

# Assessing the contribution of Welsh MPAs towards an ecologically coherent MPA network in 2016

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# Assessing progress towards an ecologically coherent MPA network in waters around Wales in 2016

### **Executive summary**

The Welsh Government and the other UK administrations are committed to contributing to an ecologically coherent network of Marine Protected Areas (MPAs)<sup>1</sup>.

Welsh Government requested an analysis of progress towards the development of an ecologically coherent network of MPAs in waters around Wales. JNCC and Natural Resources Wales processed available data to enable Welsh Government to demonstrate the level of progress and Wales' contribution to the wider network of MPAs in the UK.

JNCC assessed progress towards a MPA network in the context of the Charting Progress 2 Regional Seas (CP2 regions) that overlap Welsh waters. Welsh Government agreed the following criteria to assess their contribution to the MPA network within these regions:

- Each feature on the MPA Features List for Wales (see <u>Annex 1</u>) should be represented in a Welsh MPA;
- Broadscale habitat features need to be replicated in at least two MPAs within the CP2 region;
- Features of conservation importance need to be replicated in at least three MPAs in the CP2 region;
- A minimum of 10% of the area of each broadscale habitat should be protected in MPAs (aligning with OSPAR Commission guidance on ecological coherence); and
- MPAs should be well connected with sites affording protection to the same broad habitat type no further than 80km apart.

The MPAs in Welsh territorial waters make a substantial contribution towards the aim for an ecologically coherent network in the wider Irish Sea and Western Channel and Celtic Sea CP2 regions. When considering the contribution of Welsh MPAs in each of these wider biogeographic regions, the majority of broadscale habitats are represented and only a few gaps remain in relation to the area of these habitats afforded protection. There are a small number of shortfalls in the protection of habitats and species of conservation interest that Welsh Government could address to both ensure that MPAs in Welsh waters adequately represent the features on the Welsh MPA list, and also to contribute to the ecological coherence of the wider MPA network.

<sup>&</sup>lt;sup>1</sup> Obligations under OSPAR, Marine Strategy Framework Directive, and the Convention on Biological Diversity.

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### 1 Background

In 2012 the Welsh Government and the other UK administrations published a statement on the expected UK contribution to an ecologically coherent Marine Protected Area (MPA) network in the north-east Atlantic<sup>2</sup>. The statement noted that:

"The UK has committed to a number of international agreements on MPAs including an ecologically coherent network of MPAs in the North East Atlantic. The UK network will act as a contribution to this wider network, in partnership with neighbouring countries, based on OSPAR Convention, World Summit on Sustainable Development and Convention on Biological Diversity. There are also links to European Directives such as the Marine Strategy Framework Directive and EC Birds and Habitats Directives which make reference to establishing coherent networks."

In 2014, Welsh Government asked the Joint Nature Conservation Committee (JNCC) and Natural Resources Wales (NRW) to provide an assessment of the protection offered to features by existing MPAs, together with advice on whether there are any potential gaps that need to be filled for Wales to meet its MPA network obligations.

In December 2014, JNCC provided a briefing to Welsh Government summarising the results of a Defra network analysis<sup>3</sup> that had assessed ecological coherence of the MPA network in Secretary of State waters. The briefing set out the principles and criteria for assessment and the key results for the Charting Progress 2 (CP2) regions overlapping with Welsh waters. JNCC advised Welsh Government that any network analysis in Welsh waters should use the same criteria. In April 2015, Welsh Government asked for an assessment to undertaken to provide the following information:

- How do existing MPAs in Wales contribute to the ecologically coherent network of MPAs in the UK?
- Are there any shortfalls in the network of MPAs in Welsh waters? and,
- Advice on potential options for filling any gaps.

It was agreed that an assessment would be undertaken at the CP2 regional seas level in the context of features selected for the MPA features list for Wales (<u>Annex 1</u>), to ensure that Wales is sufficiently contributing to the wider MPA network as well as meeting commitments towards protecting features in Welsh waters. It was requested that the assessment should consider both intertidal and subtidal features.

A two-stage approach was agreed:

- 1. An analysis to identify what is currently protected within existing MPAs in Welsh waters, undertaken for:
  - i) Welsh territorial waters only
  - ii) all Welsh waters (territorial waters and offshore waters)
- 2. An analysis to identify: whether there are gaps for Welsh MPA features in each CP2 region; whether Welsh MPAs make a proportionate contribution based on the known presence/extent of the feature in Welsh waters; and whether gaps can be addressed in Welsh waters. This required assessments for the:
  - i) CP2 regions as a whole
  - ii) Welsh territorial waters only, subdivided by CP2 region
  - iii) all Welsh waters, subdivided by CP2 region

<sup>&</sup>lt;sup>2</sup> Joint Administrations Statement (2012). UK Contribution to Ecologically Coherent MPA Network in the North East Atlantic. Available online at: <u>http://www.scotland.gov.uk/Resource/0041/00411304.pdf</u>

<sup>&</sup>lt;sup>3</sup> JNCC (2014). Assessing progress towards an ecologically coherent network of MPAs in Secretary of State Waters in 2014. Available online at: <u>http://jncc.defra.gov.uk/pdf/JNCC\_NetworkProgressInSoSWaters\_2014.pdf</u>

### 2 Criteria for identifying gaps in the MPA network

JNCC provided advice to Welsh Government on the criteria to be used for assessing how well the existing MPAs in Wales contribute towards an ecologically coherent network (stage 2 of the analysis). This followed the criteria adopted for the analysis of the MPA network in Secretary of State waters undertaken in 2014<sup>3</sup> which took into account OSPAR MPA network principles (where appropriate information was available) as well as wider guidance published by the OSPAR Commission. This was in line with the joint Administration statement in 2012 on the UK Contribution to Ecologically Coherent MPA Network in the North East Atlantic<sup>4</sup>:

"We are aiming for a UK contribution to an ecologically coherent MPA network in the North East Atlantic, in accordance with the OSPAR Convention which is an evolving scientific concept. The OSPAR Commission guidance outlines five main elements to assist in interpreting the concept of an ecologically coherent MPA network. The principles which underpin an ecologically coherent network are widely accepted and supported by the scientific community and by the administrations.

The five main OSPAR principles guiding the process are:

**Features:** Sites should represent the range of species, habitats and ecological processes in the area. The proportion of features included in the MPA network should be determined on a feature-by-feature basis, considering whether features that are in decline, at risk or particularly sensitive are of a higher priority and would benefit from a higher proportion being protected by MPAs.

**Representativity:** To support the sustainable use, protection and conservation of marine biological diversity and ecosystems, areas which best represent the range of species, habitats and ecological processes.

**Connectivity:** This may be approximated by ensuring the MPA network is well distributed in space and takes into account the linkages between marine ecosystems.

**Resilience:** Adequate replication of habitats, species and ecological processes in separate MPAs in each biogeographic area is desirable where possible. The size of the site should be sufficient to maintain the integrity of the feature for which it is being selected.

**Management:** MPAs should be managed to ensure the protection of the features for which they were selected and to support the functioning of an ecologically coherent network."

It should be noted that the criteria for this assessment only took into consideration the first four principles of 'Features', 'Representativity', 'Resilience' and 'Connectivity'.

### 2.1 Assessment criteria by feature type

The assessment criteria encompassed the OSPAR network principles (outlined above) on a feature-type basis tailored to the different network requirements for broadscale habitats compared to Habitats of Conservation Importance and Sessile & Limited Mobility Species of Conservation Importance. For the purposes of this assessment (specifically stage 2 of the analysis), a gap was considered to exist in the MPA network if any of the following criteria were **not** met:

<sup>&</sup>lt;sup>4</sup> Joint Administrations Statement. 2012. UK Contribution to Ecologically Coherent MPA Network in the North East Atlantic. Available online at: <u>http://www.scotland.gov.uk/Resource/0041/00411304.pdf</u>

### Crit. i. Each feature on the MPA feature list for Wales should be represented in Welsh MPAs

- a. This is relevant to the OSPAR principle of representativity.
- Crit. ii. Two examples of each broadscale habitat feature (EUNIS level 3) are protected within each Charting Progress 2 region:
  - a. Ensures that all broadscale habitats (equivalent to the current EUNIS level 3 habitats) are represented within the network in each biogeographic region. This is relevant to the OSPAR principle of **representativity**; and,
  - b. Ensures a degree of **replication** of broadscale habitats within the network. This is relevant to the OSPAR principle of resilience.
- Crit. iii. Three examples of each Habitat of Conservation Importance and Sessile & Limited Mobility Species of Conservation Importance are afforded protection in each Charting Progress 2 region<sup>5</sup>:
  - a. Ensures that rare and/or threatened species and habitats are afforded specific protection within the network, which is relevant to the OSPAR features principle; and,
  - b. Helps ensure **replication** of rare and/or threatened species and habitats within the network, which is relevant to the OSPAR resilience principle.

### Crit. iv. A minimum 10% by area of each broadscale habitat occurring in each Charting Progress 2 region is protected within the network:

- a. The proportion of each broadscale habitat afforded protection within the network (known as '**adequacy**') is relevant to the OSPAR features principle;
- b. Ensures that an appropriate amount of each habitat is represented within the network for it to be effective and ecologically viable; and,
- c. OSPAR Commission guidance<sup>6</sup> for an ecologically coherent network contains a more aspirational target of at least 20% (by area) of each habitat to be protected; evidence indicates that this amount is needed to include 70% of species occurring within a given broadscale habitat type.

### Crit. v. Sites affording protection to the same habitat at EUNIS level 2 are not further than 80km apart from each other:

a. Applying a basic distance separation criterion increases the likelihood that sites with similar features are ecologically connected to each other, which is relevant to the OSPAR **connectivity** principle.

Meeting these criteria alone will not necessarily ensure the MPAs in Wales make an appropriate 'full' contribution to the creation of an ecologically coherent network of MPAs. It should also be noted that the questions above do not address all aspects of the OSPAR MPA network principles.

<sup>&</sup>lt;sup>5</sup> Five features (Carbonate reefs, Mud habitats in deep water, *Musculus discors* beds, Subtidal mixed muddy sediments and *Alkmaria romijni*) are only recognised as a conservation priority in Wales and are unique to the MPA features list for Wales. To assess their replication in a Welsh-only context, JNCC assessed whether three replicates are protected in Welsh waters as a whole (independent of CP2 regions).

<sup>&</sup>lt;sup>6</sup> OSPAR Commission (2006). Guidance on developing an ecologically coherent network of OSPAR marine protected areas. No. 2006-03. Available at: <u>http://www.ospar.org/welcome.asp?menu=0</u>

OSPAR guidance on developing an ecologically coherent network<sup>6</sup> of MPAs suggests that:

'Contracting Parties may wish to include 20% of the total extent of each EUNIS level 3 habitat or species population (where considered appropriate) with at least 10% included within the network'. JNCC has also provided more detailed advice on the progress towards broadscale habitat features meeting this 20% (by area) recommendation by the OSPAR Commission.

### 3 Assessment scope and input data

The scope of the network assessment was defined by the extent of Welsh waters, the features relevant to MPA-based conservation in Wales, and the biogeographic regions and MPA designation types occurring in Welsh waters. Datasets listing the sites and protected features in waters around Wales and the wider CP2 regions were collated to inform the assessment.

### 3.1 Biogeographic regions

OSPAR guidance suggests the network should take biogeographic variation into account when considering MPA features. In line with the approach taken for the 2013 and 2014 assessments for Defra<sup>7,8</sup> (which informed English Marine Conservation Zone designations), this assessment used the regional seas developed by the Charting Progress initiatives<sup>9</sup> to provide biogeographic context. Two of these CP2 regions overlap with Welsh waters (Figure 1) and these formed the biogeographic scope of the assessment:

- Western Channel and Celtic Sea;
- Irish Sea

The Celtic Sea includes sections of English and Welsh waters and the Irish Sea incorporates sections of English, Welsh, Northern Irish and Scottish waters. Consequently MPAs outside of the Welsh waters but within these CP2 regions form part of the MPA network at this biogeographic scale and data for these sites were included in this assessment.

<sup>&</sup>lt;sup>7</sup> JNCC (2014). Identifying the remaining MCZ site options that would fill big gaps in the existing MPA network around England and offshore waters of Wales & Northern Ireland. Available at: http://jncc.defra.gov.uk/pdf/140224\_BigGapsMethod\_v8.pdf

http://jncc.defra.gov.uk/pdf/140224\_BigGapsMethod\_v8.pdf <sup>8</sup> JNCC (2014). Assessing progress towards an ecologically coherent network of MPAs in Secretary of State Waters in 2014. Available at: http://jncc.defra.gov.uk/pdf/JNCC\_NetworkProgressInSoSWaters\_2014.pdf <sup>9</sup> Charting Progress 2. Published by the Department for Environment, Food and Rural Affairs on behalf of the UK

Marine Monitoring and Assessment Strategy community. Available online at: <u>http://chartingprogress.defra.gov.uk/</u>



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Figure 1. Welsh waters showing the broader Charting Progress 2 (CP2) regions <sup>10</sup>.

<sup>&</sup>lt;sup>10</sup> The CP2 regional boundaries have been modified to show the updated extent of the UK continental shelf and are unofficial.

### 3.2 Welsh waters

For the purposes of this assessment Welsh waters is considered to combine Welsh territorial waters and Welsh offshore waters, as defined in Table 1 below and illustrated in <u>Figure 1</u>. The main stages of the network assessment were undertaken for Welsh territorial waters in isolation, as well as for all Welsh waters which included both territorial waters and offshore waters.

**Table 1**. Definition of terms relating to sections of Welsh waters.

Area of Welsh waters	Definition
Welsh territorial waters	Welsh inshore waters from the mean high water mark to the 12 nautical mile territorial seas limit.
Welsh offshore waters	Waters between the 12 nautical mile territorial seas limit and the UK- Ireland median line or the Northern Ireland adjacent waters limit. Currently the jurisdiction of the UK Government.
(All) Welsh waters	Welsh territorial and Welsh offshore waters combined.

### 3.3 Features for consideration

The MPA features list for Wales (<u>Annex 1</u>) includes intertidal and subtidal broadscale habitats (equating to EUNIS level 3 habitats), and Habitats of Conservation Importance (HOCI) and Sessile and Limited Mobility Species of Conservation Importance (SLMS). The HOCI and SLMS comprise OSPAR Threatened and/or Declining habitats and species<sup>11</sup> and habitats and species from the interim Section 7 list of the Environment (Wales) Act 2016<sup>12</sup>. This present assessment only considered habitats and sessile or low-mobility species (which are considered suitable for protection in MPAs); whilst highly mobile species including birds are an integral part of the ecosystem, they were not considered as features in this assessment.

EUNIS level 3 broadscale habitats were used as a proxy for representing the full range of habitat features within Welsh waters. However, some EUNIS level 3 habitats occur across a range of physical conditions resulting in many more detailed biotopes present at EUNIS level 4 and beyond. If there are only a limited number of MPAs protecting a given EUNIS level 3 habitat (or a limited total extent of habitat within them), there is a reasonable likelihood that the range of more detailed biotopes known to comprise that habitat would not be encompassed by the MPAs.

To better represent the full range of biodiversity in Welsh waters, this assessment considered the presence and extent of EUNIS level 3 habitats within MPAs across biological zones (biozones) predicted in EUSeaMap<sup>13</sup>. These zones divide the subtidal region into the shallow versus deeper shelf areas of the continental shelf (Figure 2)<sup>14</sup>. This approach allowed JNCC to better assess the likelihood that existing MPAs represent the marine flora and fauna of both the deeper, offshore areas of Welsh waters as well as shallower, inshore waters.

 <sup>&</sup>lt;sup>11</sup> OSPAR Commission (2008). OSPAR List of Threatened and/or Declining Species and Habitats. Ref No. 2008 6. Available online at: <u>http://www.ospar.org/documents?d=32794</u>
 <sup>12</sup> Section 7 list of the Environment (Wales) Act 2016 is available online at:.

<sup>&</sup>lt;sup>12</sup> Section 7 list of the Environment (Wales) Act 2016 is available online at:. <u>http://www.legislation.gov.uk/anaw/2016/3/section/7</u>

<sup>&</sup>lt;sup>13</sup> JNCC (2015). EUSeaMap2 (2015) Interim draft North and Celtic Seas biozones.

<sup>&</sup>lt;sup>14</sup> The division between shallow and shelf waters is defined by a 1.5 to 2.5 wave base (wave length/water depth) fuzzy threshold, predicted using wave energy models and bathymetric data. For more information see the following report and technical appendixes:

Cameron, A. (ed). (2012). EUSeaMap maintenance report - preparatory action for development and assessment of a European broad-scale seabed habitat map final report. Available online at: <u>http://www.emodnet-seabedhabitats.eu/outputs</u>



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**Figure 2.** Biological zones in the Western Channel and Celtic Sea and Irish Sea CP2 regions, dividing subtidal waters by wave base (shallow versus shelf) and deep-sea waters by seabed depth (bathyal versus abyssal).

### 3.4 Marine protected areas

The MPA designation types included in this assessment are shown in <u>Figure 3</u>. The main MPA designation types included (where they occur in the Western Channel and Celtic Sea and Irish Sea CP2 regions) were:

- Special Areas of Conservation (SACs) with marine components
- Marine Conservation Zones (MCZs)
- Nature Conservation MPAs (NCMPAs)

Small subsets of the following MPA designation types were also included:

- Sites of Special Scientific Interest with marine components (SSSIs) a subset of SSSIs with marine components making an additional contribution to the MPA network in England (beyond the coverage of the MPAs listed above)<sup>15</sup>. Note data for SSSIs considered to have a marine component in Wales and Scotland and Areas of Special Scientific Interest (ASSIs) considered to have a marine component in Northern Ireland were not available for inclusion in the assessment; and
- Ramsar Sites a subset of Ramsar Sites with marine components making an additional contribution to the MPA network in England (beyond the coverage of the MPAs listed above)<sup>15</sup>. Note data for Ramsar sites considered to have a marine component in Wales, Scotland and Northern Ireland were not available for inclusion in the assessment.

The following MPA designation types were not included in this assessment:

Special Protection Areas (SPAs) – a site-by-site assessment of non-avian marine features afforded protection in each SPA has not yet been undertaken by the country agencies; SSSIs, Ramsar Sites, SPAs and ASSIs afford protection to substantial areas of the intertidal zone, so it is worth noting that the exclusion of all or the majority of these sites could underestimate the current degree of protection to this zone within the current MPA network. However, as many of these designation types overlap and underpin others already included in the assessment (particularly ASSIs/SSSIs and Ramsar Sites with SACs) a sizeable amount of this protection would have already be accounted for in this assessment. It should also be noted that some SPAs and Ramsar Sites may offer protection to subtidal features. The focus of any management in a SPA will however be the avian qualifying features and so this may not convey full protection to any further habitat or species features.

<sup>&</sup>lt;sup>15</sup> Site-by-site assessments of the marine habitats and species protected in Welsh, Scottish, Northern Irish and other English SSSIs and Ramsar Sites have not yet been undertaken and so the full complement of these sites could not be included in the analysis.



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**Figure 3**. Marine protected areas in the Western Channel and Celtic Sea and Irish Sea CP2 regions included in the MPA network assessment.

### 3.5 Protected features of MPAs

### 3.5.1 Compiling a catalogue of protected features

An assessment of MPA network gaps requires data on the features afforded protection within the existing MPA network. This assessment used the most up-to-date protected feature data possible, however efforts to catalogue MPA protected features are at different stages of completion for each designation type and country and so in practice JNCC collated data from a variety of sources compiled at different dates.

JNCC and the Statutory Nature Conservation Bodies (SNCBs) have been undertaking a 'UK MPA stocktake' exercise to create a standardised inventory of features protected in UK MPAs. This provided the most up-to-date protected feature data and was used whenever possible. Completed datasets from the UK MPA stocktake (as of March 2016) used in this assessment were available for:

- all offshore MPAs (SACs and MCZs)
- inshore Welsh SACs
- inshore Scottish SACs

Interim datasets provided for the purpose of this assessment (but still being prepared for the UK MPA stocktake) were available for:

- inshore English SACs and MCZs
- subsets of English SSSIs and Ramsar Sites with marine components

In the absence of more up-to-date data, datasets cataloguing Welsh MPA features for the 2014 Defra network assessment<sup>16</sup> were used for:

- inshore Northern Irish SACs and MCZs
- Scottish NCMPAs

The UK MPA stocktake exercise has a step built into the process to ensure it is clear which features protected within the MPAs are representative examples of features which could therefore be considered as contributing a replicate to the MPA network. As some of the data used in the assessment was derived from earlier sources, JNCC assumed that the protected MPA features identified in the datasets supplied by the SNCB comprised viable replicates of those features also.

### 3.5.2 Spatial extent of Annex I protected features

The boundaries of Welsh SACs are often much larger than the extents of the component Annex I features within the site. As such, when undertaking the spatial assessment these do not align closely with the delineated feature extents, therefore calculating the areas of broadscale habitats protected in these SACs based on the site boundaries would lead to overestimation in the amount of habitat protected. To overcome this issue, NRW supplied the delineated extents of the component Annex I features, which were used instead of the site boundary to undertake broadscale habitat adequacy calculations. Annex I feature extents were also readily available for offshore SACs and so adequacy calculations also used this feature-level approach in these sites. Elsewhere, designated feature delineations

<sup>&</sup>lt;sup>16</sup> JNCC (2014). Assessing progress towards an ecologically coherent network of MPAs in Secretary of State Waters in 2014. Available at: <u>http://jncc.defra.gov.uk/pdf/JNCC\_NetworkProgressInSoSWaters\_2014.pdf</u>

for SACs and NCMPAs were not readily available and therefore site boundaries were adopted as a proxy for the spatial extent of protection in all other MPAs.

### 3.6 Broadscale habitats map

A EUNIS level 3 seabed habitat map<sup>17</sup> was used to undertake adequacy calculations for broadscale habitats. This map (henceforth the 'Combined Map') integrated data from field survey maps, an updated version of EUSeaMap 2012<sup>18</sup>, Habmap<sup>19</sup> and a recent map product of rock in the English Channel and Celtic Sea<sup>20</sup>. The Combined Map is a single flat layer without overlaps between habitats or component datasets, making it suitable and efficient for area calculations. This map was used to calculate habitat cover within MPAs at all scales of the assessment.

### 3.7 Potential options to fill gaps

By way of example, JNCC noted the potential contribution of the broadscale habitats, HOCI and SLMS present in the recommended Marine Conservation Zones (MCZ) in Welsh offshore waters as potential options for filling any gaps identified through this assessment. The regional MCZ project stakeholders considered UK offshore waters around Wales and recommended four sites in the Western Channel and Celtic Sea section of offshore waters (Celtic Deep, East of Celtic Deep, North of Celtic and South of Celtic Deep<sup>21</sup> recommended MCZs) and two sites in the Irish Sea section of offshore waters (Mid St. George's Channel and North St. George's Channel recommended MCZs) around Wales. Whilst noting these sites have recent survey data, JNCC advised Welsh Government that these areas are only indicative since the present site boundaries are inappropriate in a Welsh context given they follow the 12 mile limit rather than an ecological boundary.

### 3.8 Limitations of the input data

JNCC identified the following limitations with the information currently available to inform the assessment:

- The assessment did not incorporate the protection afforded to MPA features by ASSIs, SPAs and the majority of SSSIs and Ramsar Sites (where these do not overlap with SACs, MCZs and NCMPAs), and therefore the assessment may have identified gaps for features (particularly intertidal features) that are already afforded adequate protection by these existing MPAs.
- The assessment did not incorporate the intertidal features of Scottish NCMPAs or Northern Irish inshore SACs and MCZs and therefore gaps identified for intertidal features in the Irish Sea CP2 region could be closed by virtue of the protection already afforded to these features in these existing MPAs.
- The assessment used a variety of sources of different ages to compile a catalogue of protected features in the existing MPA network. Work is ongoing to build a standardised UK-wide inventory of the entire MPA network (the UK MPA stocktake);

 <sup>&</sup>lt;sup>17</sup> JNCC (2015). EUNIS habitats: full-coverage EUNIS level 3 layer integrating maps from surveys and broad-scale models version 9.6.1.
 <sup>18</sup> Using the latest biozone data: JNCC (2015). EUSeaMap2 (2015) Interim draft North and Celtic Seas biozones.

 <sup>&</sup>lt;sup>18</sup> Using the latest biozone data: JNCC (2015). EUSeaMap2 (2015) Interim draft North and Celtic Seas biozones.
 <sup>19</sup> Robinson et al. 2007. Habmap : habitat mapping for conservation and management of the southern Irish

Sea, CCW Science Report No. 810. <sup>20</sup> Diesing, M. et al. (2015). Semi-automated mapping of rock in the English Channel and Celtic Sea. JNCC report No. 569. Available online at http://jncc.defra.gov.uk/pdf/569\_web.pdf

<sup>&</sup>lt;sup>21</sup> Only the section of South of Celtic Deep rMCZ occurring within Welsh offshore waters was advised on, the English section of the site was excluded from this assessment.

the gaps identified in this assessment may be subject to change once this work is complete, providing a comprehensive and consistent view of the MPA network.

 Input data sources represent the best available data at a snapshot point in time. Datasets of evidence collated from marine surveys are particularly subject to change as new data become available on a frequent basis. As information is updated on the features present within MPAs, Welsh waters and wider CP2 regions, so too will the gaps in the MPA network.

A number of limitations apply to the Combined Map specifically:

- The Combined Map includes large areas where habitat distributions are derived from habitat models or interpolation of widely spaced data, and where there may be limited groundtruthing and/or acoustic data.
- The map is missing intertidal broadscale habitat data around Northern Ireland and around some parts of Scotland in the Irish Sea CP2 region. Some subtidal broadscale habitats are missing in near-shore areas around England and Scotland in the Irish Sea and Western Channel and Celtic Sea CP2 regions.
- Some broadscale habitats designated in existing MPAs were not shown within the site in the Combined Map since their data have yet to be added to the source data sets of the map, or are point data only.
- The Combined Map is a broadscale map with a coarse spatial resolution. Habitats typically occurring at a fine scale (e.g. A5.5 Sublittoral macrophyte-dominated sediment) are likely to be under-represented in these maps and their extent would therefore be underestimated in the analysis.

### 4 Method for assessing gaps

Each feature on the MPA features list for Wales was assessed against the MPA network criteria with a yes/no outcome indicating whether the criterion was met or not. These results were used to conclude whether or not a gap occurred (against any of the criteria) for the given MPA feature. Gaps were then reviewed by JNCC and NRW to check their validity.

### 4.1 Assessment against network criteria

- Crit. i. Each feature on the MPA feature list for Wales should be represented in Welsh MPAs
- Crit. ii. Two examples of each broadscale habitat feature (EUNIS level 3) are protected within each Charting Progress 2 region

### Crit. iii. Three examples of each Habitat of Conservation Importance and Sessile & Limited Mobility Species of Conservation Importance are afforded protection in each Charting Progress 2 region

To assess these representation and replication criteria, tables of EUNIS level 3 broadscale habitats, HOCI and SLMS were created to identify all of the MPAs in which these features were protected, from which the number of replicates could then be counted. These tables included breakdowns by CP2 region, Welsh territorial waters and all Welsh waters.

If there were no sites within the region affording protection to an MPA feature then a gap in relation to representativity was identified. In these circumstances one example would need

to be designated to meet the minimum network requirements for representation. If there was one site within the region affording protection to a broadscale habitat, or only one-to-two sites within the region affording protection to a HOCI or SLMS, then further replicates would need to be designated to meet the minimum network criteria for replication.

In cases where a Welsh MPA straddled the boundary between the two CP2 regions, NRW reviewed the protected broadscale habitat, HOCI and SLMS features of the site and indicated which of the two regions they should count as a replicate in. For English MPAs straddling CP2 region boundaries, the mapped location of protected broadscale habitat features was examined in the Combined Map to determine for which region(s) the site should count as a replicate for each feature. The presence of any amount of habitat within a given CP2 region within the site was considered sufficient to qualify as a replicate; if spatial data for a protected feature in the MPA were not available in the Combined map, it wasn't possible to determine its precise location within the site boundary. As such, in the case of sites which traverse a CP2 region boundary, an assumption was made that the feature occurs in both CP2 regions and therefore be a replicate in both o<sup>22</sup>.

Any overlap between the boundaries of two MPAs in which the same MPA feature(s) was protected was also considered when determining the total number of replicates of a feature to avoid double-counting. The mapped location of a given broadscale habitat feature protected in two overlapping sites was examined using the Combined Map to confirm if the habitat occurred in the area of overlap between the sites. If the duplication in protection was confirmed then only one replicate was counted from the two sites (regardless of the size of the overlap in area terms). There were no known cases of overlaps in MPA boundaries affecting the counts of HOCI or SLMS replicates.

### Limitations:

- For broadscale habitats, HOCI and SLMS occurring in the intertidal zone, this assessment may have identified gaps where these features are already afforded sufficient representation and replication in the region by A/SSSIs, Ramsar Sites, inshore Northern Irish SACs and MCZs, and inshore Scottish NCMPAs.
- It was beyond the scope of the assessment to examine the spatial configuration of replicates, therefore cases of nuanced habitat configurations that might increase or decrease the number of replicates cannot be ruled out. For example, where habitat features might run contiguously between close but geographically separated MPAs, which might result in these features being considered the same replicate.

### Crit. iv. A minimum 10% by area of each broadscale habitat occurring in each Charting Progress 2 region is protected within the network

JNCC calculated the area of each EUNIS level 3 broadscale habitat present within each CP2 region and in Welsh waters, and the area of that habitat that was already afforded protection within existing MPAs. The first step in this GIS analysis was to cut the Combined Map down to the various scales required for assessment.

Scales for calculating the total areas of habitats in CP2 regions/ Welsh waters:

- Welsh territorial waters (stage 1 of the assessment)
- All Welsh waters (stage 1)
- CP2 regions as a whole (stage 2)

<sup>&</sup>lt;sup>22</sup> There were no cases of Scottish or Northern Irish MPAs straddling two CP2 regions, and no significant cases of an English MPA protecting a HOCI or SLMS and also straddling two CP2 regions.

- Welsh territorial waters only, subdivided by CP2 region (stage 2)
- All Welsh waters, subdivided by CP2 region (stage 2)

Scales for calculating total areas of habitats protected in MPAs (in addition to the above):

- MPA boundaries (stages 1-3)
- Annex I feature extents in Welsh and offshore SACs (stages 1 and 2)

The areas of broadscale habitats were then calculated at each of these scales in Microsoft SQL-Server Management Studio (2008 R2)<sup>23</sup>. The total areas of broadscale habitats present within each CP2 region/Welsh waters were calculated by summing together the areas of all habitat polygons found in the Combined Map for each region or section of Welsh waters. The total areas of habitats protected in MPAs were calculated by adding together the areas of habitat polygons within MPA boundaries (MCZs, NCMPAs and English, Scottish and Northern Irish inshore SACs) and within Annex I feature extents (Welsh and offshore SACs only)<sup>24</sup>. Habitat areas were then cross-referenced with the catalogue of broadscale habitats afforded protection by the MPAs to ensure that habitats were excluded if they were present in MPAs but were not formally protected. The areas of broadscale habitats afforded protection in overlapping MPAs were included only once. Further details on the methods used to calculate broadscale habitat areas are given in <u>Annex 2</u>.

The percentage (by area) of habitat protected in MPAs, relative to the total area of habitat occurring in and beyond MPAs, was used to determine any shortfalls in adequacy under criteria iv for Welsh waters subdivided by CP2 region (stage 2 of the assessment). Where less than 10% of a broadscale habitat was protected in MPAs a gap was flagged. As an additional and more aspirational target, where less than 20% of a broadscale habitat was protected in MPAs this too was flagged as a gap. If either of these targets were not met but the total area of the broadscale habitat in the CP2 region or in Welsh waters was minimal (< 0.1% of the region or section of Welsh waters) the gap was not considered a true gap. This was based on the assumption that the tiny area of unprotected habitat occurring outside of existing MPAs would not be viable for further protection.

JNCC advised Welsh Government on the degree of uncertainty in the energy layers contained within EUSeaMap (a component of the CombinedMap) and that the application of this finer scale information for calculating the areas of rock habitats could result in gaps being erroneously identified for adequacy, particularly for subtidal (infralittoral and circalittoral) rock habitats where modelled data may be more prevalent than survey data. The adequacy of subtidal rock habitat protection was also assessed at the coarser resolution of broad habitat type (EUNIS level 2 *Infralittoral rock* and *Circalittoral rock*), where energy is not a factor. Results for the broadscale habitats are still presented in this report, but network gap outcomes have been considered at the broad habitat level also.

### Limitations:

- Data for some broadscale habitats protected in existing MPAs were not shown within the Combined Map. As such, the contribution of these features could not be assessed and consequently their extent was underestimated. Correspondingly, the extent of habitats shown in their place within the Combined Map will have been overestimated.
- Many parts of the Combined Map are derived from habitat models or rely on the interpolation of widely spaced data, and in a minority of other locations data may be

 <sup>&</sup>lt;sup>23</sup> Area estimates were calculated in Albers Equal Area Conic Projection with modified standard parallels.
 <sup>24</sup> The overlap between Annex I feature extents within MPAs was accounted for in the analysis; duplicate habitat areas were removed.

lacking altogether (see section 3.8). These factors limited the accuracy of habitat area calculations and in some cases low confidence data will have informed the identification of an adequacy gap. Scrutiny of these data (following this assessment) may reveal that such evidence is inadequate to support further designation of the feature, and therefore it may not be possible to address a gap.

- In cases where the extent of Annex I or Scottish NCMPA features in sites were not available, the analysis assumed that protected broadscale habitat features of the MPA were afforded protection to their entire extent within site boundaries<sup>25</sup>. In practice a broadscale habitat will only be protected where its associated listed feature is present. Therefore the number and area of habitats may have been overestimated in SACs and NCMPAs where the extents of designated Annex I and Scottish priority marine features (respectively) may not encompass all of the habitats found within the site boundary<sup>26</sup>. Likewise, small patches of broadscale habitats that do not constitute viable replicates will have contributed to adequacy calculations where site boundaries were used to determine the extent of broadscale habitats protected in MPAs.
- The areas of finer-scale EUNIS level 3 habitats such as *Sublittoral macrophytedominated sediment* are likely to have been underestimated as these habitats may be under-represented in a coarse resolution map such as the Combined Map.

### Crit. v. Sites affording protection to the same habitat at EUNIS level 2 are not further than 80km apart from each other

JNCC undertook a simple assessment of connectivity by visually examining the contiguity of the MPAs that protect the same broad features. This high level assessment uses proximity of the broadscale habitats as a proxy assuming similarity between habitats and species composition due to the complex and feature specific nature of the connectivity principle. Five data layers were built in ArcGIS v10.1 to show the MPAs affording protection to the following five EUNIS level 2 habitats:

- Littoral rock and other hard substrata
- Littoral sediment
- Infralittoral rock and other hard substrata
- Circalittoral rock and other hard substrata
- Sublittoral sediment

Buffers of 40km radius<sup>27</sup> around site boundaries were calculated in ArcGIS for each of the MPAs identified in these layers, and expert judgement was used to identify by eye any spatial gaps of more than 80km between EUNIS Level 2 habitats in these sites. Sites were deemed not connected when the buffers between two adjacent existing sites holding the same habitat did not meet. Large and continuous areas of CP2 regions or Welsh waters which did not fall within any buffers were flagged as potential gaps that could be addressed, but requiring further checks that viable patches of habitat occur in these areas.

<sup>&</sup>lt;sup>25</sup> Applies to MCZs, NCMPAs and English/Scottish/Northern Irish inshore SACs only. Welsh and offshore SACs were assessed using Annex I feature extents and therefore this limitation did not apply.
<sup>26</sup> The assumption is safer for MCZs in which broadscale habitats are formally designated features of the sites

<sup>&</sup>lt;sup>26</sup> The assumption is safer for MCZs in which broadscale habitats are formally designated features of the sites and therefore mapped extents of broadscale habitats in the Combined Map will align well with designated features and the actual area of protected habitat.
<sup>27</sup> The 20/m and the actual area of protected habitat.

<sup>&</sup>lt;sup>27</sup> The 80km spacing was identified by Roberts et al (2010) as a guideline for the greatest distance between sites supporting similar habitats to ensure sufficient ecological connectivity. Roberts, C.M., Hawkins, J.P., Fletcher, J., Hands, S., Raab, K. and Ward, S. 2010. Guidance on the size and spacing of Marine Protected Areas in England. NECR037, Sheffield: Natural England, 2010. Available at: <a href="http://publications.naturalengland.org.uk/publication/46009">http://publications.naturalengland.org.uk/publication/46009</a>

Limitations:

• This analysis assumes that linear distance (or proximity) between MPAs is the only factor acting on connectivity. In reality connectivity is influenced by a number of physical factors (such as tidal and oceanographic currents) and biological factors (e.g. location and productivity of propagule source areas) and will vary between habitats and species.

### 4.2 Review of HOCI and SLMS gaps

Potential gaps for Habitats of Conservation Importance (HOCI) and Sessile and Low Mobility Species of Conservation Importance (SLMS) (identified under Criteria i and iii above) were reviewed by JNCC and NRW to verify whether these could be practically addressed either at CP2 or Welsh waters scales, thereby confirming these as 'true gaps' for Wales. In some cases the assessment process had suggested representation/replication gaps for a feature at both the wider CP2 region scale and in Welsh waters scales, yet closer examination of data revealed that these should not be considered 'true gaps' due to one of the following reasons:

- limited or no evidence for viable patches/populations of the feature in the Welsh waters section of the CP2 region that were not already protected by MPAs;
- limited or no evidence for viable patches/populations of the feature in the Welsh waters section of the CP2 region, either already protected in MPAs or outside MPAs;
- further survey work required to determine whether the examples of the feature present in Welsh waters could contribute viable replicates to the network;
- awaiting completion of UK MPA stocktake to determine whether protection is afforded to the feature in Welsh SSSIs.

Where a representation or replication gap had initially been identified, JNCC and NRW used the following sources to check for evidence of the HOCI or SLMS occurring in areas outside of existing MPAs:

- UK offshore habitat features of conservation importance layers (JNCC draft v.0.3)
- Marine Recorder snapshot version 5.1<sup>28</sup>
- NRW habitat features of conservation importance layers
- Expert judgement by NRW

### Limitations:

 It was beyond the scope of this review to thoroughly evaluate every habitat patch size or species population size occurring outside of existing MPAs to confirm whether further, (thus far unprotected), viable replicates occurred. It was also not possible to undertake any form of confidence assessment for the records identified outside of existing MPAs. Further work on feature viability, and perhaps also further evidence collection, will be required to check that any potential new replicate could offer a viable contribution to the MPA network. This work might result in changes to the gaps identified by this assessment and brief review.

<sup>&</sup>lt;sup>28</sup> Marine Recorder data are available online at: <u>http://jncc.defra.gov.uk/page-1599</u>

### 4.3 Overall gap outcomes

JNCC provided an overall conclusion as to whether MPA network gaps occurred for each feature on the MPA features list for Wales, both for Welsh territorial waters subdivided by CP2 region, and all Welsh waters subdivided by CP2 region.

Broadscale habitat gap outcomes summarised the representation, replication and adequacy targets. JNCC assumed that Welsh Government would seek to represent each broadscale habitat within Welsh territorial waters and seek to adequately protect each broadscale habitat in proportion to the area of Welsh waters within the wider CP2 region; where these targets were not met a broadscale habitat gap was identified.

HOCI and SLMS gap outcomes summarised the representation and replication targets, as well as findings of the review by JNCC and NRW. JNCC assumed that Welsh Government would seek to represent each of these features within Welsh territorial waters, and would also consider further protection of features if closing a replication gap at the CP2 region level was dependent on Welsh territorial waters (where all known records of a feature outside of existing MPAs occur in Welsh waters).

'Potential' gaps were highlighted where features met the network criteria in Welsh territorial waters but Wales could make further contributions to help fill replication or adequacy gaps remaining in the wider CP2 regions.

Final gap outcomes were categorised as "yes", "no", "potential" or "not applicable" according to the circumstances relevant to each MPA feature; these are described in more detail in <u>Section 5</u>.

### 4.4 Additional analyses

### 4.4.1 Refining broadscale habitat protection by depth biozones

Representation, replication and adequacy were also assessed relative to shallow and deeper shelf biozones within the subtidal region (Figure 2), providing a more detailed picture of the extent of protection afforded to the full range of marine biodiversity by EUNIS level 3 broadscale habitats in the MPA network. Some broad scale habitat features occur across different physical environmental conditions that then encapsulate many more detailed biotopes occurring within these different conditions. If there are only a limited number of MPAs for a broadscale habitat, particularly if those MPAs are located in similar environmental conditions, there is a reasonable likelihood that the range of more detailed biotopes known to occur within that broad habitat would not be encompassed in those few sites. To better represent the full range of biodiversity within the network, the assessment considered the presence of broadscale habitat features within sites across the biological zones from EUSeaMap. The biozones were overlaid with site boundaries in ArcGIS to determine whether broadscale habitats protected in MPAs occurred in the shallow and/or shelf biozone. Counts of broadscale habitat replicates per biozone were then made to assess the extent of protection of features in both the shallow coastal and deeper offshore areas The biozones were also included in the adequacy GIS analysis, providing a breakdown of the percentage (by area) of each broadscale habitat protected in shallow and shelf waters. These results provided a quick comparison of the coherence of the MPA network in shallow versus deeper areas of the continental shelf.

### 4.4.2 Spatial distribution of MPAs

To further understand the relative protection to shallow versus deeper waters in the MPA network and therefore the likelihood that MPAs are protecting the full range of biodiversity in

Welsh waters, JNCC undertook a simple assessment of the distribution of MPAs in relation to seabed depth bands. This used bathymetry as a proxy for the different biotopes/species known to occur in the deeper waters of the Western Channel and Celtic Sea and Irish Sea CP2 regions. Depth bands of 0-10m (coastal zone); 10-75m (shelf seas); 75-200m (deeper shelf seas); and 200-2000m (slope/upper bathyal zone) were selected, following an approach used by a recent study of the ecological coherence of the OSPAR MPA network<sup>29</sup>. Site boundaries were overlaid onto EMODnet bathymetric data<sup>30</sup> to calculate the percentage (by area) of each depth band occurring within MPAs per CP2 region.

This spatial assessment also considered whether sites have been designated in the transition zones between CP2 regions (where one CP2 region meets another). A JNCC-commissioned independent review on the application of biogeography and different biogeographic scales to MPA network design concluded that careful consideration should be given to assessing the contribution of habitats and species in the transition zones between biogeographic regions as these areas can themselves be unique environments<sup>31</sup>.

### 4.5 Evidence Quality Assurance

The JNCC Evidence Quality Assurance policy and guidance was applied throughout different stages of this assessment, with quality control checks made to data used in the assessment and quality assurance checks of the results presented in the final products. JNCC's conclusions were reviewed by Natural Resources Wales. The final methods and the key summary results were reviewed by JNCC's MPA Sub Group, a non-Executive group of independent scientists who provide oversight and strategic direction to JNCC's MPA work.

<sup>&</sup>lt;sup>29</sup> OSPAR, (2013). An assessment of the ecological coherence of the OSPAR network of Marine Protected Areas. Available online at:

http://www.ospar.org/documents/dbase/publications/p00619/p00619\_ecological\_coherence\_report.pdf <sup>30</sup> EMODnet Digital Elevation Model 2015.

<sup>&</sup>lt;sup>31</sup> Gubbay, S. (2014). A review of the use of biogeography and different biogeographic scales in MPA network assessment, JNCC Report 496. Available online at: <u>http://incc.defra.gov.uk/page-6750</u>

# 5 Overview results: progress and gaps for Welsh territorial waters

The two-stage analysis approach outlined in <u>Section 1</u> generated a multitude of results, incorporating a range of purposes and scales of analysis. The results from the stages of the analysis listed below are discussed in the following sections:

- Stage 2i identifying whether there are gaps for Welsh MPA features in each CP2 region; and,
- Stage 2ii assessing whether MPAs in Welsh territorial waters make a proportionate contribution to the gaps identified in the wider CP2 region.

Results from stage *2iii* of the analysis, assessing whether MPAs in all Welsh waters (including the offshore area) make a proportionate contribution to gaps in the wider CP2 region, are presented separately in <u>Annex 4</u> but not discussed here.

### 5.1 Gaps at the CP2 region scale (Analysis Stage 2i)

Gaps were identified for the whole MPA network in the Irish Sea and Western Channel and Celtic Sea CP2 regions to view Welsh MPAs in the context of this wider biogeographic scale. These results (see <u>Annex 3</u>) were a prerequisite to understanding Wales' contribution to the wider MPA network and whether there were any gaps that Wales could help to address.

In the wider CP2 regions all broadscale habitats are represented within the MPA network and adequately replicated. There remain shortfalls in the proportion of some broadscale habitats protected in both regions: three sediment habitats have less than 10% of their known area protected in the Irish Sea CP2 region and two sediment habitats in the Western Channel. For one other sediment habitat in each of the CP2 regions, although 10% of the known extent is being protected within the existing MPA network, the proportion of this habitat receiving protection remains below the 20% by area recommended by the OSPAR Commission.

Habitats of conservation importance are well represented in the Irish Sea and Western Channel and Celtic Sea CP2 regions. The analysis identified 16 cases across the two regions where the minimum replication target (3 replicates) had not been met, particularly in the Western Channel and Celtic Sea. However, the majority of these cases are not considered 'true gaps' because either: the habitat does not occur in that region; there are currently no additional records outside of MPAs; or, there is limited evidence that additional records relate to viable examples of the feature. Protecting more replicates is therefore not feasible according to the existing evidence base and so these cases are not considered 'true gaps'. There were also gaps identified in the representation and replication of sessile and limited mobility species in the Irish Sea CP2 region, with only four of fourteen species represented, and only one of these four meeting the minimum replication target.

### 5.2 MPAs in Welsh territorial waters (Analysis Stage 2ii)

The next step of the analysis assessed whether MPAs in Welsh territorial waters make a proportionate contribution to the gaps identified in the wider CP2 regions, when compared against the MPA network criteria and whether further contribution to help address these gaps was possible.

The following sections provide an overview of the results for Welsh territorial waters subdivided by the CP2 regions. Sections 5.2.1. and 5.2.2. cover the MPA network criteria of representation, replication and adequacy (criteria i-iv described in Section 2.1), and Section 5.2.3. makes a brief assessment of connectivity (criteria v) and the spatial distribution of MPAs.

### 5.2.1 Broadscale habitats

Broadscale habitats were assessed against the criteria for representativity, replication and adequacy (<u>Section 2</u>). Gaps were identified where broadscale habitats are not represented in Welsh territorial waters or not adequately protected in proportion to the area of Welsh territorial waters within the wider CP2 region. 'Potential' gaps were highlighted where habitats met network criteria in Welsh territorial waters but Wales could help to fill adequacy gaps remaining at the wider CP2 region scale. A full explanation of each gap outcomes is given in Table 2 and results are presented in Table 3.

Table 2: Key to broadscale habitat gaps for Welsh territorial waters.

Gap for Wales?	Explanation
Yes	Habitat does not meet representativity and/or adequacy criteria in the Welsh territorial section of the CP2 region, and there is also a gap in representativity or replication or adequacy in the wider CP2 region.
No	<i>(i)</i> Habitat is represented and meets adequacy criteria in the Welsh territorial section of the CP2 region, <i>and</i> there are no gaps for this feature at the wider CP2 region.
	<i>or</i> ( <i>ii</i> ) There are gaps in Welsh territorial waters and in the wider CP2 region, but these cannot be addressed because the known extent of the habitat outside of existing MPAs within Welsh waters is minimal <sup>32</sup> .
Potential	Habitat meets criteria in Welsh territorial waters but Wales could help to address an adequacy gap in the wider CP2 region.

<sup>&</sup>lt;sup>32</sup> Some features only occur as very small fragmented patches in Welsh territorial waters. These patches are not considered to be sufficiently good enough examples to provide potential replicates for affording additional protection to this feature in the MPA network.

**Table 3**. Representation, replication and adequacy of broadscale habitats in Welsh territorial waters for (a) Irish Sea and (b) Western Channel and Celtic Sea CP2 regions.

#### (a) Welsh territorial waters in the Irish Sea CP2 region

Broadscale habitats	Represented	Replicated 2+ times	10% area target	20% area target	Gap for Wales?	Comments
High energy littoral rock	Y	Y	Y	Y	No <i>(i)</i>	
Moderate energy littoral rock	Y	Y	Y	Y	No <i>(i)</i>	
Low energy littoral rock	Y	Y	Y	Y	No <i>(i)</i>	
Littoral coarse sediment	Y	Y	Y	Y	No <i>(i)</i>	
Littoral sand and muddy sand	Y	Y	Y	Y	No <i>(i)</i>	
Littoral mud	Y	Y	Y	Y	No <i>(i)</i>	
Littoral mixed sediments	Y	N	Y	Y	No <i>(i)</i>	
Coastal saltmarshes and saline reedbeds	Y	Y	Y	Y	No <i>(i)</i>	
Littoral sediments dominated by aquatic angiosperms	Y	Ν	Y	Y	No <i>(i)</i>	
Littoral biogenic reefs	Y	Y	Y	Y	No <i>(i)</i>	
High energy infralittoral rock	Y	Y	Y	Y	No <i>(i)</i>	
Moderate energy infralittoral rock	Y	Y	Y	Y	No <i>(i)</i>	
Low energy infralittoral rock <sup>33</sup>	Ν	Ν	Y	Y	No <i>(ii)</i>	
High energy circalittoral rock	Y	Y	Y	Y	No <i>(i)</i>	
Moderate energy circalittoral rock	Y	Y	N - 7.8%	N - 7.8%	No <i>(i)</i>	Not a gap when assessed for the broader <i>Circalittoral rock</i> EUNIS level 2 habitat (16.6% protected).
Low energy circalittoral rock <sup>33</sup>	N	N	N - 0%	N - 0%	No <i>(ii)</i>	
Sublittoral coarse sediment	Y	Y	N - 7.6%	N - 7.6%	Yes	
Sublittoral sand	Y	Y	Y	Y	Potential	Could contribute to CP2 gap. 1468km <sup>2</sup> available outside of Welsh MPAs
Sublittoral mud	Y	Y	Y	Y	Potential	Could contribute to CP2 gap. 138km <sup>2</sup> available outside of Welsh MPAs
Sublittoral mixed sediments	Y	Y	N - 9.8%	N - 9.8%	Yes	

<sup>&</sup>lt;sup>33</sup> Only a very small amount *of Low energy infralittoral rock* and *Low energy circalittoral rock* are known to exist in Welsh territorial waters. These are present in Welsh MPAs but the majority of patches are fragmented and not considered to be good enough examples to provide representative replicates, therefore *Low energy infralittoral rock* is only considered a protected replicate in one MPA (in Welsh waters within the Western Channel & Celtic Sea CP2 region) and *Low energy circalittoral rock* is not considered a protected replicate in any Welsh MPAs. However, where these habitats falls within relevant protected features of a MPA (e.g. Annex I Reef) their presence has contributed to the total area assessed against the adequacy criterion.

Sublittoral macrophyte-dominated sediment	Y	Y	Y	Y	No <i>(i)</i>	
Sublittoral biogenic reefs	Y	Ν	Y	Y	No <i>(i)</i>	

### (b) Welsh territorial waters in the Western Channel and Celtic Sea CP2 region

Broadscale habitats	Represented	Replicated 2+ times	10% area target	20% area target	Gap for Wales?	Comments
High energy littoral rock	Y	Y	Y	Y	No <i>(i)</i>	
Moderate energy littoral rock	Y	Y	Y	Y	No <i>(i)</i>	
Low energy littoral rock	Y	Y	Y	Y	No <i>(i)</i>	
Littoral coarse sediment	Y	Y	Y	Y	No <i>(i)</i>	
Littoral sand and muddy sand	Y	Y	Y	Y	No <i>(i)</i>	
Littoral mud	Y	Y	Y	Y	No <i>(i)</i>	
Littoral mixed sediments	Y	Ν	Y	Y	No <i>(i)</i>	
Coastal saltmarshes and saline reedbeds	Y	Y	Y	Y	No <i>(i)</i>	
Littoral sediments dominated by aquatic angiosperms	Y	Y	Y	Y	No <i>(i)</i>	
Littoral biogenic reefs	Y	Y	Y	Y	No <i>(i)</i>	
High energy infralittoral rock	Y	Ν	Y	Y	No <i>(i)</i>	
Moderate energy infralittoral rock	Y	Ν	Y	Y	No <i>(i)</i>	
Low energy infralittoral rock <sup>33</sup>	Y	Ν	Y	Y	No <i>(i)</i>	
High energy circalittoral rock	Y	Ν	Y	Y	No <i>(i)</i>	
Moderate energy circalittoral rock	Y	Ν	Y	Y	No <i>(i)</i>	
Low energy circalittoral rock <sup>33</sup>	N	Ν	Y	Y	No <i>(ii)</i>	
Sublittoral coarse sediment	Y	Y	N - 8.1%	N - 8.1%	Yes	
Sublittoral sand	Y	Y	Y	Y	Potential	Could contribute to CP2 gap. 1731km <sup>2</sup> available outside of Welsh MPAs.
Sublittoral mud	Y	Y	Y	Y	Potential	Could contribute to CP2 gap. 30km <sup>2</sup> available outside of Welsh MPAs.
Sublittoral mixed sediments	Y	Ν	Y	Y	No <i>(i)</i>	
Sublittoral macrophyte-dominated sediment	Y	Ν	Y	Y	No <i>(i)</i>	
Sublittoral biogenic reefs	Y	Y	Y	Y	No <i>(i)</i>	

### 5.2.1.1 Welsh territorial waters in the Irish Sea CP2 region

### Broadscale habitat representativity

- All but two broadscale habitats are represented in Welsh territorial waters of the Irish Sea CP2 region.
- Low energy infralittoral rock and Low energy circalittoral rock are not represented but only occur in very small amounts in these waters (<0.1% and <0.01% of the area of Welsh territorial waters in this CP2 region, respectively). The known patches of these habitats are fragmented and not considered representative replicates, therefore cannot be considered for protection.
- Both of these rock habitats are represented in the MPA network in the wider CP2 region.

#### Broadscale habitat replication

- All but three of the broadscale habitats represented in Welsh territorial waters in this CP2 region are also replicated at least twice.
- Littoral mixed sediments, Littoral sediments dominated by aquatic angiosperms and Sublittoral biogenic reefs are represented but not replicated at least twice. However, there are two or more replicates for all of these habitats within the wider CP2 region.

#### Broadscale habitat adequacy

- All but two broadscale habitats are adequately protected in Welsh territorial waters of this CP2 region.
- Only *Sublittoral coarse sediment* and *Sublittoral mixed sediments* have less than 10% of their area protected in Welsh MPAs<sup>34</sup>.
- These two broadscale habitats also fall short of the 10% level in the wider CP2 region.

### 5.2.1.2 Welsh territorial waters in the Western Channel and Celtic Seas CP2 region

### Broadscale habitat representativity

- All but one broadscale habitats are represented in Welsh territorial waters of the Western Channel and Celtic Seas CP2 region.
- Low energy circalittoral rock is not represented but only occurs in very small amounts in these waters (<0.1% of the area of Welsh territorial waters in this CP2 region). This habitat is represented and replicated in the wider CP2 region.

### Broadscale habitat replication

- Thirteen of 21 broadscale habitats represented in Welsh territorial waters in this CP2 region are also replicated at least twice.
- Littoral mixed sediments, High energy infralittoral rock, Moderate energy infralittoral rock, Low energy infralittoral rock, High energy circalittoral rock, Moderate energy circalittoral rock, Sublittoral mixed sediments and Sublittoral macrophyte-dominated sediment are represented but not replicated at least twice. However there are two or

<sup>&</sup>lt;sup>34</sup> Low energy circalittoral rock is also less than 10% protected but cannot be protected further as patches of this habitat are small and fragmented (based on currently available evidence).

more replicates for all of these broadscale habitats within the wider CP2 region.

#### Broadscale habitat adequacy

- All but one broadscale habitats are adequately protected in Welsh territorial waters in this CP2 region.
- Only *Sublittoral coarse sediment* has less than 10% of its known area protected in Welsh MPAs and this feature also falls short of the 10% level in the wider CP2 region.

### 5.2.1.3 Assessing broadscale habitat protection in shallow versus shelf seabed depths

In line with our advice provided on the network criteria (<u>Section 2</u>), JNCC undertook an additional analysis of the protection being afforded to each broadscale habitat within the shallow and shelf biozones occurring in Welsh territorial waters (<u>Figure 4</u>). Depth is a factor determining the distribution of species and associated biological communities and depth biozones offer a basic proxy to determine the likelihood that the range of species and communities are represented in the MPA network. The results of this assessment are shown in Table 4.



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Figure 4. Distribution of Welsh MPAs relative to seabed depth biozones around Wales.

**Table 4**. Representation, replication and adequacy of subtidal broadscale habitats in shallow versus shelf areas of seabed, for Welsh territorial waters subdivided by (a) Irish Sea and (b) Western Channel and Celtic Sea CP2 regions. All intertidal features are located in shallow inshore waters and not shelf waters so are not presented here. Grey text indicates that very little (less than 1km<sup>2</sup>) or no habitat occurs in shallow or shelf areas of Welsh territorial waters and so protecting this habitat is not achievable or practical.

	Shallow seabed			Shelf seabed		
Subtidal broadscale habitats	Represented	Replicated (2+)	Adequacy (%)	Represented	Replicated (2+)	Adequacy (%)
High energy infralittoral rock	Y	Y	61.6	Ν	Ν	0.0
Moderate energy infralittoral rock	Y	Y	46.4	Ν	Ν	0.0
Low energy infralittoral rock <sup>35</sup>	Ν	Ν	58.5	Ν	Ν	100.0
High energy circalittoral rock	Y	Y	32.9	Y <sup>36</sup>	N	0.6
Moderate energy circalittoral rock	Y	Y	18.5	Y	N	3.4
Low energy circalittoral rock <sup>35</sup>	Ν	Ν	0.0	Ν	Ν	0.0
Sublittoral coarse sediment	Y	Y	14.8	Y <sup>36</sup>	Y <sup>36</sup>	0.9
Sublittoral sand	Y	Y	27.8	N <sup>37</sup>	N <sup>37</sup>	0.2
Sublittoral mud	Y	Y	32.7	Y	N	0.0
Sublittoral mixed sediments	Y	Y	29.3	N <sup>37</sup>	N <sup>37</sup>	0.1
Sublittoral macrophyte-dominated sediment	Y	Y	79.3	Ν	Ν	0.0
Sublittoral biogenic reefs	Y	N	58.4	N	N	0.0

#### (a) Welsh territorial waters in the Irish Sea CP2 region

<sup>&</sup>lt;sup>35</sup> Only a very small amount *of Low energy infralittoral rock* and *Low energy circalittoral rock* are known to exist in Welsh territorial waters. These are present in Welsh MPAs but the majority of patches are fragmented and not considered to be good enough examples to provide representative replicates, therefore *Low energy infralittoral rock* is only considered a protected replicate in one MPA (in Welsh waters within the Western Channel & Celtic Sea CP2 region) and *Low energy circalittoral rock* is not considered a protected replicate in any Welsh MPAs. However, where these habitats falls within relevant protected features of a MPA (e.g. Annex I Reef) their presence has contributed to the total area assessed against the adequacy criterion.

 $<sup>^{36}</sup>$  One of the occurrences has a patch size of < 5km<sup>2</sup> and is considered a replicate in this analysis but may warrant further assessment of its viability.

<sup>&</sup>lt;sup>37</sup> Occurs in a patch of less than 1km<sup>2</sup> in a MPA in the shelf areas of Welsh territorial waters, therefore unlikely to be viable and so not considered a replicate but still contributes to the overall adequacy assessment.

### (b) Welsh territorial waters in the Western Channel and Celtic Sea CP2 region

	Shallow seabed			Shelf seabed		
Subtidal broadscale habitats	Represented	Replicated (2+)	Adequacy (%)	Represented	Replicated (2+)	Adequacy (%)
High energy infralittoral rock	Y	N	70.6	Ν	Ν	0.0
Moderate energy infralittoral rock	Y	N	89.6	Ν	N <sup>37</sup>	0.0
Low energy infralittoral rock <sup>35</sup>	Y	Ν	100.0	Ν	Ν	0.0
High energy circalittoral rock	Y	N	35.0	Y	N	5.4
Moderate energy circalittoral rock	Y	N	40.3	Y	N	36.3
Low energy circalittoral rock <sup>35</sup>	Ν	Ν	100.0	Ν	Ν	0.0
Sublittoral coarse sediment	Y	Y	10.5	Y	N	5.1
Sublittoral sand	Y	Y	34.4	Y	N	0.0
Sublittoral mud	Y	Y	75.8	N	N	0.0
Sublittoral mixed sediments	Y	N	60.0	Y	N	33.2
Sublittoral macrophyte-dominated sediment	Y	N	80.3	Ν	Ν	0.0
Sublittoral biogenic reefs	Y	N	67.5	N	N <sup>37</sup>	0.0

In general when looking at the proportion of the shallow and shelf seabed protected within the network, approximately 62% of the entire Irish Sea CP2 region is on the deeper shelf area of which 3.6% is currently protected in MPAs.

In the Western Channel over 87% of the seabed is found in the deeper shelf area and the area of deep-sea bed in the South-West Approaches. Approximately 8.5% of this deeper area is currently protected in MPAs.

This more detailed analysis identified broadscale habitats that are not currently represented in deeper shelf areas of Welsh territorial waters. These include *Sublittoral sand* and *Sublittoral mixed sediments* which make up 6% and 15% (respectively) of the deeper shelf area in Welsh territorial waters within the Irish Sea, *Sublittoral mud* is also not represented in deeper shelf areas of Welsh territorial waters in the Western Channel and Celtic Sea region.

Whilst not strictly part of the network criteria to replicate features in different depth biozones, the analysis showed that the following habitats do not have more than one example protected in the deeper shelf areas of one or both CP2 regions within Welsh territorial waters:

- High energy circalittoral rock
- Moderate energy circalittoral rock
- Sublittoral coarse sediment
- Sublittoral sand
- Sublittoral mud
- Sublittoral mixed sediments
- Sublittoral biogenic reefs

The proportion of habitat protected also falls beneath 10% for several of these habitats; seven broadscale habitats in the Irish Sea region and five in the Western Channel and Celtic Sea region of Welsh territorial waters. In the case of all four sublittoral sediment habitats in the Irish Sea, no more than 1% of each of these habitats occurring on the deeper shelf area are protected in the current MPA network. With these habitats making up the majority of the area this leaves a significant gap; in particular for *Sublittoral coarse sediment* which makes up 70% of the deeper shelf area in Welsh territorial waters within the Irish Sea, and *Subtidal sand* in Welsh territorial waters within the Western Channel region where it makes up 36% of the deeper shelf area.

The analysis also demonstrated that whilst the proportion of broadscale habitat protection is generally high in shallow inshore depths, a number of broadscale habitats are not replicated at shallow depths in Welsh territorial waters within the Western Channel and Celtic Sea.

### 5.2.2 Habitats of conservation importance and sessile and limited mobility species

Habitats of Conservation Importance (HOCI) and Sessile and Low Mobility Species of Conservation Importance (SLMS) were assessed against the criteria for representativity and replication. Gaps were identified where HOCI and SLMS features are not represented in Welsh territorial waters. 'Potential' gaps were highlighted where the MPA network within Welsh territorial waters had fulfilled country-level representation but further replicates would help to fill replication gaps at the wider CP2 region scale. A full explanation of each gap outcome is given in Table 5 below and results are presented in Tables 6 and 7. **Table 5**: Key to gaps for Habitats of Conservation Importance (HOCI) and Sessile and Limited Mobility

 Species (SLMS) for Welsh territorial waters.

Gap for Wales?	Explanation
Yes	(i) The feature is not represented in the Welsh territorial section of the CP2 region, and there is also a gap in the wider CP2 region. <i>Or</i>
	(ii) The feature is represented in the Welsh territorial section of the CP2 region, but there is a replication gap in the wider CP2 region and all known records of the feature outside of MPAs occur in Welsh waters.
No	<i>(iii)</i> The feature is represented in the Welsh territorial section of the CP2 region, <i>and</i> there are no gaps at the wider CP2 region. Or
	( <i>iv</i> ) There are gaps in the Welsh territorial section of the CP2 region and wider CP2 region, <i>but</i> these cannot be addressed because there is limited or no evidence for viable patches/populations of the feature in this section of Welsh territorial waters that are not already protected by MPA(s). <sup>38</sup> <i>Or</i>
	(v) The feature is represented in the Welsh territorial section of the CP2 region, but there is a replication gap in the wider CP2 region. There are no additional known records of the feature in the Welsh territorial section of the CP2 region (and in some cases the wider CP2 region). <sup>38</sup>
Potential	(vi) There is a gap for the Welsh territorial section of the CP2 region but further survey work is required to determine whether examples of the feature in Welsh territorial waters could contribute viable replicates to the network. Or
	( <i>vii</i> ) There is a gap that could potentially be addressed by records of the feature in Welsh SSSIs (but this will not be confirmed until a full stocktake has been done of these sites).
	( <i>viii</i> ) The feature meets criteria in Welsh territorial waters, but Wales could help to address a replication gap in the wider CP2 region.
N/A	There are no examples of this feature in Welsh waters that fall within the CP2 region.

Four HOCI and one SLMS<sup>39</sup> are only recognised as a conservation priority in Wales and therefore, in a UK context, are unique to the MPA features list of Wales. Although these are presented by CP2 region in Table 6, shortfalls for these features were only flagged where representation or replication criteria were not met (but are possible) in Welsh waters as a whole, irrespective of the CP2 region in which they occur.

<sup>&</sup>lt;sup>38</sup> Some habitats or species are likely to be at the north-westernmost extreme of their natural range in the Western Channel and Celtic Sea or Irish Sea CP2 regions, and therefore may occur in southern parts of Welsh waters but not more northerly areas. In these cases it will not be possible to find replicates for features in regions or sections of Welsh waters that are beyond their natural range.

<sup>&</sup>lt;sup>39</sup> Carbonate reefs, Mud habitats in deep water, *Musculus discors* beds and Subtidal mixed muddy sediments are only considered MPA features in Wales.

**Table 6**. Representation and replication of habitats of conservation importance in Welsh territorial waters subdivided by (a) Irish Sea and (b) Western

 Channel and Celtic Sea CP2 regions. The number of existing replicates is given in brackets where a feature is represented but not sufficiently replicated.

#### (a) Welsh territorial waters in Irish Sea CP2 region

Habitats of conservation importance	Represented	Replicated	Gap for Wales?	Comments		
Blue mussel beds	Y	Y	No (iii)			
Carbonate reefs*	Y	N (1)	No <i>(iii)</i>	A Wales-specific feature. The only known example in Welsh waters (occurring in the Irish Sea) is protected; there are no further replicates to consider for protection in Welsh territorial waters.		
Estuarine rocky habitat	Y	N (1)	Potential <i>(vii)</i>	Feature is only replicated twice in the wider CP2 region. Records in Welsh waters are not considered to have sufficient variety and quality to justify designation as a MPA; the feature is not extensive and patchy in its occurrence. SSSIs may make a contribution towards this gap but need further assessment.		
Fragile sponge and anthozoan communities on subtidal rocky habitats	Y	N (1)	Yes <i>(ii)</i>	Feature is not replicated in the wider CP2 region. All known records for this feature in the CP2 region occur within Welsh waters.		
Intertidal mudflats	Y	Y	No <i>(iii)</i>			
Intertidal underboulder/boulder communities	Y	Y	No <i>(iii)</i>			
Maerl beds			N/A			
Modiolus modiolus beds	Y	N (1)	No <i>(iii)</i>			
Mud habitats in deep water*	Y	N (1)	No <i>(iii)</i>	A Wales-specific feature. There are two known examples protected in Welsh territorial waters, and one example is protected in each of the CP2 regions in these waters. There are no further suitable records to consider for protection in the Irish Sea section of Welsh territorial waters.		
Musculus discors beds*	Y	N (1)	Potential (vi)	A Wales-specific feature. The feature is represented in Welsh waters (where it is known in the Irish Sea) but not replicated. There are records for this habitat off the west coast of Anglesey but they would need further consideration and possibly new survey data gathering to determine whether there are areas that could be considered for designation.		

Habitats of conservation importance	Represented	Replicated	Gap for Wales?	Comments
Ostrea edulis beds			N/A	
Peat and clay exposures	Y	Y	No <i>(iii)</i>	
Sabellaria alveolata reefs	Y	Y	No <i>(iii)</i>	
Sabellaria spinulosa reefs			N/A	NRW are aware there are examples of the species in the Irish Sea part of Welsh waters but have no additional data to assess the presence of reef formations. NRW plan to undertake some data gathering this year to investigate previous records of the species.
Seagrass beds	Y	Y	No <i>(iii)</i>	
Sea-pen and burrowing megafauna communities	Y	N (1)	No <i>(iii)</i>	
Sheltered muddy gravels	Y	Y	Potential <i>(vii)</i>	Feature is only replicated twice in the wider CP2 region. Welsh MPAs already contribute both replicates. All known records of the feature lie within Welsh territorial waters, albeit in small amounts. The main location is within a Welsh SSSI where a small proportion of it is a feature of the site. It is unclear without further assessment whether this example would represent this feature in the network.
Subtidal mixed muddy sediments*	Y	Y	No (iii)	
Tide-swept channels	Y	N (1)	No <i>(v)</i>	

\* Wales specific feature and therefore not relevant at the CP2 region scale.

Habitats of conservation importance	Represented	Replicated	Gap for Wales?	Comments
Blue mussel beds	Y	Y	No <i>(iii)</i>	
Carbonate reefs*			N/A	
Estuarine rocky habitat	Y	Y	No <i>(iii)</i>	
Fragile sponge and anthozoan communities on subtidal rocky habitats	Y	N (1)	No <i>(iii)</i>	
Intertidal mudflats	Y	Y	No <i>(iii)</i>	
Intertidal underboulder/boulder communities	Y	N (1)	No <i>(iii)</i>	
Maerl beds	Y	N (1)	No <i>(v)</i>	
Modiolus modiolus beds			N/A	
Mud habitats in deep water*	Y	N (1)	Potential ( <i>vi</i> ) <sup>Error!</sup> ookmark not defined.	A Wales-specific feature. There are two examples protected in Welsh territorial waters, and one example is protected in each of the CP2 regions within these waters. Records within the Welsh territorial waters section of this CP2 region are not of sufficient quality to provide an opportunity for protecting a third replicate in Welsh waters without further survey work.
Musculus discors beds*	N	Ν	N/A	
Ostrea edulis beds	Y	N (1)	No <i>(v)</i>	
Peat and clay exposures	Y	Y	No <i>(v)</i>	
Sabellaria alveolata reefs	Y	N (1)	No (iii)	
Sabellaria spinulosa reefs			N/A	
Seagrass beds	Y	Y	No (iii)	
Sea-pen and burrowing megafauna communities	N	Ν	No <i>(iv)</i>	
Sheltered muddy gravels	Y	N (1)	Potential <i>(vii)</i>	Feature is only replicated twice in the wider CP2 region. There are limited examples outside of existing SACs in Welsh waters to address this gap The main location is within a Welsh SSSI where a small proportion of it is a feature of the site. It is unclear without further assessment whether this example would represent this feature in the network

### (b) Welsh territorial waters in Western Channel and Celtic Sea CP2 region

Habitats of conservation importance	Represented	Replicated	Gap for Wales?	Comments
Subtidal mixed muddy sediments*	Y	N (1)	No <i>(iii)</i>	
Tide-swept channels	Y	N (1)	No <i>(v)</i>	

\* Wales specific feature and therefore not relevant at the CP2 region scale.

**Table 7**. Representation and replication of sessile and limited mobility species in Welsh territorial waters subdivided by (a) Irish Sea and (b) Western Channel and Celtic Sea CP2 regions. The number of existing protected replicates is given in brackets where a feature is represented but not sufficiently replicated.

### (a) Welsh territorial waters in Irish Sea CP2 region

Sessile and limited mobility species	Represented	Replicated	Gap for Wales?	Comments
Alkmaria romijni (Tentacled lagoon worm)*	N	N	No (iii)	
Anotrichium barbatum	Y	N (1)	No <i>(v)</i>	
Arctica islandica (Ocean quahog)	Y	Y	No (iii)	
Cruoria cruoriaeformis	Ν	Ν	No <i>(iv)</i>	
Dermocorynus montagnei / Grateloupia montagnei	Ν	Ν	No <i>(iv)</i>	
Edwardsia timida (Burrowing anemone)	Ν	Ν	No <i>(iv)</i>	
<i>Eunicella verrucosa</i> (Pink sea-fan)	Ν	Ν	Yes (i)	Feature is not represented or replicated in the wider CP2 region, or represented in the Welsh waters part of the CP2 region. There are known records for this feature in the Welsh territorial waters part of the CP2 region.
<i>Haliclystus auricula</i> (Stalked jellyfish)	Ν	Ν	Potential <i>(vi)</i>	Feature is not represented or replicated in the wider CP2 region, or represented in the Welsh waters part of the CP2 region. There are known records in the Welsh territorial waters part of the CP2 region. Whether this gap could be addressed in Welsh territorial waters would need further consideration of existing data, and possibly new survey data gathering to determine any areas that could be considered.
Lithothamnion corallioides (Coral maërl)	N	N	No (iv)	
Lucernariopsis campanulata (Stalked jellyfish)	N	N	No (iv)	
Ostrea edulis (Flat/native oyster)	Ν	Ν	Potential <i>(vi)</i>	There are known records for this feature in the Welsh territorial waters part of the CP2 region, however these will need further investigation.
Padina pavonica (Peacock's tail)	N	N	No (iv)	
Palinurus elephas (Crayfish, Crawfish or Spiny lobster)	Y	N (1)	Potential (viii)	Feature is not replicated in the wider CP2 region. There are known records for this feature in the Welsh territorial waters part of the CP2 region.
Phymatolithon calcareum (Common maerl)	N	N	No (iv)	
Tenellia adspersa (Lagoon sea slug)			N/A	

### (b) Welsh territorial waters in Western Channel and Celtic Sea CP2 region

Sessile and limited mobility species	Represented	Replicated	Gap for Wales?	Comments
Alkmaria romijni (Tentacled lagoon worm)*	Y	N (1)	No (iii)	
Anotrichium barbatum			N/A	
Arctica islandica (Ocean quahog)	Y	N (1)	Potential (viii)	Feature is only replicated twice in the wider CP2 region. There are sparse records of this feature in the Welsh territorial waters part of the CP2 region.
Cruoria cruoriaeformis	Y	N (1)	No <i>(v)</i>	
Dermocorynus montagnei / Grateloupia montagnei			N/A	
Edwardsia timida (Burrowing anemone)			N/A	
Eunicella verrucosa (Pink sea-fan)	Y	N (1)	No (iii)	
Haliclystus auricula (Stalked jellyfish)	Ν	Ν	No <i>(iv)</i>	
Lithothamnion corallioides (Coral maërl)	Y	N (1)	No <i>(v)</i>	
Lucernariopsis campanulata (Stalked jellyfish)	Ν	Ν	No (iv)	
Ostrea edulis (Flat/native oyster)	Y	N (1)	Potential (vi and viii)	Feature is only replicated twice in the wider CP2 region. Records occur in Welsh territorial waters but their quality is uncertain. Whether this shortfall could be addressed in Welsh waters part of the CP2 region would need further consideration of the available data and possibly additional data gathering.
Padina pavonica (Peacock's tail)			N/A	
Palinurus elephas (Crayfish, Crawfish or Spiny lobster)	Y	N (1)	No <i>(iii)</i>	
Phymatolithon calcareum (Common maerl)	Y	N (1)	No <i>(v)</i>	
Tenellia adspersa (Lagoon sea slug)			N/A	

\* Wales specific feature and therefore not relevant at the CP2 region scale.

### 5.2.2.1 Welsh territorial waters in the Irish Sea CP2 region

### HOCI and SLMS representativity

- There are 16 HOCI and 13 SLMS known to occur in the Welsh waters part of the CP2 region.
- Out of those present, 16 HOCI and three SLMS are represented within Welsh MPAs. Of the 10 SLMS not represented, there are no suitable records for addressing the shortfall for seven of these features.
- For the remaining three SLMS, existing records need further consideration to address the representativity gaps for *Eunicella verrucosa* (pink sea-fan) and *Ostrea edulis* (flat/native oyster); there are some records of *Haliclystus auricula* (stalked jellyfish) but new survey data will possibly be required to confirm representative examples that Welsh Government could consider for protection in Welsh MPAs.
- Including these three SLMS within the Welsh MPA network would also help to address representation gaps in the wider CP2 region.

### HOCI and SLMS replication

- Eight of the HOCI and one SLMS known to occur in the Welsh waters part of this CP2 region are replicated at least twice. Wales is therefore contributing two replicates of each of these features to the wider CP2 region.
- In the wider CP2 region three HOCI are not sufficiently replicated (of the HOCI for which further records within the CP2 region are known): *Estuarine rocky habitat, Fragile sponge and anthozoan communities on subtidal rocky habitats* and *Sheltered muddy gravels*.
- For all three HOCI, the only known records within the CP2 region exist within Welsh territorial waters and so the gap can only be closed within Welsh waters. The gaps for *Estuarine rocky habitat* and *Sheltered muddy gravels* could potentially be addressed by Welsh SSSIs in this region once these have been fully assessed through the UK MPA stocktake.
- In the wider CP2 region two SLMS are not sufficiently replicated (of the SLMS for which further records within the CP2 region are known). For one of these features, *Palinurus elephas* (spiny lobster), there are records in the Welsh territorial waters part of this CP2 region that could be considered for protection to fill this gap.

### 5.2.2.2 Welsh territorial waters in the Western Channel and Celtic Seas CP2 region

HOCI and SLMS representativity

- There are 15 HOCI and 10 SLMS known to occur in the Welsh waters part of the CP2 region.
- Out of those present, 14 HOCI and eight SLMS are represented within Welsh MPAs.
- For the single HOCI not represented, *Sea-pen and burrowing megafauna communities,* there are a few records in Welsh territorial waters with most records in Welsh offshore waters. Representing this feature in the Welsh MPA network would also contribute to a shortfall in replication of this feature in the wider CP2 region.

• There are no suitable records to close the gap for either of the two SLMS not represented.

### HOCI and SLMS replication

- Five of the HOCI known to occur in the Welsh territorial waters part of this CP2 region are replicated at least twice. Wales is therefore contributing two replicates of each of these features to the wider CP2 region.
- In the wider CP2 region two HOCI are not sufficiently replicated (of the HOCI for which further records in the CP2 region are known): Sea-pen and burrowing megafauna communities and Sheltered muddy gravels.
- There are records in Welsh offshore waters that could be considered to close the replication gaps at the wider CP2 region for *Sea-pen and burrowing megafauna communities*. There are only sparse data for this HOCI in Welsh territorial waters.
- In the wider CP2 region five SLMS are not sufficiently replicated (of the SLMS for which further records within the CP2 region are known). For two of these features, *Arctica islandica* (ocean quahog) and *Ostrea edulis* (flat/native oyster) there are sparse records in Welsh territorial waters but further records known in Welsh offshore waters that could be considered for protection to fill these gaps.

### 5.2.3 Connectivity and spatial distribution of MPAs in Welsh territorial waters

JNCC conducted a high level spatial assessment of connectivity between MPAs protecting similar broadscale habitats in Welsh territorial waters in the context of the wider CP2 regions. In general broadscale habitats are relatively well connected in the existing MPA within Welsh territorial waters. There remains a small gap in the connection between sites containing *Circalittoral rock* habitat in the Irish Sea CP2 region. For offshore waters, there are a few remaining areas where connectivity could be improved for both *Circalittoral rock* and *Sublittoral sediments* (see Section A3.4 for more detail).

However, at the finer scale of seabed depth bands it is clear that there are gaps in the spatial distribution of Welsh MPAs, and in the outermost part of Welsh territorial waters in particular. A much larger proportion of the 0-75m depth band falls within Welsh MPAs (in both CP2 regions) than in comparison to the area protected in bands deeper than 75m in Welsh territorial waters (see Section A3.3 for more detail).

### 6 Conclusion

The MPAs in Welsh territorial waters make a substantial contribution towards the aim for an ecologically coherent network in the wider Irish Sea and Western Channel and Celtic Sea CP2 regions. When considering the contribution of Welsh MPAs in each of these wider biogeographic regions, the majority of broadscale habitats are represented and only a few gaps remain in relation to the area of these habitats afforded protection. There are a small number of shortfalls in the protection of habitats and species of conservation interest that Welsh Government could address to both ensure that MPAs in Welsh waters adequately represent the features on the Welsh MPA list, and also to contribute to the ecological coherence of the wider MPA network. JNCC note however that only a very small proportion of the broadscale habitats occurring on the deeper shelf area of the region are protected in the existing network. Consequently, representation and replication of biotopes known to occur in deeper waters will not be achieved in the existing network. Additionally, existing MPAs are not well distributed in the depth zones across the seabed in both CP2 regions, with a much larger proportion of the seabed in the 0-75m depth-band falling within MPAs compared to areas deeper than 75m. Broad habitat types in the existing MPA network are relatively well connected but some gaps remain. In particular, subtidal habitats in the offshore area between waters offshore of Wales and waters offshore of England in the Western Channel and Celtic Sea CP2 region are less well connected.

# Annex 1 - MPA features list for Wales – habitats, sessile species and limited mobility species

### **BROADSCALE HABITATS**

Habitat name	EUNIS code	JNCC code
High energy littoral rock	A1.1	LR.HLR
Moderate energy littoral rock	A1.2	LR.MLR
Low energy littoral rock	A1.3	LR.LLR
Littoral coarse sediment	A2.1	LS.LCS
Littoral sand and muddy sand	A2.2	LS.LSa
Littoral mud	A2.3	LS.LMu
Littoral mixed sediments	A2.4	LS. LMx
Coastal saltmarshes and saline reedbeds	A2.5	
Littoral sediments dominated by aquatic angiosperms	A2.6	LS.LMp
Littoral biogenic reefs	A2.7	LS.LBR
Atlantic and Mediterranean high energy infralittoral rock	A3.1	IR.HIR
Atlantic and Mediterranean moderate energy infralittoral rock	A3.2	IR.MIR
Atlantic and Mediterranean low energy infralittoral rock	A3.3	IR.LIR
Atlantic and Mediterranean high energy circalittoral rock	A4.1	CR.HCR
Atlantic and Mediterranean moderate energy circalittoral rock	A4.2	CR.MCR
Atlantic and Mediterranean low energy circalittoral rock	A4.3	CR.LCR
Sublittoral coarse sediment	A5.1	SS.SCS
Sublittoral sand	A5.2	SS.SSa
Sublittoral mud	A5.3	SS.SMu
Sublittoral mixed sediments	A5.4	SS.SMx
Sublittoral macrophyte-dominated sediment	A5.5	SS.SMp
Sublittoral biogenic reefs	A5.6	SS.SBR

### HABITATS OF CONSERVATION IMPORTANCE (HOCI)

Habitat name	Common names	Section 7 <sup>40</sup> / OSPAR	Specific to Welsh waters?
Blue mussel beds		Section 42 & OSPAR	
Carbonate reefs		Section 42	Yes
Estuarine rocky habitat		Section 42	
Fragile sponge and anthozoan communities on subtidal rocky habitats		Section 42	
Intertidal Mudflats		OSPAR	
Intertidal underboulder/boulder communities		Section 42	
Maerl beds		Section 42 & OSPAR	
Modiolus modiolus beds	Horse mussel	Section 42 & OSPAR	
Mud habitats in deep water		Section 42	Yes41
Musculus discors beds	Green crenella (carpet mussel)	Section 42	Yes
Ostrea edulis beds	Oyster beds	OSPAR	
Peat and clay exposures		Section 42	
Sabellaria alveolata reefs	Honeycomb worm (mostly intertidal species)	Section 42	
Sabellaria spinulosa reefs	Ross worm (subtidal species)	OSPAR	
Seagrass beds		Section 42 & OSPAR	
Sea-pen and burrowing megafauna communities		OSPAR	
Sheltered muddy gravels		Section 42	
Subtidal mixed muddy sediments		Section 42	Yes
Tide-swept channels		Section 42	

<sup>&</sup>lt;sup>40</sup> The Section 7 list of the Environment (Wales) Act 2016. <u>http://www.legislation.gov.uk/anaw/2016/3/section/7</u> <sup>41</sup> Mud habitats in deep water has been removed as a feature from the MPA features list for Secretary of State waters and so this feature is considered a Wales-specific feature. Further information on the review of MCZ Features of Conservation Importance can be found here: <u>http://jncc.defra.gov.uk/page-4527</u>

### SESSILE AND LIMITED MOBILITY SPECIES OF CONSERVATION IMPORTANCE (SLMS)

Species name	Common names	Section 42 <sup>39</sup> / OSPAR	Specific to Welsh waters?
Alkmaria romijni	Tentacled lagoon worm	Section 42	Yes
Anotrichium barbatum	Bearded red seaweed	Section 42	
Arctica islandica	Ocean quahog	Section 42 & OSPAR	
Cruoria cruoriaeformis	Red seaweed	Section 42	
Dermocorynus montagnei / Grateloupia montagnei	A red seaweed	Section 42	
Edwardsia timida	Burrowing anemone	Section 42	
Eunicella verrucosa	Pink sea-fan	Section 42	
Haliclystus auricula	Stalked jellyfish	Section 42	
Lithothamnion corallioides	Coral Maërl	Section 42	
Lucernariopsis campanulata	Stalked jellyfish	Section 42	
Ostrea edulis	Flat/native oyster	Section 42 & OSPAR	
Padina pavonica	Peacock's tail	Section 42	
Palinurus elephas	Crayfish, Crawfish or Spiny Lobster	Section 42	
Phymatolithon calcareum	Common maerl	Section 42	
Tenellia adspersa	Lagoon sea slug	Section 42	

# Annex 2 - Technical account of area calculations for assessing adequacy of broadscale habitats

Calculating the percentage cover of features within each CP2 region and section of Welsh waters, and the percentage cover of protection provided by the existing MPA network, required the following area parameters:

- 1. Total area of each subtidal EUNIS Level 3 habitat per Charting Progress 2 reporting region and per section of Welsh waters;
- 2. Total area of each subtidal EUNIS Level 3 habitat within existing MPAs per Charting Progress 2 reporting region and per section of Welsh waters;
- 3. Total area of each Charting Progress 2 reporting region and section of Welsh waters.

The source of habitat data was a UK-wide layer of EUNIS level 3 habitats (henceforth called the 'Combined Map')<sup>42</sup>, integrating maps from surveys and broadscale, modelled datasets such as EUSeaMap and a modelled map of seabed rock in the English Channel and Celtic Sea<sup>43</sup>. The Combined Map was used to calculate habitat cover within MPAs, and habitat cover outside of MPAs at the regional scale. The 'biozgroup' attribute of the EUSeaMap model (draft 2015 version) was aggregated to create broad depth bands (shallow, shelf/offshore, bathyal and abyssal biozones) which were merged into the Combined Map to further refine the EUNIS Level 3 habitats by depth.

The Combined Map was imported into a SQL-Server database along with layers containing CP2 reporting regions (modified to the 2013 UK continental shelf limit) and Welsh offshore and territorial waters limits (see Figure 1 in the above report), MPA site boundaries (SACs, NCMPAs, MCZs and a small number of SSSIs and Ramsar Sites; Figure 3 above) and Annex I feature extents for Welsh and offshore Special Areas of Conservation. Manipulation of these spatial data and area calculations were undertaken in Microsoft SQL-Server Management Studio (2008 R2). Areas estimates were calculated in square-kilometres with the map layers in Albers Equal Area Conic Projection.

Broadscale habitat polygons in the Combined Map were subdivided using the boundaries of intersecting CP2 regions and Welsh waters limits to create an integrated map, with each habitat polygon attributed by CP2 region name, administrative area (Welsh territorial waters; Welsh offshore waters; other countries' waters), and the area of the polygon. This map covered the full extent of the Irish Sea and Western Channel and Celtic Sea CP2 regions thereby providing the source data for parameter 1 (above).

In a separate layer the habitat polygons from the Combined Map were also subdivided by and clipped to MPA site boundaries (MCZs, NCMPAs and English, Scottish and Northern Irish inshore SACs) and Annex I feature extents (Welsh and offshore SACs only). This created an integrated map of habitats occurring within MPAs and contained the attribute data from all input layers (final habitat polygons were the smallest common denominator of the overlaid layers). Each habitat polygon was attributed by CP2 region, administrative area, MPA site name, MPA designation status, Annex I feature name (where applicable) and the area of the polygon.

SQL scripts were written to resolve overlaps between the input layers (for example between MPAs, or between Annex I features within a given site) while maintaining their respective attributes in the integrated output; this prevented duplication within habitat area estimates

<sup>&</sup>lt;sup>42</sup> JNCC (2015). EUNIS habitats: full-coverage EUNIS level 3 layer integrating maps from surveys and broadscale models version 9.6.1.

<sup>&</sup>lt;sup>43</sup> Diesing, M. et al. (2015). Semi-automated mapping of rock in the English Channel and Celtic Sea. JNCC report No. 569. Available online at <u>http://jncc.defra.gov.uk/pdf/569\_web.pdf</u>

but allowed area calculations at various scales. The integrated map of MPA habitats was then joined with a look-up table cataloguing the broadscale habitats protected in MPAs (also known as MPA stocktake data), creating an attribute column that indicated whether or not the habitat found within a given site or Annex I feature was afforded protection. This join ensured that only those habitat polygons falling within a MPA and with 'protected' status could contribute to parameter 2 (above); those habitats within MPAs but not formally protected were excluded from final area totals.

Area data for all polygons in the two integrated broadscale habitat layers were aggregated using SQL database queries to estimate the total area of each broadscale habitat per CP2 region and per section of Welsh waters (parameter 1), or protected in the existing MPA network per CP2 region and per section of Welsh waters (parameter 2). The total areas of each Charting Progress 2 reporting region and section of Welsh waters (parameter 3) were calculated from their respective input layers. Where habitat data comprised a mosaic of EUNIS level 3 broadscale habitats (e.g. *Subtidal coarse sediment* and *Subtidal mixed sediments*) the area data were divided by the number of component habitats so that areas could be attributed to each habitat individually.

The three area parameters were used to calculate the percentage cover of each EUNIS Level 3 habitat, and the percentage of each habitat protected by MPAs (relative to its total extent) at the following scales (outlined in <u>Section 1</u> of the above report):

#### Analysis Stage 1

- i) Welsh territorial waters only;
- ii) all Welsh waters (territorial waters and offshore waters);

#### Analysis Stage 2

- i) CP2 regions as a whole;
- ii) Welsh territorial waters only, subdivided by CP2 region;
- iii) all Welsh waters, subdivided by CP2 region.

# Annex 3 - Identifying gaps for Welsh MPA features in the wider Charting Progress 2 regions (Stage 2i)

Stage 2i of the analysis focussed on the ecological coherence of the MPA network at the Charting Progress 2 (CP2) regional seas scale, including waters within and beyond Welsh waters. This analysis included existing SACs in Welsh waters and SACs and national MPAs in English, Northern Irish and Scottish waters within the Western Channel and Celtic Sea and Irish Sea CP2 regions (see Figure 3 in the main text). It determined how well these MPAs protect the features on the MPA features list for Wales (Annex 1) and whether there are any gaps for these features in either of the wider CP2 regions, assessed against the criteria described in Section 2 of the above report. The tables below provide an overview of the results at the CP2 region scale.

### A3.1 Broadscale habitat gaps at the CP2 region scale

Broadscale habitats were assessed against the minimum criteria of representativity (at least one example), replication (at least two replicates) and adequacy (minimum of 10% of known area of habitat included within network), as well as the recommended target for adequacy of 20% protection. Table A3-1 describes the circumstances where a broadscale habitat gap was identified at the CP2 region scale, and Table A3-2 presents the results.

**Table A3-1**: Key to broadscale habitat gaps at the CP2 region scale.

Gap in CP2 region?	Explanation
Yes	Habitat does not meet representativity, replication and/or adequacy targets at the
	currently within existing MPAs that could address a gap.
No	Habitat is represented <i>and</i> replicated <i>and</i> meets adequacy targets at the CP2 region scale.

 Table A3-2.
 Assessment of broadscale habitat protection against representativity, replication and adequacy criteria at the CP2 region level, subdivided by (a)

 Irish Sea and (b) Western Channel and Celtic Sea CP2 regions.

#### (a) Irish Sea CP2 region

Broadscale habitats	Represented	Replicated	10% area target	20% area target	Gap at CP2 scale?	Comments
High energy littoral rock	Y	Y	Y	Y	No	
Moderate energy littoral rock	Y	Y	Y	Y	No	
Low energy littoral rock	Y	Y	Y	N - 19.97%	No	Not considered a gap as only 0.03% away from 20%. Data for the extent of this feature in Luce Bay and Sands SAC were not included in the habitat map used for the assessment and so it is likely this gap does not occur.
Littoral coarse sediment	Y	Y	Y	Y	No	
Littoral sand and muddy sand	Y	Y	Y	Y	No	
Littoral mud	Y	Y	Y	Y	No	
Littoral mixed sediments	Y	Y	Y	Y	No	
Coastal saltmarshes and saline reedbeds	Y	Y	Y	Y	No	
Littoral sediments dominated by aquatic angiosperms	Y	Y	Y	Y	No	
Littoral biogenic reefs	Y	Y	Y	Y	No	
High energy infralittoral rock	Y	Y	Y	Y	No	
Moderate energy infralittoral rock	Y	Y	Y	Y	No	
Low energy infralittoral rock	Y	Ν	N - 7.9%	N - 7.9%	No	Not a gap when assessed for the broader <i>Infralittoral rock</i> habitat (38.1% protected). Also, data for the extent of this feature in Luce Bay and Sands SAC was not included in the habitat map used for the assessment and so will make a further contribution to the protection of this feature.
High energy circalittoral rock	Y	Y	Y	Y	No	
Moderate energy circalittoral rock	Y	Y	N - 6.8%	N - 6.8%	No	Not considered a gap when assessed for the broader Circalittoral rock

						habitat (9.6% protected). It is impractical to address this gap given the minimal shortfall (< 10km <sup>2</sup> ) and missing data (see row below).
Low energy circalittoral rock	Y	Y	N - 0.3%	N - 0.3%	No	Not considered a gap when assessed for the broader <i>Circalittoral rock</i> habitat (9.6% protected). Data for the extent of this feature in Luce Bay and Sands SAC were not included in the habitat map used for the assessment and will make a further contribution to the protection this feature in the CP2 region. It is impractical to address this gap given the minimal shortfall (< 10km <sup>2</sup> ) and missing data.
Sublittoral coarse sediment	Y	Y	N - 6.8%	N - 6.8%	Yes	
Sublittoral sand	Y	Y	Y	N - 16.1%	Yes	
Sublittoral mud	Y	Y	N - 9.4%	N - 9.4%	Yes	Data for the extent of this feature in Luce Bay and Sands SAC were not included in the habitat map used for the assessment and will make a further contribution to the protection of this feature in the CP2 region.
Sublittoral mixed sediments	Y	Y	N - 8.8%	N - 8.8%	Yes	Data for the extent of this feature in Allonby Bay MCZ were not included in the habitat map used for the assessment and will make a further contribution to the protection of this feature in the CP2 region. It is unlikely that the contribution would be enough to address the gap however.
Sublittoral macrophyte-dominated sediment	Y	Y	Y	Y	No	
Sublittoral biogenic reefs	Y	Y	Y	Y	No	

### (b) Western Channel and Celtic Sea CP2 region

Broadscale habitats	Represented	Replicated	10% area target	20% area target	Gap at CP2 scale?	Comments
High energy littoral rock	Y	Y	Y	Y	No	
Moderate energy littoral rock	Y	Y	Y	Y	No	
Low energy littoral rock	Y	Y	Y	Y	No	
Littoral coarse sediment	Y	Y	Y	Y	No	
Littoral sand and muddy sand	Y	Y	Y	Y	No	
Littoral mud	Y	Y	Y	Y	No	
Littoral mixed sediments	Y	Y	Y	Y	No	
Coastal saltmarshes and saline reedbeds	Y	Y	Y	Y	No	
Littoral sediments dominated by aquatic angiosperms	Y	Y	Y	Y	No	
Littoral biogenic reefs	Y	Y	Y	Y	No	
High energy infralittoral rock	Y	Y	Y	Y	No	
Moderate energy infralittoral rock	Y	Y	Y	Y	No	
Low energy infralittoral rock	Y	Y	Y	Y	No	
High energy circalittoral rock	Y	Y	Y	Y	No	
Moderate energy circalittoral rock	Y	Y	Y	Y	No	
Low energy circalittoral rock	Y	Y	N - 2.1%	N - 2.1%	No	Not considered a gap when assessed for the broader <i>Circalittoral rock</i> habitat (33.7% protected).
Sublittoral coarse sediment	Y	Y	N - 7%	N - 7%	Yes	
Sublittoral sand	Y	Y	N - 8.8%	N - 8.8%	Yes	
Sublittoral mud	Y	Y	Y	N - 14.9%	Yes	
Sublittoral mixed sediments	Y	Y	Y	Y	No	
Sublittoral macrophyte-dominated sediment	Y	Y	Y	Y	No	
Sublittoral biogenic reefs	Y	Y	Y	Y	No	

In the Irish Sea CP2 region, all broadscale habitats are represented within the MPA network and adequately replicated (Table A3-2a). There remain shortfalls in the proportion of *Sublittoral coarse sediment, Sublittoral mud* and *Sublittoral mixed sediments* protected in the network with all of these habitats being represented at less than the minimum 10% of known extent. To note, the proportion of *Sublittoral sand* in this CP2 region receiving protection remains below the recommended 20% by area advised by the OSPAR Commission.

In the Western Channel and Celtic Sea CP2 region, all broadscale habitats are represented within the MPA network and adequately replicated (Table A3-2b). There remain shortfalls in the proportion of *Sublittoral coarse sediment* and *Sublittoral sand* protected in the network with these habitats represented at less than the minimum 10% of known extent. To note, the proportion of *Sublittoral mud* receiving protection in this CP2 region remains below the recommended 20% by area advised by the OSPAR Commission.

### A3.2 Habitats of conservation importance and sessile and limited mobility species gaps at the CP2 region scale

Habitats of conservation importance (HOCI) and sessile and limited mobility species (SLMS) were assessed against the criteria for representativity (at least one example protected) and replication (at least three examples protected). Table A3-3 provides an explanation for each type of gap at the CP2 region scale and the results are presented in Tables A3-4 and A3-5.

Explanation
The feature is present but does not meet representativity and/or replication targets at the CP2 region scale
The feature is represented and replicated at the CP2 region scale
Or the feature is not represented or replicated because there are no records of the feature occurring in the CP2 region
<i>Or</i> the feature is represented but not replicated, however there are no further known records, or there is limited evidence for any further viable examples of the feature in the CP2 region that are not already protected by MPA(s)
The feature is represented but not replicated at the CP2 region scale, however there is:
some uncertainty surrounding the potential contribution from existing Welsh SSSIs
Or the only records occur in Welsh territorial waters where records are uncertain, or in Welsh offshore waters (which the Welsh Government does not yet have formal jurisdiction over).
Only considered a MPA feature in Wales, therefore assessment at CP2 region scale is not required.

Table A3-3: Key to HOCI and SLMS gaps at the CP2 region scale.

Four HOCI and one SLMS<sup>44</sup> are only recognised as a conservation priority in Wales and therefore, in a UK context, are unique to the MPA features list of Wales. As these are specific to Wales these features were not assessed at the CP2 region scale.

<sup>&</sup>lt;sup>44</sup> Carbonate reefs, Mud habitats in deep water, *Musculus discors* beds, Subtidal mixed muddy sediments and *Alkmaria romijni* (Tentacled lagoon worm) are only considered MPA features in Wales.

**Table A3-4**. Assessing protection of habitats of conservation importance against representativity and replication criteria at the CP2 region level, subdivided by (a) Irish Sea and (b) Western Channel and Celtic Sea CP2 regions.

### (a) Irish Sea CP2 region

Habitats of conservation importance	Represented	Replicated	Gap at CP2 scale?
Blue mussel beds	Y	Y	No
Carbonate reefs*	N/A	N/A	N/A
Estuarine rocky habitat	Y	Ν	Potential
Fragile sponge and anthozoan communities on subtidal rocky habitats	Y	Ν	Yes
Intertidal mudflats	Y	Y	No
Intertidal underboulder/boulder communities	Y	Y	No
Maerl beds	Y	Y	No
Modiolus modiolus beds	Y	Y	No
Mud habitats in deep water*	N/A	N/A	N/A
Musculus discors beds*	N/A	N/A	N/A
Ostrea edulis beds	Y	N	No
Peat and clay exposures	Y	Y	No
Sabellaria alveolata reefs	Y	Y	No
Sabellaria spinulosa reefs	N	N	No
Seagrass beds	Y	Y	No
Sea-pen and burrowing megafauna communities	Y	Y	No
Sheltered muddy gravels	Y	N	Potential
Subtidal mixed muddy sediments*	N/A	N/A	N/A
Tide-swept channels	Y	N	No

\* Wales specific feature and therefore not relevant at the CP2 region scale.

### (b) Western Channel and Celtic Sea CP2 region

Habitats of conservation importance	Represented	Replicated	Gap at CP2 scale?
Blue mussel beds	Y	Y	No
Carbonate reefs*	N/A	N/A	N/A
Estuarine rocky habitat	Y	Y	No
Fragile sponge and anthozoan communities on subtidal rocky habitats	Y	Y	No
Intertidal mudflats	Y	Y	No
Intertidal underboulder/boulder communities	Y	Y	No
Maerl beds	Y	N	No
Modiolus modiolus beds	N	N	No
Mud habitats in deep water*	N/A	N/A	N/A
Musculus discors beds*	N/A	N/A	N/A
Ostrea edulis beds	Y	N	No
Peat and clay exposures	Y	Ν	No

Sabellaria alveolata reefs	Y	Y	No
Sabellaria spinulosa reefs	N	Ν	No
Seagrass beds	Y	Y	No
Sea-pen and burrowing megafauna communities	Y	N (2)	Yes
Sheltered muddy gravels	Y	Ν	Yes
Subtidal mixed muddy sediments*	N/A	N/A	N/A
Tide-swept channels	Y	Ν	No

\* Wales specific feature and therefore not relevant at the CP2 region scale.

Habitats of conservation importance are well represented in the Irish Sea and Western Channel and Celtic Sea CP2 regions (Table A3-4 a and b). The analysis identified 16 cases across the two regions where the minimum replication target (3 replicates) had not been met, particularly in the Western Channel and Celtic Sea. However, the majority of these cases are not considered network gaps because either: (*i*) the habitat is not known to occur in that area; or (*ii*) there are currently no additional records outside of MPAs, or (*iii*) there is limited evidence that additional records relate to viable examples of the feature. Consequently, protecting more replicates is not feasible according to the existing evidence base.

Gaps in replication that could be addressed at the CP2 region scale include *Fragile sponge* and anthozoan communities on subtidal rocky habitats in the Irish Sea, and Sea-pen and burrowing megafauna communities and Sheltered muddy gravels in the Western Channel and Celtic Sea. Potential gaps arise for three other habitats where there is currently some uncertainty around the protection to, or quality of the existing records, for these habitats, or where the majority of records occur in Welsh offshore waters. **Table A3-5**. Assessing protection of sessile and limited mobility species against representativity and replication criteria at the CP2 region level, subdivided by (a) Irish Sea and (b) Western Channel and Celtic Sea CP2 regions.

### (a) Irish Sea CP2 region

Sessile and limited mobility species	Represented	Replicated	Gap at CP2 scale?
Alkmaria romijni (Tentacled lagoon worm)*	N/A	N/A	N/A
Anotrichium barbatum	Y	Ν	No
Arctica islandica (Ocean quahog)	Y	Y	No
Cruoria cruoriaeformis	N	Ν	Yes
Dermocorynus montagnei / Grateloupia montagnei	N	Ν	Yes
Edwardsia timida (Burrowing anemone)	N	N	Yes
Eunicella verrucosa (Pink sea-fan)	N	Ν	Yes
Haliclystus auricula (Stalked jellyfish)	N	Ν	Yes
Lithothamnion corallioides (Coral Maërl)	N	Ν	Yes
Lucernariopsis campanulata (Stalked jellyfish)	N	Ν	Yes
Ostrea edulis (Flat/native oyster)	N	Ν	Yes
Padina pavonica (Peacock's tail)	N	Ν	Yes
Palinurus elephas (Crayfish, Crawfish or Spiny Lobster)	Y	Ν	Yes
Phymatolithon calcareum (Common maerl)	Y	Ν	Yes
Tenellia adspersa (Lagoon sea slug)	N	Ν	Yes

### b) Western Channel and Celtic Sea CP2 region

Sessile and limited mobility species	Represented	Replicated	Gap at CP2 scale?
Alkmaria romijni (Tentacled lagoon worm)*	N/A	N/A	N/A
Anotrichium barbatum	N	Ν	No
Arctica islandica (Ocean quahog)	Y	Ν	Yes
Cruoria cruoriaeformis	Y	Ν	Yes
Dermocorynus montagnei / Grateloupia montagnei	N	Ν	Yes
Edwardsia timida (Burrowing anemone)	N	Ν	Yes
Eunicella verrucosa (Pink sea-fan)	Y	Y	No
Haliclystus auricula (Stalked jellyfish)	Y	Y	No
Lithothamnion corallioides (Coral Maërl)	Y	Ν	No
Lucernariopsis campanulata (Stalked jellyfish)	Y	Ν	Yes
Ostrea edulis (Flat/native oyster)	Y	Ν	Yes
Padina pavonica (Peacock's tail)	N	Ν	Yes
Palinurus elephas (Crayfish, Crawfish or Spiny Lobster)	Y	Y	No
Phymatolithon calcareum (Common maerl)	Y	N	Yes
Tenellia adspersa (Lagoon sea slug)	N	Ν	Yes

\* Wales specific feature and therefore not relevant at the CP2 region scale.

Numerous representation and replication gaps occur for Sessile and limited mobility species in the Irish Sea CP2 region (Table A3-5a), with only four of fourteen species represented, and only one of these four meeting the replication target. Nine of fourteen species are represented in the Western Channel and Celtic Sea CP2 region (Table A3-5b), but further data suggest that four more of these species could be represented in this region. Gaps in replication could also be addressed for nine species in this CP2 region.

### A3.3 Spatial distribution of MPAs at the CP2 region scale

200-2000

5.7

JNCC undertook a spatial analysis of the distribution of MPAs in relation to seabed bathymetry (as depth bands) and their proximity to the boundary between CP2 regions. The assessment against bathymetry considered whether there are MPAs designated within broad seabed depth-bands within each CP2 region (Table A3-6 and Figure A3-1).

Seabed	Western Cha	Irish Sea						
depth band	% of depth band	% of depth band in	% of depth band	% of depth band in				
(m)	in CP2 region	MPAs in CP2 region	in CP2 region	MPAs in CP2 region				
0-10	1.4	69.7	9.7	53.5				
10-75	26	13.2	65.5	15.7				
75-200	67	0.9	24.7	4.6				

<1%

0

**Table A3-6:** The percentage of each CP2 region found within bathymetric depth zones and the percentage of that zone within MPAs.

12.1

There is a much larger proportion of seabed in the 0-75m depth band protected within MPAs in both CP2 regions in comparison to deeper >75m areas. In the Western Channel and Celtic Sea, there is proportionately more seabed in the two >75m depth bands relative to shallower waters, but there is much less of this area protected in the existing MPA network than in the coastal zone. Over 67% of the seabed is within the 75-200m depth band but only 0.9% is currently protected within the existing MPA network in this region.

The situation is slightly different in the Irish Sea CP2 region where there is much less seabed in the 75-200m depth band and much more in the 10-75m zone. Nevertheless, there is still much more of the shallower depth bands protected within MPAs than the deeper depths. Almost 70% of the seabed is currently protected in the 0-75m depth category, but less than 5% within the 75-200m depth band.

This spatial assessment also considered whether sites have been designated in the transition zones between CP2 regions. The existing MPA network has one site that crosses the transition zone between the Western Channel & Celtic Sea and Irish Sea CP2 regions (Pembrokeshire Marine/Sir Benfro Forol SAC).JNCC recommend that the importance of locating sites in the transition areas between biogeographic regions is noted when making any decisions on future site designations to ensure these areas of importance contribute to the network.



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**Figure A3-1.** The distribution of existing MPAs in relation to seabed bathymetric depth bands in the Irish Sea and Western Channel and Celtic Sea CP2 regions.

### A3.4 Connectivity of MPAs at the CP2 region scale

A high level spatial assessment of the distance between MPAs protecting similar broadscale habitat types showed that these protected habitats are well connected across the Western Channel and Celtic Sea and Irish Sea CP2 regions (Figure A3-2). There remains a small gap in the connectivity of sites protecting circalittoral rock habitat in the Irish Sea CP2 region. There is also an apparent gap for littoral rock in this region, however this feature is absent from this part of the CP2 region and so this is simply a result of the feature's distribution. In both CP2 regions there are a few remaining areas in offshore waters where connectivity could be improved for both circalittoral rock and circalittoral sediments.

![](_page_57_Figure_2.jpeg)

**Figure A3-2:** Illustrating the potentially connectivity between MPAs protecting the same habitat types, when aggregated to broad habitat level. Deeper blue areas outline 40km buffers around the existing MPAs. Paler blue delineates the Western Channel and Celtic Sea CP2 region and yellow delineates the Irish Sea CP2 region. Bold black lines are the extent of Welsh waters (divided into territorial and offshore waters). *Continued on next page*.

![](_page_58_Figure_0.jpeg)

![](_page_58_Figure_1.jpeg)

Figure A3-2 continued.

# Annex 4 – Contribution of MPAs in all Welsh waters to gaps identified in the wider CP2 regions (Stage 2iii)

Stage 2iii of the assessment extended the analysis of the MPA network to cover all Welsh waters – adding Welsh offshore waters to the Welsh territorial waters that were considered in stage 2ii (section 5.2). This assessment enables Welsh Government to evaluate the complete Welsh MPA network (in terms of its contribution to the wider CP2 regions) if this offshore area were to fall under their jurisdiction. As there is currently only one site in Welsh offshore waters, extending the analysis to Welsh offshore waters adds just one other existing MPA: Croker Carbonate Slabs cSAC/SCI. This site protects moderate energy circalittoral rock (as part of Annex I submarine structures made by leaking gases) and therefore contributes another replicate and additional area for this feature to the MPA network in Welsh waters.

### A4.1 Broadscale habitats

Table A4-1 provides the results for broadscale habitat features in all Welsh waters. The assessment criteria and the types of gaps applicable at this scale remain the same as those assessed for the MPA network in Welsh territorial waters (Section 2 and Table 2 of the above report).

Table A4-1. Assessment of broadscale habitat protection against representativity, replication and adequacy criteria for all Welsh waters subdivided by (a) Irish Sea and (b) Western Channel and Celtic Sea CP2 regions.

#### (a) All Welsh waters in the Irish Sea CP2 region

Broadscale habitats	Represented	Replicated	10% area target	20% area target	Gap for all Welsh waters?	Comments
High energy littoral rock	Y	Y	Y	Y	No	
Moderate energy littoral rock	Y	Y	Y	Y	No	
Low energy littoral rock	Y	Y	Y	Y	No	
Littoral coarse sediment	Y	Y	Y	Y	No	
Littoral sand and muddy sand	Y	Y	Y	Y	No	
Littoral mud	Y	Y	Y	Y	No	
Littoral mixed sediments	Y	Ν	Y	Y	No	
Coastal saltmarshes and saline reedbeds	Y	Y	Y	Y	No	
Littoral sediments dominated by aquatic angiosperms	Y	Ν	Y	Y	No	
Littoral biogenic reefs	Y	Y	Y	Y	No	
High energy infralittoral rock	Y	Y	Y	Y	No	
Moderate energy infralittoral rock	Y	Y	Y	Y	No	
Low energy infralittoral rock <sup>45</sup>	Ν	Ν	Y	Y	No	
High energy circalittoral rock	Y	Y	Y	Y	No	
Moderate energy circalittoral rock	Y	Y	N - 9%	N - 9%	No	Not considered a gap when assessed for the broad <i>Circalittoral rock</i> habitat (14.9% protected).
Low energy circalittoral rock <sup>45</sup>	Ν	Ν	N - 0%	N - 0%	No	
Sublittoral coarse sediment	Y	Y	N - 4%	N - 4%	Yes	
Sublittoral sand	Y	Y	Y	N - 15.9%	Yes	
Sublittoral mud	Y	Y	Y	Y	Potential	Could contribute to wider CP2 gap. 167km <sup>2</sup> outside of Welsh MPAs.

<sup>&</sup>lt;sup>45</sup> Only a very small amount *of Low energy infralittoral rock* and *Low energy circalittoral rock* are known to exist in Welsh territorial waters. These are present in Welsh MPAs but the majority of patches are fragmented and not considered to be good enough examples to provide representative replicates, therefore *Low energy infralittoral rock* is only considered a protected replicate in one MPA (in Welsh waters within the Western Channel & Celtic Sea CP2 region) and *Low energy circalittoral rock* is not considered a protected replicate in any Welsh MPAs. However, where these habitats falls within relevant protected features of a MPA (e.g. Annex I Reef) their presence has contributed to the total area assessed against the adequacy criterion.

Sublittoral mixed sediments	Y	Y	N - 3%	N - 3%	Yes	
Sublittoral macrophyte-dominated sediment	Y	Y	Y	Y	No	
Sublittoral biogenic reefs	Y	Ν	Y	Y	No	

### (b) All Welsh waters in the Western Channel and Celtic Sea CP2 region

Broadscale habitats	Represented	Replicated	10% area target	20% area target	Gap for all Welsh waters?
High energy littoral rock	Y	Y	Y	Y	No
Moderate energy littoral rock	Y	Y	Y	Y	No
Low energy littoral rock	Y	Y	Y	Y	No
Littoral coarse sediment	Y	Y	Y	Y	No
Littoral sand and muddy sand	Y	Y	Y	Y	No
Littoral mud	Y	Y	Y	Y	No
Littoral mixed sediments	Y	Ν	Y	Y	No
Coastal saltmarshes and saline reedbeds	Y	Y	Y	Y	No
Littoral sediments dominated by aquatic angiosperms	Y	Y	Y	Y	No
Littoral biogenic reefs	Y	Y	Y	Y	No
High energy infralittoral rock	Y	Ν	Y	Y	No
Moderate energy infralittoral rock	Y	Ν	Y	Y	No
Low energy infralittoral rock <sup>45</sup>	Y	Ν	Y	Y	No
High energy circalittoral rock	Y	Ν	Y	Y	No
Moderate energy circalittoral rock	Y	Ν	Y	Y	No
Low energy circalittoral rock <sup>45</sup>	N	Ν	Y	N - 16.1%	No
Sublittoral coarse sediment	Y	Y	N - 6.9%	N - 6.9%	Yes
Sublittoral sand	Y	Y	N - 8.2%	N - 8.2%	Yes
Sublittoral mud	Y	Y	N - 3.9%	N - 3.9%	Yes
Sublittoral mixed sediments	Y	Ν	Y	N - 16.4%	No
Sublittoral macrophyte-dominated sediment	Y	Ν	Y	Y	No
Sublittoral biogenic reefs	Y	Y	Y	Y	No

### A4.1.1. All Welsh waters within the Irish Sea CP2 region

A smaller proportion of sublittoral sediment is protected in MPAs in Welsh offshore waters than in the Welsh territorial waters within the Irish Sea CP2 region. Sedimentary habitats dominate the offshore areas, contrasting with an absence of MPAs protecting these habitats here. Comparing protection in Welsh territorial (Table 3a, Section 5.2.1 above) versus Welsh offshore waters (Table A4-1a), the percentage of *Sublittoral coarse sediment* protected drops from 7.6% to 4%, *Sublittoral mixed sediments* from 9.8% to 3% and *Sublittoral sand* from over 24% to 16%. Both *Sublittoral coarse sediment and Sublittoral mixed sediments* also fall short of the 10% level in the wider CP2 region.

### A4.1.2. All Welsh waters within the Western Channel and Celtic Seas CP2 region

A smaller proportion of sublittoral sediment is protected in MPAs in Welsh offshore waters than in the Welsh territorial waters within the Western Channel and Celtic Seas CP2 region. Sedimentary habitats dominate the offshore areas of this region, which again contrasts with an absence of MPAs protecting these habitats in these areas. Comparing protection in Welsh territorial (Table 3b, Section 5.2.1 above) versus Welsh offshore waters (Table A4-1b), the percentage of *Sublittoral coarse sediment* drops from 8.1% to 6.9%, *Sublittoral sand* decreases from 21.8% to 8.2%, and most significantly, *Sublittoral mud* protection decreases from 74% to only 3.9%. Both *Sublittoral coarse sediment* and *Sublittoral sand* also fall short of the 10% level in the wider CP2 region.

### A4.2 Habitats of conservation importance and sessile and limited mobility species

There are no changes to Habitats of Conservation Importance (HOCI) and Sessile and Low Mobility Species of Conservation Importance (SLMS) protection when the analysis is extended to include Welsh offshore waters alongside Welsh territorial waters, and the gaps described in Section 5.2.2 of the main report still apply. There are records for some features in Welsh offshore waters that could help to address some of the gaps identified, for example the gaps for *Arctica islandica* and *Ostrea edulis* in the Western Channel and Celtic Sea CP2 region (Tables 6 and 7, Section 5 above).

In the Western Channel and Celtic Sea CP2 region, an extra HOCI gap for Wales arises when Welsh offshore waters are considered. *Sea-pen and burrowing megafauna communities* are not sufficiently replicated in this CP2 region (Table A3-4b, Annex 3) but this was not considered a gap for Welsh territorial waters (Table 6a, Section 5) as the records in these waters were not considered of sufficient quality or representative of this habitat. However, more extensive and higher confidence data exist in Welsh offshore waters in this CP2 region, and a number of these records occur within recommended MCZs identified by the Regional MCZ project. As such, this should be considered a gap that could potentially be addressed.

A similar situation arises for *Mud habitats in deep water*, a Wales-specific feature. When Welsh offshore waters are considered there are more and higher confidence records of deep water mud that could be considered for protection as an additional replicate for this feature in Welsh waters as a whole. This would add to the two replicates currently protected in Welsh territorial waters (Table 6a and 6b, Section 5), where available records are not currently sufficient to protect an additional replicate in these inshore waters.

### A4.3 Connectivity and spatial distribution of MPAs across all Welsh waters

The assessment of connectivity within the MPA network and the spatial distribution of sites is best undertaken at the wider CP2 region scale; the results of this assessment are presented in <u>Annex 3</u> (Section A3.3 and A3.4). MPAs in all Welsh waters meet the connectivity criteria set out for the CP2 region level, however subtidal habitats in the offshore area between Welsh offshore and English offshore waters in the Western Channel and Celtic Sea CP2 region are less well connected. This shortfall is largely because there is only one MPA in Welsh offshore waters and consequently a substantial area of sediment habitats is left unprotected. Existing MPAs are not well distributed across seabed depth bands within the two CP2 regions; this is particularly apparent when considering Welsh offshore waters. A much larger proportion of the 0-75m depth band falls within MPAs in the Welsh parts of these CP2 regions than the proportion of deeper waters (>75m) within MPAs.

### **Document Version Control**

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1.0	Hannah Carr	Final edits for publishing	Welsh Government and NRW	02/11/16
0.9	Hannah Carr	Minor edits ready for final review	Jon Davies	25/10/16
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