

STRATEGY FOR MARINE PROTECTED AREAS IN WALES

A1.1 Overview

The Welsh Government's proposed strategy for marine protected areas 'Protecting Welsh Seas' was published for a period of public consultation between 16 September and 16 December 2009.

The strategy will be finalised and published later this year, when we have developed, with the Countryside Council for Wales, an appropriate and proportionate management regime for all marine protected areas in Wales – the need for which featured strongly in the consultation feedback.

The strategy outlined how the Welsh Government intends to use marine protected areas to protect and improve the marine ecosystems in Welsh waters. This included using the new MCZ power to establish a small number of highly protected sites, mostly within existing marine protected areas, for the key purpose of enhancing ecosystem resilience and recovery.

A1.2 Feedback on the MCZ approach

Overall there was general support for the Welsh Government's intention to supplement the existing suite of marine protected areas in Wales with a small number of highly protected MCZs, provided an acceptable balance was struck between, ecological, economic and social impacts.

The feedback relating to the highly protected approach was used to inform the development of the site selection guidance²⁶ that was published by the Welsh Government in March 2011. Further information is also available (covering many of the issues noted above) in the HPMCZ Site Selection Guidance: the

²⁶<http://wales.gov.uk/topics/environmentcountryside/consmanagement/marinefisheries/conservation/protected/conservationzones/project/siteselection/?lang=en>

Welsh Government's analysis and response to the period of public comment²⁷ also published in March 2011.

A1.3 Key messages

The responses contained a number of key messages/themes in relation to the highly protected approach including:

- The timeframe for selection and designation of sites by the end of 2012 is too ambitious. *The Welsh Government has reviewed and revised the timetable; designation is now planned for 2014.*
- Further information is needed as to the purpose of highly protected MCZs and the anticipated benefits. *Further information was provided in the site selection guidance; and the way in which the consultation is being staged will further inform the expected benefits.*
- The identification and selection of highly protected MCZs in Welsh waters should be based on the best available evidence and underpinned by a robust process. *The Welsh Government confirmed its commitment to these principles in the site selection guidance and they are being delivered in practice by the way the project is being and will continue to be run, including the consultation process.*
- Care is needed to develop a site selection process that minimises the impact these areas may have on the users of the sea and with this regard socio-economic factors should be a key factor in determining designations. *The Welsh Government has made this commitment throughout. The site selection process, including the importance of the different consultation stages, has been designed to deliver the commitment in practice.*

²⁷<http://wales.gov.uk/topics/environmentcountryside/consmanagement/marinefisheries/conservation/protected/conservationzones/project/siteselection/?lang=en>

- Others thought that socio-economic considerations should not be a factor in the selection and designation process. *The Welsh Government has always made clear that we will take into account the social and economic impacts in considering all site options. We have an overarching commitment to sustainable development and therefore we need to aim for a situation where the ecological basis remains acceptable and any socio-economic consequences are considered insignificant or can be managed.*
- The selection process for highly protected MCZs should include extensive engagement/ consultation with interest groups/individuals. *We are/will arrange a variety of meetings with key sectors and interested groups, together with public events, throughout the consultation process.*
- Fishing interests raised concerns about the impact of displacement resulting in greater competition for fishing grounds and reduction in fishing opportunities. *The Welsh Government will learn more about these impacts as part of the consultation process and they will be taken into account in making designation decisions.*
- More information is required to inform how highly protected MCZs will be managed, monitored and enforced, the organisations involved and resources available. *The first consultation provides the general management framework; this will be developed as the consultation progresses and sites are refined.*

DETAILED EXPLANATION OF THE BOUNDARY DRAWING PRINCIPLES

References are provided at the end of this Annex

The Ecological Principles

A2.1 Sites should include a viable area of each habitat type present

The site selection guidelines specify areas of each habitat that are considered viable. The following is a summary from the site selection guidelines: “As a general guideline the minimum size of each patch of habitat within each site should be 500 m to 1 km length for habitats with a linear distribution (e.g. coastal rock, or shallow water fringing rock). For other habitats the minimum habitat patch size should be 500 m to 1 km diameter. For some of the important habitats (e.g. maerl beds, seagrass beds) it may be difficult to find areas that are large enough to reach these guidelines. In any such cases the habitats should still be included in the highly protected MCZ series and efforts should be made to protect the most viable examples of each habitat (which in many cases will be the larger examples).” Further details can be found in section A2.5 of the site selection guidelines. In the original selection of Focus Sites a list was created for each site of the habitats within the site that were present in viable amounts. These habitats should all continue to be present in viable amounts while the boundary is redrawn.

A2.2 The shape of the site should be as compact as possible and there should be no big indentations in the site boundary shape

A compact site shape with no large indentations will maximise interior area and minimise ‘edge effects’. Edge effects occur where the edges of a site are often more intensively fished (Kritzer 2004), causing a deterioration in ecological quality of the area just outside the site. In addition, some activities such as dredging may also potentially increase siltation at the boundary of the site (Caddy 1989, Hall-Spencer & Moore 2000). A compact site shape with no large indentations will also maximise the average distance from any point within the site to the outer edge of the site and this should help to improve

protection for species with limited mobility as adults and also short-distance larval dispersers. Good larval connectivity between different parts of a site should be an overall aim, as this will help to improve overall viability of the site, allowing the site to be more of a self sustaining entity than might otherwise be the case (there will also be larval flow both into and out of the site). The site shape proposed should help to enable this by reducing the chance that short distance larval dispersers settle outside of the site. In addition, a compact shape and a lack of large indentations will also mean that adults of species with limited mobility (i.e. those that are mobile but only move short distances as adults) will be less likely to move outside of the site and be impacted whilst outside of the site. In some cases inclusion of an area between two different habitat patches may also enable expansion of a recovering habitat into that area. In addition, some habitats vary from year to year in their distribution within a local area (for example honeycomb worm reefs tend to move around to occupy different patches of the same shore) and therefore the inclusion of areas adjacent to existing patches will allow this fluidity to continue. Examples of best practice are shown in Figures 1 and 2. This principle will be applied on a case-by-case basis, requiring a degree of expert judgement to determine what is ecologically sensible for each site.

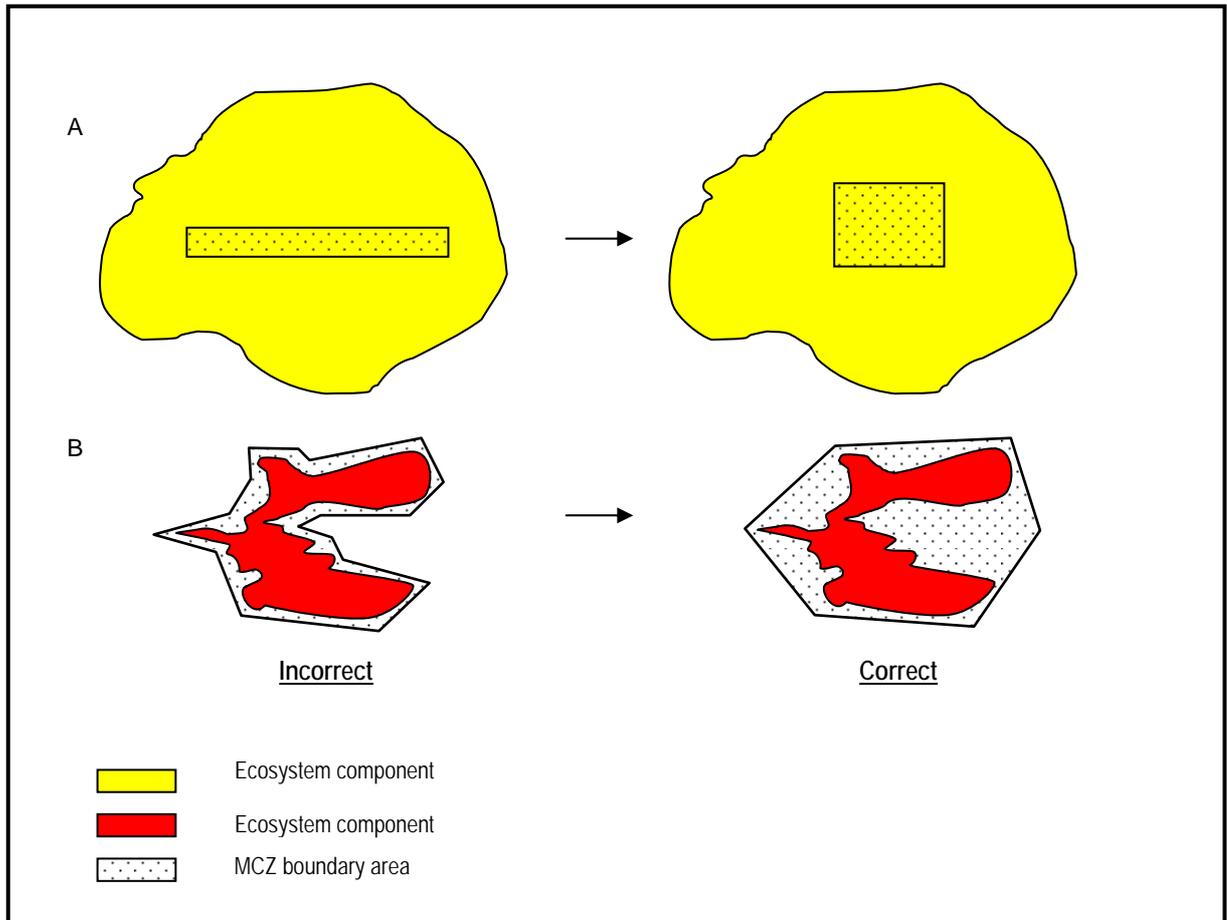


Figure 1: Boundaries drawn to maximise interior area and minimise ‘edge effects’ through a compact design. Illustration ‘A’ demonstrates a boundary *within* a large area of broadscale habitat. Illustration ‘B’ demonstrates a boundary around a habitat.

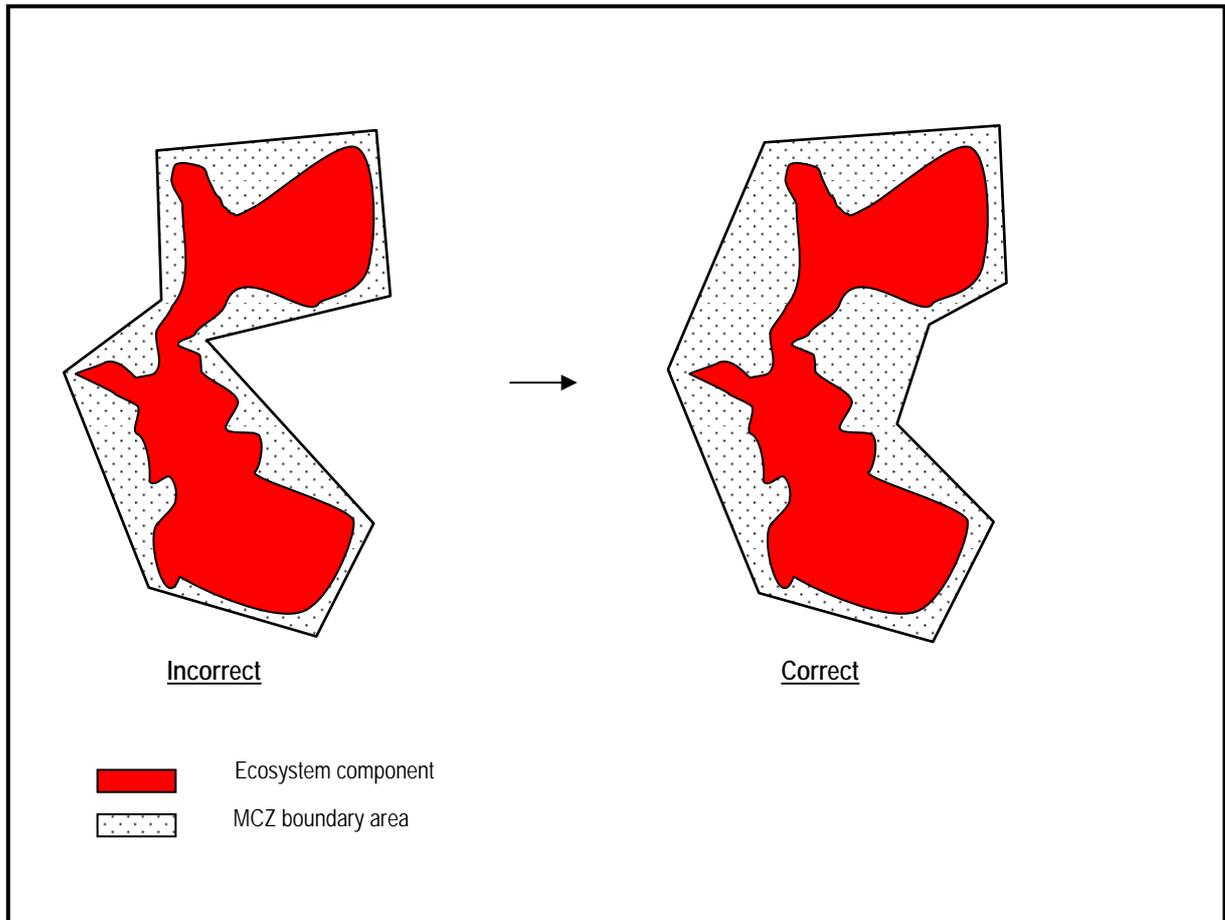


Figure 2: Boundaries drawn without large indentations and with area allowed for recovery / expansion and within-site connectivity.

A2.3 In most instances whole habitat patches should be included, or natural features should be used to define the edges of a site

Evidence indicates that MPAs with boundaries that conform to natural habitat edges can better protect species than reserves with boundaries that cross habitats (Bartholomew et al. 2007). Therefore, where possible, boundaries should be drawn that protect whole patches of habitat. However, in the case of subtidal sediment broadscale habitats a habitat patch may be extremely large, and in these cases, it is likely that the boundary will need to be drawn following the other guidelines in this document.

For intertidal rocky habitats that extend a long distance along the coast, it may be difficult to identify distinct habitat patches. If there are natural features along the coastline that could conveniently be used (e.g. headlands), the edge of the site should be set using these. In general, the entire intertidal area

should be included in the site, i.e. boundaries should not be placed half way up the shore. This reflects the fact that the whole shore can be considered as an ecosystem, with processes at one height of the shore interacting with and impacting on processes in different parts of the shore.

A2.4 Site size should be examined on a site-by-site basis

Site size will need to be examined for each site as the consultation process progresses, taking into account feedback from the consultation. A site size with minimum dimensions of 5 km is supported by biological considerations relating to larval and adult dispersal (Moffitt et al 2011, Roberts et al 2010, Shanks et al 2003). Larger sites will tend to benefit a larger range of species, in particular those that are slightly more mobile (Roberts et al 2010). However, smaller sites (between 0.01 and 5 km²) have also been shown to have benefits (Claudet et al 2008, Halpern et al 2003, Lester et al 2009), although these often relate to the recovery of a single species or a set of exploited species (Lester et al 2009). However, trophic cascades²⁸ resulting in changes to a larger number of species have also been observed at several small sites (e.g. the Leigh Marine Reserve which is approx 5 km² and the Tawharanui Reserve which is 3.5 km² (Salomon et al 2008)). It is important to remember that the key objective for highly protected MCZs in Welsh waters is to promote ecosystem recovery and resilience. Very small sites are unlikely to be as effective in this respect but are likely to have more localised benefits.

The Practical Principles (*these have not yet been applied to the indicative boundaries*)

A2.5 In general, simple site boundaries are preferred

In general, site boundaries should be relatively simple. This is a consideration which should reduce administrative complexity and assist sea users to know whether they are inside or outside of the site. Recreational

²⁸ Trophic levels are the location of different types of organisms within a food chain. A very simple example of a food chain with three trophic levels would be where predators feed on herbivores that feed on plants. An example of a trophic cascade could be when a predator (e.g. lobster) increases in numbers or size, eats more herbivores (e.g. urchins) thereby suppressing the numbers of herbivores which releases the grazing pressure on the primary producers (e.g. kelp) enabling increased plant or algal growth.

users and small boat users may not have sophisticated navigation software (or indeed, any navigation software at all) onto which complex site boundaries can be entered. For these users it may also be helpful if boundaries follow lines of latitude and longitude, lines of sight, or distances from recognizable landmarks, to enable users to know when they are inside the protected site. In addition, legal or administrative boundaries at sea must be defined in text and these can become unworkably lengthy if highly complex boundaries are devised. However, other users particularly fishing interests may prefer more complex site boundaries, if these allow access to larger areas of the seabed. For this reason, comments on the boundary shape for each site will be invited at the public consultation stage.

A2.6 Where a proposed boundary is close to another boundary (e.g. existing MPA, or top of the shore), then it may be practical to follow the existing boundary

If a proposed boundary is very close to an existing MPA boundary (e.g. Special Area of Conservation), it may reduce confusion if the site boundary follows the existing MPA boundary, providing that this does not conflict with any of the other guidelines. This will have to be assessed on a case-by-case basis.

In practical terms it is important to recognise that users of the shore will rarely carry navigational equipment (in contrast to boat users, who will often have Geographical Positioning System (GPS) equipment) and therefore boundaries will need to be easily interpreted from maps and visual features. Therefore, boundaries in the intertidal will need to be clearly identifiable on the ground, for example, by following natural features (e.g. where cliffs meet sediment flats), or artificial features (e.g. hedges, fences, or a property line).

A2.7 Possible displacement of activities into sensitive areas

In some cases the site boundary initially proposed may displace activities to adjacent areas, which may contain highly sensitive habitats (including habitats on the list of important habitats). If habitats sensitive to the activities that are likely to be displaced are found adjacent to the site boundary then either the extension or redrawing of the boundary to include those habitats should be

considered. Local knowledge of the site will need to be used to assess whether displacement of activities is likely to occur.

THE ADDITIONAL SITE SPECIFIC CONSIDERATIONS FOR DRAWING BOUNDARIES

These have been used to draw indicative boundaries for the first consultation but remain work in progress. The extent and nature to which they will be used to determine the final site boundaries will depend upon the outcome of further consideration by TAG, and feedback from the consultation exercise.

The Ecological Considerations

A2.8 Ecological quality

A single habitat type (e.g. intertidal sand, moderate energy circalittoral rock) can vary greatly in ecological quality. In this context we would consider an area of high ecological quality to be one of the following:

- An area with high biological diversity (including various measures of species, habitat and biotope diversity)
- An area with a relatively high density of species that are characterising species of important habitats.

Note that in the context of other MPA designations, areas of 'low' ecological quality may be good examples of representative habitat; it is only in the context of highly protected sites that we are placing less emphasis on these areas.

Biological diversity is discussed in Section A2.8 of the site selection guidelines which includes the following: "*There is growing evidence that biological diversity contributes to ecosystem resilience (Petchy & Gaston 2009) and therefore areas with high levels of biodiversity should be included in the highly protected MCZ series.*". In terms of site selection it was decided that habitat heterogeneity was the most reliable measure to use as a proxy, given the nature of the data. However, on a site specific basis it is possible to

incorporate other measures of diversity (especially species diversity) into the design of the site boundary.

For most important habitats and especially the biogenic habitats, habitat quality is considered higher where the density of species that characterise the habitat is greater. For biogenic habitats this would mean that the reef forming organisms themselves are more numerous (e.g. denser horse mussels in a horse mussel reef or denser honeycomb worms in a honeycomb worm reef). For other habitats this would mean that the characterising species are more abundant (e.g. pink sea fans in the Fragile sponge & anthozoan communities on subtidal rocky habitat, or Ross 'coral' in the Subtidal rock with Ross 'coral' *Pentapora foliacea/fascialis* habitat).

Areas of higher ecological quality should be included in preference to, or in addition to, areas of lower species diversity and/or abundance, especially where these differences are considered to be natural, rather than a result of anthropogenic impacts. Conversely, for habitats where the only example(s) of the habitat in the original Focus Site boundary are thought to have low species richness and/or abundance (but not as a result of anthropogenic activities) then the inclusion of that habitat in the site may receive a lower prioritisation at the point when boundaries are being adjusted to take account of socio-economic impacts (post consultation).

The assessment of ecological quality may be a more reliant on expert judgement, as there will often be insufficient data to statistically assess components of ecological quality (for example, data may have been collected using different methods, or there may not be enough data points to make a statistical comparison). This criterion was not applied in the initial site selection process because our information on ecological quality is fairly patchy and could not be applied on an all-Wales basis. However, for some of the Potential Sites, especially those within areas that are currently monitored as part of existing MPA monitoring programmes (e.g. Skomer Island, Traeth Afon Wen), site specific information does exist.

A2.9 Linked habitats

The site selection guidelines include the following statement: *“It is important that each highly protected MCZ creates an ecologically viable unit (an area that is, as far as possible, an effective self-sustaining ecological entity) and this will have to be considered on a case-by-case basis. The linkages between different habitats and the ecological requirements of the habitats and species within each site will need to be considered in order to achieve this.”*

Good connectivity between different parts of a site should therefore be an overall aim, as this will help to improve overall viability of the site, allowing the site to be more of a self sustaining entity than might otherwise be the case (for example, larvae that have short dispersal distances, or species which produce live young but are not highly mobile are more likely to remain within the site).

This should be considered when drawing site boundaries, for example by including areas of subtidal rock where the adjoining intertidal has been included within the site and vice versa. In addition, where a site includes an island which has continuous fringing rocky habitats, the shore and subtidal habitats around the whole island should be included, unless there is evidence that there are no ecological links between different parts of the island. This is, in part, also required by one of the original boundary principles: *“In most instances whole habitat patches should be included or natural features should be used to define the edges of a site”*. Another example might be including areas of sediment adjacent to *Sabellaria* reef habitat, where they are important for sand supply to the *Sabellaria*. Concern has been expressed that this could result in the inclusion of areas for which we have no data; the preferable solution to this problem would be to collect additional survey data for these areas.

A2.10 Increasing habitat heterogeneity

Sites were originally selected on the basis of hexagons from a grid. For a few sites this means that there are additional habitats (that reach the target patch size) just outside of the hexagon / site boundary that could be added to the site boundary and therefore could increase the habitat heterogeneity of the site. Maximising habitat heterogeneity is an important principle in the site selection guidelines. This consideration should not, however, be used for

large increases in site size but only in circumstances where the additional habitat intersects or borders the boundary created by application of the original principles or other additional considerations.

In addition, for some sites certain habitats may have been excluded because they did not reach the habitat indicative viability target areas (as specified in the site selection guidelines and based on Hill *et al* 2010). This applied to the seagrass bed at North Haven off Skomer Island. Although the bed is smaller than the indicative viable target size specified in the guidelines it has been present for decades (was first recorded in 1946 (Bassindale 1946), first mapped in 1979 (Jones & Hodgson 1980) and has been monitored regularly since 1997 (Burton *et al* 2010)). During this time the bed has increased both in extent as well as density, which suggests that it is indeed viable. Therefore, inclusion of this area within the site boundary would add another habitat to the site.

A2.11 Potential for recovery of specific localised habitats

One of the aims of highly protected MCZs is to support ecosystem recovery. The boundary guidance emphasises the importance of including whole habitat patches for some habitats. For a few habitats (especially biogenic habitats such as *Modiolus* beds and oyster beds) it is likely that the habitat is currently smaller in extent than was historically the case in some areas. For these habitats there is a possibility that once fully protected the habitat will increase in extent. If this is anticipated, the option of including additional areas around or between fragmented patches of the habitat to facilitate this recovery should be considered. This will need to be carefully considered in light of the strength of the evidence both for a decline in the habitat at the specific site and also the likelihood of recovery. There may also be areas where there are historical records of a habitat, combined with a likelihood that the habitat may naturally regenerate in these areas. This judgement will have to be made on a site by site and habitat by habitat basis, incorporating expert knowledge of the likely recovery potential of the habitat and the local conditions. This consideration has not been applied for any of the current Potential Sites.

The other scientific considerations

A2.12 Areas with long term ecological datasets

If a site boundary is close to an existing ecological monitoring site then it may be worth extending or moving the proposed site boundary to include the monitoring site. This will help us to improve our scientific understanding of the marine environment by including an area where there are long-term datasets. This could then be continued and examined for changes resulting from the additional protection of the area. Having datasets that stretch back in time provides useful information about the natural variability of (or, in some cases, anthropogenic impacts on) a site. This type of information will be missing from many of the sites as monitoring is likely to commence only just prior to sites being chosen.

A2.13 Improving the evidence base by maximising the number and confidence of data points (has not yet been applied to the indicative boundaries)

Reducing the size of a site may reduce the number of data points that support the habitats present. Having fewer data points lowers the confidence rating that can be given. In addition, for habitats where only sparse or single point data exists (some of the important habitats), increasing the number of data points included in the site boundary will also increase the likelihood that a viable area of habitat is included.

Sites were initially selected on the basis of a hexagonal grid and the site selection process used either polygons (the shape of which was based on physical data but with supporting point data for subtidal habitats) or point data for some important habitats. For the habitats that were selected on the basis of polygons, the 'cutting down' of site boundaries that were originally hexagons to sites that contain only the minimum viable habitat areas has resulted in the loss of point data. Where point data were used the target number of points for site selection was fairly low (see data sources document for more details). The risk of setting a higher number of points as the criteria for site selection would have been that the site selection became even more

skewed towards selecting areas where we have more data than is already the case. However, because of the nature of some of the sites that have now been selected there are areas where the inclusion of additional data points would not result in a large increase in the boundary.

Collecting additional data to support the site boundary might be an alternative to this consideration as then boundaries could be drawn based on the actual distribution of the relevant habitats rather than the distribution of the current survey data. This will be looked at further by the Project as part of the process.

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