THE IRISH SEA PILOT

Report on the identification of nationally important marine features in the Irish Sea

Louise M. Lieberknecht, Malcolm A. Vincent and David W. Connor

March 2004

© JNCC, Peterborough

Acknowledgements

Table of Contents

1 Executive summary

This report outlines work on developing and testing criteria for the identification of nationally important marine features (species, habitats and marine landscapes), carried out under Defra's Review of Marine Nature Conservation (RMNC).

The rationale behind identifying threatened, rare or otherwise exceptional features for priority conservation attention is that, unless urgent action is taken, such features could be driven to extinction or suffer severe decline. Examples of this approach to conservation are to be found in numerous existing international and national conservation mechanisms, but the marine environment poses special challenges to these mechanisms. One of the tasks identified by the RMNC was the need to determine how to select nationally important marine features for the UK, and how to conserve such features in practice.

Draft criteria for the identification of nationally important marine features were developed, covering features for which the UK has special responsibility, features which are rare, and features which are declining or threatened. Their application and the process for identifying nationally important features were tested within the framework of the Irish Sea Pilot.

Criteria were tested by selecting a set of 25 "test" features from a shortlist proposed as meriting consideration for "nationally important" status, and applying the criteria to them. The test features were selected so as to cover all levels of feature (species, habitats and marine landscapes), and species were selected to cover a broad range of taxonomic groups and life forms. The result of this work was that 18 of the 25 test features qualify as nationally important features, one feature was borderline, one feature met none of the criteria, and there was insufficient information to reach a conclusion on a further four. The features which qualified should be included on a list of nationally important marine features.

Given the time constraints on this work, there was insufficient time to carry out a full assessment of more than the test features. The features from the test list which qualify as nationally important, therefore, fall far short of a comprehensive list of nationally important marine features. A provisional list of nationally important features was compiled from features which are currently considered to be of conservation concern by other fora, e.g. species listed on the SoCC (Species of Conservation Concern) list and priority features listed under the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) and Biodiversity Action Plans (BAP). Expert opinion suggested some modification of the list, but no formal assessment of the features was carried out against the criteria. The provisional list was used in lieu of a list of nationally important features for other aspects of the Irish Sea Pilot work. Features on this provisional list should, after some degree of prioritisation, be tested against the criteria in future and be placed formally on the "nationally important" list if the criteria are met.

As a result of testing the criteria, suggestions have been made as to how to improve the draft criteria. The modifications to the criteria attempt to simplify the process of applying the criteria, resulting in an outcome which meets conservation requirements and is consistent with current conservation practice. The main problem encountered during the testing was a lack of information in the right format. Therefore, it is the criteria should be worded openly enough to allow consideration of all available evidence and use of best judgement, rather than requiring strict thresholds to be met, or hard scientific evidence for threats and declines. In addition to modifications to the criteria, guidance for applying the criteria has been developed, a process for formally establishing a full list of nationally important marine features is suggested, and practical considerations for approaches to management and conservation of nationally important marine features are outlined.

Further to the main Irish Sea Pilot data collation work carried out by Lumb *et al.* (2004a), a data collation exercise was carried out by the *MarLIN* programme at the Marine Biological Association (MBA), targeted at 48 specific species and habitats. The aim was to test whether, after the main Irish Sea Data Collation, there were still significant numbers of existing records for these species and habitats which had not yet been collated. marine database collated. An attempt was made to collate all existing records from the scientific literature, grey literature, and research institutions. It was concluded that this approach to data collation is not cost-effective, and that data collation should target specific datasets and/or institutions known to hold significant amounts of data, rather than targeting individual features. The outcome of this attempt to collate data highlights some of the problems that have been encountered in other data collation work, especially the lack of resources to access existing datasets held at marine research institutions and consultancies.

2 Introduction

This report outlines work carried out on developing and testing criteria for the identification of nationally important marine features, under Defra's Review of Marine Nature Conservation (RMNC). The term "features" in this context refers to species, habitats and marine landscapes (defined in Golding *et al.*, 2004). Work carried out on developing and testing criteria for the identification of nationally important marine areas is reported separately in Lieberknecht *et al.* (2004).

The rationale behind identifying threatened, rare or otherwise exceptional features for priority conservation attention is that, unless urgent action is taken, they could either be driven to extinction or reduced to tiny populations or residual areas. Examples of this approach to conservation are to be found in the international and national series of Red Data Books, in the Bern Convention, in the EC Birds and Habitats Directives, and in national species protection legislation. The approach is also an important component of the work being undertaken in relation to the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) Annex V.

In the UK, this approach has also been followed in the preparation of Biodiversity Action Plans (BAP) for a range of priority habitats and species, as a significant contribution towards the national implementation of the Convention on Biological Diversity. In the terrestrial environment at least, these Action Plans have channelled a great deal of national and local endeavour into the conservation of the priority features. Some 60 Action Plans relate to marine species and habitats, but the marine environment presents a number of particular challenges for BAP implementation.

One of the tasks identified by the Review of Marine Nature Conservation was the need to determine how to select nationally-important marine features for the UK, and how to conserve such features in practice. As part of this work, JNCC was requested to develop draft criteria for the identification of nationally-important marine features. Drawing extensively upon previous and current work in other fora, notably the World Conservation Union (IUCN), OSPAR and the EC Habitats and Birds Directives, a criteria paper was prepared (Connor *et al* 2002), which contained an outline rationale and a suite of draft criteria, together with indicative threshold values for using these criteria. The paper was endorsed by the RMNC Working Group for the purpose of trialling as part of the Pilot.

The purpose of trialling the criteria under the Pilot was to determine whether they were fully satisfactory or whether amendment was necessary in order to make them applicable and yield results that meet conservation requirements. The trial also tested methodologies for applying the criteria in practice.

Following on from the work to develop and test the criteria was the need to identify nationally important features, as well as to consider the conservation requirements of these features and the appropriate mechanisms for achieving their practical conservation.

3 Draft Criteria for the identification of nationally important marine features

3.1 About the criteria

The criteria for the identification of nationally important marine features fall into two groups. Firstly, there are criteria to identify features of special importance; the second group identify features which are threatened or declining.

Features of special importance include those whose distribution is focussed on the UK, where the UK may host a particularly high proportion of the feature in a regional or global context. As such, we have special responsibility for these as our contribution to the protection of the world's biodiversity and should recognise these as marine landscapes, habitats and species of national importance. Additionally, within the UK certain features are worthy of special recognition because of their rarity.

Sections 3.2 and 3.3 show the text of the draft criteria, taken from Connor *et al.* (2002). These draft criteria were applied to a set of "test features" (section 4), and were modified as a result of the testing. The modified criteria are included in section 7, together with generic guidance developed for their application, and they supersede the draft criteria presented here.

3.2 Criteria for special importance

The criteria for the identification of features of special importance are given in Connor *et al.* (2002) as follows:

Proportional importance[1]:

A high proportion of the marine landscape, habitat, or population of a species (at any time of its life cycle) occurs within the UK. This may be related to either the global or north-east Atlantic/European extent of the feature, with global importance being of greater significance.

Features may be categorized as follows:

Globally important:
a high proportion of the global extent of a marine landscape or habitat or a high proportion of the global population of a species (at some stage in its life cycle) occurs within the UK. 'High proportion' is considered to be more than 50%, when known.

Regionally important:
a high proportion of the regional (north-east Atlantic) extent of a marine landscape or habitat, or a high proportion of the regional population of a species (at some stage in its life cycle) occurs within the UK. 'High proportion' is considered to be more than 50%, when known.

---

[1] A combination of the OSPAR Texel-Faial criteria 'global importance' and 'regional importance'.

Rarity[2]:

Marine landscapes, habitats and species that are sessile or of restricted mobility (at any time in their life cycle) are considered rare if their distribution is restricted to a limited number of locations. Rarity can be assessed at global, regional or national level as follows:

Globally rare: No guidelines available.

Regionally rare: 'The 'limited number of locations' is set at 2% of the 50 km by 50 km UTM[3] grid squares for each of the following three bathymetric zones in the north-east Atlantic:
a.   littoral (intertidal zone and splash zone)
b.   sublittoral (down to 200 m depth)
c.   bathyal / abyssal (below 200 m depth)

Nationally rare[4]: recorded in 1-8 of the 10 km x 10 km squares in GB (i.e. less than 0.5% of the total numbers of squares - based on the numbers of 10 km squares in which the feature is recorded in comparison with the total number of squares within the 3 nm limit). […]
In the case of a mobile species, the total population size will determine rarity […]

The assessment should be dependent on scientific judgement regarding natural abundance, range or extent and the adequacy of recording.

3.3 Criteria for threatened or declining features

Previous nature conservation policy has accorded a high priority to features that have significantly declined in extent or quality or are under threat of such decline. This element of the overall approach to nature conservation needs to be retained as an essential part of the conservation framework. Failure to take measures to conserve such features is likely to lead to them being lost.

The criteria for declined or threatened features given by Connor *et al.* (2002) are the following:

Decline[5]:

An observed, estimated, inferred or suspected[6] significant decline[7] in numbers, extent or quality of a marine landscape, habitat or a species (for species, quality refers to life history parameters). The decline may be historic, recent or current and may be throughout UK waters, or at a regional or global level.

Assessments of decline should be those that occur beyond what is known about long-term natural variability and resilience, as well as in an appropriate time frame for that feature.

Lesser degrees of decline than Significantly Declined will occur but will not qualify under this criterion.

---

[2] From the OSPAR Texel-Faial criteria.
[3] Universal Transverse Mercator
[4] From Sanderson (1996).
[5] From the OSPAR Texel-Faial criteria; threshold values adjusted.
[6] Follows the IUCN approach, which accounts for uncertainty.
[7] Two further levels of decline (severe and extirpated or extinct) are defined by OSPAR; these can be used to further define the severity of the decline and hence linked to the priority for remedial action. These categories are broadly similar to the IUCN categories Extinct, Critically endangered, Endangered and Vulnerable.

Evidence for decline can be based on actual evidence or reasonable expert judgement. The percentages suggested for categorizing habitat decline reflect the fact that habitats are far less likely to recover from even a small percentage loss compared to most species.

	Extent	Quality
Marine landscapes and habitats	A marine landscape or habitat that has declined in extent to 90% or less of its former natural extent in the UK, or its distribution within the UK has become significantly reduced (e.g. lost from several sub-regions).	A marine landscape or habitat for which quality, based on change from natural conditions caused by human activities, is negatively affected by: (1) a change of its typical or natural components over almost the entire UK, or (2) the loss of its typical or natural components in several sub-regions. Such judgement is likely to include aspects of biodiversity, species composition, age composition, productivity, biomass per area, reproductive ability, non-native species and the abiotic character of the habitat.
Species	A population of a species occurring in the UK is defined as significantly declined: if numbers of individuals show an extremely high and rapid decline in the area over an appropriate time frame, or the species has already disappeared from the major part of its former range in the area. or if numbers of individuals are at a significantly low level due to a long, continuous and distinct general decline in the past. […]	The species has suffered a significant decline in one or more of the following: Loss of genetic diversity Loss of fecundity Reduction in the number of mature individuals Fragmentation of the population

Threat of significant decline[8]:

the feature is expected to suffer significant decline in the foreseeable future due to its expected high level of exposure to damaging activities and to its inherent sensitivity to those activities. Where such potential decline is inferred or estimated, a precautionary approach should be adopted.

The following table offers a way of integrating relative sensitivity and the degree of exposure to damaging activities to give a threat of significant decline rating (equates to vulnerability) (Gilliland, 2001).

Sensitivity accounts for both the ease of damage to the feature by the activity and to its ability to recover from that damage. Sensitivity is therefore assessed against particular activities rather than applied once to a feature.

	Sensitivity			
Degree of exposure	High	Moderate	Low	None detectable
High	High	High	Moderate	N/A
Medium	High	Moderate	Low	N/A
Low	Moderate	Low	Low	N/A
None	N/A	N/A	N/A	N/A

---

[8] From the OSPAR Texel-Faial criteria, where it is termed 'probability of significant decline'.

4 Applying the criteria: methods of testing

The criteria were tested by selecting an initial set of 16 "test" features, and applying the criteria to them. It was decided to select this test list of features from a shortlist proposed as meriting consideration for "nationally important" status (the "provisional list" described in section 5). The test features were selected to cover all levels of feature (species, habitats and marine landscapes), and species were selected to cover a broad range of taxonomic groups and life forms. This was to ensure that the criteria would be tested on the broadest range of feature types possible within the time constraints. A further nine features were added to the initial "test list" by letting a contract to the Marine Biological Association (MBA) to apply the criteria to those nine features through the *MarLIN* programme. This brings the total number of "test features" to around 10% of the number of features on the "Irish Sea provisional list" (section 5). Table 4.1 lists the initial test features as well as the additional nine features researched by *MarLIN*.

The criteria were applied to the test features by drawing up dossiers for each feature. The dossiers drew together information relating to each criterion in turn. Information sources used were those readily available to JNCC, the JNCC marine reports and reprints collection, the internet, and scientific literature available online (*MarLIN* also had access to further information and library resources for their nine test features). The dossier for *Palinurus elephas* is shown in appendix 1 to this report, as an example.

Under the "proportional importance" criterion, information on national and global species distribution and population numbers was researched. Exact information on what proportion of the global resource of a feature occurs nationally is usually unavailable. Therefore, inferences were often made from existing information on global distribution patterns and national/regional/global population sizes.

The "rare" criterion was adopted from work originally carried out by Sanderson (1996), who carried out an assessment for rarity of UK marine benthic species based on information in the Marine Nature Conservation Review (MNCR) database. All features listed as "rare" in Sanderson (1996) were taken to meet the "rare" criterion, but no new assessment was carried out. When time allows, the assessment should be repeated with data from the JNCC marine database, as considerably more information is now available than in 1996.

The "decline" and "threat of decline" criteria were assessed by searching readily available sources for relevant information. Exact information of percentage declines in the national resource of a feature is rarely available, but, in many cases, there is sufficient information to provide robust evidence for significant levels of decline or threat. In some cases, more tenuous inferences have to be drawn from the available data.

The result of testing the initial 16 test features was that 11 of the 16 features qualified as nationally important features (i.e. they met one or more of the criteria), while one feature was borderline. One feature failed to meet any of the criteria, and for three features there proved to be insufficient data to make the assessment. Of the nine features tested by *MarLIN*, seven qualified as nationally important, one failed to meet the criteria, and one possibly fulfils the criteria but suffers from lack of information. The features tested and the results of the assessment are given in table 4.1.

The map in figure 4.1 (page 31) shows the distribution of the benthic test species within the Pilot area, mapped from species records on the JNCC marine database. All records for the tall sea pen, *Funiculina quadrangularis*, fall outside the study area and are therefore not included on the map.

Table 4.1. Results of applying the criteria to the 16 test features. The first three columns list the test features. The subsequent four columns show which criteria they meet and fail, or an indicate that insufficient information was available to carry out the assessment. The column labelled NI shows the overall result of the assessment (yes – nationally important; no – not nationally important; ? – unknown). Abbreviations: PI = Proportional Importance; R = Rare; D = Decline; T = Threat of significant decline; NI = Nationally Important; yes = indicates criterion is met and the feature therefore qualifies as nationally important; yes* = probably meets criterion based on available information; (yes) = borderline case; poss. = possibly meets criterion; (no* = probably doesn't meet criterion); no = doesn't meet criterion; ? = not enough information found to carry out assessment

Test Feature	Common name	Feature Type	PI	R	D	T	NI	Comments
Initial 16 "test features"								
Axinella damicornis	Sponge	Species	?	no	?	?	?	total lack of information
Balanophyllia regia	Scarlet and gold star coral	Species	no	no	?	?	?	total lack of information
Eunicella verrucosa	Pink seafan	Species	no	no	?	poss.	no	Suffers from lack of information despite recent research programmes
Funiculina quadrangularis	Tall sea pen	Species	no	no	yes	yes	yes	Suffers from lack of information despite recent research programmes
Palinurus elephas	European spiny lobster	Species	no	no	yes	yes*	yes	
Cetorhinus maximus	Basking shark	Species	?	yes*	yes	yes	yes	suffers from lack of information
Gadus morhua	Cod	Species	no	no	yes	yes	yes	lots of relevant info is available.

Lophius piscatorius	Sea monkfish	Species	no	no	?	yes	yes	possibly more information available especially with respect to past declines if there were any
Puffinus puffinus	Manx shearwater	Species	yes	?	?	poss.	yes	It would be best for bird experts to carry out these assessments for bird species - there is a lot of information available
Halichoerus grypus	Grey seal	Species	(yes)	no	no	poss.	(yes)	Meets criterion for proportional importance at regional but not at global level. This is a "borderline" case.
Callophyllis cristata	Red seaweed	Species	?	?	?	?	?	total lack of information
Ostrea edulis beds	Native oyster beds	Habitat	no	no	yes	yes	yes	should be dealt with at habitat level, though would also qualify at species level
Limaria hians beds	File shell beds	Habitat	?	?	yes	yes	yes	inferences made from information about the species Limaria hians as little/no information found regarding the habitat.
Sabellaria spinulosa reefs	Ross worm reefs	Habitat	?	yes*	yes	yes	yes	suffers from lack of information and different definitions of habitat
Modiolus modiolus beds	Horse mussel beds	Habitat	no	no	yes	yes	yes	decided that should deal with at habitat level. suffers from lack of information and different definitions of habitat
Estuaries	Estuaries	Marine landscape	no	no	yes	yes	yes	should meet proportional importance criterion - threshold set too high. Meets "decline" criterion in terms of decline in quality.

Test Feature	Common name	Feature Type	PI	R	D	T	NI	Comments
Features assessed by *MarLIN*								
Alosa alosa	Allis shad	Species	No	no*	Yes	Yes	Yes	Some populations may be locally extinct. Decline may be reversed in some areas.
Anotrichium barbatum	Bearded Anotrichium	Species	No	Yes	Yes	Yes	Yes	Decline may be due to natural variability.
Atrina fragilis	Fan mussel	Species	No	Yes	Yes	Yes	Yes	
Dipterus oxyrinchus	Long-nosed skate	Species	No	Yes	Yes*	Yes*	Yes	
CR.HCR.Dp Sp	Deep sponge communities	Habitat	poss	(Yes)	no*	poss	?	More data analysis required.
IR.HIR.Kse d.XKT	Tide-swept kelp and seaweed communities	Habitat	?	No	Yes*	Yes	Yes	
LS.LMX.Lm us	Intertidal mussel beds	Habitat	No	No	No	No	No	
Deep -water mud basins	Deep - water mud basins	Marine landscape	no*	No	Yes*	Yes	Yes	
Sealochs	Sealochs	Marine landscape	Yes	No	Yes*	Yes*	Yes	

5 Provisional list of nationally important features

Given the time constraints on this work, there was insufficient time to carry out a full assessment of more than the test features. The features from the test list which qualify as nationally important, therefore, fall far short of a comprehensive list of nationally important marine features.

In order to develop a comprehensive list of marine features, ideally all existing UK marine features should be tested against the criteria. It is unlikely that such a monumental task is achievable, and it would certainly not be cost-effective. A list of features which may meet the criteria was, therefore, compiled to create a "provisional" list. The provisional list was compiled from features which are currently considered to be of conservation concern by other fora, as listed on the Species of Conservation Concern (SoCC) list for species (Biodiversity Information Group, 2000). Appendix 2 lists the mechanisms covered on the SoCC list. Species qualifying as nationally scarce but not nationally rare (Sanderson, 1996), as well as species on the Biodiversity Long List, were not included on the provisional list. In addition to the remaining species on the SoCC list, the provisional list also includes OSPAR and BAP species and habitats. This list was circulated around the expert group which had developed the criteria paper (Connor *et al.,* 2002). This resulted in more additions to and deletions from the list. In particular, a series of biotope complexes from the national marine habitat classification (Connor *et al.,* 2003) were added (see following paragraph). Further expert review of the provisional list may be advisable to avoid missing features that may meet the criteria. The provisional list (after modification resulting from expert comments) is shown in appendix 3.

It needs to be emphasized that the provisional list is <u>not</u> a list of nationally important features, as most of the features on this list were not assessed formally against the criteria. The list should also not be treated as a "suggested list" for nationally important marine features, though it may be treated as a "scoping list" from which ti prioritise features for assessment (see the flow diagram in section 7.3). This applies especially to some of the biotope complexes listed, such as "Infralittoral clean sands". These broad units were listed because they are potentially threatened or declined through fishing activities, though not all biotopes within these complexes will qualify as nationally important. The assessment should be started at the broad scale of biotope complex, but only those biotopes that qualify within each complex should be listed as nationally important (see recommendations in section 6.2). Please also note that the sublittoral sediment section of the national marine habitat classification (Connor *et al.*, 2003) was still under development at the time this list was compiled, and some of the broad habitats have changed. The biotope complexes from the finalised version of the classification should be used for future assessments.

For the purpose of the Irish Sea Pilot, a list of nationally important features which occur in the Irish Sea was needed. Ideally, the criteria would have been finalised, and

a comprehensive national list subsequently developed, prior to the start of the Pilot. As both pieces of work were carried out in parallel, the next best solution in the absence of a finalised national list was considered to be to make use of the provisional list. A subset of the provisional list was created, containing those features which are known to occur in the Irish Sea. For the purpose of the Pilot, this "Irish Sea provisional list" was used in lieu of a list of nationally important marine features. The list was used when applying the criteria for selection of nationally important marine areas, as described in Lieberknecht *et al.* (2004).

The distribution of benthic species and habitats on the Irish Sea provisional list is shown in figure 4.2 (page 32). Because of the relative lack of data in offshore waters, their distribution in those waters is likely to be under-represented. Features above the level of "biotope" in the national marine habitat classification (i.e. biotope complexes and marine landscapes) are not included in the map.

6 Applying the criteria: issues

6.1 Lack of information

The main problem in carrying out the assessments was lack of information. The existing information was used to inform best judgement against the criteria, as the exact necessary figures were rarely available. For example, whilst distribution maps exist for a lot of the species, quantitative information on national and global populations is rare, so the "proportional importance" largely has to be inferred from known global distribution. It has been assumed, for example, that a south-western species with a distribution ranging from the Mediterranean and northern Africa to Cornwall does not qualify under this criterion, even where no quantitative data on population sizes is available. Similar inferences have to be made for other criteria such as "decline" or "threat". The tall sea pen *Funiculina quadrangularis*, for example, is only present in sheltered sealochs where no trawling is carried out, though seemingly suitable habitat exists in trawled areas. From this it is inferred that there is likely to have been a past decline in the distribution of the species as a result of trawling damage.

Given the paucity of quantitative information in exactly the right format to assess the criteria, it is vital that the current "fuzzy" wording of the criteria is maintained. This has been based on the IUCN criteria for red list species, which include phrases such as "suspected decline", "inferred decline" etc., which allow inferences to be made from whatever information is available. Connor *et al.* (2002) point out that whilst every attempt should be made to assess status in a sound and rigorous manner, a lack of hard evidence should not prevent features from being allocated to the "nationally important" category. In some cases, a precautionary approach should be adopted, e.g. where there are indications that the status is poor or is likely to become poor. In such circumstances, if actions are not taken, the feature may be lost or deteriorate to an unacceptable level before detailed information becomes available.

Habitat information was even more sparse than information for species. Virtually no information about the global distribution and extent of the test habitats was found, which made it very difficult to assess "proportional importance". The status of habitats in terms of threat and decline has to be inferred largely from the status of the characterising species of the habitats, where that is known. The lack of information on habitats is caused in part by the problems in habitat definition, described in detail in section 6.2 below.

In terms of marine landscapes, the assessment for "estuaries" posed few problems. There is plenty of information available, e.g. in Buck (1993) and Davidson *et al.* (1991). From that point of view this was a straightforward assessment to carry out. There is no question that "estuaries" meet the criteria for decline / threat of decline and, therefore, qualify as nationally important. However, it is highly unlikely that other marine landscapes will be so easy to assess, given that a lot of these units have

only just been defined (Golding *et al*., 2004). There is unlikely to be a lot of information relating specifically to the status of these units.

There is a need for some clear guidance on what to do in the cases where no or very little information can be found. For example, no information at all was found on the red seaweed *Callophyllis cristata*. An in-depth review of all existing scientific literature and expert consultation may have yielded better results, but was not possible within the time constraints of this testing process. There are likely to be resource constraints on future assessments, and for some benthic invertebrates there are considerable gaps in knowledge. This means that, in all likelihood, insufficient information will be available to reach a decision for some features, even when the criteria are worded in a "fuzzy" manner (section 7.1).

It is suggested that, in a future comprehensive assessment, the UK's marine features should be placed into one of four categories, instead of simply being either on or off a "nationally important marine features" list. The suggested categories are:
1.   nationally important (feature meets one or more of the criteria)
2.   not nationally important (feature doesn't meet any of the criteria)
3.   information insufficient for clear decision
4.   feature not (yet) assessed
This would make a clear distinction between features which are not nationally important, and features for which no information is available.

6.2 Definition of the "habitat" level

The term "marine feature" in this context is taken to mean species, habitats and marine landscapes. The definition of the upper and lower level units is clear: Golding *et al.* (2004) define "marine landscapes", and there is a large degree of agreement on what, taxonomically, may be defined as a "species". There has been discussion over what level of scale the units referred to here as "habitats" should be defined at.

Initially, it was agreed that the "habitats" in this context should refer to units from one of the hierarchical levels of the national marine habitat classification (Connor *et al.*, 2003). The classification structure contains six hierarchical levels. The broadest level (level 1) encompasses the entire marine realm, whereas biotopes and sub-biotopes (levels 5 and 6) consist of species assemblages found in particular physical environments, e.g. assemblages of rocky shore species found at different shore heights on exposed shores. It was considered initially that biotopes and sub-biotopes would be too detailed to use as "habitats" in the context of nationally important marine features. However, whilst compiling the provisional list of nationally important marine features (section 5) it was recognised that units at the biotope complex level (level 4) may be too broad, and some biotopes (level 5) were included on the list.

During the testing process it was confirmed that the biotope complex level can be too broad (e.g. the biotope complex termed "sublittoral mussel beds" – this includes

18

Mytilus edulis dominated biotopes as well as *Modiolus modiolus* beds, which was the feature for which the assessment was eventually carried out, as it meets the criteria for threat and decline).

The testing revealed that even the biotope level of the national classification may be either too broad, or the definition of the units inappropriate, for the purpose of this work. For example, the *Sabellaria spinulosa* assessment was carried out for *Sabellaria spinulosa* reefs – despite the initial test feature being the biotope called "*Sabellaria* crusts on circalittoral rock". On investigation, it was concluded that the biotope formed by annual crusts or clumps of the species was relatively common, and would probably fail the criteria, whereas there is evidence that reef structures formed by *Sabellaria spinulosa* are threatened and declining. Actions should therefore be taken to protect the reefs, and they should be listed as nationally important, even though they aren't represented as a separate unit within the national biotope classification.

It is felt that any entity which meets the criteria (whatever level of scale) should be listed as nationally important. In having three levels of scale of features (species, habitats, marine landscapes) we are only partly addressing the sliding levels of scale of units in ecological systems. For nationally important marine features, it should be possible to fix the upper and lower ends of the scale (as marine landscapes and species), but leave the scale at which "habitats" are listed open.

Assessment against the criteria for "habitats" should begin with the units at the biotope complex level from the marine habitat classification. For a given biotope complex the assessment may show that only specific biotopes or sub-biotopes (or even units not defined in the national classification) within that complex fulfil the criteria, whereas the biotope complex as a whole does not. In this case, the smaller units should be listed as nationally important. As a result, "nationally important habitats" would include units at varying scales, from biotope complexes to sub-biotopes. By starting the assessment at the broadest level (biotope complex), the resulting list of nationally important habitats will contain units of varying scales, but there should be no overlap between them.

Further confusion may be caused by the fact that there is a lack of consistency in the definition and scale of units referred to as "habitats" in the literature. For example, when researching *Modiolus* beds, information was found for the species *Modiolus modiolus*, as well as *Modiolus* "reefs" and *Modiolus* "beds" – but with no precise definition given for the "reefs" and "beds". Attempting to research the status of a clearly defined biotope complex can, therefore, be problematic. Given that the biotope classification has very recently been revised, some of the units to be assessed will be newly defined entities, with little existing literature referring to precisely these entities.

As indicated in section 6.1, lack of information in precisely the right format should not be taken as a reason not to list a feature as nationally important. Inferences will have

to be made from whatever information exists for habitats, e.g. the distribution, abundance and status of principal component species (species information being more readily available). An example is *Sabellaria spinulosa* – though information about the distribution of the species exists, there seems to be very little information about where the species forms reef habitats, especially at an international scale. This makes it difficult to assess the proportional importance criterion for *S. spinulosa* reefs, unless the inference is made that reefs occur wherever the species is recorded above a certain abundance.

7 Modifications to the criteria

7.1 Modifications to the wording of the criteria

As a result of applying the criteria to the test features, the draft criteria have been modified to improve their applicability. In general, the modifications attempt to simplify the process of applying the criteria, resulting in the an outcome meeting conservation requirements. As the main problem encountered during the testing was a lack of information in the right format, flexible ("fuzzy") wording of the criteria has been maintained in order to allow inferences to be made on best existing knowledge

The modifications for specific criteria are shown in the grey boxes below, with the text in between explaining the rationale behind the amendments. It is recommended to the RMNC Working Group that the modified criteria, as shown in the grey boxes, should be adopted by the UK, subject to any refinement that may be needed following further discussion with other countries through EU and OSPAR. Section 7.2 provides generic guidance for applying the criteria, which should always be published and read in conjunction with the criteria.

Proportional importance

A high proportion of the marine landscape, habitat, or population of a species (at any time of its life cycle) occurs within the UK. This may be related to either the global or regional extent of the feature.

Features are categorised as follows:

Globally important: a high proportion of the global extent of a marine landscape or habitat or a high proportion of the global population of a species (at some stage in its life cycle) occurs within the UK. 'High proportion' is considered to be more than 20%.

Regionally important: a high proportion of the regional extent of a marine landscape or habitat, or a high proportion of the regional population of a species (at some stage in its life cycle) occurs within the UK. 'Regional' refers to the north-east Atlantic (OSPAR) area. 'High proportion' is considered to be more than 30%.

Unless the region holds all of the global population, the overall importance of the regional population will be less in global terms. It follows that to qualify as nationally important, the threshold UK proportion of the regional population should be higher than the threshold UK proportion of the global population. It is recommend that 20% be adopted as a threshold at the global level, and 30 % be adopted as a threshold at the regional level.

It is considered that the level of both thresholds needs to be lower than the originally proposed 50% (Connor *et al.*, 2002). The UK has 40-45% of the global population of Grey Seal, and as such is surely of global significance, yet it would fail the 50% threshold.

Rarity

Marine landscapes, habitats and species that are sessile or of restricted mobility (at any time in their life cycle) are considered nationally rare if their distribution is restricted to a limited number of locations.

Rarity is assessed as follows:

The feature occurs in fewer than 0.5% of the total number of 10 km x 10 km squares in UK waters.

A mobile species qualifies as nationally rare if the total population size is known, inferred or suspected to be fewer than 250 mature individuals. Vagrant species should not be considered under this criterion.

Originally (in Connor *et al.,* 2002), there were additional categories for global and regional rarity under this criterion. However, it was agreed by the criteria group that these categories should be removed, with the underlying reasoning as follows: If something is nationally rare, it should be deemed nationally important because of its contribution to national biodiversity. If it is regionally and globally rare, but not rare nationally – then it would be likely to qualify under the proportional importance criterion. If it does not fulfil the proportional importance criterion, there is no reason to consider something that is not nationally rare as nationally important (note that the "decline" and "threat of decline" criteria - defined below - have been amended to include features that are declining or threatened at a global or regional level, where there is cause for concern that the proportional importance criterion may be met in the foreseeable future).

Vagrant species that are globally rare should be picked up through different processes – we would rely on them being afforded any necessary protection measures through international mechanisms – a "national" mechanism such as a list of nationally important features is not thought to be the right tool to address the needs of such species.

The rarity threshold population size of 250 mature individuals for mobile species is based on the 2001 IUCN criteria for red list species in the "endangered" category (www.redlist.org/info/categories_criteria2001.html#critical).

Decline

An observed, estimated, inferred or suspected significant decline (exceeding expected or known natural fluctuations) in numbers, extent or quality of a marine landscape, habitat or a species in the UK (for species, quality refers to life history parameters). The decline may be historic, recent or current. Alternatively, a decline at a global or regional level, where there is cause for concern that the proportional importance criterion will be met within the forseeable future.

Decline in extent and quality of features at different scales should be assessed as shown in the following table:

	Extent	Quality
Marine land-scapes and habitats	A marine landscape or habitat that has declined in extent to 90% or less of its former natural extent in the UK, or its distribution within the UK has become significantly reduced (e.g. lost from several sub-regions).	A marine landscape or habitat for which quality, based on change from natural conditions caused by human activities, is negatively affected by: (1) a change of its typical or natural components over a significant part of its UK distribution, or (2) the loss of its typical or natural components in several sub-regions. Such judgement is likely to include aspects of biodiversity, species or habitat composition, age composition, productivity, biomass per area, reproductive ability, non-native species and the abiotic character of the habitat.
Species	Within the UK population of the species: there has been a recent significant decline in numbers of individuals / geographical range, or numbers of individuals / geographical range are presently in marked decline, or the present population is at significantly lower levels than in the past as a result of human activity (evidence for past significant decline)	The species has suffered a significant decline in one or more of the following: Loss of genetic diversity Loss of fecundity Reduction in the number of mature individuals Fragmentation of the population

There is a danger of complicating this criterion too far - bearing in mind the biggest problem in carrying out the assessments is a lack of information in the right format. It is considered best to keep the wording general and avoid having too many thresholds (e.g. "a feature has to decline by x % to qualify"), to avoid features in need of conservation action falling through the net. If the wording is kept general, that will enable consideration of whatever information does exist about a feature, and common sense can be used to reach a verdict.

Threat of significant decline

It is estimated, inferred or suspected that the feature will suffer significant decline (as defined under the "decline" criterion) in the foreseeable future as a result of human activity. This assessment will need to take into account the inherent sensitivity of the feature and its expected degree of exposure to the effects of human activity.

A feature may also qualify under this criterion if there is real cause for concern that it would fulfil the proportional importance criterion in the near future due to the threat of global or regional decline.

7.2 Generic guidance on the application of the criteria

"Feature" refers to species, habitats and marine landscapes. Species are relatively well defined units for carrying out the assessment. Habitats and marine landscapes are broader units which are not as tightly defined, and therefore may give rise to confusion about how to define and delimit the units for assessment.

Habitats, in the context of nationally important marine features, do not refer to one, fixed, level of scale (such as a defined level in the marine habitat classification). It is recommended that the assessment should initially be carried out at the (relatively broad) biotope complex level. If the biotope complex level doesn't meet any of the criteria, but more narrowly defined biotopes within the complex do, then those biotopes should be listed as nationally important. This may be the case, for example, with the "sublittoral mussel beds" biotope complex (SMus), which includes widespread types dominated by *Mytilus edulis* as well as *Modiolus modiolus* beds. SMus may not qualify as nationally important, but *M. modiolus* beds would qualify under the threat and decline criteria and should therefore be listed.

Marine landscapes are considered to be broad units which should not be too tightly defined in terms of their biology. For example, sealochs in Scotland differ in their biota from sealochs (fjords) in other parts of Northern Europe, because of biogeographical factors. Too tightly defined marine landscapes would therefore always qualify under the proportional importance criterion. However, marine landscapes should only qualify under this criterion if similar functional types are rare outside the UK – this could be the case for fjardic sealochs. Biologically defined features should not be assessed at this scale.

"National" refers to the boundary of UK jurisdiction, i.e. the assessment of whether a feature meets any of the criteria is carried out using a political boundary, and features which qualify are deemed "nationally important" at the UK level. However, existing datasets will usually cover a range of different local, regional or biogeographical areas, and judgements will often have to be carried out using datasets that cover only part of the UK seas, or which also include areas of adjacent waters outside UK jurisdiction.

The "ideal" dataset (comprehensive, evenly distributed, covering the right geographical area, including historic & recent data) is unlikely to exist for any feature, even well-studied species. This means that, in most feature assessments, some degree of expert judgement will be required to reach a conclusion. Care has been taken in the wording of the criteria to allow for this. Even where exact threshold figures are mentioned in the criteria (e.g. in the criterion for nationally rare features), it is not necessary to have the exact scientific data to "prove" that these figures are reached in order for a feature to qualify as nationally rare – existing data and expert knowledge need to be evaluated, applying the precautionary approach where there is a degree of uncertainty. Expert judgement has to distinguish between lack of recorded data and true rarity or absence of a feature (e.g. in assessing rarity or decline). It is also important to take account of the age of data. For example, in assessing rarity of a feature which is known to have declined (e.g. *Atrina fragilis*), it is important to use a cut-off date for data. The inclusion of historical data may lead to an overestimation of current numbers.

If insufficient information is available to carry out the assessment, it is important to highlight this rather than simply recording a feature as not nationally important.

7.3 Proposed process for developing a nationally important features list

A) Development of national scoping list: This list should be the "national provisional list" plus / minus features depending on expert opinion gathered in open consultation. Everything on the scoping list should be thought about in terms of the criteria and have a good possibility of meeting one or all of them (broad input).

B) Prioritisation of the features on the scoping list based on the likely need for conservation action. This should have a broad input and could be carried out at the same time as A) above.

C) Drafting of justifications ("dossiers") for priority features, assessing whether they qualify under the criteria. Recommendations should be made for conservation action for features which qualify, where such action is required. This would best be carried out by expert ecologists.

D) Consultation phase: open peer review of "dossiers" and recommended conservation actions, with as broad an input as possible.

E) Submission of case studies, suggested conservation action and comments to panel (criteria group?) for approval and formal placing of features on nationally important list.

F) Periodic meeting of "nationally important marine features panel" to review the status of the features and discuss assessment of new features. There is the possibility of taking a fully recovered feature off the list (or recommend no further conservation action), but only if there is no further threat and it does not fulfil the criteria for special importance. If there is any doubt, the precautionary approach needs to be adopted.

There was agreement within the criteria group that the process has to be open, consultative, with broad input on proposed features. The proposed process will result in a list of nationally important features, together with some recommendations for conservation action, that will form advice to Government, based on **biological** expertise and best available data.

8 Practical conservation considerations

The practical conservation of nationally-important features is not straightforward. It is anticipated, from the work carried out to date, that in the order of 300 features might meet the criteria in the UK and adjacent waters, of which perhaps half will occur in the Irish Sea. These features will range from relatively static benthic features known from only one or two localities, to highly mobile, wide-ranging species. Some features will be conspicuous and easy to identify, others will be inconspicuous or difficult to differentiate from ones which are similar in appearance but which are not nationally-important. The approach needed to conserve the various features can be expected to differ considerably across the range of features.

In general, the features are likely to fall into one or more of the following categories:
i.   features whose distribution is clustered and centred on a small number of distinct localities for all or most of the year;
ii.   features which form aggregations in predictable localities during at least part of the year;
iii.   features which are widely but thinly distributed, though everywhere uncommon;
iv.   species which are mobile, occurring as individuals or in small or even large groups, and which may be vulnerable to capture fisheries;
v.   species which are vulnerable to disturbance resulting from human-induced noise, vibration or movement;
vi.   features which have narrow tolerances in relation to water conditions or which are vulnerable to pollution;
vii.   species which are relatively mobile and which are at the edge of their range in national waters.

While needs will vary across the range of features, the types of measures needed to conserve nationally-important features are likely to include:
i.   zoning of human activities so as to avoid damage or disturbance to sensitive areas, within a wider framework of spatial planning. This zoning would include the identification of areas of particular value to nature conservation where human activity would be carefully managed;
ii.   measures to reduce the impact of the incidental take of vulnerable mobile species by capture fisheries;
iii.   measures to ensure the maintenance or improvement of water quality conditions, or the avoidance of pollution;
        iv.   measures aimed at maintaining the physical and biological processes that support marine ecosystems, including the maintenance of their trophic structure;
v.   Action Plans to address the specific needs of particular features.

It is desirable that a single national process is operated in relation to the identification of nationally-important features and the identification of action needed to conserve them. The Pilot considers that it would be desirable, therefore, to combine the process recommended here with the current Biodiversity Action Plan process in relation to marine features. Further work should be carried out to determine which nationally important features may require specific action plans.

It should be noted that one of the test species which failed the test criteria, the Pink seafan *Eunicella verrucosa*, is a Biodiversity Action Plan priority species. This fragile and attractive species is potentially threatened by mechanical damage and by collecting, and the conservation measures taken to support it are considered to be helping to maintain its populations. In circumstances such as these, the Pilot recommends the maintenance of existing conservation measures.

Measures to address the needs of nationally-important features are discussed further in Lieberknecht *et al.* (2004), Lumb *et al.* (2004b) and Vincent *et al.* (2004).

9 Data collation

For the Pilot area, work has been underway to collate as much existing biological data into the JNCC marine database as possible. This included collating biological data by targeting specific datasets, which were added to the JNCC database (Northen, 2003).

In order to test the extent to which the Irish Sea data on the JNCC marine database reflects the true extent of knowledge of species and habitat distribution, a contract was let to the MBA to conduct a "mop-up" exercise for the 48 species and habitats shown in table 8.1, through their *MarLIN* programme. The task was to conduct a literature review, and contact individuals and institutions holding relevant information, in order to collate as close to 100% as possible of all existing records for the 48 features.

Table 8.1 The features for which this data collation exercise was carried out are the following:

Amphianthus dohrnii	Sea fan anemone
Leptopsammia pruvoti	Sunset cup coral / Sunset star coral
Scolanthus callimorphus	Worm anemone
Alcyonium glomeratum	Red sea fingers
Caryophyllia inornata	Cup coral
Caryophyllia smithii	Devonshire cup-coral
Funiculina quadrangularis	The tall sea pen
Hoplangia durotrix	Carpet coral / Weymouth carpet coral
Parazoanthus axinellae	Yellow cluster anemone
Pachycerianthus multiplicatus	Fireworks anemone
Ophelia bicornis	Worm
Sabellaria alveolata	Honeycomb worm
Sabellaria spinulosa	Ross worm
Serpula vermicularis	Serpulid tube worm
Sternaspis scutata	Bristle worm
Achaeus cranchii	Crab
Palinurus elephas	European spiny lobster
Pectenogammarus planicrurus	Amphipod
Acanthocardia aculeata	Spiny cockle
Aeolidiella sanguinea	Sea slug
Arctica islandica	Ocean quahog
Atrina fragilis	Fan Mussel
Caloria elegans	Sea slug
Doris sticta	Sea slug
Hydrobia (Ventrosia) ventrosa	Mud Snail
Modiolus modiolus	Horse mussel
Nucella lapillus	Dog whelk
Okenia elegans	Yellow skirt slug
Ostrea edulis	Native oyster / Flat oyster
Patella ulyssiponensis aspera	Limpet
Tenellia adspersa (Tenella adspersa)	Lagoon sea slug

Trapania maculata	Sea slug
Amathia pruvoti	Bryozoan
Echinus esculentus	edible sea urchin, Common Urchin
Polysyncraton lacazei	Colonial sea squirt
Pectenogammarus planicrurus in midshore well-sorted gravel or coarse sand	
Cirratulids and *Cerastoderma edule* in littoral mixed sediment	
Zostera noltii beds in littoral muddy sand	
Sabellaria alveolata reefs on sand-abraded eulittoral rock	
Laminaria saccharina, Chorda filum and dense red seaweeds on shallow unstable infralittoral boulders or cobbles	
Flustra foliacea and *Haliclona oculata* with a rich faunal turf on tide-swept circalittoral mixed substrata	
Suberites spp. with a mixed turf of crisiids and *Bugula* spp. on heavily silted, moderately wave exposed, shallow circalittoral rock	
Sabellaria spinulosa encrusted circalittoral rock	
Ampharete falcata turf with *Parvicardeum ovaleum* cohesive muddy very fine sand near margins of deep stratified seas	
Styela gelatinosa and other solitary ascidians on very sheltered deep circalittoral muddy sediment	
Modiolus modiolus beds with *Chlamys varia*, sponges, hydroids and bryozoans on slightly tide-swept very sheltered circalittoral mixed substrata	
Modiolus modiolus beds on circalittoral mixed sediment	
Limaria hians beds in tide-swept sublittoral muddy mixed sediment	

No new records of any of the habitats could be found, in a large part due to similar problems as those encountered in terms of habitat definition during the criteria testing process described in section 6.2 above. Some new species records were encountered and entered into the JNCC marine database. The maps in figures 8.1, 8.2, 8.3 and 8.4 (pages 33 – 36) show existing and newly collated records for the species. Note that the star symbols cover over the small circles, and it may therefore appear that the newly collated records expand the area within which a feature has been recorded significantly. This is only true for *Modiolus modiolus*, where records have been added for the area south of the Isle of Man (figure 8.3, page 35). Full details on data sources are given in Parr and Ager (2003 a,b,c).

Data collation proved vital for carrying out much of the Irish Sea Pilot work, as there are still significant gaps in data coverage, particularly in offshore areas (see also Northen, 2003, Lumb *et al.,* 2004a and Lieberknecht *et al.,* 2004). Further to the main Irish Sea Pilot data collation work (Lumb *et al.*, 2004a), data collation was carried out by the *MarLIN* programme at the Marine Biological Association, targeted at 48 specific species and habitats. The aim was to test whether, after the main Irish Sea data collation work, there were still significant numbers of existing records for these species and habitats which had not been collated. An attempt was made to collate all existing records from the scientific literature, grey literature, and research institutions.

It was concluded that a feature-by-feature approach to data collation is not cost-effective. The collation of data is considered vital for the success of the Irish Sea Pilot work and any similar work in the future, but targeting individual features was found to be time-consuming, yielding few additional records. Instead of targeting individual features, a more cost-effective way of data collation may be to target specific datasets and/or institutions known to hold significant amounts of data. However, data collation for individual features may still be useful where there are significant known gaps in the available data, and where it is considered that the addition of other existing records may affect whether or not a feature may qualify as nationally important.

The results from the data collation carried out on the 48 features serve to highlight the general difficulty of being able to access data on the marine environment, e.g. from marine research establishments and environmental impact assessments. The same problems were encountered by Lumb *et al.* (2004a). As an example, there is virtually no data on the Firth of Clyde on the JNCC marine database, even after the Irish Sea Pilot data collation work. This is despite there being a marine biology station within the Clyde, and SEPA and predecessors have extensive marine biological survey and monitoring programmes in the Clyde (Lumb, pers. comm.). One of the problems in collating existing survey data is that they are often not recorded in any consistent or easily accessible format, and to collate and enter the data into a tool such as Marine Recorder would be time-consuming and potentially costly. Such work would be a lot more cost-effective than collecting the data afresh, and should be pursued wherever possible, but would require considerable resources and a mechanism by which to access datasets held by a range of institutions.

10 Colour Plates
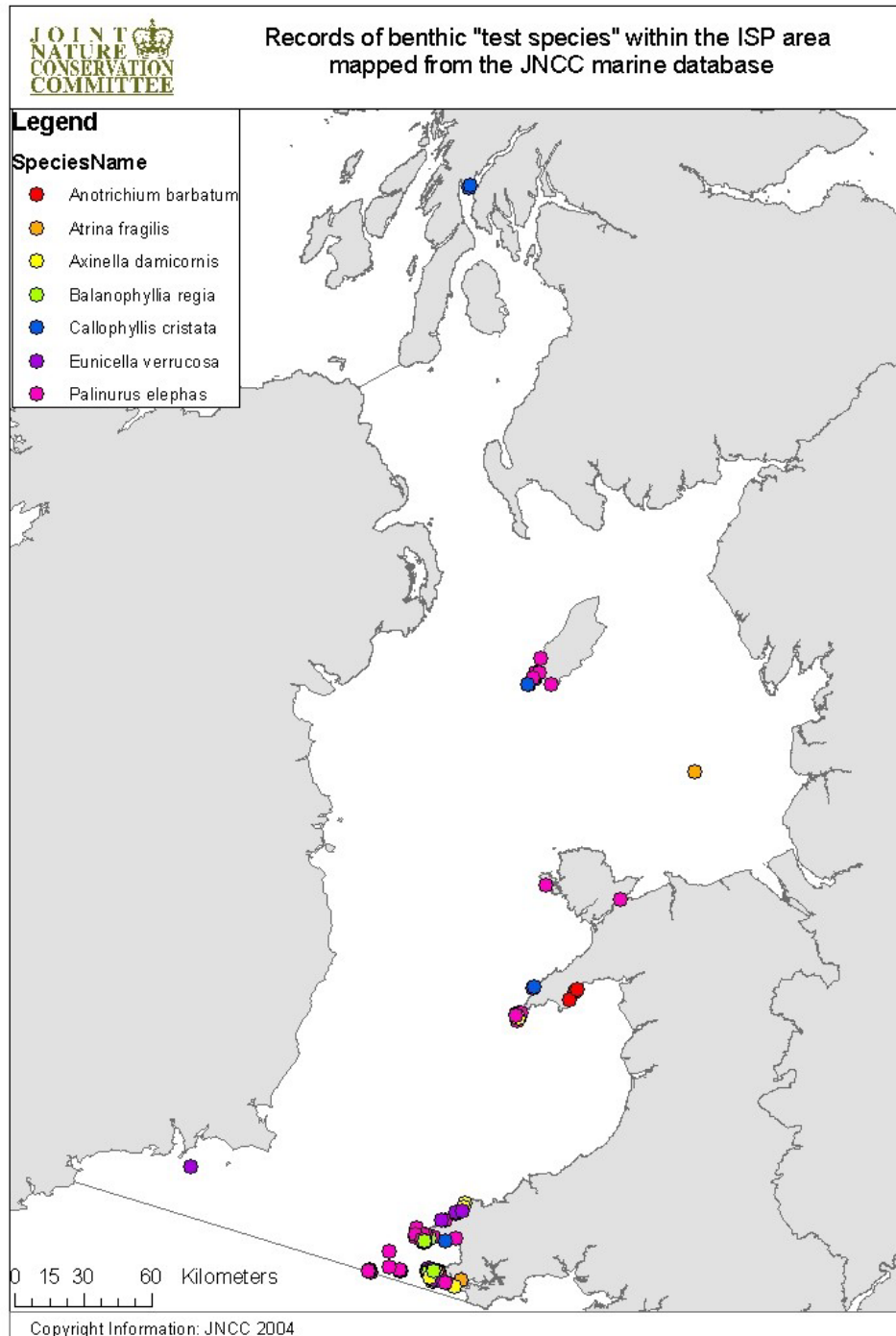
Figure 4.1. Distribution of the benthic test species within the Pilot area, mapped from species records on the JNCC marine database (data from various sources). All records for the tall sea pen, *Funiculina quadrangularis,* fall outside the study area and are therefore not included on the map. The JNCC marine database contains historic as well as recent records, all records are shown.
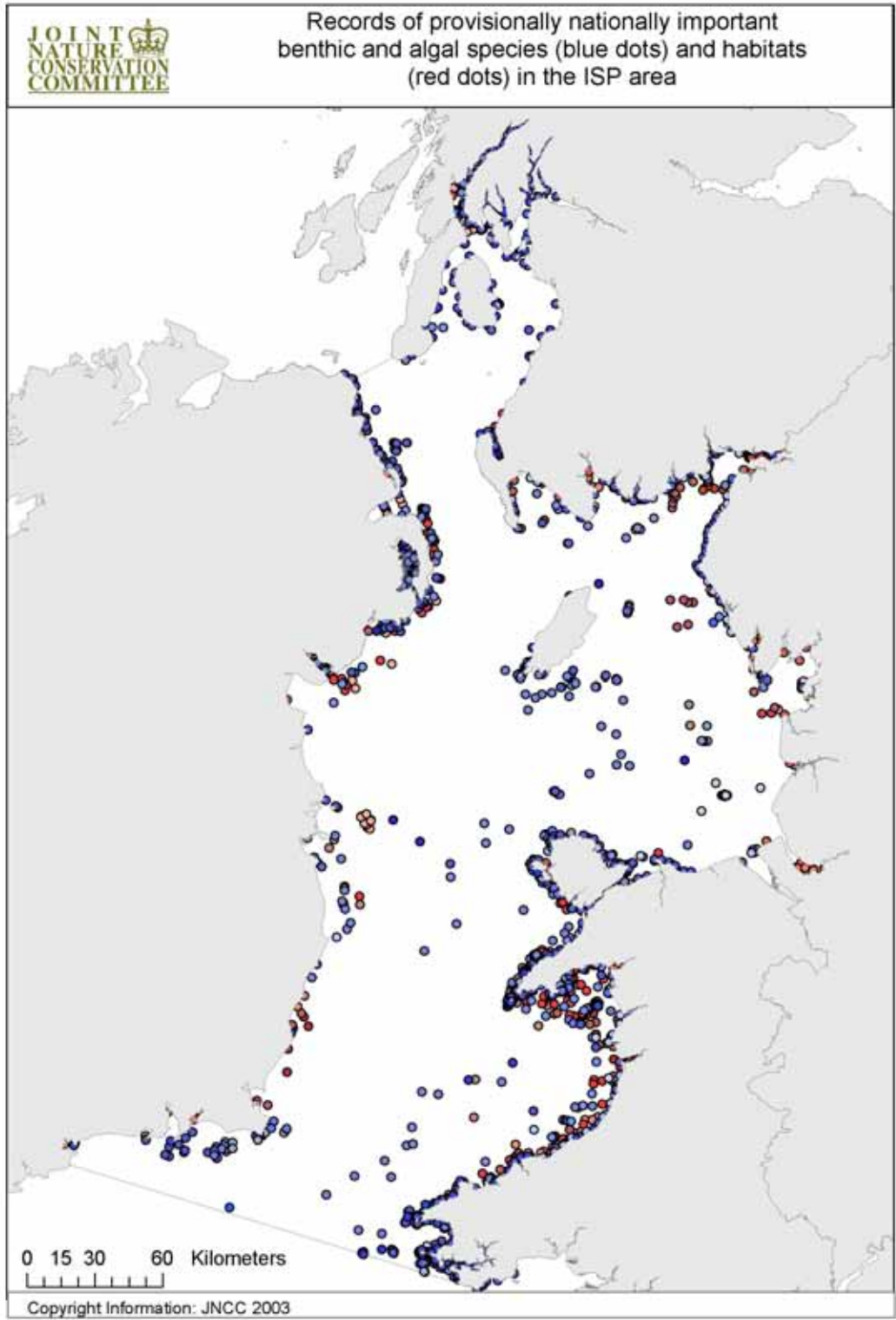
Figure 4.2. The distribution of records in the Irish Sea of benthic species (blue dots) and habitats (red dots) on the Irish Sea provisional list, mapped from records on the JNCC marine database(records from various sources). Different tones indicate different features. Note that species and habitat records are often recorded from the same location and may lie on top of each other on this map.
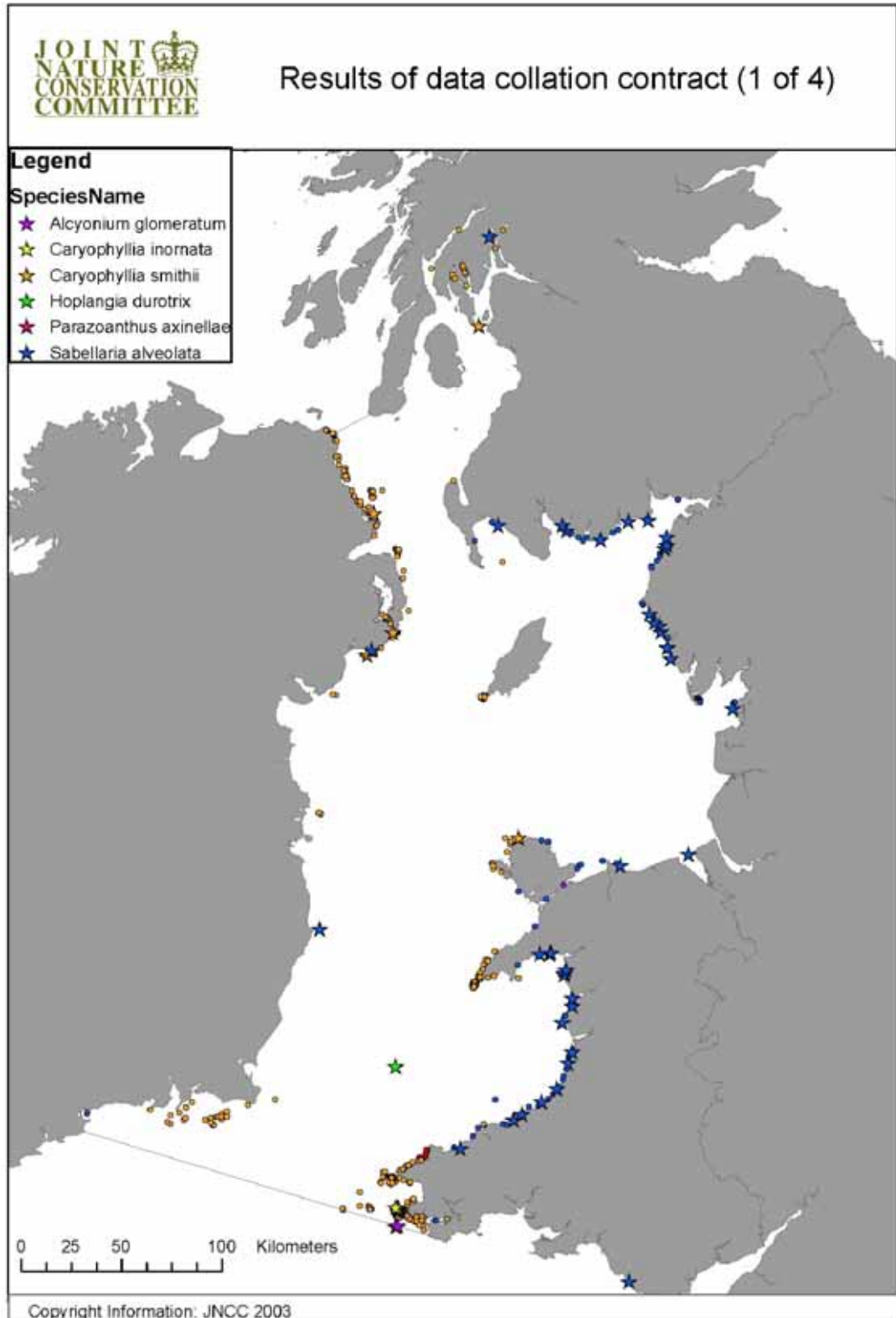
Figure 8.1. Map showing the distribution of existing and newly collated benthic species records (map 1 of 4). Newly collated species records are indicated by stars, records of the same species which were already present on the JNCC marine database are shown in small circles of the same colour. The latter are not included on the legend for clarity of presentation.
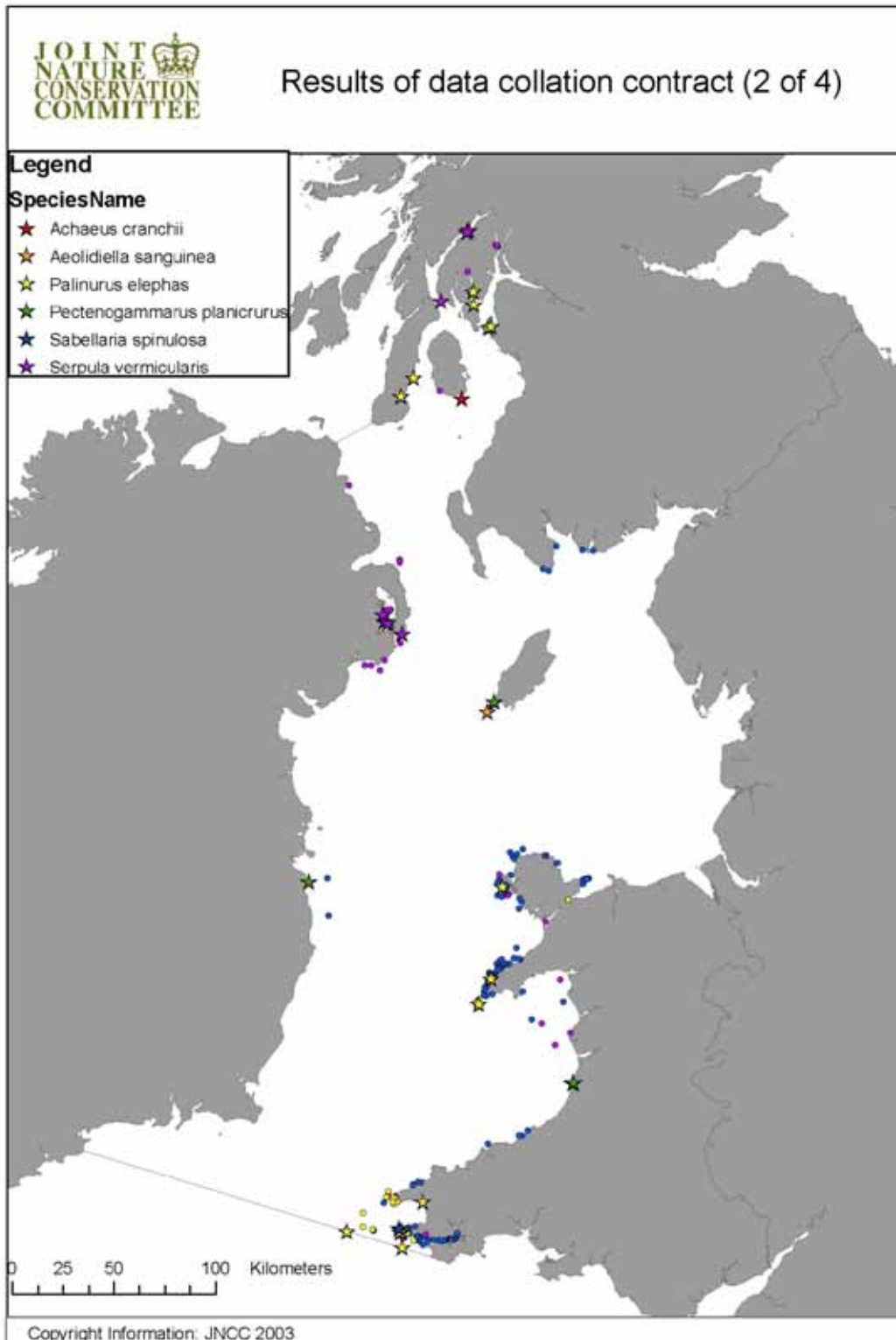
Figure 8.2 Map showing the distribution of existing and newly collated benthic species records (map 2 of 4). Newly collated species records are indicated by stars, records of the same species which were already present on the JNCC marine database are shown in small circles of the same colour. The latter are not included on the legend for clarity of presentation.
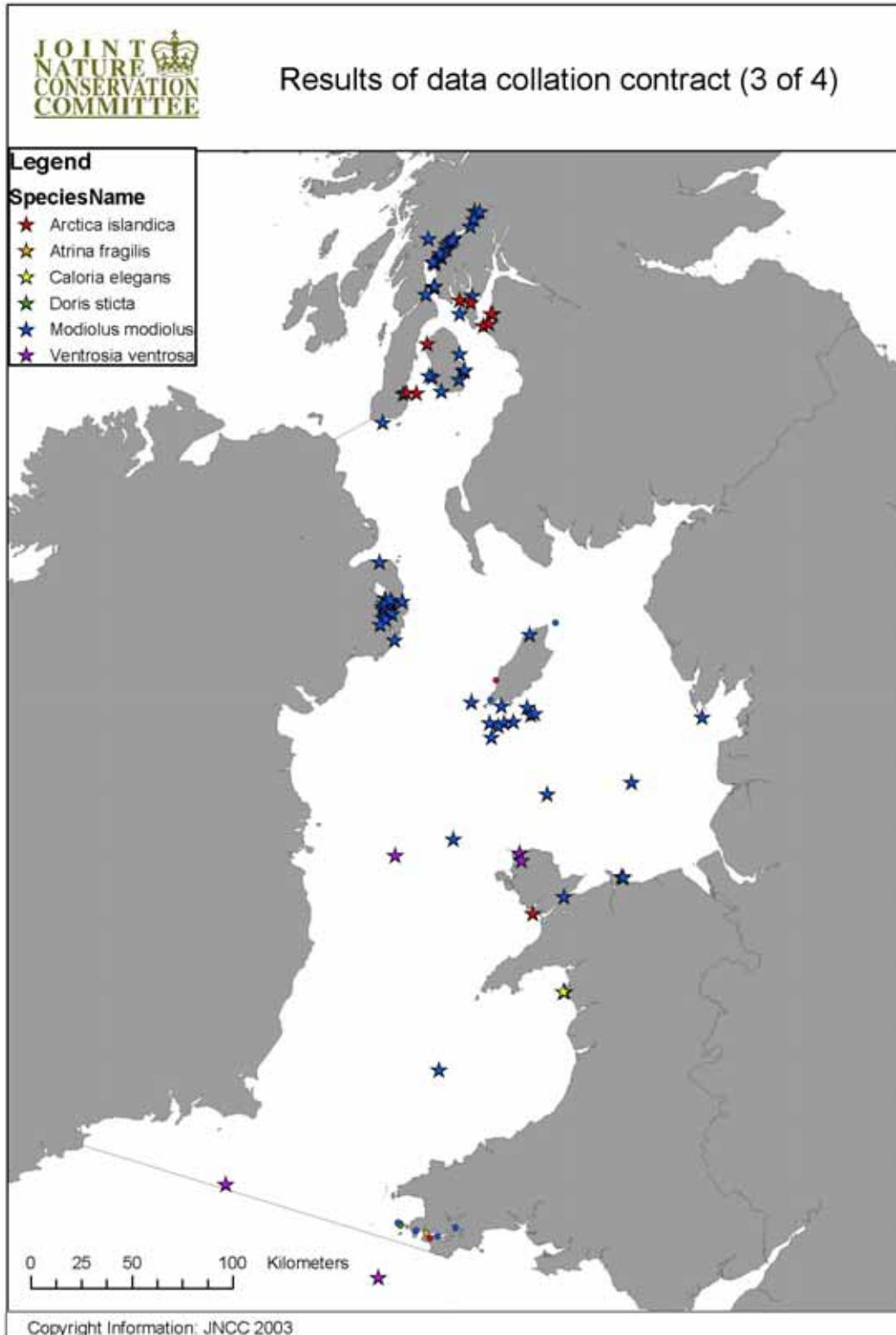
Figure 8.3 Map showing the distribution of existing and newly collated benthic species records (map 3 of 4). Newly collated species records are indicated by stars, records of the same species which were already present on the JNCC marine database are shown in small circles of the same colour. The latter are not included on the legend for clarity of presentation.
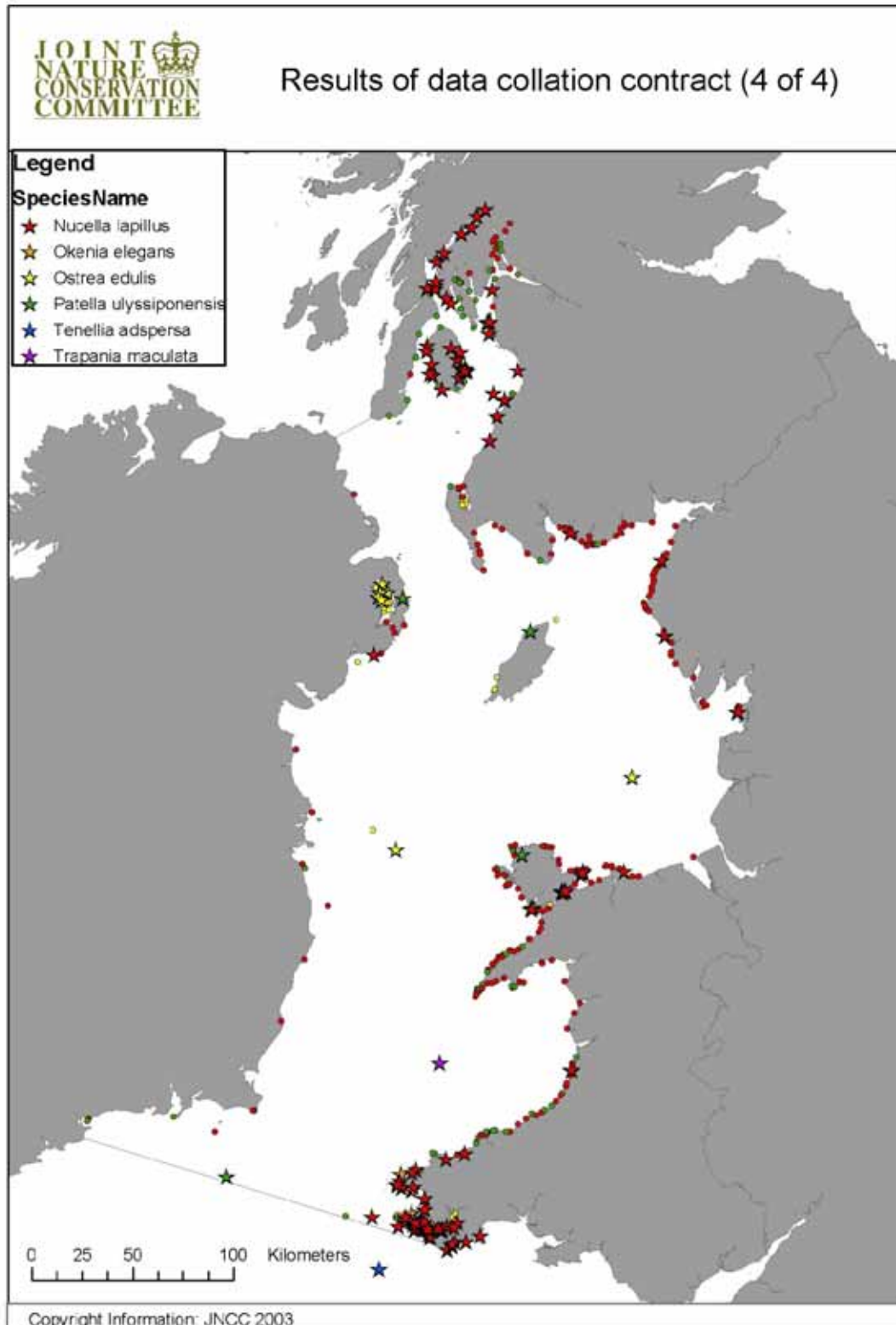
Figure 8.4. Map showing the distribution of existing and newly collated benthic species records (map 4 of 4). Newly collated species records are indicated by stars, records of the same species which were already present on the JNCC marine database are shown in small circles of the same colour. The latter are not included on the legend for clarity of presentation.

11 References

Biodiversity Information Group (2000) *Species of Conservation Concern (SoCC) list.* Available to download at http://www.ukbap.org.uk/SoCC.htm

Buck, A L (1993) *An inventory of UK estuaries Vol 4 North and East Scotland.* Peterborough, Joint Nature Conservation Committee.

Connor, D W, Breen, J, Champion, A, Gilliland, P M, Huggett, D, Johnston, C, Laffoley, D d'A, Lieberknecht, L M, Lumb, C, Ramsay, K, and Shardlow, M (2002) *Rationale and criteria for the identification of nationally important marine nature conservation features and areas in the UK. Version 02.11.* Peterborough, Joint Nature Conservation Committee (on behalf of the statutory nature conservation agencies and Wildlife and Countryside Link) for the Defra Working Group on the Review of Marine Nature Conservation.

Connor, D W, Allen, J H, Golding, N, Lieberknecht, L M, Northen, K O and Reker, J B (2003) *The National Marine Habitat Classification for Britain and Ireland Version 03.02* © 2003 Copyright JNCC, Peterborough ISBN 1 86107 546 4 (available online at http://www.jncc.gov.uk/marine/biotopes/default.htm)

Davidson, N C, Laffoley D d'A, Doody, J P, Way, L S, Gordon, J, Key, R, Drake, C M, Pienkowski, M W, Mitchell, R and Duff, K L (1991) *Nature conservation and estuaries in Great Britain.* Peterborough, Nature Conservancy Council

Gilliland, P (2001) *Understanding and managing human activities.* In: *Natura 2000. UK Marine SACs Project: Partnerships in Action. Proceedings of a conference held in Edinburgh, 15th-16th November 2000 by EN, SNH, CCW, EHS (DoE(NI)), JNCC & SAMS.* Peterborough, English Nature.

Golding, N, Vincent, M A and Connor, D W (2004) *Irish Sea Pilot - Report on the development of a Marine Landscape classification for the Irish Sea.* JNCC and Available at www.jncc.gov.uk/irishseapilot.

Lieberknecht, L M, Carwardine, J, Connor, D W, Vincent, M A, Atkins, S and Lumb, C (2004) *The Irish Sea Pilot - Report on the identification of nationally important marine areas in the Irish Sea.* JNCC and online at www.jncc.gov.uk/irishseapilot.

Lumb, C, Webster, M, Golding, N, Atkins, S and Vincent, M A (2004 a) *Irish Sea Pilot – Project boundary, collation and mapping of data.* JNCC. & online at www.jncc.gov.uk/irishseapilot.

Lumb, C M, Fowler, S L, Atkins, S M, Gilliland, P M & Vincent, M A (2004 b) *Irish Sea Pilot - Report on Conservation Objectives.* JNCC and online at www.jncc.gov.uk/irishseapilot.

Northen K, (2003) *Irish Sea Pilot Scheme - Collation of biological data.* JNCC Contract F90-01-562.

Parr, J and Ager, O E D (2003a) *Collation of data distribution on species and habitats in the Irish Sea (Stage 1).* Report from the Marine Biological Association to the Joint Nature Conservation Committee (JNCC Contract: F90-01-592).

Parr, J and Ager, O E D (2003b) *Collation of data distribution on species and habitats in the Irish Sea (Stage 2).* Report from the Marine Biological Association to the Joint Nature Conservation Committee (JNCC Contract: F90-01-592).

Parr, J and Ager, O E D (2003a) *Collation of data distribution on species and habitats in the Irish Sea (Consultation).* Report from the Marine Biological Association to the Joint Nature Conservation Committee (JNCC Contract: F90-01-592).

Sanderson, W G (1996) *Rare benthic marine flora and fauna in Great Britain: the development of criteria for assessment*. JNCC report no. 240.

Vincent, M A, Atkins, S, Lumb, C, Golding, N, Lieberknecht, L M and Webster, M (2004) *Marine Nature Conservation and Sustainable Development: the Irish Sea Pilot*. JNCC & online at www.jncc.gov.uk/irishseapilot.

12 Appendices

12.1 Appendix 1: Dossier for *Palinurus elephas*

12.1.1 Application of the criteria for special importance

Proportional importance

UK distribution: The main populations of *Palinurus elephas* (European spiny lobster, crawfish, thorny lobster) are confined to rocky bottoms on the west coast of Scotland, the extreme south-west coasts of England & Wales and the west coast of Ireland. Only occasional occurrences have been noted from elsewhere (Jackson, 1999).

Global distribution ranges from West Norway along Atlantic shores of France and into the Mediterranean (Tambs-Lyche, 1958; Díaz and Abelló, 2001; Anonymous, 1999).

Distribution map taken from Anonymous, 1999.

Verdict: given the wide distribution of the species, it is unlikely to meet this criterion.

Rarity

Described as "common" off the south and west coasts of Britain (Hayward & Ryland, 1990), though this information should be treated with some caution now (Connor, pers. comm.). Not present on list of nationally rare and scarce marine features (Sanderson, 1996).

Verdict: Doesn't meet criterion.

12.1.2 Application of the criteria for threatened / declined features

Decline

The main populations are confined to rocky bottoms on the west coast of Scotland, the extreme south-west coasts of England & Wales and the west coast of Ireland. Only occasional occurrences have been noted from elsewhere (Jackson, 1999). In 1977 its distribution was described as continuous along the Scottish west coast, along the northern coast to Orkney, and in Shetland, with only rare vagrants recorded from the east coast. It was stated that with advent of SCUBA more records – earlier data from traditional fishing methods likely to have underestimated population abundance (Ansell and Robb, 1977). Earlier records (1950s – 60s) exist from the north and west coasts of Scotland but the species is referred to as "rare" (Rae and Lamont, 1963; Wilson, 1956; Stephen et al., 1957).

[Evidence of overexploitation and resulting population decline as a result of fisheries throughout its range (Díaz and Abelló, 2001; Anonymous, 1999).]

In UK: Evidence for decline of population as a result of overfishing: landings much reduced in Cornwall and Wales since 1970s, diving for crawfish is not economical anymore though it used to be. Reports of increasing proportions of small individuals taken. Crawfish not targeted directly but taken as bycatch (Hunter et al., 1996 - and reference therein: Hunter, 1994; Hepper, 1977; Eno et al., 1996).

Hunter et al., 1996: Most male crawfish landed in Cornwall between 1963-1971 had a carapace length (CL) of 140 – 180mm, whereas in 1993-1994 most male crawfish measured between 100 and 130 mm CL, skewed towards the low end. For females, 1963-1971 CL was 110-140 mm, 1993-1994 125 – 155 mm, skewed towards the large end. It appears that the size frequency distribution of males and females was reversed during those two decades. Diving for crawfish off Cornwall virtually eliminated the species from shallow water during the 1960s (Hepper, 1977).

Verdict: Likely to meet criterion (though no measure of scale of decline found).

Threat of significant decline

Need to assess present / predicted future impacts from fishing, but recent studies seem to indicate continued pressure (Hunter et al., 1996) even if fisheries not directly targeted at crawfish.

Verdict: Probably meets criterion.

Overall Verdict
Likely to meet "decline" criterion: should be on list of nationally important features.

12.1.3 References cited in appendix 1

Noel, P. (1999) Palinurus elephas *(Fabricius, 1787) Langouste rouge.* Paris: Muséum National d'Histoire Naturelle (cited 20.01.03)
www.mnhn.fr/mnhn/bimm/protection/fr/Especes/Fiches/Palinuruselephas.html

Ansell, A D and Robb, L (1977) The spiny lobster *Palinurus elephas* in Scottish Waters. *Marine Biology* **43** 63-70.

Díaz, D. and Abelló, P. (2001) Las poblaciones de la langosta roja (Palinurus elephas), especie emblemática del litoral rocoso costero mediterráneo. *Buceo* XXI 12 18-19
http://www.icm.csic.es/rec/abello/buceo2101.htm

Eno, N.C., MacDonald, D. & Amos, S.C., 1996. *A study on the effects of fish (Crustacea/Molluscs) traps on benthic habitats and species*. Final report to the European Commission. Study Contract, no. 94/076.

Hayward, P. J. & Ryland, J. S. (eds) (1990) *The marine fauna of the British Isles and North West Europe. Vol I Introduction and Protozoans to Arthropods*. Oxford Science Publications, Oxford.

Hepper, B. T. 1977 The fishery for crawfish, *Palinurus elephas* off the coast of Cornwall. *JMBA* 57 925-941

* Hunter, E.1994 *Fishery biology of the crawfish* Palinurus elephas, *in South Wales and Cornwall*. London: MAFF Chief Scientists Group Fisheries, ref. CSA 2331, 44pp.

Hunter, E., Shackley, S. E. and Bennet, D. B. (1996) Recent studies on the crawfish *Palinurus elephas* in South Wales and Cornwall. *JMBA* 76 963-983.

Jackson, A., 1999. Palinurus elephas. *European spiny lobster. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line].* Plymouth: Marine Biological Association of the United Kingdom. [cited 14/01/03]. Available from: <http://www.marlin.ac.uk>

Rae, B.B. and Lamont, J. M. (1963) Rare marine invertebrates found in the Scottish Area. *The Scottish Naturalist* 71 23-29

Sanderson, W. G. (1996) *Rare benthic marine flora and fauna in great Britain: the development of criteria for assessment*. JNCC Report, No. 240.

Stephen, A. C.; Rae, B. B. and Wilson, E. (1957). Rare invertebrates recently found in the Scottish Area. *The Scottish Naturalist* 69 178-181

Tambs-Lyche, H.(1958) Zoogeographical and faunistic Studies on West Norwegian Marine Animals. Universitetet I Bergen. *Naturvitenskapelig rekke*.7 3-24

Wilson, E. (1956) Spiny lobsters off the Scottish coasts. *The Scottish Naturalist* 68 57

* References cited in other sources (not referred to directly)

12.2 Appendix 2 Designations covered by the SoCC list

The following is a list of all designations covered on the SoCC list (Biodiversity Information Group (2000), available to download at www.ukbap.org.uk/SoCC.htm).

Berne Convention Appendix 1
Berne Convention Appendix 2
Biodiversity Lists - Long List
Biodiversity Lists - Middle List
Biodiversity Lists - Short List
Birds Directive Annex 1
Birds Directive Annex 2.1
Birds Directive Annex 2.2
Bonn Convention Appendix 1
Bonn Convention Appendix 2
EC CITES Annex A
EC CITES Annex B
EC CITES Annex C
EC CITES Annex D
Habitats and species directive Annex 2 - non-priority species
Habitats and species directive Annex 2 - priority species
Habitats and species directive Annex 4
IUCN (1994) - Critically endangered
IUCN (1994) - Endangered
IUCN (1994) - Extinct
IUCN (1994) - Extinct in the wild
IUCN (1994) - Lower risk - least concern
IUCN (1994) - Lower risk - conservation dependent
IUCN (1994) - Lwr risk - near threatened
IUCN (1994) - Vulnerable
IUCN (pre 1994) - Endangered
IUCN (pre 1994) - Extinct
IUCN (pre 1994) - Rare
IUCN (pre 1994) - Vulnerable
Nationally rare marine species
Nationally scarce marine species
Priority Species
RDB Birds - 1a
RDB Birds - 1b
RDB Birds - 2
RDB Birds - 3
The Wildlife (Northern Ireland) Order 1985 (Schedule 1 Part 1)
The Wildlife (Northern Ireland) Order 1985 (Schedule 1 Part 2)
The Wildlife (Northern Ireland) Order 1985 (Schedule 5)
The Wildlife (Northern Ireland) Order 1985 (Schedule 8 - Part 1)

The Wildlife (Northern Ireland) Order 1985 (Schedule 8 - Part 2)
Wildlife and Countryside Act 1981 (Schedule 1 Part 1)
Wildlife and Countryside Act 1981 (Schedule 1 Part 2)
Wildlife and Countryside Act 1981 (Schedule 5 Section 9.1 (killing/injuring))
Wildlife and Countryside Act 1981 (Schedule 5 Section 9.1 (taking))
Wildlife and Countryside Act 1981 (Schedule 5 Section 9.2)
Wildlife and Countryside Act 1981 (Schedule 5 Section 9.4a)
Wildlife and Countryside Act 1981 (Schedule 5 Section 9.4b)
Wildlife and Countryside Act 1981 (Schedule 5 Section 9.5a)
Wildlife and Countryside Act 1981 (Schedule 5 Section 9.5b)
Wildlife and Countryside Act 1981 (Schedule 8)

11.3 Appendix 3 Provisional list of nationally important marine features

Table A3.1. Provisional list of nationally important marine features. Please note that this list should not be treated as a "suggested" list of nationally important features, though it may be treated as a scoping list as referred to in section 7.3. Features included on the test list are highlighted in light grey, indicating which criteria they meet (/), which criteria they fail (x), and where the verdict is undecided (?). During development of the provisional list, expert feedback was provided on most of the features. Where expert opinion was given on the specific criteria, rather than in the form of comments, this is shown, indicating which criteria are likely to be met (/), which criteria may be met (?), and which ones probably won't be met (x). Note that for features not on the test list, no formal assessment was carried out. The "comments" column shows which of the features do not occur significantly in the Irish Sea Pilot (ISP) study area – these are the features which were removed to provide the "Irish Sea provisional list" (see section 5.4.). Some additional comments are included for some of the test features.

Feature type	Feature name	Common name (for species); broad habitat (for habitats)	Proportional importance	Rarity	Decline	Threat of significant decline	Comments
species	*Axinella damicornis*	Sponge	?	?	?	?	total lack of information - hence no "dossier"
species	*Stelletta grubii*	Sponge					
species	*Stylostichon dives*	Sponge					
species	*Tethyspira spinosa*	Sponge					
species	*Adreus fascicularis*	Sponge					not in ISP area
species	*Dysidea pallescens*	Sponge					not in ISP area
species	*Suberites massa*	Sponge					not in ISP area
species	*Desmacidon fruticosum*	Sponge					not in ISP area
species	*Balanophyllia regia*	Scarlet and gold star coral	x	x	?	poss.	
species	*Anthopleura thallia*	Glaucus pimplet					
species	*Amphianthus dohrnii*	Sea fan anemone					
species	*Halcampoides elongatus*	Burrowing anemone					
species	*Leptopsammia pruvoti*	Sunset cup coral / Sunset star coral					
species	*Scolanthus callimorphus*	Worm anemone					
species	*Parazoanthus anguicomus*	White cluster anemone					
species	*Aglaophenia kirchenpaueri*	Hydroid					
species	*Aiptasia mutabilis*	Trumpet anemone					
species	*Alcyonium glomeratum*	Red sea fingers					
species	*Caryophyllia smithii*	Devonshire cup-coral					
species	*Edwardsia timida*	Burrowing anemone					
species	*Funiculina quadrangularis*	The tall sea pen	x	x	/	/	No records found in ISP area
species	*Hartlaubella gelatinosa*	Hydroid					
species	*Hoplangia durotrix*	Carpet coral / Weymouth carpet coral					
species	*Laomedea angulata*	Hydroid					
species	*Parazoanthus axinellae*	Yellow cluster anemone					
species	*Parerythropodium coralloides*	Soft coral					
species	*Tamarisca tamarisca*	Hydroid					

species	Pachycerianthus multiplicatus	Fireworks anemone					
species	Obelia bidentata	Hydroid					not in ISP area
species	Cataphellia brodricii	Latticed corklet					not in ISP area
species	Clavopsella navis	a Hydroid (Brackish hydroid)					not in ISP area
species	Edwardsia ivelli	Ivell's (Ivels) sea anemone					not in ISP area
species	Nematostella vectensis	Starlet sea anemone					not in ISP area
species	Phellia gausapata	Sea anemone					not in ISP area
species	Anemonactis mazeli	Sea anemone					not in ISP area
species	Amalosoma eddystonense	Echiuran worm					
species	Ophelia bicornis	Worm					
species	Sternaspis scutata	Bristle worm					
species	Alkmaria romijni	Tentacled lagoon worm					
species	Armandia cirrhosa	Lagoon sandworm					not in ISP area
species	Baldia johnstoni	Worm					not in ISP area
species	Achaeus cranchii	Crab					
species	Meiosquilla (Rissoides) desmaresti	Mantis shrimp					
species	Dromia personata	Sleepy crab					
species	Nannonyx spinimanus	Amphipod					
species	Palinurus elephas	European spiny lobster	x	x	/	/	
species	Pectenogammarus planicrurus	Amphipod					
species	Thia scutellata	(Thumbnail) Crab					
species	Apherusa clevei	Amphipod					not in ISP area
species	Apherusa ovalipes	Amphipod					not in ISP area
species	Bathynectes longipes	Crab					not in ISP area
species	Clibanarius erythropus	Hermit crab					not in ISP area
species	Corophium lacustre	Amphipod					not in ISP area
species	Gammarus insensibilis	Lagoon sand shrimp					not in ISP area
species	Menigrates obtusifrons	Amphipod					not in ISP area
species	Microdeutopus stationis	Amphipod					not in ISP area
species	Pereionotus testudo	Amphipod					not in ISP area
species	Synisoma lancifer	Sea Slater					not in ISP area
species	Trapania pallida	Sea slug					
species	Acanthocardia aculeata	Spiny cockle					
species	Aeolidiella sanguinea	Sea slug					
species	Arctica islandica	Ocean quahog					
species	Atrina fragilis	Fan Mussel					
species	Caloria elegans	Sea slug					
species	Doris sticta	Sea slug					
species	Greilada elegans	Blue spot slug					
species	Hero formosa	Sea slug					
species	Hydrobia (Ventrosia) ventrosa	Mud Snail					
species	Modiolus modiolus	Horse mussel					
species	Nucella lapillus	Dog whelk					
species	Okenia elegans	Yellow skirt slug					
species	Ostrea edulis	Native oyster / Flat oyster					

species	Patella ulyssiponensis aspera	Limpet					
species	Tenellia adspersa (Tenella adspersa)	Lagoon sea slug					
species	Trapania maculata	Sea slug					
species	Tritonia nilsodhneri	Sea slug					
species	Atagema gibba	Sea slug					not in ISP area
species	Bittium simplex	Sea snail					not in ISP area
species	Caecum armoricum	DeFolin's lagoon snail					not in ISP area
species	Callista chione	Smooth venus					not in ISP area
species	Circulus striatus	Sea snail					not in ISP area
species	Hydrobia neglecta						not in ISP area
species	Jordaniella truncatula	Sea snail					not in ISP area
species	Jujubinus striatus	Sea snail					not in ISP area
species	Leptochiton scrabridus	Chiton					not in ISP area
species	Paludinella litorina	Lagoon snail					not in ISP area
species	Pholadidea loscombiana	Paper piddock					not in ISP area
species	Pholas dactylus	Common piddock					not in ISP area
species	Steliger (Stiliger) bellulus	Sea slug					not in ISP area
species	Thyasira gouldi	Northern hatchet shell					not in ISP area
species	Truncatella subcylindrica	Looping snail					not in ISP area
species	Vertigo angustior	Narrow-mouthed whorl snail (freshwater marshes and saltmarshes)					not in ISP area
species	Pseudamnicola confusa						not in ISP area
species	Amathia pruvoti	Bryozoan					
species	Bugula purpurotincta	Bryozoan					not in ISP area
species	Cylindroporella tubulosa	Bryozoan					not in ISP area
species	Epistomia bursaria	Bryozoan					not in ISP area
species	Plesiothoa gigerium	Bryozoan					not in ISP area
species	Schizobrachiella sanguinea	Bryozoan					not in ISP area
species	Smittina affinis	Bryozoan					not in ISP area
species	Turbicellepora magnicostata	Orange peel bryozoan					not in ISP area
species	Victorella pavida	Trembling sea mat					not in ISP area
species	Watersipora complanata	Bryozoan					not in ISP area
species	Ophiopsila annulosa	Brittlestar					not in ISP area
species	Ophiopsila aranea	Brittlestar					not in ISP area
species	Paracentrotus lividus	Purple sea urchin / Rock urchin					not in ISP area
species	Strongylocentrotus droebachiensis	Northern sea urchin					not in ISP area
species	Molgula oculata	Sea squirt					
species	Phallusia mammillata	Sea squirt					
species	Polysyncraton lacazei	Colonial sea squirt					
species	Pycnoclavella aurilucens	Sea squirt					
species	Styela gelatinosa	Sea squirt					not in ISP area
species	Alosa alosa	Allis shad					
species	Alosa fallax	Twaite shad					

				prob.			
species	*Cetorhinus maximus*	Basking shark	?	/	/	/	
species	*Lampetra fluviatilis*	River lamprey					
species	*Pomatoschistus microps*	Common goby					
species	*Pomatoschistus minutus*	Sand goby					
species	*Salmo salar*	Atlantic salmon					
species	*Clupea harengus*	Herring					
species	*Gobius couchi*	Couch's goby					
species	*Dipturus batis*	Skate / Common Skate					
species	*Gadus morhua*	Cod	x	x	/	/	
species	*Galeorhinus galeus*	Tope					
species	*Hippocampus hippocampus*	Short-Snouted Seahorse					
species	*Hippocampus ramulosus (guttulatus)*	(Long Snouted) Seahorse					
species	*Lophius piscatorius*	Sea monkfish	x	x	?	/	
species	*Merlangius merlangus*	Whiting					
species	*Merluccius bilinearis*	a Hake					
species	*Merluccius merluccius*	a Hake					
species	*Pleuronectes platessa*	Plaice					
species	*Dipturus (Raja) batis*	Common Skate					
species	*Dipturus oxyrhinchus*	Longnose Skate					
species	*Raja brachyura*	Blonde Ray					
species	*Raja clavata*	Thornback Ray /Roker					
species	*Raja montagui*	Spotted Ray					
species	*Rostroraja alba*	White Skate					
species	*Scomber scrombrus*	Mackerel					
species	*Solea vulgaris*	Sole					
species	*Squatina squatina*	Angel Shark					
species	*Trachurus trachurus*	Horse Mackerel					
species	*Molva molva*	Ling					
species	*Petromyzon marinus*	Sea lamprey					
species	*Pollachius virens*	Saithe					
species	*Acipenser sturio*	(Common) Sturgeon					not in ISP area
species	*Aphanopus carbo*	Black Scabbardfish					not in ISP area
species	*Argentina silus*	Greater silver smelt					not in ISP area
species	*Brosme brosme*	Tusk					not in ISP area
species	*Coregonus (lavaretus) oxyrinchus*	Houting					not in ISP area
species	*Coryphaenoides rupestris*	Roundnose grenadier					not in ISP area
species	*Gobius cobitis*	Giant goby					not in ISP area
species	*Gobius gasteveni*	Steven's Goby					not in ISP area
species	*Hoplostethus atlanticus*	Orange roughy					not in ISP area
species	*Macrourus berglax*	Roughhead grenadier					not in ISP area
species	*Micromesistius poutassou*	Blue Whiting					not in ISP area
species	*Molva dypterygia*	Blue Ling					not in ISP area
species	*Osmerus eperlanus*	Smelt					not in ISP area

species	*Prionace glauca*	Blue Shark					not in ISP area
species	*Raja hyperborea*	Arctic Skate					not in ISP area
species	*Reinhardtius hippoglossoides*	Greenland halibut					not in ISP area
species	*Salvelinus alpinus*	Charr					not in ISP area
species	*Sebastes spp.*	Redfish					not in ISP area
species	*Thunnus thynnus*	Bluefin tuna					not in ISP area
species	*Thymallus thymallus*	Grayling					not in ISP area
species	*Dipturus nidarosiensis*	Black Skate					not in ISP area
species	*Chelonia mydas*	Green turtle					
species	*Eretmochelys imbricata*	Hawk's-bill (Hawksbill) turtle					
species	*Caretta caretta*	Loggerhead turtle					
species	*Dermochelys coriacea*	Leatherback turtle					
species	*Lepidochelis kempii*	Kemp's ridley turtle					
species	*Gavia stellata*	Red-Throated Diver	x	/	/	/	
species	*Sterna albifrons*	Little Tern					
species	*Sterna paradisaea*	Arctic Tern					
species	*Gavia arctica*	Black-Throated Diver	x	/	x	/	
species	*Hydrobates pelagicus*	Storm Petrel	x	/	x	x	
species	*Larus minutus*	Little Gull					
species	*Puffinus puffinus*	Manx Shearwater	/	?	?	poss.	
species	*Sterna dougallii*	Roseate Tern	/	/	/	/	
species	*Larus fuscus fuscus*	Lesser Black-Backed Gull					
species	*Alca torda*	Razorbill	/	x	x	x	
species	*Aythya marila*	Scaup					
species	*Cepphus grylle*	Guillemot	/	x	x	/	
species	*Larus argentatus*	Herring Gull	x	x	/	?	
species	*Larus canus*	Mew Gull	x	x	/	?	
species	*Larus fuscus*	Lesser Black-Backed Gull	/	x	x	x	
species	*Larus marinus*	Great Black-Backed Gull	/	x	x	x	
species	*Larus ridibundus*	Black-Headed Gull	x	x	/	?	
species	*Melanitta nigra*	Common Scoter	x	/	/	/	
species	*Morus bassanus*	Northern Gannet	/	/	x	x	
species	*Phalacrocorax carbo*	Great Cormorant	/	x	x	x	
species	*Somateria mollissima*	Eider	x	/	/	?	
species	*Stercorarius parasiticus*	Arctic Skua	x	x	/	?	
species	*Sula bassana*	Gannet					
species	*Uria aalge*	Guillemot	/	x	x	x	
species	*Phalacrocorax aristotelis*	Shag					
species	*Sterna sandvicensis*	Sandwich Tern	/	x	/	/	
species	*Phalacrocorax aristotelis*	Shag					not in ISP area
species	*Charadrius alexandrinus*	Kentish Plover					not in ISP area
species	*Charadrius hiaticula*	Ringed Plover					not in ISP area
species	*Tadorna tadorna*	Shelduck					not in ISP area
species	*Arenaria interpres*	Turnstone					not in ISP area
species	*Limosa lapponica*	Bar-Tailed Godwit					not in ISP area
species	*Pluvialis squatarola*	Grey Plover					not in ISP area

species	*Calidris canutus*	Red Knot					not in ISP area
species	*Haematopus ostralegus*	Oystercatcher					not in ISP area
species	*Tringa erythropus*	Spotted Redshank					not in ISP area
species	*Tringa totanus*	Redshank					not in ISP area
species	*Calidris alpina*	Dunlin					not in ISP area
species	*Limosa limosa*	Black-Tailed Godwit					not in ISP area
species	*Numenius arquata*	Eurasian Curlew					not in ISP area
species	*Branta bernicla*	Brent Goose					not in ISP area
species	*Bulweria bulwerii*	Bulwer's Petrel					not in ISP area
species	*Burhinus oedicnemus*	Stone-Curlew					not in ISP area
species	*Calidris alpina*	Dunlin					not in ISP area
species	*Calidris ferruginea*	Curlew Sandpiper					not in ISP area
species	*Clangula hyemalis*	Long-tailed duck					not in ISP area
species	*Cygnus cygnus*	Whooper Swan					not in ISP area
species	*Diomedea melanophris*	Black-Browed Albatross					not in ISP area
species	*Eremophila alpestris*	Shore Lark					not in ISP area
species	*Falco columbarius*	Merlin					not in ISP area
species	*Gallinago gallinago*	Snipe					not in ISP area
species	*Gavia immer*	Great Northern Diver					not in ISP area
species	*Melanitta fusca*	Velvet Scoter					not in ISP area
species	*Melanitta perspicillata*	Surf Scoter					not in ISP area
species	*Mergus serrator*	Red-Breasted Merganser					not in ISP area
species	*Podiceps nigricollis*	Black-Necked Grebe					not in ISP area
species	*Recurvirostra avosetta*	Pied Avocet					not in ISP area
species	*Sterna hirundo*	Common Tern					
species	*Phalaropus lobatus*	Red-Necked Phalarope					not in ISP area
species	*Acrocephalus paludicola*	Aquatic Warbler					not in ISP area
species	*Actitis hypoleucos*	Common Sandpiper					not in ISP area
species	*Actitis macularia*	Spotted Sandpiper					not in ISP area
species	*Anas rubripes*	Black Duck					not in ISP area
species	*Anser anser*	Greylag Goose					not in ISP area
species	*Anser brachyrhynchus*	Pink-Footed Goose					not in ISP area
species	*Anthus spinoletta*	Water Pipit					not in ISP area
species	*Ardea cinerea*	Grey Heron					not in ISP area
species	*Ardea purpurea*	Purple Heron					not in ISP area
species	*Aythya fuligula*	Tufted Duck					not in ISP area
species	*Branta leucopsis*	Barnacle Goose					not in ISP area
species	*Calidris acuminata*	Sharp-Tailed Sandpiper					not in ISP area
species	*Calidris alba*	Sanderling					not in ISP area
species	*Calidris bairdii*	Baird's Sandpiper					not in ISP area
species	*Calidris fuscicollis*	White-Rumped Sandpiper					not in ISP area
species	*Calidris maritima*	Purple Sandpiper					not in ISP area
species	*Calidris mauri*	Western Sandpiper					not in ISP area
species	*Calidris melanotos*	Pectoral Sandpiper					not in ISP area
species	*Calidris minuta*	Little Stint					not in ISP area
species	*Calidris minutilla*	Least Sandpiper					not in ISP area

species	Calidris pusilla	Semipalmated Sandpiper					not in ISP area
species	Calidris ruficollis	Red-necked Stint					not in ISP area
species	Calidris subminuta	Long-Toed Stint					not in ISP area
species	Calidris temmincki	Stint					not in ISP area
species	Calidris tenuirostris	Great Knot					not in ISP area
species	Casmerodius albus	Great Egret					not in ISP area
species	Charadrius dubius	Ringed Plover					not in ISP area
species	Charadrius leschenaultii	Greater Sand Plover					not in ISP area
species	Charadrius mongolus	Lesser Sand Plover					not in ISP area
species	Charadrius semipalmatus	Semipalmated Plover					not in ISP area
species	Charadrius vociferus	Killdeer					not in ISP area
species	Chlidonias leucopterus	White-winged Tern					not in ISP area
species	Chlidonias niger	Black tern					not in ISP area
species	Cygnus bewickii						not in ISP area
species	Cygnus columbianus	Tundra Swan					not in ISP area
species	Cygnus olor	Mute Swan					not in ISP area
species	Egretta garzetta	Little Egret					not in ISP area
species	Emberiza calandra						not in ISP area
species	Falco eleonorae	Eleonora's Falcon					not in ISP area
species	Falco peregrinus	Peregrine Falcon					not in ISP area
species	Falco rusticolus	Gyrfalcon					not in ISP area
species	Gavia adamsii	Yellow-billed Diver					not in ISP area
species	Glareola nordmanni	Black-Winged Pratincole					not in ISP area
species	Himantopus himantopus	Black-Winged Stilt					not in ISP area
species	Hirundo daurica	Red-Rumped Swallow					not in ISP area
species	Hirundo pyrrhonota	Cliff Swallow					not in ISP area
species	Jynx torquilla	Wryneck					not in ISP area
species	Larus genei	Slender-Billed Gull					not in ISP area
species	Larus ichthyaetus	Pallas's Gull					not in ISP area
species	Mergus albellus	Smew					not in ISP area
species	Mergus merganser	Goosander					not in ISP area
species	Netta rufina	Red-Crested Pochard					not in ISP area
species	Numenius arquata	Eurasian Curlew					not in ISP area
species	Numenius phaeopus	Whimbrel					not in ISP area
species	Oceanites oceanicus	Wilson's Storm-petrel					not in ISP area
species	Oceanodroma castro	Madeiran Storm-petrel					not in ISP area
species	Podiceps auritus	Slavonian Grebe					not in ISP area
species	Polysticta stelleri	Steller's Eider					not in ISP area
species	Puffinus assimilis	Little Shearwater					not in ISP area
species	Puffinus assimilis baroli	Little Shearwater					not in ISP area
species	Saxicola torquata	Stonechat					not in ISP area
species	Somateria spectabilis	King Eider					not in ISP area
species	Tadorna ferruginea	Shelduck					not in ISP area
species	Tringa nebularia	Greenshank					not in ISP area
species	Tringa stagnatilis	Marsh Sandpiper					not in ISP area
species	Balaenoptera (Sibbaldus)	Blue whale					

	musculus						
species	*Balaenoptera borealis*	Sei whale					
species	*Balaenoptera acutorostrata*	Minke whale	x	/	x	?	
species	*Balaenoptera physalus*	Fin whale					
species	*Delphinus delphis*	Common dolphin	x	/	x	/	
species	*Globicephala melaena*	Long-finned pilot whale on 94, Pilot whale on SoCC list					
species	*Globicephala melas*	Long-finned pilot whale on SoCC / BAP					
species	*Grampus griseus*	Risso's dolphin	x	/	x	/	
species	*Halichoerus grypus*	Grey seal	/(*)	x	x	poss.	Meets criterion for proportional importance at regional but not at global level - "borderline" case
species	*Lagenorhynchus acutus*	Atlantic white-sided dolphin	x	/	x	/	
species	*Lagenorhynchus albirostris*	White-beaked dolphin	?	/	x	/	
species	*Orcinus orca*	Killer whale	x	/	x	?	
species	*Phoca vitulina*	Common seal					
species	*Phocoena phocoena*	Harbour porpoise	/	x	/	/	
species	*Stenella coeruleoalba*	Striped dolphin					
species	*Tursiops truncatus*	Bottle-nosed dolphin	x	/	x	/	
species	*Balaena glacialis*	Black Right Whale					not in ISP area
species	*Balaena mysticetus*	Bowhead Whale					not in ISP area
species	*Eubalaena glacialis*	Northern right whale					not in ISP area
species	*Hyperoodon ampullatus*	Northern bottlenose whale					not in ISP area
species	*Kogia (Physeter) breviceps*	Pygmy sperm whale					not in ISP area
species	*Megaptera novaeangliae*	Humpback whale					not in ISP area
species	*Mesoplodon bidens*	Sowerby's beaked whale					not in ISP area
species	*Mesoplodon europaeus*	Gervai's beaked whale					not in ISP area
species	*Mesoplodon mirus*	True's beaked whale					not in ISP area
species	*Monodon monocerus*	Narwhal					not in ISP area
species	*Odobenus rosmarus*	Walrus					not in ISP area
species	*Phoca (Pusa) hispida*	Ringed seal					not in ISP area
species	*Phoca groenlandica (Pagophilus groenlandicus)*	Harp seal					not in ISP area
species	*Physeter catodon*	Sperm Whale					not in ISP area
species	*Physeter macrocephalus*	Sperm whale					not in ISP area
species	*Pseudorca crassidens*	False killer whale / Killer Whale on SoCC					not in ISP area
species	*Ziphius cavirostris*	Cuvier's beaked whale					not in ISP area
species	*Acarospora subrufula*						not in ISP area
species	*Caloplaca aractina*	a Lichen (above HW)					not in ISP area
species	*Caloplaca aractina*						not in ISP area
species	*Catillaria subviridis*						not in ISP area
species	*Cladonia uncialis uncialis*						not in ISP area
species	*Cliostomum corrugatum*						not in ISP area
species	*Degelia ligulata*						not in ISP area
species	*Heterodermia leucomelos*						not in ISP area
species	*Heterodermia propagulifera*						not in ISP area
species	*Lecania olivacella*						not in ISP area

species	Opegrapha subelevata						not in ISP area
species	Peltigera malacea						not in ISP area
species	Pseudocyphellaria aurata						not in ISP area
species	Ramalia chondrina						not in ISP area
species	Tornabea scutellifera						not in ISP area
species	Chara baltica	Baltic stonewort					
species	Chara curta	Lesser bearded stonewort					
species	Aglaothamnion diaphanum	Red seaweed					
species	Aglaothamnion priceanum	Red seaweed					
species	Anotrichium barbatum	Red seaweed					
species	Asperococcus compressus	Brown seaweed					
species	Bornetia secundiflora	Red seaweed					
species	Callophyllis cristata	Red seaweed	?	?	?	?	No information found
species	Carpomitra costata	Brown seaweed					
species	Cruoria cruoriaeformis	Red seaweed					
species	Gelidiella calcicola	Red seaweed					
species	Gelidium sesquipedale	Red seaweed					
species	Gigartina pistillata	Red seaweed					
species	Gracilaria bursa-pastoris	Red seaweed					
species	Gracilaria multipartita	Red seaweed					
species	Halothrix lumbricalis	Brown seaweed					
species	Leblondiella densa	Brown seaweed					
species	Lithoamnion coralloides	Maerl					
species	Padina pavonica	Turkey feather alga					
species	Phymatolithon calcareum	Maerl					
species	Pterosiphonia pennata	Red seaweed					
species	Schmitzia hiscockiana	Red seaweed					
species	Zanardinia prototypus	Brown seaweed					
species	Phragmites australis	Common reed					not in ISP area
species	Chara canescens	Bearded stonewort					not in ISP area
species	Chara connivens	Convergent stonewort					not in ISP area
species	Chara muscosa	Mossy stonewort					not in ISP area
species	Chara rudis	Rugged stonewort					not in ISP area
species	Lamprothamnium papulosum	Foxtail stonewort					not in ISP area
species	Nitella hyalina	Many-branched stonewort					not in ISP area
species	Tolypella nidifica	Bird's nest stonewort					not in ISP area
species	Chara aspera	Rough stonewort					not in ISP area
species	Chara contraria	Opposite stonewort					not in ISP area
species	Chara globularis	Fragile stonewort					not in ISP area
species	Chara hispida	Bristly stonewort					not in ISP area
species	Chara virgata	Delicate stonewort					not in ISP area
species	Chara vulgaris	Common stonewort					not in ISP area
species	Lophosiphonia reptabunda	Red seaweed					not in ISP area
species	Nitella flexilis	Smooth stonewort					not in ISP area
species	Polysiphonia ceramiaeformis						not in ISP area
species	Polysiphonia foetidissima						not in ISP area

species	*Pseudolithoderma roscoffensis*	Brown seaweed					not in ISP area
species	*Tolypella glomerata*	Clustered stonewort					not in ISP area
species	*Eleocharis parvula*	Dwarf spike-rush					not in ISP area
species	*Limonium britannicum*	Rock Sea-lavender					not in ISP area
species	*Limonium procerum*	Rock Sea-lavender					not in ISP area
species	*Limosella australis*	Welsh mudwort					not in ISP area
species	*Zostera noltii*	Dwarf eelgrass					not in ISP area
species	*Zostera marina*	Common eelgrass					not in ISP area
species	*Atriplex pedunculata*	Pedunculate Sea-purslane					not in ISP area
species	*Chenopodium chenopodioides*	Saltmarsh goosefoot					not in ISP area
species	*Crepis foetida*	Stinking hawk's beard					not in ISP area
species	*Cynodon dactylon*	Bermuda grass					not in ISP area
species	*Limonium binervosum*	Rock Sea-lavender					not in ISP area
species	*Limonium dodartiforme*	Rock Sea-lavender					not in ISP area
species	*Limonium loganicum*	Rock Sea-lavender					not in ISP area
species	*Peucedanum officinale*	Sea hog's fennel					not in ISP area
habitat *	*Pectenogammarus planicrurus* in midshore well-sorted gravel or coarse sand	intertidal sediment		Y			
habitat	Polychaete / bivalve dominated mid estuarine mud shores	intertidal sediment			?		
habitat	Polychaete / oligochaete dominated upper estuarine mud shores	intertidal sediment			?		
habitat	Species-rich mixed sediment shores	intertidal sediment	?	?			
habitat * (only one in complex)	Cirratulids and *Cerastoderma edule* in littoral mixed sediment		?	?			
habitat	Saltmarsh	intertidal sediment			?		
habitat	Seagrass beds on littoral sediments	intertidal sediment					
habitat * (only one in complex)	*Zostera noltii* beds in littoral muddy sand						
habitat	Fucoids in tide-swept conditions	intertidal rock		?			
habitat	Littoral *Sabellaria* honeycomb worm reefs	intertidal rock		?			
habitat * (only one in complex)	*Sabellaria alveolata* reefs on sand-abraded eulittoral rock			?			
habitat	Littoral caves and overhangs	intertidal rock		?			

habitat *	*Laminaria saccharina, Chorda filum* and dense red seaweeds on shallow unstable infralittoral boulders or cobbles			Y			
habitat	Tide-swept kelp and seaweed communities (sheltered infralittoral rock)	infralittoral rock		?			
habitat	Shallow faunal communities in variable salinity	infralittoral rock		?			
habitat	Submerged fucoids, green and red seaweeds (lagoonal rock)	infralittoral rock		?			
habitat	Robust faunal cushions and crusts (surge gullies and caves)	infralittoral rock		?			
habitat	Very tide-swept faunal communities	circalittoral rock	?	?			
habitat *	*Flustra foliacea* and *Haliclona oculata* with a rich faunal turf on tide-swept circalittoral mixed substrata		?	?			
habitat *	*Suberites* spp. with a mixed turf of crisiids and *Bugula* spp. on heavily silted, moderately wave exposed, shallow circalittoral rock			?			
habitat	Circalittoral *Sabellaria* reefs						
habitat *	*Sabellaria spinulosa* encrusted circalittoral rock		?	prob. /	/	/	NOTE: biotope definition changed in assessment (see dossier)
habitat	Soft rock communities	circalittoral rock	?	?			
habitat	Circalittoral variable salinity faunal communities	circalittoral rock		?			
habitat	Brachiopods and ascidians	circalittoral rock		?			
habitat	Caves and overhangs (deep)	circalittoral rock		Y			
habitat	Estuarine cobbles, pebbles & gravel	sublittoral sediment					
habitat	Estuarine coarse sand and gravel	sublittoral sediment					
habitat	Infralittoral (shallow) unstable cobbles, pebbles & gravel	sublittoral sediment					
habitat	Infralittoral (shallow) coarse sand & gravel	sublittoral sediment				y	
habitat	Circalittoral (deep) coarse sand & gravel	sublittoral sediment					
habitat	Offshore circalittoral (very deep) coarse sand & gravel	sublittoral sediment					
habitat	Estuarine clean sands	sublittoral sediment					
habitat	Estuarine non-cohesive muddy sands	sublittoral sediment					
habitat	Infralittoral (shallow) clean	sublittoral sediment				y	

	sands							
habitat	Infralittoral (shallow) non-cohesive marine muddy sands	sublittoral sediment						
habitat	Circalittoral (deep) clean sands	sublittoral sediment						
habitat	Circalittoral (deep) non-cohesive muddy sands	sublittoral sediment						
habitat	Offshore circalittoral (very deep) clean sands	sublittoral sediment						
habitat	Offshore circalittoral (very deep) non-cohesive muddy sands	sublittoral sediment						
habitat	Lagoonal muddy sands and muds	sublittoral sediment						
habitat	Estuarine cohesive muddy sands & sandy muds	sublittoral sediment						
habitat	Estuarine muds	sublittoral sediment						
habitat	Infralittoral (shallow) cohesive marine muddy sands sandy muds	sublittoral sediment						
habitat	Infralittoral (shallow) muds	sublittoral sediment						
habitat	Circalittoral (deep) cohesive sandy muds & muddy sands	sublittoral sediment			?		?	
habitat *	*Ampharete falcata* turf with *Parvicardeum ovaleum* cohesive muddy very fine sand near margins of deep stratified seas	sublittoral sediment						
habitat	Circalittoral (deep) muds	sublittoral sediment			?		?	
habitat *	*Styela gelatinosa* and other solitary ascidians on very sheltered deep circalittoral muddy sediment	sublittoral sediment						
habitat	Offshore circalittoral (very deep) cohesive sandy muds & muddy sands	sublittoral sediment						
habitat	Offshore circalittoral (very deep) muds	sublittoral sediment						
habitat	Lagoonal mixed sediments	sublittoral sediment						
habitat	Estuarine coarse mixed sediments	sublittoral sediment						
habitat	Estuarine muddy mixed sediments	sublittoral sediment						
habitat	Infralittoral (shallow) coarse mixed sediments	sublittoral sediment						
habitat	Infralittoral (shallow) muddy mixed sediments	sublittoral sediment						
habitat	Circalittoral (deep) coarse mixed sediments	sublittoral sediment						

habitat	Circalittoral (deep) mudddy mixed sediments	sublittoral sediment					
habitat	Offshore circalittoral (very deep) mixed sediments	sublittoral sediment					
habitat	Maerl beds	sublittoral sediment	?	?	?	y ?	
habitat	Kelp and seaweeds	sublittoral sediment					
habitat	Seagrass beds	sublittoral sediment		?	Y	?	
habitat	Angiosperm beds of brackish waters	sublittoral sediment					
habitat *	*Modiolus modiolus* beds with *Chlamys varia,* sponges, hydroids and bryozoans on slightly tide-swept very sheltered circalittoral mixed substrata	sublittoral sediment		y		y	
habitat *	*Modiolus modiolus* beds on circalittoral mixed sediment	sublittoral sediment		y		y	
	Modiolus modiolus beds		x	x	/	/	
habitat	Oyster beds	sublittoral sediment		y	y	y	
	Ostrea edulis beds		x	x	/	/	
	File shell beds	sublittoral sediment					
habitat *	*Limaria hians* beds in tide-swept sublittoral muddy mixed sediment	sublittoral sediment	?	y	?	y ?	
	Limaria hians beds in tide-swept sublittoral muddy mixed sediment		?	?	/	/	
marine landscape	Fine sediment plains						
marine landscape	Coarse sediment plains (lag deposits)						
marine landscape	Sediment wave/mega-ripple fields						
marine landscape	gravel/sand banks						
marine landscape	Shallow-water mud						
marine landscape	Deep-water channel						
marine landscape	Irish Sea mounds						
marine landscape	Reefs (rocky/biogenic)			?	?	?	
marine landscape	Gas structure			?			

marine landscape	Estuary		x	x	/ (quality)	/	
marine landscape	Ria				y?		
marine landscape	Saline Lagoon			y		y	
marine landscape	Sealoch		y				
marine landscape	Sound						