Marine Scotland

The Scottish Government

BLUE SEAS – GREEN ENERGY
A Sectoral Marine Plan for Offshore Wind Energy in Scottish Territorial Waters

PART B
Post Adoption Statement

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The Scottish Government, Edinburgh 2011

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PART B

Post Adoption Statement

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B.1 POST ADOPTION STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) STATEMENT

B1.01 This Section of the Post Adoption Statement focuses on how the SEA findings have informed the finalisation of the Plan for Offshore Wind. Part 3 of the Environmental Assessment (Scotland) Act 2005 sets out the requirements for the post-adoption stage of SEA. This includes publication and advertising of the Plan, the Environmental Report and a Statement setting out:

- How environmental considerations have been integrated into the plan (Section 18(3)a of the Environmental Assessment (Scotland) Act 2005);
- How the environmental report has been taken into account (Section 18(3)b);
- How consultee opinions have been taken into account (including transboundary consultations)[1] (Section 18(3)c and d);
- The reasons for choosing the plan or programme as adopted, in the light of the other reasonable alternatives considered (Section 18(3)e); and
- Measures to be used to monitor the significant effects of the plan (Section 18(3)f).

B1.02 In order to fulfil these requirements, in the following paragraphs the findings of the technical and environmental assessment have been brought together and linked with the consultation findings on a topic by topic basis. To aid interpretation of the statement, the following questions provide the structure for this part of the report:

1. **What options were considered within the SEA, and how were they identified?**
2. **What environmental effects were predicted by the SEA and what did consultees say about them?**
3. **What were the views on developments in specific locations or regions?**
4. **What were the views on the Plan as a whole and its SEA?**
5. **What are the reasons for choosing the Plan as adopted?**
6. **What monitoring will be undertaken?**

What options were considered within the SEA, and how were they identified?

B1.03 The first set of issues and questions relate to how options within the Draft Plan were identified for the purposes of the SEA. This was an important part of the SEA and planning process, as it allowed the SEA to focus on areas where offshore wind was potentially feasible, as opposed to generally assessing the whole area of Scottish Territorial Waters, including areas where development was unlikely to be feasible.

B1.04 The development of the Draft Plan was informed by detailed consideration of a range options for development. At the outset of the process, the 10 sites

[1] Two responses were received from other EC Member States (Denmark and the Netherlands) as a result of transboundary consultation. Responses included general points of interest, and therefore no specific section of the Statement focuses on these responses. Where issues were raised, they have been reflected in the broader discussion of key issues as appropriate.

announced by The Crown Estate in 2009 were identified as a practical and realistic set of potential development options for the Plan. However, the Plan also aimed to look beyond these sites to give fuller consideration to options for development going forward into the medium and long term. As a result, and in consultation with the Offshore Wind Industry Group (OWIG), The Crown Estate's Marine Resource System (MaRS) was used to ascertain where development may or may not be sustainable as a result of baseline environmental and technical conditions. This took into account a range of environmental and technical constraints and exclusions, as set out in Section 2 of the Draft Plan.[2] This led to the identification of a further 30 medium term 'options' – essentially forming areas of search where development could be considered further.

B1.05 In broader terms, the SEA also included consideration of the option of 'business as usual' as an overarching alternative to the Draft Plan as a whole.

B1.06 The SEA subsequently assessed the individual and cumulative effects of these options, together with the short term options. The findings from this process were set out in full in the SEA Environmental Report[3] and its Appendices[4], and are summarised below under the relevant headings.

Consultee views on options selection

B1.07 The Consultation Analysis Report[5] and a further Addendum set out the detailed views from respondents on how the options were identified, including information used within this process. Three key questions (see below) were highlighted to steer consultees towards commenting on this aspect of the Plan and its SEA. Views on these questions were varied. The following key points emerged in response to each of these questions:

Consultation Question 1. Does the mapping of exclusion zones, environmental issues and technical issues provide a reasonable basis for modelling the options?

B1.08 Some consultees considered the options to be a reasonable first step in the planning and SEA process, whilst others sought clarification of the status and weighting of options as a result of their inclusion in the Plan.

B1.09 Concerns about the limitations of MaRS were raised by a number of consultees, primarily those who believed that the outputs were dependent on providing good quality environmental data. Some considered that the modelling would be commercially biased, noting for example that MaRS does not enable non-designated areas to be explored. Others were of the view that environmental matters were too heavily weighted within the mapping, and that social and cultural issues should be afforded further consideration. Of the SEA Consultation Authorities, Scottish Natural Heritage (SNH) raised particular concerns about MaRS

[2] http://www.scotland.gov.uk/Publications/2010/05/14155221/8
[3] http://www.scotland.gov.uk/Publications/2010/05/14155353/0
[4] http://www.scotland.gov.uk/Publications/2010/05/14155741/0
[5] http://www.scotland.gov.uk/Publications/2010/12/22153227/0

and suggested that further testing should be undertaken to ensure that these options were valid. In the meantime, restraint was recommended to reflect their concerns.

B1.10 The transparency of the MaRS system was questioned, and some consultees suggested that it would be useful to involve stakeholders more fully in data collection and input, to ensure that the information used, and therefore the options identified, accurately reflected their interests. The need to acknowledge and address data gaps was also raised. Industry stakeholders stated that the use of MaRS had meant that the SEA had sought to conduct too detailed a level of analysis, within what should be a high-level national plan. This view was supported by some other individuals and organisations.

B1.11 Some respondents noted that different criteria had been used to identify the short and medium term sites. This remained a fundamental point of concern throughout the SEA and associated consultation process.

Consultation Question 2. Do you have any further technical or environmental information you think we should take into account as we refine the Draft Plan?

B1.12 A range of additional information was raised by respondents, to take into account within the identification of options. This included reference to onshore development, including the grid connections and support facilities, other types of renewable energy development, further socio-economic information, information on fishing, aviation, defence activities and munitions and more detailed environmental evidence.

B1.13 More specifically, the key environmental information raised included bathymetric information, bird data, Marine Protected Areas, bats, mobile species (marine mammals and fish), landscape sensitivity information, aspirations for marine and coastal national parks, archaeological data, World Heritage sites in England and Northern Ireland. In addition to using this available information, some respondents emphasised that the Plan should explain how strategically significant data gaps will be addressed.

Consultation Question 3. Do you consider that the Draft Plan represents a practical set of options?

B1.14 Some organisations viewed the options to be practical, at the very least forming a useful starting point for the assessment. Some reiterated views raised in response to Question 1 that the options are too detailed for a high level, national plan. There was also overlap with comments on the data sources used to define the medium options, with respondents considering them to be impracticable if, in their view, their interests had not been adequately covered.

B1.15 Suggestions of alternative approaches included setting a clearer target for the Plan as a whole, to better articulate the options for contributing these aims at different scales.

Response to issues raised within the Finalised Plan

B1.16 The table on the next page explains how these issues and views have been addressed within the Plan.

Issue / View	**Response**
Overall shortcomings of MaRS including data, transparency should be recognised.	These shortcomings have been recognised and taken into account. Data sources have already improved since the Draft Plan was developed, and it is expected that this will continue to be the case over the course of the Plan's two year review cycles. As explained in Section B5, further work (sensitivity testing) has been progressed and will be further undertaken by Marine Scotland Science to explore the application of MaRS to options identification more fully.
Options are overly specific for a national level plan.	To reflect uncertainty at this scale, the medium term options are simply regarded as indicative areas of search. These will be revisited as the above further study progresses.
Inconsistency of mapping approaches used to identify short and medium term options.	This is acknowledged as an issue for the Plan. However, whilst different processes were used to identify the short term sites and medium term options, the SEA applied the environmental assessment objectives to them in a consistent way. The different approaches to selecting sites and options is likely to have been a key factor in the varying environmental effects identified in the assessment.
Comments on the additional data that should be used to feed into the MaRS process / identification of options. Acknowledgement of ongoing data gaps is required.	See the comments relating to MaRS above. These data can be taken into account and developed further, in consultation with key stakeholder organisations as the MaRS modelling is revisited within the 2 year review process.
Clarification should be provided on the status of options within the Plan.	As clarified in the Plan, inclusion of any site or option within the Plan does not imply 'deemed consent' for development in that area. The spatial recommendations and mitigation proposals are intended to be guidance which should be taken into account, as and where appropriate, at the project level.

What environmental effects were predicted by the SEA from the Draft Plan as a whole, and what views were expressed about them?[6]

B1.17 The SEA predicted the environmental effects that could arise on the environmental receptors that are required to be considered under the terms of the SEA Directive and consequently the Environmental Assessment (Scotland) Act 2005. Extending beyond the focused consultation questions, the SEA findings, and comments in response to them, were extensive.

B1.18 Integrating the responses to these questions with those on the options and regional prioritisation, key issues are set out in relation to the overall topics and issues below.

Climatic Factors

B1.19 The environmental assessment concluded that the Draft Plan would have major beneficial impacts on climatic factors as a result of the role of operational wind farms in the long term in reducing greenhouse gas emissions. In terms of the short term sites, it was noted that the Argyll Array had the potential to make the greatest positive contribution to renewable energy generation targets as a result of its size and location.

Consultee views

B1.20 Consultee views relating to this topic area tended to be made in conjunction with opposition to some of the short term options, rather than taking the form of broader comments on the Plan as a whole. A number of consultees raised concerns that the proposed developments would make only a minimal contribution to climate change mitigation. Some contended that this was due to some sites, particularly in the Solway Firth but also Kintyre, being located in areas with relatively low wind speeds. Others believed that wave and tidal energy generation would be more reliable sources of energy than offshore wind. Again in the South West, many asserted that more information on the efficiency and output of Robin Rigg wind farm should be made available, to allow their view that offshore wind was not worthwhile to be substantiated. A few consultees expressed doubt that climate change was a real issue and therefore questioned the necessity and efficiency of offshore wind development.

B1.21 A significant number of consultees expressed support for the broad aim of the Draft Plan to secure a greater contribution to climate change mitigation from offshore wind or renewable energy more generally. This view was often tempered by comments that this should not mean that offshore wind energy development should take place at any cost. The RSPB, for example, questioned the benefits identified by the assessment as they contended that climate change impacts will arise over the very long term and are uncertain. As a result clarification was sought as to how the precautionary principle had been applied to the assessment.

[6] This part of the SEA Statement extends beyond the issues which were considered under the terms of the 2005 Act, to include consideration of technical issues which also contributed to the development of the Plan itself.

Issue / View	Response
The Plan was predicted to generate significant positive effects on climatic factors.	The need to maximise the contribution of offshore wind to renewable energy generation in Scotland has underpinned the development of the Plan. The finalised Plan has drawn on the available evidence and responses to the associated consultation, to achieve this in a sustainable way.
Consultee views on the potentially limited contribution of offshore wind to climate change mitigation.	The Scottish Government is committed to maximising the contribution of offshore wind, along with other types of renewable generation, to the overall energy mix. This will help to ensure that Scotland meets ambitious renewable energy and climate change targets and secures related economic and environmental benefits. Views on the productivity of offshore wind are recognised but the options are nevertheless expected to provide scope to generate a significant amount of low carbon electricity.
Consultee preferences for wave and tidal energy generation.	This Plan only goes as far as considering the opportunities for offshore wind energy generation. The process of developing a separate sectoral plan for wave and tidal energy has commenced, building on the published Marine Energy SEA as a starting point for the process. These sectoral plans will be taken into account within the national and regional marine planning processes. The SEA took into account potential for cumulative effects as far as possible at this stage. In addition, cumulative effects and synergies between offshore wind and marine energy generation will be considered as part of the development of the Marine Renewables Plan, and will be subject to further assessment and public consultation.
Consultee views that renewable energy should not be given preference over other users of the sea or environmental issues.	There is no intention to develop renewable energy in a way that overrides the needs of other users of the sea or environmental issues. To provide reassurance in response to consultee concerns, this is noted within the Plan itself.

Water Resources

B1.22 There is potential for this type of development to disturb the seabed, with consequences for the water environment and the associated habitats and species. The assessment concluded that the impacts of the Draft Plan on water quality remained uncertain at this stage. However, it was noted that this type of effect could impact on the ability of fish species to spawn, breathe and feed, and that there was potential for shellfish waters to be affected.

B1.23 The SEA showed that construction and decommissioning effects would be temporary but could be significant. Extending into the wind farm operational phase, removal of energy from the water column was also found to have the potential to affect wave climate, hydrology and water quality, and these effects remain largely uncertain at this stage.

Consultee views

B1.24 Some consultees asked for further clarity on the impact of the Draft Plan on the water environment. The Scottish Environment Protection Agency (SEPA) identified areas where impacts on water quality had the potential to be most significant and advised that the baseline information on water could be improved by making reference to the status of waters, as classified in line with the Water Framework Directive. Fishing sector respondents questioned how the Draft Plan related to the requirement for marine waters to reach good environmental status by 2020.

B1.25 SEPA identified where, at a regional, option and site level, there may be particular issues arising with water quality. This included: Bell Rock, Kintyre, N1, and NW8. Where this is found to be the case, there would be a need to justify development on the basis of a lack of other alternatives. SEPA pointed out that, in some cases, further morphological assessment will be required.

B1.26 Other consultees raised issues about the potential effects of development on the wave climate and sediment. The wave climate (dampening of waves, changes to height or direction) was raised by several people, including those with particular interests in water sports, and those with more general environmental awareness. Sediment movement and effects on currents was also highlighted as an issue. In contrast, some developer groups suggested that, on the basis on information gathered at the regional level, it may have been possible to scope water out of the assessment.

Issue / View	**Response**
Effects of the Draft Plan on water resources were viewed as uncertain.	This uncertainty has been taken into account within the finalised Plan. Further assessment focusing on the effects of offshore wind on water, and in particular the wave climate is required, as noted in Section B5.
Impacts on the wave climate and currents were noted by consultees.	
SEPA identified areas where water is a key concern and recommended further assessment. The context of the Water Framework Directive and good environmental status was emphasised.	This issue has been noted, and will require further consideration at the project level.

Geology, Sediments and Coastal Processes

B1.27 The SEA concluded that effects of the Draft Plan on geology, sediments and coastal processes were also uncertain. However, potential for disturbance of the seabed was raised, together with possible effects on sediment transport dynamics and water quality, with secondary implications for other matters including biodiversity.

B1.28 It was noted that the short term sites in the east region had the highest potential to impact on the seabed and cause erosion or accretion of designated geological sites, and there was potential for these effects to combine with other activities to generate more significant effects in areas such as the Firth of Forth.

Consultee views

B1.29 Responding to the consultation, the fishing sector recommended more work on impacts on sediments, including research to establish its consequences for commercial fishing operations. This was also raised as local concern in some areas, including Wigtown Bay and Kintyre. In terms of the Solway, people were concerned that sediment disturbance could also mobilise radioactive particles on the seabed.

B1.30 Coastal processes were also raised and potentially sensitive areas highlighted. This included the Gauldrons and the Machrihanish Dunes on the Kintyre coast, and Tiree. Geology was also a concern in these locations, in terms of ability to construct wind farms and the likelihood of seismic activity at Kintyre.

Issue / View	**Response**
Effects of the Draft Plan on geology, sediments and coastal processes were viewed as uncertain.	This uncertainty has been taken into account within the finalised Plan. Further research focusing on the effects of offshore wind on geology, sediments and coastal processes is proposed in Section B5 of the Plan, which highlights the need for collaboration between key parties to achieve this. This issue will also need to be explored in more detail within the site licensing process.
Impacts of sediments was raised by consultees, including the fishing sector.	
Impacts on coastal processes was raised generally, and in relation to specific locations.	
Geology and coastal processes was raised as a potential issue in relation to Tiree and Kintyre.	These issues have been noted and identified as key issues requiring further consideration in the mitigation measures identified in the finalised Plan (West Region).

Biodiversity, Flora and Fauna

B1.31 A range of effects were predicted in relation to this environmental topic. Adverse effects included those that could impact on underwater habitats and associated species in the footprint of the development, displacement or disturbance of birds, mammals, fish, benthic communities and flora through a combination of factors including noise (multiple noise sources), vibration, visual and light intensity changes, water quality changes, habitat disturbance or the presence of structures or

vessels. Further potential cumulative effects were identified, particularly in relation to mammals and migratory fish from an increased number of barriers affecting movement, multiple noise sources during construction and increased vessel disturbance. It was also noted, however, that many of the effects would arise during construction and decommissioning and may therefore be temporary and reversible.

B1.32 Given the high level nature of the Plan at this stage and acknowledged data gaps, the assessment showed some uncertainties in these types of effects. This included impacts on nature conservation sites through changes in coastal processes and sediment circulation. In addition, it was noted that the sensitivity and behaviour of species to particular noise and vibration generating activities was uncertain and that species distribution is also unknown. In addition, effects may vary from those predicted depending on the baseline at the project level. For example, effects may be less significant in areas which have already been subjected to trawling.

B1.33 Positive effects were also predicted by the assessment, including the creation of artificial habitats for marine organisms resulting from the presence of new structures.

B1.34 In terms of the options, it was noted that in the North East and East, there is potential to affect the population of bottlenose dolphins which is resident in the Moray Firth, as well as internationally important resident and migratory birds. In the South West, impacts on wintering wildfowl and waders in international conservation sites and Important Bird Areas were predicted.

B1.35 The assessment concluded that all of the options had potential to impact on cetaceans, seals, migratory birds, otters and fish nursery and/or spawning areas. More specifically in relation to fish, most of the short term options were shown to have the potential to impact directly on spawning grounds for mackerel, plaice or sandeels and nursery areas for plaice, whiting, herring, cod or saithe.

Consultee views

B1.36 Many consultees commented on the potential effects of the Draft Plan on offshore and onshore biodiversity, including habitats and species. These impacts were raised in virtually all of the Plan's regions, and consultees highlighted assets which are particularly valued. Some also emphasised the importance of natural heritage to coastal and marine tourism. Several environmental organisations (both statutory and non-statutory) recommended restraint, given the potential significance of effects overall, and the uncertainty about biodiversity impacts that remains at this stage.

B1.37 Some comments recommended further evaluation, for example those focusing on impacts on marine mammals, birds and fish species. Issues were raised about designated sites, from the international to local level. Wider biodiversity, which is not afforded as high a level of protection, was also noted to be of comparable importance to communities and other interested parties. Several consultees emphasised the importance of ensuring that the assessment of effects takes into

account natural heritage interests lying beyond Scottish Territorial Waters, including the RSPB, the Northern Ireland Environment Agency (NIEA) and Natural England.

B1.38 The fishing sector questioned conclusions of the assessment suggesting that displacement of trawling activity or the creation of artificial reefs would provide benefits. Others, specifically wind industry respondents supported the conclusion that habitat creation or enhancement would occur. This underlines the need for further study of this matter, as set out in Section B5.

B1.39 Impacts on migratory birds and mobile marine species were a particular focus, with organisations being particularly concerned with how impacts on them could be undertaken in a meaningful way. Detailed responses focusing on biodiversity impacts were received from the RSPB and Scottish Environment LINK. The RSPB considered that there was a need to more fully assess collision risk for migratory and passage birds, taking into account factors including low visibility at sea. Scottish Environment LINK highlighted a number of issues and provided clarification and corrections on some of the data and associated conclusions. This information was supplemented by further detailed views from other environmental organisations. Further responses focused on potential impacts on bats, arising from collision risk, and asked that this is given further consideration.

B1.40 Questions were also asked about the data used to inform the assessment, and on how known data gaps would be filled. In terms of the baseline, comments were made about the timing of the Plan in relation to designation of Marine Protected Areas and marine foraging Special Protection Areas (SPAs), with some consultees viewing development proposals as premature on this basis. Further environmental problems were raised to feed into the assessment. SNH had questioned the data used in mapping options within MaRS, with concerns including the use of incomplete information on biodiversity. Information on marine mammals was raised by a number of respondents, with further data including basking shark hotspots and on cetaceans providing a particular focus. Construction activities including pile driving and noise, and cables were noted as particular issues. Scottish Environment LINK suggested that clear recommendations and resourcing are required to address data gaps, and recommended that SNH take a lead in compiling and updating information held by stakeholders. Some aspects of the baseline were welcomed, including the reference to Important Bird Areas (IBAs) which overlap with and extend beyond statutory designations.

B1.41 Several consultees made recommendations for the Habitats Regulations Appraisal (HRA) (see Section B3).

Issue / View	**Response**
Negative effects on underwater habitats and species. *Some consultees believed that these effects would be significant and therefore recommended a precautionary approach.*	This has been taken into account within regional recommendations, and in terms of mitigation measures for each of the short term sites, to be explored in more detail at the project level. The need for further research on the effects of offshore wind on biodiversity is acknowledged. Key priorities are noted in Section B5 of this Statement.

Issue / View	Response
Negative effects on birds including wildfowl and waders in the South West.	This issue has been noted within the Plan as requiring further consideration in the South West Region. In addition, recommendations have been made for further research on biodiversity nationally and regionally within Section B5.
Negative effects on marine mammals including bottlenose dolphins.	The Habitats Regulations Appraisal (HRA) (see Section B3) has explored the potential for effects of developments in various locations on bottlenose dolphins and other marine mammals. Mitigation measures and further research have been identified as set out in Section B5. Further assessment will be required at the project level, as noted in the Plan.
Potential effects on fish nursery / spawning areas.	A commitment to further research on the interaction of spawning and nursery areas of commercial fish species with offshore wind energy development has been identified in Section B5. Further assessment will be required at the project level, as noted in the Plan.
Effects on otters.	Effects on this species were explored in more detail in the HRA. Further assessment will be required at the project level as more specific development proposals come forward.
Views that impacts on existing and future designated sites and species should be considered further.	The HRA has assessed the potential for effects on internationally designated sites and this will continue within the 2 year review process. Further assessment will be required at the project level as more specific development proposals come forward.
Concern about uncertainty about biodiversity effects at this stage, data gaps and the need for further research.	The need for further environmental data to be gathered and taken into account within the selection of options is acknowledged in Section B5 and is a key driver for the further sensitivity testing of MaRS to be undertaken within the two year plan review process.
Concerns about secondary social and economic effects arising from biodiversity impacts, including on tourism and fishing.	Impacts on tourism and fishing have been considered within the socio-economic assessment and will be addressed within the 2 year review process.
Effects on bats should be considered further.	Effects of development on bats should be explored further, through research and at the licensing stage as more specific development proposals emerge.
Positive effects through the creation of artificial habitats from new structures.	It is acknowledged that views on this finding are mixed. They range from those who consider that the positive effects have been overstated, to those who consider the assessment to underestimate the benefits. To clarify this, Section B5 of this Statement includes a commitment to review monitoring data and available evidence to establish if there is scope for these benefits to accrue.

Issue / View	Response
Migratory / Anadromous Fish.	Review undertaken by Marine Scotland Science (MSS) and SNH. Further research identified and will be taken forward within the Plan review process.

Landscape, Seascape and Visual Amenity

B1.42 Effects of offshore wind energy development on coastal landscapes, seascapes and visual amenity formed a key consideration in the environmental assessment associated planning process. Taking into account the likelihood of significant environmental effects at a national scale, two further specific questions were included for consultees, to ensure that this issue was explored as fully as possible:

10. The SEA has identified that there could be significant adverse effects from the Draft Plan as a whole, on Scotland's landscapes and seascapes. Measures for the mitigation of these effects have been identified in the Environmental Report. Do you have a view on these findings? Do you think that the proposed mitigation measures will be effective? Do you have any additional suggestions?

11. Do you have any other views on the findings of the SEA? Do you think that all the environmental effects have been identified? Are there other issues that we should be taking into account in the preparation of the Draft Plan?

B1.43 The assessment identified a range of effects, from neutral to major change on landscape character and visual amenity. The options located within 8km of designated landscapes and receptors on the coastline were predicted to have potentially significant effects. These effects were characterised as 'changes', rather than positive or negative effects, as the assessment explained that this can be subjective, depending on the preferences and perceptions of viewers. It was also noted that decommissioning would reverse these effects.

B1.44 It was recommended within the SEA Environmental Report that further consideration is given to the combined presence of existing and proposed wind farms in the southern part of Scotland. It was also noted that at the project level the combined effects of other types of development with wind energy generation proposals will need to be fully assessed.

B1.45 Significant changes and effects on seascape / landscape character were predicted for the Islay, Kintyre, Argyll Array (Tiree), Solway Firth and Wigtown Bay proposals, given their proximity to medium-high sensitivity seascapes. It was noted that these developments could have major visual impacts as a result of their locations close to land and nationally designated landscapes. Solway Firth and Wigtown Bay were also predicted to have potential cumulative impacts when combined with the effects of Robin Rigg wind farm. The assessment emphasised the significance of these effects, given that the two sites are within 8km of visual receptors on the coast and nationally designated landscapes ,and may together be visible from a single point on the coastline.

B1.46 In terms of medium term options, the assessment showed that NW5 and NW6 could have major impacts on seascape / landscape and visual amenity due to their proximity to high sensitivity seascapes, the coast and National Scenic Areas (NSAs). Development in all of the other options (except E1) were shown to have the potential to affect medium or high sensitivity seascapes. All options (except SW2) were predicted to have minor impacts on nationally designated landscapes where they are located within 24 to 35 km of the sites.

Consultee views

B1.47 The overwhelming majority of respondents to the consultation focused on this issue. Many regarded it as the most significant issue that requires serious consideration and mitigation.

B1.48 Firstly, with regard to information, some respondents suggested that the landscape and visual impact assessment methodology should be updated, and made reference to other aspects that should be built into the mapping of options. This included non designated landscapes (with reference to the European Landscape Convention) key views, proximity to shore and associated areas of importance on the coast, scenery which is important to tourism, and the setting of cultural heritage remains and historic buildings (see below). Some noted that local authorities could provide a finer grain of information to feed into the baseline.

B1.49 The assessment methodology and guidance was also questioned and many consultees debated the apparent conflict between options close to shore and their interpretation of SNH guidance that appeared to suggest that a minimum separation distance of 8km or 13km between the coast and turbines should be followed. A range of other minimum distances were proposed within responses and during the consultation events.

B1.50 Specific views on these effects were raised in relation to local areas and regions, and there was a close correlation between the proximity to shore of several short term options, particularly Kintyre, Solway Firth, Wigtown Bay and the Argyll Array, and levels of public concern about their significance. As well as visual impacts on coastal and inshore receptors and the more technical impacts on landscape character or seascape sensitivity, wider issues were raised about lighting of turbines and the effect of natural light, including sunrises and sunsets, upon them. Also, the 'feel' and experience of landscapes was frequently alluded to, with visual issues extending to include qualities such as tranquillity. Impacts on key views were particularly emphasised in many parts of the West and South West, including perspectives from or to key features or important areas.

B1.51 Potential cumulative effects of the options when considered together, or with existing development and in relation to potential future plans, were also recognised by many stakeholders. Many consultees were concerned that this was likely to culminate in the industrialisation of areas.

B1.52 Impacts on National Scenic Areas (NSAs) and wild land were discussed by a significant number of consultees, including SNH. In particular, concerns were raised about impacts of the Wigtown Bay and Solway Firth sites on NSAs in the

South West, and on a regional scenic area. Impacts of the Kintyre proposal on NSAs were also raised by many environmental organisations and members of the public. Impacts of these three sites on Areas of Outstanding Natural Beauty (AONBs) beyond Scotland were also raised, with responses from Northern Ireland and England.

B1.53 Secondary effects were also a key concern. Close links were made between landscape and scenic quality, and secondary impacts on tourism and quality of life more generally. Impacts on property values were also raised by a good number of consultees.

B1.54 Views on the available mitigation measures to address landscape, seascape and visual effects were also specifically sought within the consultation documents. The majority of respondents believed that mitigation, in the form of the design or layout of arrays would be ineffective. Many considered that the only measure that could have any real impact would involve removing the option in question from the Plan altogether, or, in a more limited number of responses, increasing the distance of the development from the coast or substantially reducing the number of turbines. A significant number of respondents questioned why significant landscape effects had not been viewed as sufficient grounds to merit the removal of any of the options from the Draft Plan, and strongly suggested reconsideration of this position.

Issue / View	**Response**
Effects on landscapes and seascapes and visual effects – individual and cumulative.	These issues have been taken into account at a national level. The Scottish Government has identified these effects as significant issues that will require robust assessment and mitigation at a project level. The Plan also acknowledges that in some cases, this may be very difficult to achieve for some projects, particularly at some of the short term sites.
Questioning of the LVIA methodology, baseline information and guidance.	The guidance is in the process of being updated. The revised version will be taken into account as the Plan is revisited. This guidance will also help to ensure that these effects are more fully and robustly assessed at the project level, as more specific details on the development proposals emerge.
Close correlation between levels of concern and proximity to the coast.	This key message has been noted. The regional guidance in the Plan aims to provide a clear signal as to where this is a significant issue.
Preference for mitigation taking the form of removing options from the Plan or scaling down / moving development further from shore. *Concerns about secondary impacts on tourism, the economy and quality of life.*	This has been noted and the Scottish Government has taken this factor into consideration with regard to considering options in the Plan. Guidance on assessment at the regional and project levels will be progressed. Marine Scotland is taking forward a licensing manual to cover offshore wind development. Visual impact assessment methodology and guidance will be considered initially within this initiative and for other strategic guidance.

Issue / View	Response
Effects on nationally designated landscapes. *This was viewed as being so significant that affected options should be removed from the Plan. Many consultees were of the view that impacts on NSAs and AONBs meant that options should be reconsidered.*	This is noted as a nationally significant issue. It has informed the Plan's guidance on the South West and West Regions. Further work on this issue will be taken forward by SNH and Marine Scotland.

Population and Human Health

B1.55 Given the environmental focus of the SEA, as agreed with the Consultation Authorities at the scoping stage, the assessment focused on a limited range of factors including outdoor recreation activity and access to renewable energy supplies. The SEA concluded that the Plan would be beneficial by helping to secure a renewable energy supply for the projected growth in the Scottish population. However, more negative effects on recreational users were also noted, as a result of combined pressure on those using the sea and the coast. Potential effects included disturbance to, displacement or loss of coastal and marine recreational areas, impacts on the wave climate and activities with associated effects on the enjoyment and potentially the safety of marine users. It was also noted that most of these effects would be reversible, subject to decommissioning.

B1.56 In terms of the regional distribution of these effects, the assessment showed that all short term options had the potential for impacts on recreational users, predominantly in and around the Firths, where concentrations of activity are greatest. It was noted that Wigtown Bay and Solway Firth could generate cumulative recreational pressures during construction together with Robin Rigg wind farm, that the Solway Firth as a whole was of great importance for informal recreation including sea angling, and effects would be exacerbated by visual amenity and seascape effects. Similar effects were predicted from the medium term options.

<u>Consultee views</u>

B1.57 Many individuals and organisations raised issues relating to population and health in their responses. Clear messages arising included the need to ensure that the Plan balances consideration of environmental issues, with a full assessment of its impacts on quality of life more generally.

B1.58 Recreation interests provided comments relating to their specific interests. This included a detailed response from Sportscotland and organisations including the Royal Yachting Association (RYA) Scotland, the Scottish Canoe Association and surfing groups. These responses indicated areas where it was anticipated that impacts on these activities could be most significant. In particular known surfing areas, areas for watersports, yachting and cruising areas and coastal recreation paths and beaches were all raised as key receptors requiring further consideration.

These organisations also noted that secondary effects on the economy, health and wellbeing should also be considered.

B1.59 Many consultees questioned the positive effects which were expected from the Plan in terms of its contribution to supplies of renewable energy. In the South West, there was great scepticism about the efficiency of offshore wind and questions were asked about the output from Robin Rigg. Here and in other areas, a general preference was expressed for wave and tidal energy by many. At the same time, concerns were raised that the cumulative effects of different types of generation had not been viewed in a joined up way. People also believed that it was difficult to consider the scale of development without clearer regional targets for levels of generation being set.

B1.60 Strong views arose from communities, particularly those closest to the proposed short term options, that the SEA needed to be supplemented with more detailed consideration of the effects of the Plan on people and communities. Many were concerned that the impacts of the offshore developments would fundamentally reduce their quality of life, and issues were also raised about the onshore elements of developments. This was a particular concern in the South West, in Kintyre and in Tiree in relation to the Argyll Array.

B1.61 More detailed comments are set out in the relevant sections focusing on each of the regions, but frequently cited onshore issues included grid connections, cumulative impacts from on and offshore development, impacts on infrastructure and services, and the construction of ancillary structures. The fragility of many rural and remote communities was emphasised and also linked with cultural heritage by emphasising that there is a fundamental question about the effects of development on their way of life and identity. In addition, detailed responses relating to fishing emphasised that impacts on the sector cannot be judged from analysis of the available data, with small scale concerns having a vital role to play as part of rural communities, and impacts therefore being potentially greater than had been suggested by the assessment and Draft Plan. Fishing is considered in more detail below.

B1.62 Concern about changes to workforce and population migration was also a key theme. Some communities (e.g. Tiree) viewed this as a threat to their way of life, infrastructure and services. Others (largely in the South West) expected that development could deter people from relocating into the area, thereby undermining local communities, services and economies.

B1.63 Impacts on health were raised by a number of consultees. Key concerns included the effects of shadow flicker (potentially being exacerbated by low sun or the aspect of developments), noise (including infrasound), secondary effects from loss of outdoor recreation and effects on more general wellbeing. It was also suggested that the assessment should take into account the potential long term effects of climate change on health, in order to better reflect the full range of potential positive and negative effects of the Draft Plan.

Issue / View	Response
Negative effects on recreational activity.	These effects have been noted where relevant in relation to specific options and regions. A commitment to further working with recreation sector organisations and representatives has been included in Section B5.
Respondents noted areas where development could generate significant impacts on the basis of known recreation activity.	Potential issues at a regional scale have been identified and guidance provided on where this is expected to be a significant issue at the project level. This will require more detailed assessment at the project level.
Positive effects on renewable energy supplies.	These issues were discussed in relation to 'climatic factors' above.
Consultee issues about the legitimacy and efficiency of offshore wind as a part of the overall energy mix.	The Scottish Government is committed to maximising the contribution of offshore wind, along with other types of renewable generation, to the overall energy mix. This will help to ensure that Scotland meets ambitious renewable energy and climate change targets and secures related economic and environmental benefits.
Consultee concerns about impacts on communities.	This has been noted as a key concern. It is also noted that effects are expected to be particularly significant where developments are located close to the shore, and therefore will be visible from areas where people live and work. Where this is a particular regional or option-specific issue, it has been highlighted within the Plan, for further consideration at the project level where appropriate.
Community wellbeing was expected to be affected by development.	This has emerged as a key regional theme within the development of the Draft Plan. As noted in the Plan, a pilot project exploring scope for community led masterplanning is being taken forward for Tiree, to identify how the onshore elements of the Argyll Array proposal can be implemented in a sustainable way. It is expected that this approach, which is led by the planning authority also involves the community, developer, The Crown Estate, HIE and the Scottish Government, should be rolled out to other communities, where there are expected to be similar challenges. It is expected that this approach will also be adopted for Islay and could also be applied in other projects. The Scottish Government and its partners will reflect on this experience and ensure any lessons learned are fed into both the licensing process and the future iterations of the Plan as a whole.
Concerns about noise generated by developments and impacts on health.	Noise effects of the developments will require further assessment at the project level.

Issue / View	Response
Consultee concerns about impacts on health: shadow flicker.	Shadow flicker is not expected to be a significant issue arising from the proposals for offshore wind. However, the Plan indicates that this should be assessed where relevant at a project level, and appropriate mitigation deployed.
Assessment should include consideration of the role of the Plan in reducing the long term impacts of climate change on health.	This is noted as a potential benefit of the Plan, and is part of the reasoning behind the overall commitment to climate change mitigation that underpins the Plan and Scottish Government renewable energy policy.
Concerns about changes to migration patterns: effects of large scale in-migration to small communities and concern about loss of in-migration.	This was noted as a key issue requiring further consideration. Some island communities are concerned that incoming workforces could overwhelm the local community culture and affect their way of life. Other communities require 'incomers' to retire or settle in their area to maintain house and business prices.

Cultural Heritage

B1.64 Potential adverse effects on cultural heritage were predicted in the SEA, specifically in relation to proposals for development of short term sites at Bell Rock and the Argyll Array, given the proximity of these sites to listed lighthouses and combined impacts arising from the Round 3 wind farms.

B1.65 The assessment also noted that other unknown, submerged or non-designated archaeological assets, features or palaeo-landscapes may also be present within the footprint of the short term options. Some medium term optionswere also shown to have potential for direct impacts on two designated wrecks (N7), and the St. Kilda World Heritage Site (NW1 and NW3).

Consultee views

B1.66 Comments on the predicted cultural heritage effects of the Draft Plan were largely made in relation to specific sites or options. Historic Scotland agreed with many of the assessment findings, including the potential for effects on lighthouses and their settings and designated wrecks. In addition, Historic Scotland noted that much had been passed to the project level, given the scale of the Plan, and recommended further thought being given to identifying the generic types of monuments that would require further consideration. It was noted that fortifications, duns, brochs, lighthouses, ecclesiastical sites, chambered cairns, castles and A listed structures could be particularly affected by offshore wind proposals and will require further consideration.

B1.67 The importance of considering impacts on onshore coastal archaeology, wrecks and underwater landscapes was also raised. In some areas, specific coastal sites were identified that could be affected by offshore wind development. Other responses noted the importance of non-designated resources including sacred sights, historic routes and culturally important views. In Tiree, it was emphasised

that the island and its community constituted a resource and way of life of cultural heritage significance in their own right. This theme also emerged in other communities. Shetland Islands Council also noted potential impacts on Sule Skerry Lighthouse, the Heart of Neolithic Orkney World Heritage Site, and the setting of numerous coastal scheduled sites.

B1.68 The National Trust for Scotland highlighted a number of key options which could impact on the views from, and setting of, their properties including St Abbs Head (Forth Array) and others in the South West. Further issues raised by English Heritage and the Solway Firth Partnership included the potential impact of development on the Lake District National Park and Hadrian's Wall World Heritage Site. The Northern Ireland Environment Agency also noted concern about effects on the Giant's Causeway World Heritage Site.

B1.69 Historic Scotland broadly welcomed the overarching approach to mitigating impacts on cultural heritage, including detailed positioning of sites and turbines within option boundaries to avoid or reduce impacts. This was considered particularly important for the options on the west coast.

Issue / View	**Response**
Cultural heritage effects on listed light houses (Bell Rock and Argyll Array).	These have been noted as issues that will require further assessment and appropriate mitigation at the project level.
General adverse effects on archaeology.	
Effects on designated wrecks.	
Further consideration to types of features that could be affected by development at a project level would be welcomed.	
Effects on non-designated aspects of cultural heritage should be taken into account.	
Comments on specific types of monuments which could be sensitive to change.	
Effects on the St. Kilda World Heritage Site.	Two of the early medium term areas of search that had the potential to adversely impact on the outstanding universal value of the WHS were removed from the Draft Plan as a result of the SEA.
Impacts on other World Heritage Sites: Hadrian's Wall and the Giant's Causeway.	The SEA findings have been reviewed and it is acknowledged that specific projects could have impacts on these sites. This information has been taken into consideration in the Plan's recommendations for the West and South West Regions.
Mitigation measures are appropriate for a high level plan.	The mitigation measures identified in the SEA and HRA have been incorporated into the Plan. This includes a commitment to further research identifying submerged archaeology.

Material Assets and Other Technical Issues

B1.70 The development of the Draft Plan included consideration of navigation under the heading 'material assets' as well as early consideration of further issues which were viewed as lying beyond the scope of the SEA, as agreed with the Consultation Authorities. This included commercial aspects of fishing (fish stocks having been addressed under 'biodiversity'), radar and aviation issues and other forms of offshore renewables (wave and tidal). In addition, the MaRS mapping system that was used to identify medium term options included consideration of more detailed factors, such as the presence of cables and munitions on the seabed. These issues were set out in the Draft Plan and are discussed below.

Navigation

B1.71 Potential navigation issues were identified in the development of the draft Plan. This included the building key navigational data into the MaRS process, including referring to shipping density and RYA cruising routes, sailing areas and racing areas, anchorage areas and navigation aids and technical issues. International Maritime Organisation (IMO) routes were identified as exclusions within the mapping process.

B1.72 Navigation issues were identified in all of the regions, and it was noted that development could impact on areas of moderate or high vessel activity. Key areas of concern included the North where some options lay within heavily used shipping routes (routes between north west Orkney and Shetland) and, in the North West where the Minches and a ferry route were particular concerns. In terms of mitigation, it was noted that the Maritime and Coastguard Agency would manage these effects to ensure there are no hazards to shipping.

Consultee views

B1.73 As with many other topics, much of the focus of comments on navigation related to the effects of specific developments, or on certain areas or regions. Issues were raised in all of the areas covered by the Plan, with varying levels of concern about the possible consequences of development for safe navigation.

- In the North, concern was expressed about impacts on the use of the Pentland Firth and Fair Isle Channels, and the importance of Lerwick was raised.
- Navigation in the Moray Firth was noted in the North East, and recognition of ports in the area was welcomed.
- In the East, individual and cumulative effects of the short term sites in combination with the Round 3 zone, beyond Scottish Territorial Waters, were key concerns.
- In the South West, people and organisations were concerned about impacts of development on busy shipping routes, including the impact of option SW1 on the Belfast and Larne to Loch Ryan ferry crossing and on traffic between the coast, North West England and the Isle of Man.
- Dumfries and Galloway Council provided more detailed information on navigation which suggested that the Wigtown Bay proposal should be

removed from the Plan. This was supported by the public's view that the site was located on a navigation route, and would require more detailed assessment. Recreational boating was also a key concern.

- In the West, impacts on shipping routes were also raised and it was noted that diversions would incur costs, with particular implications for small fishing concerns.
- Area W1 raised concerns as a result of its potential to restrict access from the Minch and the impact of W4 on users of the IMO route in the North Channel were also raised.
- Significant issues were raised in relation to the North West, with several options potentially impacting on important shipping routes. Access to the Minch from both north and south was raised by several key consultees, and will require further consideration.

B1.74 Recreational sailing and navigation by the fishing sector were also highlighted at the regional and option levels. General concerns were raised about the data that had been used to assess impacts on navigation, and it was particularly emphasised that AIS data does not cover small vessels. Some respondents also noted issues about access to ports and harbours. Mitigation was touched on by some consultees, who noted that physical gaps or restrictions in operations could be used to reduce safety risks to an appropriate level.

Issue / View	**Response**
Potential navigation issues, particularly in the North and North West	Further liaison with the shipping sector will be undertaken at a national level, as recognised within the Draft Plan.
Specific hotspots identified at the regional and option level	These hotspots have been noted and referred to as appropriate within the regional and site specific recommendations.
Impacts on recreational and fishing vessels	
Shortcomings of shipping data used in the assessment	This has been noted. Further information on shipping will be provided through traffic navigation assessment work at the regional level.
Scope for mitigation.	Mitigation measures will be identified following more detailed assessment at the regional level and project stage, but should include consideration of the potential cumulative effects arising from multiple developments in specific regions. Further liaison with key organisations and more detailed risk assessments will be required to identify the need for mitigation at the project level.

Fishing

B1.75 In terms of commercial fishing activity, information gathered to inform the development of the Plan showed that the impact of offshore wind options was likely to vary between regions, but that the Draft Plan as a whole was expected to have potentially significant adverse effects on the Scottish fishing industry. Commercial fishing value was one of the criteria that was viewed as a 'technical constraint' and

embedded in the MaRS process. In addition, particularly high levels of catch were noted in some areas such as the West and North West, whilst others, including the South West, were considered to be potentially less sensitive to development as a result of relatively low recorded catches.

B1.76 This assessment was linked with the SEA findings relating to fish (including spawning and nursery areas), as recorded under the heading of 'Biodiversity' within the Environmental Report.

B1.77 In terms of regional findings of the SEA, most of the options were found to overlap with nursery and / or spawning grounds of commercial fish species. However, the consultation highlighted a need for much more information about fishing activities to inform planning and development activities. Work to achieve this is underway (see Section B5), and there will be a need for further assessment of regional level socio-economic impacts arising from specific proposals.

Consultee views

B1.78 Many respondents focused on fishing, including key sector representative organisations, individuals and businesses.

B1.79 Firstly, concerns were raised about the data used to develop the Plan. The information which had been used within MaRS to identify options was questioned, as well as the weightings and scorings that had been applied. The Scottish Fishermen's Federation (SFF) offered to provide data at a finer grain, whilst the National Federation of Fishermen's Organisations (NFFO) stated that the data were deficient, suggesting that there was a particular need for further information to be gathered from the Cumbria Sea Fisheries Committee and the Irish Sea Marine Conservation Project. The West of Four Fisheries Management Group (WOFFMG) contended that there was a need for more data on commercial fishing and for that data to be afforded the highest weighting. The Sea Angling Conservation Network raised similar issues. As a result, the outputs from MaRS were not considered to be accurate by those responding from the fisheries sector.

B1.80 In terms of regional perspectives, key issues can be summarised as follows:

- In the North, it was noted that further information on the creation of artificial reefs and loss of fishing grounds is required.
- Fishing impacts were a key issue in the North East, with the Moray Firth Inshore Fisheries Group, for example, raising particular concerns about specific aspects of development including cabling, test sites, navigation and diversion, exclusions and safety.
- In the East, the conclusions of the assessment about potential impacts on fish stocks were questioned by the prospective developers, given the lack of certainty about the site layout at this stage.
- Many responses focused on fishing in the South West from the fishing sector and the wider public. There was concern about impacts and a view that these interests had not been fully covered within the SEA, but also an offer of assistance in undertaking a fuller assessment of the Plan was offered.

- Displacement of activity and the consequential increase in pressure in remaining areas was a key issue. Respondents reported particularly high impacts on small vessels originating from Cumbria and the Isle of Man.
- Key issues also included impacts on migratory fish routes, nursery and spawning grounds. Effects on salmon and sea trout (questioning the impact of cables), cockle and shellfish aquaculture, lamprey, smelt and eels.
- Fishing was noted to be a major economic driver for the region as a whole. Overlaps with trawling routes and potential interference with static gear activities were raised. It was emphasised that there is a lack of safe alternatives to sheltered fishing areas which could be affected by the Plan.
- In the West, key responses focused again on the data used in MaRS and it was emphasised that current activity and the value of catch were inaccurate. Migratory fish were also a key concern.
- Questions were asked about compensation and the Clyde Fishermen's Association asserted that impacts on safe navigation and displacement of activity had been inappropriately overruled by a drive towards renewable energy development.
- It was emphasised that many small communities rely on fishing and that seemingly small scale effects may nevertheless be very significant for their survival in socio-economic terms.
- In the North West, fishing interests were a significant concern. Again it was recommended that more detailed data are built into the assessment.
- Concern was expressed about engagement with the sector and it was noted that the Plan would only add to ongoing challenges. It was suggested that a common sense approach to exclusions was needed.
- In Barra, the fishermen pointed out that they had historic rights to harvesting the water column and should therefore be entitled to the benefits arising from its development.

B1.81 It was recommended by sector respondents that these issues are explored in more detail to ensure the implications of the Plan on the fishing fleet as a whole was fully understood before it is adopted.

Issue / View	**Response**
Impacts on commercial fishing activity particularly in the North and North West were raised by the SEA. *Consultees raised further concerns about fishing in other regions, particularly the South West but also the East, North and North East, in addition to the West and North West.*	This has been noted as a key issue at the national, regional and local scales. At the national and regional scale, further liaison with stakeholder organisations will be undertaken to establish how the Plan can be delivered with minimal effects on the fishing sector. Commitments to this and to further research relating to the sector is set out in the Plan and Section B5 of this statement respectively. This will include fishing activity mapping and evaluation and regionally focused socio-economic assessment. In addition, further assessment and appropriate mitigation measures will be required regionally and locally, as specific development proposals come forward for licensing at the project level.

Issue / View	Response
Concerns about data used in MaRS to identify options – view that they do not reflect fishing interests.	The issue of available data is being addressed through further research on fishing activity. This information will be fed into the ongoing use of MaRS to refine options and subsequent review of the Plan as part of the 2 yearly cycle.
Impacts on the Scottish fishing fleet should be further assessed in the socio-economic study.	This has been explored in more detail in the socio-economic assessment and will be informed by the further spatial analysis of fishing activity and regional assessment, set out in Section B5.

Aviation and Radar

B1.82 Aviation and radar issues were built into the MaRS process as constraints, including a 24km buffer around Ministry of Defence airfields, UK Civil Licensed Aerodromes, helicopter platforms and routes and Radar Interference Zones. In addition, the Draft Plan highlighted where regional radar issues were expected to arise. This included NATS radar areas potentially affecting a number of sites within all of the regions, and buffer zones for airports, influencing potential development in the East and West. In addition, helicopter activity and potential interference with RAF Lossiemouth and Kinloss were identified in the North East.

B1.83 The analysis was broad at this stage, reflecting the national coverage of the Plan and noting that these issues are better resolved at a project level when further information on the height and number of turbines and layout of arrays are clearer.

Consultee views

B1.84 A number of specialist stakeholders responded to the consultation, highlighting potential issues in more detail. The Civil Aviation Authority (CAA) provided further detailed information on aviation issues, covering terminology, distances and buffer zones. It was noted that these issues will be fully considered at the project level, but suggested that further consideration of potential in-combination effects, including of offshore development combined with onshore projects, would be useful.

B1.85 Further information on aviation to and from the Isle of Man and Northern Ireland was requested. Representatives were critical of the dataset used within the assessment. North Sea helicopter routes and longer distance flight paths were highlighted as further constraints.

B1.86 In terms of regional issues, the following key points were raised:

- In the North East, Highlands and Islands Airports Ltd. (HIAL) stated an interim objection to the short term option of Beatrice, as a result of potential impacts on Wick Airport, but it was noted that mitigation should be possible.
- In the East, the CAA questioned how radar issues have been avoided, given the existence of military and civil aviation radars.

- Responses relating to the West focused particularly on the potential impact of development of the Kintyre site on Campbeltown Airport. This was viewed as unfeasible by Loganair / Flybe, a key operator using the facility. The safety issues arising here were highlighted, and it was explained that they are corresponding with the prospective developer to seek a solution.
- In addition, potential impacts on air traffic control from the Argyll Array were noted by consultees.

Issue / View	**Response**
Potential effects on aviation and radar, particularly in the West and East. *Further assessment required at the project level*	These issues will need to be addressed at the project level. Liaison with the aviation sector is already underway at a number of the short term sites.
Datasets used at this level may not be suitable.	Views on the limitations of the datasets used is acknowledged, but the information used at this stage is considered to provide a sufficiently broad perspective on likely issues that will require further assessment at regional and / or project levels.
Cumulative assessment of on and offshore development should be undertaken.	Assessment of these issues will be required at the project level to take into account cumulative effects arising from on and offshore development.
Regional / site specific issues in the North East, East and West.	These have been noted as significant issues and in relation to the specific short term sites and medium term options.

Military Activity and Munitions

B1.87 The Draft Plan explained where development sites and options coincided with military activity. For the medium term options, the MaRS mapping process took into account Ministry of Defence (MoD) munitions dumps and Danger Areas as exclusions to development, and MoD Practice and Exercise Areas (PEXA) were viewed as a constraint.

B1.88 The Draft Plan also identified where there were potential issues at a regional level. In the North, this included the MoD exercise area at Cape Wrath, a munitions dump off the Aberdeen coast and MoD training area in the Dornoch Firth, military interests in Fife (Rosyth and Leuchars) affecting sites in the East, MoD training areas and a munitions dump in the South West, and MoD training areas in the West and North West.

Consultee views

B1.89 The MoD provided a very detailed response to the consultation, confirming areas of potential constraint at a regional level. It was noted that PEXA had been identified as a constraint, but that there may be scope to accommodate development in these areas, depending on issues being addressed on a case by case basis. The MoD did not support the approach to using buffer zones around radar facilities, as its analysis uses actual radar coverage data and line of sight assessments to provide a

more accurate picture of effects. In addition, the MoD had concerns that precision approach radar systems at military aerodromes, Ministry air traffic control facilities not at aerodromes, air defence and meteorological radar sites had not been covered.

B1.90 At the regional level, more detailed information was provided:

- In the North, the air defence radar at Saxa Vord should be considered as it could be a constraint to development in the vicinity of the Shetland Islands.
- In the North East, the constraints identified at Kinloss and Lossiemouth should be extended to reflect air traffic control radars. Other key assets include the Hill of Dudwick Meteorological Radar, RAF Tain Air Weapon Range (potentially affecting NE1) and MoD Danger Areas in proximity to NE1 and NE2.
- In the East, the potential impact of the medium term option on Naval Exercise Areas was noted as an issue requiring further consideration. In addition cumulative impacts of the short and medium term options were a concern as a result of their potential to block key maritime and strategic defence navigational access to the Firth of Forth.
- In the South West, medium term options were a concern and it was noted that ongoing military training should be seen as a further constraint. The public in the area also raised concerns about munitions dumps and the existence of live shells in the proximity of Dundrennan MoD range.
- In the West, impacts on MoD low flying exercises and exercises at sea were noted. Some consultees also raised concerns about the likelihood of munitions migrating on the seabed.
- Extensive MoD activity was raised in relation to development options in the North West. Air traffic control radar on St. Kilda and South Uist and the Drium-A-Starraid Meteorological Radar near Stornoway were raised. Further potential conflicts arising from some medium terms options (NW6, NW7) were raised, with the MoD recommending their relocation as a result.

Issue / View	**Response**
Effects on military activity across the regions.	These have been noted as key areas where further liaison with the Ministry of Defence will be required.
Incomplete data on military activity and installations at this stage in the process.	
Regional level constraints and potential impacts on further installations and activities identified by the MoD.	
Further comments on the likelihood of munitions migrating on the seabed.	This issue will require further assessment at the project level.

Other marine renewables

B1.91 The interrelationship between wave and tidal power proposals and offshore wind was broadly considered within the assessment. The Draft Plan included some areas of exclusion at the MaRs mapping stage, including the European Marine Energy Centre (EMEC) and other wave and tidal power lease sites.

B1.92 In the North Region, The Crown Estate leasing round for wave and tidal development were noted. Areas with potential for marine renewables in the West and North West were also noted within the Draft Plan.

Consultee views

B1.93 The majority of respondents referring to this issue expressed a general preference for wave and tidal energy as an alternative to offshore wind. Many people questioned whether cumulative effects and potential positive synergies between different types of activity had been taken into account. This issue arose particularly in the South West, where many consultees suggested that a tidal barrage across the Solway Firth would be a preferable development proposal and questioned why no Saltire Prize areas had been identified in this location. In the West, wind industry respondents and The Crown Estate questioned the identified cumulative effects arising from the Sound of Islay project in combination with medium term options. They suggested that timing of the development and mitigation measures identified in the Marine Renewables SEA should be explained further to provide a clearer picture of these effects. Potential development areas were identified in the area between Kintyre and Rathlin. Opportunities for co-development of wave and tidal and wind projects were also raised in the West region. In very broad terms, many respondents believed that marine renewables offered a more sustainable and efficient form of generation than offshore wind.

B1.94 Others suggested that, in the absence of fuller consideration of areas identified for wave and tidal development, the MaRS analysis was incomplete. For example, Comhairle nan Eilean Siar recommended further consideration of information gathered to inform The Saltire Prize.

Issue / View	**Response**
Areas of constraint as a result of ongoing and future wave and tidal energy in the North, West and North West.	As noted under the heading of 'climatic factors' above, the need to reconcile aspirations for offshore wind, wave and tidal energy will be considered further within the Marine Renewables SEA and Plan, and national and regional marine planning processes.
Consultee preference for wave and tidal energy generally, particularly within the South West.	This is noted, and will be explored further within the ongoing Marine Renewables Plan development process.
Estimation of cumulative effects of tidal and wind energy – Sound of Islay.	This is noted. The findings of the SEA and this opinion should be taken into account in Plan review, Marine Renewables Plan development and more detailed regional and project level assessment.

Electricity Transmission Grid

B1.95 Grid capacity and availability were not specifically considered within the development of the Draft Plan, as this was viewed as lying beyond its scope, and therefore its assessment. This also reflected a general assumption that, should

developments proceed, a connection will be provided and will require to be considered at the project level. Further strategic options will be considered within the Plan review process.

Consultee Views

B1.96 The electricity transmission grid was raised by several respondents as an issue requiring further consideration.

B1.97 Firstly, concerns were expressed about the potential onshore implications of development and additional environmental effects arising from associated grid connections. With regard to the MaRS stage of the process identifying options, some consultees, including SEPA and Scottish Environment LINK, suggested that the assessment was incomplete in the absence of further information about the grid. Argyll and Bute Council asserted that this omission meant that an opportunity was being missed to consider infrastructure requirements, and as a result the full range of environmental effects could not be identified. SNH also viewed the lack of consideration of cable connections to be a major omission.

B1.98 At the regional level, this was a particular concern in the South West, where people also anticipated that any potential developments would connect with the grid in England, thereby reducing their potential benefits to Scotland. Questions were also raised about the grid connection in the West.

B1.99 In the North West, it was emphasised that development should proceed at a faster pace, in order to enable upgrading of grid connections.

Issue / View	**Response**
Likely grid connections and associated environmental effects remain unknown at this stage.	This remains the current position. The Plan does not cover matters relating to the grid. However, the proposed Marine Renewables Sectoral Marine Plan, the review of this Plan, national and regional marine planning and project assessment will explore this issue further.
MaRS should have incorporated further consideration of grid capacity and connections.	This will be explored further within the further work on the MaRS model as outlined in the Plan and Section B5.
Cumulative on and offshore effects from the grid connections should be considered further.	It is not possible to fully define these effects at the Plan level. As specific requirements for connections emerge, further Plan review and regional level consideration of this issue will be undertaken. Cable and grid connection issues will have to be addressed at the project level.
Scope for the Plan to achieve grid upgrades should be taken into account.	

What were the views on developments in specific locations or regions?

B1.100 The development of the Draft Plan was based on the identification of short and medium term options for offshore wind energy development. Whilst this created additional complexity and raised questions about the extent to which apparently site specific issues could or should be addressed in a strategic level assessment, it also provided a useful means of exploring the full range of potential environmental effects of the Draft Plan.

B1.101 In order to explore the Draft Plan and its effects from a regional perspective, consultees were asked the following questions:

4. Should any options be removed from the Draft Plan?

5. Are there other options we should consider in the medium or long term?

12. The Draft Plan has identified environmental and technical issues in the north and north west regions of Scotland in particular. It may therefore be reasonable to give further consideration to these regions. Do you think that development in these or other regions, or individual options within them, should be given lower priority or perhaps deferred to the long term?

B1.102 The following section summarises the key effects and opinions relating to each of the regions containing short and medium term options. These issues have been taken into account in the development of the Plan. In addition, the recommendations for each of the regions should form a guide for the project assessment stage. Whilst it is acknowledged that more detailed information, proposals and environmental assessment may rule out some of these issues, they will form a reference position.

East: Short term options	
Potential Environmental and Technical Effects	• Potential adverse effects on marine mammals, including Moray Firth bottlenose dolphins. • Potential effects on resident, breeding and migratory birds. • Direct adverse impacts on fish spawning grounds. • Minor to moderate visual effects, minor to moderate seascape effects. • Adverse impacts on shipping accessing the Firth of Tay and Firth of Forth. • Potential impacts on commercial fishing activity. • Potential impacts on migratory fish.
Opinions	• There will be a need to assess cumulative effects of short term options in combination with option E1. • Cumulative impacts of short term options are already being considered at a regional scale. • Concerns about individual and cumulative effects on navigation and access to ports. • Potential impacts on beaches and surfing (wave climate). • Concern about potential radar issues and impacts on access to defence related ports on the Forth. • Concern that the Habitats Regulations Appraisal (HRA) could create uncertainty. • A view that sufficient information has been identified to inform strategic level planning. This contrasts with others expressing concern that the Plan and the assessment attempt to cover issues which should be addressed at the project level. As a result some of the findings were considered questionable, and are not borne out by site level work. This included information on shipping and fish stocks. • Low level of broader general public interest or concern about the Plan or the assessment findings.
Recommendations	
The following matters require further consideration within the Plan review and project level Environmental Impact Assessment: • Appropriate navigation mitigation, taking into account individual and cumulative effects in collaboration with the shipping industry. • Further consideration of impacts on fishing, in collaboration with the fishing industry. • Resolution of radar issues and avoidance of potential conflict with defence activities, in collaboration with the relevant stakeholders. • Satisfactory completion of project level HRA, taking into account mitigation measures identified in the HRA of the Draft Plan as appropriate. This should include a focus on potential effects on the Moray Firth Dolphins. • Cumulative and in-combination effects have to be addressed including the adjacent Round 3 site. • Further research is required to cover potential impacts on migratory fish.	

East: Medium term areas of search	
Potential Environmental and Technical Effects	• Potentially significant cumulative effects, when short term options and Round 3 sites are taken into account. • Impacts on navigation and access to ports. • Impacts on commercial fishing activity. • Potentially major visual and seascape impacts due to proximity to land and nationally designated landscapes. • Potential effects on migratory and breeding birds. • Direct effects on fish nursery and spawning areas. • Potential impacts on migratory fish. • Potential effects on coastal processes and sediment transport.
Opinions	• Impacts on Ministry of Defence activity, with potential for blocking strategic defence access to the Firth of Forth. • Impacts on sensitive coastal sites, including designated sites with high conservation value. Impacts on seabirds, grey seals, migrant birds, migratory fish, cetaceans, sharks, rays and skate were also raised. • Proximity of development to the Berwickshire Coast and associated potential for significant landscape, seascape and visual effects. • Low level of public interest / concern. • Cultural heritage effects, on the setting of Bell Rock Lighthouse, sensitive coastal sites and properties.
Recommendations	
Area E1 has potential to provide longer term options for development. However, there will be a need to ensure that cumulative effects of development proposals arising within the area of search are considered in combination with the short term sites, onshore development and the Round 3 zone to the east of the region. To address issues raised above, the following factors should be taken into account within any future site selection process within this option area: • The need to retain an east-west corridor allowing for maritime navigation. • Avoidance of significant visual effects by maintaining an appropriate distance from the coast and taking into account cultural heritage concerns. • Ecological assessment, including HRA to inform the site selection process.	

North East: Short term option	
Potential Environmental and Technical Effects	• Potential adverse effects on marine mammals, including the Moray Firth dolphins, common and grey seals, harbour porpoise and various species of dolphin and whale. • Potential impacts on resident, breeding and migratory birds and fish. • Direct effects on fish spawning and nursery areas. • Minor changes in views for land based receptors, and minor seascape effects. • Impacts on commercial fishing activity.
Opinions	• Information on spawning and nursery grounds is incomplete – project level data can provide a more accurate source. • Interim objection by HIAL on basis of impact on Instrument Approach Procedures to Wick Airport. • Limited general public interest / concern.
Recommendations	
The following matters require further consideration within the Plan review process and / or project level Environmental Impact Assessment, which has to take account of the adjacent Round 3 site: • Further information on fish, being gathered at the project level should be taken into account. • Further discussion of the proposal with HIAL will be required. • Potential impacts on birds and marine mammals require further exploration, including within project specific HRA. • Further liaison with the fishing and shipping industries will be required.	

North East: Medium term areas of search	
Potential Environmental and Technical Effects	• Potential adverse impacts on marine mammals including cetaceans and seals. • Potential adverse impacts on migratory and breeding birds and fish. • Adverse impacts on spawning and nursery areas. • Moderate impacts on medium sensitivity seascapes. In particular, area NE1 lies only 3km from the coast and as a result major visual change has been predicted.

Opinions	• Concern about fishing impacts, given the importance of the area including Peterhead port to the industry. Concerns identified in the assessment were extended to include issues around cabling and potential exclusions. Further effects on food security, safety and employment were raised, as well as the need for further consultation with the fishing sector, to establish a more accurate baseline and discuss mitigation measures. • Questions were raised about potential grid connections onshore, and into wider European networks. • Shipping issues in the Moray Firth, and potentially affecting ports. Further liaison should be undertaken to address potential conflicts between marine users. • Ministry of Defence concerns, including the need to take into account impacts on bases, air traffic control and meteorological radar, aviation and danger areas. • RSPB views that the assessment of Natura impacts would require further consideration. • The need to recognise the economic contribution and value of the Moray Firth Dolphins.

Recommendations

There are some significant constraints to development in the North East, but it is anticipated that many issues will be overcome at the project level, and through appropriate site selection in the future. There is a need to consider cumulative and in-combination effects including those associated with the adjacent Round 3 offshore wind proposal.

To address issues, the following considerations should be built into medium term site selection within the areas of search:

- Fishing is a key consideration requiring further data and liaison within the region as a whole. This should be linked with broader consideration of navigation issues.
- Careful consideration should be given to the potential for significant visual impacts arising from sites within area NE1.
- An HRA should be undertaken to inform future site selection within the areas of search and address potential effects on marine mammals, birds and fish.
- The presence of an adjacent Round 3 site has to be taken into account.

North: Medium term areas of search	
Potential Environmental and Technical Effects	• Potential adverse effects on marine mammals, including cetaceans and seals. • Potentially adverse impacts on migratory and breeding birds and migratory fish. • Direct adverse impacts on spawning grounds and nursery areas for fish species. • Moderate to major adverse impacts on medium and high sensitivity seascapes from all options except N5, N6 and N8, and potential moderate visual impacts on land based receptors on the coastline, except for N1. • Moderate averse impacts on the Heart of Neolithic Orkney World Heritage site, although no significant impacts on the Outstanding Universal Value of the WHS are expected. • Potential for adverse impacts on two designated wrecks, protected under the Protection of Wrecks Act 1873, and lying within area N7. • Potential effects on tourism, aviation, navigation and commercial fishing.
Opinions	• Support for further development around Orkney to support aspirations for associated economic opportunities – Orkney Islands Council suggested that options should not be ruled out at this stage. • Further consideration should be given to the Shetland Marine Spatial Plan and recognition of the greater potential for wave and tidal energy, given significant water depths. • Questions were raised about whether zoning areas for wind would preclude other marine renewables. It was also noted that technological development will be required to install turbines given water depth and wave height within the area. • Landward infrastructure and development should be considered further. • Further work on fishing is required to explore potential loss of fishing grounds and substantiate the expectation of benefits from the creation of artificial reefs. • Recommendation that the 250m buffer for marine mammals is extended and that UK Biodiversity Action Plan (UKBAP) priority habitats should be recognised. • Likely cultural heritage effects, including on Sule Skerry Lighthouse (N1), the Heart of Neolithic Orkney World Heritage Site (including its setting), castles fortifications and churches on the north coast of the mainland, and effects from N4, N5, N6, N7, and N8 on scheduled sites on the coasts. • Agreement with the conclusions on effects on designated wrecks.

North: Medium term areas of search

	• Clarification on the governance of the Plan and the roles of key organisations was sought: Will power be exported or available for purchase locally? Is there grid capacity? • Concerns about noise, vibration and safety of offshore wind turbines. • Likely impacts on resident or breeding birds. The RSPB noted particular issues with N1 and N3, given their potential impacts on high numbers of seabirds associated with Sule Skerry and Sule Stack SPA. N4 and N5 could impact on the Isle of Foula SPA. The RSPB noted concern about overall levels of development in this area. • Fish displacement should be considered and there is a need for further biodiversity studies to fill data gaps. • Navigation is a key issue – shipping routes in close proximity to option areas require further consideration. Impacts on the port of Lerwick also requires further consideration, and reference should be made to Sullom Voe. • Development in N1 could result in the downgrading of the water body's Water Framework Directive Status and would therefore require justification on the basis of a lack of other alternatives. • The MoD defence radar at Saxa Vord requires consideration. • Several recreation issues were raised. High levels of recreational sailing should be taken into account – these are not necessarily covered by mapped areas. N2 could impact on surf beaches on the North Coast. Kayaking could be affected by development of sites near Foula.

Recommendations

There are some significant constraints to development in the North, but it is anticipated that many issues will be overcome through appropriate option assessment and site selection within the options.

To address key issues, the following considerations should be built into medium term site selection within the areas of search:

- Fishing is a key consideration requiring further data and liaison within the region as a whole. This should be linked with broader consideration of navigation issues.
- Careful consideration should be given to the potential for significant visual impacts on scheduled sites, the Orkney WHS and designated coasts within the site selection process.
- Further consideration of potential impacts on radar and shipping is required.
- Sterilisation of areas for marine renewables should be avoided.
- Impacts on water body status from N1 will require further consideration and liaison with SEPA.
- Impacts on recreation should be considered further, in discussion with SportScotland and other interest groups.

North: Medium term areas of search
• An HRA should be undertaken to inform future site selection within the areas of search and address potential effects on marine mammals, birds and fish. Further data on biodiversity in the region will be required to achieve this. • Potential onshore impacts will require further consideration, and if site options emerge 'scenario' or 'masterplanning'. • Marine Scotland will undertake further scoping and regional locational guidance work for offshore wind, in line with The Saltire Prize initiative work undertaken for marine renewables.

North West: Medium term areas of search	
Potential Environmental and Technical Effects	• Potential adverse impacts on marine mammals including cetaceans and seals. • Potential adverse impacts on migratory and breeding birds and migratory fish. • Direct impacts on spawning grounds and nursery areas for fish species. • Major adverse impacts on seascapes. Impacts on Loch Druidbeg NNR / UNESCO Biosphere Reserve Many be affected. All options (except N8) could affect a nationally designated landscape or impact on visual amenity. • Collision risk arising from conflict with ships using the Minch and the IMO route to the west of the Outer Hebrides. • Potential effects on tourism, aviation, navigation and commercial fishing.
Opinions	• Strong support for further development in the short term to support economic development within the area. • Regionally significant fishing impacts require further consideration. This should be taken forward in collaboration with the sector, and informed by further baseline information that ensures that smaller vessels are considered. • NW8 could result in downgrading of the Water Framework Directive status of the water body and could therefore require justification on the basis of a lack of alternatives. • Concerns about visual, landscape and seascape effects and secondary effects on tourism and recreation require further consideration. Potential effects on wild land. • NW6 raised particular concerns in terms of visual impacts. • Further information on the relationship between development and the grid is required. • The SEA should acknowledge the large numbers of resident and breeding internationally important bird populations. Further consideration of impacts on Icelandic passerine migrants and Scandinavian migrants is required. • High concentrations of Natura sites will require careful assessment. Basking sharks should be recognised alongside seals and cetaceans.

North West: Medium term areas of search

	• Shipping and navigation issues are likely to be significant, particular in relation to sites affecting access to the Minch from the north and south and the traffic separation scheme from the Butt of Lewis to Cape Wrath. • MoD issues include the need to consider air traffic control radar at St. Kilda and South Uist, and the Drium-A-Starraid Meteorological Weather Radar near Stornoway. • Relationship with marine renewables also requires further consideration. • Cultural heritage issues should be explored further, including impact on North Rona.

Recommendations

There are some significant constraints to development in the North West, but it is anticipated that many issues will be overcome through appropriate option and site selection within the areas in the future.

To address key issues, the following considerations should be built into medium term site selection within the areas of search:

- Where environmentally and technically feasible, further development in this area should be prioritised.
- Further consideration of potential impacts on radar and shipping is required. In particular, detailed discussions will be required to ensure that site selection does not reduce access to the Minch and takes into account other shipping designation and guidance.
- Fishing is a key consideration requiring further data, assessment and liaison within the region as a whole. This should also be linked with broader consideration of navigation issues.
- Impacts on water body status from N1 will require further consideration and liaison with SEPA.
- Impacts on recreation should be considered further, in discussion with Sportscotland and other interest groups.
- An HRA should be undertaken at the regional level to inform future site selection within the areas of search and address potential effects on marine mammals, birds and fish.
- Further data on biodiversity in the region will be required to achieve this.
- Potential onshore impacts will require further consideration and if site options emerge ‘scenario’ and / or ‘masterplanning’.
- Careful consideration should be given to the potential for significant impacts on scheduled sites, including those on North Rona arising from NW8.
- Sterilisation of areas for marine renewables should be avoided.
- The social and cultural identity of remote, particularly island, communities should be taken into account in project planning and assessment.
- Marine Scotland will undertake further scoping and regional locational guidance work for offshore wind, in line with The Saltire Prize initiative work undertaken for marine renewables.

West: Short term options	
Potential Environmental and Technical Effects	• Short term options within the region are relatively large scale, and therefore provide significant potential to contribute to climate change mitigation. • Potential adverse impacts on marine mammals, including harbour porpoise, white-beaked dolphin, grey and harbour seals. • Potential effects on birds, including breeding storm petrel, auks and terns. • Direct adverse impacts on fish spawning grounds and nursery areas. • Potential impacts on migratory fish. • Major visual and seascape impacts due to the proximity of the site to land and high sensitivity seascapes. • Potential adverse impacts on the setting of listed lighthouses, and A-listed buildings. • Potential effects on tourism, aviation, navigation and commercial fishing. • Community and public acceptability.
Opinions	• Strong community concern in some areas about the scale of development and its likely impacts. • Concern that community views would not be given full consideration and that developer engagement and information should be increased significantly, to allow this to take place in a meaningful way. • Particular concern about the onshore implications of development on infrastructure, services, health and quality of life. This extends to fundamental concern that the development could undermine community / island culture and way of life. • Further cultural heritage effects, including on onshore coastal archaeology such as coastal fortifications and early church sites and marine archaeology, and wrecks. • Significant concern about impacts on landscapes and seascapes, taking into account the scale and proximity of development. • People emphasised the sensitivity and value of non-designated landscapes. • The methodology for assessing these effects and the baseline information (seascape characterisation) were also raised. Related qualities such as tranquillity and lack of industrialisation were raised. Shadow flicker and light pollution were also raised. • Questions were asked about why the short term options were located much closer to shore than medium term options. • Ecological impacts were raised, with further information on birds (wintering, breeding and migratory birds), marine mammals and wildlife, the machair, and candidate Natura Sites.

West: Short term options	
	• Prospective developers questioned the data used in the SEA and recommended consideration of their scoping study. • Potential impacts on air traffic control. • Possible effects on climate affecting parts of the west coast. • Fishing issues, with particular concerns about impacts on small vessels with static gear and further implications this might have for the rural community. • Lack of opportunities for mitigation (e.g. relocation of activities during construction were also raised). • Broader issues around energy policy and the need to ensure that renewable energy is taken forward in a sustainable way. • Views extended beyond site specific impacts to include concerns about the potential overall scale of development into the medium term, potential for islands or remote communities becoming servicing bases for numerous proposals in the west region. • Further work is required to assess the combined effects of the development with proposals for wave and tidal energy in the area. • Concerns about the level of engagement at this stage and comments on the need to ensure that the community is fully engaged at both the Plan and project level. • Industry views that there remains significant uncertainty about development proposals at this stage, and as a result impact assessment for the Plan should be expressed in broader terms, focusing on regional options. • The Kintyre site generated very significant levels of public concern – with objections amounting to more than a third of all responses. • People were concerned about impacts on the area's special qualities, including its views, sunsets, tranquillity and overall environmental quality. Light pollution was also raised and people were concerned about the accuracy of visualisations of development. Linked with these effects, many people were concerned about the impact this could have on tourism and recreation. In turn this was viewed as a significant economic issue. • Many people raised the importance of taking into account plans for investment in the Machrihanish Dunes golf course. Some viewed this as being at risk as a result of the visual effects of the proposal. • Other recreation activities were raised, including the importance of the area for surfing, wildlife watching and walking. • Numerous further environmental constraints were noted by consultees. Further information on coastal processes, the seabed, fish, birds (with an extensive response from the RSPB), marine mammals (including dolphins) and many other species and sources of more accurate local data were highlighted.

West: Short term options

	• Concerns about impacts on communities, including quality of life, property values (including potential impacts on their stability as a result of construction works), radio and TV reception and way of life generally. • Concerns from Argyll and Bute Council and SNH about the Kintyre proposal, and a view from the former that one of the medium term options should be considered as an alternative. • Issues around radar and aviation interference, including a detailed response from Loganair / Flybe setting out constraints on the approach routes to Campbeltown Airport. • Navigation issues, affecting particularly recreation activity. This included concerns about the safety of small vessels navigating the Mull of Kintyre and effects on local marinas and related tourism income. • Numerous responses from visitors to the Kintyre area, supporting views that tourism would be adversely impacted. • Concerns from Northern Irish organisations about impacts on the Giant's Causeway World Heritage Site and confirming the findings relating to AONBs from the assessment. • Issues around potential cumulative effects and conflicts arising from the combination of offshore wind, wave and tidal energy in the region.

Recommendations

The SEA and consultation identified some significant concerns and constraints relating to this type of development in the West region. The scale of development and its proximity to sensitive environments suggests that very careful planning would be required to develop a combined on and offshore development proposal that avoids impacts and significantly undermining quality of life of communities and their unique environments.

The following matters require further consideration within Plan review and project level Environmental Impact Assessment of the short term options generally:

- Development of a scenario / masterplanning approach which links on and offshore aspects of development and considers issues including onshore connections and ancillary development, infrastructure upgrading, and socio-economic impacts in addition to environmental effects.
- Full assessment of the landscape, seascape and visual effects of development. This should take into account the scale of proposals and their positioning within the site boundary.
- Visual impact and public acceptability issues can be improved if turbines can be moved further from the shore, or the scale of development (overall or in terms of the turbines) could be reduced.
- Further consideration of impacts on shipping and fishing and scope for mitigating these effects, in collaboration with the fishing industry and local community.
- Resolution of radar issues, in collaboration with the relevant stakeholders.
- Further ecological data collection and detailed assessment of impacts on designated (see below) and non-designated habitats and species.

West: Short term options

- Detailed consideration of cultural heritage impacts, including on offshore assets such as lighthouses, onshore remains and their settings, marine archaeology, and less tangible aspects of cultural heritage.
- Satisfactory completion of project level HRA, taking into account mitigation measures identified in the HRA of the Draft Plan, and any further research and review work, as appropriate.

The SEA and consultation identified very significant concerns and constraints relating to the Kintyre development. The consultation in particular reinforced the findings of the SEA and emphasised that the development would not be publicly acceptable to many who live and visit Kintyre. It was anticipated that these issues would be extremely difficult to resolve at the project level for the following reasons:

- Resolution of the likely significant effects of the development on internationally and nationally significant landscapes and seascapes.
- Consideration of increasing the distance of the site from the coast, resulting in significant visual impacts.
- The potential for adverse effects on tourism and recreation, including investment in the Machrihanish Dunes international golf course project. A full socio-economic study relating specifically to the site would have been required.
- Technical issues arising for the navigation and aviation sectors.
- Effects on biodiversity, which include, but also extend beyond designated sites, species and habitats and the sensitivities raised by consultees, particularly in connection with birds, fish and rare species.
- Potential effects on the wave climate, water quality, sediments and coastal processes, which could adversely impact on coastal features and stability, Machrihanish beach and recreation activities including surfing.
- Impacts on the fishing sector.
- Impacts on aviation and flight activity into and out of Campbeltown Airport.
- Significant community opposition and lack of public acceptability of the proposal.

West: Medium term areas of search

Potential Environmental and Technical Effects	• Potential adverse impacts on marine mammals including cetaceans and seals. • Potentially adverse impacts on birds including migratory birds, breeding birds and migratory fish. • Direct adverse impacts on fish spawning ground and nursery areas. • Moderate or major effects on seascapes, as all of the medium term options lie within medium or high sensitivity seascapes. • W1, W3 and W4 are likely to have significant impacts on coastal receptors due to the proximity of the coastline. • Potential effects on tourism, aviation, navigation and commercial fishing. • Community and public acceptability.

West: Medium term areas of search

Opinions	• Concerns about the effects of some of the options on navigation. This included the impacts of W1 on ships accessing the Minch and of W4 on vessels entering the IMO Route in the North Channel. • W1 and W4 were also of primary concern to the Ministry of Defence, given ongoing use of these areas. • W4 also raised issues about aviation. • Conflict arising from area W4 and investment in infrastructure to support economic development. • Further effects on local regeneration plans, including work centering on realising the benefits of recreational boating. • Potential effects on cultural heritage from W1 (affecting coastal sites and Barra Head lighthouse), and from W4 where the linkages and views between islands and their historic sites could be impacted. • Confirmation that the location of area W4 relatively close to the coast could generate significant adverse visual an seascape impacts, with secondary impacts on tourism. • Further views on visual, landscape and seascape effects, noting potential for significant regional cumulative effects and highlighting particular sensitivities such as the impact of W2 on wild land and views from National Scenic Areas. • RSPB concerns about potentially significant cumulative effects on a range of species using the East Atlantic Flyway, locally breeding birds and seabirds. The potential to affect birds crossing or travelling through the Minch was raised, and it was emphasised that impacts on Natura sites in the region required further consideration.

Recommendations

There are some significant constraints to the medium term options for development in the West, but it is anticipated that some of issues will be overcome through appropriate further option selection work and Plan review, and site selection within the options.

To address key issues, the following considerations should be built into medium term site selection within the areas of search:

- The overall environmental sensitivities and special quality of the West Region should be taken into account. Potential for large scale cumulative landscape, navigation and biodiversity effects should be fully explored.
- Potential for significant impacts on sensitive seascapes will require further assessment and mitigation.
- Further consideration of potential impacts on shipping (particularly from areas W1 and W4) is required. In particular, detailed discussions will be required to ensure that site selection does not reduce access to the Minch and takes into account other shipping designation and guidance.
- Fishing is a key consideration requiring further data and liaison within the region as a whole. This should be linked with broader consideration of navigation issues and socio-economic assessment.

West: Medium term areas of search
• Potential onshore impacts will require further consideration. This is particularly important to area W4. • An HRA should be undertaken to further inform future regional option and site selection within the areas of search and address potential effects on marine mammals, birds and fish. Further data on biodiversity in the region will be required to achieve this. • Careful consideration should be given to the potential for significant impacts on cultural heritage sites, including coastal archaeology, will be required. • Effects on tourism and recreation within the region as a whole will require more detailed assessment. • Sterilisation of areas for marine renewables should be avoided.

South West: Short term options	
Potential Environmental and Technical Effects	• Potential adverse impacts on marine mammals. • Potential adverse impacts on birds including wintering wildfowl and waders in the adjacent international nature conservation sites and Important Bird Areas in the Solway Firth. • Direct adverse impacts on fish spawning grounds and nursery areas, a Regulate Cockle Fishery and mussel and winkle fisheries on the shores of the Solway. • Major visual and seascape impacts due to proximity to land, National Scenic Areas, AONBs and the presence of the high sensitivity seascape of the Outer Solway. • Potential impacts on migratory fish. • Potential effects on tourism, navigation and commercial fishing.
Opinions	• Around a half all respondents to the consultation expressed opposition to the two short term development options in the Solway Firth. • The most frequently raised concern related to the individual and cumulative visual, landscape and seascape effects of the developments, on both designated areas and other less formally protected areas and receptors. • Dumfries and Galloway Council, supported by the wider public who responded, considered the scale of development and their proximity to shore to be unacceptable. • Views from the coast, across the Solway and to Cumbria, the Isle of Man and Ireland were all expected to be affected. • Lighting and impacts on the area's dark sky status were also a key concern.

South West: Short term options	
	• Many respondents were concerned about cumulative and in-combination effects with Robin Rigg, onshore wind energy developments, the two short term sites and medium term options for development. • People envisaged a 'wall of turbines' across the Firth. • Impacts on communities, tourism and recreation were viewed as also being negatively affected. Key issues included impacts on quality of life and employment, general disturbance, noise, shadow flicker. • People were also concerned that impacts would not be offset by economic gains from the development. • Fishing was a key concern. The area's fishing interests were expected to be significantly affected by the development. • Concerns came from local businesses and further afield. Safety concerns and implications for business viability was raised. All types of fish and shellfish resource were expected to be affected. Concern was also raised about recreational angling, and migratory fish species. • Various environmental bodies raised further environmental issues. Some highlighted key areas of value, including the Wigtown Bay Local Nature Reserve (LNR), and the Wigtown Bay (Cree Estuary) SSSI. • Significant issues were expected for a number of internationally and nationally important bird species. • Concerns about impacts on fish species, shellfish, crustaceans and bottom feeding fish were raised. • Issues about water quality, sediment, coastal processes and the wave climate were raised. • People were concerned about areas where munitions are likely to be present. • Shipping and navigation were also key issues and concerns about data raised in relation to the Plan as a whole were emphasised in relation to the sites. Entry to harbours and impacts on key commercial and recreation routes were highlighted and people called for a full navigational assessment. • Further concerns about impacts on cultural heritage were raised, including potential for effects on Hadrian's Wall World Heritage Site, including from English Heritage and the Solway Firth Partnership. • There were also concerns about radioactive particle disturbance on the sea bed. • People believed that the economic benefits of the development would be limited and not accrue in the Dumfries and Galloway Region, based on their experience with Robin Rigg.

South West: Short term options	
	• Impacts on coastal paths and recreation were raised. • Further work on establishing the value of the coastline in economic terms was proposed. • The sites were noted to be an important fishing area. • Concerns about navigation from Maryport and Whitehaven were raised, alongside impacts on key fishing grounds.

Recommendations

The SEA and consultation identified very significant concerns and constraints relating to development in the South West. The consultation in particular reinforced the findings of the SEA and emphasised that the development would not be publicly acceptable to many who live in and visit Dumfries and Galloway. It is anticipated that these issues would be extremely difficult to resolve at the project level for the following reasons:

- Significant effects of the development on nationally significant landscapes and seascapes including impacts on Hadrian's Wall World Heritage Site.
- Distance of the sites from the coast, causing significant visual impacts.
- Potential for adverse effects on tourism and recreation. A full socio-economic study relating specifically to the site would be required.
- Technical issues arising for the navigation sector - a full navigational risk assessment would be required.
- Effects on biodiversity, including but also extending beyond designated sites, species and habitats and taking into account the sensitivities raised by consultees, particularly birds and fish species.
- Significant impacts on the fishing sector.
- Significant community impacts and lack of public acceptability of the proposals.
- Potential net socio-economic costs for the regional economy.

South West: Medium term areas of search	
Potential Environmental and Technical Effects	• Potential effects on marine mammals including cetaceans and seals. • Potential adverse effects on migratory and breeding birds off the Irish coastline and elsewhere. • Direct adverse impacts on fish spawning grounds and nursery areas. • Moderate or major seascape impacts due to the presence of medium and high sensitivity seascapes and nationally designated landscapes. • Effects on migratory fish. • Potential effects on tourism, aviation, navigation and commercial fishing.

South West: Medium term areas of search	
Opinions	• Concerns about the consultation process and views that further work is required to address the many concerns about development in this area, from within Dumfries and Galloway and also extending to Cumbria, the Isle of Man and Northern Ireland. • Concern about the overall scale of development in the area as a whole, and its impacts on the special qualities of the Solway Coast. • Significant concerns about visual and seascape impacts from development areas, individually and cumulatively. These related to both designated and undesignated landscapes and included impacts on NSAs, AONBs, and a regional scenic area. • Concern about secondary impacts on communities, tourism and the local economy. • Environmental issues, including impacts on the proposed biosphere reserve, marine wildlife, birds, fish and local nature reserves. • A need for closer links with wider processes of regional marine planning. • Significant concern about impacts on the commercial fishing sector, with activity from ports around the Solway and further afield potentially being directly impacted by development, to the extent that development could significantly undermine the viability of businesses. • Recreational issues relating to boating, sea angling and diving in the region. • Concern about impacts on navigation, including access to ports and key routes for both commercial and leisure vessels. This included detailed responses from the Maritime and Coastguard Agency, and the DETI Northern Ireland. • Issues around impacts on undesignated cultural heritage resources, as well as designated sites. In particular, impacts on the Hadrian's Wall and the Giant's Causeway World Heritage sites emerged as key concerns for conservation agencies. • Particular concern about options in the vicinity of Luce Bay – some suggesting the impacts would be as great as those expected for Wigtown Bay, but others proposing this as a preferable option. • Concern about development within danger areas, areas where munitions may exist on the seabed, Ministry of Defence activities and radar issues.

Recommendations

There are some significant constraints to the medium term options for development in the South West, including widespread public opposition to development within the Solway as a whole. Some of these issues may be overcome through appropriate site selection within the options in the future.

To address key issues, the following considerations should be built into medium term site selection within the areas of search:

- The overall environmental sensitivities and special quality of the South West Region should be taken into account. Potential for large scale cumulative landscape and biodiversity effects should be fully explored.
- Potential for significant impacts on sensitive seascapes and designated areas will require further assessment and mitigation.
- Effects on tourism and recreation within the region as a whole will require more detailed assessment.
- Further consideration of potential impacts on navigation is required.
- Fishing is a key consideration requiring further data and liaison within the region as a whole. This should be linked with navigation issues.
- Potential onshore impacts will require further consideration.
- An HRA should be undertaken to inform future site selection within the areas of search and address potential effects on marine mammals, birds and fish. Further data on biodiversity in the region will be required to achieve this.
- Careful consideration should be given to the potential for significant impacts on cultural heritage sites, particularly the two nearby WHS, will be required.
- Sterilisation of areas for marine renewables should be avoided.
- The need for SEA, HRA and socio-economic assessment at the regional level was emphasised. This should include an integrated review focused on this level to further assess the medium term options.

In summary, the Scottish Government believes that any prospective developer considering taking forward offshore wind development in the South West faces significant challenges with regard to: visual and ecological impact, as well as socio-economic issues of concern to the fishing, shipping and tourism sectors. The developer would therefore have to work closely with Marine Scotland and Dumfries and Galloway Council to ensure these issues were tackled and public acceptability issues addressed.

What were the views on the Plan as a whole and its SEA?

B1.103 The consultation on the SEA and Draft Plan included four further questions that aimed to address the environmental effects of the Plan as a whole. The responses to these questions were detailed in full in the Analysis of Consultation Responses Report. The following paragraphs provide a summary of key issues raised, and the response to each of them.

Question 6: How can the Draft Plan be improved? What should be taken forward differently and why?

B1.104 In summary, respondents raised the following views.

B1.105 A range of interests suggested that a more regional approach would be appropriate for a national level plan. The wind industry representatives particularly considered it to be important that the SEA does not prejudge issues that require more detailed consideration at the project scale. Linked with this, consideration of higher level alternatives to the Plan as a whole was recommended to test out some assumptions more rigorously.

B1.106 Timescales were considered to be arbitrary by some respondents, given the pace of change within the sector. Concerns included a view that too rigid an approach could hinder the pace of development. TCE pointed out that, in reality, all of the developments will not proceed concurrently, and therefore cumulative effects may be overstated as a worst case scenario.

B1.107 Clarification of the status of medium and long term options was sought by many respondents. Some suggested that further prioritisation or comparison of the medium term options using an evaluation system would be useful.

B1.108 Some consultees recommended further consideration of the links between offshore wind and onshore developments and planning. This included several local authorities with responsibility for development planning. Such considerations could include further consideration of infrastructure requirements and cumulative effects, and also extends to include Round 3 wind energy sites and other marine renewables.

B1.109 Some consultees asked for further clarification on specific issues and in doing so underlined the need for maximum transparency within the Plan. This included concerns about the apparent lack of information on the way in which MaRS had been used, clarification of some aspects of the assessment methodology and more general views on the visual presentation of the Final Plan. The importance of further engagement in the Plan was emphasised, by members of the public and by key sectors: specifically fishing and shipping. This reflected concerns about the consultation process on the Plan throughout its preparation, and local level views that the opinions and requirements of communities was being overlooked. Some expressed disappointment about their engagement in the development of the Draft Plan and its SEA, but offered to assist further as the Plan is refined and implemented.

B1.110 Many stakeholders and members of the public expressed a strong view that further analysis of the social and economic effects of the Plan was required, prior to its implementation. The need to focus more on social effects, and build in further data on shipping and fishing was particularly emphasised. The fishing sector in argued that their perspective should have been fully addressed under the heading 'material assets' within SEA. They believed that their needs were coming second to the aspiration for renewable energy development, but that there was scope to improve the Plan, if further analysis of the spatial sensitivities of the fishing industry is incorporated. Similarly, the shipping sector noted that the Plan could be improved if it took into account further information on navigation and levels of activity, and allowed for a risk assessment based approach.

B1.111 It was also recommended that the broader context and contribution of the Plan should be considered further. This could usefully include reference to the National Renewables Infrastructure Plan (N-RIP), the grid (explored in more detail above), and overall targets for renewable energy generation, to which the Plan should relate.

B1.112 The need for a Habitats Regulations Appraisal of the Plan was emphasised by several consultees, including Scottish Natural Heritage, the RSPB and Scottish Environment LINK.

Issue / View	**Response**
A regional perspective is preferable to the emphasis within the Draft Plan on specific sites and options.	This key point has been taken into account. It appeared from the consultation that, regardless of their stance on offshore wind and development proposals, consultees were agreed that there is insufficient information at this stage, and some suggested that this meant that the Scottish Government was not in a position to make a fully informed decision on specific projects. As a result, the Plan aims to recognise these uncertainties and focuses on national and regional level recommendations, supported by finer grained information which can be used as guidance for the project assessment stage. It is acknowledged that further review is required and more detailed, studies and data collection may indicate that these issues may not be valid at the regional and / or project level.
Higher level alternatives should have been considered.	The SEA considered the options that were considered within the formulation of the Draft Plan. These primarily took the form of spatial options. Broader options, such as alternative renewable energy technologies, will be considered within sectoral and non-sectoral plans, such as the National Marine Plan.
Timescales should be flexible.	This is noted. Timescales presented within the Plan are indicative at this stage and will be reconsidered within the Plan review process.

Issue / View	Response
Medium and long term option status should be clarified and more fully evaluated and prioritised	This recurring concern has been addressed in the finalised version of the Plan.
Further consideration of offshore and onshore links is required, together with Round 3 sites and marine renewables.	The SEA considered cumulative effects of development as far as practicable at this stage. However, it is recognised that further work on this is required. This is being taken forward by the regional groupings of developers at present. The outputs from this process will be used to inform project level EIA and associated licensing. Also, the Plan review process will expand the geographic scope of SEA, HRA and socio-economic assessment for offshore wind out to the 200 nautical mile limit, capturing the adjacent Round 3 sites and further future development potential within this expanded geographic scope. In addition the Scottish Government will take forward a similar approach for marine renewables and start to share information across these plans and their assessments..
Information used within MaRS and assessment methods should be made more transparent.	The Scottish Government remains of the view, shared by some consultees, that the use of MaRS provided an appropriate means of focusing on potential future Plan options, as a starting point for the SEA. However, it is acknowledged that there are issues which require to be revisited in line with the original intention of the approach to modelling, including coverage of datasets and transparency. The Plan has indicated that the medium term options are indicative areas of search at this stage, and states a commitment to revisiting MaRS in collaboration with stakeholders to explore how sensitivity testing can be applied and model calibration / normalisation can be achieved as the Plan undergoes review.
The final Plan should be presented in a clear, accessible way.	Noted. The Scottish Government has endeavoured to make the Plan comprehensive, but also as clear and accessible as possible.
Need for continuing engagement in the planning process, particularly for the fishing and shipping sectors. Need to ensure local communities continue to have a voice within the planning and implementation processes.	The Plan emphasised the importance of ongoing liaison with key sectors and the public as an integral part of its review and implementation strategy. The Scottish Government is also trialling scenarios and masterplanning techniques to include communities within the process and will consider other best practice techniques.

Issue / View	Response
Further socio-economic assessment is required.	The findings of the socio-economic assessment are summarised in Section B4 of this Post Adoption Statement. These findings have been taken into account in the Plan.
Further consideration of the fishing sector, based on fuller data coverage, is required. This should have been addressed under 'material assets' within the SEA.	The Scottish Government included an assessment of the environmental aspects of the fishing sector within the SEA, in relation to biodiversity. The socio-economic assessment provided further consideration of the economic aspects of the sector. These studies, together with the extensive consultee views from the sector, have been taken into account in the finalised Plan, which also includes a commitment to further liaison with the sector (see Section B5).
Further consideration of the shipping sector is required.	Shipping activity were considered within the environmental assessment and the socio-economic study. The issues identified, together with consultee views have been taken into account in the same way that fishing issues have been covered in the finalised Plan. Marine Scotland will consider how it can work with the shipping industry and address its concerns within the Plan review process and at the project level.
Offshore wind should be considered within the context of overall targets for renewable energy generation.	The Scottish Government has sought to incorporate environmental factors into the Plan by frontloading the SEA and using it as a plan-making tool. The socio-economic study explored this issue in more detail. The Plan has sought to provide further context for the offshore wind sector, by explaining the likely overall contribution that could be achieved nationally.
There is a need to link the Plan with N-RIP proposals.	The socio-economic study has helped to highlight this further. Further liaison with key partners at the national and regional levels will be required to achieve this as implementation of the Plan progresses.
A Habitats Regulations Appraisal of the Plan is required.	This has now been undertaken. The findings are set out in Section B3 of this Report. Further HRA is likely to be required as monitoring research and assessment are taken forward as part of the Plan review. The recommendations for mitigation will need to be taken into account and used to inform project level HRA.

Question 7: Do you have any views on the scale and pace of development that could be sustainably accommodated in Scottish Territorial Waters, taking into account the findings of the SEA and the technical assessment?

B1.113 This question aimed to encourage consultees to consider their views on the Plan as a whole, as opposed to focusing entirely on their specific interests or options being proposed. In response, the following key points were raised.

B1.114 Some consultees believed that the pace of development was too ambitious and was likely to lead to significant environmental, social and economic

impacts. This included many of those who had focused on objecting to specific development proposals, the shipping and fishing sectors. Many of these viewed this as a serious issue but were not convinced that this would result in any changes to the Plan. Several consultees asserted that more time is needed to provide a fuller assessment of the Plan and its environmental effects. As a result, groups such as Scottish Environment LINK urged that the precautionary principle is applied.

B1.115 In contrast, others believed that the Plan lacked ambition and could hinder development aspirations. In particular, strong views were expressed by Comhairle nan Eilean Siar that there is a need to send out strong positive signals from the Plan to ensure its potential benefits would be maximised.

B1.116 Some considered the scale and pace of change to be about right. For example, with Aberdeen City Council, recognised that the scale of the opportunity necessitated rapid action, providing that this was balanced with work to gather better information and secure mitigation. The Highland Council believed that the scale of development proposed was broadly correct, providing there is scope to adjust the Plan as implementation processes.

B1.117 Some respondents considered that there was scope for the Plan to evolve over time, with continuing reviews of progress and information informing future changes. SNH recommended that within this, priority should be given to lowest risk development, and advised caution in the absence of comprehensive data. Several other stakeholders referred to the need to revisit the Plan periodically to take on board further information, and the findings of monitoring, as they emerge. Some considered the Plan's timescales to be too inflexible, requiring refinement as work progresses.

B1.118 Several organisations considered there to be a need to view the proposals in terms of capacity – for generation (energy targets) or in terms of environmental capacity. Suggestions were made about how the Plan could be better linked with other factors, including grid capacity, infrastructure constraints, availability of materials, quayside manufacturing facilities, skills and development planning.

<table>
<tr><th>Issue / View</th><th>Response</th></tr>
<tr><td>Scale and pace of development within the Draft Plan is too great.</td><td rowspan="3">The Scottish Government recognises this concern, but is seeking to take forward development in a practical way which realises ambition for renewable energy and associated economic development, but avoids generating significant adverse environmental impacts. Further liaison with the fishing and shipping sectors, will be used to consider an acceptable level and pace of development.</td></tr>
<tr><td>Scale of pace and aspirations are too limited.</td></tr>
<tr><td>Scale and pace proposed is necessary to capitalise on this significant opportunity in a sustainable way.</td></tr>
<tr><td>Further information is required prior to development proceeding.</td><td>This is a strategic environmental assessment of a high level plan. It is expected that further information will need to be gathered to inform review of the Plan and more detailed environmental assessment at the project level.</td></tr>
</table>

Issue / View	Response
	No development will take place before project level EIA is undertaken. In the meantime, the inclusion of options or areas of search in the Plan does not indicate that consent will be granted at licensing.
Review of the Plan is essential and should provide further information which can be used to adjust the proposals. In the meantime caution is required.	The Scottish Government agrees with this point as it is a statutory requirement to monitor and revisit the SEA as necessary in any case. The Plan sets out proposals for monitoring and research within the review. More work is also required at the project level.
Prioritisation and / or a sequential approach to implementation may allow lessons to be learned and used to inform future choices.	The Plan sets out priorities at a regional scale. The need to learn from existing and future development is acknowledged and has formed the foundations of the monitoring proposals.
Greater flexibility is required.	The Plan seeks to strike an appropriate balance between providing assurance of the continuing commitment of the Scottish Government to achieving large scale benefits from offshore wind, whilst also noting that more work is required to deliver this in a sustainable way.
The Plan should be framed in relation to capacity of the environment.	In very broad terms, environmental capacity has underpinned the approach to defining regional recommendations within the Plan. However, this is a complex concept, and capacity has not been defined in absolute terms.
The Plan should be framed within broader aspirations for renewable energy generation, national and regional targets for output etc.	Further work on this was undertaken as part of the socio-economic study. The Plan aims to provide further detail on this context.
Consideration should be given to other factors: grid capacity, infrastructure, materials, manufacturing capacity, supply chain infrastructure and investment, skills supply and development planning.	This view has been noted in relation to specific areas and parts of the planning and assessment process above. The socio-economic assessment has been used to achieve a greater link between these types of issues and the proposals within the Plan itself. The Plan review process will allow further consideration of these issues.
The Plan should be framed within consideration of the needs of other marine users to accommodate change.	The needs of other marine users is fully acknowledged within the Plan. A commitment has been made to further and ongoing liaison with representative sectors and the public to deliver this as the Plan is implemented. The Plan review process will take into account regional information and assessment findings as they emerge.

Question 8: Have we got the balance right in the Draft Plan, between tackling climate change, maximising opportunities for economic development and dealing with environmental and commercial impacts?

B1.119 The following points provide a summary of key issues raised in response to this question.

B1.120 As with the previous question, several respondents believed that an answer could only emerge if the Plan was viewed in the context of stated energy generation targets. Some considered that there was greater potential for reliable and efficient generation from other types of marine renewables. Some went as far as questioning the need for the Plan in the first place, asking why offshore wind has been prioritised in Scotland.

B1.121 Several consultees believed that the Plan had not balanced potential economic gains from offshore wind with anticipated losses, particularly for the tourism and fishing sectors and in terms of communities more generally. Specific areas were identified, where it was expected that impacts on local economies would be greatest. The fishing sector raised the need for compensation to address likely losses, extending to individual vessels. There was also a general questioning of the viability and benefits of offshore wind.

B1.122 More positively, some consultees believed that the Plan presented a significant positive opportunity for their local economy, specifically the Western Isles where it was emphasised that offshore wind could play a key role in reducing depopulation and improving skills and quality of life more generally. The local authority believed these benefits may have been underplayed within the Draft Plan. Highlands and Islands Enterprise (HIE) supported this view, and others, such as Argyll Renewables Communities (ARC), suggested fuller evaluation would provide a clearer view.

B1.123 In response to this question, some consultees suggested that there was a need for fuller consideration of the environmental effects of the Plan. These have already been addressed in the discussion above.

B1.124 Reasonable alternatives within the context of the SEA requirements were also raised by some consultees. It was suggested that other broad options should have been addressed within the assessment: specifically the ‘do nothing’ option and a comparison of the effects of offshore wind with wave and tidal energy. Instead, some consultees contended that an assumption had been made that offshore wind energy would be pursued, regardless of other points of view.

Issue / View	Response
Consideration of the Plan's (and offshore wind's) contribution can only be established in the context of the wider energy mix and energy generation targets.	The Scottish Government is committed to maximising the contribution of offshore wind, along with other types of renewable generation, to the overall energy mix. This will help to ensure that Scotland meets ambitious renewable energy and climate change targets and secures related economic and environmental benefits. Further consideration of offshore wind in relation to other forms of marine renewables will be undertaken as further sectoral planning progresses and within the National Marine Plan as appropriate.
Economic gains are outweighed by tourism, fishing and community losses.	The socio-economic assessment sought to explore this in more detail (see Section B4).
The benefits of the Plan should be more fully evaluated and capitalised upon.	
Further consideration should be given to compensation for the fishing sector.	This is an issue for offshore wind developers and the fishing sector to address.
Assessment alternatives should have covered broad options: do nothing and wave and tidal as compared to offshore wind.	The SEA included consideration of the evolution of the environment in the absence of the Plan. Given its sectoral focus, it would not have been appropriate or possible at this early stage to more fully compare offshore wind proposals with wave and tidal. It is intended that all three types of generation have a legitimate role to play within the overall mix of energy sources in Scotland. However, as further sectoral marine planning work is taken forward, the Scottish Government will seek to take account of issues and alternatives and build in inter-relationships made possible by sectoral marine planning.

Question 9: The Plan, once implemented, will be reviewed to take account of actual development and increasing knowledge of development factors How often should this be done and why?

B1.125 Linking with proposals for monitoring, this final question focused on the proposal within the Draft Plan to undertake a review every two years, to determine whether the SEA and the Plan require updating. Views on this question were varied, and are summarised below.

B1.126 There was concern that if the Plan is reviewed too frequently, uncertainty could hinder development. Scottish Renewables raised concerns about the difficulties this would introduce for the project consenting stage, and asked for

clarification on how applications for consent would be treated. Others agreed with this view. Greater flexibility was called for by some, suggesting that as opposed to a fixed time period, reviews should be linked with key milestones in research and implementation. Several wind energy representatives agreed with this view and suggested relevant points at which it would be meaningful to undertake a review.

B1.127 Some consultees agreed that the proposed two year period was 'about right', reflecting the likely pace of change in the sector and expected technological progress. Some suggested that revisiting the Plan after two years should not automatically trigger a major review.

B1.128 Specific issues to be taken into account were also raised, including the emergence of marine spatial planning, work by DECC, research findings, progress in developing other alternatives, new guidance and lessons learned from implementation of the short term sites. This latter point broadly reflected views from the public raised in consultation events, that there is a need to learn from existing and proposed developments, before taking forward further activities. Comments were also made on the information that should be referred to within the review process. Some developers asked how the review would be undertaken, and how data would be gathered as part of this, urging further discussion to avoid duplication of research. Further baseline data collection was also suggested. Many believed that the review would play a critical role in addressing uncertainties and data gaps.

B1.129 Some respondents suggested a more frequent review, to reflect the likely speed of technological and research development and concerns about rapid obsolescence. In contrast, others believed that a longer review period would be preferable, for example to achieve a better fit with development plan reviews and marine spatial planning. Some suggested that five years would be more appropriate, to allow significant change to take place in the interim period. Others suggested this on the basis of likely resourcing issues.

Issue / View	**Response**
More frequent review is appropriate to reflect the pace of change in the sector.	The Scottish Government is of the view that a two year review period is appropriate at least over the initial stages of Plan development. It is acknowledged that in some circumstances certain triggers may arise which merit more flexible review. The commitment extends to initially considering whether a full revisiting of the Plan and SEA are required. If there is no significant new information or progress is slower than expected, no full revision will be required. However, the HRA and socio-economic issues will also be subject to 2 yearly review.
Less frequent review is more practical.	
Take a more flexible approach to the review period, linked with key milestones as opposed to fixed time periods.	
Advice on information to be included in the review and its role in addressing data gaps.	This information has been taken into account in the finalised Plan's proposals for review.
Avoid uncertainty in the review period by explaining its implications for development consent applications.	This has been addressed in the finalised version of the Plan.

What are the reasons for choosing the Plan as adopted?

B1.130 The Scottish Government is committed to maximising the contribution which offshore wind can make towards meeting Scotland's ambitious renewable electricity targets, and securing the related economic and environmental benefits. It is also recognised that this type of development needs to be carefully planned, to avoid generating significant adverse effects on the environment, communities and local economies. The finalised version of the Plan has taken into account the findings from the SEA, the HRA, the socio-economic assessment and all associated consultation with stakeholders and the public. As far as possible, key issues have been explicitly addressed within the Plan itself.

What monitoring will be undertaken?

B1.131 The Environmental Assessment (Scotland) Act 2005 requires that the Post Adoption SEA Statement includes proposals for monitoring the environmental effects arising from the Plan. In addition, considerable further research will be required to ensure that current uncertainties and data gaps are prioritised and addressed. The table below sets out the formal commitments to monitoring that have emerged from the SEA. Section B5 brings requirements for data collection and research arising from this framework together with the findings and recommendations of the HRA and socio-economic assessment to provide an integrated framework for future work.

Table B1.1 MONITORING FRAMEWORK

SEA Receptors	SEA Indicators	Significant Environmental Effects	Summary of Proposed Monitoring	Data Sources	Time scale and responsibility
Climatic Factors	Provision of a renewable source of energy. Positive contributions to reducing Scotland's 'carbon footprint'. Extent to which climate change predictions raise the risk to population, environment and infrastructure over the long term.	The development of increased power generation by offshore wind aims to provide significant benefits in relation to climatic factors. The consultation process underlined the importance of this indicator, to provide some assurance that the developments provide net benefits in terms of reducing greenhouse gas emissions.	Measure the proportion of Scottish and UK power and renewables target generated by offshore wind development in STW. Monitor generating capacity of offshore wind development constructed under the Plan to review its contribution to greenhouse gas reduction and minimising Scotland's 'carbon footprint'.	Scottish Carbon statistics e.g. www.Scotlandsfootprint.org and DECC data on energy generation.	To be undertaken for the life of the Plan. Progress and issues to be considered at a strategic level within the 2 year review process. Scottish Government
Water Resources	Potential changes to surface and groundwater quality with respect to chemistry, biology or physical characteristics – e.g. EU Directives (shellfish, bathing waters, WFD etc).	The environmental effects on water resources were assessed as 'uncertain' at the strategic scale. Impacts would relate closely to specific scheme configurations.	Information on this arising from the project level, can be reviewed and eventually collated to provide a strategic level perspective.	Existing and future SEPA and developers' water quality monitoring data.	Data on effects will not emerge until the first developments have progressed. SEPA Marine Scotland

SEA Receptors	SEA Indicators	Significant Environmental Effects	Summary of Proposed Monitoring	Data Sources	Time scale and responsibility
Geology, Sediments and Coastal Processes	Likelihood of large scale changes in geochemistry, bathymetry, sediment grain size distribution and sediment transport budgets. Physical damage or exclusion to designated geological conservation site.	The environmental effects of wind development on geology, sediments and coastal processes are assessed as 'uncertain', this is due to the fact that impacts would relate closely to specific scheme configurations.	No strategic monitoring required. However, this can be considered as part of the review process. Data on effects will not emerge until the first developments have progressed.	Condition of geological SSSIs (SNH) Integrated Coastal Zone Management plans/ future Shoreline Management Plans Coastal protection studies Sediment flux research projects Regional level assessment of cumulative impacts.	Progress and issues to be considered at a strategic level within the 2 year review process. SNH SEPA Marine Scotland Developers
Biodiversity, Flora and Fauna	Presence of conservation sites within the 'footprint' of the options and likelihood of potentially adverse impacts on conservation site. Presence of protected species within 'footprint' of the options and likelihood of potentially adverse impact on protected species. .	The environmental effects of wind development on Biodiversity, Flora and Fauna are variable depending on impact receptor.	No strategic monitoring required at this stage in addition to matters identified within the HRA.	Data sources may include SNH, Environmental Clerk of Works, Marine mammal observers, NGOs. Data on effects will not emerge until the first developments have progressed. Regional level assessment of in-combination impacts.	Progress and issues to be considered at a strategic level within the 2 year review process. Marine Scotland SNH, environmental NGOs and data providers.

SEA Receptors	SEA Indicators	Significant Environmental Effects	Summary of Proposed Monitoring	Data Sources	Time scale and responsibility
Landscape, Seascape and Visual Amenity	Likely adverse effect on areas of high natural heritage sensitivity. Proximity to National Scenic Areas, Heritage Coast, Areas of Outstanding Natural Beauty and World Heritage Sites. Distance of the wind farm from the coastline.	The environmental effects of wind development on Landscape, Seascape and Visual Amenity range from 'neutral' to 'moderate to major adverse' depending on the site/area assessed.	Monitor any future changes to national level Landscape/seascape Character Assessments and updates to natural heritage features undertaken by SNH. During the design of projects, detailed landscape/seascape impact assessments and visual assessments should be undertaken. This will provide important inputs to national monitoring.	Siting and Designing wind farms in the Landscape (SNH 2010). Regional level assessment of cumulative impacts.	Progress and issues to be considered at a strategic level within the 2 year review process and within the Licensing Manual. SNH Marine Scotland Planning authorities
Population and Human Health	Disruption to key recreational areas for boating. Disruption to areas of 'greatest' importance for recreation.	The environmental effects of wind development on recreation range from 'neutral' to 'major adverse depending on the site/area assessed.	Monitor significant changes arising from future coastal and marine recreation surveys carried out by both SNH and other key stakeholders, such as the RYA and ensure that these are reflected in discussed with key stakeholders and reflected in revisions to the Plan.	Existing and future SNH/RYA recreational surveys/research Regional level assessment of cumulative impacts.	Progress and issues to be considered at a strategic level within the 2 year review process. SNH RYA Scotland Sportscotland Marine Scotland

SEA Receptors	SEA Indicators	Significant Environmental Effects	Summary of Proposed Monitoring	Data Sources	Time scale and responsibility
Cultural Heritage	Likely impact on designated site or features (and setting), military remains and/or designated wreck attributable to wind farm development.	The environmental effects of wind development on Cultural Heritage were considered to be localised within the SEA with impacts ranging from 'neutral' to 'major adverse' depending on the site / area assessed.	No strategic monitoring required. However, during the detailed design of a scheme detailed archaeological and Cultural Heritage impact assessments will be undertaken and monitoring of localised effects will be carried out.	MoD data for military protected sites, wrecks and aircraft crash sites Seazone Canmore database Historic Scotland data on listed buildings, scheduled monuments etc.	Developers Marine Scotland Historic Scotland
Material Assets (infrastructure and natural resources)	Likely interference with defined navigation routes and/or associated anchorage area potentially resulting in increased collision risk and restrictions on pollution-prevention methods.	The environmental effects of wind development on Material Assets are assessed as 'neutral', 'uncertain' 'minor negative' or' moderate to major negative' depending on the site / area assessed.	Liaison with OWIG etc to obtain specific monitoring data on various environmental receptors. (National coverage, ongoing dialogue). Liaison with MCA and shipping industry to assess the progress of mitigation measures. (National coverage, ongoing dialogue).	Regional level assessment of navigation risk. Detailed assessments of potential impacts on local and strategic material assets should be undertaken.	Progress and issues to be considered at a strategic level within the 2 year review process.

B2. SUMMARY OF THE CONSULTATION PROCESS

Background

B2.1 Public and stakeholder engagement has formed an integral part of the development of this Plan. This is a requirement, specifically within the terms of the Environmental Assessment (Scotland) Act 2005, but also reflects the importance placed by Scottish Ministers on effective consultation at all stages of information gathering and assessment. For example, option assessment, at strategic level, has been considered by consultees from affected sectors and regions, to help identify or confirm the impacts, concerns, gaps in knowledge, and further work requirements. Consultation on this Plan has allowed Scottish Ministers to consider the high level impacts from the Draft Plan, and to gauge views, including sectoral and public acceptability of the development proposals it contains.

B2.2 As required by the Environmental Assessment (Scotland) Act 2005, the key opinions expressed on the Plan and the SEA have been set out in Section B1 'The Post Adoption SEA Statement'. This Section also explains how these views have been taken into account. In addition, this section of the Report provides an overview of the engagement process itself, to clarify the steps that were taken to ensure that the development of the Plan was transparent and robust.

Pre-consultation engagement

B2.3 Consultation on the Plan began at the start of the planning and assessment processes. As required by the 2005 Act, SEA screening and scoping involved a 5 week statutory consultation with the SEA Consultation Authorities via the SEA Gateway. Transboundary consultation was also undertaken via the Gateway and the Department of Communities and Local Government (DCLG). The report was also made available online at www.scotland.gov.uk/consultations allowing for interested individuals and organisations to comment at that stage.

B2.4 When the SEA Environmental Report was commissioned, a steering group was formed which included the Consultation Authorities. The contractors undertaking the SEA periodically reported to relevant groups, including the Offshore Wind Industry Group. Discussion with these groups included a focus on agreeing the environmental objectives to be used in the SEA process and subsequently involved debate on the use of the MaRS model to develop medium term options.

B2.5 Prior to publication of the Environmental Report, five pre-consultation workshops were held to explain the environmental assessment process. The offshore wind, shipping, fishing and recreation sectors were invited to these workshops, along with environmental non-governmental organisations, the SEA Consultation Authorities and other relevant bodies identified by the SEA consultants.

B2.6 A range of issues emerged at this stage in the process, particularly on the suitability of information gathered, key sectoral concerns and engagement in the process of identifying medium term options.

Statutory Consultation

B2.7 The SEA Environmental Report and Draft Plan were published for consultation on the Scottish Government's website on 19 May 2010. The Report and Plan were made available initially for a 12 week statutory consultation period, although this was subsequently extended for a further 6 weeks. Statutory adverts were placed in national newspapers at this time.

B2.8 A set of key questions were included in the consultation, to help focus consultee views on significant challenges arising from the Plan and its assessment, and provide a structure for the consultation analysis, but consultee responses were not restricted to returns of this questionnaire.

B2.9 The process of engagement extended beyond formal, written consultation and responses. To ensure that the process was as transparent and participative, as resources would allow, a number of stakeholder and public meetings were held. A series of sectoral workshops were undertaken, involving fishing, shipping, ports and harbours, aquaculture, aviation, offshore wind, tourism, recreation, environmental and other representative bodies. A joint consultation workshop was held with the Scottish Coastal Forum and Scottish Environment LINK. In addition, a set of regional workshops were undertaken in Ullapool, Inverness, Edinburgh, Peterhead, Stornoway, Lerwick, Dumfries, Wigtown, Campbeltown and Oban.

B2.10 Following consultee feedback Scottish Ministers agreed to extend the consultation period to 18 weeks to allow consultees more time to respond to the consultation and to allow further regional venues to be included, based upon requests for further regional dialogue, especially from communities in Argyll. Further regional workshops were therefore held in Tiree, Islay, Barra and Dundee. Scottish Government officials also attended a workshop in Kirkcudbright at the request of local councillors to present the SEA Environment Report findings and Draft Plan.

B2.11 In summary, the engagement process included:

- 24 consultation workshops, attended by more than 500 people. Many of these people were individuals, but a significant number represented organisations with wider membership.
- 856 written responses were received from individuals and organisations who wished to comment on the SEA Environment Report and Draft Plan. If correspondents provided permission to do so, the responses to the consultation were published online.[7]

[7] http://www.scotland.gov.uk/Publications/2011/01/21154513/0

Advertising events

B2.12 As many as possible of the events were advertised in local newspapers. In all areas posters were distributed and emails to organisations and local networks were also utilised to advertise the events. Adverts were placed in:

> The Oban Times, The Shetland Times, Buchan Observer, Dundee Courier, Stornoway Gazette, Campbeltown Courier, Guth Bharraidh.

B2.13 Advertisements were also placed in national and local newspapers to inform the public of the extension to the deadline for the consultation when it was announced in August 2010. Adverts were placed in:

> The Scotsman, The Herald, Aberdeen Press and Journal, Ross-shire Journal, Northern Scot, John O Groats Journal, Caithness Courier, Northern Times, Highland News Group, Inverness Courier, Ullapool News, West Highland Free Press, Fraserburgh Herald, Buchan Observer Group, Aberdeen Evening Express, Shetland Times, The Orcadian, Stornoway Gazette, Dundee Courier, Fife Free Press, Edinburgh Evening News, East Lothian Courier, Dumfries and Galloway Standard, Galloway Gazette, Stranraer and Wigtownshire Free Press, West Cumberland Times and Star, Oban Times.

B2.14 For the second round of events, adverts were placed in national and local newspapers, which highlighted the publication of the consultation analysis (see below). In all areas posters were distributed and emails to organisations and local networks were also utilised to advertise the events. Adverts were placed in:

> The Herald (all Scottish events), Campbeltown Courier, Oban Times, The Ileach, Galloway Gazette, Whitehaven News, West Cumberland Times and Star, Stranraer and Wigtownshire Free Press, Dumfries and Galloway Standard, West Highland Free Press.

B2.15 The Scottish Government webpages were also used to encourage responses and provide further information as the work progressed. This included publication of accompanying information, such as Frequently Asked Questions arising during the process.[8] Links to the relevant documents, including the Draft Plan and SEA outputs were available online throughout the consultation process.

[8] http://www.scotland.gov.uk/Topics/marine/marineenergy/wind/Consultation/ConsultationFAQs

Consultation Analysis

B2.16 Notes of the consultation meetings and written responses to the consultation were reviewed and analysed as part of the process. To aid transparency, a summary of the analysis was published, which reflected the main points raised from the consultation process as a whole.[9]

B2.17 The analysis examined the responses from sectors, authorities, statutory bodies, environmental NGOs, community bodies and individual members of the public. The geographic spread of consultee responses was summarised, along with the main environmental, sectoral and community issues. This highlighted where specific proposals were raising issues of public acceptability, allowing Scottish Ministers to take these views into account within their decision making process.

B2.18 The consultation questionnaire responses were used to categorise issues and graphs and mind mapping techniques were used to explain and summarise consultee views. The analysis highlighted that there were particular significant public acceptability issues raised in relation to three short term options identified in the Draft Plan: two in the Solway Firth and one off Kintyre. However, the analysis also showed that there are significant issues which have to be overcome at other sites and across the regions, and subsequent consultation emphasised that levels of concern cannot be fully gauged by recording numbers of responses alone. The key issues identified through the strategic assessment, and the responses to them, are set out in Section B1 of the Post Adoption SEA Statement.

Post-consultation Verification

B2.19 The Consultation Analysis was published on the Scottish Government website on 23 December 2010. To ensure that consultees were aware of this publication, Marine Scotland contacted all individuals and organisations who contributed to the consultation process by e-mail or letter if they had provided contact details.

B2.20 To further check that the Consultation Analysis publication fully reflected consultees' views a set of Regional Workshops were held at consultation 'hotspots'. The consultation 'hotspots' were identified as Campbeltown, Tiree, Islay, Dumfries, Wigtown and Maryport, based upon mapping of the origin of responses, previous workshop attendance and strength of views expressed. If consultees identified relevant omissions or explained issues differently their views were captured within workshop notes or through consideration of consultee submissions. These were included within an Addendum to the Consultation Analysis, brought to Scottish Ministers' attention and again published on The Scottish Government website. The meeting notes were published online.[10]

[9] http://www.scotland.gov.uk/Publications/2010/12/22153227/0
[10] http://www.scotland.gov.uk/Topics/marine/marineenergy/wind

B3. HABITATS REGULATIONS APPRAISAL

B3.1 The SEA Environmental Report identified the potential for likely significant effects on sites designated for their nature conservation interest at a European Level ("European sites"). Accordingly, a Habitats Regulations Appraisal (HRA)[11] of the Draft Plan for Offshore Wind was required under The Conservation (Natural Habitats, &c.) Regulations[12] / The Conservation of Habitats and Species Regulations 2010,[13] which implement the EC Birds[14] and Habitats Directives[15] in the UK.

B3.2 The HRA focused on the effects of the short and medium term options within the Draft Plan on European sites, to determine whether or not it would have 'likely significant effects', it then assesses whether the integrity of these sites would be adversely affected. This included consideration of Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and, in UK policy terms, Ramsar sites. As the 'Competent Authority' Marine Scotland was required to establish that the Plan could be taken forward without generating adverse effects on these sites, and the interests for which they had been designated.

B3.3 As part of the SEA Environmental Report and Draft Plan work, Marine Scotland commissioned consultants, Halcrow, to undertake a pre-screening exercise and scoping report on the need to undertake an HRA for the short term options identified within the Draft Plan. The Report concluded that there were likely significant effects from the proposed development options. Therefore a strategic HRA of the short and medium term options was commissioned by Marine Scotland. Consultants, ABP Marine Environmental Research Ltd. were commissioned to carry out a pre-screening assessment of the medium term options and an HRA of the Draft Plan on behalf of Marine Scotland. The pre-screening report of the medium term concurred with the earlier pre-screening report on the short term sites, that there were likely significant effects from the proposed short and medium term options.

B3.4 The HRA was taken forward in line with HRA Guidelines issued by SNH in 2010 and was overseen by a Project Steering Group which included representatives from the Scottish Government, Scottish Enterprise, Highlands and Islands Enterprise, Scottish Natural Heritage, the Joint Nature Conservation Committee, The Crown Estate, Scottish Renewables, the Whale and Dolphin Conservation Society, Scottish Environment Link and the Royal Society for the Protection of Birds.

What were the findings of the Habitats Regulations Appraisal (HRA)?

B3.5 The screening and scoping exercises of the short and medium term options were undertaken to identify the possible impacts of the options within the draft Plan on the European sites. This work was followed by the production of a working paper which set out the proposed approach to the screening of issues and

[11] HRA includes Appropriate Assessment, preceded by screening and scoping stages which initially focus on identifying the likelihood of significant effects on Natura sites and their interests.
[12] http://www.legislation.gov.uk/uksi/1994/2716/contents/made
[13] http://www.legislation.gov.uk/uksi/2010/490/contents/made
[14] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:020:0007:0025:EN:PDF
[15] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31992L0043:EN:NOT

how the assessment stages would be undertaken. After screening, a large number of European sites, 370, were taken forward into the assessment stage of the HRA.

B3.6 The assessment reviewed the impacts arising from the draft Plan. This review showed that additional mitigation measures, beyond the scope of the SEA, were required to comply with HRA to ensure that there would be no 'likely significant effect' and no adverse effect on the integrity of European sites. However there is still a level of uncertainty associated with the proposed offshore wind development. To address this the HRA identified additional mitigation measures to address all the remaining risks. The additional mitigation measures build upon the initial and generic measures set out in the SEA Environmental Report but have added extra detail and actions where required to address the risks and gaps identified during the assessment work. Details of the risks (impact pathways), initial and additional mitigation measures are set out in **Tables B3.2, B3.3, B3.4, and B3.5** at the end of this section of the Post Adoption Statement.

B3.7 As well as setting out mitigation measures for specific project developers to consider, the HRA also proposes a clear process for the implementation of the Plan. In particular, the process needs to involve a phased and iterative approach to offshore wind farm deployment, linked to ongoing monitoring, with the findings feeding back into the next phases of construction work. This process is in line with the SEA review requirements but provides a separate category for HRA monitoring and applying mitigation.

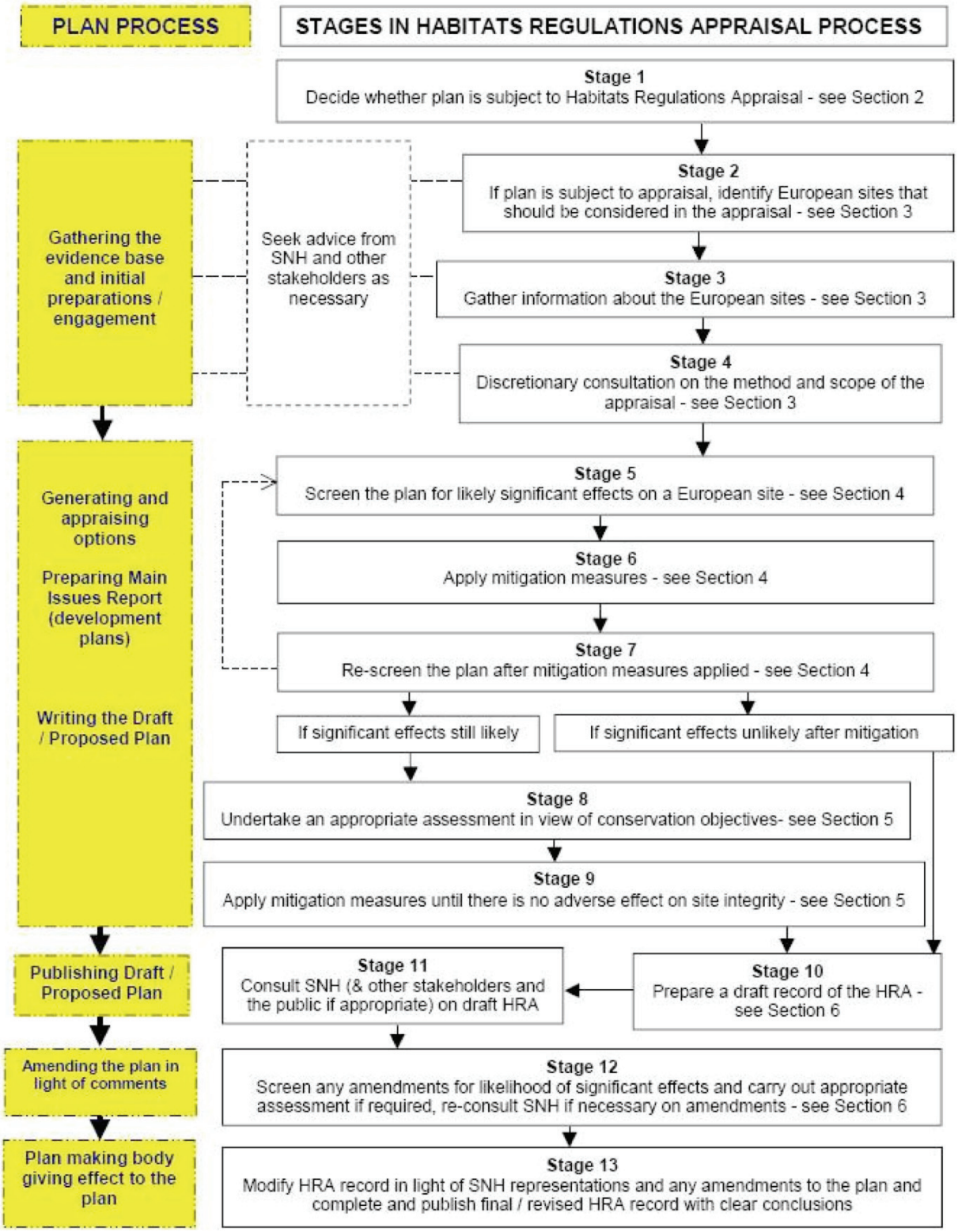
B3.8 Each individual short and medium term option development will be required to undergo a project level HRA wherever the possibility of a 'likely significant effect' on a European site cannot be excluded on the basis of currently available information. The details of how the Plan will be implemented are not known at this stage i.e. the precise timing, location, form and design of all the projects which may come forward for licensing. However, this Plan level HRA gives direction to these future project level HRA by identifying measures that should be required at that stage to avoid an adverse effect on the integrity of European sites. Equally, the project level HRA and associated monitoring will be linked to and will inform regular reviews of the Plan as part of the Iterative Plan Review process.

B3.9 As Competent Authority, Marine Scotland has concluded in consultation with SNH and the JNCC that, on the basis of the application of appropriate and phasing based monitoring being integrated into an overall approach to mitigation measures, there will be no adverse effect on the integrity of a European/Ramsar site arising from the Draft Plan for Offshore Wind Energy in Scottish Territorial Waters. Taking into account the changes which have been made to the Plan in the interim period since the Draft Plan was published, Marine Scotland remains of the view that implementation will be achieved without adverse effects on the integrity of these European sites.

Method

B3.10 The HRA was carried out in accordance with the 13-step process for Plan-level HRAs described in guidance issued by Scottish Natural Heritage (SNH, David Tyldesley and Associates, 2010), and outlined in **Figure B3.1** below.

Figure B3.1 Key Stages in the HRA process (reference as above).



B3.11 A series of documents were prepared to meet requirements of the HRA process. These are summarised in **Table B3.1** below, together with their relationships to the stages in the HRA process. The first key documents are the two pre-screening studies undertaken to identify the possible impacts of the short-term options (Halcrow, 2010) and the medium-term options (ABPmer, 2010a). These

were followed by a working paper (ABPmer, 2010b) which set out the proposed approach for the screening of issues and assessment stages (for both the short and medium term options). By reviewing these methods, this working paper met the discretionary requirements for Stage 4 of the HRA process and formed the focus for early consultations with key stakeholders including SNH.

B3.12 The third key document is the Appropriate Assessment Information Review which sets out the findings of the screening and assessment work (for both the short and medium term options). This assessment work constitutes Stages 4 to 10 of the Plan-level HRA process and includes:

- Revisiting Stages 4 and 5 followed by Stages 6 and 7 of the HRA (Pre-screening and re-screening having applied initial mitigation measures):
- Stages 8 and 9 of the HRA (Assessment and Application of Additional Mitigation), covering the following grouped-feature categories: Habitats, Birds, Marine Mammals, Fish and Otter.
- Stage 10 of the HRA (draft HRA Record): This report presents a draft record of the HRA to inform consultation.

B3.13 As described in paragraph B2.4 the HRA process for the Draft OWE Plan was overseen by a Project Steering Group (PSG). This ensured that the project fully met the requirements of those bodies, and therefore that the Appropriate Assessment Information Review (ABPmer 2011) incorporated the consultation and revision requirements of Stages 11 – 13 of the HRA process.

Table B3.1 Documents prepared in fulfilment of the requirements of the Plan-level HRA process.

Stages	Content of document	Reference
Stages 1-3, and 5	Pre-screening study to identify the possible impacts of the short-term options and the medium-term options	Halcrow, 2010
	Pre-screening study to identify the possible impacts of the medium-term options	ABPmer, 2010a.
Stage 4	Proposed approach to the screening of issues and assessment stages for both the short and medium term options	ABPmer, 2010b
Stages 6 - 9	Re-screening and Appropriate Assessment Information Includes a revisit of Stages 4 and 5 and completion of Stages 6 - 9	ABPmer, 2011
Stage 10	Draft record of the HRA to inform consultations	ABPmer, 2011
Stages 11 - 13	Consultations with Scottish Natural Heritage and other key stakeholders, review of amendments and modification of HRA record	ABPmer, 2011

Table B3.2 - Initial mitigation measures identified in the SEA for the Draft OWE Plan (Marine Scotland 2010)

These **initial mitigation** measures were set out in the SEA Environmental Report and are divided into two categories 'strategic level' and 'project level'. In both cases they are inherently genric in nature. The distinction is that strategic level measures apply across all impact pathways while the 'project level' measures are those identified in the SEA Environmental Report that pertain to relevant impacts that could occur to 'water'; 'geology sediments and coastal processes' and 'biodiversity, flora and fauna'. The SEA Environmental Report also identifies other 'project level' measures but they relate to impacts which are not pertinent to this HRA (e.g. Landscape or Cultural Heritage).		
Initial Mitigation measures that are 'strategic' and pertain to all impact pathways		**Abbreviation**
1	There may be a requirement to remove further options from the Plan on the basis of the findings of a strategic level HRA. This would assess the likely significant effects of the draft Plan on internationally protected sites (SPAs, SACs and Ramsar Sites). It may be necessary to change the draft Plan where adverse effects on European nature conservation sites are identified in this process, and other forms of mitigation are considered insufficient to avoid such effects arising;	Remove Option Areas and/or change Draft OWE Plan
2	Continue communications (consultation and participation) with the SEA consultation authorities (SEPA, SNH and Historic Scotland), regulators, key organisations (e.g. Scottish Fishermen's Federation), developers (including those that have been awarded exclusivity leases for areas inside STW), Offshore Wind Industry Group and the public to seek appropriate site-specific mitigation. Developers must be engaged in the process as early as possible together with the shipping and commercial fishing industries to develop appropriate mitigation;	Continue consulting with stakeholders
3	Consider the potential requirement to identify and provide habitat to help offset non-designated/nationally designated habitat losses resulting from offshore wind farm development;	Consider the potential requirements to offset habitat losses
4	Consider the implementation and scheduling of components of offshore wind projects within STW (in combination with other planned offshore developments) to minimise strategic adverse impacts on species (e.g. migratory fish, marine mammals etc, habitats and landscape), including consideration of the cumulative and in-combination effects with other identified schemes, projects or activities; and	Consider the implementation and scheduling of project components
5	Undertake the further work recommended at the strategic level.	Undertake further work

Initial Mitigation measures that are related to particular impact pathways (See Table A2a)		Abbreviation
6	**Water:** Further assessment work is required for all options to reduce uncertainty regarding potential impacts on water quality (including Shellfish Waters). This includes a recommendation for hydrodynamic and water quality modelling at project level.	Further water quality assessment is required
7	**Water:** Specific impacts during construction, operation and decommissioning should be reduced through the selection and use of appropriate methods to reduce pollution risks, e.g. through the use of best practice marine construction procedures for prevention and control of spillages and discharges of harmful substances (such as antifouling agents, sacrificial anodes, biocides, grouts etc) to the marine environment; for sediment mobilisation and associated turbidity and secondary impacts to avoid unacceptable impacts on marine and benthic fauna.	Undertake a water quality assessment at a project level and apply methods to avoid unacceptable water quality impacts an
8	**Geology Sediments and Coastal Processes:** Further assessment work is required for all options to reduce uncertainty regarding potential impacts on coastal processes. This includes a recommendation for sediment dynamic modelling at project level	Further water quality assessment is required
9	**Geology Sediments and Coastal Processes:** Optimise the location and arrangement of structures and their arrangement during the design process to mitigate any issues of erosion or deposition and resulting impacts on sensitive receptors.	Optimise project design to mitigate erosion and deposition effects
10	**Biodiversity, Flora and Fauna**: Key areas for species and habitats of nature conservation (e.g. legally designated sites, Important Bird Areas, flight corridors and migratory routes) and fisheries value (e.g. spawning grounds) should be avoided, where known, through the positioning and subsequent design of the development.	Avoid key areas for habitats and species
11	**Biodiversity, Flora and Fauna**: Specific impacts on species and habitats (including fisheries) should be reduced through appropriate design (e.g. minimising footprint of the development to minimise loss or damage to seabed habitat), and selection and use of appropriate construction (e.g. timing to avoid key seasons; selection of low noise and minimal vibration installation technologies; utilisation of 'soft start' practices for plant and vessels to minimise disturbance and allow mobile species to move away from areas of disturbance) and operation methods (e.g. use of noise attenuation technologies);	Design project and use appropriate methods and scheduling to minimise disturbance
12	**Biodiversity, Flora and Fauna:** Further work is required at a strategic and project level to determine impacts on international nature conservation sites – to be assessed through the HRA process.	Undertake further work and HRA to determine impacts to European/Ramsar sites
These initial measures may allow certain impact pathways to be removed but it is recognised that this may not result in any of the identified interest features or designated sites being excluded from the scope on the basis that other impact pathways remain. This is because of the inherent uncertainties that are associated with project developments and the need to adhere to the precautionary principle. During the assessment additional mitigation measures have been identified which are appropriate to address impacts to the integrity of designated sites.		

Table B3.3 Impact pathways from OWE turbine and initial generic mitigation measures that may be applied to avoid or reduce such impacts (derived from Entec 2009a)

Feature	Phase	Sensitivity Category	Activity / Change (Impact Pathway)
Habitats and Species (coastal, intertidal and marine)	**Pre-construction survey**	Physical Damage	Direct effects from sampling work (boreholes, trawls) during environmental baseline surveys
		Toxic Contamination	Spillage of fluids and/or fuels during survey work
		Biological Disturbance	Introduction and ingress of invasive non-native species as biofouling species on the surfaces of vessels or construction plant.
	Construction and decommissioning	Physical Damage	Direct (physical) damage by excavation/piling activities associated with the construction and decommissioning of structures (cables and turbines) including the use of jack-up legs and mooring.
		Physical Damage	Re-deposition of sediments mobilised during cable / turbine installation or decommissioning causing an increase in suspended sediment concentrations and smothering
		Toxic Contamination	Spillage of fluids, fuels and/or construction materials during installation or removal of structures (turbine and cables)
		Toxic Contamination	Contaminants associated with the release of suspended sediments during installation or removal of structures (turbines and cables)
		Non-Toxic Contamination	Increase in turbidity associated with the release of suspended sediments during installation or removal of structures (turbine and cables).
		Biological Disturbance	Introduction and ingress of invasive non-native species as biofouling species on the surfaces of vessels or construction plant.
	Operation	Loss / Gain of Habitat	Direct loss of habitat and species under the footprint of the turbine and cable armouring from the installation of these new structures.
		Physical Damage	Direct (physical) damage by excavation/piling activities associated with the maintenance of structures (cables and turbines) including the use of jack-up legs and mooring.
		Physical Damage	Indirect changes to the habitat surrounding the turbine and cable armouring structures due to hydrodynamic and physical changes (including sediment scour).

Feature	Phase	Sensitivity Category	Activity / Change (Impact Pathway)
		Toxic Contamination	Spillage of fluids, fuels and/or construction materials during maintenance.
		Biological Disturbance	Introduction of new structures providing new substratum that facilitates the colonisation and ingress of invasive non-native species.
		Biological Disturbance	Introduction and ingress of invasive non-native species as biofouling species on the surfaces of vessels or construction plant.
Birds	**Pre-construction survey**	Non-Physical Disturbance	Reduction in foraging habitat quality (and prey species availability) as a result of baseline survey work (e.g. boreholes and trawls).
		Non-Physical Disturbance	Seismic exploration and other baseline geophysical surveys causing noise injury and disturbance (including from vessel movements)
		Toxic Contamination	Spillage of fluids, fuels and/or construction materials during survey work.
	Construction and decommissioning	Loss / Gain of Habitat	Direct loss of coastal foraging, breeding or roosting habitat (or reduction in quality) as result of the installation and removal of cables
		Non-Physical Disturbance	Reduction in the quality of foraging habitat as result of the installation and removal of cables and turbines (e.g. through smothering and physical disturbance)
		Non-Physical Disturbance	Noise and visual disturbance from vessels travelling to and from the site.
		Non-Physical Disturbance	Noise and visual disturbance from the installation and removal of cables and turbines such as drilling, piling and the use of explosives for demolition.
		Non-Physical Disturbance	Indirect impacts on food resources where significant loss of habitat and species occurs in intertidal benthic communities (through cable laying work).
		Toxic Contamination	Spillage of fluids, fuels and/or construction materials during installations or removal of structures (cables and turbines).
		Non-Toxic Contamination	Reduction in water quality from cable/turbine installation and decommissioning

Feature	Phase	Sensitivity Category	Activity / Change (Impact Pathway)
	Operation	Loss / Gain of Habitat	Loss of foraging habitat as a result of the turbines and cable armouring both directly through the development footprint and associated scour and indirectly through changes to hydrodynamics.
		Physical Damage	Collision of migrating and foraging birds with turbine blades.
		Non-Physical Disturbance	Indirect impacts on food resources where significant changes occur in intertidal benthic communities and subtidal fish communities.
		Non-Physical Disturbance	Barrier effects to the movement of migrating or foraging birds as a result of the presence of turbines and arrays.
		Non-Physical Disturbance	Establishment of fishery exclusion zones around wind farms and potential Fish Aggregating Device (FAD) characteristics of sub-surface structures may lead to an increase in prey species but noise from turbines may decrease prey supply.
		Non-Physical Disturbance	Turbine operation causing noise and visual disturbance including the potential displacement from or disturbance near offshore foraging areas.
		Toxic Contamination	Spillage of fluids, fuels and/or construction materials during maintenance.
Marine Mammals (cetaceans and seals)	**Pre-construction survey**	Physical Damage	Collision risk from vessels travelling to and from the site (including propeller collision risk).
		Non-Physical Disturbance	Reduction in foraging habitat quality (and prey species availability) as a result of baseline survey work (e.g. boreholes and trawls).
		Non-Physical Disturbance	Noise/vibration disturbance from vessels and other activities during survey work (e.g. seismic exploration and geophysical surveys).
		Non-Physical Disturbance	Visual disturbance from vessels and other activities during survey work (e.g. side-scan sonar).
		Toxic Contamination	Spillage of fluids and fuels during survey work.
	Construction and decommissioning	Physical Damage	Collision risk from vessels travelling to and from the site (including propeller collision risk).
		Physical Damage	Direct damage to haul-out sites during cable installation and decommissioning (seals only).

Feature	Phase	Sensitivity Category	Activity / Change (Impact Pathway)
		Non-Physical Disturbance	Reduction in the quality of foraging habitat as result of the installation and removal of cables and turbines (e.g. through smothering and physical disturbance)
		Non-Physical Disturbance	Noise/vibration disturbance from vessels and other activities during construction and decommissioning (e.g. piling, drilling, cable laying).
		Non-Physical Disturbance	Visual disturbance from vessels and other activities during construction and decommissioning.
		Toxic Contamination	Spillage of fluids, fuels and/or construction materials during installation or removal of structures (turbine and cables).
		Toxic Contamination	Contaminants associated with the release of suspended sediments during installation or removal of structures (turbine and cables).
		Non-Toxic Contamination	Increase in turbidity associated with the release of suspended sediments during installation or removal of structures (turbine and cables).
	Operation	Loss / Gain of Habitat	Loss of foraging habitat as a result of the turbines and cable armouring both directly through the development footprint and associated scour and indirectly through changes to hydrodynamics.
		Physical Damage	Direct damage to haul-out sites during operation (seals only).
		Physical Damage	Collision risk from vessels travelling to and from the site (including propeller collision risk).
		Non-Physical Disturbance	Noise/vibration disturbance from vessels and other activities during operation (turbine noise) and maintenance.
		Non-Physical Disturbance	Visual disturbance from vessels and other activities during maintenance
		Non-Physical Disturbance	Establishment of fishery exclusion zones around wind farms and potential Fish Aggregating Device (FAD) characteristics of sub-surface structures may lead to an increase in prey species but noise from turbines may decrease prey supply.
		Non-Physical Disturbance	Presence of sub-surface structures may present a barrier to movement and migratory pathways depending on array design.

Feature	Phase	Sensitivity Category	Activity / Change (Impact Pathway)
		Non-Physical Disturbance	Disturbance effects from electromagnetic geomagnetic fields along cable alignments (pertinent to bottlenose dolphin but not seal).
		Toxic Contamination	Spillage of fluids and fuels during maintenance.
Migratory Fish and Freshwater Pearl Mussel	**Pre-construction survey**	Non-Physical Disturbance	Reduction in foraging habitat quality (and prey species availability) as a result of baseline survey work (e.g. boreholes and trawls).
		Non-Physical Disturbance	Noise/vibration disturbance from vessels and other activities during survey work (e.g. seismic exploration and geophysical surveys).
		Toxic Contamination	Spillage of fluids and fuels during survey work.
	Construction and decommissioning	Non-Physical Disturbance	Reduction in the quality of foraging habitat as result of the installation and removal of cables and turbines (e.g. through smothering and physical disturbance)
		Non-Physical Disturbance	Noise/vibration disturbance from vessels and other activities during construction and decommissioning (e.g. piling, drilling, cable laying).
		Toxic Contamination	Spillage of fluids, fuels and/or construction materials during installation or removal of structures (turbine and cables).
		Toxic Contamination	Contaminants associated with the release of suspended sediments during installation or removal of structures (turbine and cables).
		Non-Toxic Contamination	Increase in turbidity associated with the release of suspended sediments during installation or removal of structures (turbines, cables).
	Operation	Loss / Gain of Habitat	Structures on the seabed acting as a FAD (Fish Aggregating Device) and/or artificial reef.
		Loss / Gain of Habitat	Loss of foraging habitat as a result of the turbines and cable armouring both directly through the development footprint and associated scour and indirectly through changes to hydrodynamics.
		Non-Physical Disturbance	Reduction in the quality of foraging habitat as result of maintenance work.
		Non-Physical Disturbance	Noise/vibration disturbance from vessels and other activities during operation (turbine noise) and maintenance.
		Non-Physical Disturbance	Presence of sub-surface structures and noise disturbance associated with turbines may present a barrier to movement and block migratory pathways depending on array design.

Feature	Phase	Sensitivity Category	Activity / Change (Impact Pathway)
		Non-Physical Disturbance	Impacts from EMF on electromagnetically sensitive fish interfering with prey location and mate detection in some species and creating barriers to migration.
		Toxic Contamination	Spillage of fluids and fuels during maintenance.
Otters	**Pre-construction survey**	Physical Damage	Presence of vessels travelling to and from the site resulting in a collision and/or mortality of otter.
		Non-Physical Disturbance	Visual disturbance from vessels and other activities during survey work (e.g. side-scan sonar).
	Construction and decommissioning	Physical Damage	Presence of vessels travelling to and from the site resulting in a collision and/or mortality of otter.
		Physical Damage	Direct damage to otter habitat (holts and shelters) during cable installation, and decommissioning.
		Non-Physical Disturbance	Visual disturbance from vessels and other activities during construction and decommissioning.
	Operation	Physical Damage	Direct damage to otter habitat (holts and shelters) during operation.
		Physical Damage	Presence of vessels travelling to and from the site resulting in a collision and/or mortality of otter.
		Non-Physical Disturbance	Visual disturbance from vessels and other activities during maintenance.
Bats	**Operation**	Not relevant for OWE Plan	Direct collision with turbine blades or pressure changes near turbine blades
	Notes on Impact Pathways not included:-		
	The following are not considered to be impact pathways and have not been included		
	1) Predation by rat/mink from then positioning of devices close to breeding bird colonies.		
	2) Potential positive impact of turbines creating roosting habitat for seabird species		
	These have been excluded because there is not expected to be any suitable static structures on the turbines which could provide a roosting or resting habitat (these pathways are applicable to wave and possible tidal energy devices and are note here fore reasons of completeness).		

Table B3.4 – Additional mitigation measures identified during the HRA for the Draft OWE Plan

These **additional measures** are be undertaken where, without them, it cannot be concluded with certainty that there would not be an adverse effect on the integrity of a European/Ramsar site. As with initial mitigation measures these are generic in nature (because they are at a Plan-level) and they are also divided into two categories: measures that apply across all impacts and measures that relate to particular impact types. One central principle of the measures that apply across all impacts is that there needs to be a clear process for Plan implementation. In particular, the process needs to involve a phased and iterative approach to windfarm deployment linked to ongoing monitoring with the findings feeding back into the next phases of work (i.e. what is termed the Iterative Plan Review (IPR) process – see Section 9.3 of the AA information report). As part of this iterative sequence of work the Scottish Government has undertaken to revisit the OWE SEA and review the OWE Plan every 2 years. The other key consideration is that, as a matter of law, a project will be required to undergo project-level AA (including an in-combination assessment) wherever the possibility of LSE on a European/Ramsar site cannot be excluded.

	Additional Mitigation Measures that are applicable across all impact pathways (See Table A2a)
1	**Undertake phased/iterative approach to plan implementation:** Apply a temporally-phased deploy and monitor approach to project implementation linked to the 2-yearly cycle of OWE Plan review which will inherently also require consideration of the spatial/regional context (e.g. the effects of those on the east or west coast) for project-level AAs to ensure that there are no adverse effects on the integrity of European/Ramsar sites from projects either individually or in-combination with other plans or projects.
2	**Undertake HRAs at project level:** Apply, as a matter of law, a project-level AA wherever the possibility of LSE on a European/Ramsar site cannot be excluded. The scope of any HRA will need to be agreed with Regulator and the Statutory Nature Conservation Agency (SNCA). It is expected to encompass all phases of the proposals from construction (see note re survey work below) to operation and decommissioning it could also included repowering if it were possible to anticipate these requirements in the original proposal. If, as expected, repowering cannot be anticipated for the original proposals then such work will need to be accompanied by a separate project-level HRA.

	Additional Mitigation Measures that are related to particular Impact Pathways (See Table A2a)
3	**Damage to habitat during surveys**: Design an appropriate survey methodology (in consultation with Regulator and SNCA) to provide required data whilst avoiding impacts to designated habitat/species (e.g. disturbance from geophysical surveys, borehole work, trawling).
4	**Disturbance to species from noise during surveys:** Use methods and/or timings to reduce noise (e.g. from geophysical surveys, borehole work, seismic surveys side-scan sonar) and use of standard measures to mitigate and/or avoid effects on designated habitat/species. It is recognised that baseline survey work does not require a separate HRA (through all other vessel activities for construction and maintenance will be included in the project-level HRA, however, Marine Scotland's Licensing Operations Team (MS-LOT), SNCAs and industry are working towards a solution for this in relation to the effects on European Protected Species (EPS) (Erica Knott SNH Pers. Comm.).

Additional Mitigation Measures that are related to particular Impact Pathways (See Table A2a)	
5	**Disturbance/damage to species from visual disturbance or collision impacts during surveys**: Schedule or design the work (e.g. by selecting vessel routes and considering issues such as dynamic position effects) to mitigate/avoid visual disturbance and/or collision risk from vessel or shoreline activity
6	**Reductions in water quality during all phase of work**: Use Best Practicable Environmental Option (BPEO) for vessel anchoring/positioning methodology and the implementation of an appropriate Pollution Event Contingency Plan and/or schedule work (relative to tide, season or species life cycle) to avoid adverse effects from the release of suspended sediments especially in areas of known contamination where sediment re-mobilisation could result in toxic effects. Also, identify most appropriate mechanism for disposal of excavated sediment to avoid adverse impacts on designated intertidal/coastal habitat features from smothering. Such measures can include undertaking intertidal cabling works (where cable trenching in the intertidal is unavoidable) at low water to reduce the level of resuspension and transport of sediments.
7	**Biological disturbance during all phase of work:** Ensure that vessels and equipment used during the lifetime of the project are subject to an appropriate inspection regime to address the risk of introducing invasive non-native species through biofouling and also identify an inspection regime to examine colonisation of exposed, un-buried, structural surfaces on the introduced devices (e.g. cable armouring) and agree remediation requirements to address invasive non-native species.
8	**Cable route and design planning to avoid sensitive habitats**. Select cable alignment and landfall locations to avoid effects on designated coastal/intertidal/subtidal habitats and areas of importance for bird interest features. Careful planning of terrestrial site access to avoid effects on designated habitats on or above the upper shore (e.g. vegetated shingle), and employment of appropriate mitigation measures to reduce impacts on these habitats. If such areas cannot be avoided and then alternatives (including non-invasive measures such Horizontal Directional Drilling HDD) will need to be considered to avoid an adverse effect on site integrity. Cable route design should also seek (notwithstanding obligations to address other measures) to minimise cable length and thereby reduce the area disturbed (this approach would normally be taken to reduce costs of materials and construction. Also cable protection methods should be selected for the intertidal/subtidal areas to reduce scour (e.g. burial, scour protection, pinning over bedrock). Burial at selected depth to avoid impacts from EMF may also be required.
9	**Cable installation methods to minimise effects**. Use appropriate (BPEO) installation techniques/standards as well as vessel anchoring/positioning methods to avoid adverse impacts on designated intertidal/coastal habitat features. Such methods can included allowing cables to self-bury in subtidal soft sediments rather than physically trench them in to reduce disturbance and lessen the period of construction or, where cable trenching in the intertidal is unavoidable, backfilling of trenches to reduce the potential for sediment remobilisation and facilitate recovery of benthic communities.
10	**Turbine location, design planning to avoid sensitive habitats.** Select turbine locations and designs to avoid effects (direct and indirect) on designated site habitats. This includes careful consideration of device spacing and configuration within an array. It also includes micro-siting of piles, mooring blocks and gravity-based turbine to avoid vulnerable benthic habitats and/or the use of scour protection to reduce impacts.

Additional Mitigation Measures that are related to particular Impact Pathways (See Table A2a)	
11	**Turbine installation methods to minimise effects**. Use appropriate (BPEO) installation techniques/standards as well as vessel anchoring/positioning methods to avoid adverse impacts on designated intertidal/coastal habitat features. They could also involve the use of platforms with dynamic positioning (DP) rather than physical anchoring or jack-up feet. However, this should only be used where there is a clear and significant reduction in risk.
12	**Cable and turbine decommissioning methods to minimise effects.** Use appropriate (and BPEO) decommissioning techniques/standards as well as vessel anchoring/positioning methods to avoid impacts to designated intertidal/coastal/subtidal habitat features (e.g. leaving safely buried de-energised cable in situ or having. turbine bases cut off below seabed, gravity bases left in situ, re-use of structures where possible, removal of debris from the sea bed)
13	**Disturbance from noise during construction, operation and decommissioning**: Use methods and/or timings to reduce noise (e.g. from excavation, drilling, seabed levelling, vessel movements) and use of standard measures to mitigate and/or avoid effects on designated habitat/species.
14	**Disturbance/damage from visual/collision/avoidance impacts during construction, operation and decommissioning**: Schedule or design the work to mitigate and/or avoid effects on designated habitat/species as a result of visual disturbance and/or collision risk from vessel activity, construction work, windfarm operations (including lighting) and shoreline activity.

Table B3.5 - Activities that could affect European/Ramsar site interest features (based on Entec, 2009a)

Activity	Potential environmental changes which may lead to effects on SAC/SPA/Ramsar habitats and species
Survey work	**Physical damage to habitats or species**
Trawling surveys	Removal of species or habitat features (e.g. biogenic reefs)
Seismic surveys	Injury to fish or marine mammals due to underwater pressure waves
Increased vessel activity (including dynamic positioning)	Collision risk to marine mammals/ otters from vessels travelling to and from the site (including propeller collision risk)
	Indirect disturbance
Seismic surveys	Noise and vibration (creating underwater pressure waves that may affect fish or marine mammals and/or airborne noise that may affect birds or bats)
Increased vessel activity	Increased noise disturbance to marine, avian and bats species and possibly shoreline mammals
	Toxic contamination
Increase in risk of spillages/releases of oil or other contaminants from increased vessel activity	Toxic effects on marine species
Mobilisation of contaminants by sediment disturbance during sampling (e.g. cores)	Toxic effects on marine species
	Biological disturbance
Increased vessel activity	Increased risk of introduction of non-native species via vessels from elsewhere
Installation (turbines, cables, ancillary structures)	**Physical loss/gain of habitat**
Turbine foundation installation (including any future 'repowering'/upgrading activities)	Seabed habitat loss at turbine locations
Turbine foundation installation (including any future 'repowering'/upgrading activities)	Temporary change in substrate (e.g. gravel for gravity bases)
Onshore development e.g. converter stations	Terrestrial habitat loss within footprint of above ground installations
	Physical damage to habitats or species

Activity	Potential environmental changes which may lead to effects on SAC/SPA/Ramsar habitats and species
Turbine foundation installation (percussive piling)	Injury to fish or marine mammals due to underwater pressure waves
Laying cable in trench across subtidal or intertidal seabed habitat	Subtidal and intertidal area habitat disturbance (assuming cables buried) (short term habitat loss but overall damage that will recover in case of soft substrate)
Turbine foundation installation and/or laying cable in trench across subtidal or intertidal seabed habitat	Temporary smothering of habitats and species by re-deposition of mobilised sediment
Construction activities on land	Terrestrial habitat damage within construction sites for above ground installations outside footprint of permanent structures (potential for reinstatement)
Increased vessel activity (including dynamic positioning)	Collision risk to marine mammals/ otters from vessels travelling to and from the site (including propeller collision risk)
	Indirect disturbance
Noise and vibration generating activities, particularly percussive piling	Noise and vibration (creating underwater pressure waves that may affect fish or marine mammals and/or airborne noise that may affect birds or bats)
Increased vessel activity	Increased noise disturbance to marine, avian and bats species and possibly shoreline mammals
	Toxic contamination
Increase in risk of spillages/releases of oil or other contaminants from increased vessel activity	Toxic effects on marine species
Mobilisation of contaminants by sediment disturbance during turbine or cable installation	Toxic effects on marine species
	Non-toxic contamination
Mobilisation of sediments during turbine or cable installation	Increases in turbidity potentially affecting marine pelagic species (fish and mammals)
	Biological disturbance
Increased vessel activity	Increased risk of introduction of non-native species via vessels from elsewhere
Operation and maintenance	**Physical loss/gain of habitat**
Presence of turbines	Permanent loss of former seabed at turbine locations
Presence of turbines	Changed habitat availability (colonisation of turbine bases) and reef/'sanctuary' effect via creation of fishing exclusion zones

Activity	Potential environmental changes which may lead to effects on SAC/SPA/Ramsar habitats and species
Presence of onshore above-ground installations	Terrestrial land-take for above ground installations
	Physical damage to habitats or species
Presence of turbines	Changes to hydrodynamics causing seabed disturbance through local scour, more distant erosion and smothering by re-deposition of mobilised sediment
Turbine operation	Pressure changes resulting from blade movements (e.g. effects on bat internal organs)
Turbine operation	Collision with turbine blades (bats, birds)
	Indirect disturbance
Operation of turbines	Noise and vibration (underwater noise that may affect fish or marine mammals and/or airborne noise that may affect birds or bats)
Presence and operation of turbines	Other behavioural effects through physical presence./barrier effect of operating turbines (e.g. avoidance, disorientation of migrating mammals/fish/birds, displacement of birds from feeding areas)
Operation of subsea cables	Electromagnetic fields around cables potentially affecting sensitive species
Operation of subsea cables	Heat generated by cables potentially affecting seabed communities
Operation of onshore installations	Night-time lighting potentially affecting bats or birds
Increased vessel activity	Increased noise disturbance to marine, avian and bats species and possibly shoreline mammals
	Toxic contamination
Increase in risk of spillages/releases of oil or other contaminants from increased vessel activity	Toxic effects on marine species
	Biological disturbance
Presence of turbines	Introduction of non-native species (e.g. creation of hard substrate colonisation routes via turbine bases)
Decommissioning	**Physical loss/gain of habitat**
Removal of turbines and foundations	Change in seabed habitat, removal of colonised hard substrate habitat, possible restoration of former habitat
Removal of unburied cables	Removal of colonised habitat (cables)
Removal of turbines but not foundations	Permanent change to marine habitat via structures left in situ (e.g. turbine bases)
Removal of onshore above-ground installations	Change in terrestrial habitat, possible restoration of former habitat

Activity	Potential environmental changes which may lead to effects on SAC/SPA/Ramsar habitats and species
	Physical damage to habitats or species
Removal of turbines (using percussive methods or explosives)	Injury to fish or marine mammals due to underwater pressure waves
Removal of buried cables	Subtidal and intertidal area disturbance (short term habitat loss but overall damage that will recover in case of soft substrate)
Removal of turbine foundations or buried cables Decommissioning works on land	Temporary smothering of habitats and species by re-deposition of mobilised sediment Terrestrial habitat damage within construction sites for above ground installations outside footprint of permanent structures (potential for reinstatement)
Increased vessel activity (including dynamic positioning)	Collision risk to marine mammals/ otters from vessels travelling to and from the site (including propeller collision risk)
	Indirect disturbance
Noise and vibration generating activities, particularly percussive demolition or use of explosives	Noise and vibration (creating underwater pressure waves that may affect fish or marine mammals and/or airborne noise that may affect birds or bats)
Increased vessel activity	Increased noise disturbance to marine, avian and bats species and possibly shoreline mammals
	Toxic contamination
Increase in risk of spillages/releases of oil or other contaminants from increased vessel activity	Toxic effects on marine species
Mobilisation of contaminants by sediment disturbance during turbine or cable removal	Toxic effects on marine species
	Non-toxic contamination
Mobilisation of sediments during turbine or cable removal	Increases in turbidity potentially affecting marine pelagic species (fish and mammals)
	Biological disturbance
Increased vessel activity	Increased risk of introduction of non-native species via vessels from elsewhere

B4. SOCIO-ECONOMIC ASSESSMENT

Background

B4.1 Marine Scotland responded to the views that came forward in consultation workshops and responses and commissioned consultants to carry out an initial, high-level and strategic socio-economic assessment of the Draft Plan. This study, entitled the *Economic Assessment of Short Term Options for Offshore Wind in Scottish Territorial Waters*, focused on the impacts of the Short Term options at national and regional levels. As the study focused on high-level strategic impacts, analyses of site-specific or local impacts were considered out of scope, as these would be more adequately addressed through project-level analyses.

B4.2 ABPMER, in association with SQW and Risk and Policy Analysis (RPA), were appointed to undertake the assessment, and the work commenced in December 2010. The project was managed by Marine Scotland, with input from other areas of Scottish Government. A wider project advisory group was also established, involving national and regional stakeholders from the offshore wind, fishing, shipping, ports & harbours and tourism sectors, as well as key planning authorities. A significant level of consultation with key stakeholders was undertaken during the study to develop a better understanding of potential impacts and develop key assumptions.

B4.3 The study assessed the impact of short term option development in the North East, East, West, and South West regions of the Draft Plan. As no short term options had been identified in the North and North West regions, these areas were not considered within the analysis.

B4.4 The socio-economic assessment aimed to provide information and analysis on a range of relevant areas, and will be delivered in two constituent parts. The first part of the assessment considered the costs and benefits of the Draft Plan on different marine sectors (such as commercial fisheries, tourism, and shipping) at both national and regional levels. Potential social impacts were also considered, though these were not quantified within the analysis. The results of this part of the assessment (Part 1) are reported within this Post-Adoption Statement.

B4.5 The socio-economic assessment also aimed to provide a comparison of the economic and social benefits associated with the development of the short term options for offshore wind in Scottish Territorial Waters against any potential economic and social costs. In doing so, it would also consider the impact, in terms of Gross Value Added (GVA) and employment, that the short term options could have on the regional economies affected, and on the wider Scottish economy. By its very nature, such analysis is complex and methodologically challenging. This analysis is being undertaken within the two-year review period allocated to the Plan.

B4.6 Potential environmental impacts and impacts on visual amenity associated with the short term options were considered with the SEA. Consequently, although any impacts that have emerged from the SEA have been noted within the project, valuation of these impacts was considered out of scope for the purposes of the socio-economic assessment. Consideration of different approaches for distributing

revenues from the short term options was also considered to go beyond the scope of work.

Study Methodology

B4.7 Part 1 of the socio-economic assessment was informed by a range of evidence. These included published and unpublished data and reports, spatial data layers, and other specific information provided through stakeholder engagement. Stakeholder engagement took place via the project advisory group, and through additional direct contact. These evidence and data were used to develop a Baseline for marine sectors, and to estimate the potential national and regional impact of the short term options on marine sectors.

B4.8 The evaluation of costs and benefits for other marine sectors was undertaken using several steps. These were:

- *Identification of sectors potentially affected* - this was based on a review of SEA Environmental Report consultation responses, wider information on the effects of offshore wind farm development on other marine users and a spatial analysis in GIS to identify potential interactions between the short term options and other marine users;
- *Evaluation of interactions* - the nature of the interactions between the short term options and other marine users were evaluated to determine whether specific interactions were likely to have a significant effect on the other marine user. This evaluation took account of stakeholder views and the existing evidence base; and
- *Valuation (monetisation) of costs and benefits* - where significant interactions were thought likely to occur, the costs and benefits to other marine users were estimated.

B4.9 For each marine sector, the evaluation of costs and benefits was undertaken through use of scenarios. These scenarios consisted of a High Impact scenario, a Medium Impact scenario, and a Low Impact scenario. The assumptions underpinning these scenarios for each marine sector were sector-specific. However, in broad terms, the High Impact scenario assumed that sectors' activities would be incompatible with the short term options in the areas where they interact, and therefore do not take place. The Medium Impact scenario assumed that aspects of the sectors' activities would be compatible with the short term options, or that appropriate mitigation measures could be put in place, which would allow some aspects of the sectors' activities to continue. The Low Impact scenario assumed that the short term options would have a limited significant impact on other marine sectors' activities. This may be as a result of activities being naturally compatible, through use of mitigation measures, or through reduced scale of development of short term options.

B4.10 Taken together, the scenarios provide a range of potential national and regional impacts of the short term options on other marine sectors. Costs and benefits were estimated over 50 years, which is an appraisal period consistent with the potential lifespan of offshore wind assets, and were discounted using discount rates drawn from HM Treasury's Green Book. However, it should be noted that

these impacts are ex ante estimates. The quality of these estimates are determined by the available data and evidence.

What were the Broad Findings of Part 1 of the Socio-Economic Assessment?

B4.11 Using the evidence and methodology outlined in B4.7 and B4.8, the socio-economic assessment investigated what marine sectors could potentially be affected by development of the short term options. The results of this assessment are shown in Table B4.1:

Table B4.1: Assessment of Impacts on Other Marine Sectors[16]

Sector	Impact on Sector?	Nature of Impact	Regions Affected
Commercial Fisheries	✓	Loss of revenues from displacement or cessation of fishing activity	North East, East, West, South West
Aquaculture	×		
Shipping and Ports	✓	Increased costs from additional steaming distances	East, West, South West
Aviation	×		
Wave and Tidal Energy Development	×		
Cables and Pipelines	×		
Recreational Boating	✓	Increased costs from additional steaming distances	North East, East, West, South West
Recreational Angling	✓	Loss of expenditure on related activities from displacement or cessation of activity	West, South West
Surfing, Windsurfing and Kayaking	×		
Tourism	✓	Loss of expenditure from displacement or cessation of activity	West, South West
Social Impacts	✓	Not quantified. Negative impacts as a result of impacts to existing economic activities; positive impacts as a result of offshore wind farm supply chain development	

B4.12 This assessment identified that the short term options were likely to impact on Commercial Fisheries, Shipping & Ports, Recreational Boating, Recreational Angling and Tourism activities at regional and national levels. It was thought likely that Commercial Fisheries would be affected in each area where short term options were present, and that Shipping & Ports would be affected in each area barring the North East region. Tourism and Recreational Angling impacts were thought to be affected in West and South West regions. It was thought unlikely that

[16] The analysis also assumes that additional regional or national impacts could arise through mitigation measures required for navigation and aviation (e.g. through buoyage requirements or radar mitigation measures). However, it is anticipated that these costs would be included within developers' capital costs.

there would be regional or national impacts on Aquaculture, Wave & Tidal Energy developments, Cables & Pipelines, or on Surfing, Windsurfing and Kayaking, due to the absence of significant spatial conflict between these activities and the short term options.

B4.13 The socio-economic assessment quantified the potential scale of the estimated impacts for the marine sectors potentially affected by the short term options. These costs are incurred once construction of the short term options begins, and continue to be incurred once they become operational. The range of estimated annual costs for each marine sector in each region resulting from the Low Impact to High Impact scenarios are shown in Table B4.2.

Table B4.2: Estimated annual costs to other marine users between Low and High Impact Scenarios (£m, Real Terms)[17]

Sector	North East	East	South West	West	Total
Commercial Fisheries	£0.07m - £0.13m	£0.17m - £0.76m	£0.02m - £0.06m	£0.08m - £0.70m	£0.34m - £1.65m
Shipping and Ports	-	£0m - £1.55m	£0m - £0.01m	£0m - £0.03m	£0m - £1.59m
Recreational Boating	£0m - £0.00m	£0m - £0.01m	£0m - £0.01m	£0m – £0.01m	£0m - £0.03m
Recreational Angling	-	-	£0m - £0.42m	£0m - £0.80m	£0m - £1.22m
Tourism	-	-	£0m - £0.37m	£0m - £3.42m	£0m - £3.79m
Total	£0.07m - £0.13m	£0.17m - £2.32m	£0.02m - £0.87m	£0.08m - £4.96m	£0.34m - £8.28m

B4.14 Costs are also assessed over the 50 year appraisal period, which reflects the impacts over the potential lifetime of the Short Term option developments. The range of total estimated values for each marine sector in each region resulting from the Low Impact to High Impact scenarios over the 50 year appraisal period are shown in Table B4.3.

Table B4.3: Estimated total costs to other marine users between Low and High Impact Scenarios (£m, discounted over 50 years, rounded to nearest £m)

Sector	North East	East	South West	West	Total
Commercial Fisheries	£0m - £3m	£1m - £15m	£0m - £1m	£0m - £14m	£1m - £34m
Shipping and Ports	-	£0m - £31m	£0m	£0m - £1m	£0m - £31m
Recreational Boating	£0m - £0m	£0m - £0m	£0m - £0m	£0m - £0m	£0m - £1m
Recreational Angling	-	-	£0m - £8m	£0m - £17m	£0m - £25m
Tourism	-	-	£0m - £7m	£0m - £71m	£0m - £78m
Total	£0m - £3m	£1m - £46m	£0m - £16m	£0m - £103m	£1m - £169m

[17] Costs in the Low Impact scenario only apply for 5 years following construction. Costs in the High Impact scenario apply in the full time period after construction.

B4.15 These findings illustrate the range of possible impacts across the scenarios, with the total value of the impacts varying from around £1 million over 50 years in the Low Impact scenario to around £169 million over 50 years in the High Impact scenario. The High Impact scenario is viewed as being an estimate of the 'worst-case' impact on other marine sectors. This analysis suggest that the overall impact of the short term options on other marine sectors over the 50 year appraisal period would be relatively small at the national scale. The largest impacts at a national scale were estimated to accrue to Tourism, Commercial Fisheries, and Shipping & Ports.

B4.16 The impacts are also relatively small at regional levels. Impacts also vary across regions, with the majority of estimated impacts accruing to West region. Commercial Fisheries impacts mainly accrued in West and East regions. Shipping & Ports impacts accrued mainly in East region, while Tourism impacts accrued mainly in West region.

B4.17 These impacts costs may also result in some employment opportunities being lost in the affected marine sectors, compared to what would have happened in the absence of the Short Term options. When the costs are isolated and applied to simple economic multipliers representing Commercial Fisheries, Tourism and Recreational Sea Angling, it is estimated that around 4 jobs per year in the Low Impact Scenario and up to 140 jobs per year in the High Impact Scenario are no longer supported in these sectors compared to what was projected to have happened in the absence of the Short Term options. Around 70 per cent of these jobs are in Tourism, and around 14 per cent are in Commercial Fisheries. Around 80 per cent of employment impacts per annum occur in West region. These impacts are substantially lower in the Medium Impact and Low Impact scenarios.

B4.18 The magnitude of the estimates vary across scenarios, as they are heavily influenced by the assumptions used to determine them. In the High Impact scenario, it is assumed that a substantial loss of tourism revenue takes place each year from lost resort development investment in the West. However, this does not occur in the Medium or Low Impact scenarios. The High Impact scenario also assumes that all Commercial Fisheries are excluded from fishing in Short Term option areas, whereas this assumption is relaxed for static gear vessels in the Medium and Low Impact scenarios. The High Impact scenario assumes that commercial shipping must navigate around the Short term option areas, while the Medium and Low Impact scenarios assume that flexibility around site footprints can allow for impacts on navigation to be mitigated. As the most restrictive assumptions in the analysis are present in the High Impact scenario, this should be viewed as an estimate of the 'worst case' impact on other marine sectors.

B4.19 However, although these impacts are relatively small at national and regional levels, they may still be significant at local levels.

Data Gaps

B4.20 As with all socio-economic assessments, the establishment of a baseline involves a degree of extrapolation and projection of data from recent years into future years. Consequently, it may not adequately reflect potential future trends in marine sectors' activities. Such inaccuracies will become more pronounced as the time period for analysis lengthens. Furthermore, the estimates of costs and benefits to other marine users have been based on data available within the short time scales for the study. Estimates of the costs of mitigation measures for aviation and navigation impacts are particularly uncertain, pending more detailed project-level assessments of aviation and navigation risks. Similarly, estimates of commercial fisheries impacts have necessarily been based on high-level spatial data and more site specific information is required to develop more accurate assessments of potential displacement.

B4.21 Furthermore, actual impacts to the commercial fishing sector will be sensitive to the outcome of discussions between site developers and the fisheries representatives in terms of which types of activity may be allowed to continue within arrays and along cable routes.

B4.22 The spatial scale at which tourism data was available to the study was relatively coarse, reducing the accuracy of the assessment. Data at a more disaggregated level would facilitate more accurate assessments of cost impacts. While some information exists in relation to the effects on tourism of onshore and offshore wind farms elsewhere in Europe, the circumstances are not fully comparable to those applying in some of the short-term option areas. Furthermore, it is difficult to define an appropriate zone of influence for offshore wind farms and thus to determine the size of the area over which economic impacts might be experienced. Further research on the impacts of offshore wind farms on tourism, particularly where these are located relatively close inshore is required.

B4.23 There was a lack of data on the numbers and types of vessels using recreational sailing routes. This proved a key limitation in seeking to quantify the cost impacts. Similarly there are limited publicly available data on commercial shipping data. Improved availability of AIS data would significantly ease the task of estimating impacts to commercial shipping and improve the reliability of estimated potential cost impacts.

B4.24 The socio-economic assessment did not quantify social impacts owing to the difficulties of valuing such impacts. However, the importance of social impacts has been highlighted by a considerable number of stakeholders, particularly in West and South West Regions, and further data collection and assessment of these potential impacts is needed to better inform decision-making at project level.

B4.25 Work on Part 2 of the socio-economic assessment is ongoing. This work, which is complex and methodologically challenging, is being undertaken within the two-year review period allocated to the Plan.

B5. FURTHER RESEARCH

B5.1 This section provides information on current and future research which can be used to facilitate the marine planning system including planning for offshore wind, in Scotland.

B5.2 With regards to the Offshore Wind Sectoral Marine Plan, as more detailed information on particular SEA receptors becomes available over the life-time of the Plan, and the offshore wind industry develops, further research and data will be collected on the offshore environment. This will help to inform and refine the potential impacts associated with the developments. The information will be used to further the understanding of impacts associated with wind energy and the development of industry best practice and standards. Not only would this better safeguard Scotland's resources, it sets the stage for Scotland to play a leading role in sustainable management of an offshore renewable industry.

B5.3 The following sections set out further research priorities which will be progressed over the next two years. The outcomes of any research studies will be given due consideration when the implementation of the Offshore Wind Sectoral Marine Plan reviewed after two years.

B5.4 There is a need to continue communicating and addressing issues through the Scottish Coastal Forum and the Marine Strategy Forum or a sub-group of relevant stakeholders. The research outlined within this section will benefit from being steered by groups who represent the key sectoral and environmental stakeholders. This will allow key issues from each sector to be given full and proper consideration in any such studies.

B5.5 It should be noted that the list within this section is not exhaustive and will be subject to change as new issues arise.

B5.6 The remainder of this section comprises:

- National Level – Current Studies;
- National Level – Potential Studies;
- Regional Level – Current Studies;
- Regional Level – Potential Studies; and
- Data Management.

National Level – Current Studies

Use of MaRS Spatial Modelling

B5.7 Spatial modelling can be used to bring together a wide range of types of spatial data (for example wind resource availability, environmental sensitivities, the intensity of current uses of an area, for example for fishing) and to display and combine them to provide a framework for spatially-based multifactorial aid for decision-making. The MaRS spatial modelling tool is such a system, and contains a

very large number (more than 400) data layers. MaRS can be used to select relevant data layers and to combine them through scoring and weighting procedures.

B5.8 In the case of offshore wind development, the consultants undertaking the SEA Environmental Report production were asked by the Scottish Government's Offshore Wind Energy Group to explore medium term options using the MaRS model. The consultants undertook this exercise and reported back to the pre-consultation workshops and steering group meeting held in February 2010. At a pre-consultation workshop, the issue of scorings and weightings was the subject of significant discussion. Consultees expressed views on the values used, but it was recognised by the attendees that it would be very difficult to achieve a set of scorings and weightings which would result in a robust consensus view on the values among the range of consultees involved at the workshop and the consultees not present at the meeting.

B5.9 The workshop view was that the consultants should use as simple an approach as possible so that the model subsequently built by the consultants would be relatively easily understood and could be run in a transparent manner. The underlying concept was that the model could be further developed and refined in a practical manner, within the SEA 2 year review cycle. The medium term options were therefore to be considered as future areas of search for development opportunities.

B5.10 In response to concerns expressed by the fishing, shipping and conservation sectors, Marine Scotland Science (MSS) revisited the consultants MaRS modelling work, with particular reference to the identification of the medium term options (2020-30). The purpose of the revisit was to explore the sensitivity of the outcome of the MaRS modelling undertaken as part of the development of The Draft Plan for Offshore Wind Energy in Scottish Territorial Waters to the underlying decisions made during the MaRS modelling. Such a sensitivity assessment is consistent with procedures used in the MaRS modelling to identify potential development areas in the context of the Scoping Study for the Saltire Prize for wave and tidal energy projects.

B5.11 The output from the MaRS modelling that was used to develop the proposals for medium term wind farm development in Scottish Territorial Waters has been shown to be sensitive to technical factors, such as the categorisation of data layers as representing complete (exclusion models) or partial (constraint models) constraints on development, the weighting applied to the layers, and the classification system used to create the scores. However, the degree of sensitivity differs between sea areas.

B5.12 Some of the sensitivity probably arose through the use of a single model of environmental constraints. This required that relative weightings were developed for very diverse types of data (e.g. the relative weighting of seabird colonies, wrecks, fish landings, and basking shark sightings). This is very difficult to do without some clear additional frame of reference, such as consenting risk. Alternatively, grouping the data layers into themes (e.g., conservation, recreation, heritage, commercial uses, etc) would present fewer conceptual problems, and assessing the sensitivity of the outputs to variation in the overall weighting between themes could be achieved.

B5.13 It is also clear that improvements in the available data have occurred since the Draft Plan was prepared in the first quarter of 2010. For example, European Seabird at Sea (ESAS) data are now available in a compiled form suitable for inclusion in spatial modelling. Other data layers are likely to be updated and improved during 2011 and 2012. It is likely that the data available by 2012 should allow a more robust analysis of the medium term opportunities for wind farm development. The executive devolution to Scottish Ministers of responsibility for planning (and licensing) in Scotland's seas from 12 – 200 miles in 2009 through the UK Marine and Coastal Access Act suggests that an integrated wind farm development plan covering Scottish Territorial Waters and Scottish Offshore Waters will be considered.

Fishing Spatial Analysis

B5.14 Understanding the spatial distribution of fishing activity is central to the sustainable use and development of Scotland's waters. Fishing is an economically and culturally important activity which brings considerable benefits to Scotland, particularly to coastal communities. There is a recognised need to consider fishing, and the habitats and species on which commercial fisheries ultimately depend, when planning offshore wind and other marine renewable energy developments in Scottish territorial waters, at both the national and regional level and it is acknowledged that further work in with the fishing industry is required.

B5.15 At present, Marine Scotland does not have ready access to detailed, spatially resolved information on fishing activity. The information which is available and which has been used in previous assessments and the MaRs model, is relatively broad-scale and is based primarily on the Vessel Monitoring System (VMS) records which is limited to vessels greater than 15 metres length and landings data reported by ICES statistical rectangle. This approach, although informative, does not take adequate account of the distribution of fishing activity of the smaller fishing vessels which fish mainly in inshore waters and form a significant part of the Scottish fleet.

B5.16 Over the last year, Marine Scotland has developed methodologies and a plan of work to collect and analyse fishing activity data in Scottish territorial waters. The work will involve an interview based questionnaire approach to collect detailed information on fishing locations, gear type target species and to establish usage and economic importance of different fishing grounds. Data collection will initially be limited to a pilot region in Scottish waters and the success of the work will be contingent on industry cooperation. Based on experience gained during the pilot, data collection will be extended to cover other sea areas. These data will be compiled at scales appropriate to the nature of the fishing activity and combined with updated VMS data and other broad-scale information.

B5.17 The overall aim is thus to develop and maintain a comprehensive database of fishing activity in Scottish waters. It is envisaged that data will be made available to users in the form of geographic information system (GIS) layers, pertaining to the location, type and economic importance of fisheries, for the purposes of marine spatial planning at the regional and national level. It is envisaged that the data resource would also be sufficiently detailed to inform marine licensing applications so as to minimise impacts on fishing. It will also be used in future

studies of fishing displacement and cumulative and in-combination effect to underpin regional socio-economic assessment and business impact appraisal.

Impact assessment of offshore wind farms on regional scale hydrographic, coastal and sediment transport processes

B5.18 Offshore wind farm developments have the potential to alter local and regional hydrographic processes (waves and currents) and consequently to affect sediment movement and deposition patterns offshore, and a range of erosional and depositional processes at the coast. In the case of individual development projects, these issues will be addressed in the Plan review and EIA processes, and groupings of offshore wind projects such as occurred off the Firths of Forth and Tay will raise questions regarding cumulative effects.

B5.19 The marine planning process requires that Marine Scotland is able to assess the potential significance of these interactions at a range of potential development sites, as part of the SEA element of the Plan.

B5.20 Marine Scotland Science is therefore developing an integrated approach involving mathematical modelling and field observations of impacts on hydrographic processes, building on work that has been done at wind farms elsewhere, for example at Round 1 and 2 wind farms in the UK, and at other sites in western Europe. The work is planned to begin in year 2011 – 12, and is likely to include assessment of small scale processes such as scour around foundations, consequences for local sediment movement, and consequences for regional scale processes, including interactions with the coast. This will require a conceptual model of sea water circulation and tidal movements around Scotland, with particular reference to potential development areas (Short and Medium term options) and of sediment transport in the region, i.e.

- Identification of key coastal and shelf processes operating
- Identification of key coastal sediment transport processes and pathways
- Determination of process variability due to natural climatic, seasonal and weather variation
- Identification of processes which are likely to be influenced by renewables developments

B5.21 Such work will also be available as the basis for detailed models of selected areas, should the need arise during development and review of Plans and used to underpin Regional Locational Guidance where relevant

Salmon / Eels / Sea Trout Research

B5.22 Salmon, sea trout and eels are species of high economic and / or conservation value. In recognition of the potential impacts of offshore renewable developments on these species a pair of reviews were commissioned on (1)

migratory routes and behaviour[18] and (2) sensitivity to electromagnetic fields and noise[19] by Marine Scotland Science and Scottish Natural Heritage respectively. Given the substantial knowledge gaps identified by these reviews, a research project (ROAME) has been commissioned by Marine Scotland to scope the potential for further work in these areas. Although it is difficult to pre-empt this work, it is expected that future research will include (1) Assessment of the effects of electro-magnetic field (EMF) under controlled laboratory conditions (2) Assessment of migration routes in relation to potential interactions with offshore renewable structures (3) Development of genetic tools to assign salmon to geographic area of origin (exact spatial scale of assignment to be determined as part of this work).

Offshore Wind – Carbon Budgets and Emissions Reductions

B5.23 Overall work on carbon budgets and the contribution of offshore wind to emissions reductions targets will be undertaken. This should enable sufficient carbon accounting to be undertaken at the project level.

Navigation Risk Assessment

B5.24 Requirement for a comprehensive navigation / traffic assessment under a national / regional strategy, which takes into account work carried out be developers to understand safety hazards associated with potential interaction of offshore wind development with the shipping industry. The objective would be to fully understand the potential impacts with respect to safety and navigation, rights of innocent passage, commercial and carbon implications, with full cognisance of the potential benefits that a strong wind industry can bring, in order that robust and equitable mitigation measures may be developed. It is likely that this study may be progressed on a regional basis (e.g. Firth of Forth) and scoping will help identify those priorities. The development of a steering group may be required to progress this action.

National Level – Potential Studies

Further Research on Biodiversity

B5.25 As a result of the HRA, a specialist 'data gaps' group will be established to take forward requirements for specific information on biodiversity, flora and fauna. There is a need to develop a programme of research which addresses known data gaps in order to provide a fuller baseline that can be used to inform future assessments at the national level (through the Plan review) and at a regional scale. Based on the findings of the HRA, SEA and associated consultation, this should include, as a priority, research on:

- The extent to which marine mammals and certain fish species respond to industrial marine noise, vibration and EMF, allowing frameworks to be developed to assess the population consequences of acoustic disturbance and the potential benefits of different mitigation techniques.

[18] http://www.scotland.gov.uk/Resource/Doc/295194/0111162.pdf

[19] http://www.snh.org.uk/pdfs/publications/commissioned_reports/401.pdf

- Further research on cumulative impacts on marine mammals, taking into account activities such as pile driving and linking with work to establish the effectiveness of mitigation measures.
- The broad-scale movement patterns of certain seabirds, in order to assess both cumulative impacts and the extent to which activities at development sites may affect populations within SPAs, SACs, or other protected sites. Gap filling surveys have been suggested to address issues arising from the expected DECC report on offshore bird survey movement. Use of radar monitoring, information on migration, research into foraging ranges and areas used by priority species, population level information, monitoring of avoidance responses and flight elevation, and preparation of sensitivity indices for relevant bird species have all been suggested by consultees.

B5.26 Information is required on the potential nature conservation benefits that will occur as a result of the provision of additional habitat and associated navigation safety zones and changes to fishing practices caused by the presence of offshore structures. Consideration should be given to experience from the construction of other offshore structures in terms of improvements to biodiversity e.g. the construction of offshore reefs in the UK for coastal defence purposes have in some areas increased shrimp populations. Some consultees proposed further work exploring potential impacts on key habitats including machair.

B5.27 This information should be co-ordinated to provide an agreed baseline for biodiversity that can be used by all parties. Information on all known sensitive marine sites and features should be collated and presented using GIS in order to ensure that data are spatially presented and accessible.

Water Resources

B5.28 Further consultation with SEPA will be required on the Water Framework Directive guidance. This will focus on regions with potential for cumulative and in-combination effects to ensure that the Plan is not compromising any of the WFD objectives. As outlined in the SEA, there will be a need for further water related effects from development, to address the current uncertainties arising from the process.

Landscape and Seascape Effects

B5.29 Further work is required to provide a clearer basis for assessment of landscape, seascape and visual effects. Consideration should be given to the sense of scale, distances, differing landscape/seascape, existing focal points in the landscape, effects of skylining, remoteness, wildness and landform types as well as the value of landscape/seascapes. In addition, further coastal landscape capacity studies will be required. The development of any such work should involve key agencies including SNH and Natural England.

B5.30 Marine Scotland will seek to cover the parameters which result in impact level of significance, initially within the proposed Offshore Wind Licensing Manual commission, but further work will be required in partnership with SNH, Natural

England and relevant planning authorities to further consider the value of coastal landscapes and seascapes and how or if impacts can be accommodated at the regional scale. Work to develop seascape character assessment guidance by SNH and Nautral England, further reviews of the special qualities of National Scenic Areas, mapping of wild land, isolated coasts and AGLVs will all provide increasingly robust datasets that can be taken into account as the Plan is reviewed. In addition, reconsideration of the landscape and seascape and visual impact assessment guidance will play a key role in informing future assessments.

Historic Environment

B5.31 A working group should be established with Historic Scotland and the national heritage bodies of bordering countries to ensure offshore developments add to the existing knowledge of cultural heritage. In response to issues raised during the SEA process, this group should explore the scope for a regionally co-ordinated programme that aims to refine and supplement existing data on areas with potential for submerged archaeological remains. This will provide an improved baseline that can be used to inform assessments at the project level.

Wave Climate and Impacts

B5.32 Further assessment work is required on the effects of offshore wind developments on wave climate. A working group should be established involving SNH and the JNCC, RYA, the Shipping and Fishing Sectors, and other relevant stakeholders to steer further study in this area.

Understanding Technological Development

B5.33 Some of the assessment conclusions emphasised the importance of monitoring and responding to developments within the offshore wind energy sector. This included the emergence of new turbine technologies and future plans for offshore wind beyond the 12 nautical mile limit. In addition, the scope and effectiveness of construction methods and engineering techniques to be deployed to reduce impacts on the environment should be monitored as construction progresses. This includes issues around pile driving and mitigation measures such as bubble curtains.

Tourism and recreation

B5.34 As proposed by consultees, further research is needed in the form of a more comprehensive survey to identify important and popular sites for recreation in the marine and coastal environment. This should be coupled with a fuller understanding of the impacts that turbines can have on recreation including on coastal processes as they relate to recreational use of the sea.

Regional Level - Current Studies

B5.35 Considerable work is already being undertaken by developers at a regional scale, to combine and establish a fuller baseline, and more fully consider the likely cumulative effects of short term sites at a regional scale. There is no need

to closely steer this work, as it will be defined on the basis of fuller information being gathered at the local level. However, it is important that (a) it is not duplicated at the national scale or in work by other organisations and (b) the information can be fed back to the national level monitoring group, to help provide a clearer picture of national level progress and issues.

Regional Level - Potential Studies

B5.36 There are a number of potential additional research studies including the suite of monitoring and research which underpins the development of Regional Locational Guidance which will prove beneficial to regulators and developers for the progression of offshore wind at a regional level. These include:

- Seabed mapping/classification in some areas should be undertaken to identify and avoid geologically important features. NB certain biodiversity issues are strongly linked to geology – e.g. Annex II reefs, maerl beds, herring spawning grounds.
- Further ecological survey work (including aerial and ship-based surveys) and research to clarify the offshore distribution and abundance of key species, including benthic ecology, marine mammals, fish and birds.
- Study to identify and assess likely scheduling and duration of key disturbance activities (e.g. piling) during construction, operation, and decommissioning. This study is needed to determine possible impacts on seasonal movements of various species.
- Regional cumulative impact assessments for biodiversity with particular focus on regionally important species or habitats as indicated by HRA – e.g. Moray Firth's resident bottlenose dolphins. East and west coast cumulative impact assessments already initiated but areas need to be broadened to cover all of STW.
- Cumulative impact assessment needed for the impact of offshore wind development on seascape and visual amenity on a regional scale and in conjunction with any proposed onshore wind farm developments.
- Cumulative impact assessment to include assessment of all marine developments on sea-based recreational routes e.g. the displacement of recreational craft into commercial routes and consequent risk to safety.
- Further research will be required on the value of the natural environment to tourism in areas around short term sites.

Data Management

B5.37 In order to use this data appropriately, there is a need to build the existing database, ensuring that data is collected in a consistent and compatible manner at all sites, and providing an overarching dataset that is stored appropriately and is accessible. To promote the development of industry best practice, and subject to commercial confidentiality, all developers should be required to share and make

publically available all information collected or collated on the existing environment and potential receptors in their area within 12 months of its collection. There is considerable scope to build on ongoing work being undertaken by DECC under the COWRIE project, to take into account monitoring information from existing sites and to work with stakeholders including SNH, environmental NGOs and the Crown Estate to develop a more joined up approach to research and monitoring.

B5.38 The development of protocols for data management will bring substantial benefits and are to be developed in advance of the main phase of data collection. Marine Planning is not currently developed in Scotland but will be functional in the future. These data will clearly inform Regional Marine Planning. Given its lead in the process of Marine Planning, Marine Scotland will develop data collection protocols and subsequently manage of data collection and reporting.

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