMac	LMS.BatCor, LMSPCer, LMS.Mac.Are, LMS.MacAre.Mare, LMU.HedMac.Are, LMU.HedMac.Pyg, LMU.HedMac.Mare, LMU.HedScr, LMU.HedStr, LMU.HedOl	2(10)
Reedbeds	IMU.NVC_S4		1

Appendix 6 (continued). The number of *MarLIN* researched biotope Key Information reviews and represented biotopes within BAP habitat and species reviews.

UK BAP (Habitat)	Researched biotopes included	Represented biotopes included	No. Researched (represented)
<i>Sabellaria alveolata</i> reefs	MLR.Salv		1
<i>Sabellaria spinulosa</i> reefs	MCR.Sspi, MIR.SabKR		2
Saline lagoons	IGS.Lgla, IMS.Cap, IMS.Rup, IMS.Zmar, IMU.AreSyn, IMU.NVC_A12, IMU.NVC_S4, IMU.PhiVir, IMX.CreAph, IMX.FiG, IMX.LsacX, LGS.Tal, LMS.MS, LMS.Znol, LMU.NVC_SM13, LR.Cor, LR.YG, MIR.HalXK, MIR.Ldig_Ldig, MLR.Ent, MLR.Rho, SIR.AscSAs, SIR.FchoG, SIR.Lsac.Pk, SIR.Lsac.T, SIR.LsacRS, SLR.Asc, SLR.AscX.mac, SLR.Bllit, SLR.Fcer, SLR.FvesX, CMU.Beg, ELR.Bpat, IMX.VsenMtru, SIR.PolFur	IMX.Tra, IMX.Pcri, LMS.BatCor, LMS.Pcer, LMS.Mac.Are, LMS.MacAre.Mare, LR.Cor.Par, LR.Cor.Bif, LR.Cor.Cys, LR.L, LR.Pra, LR.Ver, LR.Ver.Por, LR.Ver.B, LR.Ver.Ver, MIR.Ldig.T, MLR.Ent.Por, SIR.LsacRS.FiR, SIR.LsacRS.Psa, SIR.LsacRS.Phy, SLR.FcerX, SLR.FcerEnt, SLR.AscX, SLR.FserX, SLR.FserX.T, ELR.BPat.Cht, ELR.BPat.Lic, ELR.BPat.Cat, ELR.BPat.Fvesl, ELR.BPat.Sem,	36(29)
Seagrass beds	IMS.Zmar, LMS.Znol		2
<i>Serpula vermicularis</i> reefs	CMS.Ser		1
Sheltered muddy gravels	IMX.An, IMX.CreAph, IMX.Ost, IMX.PolMtru, IMX.VsenMtru		5
Sublittoral sands and gravels	CGS.Ven, IGS.FabMag, IGS.HalEdw, IGS.Lcon, IGS.Lgla, IGS.NeoGam, IGS.Phy.Hec, MIR.LsacChoR, IGS.NcirBat	CGS.Ven.Neo, CGS.Ven.Bra, IGS.Sell, IGS.Phy.R, IGX.Lcor, IMX.Lfas, IMX.Lden	9(7)
Tidal rapids	MCR.ModT, SIR.Lsac.T, SIR.MytT		3
Broad BAP habitat			
Inshore sublittoral rock	EIR.Ala, EIR.FoR, EIR.LhypFa, EIR.LhypR, EIR.LsacSac, EIR.SCAn, MIR.HalXK, MIR.Ldig.Ldig, MIR.LhypGz, MIR.LsacChoR, MIR.PolAhn, MIR.SabKR, SIR.AscSAs, SIR.CorEle, SIR.FchoG, SIR.HarCon, SIR.Lsac.Pk, SIR.Lsac.T, SIR.LsacRS, SIR.MytT, SIR.PolFur, IR.AlcByH	EIR.Ala.Myt, EIR.Ala.Ldig, EIR.Ala.AnSC, EIR.FoR.Dic, EIR.FoSwCC, EIR.LhypR.Ft, EIR.LhypR.Pk, EIR.LhypR.Loch, MIR.LhypT, MIR.Lhyp, MIR.Lhyp.Ft, MIR.Lhyp.Pk, MIR.Lhyp.Tft, MIR.Lhyp.TPk, MIR.Lhyp.Loch, EIR.SCAn.Tub, EIR.SCAs, EIR.SCAs.DenCla, EIR.SCAs.ByH, EIR.SC, MIR.LdigT, SIR.EchBriCC, EIR.LhypPar, MIR.LhypGz.Pk, MIR.LhypGz.Ft, MIR.EphR, MIR.XKScR, MIR.Sac, SIR.LsacRS.FiR, SIR.LsacRS.Psa, SIR.LsaRS.Phy, ECR.AlcTub, ECR.AlcMaS, ECR.AlcSec.	56

Appendix 6 (continued). The number of researched biotope Key Information reviews and represented biotopes within BAP habitat and species reviews.

UK BAP (Habitat)	Researched biotopes included	Represented biotopes included	No. Researched (represented)
Inshore sublittoral sediment	IGS.FabMag, IGS.HalEdw, IGS.Lcon, IGS.Lgla, IGS.NcirBat, IGS.NeoGam, IGS.Phy.Hec, IMS.Cap, IMS.EcorEns, IMS.MacAbr, IMS.Rup, IMS.Zmar, IMU.AphTub, IMU.AreSyn, IMU.LimTtub, IMU.NVC_A12, IMU.Ocn, IMU.PhiVir, IMU.PolVS, IMU.TubeAP, IMX.An, IMX.CreAph, IMX.FiG, IMX.Lim, IMX.LsacX, IMX.MytV, IMX.Ost, IMX.PolMtru, IMX.VsenMtru	IGS.Sell, IGS.Mob, IGS.MobRS, IGS.Phy.R, IMX.Lcor, IMX.Lfas, IMX.Lden, IMU.NhomTub, IMU.MobMud, IMU.CapTub, IMU.Tub, IMX.PolMtru, IMX.Tra, IMX.Pcri,	43
Littoral rock	ELR.Bpat, ELR.Coff, ELR.Fdis, ELR.Him, ELR.MytB, LR.Cor, LR.Ov, LR.RhoCv, LR.YG, MCR.Pid, MCR.Pol, MLR.BF, MLR.Ent, MLR.Fser.Fser.Bo, SLR.Fcer, SLR.FvesX, LR.G MLR.MytFves, MLR.Rho, MLR.Rpid, MLR.Salv, SLR.Asc, SLR.AscX.mac, SLR.Bllit,	ELR.BPat.Cht, ELR.BPat.Lic, ELR.BPat.Cat, ELR.BPat.Fvesl, ELR.BPat.Sem, MLR.XR, MLR.Pal, MLR.Mas, MLR.Osm, LR.Cor.Par, LR.Cor.Bif, LR.Cor.Cys, LR.SbyAs, LR.SR, LR.L, LR.Pra, LR.Ver, LR.Ver.Por, LR.Ver.B, LR.Ver.Ver, MLR.PelB, MLR.FvesB, MLR.Fser, MLR.Fser.R, MLR.Fser.Fser, MLR.Fser.Pid, SLR.Pel SLR.Fspi SLR.Fves, SLR.Fserr SLR.Fserr.T, SLR.Fserr.VS, MLR.EntPor, MIR.Ldig.Ldig.Bo, SLR.FcerX, SIR.FcerEnt, SLR.AscX, SLR.FseX, SLR.FserX.T, SLR.MytX, MLR.Myt.FR, MLR.MytPid,	24(42)
Littoral sediment	LGS.AEur, LGS.BarSnd, LGS.Lan, LGS.Pec, LMS.MS, LMS.Znol, LMU.HedMac, LMU.NVC_SM13, LMU.Sm	LGS.AP, LGS.AP.P, LGS.AP.Pon, LGS.Ol, LGS.BarSh, LMS.BatCor, LMS.Pcer, LMS.MacAre, LMS.MacAre.Mare, LMU.HedMac.Are, LMU.HedMac.Pyg, LMU.HedMac.Mare, LMU.HedScr, LMU.HedStr, LMU.HedOl,	9(15)
Oceanic seas			0
Offshore shelf rock	COR.Lop		1
Offshore shelf sediment			0
Supralittoral rock	LR.Chr, LR.G, LR.YG	LR.Bli, LR.UloUro, LR.L, LR.Pra, LR.Ver, LR.Ver.Por, LR.Ver.B, Lr.Ver.Ver	3(8)
Supralittoral sediment	LGS.Tal		1

Appendix 7a. Nationally scarce biotopes in the MarLIN database.

Biotope code	Biotope name	Biotope researched	Biotope not researched but represented by
Nationally Scarce Biotopes			
LITTORAL ROCK (and other hard substrata)			
EXPOSED LITTORAL ROCK (mussel and barnacle shores, robust furoids or red seaweeds)			
ELR.MB.Bpat. Fvesl	Barnacles, <i>Patella</i> spp. and <i>Fucus vesiculosus</i> f. <i>linearis</i> on exposed eulittoral rock.		ELR.MB.BPat
ELR.FR.Coff	<i>Corallina officinalis</i> on very exposed lower eulittoral rock.	•	
MODERATELY EXPOSED LITTORAL ROCK (barnacle and furoid shores, <i>Mytilus</i> (mussels) and furoids)			
MLR.BF.Fser.Pid	<i>Fucus serratus</i> and piddocks on lower eulittoral soft rock.		MLR.BF
MLR.R.XR	Mixed red seaweeds on moderately exposed lower eulittoral rock.		ELR.FR.Him
MLR.R.Mas	<i>Mastocarpus stellatus</i> and <i>Chondrus crispus</i> on very moderately exposed mid eulittoral rock.		ELR.FR.Him
MLR.R.Osm	<i>Osmundea (Laurencia) pinnatifida</i> and <i>Gelidium pusillum</i> on moderately exposed mid eulittoral rock.		ELR.FR.Him
MLR.Eph.EntPor	<i>Porphyra purpurea</i> or <i>Enteromorpha</i> spp. on sand-scoured mid to lower eulittoral rock.		MLR.Eph.Ent
MLR.MF.MytFves	<i>Mytilus edulis</i> and <i>Fucus vesiculosus</i> on moderately exposed mid-eulittoral rock.	•	
MLR.SabSalv	<i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock.	•	
SHELTERED LITTORAL ROCK (furoid shores)			
SLR.F.Asc.T	<i>Ascophyllum nodosum</i> , sponges and ascidians on tide-swept mid eulittoral rock.		SLR.F.Asc
SLR.F.Asc.VS	<i>Ascophyllum nodosum</i> and <i>Fucus vesiculosus</i> on variable salinity mid eulittoral rock.		SLR.F.Asc
SLR.F.Fser.T	<i>Fucus serratus</i> , sponges and ascidians on tide-swept lower eulittoral rock.		MLR.BF
SLR.F.Fserr.VS	<i>Fucus serratus</i> and large <i>Mytilus edulis</i> on variable salinity lower eulittoral rock.		MLR.BF
SLR.F.Fcer	<i>Fucus ceranoides</i> on reduced salinity eulittoral rock.	•	
SLR.AscX.mac	<i>Ascophyllum nodosum</i> ead <i>mackaii</i> beds on extremely sheltered mid eulittoral rock.	•	
LITTORAL ROCK (OTHER) (overhangs and caves)			
LR.Ov	Caves and overhangs.	•	

Biotope code	Biotope name	Biotope researched	Biotope not researched but represented by
LITTORAL SEDIMENTS			
LITTORAL GRAVELS AND SANDS			
LGS.Sh.Pec	<i>Pectenogammarus planicrurus</i> in mid shore well-sorted gravel and coarse sand.	•	
LITTORAL MUDDY SANDS			
LMS.Zos.Znol	<i>Zostera noltii</i> beds in upper to mid shore muddy sand.	•	
LITTORAL MUDS			
LMU.HedMac. Mare	<i>Hediste diversicolor</i> , <i>Macoma balthica</i> and <i>Mya arenaria</i> in sandy mud shores.		LMU.HedMac

Biotope code	Biotope name	Biotope researched	Biotope not researched but represented by
INFRALITTORAL ROCK (and other hard substrata)			
EXPOSED INFRALITTORAL ROCK			
EIR.LhypR.Loch	Mixed <i>Laminaria hyperborea</i> and <i>Laminaria ochroleuca</i> forest on exposed infralittoral rock.		EIR.LhypR
EIR.SCAs.DenCla	<i>Dendrodoa grossularia</i> and <i>Clathrina coriacea</i> on wave-surfed vertical infralittoral rock.		EIR.SCAn
MODERATELY EXPOSED INFRALITTORAL ROCK			
MIR.Ldig.T	<i>Laminaria digitata</i> , ascidians and bryozoans on tide-swept sublittoral fringe rock.		MIR.KR.Ldig.Ldig
MIR.KR.Ldig.Pid	<i>Laminaria digitata</i> and piddocks on sublittoral fringe soft rock.	•	
MIR.Lhyp.TPk	<i>Laminaria hyperborea</i> park with hydroids, bryozoans and sponges on tide-swept lower infralittoral rock.		EIR.LhypT
MIR.Lhyp.Loch	Mixed <i>Laminaria hyperborea</i> and <i>Laminaria ochroleuca</i> forest on moderately exposed infralittoral rock.		EIR.LhypR
SHELTERED INFRALITTORAL ROCK			
SIR.K.Lsac.Pk	<i>Laminaria saccharina</i> park on very sheltered lower infralittoral rock.	•	
SIR.K.Lsac.Pk. Cod	Sparse <i>Laminaria saccharina</i> with <i>Codium</i> spp. and sparse red seaweeds on heavily silted very sheltered infralittoral rock.		SIR.K.Lsac.Pk
SIR.EstFa.MytT	<i>Mytilus edulis</i> beds on reduced salinity tide-swept infralittoral rock.	•	
SIR.Lag.FchoG	Mixed fucoids, <i>Chorda filum</i> and green seaweeds on reduced salinity infralittoral rock.	•	

CIRCALITTORAL ROCK (and other hard substrata)			
EXPOSED CIRCALITTORAL ROCK			
ECR.CuSH	Cushion sponges, hydroids and ascidians on very tide-swept sheltered circalittoral rock.		IR.AlcBytH
MODERATELY EXPOSED CIRCALITTORAL ROCK			
MCR.MolPol.Sab	Dense ascidians, bryozoans and hydroids on crust of <i>Sabellaria spinulosa</i> on tide-swept circalittoral rock.		MCR.MolPol
MCR.Pid	Piddocks with a sparse associated fauna in upward-facing circalittoral soft chalk or clay.	•	
SHELTERED CIRCALITTORAL ROCK			
SCR.NeoPro. CaTw	Brachiopods, calcareous tubeworms (<i>Placostegus tridentatus</i> , <i>Hydroides</i>) and sponges on variable salinity circalittoral rock.		SCR.NeoPro
SCR.NeoPro.Den	<i>Neocrania anomala</i> , <i>Dendrodoa grossularia</i> , and <i>Sarcodictyon roseum</i> on reduced or low salinity circalittoral rock.		SCR.NeoPro
CIRCALITTORAL ROCK (OTHER)			
CR.Cv	Caves and overhangs (deep).	•	
CR.Scup	Sponges, cup corals and <i>Parerythropodium coralloides</i> on shaded or overhanging circalittoral rock.	•	

Biotope code	Biotope name	Biotope researched	Biotope not researched but represented by
SUBLITTORAL SEDIMENTS			
INFRALITTORAL GRAVELS AND SANDS			
IGS.Lgla	<i>Lithothamnion glaciale</i> maerl beds in tide-swept variable salinity infralittoral gravel.	•	
IGS.HalEdw	<i>Halocynthia chrysanthellum</i> and <i>Edwardsia timida</i> on sublittoral clean stone gravel.	•	
INFRALITTORAL MUDS			
IMU.NVC A12	<i>Potamogeton pectinatus</i> community.	•	
IMU.NVC S4	<i>Phragmites australis</i> swamp and reed beds.	•	
CIRCALITTORAL MUDS			
CMU.SpMeg.Fun	Seapens, including <i>Funiculina quadrangularis</i> , and burrowing megafauna in undisturbed circalittoral soft mud.		CMU.SpMeg
IMU.NVC S4	<i>Phragmites australis</i> swamp and reed beds.	•	

Biotope code	Biotope name	Biotope researched	Biotope not researched but represented by
INFRALITTORAL MIXED SEDIMENT			
IMX.FiG	Filamentous green seaweeds on low salinity infralittoral mixed sediment or rock.	•	
IMX.Lcor	<i>Lithothamnion corallioides</i> maerl beds on infralittoral muddy gravel.		IGS.Phy.HEc
IMX.Ost	<i>Ostrea edulis</i> beds on shallow sublittoral muddy sediment.	•	
IMX.VsenMtru	<i>Venerupis senegalensis</i> and <i>Mya truncata</i> in lower shore or infralittoral muddy gravel.	•	
IMX.Lim	<i>Limaria hians</i> beds in tide-swept sublittoral muddy mixed sediment.	•	

Appendix 7b. Nationally scarce biotope complexes in the MarLIN database.

Biotope code	Biotope name	National status	Biotope researched	Comments
SIR.Est.Fa	ESTUARINE FAUNAL COMMUNITIES	S		SIR.EstFa is a biotope complex listed as nationally scarce. There are three associated biotopes, all of which have been researched.
SIR.EstFa.MyT	<i>Mytilus edulis</i> beds on reduced salinity tide-swept infralittoral rock.	S	•	
SIR.EstFa.CorEle	<i>Cordylophora caspia</i> and <i>Electra crustulenta</i> on reduced salinity infralittoral rock.	R	•	
SIR.EstFla.HarCon	<i>Hartlaubella gelatinosa</i> and <i>Conopeum reticulum</i> on low salinity infralittoral mixed substrata.	R	•	
SIR.Lag	SUBMERGED FUCOIDS, GREEN AND RED SEaweEDS (LAGOONAL ROCK)	S		SIR.Lag is a biotope complex listed as nationally scarce. There are four associated biotopes, three have been researched and one is represented by SLR.Fcer
SIR.Lag.FchoG	Mixed fucoids, <i>Chorda filum</i> and green seaweeds on reduced salinity infralittoral rock.	S	•	
SIR.Lag.AscSAs	<i>Ascophyllum nodosum</i> with epiphytic sponges and ascidians on variable salinity infralittoral rock.	R	•	
SIR.Lag.PolFur	<i>Polyides rotundus</i> and/or <i>Furcellaria lumbricalis</i> on reduced salinity infralittoral rock.	R	•	
SIR.Lag.FcerEnt	<i>Fucus ceranoides</i> and <i>Enteromorpha</i> spp. on low salinity infralittoral rock.	R		
MCR.SfR	SOFT ROCK COMMUNITIES	S		MCR.SfR is a biotope complex listed as nationally scarce. There are two associated biotopes, both of these have been researched.
MCR.SfR.Pid	Piddocks with a sparse associated fauna in upward-facing circalittoral very soft chalk or clay.	S	•	
MCR.SfR.Pol	<i>Polydora</i> sp. tubes on upward-facing circalittoral soft rock.	Not available	•	

Biotope code	Biotope name	National status	Biotope researched	Comments
SCR.Mod	SHELTERED <i>MODIOLUS</i> (HORSE-MUSSEL) BEDS	S		SCR.Mod is a biotope complex listed as nationally scarce. There are two associated biotopes, these have not been researched but are represented by MCR.M.ModT.
SCR.Mod. ModCvar	<i>Modiolus modiolus</i> beds with <i>Chlamys varia</i> , sponges, hydroids and bryozoans on slightly tide-swept very sheltered circalittoral muddy substrata.	Not available		
SCR.Mod.ModHAs	<i>Modiolus modiolus</i> beds with fine hydroids and large solitary ascidians on very sheltered circalittoral mixed substrata.	Uncommon		
IMU.Ang	ANGIOSPERM COMMUNITIES (LAGOONS)	S		IMU.Ang is a biotope complex listed as nationally scarce. There are two associated biotopes, both of these have been researched.
IMU.Ang. NVC A12	<i>Potamogeton pectinatus</i> community.	S	•	
IMU.Ang.NVC S4	<i>Phragmites australis</i> swamp and reed beds.	S	•	
IMX.MrlMx	MAERL BEDS (MUDDY MIXED SEDIMENTS)	S		IMX.MrlMx is a biotope complex listed as nationally scarce. There are three associated biotopes, these have not been researched but are represented by IGS.Mrl.Py.HEc
IMX.MrlMx.Lcor	<i>Lithothamnion corallioides</i> maerl beds with infralittoral muddy gravel.	S		
IMX.MrlMx.Lfas	<i>Lithothamnion fasciculatum</i> maerl beds with <i>Chlamys varia</i> on infralittoral sandy mud or mud.	Not available		
IMX.MrlMx.Lden	<i>Lithothamnion dentatum</i> maerl beds with on infralittoral muddy sediment.	Not available		
IMX.Oy	OYSTER BEDS	S		IMX.Oy is a biotope complex listed as nationally scarce. There is one associated biotope, this has been researched.
IMX.Oy.Ost	<i>Ostrea edulis</i> beds on shallow sublittoral muddy sediment.	S	•	

Appendix 7c. Nationally rare biotopes in the MarLIN database.

Biotope code	Biotope name	Biotope researched	Actual biotope not researched but represented by
Nationally rare biotopes			
LITTORAL ROCK (and other hard substrata)			
LICHENS & ALGAL CRUSTS			
LR.L.Chr	Chrysophyceae on vertical upper littoral fringe soft rock.	•	
LRL.L.Bli	<i>Blidingia</i> spp. on vertical littoral fringe soft rock.		LR.L.Chr
LR.L.Ulo.Uro	<i>Ulothrix flacca</i> and <i>Urospora</i> spp. on freshwater-influenced vertical littoral fringe soft rock.		LR.L.Chr
EXPOSED LITTORAL ROCK (Robust fucoids or red seaweeds)			
ELR.FR.Fdis	<i>Fucus distichus</i> subsp. <i>anceps</i> and <i>Fucus spiralis</i> f. <i>nana</i> on extremely exposed upper eulittoral rock.	•	
MODERATELY EXPOSED LITTORAL ROCK (Red seaweeds moderately exposed shores, Littoral Sabellaria (honeycomb worm) reefs)			
MLR.R.RPid	<i>Ceramium</i> sp. and piddocks on eulittoral fossilised peat.	•	
MLR.MF.MytFR	<i>Mytilus edulis</i> , <i>Fucus serratus</i> and red seaweeds on moderately exposed lower eulittoral rock.		MLR.MF.MytFves
MLR.MF.Myt.Pid	<i>Mytilus edulis</i> and piddocks on eulittoral firm clay.		MLR.MF.MytFves
MLR.Sab	Littoral <i>Sabellaria</i> (honeycomb worm) reefs.		
SHELTERED LITTORAL ROCK (fucoid shores)			
SLR.FX.BLlit	Barnacles and <i>Littorina littorea</i> on unstable eulittoral mixed substrata.	•	
SLR.Lag.FcerEnt	<i>Fucus ceranoides</i> and <i>Enteromorpha</i> spp. on low salinity infralittoral rock.		SLR.F.Fcer
LITTORAL ROCK (other) (rockpools, overhangs & caves)			
LR.Rkp.Cor.Par	Coralline crusts and <i>Paracentrotus lividus</i> in shallow eulittoral rockpools.		LR.Rkp.Cor
LR.Rkp.Cor.Bif	<i>Bifurcaria bifurcata</i> in shallow eulittoral rockpools.		LR.Rkp.Cor
LR.Rkp.Cor.Cys	<i>Cystoseria</i> spp. in shallow eulittoral rockpools.		LR.Rkp.Cor
LR.FK.Sar	<i>Sargassum muticum</i> in eulittoral rockpools.		
LR.Rkp.H	Hydroids, ephemeral seaweeds and <i>Littorina littorea</i> in shallow eulittoral mixed substrata pools		
LR.Ov.RhoCv	<i>Rhodothamniella floridula</i> in littoral fringe soft rock caves.	•	

Biotope code	Biotope name	Biotope researched	Actual biotope not researched but represented by
INFRALITTORAL ROCK (and other hard substrata)			
MODERATELY EXPOSED INFRALITTORAL ROCK			
EIR.KfaR. LhypPar	Sparse <i>Laminaria hyperborea</i> and dense <i>Paracentrotus lividus</i> on exposed infralittoral limestone.		MIR.Lhyp.Gz
SHELTERED INFRALITTORAL ROCK			
SIR.K.LsacRS.Psa	<i>Laminaria saccharina</i> and <i>Psammechinus miliaris</i> on slightly reduced salinity grazed infralittoral rock.		SIR.K.LsacRS
SIR.K.LsacRS. Phy	<i>Laminaria saccharina</i> with <i>Phyllophora</i> spp. and filamentous green seaweeds on reduced or low salinity infralittoral rock.		SIR.K.LsacRS
SIR.EstFa.CorEle	<i>Cordylophora caspia</i> and <i>Electra crustulenta</i> on reduced salinity infralittoral rock.	•	
SIR.EstFa.HarCon	<i>Hartlaubella gelatinosa</i> and <i>Conopeum reticulum</i> on low salinity infralittoral mixed substrata	•	
SIR.Lag.AscSAs	<i>Ascophyllum nodosum</i> with epiphytic sponges and ascidians on variable salinity infralittoral rock.	•	
SIR.Lag.PolFur	<i>Polyides rotundus</i> and/or <i>Furcellaria lumbricalis</i> on reduced salinity infralittoral rock.	•	
INFRALITTORAL ROCK (OTHER)			
ECR.BS.BalHpan	<i>Balanus crenatus</i> , <i>Halichondria panicea</i> , and <i>Alcyonidium diaphanum</i> on extremely tide-swept sheltered circalittoral rock.		IR.FaSwV.AlcBytH

Biotope code	Biotope name	Biotope researched	Actual biotope not researched but represented by
CIRCALITTORAL ROCK (and other hard substrata)			
EXPOSED CIRCALITTORAL ROCK			
ECR.BS. HbowEud	<i>Halichondria bowerbanki</i> , <i>Eudendrium arbusculum</i> and <i>Eucratea loricata</i> on reduced salinity tide-swept circalittoral mixed substrata.	•	
MODERATELY EXPOSED CIRCALITTORAL ROCK			
MCR.Bri.Oph. Oacu	<i>Ophiopholis aculeata</i> beds on slightly tide-swept circalittoral rock or mixed substrata.		MCR.Bri.Oph

Biotope code	Biotope name	Biotope researched	Actual biotope not researched but represented by
SUBLITTORAL SEDIMENTS			
CIRCALITTORAL MUDDY SANDS			
CMS.Ser	<i>Serpula vermicularis</i> reefs on very sheltered circalittoral muddy sand.	•	
INFRALITTORAL MUDS			
IMU.MarMu.Ocn	<i>Ocnus planci</i> aggregations on sheltered sublittoral muddy sediment.	•	

Biotope code	Biotope name	Biotope researched	Actual biotope not researched but represented by
CIRCALITTORAL OFFSHORE SEDIMENTS			
COS. Sty	<i>Styela gelatinosa</i> and other solitary ascidians on sheltered deep circalittoral muddy sediment.	•	

Appendix 7d. Nationally rare biotopes complexes in the *MarLIN* database.

Biotope code	Biotope name	National status	Biotope researched	Comments
MLR.Sab	Littoral <i>Sabellaria</i> (honeycomb) worm reefs	R		MLR.Sab is a biotope complex listed as nationally scarce. There is one associated biotope, this has been researched
MLR.Sab.Salv	<i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock.	S	•	

Appendix 8. Biotopes considered in the UK Marine SACs habitat reviews that have been researched or represented by *MarLIN*.

UK Marine SAC	Researched biotopes included	Represented Biotopes	No. Researched (represented)
<i>Zostera</i> Biotopes	LMU.Znol, IMS.Zmar		2
Intertidal Sand and Mudflats & Subtidal Mobile Sandbanks	LGS.BarSnd, LGS.Pec, LGS.Aeur, LGS.Lan, LMS.MS, LMU.HedMac, IGS.NcirBat, IGS.Lcon, IGS.FabMag, IGS.NeoGam,	LGS.Ap, LGS.AP.P, LGS.AP.Pon, LGS.Est.Ol, LMS.BatCor, LMS.Pcer, LMS.Mac.Are, LMU.HedMac.Are, LMU.HedMac.Pyg, LMU.HedMac.Mare, LMU.HedScr, LMU.HedStr, LMU.HedOl, IGS.Mob, IGS.Sell, IGS.Ncir, IGS.MobRS	10(17)
Sea Pens and Burrowing Megafauna	CMU.SpMeg, CMU.BriAchi, CMS.AfliEcor, CMS.VirOph, IMU.PhiVir	CMU.SpMeg.Fun, CMS.VirOph.HAs	5(2)
Subtidal Brittlestar Beds	MCR.Oph	MCR.OphOacu	1(1)
Maerl	IGS.Lgla, IGS.Phy.HEc	IGS.Phy.R, IMX.Lcor, IMX.Lfas, IMX.Lden	2(4)
Intertidal Reef Biotopes	LR.Chr, LR.YG, ELR.MytB, ELR.Bpat, ELR.Fdis, ELR.Coff, ELR.Him, MLR.BF, MLR.Fser.Fser.Bo, MLR.Rho, MLR.Ent, MLR.MytFves, SLR.AscX.mac, SLR.F.Asc, SLR.FvesX, SLR.Bllit, LR.G, LR.Cor, LR.RhoCv	LR.Bli, LR.Ulo.Uro, LR.Pra, LR.Ver, LR.Ver.Por, LR.Ver.B, LR.Ver.Ver, ELR.BPat.Cht, ELR.BPat.Lic, ELR.Bpat.Cat, ELR.Fvesl, ELR.BPat.Sem, MLR.XR, MLR.Pal, MLR.Mas, MLR.Osm, MLR.PelB, MLR.FvesB, MLR.Fser, MLR.Fser.R, MLR.Fser.Fser, MLR.Fser.Pid, SLR.Pel, SLR.Fspi, SLR.Fves, SLR.Fserr, SLR.Fserr.T, SLR.Fserr.VS, SLR.FcerX, MLR.EntPor, SLR.EphX, SLR.MytX, MLR.MytFR, MLR.Myt.Pid, SLR.Asc.Asc, SLR.Asc.T, SLR.Asc.VS, SLR.AscX, SLR.FserX, SLR.FserX.T LR.SwSed, LR.Cor.Par, LR.Cor.Bif, LR.Cor.Cys, LR.SR, LR.SByAs	19(45)
Infralittoral Reef Biotopes with Kelp Species	EIR.Ala, EIR.LhypFa, EIR.LhypR, EIR.LsacSac, MIR.Ldig.Ldig, MIR.Ldig.Pid, MIR.LhypGz, MIR.LsacChoR, SIR.LsacPk, SIR.LsacT, SIR.LsacRS, IMX.LsacX	EIR.AlaMyt, EIR.Ala.Lig, EIR.AlaAnSC, EIR.LhypR.Ft, EIR.LhypR.Pk, EIR.LhypR.Loch, MIR.Lhyp, MIR.Lhyp.Ft, MIR.Lhyp.Pk, MIR.Lhyo.TFt, MIR.Lhyp.TPk, MIR.Lhyp.Loch, MIR.Ldig.T, LR.FK, EIR.LhypPar, MIR.LhypGz, MIR.LhypGz.Ft, MIR.HalXK, SIR.LhypLsac, SIR.LhypLsac.Ft SIR.LhypLsac.Pk, SIR.Lsac, SIR.Lsac.Ldig, SIR.Lsac.Ft, SIR.Lsac.Cod, SIR.LsacRS.FiR, SIR.LscaRS.Psa, SIR.LsacRS.Phy MIR.Ldig.Ldig.Bo	12(29)

UK Marine SAC	Researched biotopes included	Represented Biotopes	No. Researched (represented)
Circalittoral Faunal Turfs	ECR.PomByC, ECR.HbowEud, MCR.ErSEun, MCR.Flu, MCR.ByH.Urt, MCR.FaAIC, MCR.MolPol, MCR.Pid, MCR.Pol, SCR.AntAsH, SCR.SubSoAs, SCR.NeoPro, CR.Bug, CR.Scup	EIR.CC, EIR.CC.BalPom, EIR.CC.Mob, MCR.PhaAxi, MCR.ErSPbolSH, MCR.ErSSwi, MCR.SnemAdia, MCR.Flu.Flu, MCR.Flu.HbyS, MCR.Flu.SerHyd, MCR.Flu.Hocu, MCR.Urt.Urt, MCR.Urt.Cio, MCR.FaAIC.Abi, MCR.Sto.Paur, SCR.Amen.Cio, SCR.AmenCio.Met, SCR.Aasp, SCR.NeoPro.CaTw, CR.Ant	14(20)
Biogenic reefs	MLR.Salv, MCR.Sspi, MIR.SabKR, CMS.Ser	MCR.MolPol.Sab	4(1)

Appendix 9. Researched biotopes Key Information within Lifeforms

Lifeform	Biotope code	Biotope name
ALGAL TURF	MLR.R.RPid	<i>Ceramium</i> sp. and piddocks on eulittoral fossilised peat.
	MLR.Eph.Rho	<i>Rhodothamniella floridula</i> on sand-scoured lower eulittoral rock.
	MLR.Eph.Ent	<i>Enteromorpha</i> spp. on freshwater influenced or unstable upper eulittoral rock.
	LR.Rkp.G	Green seaweeds (<i>Enteromorpha</i> spp. and <i>Cladophora</i> spp.) in upper shore rockpools.
	LR.Rkp.Cor	<i>Corallina officinalis</i> and coralline crusts in shallow eulittoral rockpools.
	LR.Ov	Overhangs and caves
	LR.Ov.RhoCv	<i>Rhodothamniella floridula</i> in littoral fringe soft rock caves.
BACTERIAL MATS IN ANOXIC MUD.	CMU.Beg	<i>Beggiatoa</i> spp. on anoxic sublittoral mud.
BIOGENIC CALCAREOUS REEFS	CMS.Ser	<i>Serpula vermicularis</i> reefs on very sheltered circalittoral muddy sand.
BIOGENIC SAND REEFS.	MLR.Sab.Salv	<i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock.
	MCR.Csab.Sspi	<i>Sabellaria spinulosa</i> crusts on silty turbid circalittoral rock.
BRITTLE STAR BEDS	MCR.Bri.Oph	<i>Ophiothrix fragilis</i> and/or <i>Ophiocomina nigra</i> beds on slightly tide-swept circalittoral rock or mixed substrata.
FAUNAL & ALGAL CRUSTS	MCR.GzFa.FaAIC	Faunal and algal crusts, <i>Echinus esculentus</i> , sparse <i>Alcyonium digitatum</i> and grazing-tolerant fauna on moderately exposed circalittoral rock.
FAUNAL TURF	SIR.EstFa.CorEle	<i>Cordylophora caspia</i> and <i>Electra crustulenta</i> on reduced salinity infralittoral rock.
	SIR.EstFa.HarCon	<i>Hartlaubella gelatinosa</i> and <i>Conopeum reticulum</i> on low salinity infralittoral mixed substrata.
	ECR.BS.HbowEud	<i>Halichondria bowerbanki</i> , <i>Eudendrium arbusculum</i> and <i>Eucratea loricata</i> on reduced salinity tide-swept circalittoral mixed substrata.
	MCR.ByH.Flu.	<i>Flustra foliacea</i> and other hydroid/bryozoan turf species on slightly scoured circalittoral rock or mixed substrata.
	MCR.ByH.Urt.	<i>Urticina felina</i> on sand-affected circalittoral rock.
	SCR.BrAs.AntAsH	<i>Antedon</i> spp., solitary ascidians and fine hydroids on sheltered circalittoral rock.
	SCR.BrAS.SubSoAs	<i>Suberites</i> spp. and other sponges with solitary ascidians on very sheltered circalittoral rock.
	SCR.BrAs.NeoPro	<i>Neocrania anomala</i> and <i>Protanthea simplex</i> on very sheltered circalittoral rock.
	CR.Cv	Caves and overhangs (deep)
	CR.Cv.Scup	Sponges, cup corals and <i>Parerythropodium coralloides</i> on shaded or overhanging circalittoral rock.
	MCR.Xfa.ErSEun	Erect sponges, <i>Eunicella verrucosa</i> and <i>Pentapora foliacea</i> on slightly tide-swept moderately exposed circalittoral rock.
	MCR.As.MolPol	<i>Molgula manhattensis</i> and <i>Polycarpa</i> spp. with erect sponges on tide-swept moderately exposed circalittoral rock.
	CR.FaV.Bug	<i>Bugula</i> spp. and other bryozoans on vertical moderately exposed circalittoral rock.
	FUCOIDS	ELR.FR.Fdis
MLR.BF.Fser.Fser.Bo		<i>Fucus serratus</i> and under-boulder fauna on lower eulittoral boulders.
SLR.Fx.FserX.T		<i>Fucus serratus</i> with sponges, ascidians and red seaweeds on tide-swept lower eulittoral mixed substrata.
SLR.F.Asc		<i>Ascophyllum nodosum</i> on very sheltered mid eulittoral rock.
SLR.F.Fcer		<i>Fucus ceranoides</i> on reduced salinity eulittoral rock.
SLR.FX.FvesX		<i>Fucus vesiculosus</i> on mid eulittoral mixed substrata.

Lifeform	Biotope code	Biotope name
FUCOIDS (continued)	SLR.FX.BLlit	Barnacles and <i>Littorina littorea</i> on unstable eulittoral mixed substrata.
	SIR.Lag.FchoG	Mixed fucoids, <i>Chorda filum</i> and green seaweeds on reduced salinity infralittoral rock.
	SIR.Lag.AscSAs	<i>Ascophyllum nodosum</i> with epiphytic sponges and ascidians on variable salinity infralittoral rock.
	ELR.FR.Coff	<i>Corallina officinalis</i> on very exposed lower eulittoral rock.
	ELR.FR.Him	<i>Himantalia elongata</i> and red seaweeds on exposed lower eulittoral rock.
	MLR.BF	Barnacles and fucoids (moderately exposed shores).
	SLR.FX.AscX.mac	<i>Ascophyllum nodosum</i> ecad <i>mackaii</i> beds on extremely sheltered mid eulittoral mixed substrata.
	SIR.Lag.PolFur	<i>Polyides rotundus</i> and/or <i>Furcellaria lumbricalis</i> on reduced salinity infralittoral rock.
KELP	EIR.KfaR.Ala	<i>Alaria esculenta</i> on exposed sublittoral fringe rock.
	EIR.KfaR.LypR	<i>Laminaria hyperborea</i> with dense foliose red seaweeds on exposed infralittoral rock.
	EIR.KfaR.LsacSac	<i>Laminaria saccharina</i> and/or <i>Saccorhiza polyschides</i> on exposed infralittoral rock.
	EIR.KfaR.FoR	Foliose red seaweeds on exposed or moderately exposed lower infralittoral rock.
	MIR.KR.Ldig.Ldig	<i>Laminaria digitata</i> on moderately exposed sublittoral fringe rock.
	MIR.KR.Ldig.Pid	<i>Laminaria digitata</i> and piddocks on sublittoral fringe soft rock.
	MIR.SedK.SabKR	<i>Sabellaria spinulosa</i> with kelp and red seaweeds on sand-influenced infralittoral rock.
	MIR.LhypGz	Grazed <i>Laminaria hyperborea</i> with coralline crusts on infralittoral rock
	MIR.SedK.LsacChoR	<i>Laminaria saccharina</i> , <i>Chorda filum</i> and dense red seaweeds on shallow unstable infralittoral boulders and cobbles.
	MIR.SedK.HalXK	<i>Halidrys siliquosa</i> and mixed kelps on tide-swept infralittoral rock with coarse sediment.
	MIR.SedK.PolAhn	<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock.
	SIR.K.Lsac.Pk*	<i>Laminaria saccharina</i> park on very sheltered lower infralittoral rock.
	SIR.K.Lsac.T	<i>Laminaria saccharina</i> , foliose red seaweeds, sponges and ascidians on tide-swept infralittoral rock.
	SIR.K.LsacRS	<i>Laminaria saccharina</i> on reduced salinity infralittoral rock.
	EIR.KfaR.LhypFa	<i>Laminaria hyperborea</i> forest with a faunal cushion (sponges and polyclinids) and foliose red seaweeds on very exposed infralittoral rock.
	LICHENS & ALGAE	LR.L.Chr
LR.L.YG		Yellow and grey lichens on supralittoral rock.
MAERL BEDS	IGS.Mrl.Py.HEc	<i>Phymatolithon calcareum</i> maerl beds with hydroids and echinoderms in deeper infralittoral clean gravel or coarse sand .
	IGSMrl.Lgla	<i>Lithothamnion glaciale</i> maerl beds in tide-swept variable salinity infralittoral gravel.
MUD	IMU.MarMu.TubeAP	Semi-permanent tube-building amphipods and polychaetes in sublittoral mud or muddy sand.
	IMU.MarMu.AreSyn	<i>Arenicola marina</i> and synaptid holothurians in extremely shallow soft mud.
	IMU.MarMu.PhiVir	<i>Philine aperta</i> and <i>Virgularia mirabilis</i> in soft stable infralittoral mud.
	IMU.MarMu.Ocn	<i>Ocnus planci</i> aggregations on sheltered sublittoral muddy sediment.

Lifeform	Biotope code	Biotope name
MUD (continued)	IMU.EstMu.PoIVS	<i>Polydora ciliata</i> in variable salinity infralittoral firm mud or clay.
	IMU.EstMu.AphTub	<i>Aphelochaeta marioni</i> and <i>Tubificoides</i> spp. in variable salinity infralittoral mud.
	IMU.EstMu.Lim.Ttub	<i>Limnodrilus hoffmeisteri</i> , <i>Tubifex tubifex</i> and <i>Gammarus</i> spp. in low salinity infralittoral muddy sediment.
	CMU.BriAchi	<i>Brissopsis lyrifera</i> and <i>Amphiura chiajei</i> in circalittoral mud.
	CMU.SpMeg	Seapens and burrowing megafauna in circalittoral soft mud.
	COS.ForThy	Foramaniferans and <i>Thyasira</i> sp. in deep circalittoral soft mud.
	COS.Sty	<i>Styela gelatinosa</i> and other solitary ascidians on sheltered deep circalittoral muddy sediment.
	IMU.Ang.NVC A12	<i>Potamogeton pectinatus</i> community.
MUDDY SAND	LMS.MS	Muddy sand shores.
	LMU.Smu.HedMac	<i>Hediste diversicolor</i> and <i>Macoma balthica</i> in sandy mud shores.
	IMS.FaMS.EcorEns	<i>Echinocardium cordatum</i> and <i>Ensis</i> sp. in lower shore or shallow sublittoral muddy fine sand.
	IMS.FaMS.MacAbr	<i>Macoma balthica</i> and <i>Abra alba</i> in infralittoral muddy sand or mud.
	IMS.FaMS.Cap	<i>Capitella capitata</i> in enriched sublittoral muddy sediments.
	CMS.AbrNucCor	<i>Abra alba</i> , <i>Nucula nitida</i> and <i>Corbula gibba</i> in circalittoral muddy sand or slightly mixed sediment.
	CMS.AfilEcor	<i>Amphiura filiformis</i> and <i>Echinocardium cordatum</i> in circalittoral clean or slightly muddy sand.
	CMS.VirOph	<i>Virgularia mirabilis</i> and <i>Ophiura</i> spp. on circalittoral sandy or shelly mud.
	COS.AmpPar	<i>Ampharete falcata</i> turf with <i>Parvicardium ovale</i> on cohesive muddy very fine sand near margins of deep stratified seas.
MUSSEL & BARNACLE	ELR.MB.MytB	<i>Mytilus edulis</i> and barnacles on very exposed eulittoral rock.
	ELR.MB.Bpat	Barnacles and <i>Patella</i> spp. On exposed or moderately exposed, or vertical sheltered eulittoral rock.
	MLR.MF.MytFves	<i>Mytilus edulis</i> and <i>Fucus vesiculosus</i> on moderately exposed mid-eulittoral rock).
MUSSEL BEDS	SIR.EstFa.MytT	<i>Mytilus edulis</i> beds on reduced salinity tide-swept infralittoral rock.
	IMX.EstMx. MytV	<i>Mytilus edulis</i> beds in variable salinity infralittoral mixed sediment.
	MCR.M.MytHAs	<i>Mytilus edulis</i> beds with hydroids and ascidians on tide-swept moderately exposed circalittoral rock.
	MCR.M.Mus	<i>Musculus discors</i> beds on moderately exposed circalittoral rock.
	MCR.M.ModT	<i>Modiolus modiolus</i> beds with hydroids and red seaweeds on tide-swept circalittoral mixed substrata.
OFFSHORE DEEP WATER CORAL HABITATS.	COR.Lop	<i>Lophelia</i> reefs.
OYSTER BEDS	IMX.Oy.Ost	<i>Ostrea edulis</i> beds on shallow sublittoral muddy sediment.
SOFT ROCK COMMUNITIES	MCR.SfR.Pid	Piddocks with a sparse associated fauna in upward-facing circalittoral very soft chalk or clay.
	MCR.SfR.Pol	<i>Polydora</i> sp. tubes on upward-facing circalittoral soft rock.
REEDBEDS	IMU.Ang.NVC S4	<i>Phragmites australis</i> swamp and reed beds.
SALTMARSH	LMU.Sm (low mid) (NVC SM13)	<i>Puccinellia maritima</i>
	LMU.Sm (NVC SM8)	<i>Salicornia</i> sp.

Lifeform	Biotope code	Biotope name
SAND	LGS.S.BarSnd	Barren coarse sand shores.
	LGS.S.Tal	Talitrid amphipods in decomposing seaweed on the strandline.
	LGS.S.AEur	Burrowing amphipods and <i>Eurydice pulchra</i> in well-drained clean sand shores.
	LGS.S.Lan	Dense <i>Lanice conchilega</i> in tide-swept lower shore sand.
SEAGRASS BEDS	LMS.Zos.Znol	<i>Zostera noltii</i> beds in upper to mid shore muddy sand.
	IMS.Sgr.Zmar	<i>Zostera marina/angustifolia</i> beds in lower shore or infralittoral clean or muddy sand.
	IMS.Sgr.Rup	<i>Ruppia maritima</i> in reduced salinity infralittoral muddy sand.
SHINGLE, COARSE SAND & MIXED SEDIMENTS	IGS.FaS.NcirBat	<i>Nephtys cirrosa</i> and <i>Bathyporeia</i> spp. in infralittoral sand.
	IGS.FaS.Lcon	Dense <i>Lanice conchilega</i> and other polychaetes in tide-swept infralittoral sand.
	IGS.FaS.FabMag	<i>Fabulina fabula</i> and <i>Magelona mirabilis</i> with venerid bivalves in infralittoral compacted fine sand.
	IGS.EstGS.NeoGam	<i>Neomysis integer</i> and <i>Gammarus</i> spp. In low salinity infralittoral mobile sand.
	CGS.Ven	Venerid bivalves in circalittoral coarse sand or gravel.
	IMX.KSwMx.LsacX	<i>Laminaria saccharina</i> , <i>Chorda filum</i> and filamentous red seaweeds on sheltered infralittoral sediment.
	IMX.FaMx.VsenMtru	<i>Venerupis senegalensis</i> and <i>Mya truncata</i> in lower shore or infralittoral muddy gravel.
	IMX.FaMx.An	Burrowing anemones in sublittoral muddy gravel.
	IMX.FaMx.Lim	<i>Limaria hians</i> beds in tide-swept sublittoral muddy mixed sediment.
	IMX.EstMx.CreAph	<i>Crepidula fornicata</i> and <i>Aphelochaeta marioni</i> in variable salinity infralittoral mixed sediment.
	IMX.EstMx.PolMtru	<i>Polydora ciliata</i> , <i>Mya truncata</i> and solitary ascidians in variable salinity infralittoral mixed sediment.
	IGS.FaG.HalEdw	<i>Halocampia chrysanthellum</i> and <i>Edwardsia timida</i> on sublittoral clean stone gravel.
	IMX.KSwMx.FiG	Filamentous green seaweeds on low salinity infralittoral mixed sediment or rock.
	LGS.Sh.Pec	<i>Pectenogammarus planicrurus</i> in mid shore well-sorted gravel or coarse sand.
SHORT FAUNAL TURF, CRUSTS & CUSHIONS	EIR.SG.SCAN	Sponge crusts and anemones on wave-surged vertical infralittoral rock.
	IR.FaSwV.AlcBytH	<i>Alcyonium digitatum</i> and a bryozoan, hydroid and ascidian turf on moderately exposed vertical infralittoral rock.
	ECR.Efa.PomByC	<i>Pomatoceros triqueter</i> , <i>Balanus crenatus</i> , and bryozoan crusts on mobile circalittoral cobbles and pebbles.

Appendix 10. Comparison of biotopes of Welsh interest (supplied by CCW) with full list of biotopes taken from Connor *et al.* (1997a, b) and biotopes researched or represented by *MarLIN*. Biotopes are listed as researched, represented or not done.

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
LR		Littoral rock (and other hard substrata)		
LR.L		Lichens or algal crusts		BIOTOPE COMPLEX
LR.L	YG	Yellow and grey lichens on supralittoral rock	●	Researched
LR.L	Pra	<i>Prasiola stipitata</i> on nitrate-enriched supralittoral or littoral fringe rock	●	Represented by LR.L.YG
LR.L	Ver	<i>Verrucaria maura</i> on littoral fringe rock	●	Represented by LR.L.YG
LR.L	Ver.Por	<i>Verrucaria maura</i> and <i>Porphyra umbilicalis</i> on very exposed littoral fringe rock	●	Represented by LR.L.YG
LR.L	Ver.B	<i>Verrucaria maura</i> and sparse barnacles on exposed littoral fringe rock	●	Represented by LR.L.YG
LR.L	Ver.Ver	<i>Verrucaria maura</i> on moderately exposed to very sheltered upper littoral fringe rock	●	Represented by LR.L.YG
LR.L	Chr	Chrysophyceae on vertical upper littoral fringe soft rock		Researched
LR.L	Bli	<i>Blidingia</i> spp. on vertical littoral fringe soft rock	●	Represented by LR.L.Chr
LR.L	UloUro	<i>Ulothrix flacca</i> and <i>Urospora</i> spp. on freshwater-influenced vertical littoral fringe soft rock	●	Represented by LR.L.Chr
ELR		Exposed littoral rock		
ELR.MB		Mytilus (mussels) and barnacles		BIOTOPE COMPLEX
ELR.MB	MytB	<i>Mytilus edulis</i> and barnacles on very exposed eulittoral rock	●	Researched
ELR.MB	BPat	Barnacles and <i>Patella</i> spp. on exposed or moderately exposed, or vertical sheltered, eulittoral rock	●	Researched
ELR.MB	BPat.Cht	<i>Chthamalus</i> spp. on exposed upper eulittoral rock	●	Represented by ELR.MB.Bpat
ELR.MB	BPat.Lic	Barnacles and <i>Lichina pygmaea</i> on steep exposed upper eulittoral rock	●	Represented by ELR.MB.Bpat
ELR.MB	BPat.Cat	<i>Catenella caespitosa</i> on overhanging, or shaded vertical, upper eulittoral rock	●	Represented by ELR.MB.Bpat
ELR.MB	BPat.Fvesl	Barnacles, <i>Patella</i> spp. and <i>Fucus vesiculosus</i> f. <i>linearis</i> on exposed eulittoral rock	●	Represented by ELR.MB.Bpat
ELR.MB	BPat.Sem	<i>Semibalanus balanoides</i> on exposed or moderately exposed, or vertical sheltered, eulittoral rock	●	Represented by ELR.MB.Bpat
ELR.FR		Robust furoids or red seaweeds		BIOTOPE COMPLEX
ELR.FR	Fdis	<i>Fucus distichus</i> subsp. <i>anceps</i> and <i>Fucus spiralis</i> f. <i>nana</i> on extremely exposed upper eulittoral rock		Researched
ELR.FR	Coff	<i>Corallina officinalis</i> on very exposed lower eulittoral rock	●	Researched
ELR.FR	Him	<i>Himanthalia elongata</i> and red seaweeds on exposed lower eulittoral rock	●	Researched

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
MLR		Moderately exposed littoral rock	●	BIOTOPE COMPLEX
MLR.BF		Barnacles and fucoids (moderately exposed shores)	●	Researched
MLR.BF	PeIB	<i>Pelvetia canaliculata</i> and barnacles on moderately exposed littoral fringe rock	●	Represented by MLR.BF
MLR.BF	FvesB	<i>Fucus vesiculosus</i> and barnacle mosaics on moderately exposed mid eulittoral rock	●	Represented by MLR.BF
MLR.BF	Fser	<i>Fucus serratus</i> on moderately exposed lower eulittoral rock	●	Represented by MLR.BF
MLR.BF	Fser.R	<i>Fucus serratus</i> and red seaweeds on moderately exposed lower eulittoral rock	●	Represented by MLR.BF
MLR.BF	Fser.Fser	Dense <i>Fucus serratus</i> on moderately exposed to very sheltered lower eulittoral rock	●	Represented by MLR.BF
MLR.BF	Fser.Fser.Bo	<i>Fucus serratus</i> and under-boulder fauna on lower eulittoral boulders	●	Researched
MLR.BF	Fser.Pid	<i>Fucus serratus</i> and piddocks on lower eulittoral soft rock	●	Represented by MLR.BF
MLR.R		Red seaweeds (moderately exposed shores)	●	BIOTOPE COMPLEX
MLR.R	XR	Mixed red seaweeds on moderately exposed lower eulittoral rock	●	Represented by ELR.FR.Him
MLR.R	Pal	<i>Palmaria palmata</i> on very to moderately exposed lower eulittoral rock	●	Represented by ELR.FR.Him
MLR.R	Mas	<i>Mastocarpus stellatus</i> and <i>Chondrus crispus</i> on very to moderately exposed lower eulittoral rock	●	Represented by ELR.FR.Him
MLR.R	Osm	<i>Osmundea (Laurencia) pinnatifida</i> and <i>Gelidium pusillum</i> on moderately exposed mid eulittoral rock	●	Represented by ELR.FR.Him
MLR.R	RPid	<i>Ceramium</i> sp. and piddocks on eulittoral fossilised peat		Researched
MLR.Eph		Ephemeral green or red seaweeds (freshwater or sand-influenced)	●	BIOTOPE COMPLEX
MLR.Eph	Ent	<i>Enteromorpha</i> spp. on freshwater-influenced or unstable upper eulittoral rock	●	Researched
MLR.Eph	EntPor	<i>Porphyra purpurea</i> or <i>Enteromorpha</i> spp. on sand-scoured mid or lower eulittoral rock	●	Represented by MLR.Eph.Ent
MLR.Eph	Rho	<i>Rhodothamniella floridula</i> on sand-scoured lower eulittoral rock	●	Researched
MLR.MF		Mytilus (mussels) and fucoids (moderately exposed shores)	●	BIOTOPE COMPLEX
MLR.MF	MytFves	<i>Mytilus edulis</i> and <i>Fucus vesiculosus</i> on moderately exposed mid eulittoral rock	●	Researched
MLR.MF	MytFR	<i>Mytilus edulis</i> , <i>Fucus serratus</i> and red seaweeds on moderately exposed lower eulittoral rock	●	Represented by MLR.MF.MytFves
MLR.MF	MytPid	<i>Mytilus edulis</i> and piddocks on eulittoral firm clay	●	Represented by MLR.MF.MytFves
MLR.Sab		Littoral Sabellaria (honeycomb worm) reefs		BIOTOPE COMPLEX
MLR.Sab	Salv	<i>Sabellaria alveolata</i> reefs on sand-abraded eulittoral rock	●	Researched

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
SLR		Sheltered littoral rock		
SLR.F		Dense fucoids (stable rock)	●	BIOTOPE COMPLEX
SLR.F	Pel	<i>Pelvetia canaliculata</i> on sheltered littoral fringe rock	●	Represented by MLR.BF
SLR.F	Fspi	<i>Fucus spiralis</i> on moderately exposed to very sheltered upper eulittoral rock	●	Represented by MLR.BF
SLR.F	Fves	<i>Fucus vesiculosus</i> on sheltered mid eulittoral rock	●	Represented by MLR.BF
SLR.F	Asc	<i>Ascophyllum nodosum</i> on very sheltered mid eulittoral rock	●	Researched
SLR.F	Asc.Asc	<i>Ascophyllum nodosum</i> on full salinity mid eulittoral rock	●	Represented by SLR.F.Asc
SLR.F	Asc.T	<i>Ascophyllum nodosum</i> , sponges and ascidians on tide-swept mid eulittoral rock	●	Represented by SLR.F.Asc
SLR.F	Asc.VS	<i>Ascophyllum nodosum</i> and <i>Fucus vesiculosus</i> on variable salinity mid eulittoral rock	●	Represented by SLR.F.Asc
SLR.F	Fserr	<i>Fucus serratus</i> on sheltered lower eulittoral rock	●	Represented by MLR.BF
SLR.F	Fserr.T	<i>Fucus serratus</i> , sponges and ascidians on tide-swept lower eulittoral rock	●	Represented by MLR.BF
SLR.F	Fserr.VS	<i>Fucus serratus</i> and large <i>Mytilus edulis</i> on variable salinity lower eulittoral rock	●	Represented by MLR.BF
SLR.F	Fcer	<i>Fucus ceranoides</i> on reduced salinity eulittoral rock	●	Researched
SLR.FX		Furoids, barnacles or ephemeral seaweeds (mixed substrata)		BIOTOPE COMPLEX
SLR.FX	BLlit	Barnacles and <i>Littorina littorea</i> on unstable eulittoral mixed substrata	●	Researched
SLR.FX	FvesX	<i>Fucus vesiculosus</i> on mid eulittoral mixed substrata		Researched
SLR.FX	AscX	<i>Ascophyllum nodosum</i> on mid eulittoral mixed substrata	●	Represented by SLR.FX.FvesX
SLR.FX	AscX.mac	<i>Ascophyllum nodosum</i> ecad <i>mackaii</i> beds on extremely sheltered mid eulittoral mixed substrata		Researched
SLR.FX	FserX	<i>Fucus serratus</i> on lower eulittoral mixed substrata	●	Represented by SLR.FX.FvesX
SLR.FX	FserX.T	<i>Fucus serratus</i> with sponges, ascidians and red seaweeds on tide-swept lower eulittoral mixed substrata	●	Represented by SLR.FX.FvesX
SLR.FX	EphX	Ephemeral green and red seaweeds on variable salinity or disturbed eulittoral mixed substrata	●	Represented by MLR.Eph.Ent
SLR.FX	FcerX	<i>Fucus ceranoides</i> on reduced salinity eulittoral mixed substrata	●	Represented by SLR.F.Fcer
SLR.MX		<i>Mytilus</i> (mussel) beds (mixed substrata)		BIOTOPE COMPLEX
SLR.MX	MytX	<i>Mytilus edulis</i> beds on eulittoral mixed substrata	●	Represented by MLR.MF.MytFves

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
LR		Littoral rock (other)		
LR.Rkp		Rockpools	●	BIOTOPE COMPLEX
LR.Rkp	G	Green seaweeds (<i>Enteromorpha</i> spp. and <i>Cladophora</i> spp.) in upper shore rockpools	●	Researched
LR.Rkp	Cor	<i>Corallina officinalis</i> and coralline crusts in shallow eulittoral rockpools	●	Researched
LR.Rkp	Cor.Par	Coralline crusts and <i>Paracentrotus lividus</i> in shallow eulittoral rockpools		Represented by LR.Rkp.Cor
LR.Rkp	Cor.Bif	<i>Bifurcaria bifurcata</i> in shallow eulittoral rockpools	●	Represented by LR.Rkp.Cor
LR.Rkp	Cor.Cys	<i>Cystoseira</i> spp. in shallow eulittoral rockpools	●	Represented by LR.Rkp.Cor
LR.Rkp	FK	Fucoids and kelps in deep eulittoral rockpools	●	Represented by MIR.KR.Ldig.Ldig
LR.Rkp	FK.Sar	<i>Sargassum muticum</i> in eulittoral rockpools	●	Not done
LR.Rkp	SwSed	Seaweeds in sediment (sand or gravel)-floored eulittoral rockpools	●	Represented by LR.Rkp.Cor
LR.Rkp	H	Hydroids, ephemeral seaweeds and <i>Littorina littorea</i> in shallow eulittoral mixed substrata pools	●	Not done
LR.Ov		Overhangs and caves		Researched
LR.Ov	RhoCv	<i>Rhodothamniella floridula</i> in upper littoral fringe soft rock caves	●	Researched
LR.Ov	SR	Sponges and shade-tolerant red seaweeds on overhanging lower eulittoral bedrock	●	Represented by LR.Ov
LR.Ov	SByAs	Sponges, bryozoans and ascidians on deeply overhanging lower shore bedrock	●	Represented by LR.Ov
LS		Littoral sediment		
LGS		Littoral gravels and sands	●	
LGS.Sh		Shingle (pebble) and gravel shores		BIOTOPE COMPLEX
LGS.Sh	BarSh	Barren shingle or gravel shores	●	Represented by LGS.S.BarSnd
LGS.Sh	Pec	<i>Pectenogammarus planicrurus</i> in mid shore well-sorted gravel or coarse sand	●	Researched
LGS.S		Sand shores	●	BIOTOPE COMPLEX
LGS.S	Tal	Talitrid amphipods in decomposing seaweed on the strand-line	●	Researched
LGS.S	BarSnd	Barren coarse sand shores	●	Researched
LGS.S	AEur	Burrowing amphipods and <i>Eurydice pulchra</i> in well-drained clean sand shores	●	Researched
LGS.S	AP	Burrowing amphipods and polychaetes in clean sand shores	●	Represented by LGS.Aeur
LGS.S	AP.P	Burrowing amphipods and polychaetes (often with <i>Arenicola marina</i>) in clean sand shores	●	Represented by LGS.Aeur
LGS.S	AP.Pon	Burrowing amphipods <i>Pontocrates</i> spp. and <i>Bathyporeia</i> spp. in lower shore clean sand	●	Represented by LGS.Aeur

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
LGS.S	Lan	Dense <i>Lanice conchilega</i> in tide-swept lower shore sand	●	Researched
LGS.Est		Estuarine coarse sediment shores		
LGS.Est	Ol	Oligochaetes in reduced or low salinity gravel or coarse sand shores	●	Represented by LGS.Aeur
LMS		Littoral muddy sands	●	
LMS.MS		Muddy sand shores		Researched
LMS.MS	BatCor	<i>Bathyporeia</i> spp. and <i>Corophium</i> spp. in upper shore slightly muddy fine sands	●	Represented by LMS.MS
LMS.MS	PCer	Polychaetes and <i>Cerastoderma edule</i> in fine sand and muddy sand shores	●	Represented by LMS.MS
LMS.MS	MacAre	<i>Macoma balthica</i> and <i>Arenicola marina</i> in muddy sand shores	●	Represented by LMS.MS
LMS.MS	MacAre. Mare	<i>Arenicola marina</i> , <i>Macoma balthica</i> and <i>Mya arenaria</i> in muddy sand shores	●	Represented by LMS.MS
LMS.Zos		Littoral <i>Zostera</i> (seagrass) beds		BIOTOPE COMPLEX
LMS.Zos	Znol	<i>Zostera noltii</i> beds in upper to mid shore muddy sand	●	Researched
LMU		Littoral muds	●	
LMU.Sm		Saltmarsh (drift-line)		Represented by LMU.Sm(low mid) (NVC SM13)
LMU.Sm	NVC SM24	<i>Elymus pycnanthus</i> with <i>Suaeda vera</i> or <i>Inula crithmoides</i>		
LMU.Sm	NVC SM28	<i>Elymus repens</i>		
LMU.Sm	NVC SM25	<i>Suaeda vera</i>		
LMU.Sm	NVC SM21	<i>Suaeda vera</i> - <i>Limonium binervosum</i>		
LMU.Sm	NVC SM23	<i>Spergularia marina</i> - <i>Puccinellia distans</i>		
LMU.Sm	NVC SM22	<i>Frankenia laevis</i> - <i>Halimione portulacoides</i>		
LMU.Sm	NVC SM26	<i>Inula crithmoides</i> on saltmarshes		
LMU.Sm	NVC SM27	<i>Sagina maritima</i> ephemeral saltmarsh in sand		
LMU.Sm		Saltmarsh (mid-upper)		
LMU.Sm	NVC SM18	<i>Juncus maritimus</i>		
LMU.Sm	NVC SM15	<i>Juncus maritimus</i> with <i>Triglochin maritima</i>		
LMU.Sm	NVC SM20	<i>Eleocharis uniglumis</i>		
LMU.Sm	NVC SM19	<i>Blysmus rufus</i>		
LMU.Sm	NVC SM17	<i>Artemisia maritima</i> with <i>Festuca rubra</i> , or open canopy of <i>A. maritima</i> and <i>Halimione</i>		
LMU.Sm	NVC SM16	<i>Festuca rubra</i>		

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
LMU.Sm	NVC SM16	Sub-communities of <i>Festuca rubra</i> with <i>Agrostis stolonifera</i> , <i>Juncus gerardi</i> , <i>Puccinellia maritima</i> , <i>Glaux maritima</i> , <i>Triglochin maritima</i> , <i>Armeria maritima</i> and <i>Plantago maritima</i>		
LMU.Sm		Saltmarsh (low-mid)		
LMU.Sm	NVC SM14	<i>Halimione portulacoides</i>		
LMU.Sm	NVC SM13	<i>Puccinellia maritima</i>		
LMU.Sm	NVC SM13	Sub-communities of <i>Puccinellia maritima</i> saltmarsh with <i>Limonium vulgare</i> and <i>Armeria maritima</i> ; <i>Puccinellia maritima</i> with <i>Glaux maritima</i> co-dominant in species-poor vegetation; <i>Puccinellia maritima</i> with <i>Plantago maritima</i> and/or <i>Armeria maritima</i>		Researched
LMU.Sm	NVC SM10	Annual <i>Salicornia</i> , <i>Suaeda maritima</i> and <i>Puccinella maritima</i>		
LMU.Sm		Saltmarsh (pioneer)		Researched
LMU.Sm	NVC SM12	Rayed <i>Aster tripolium</i>	●	Not done
LMU.Sm	NVC SM11	<i>Aster tripolium</i> var. <i>discooides</i>		
LMU.Sm	NVC SM7	<i>Arthrocnemum perenne</i> , sometimes with <i>Halimione</i> , <i>Puccinella</i> and <i>Suaeda</i>		
LMU.Sm	NVC SM9	<i>Suaeda maritima</i>		
LMU.Sm	NVC SM8	<i>Salicornia</i> spp.	●	Not done
LMU.Sm	NVC SM6	<i>Spartina anglica</i>		
LMU.Sm	NVC SM5	<i>Spartina alterniflora</i> with <i>Spartina anglica</i> , <i>Puccinellia maritima</i> and <i>Aster tripolium</i>		
LMU.Sm	NVC SM4	<i>Spartina maritima</i>		
LMU.Sm		Saltmarsh (low)		
LMU.Sm	NVC SM3	<i>Eleocharis parvula</i>		
LMU.SMu		Sandy mud shores	●	BIOTOPE COMPLEX
LMU.SMu	HedMac	<i>Hediste diversicolor</i> and <i>Macoma balthica</i> in sandy mud shores	●	Researched
LMU.SMu	HedMac.Are	<i>Hediste diversicolor</i> , <i>Macoma balthica</i> and <i>Arenicola marina</i> in muddy sand or sandy mud shores	●	Represented by LMU.Smu.HedMac
LMU.SMu	HedMac.Pyg	<i>Hediste diversicolor</i> , <i>Macoma balthica</i> and <i>Pygospio elegans</i> in sandy mud shores	●	Represented by LMU.Smu.HedMac
LMU.SMu	HedMac.Mare	<i>Hediste diversicolor</i> , <i>Macoma balthica</i> and <i>Mya arenaria</i> in sandy mud shores	●	Represented by LMU.Smu.HedMac
LMU.Mu		Soft mud shores	●	BIOTOPE COMPLEX
LMU.Mu	HedScr	<i>Hediste diversicolor</i> and <i>Scrobicularia plana</i> in reduced salinity mud shores	●	Represented by LMU.Smu.HedMac

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
LMU.Mu	HedStr	<i>Hediste diversicolor</i> and <i>Streblospio shrubsolii</i> in sandy mud or soft mud shores	●	Represented by LMU.Smu.HedMac
LMU.Mu	HedOl	<i>Hediste diversicolor</i> and oligochaetes in low salinity mud shores	●	Represented by LMU.Smu.HedMac
LMX		Littoral mixed sediments		
LMX	MytFab	<i>Mytilus edulis</i> and <i>Fabricia sabella</i> in poorly-sorted muddy sand or muddy gravel shores	●	Not done
LMX	Mare	<i>Mya arenaria</i> and polychaetes in muddy gravel shores	●	Not done
IR		Infralittoral rock (and other hard substrata)	●	
EIR		Exposed infralittoral rock	●	
EIR.KFaR		Kelp with cushion fauna, foliose red seaweeds or coralline crusts (exposed rock)	●	BIOTOPE COMPLEX
EIR.KFaR	Ala	<i>Alaria esculenta</i> on sublittoral fringe bedrock	●	Researched
EIR.KFaR	Ala.Myt	<i>Alaria esculenta</i> , <i>Mytilus edulis</i> and coralline crusts on very exposed sublittoral fringe bedrock	●	Represented by EIR.Kfar.Ala
EIR.KFaR	Ala.Ldig	<i>Alaria esculenta</i> and <i>Laminaria digitata</i> on exposed sublittoral fringe bedrock	●	Represented by EIR.Kfar.Ala
EIR.KFaR	AlaAnSC	<i>Alaria esculenta</i> forest with dense anemones and sponge crusts on extremely exposed infralittoral bedrock		Represented by EIR.Kfar.Ala
EIR.KFaR	LhypFa	<i>Laminaria hyperborea</i> forest with a faunal cushion (sponges and polyclinids) and foliose red seaweeds on very exposed infralittoral rock	●	Researched
EIR.KFaR	LhypPar	Sparse <i>Laminaria hyperborea</i> and dense <i>Paracentrotus lividus</i> on exposed infralittoral limestone		Represented by MIR.LhypGz
EIR.KFaR	LhypR	<i>Laminaria hyperborea</i> with dense foliose red seaweeds on exposed infralittoral rock	●	Researched
EIR.KFaR	LhypR.Ft	<i>Laminaria hyperborea</i> forest with dense foliose red seaweeds on exposed upper infralittoral rock	●	Represented by EIR.Kfar.LhypR
EIR.KFaR	LhypR.Pk	<i>Laminaria hyperborea</i> park with dense foliose red seaweeds on exposed lower infralittoral rock	●	Represented by EIR.Kfar.LhypR
EIR.KFaR	LhypR.Loch	Mixed <i>Laminaria hyperborea</i> and <i>Laminaria ochroleuca</i> forest on exposed infralittoral rock		Represented by EIR.Kfar.LhypR
EIR.KFaR	LsacSac	<i>Laminaria saccharina</i> and/or <i>Saccorhiza polyschides</i> on exposed infralittoral rock		Researched
EIR.KFaR	FoR	Foliose red seaweeds on exposed or moderately exposed lower infralittoral rock	●	Researched
EIR.KFaR	FoR.Dic	Foliose red seaweeds with dense <i>Dictyota dichotoma</i> and/or <i>Dictyopteris membranacea</i> on exposed lower infralittoral rock	●	Represented by EIR.Kfar.FoR

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
EIR.SG		Robust faunal cushions and crusts (surge gullies & caves)	●	BIOTOPE COMPLEX
EIR.SG	FoSwCC	Foliose seaweeds and coralline crusts in surge gully entrances	●	Represented by EIR.Kfar.FoR
EIR.SG	SCAn	Sponge crusts and anemones on wave-surged vertical infralittoral rock	●	Researched
EIR.SG	SCAn.Tub	Sponge crusts, anemones and <i>Tubularia indivisa</i> in shallow infralittoral surge gullies	●	Represented by EIR.SG.SCAn
EIR.SG	SCAs	Sponge crusts and colonial ascidians on wave-surged vertical infralittoral rock	●	Represented by EIR.SG.SCAn
EIR.SG	SCAs.DenCla	<i>Dendrodoa grossularia</i> and <i>Clathrina coriacea</i> on wave-surged vertical infralittoral rock	●	Represented by EIR.SG.SCAn
EIR.SG	SCAs.ByH	Sponge crusts, colonial (polyclinid) ascidians and a bryozoan/hydroid turf on wave-surged vertical or overhanging infralittoral rock	●	Represented by EIR.SG.SCAn
EIR.SG	SC	Sponge crusts on extremely wave-surged infralittoral cave or gully walls	●	Represented by EIR.SG.SCAn
EIR.SG	CC	<i>Balanus crenatus</i> and/or <i>Pomatoceros triqueter</i> with spirorbid worms and coralline crusts on severely scoured infralittoral rock (No description at this level)	●	Represented by ECR.Efa.PomByC
EIR.SG	CC.BalPom	<i>Balanus crenatus</i> and/or <i>Pomatoceros triqueter</i> with spirorbid worms and coralline crusts on severely scoured vertical infralittoral rock	●	Represented by ECR.Efa.PomByC
EIR.SG	CC.Mob	Coralline crusts and crustaceans on mobile boulders or cobbles in surge gullies	●	Represented by ECR.Efa.PomByC
MIR		Moderately exposed infralittoral rock	●	
MIR.KR		Kelp with red seaweeds (moderately exposed rock)	●	BIOTOPE COMPLEX
MIR.KR	Ldig	<i>Laminaria digitata</i> on moderately exposed or tide-swept sublittoral fringe rock	●	Not done
MIR.KR	Ldig.Ldig	<i>Laminaria digitata</i> on moderately exposed sublittoral fringe rock	●	Researched
MIR.KR	Ldig.Ldig.Bo	<i>Laminaria digitata</i> and under-boulder fauna on sublittoral fringe boulders	●	Represented by MLR.BR.Fser.Fser.Bo
MIR.KR	Ldig.T	<i>Laminaria digitata</i> , ascidians and bryozoans on tide-swept sublittoral fringe rock	●	Represented by MIR.KR.Ldig.Ldig
MIR.KR	Ldig.Pid	<i>Laminaria digitata</i> and piddocks on sublittoral fringe soft rock	●	Researched
MIR.KR	Lhyp	<i>Laminaria hyperborea</i> and foliose red seaweeds on moderately exposed infralittoral rock	●	Represented by EIR.Kfar.LhypR
MIR.KR	Lhyp.Ft	<i>Laminaria hyperborea</i> forest and foliose red seaweeds on moderately exposed upper infralittoral rock	●	Represented by EIR.Kfar.LhypR
MIR.KR	Lhyp.Pk	<i>Laminaria hyperborea</i> park and foliose red seaweeds on moderately exposed lower infralittoral rock	●	Represented by EIR.Kfar.LhypR

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
MIR.KR	Lhyp.TFt	<i>Laminaria hyperborea</i> forest, foliose red seaweeds and a diverse fauna on tide-swept upper infralittoral rock	●	Represented by EIR.Kfar.LhypR
MIR.KR	Lhyp.TPk	<i>Laminaria hyperborea</i> park with hydroids, bryozoans and sponges on tide-swept lower infralittoral rock	●	Represented by EIR.Kfar.LhypR
MIR.KR	Lhyp.Loeh	Mixed <i>Laminaria hyperborea</i> and <i>Laminaria ochroleuca</i> forest on moderately exposed or sheltered infralittoral rock		Represented by EIR.Kfar.LhypR
MIR.GzK		Grazed kelp with algal crusts		BIOTOPE COMPLEX
MIR.GzK	LhypGz	Grazed <i>Laminaria hyperborea</i> with coralline crusts on infralittoral rock		Researched
MIR.GzK	LhypGz.Ft	Grazed <i>Laminaria hyperborea</i> forest with coralline crusts on upper infralittoral rock		Represented by MIR.LhypGz
MIR.GzK	LhypGz.Pk	Grazed <i>Laminaria hyperborea</i> park with coralline crusts on lower infralittoral rock		Represented by MIR.LhypGz
MIR.SedK		Sand or gravel-affected or disturbed kelp and seaweed communities	●	BIOTOPE COMPLEX
MIR.SedK	Sac	<i>Saccorhiza polyschides</i> and other opportunistic kelps on disturbed upper infralittoral rock	●	Represented by MIR.SedK.LsacChoR
MIR.SedK	LsacChoR	<i>Laminaria saccharina</i> , <i>Chorda filum</i> and dense red seaweeds on shallow unstable infralittoral boulders and cobbles	●	Researched
MIR.SedK	XKScrR	Mixed kelps with scour-tolerant and opportunistic foliose red seaweeds on scoured or sand-covered infralittoral rock	●	Represented by MIR.SedK.LsacChoR
MIR.SedK	SabKR	<i>Sabellaria spinulosa</i> with kelp and red seaweeds on sand-influenced infralittoral rock		Researched
MIR.SedK	EphR	Ephemeral red seaweeds and kelps on tide-swept mobile infralittoral cobbles	●	Represented by MIR.SedK.LsacChoR
MIR.SedK	HalXX	<i>Halidrys siliquosa</i> and mixed kelps on tide-swept infralittoral rock with coarse sediment	●	Researched
MIR.SedK	PolAhn	<i>Polyides rotundus</i> , <i>Ahnfeltia plicata</i> and <i>Chondrus crispus</i> on sand-covered infralittoral rock	●	Researched
SIR		Sheltered infralittoral rock	●	
SIR.K		Silted kelp (stable rock)		BIOTOPE COMPLEX
SIR.K	LhypLsac	Mixed <i>Laminaria hyperborea</i> and <i>Laminaria saccharina</i> on sheltered infralittoral rock	●	Represented by SIR.K.Lsac.Pk
SIR.K	LhypLsac.Ft	Mixed <i>Laminaria hyperborea</i> and <i>Laminaria saccharina</i> forest on sheltered upper infralittoral rock		Represented by SIR.K.Lsac.Pk
SIR.K	LhypLsac.Pk	Mixed <i>Laminaria hyperborea</i> and <i>Laminaria saccharina</i> park on sheltered lower infralittoral rock	●	Represented by SIR.K.Lsac.Pk
SIR.K	Lsac	<i>Laminaria saccharina</i> on very sheltered infralittoral rock		Represented by SIR.K.Lsac.Pk
SIR.K	Lsac.Ldig	<i>Laminaria saccharina</i> and <i>Laminaria digitata</i> on sheltered sublittoral fringe rock		Represented by SIR.K.Lsac.Pk

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
SIR.K	Lsac.Ft	<i>Laminaria saccharina</i> forest on very sheltered upper infralittoral rock		Represented by SIR.K.Lsac.Pk
SIR.K	Lsac.Pk	<i>Laminaria saccharina</i> park on very sheltered lower infralittoral rock		Researched
SIR.K	Lsac.T	<i>Laminaria saccharina</i> , foliose red seaweeds, sponges & ascidians on tide-swept infralittoral rock		Researched
SIR.K	Lsac.Cod	Sparse <i>Laminaria saccharina</i> with <i>Codium</i> spp. and sparse red seaweeds on heavily silted very sheltered infralittoral rock		Represented by SIR.K.Lsac.Pk
SIR.K	EchBriCC	<i>Echinus</i> , brittlestars and coralline crusts on grazed lower infralittoral rock		Represented by MIR.LhypGz
SIR.K	LsacRS	<i>Laminaria saccharina</i> on reduced or low salinity infralittoral rock		Researched
SIR.K	LsacRS.FiR	Sparse <i>Laminaria saccharina</i> with dense filamentous red seaweeds, sponges and <i>Balanus crenatus</i> on tide-swept variable salinity infralittoral rock		Represented by SIR.K.LsacRS
SIR.K	LsacRS.Psa	<i>Laminaria saccharina</i> and <i>Psammechinus miliaris</i> on reduced salinity grazed infralittoral rock		Represented by SIR.K.LsacRS
SIR.K	LsacRS.Phy	<i>Laminaria saccharina</i> with <i>Phyllophora</i> spp. and filamentous green seaweeds on reduced or low salinity infralittoral rock		Represented by SIR.K.LsacRS
SIR.EstFa		Estuarine faunal communities (shallow rock/mixed substrata)		BIOTOPE COMPLEX
SIR.EstFa	MytT	<i>Mytilus edulis</i> beds on reduced salinity tide-swept infralittoral rock	●	Researched
SIR.EstFa	CorEle	<i>Cordylophora caspia</i> and <i>Electra crustulenta</i> on reduced salinity infralittoral rock		Researched
SIR.EstFa	HarCon	<i>Hartlaubella gelatinosa</i> and <i>Conopeum reticulum</i> on low salinity infralittoral mixed substrata		Researched
SIR.Lag		Submerged fucoids, green and red seaweeds (lagoonal rock)		BIOTOPE COMPLEX
SIR.Lag	FChoG	Mixed fucoids, <i>Chorda filum</i> and green seaweeds on reduced salinity infralittoral rock		Researched
SIR.Lag	AscSAs	<i>Ascophyllum nodosum</i> with epiphytic sponges and ascidians on variable salinity infralittoral rock		Researched
SIR.Lag	PolFur	<i>Polyides rotundus</i> and/or <i>Furcellaria lumbricalis</i> on reduced salinity infralittoral rock		Researched
SIR.Lag	FcerEnt	<i>Fucus ceranoides</i> and <i>Enteromorpha</i> spp. on low salinity infralittoral rock		Represented by SLR.F.Fcer
IR		Infralittoral rock (other)	●	
IR.FaSwV		Fauna and seaweeds (shallow vertical rock)	●	BIOTOPE COMPLEX
IR.FaSwV	CorMetAlc	<i>Corynactis viridis</i> , <i>Metridium senile</i> and <i>Alcyonium digitatum</i> on exposed or moderately exposed vertical infralittoral rock	●	Represented by IR.FaSwV.AlcBytH
IR.FaSwV	AlcByH	<i>Alcyonium digitatum</i> and a bryozoan, hydroid and ascidian turf on moderately exposed vertical infralittoral rock	●	Researched
IR.FaSwV	AlcByH.Hia	<i>Hiatella arctica</i> , bryozoans and ascidians on vertical infralittoral soft rock	●	Represented by IR.FaSwV.AlcBytH

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
CR		Circalittoral rock	●	
ECR		Exposed circalittoral rock	●	
ECR.EFa		Faunal crusts or short turfs (wave-exposed rock)	●	BIOTOPE COMPLEX
ECR.EFa	CCParCar	Coralline crusts, <i>Parasmittina trispinosa</i> , <i>Caryophyllia smithii</i> , <i>Haliclona viscosa</i> , polyclinids and sparse <i>Corynactis viridis</i> on very exposed circalittoral rock		Represented by IR.FaSwV.AlcBytH
ECR.EFa	CorCri	<i>Corynactis viridis</i> and a crisiid/ <i>Bugula/Cellaria</i> turf on steep or vertical exposed circalittoral rock	●	Represented by IR.FaSwV.AlcBytH
ECR.EFa	PomByC	<i>Pomatoceros triqueter</i> , <i>Balanus crenatus</i> and bryozoan crusts on mobile circalittoral cobbles and pebbles	●	Researched
ECR.Alc		Alcyonium-dominated communities (tide-swept/vertical)	●	BIOTOPE COMPLEX
ECR.Alc	AlcTub	<i>Alcyonium digitatum</i> with dense <i>Tubularia indivisa</i> and anemones on strongly tide-swept circalittoral rock	●	Represented by IR.FaSwV.AlcBytH
ECR.Alc	AlcMaS	<i>Alcyonium digitatum</i> with massive sponges (<i>Cliona celata</i> and <i>Pachymatisma johnstonia</i>) and <i>Nemertesia antennina</i> on moderately tide-swept exposed circalittoral rock		Represented by IR.FaSwV.AlcBytH
ECR.Alc	AlcSec	<i>Alcyonium digitatum</i> with <i>Securiflustra securifrons</i> on weakly tide-swept or scoured moderately exposed circalittoral rock	●	Represented by IR.FaSwV.AlcBytH
ECR.Alc	AlcC	<i>Alcyonium digitatum</i> , <i>Pomatoceros triqueter</i> , algal and bryozoan crusts on vertical exposed circalittoral rock	●	Represented by IR.FaSwV.AlcBytH
ECR.BS		Barnacle, cushion sponge and <i>Tubularia</i> communities (very tide-swept/wave-sheltered)		BIOTOPE COMPLEX
ECR.BS	BalTub	<i>Balanus crenatus</i> and <i>Tubularia indivisa</i> on extremely tide-swept circalittoral rock	●	Represented by IR.FaSwV.AlcBytH
ECR.BS	TubS	<i>Tubularia indivisa</i> , sponges and other hydroids on tide-swept circalittoral bedrock	●	Represented by IR.FaSwV.AlcBytH
ECR.BS	BalHpan	<i>Balanus crenatus</i> , <i>Halichondria panicea</i> and <i>Alcyonidium diaphanum</i> on extremely tide-swept sheltered circalittoral rock	●	Represented by IR.FaSwV.AlcBytH
ECR.BS	CuSH	Cushion sponges, hydroids and ascidians on very tide-swept sheltered circalittoral rock	●	Represented by IR.FaSwV.AlcBytH
ECR.BS	HbowEud	<i>Halichondria bowerbanki</i> , <i>Eudendrium arbusculum</i> and <i>Eucratea loricata</i> on reduced salinity tide-swept circalittoral mixed substrata	●	Researched
MCR		Moderately exposed circalittoral rock	●	

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
MCR.XFa		Mixed faunal turfs (moderately exposed rock)	●	BIOTOPE COMPLEX
MCR.XFa	PhaAxi	<i>Phakellia ventilabrum</i> and axinellid sponges on deep exposed circalittoral rock		Represented by MCR.Xfa.ErSEun
MCR.XFa	ErSEun	Erect sponges, <i>Eunicella verrucosa</i> and <i>Pentapora foliacea</i> on slightly tide-swept moderately exposed circalittoral rock	●	Researched
MCR.XFa	ErSPbolSH	Cushion sponges (<i>Polymastia boletiformis</i> , <i>Tethya</i>), stalked sponges, <i>Nemertesia</i> spp. and <i>Pentapora foliacea</i> on moderately exposed circalittoral rock	●	Represented by MCR.Xfa.ErSEun
MCR.XFa	ErSSwi	Erect sponges and <i>Swiftia pallida</i> on slightly tide-swept moderately exposed circalittoral rock		Represented by MCR.Xfa.ErSEun
MCR.ByH		Bryozoan/hydroid turfs (sand-influenced)	●	BIOTOPE COMPLEX
MCR.ByH	SNemAdia	Sparse sponges, <i>Nemertesia</i> spp., <i>Alcyonidium diaphanum</i> and <i>Bowerbankia</i> spp. on circalittoral mixed substrata	●	Represented by MCR.ByH.Flu
MCR.ByH	Flu	<i>Flustra foliacea</i> and other hydroid/bryozoan turf species on slightly scoured circalittoral rock or mixed substrata	●	Researched
MCR.ByH	Flu.Flu	<i>Flustra foliacea</i> on slightly scoured silty circalittoral rock or mixed substrata	●	Represented by MCR.ByH.Flu
MCR.ByH	Flu.HByS	<i>Flustra foliacea</i> with hydroids, bryozoans and sponges on slightly tide-swept circalittoral mixed substrata	●	Represented by MCR.ByH.Flu
MCR.ByH	Flu.SerHyd	<i>Sertularia argentea</i> , <i>S. cupressina</i> and <i>Hydrallmania falcata</i> on tide-swept circalittoral cobbles and pebbles	●	Represented by MCR.ByH.Flu
MCR.ByH	Flu.Hocu	<i>Haliclona oculata</i> and <i>Flustra foliacea</i> with a rich faunal turf on tide-swept sheltered circalittoral boulders or cobbles	●	Represented by MCR.ByH.Flu
MCR.ByH	Urt	<i>Urticina felina</i> on sand-affected circalittoral rock		Researched
MCR.ByH	Urt.Urt	<i>Urticina felina</i> on sand-scoured circalittoral rock		Represented by MCR.ByH.Urt
MCR.ByH	Urt.Cio	<i>Urticina felina</i> and <i>Ciocalypa penicillus</i> on sand-covered circalittoral rock		Represented by MCR.ByH.Urt
MCR.CSab		Circalittoral Sabellaria reefs		BIOTOPE COMPLEX
MCR.CSab	Sspi	<i>Sabellaria spinulosa</i> crusts on silty turbid circalittoral rock	●	Researched
MCR.M		Mussel beds (open coast circalittoral rock/mixed substrata)		BIOTOPE COMPLEX
MCR.M	MytHAs	<i>Mytilus edulis</i> beds with hydroids and ascidians on tide-swept moderately exposed circalittoral rock	●	Researched
MCR.M	Mus	<i>Musculus discors</i> beds on moderately exposed circalittoral rock	●	Researched

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
MCR.M	ModT	<i>Modiolus modiolus</i> beds with hydroids and red seaweeds on tide-swept circalittoral mixed substrata	●	Researched
MCR.Bri		Brittlestar beds	●	BIOTOPE COMPLEX
MCR.Bri	Oph	<i>Ophiothrix fragilis</i> and/or <i>Ophiocomina nigra</i> beds on slightly tide-swept circalittoral rock or mixed substrata	●	Researched
MCR.Bri	Oph.Oacu	<i>Ophiopholis aculeata</i> beds on slightly tide-swept circalittoral rock or mixed substrata		Represented by MCR.Bri.Oph
MCR.GzFa		Grazed fauna (moderately exposed or sheltered rock)		BIOTOPE COMPLEX
MCR.GzFa	FaAIC	Faunal and algal crusts, <i>Echinus esculentus</i> , sparse <i>Alcyonium digitatum</i> and grazing-tolerant fauna on moderately exposed circalittoral rock	●	Researched
MCR.GzFa	FaAIC.Abi	Faunal and algal crusts, <i>Echinus esculentus</i> , sparse <i>Alcyonium digitatum</i> , <i>Abietinaria abietina</i> and other grazing-tolerant fauna on moderately exposed circalittoral rock		Represented by MCR.GzFa.FaAIC
MCR.As		Ascidian communities (silt-influenced)	●	BIOTOPE COMPLEX
MCR.As	StoPaur	<i>Stolonica socialis</i> and/or <i>Polyclinum aurantium</i> with <i>Flustra foliacea</i> on slightly sand-scoured tide-swept moderately exposed circalittoral rock		Represented by MCR.As.MolPol
MCR.As	MolPol	<i>Molgula manhattensis</i> and <i>Polycarpa</i> spp. with erect sponges on tide-swept moderately exposed circalittoral rock	●	Researched
MCR.As	MolPol.Sab	Dense ascidians, bryozoans and hydroids on a crust of <i>Sabellaria spinulosa</i> on tide-swept circalittoral rock	●	Represented by MCR.As.MolPol
MCR.SfR		Soft rock communities		BIOTOPE COMPLEX
MCR.SfR	Pid	Piddocks with a sparse associated fauna in upward-facing circalittoral very soft chalk or clay	●	Researched
MCR.SfR	Pol	<i>Polydora</i> sp. tubes on upward-facing circalittoral soft rock	●	Researched
SCR		Sheltered circalittoral rock		
SCR.BrAs		Brachiopod and solitary ascidian communities (sheltered rock)		BIOTOPE COMPLEX
SCR.BrAs	AntAsH	<i>Antedon</i> spp., solitary ascidians and fine hydroids on sheltered circalittoral rock		Researched
SCR.BrAs	SubSoAs	<i>Suberites</i> spp. and other sponges with solitary ascidians on very sheltered circalittoral rock		Researched
SCR.BrAs	AmenCio	Solitary ascidians, including <i>Ascidia mentula</i> and <i>Ciona intestinalis</i> , on very sheltered circalittoral rock	●	Represented by SCR.BrAs.SubSoAs
SCR.BrAs	AmenCio.M et	Large <i>Metridium senile</i> and solitary ascidians on grazed very sheltered circalittoral rock		Represented by SCR.BrAs.SubSoAs

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
SCR.BrAs	Aasp	<i>Asciidiella aspersa</i> on sheltered circalittoral rocks on muddy sediment		Represented by SCR.BrAs.SubSoAs
SCR.BrAs	NeoPro	<i>Neocrania anomala</i> and <i>Protanthea simplex</i> on very sheltered circalittoral rock		Researched
SCR.BrAs	NeoPro.CaTw	Brachiopods, calcareous tubeworms (<i>Placostegus tridentatus</i> , <i>Hydroides</i>) and sponges on variable salinity circalittoral rock		Represented by SCR.BrAs.NeoPro
SCR.BrAs	NeoPro.Den	<i>Neocrania anomala</i> , <i>Dendrodoa grossularia</i> and <i>Sarcodictyon roseum</i> on reduced or low salinity circalittoral rock		Not done
SCR.Mod		Sheltered <i>Modiolus</i> (horse-mussel) beds		BIOTOPE COMPLEX
SCR.Mod	ModCvar	<i>Modiolus modiolus</i> beds with <i>Chlamys varia</i> , sponges, hydroids and bryozoans on slightly tide-swept very sheltered circalittoral mixed substrata	●	Represented by MCR.M.ModT
SCR.Mod	ModHAs	<i>Modiolus modiolus</i> beds with fine hydroids and large solitary ascidians on very sheltered circalittoral mixed substrata		Represented by MCR.M.ModT
CR		Circalittoral rock (other)	●	
CR.FaV		Faunal turfs (deep vertical rock)	●	BIOTOPE COMPLEX
CR.FaV	Ant	<i>Antedon bifida</i> and a bryozoan/hydroid turf on steep or vertical circalittoral rock	●	Represented by CR.FaV.Bug
CR.FaV	Bug	<i>Bugula</i> spp. and other bryozoans on vertical moderately exposed circalittoral rock	●	Researched
CR.Cv		Caves and overhangs (deep)		Researched
CR.Cv	SCup	Sponges, cup corals and <i>Parerythropodium coralloides</i> on shaded or overhanging circalittoral rock	●	Represented by Cr.Cv.Scup
COR		Circalittoral offshore rock (and other hard substrata)		
COR.Lop		<i>Lophelia</i> reefs		Researched
SS		Sublittoral sediments	●	
IGS		Infralittoral gravels and sands	●	
IGS.Mrl		Maerl beds (open coast/clean sediments)	●	BIOTOPE COMPLEX
IGS.Mrl	Phy	<i>Phymatolithon calcareum</i> maerl beds in infralittoral clean gravel or coarse sand	●	Not done
IGS.Mrl	Phy.R	<i>Phymatolithon calcareum</i> maerl beds with red seaweeds in shallow infralittoral clean gravel or coarse sand	●	Represented by IGS.Mrl.Phy.HEc
IGS.Mrl	Phy.HEc	<i>Phymatolithon calcareum</i> maerl beds with hydroids and echinoderms in deeper infralittoral clean gravel or coarse sand		Researched

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
IGS.Mrl	Lgla	<i>Lithothamnion glaciale</i> maerl beds in tide-swept variable salinity infralittoral gravel		Researched
IGS.FaG		Shallow gravel faunal communities	●	BIOTOPE COMPLEX
IGS.FaG	HalEdw	<i>Halcampa chrysanthellum</i> and <i>Edwardsia timida</i> on sublittoral clean stone gravel		Researched
IGS.FaG	Sell	<i>Spisula elliptica</i> and venerid bivalves in infralittoral clean sand or shell gravel	●	Represented by IGS.FaS.FabMag
IGS.FaS		Shallow sand faunal communities	●	BIOTOPE COMPLEX
IGS.FaS	Mob	Sparse fauna in marine infralittoral mobile clean sand	●	Represented by IGS.FaS.NcirBat
IGS.FaS	NcirBat	<i>Nephtys cirrosa</i> and <i>Bathyporeia</i> spp. in infralittoral sand	●	Researched
IGS.FaS	ScupHyd	<i>Sertularia cupressina</i> and <i>Hydrallmania falcata</i> on tide-swept sublittoral cobbles or pebbles in coarse sand	●	Not done
IGS.FaS	Lcon	Dense <i>Lanice conchilega</i> and other polychaetes in tide-swept infralittoral sand	●	Researched
IGS.FaS	FabMag	<i>Fabulina fabula</i> and <i>Magelona mirabilis</i> with venerid bivalves in infralittoral compacted fine sand		Researched
IGS.EstGS		Estuarine sublittoral gravels and sands		BIOTOPE COMPLEX
IGS.EstGS	MobRS	Sparse fauna in reduced salinity infralittoral mobile sand	●	Represented by IGS.EstGS.NeoGam
IGS.EstGS	Ncir	<i>Nephtys cirrosa</i> and fluctuating salinity-tolerant fauna in reduced salinity infralittoral mobile sand	●	Represented by IGS.EstGS.NeoGam
IGS.EstGS	NeoGam	<i>Neomysis integer</i> and <i>Gammarus</i> spp. in low salinity infralittoral mobile sand	●	Researched
CGS		Circalittoral gravels and sands	●	
CGS.Bv		Circalittoral sediment with venerid bivalves		BIOTOPE COMPLEX
CGS.Bv	Ven	Venerid bivalves in circalittoral coarse sand or gravel		Researched
CGS.Bv	Ven.Neo	<i>Neopentadactyla mixta</i> and venerid bivalves in circalittoral shell gravel or coarse sand	●	Represented by CGS.Ven.Neo
CGS.Bv	Ven.Bra	Venerid bivalves and <i>Branchiostoma lanceolatum</i> in circalittoral coarse sand with shell gravel		Represented by CGS.Ven.Neo
IMS.Sgr		Seagrass beds (sublittoral/lower shore)		BIOTOPE COMPLEX
IMS.Sgr	Zmar	<i>Zostera marina/angustifolia</i> beds in lower shore or infralittoral clean or muddy sand	●	Researched
IMS.Sgr	Rup	<i>Ruppia maritima</i> in reduced salinity infralittoral muddy sand	●	Researched

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
IMS.FaMS		Shallow muddy sand faunal communities	●	BIOTOPE COMPLEX
IMS.FaMS	EcorEns	<i>Echinocardium cordatum</i> and <i>Ensis</i> sp. in lower shore or shallow sublittoral muddy fine sand	●	Researched
IMS.FaMS	SpiSpi	<i>Spio filicornis</i> and <i>Spiophanes bombyx</i> infralittoral clean or muddy sand		Not done
IMS.FaMS	MacAbr	<i>Macoma balthica</i> and <i>Abra alba</i> in infralittoral muddy sand or mud	●	Researched
IMS.FaMS	Cap	<i>Capitella capitata</i> in enriched sublittoral muddy sediments		Researched
CMS		Circalittoral muddy sand	●	
CMS	AbrNucCor	<i>Abra alba</i> , <i>Nucula nitida</i> and <i>Corbula gibba</i> in circalittoral muddy sand or slightly mixed sediment	●	Researched
CMS	AfilEcor	<i>Amphiura filiformis</i> and <i>Echinocardium cordatum</i> in circalittoral clean or slightly muddy sand	●	Researched
CMS	VirOph	<i>Virgularia mirabilis</i> and <i>Ophiura</i> spp. on circalittoral sandy or shelly mud		Researched
CMS	VirOph.HAS	<i>Virgularia mirabilis</i> and <i>Ophiura</i> spp. with hydroids and ascidians on circalittoral sandy or shelly mud with shells or stones		Represented by CMS.VirOph
CMS	Ser	<i>Serpula vermicularis</i> reefs on very sheltered circalittoral muddy sand		Researched
IMU		Infralittoral muds	●	
IMU.Ang		Angiosperm communities (lagoons)		BIOTOPE COMPLEX
IMU.Ang	NVC A12	<i>Potamogeton pectinatus</i> community		Researched
IMU.Ang	NVC S4	<i>Phragmites australis</i> swamp and reed beds		Researched
IMU.MarMu		Shallow marine mud communities		BIOTOPE COMPLEX
IMU.MarMu	TubeAP	Semi-permanent tube-building amphipods and polychaetes in sublittoral mud or muddy sand		Researched
IMU.MarMu	AreSyn	<i>Arenicola marina</i> and synaptid holothurians in extremely shallow soft mud		Researched
IMU.MarMu	PhiVir	<i>Philine aperta</i> and <i>Virgularia mirabilis</i> in soft stable infralittoral mud		Researched
IMU.MarMu	Ocn	<i>Ocnus planci</i> aggregations on sheltered sublittoral muddy sediment		Researched
IMU.EstMu		Estuarine sublittoral muds	●	BIOTOPE COMPLEX
IMU.EstMu	PolVS	<i>Polydora ciliata</i> in variable salinity infralittoral firm mud or clay	●	Researched
IMU.EstMu	AphTub	<i>Aphelochaeta marioni</i> and <i>Tubificoides</i> spp. in variable salinity infralittoral mud	●	Researched
IMU.EstMu	NhomTub	<i>Nephtys hombergii</i> and <i>Tubificoides</i> spp. in variable salinity infralittoral soft mud	●	Represented by IMU.EstMu.AphTub

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
IMU.EstMu	MobMud	Infralittoral fluid mobile mud	●	Represented by IMU.EstMu.AphTub
IMU.EstMu	CapTub	<i>Capitella capitata</i> and <i>Tubificoides</i> spp. in reduced salinity infralittoral muddy sediment	●	Represented by IMU.EstMu.AphTub
IMU.EstMu	Tub	<i>Tubificoides</i> spp. in reduced salinity infralittoral muddy sediment	●	Represented by IMU.EstMu.AphTub
IMU.EstMu	LimTtub	<i>Limnodrilus hoffmeisteri</i> , <i>Tubifex tubifex</i> and <i>Gammarus</i> spp. in low salinity infralittoral muddy sediment		Researched
IMU.LagMu		Sublittoral lagoonal mud communities	●	
CMU		Circalittoral muds		
CMU	BriAchi	<i>Brissopsis lyrifera</i> and <i>Amphiura chiajei</i> in circalittoral mud		Researched
CMU	SpMeg	Seapens and burrowing megafauna in circalittoral soft mud		Researched
CMU	SpMeg.Fun	Seapens, including <i>Funiculina quadrangularis</i> , and burrowing megafauna in undisturbed circalittoral soft mud		Represented by CMU.SpMeg
CMU	Beg	<i>Beggiatoa</i> spp. on anoxic sublittoral mud		Researched
IMX		Infralittoral mixed sediments	●	
IMX.KSwMx		<i>Laminaria saccharina</i> (sugar kelp) and filamentous seaweeds (mixed sediment)	●	BIOTOPE COMPLEX
IMX.KSwMx	LsacX	<i>Laminaria saccharina</i> , <i>Chorda filum</i> and filamentous red seaweeds on sheltered infralittoral sediment	●	Researched
IMX.KSwMx	Tra	Mats of <i>Trilliella</i> on infralittoral muddy gravel		Represented by IMX.KSwMx.LsacX
IMX.KSwMx	Pcri	Loose-lying mats of <i>Phyllophora crispa</i> on infralittoral muddy sediment		Represented by IMX.KSwMx.LsacX
IMX.KSwMx	FiG	Filamentous green seaweeds on low salinity infralittoral mixed sediment or rock		Researched
IMX.MrlMx		Maerl beds (muddy mixed sediments)		BIOTOPE COMPLEX
IMX.MrlMx	Lcor	<i>Lithothamnion corallioides</i> maerl beds on infralittoral muddy gravel		Represented by IGS.Mrl.Phy.HEc
IMX.MrlMx	Lfas	<i>Lithothamnion fasciculatum</i> maerl beds with <i>Chlamys varia</i> on infralittoral sandy mud or mud		Represented by IGS.Mrl.Phy.HEc
IMX.MrlMx	Lden	<i>Lithothamnion dentatum</i> maerl beds on infralittoral muddy sediment		Represented by IGS.Mrl.Phy.HEc

Biotope complex	Biotope Code	Biotope Name	Biotope of Welsh Interest (●)	Researched Represented by Not done
IMX.Oy		Oyster beds		BIOTOPE COMPLEX
IMX.Oy	Ost	<i>Ostrea edulis</i> beds on shallow sublittoral muddy sediment	●	Researched
IMX.FaMx		Shallow mixed sediment faunal communities	●	BIOTOPE COMPLEX
IMX.FaMx	VsenMtru	<i>Venerupis senegalensis</i> and <i>Mya truncata</i> in lower shore or infralittoral muddy gravel	●	Researched
IMX.FaMx	An	Burrowing anemones in sublittoral muddy gravel	●	Researched
IMX.FaMx	Lim	<i>Limaria hians</i> beds in tide-swept sublittoral muddy mixed sediment		Researched
IMX.EstMx		Estuarine sublittoral mixed sediments	●	BIOTOPE COMPLEX
IMX.EstMx	CreAph	<i>Crepidula fornicata</i> and <i>Aphelochaeta marioni</i> in variable salinity infralittoral mixed sediment	●	Researched
IMX.EstMx	MytV	<i>Mytilus edulis</i> beds in variable salinity infralittoral mixed sediment	●	Researched
IMX.EstMx	PolMtru	<i>Polydora ciliata</i> , <i>Mya truncata</i> and solitary ascidians in variable salinity infralittoral mixed sediment	●	Researched
IMX.EstMx	SalvMx	<i>Sabellaria alveolata</i> in variable salinity mixed sediments		Not done
CMX		Circalittoral mixed sediment	●	
CMX	SspiMx	<i>Sabellaria spinulosa</i> and <i>Polydora</i> spp. on stable circalittoral mixed sediment		Not done
CMX	ModMx	<i>Modiolus modiolus</i> beds on circalittoral mixed sediment		Represented by MCR.M.ModT
CMX	ModHo	Sparse <i>Modiolus modiolus</i> , dense <i>Cerianthus lloydii</i> and burrowing holothurians on sheltered circalittoral stones and mixed sediment		Not done
COS		Circalittoral offshore sediment		
COS	AmpPar	<i>Ampharete falcata</i> turf with <i>Parvicardium ovale</i> on cohesive muddy very fine sand near margins of deep stratified seas		Researched
COS	ForThy	Foramaniferans and <i>Thyasira</i> sp. in deep circalittoral soft mud		Researched
COS	Sty	<i>Styela gelatinosa</i> and other solitary ascidians on sheltered deep circalittoral muddy sediment		Researched

Appendix 11. Species biology and sensitivity key information (September 1999 onwards).

Scientific name (Authority and Date)

Common name(s)

TAXONOMY

1. **Information researched by**
2. **Information entered by**
3. **Information refereed by**
4. **Date last updated**
5. **MCS / Ulster Museum species code**
6. **Taxonomic classification**
 - Phylum
 - Subphylum
 - Superclass
 - Class
 - Subclass
 - Order
 - Suborder
 - Family
 - Subfamily
 - Genus
 - Species
 - Subspecies / variety / form
7. **English equivalent for each taxonomic category**
8. **Recent synonyms (since 1950) with authorities and dates**
9. **General description**
10. **Key identification features**
11. **Images [with description, holder and photographer]**
12. **Additional information**
13. **Key references**

GENERAL BIOLOGY (Larval)

1. **Information researched by**
2. **Information entered by**
3. **Information refereed by**
4. **Date first entered**
5. **Typical abundance in Britain** High / Moderate / Low / Very low densities / Field not researched / No information found / Data deficient / Not relevant.
6. **Typical body size range (units)**
7. **Mobility / Attachment** Swimmer / Crawler / Burrower / Drifter / Temporary attachment / Permanent Attachment / Field not researched / No information found / Data deficient / Not relevant.
8. **Sociability** Solitary / Gregarious / Colonial / Field not researched / No information found / Data deficient / Not relevant.
9. **Environmental position** Epibenthic/Epilithic/Epiphytic/Epizoic/Epifaunal/floral / Infaunal / Interstitial / Demersal / Pelagic / Neustonic/Pleustonic/Field not researched / No information found / Data deficient / Not relevant.
10. **Growth form.**
11. **Body flexibility** High (>45°) / Low (10 – 45°) / None (<10°)
12. **Feeding method** Photoautotroph, Chemoautotroph /Active/passive suspension, Surface/subsurface deposit, active /passive carnivore, active/passive omnivore, herbivore, scavenger, symbiont contribution, parasite/Field not researched / No information found / Data deficient / Not relevant.
13. **Typically feeds on?**

14. **Is the species toxic?** Yes / No / Field not researched / No information found / Data deficient / Not relevant.
1. **Further toxicity information**
15. **Mode of life – Dependent on** Independent, Parasite on/in, Mutualist on/in/with, Inquilinist on/in/with, Commensal on/in/with, Field not researched, No information found, Data deficient, Not relevant.
- Mode of life – Supports** Host for / Field not researched / No information found / Data deficient / Not relevant
16. **Additional Information.**
17. **Key references**

GENERAL BIOLOGY (Adult)

1. **Information researched by**
2. **Information entered by**
3. **Information refereed by**
4. **Date first entered**
5. **Typical abundance in Britain** High / Moderate / Low / Very low densities / Field not researched / No information found / Data deficient / Not relevant.
6. **Typical male and female body size range (units)**
7. **Male and female size at maturity (units)**
8. **Growth rate (units)**
9. **Mobility / Attachment** Swimmer / Crawler / Burrower / Drifter / Temporary attachment / Permanent Attachment / Field not researched / No information found / Data deficient / Not relevant.
10. **Sociability** Solitary / Gregarious / Colonial / Field not researched / No information found / Data deficient / Not relevant.
11. **Environmental position** Epibenthic/Epilithic/Epiphytic/Epizoic/Epifaunal/floral / Infaunal / Interstitial / Demersal / Pelagic / Neustonic/Pleustonic/Field not researched / No information found / Data deficient / Not relevant.
12. **Growth form** See Appendix 3
13. **Body flexibility** High (>45°) / Low (10 – 45°) / None (<10°)
14. **Feeding method** Photoautotroph, Chemoautotroph/Active/passive suspension, Surface/subsurface deposit, active /passive carnivore, active/passive omnivore, herbivore, scavenger, symbiont contribution, parasite/Field not researched / No information found / Data deficient / Not relevant..
15. **Typically feeds on?**
16. **Is the species toxic?** Yes / No / Field not researched / No information found / Data deficient / Not relevant.
17. **Further toxicity information**
18. **Mode of life – Dependent on** Independent, Parasite on/in, Mutualist on/in/with, Inquilinist on/in/with; Commensal on/in/with; Field not researched / No information found / Data deficient / Not relevant.
- Mode of life – Supports** Host for; Field not researched / No information found / Data deficient / Not relevant.
19. **Additional Information.**
20. **Key references**

GEOGRAPHICAL DISTRIBUTION AND HABITAT PREFERENCES (larval)

1. **Information researched by**
2. **Information entered by**
3. **Information refereed by**
4. **Date first entered**
5. **Geographical Distribution** Map and text description
6. **Global distribution** Map and text description

7. Habitat preferences**Major****Physiographic****Biological zone****Component****Substratum****Wave exposure****Tidal stream strength****Depth range in metres****Salinity****Other**

- 8. Resident / Migratory** Resident /non migratory, Seasonal feeding, Seasonal reproduction, Seasonal environmental, Diel, Passive, Active, Field not researched / No information found / Data deficient / Not relevant.

9. Additional information**10. Key references****GEOGRAPHICAL DISTRIBUTION AND HABITAT PREFERENCES (Adult)****1. Information researched by****2. Information entered by****3. Information refereed by****4. Date first entered****5. Geographical distribution** Map and text description**6. Global distribution** Map and text description**7. Habitat preferences****Major****Physiographic****Biological zone****Component****Substratum****Wave exposure****Tidal stream strength****Depth range in metres****Salinity****Other****8. General habitat information**

- 9. Resident / Migratory** Resident /non migratory, Seasonal feeding, Seasonal reproduction, Seasonal environmental, Diel, Passive, Active, Field not researched / No information found / Data deficient / Not relevant.

- 10. Native species** Yes / No / Field not researched / No information found / Data deficient / Not relevant.

11. Origin if not native**12. Date of arrival if known****13. Additional information****14. Key references****REPRODUCTION****1. Information researched by****2. Information entered by****3. Information refereed by****4. Date first entered**

- 5. Life-span (units):** <1 / 1-2 years / 2-5 years / 5-10 years / 10-20 years / 20-100 years / 100+ years / Field not researched / No information found / Data deficient / Not relevant/See additional information.

6. Age at maturity (units)

7. **Generation time (units)**
8. **Reproductive type** Budding, parthenogenesis, fission, Permanent hermaphrodite, Protandrous hermaphrodite, Protogynous hermaphrodite, Gonochoristic, Metagamic / Gamete type/ Field not researched / No information found / Data deficient / Not relevant / See additional information.
9. **Frequency of reproduction** Semelparous, <biannual, biannual episodic, biannual protracted, annual episodic, annual protracted.
10. **Fecundity (no. of eggs / young)** 1 / 2-10 / 11-100 / 100 – 1,000 / 1,000 – 10,000 / 10,000 – 100,000 / 100,000 – 1,000,000 / 1,000,000+ / Field not researched / No information found / Data deficient / Not relevant / See additional information.
11. **Developmental mechanism** Planktotrophic / Lecithotrophic / Direct Development / Ovoviviparous / Viviparous (Parental Care) / Viviparous (No Care) / Field not researched / No information found / Data deficient / Not relevant.
12. **Larval settling time** <1 day / 1 day / 2-10 days / 11-30 days / >30 days / Field not researched / No information found / Data deficient / Not relevant.
13. **Dispersal potential** <10m / 10-100m / 100-1000m / >1000m / Field not researched / No information found / Data deficient / Not relevant.
14. **Time of first gamete release**
15. **Time of last gamete release**
16. **Additional information**
17. **Key references**

SENSITIVITY (Larval)

1. **Information researched by**
2. **Information entered by**
3. **Information refereed by**
4. **Date first entered**
5. **Sensitivity to factors:**

Physical factors	Substratum loss
	Smothering
	Suspended sediment
	Desiccation
	Changes in emergence regime
	Changes in water flow rate
	Changes in temperature
	Changes in turbidity
	Changes in wave exposure
	Noise
	Visual presence
	Abrasion and physical disturbance
Displacement	
Chemical factors	Synthetic compounds
	Heavy metals
	Hydrocarbons
	Radionuclides
	Changes in nutrient levels
	Changes in salinity
Biological factors	Changes in oxygenation
	Introduction of microbial pathogens
	Introduction of non-native species and translocation
	Selective extraction of this species
Selective extraction of other species	

6. Evidence / Confidence High, Moderate, Low, Very low, Not relevant
 7. Additional information
 8. Key references

SENSITIVITY (Adult)

1. Information researched by
 2. Information entered by
 3. Information refereed by
 4. Date first entered
 5. Sensitivity to factors See table above for factors
 6. Recoverability following removal of factor See table above for factors
 7. Confidence
 8. Additional information
 9. Key references

IMPORTANCE

1. Information researched by
 2. Information entered by
 3. Information refereed by
 4. Date first entered

Marine Natural Heritage Importance**5. Legislation****Protected status or relevance under directives and conventions**

Berne
 CITES
 EC Habitats Directive
 W&C 1981 Act
 NI Act
 UK Biodiversity Action Plans
 IUCN categories
 Other

6. National status Is the species nationally rare or scarce?
 7. Biotope or Ecosystem Importance
 8. Does the species create space in assemblage? Little / Moderate / Lots / No / Field not researched / No information found / Data deficient / Not relevant.
 9. Does the species occupy space and exclude? Little / Moderate / Lots / No / Field not researched / No information found / Data deficient / Not relevant.
 10. Does the species provide structure Substratum / Crevices / Shelter / No / Field not researched / No information found / Data deficient / Not relevant.
 11. Does the species provide a unique food source? Yes / No / Field not researched / No information found / Data deficient / Not relevant.
 12. For What?
 13. Commercial Importance
 14. Utilisation
 15. Medicinal use Yes / No / Field not researched / No information found / Data deficient / Not relevant
 16. Trade use
 17. Aquaculture use
 18. Harvested (targeted)
 19. Harvested (by-catch)
 20. Curio use
 21. Research use
 22. Culinary use

23. Other

24. Management measures **None, Quota or take limited by numbers, Quota or take limited by effort, Restriction of movement** of this species, Restriction of movement of host species, technical restriction in methods of collection, habitat maintenance, habitat enhancement, reintroduction, ex-situ breeding, culling.

25. Additional Information

26. Key references

Appendix 12. Biotope biology and sensitivity key information (May 2000 onwards)

(MERMAID) = Linked data from JNCC Mermaid Web pages)

BASIC INFORMATION**Biotope / Habitat name****MNCR Biotope code**

1. **Information researched by**
2. **Information entered by**
3. **Information refereed by**
4. **Date last updated**
5. **Image and distribution map**
6. **British and Irish Distribution**
7. **National status**
8. **Description (from Connor et al., 1997 a & b)**

BIOTOPE CLASSIFICATION

1. **UK and Ireland Classification**
2. **MNCR Habitat Complex**
3. **MNCR Biotope Complex**
4. **MNCR Biotope**
5. **Similar Biotopes** Other biotopes that could be confused with this biotope or characterized by the same species
6. **Biotopes represented by Key Information review**
7. **Characterising species (MERMAID)** Species name, abundance, frequency, faithfulness
8. **Additional Information** Other classifications (for example, EUNIS, ZNIEFF-MER, Wadden Sea, Helcon)
9. **Key references**

ECOLOGY

1. **Ecological Relationships**
2. **Seasonal / Temporal Changes**
3. **Key references**

ADDITIONAL ECOLOGY

1. **Habitat Complexity**
2. **Dominant trophic groups** Photoautotrophs, Chemoautotrophs, Deposit feeders (detritivors), Suspension feeders, Herbivores, Predators, Scavengers, Epifaunal grazers, Not relevant, No information found, Data deficient, Field unresearched.
3. **Productivity**
4. **Major sources of organic carbon** Photosynthesis (macroalgae and halophytic plants), Photosynthesis (microalgae), Chemoautotrophs, Detritus, Dissolved organic matter, Not relevant, Data deficient, Field unresearched
5. **Recruitment processes**
6. **Time for the community to reach maturity**
7. **Additional Information**
8. **Key references**

HABITAT PREFERENCES AND DISTRIBUTION

1. **British and Irish Distribution**
2. **Distribution map**
3. **Habitat preferences**
 - **Substratum (MERMAID)**
 - **Zone (MERMAID)**

- **Depth range (MERMAID)**
 - **Wave exposure (MERMAID)**
 - **Tidal streams (MERMAID)**
 - **Salinity (MERMAID)**
 - **Temperature range**
 - **Water clarity** High clarity/Low Turbidity, Low clarity/ High turbidity, Very high turbidity, No preference, Not relevant, No information found, Data deficient, Field unresearched.
 - **Limiting nutrients** Nitrogen (e.g. nitrates), Phosphorus (e.g. phosphates), Silicon (silicates), Manganese, Iron, Not relevant, No information found, Data deficient, Field unresearched.
 - **Other preferences**
4. **Additional Information**
 5. **Key references**

SPECIES COMPOSITION

1. **Characterising species (MERMAID)** Species name, abundance, frequency, faithfulness
2. **Species indicative of sensitivity** Key structural/functional, important characterizing, important structural/functional, important other.
3. **Explanation**
4. **Species found uniquely in the biotope**
5. **Nationally rare or scarce species associated with biotope**
6. **Additional information**
7. **Key references**

BIOTOPE SENSITIVITY

Physical factors	Substratum loss
	Smothering
	Suspended sediment
	Desiccation
	Changes in emergence regime
	Changes in water flow rate
	Changes in temperature
	Changes in turbidity
	Changes in wave exposure
	Noise
	Visual presence
	Abrasion and physical disturbance
	Displacement
Chemical factors	Synthetic compounds
	Heavy metals
	Hydrocarbons
	Radionuclides
	Changes in nutrient levels
	Changes in salinity
	Changes in oxygenation
Biological factors	Introduction of microbial pathogens
	Introduction of non-native species and translocation
	Selective extraction of this species
	Selective extraction of other species

1. **Sensitivity to factors (ranked against the above factors)**
2. **Recoverability (ranked against the above factors)**
3. **Likely change in species richness** Major decline/decline/minor decline/no change/rise/ not relevant.

4. Evidence / Confidence
5. Species used to indicate biotope sensitivity or recoverability
 - *Presentation of sensitivity assessments for species that indicate biotope sensitivity*
 - *Presentation of recoverability assessments for species that indicate biotope sensitivity*
6. Additional information
7. Key references

MARINE NATURAL HERITAGE IMPORTANCE

1. Legislation

Protected status or relevance under directives and conventions

Berne Convention

EC Habitats Directive

NI Conservation legislation

UK Biodiversity Action Plans

UK Biodiversity Action Plan habitat

EC Directive Annex I habitat

Other

2. National status Is the biotope nationally rare or scarce?

3. Habitat Directive feature Reefs, Estuaries, etc (data supplied by EN/SNH).

Commercial Importance

4. Exploitation Description of the commercial, aquacultural, research, curio, or culinary exploitation of the habitat.

5. Biotope importance for other species

6. Additional Information

7. Key references

Appendix 13. Maritime and coastal activities to environmental factors matrix

Coastal & Maritime Activities / Events	Sub-activities / events	ENVIRONMENTAL FACTORS																							
		Physical									Chemical						Biological								
		Substratum loss	Smothering	Suspended sediment	Desiccation	Changes in emergence regime	Changes in water flow rate	Changes in temperature	Changes in turbidity	Changes in wave exposure	Noise disturbance	Visual presence	Abrasion / Physical disturbance	Displacement	Synthetic compound contamination	Heavy metal contamination	Hydrocarbon contamination	Radionuclide contamination	Changes in nutrient levels	Changes in salinity	Changes in oxygenation	Introduction of microbial pathogens / parasites	Introduction of non-native species	Selective extraction of target species	Selective extraction of non-target species
Aquaculture	Fin-fish		R	R			R	R			P	P	R		R						R	R	R		
	Macro-algae			P							P	P										R	R	R	R
	Predator control											R	R			P									
	Shellfisheries		R	R			R	R	R			R	R	R		R					R	R	R	R	R
Climate change	Current change						R	R	R												R	P		R	R
	Sea level change					R	R	R														R			
	Temperature change					R			R													R	R	R	R
	Weather pattern change					R			R														R	R	
Coastal defence	Barrage	R	R	R	R	R	R	R	R	R	R	R	R	R	P	P	P			R	R	R			
	Beach replenishment	P	R	R	R	R	R	R	R	R	R	R	R	R	P	P	P								
	Groynes	P	P	R	R			R	R	R					P							P			
	Sea walls / breakwaters	P	P	R	R	R	R	R	R	R					P							P			
Collecting	Bait digging	R	R	R	R					R	R	R	R	R											R
	Bird eggs										R	R	R												R
	Curios										P	P	R												R
	Higher plants	R	R			R					R	R	R	R							R				R
	Kelp & wrack harvesting	R	R	R		R			R	R	R	R	R	R							R	R			R
	Macro-algae	R		R		R					R	R	R	R	P										R
	Peelers (boulder turning)	R				R					R	R	R	R											R
Development	Shellfish	R	R	R	R				R		R	R	R	R											R
	Construction phase	R	R	R	R	R	P	R	R	R	R	R	R	R	P	P	P	P			R	R	R		
	Artificial reefs		P	R					R	R						P	P	P				R	R		
	Communication cables		P	R				R	R																
	Culverting lagoons		R	R	R	R	R	R	P												R	R	R		
	Dock/port facilities						R	P	R	R	R	R	R	R	R	P	R	P			R	P	R	R	R
	Land claim	R	R	R	R	R			R	R												R	R		
	Marinas	R	R	R	P	R	P	R	R	R	R	R	R	R	R	P	R					R	R	R	
	Oil & gas platforms		R				R					R	R	R	R	R	R	R				R	R	R	R
Dredging	Urban										R	R	R	R	R	R	R	R				R	R	R	
	Capital dredging	R	R	R	R	R				R	R	R	R	R	P	P	P	P			R	R	R		
Energy generation	Maintenance dredging	R	R	R						R	R	R	R	R	P	P	P	P			R	R	R		
	Nuclear power generation		P	R				R	R						R	P		P			R	P	R		
	Power stations		P	R							R	R	R	R		R	R	P			R	P	R		
Extraction	Renewable (wind/tide/wave)		P	P	P	P	R			P	R	P	P				P					P			
	Maerl	R	R	R			R				R	R	R	R							R	R	R	R	
	Rock/minerals (coastal quarrying)	R	R	R							R	R	R	R	R	R	R	R				R	R	R	
	Oil & gas	R										R	R	R		R	R	R							
	Sand / gravel (aggregates)	R	R	R			R				R	P	R	R	R	P	P	P				R	R	R	
Fisheries/ Shellfisheries	Water resources (abstraction)					P	P	R													R	R			
	Benthic trawls (e.g. scallop dredging)	R	R	R						R		R	R	R	R	P	P	P			R	R		R	
	Netting (e.g. fixed nets)											R	R	R	R										R
	Pelagic trawls											P	P												R
	Potting / creeling		R									R	R	R	R										R
Recreation	Suction (hydraulic) dredging	R	R	R						R		R	R	R	P	P	P				R	R		R	
	Angling											R	R	R	P										R
	Boating / yachting										P		R	R	R		R	P	R		R	R	R	R	
	Diving / dive site											R	R	R	R										R
	Public beach											R	R	R							P				
	Tourist resort		R									R	R	R	R	R	R	R				R	R		
	Water sports											R	R	R	R	R	P	R							
Uses	Animal sanctuaries										P	P	P								P	P			
	Archaeology	R	R	R						R		R	R	R	R	P	P	P			R	R	R	R	
	Coastal farming	R	R								R	R	R	R	R	P	R							P	
	Coastal forestry	R	R								R	R	R	R	R	P	R								
	Education/interpretation											R	R	R	R										R
	Military											R	R	R	R	P	P	P	P						
	Mooring / beaching / launching		R	R							R	R	R	R	R	P	R						P	P	
	Research	P										R	R	R	P	P	P	P			P		P	P	P
Wastes	Shipping		P	R						R		R	R	R	R	R	R	P			R	R	R	R	
	Fishery & agricultural wastes	R	R												R									R	
	Industrial effluent discharge	R	R												R	R	R	R							
	Industrial / urban emissions (air)		P												R	R	R								
	Inorganic mine and particulate wastes	R	R												R	P	R	P			R	R	R		
	Land / waterfront runoff	R	R												P	P	P				R	R	R		
	Litter and debris	R													R	P	P	P							
	Nuclear effluent discharge		R													R		R							
	Sewage discharge	R	R												R	R	R	P			R	R	R		
	Shipping wastes	P	R												R	R	R	R						R	
Other	Spoil dumping	R												P	P	P	P								
	Thermal discharges (cooling water)	R													R	R	P				P	R	P	P	
	Removal of substratum	R	R	R	P	P	P			R	P	R	R	R	R	P	P	P			R	R			

PROBABLE EFFECT - R POSSIBLE EFFECT - P

Appendix 14. List of maritime and coastal activities and their definitions used by *MarLIN*.

Terms and definitions

Aquaculture - The cultivation of aquatic organisms by human effort for commercial purposes. For the cultivation of marine organisms in seawater, the term 'mariculture' is also used. (Based on Baretta-Bekker *et al.*, 1992.).

- **Fin-fish:** for example, Atlantic salmon, rainbow trout, turbot, halibut, and grey mullet.
- **Macro-algae** - for example, kelps (Laminarians), laver (*Porphyra* spp.), *Gracilaria* sp., dulse (*Palmaria palmata*), and carrageen (*Chondrus crispus*).
- **Shellfish:** for example, mussels, oysters (native, Pacific and American), scallops, queen scallops, Manila clams and American clams.
- **Predator control:** control of predators for conservation or to protect fish farms. Gulls may be controlled around tern colonies. Fish farms may introduce control methods for heron, shag, cormorant, mink, otter, common and grey seals. Seals may also conflict with fishermen using inshore fixed nets.

Climate Change - natural and anthropogenic change in the climate. The climate of an area refers to the totality of weather conditions at a certain location for a certain period (conventionally 30 years).

- **Current change** - potential perturbation of the ocean currents due to global warming.
- **Sea level change** - increase in the average sea level over time, currently thought to be about 50 cm by the year 2100, resulting in an increased potential flood risk and 'coastal squeeze'.
- **Temperature change** - general increase in air, seawater surface, and sea water temperature over time.
- **Weather pattern change** - changes in the patterns of season and rainfall, for example, it is thought that global warming will increase rainfall and general storminess in the temperate regions of the Northern Hemisphere.

Coastal defence: includes both sea defence and flood defence in coastal areas against inundation of land by seawater or fresh water. Defence measures vary from engineering solutions such as sea walls, breakwaters and revetments, beach re-charge to 'managed retreat'.

- **Barrages** - impermeable barriers built across estuaries or embayments. Amenity barrages are usually built to create artificial lakes for water sports or aesthetic property development (e.g. Cardiff Barrage). Storm surge barrages may be built across estuaries in built up areas to reduce the risk of flooding due to surge tides and are usually open to allow water flow (e.g. Thames Barrier). Tidal barrages are constructed across estuaries with strong currents and large tidal ranges to generate tidal energy (e.g. St Malo, France).
- **Beach replenishment** - addition of beach material (shingle, pebbles, or sand) from another location to combat erosion.
- **Groynes** - a wall or jetty built out from a riverbank or seashore to combat the effects of longshore drift and control erosion.
- **Sea walls** - for example, breakwaters, curved sea-walls, revetments, and rip-rap.

Collecting: includes commercial harvesting of living resources and collection of marine organisms for personal use or consumption but excludes fishing.

- **Bait digging** - collection of marine invertebrates (annelids, molluscs) for use as bait by anglers by digging on mud and muddy sand shores. In extreme cases, mechanical diggers have been known to be used by commercial bait collectors.
- **Bird eggs** - collection of sea bird eggs e.g. gulls eggs (herring, lesser black-backed and greater black-backed and black headed gulls).

- **Curios** - collection of species as souvenirs, either for personal use by divers or for the curio (souvenir) trade. Species collected include, the common sea urchin (*Echinus esculentus*), sea fans (e.g. *Eunicella verrucosa* and occasionally *Swiftia pallida*), and 'white weed' (*Sertularia* spp.).
- **Higher plants** - e.g. collection of samphire (*Salicornia* spp.), rock samphire, sea-spinach and spear-leaved orache and sea-kale for human consumption; the cutting of turfs from saltmarsh; reeds (*Phragmites australis*) for thatching and various other plants such as seagrass, sea holly and the sea-pea.
- **Kelp & wrack harvesting** - commercial harvesting of kelp species, e.g. *Laminaria hyperborea* and wrack (fucoid) species, e.g. *Ascophyllum nodosum*.
- **Macro-algae** - includes the local collection of drift seaweed as a soil conditioner or fertiliser and collection for human consumption e.g. laver (*Porphyra* sp.) and carrageen (*Chondrus crispus*). This category excludes kelp and wrack (fucoid) species (see below).
- **Peelers (boulder turning)** - primarily directed at the collection of crabs. In some cases roofing tiles are laid on flats to attract peeler crabs (*Carcinus maenas* just before moulting) e.g. Teign Estuary.
- **Shellfish** - collection of shellfish such as razor shells, mussels, limpets, cockles, whelks, winkles, and mussels for consumption or use as bait (see above).

Development - property, industrial or other commercial development of coastal land or below the mean low water mark. Coastal land may be arbitrarily defined as land adjacent to the sea or areas of sea water influence such as estuaries and lagoons or areas whose climate is influenced by its proximity to the sea.

- **Construction phase** - includes the construction phase of coastal and offshore structures such as coastal defences, barrages, breakwaters, quays and terminals.
- **Artificial reefs** - any intertidal or subtidal man-made structure that offers new hard substrata for colonisation by marine organisms may be considered as artificial reefs. Barrages, marinas, docks, coastal defence structures, jetties, piers, breakwaters, outfalls, and artificial islands may incidentally act as artificial reefs. The use of deliberately constructed artificial reefs to attract or improve fisheries or reef communities is growing in popularity.
- **Communication cables** - underwater telecommunication cables for example telephone cables.
- **Culverting lagoons** - the building of culverts to divert, drain or otherwise change the water supply of coastal lagoons.
- **Dock/port facilities** - facilities and structures required for safe navigation of shipping, their maintenance, safe loading and unloading of cargo, including passengers and livestock. For example, quays, terminals (petroleum products, containers, general cargo, Ro-Ro), cranes, floating docks, dry dock, locks, berths for vessels.
- **Land claim** - reclamation of land from the sea or more often estuarine waters by the construction of dykes and in-fill of the area. For example, land may be reclaimed for the construction of new port terminals, disposal of dredged spoil or agriculture.
- **Marina** - specific areas for the berthing or mooring of pleasure craft together with waste reception facilities and other visitor support infrastructure (e.g. shops, toilets).
- **Oil / gas platforms** - extraction of oil and gas from undersea deposits usually by oil or gas drilling rigs. This activity includes subsequent transportation of oil / gas by pipeline together with disposal of drilling muds, accidental spills, and burn-off of waste gases.
- **Urban** - construction of housing and industrial estates on coastal land either through new developments or continued urban sprawl.

Dredging - removal of material from the seabed.

- **Capital dredging** - refers to the major works that include removal of material for construction of, for example, quays or new terminal facilities.
- **Maintenance dredging** - maintenance dredging refers to regular dredging to maintain navigation channels for shipping.

Energy generation - industrial plants for the generation of energy in the form of heat or primarily electricity.

- **Nuclear power stations** - electrical power generation from the heat liberated by nuclear fission.
- **Power stations** - power generation from the burning of non-renewable fossil fuels such as coal, oils, or gas.
- **Renewable (wind/tide/wave)** - developments to extract energy from renewable resources. For example coastal and offshore wind farms, underwater turbines, tidal barrages (see above), and wave power generation plants or pontoons.

Extraction - physical removal of non-renewable resources from marine or coastal resources.

- **Maerl** - dredging of calcareous maerl deposits (living or dead) for use as a soil conditioner, filtration media or in the pharmaceutical or cosmetic industry.
- **Sand/gravel** - coastal sand mining (e.g. from dunes) and aggregate dredging. Aggregate dredging of sand or gravel for the building industry from licensed offshore deposits.
- **Rock/minerals** - this includes coastal quarrying and dredging of metalliferous deposits on the seabed. Coastal quarries for granite, slate or coal along the coast.
- **Water resources:** activities that affect the water table, riverine flow and supply of freshwater into the marine environment, for example river water and groundwater abstraction for consumption and industry.

Fisheries / Shellfisheries - human activities directed towards the capture of fish or shellfish. The method used depends on the type of fish or shellfish sought.

- **Benthic trawls** - towing a net or 'dredge' (e.g. scallop dredge) along the seabed (bottom trawls) for example, the beam and otter trawls for demersal fish, shrimp and lobster and scallop dredge for scallops, oysters, clams and mussels. Trawls may be used in inshore waters (e.g. lochs and estuaries) as well as offshore.
- **Netting** - use of fixed nets (e.g. gill, tangle and trammel) or seine netting inshore or in estuaries.
- **Pelagic trawls** - towing a net through the water for example, pair and mid-water trawls for demersal cod and whiting and pelagic mackerel and herring. Trawls may be used in inshore waters (e.g. lochs and estuaries) as well as offshore.
- **Potting / creeling** - use of standard traps (pots or creels) attached to lines and left on the seabed for periods to catch shellfish, primarily lobsters, crawfish, and crabs but including spider crabs, velvet swimming crabs, shore crabs, squat lobsters and whelks.
- **Suction (hydraulic) dredging** - uses water jets to loosen sediment and the organisms are then 'sucked' up with the sediment slurry to the dredger. This method is often used to exploit bivalve beds such as, cockles, razor shells, and lugworms.

Recreation - Any pursuit in the maritime area designed for pleasure, amenity or tourism and includes diverse activities such as bathing, water-skiing, power boating, jet-skis, surfing, horse-riding, dog-walking and sailing.

- **Angling** - capture of fish by rod and line, usually on an individual basis, for example, bass, cod, whiting, sole, mackerel, mullet, eel, skate, flounder, pollack, sea bream, and blue shark. Spear fishing is also included in this category.

- **Boating** - - this includes recreational boating, e.g. inshore dinghy, sailing and small pleasure vessels as well as sea going yachts and power boats.
- **Dive site** - specified areas regularly visited by divers, for example, wrecks and reefs
- **Public beach** - a beach area frequented by members of the public e.g. for walking, dog-walking, sunbathing, bathing and horse-riding.
- **Tourist Resort** - any urban or residential development designed to accommodate, entertain, and attract tourists in a coastal area.
- **Water sports** - any sporting or recreational activity based on water e.g. jet skiing, surfing, wind surfing, swimming, bathing, and canoeing.

Uses - other activities or uses that are dependent on a coastal or maritime location.

- **Animal sanctuaries** - areas where potentially damaging activities are prohibited or regulated to protect specific species (activity zoning), e.g. wildfowl, bottle-nose dolphin and cup corals.
- **Archaeology** - this activity includes examination of marine wrecks by marine archaeologists as well as prospecting / searching for historic wrecks by diver teams, remote cameras and salvers.
- **Coastal forestry** - Afforestation of coastal land and subsequent management of the forest, including felling and replanting.
- **Coastal farming** - farms on coastal land or adjacent to coastal land. This activity includes grazing of saltmarsh and drift seaweeds by sheep, cattle, or horses.
- **Education/interpretation** - the use of the maritime area for education or raising public awareness. For example, school and university field courses, public interpretation centres, and Eco-tourism.
- **Military** - the use of the maritime area for military installations (dockyards), training and firing ranges together with areas used in military landing and low-flying exercises.
- **Mooring/beaching/launching** - includes moorings for recreational vessels and launching of small boats or jet-skis from slip-ways.
- **Research** - marine environmental and oceanographic research but also includes sample collection for laboratory research by universities and pharmaceutical companies.
- **Shipping** - this includes commercial shipping such as cargo vessels, Ro-Ro and container vessels, livestock and car carriers, ferries (including hovercraft) and passenger liners as well as tanker vessels designed to carry liquid or gaseous products, for example; petroleum and petroleum products (crude or refined oils,); liquefied gases (e.g. liquefied natural gas (LNG) and liquefied petroleum gas (LPG)) and chemicals (e.g. alumina, acids, methanol and bitumen); and liquid bulk (e.g. edible oils, fruit juices, and wine).

Waste - waste is generally regarded as material that is no longer required or fit for its original purpose and that has no alternative use. For example special and controlled hazardous wastes, packaging, oils, sewage and garbage.

- **Fisheries & agricultural wastes** - includes discarded fish/shellfish material (e.g. fish entrails) from fish/shellfish processing onshore or in factory ships, or direct discard over the side of vessels (e.g. by-catch). Agricultural wastes include high BOD waste discharges from abattoirs, which may enter the marine environment via rivers.
- **Industrial effluent discharge** - discharge from industrial processes directly or indirectly (airborne discharges) into the marine environment. This includes thermal and hyper-saline discharges.
- **Inorganic mine and particulate wastes** - this includes colliery waste discharges (mine tailings) from the coal, tin, copper mining, or alumina production together with inert particulate wastes from potash mines or china clay quarries.

- **Industrial / urban emissions (air)** - includes air emissions from industrial, chemical and pharmaceutical plants, domestic and industrial vehicles, aircraft and shipping (e.g. ferries). Air emissions may enter the marine environment due to fumigation or precipitation.
 - **Land /waterfront runoff** - rainfall washes particulates and other contaminants from soil, industrial and urban developments and road surfaces. Contaminants and particulates may enter the coastal environment as runoff from waterfront developments or, predominately, via rivers.
 - **Litter and debris** - marine litter from a variety of sources including for example shipping garbage, wind blown litter from land, fly tipping of wastes, accidental spillage from ships and discarded fishing gear.
 - **Nuclear effluent discharges** - includes radioactive discharges from nuclear waste reprocessing plants and contaminated nuclear power plant cooling water.
 - **Shipping wastes** - include discharges of ballast and bilge waters, hull flushings, sewage and garbage.
 - **Spoil dumping** - the dumping at sea or on land of spoil from excavation or construction works, capital or maintenance dredging.
 - **Sewage discharges** - direct discharge of sewage effluents from water treatment plants and untreated sewage. Also includes the dumping of sewage sludge and sewage discharges from shipping at sea.
 - **Thermal discharges (cooling water)** - includes discharges of water of higher or lower temperature than ambient. Predominately discharge of water used for cooling in industrial plants and power stations at higher than ambient temperatures although some industrial processes, e.g. liquid gas production, discharge cooler water.
- Other:** activities not addressed above.
- **Removal of substratum:** for example because of beach cleaning after oil spills or due to erosion of the foreshore (beach or cliff).