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Patrick Cowdy - Marine Planning Policy Officer  
Marine and Fisheries Division  
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29<sup>th</sup> March 2018

Dear Patrick

## **Draft Habitats Regulations Assessment consultation on the Welsh National Marine Plan under the Conservation of Habitats and Species Regulations 2017**

Thank you for consulting Natural Resources Wales on the draft Habitats Regulations Assessment (HRA) of the Welsh National Marine Plan (WNMP). Our comments are made in the context of our role under the Conservation of Habitats and Species Regulations 2017.

As you are aware, Natural Resources Wales has had some formal involvement in the management of the environmental consultancy that has prepared the HRA for Welsh Government. Therefore, in order to maintain and demonstrate Natural Resources Wales' impartiality, this statutory consultation advice provided to Welsh Government is led on by our Strategic Assessment Team (SAT) that sits functionally separate from the rest of the organisation.

We provide our key comments below, and provide more detail on these, together with general and more specific comments in the attached Appendix.

- 1. We welcome and support** Welsh Government's commitment to the HRA process, and recognise the time and effort that has gone in to producing this significant assessment. We also welcome the informal opportunities we have had to provide comments at various stages as the plan and HRA have developed.

### **Tidal lagoons policy appropriate assessments and consideration under Article 6(4)**

- 2.** We support the approach taken by Welsh Government in considering the tidal lagoon policy through appropriate assessment, the conclusions of being unable to rule out adverse effects in relation to birds, fish and certain habitats, and therefore taking the assessment though the derogations set out under Article 6(4) of the Habitats Directive. However, we have concerns that the assessments understate

the potential impacts in specific areas, as well as significant concerns regarding the challenges of delivering adequate compensatory measures, all of which we set out below and in more detail in the attached Appendix.

- 3. Tidal lagoons policy appropriate assessment zone of influence (ZOI)** – we are concerned that the assessment understates the hydrodynamic/physical effects footprint for tidal lagoons. The ZOI used is the tidal lagoon Strategic Resource Area (SRA) plus 50km. We disagree with this approach as it is our opinion that significant effects are likely to extend beyond this. Our advice remains that the ZOI should be Welsh territorial waters plus 50km, due to potential far field effects for lagoons leading to potentially significant (in HRA terms) water level changes at these distances (we set out the reasoning behind this in more detail pt. 76 in the Appendix). This larger ZOI has the potential to screen in additional sites, with habitats features that could be affected, and which are not currently considered in the assessment presented.
- 4. Conclusions of the detailed tidal lagoon Appropriate Assessments** – there does not appear to be any one place in the HRA where the conclusions of the more detailed appropriate assessments on marine mammals, fish, habitats, and birds are clearly set out. In particular, it is difficult to understand which specific sites and features each of the appropriate assessments has been unable to conclude no AEOI for, and which have therefore passed through for consideration under Article 6(4). For example, it is not clearly set out anywhere in the assessment which specific supralittoral, intertidal and subtidal habitats the HRA has been unable to conclude no AEOI. It is our advice that this needs to be clearly set out in a summary table/s, probably in chapter 10.
- 5. Tidal lagoon policy Appropriate Assessment for marine mammals – Appendix G** – whilst we agree with the conclusions of the appropriate assessment, we emphasise that effects may become adverse depending on the scale and/or number of and/or the mitigation included within subsequent proposals, particularly in relation to bottlenose dolphin and the northern SRA.

In addition, Table 10.2 of the main HRA report and Appendix G are not clear in their conclusions, or when it is appropriate to defer assessment down to project level. To defer down, it is necessary for a proposal in some form to be able to avoid AEOI at project level, it is simply the detail of the mitigation that is lacking. However, in a number of instances the Appendix appears to defer down to project level when the ability to avoid the impact, regardless of mitigation, is uncertain. This is not correct, and we advise that the text in Chapter 10 and Appendix G is clarified on this issue.

- 6. Tidal Appropriate Assessment for fish and marine habitats – Appendix H** – whilst we agree with the conclusions of this assessment, we are concerned that the assessment, whilst considering exposure to risk of collision to individual fish species, has not addressed the potential effects of this at a population level. This is a key omission given the results of the 2010 DECC Severn Tidal Power study that concluded:

*Fish are likely to be severely affected with local extinctions and population collapses predicted for designated fish, including Atlantic salmon and twaite shad. This could mean the loss of twaite shad as a breeding species in the UK as 3 of the 4 rivers where it breeds run out into the Severn estuary;*

It is unclear why this risk has not been referred to either in Appendix H or in the main HRA report, and it is our view that this potential impact should be recognised in the HRA.

- 7. Tidal lagoon policy Appropriate Assessment for birds – Appendix I** – whilst we agree with the conclusions of this assessment, we have concerns regarding the method used to assess potential impacts on birds. This appears to attach the highest sensitivity to impacts that affect the most functional groups/species interest features. Taking this approach understates impacts that have a large effect on a smaller number of functional groups/species interest features. This is of particular relevance to emergence regime changes (i.e. changes that have the potential to cause loss or reduced exposure of intertidal habitats), which we consider may have very significant effects on certain functional groups of birds.
- 8. Tidal lagoon policy Article 6(4) consideration - Alternative solutions** - it is our view that three of the six alternative solutions considered would be less damaging to European sites than the current policy, namely:
  - Alternative or smaller SRAs (e.g. only one SRA);
  - Use of European site safeguarding criteria or exclusions within SRAs;
  - Policy support for further sector investigation only.
- 9. Tidal lagoon policy Article 6(4) consideration - Compensatory measures** – the very significant challenges and risks around securing adequate compensatory measures for the potential impacts of tidal lagoon development in both the northern and southern SRA is acknowledged on multiple occasions in the HRA. We share these very serious concerns, in particular for potential impacts on migratory fish and submerged habitats, as well as delivering potentially significant areas of intertidal habitats that could be lost in the Severn estuary, and sandy subtidal habitat in Liverpool Bay Special Protection Area (SPA), utilised by common scoter and red-throated diver for foraging. It should also be noted that there is likely to be a reliance on the delivery of compensatory measures outside of Wales.

Given the scale of the potential impacts, evidence gaps and uncertainty, and the acknowledged challenges and risks around securing adequate compensatory measures for certain habitats and species, we disagree with the approach advocated that consideration of compensatory measures should be left to project-level applications. It is our view that strategic consideration of how these issues will be addressed is critical and should start immediately. Leaving it to project-level assessment will only increase the challenges to developers, regulators and Welsh Government, and risks to the environment.

### **Ports and Shipping policy appropriate assessment**

- 10.** We have concerns regarding the Ports and Shipping policy appropriate assessment given the support that it offers to port proposals and development, and its spatial nature. As written this section does not present much useful information or analysis to aid assessment. Port development is most likely in the form of expansion to existing ports. No information is provided on sites or features potentially affected. It is our view that this section would benefit from more analysis, in particular identifying overlapping or adjacent European sites and features.

We hope that you find these comments useful, but if you would like to discuss any of these points further please do not hesitate to contact Roger Matthews via our Strategic Assessment mailbox at [strategic.assessment@cyfoethnaturiolcymru.gov.uk](mailto:strategic.assessment@cyfoethnaturiolcymru.gov.uk)

Yours sincerely



**Howard Davies**  
**Head of Governance and Planning**

## Annex 1

# Habitats Regulations Assessment of the Welsh National Marine Plan

### General comments

11. All references to *Conservation of Habitats and Species Regulations 2010 (as amended)* should from 31<sup>st</sup> November 2017 refer to *Conservation of Habitats and Species Regulations 2017*.

12. Mitigation and avoidance measures – it is common and best practice for plan HRAs to include section/s on ‘high level’ mitigation and avoidance measures. This is in part to demonstrate that deferring down is an acceptable course of action, because detailed mitigation available at a lower tier plan or project level will be able to avoid adverse effects. Plan level paragraphs on mitigation and avoidance recognise that detailed mitigation measures for future schemes cannot be determined at this strategic level but should include some broad mitigation measures. This also ensures that plan level HRA adds value by providing some direction or guidance for project level activity. We note that this HRA document does not contain sections on mitigation and avoidance, other than in relation to the tidal lagoon policy in the three appendices on marine mammals, fish and marine habitats, and birds. In line with best practice, our advice is that broad mitigation and avoidance measures should be added to the HRA for the sector policies where this has not been done.

This plan-level HRA relies heavily upon project-level HRA in reaching the conclusion that there will be no adverse effect on the integrity of any European sites, alone or in-combination, in relation to the aggregates, aquaculture, ports and shipping, wave and tidal stream policies’ (12.3.5). We consider this a missed opportunity to provide some information at the plan level to support project-level assessments. It would be useful to capture some of this in ‘sector summary reports’, in particular to summarise the mitigations that have been assumed at a plan-level, and the mitigations that have been identified as necessary at a project level.

13. Summary of conclusions for appropriate assessments – in a number of the appropriate assessments, including the appropriate assessments in the appendices, it is not easy to determine what the conclusions are in relation to specific sites and features. In particular, in the appendices this is in relation to the sites and features it has not be possible to conclude no adverse effect on integrity (AEOI) for. A summary table for each sector policy showing the results by sites and feature (habitats and species) would be useful.

14. Following on from this, for supralittoral, intertidal and subtidal habitats, it is not clearly set out in the assessment for which habitats and associated European sites it has not been possible to conclude no AEOI, and which have therefore passed through for consideration under Article 6(4).

Appendix H considers the following habitats:

- Sandbanks which are slightly covered by sea water all the time;
- Reefs;

- Submerged or partially submerged sea caves;
- Mudflats and sandflats not covered by seawater at low tide;
- Annual vegetation of drift lines;
- Salicornia and other annuals colonizing mud and sand;
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*);
- Atlantic decalcified fixed dunes (*Calluno-Ulicetea*);
- Coastal lagoons;
- Dunes with *Salix repens* ssp. *Argentea* (*Salicon arenariae*);
- Embryonic shifting dunes;
- Fixed coastal dunes with herbaceous vegetation ('grey dunes');
- Humid dune slacks;
- Perennial vegetation of stony banks;
- Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes'); and
- Vegetated sea cliffs of the Atlantic and Baltic Coasts.

Within the HRA there are several places where the habitats for which adverse effects cannot be excluded are listed and the lists vary as follows:

- Page 8, HRA summary: Intertidal habitats, fish, pelagic seabirds and wildfowl and waders.
- Page 147, Table 10.3 lists a large number of SACs with marine / coastal habitat interest features where significant effects cannot be excluded but does not explain which habitats are considered to be relevant.
- Page 164, para 12.3.6, AA conclusions “adverse effects on European sites or interest features, particularly habitats, fish and birds, cannot clearly be avoided at the project level”.
- Page 167 para 13.3.2 lists “Estuarine habitats (estuary, intertidal mudflats and sandflats, subtidal sandbanks, Atlantic saltmeadow, reefs)”. This is problematic as it implies that these habitats are only an issue where they occur within an estuary.
- Page 183, para 13.8.1, Overall conclusions “Potential adverse effects were identified for European sites containing migratory fish species, some intertidal habitats and intertidal habitats that may support feeding and / or roosting of birds”

It is our advice that a clear summary table is required showing those habitats and associated European sites where it has not been possible to conclude no AEOI, and have therefore passed through for consideration under Article 6(4).

## **Specific comments**

### **Chapter 2 The Welsh National Marine Plan**

15.Pg. 25, Table 2.3 WNMP Sector Objectives and Policies – an incorrect tidal lagoon objective is included in this table.

### **Chapter 4 HRA of the Welsh National Marine Plan**

16.Pg. 38, 4.2.8, Mobile species screening – as a mobile species, otters should be referred to in this paragraph.

17. Pg. 41, 4.2.24 Typical species - it is our view that for HRA purposes, typical species only need to be considered within the boundaries of their home European site, and do not need to be considered when outside of their home sites.
18. Pg. 45, 4.2.37 Diadromous fish (plus Freshwater pearl mussel) – this paragraph is missing a narrative for eels, which are also missed out of Table 4.3
19. Pg. 50, Table 4.4 Sensitivities - Diadromous fish would be sensitive to secondary effects of penetration/disturbance to substrate below the seabed, such as noise vibration associated with drilling, or subsurface extraction of shale gas, or other materials.

## **Chapter 6 Aggregates**

20. Pgs. 62 & 63, Table 6.1 and 6.3 - River Dee and Bala lake SAC for salmon, river and sea lamprey appears to be missing from these tables.
21. Pg. 75, Table 6.4, Habitats Summary – this references Liverpool Bay rather than Carmarthen Bay.
22. Pg. 80, Table 6.5, Habitats Summary – this does not refer to the tonnage cap for the Severn Estuary SRA of 800,000 tonnes per annum, which would limit the scale of activity to current levels and provide a further safeguard against adverse effects. It is mentioned later in para 6.2.16.

## **Chapter 7 Aquaculture**

23. The HRA acknowledges that aquaculture development is not restricted to the SRAs (as it does with the other sector activities), indeed it may be overstating the case to say that aquaculture development is most likely to be located within SRAs. This is because the aquaculture SRAs do not include data on access to infrastructure. In terms of aquaculture these are the key areas that will likely influence the siting and investment in activities, so while environmental conditions conducive to enhancing the natural resource are important they are by no means the full picture. It may be that an aquaculture investor would prefer to be somewhere inshore, sheltered with access to infrastructure rather than within one of the SRAs.

Therefore, as set out in earlier responses (e.g. 17<sup>th</sup> March 2017, pt. 50), we consider the aquaculture SRAs less robust than the other sector policies that have SRAs, and this is recognised in several places in this chapter. The consequence of this is that the HRA is also less robust (because of the increased likelihood of proposals occurring outside of the SRAs, and therefore not falling within the SRAs plus 30 km screening buffer that the assessment adopts). Whilst we recognise that the assessment required a spatial element in order to carry out an analysis, it should be noted that an equally valid approach would have been to simply screen in all relevant sites in Welsh territorial waters (the only additional site that this would have screened in on habitat grounds is Croker Slabs SAC).

It is therefore particularly important that this chapter makes clear that HRAs of aquaculture proposals that fall outwith the SRAs are not constrained by the analysis presented in this chapter.

24. Pg. 86, Screening summary, 7.1.3 – this paragraph refers to aquaculture schemes being of a small scale - it should be noted that this is not always the case, for example the Menai East Several Order, Menai West Several Order (in application) and the proposed new offshore rope growing mussel/seaweed farm near Puffin Island all have large footprints. It is also worth reiterating that size or scale of a development does not necessarily determine impact. This assumption is repeated in 7.2.11.
25. Pg. 87, Table 7.1 European sites within the Aquaculture SRAs or within marine or terrestrial zones of influence - Afon Eden–Cors Goch Trawsfynydd SAC is also designated for Freshwater pearl mussel. In addition, Ynys Seiriol/ Puffin Island SPA appears to be missing.
26. Pg. 94, Potential effect pathways, Operation, 7.2.12 – this mentions predator behaviour, and should also mention prey behaviour (fish/shellfish).
27. Pg. 94, 7.2.13 – this paragraph should mention the potential entangling effect from rope grown mussels or seaweed aquaculture on diving sea birds.

## **Chapter 8 Ports and Shipping**

28. Given the support that the Ports and Shipping policy offers to port proposals and development, and its spatial nature, as written this section does not present much useful information or analysis to aid assessment. Port development is most likely in the form of development within or expansion to existing ports. No information is provided on sites or features potentially affected. The analysis refers to the aquaculture sites table, but this table does not identify where existing ports and port Strategic Resource Areas (SRAs) overlap with European sites. In 8.2.8 (pg. 106, Site / feature exposure), it also refers to the sites and features listed in Table 1, but Table 1 sets out sensitivities, and does not list sites or specific features. It may be that this table has been missed out by mistake. It is our view that this section would benefit from more analysis, in particular in relation to overlapping or adjacent European sites and features.
29. Pg. 101, pt. 8.1.2 - this section should acknowledge that some of the existing port areas are very large, and only a proportion of the area is currently developed. This means that there could be considerable scope for further development and construction within the SRAs. The text at present suggests that impacts will be less/minimal because the SRAs are locations of existing ports.
30. Pg. 102, Potential effect pathways, 8.2.5 Construction - this should include the introduction of non-native invasive species.

## **Chapter 9 Energy – Low Carbon (Wave and Tidal Stream)**

31. Pg. 114, Potential effect pathways, 9.2.9 Construction and Decommissioning – this should include the introduction of non-native invasive species.
32. Pg. 114, Potential effect pathways, 9.2.10 Operation, Hydrodynamic changes – this paragraph describes the potential hydrodynamic effects that may result from tidal stream schemes. It should also be noted in this paragraph that wave energy devices and arrays can also influence hydrodynamics. For example, a large array of devices may result in the removal of a percentage of the wave energy and

therefore a shadowing effect in the lee of the array. This could result in changes to nearshore sediment dynamics. A study by Smith *et al* (2012) analysed changes in nearshore wave climate due to an offshore wave farm using WaveHub Cornwall as a case study. This is one example of a relevant study, and others have been undertaken to improve understanding in this area - WaveHub Cornwall is a good source of information on the impacts of wave arrays.

33. Pg. 115, 9.2.13 – this paragraph states that “*The sensitivity of the interest feature groups to the potential pressures associated with wave and tidal stream schemes is summarised in Table 9.2.*” This is incorrect as wave energy has not been included in table 9.2. Although the sensitivities may be similar it is important that wave energy is also considered.
34. Pg. 116, Table 9.2. Sensitivities - for submarine cabling we would expect that under the “*supralittoral habitats and plants*” pressure, the physical loss, physical change and habitat structure are also identified as Y-directly sensitive. This is due to cable landfalls potentially interacting with designated coastal habitats where excavation and cable burial may be required.
35. Pg. 119, pt. 9.2.14 – this refers to Outer Bristol Channel SRA. We suggest the area is more central/inner than outer. Table 9.5 just refers to it as the Bristol Channel SRA.
36. Pg. 120, 9.3 – in this section the text states that many of the subtidal habitats within Anglesey Terns Special Protection Area (SPA) “*will not be particularly important for maintaining the conservation status of the interest*”. We have some concerns about this statement, and suggest that it requires evidence to support it.
37. There appears to be an assumption in this chapter that project-level controls would enable all adverse effects to be avoided with relative ease (see Tables 9.3, 9.4 and 9.5). There is insufficient information provided on avoidance of adverse effects in relation to current installations, and no indication is given of broad mitigation that could be put in place to address such effects. For example, it is important to consider that migration paths and corridors used by diadromous fish remain largely unknown.
38. Pg. 129, Table 9.3 - Manx shearwater should be included from Bardsey, Skomer and Skokholm in relation to the relevant tidal stream SRA's, as they fall within the mean maximum foraging range of 330km. It is now known that they dive to a depth in which they could interact with tidal devices. Manx shearwaters have been recorded regularly diving down to 31m and have reached depths of 55m (Shoji *et al*, 2016). Furness *et al* (2012) is out of date concerning the diving behaviour of Manx shearwater.  
  
**Shoji, A., Dean, B., Kirk, H., Freeman. R., Perrins, C.M and Guilford, T.** 2016. The diving behaviour of the Manx Shearwater *Puffinus puffinus*. *Ibis* **158**: 598-606.
39. Pg. 140, 9.2.22 – in this section the text states that “*Nevertheless, there is little evidence of significant adverse effects from existing tidal stream schemes*”. We have concerns about this statement due to the paucity of data that is currently available on the effects of tidal turbines due to the lack of tidal turbines currently

operating. Note that Minesto is not in the water yet and therefore has not shown that a project can operate without having an adverse effect.

40. Pg. 124, Table 9.4 Summary of the potential for effects on those European sites / features that are most exposed to the St David's Tidal Stream SRA and hence outcomes of policy - there are some inconsistencies between sites highlighted in bold "within SRA" and Table 9.1. For example, Pembrokeshire Marine SAC is "in SRA" in Table 9.1 but has not been highlighted in Table 9.4. There are also discrepancies with Ramsey and St David's Peninsula Coast SPA, Skokholm and Skomer SPA, St David's SAC.

Because of this the "Habitats" feature group summary has concentrated on the wrong sites within the SRA. The SRA does fall within West Wales Marine cSAC, but, arguably of more significance in terms of impacts to habitats is the absence of a reference to Pembrokeshire Marine SAC for which there are potentially sensitive habitat features, including subtidal and intertidal reef and large shallow inlets and Bays. For example, if several devices were deployed with seabed anchors or ground penetrating foundations then this could have a significant effect on the subtidal reef feature due to direct habitat loss. There may also be indirect effects on these features from such development as highlighted in Table 9.2.

Under "Pelagic seabirds" the SRA does not overlap with Skokholm and Skomer SPA. It is adjacent to it but not within.

## **Chapter 10 Energy – Low Carbon (Tidal Lagoons)**

41. Pg. 150, Policy review, 10.2.20 – this paragraph states that "*The three-yearly WNMP review process provides a mechanism for the monitoring and review of policy performance, which will be based on accumulated evidence from project and strategic studies, and hence ensures that effects that cannot currently be assessed as part of a plan-level HRA are appropriately captured and addressed in future revisions of the policy or the SRA. The WNMP also encourages investigation and feedback through Policy ELC\_01.*"

There is some uncertainty as to how this will function in reality as, due to the novel aspect of tidal range projects, little data is currently available with regards to impacts on habitats and species. Operational monitoring, which is what is required to understand potential effects, is still several years away from starting, and will likely take years after that in order to gain a robust understanding of impacts. Therefore, relying on it as mitigation at this stage is arguably somewhat premature. It would also be useful to include some clarity as to how it is envisaged the strategic studies will be taken forward.

42. Pg. 150, Policy review, 10.2.21 - a conclusion about the adequacy of project measures to ensure avoidance of significant adverse effects is drawn based on experience of assessments undertaken in connection with Swansea Bay Tidal Lagoon (SBTL) and adequacy of mitigation, in particular for fish. We assume that the conclusion that adequate mitigation exists has been drawn from the Development Consent Order (DCO) HRA, which should be made clear. The HRA for the determination of the Marine Licence for SBTL has yet to be concluded.

43. This chapter should be a key place where the conclusions of the more detailed appropriate assessments on marine mammals, fish and marine habitats, and birds are clearly set out. Specifically, this should clearly set out for which sites and features each of the appropriate assessments has been unable to conclude no AEOI for.
44. The only place where this has been attempted is pg. 145 Table 10.2 Summary of appropriate assessment for sites with marine mammals. As discussed in detail in pt. 66 below, it is not clear from the entry in the project column in this table whether adverse effects can be confidently ruled out at project level. We advise that if they cannot confidently be ruled out at plan level for a subsequent project regardless of the mitigation it includes, then AEOI cannot be ruled out at plan level, and these aspects should be considered under the derogations set out under Article 6(4) of the Habitats Directive.

### **Chapter 11 'In Combination' Effects**

45. 'Within plan' in-combination assessment – the HRA does not include a high-level within-plan in-combination assessment i.e. a strategic assessment of whether any residual effects from the plans policies cause likely significant effects or adverse effects on integrity when considered in-combination with each other. Our advice is that such an assessment should be undertaken.
46. Pg. 153, Table 11.1 Sector-specific plans - the 'aquaculture' and 'fisheries' entries erroneously refer to commercial fisheries being considered as a plan or project under the Habitats Directive. This is not the case - Defra and Welsh Government do not consider fisheries as plans or projects. In 2012, Defra revised its approach to assessing fisheries under Article 6 of the Habitats Directive, but it did not acknowledge that fisheries were plans or projects under article 6.3. but rather 'activities' needing to be assessed under article 6.2 of the Directive. Welsh Government are currently implementing a similar 6.2. assessment approach through the Assessing Welsh Fishing Activities Project, delivered by Natural Resources Wales. See pg. 217, pt. 738 WNMP.
47. Pg. 153, Table 11.1 Sector specific plans, Sector: Energy – Low Carbon - the quote included under "*Existing Strategies and HRAs*" from The Crown Estate (TCE) is incorrect. TCE undertook a plan-level HRA for the wave and tidal leasing round which was completed in April 2014. They have also recently drafted an addendum for "consideration of proposed South Pembrokeshire Demonstration Zone boundary change" (November 2017). This error also appears in Table 5.3 in relation to the Round 3 wind leasing round and the requirement to undertake a plan-level HRA.
48. Pg. 156, Table 11.3 Other plans with potential in combination effects with WNMP and supported activities - Shoreline Management Plans are described as having no likely significant effects in-combination with the WNMP. It should be noted that the requirement for compensatory measures (i.e. habitat restoration and creation) needed to satisfy the Article 6(4) tests associated with both the Tidal lagoon policy and the Shoreline Management Plans may mean that they 'compete' for the same limited resource. Addressing such issues would be better achieved at a strategic level.

49. Pg. 158, Table 11.4 Current NSIPs and known large-scale projects with the potential to operate in combination with the marine plan or future activities - please note the following errors:

- Swansea Bay Tidal Lagoon – note that the impacts to all relevant diadromous interest feature fish, not just salmon, are currently being considered for the HRA (and WFD) considerations of the Marine License application.
- Tidal Energy Ltd is not at pre-application.
- The south Pembrokeshire wave demonstration zone has not been included. This is at the feasibility and pre-app stage. Expected date of scoping submission is February 2018.
- Marine Energy Wales (MEW), Marine Energy Test Area (META) should be included. This is at the pre-app stage and no scoping opinion has been submitted. This project will involve the testing and demonstration of prototype wave and tidal devices within Milford Haven. MEW has been in contact with Natural Resources Wales for pre-app discussions.
- Egnedol Blackbridge Development of National Significance (DNS) biomass energy plant and associated development. Application submitted. The marine aspect of this development includes refurbishment of a large pier which will involve piling operations and associated underwater noise, as well as the potential loss of feature extent from the direct footprint of the structure.
- For the Aquaculture SRAs, they should be considered in-combination with the other regulated shellfisheries in Wales such as the Burry Inlet cockle fishery regulating order. These are subject to HRA and include mitigation to avoid disturbance to designated species features such as Oystercatcher.

## **Chapter 13 Assessment of Alternative Solutions, IROPI and Compensatory Measures**

50. In summary, Natural Resources Wales' role in relation to Article 6(4) of the Habitats Directive 2017 is predominantly twofold:

- a. To advise on whether we consider that the alternative solutions considered would be less damaging to European sites than the policy as proposed;
- b. To advise on whether we consider that the compensatory measures offered would ensure that the overall coherence of Natura 2000 network is protected.

### Consideration of Alternatives

51. Alternative or smaller SRAs - it is our view that **this alternative would be less damaging to European sites than the policy as proposed**. It is the plans intention that SRAs '*allocate space and focus future use*', as well as affording a *degree of policy safeguarding to encourage strategic decisions on the future use and prevent potential sterilisation of a resource*'. More applications are therefore likely within the SRAs, and the plan will influence decision-making. We therefore consider that smaller or fewer tidal lagoon SRAs would be less damaging to European sites.

52. Use of European site safeguarding criteria or exclusions within SRAs - it is our view that **this alternative would be less damaging to European sites than the policy as proposed**. If European site safeguarding criteria or exclusions within SRAs are rigorously adhered to, which is different from simply relying on the protection offered by the Habitats Directive, then the Habitats Directive's derogations would not be

used to progress a proposal that would damage a European site (because the policy would be clear that such proposals would not be supported by the plan). We therefore consider that the use of European site safeguarding criteria or exclusions within SRAs would be less damaging to European sites.

- 53. Policy support for further sector investigation only** - it is our view that **this alternative would be less damaging to European sites than the policy as proposed**. If it is accepted that the plan has any influence on future proposals, then a policy with this wording is likely to result in fewer successful applications than a policy that offers *strong encouragement* for proposals. We therefore consider that policy support for further sector investigation only would be less damaging to European sites. It is our view that **of all the alternatives considered, this alternative would be the least damaging to European sites**.

#### Compensatory Measures

- 54.** We welcome the consideration of compensatory measures set out in this section. We do, however, have two key concerns:-

- a. There are extremely significant challenges in delivering the compensatory measures that are likely to be required in order to meet the criteria set out in 13.7.2, and thereby are *necessary to ensure that the overall coherence of Natura 2000 is protected*. This is acknowledged in the text in this section of the HRA and elsewhere (for example 13.7.8 *The high-level conclusions of the AA are as follows: The respective AA reports note that the success of such habitat compensation measures will depend upon the scale of the feature affected by any lagoon(s) operation and that it may be challenging to adequately compensate at large or multiple lagoon scales.*).

Our particular concerns are:

- i. Given the potential scale of the impacts, where habitat interest features may be lost or degraded, it is not clear whether sufficient areas are available for re-creation or restoration – intertidal habitats in the Severn estuary are particularly relevant here. In Wales, we know through our own work on the National Habitat Creation Programme that it can be incredibly difficult and expensive to develop habitat creation projects, and that there are very limited opportunities which can be considered straightforward. Welsh Government should therefore note that a policy to strongly encourage tidal lagoon development in Welsh waters is likely to have a significant reliance on delivery of compensatory measures outside of Wales;
- ii. The proposed compensatory measures relating to fish are largely considered to be un-tested and we have low confidence in their feasibility or suitability (further comments are provided on individual measures in our detailed response to the Appropriate Assessment for Fish and supporting environs below).
- iii. The feasibility of compensatory measures to address loss of intertidal habitats for waterbirds, and potential loss of shallow sandy bottomed sea areas used by Red-throated diver and Common scoter in Liverpool Bay SPA (further comments are provided on individual measures in our detailed response to the Appropriate Assessment for birds below).

- b. There is an absence of any strategic approach to addressing these challenges. We disagree with statements made in a number of places in the HRA that a more detailed consideration of compensatory measures at a strategic level is not possible. Given the scale of the potential impacts, evidence gaps and uncertainty, and the acknowledged challenges and risks around securing adequate compensatory measures for certain habitats and species, we consider it imperative that consideration of these issues is taken forward at a strategic level, and not left to individual projects-level applications and assessments to try and resolve.

The establishment of the National Habitat Creation Programme in response to the requirement for compensatory measures following the adoption of the Shoreline Management Plans is an example of where Welsh Government has already taken such an approach.

- 55.** The compensatory measures principles set out on pgs. 180-181 (13.7.2 and 13.7.4) of this chapter are helpful, as are the possible project level compensation measures identified on pg. 182 (13.7.9). In addition, 13.7.12 usefully states *'Whilst this plan level HRA identifies potential compensatory measures, it is important to note that securing compensation for some site feature(s) that meets the necessary requirements may represent a considerable challenge depending upon the specific nature of a particular project proposal. In some cases, projects may not be viable because adequate and satisfactory compensation cannot be secured.*
- 56.** Pg. 168, pts. 13.3.4 and 13.3.5 – habitat loss and change is not acknowledged here, although it is clearly considered an issue in the Appropriate Assessment in Appendix H.
- 57.** Pg. 181, pt. 13.7.8 - Appendix H states that adverse effects cannot be ruled out for subtidal habitats, and they should therefore be referred to in this paragraph as potentially requiring compensatory measures.
- 58.** Pg. 181, pt. 13.7.8 - it should be recognised that the features that are likely to be adversely affected, and therefore may require compensatory measures at the project level, may differ depending on the nature, scale and location of individual proposals.
- 59.** Pg. 181, pt. 13.7.9 - in some cases, the compensatory approaches specified include 'suggestions' (e.g. fish translocation, subtidal habitat creation) for which there is little or no evidence of success. Should a programme of lagoon development emerge as a consequence of the plan it will be necessary to undertake significant research into such techniques.

### **Appendix C SACs (etc.) with Potentially Exposed Mobile Species**

- 60.** This appears to miss out a number of European sites with diadromous fish as interest features, namely Afon Eden – Cors Goch Trawsfynydd SAC, River Wye SAC, River Dee and Bala lakes SAC.

## **Appendix G Appropriate Assessment – Marine Mammals**

- 61.** There appears to be some confusion in this Appendix over the use of Marine Mammal Management Units (MUs), with contradictory statements over their use as part of screening. It remains our advice that MUs should be used for screening in European sites for marine mammals i.e. where an MU for a particular species overlaps with the SRAs zone of influence, all European sites that have that species as a feature should be screened in. This appears to be acknowledged on pg. 40, pt 123, 3<sup>rd</sup> bullet, but contradicted on pg. 42, pt 135, 2<sup>nd</sup> bullet. It again appears to be contradicted on pg. 51, 3.2.2.2 *Potential pathways* where a distance-based measure for screening appears to have been employed for Harbour porpoise, Bottlenose dolphin and Grey seal. As discussed above, the relevant MUs should be used as the screening spatial scale. It is then a task of the Appropriate Assessment to determine if those sites are adversely affected.
- 62.** Pg. 45, Table 2: Potential impacts of Tidal Lagoons on marine mammals and their prey species – it is not clear why the row on *Changes in habitat extent, type or quality* is assessed as not likely to have an impact on marine mammals.
- 63.** In the same table, the row on Underwater noise should also include potential noise from mitigation such as active sonar and Acoustic Deterrent Devices (ADDs), and masking effects.
- 64.** Pg. 52, 3.2.2.2 Potential pathways, Bottlenose dolphin, pt 165 - the northern SRA (Liverpool Bay) is in the Irish Sea Bottlenose dolphin MU, and the southern SRA (Severn estuary) is in the Channel and SW England MU. As such, the southern SRA needs to screen in SACs with Bottlenose dolphin features in that MU i.e. the French coast SACs. These are currently screened out because they do not occur in the Irish Sea MU. The wrong MU is being considered for the southern SRA. Table 4 and the text (pg. 54) needs to be updated to reflect this.
- 65.** Pg. 53, 3.2.2.2 Potential pathways, Otters, pt. 179 - the text in this paragraph states that coastal sites have to fall within the ZOI to be screened in - our earlier advice, set out in pt. 122 was for sites to be screened in within 5 km of the ZOI.
- 66.** Pg. 62 Section 4 – Assessment of potential for adverse effects - it isn't clearly set out in this section what the approach is to deferring down HRA to project level. Despite the name given to this approach ('deferring down the HRA'), this way of ascertaining no AEOL is not a way of deferring or delaying the assessment process, but a way of securing mitigation measures in a lower level plan, or later stage of a plan, or project level, where they cannot be secured in detail in the higher-level plan or early in the plan making process. In other words, to take this approach negative impacts need to be avoidable at project level.

The way that this information is presented in the tables that accompany each of the potential impacts that run through this section, is that it is uncertain if AEOL can be avoided at project level (regardless of mitigation). If this is the case, then it is not appropriate to conclude AEOL at plan level and defer down. If it is not possible to be confident that AEOL can be ruled out at project level, then a conclusion that AEOL cannot be ruled out at plan level should be drawn, and these impacts on these sites and features should enter the derogation process set out under 6(4) of the Habitats

Directive. HRAs would still be required at project level regardless. This lack of clarity is replicated on pg.145 Table 10.2 of the main HRA report.

**67.** Pg. 62 Section 4 – Assessment of potential for adverse effects – this section goes through each of the potential impacts and discusses their potential for adverse effects. It concludes in each case that assessment can safely be deferred down to project level, and that it can therefore be concluded that there are no adverse effects at plan level. We have the following comments:

- Direct Habitat loss – note that there are habitat features, such as hydrodynamic processes or aggregations of prey for example, that could make certain areas more important than others. This information is not available at the current time, and applications will require full assessment at project level;
- Changes in habitat extent, type or quality – this paragraph acknowledges that there is the potential for effects on the West Hoyle or other sandbanks along the North Wales coast that seals use as haul-out sites. West Hoyle is the largest haul out for grey seals in the Irish and Celtic Seas, and therefore loss of this habitat could have a significant impact on grey seals from all Welsh SACs and beyond that have demonstrated connectivity with this haul out site. Other effects could also be adverse elsewhere. This information is not available at the current time, and applications will require full assessment at project level;
- Airborne noise – this section includes reference to the river SACs for otters, but not the coastal site Carmarthen Bay and Estuaries SAC which we believe should be added. The same is true for 4.6 Visual disturbance on pg. 80, pt. 262.
- Collision risk with operational turbines – this paragraph states that the potential of collision risk for marine mammals with operational turbines would be avoided through appropriate mitigation measures. Mitigation measures still require significant research and development to allow confidence that they can adequately mitigate all collision risk for marine mammals. To try and address this an adaptive management approach has been recommended for Tidal Lagoon Swansea Bay (TLSB). The species of most concern here is bottlenose dolphin, for which a very small number of casualties a year could cause population level effects at the Irish Sea MU scale, and therefore AEOI for both Pen Llyn a'r Sarnau and Cardigan Bay SACs. The ability of subsequent proposals to conclude no AEOI is likely to depend on their scale and the mitigation included (which could have implications for scheme energy output). This information is not available at the current time, and applications will require full assessment at project level.
- Barrier effects to movement and habitat fragmentation – this section acknowledges the location of an important grey seal haul out close to the northern SRA, movement of bottlenose dolphins between Cardigan Bay and the north Wales coast, and a general lack of knowledge on the movements of bottlenose dolphins, grey sea, and, in particular, harbour porpoise. The collection of further information is clearly required, and this may find there are a limited number of sites where tidal lagoons could be located that would avoid adverse effects. This information is not available at the current time, and applications will require full assessment at project

level. Barrier effects may also affect otters having to negotiate infrastructure or roads associated with lagoon development;

- Changes in prey availability – this section makes the case that significant effects on fish would be avoided through mitigation, and any impacts would be localised and not significant. It is our understanding that the evidence on efficacy for mitigation for fish collision is currently limited, and significant research and development is required. It is therefore premature to assume that mitigation will be able to entirely rule out this risk. Furthermore, we disagree with the conclusion that the potential impact area for prey species will necessarily be confined to the zone of influence of the operational turbine. For example, if the operational zone affects the breeding grounds for fish, then the potential impact could be more wide ranging than the immediate zone of influence. Impacts could become significant for breeding and migratory fish if tidal lagoon developments are near estuaries. Applications will require full assessment at project level.
- In relation to all the above, it is emphasised that many of the effects described may become adverse depending on the scale and/or number of and/or the mitigation included within subsequent proposals, particularly in relation to bottlenose dolphin and the northern SRA. **It should not be assumed that because this HRA was able to conclude no AEOI at plan level that all project-level assessments would be able to conclude no AEOI.**

68. Pg. 92, 4.11 Sensitivity of Marine Mammals to Potential Impacts, Table 17: Sensitivity of marine mammals to potential impacts – it is our view that collision risk with turbines is a key impact pathway for marine mammals and tidal lagoons, and as such, its sensitivity should reflect this.

The text in this section acknowledges that the potential sensitivity of marine mammals for collision risk with operational turbines at tidal lagoons is unknown, and allocates a sensitivity of low or medium. The rationale for this decision is based on information from the Seagen device at Strangford Lough. This had a shutdown clause during operation, which means that whenever a large marine object was detected near the turbine using the Active Sonar detection system, the turbine was shut down (turned off). So, we might detect an object approaching – which could be a marine mammal – but the system was shutdown before we got to observe how the potential animals might behave around the turbine or indeed evade, avoid or collide with the structure at close quarters (near-field evasion). It is therefore still the case that there is very limited information on how and if marine mammals avoid/evade turbines in the near field or further afield.

Similarly, the information on the test site at the European Energy Marine Centre (EMEC) is largely based on vantage point data and disturbance, rather than in-water observations of mammals around operating turbines. It remains the case that we know very little about how marine mammals behave around turbines during operation, hence the strict consenting conditions to better understand the potential risk. It is our view that the precautionary approach should be adopted in relation to this impact pathway and it should therefore be given a rating of high sensitivity.

69. Pg. 92, Table 17: Sensitivity of marine mammals to potential impacts – it is our view that the assessment of ‘negligible’ for otter and barrier effects should be changed to low-medium. This is because of potential impacts on otters in relation to the Carmarthen Bay and Estuaries SAC, including possible barrier effects from associated infrastructure.
70. Pg. 110, 7.2.1 Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd SAC – we advise that barrier effects should be added to the list of potential adverse effects that would require consideration at project level for otters for this site. This includes potential barrier effects of associated infrastructure.
71. Pg. 112, Chapter 8 Consideration of applicability of the A6(4) IROPI process – we support the suggestion for compensatory measures in the form of reduction of other threats (e.g. bycatch), particularly for harbour porpoise and grey seal. However, bycatch is not considered a significant threat to bottlenose dolphin, so this would be unlikely to be a realistic compensatory measure for impacts on bottlenose dolphin populations.
72. In summary, whilst we agree with the conclusions of the appropriate assessment, we emphasise that many of the effects described may become adverse depending on the scale and/or number of and/or the mitigation included within subsequent proposals (which could have implications for scheme energy output), particularly in relation to bottlenose dolphin and the northern SRA. It should not be assumed that because this HRA was able to conclude no AEOL at plan level that all project-level assessments would be able to conclude no AEOL.

In addition to the above, there appears to be some confusion in this Appendix in relation to deferring HRAs down to project level. As set out earlier in this response, in order to conclude no AEOL and defer down, there needs to be confidence that a proposal could be delivered at project level that avoided AEOL, not that it was uncertain. The conclusions set out in Chapter 7 *Record of Assessment* (pg. 107) (and replicated on pg.145 Table 10.2 of the main HRA report) are unclear, and could be interpreted as confirming that uncertainty remains, and therefore no AEOL cannot be concluded. The inclusion of Chapter 8 *Consideration of applicability of the A6(4) IROPI process* (pg. 112), which includes compensatory measures, appears to confirm this conclusion, given that it is unnecessary to enter A6(4) unless it has not been possible to conclude no AEOL. Clarity is required in relation to this aspect.

#### **Appendix H Appropriate Assessment – Fish and Marine Habitats**

73. Because this Appendix is considering marine habitats (as well as fish), it also needs to be clear that it is considering (and that there is a need to consider in subsequent project-level HRAs) typical species. This consideration appears to be absent, for example see pg. 10, Table 2.
74. Pg. 2, Figure 1 – the SRA areas are slightly different to those shown in Figure 10.1, e.g. in Figure 10.1 the area to the south east of Gower is included, but this isn’t shown in the Figure 1 in Appendix H.

75. Table 2. Impact pathways associated with tidal lagoon projects - this should include fish entrapment into the lagoon, and associated potential delays to migration and increases in predation. These potential impacts should also be included in the list in 5.3.1.

76. Pg. 11, 3.2.2 Step 2 - High level application of buffer/zone of influence – Water Level Assessments - we have outstanding concerns regarding the buffer applied to water levels impacts for Tidal Range (note that the application of a 50 km buffer for other aspects of hydrodynamics (waves and tidal currents) and sediment transport is acceptable). The authors have referenced a range of evidence (see extracts in italics below) to justify a 50 km buffer zone for water levels. We comment briefly on each of these below.

*'With specific regard to consented and proposed tidal lagoon schemes along the Welsh coastline, predicted effects on water levels from combined schemes within the Bristol Channel/Severn Estuary are shown by a range of studies (e.g. DECC, 2010a; Tidal Lagoon Swansea Bay, 2014; Angeloudis and Falconer, 2016; Centre for Environment, Fisheries and Aquaculture Science (Cefas), 2017) to extend across the Severn Estuary and into the Bristol Channel approximately to the Gower peninsular (with slight variances depending on the number and associated operational conditions of the lagoon schemes assessed). This is well within the proposed 50 km buffer of the associated tidal range SRA, which extends from the Pembrokeshire coast and includes Carmarthen Bay.'*

Department of Energy and Climate Change (DECC). 2010a. Severn Tidal Power - SEA Topic Paper: Hydraulics and Geomorphology Annex 8. Geo 6: Investigation of changes to hydraulics for short-listed options (water levels and flows). April 2010.

Comment: Natural Resources Wales referenced this report in our previous advice. We advised that this document demonstrates that there are potential far field effects on water levels (of  $\pm 10$  cm) arising from large scale tidal lagoons in the Severn Estuary, which extend beyond the 50km buffer for the SRAs.

Tidal Lagoon Swansea Bay. 2014. Tidal Lagoon Swansea Bay Environmental Statement. Submitted to PINS in support of DCO Application. February 2014.

Comment: We acknowledge that the predicted effects on water levels for the proposed Tidal Lagoon at Swansea Bay do not extend beyond the 50km buffer. This is largely a result of project scale and location as it is set within the embayment of Swansea Bay with less effects on tidal resonance within the Bristol Channel.

Angeloudis, A. and Falconer, R.A. 2016. Sensitivity of tidal lagoon and barrage hydrodynamic impacts and energy outputs to operational characteristics. Renewable Energy 114(A): 337-351.

Comment: This paper explores the impacts of possible tidal lagoon scenarios in North Wales. Some of the outputs of this paper and a similar paper by the same authors looking at south Wales lagoons were referenced in the CEFAS 2017 paper discussed below, and comments were provided by Natural Resources Wales on the draft CEFAS paper previously. The paper(s) note that there are water level effects which can extend beyond the near-field, but the models were not designed to explore the full extent of far-field effects,

and the figures show changes in water level at the model boundaries. Therefore, these papers do not provide clear evidence on the appropriateness of a 50km buffer.

Centre for Environment, Fisheries and Aquaculture Science (CEFAS). 2017. Assessment of the potential scale of the physical impacts from two tidal lagoons in the Severn Estuary. Reference Number: C5387L. July 2017.

- c. Comment: Natural Resources Wales provided extensive comments on the draft version of this paper on 26 July 2017. We have not seen a final version, but in summary, comments on the draft suggested that the evidence presented did not dismiss the earlier DECC 2010 work referenced above, which suggested far-field effects beyond the 50km buffer, unless a decision had been taken to dismiss effects on water levels that were  $\pm 10$  cm as insignificant. This was not clear in the draft paper, but the final version may include further detail on this. The discussion in Appendix H does not comment on this.

Appendix H goes on to refer to evidence from work done by ABPMer for Tidal Lagoon Power and submitted to the Hendry Review.

*'The results of these studies are also supported by individual and in-combination scheme testing carried out by ABPmer, on behalf of Tidal Lagoon Power (TLP). These results, which included outputs provided to the Hendry Review of tidal lagoons, also show an extent of effect on water levels that extend into the Bristol Channel, but not as far as the proposed 50 km buffer zone.'*

It is not clear exactly what evidence is being referred to here. As it is not referenced we assume it is not in the public domain. Natural Resources Wales has seen draft outputs of modelling work by TLP, but we were not able to reference this in our previous advice as it is not considered to be in the public domain and is marked commercial in confidence. The modelling that we have seen looked at the proposed Swansea lagoon in addition to the most recent available design for the proposed Cardiff lagoon. Whilst detailed calibration and validation of the model has not yet been provided to Natural Resources Wales, and we have a number of outstanding comments to be addressed, the conclusions summarised above do reflect the outputs of this modelling work in terms of predicted zone of influence.

Overall, the evidence to support restricting the zone of influence to 50km is relatively weak and, given comments on the other sources of evidence above, is based largely on unpublished modelling work for two specific lagoons. We would welcome further recognition of the need for projects to fully consider the potential far-field effects on water levels alone and in-combination, and not assume that they will not exceed 50km. This means that there is low confidence that the buffer is precautionary enough and that the correct suite of sites has been screened into the assessment. In addition, the potential implications in terms of transboundary effects have (except for England) been excluded. As such, it remains our advice that the hydrodynamic/physical effects buffer should be Welsh territorial waters plus 50 km.

**77.3.2.2** Water level assessments – we note the statement that *'The growing body of evidence relating to the assessment of predicted effects from tidal range lagoon schemes indicates that changes to flow speed tend to be generally observed local*

to any proposed scheme'. We are concerned that this may downplay changes to water speeds and currents/flow patterns due to the physical presence of the lagoon. For example, future tidal lagoons (such as Cardiff) falling within the southern SRA may extend almost halfway across Bristol channel. This could lead to large scale changes in hydrodynamics, with subsequent impacts on a wide range of fish life processes including juvenile dispersal, foraging opportunities, and energy expenditure.

**78.3.2.3 Step 3 – LSE screening for interest features not considered within this assessment – many diadromous fish range over hundreds (or even thousands) of miles, not tens of miles, as stated here. Sea trout range is also much wider than river lamprey, and for either species the migratory ranges are largely unknown.**

**79.** Pg. 23, 5.2.1 Relevant impact pathways, Direct changes in habitat extent, type and quality – this section should recognise that direct habitat loss can also arise from loss of original habitat within the lagoon, not just when dredging operations occur within the lagoon. Changes in physical parameters such as hydrodynamics and sedimentation can result in a very different habitat within the lagoon which may not resemble the original SAC habitat. It should not be assumed that the habitat within the lagoon will remain either the same habitat for which it was designated, or have the same quality in terms of biodiversity and species abundance. This in turn can affect the suitability of the habitat to support the estuarine fish assemblage, in the same way as the habitats within the Severn SAC estuary feature support this assemblage currently.

**80.** This section also states *“For example, as part of a proposed tidal lagoon development at Swansea Bay, the lagoon seawall has been designed to promote and enhance the ecological diversity of the Bay through the use of bioblocks and rockpools which may promote the settlement of Sabellaria larvae and species associated with hydroid rockpools (Tidal Lagoon (Swansea Bay) PLC, 2014).”* Note that the Swansea Bay lagoon wall enhancements will increase the diversity of the lagoon wall (compared to a lagoon wall without enhancements), but there is no proof that diversity throughout the bay will be enhanced.

In addition, mitigation measures require careful consideration to ensure that they are appropriate to the marine habitats affected. *Sabellaria* settlement on lagoon walls for the SBTL could be considered suitable due to the potential loss of naturally occurring *Sabellaria* in Swansea Bay. However, the use of artificial rocky reefs to increase biodiversity may not be suitable in more sandy/muddy habitats in light of the type of designated habitat being lost.

**81.** Pg. 26, Indirect changes in habitat extent, type and quality – this section contains the following text: *“For all of the above activities, the rate at which habitats recover/adapt from damage will also be a key factor influencing the significance of any impact. Recovery rate will be strongly related to the ecology of the habitats; reef features and richer mudflat habitats for instance are likely to be more susceptible and take longer to recover than sandflats.”*

Some caution is required in relation to this statement – it is not clear whether it relates to the construction or operational phases. Recovery from the operational phase should not be assumed as the projects are for a long time period (e.g. 120

years for SBTL), and do not have sea wall removal as part of the decommissioning plans. Once the physical parameters resulting from the presence of the lagoon are changed, the habitats are likely to be permanently altered as well.

- 82.** Pgs. 26-28, Changes in Water Quality - this section does not discuss the potential for nutrients and / or organic matter to accumulate within the lagoon due to reduced tidal exchange and flushing, and the impacts of this on benthic habitats.
- 83.** Pg. 30, Section 5.2.2, Feature Sensitivities – this section states that it considers both Estuaries and Large shallow inlets and bays. However, the text appears to largely focus on estuaries rather than both estuaries and Large Shallow Inlets and Bays. It should be noted that these features function quite differently from a hydrodynamic perspective.
- 84.** Estuaries feature – the sensitivity of the estuary SAC feature to tidal lagoon impacts is not presented because the report considers that “*overall sensitivity is considered to be reflected in the specific sensitivities of the component habitats*”. There are however discrepancies between the presentation of the habitats assessed and the format of component features within Reg. 35 documents, e.g. for the Severn Estuary SAC. The component habitats are more precisely defined in the Reg. 35 document than presented within the report, for example, within the Reg. 35 document the hard substrate habitat notable communities include habitats such as *Zostera* beds and Peat and clay exposures which are not mentioned within the assessment. It is therefore unclear whether the assessment has taken account of the component habitats as described within the Reg. 35 document or has assessed Annex 1 features in a more general fashion. There are obviously other sites than the Severn SAC which require consideration, but it is not clear how the assessment was made, and this would further influence the impact pathway tables. For example, the potential sensitivity to changes in water quality may have been greater if *Zostera* beds were evaluated. There are also objectives relating to estuary form and function including tidal range, and the wider fish assemblage of the estuary.
- 85.** Subtidal Habitats “Hard Substratum (reefs and seacaves)” - see earlier comment in relation to the effectiveness of artificial substrate to act as a colonising surface for reef. This ability depends greatly on structure design and the materials used, as well as location and exposure to both the physical environment and to potentially colonising organisms. In addition, this section does not include changes in water quality as a potential impact pathway.
- 86.** Pg. 38, Table 8: Assessment of the potential effects on habitats features of relevant European/Ramsar sites, Impact pathway “Changes in water quality (including temperature, dissolved oxygen, suspended sediment concentrations and contaminants)” - accumulation of nutrients and organic matter should be included here as a potential impact pathway associated with water quality.
- 87.** Pg. 40, 5.3.1 Relevant impact pathways and feature sensitivity - we do not agree that sea trout and eels can be considered together, as their biology and life history is considerably different. Sea trout make repeated spawning migrations to and from their natal rivers, although a smaller proportion do stray into other rivers. This puts them repeatedly at risk as they potentially migrate through the same area throughout their life. Eels arrive in UK waters as juveniles and can grow to maturity

in coastal, estuarine or riverine environments. However, they show low site fidelity and do not home to any natal river.

- 88.** Pg. 40, 5.3 Potential for adverse effects on fish interest features – this section includes a number of tables and associated text relating to sensitivities, for both migratory and marine fish species. We note the caveat on each of the sensitivity tables that ‘...*only the estimated sensitivity levels are shown. The level of risk will be dependent upon exposure (project specific). For instance, there would be an increased degree of exposure for European/Ramsar site habitat interest features where a tidal lagoon activity occurs within or near these sites. However, at the present time, there is very little information about exposure given the inherent uncertainties associated with the tidal lagoon policy within the WNMP.*

We advise that a note should be added to these tables to confirm that even where an impact pathway has been assessed as ‘low’, for some projects the impact may nevertheless cause a significant effect. Sensitivities may increase across many of the impacts depending on the location, size or number of lagoons that subsequently come forward, in particular in relation to direct and indirect habitat changes.

In addition, it seems unlikely that “*No direct changes are anticipated to occur to the amount of available spawning or nursery habitat resulting from the installation of a tidal lagoon within the SRA*” as there will be direct loss of habitat from the construction of the walls as well as a highly modified habitat subjected to dredging within the lagoons; there will also be changes to habitats outside the lagoon from changes in physical processes.

In relation to marine fish, we query the focus on herring and sandeel within this section, which only represent two of the many other fish species which form the species of the estuarine fish assemblage of the Ramsar site and typical species of the SAC.

- 89.** Pg. 41, Table 9. Potential sensitivities of migratory fish interest features - we disagree with the level of sensitivity assigned to the migratory fish interest features in some cases. For instance, the sensitivity to ‘*Indirect changes to habitat extent, etc.*’ – it is our view that sensitivity to disruption to olfactory trail should be the same for all diadromous species, which rely on freshwater cues to locate rivers and complete their lifecycle. They may not be returning to a natal river, but are unlikely to divert to another river and not face adverse impacts in terms of additional competition, failure to spawn, increased competition, displacement to lower quality environments, and increased risk of predation, etc. Likewise, salmonids are known to be sensitive to impacts to water quality, especially in terms of higher temperatures or lower dissolved oxygen levels.

- 90.** Pg. 43, Direct changes in habitat extent, type and quality, 3<sup>rd</sup> paragraph - it should be noted that not all species will be able to switch prey preference to take advantage of different food sources. Diet analysis of sea trout for instance, has shown that they primarily feed on pelagic fish, sprats and sandeel, which may become less prevalent when lagoon walls are introduced. Additionally, although fish are mobile and able to move away from adverse conditions, the text in this section seems to suggest that there are no adverse impacts from doing so, for either the displaced fish, or the populations in the areas that they are displaced to - there are

costs involved in terms of the energy cost of displacement, additional competition for resources, changes in predation, etc.

91. Pg. 43, final paragraph - River lamprey predate flatfish, which are a benthic species that may be affected by tidal lagoon development.
92. Pg. 44, Indirect changes in habitat extent, type and quality, final paragraph – the disruption of freshwater/olfactory trails would be an issue for all diadromous fish, not just salmon as stated, with potential impacts as set per pt 89.
93. Pg. 45, Changes in water quality – the text in this section appears to play down impacts from additional suspended sediment levels. It talks about diadromous fish simply relocating or avoiding affected areas, without acknowledging the potential associated impacts (as set out in pt. 89). Furthermore, while many diadromous fish are well adapted to cope with high levels of suspended solids, other changes to water quality, some of which may come as a result of high levels of suspended solids, such as increases in temperature or low oxygen levels, can cause adverse effects on salmonids. These potential impacts do not appear to be included in the section.
94. Pg. 47, Disturbance via noise and vibration - hearing generalists may be less sensitive to disturbance from noise and vibration, however, in combination with other construction activities the effects may be more pronounced, especially given the large spatial and temporal scale of construction for lagoons.
95. Pg. 49, Barrier to movement through presence of infrastructure and habitat fragmentation for aquatic species – it should be noted that the large scale of potential lagoon development makes it likely that;
- smaller watercourses would be enclosed inside the lagoon footprint;
  - hydrodynamic changes to freshwater flows, tidal flows and flow speeds will be on a large scale with subsequent potential for significant adverse effects on the migration of diadromous fish;
  - large volumes of water exchange on each tide and the use of selective tidal transport by many fish species means that encounters with lagoon structures and turbines is inevitable;
  - entrapment inside lagoons, whether temporarily or long term, has the potential to lead to failure to complete migrations, disruption to spawning or increased predation risk.
96. Pg. 50, Collision risk - collision risk will also be higher for weak swimming species and species which use selective tidal transport, which are more likely to be drawn into the turbines, or select to swim with flows going into the turbines.
97. The assessment has considered exposure to risk of collision to individual fish species, but has not addressed the possible or likely effects of this at a population level. **This is a key omission** given the results of the 2010 DECC Severn Tidal Power study that concluded:  
*Fish are likely to be severely affected with local extinctions and population collapses predicted for designated fish, including Atlantic salmon and twaite shad. This could*

*mean the loss of twaite shad as a breeding species in the UK as 3 of the 4 rivers where it breeds run out into the Severn estuary;*

It is unclear why this risk has not been referred to either in this Appendix or in the main HRA report, and it is our view that this potential impact should be recognised in the HRA. Life cycle modelling may also be required to assess the long-term impacts.

- 98.** This section should also include reference to the risk of increase in predation due to changes in species composition, to attraction of predators to structures, and increases in roosting/resting places for avian predators.
- 99.** Pg. 58, 5.4 Potential in-combination effects - there seems to be some confusion in this section between what should be considered to be background data and therefore included in the alone assessment, and what should be considered to be a separate plan or project and therefore considered as part of the in-combination assessment. Whether something has a clear start and finish point is a useful consideration in this context. Table 11 appears to compound this confusion. Examples of this are fishing and shipping which are not plans or projects, and therefore should be considered as part of background in the alone assessment, not the in-combination assessment.
- 100.** Pg. 61, 6 Assessment Conclusions and Mitigation Requirements – we support the approach proposed for evidence gathering.
- 101.** Page 62, Chapter 6, Section 6.1.1 Marine Habitats, Table 13 – it should be noted that it is unlikely that micro-siting can be a form of mitigation due to the large scale of tidal range projects. The entirety of the Severn SAC is composed of habitat features, whether they are component features of the estuary feature such as reef, sandbanks etc., as well as the estuary feature on its own. Therefore, loss of habitat for any project within the SAC will inevitably result in loss of habitat and cannot be mitigated, only potentially compensated for. Therefore, micro-siting around features in the Severn SAC is unlikely.

The table also suggests the following mitigation measure “*Aim to site structures in areas with low suspended sediment loads.*” It should be acknowledged that this will be difficult in the southern SRA.

In addition, Table 13 would benefit from including the introduction or spread of invasive non-native species, and therefore the need to consider developing construction materials that reduce the risk of marine invasive non-native species establishment.

- 102.** Pg. 64, Table 14. Mitigation typical of tidal energy schemes for fish interest features – it is useful to have the broad mitigation types set out and linked to the different impact types. Whilst recognising that these are high level, it is important to recognise the challenges in relation to some of the measures proposed - we have the following comments:
- d. The scale of potential lagoon development makes it difficult to see how site selection can practicably avoid loss of habitat or fragmenting migratory routes.

- e. The positioning of the turbines is likely to seek to ensure maximum velocity and head differential, and this will likely coincide with patterns of fish movements as many fish will tend to follow favourable tidal and water current flows.
- f. Use of Individually Based Modelling (IBM) is contentious as there is a lack of available data and evidence to construct credible models of fish behaviour. This was highlighted through the fish Expert Topic Group for the Cardiff lagoon proposal.
- g. Use of behavioural deterrents for fish (acoustic, lighting, or bubble curtains) is not considered feasible on the scale of lagoon intakes (based on experience with Pembroke Power Station (which abstracts many more clupeids than predicted in the HRA (it was predicted that the deterrents would result in no clupeids being entrained)) which has an intake an order of magnitude smaller than that proposed for Swansea Bay Tidal Lagoon for which details of deterrents have yet to be received). In addition, there is little credible and independent research to support the effectiveness of such measures.
- h. The provision of suitable replacement habitat may not be feasible for many diadromous fish species. Furthermore, this appears to suggest that there is some under-utilised or barren/low value habitat, which can be converted into suitable replacement habitat for displaced species.
- i. The measure to “avoid smooth rock material/increase roughness” may aid for any loss of *Sabellaria* sp. reef feature, but the HRA does not state how this would serve to mitigate direct changes to fish habitat extent, type and quality. The rock may attract rocky shore species but how this is linked to mitigation for the loss of the estuarine fish assemblage is not clear.

**103.** Pg. 67, 6.2 Additional evidence gathering measures – the text states that *“Through the continued involvement of SNCBs, marine planners/regulators and wider stakeholders in such initiatives, the lessons learned from tidal lagoon (and other) projects, their associated mitigation and monitoring work and any further strategic information will be fed into the marine planning and regulatory processes”*. It should be emphasised that, as no tidal lagoons have been built to date, there are currently no lessons learnt with regards to associated mitigation and monitoring, beyond baseline monitoring. In addition, once a tidal lagoon is operational it is likely to take five plus years before meaningful lessons can be learnt.

**104.** It might be useful for this section of the HRA to include reference to the review carried out by Marine Space for Natural Resources Wales on evidence relating to the likely success of recreation of marine habitats as part of our advice on the Swansea Bay Tidal lagoon Project.  
*Advice for Adaptive Environmental Management, and Marine Biodiversity Enhancement Measures for Coastal Lagoon Developments Prepared by: Marine Space Ltd and Associates Feb 2015.*

This report can be provided on request. The review highlights the challenges in recreating marine habitats other than saltmarsh, and identifies the risks in using enhancement/restoration/recreation of marine habitats as mitigation or compensation.

It should also be noted that as part of Natural Resources Wales' marine casework guidance development, we are due to publish guidance in 2018 on benthic monitoring and characterisation for marine developments. This guidance complements the recently published JNCC benthic habitats monitoring guidance aimed at protected site monitoring.

[http://jncc.defra.gov.uk/pdf/Marine\\_Monitoring\\_Strategy\\_ver.4.1.pdf](http://jncc.defra.gov.uk/pdf/Marine_Monitoring_Strategy_ver.4.1.pdf)

- 105.** Pg. 69, Habitats Directive Article 6(4), 2<sup>nd</sup> paragraph – it is not clear what '*Ultimately this would be established through a project-level HRA designed to ensure no AEOI*' means – it should be the project that is designed to avoid the AEOI, not the assessment.
- 106.** Pg. 69, 7 Habitats Directive Article 6(4) – we suggest that the impact pathways listed here as bullet points should also include Changes in Water Quality, as this is specifically considered in marine habitats and fish assessment sections of this Appendix.
- 107.** Pg. 71, 7.2 Project level compensation options - there is no mention of measures to compensate for loss of marine fish and/or their supporting habitat other than the designation or creation of new estuarine habitat. New estuarine habitat should support the diverse assemblage of estuarine fish for which the Severn SAC was designated, in order to be considered as a compensation option for this aspect.
- 108.** Pg. 74, pt. 7.2.3 Assessment of enhancement opportunities - the HRA proposes a range of compensation measures to mitigate for the adverse effects on diadromous fish; stock enhancement (habitat restoration, stocking or predation control), fish stock translocation, and selection of alternative SACs (see pts. immediately below for further detailed comment). We note however, that while the challenges of securing adequate compensation is recognised in the document, the feasibility of the compensation measure is not considered in any detail

We consider that there are several constraints both in practical terms and in terms of Natural Resources Wales policy which means that we can have little confidence that the proposed measures would be deliverable or feasible. The proposed list is a list of potential options, some of which are tried and tested, while others are purely speculative. As reiterated elsewhere in this response, Natural Resources Wales considers that a strategic approach is required to examine the scope and feasibility for compensation measure for fish. The objective would be to examine and evidence potential mitigation and compensation initiatives from a 'first principles' point of view, and examine all the likely constraints, risks and benefits to provide a framework of measures which can then be adapted at individual project level.

- 109.** Enhancement of habitats/migratory spawning and nursery habitats – it should be noted that in most rivers, addressing factors in the freshwater environments by river restoration and enhancement, improving access to and removing barriers to spawning and nursery habitats have been on-going over many years driven by other legislation, including meeting conservation objectives and Water Framework Directive targets etc. Thus, most improvements have either been done, or are committed to through other means of delivery. Furthermore, the potential scale of compensation required is unlikely to be commensurate with the potential available.

**110.** Migratory stock enhancement - various option for enhancing migratory stocks are discussed in this section, including stocking, limiting exploitation and predator control.

- j. Consent would be required from Natural Resources Wales to remove brood stock fish and stock progeny fish into any inland waters. Natural Resources Wales has adopted a policy of not consenting stocking of migratory salmonids, as evidence suggests that stocking is not cost effective, and can damage wild fish stocks, through selecting and limiting the parentage. Also, artificial rearing conditions limits the genetic diversity, promotes survival of less fit offspring and bypasses natural selection processes. Although this policy is specific in covering salmonids, the same constraints are likely to operate for other species. It is therefore unlikely that artificially rearing fish to boost fish stock or enhance populations can be seen as a viable compensation measure, and may also contradict the stated conservation objectives of maintaining the range of genetic types of the population.
- k. Limiting exploitation by fishermen has been used as a fishery management tool in the past, where commercial fishermen has been paid to give up the commercial licences to boost stocks. However, current catch controls for salmon is already limiting exploitation by commercial nets to a very low number, and further controls are being proposed for both commercial and recreational fishing in Wales which would mean that no salmon can be killed. There is no commercial or recreational exploitation of shad or lamprey. The potential for enhancing natural stocks through this compensation measure is therefore extremely limited.
- l. With regards to predator management, most predators of diadromous fish (seals, porpoises and piscivorous birds) are also protected species and therefore the options to control them are limited. Furthermore, the benefits of doing so are largely unknown at the current time.

**111.** Fish translocation - the same considerations on maintaining genetic diversity would operate for translocating populations into new habitats. Translocation, furthermore could only be undertaken if suitable and 'virgin' new habitat could be found where the translocated species would not be in competition with the 'indigenous' individuals or species. Salmon, river and sea lamprey (and eels and sea trout) are already indigenous to most UK rivers, so finding suitable rivers for translocating a population to would be challenging. In addition, salmon are genetically adapted to their natal river, and each river, and even sub-catchment has a genetically distinct stock, which would make it difficult to see how translocation would be feasible. Shad only maintain a breeding population a few rivers in England and Wales, although they have been recorded in many more. However, the fundamentals of how to maintain a breeding presence in some rivers but not in others remains unknown, and hence it is not possible based on current knowledge to predict whether translocation would be successful.

**112.** Habitat compensatory measures – there are clearly likely to be significant challenges around delivering adequate compensatory measures for impacts on habitats, especially physically in terms of suitable land that is potentially available. Difficulties of this nature have already been encountered with the National Habitats Creation Programme. As elsewhere in this response, we emphasise that pushing this down the line to project-level applications and assessments is not advisable - strategic consideration of these issues should be taken forward at the current time.

113. Pg. 76, Section 8 Conclusion – for marine habitats, it is not clearly set out anywhere in the assessment, for which habitats and associated European sites it has not been possible to conclude no AEOI, and which have therefore passed through for consideration under Article 6(4). It is our advice that this needs to be clearly set out in a summary table.
114. This section notes that from a habitat perspective there is potential for sufficient compensatory measures to be delivered. The likely scale of compensatory habitat required is not quantified at the plan level, but even without considering the issues raised above regarding ZOI for water levels, compensatory measures would be extremely challenging. In Wales, we know through our own work on the National Habitat Creation Programme that it can be incredibly difficult and expensive to develop habitat creation projects, and that there are very limited opportunities which can be considered straightforward. As set out earlier in this response, Welsh Government should therefore note that a policy to strongly encourage tidal lagoon development in Welsh waters is likely to have a significant reliance on delivery of compensatory measures outside of Wales.
115. The HRA document text states that *It is not envisaged that the provision of potential compensation requirements will be considered strategically at the scale of the WNMP due to the level of uncertainty in future requirements.* We disagree. Given the scale of any tidal lagoons that are likely to flow from tidal lagoon policy, it is clear what many of the likely impacts are likely to be, and therefore the likely broad requirements for compensatory measures. As we have reiterated elsewhere, it is therefore our view that it is imperative that the strategic consideration of compensatory measures is started now, and not left to project level, where it would in our view stand less of a chance of ensuring that the overall coherence of the European site network is protected.
116. As with the other Appendices, this Appendix requires a clear summary table setting out which sites (including transnational sites) and features for which it has been unable to conclude no AEOI for both fish and supralittoral, intertidal and subtidal habitats.
117. Pg. A3, Appendix A, Table A1: Activities and Pressures Associated with Tidal Lagoons - nutrient and organic enrichment have not been selected as pressures. This should be added. There is a possibility for build-up of nutrients and organic matter lagoons due to input and accumulation from non-controlled land-based sources as well as natural processes within the marine part of the lagoon, combined with reduced tidal exchange and flushing capacity within the lagoon.
118. Pg. D1, Table D1 – Tabbs Gout & Portland Grounds – this table states that construction has not started when actually these projects have been completed.

#### **Appendix I Appropriate Assessment – Birds**

119. Offshore SPAs and pSPAs should be considered in this assessment – Natural Resources Wales did not advise that they should be excluded, as stated on pg. 14.

- 120.** Pg. 10, 3.2 Appropriate Area of Consideration, final paragraph – the text in the final paragraph appears to describe the wrong screening criteria – it is not where the site overlaps with the SRA + 50 km, but where foraging range overlaps with it, then the site is screened in – this is important and is not currently clear.
- 121.** We have significant concerns regarding the method used to assess potential impacts on birds. This appears to attach the highest sensitivity to impacts that affect the most functional groups/species interest features. Taking this approach understates impacts that have a large effect on a smaller number of functional groups/species interest features. This is of particular relevance to emergence regimes changes i.e. changes that have the potential to cause loss or reduced exposure of intertidal habitats, which we consider may have very significant effects on certain groups of birds. The potential scale of this particular impact begins to get played down from Table 2 onwards, and leads to it only receiving limited assessment and discussion throughout the Appendix, and especially in section 5.2. (5.2.7).
- 122.** The approach taken, outlined in the previous point, also appears to understate the significance of potential habitat change. For example, change in habitat which could then have an effect on prey availability such as sandy habitats in Liverpool bay SPA changing to mud and losing the bivalve and fish prey that the common scoter and Red-throated diver features of the site rely on - this broad type of effect does not appear in Table 8.
- 123.** Pg. 29, 5.2.2 Collision below water – we disagree with the statement that ‘*the likelihood of an in-series and in-combination effect is however relatively low*’. This would depend on the siting of the lagoon and the state of the potentially affected population at a site.
- 124.** Pg. 31, 5.2.3 Habitat structure change, Box 3a – in the first row the Table refers to ‘*localised reduction in foraging potential*’. Loss of foraging habitat could be significant depending on the species and how far afield the effects on habitats extends. For instance, Little tern forage within 3km of their nesting ground.
- 125.** Pg. 32, Box 3a – we disagree that construction effect and operational effect is a low impact to seabirds at sea – this could have a significant effect on red-throated diver or common scoter foraging areas, depending on the siting and size of lagoon, and the foraging range of the seabirds affected.
- 126.** Pg. 39, 5.2.5 Visual disturbance – it is worth noting that noise and vibration can have an effect on prey such as sprat breeding areas, which can then have a knock-on effect due to reduction of prey for birds.
- 127.** Pg. 39, Box 5a: Visual Disturbance Summary of Effects - the table quotes a 300m disturbance effect. This probably comes from work relating to wintering wildfowl and waders, so is not directly relevant to coastal breeders.
- 128.** Pg. 53, Terrestrial Noise – the document states that ‘*...these effects would be site specific and localised and unlikely to generate AEO*’. It is our view that a degree of caution is required here, given the proximity of both the north and the south SRAs to the estuarine SPAs, namely The Dee SPA and The Severn SPA.

**129.** Pg. 65, 6.3 Conclusions of Compensation Efficacy – this section argues that it would be possible to provide appropriate compensatory measures for an individual lagoon, but acknowledges the challenges this presents at a large scale when this is considered with other potential lagoons within the SRAs, and in combination with other similar developments outside of the SRAs. We share the concerns in relation to delivering appropriate compensatory measures, for both multiple and single lagoons, in particular the challenges around delivering potentially significant areas of intertidal habitats that may be lost in the Severn estuary, or sandy subtidal habitat in Liverpool Bay SPA, utilised by common scoter and red-throated diver features for foraging.

As part of the Severn Tidal Power study, a *strategic level review of the issues surrounding potential habitat creation mitigation / compensation measures for SPA waterbirds affected by tidal power development on the Severn Estuary* was carried out by the British Trust for Ornithology (BTO). This concluded that adequate compensation for the waterbird features of the SPA could not be found locally. The report looked at managed realignment, creation of freshwater wetlands locally, as well as creation of new intertidal habitats at a distance from the Severn, and found that these measures might work partially, but that there is considerable risk in intertidal creation elsewhere being utilised by populations from the Severn estuary. It also needs to be borne in mind that habitats created on the east coast of the UK would not act as a buffer for birds in severe winter conditions (as the Severn estuary does now), or provide vital stop over sites for certain passage migrant bird species that migrate along the west side of the UK.

With regard to Red-throated diver and Common scoter in Liverpool Bay SPA, these species rely on shallow sandy bottomed sea areas in which their food of fish (clupeids) and bivalves live. It is likely that the sea floor within any lagoons built with the north Wales SRA will change from sand to mud, and as a consequence not provide suitable habitat for these species to forage. It is also unclear what would happen to the sea floor habitat adjacent to lagoons due to changes in coastal processes, and these may also become unsuitable. It is difficult to see how suitable sandy subtidal habitat could be re-created elsewhere.

We also note that Pg. 68, 7.2 Project Level Compensation omits to mention the potential loss of sandy subtidal habitat in Liverpool Bay SPA, utilised by the common scoter and red-throated diver features for food, as discussed above.

**130.** Pg. 71, 8. Conclusions and recommendations - in relation to ways of delivering appropriate compensatory measures, the text in this section refers to '*revisions to the interpretation of the Habitats Directive*' in several places, for example pg. 76. We have concerns that this appears to be advocated as a means of delivering compensatory measures, as it's acceptability is purely speculative. It is our view that assessments should work within the parameters of current legislation and caselaw, not attempt to second-guess changes that may or may not occur at an unspecified time in the coming years.

**131.** We note that this section makes a clear recommendation for a strategic approach to compensatory measures to be started now, something that we strongly support, and have expanded upon elsewhere in this response.

- 132.** As with the other Appendices, this Appendix requires a clear summary table setting out which sites (including transnational sites) and features for which it has been unable to conclude no AEOI.
- 133.** Appendix 1: Construction and Operation related impact pressures for all screened in sites and associated interest features – these tables are poorly explained, and difficult to follow. Assuming that this a key place in the HRA where sites and features, including transnational sites where AEOI cannot be ruled out are listed, it requires greater clarity.