Science Advisory Panel response to ISCZ draft Final Recommendations

July 2011

1. Overview

1.1. The submission consists of a progress report, which describes actions taken since the 3rd iteration report was submitted at the end of March, an Excel based tabulation of the draft recommended network characteristics, an iPDF which enables various map-based data layers to be viewed, singly and in combination, and a set of site descriptions in a so-called Selection Assessment Document (SAD).

1.2. The report is well written and provides reassurance that sound, improved procedures have been followed.

1.3. The report also includes a commentary on the SAP's response to the 3rd iteration report and the largely positive ISCZ reactions to suggestions made there. An explanation of where and why some ENG targets have not yet been met is provided. Outstanding issues, in particular completion of reference area proposals, are identified.

1.4. The report contains an extensive section on what assumptions are being made by ISCZ stakeholders about management measures to achieve the declared conservation objectives for designated features. It is natural for stakeholders to be concerned about prospective management measures that may affect their activities and to identify possible measures for sites. However ISCZ need to be clear that, whilst it is their responsibility to define conservation objectives, public authorities, such as the Marine Management Organisation (MMO) and Inshore Fisheries & Conservation Authorities (IFCAs), have responsibility for defining and implementing management measures.

1.5. The tabulation of the network characteristics is very helpful, although it contains some minor errors that need to be corrected. These have been identified separately.

1.6. The Site Descriptions are comprehensive and provide useful references to the evidence on which they are based. The description of pressures to which designated features are sensitive is adequate although somewhat stylised and will bear simplification.

1.7. The network of MCZs that is recommended in draft comprises 16pMCZs and one Broad Area of Interest (BAI)I adjoining pMCZ2. These go a long way towards meeting the targets for the ENG design principles. However, the minimum adequacy target for subtidal mud will not be met unless BAI2 is taken into pMCZ2 or the boundaries of other pMCZs are adjusted. Other design principle deficiencies are discussed in section 2.

1.8. 19 possible Reference Areas (RAs) have been identified. 5 of these have been accepted by the Regional Stakeholder Group (RSG), but 3 were rejected. Further efforts are required, and promised, to complete the contribution of such Areas to the network.

2. Detailed Comments

2.1. The introduction of focus groups, held to garner relevant expertise, has had a positive effect on the work of ISCZ. It has clearly improved the quality of the evidence base and confidence in the identification of pMCZs. The focus group assembled with the relevant authorities specifically to consider where to protect eels and smelt and devise conservation objectives and likely management measures is a good example.

2.2. Good practice was also followed by ensuring full representation of users at meetings to discuss the objectives of each pMCZ and its ecological importance – this ensured effective communication and buy-in.

2.3. The SAP is concerned that there seems to be little recognition of the relative physical scale of the impacts of wholly static physical structures on the seabed and the habitats which an MPA is designated to protect. For example, the scale of the disturbance caused by cables or support structures for wind farms beyond the wave mixing depth is certain to be small compared with the scale of a viable MCZ; the extent of the lateral disturbance of cables is invariably overestimated on maps too. There seems to be no recognition of this overestimation when their colocation is under consideration. This is a subject where the SNCBs need to take a lead and is very relevant to the issue of colocation in BAI2 .

2.4. **Representativity**: The ENG targets for representativity are met by the combination of existing MPAs and pMCZs.

2.5. **Replication**: The target of at least 2 broad-scale habitat and 3 to 5 FOCI replicates appears to have been met where their distribution allows, except in the case of High Energy Circalittoral Rock and Subtidal Macrophyte-dominated Sediments. Examples of both occur in Morecambe Bay but the RSG has chosen not to locate a pMCZ there to afford them protection. The only reason for this appears to be a wish to avoid adding further restrictions in this MPA. The SAP believes that this is an inadequate rationale. Although not yet ratified we note the planned protection of horse mussel beds in Welsh waters and an MPA proposed for Ramsey Bay, within 3 miles of the Isle of Man, as potential sources of replicates of this feature. These cannot contribute to the targets for replication of this FOCI in the ISCZ region but will be borne in mind when ecological coherence across the UK is under consideration.

2.6. **Adequacy**: As noted in paragraph 1.7 the minimum target for A5.3 Subtidal Mud will be met only if the adjoining BAI is taken into pMCZ2 or the boundaries of other pMCZs are adjusted. The shortfall without these changes will amount to 50 km^2 of this broad-scale habitat. The minimum adequacy targets for High Energy Infralittoral Rock and Moderate Energy Circalittoral Rock are not met but these are only present in small quantities (~5 km^2) in the region. All other broad-scale habitats are adequately represented in the network.

2.7. **Viability**: It is not obvious that pMCZ12 is viable. The site occupies only 107 ha and the features offered for designation cover 57 ha. The site is bounded by the coast but the case for not extending it parallel to the shore to include additional patches of honeycomb worm, for example, is not discussed. The option of extending the site to afford protection to adjacent (but not offered for designation) subtidal sands and gravels is not discussed either. The possibilities should be explored. All other pMCZs appear to be viable.

2.8. **Connectivity**: Although careful scrutiny of the various tables and listing of distances between pMCZs suggests that connectivity, as defined in the ENG, has been met, it would be helpful if ISCZ could adopt a graphical method of demonstrating this – as used by Finding Sanctuary for example. No doubt such a map-based product would be of interest to the devolved administrations and Ireland in their planning of MPAs. The comments in section 11 of the SAD for pMCZ5 are helpful in indicating the degree of connectivity that exists for EUNIS Level 2 habit A5 across the ISCZ and Finding Sanctuary boundary. This needs to be retained in their Final Recommendations.

2.9. **Conservation Objectives**: The methodology for developing these has been agreed with the SNCBs, is well described and has been used by all the Regional Projects. The extent to which this has delivered consistent results is being assessed by the SNCBs and will provide an important quality check; the outcome is awaited. The SAP has concerns about the methodology but these are expressed in section 4.

2.10. **Reference Areas**: As noted in paragraph 1.8, ISCZ have identified 19 RAs of which 5 have been accepted by the RSG; 4 are located in pMCZs. Three in the inshore areas off Walney Island, in Morecambe Bay and in the Mersey River have been rejected. The remainder are also located in pMCZs but are subject to further discussion by the RSG. The accepted RAs are detailed in the report and described in the SAD; it is difficult to judge whether pREF_J in pMCZ11 at least is viable. The SAP comments on the general lack of viability of RAs offered by the RSGs are contained in section 4. In the Final Recommendations it will be helpful to have a summary table to demonstrate whether guideline 16 has been fulfilled in all respects by viable sites. Confirmation is also sought that the RSG accepts Conservation Objectives for the RAs to deliver reference condition for all the features contained with them, requiring all extraction, deposition or human derived disturbance to be removed or prevented.

2.11. **Best Available Evidence**: There has been a welcome step change in the effort devoted by ISCZ to assembling sound ecological data and it shows in the results achieved. The presentation of evidence used and the development of a narrative, with appropriate citations, are exemplary. To ensure that the quality of evidence underpinning decisions is not in doubt, it is important to ensure that data traceability is maintained.

2.12. **Areas of Additional Ecological Importance (AAEI)**: Although relevant evidence has been assembled and is shown in the iPDF, and figures in Annex 3 of the report, there are few signs that AAEI have had a significant effect on the selection of pMCZs or Reference Areas. No explanation of how choices of datasets that are surrogates for productivity or biodiversity have influenced site or boundary choices in a systematic manner. Furthermore, whilst pMCZs 6, 7, 4 and 5 overlap areas of high potentially high productivity, implied from location of persistent pelagic fronts, pMCZs 1, 2, 8 and 3 do not (and even skirt around them). On this basis, coincidences between PMCZs and AAEI seem to be coincidental. The evidence from maps of marine biodiversity is equally ambivalent.

2.13. **Scientific value**: There is no discussion of this driver for the selection of MCZs or Reference Areas, notwithstanding the long history of scientific study of the Irish Sea. As noted in section 5, several sites chosen as pMCZs have high quality ecological survey data so there are arguments to be made for them to be included in the network under this guideline. There is a similar aspiration that where possible, Reference Areas may be placed in good areas that have also been subject to previous scientific investigation.

2.14. **MCZ boundaries**: There is no evidence that the guidelines in section 6.3 have had a significant influence on boundary design, beyond the use of straight lines and geo political boundaries to make maximum use of space and possible future connectivity in this very cramped and awkwardly shaped region. Perhaps that is inevitable. Nevertheless, guideline 25 relating to the incorporation of margins around features to be protected should be being followed. Page 7 of the report indicates that the curved boundary of the pMCZ1 is delineated on the basis of DECCA lines used in the past by the fishing industry. This navigation aid is no longer in

operation and all vessels now have GPS navigation systems. It would be more sensible to adopt a straight line boundary from point to point.

2.15. **Geological and Geomorphological features**: Assessment is continuing. The results are to be reported in the Final Recommendations, but see comments in paragraph 5.3.

2.16. Points of clarification

2.16.1. On page 9 section 2.7 the ISCZ refer to 'thermal upwelling'. We are not convinced that this is the correct term and that the reference should be to areas of strong hydrographic gradients, particularly sea surface temperature if detected by satellites measuring this parameter. Such contrasts are maintained by converging currents that may or may not include a vertical component. Such convergence can concentrate nutrients hence productivity which makes them of useful as indicators of AAEI.

3. Recommendations for action by ISCZ

3.1. In response to comments in paragraph 2.4, the SAP urges the RSG, aided by the ISCZ team, to propose viable pMCZ(s) in Morecambe Bay for High Energy Circalittoral Rock and Subtidal Macrophyte-dominated Sediments, if that is technically feasible, to achieve their required replication. Associated Impact Assessment(s) should be prepared if such pMCZs create new socio-economic impacts.

3.2. In response to comments in paragraph 2.5, the SAP urges the RSG, aided by the ISCZ team and SNCBs, to agree to extend pMCZ2 to include all or sufficient of BAI2 to achieve at least the minimum adequacy target for A5.3 Subtidal Mud. If that is not possible efforts are required to modify the boundaries of other pMCZs to achieve the same goal.

3.3. ISCZ are encouraged to complete their work on the identification of viable Reference Areas and provide the information and assurance sought in paragraph 2.10.

3.4. In response to paragraph 2.6, the SAP asks the RSG aided by the ISCZ team to review the viability of pMCZ12 and take action as suggested to better meet the guidelines set out in section 4.5 of the ENG.

3.5. The SAP suggests that ISCZ follows up the actions recommended in paragraphs, 2.7, 2.8, 2.11, 2.14, 2.16.1, 4.1, 5.5, 5.9, 5.10 and 5.12.

3.6. Editorial errors are noted in paragraphs 5.1, 5.7 and 5.8.

4. General Comments – addressed to the Regional Projects, SNCBs and Defra

4.1. The SAP seeks confirmation that the draft MPA network has been designed to include all of the best areas for biodiversity in the d/pMCZ and Reference Areas, and where these were considered and rejected an explanation of why that was so - as set out in Government Expectations Note 1.

4.2. The SAP believes that to date Regional Projects and their RSGs have failed to meet important requirements of the ENG to identify a set of viable RAs. This is very regrettable given their importance in providing (a) the maximum feasible protection for flora and fauna that are rare, threatened or representative of UK biodiversity, and (b) sound scientific benchmarks for the future management of the MPA network. The criteria for viability of broadscale habitats and FOCI are set out in section 4.5 of the ENG -

guidelines 9 and 10. Guideline 16 in section 4.7 indicates that these criteria are to be applied to reference areas.

4.3. Regional Projects and their RSGs have interpreted guideline 9 as implying that 5x5 km (=25 km^2) is the target area for a broadscale habitat reference area away from the coast. It is not. The **minimum** acceptable diameter of 5 km for a single RA implies a minimum viable area of 20 km^2 and the goal is to achieve an **average** diameter of between 10 and 20 km, i.e. an average area of the broadscale habitat RAs within a region of between 80 and 310 km^2. Given that recommended individual reference areas for intertidal and near shore broadscale habitats are being recommended with areas of or less than 0.25 km^2 , the present collection of potential or draft reference areas will fall substantially short of the average size target in all regions – perhaps by an order of magnitude. This compromises the scientific basis of the network of highly protected areas.

4.4. Matters have been compounded by the way the sensible advice of the SNCBs that RAs can contain more than one broadscale habitat has been followed. An RA of 5x5 km cannot accommodate more than one viable broadscale habitat occupying 20 km^2. We and the SNCBs have advised that small sites can make a useful contribution to MCZs and RAs in particular circumstances but we are deeply disappointed that this pragmatism has not been matched by recommendations for some large RAs containing viable amounts of a several broadscale habitats to achieve an average size that meets – or even approaches - the target set in the ENG. Finding Sanctuary and ISCZ have each identified one larger pRA (150 and 300 km^2 respectively) but this merely demonstrates that it is possible to do so. We accept that it is probably too late to make good this shortfall now but believe that the problem will have to be revisited in the future to meet ENG guideline 16.

4.5. Conservation Objectives (COs) give cause for concern as they are all either ‘maintain’ or ‘recover’ based on the (putative, assumed, predicted) impacts of activities on a particular habitat type. Most of the COs are to ‘maintain’ although no evidence is adduced by any of the Projects to demonstrate that such sites are in favourable status despite the large number of users/uses in their regions.

4.6. The logic of setting an objective that an area has to be managed to recover, when in fact there is no evidence that it (the particular site and/or feature) is in a degraded state, is flawed. A manager faced with this is going to be required to put in recovery measures based on only an assumption that there has been damage. When will he/she know that an area has recovered or will it be assumed that if the pressures are removed then the area will be as it should? It is acknowledged that the COs are all preliminary at present but this aspect needs addressing by the SNCBs and to be explained to stakeholders.

4.7. To what degree have certain activities influenced site selection? For instance, activities with management implications (beam-trawling, otter trawling, scallop dredging, beach replenishment, coastal protection) have led to COs for ‘recover’ – are these the only activities which require management (aggregate extraction is not included) or have all the sites been chosen to exclude activities such as aggregate extraction, with a buffer, on principle irrespective of their ecological benefit? The matrices for the CO giving the sensitivity of areas and the confidence in the assessment are very valuable but the implications of this need to be considered further, for example an area of high sensitivity but low

confidence will may be discounted and management concentrates on areas that are high for both – this is not a precautionary approach.

4.8. All the Regional Projects need to consider the implications of the term 'recover' as a CO – does this presume to remove pressure, return to 'normal', define according to a reference area or reference status. Following WFD discussions, the areas with which sites are compared can be deemed in good condition either through the absence of pressures (which is easy to determine) or the presence of a good ecology (which is costly to determine). However, it is emphasised that unless there are well-defended arguments for indicating that a site needs to recover from pressures or to a pre-defined state then there will be challenges from user groups.

4.9. Notwithstanding the advice we provided in Annex 1 to our response to the 3rd iteration reports on AAEI some Regional Projects continue to bring forward proposals to designate p/dMCZs for birds and cetaceans without cases to do so, or vulnerability assessments or conservation objectives or indications of possible management measures. ISCZ have promised to bring forward a case for the black guillemot *Cepphus grylle* in their Final Recommendations which we look forward to seeing. The SNCBs are the formal source of guidance on these matters. We can help by offering advice to augment this from a scientific viewpoint. Rather than repeat that earlier advice and its implications (which remain extant), in Annex 1 to this response we provide a 'How to Guide' to help in assembling a suitable case. There should be no difficulty in setting out vulnerability assessments where habitats are the subject of designation, but we are unable to provide general advice on the preparation of such assessments where the highly mobile species itself is viewed as vulnerable. Section 3 of the 'Guide' suggests the issues that need to be addressed **before** a vulnerability assessment is provided in that case.

4.10. The SAP understands that the Regional Projects have been advised that only tide-swept channels where the velocity of currents exceeds 7 knots are to be considered for identification of FOCI habitats. The effect of this advice is that there are no locations that qualify as 'Tide-swept channels' in any of the Regions. A rescue operation by the SNCBs is needed. This should take account of the existing BAP description..

5. Site-specific issues

5.1. **pMCZ1**: There are typos in section 8 of the SAD i.e. references to pMCZ2. Reference to Hinz et al. 2009 should indicate that this study demonstrated a causal link between the occurrence of trawling and presence/absence of sea pens and that areas having no or little otter trawling tend to have sea pens. There are a number of high quality ecological surveys undertaken in the area and these are reported.

5.2. **pMCZ2**: The key issue relates to the co-location of a wind farm area (Walney and West of Duddon sands wind farm licence areas). Urgent clarification is required from the SNCBs to enable the windfarm developers to produce an informed opinion about future risk to their activities. The view of the SAP is that the windfarm activities are unlikely to have a detrimental effect if BAI2 was included in pMCZ2. Thus the SAP recommends integration of BAI2 into pMCZ2 to meet the adequacy target. There are a number of high quality ecological surveys undertaken in the area and these are reported.

5.3. **pMCZ3:** There is reluctance to consider pMCZ3 in relation to drumlin features on the seabed because the implications for subsea cables (associated with the Round 3 windfarm development) were unclear. Again, some pragmatic advice is required from the SNCBs. In amplification of the point made in paragraph 2.3, it is unlikely that cable laying will have an substantial impact on the viability or main structure of such drumlin features, however an activity such as aggregate extraction would clearly have potential impact. This area appears to be well described from a number of studies and also authoritative expert reporting. The area contains a high diversity of habitats. The latter seem well represented in the designated reference area, however it seems logical to extend pREFS to the North East to abut the boundary of the pMCZ to the extreme NE

5.4. **pMCZ4**: A large area, relatively well surveyed with a range of important habitats and substantial reference areas.

5.5. **pMCZ5**: This site is important as it is located offshore and is the most southerly site in the network. As noted in paragraph 2.8 it serves an important function in contributing to connectivity between the ISCZ and Finding Sanctuary regions for EUNIS Level 2 habit A5. In section 9 of the SAD it would be useful to say 'why' the area is critical for bottlenose dolphins. There is a reasonable amount of scientific information for this area. The reference to Clark et al. regarding the bottlenose dolphins is missing and should be added.

5.6. **pMCZ6**: This site is reasonably well described with a relatively high level of confidence in the features encompassed due to the previous published studies. The site also contains a potentially breeding population of ocean quahogs. Two possible reference sites have been highlighted but are subject to agreement. It is very good to note that the discussion of this site makes reference to its relationship to the Scottish and Northern Irish coasts and conservation features.

5.7. **pMCZ7**: Unfortunately the text from pMCZ6 has been copied and pasted into this section and inadequately scrutinized for consistency. Text still refers to pMCZ6. The last paragraph in section 9 could reference Hinz et al. 2009 as supporting evidence of the assertion that sea pens would recover in the absence of trawl pressure. Once again, good reference is made to the adjacent conservation features in the waters under devolved administrative control.

5.8. **pMCZ8**: A few typos are present in section 9 of the SAD, 'blond ray' should be 'blonde ray', the Latin name of sandeels needs to be in italics. Further consideration of this site awaits input on conservation objectives from the SNCBs.

5.9. **pMCZ10**: It seems rather odd for the proposed REF site (RA) to avoid entirely the *Sabellaria* reef which is a feature of the pMCZ. The SAP recommends that the REF area should include some representation of this feature. Spelling of 'Lancester' needs to be resolved. Good use of references to adjacent areas e.g. Solway Firth.

5.10. **pMCZ11**: This area seems to contain a large number of features of conservation importance. However, at present, no detailed justification for the selection of the potential reference areas is provided so it is difficult to assess whether these are good representative sites. Given the length and narrow width of this pMCZ it would be highly desirable to have more than one reference area with some distance between the selected areas. At present no case is made for designation with respect to guillemots, however this lies with RSPB to make an adequately constructed argument for their inclusion. The guidance note at annex A may help with this. Without more local knowledge of the pressures to which *Zostera*

angustifolia is exposed locally we cannot carry out a vulnerability assessment but the feature is known to exist[1] at St. Bees Head and a Conservation Objective of 'maintain' would be prudent.

5.11. **pMCZ12:** Doubts about the viability of this very small site are raised in paragraph 2.7. However there are no doubts about its importance in terms of its contribution to the overall network because of the features protected (biogenic reefs – *Sabellaria* and mussel beds).

5.12. **pMCZ13**: the commentary now provides adequate explanation of why the site has arrived at its present shape. Given the nature of the main feature of the site it is reasonable to assume that it will be protected by the current configuration. Nevertheless, some consideration should be given to the possible threat to the site from the construction of offshore structures that might reduce the level of wave erosion at the site leading to the peat and clay features becoming smothered with sediments and thus undermining the purpose of the site. The latter was one of the reasons for suggesting an offshore extension, but the concerns in relation to other features are noted. Perhaps an extension would be more acceptable if the possible threats were more clearly related to their potential impact on the feature of interest. The site is designed to protect exposed peat and clay. It also contains some important archaeological features (footprints) that are preserved in the clay/peat. Other features within the boundary of the site have not been designated for protection. However, we wonder how sensible this might be, for example, if there was excessive bait collecting on the muddy shore, could this lead to excessive trampling and erosion of the site? Would it be possible to protect the peat and clay without being able to protect the 'mud' which was the cause of the trampling linked to bait collectors? While it is not for the group to determine management measures, the thought process might inform which features may also have a role to play through designation

5.13. **pMCZ 14**: Palumbi is cited in the reference list but not used as a citation in the text. This site is an important 'hard' feature in the network. The boundaries of the site would be more easily enforced if they were straight lines.

5.14. **PMCZ –estuaries**: These seem sensible and are based on the advice of an agency with the appropriate expertise. Be careful not to set conservation objectives of 'recover' if the species is not confirmed to occur in that site (e.g. smelt).

[1] Brodie, J., John, D, Tittley, I., Holmes M.J, & Williamson, D. (2007). *Important Plant Areas for algae: a provisional review of sites and areas of importance for algae in the United Kingdom*. Plantlife International, Salisbury, UK.

Annex 1

How-To guide: to help make the case for protecting locations that benefit highly mobile species, within the ENG guidelines.

Working from the top down to make the case from the bottom up:

1) What does the mobile species eat?
    a) If for example the answer is a prey species that doesn't move much i.e. mussels or invertebrates (or even small bodied fish, or juvenile fish) that live on / within kelp beds, etc. Then it is a simple case of protecting the habitats which gives rise to mussel and/or kelp beds, etc.
    b) If the prey of the mobile species also moves around a lot, then one has to ask 2 more questions,
        i) What does the prey eat - and if that happens to be a sessile or easily defined seabed habitat then repeat 1) (i.e. for top predator such as the Black Guillemots whose prey includes benthic invertebrate with clear habitat preferences and sandeels which require specific sand/gravel grain size and bottom current speed for their habitat and don't move far from this habitat while feeding (Van der kooij et al 2008) OR
        ii) If the prey of the prey also moves around a lot then one has to ask the following question
2) Are there specific characteristics of locations where the top predator is repeatedly seen foraging i.e. where prey is more available, easier to catch for some physical reason? Specific characteristics can be
    a) Frontal regions, where there is a rapid change in horizontal or vertical gradient of temperature. This is a habitat captured as an Area of Additional Ecological Importance (AAEI) in this case P. Miller's thermal fronts, and can be defined spatially as the locations where the ratio of the depth of the water column divided by the mean monthly speed of the tide is approximately 2.7 - 2.9 (Simpson and Hunter 1974, Sharples 2008). Mobile species such as basking sharks are known to target this type of habitat for foraging (Sims et al 2000).
    b) Areas with high primary productivity either at the surface as would be found in locations in 2 a) or sub surface productive areas that are most likely caused by internal wave mixing over bumpy topography (Scott et al 2008) which can be defined in space by variation in depth of bottom features (again areas of AAEI such as banks and troughs).
    c) Areas with high tidal speeds (> 2 m/s) are also known to attract many top predators for feeding (i.e. Black Guillemots which also generally forage close (< 5 km) to nest sites and Harbour porpoise are now well documented at using particular < 1 km^2 sites for repeated foraging (Pierpoint 2008)). As the reasons for high tidal high speeds are predictable and mostly topographically driven these areas can be easily defined spatially.
3) Then it is necessary to specify the features that will be designated at the site and their conservation objectives. In the case of 1 (a) and 1 (b)i it is straightforward to designate the habitats that enable the prey to flourish and, given that the mobile species is successfully exploiting these locations, it is likely that the conservation objective will be to maintain the habitats, unless they are under moderate or high pressure from some other activity. In the case of 2, the ENG requires the spatially defined AAEI to be used to preferentially select MCZs that deliver against the network design principles of Representativity, Replication, Viability, Adequacy and Connectivity for broadscale habitats or the listed FOCI.

In principle it is possible to protect highly mobile species by making the case to expand the list of such FOCI beyond the bony fish identified in Table 4 of the ENG.

The methodology for doing so is reviewed in Annex 2 of the ENG where it is concluded (Box 1, p75) that the case will depend on:

- Knowledge of the species ecology and behaviour and in particular whether the species has localised distribution, exhibits site fidelity or aggregates at some point in its life cycle;
- whether applicable and useable spatial data exist to provide the necessary evidence;
- whether MCZs are the most appropriate tool to deliver conservation benefits.

As explained above there are many reasons to suppose that site based protection may be appropriate, although systematically gathered spatial evidence to support clear identification and prioritisation of sites is not readily available. However the key consideration is likely to be whether conservation benefits are likely to be delivered by MCZs or mechanisms such as bylaws, codes of practice and technological developments that reduce the pressures to which the species is vulnerable.
No such cases have been seen by the SAP to date.

Pierpoint, C. 2008 Harbour porpoise (Phocoena phocoena) foraging strategy at a high energy, near-shore site in south-west Wales, UK. Journal of the Marine Biological Association of the United Kingdom, 2008, 88(6), 1167–1173.

Scott, B.E., Sharples, J., Ross, O.N., Wang, J., Pierce, G.J. and Camphuysen, C.J. 2010 Sub-surface hotspots in shallow seas: fine scale limited locations of top predator foraging habitat indicated by tidal mixing and sub-surface chlorophyll. *Mar Eco Prog Ser* 408: 207-226

Sims, D.W., Southall, E.J., Quayle, V.A. & Fox, A.M. 2000. Annual social behaviour of Basking sharks associated with coastal front areas. *Proceeding of the Royal Society of London. B.* **267**: 1897-1904

Sharples J (2008) Potential impacts of the spring-neap tidal cycle on shelf sea primary production. J Plankton Res 30:183–197

Simpson JH, Hunter JR (1974) Fronts in the Irish Sea. Nature 250:404–406

Van der kooij, J., Scott, B.E. and Mackinson, S., 2008. The effects of environmental factors on daytime sandeel distribution and abundance on the Dogger Bank. *Journal of Sea Research,* 60(3) 201-209.