

Appropriate Assessment for Sectoral Marine Plan for Offshore Wind Energy (2020)

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SCOTTISH MINISTERS' ASSESSMENT OF THE IMPLICATIONS OF
THE SECTORAL MARINE PLAN FOR OFFSHORE WIND ENERGY
FOR DESIGNATED SPECIAL AREAS OF CONSERVATION ("SAC"),
SPECIAL PROTECTION AREAS ("SPA"), CANDIDATE SPECIAL
AREAS OF CONSERVATION ("cSAC") AND PROPOSED SPECIAL
PROTECTION AREAS ("pSPA") IN VIEW OF THE SITES'
CONSERVATION OBJECTIVES.

PLAN DETAILS: SECTORAL MARINE PLAN FOR OFFSHORE WIND ENERGY -
15 PLAN OPTIONS LOCATED WITHIN THE SCOTTISH MARINE AREA (0-200
NAUTICAL MILES) – FURTHER DETAILS PROVIDED AT SECTION 2

DATE: 16 OCTOBER 2020

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ACRONYMS

Acronym	Term
AA	Appropriate Assessment
AEOSI	Adverse Effect on Site Integrity
CES	Crown Estate Scotland
cSAC	Candidate Special Areas of Conservation
DPOs	Draft Plan Options
dSPA	Draft Special Protection Areas
EMF	Electromagnetic field
FAD	Fish aggregating device
GW	Gigawatts
HRA	Habitats Regulations Appraisal
INNS	Invasive Non-Native Species
IPR	Iterative Plan Review
JNCC	Joint Nature Conservation Committee
LSE	Likely Significant Effect
MS-LOT	Marine Scotland Licensing Operations Team
MSS	Marine Scotland Science
MW	Megawatts
Nm	Nautical Miles
OWF	Offshore windfarm
PO	Plan Options
pSPA	Potential Special Protection Areas
RSPB Scotland	Royal Society for the Protection of Birds Scotland
s.36	Section 36, Electricity Act 1989
SA	Sustainability Appraisal
SAC	Special Areas of Conservation
SCI	Site of Community Importance
ScotMER	Scottish Marine Energy Research Programme
SEA	Strategic Environmental Assessment
SEIA	Socio Economic Impact Assessment
SNCB	Statutory Nature Conservation Bodies
SNH	Scottish Natural Heritage (now NatureScot)
SPA	Special Protection Areas
The Plan	Sectoral Marine Plan for Offshore Wind Energy
WCS	Worst Case Scenario
WTG	Wind turbine generators

SECTION 1: BACKGROUND

1. Introduction and background

1.1 Introduction

- 1.1.1 The Sectoral Marine Plan for Offshore Wind Energy (“the Plan”) has been developed to provide the spatial framework for the leasing programme for commercial-scale offshore wind by Crown Estate Scotland (“CES”) (“the ScotWind leasing round”). The Plan has been developed on a technology neutral basis and has identified Plan Options suitable for the deployment of up to 10 gigawatts (“GW”) of generating capacity nationally.
- 1.1.2 A full Sustainability Appraisal (“SA”) (incorporating Strategic Environmental Assessment (“SEA”), Socio Economic Impact Assessment (“SEIA”) and Habitats Regulations Appraisal (“HRA”)) was undertaken for the draft Plan and 17 Draft Plan Options (“DPOs”) selected by Scottish Ministers. These 17 DPOs were split across five regions (North, North East, East, South West and West), as shown in Figure 1 below.

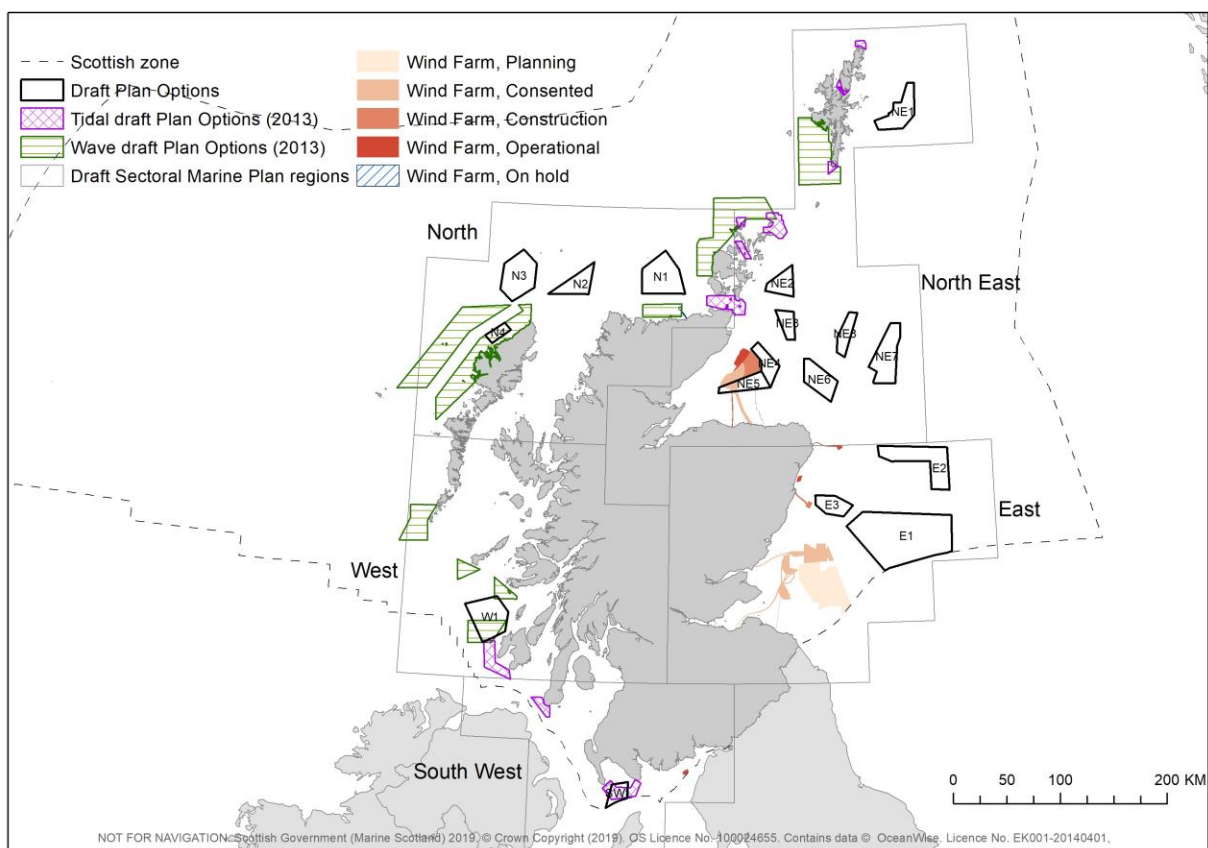


Figure 1 Draft Sectoral Marine Plan for Offshore Wind Energy - Draft Plan Options (2019)

- 1.1.3 The HRA report concluded that, due to the current levels of predicted cumulative impacts on key seabird species from East coast colonies and uncertainty regarding the distribution and abundance of certain species during the non-breeding season, it was not possible to conclude that there would not be an adverse effect on site integrity resulting from development within DPOs E1, E2, E3, NE2, NE3, NE4, NE5 and NE6, without the application of plan-level mitigation measures. Two separate sets of plan-level mitigation are proposed in the HRA Report to mitigate these impacts;
- DPOs subject to high-levels of ornithological constraint (E3, NE2, NE3, NE4, NE5 and NE6); and
 - DPOs subject to the need for further regional-level survey (E1 and E2).
- 1.1.4 Further, the HRA Report identifies the following mitigation measures should be applied across all Plan Options, in order to avoid an AEOSI;
- The legal requirement for individual projects to undergo HRA;
 - Restricting development within individual POs to the scenarios assessed in the Sustainability Appraisal and HRA Report ('maximum realistic development scenarios'); and
 - The enactment of an iterative plan review ("IPR") process to support the implementation of the Plan.
- 1.1.5 Further detail regarding these mitigation measures is provided at Section 4 of this AA.

1.2 Draft and Final Plan Options

- 1.2.1 As a result of the consultation feedback, 15 Plan Options ("POs") have been chosen to progress as final Plan Options, with boundary reductions applied to 7 Plan Options – in order to address consultee comments in relation to a range of issues (including, but not limited to, commercial fisheries, navigational safety and seascape, landscape and coastal character impacts). One DPO has been removed in the North East region (DPO NE5) and the only DPO in the South West region (DPO SW1) has also been removed. The changes are shown in Figure 2 below.
- 1.2.2 These changes are not required to have significant impacts on the conclusions of the assessment undertaken (which was completed using a range of scenarios (compared within the 'do nothing' approach) at a regional and national scale and on a worst-case scenario basis per receptor), therefore, further re-assessment has not been undertaken. Further information regarding the consultation process is provided at section 4 below.

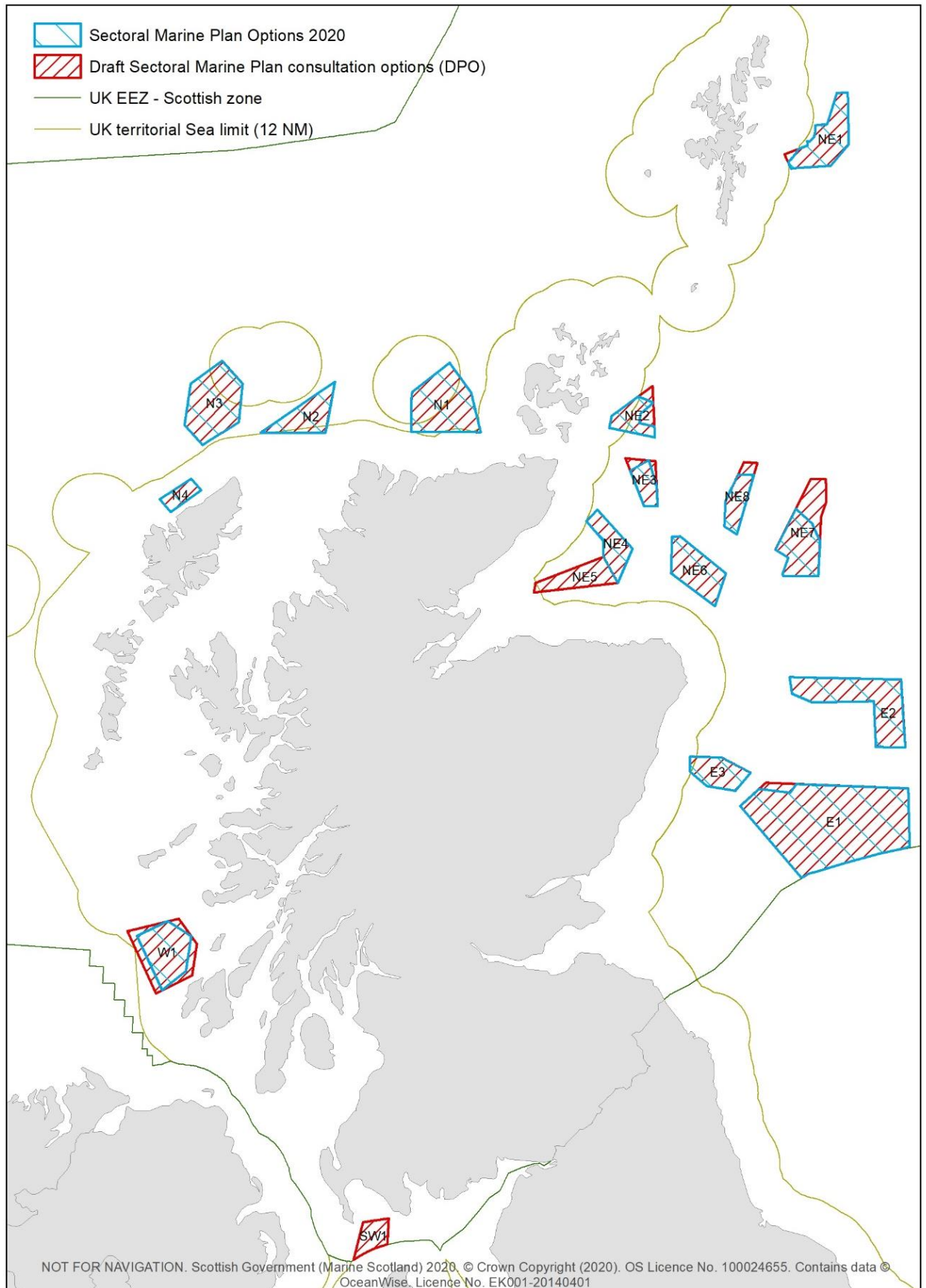


Figure 2 Final Plan Options (2020) and Draft Plan Options (2019)

1.3 Legal Context and HRA approach

- 1.3.1 In developing the Plan, Scottish Ministers have appraised whether the Plan (alone, or in combination with other plans and projects) are likely to have a significant effect (“LSE”) on any European site or European offshore marine site (special areas of conservation (“SAC”) and special protection areas (“SPA”)) and, if so, whether the Plan may have an adverse effect on the integrity of such sites.
- 1.3.2 The assessment has been undertaken by Scottish Ministers and is required under regulation 48 of the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) and regulation 63 of the Conservation of Habitats and Species Regulations 2017 (herein collectively referred to as “the Habitats Regulations”). This AA is in accordance with Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (“the Habitats Directive”) and Council Directive 2009/147/EC on the conservation of wild birds (“the Birds Directive”). Scottish Ministers, as the competent authority under the Habitats Regulations, must be satisfied that the Plan will not adversely affect the integrity of any European site or European offshore marine site (special areas of conservation (“SAC”) and special protection areas (“SPA”)) either in isolation or in-combination with other plans or projects before they can grant consent for the Development.
- 1.3.3 A detailed AA has been undertaken and Scottish Natural Heritage (“SNH”) and the Joint Nature Conservation Committee (“JNCC”) have been consulted.
- 1.3.4 It should be noted that this plan-level HRA is not a substitute for the future requirements of HRAs carried out for individual projects. Such project-level HRA processes will still be required in accordance with the relevant legislation and further project-level assessment is a required mitigation measure (see further, Section 4).

1.4 Appropriate assessment (“AA”) conclusion

- 1.4.1 This AA concludes that there will be no adverse effect on the site integrity of any European sites or European marine sites arising from the Plan, either in isolation or in-combination with other plans or projects, providing that the following mitigation measures are applied (also included at Section 4 of this AA and the final Plan);
- The application of iterative plan review (to ensure that the Plan remains reflective of current scientific knowledge and understanding and the wider spatial and regulatory landscape);

- Further project-level assessment to identify and assess the potential impacts of individual projects brought forward within the Plan Option areas;
- The application of Plan-level mitigation measures to Plan Options E1 and E2, requiring the completion of further regional-level survey work and assessment;
- The application of Plan-level mitigation measures to Plan Options E3, NE2, NE3, NE4 and NE6 (named Plan Options subject to high levels of ornithological constraint), preventing development within these Plan Options until such time as sufficient evidence on the environmental carrying capacity for seabirds exists to reduce the risk to an acceptable level”; and
- Restricting development within individual POs to the scenarios assessed in the Sustainability Appraisal and HRA Report (‘maximum realistic development scenarios’).

1.4.2 Scottish Ministers consider that the most up to date and best scientific evidence available has been used in reaching the conclusion that the Plan will not adversely affect the integrity of the sites outlined in section 8 and are satisfied that no reasonable scientific doubt remains.

1.5 Background to including assessment of proposed SPAs

1.5.1 In Scotland, the Scottish Ministers are currently in the process of identifying a suite of new marine SPAs. In 2014, advice was received from the statutory nature conservation bodies (“SNCBs”) on the sites most suitable for designation and at this stage they became draft SPAs (“dSPA”). Once the Scottish Ministers have agreed the case for a dSPA to be the subject of a public consultation, the proposal is given the status of proposed SPA (“pSPA”) and receives policy protection, which effectively offers the sites the same level of protection as designated sites, from that point forward until a decision on classification of the site is made. This policy protection for pSPAs is provided by Scottish Planning Policy (paragraph 210), the UK Marine Policy Statement (paragraph 3.1.3) and Scotland’s National Marine Plan (paragraph 4.45).

1.5.2 It is not a legal requirement under the Habitats Directive or the Habitats Regulations for this assessment to assess the implications of the Plan on any pSPAs. This AA includes an assessment of implications upon these sites in accordance with domestic policy. The Scottish Ministers are also required to consider article 4(4) of the Birds Directive in respect of pSPAs. The considerations under article 4(4) of the Birds Directive are separate and distinct to the considerations which must be assessed under this Habitats Directive assessment but they are, nevertheless, set out within this AA.

1.5.3 In accordance with the Habitats Regulations the Scottish Ministers will, as soon as reasonably practicable following the formal designation of the pSPA, review their decisions if the Plan is authorised. If required, this will include a supplementary AA being undertaken concerning the implications of the Plan on the site as designated (as the site is currently a pSPA, at present, the conservation objectives are in draft form and will be finalised at the point that the site is designated).

2. Plan details and purpose (including geographic scope)

2.1 Plan purpose and geographic scope

2.1.1 The Plan aims to identify the most sustainable plan options for the future development of commercial-scale offshore wind energy in Scottish waters, including deep water wind technologies, in line with the vision below:

This Plan seeks to contribute to the achievement of Scottish and UK energy and climate change policy objectives and targets, through the provision of a spatial strategy to inform the seabed leasing process for commercial offshore wind energy in Scottish waters, which;

- *Minimises the potential adverse effects on other marine users, economic sectors and the environment resulting from further commercial-scale offshore wind development; and*
- *Maximises opportunities for economic development, investment and employment in Scotland, by identifying new opportunities for commercial-scale offshore wind development, including deeper water wind technologies.*

This Plan has been developed to ensure consistency with the objectives and principles set out within Scotland's National Marine Plan (2015) and the UK Marine Policy Statement (2011).

Figure 3 Sectoral Marine Plan for Offshore Wind Energy - Plan Vision (2020)

2.1.2 The geographic scope of the Plan covers Scottish Waters (0-200 nautical miles (nm)), including Scottish Territorial Waters (0-12 nm) and the Scottish Marine Area (12-200 nm) (which is executive devolved to Scottish Ministers under the Marine and Coastal Access Act 2009).

2.1.3 For the purposes of the Plan, "commercial-scale development" is defined as projects capable of generating more than 100 MW of electricity. Projects which generate less than 100 MW of electricity are considered to be test and

demonstration (or pre-commercial) and therefore are not included within the scope of this Plan.

2.1.4 The final Plan provides the spatial framework for the first cycle of seabed leasing by CES (the ‘ScotWind’ leasing round). Only the areas of seabed contained within the POs identified within the final Plan can be made available for lease for commercial-scale offshore wind development. The final Plan identifies a total of 15 Plan Options, located within four geographic regions (North (4), West (1), East (3) and North East (7) – as shown in Figure 1).

2.1.5 No POs overlap with any European or Ramsar sites, although a number of Plan Options are located immediately adjacent to designated site(s), including:

Table 1 Plan Options located adjacent to designated sites

Plan Option	Designated Site(s)	Qualifying features
W1	Inner Hebrides and the Minches SAC; Gruinart Flats, Islay SPA	Harbour porpoise; includes Chough, Greenland barnacle goose, Canadian light bellied brent goose
N2	Solan Bank SAC	Reefs
NE1	Pobie Bank SAC	Reefs

2.1.6 It is considered, however, that the risks associated within these POs located directly adjacent to these SACs and SPAs can be best managed at a project-level, once further detail regarding the proposal is available. Further, whilst there is no direct overlap, there is potential for qualifying habitats and species from SPAs and SACs to be present within the PO areas and, therefore, may be subject to LSE from development activity. Developments located close to designated sites, therefore, may require additional mitigation measures (with associated cost, assessment and timing implications) when compared to those developments located further from designated sites (due to the increased likelihood of impacts). Although, it should be noted that mobile species (such as marine mammals and seabirds) may be present within PO areas from both nearby and distant designated sites.

2.1.7 It is recognised that cable routing and landfall activities associated with development within POs could overlap with designated sites. Due to the significant uncertainties surrounding potential cable routes to shore, these have been excluded from the scope of the Plan and Sustainability Appraisal (“SA”). The Strategic Environmental Assessment (“SEA”) and Regional Locational Guidance (“RLG”) highlight areas of sensitivity associated with the Plan, but these impacts are not considered within this AA in detail.

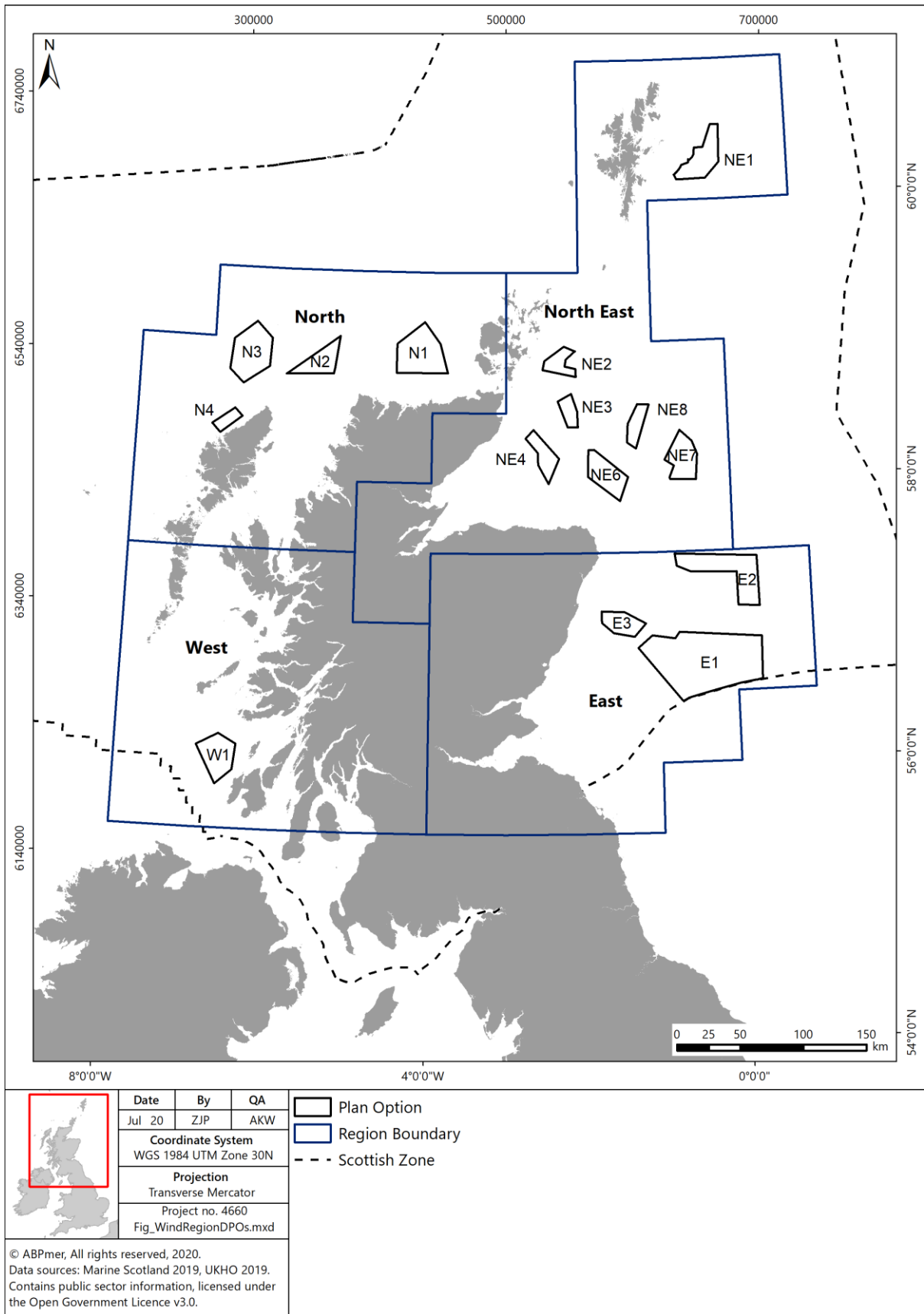


Figure 4 Final Plan Options (POs) (2020)

2.2 Key issues and technology types

- 2.2.1 For plan-level assessments, it is recognised that there is often limited information on the precise location and scale of development, or about the relevant construction methods and associated activities. Whilst 15 Plan Options have been selected and their locations are indicated, no project-level details are currently available.
- 2.2.2 The HRA report outlines the potential for floating offshore wind technologies to be deployed, to allow exploitation of deep-water sites. The Plan, however, does not direct which types of technology should be deployed within each Plan Option and these details will only be available at a project-level. These uncertainties have been duly recognised throughout all assessment stages.
- 2.2.3 The assessment has, therefore, taken account of the likely range of development options and activities (based on previous wind energy projects) and the potential worst case scenario(s) for each impact pathway and species. The Plan has a broad spatial scope and long-term temporal component, which will influence the range of potential impacts. The temporal aspects and scale of impacts will be influenced by the technological advances that will occur over the coming years. These will influence the scale of potential impacts, as well as the distances offshore that developments can be undertaken, whilst remaining commercially-viable. It will also influence the needs for future upgrading of wind generating technologies in established areas.
- 2.2.4 The assessment presented in the HRA Report, therefore, has not made specific assumptions about the project-level activities (e.g. device type and generating capacity). The full range of potential impacts have been incorporated in the assessment envelope (in line with the precautionary approach). The potential envelope of change has therefore been determined to identify the potential effects on features. On this basis, screening matrices and maps were produced in the Phase 3 report for the DPOs, which identified where features within individual European/Ramsar sites are at risk of LSE (or where the risk LSE could not be excluded). The Phase 3 report builds on the screening process, by considering the particular environmental pressures/changes that give rise to these risks and then provides a generic assessment of the impacts (having regard to the typical conservation objectives).

2.3 Maximum realistic development scenarios

- 2.3.1 The Plan provides flexibility over the exact location, nature and scale of the proposal to enable adverse effects on site integrity to be avoided at a project-level. In order to avoid significant adverse environmental effects, the Strategic

Environmental Assessment identified, under this iteration of the Plan, development should be limited to 10 GW nationally. The SA has used ‘realistic deployment scenarios’ to assess the potential positive and negative impacts of DPOs. These ‘realistic development scenarios’ equated to a proportion of the overall area of the DPO (which varies according to the size and conditions of the DPO and have been derived from known constraints on development, early indications as to developer interest and established infrastructure to support development).

2.3.2 Whilst 10 GW was used as a total maximum realistic development scenario for the Plan as a whole (nationally), the individual PO scenarios (shown in Table 3) should not be taken as being an endorsement of projects up to this size within a PO, as further project level assessment and planning will be required to ensure avoidance of significant adverse effects. The use of maximum realistic development scenarios within each PO provides sufficient flexibility regarding the exact location, scale and nature of the proposal to enable potential AEOSI to be avoided (i.e. further spatial planning within POs to avoid sensitive areas).

2.4 Iterative plan review and management

2.4.1 Once adopted, the Plan will be subject to ‘iterative plan review’ and management, to ensure that;

- The Plan and the underpinning assessments are informed by the best available and most up-to-date scientific research and understanding, including outputs of project-level assessments and monitoring;
- The Plan accurately reflects spatial/regional context (i.e. level of construction, operational, and other activity within the region) and potential transboundary impacts; and
- The Plan reflects the prevailing market conditions, technological advancements and regulatory environment (including connections to the national grid and coastal infrastructure).

Section 11.5 of the HRA Report provides an outline of the proposed iterative plan review cycle (for the first 2 years of the Plan’s lifespan). To support the iterative review process, a Programme Board and Technical Advisory Group will be established upon adoption of the final Plan, to consider the implications of emerging research, evidence and assessment methodologies. In addition, an Ornithology Working Group will be established, to specifically consider ornithology evidence gaps identified during the planning process.

- 2.4.2 The iterative plan review process will be informed by the best available scientific information, project-level assessment and post-consent monitoring (for consented and operational wind farm projects). As monitoring data is collected, it will be used to validate the conclusions of project-level assessment and the Sustainability Appraisal. The iterative plan review process will also consider the level of current and planned activity within the POs, regionally and nationally and potential transboundary impacts.
- 2.4.3 In addition, it is anticipated that the Plan will be initially reviewed after two years, to consider emerging monitoring and research evidence, the wider policy, market and regulatory context and if required, to provide an updated spatial framework for any future CES leasing round. The formal review process will commence two years after adoption of the Plan, unless Scottish Ministers seek to commence the review process earlier than Year 2. In the event that significant changes are required to the Plan, further assessment and/or consultation may be required and further details regarding this process will be confirmed at the appropriate juncture.
- 2.4.4 Each iteration of the Plan will be informed by any new and relevant information and research regarding the environmental, economic and social impacts of offshore wind and the effectiveness of any mitigation measures. Final decision making power regarding the Plan and any revisions will continue to rest with Scottish Ministers.

2.5 Plan governance structure

- 2.5.1 In order to facilitate the implementation of the Plan and iterative plan review process, a formal governance structure is required to be put in place, as outlined below in Table 2. The groupings outlined below will be formed upon adoption of the Plan and have specific functions in relation to the Plan-level mitigation measures outlined in this AA and the HRA Report.

Table 2 Plan governance structure

Group	Role/Function
Scottish Ministers	<ul style="list-style-type: none"> • Responsible for approving and adopting the SMP • Responsible for approving amendments/updates to the SMP • Responsible for granting/refusing consent/licenses for individual offshore wind projects • The final decision making power rests with Scottish Ministers.
Sectoral Planning	<ul style="list-style-type: none"> • Comprised of key officials from relevant policy areas across Scottish Government, as well as representatives from Marine Planning and Policy, Marine Scotland (“MPP”).

<p>Programme Board</p>	<ul style="list-style-type: none"> • Considers advice and evidence received from Technical Advisory Group, Ornithology Working Group and Sectoral Evidence Group. • Provides recommendations to Scottish Ministers regarding the need to revise or update the Plan (iterative plan review process), including the need and scope of further assessment. This will be on the basis of the evidence submitted to it, which may justify the need to revise or update the Plan. • External advice may be sought as appropriate. • Chair: Deputy Director, Marine Scotland • Secretariat: MPP • The group will meet at least once per annum, or more frequently if circumstances require.
<p>Technical Advisory Group</p>	<ul style="list-style-type: none"> • Comprised of representatives from the statutory consultation bodies - NatureScot, the Joint Nature Conservation Committee (“JNCC”), Historic Environment Scotland (“HES”) and the Scottish Environment Protection Agency (“SEPA”). • In addition, representatives from Marine Scotland Science (“MSS”) and MPP will be formal members of the Advisory Group. • Chair: Head of Planning, Development and Crown Estate Strategy Unit, MPP • Secretariat: MPP • Meets on at least an annual basis to consider Plan-level issues. • Provides advice and report to the Programme Board regarding continued application of plan-level mitigation measures, the need for revisions to the Plan (as adopted) and further research/evidence/guidance requirements. • This advice will be informed by consideration of the evidence provided during by the Sectoral Evidence Group and other stakeholders, consideration of other policy, legislative and regulatory changes which have occurred over the time period, outputs of project-level assessment and other research programmes and the spatial context (i.e. development which takes place after adoption of the SMP). • The evidence submitted and considered may likely pertain to fields outside the expertise of members of the Advisory Group (e.g. fisheries). In such cases, the Technical Advisory Group (and Programme Board) will be required to seek further advice and representation from the relevant stakeholders (i.e. from the Sectoral Evidence Group). These views will support the formulation of advice and production of the Report. • The decision has been taken to restrict membership of this group to the statutory consultees (as defined by the Environmental Assessment (Scotland) Act 2005), with the

	<p>addition of JNCC given geographic coverage of the Plan. Other stakeholders will have the opportunity to provide input via the Sectoral Evidence Group and as above if issues pertaining to their area of interest arise.</p>
<p>Sectoral Evidence Group</p>	<ul style="list-style-type: none"> • Formed of a wide range of sectoral interests (i.e. drawn from the current Steering Groups formed to support the planning process), i.e. commercial fisheries, commercial shipping and navigation, renewables industry. • Membership shall be as follows; Crown Estate Scotland; Highlands and Islands Enterprise; Marine Scotland Science; Regional Inshore Fisheries Groups; RSPB Scotland; Scottish Enterprise; Scottish Fishermen’s Federation; Scottish Government; Scottish Renewables; UK Chamber of Shipping; and WWF Scotland. • The exact operation of this group will be confirmed following adoption of the Plan. • This grouping will be asked to provide evidence/representations to support the iterative plan review process or may be asked to provide further representations/evidence to the Programme Board and/or Technical Advisory Board on specific issues. • This grouping will be able to provide further evidence (relevant to the implementation of the Plan and the iterative plan review process) as it becomes available, for consideration by the Technical Advisory Group and Programme Board however, at a minimum an annual call will seek any relevant responses.
<p>Ornithology Working Group</p>	<ul style="list-style-type: none"> • Formed of relevant ornithology experts (drawn from the current ScotMER ornithology receptor group), i.e. NatureScot, JNCC, MSS and Scottish Environment Link (“SE Link”). • Crown Estate Scotland will also be formal members of this group. • Chair: MPP • Secretariat: MPP <p><i>Role in relation to application of Plan-level mitigation measures for Plan Options E1 and E2</i></p> <ul style="list-style-type: none"> • To be formed immediately upon adoption of the Plan to define the scope and nature of regional surveys and research work, including assessment of survey outputs, in relation to development within Plan Options E1 and E2. • The recommendations will be formed in consultation with relevant Option Agreement holders (or their representatives). Option Agreement holders, however, will not form part of the membership of the Ornithology Working Group.

- The Ornithology Working Group will then provide advice to the Programme Board (this is due to the replication of members on the Advisory Group with the relevant expertise and to avoid unnecessary duplication). The Programme Board will then confirm the final survey and research requirements and these details will be communicated to developers via Marine Scotland.
- Developers will be advised to complete the surveys and assessment by Marine Scotland, prior to the submission of any licence/consent application.
- Survey and assessment outputs should be provided by developers to the Ornithology Working Group, prior to the submission of any licence and consent applications, in the format directed by Marine Scotland, to support the iterative plan review process and further planning and licensing/consenting decision-making processes.

Wider role – iterative plan review process, application of plan-level mitigation measures (i.e. E3, NE2-NE4 and NE6), defining research requirements

- To assist in identifying and addressing evidence gaps (relating to ornithology) that constrain potential development within the Plan Options and are required to be addressed to inform future planning exercises.
- The Working Group will provide guidance in the production of an ‘Ornithology Roadmap’, which will be prepared by a contractor(s) (appointment process currently underway). The Roadmap will identify ongoing research and any specific actions required to produce the evidence base for assessing ornithological constraints.
- Upon completion of the Roadmap, the Working Group will work with the appointed contractor(s) to support the production of a ‘Programme of Works’ – a detailed programme of works to address strategic research projects that can be implemented within the short to medium term to initiate Roadmap actions.
- The Working Group will also be asked to;
 - Provide views regarding the continued application of plan-level mitigation measures in relation to Plan Options E1-E3, NE2-NE4 and NE6;
 - To provide advice/views regarding whether further research or guidance is required to inform planning and consenting; and
 - Consider the findings of future project-level assessments, relevant research programmes and the wider spatial context and provide advice regarding the potential implications of these changes for the Plan (as adopted).

- 2.5.2 The process for continued submission of new evidence (which the draft Plan and SA referred to as the Annual Forum) is a key mechanism to support the Plan implementation and iterative review processes. Key stakeholder representatives, who form part of the Sectoral Evidence Group, will be asked to provide details of emerging evidence and research, which could have a bearing on the implementation of the Plan and resultant development on at least an annual basis, but will have the opportunity to provide this evidence as it emerged.
- 2.5.3 The evidence submitted may have arisen as a result of technological advances, scientific evidence, project survey and monitoring (including of the effectiveness of mitigation measures) and or as the result of project-level assessments. The request for new evidence, to support iterative plan review, should not be an opportunity for further public consultation on the Plan. Should sufficient evidence be presented, which Scottish Ministers consider justifies the need to review the Plan, then public consultation will occur at the appropriate stage in the planning process. It is currently anticipated that the Plan will be reviewed at Year 2 (although this may occur earlier if sufficient justification is provided).
- 2.5.4 The scope of evidence submitted will be restricted to ensure it is only relevant to the Plan and its implementation. Discussions within the Sectoral Evidence Group could follow a similar approach to that taken recently regarding consideration and discussion of emerging assessment methodologies for projects in the Forth and Tay region (2020). Further details regarding this process will be provided in due course.
- 2.5.5 The first annual request for evidence from the Sectoral Evidence Group and other stakeholders will be undertaken one year after the adoption of the Plan. The exact process and functioning of the Sectoral Evidence Group will be confirmed after the adoption of this Plan. The Technical Advisory Group shall provide the Report of findings to the Programme Board.
- 2.5.6 Members of the two Steering Groups formed to support the planning process would be approached to provide relevant evidence. The Steering Group members were as follows:-
- Crown Estate Scotland;
 - Highlands and Islands Enterprise;
 - Historic Environment Scotland;
 - Joint Nature Conservation Committee;
 - Marine Scotland Science;
 - NatureScot;

- Regional Inshore Fisheries Groups;
- RSPB Scotland;
- Scottish Enterprise;
- Scottish Environment Protection Agency;
- Scottish Fishermen's Federation;
- Scottish Government;
- Scottish Renewables;
- UK Chamber of Shipping; and
- WWF Scotland.

2.5.7 In addition, the chairs of the ScotMER Receptor-Specific groups and Regional Marine Planning Partnerships, as well as Local Authorities, will be approached to provide any relevant evidence or advice. Invitations to provide evidence will also be made to other representative groups which may have an interest in the implementation of the Plan, such as Fisheries Management Scotland.

2.5.8 Evidence submitted will be considered by the Technical Advisory Group for its relevance and appropriateness. A summary of all evidence provided (as it may likely pertain to fields outside the expertise of members of the Technical Advisory Group) will be summarised and presented to the Programme Board by officials.

2.5.9 The Programme Board will then use this information to provide recommendations to Ministers regarding whether there is the need to review the Plan at this juncture (e.g. earlier than the planned review at Year 2) or whether the Plan remains reflective of current scientific understanding and knowledge. This report will be published online.

2.5.10 The Programme Board and Technical Advisory Group will also consider evidence submitted in light of other policy, legislative and regulatory changes which have occurred over the time period and the spatial context. Further, we anticipate that we will have an improved understanding of transmission and grid connection issues, as individual projects progress through the pipeline, which may have a bearing on the Plan.

2.6 Addressing research gaps

2.6.1 The planning process and HRA Report have identified potential gaps in knowledge and data, which may need to be addressed at a Plan and/or project-level. The Technical Advisory Group and Ornithology Working Group, as outlined above, will consider these data and knowledge gaps in further detail over the coming years to support future planning exercises.

- 2.6.2 A number of strategic research programmes already exist and are undertaking work to address these gaps. Further, project-level assessment and monitoring may provide data and evidence which can address these gaps. As this evidence becomes available, it is anticipated that it will inform future plan and project-level assessment accordingly. Particularly, for example, in relation to emerging technology and installation methods (i.e. floating offshore wind technologies) and post-consent monitoring regarding seabird behaviour/interactions with wind turbine generators (“WTG”).
- 2.6.3 Consideration of the potential impacts on seabird qualifying interests has identified a number of evidence gaps, which are currently being considered by the Scottish Marine Energy Research (“ScotMER”) programme, including;
- Collision mortality and avoidance behaviour of Black-legged Kittiwake, Northern Gannet and Great Black-backed Gull (OR. 17). All three species concerned are of direct relevance to future offshore wind farm development in the Moray Firth region, whilst in the Forth and Tay region Kittiwake and Gannet are the key species of concern in relation to potential collision mortality.
 - The consequences of displacement and barrier effects on survival and productivity (OR. 23), and subsequently populations of Atlantic Puffin, Razorbill and Common Guillemot are key constraints in the Forth and Tay region, and to a lesser extent in the Moray Firth region.
 - The drivers of any observed changes in distribution and abundance of Black-legged Kittiwake, Northern Gannet, Atlantic Puffin, Razorbill, and Common Guillemot in and around offshore wind farms (OR. 06, OR. 19, OR. 20, OR. 21).
 - The movements of adult birds during the non-breeding season and immature birds during the entire year, and their level of exposure to cumulative effects (OR. 02, OR. 03, OR. 09).
- 2.6.4 Addressing these evidence gaps will support future project and plan-level decision making and assessment process.
- 2.6.5 The Post Adoption Statement (2020) sets out in further detail the research and evidence gaps which need to be addressed, including planned research work to be undertaken in the coming years. The requirement, for example, for regional-level survey and assessment work to be undertaken for POs E1 and E2 (a mitigation measure outlined at section 4 of this AA) seeks to address uncertainty regarding the presence, distribution and abundance of seabirds during the non-breeding season in this region, as well as connectivity with key seabird colonies on the East and North East coast.

2.7 Project-level mitigation measures considered

- 2.7.1 Details of mitigation measures deployed for individual wind farm projects have been collated to produce a central ‘project-level mitigations options’ table (Table J1, Appendix J)¹ – which have been measured against the impacts matrix included within Table J2, to cross-reference potential mitigation measures to impacts. These mitigation measures have been derived from previous strategic assessments and project-level assessments and provide a comprehensive overview. One of these measures is, during the early stages of any development, ‘a primary consideration will be to try to avoid habitats within a European/Ramsar site and minimise exposure and risk’.
- 2.7.2 Further relevant project-level mitigation measures identified in Appendix J include (but are not limited to);
- Identification of the most appropriate mechanism for disposal of excavated sediment to avoid adverse impacts on designated intertidal/coastal habitat features from smothering;
 - Use of cable and device installation methods that minimise sediment re-suspension (impacts on fish and shellfish from increased suspended sediment and turbidity);
 - Survey design to mitigation/avoid visual disturbance from vessels or shoreline activity; and
 - Use of methods and/or timing to reduce noise from geophysical survey, borehole work, seismic survey and use of standard measures to avoid/mitigate effects on designated habitats and species (impacts of noise on marine mammal qualifying interests).
- 2.7.3 Whilst this list demonstrates a range of potential project-level mitigation measures which could be deployed, the list does not provide further certainty that European/Ramsar sites will not be affected. The application of these measures is not a formal requirement of the Plan, however, they provide useful context for the HRA Report and can inform further project-level assessment and discussion as development progresses (as appropriate to the project location and impacts).

¹ See further, <https://www.gov.scot/publications/draft-sectoral-marine-plan-offshore-wind-energy-habitat-regulations-appraisal/pages/26/> (Last accessed 17/09/20)

Table 3 Maximum realistic development scenarios

Region	DPO	Total DPO Area (km ²)	Realistic maximum development scenario for DPO (GW)	Realistic development as percentage of total DPO Area	Regional Low Scenario (GW)	Regional Medium Scenario (GW)	Regional High Scenario (GW)
East	E1	3742	3	16%			
	E2	1287	2	31%			
	E3	474	1	42%			
	Sub-total	5505	6		1	2	3
North East	NE1	751	2	53%			
	NE2	345	1	58%			
	NE3	265	1	76%			
	NE4	440	1	45%			
	NE6	699	2	57%			
	NE7	684	3	88%			
	NE8	339	1	59%			
	Sub-total	3522	11		1.5	3	4.5
North	N1	1163	2	34%			
	N2	561	2	71%			
	N3	1106	2	36%			
	N4	200	1	100%			
	Sub-total	3030	7		1	2	3
West	W1	754	2	53%			
	Sub-total	754	2		0.5	1	2
Total:		14646	26		4.3	8.6	13.5
Scaled back to national scenarios (GW):					3	5	10

3. Preparation of the HRA Report

3.1.1 The planning process commenced in 2017 and was conducted in accordance with the process shown in Figure 5. Further detail regarding the planning process can be found in the final Plan.

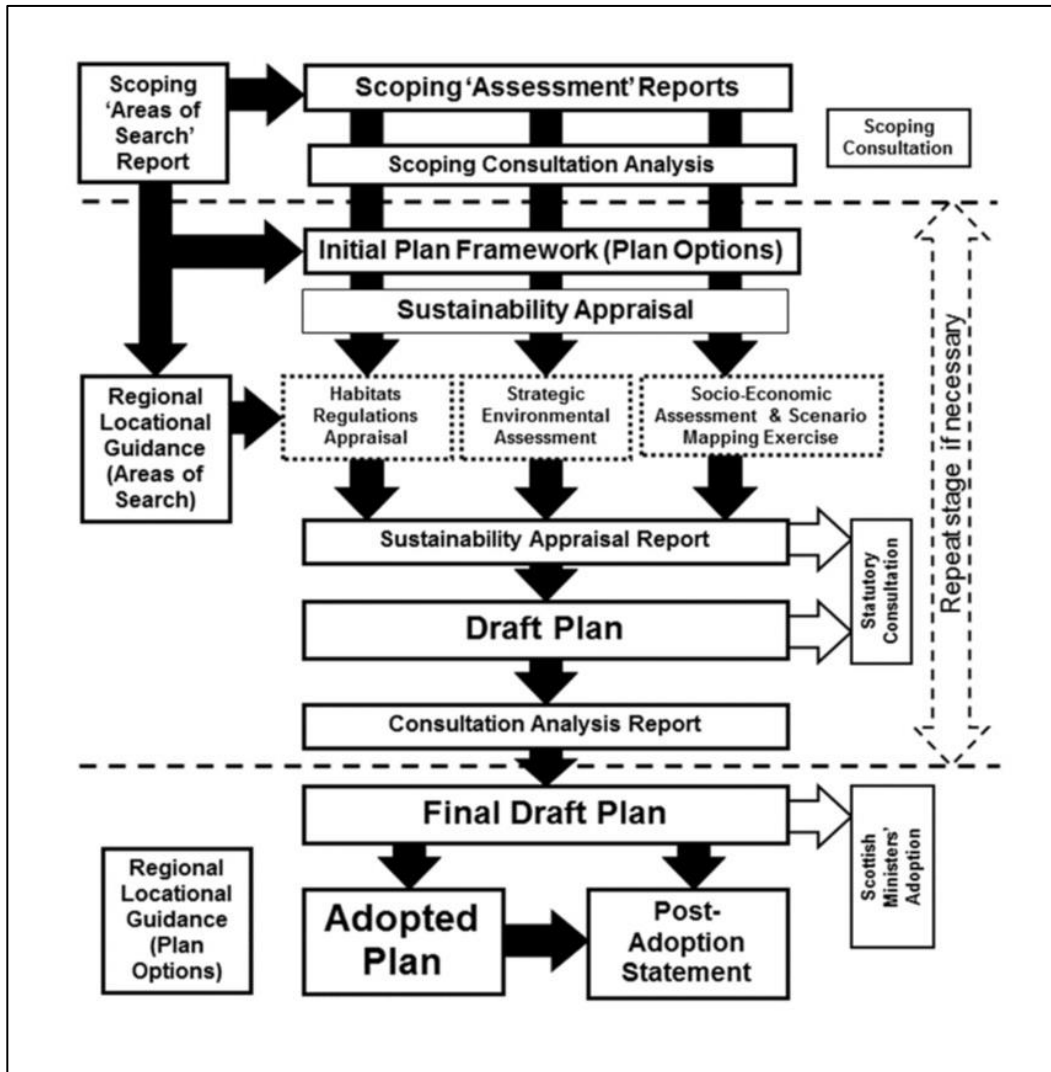


Figure 5 Sectoral marine planning process

3.1.2 The HRA process for the Plan has followed the 13-step process set out in the agreed SNH guidance for undertaking plan-level HRA in Scotland and as set out in the Pre-Screening HRA Report² and as shown in Figure 6.

² See further: David Tyldesley and Associates, 2015. Habitats and Regulations Appraisal of Plan. Guidance for Plan-Making Bodies in Scotland Version 3.0, January 2015 SNH Ref 1739.

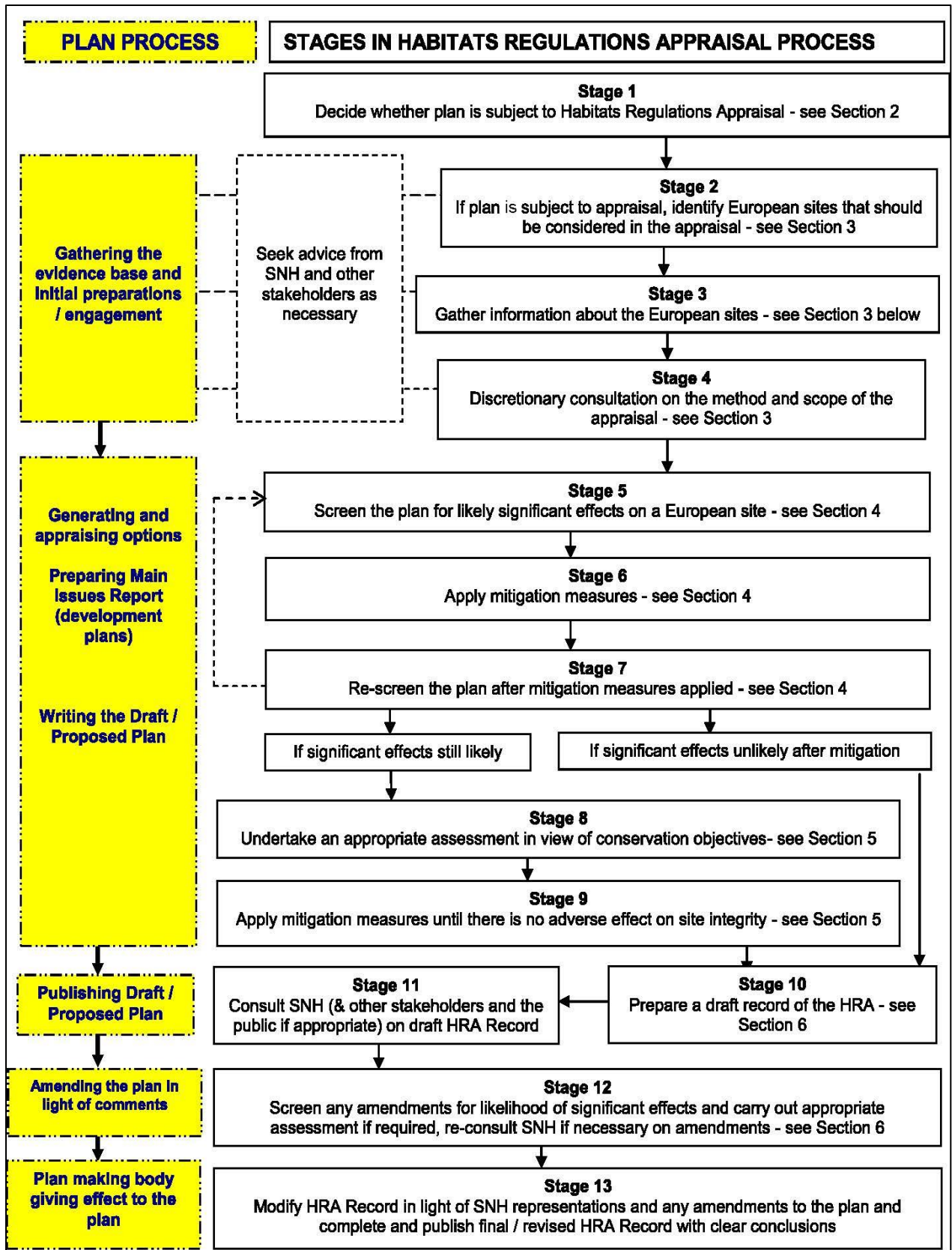


Figure 6 HRA Plan Process

- 3.1.3 The 13 step process has been adopted, and consulted upon, over three key project phases to ensure there is clarity and a clear audit trail in the assessment process (an important requirement for strategic-level HRAs, which need to be carried out in an iterative, transparent and auditable manner). The HRA and this Appropriate Assessment have been undertaken in accordance with guidance provided by SNH on HRA of Plans.³ This process also takes into the guidance produced by the European Commission on the “Assessment of plans and projects significantly affecting Natura 2000 sites”.⁴
- 3.1.4 The HRA process for the draft Plan was overseen by a Plan Steering Group which included representatives of the Scottish Government, Scottish Natural Heritage, Joint Nature Conservation Committee (“JNCC”), Royal Society for Protection of Birds (Scotland) (“RSPB (Scotland)”), Historic Environment Scotland, Marine Scotland Science (“MSS”), Regional Inshore Fisheries Groups, Scottish Environmental Protection Agency, Scottish Fishermen’s Federation, Scottish Renewables, World Wildlife Fund and Crown Estate Scotland (“CES”). This ensured that the planning process met the requirements of these bodies and therefore the Appropriate Assessment Information Report incorporated the consultation and revision requirements of stages 11 – 13 of the HRA process.
- 3.1.5 Public consultation was undertaken on the scoping reports (including the HRA Pre-Screening Report) between 13 June 2018 and 18 July 2018. The Consultation Analysis Report is available, which summarises the outputs of this scoping consultation phase and further consultation undertaken post-scoping (e.g. July 2018 to June 2019).⁵ The findings from the three phases are presented in the reports set out in Table 4.

³ SNH, *Habitats Regulations Appraisal of Plans – Guidance for Plan-Making Bodies in Scotland* (V 3.0, January 2015) Available at: <https://www.nature.scot/habitats-regulations-appraisal-plans-guidance-plan-making-bodies-scotland-jan-2015> (Last accessed: 17/06/20)

⁴ European Commission, *Assessment of plans and projects significantly affecting Natura 2000 sites* (2011).

⁵ Available here: <https://www2.gov.scot/Resource/0054/00549055.pdf> (Last accessed: 09/09/2020)

Table 4 HRA Report - 3 Phase Reports

Phase	HRA Stage(s)	Document and details
1	1-3	<p>Pre-Screening Report (June 2018) https://www.gov.scot/publications/sectoral-marine-plan-offshore-wind-energy-encompassing-deep-water-plan-9781788519632/</p> <p>Sets out the evidence base and proposed methods to be applied for the subsequent screening/scoping and assessment stages.</p>
2	4	<p>Review of proposed Assessment Methodology (November 2018) https://www.gov.scot/publications/draft-sectoral-marine-plan-offshore-wind-energy-habitat-regulations-appraisal/pages/18/</p> <p>Produced following consultation on the pre-screening report. Considered the responses received and revisited the proposed HRA scoping and assessment methods in light of feedback and recent case-law developments.</p> <p>This document was discussed with the Steering Group on 9 November 2018, generally positive feedback was received and it was agreed that the methods proposed in the Phase 1 report would be applied with minor changes (as set out in the Phase 2 report).</p>
3	5-10	<p>Screening and Appropriate Assessment Information Report (“HRA Report”) (December 2019) https://www.gov.scot/publications/draft-sectoral-marine-plan-offshore-wind-energy-habitat-regulations-appraisal/pages/4/</p> <p>Produced rationalised screening list, reflected case-law developments, impact pathways review, identification of features which are sensitive, activity-based screening of European/Ramsar sites, detailed pathway-feature sensitivity review and assessment of potential effects on European/Ramsar sites.</p>

4. Consultation

- 4.1.1 The draft Plan and SA were published for statutory consultation, in accordance with the Strategic Environment (Scotland) Act 2005, for a period of 14 weeks between 18 December 2019 and 25 March 2020. Eighteen consultation events took place during February and March 2020, to raise awareness of the consultation and discuss the draft Plan and SA in detail with stakeholders. The full outputs of this consultation process can be found in the Consultation Analysis Report⁶ and the full consultation responses are available to view on the Citizen Space consultation hub page.⁷
- 4.1.2 The Post Adoption Statement (2020) sets out in detail the changes made between the draft and final Plans and Table 5 below provides a summary of the most relevant amendments made to the Plan:

Table 5 Summary of amendments to DPOs and Plan-level mitigation measures between the draft and final Plans

DPO/Policy	Amendment(s)made
DPO SW1	Not progressed as a final PO – due to concerns regarding potential scale of negative socio-economic impacts (including potential negative seascape, landscape and visual impacts)
DPO W1	Total boundary reduced in order to mitigate potential impacts on a range of sectors (e.g. commercial shipping, seascape, landscape and coastal character).
DPOs N1, N2, N3, N4, NE4, NE6, E2 and E3	No amendments made to boundaries.
DPO NE1	Boundary amended to reduce overlap with the Shetland Island Council’s works licensing area.
DPOs NE2, NE3, NE7, NE8 and E1	Boundaries amended to avoid areas of highest existing commercial fishing activity.

⁶ Marine Scotland, *Draft Sectoral Marine Plan for Offshore Wind Energy - Consultation Analysis Report* (July 2020) Available at: <https://www.gov.scot/publications/draft-sectoral-marine-plan-offshore-wind-energy-2019-consultation-analysis-report/>

⁷ Available here: https://consult.gov.scot/marine-scotland/draft-sectoral-marine-plan-for-offshore-wind/consultation/published_select_respondent

DPO/Policy	Amendment(s)made
DPO NE5	Not progressed as a final PO- due to potential cumulative impacts.
Definition of commercial-scale offshore wind	Definition of commercial-scale offshore wind retained as “projects being capable of generating more than 100 MW of electricity’.
DPOs classed as, ‘being subject to high levels of ornithological constraint’ (E3, NE2-NE6)	<p>DPO NE5 has not been progressed as a final PO and is therefore removed from this category.</p> <p>Inconsistencies in the wording regarding this mitigation measure between the SA, HRA and Plan documents were highlighted by respondents, including the shift away from the term ‘temporal mitigation’.</p> <p>This mitigation measure has been retained, however, the text in the final Plan makes clear that it will be possible for a developer to submit an application for licence/consent for these POs before the mitigation measure is removed at a Plan-level (i.e. via the iterative plan review process). Regulatory approval/consent, however, may only be granted in these instances, if it can be concluded that there would no AEOSI, or if Scottish Ministers opt to pursue a derogation under the Habitats Regulations.</p>
DPOs classed as ‘being subject to the need for regional-level survey’ (E1 and E2)	<p>POs E1 and E2 remain subject to this mitigation measure.</p> <p>Respondents provided comments regarding the potential scope of the required survey and assessment work and Option Agreement holders will be expected to carry out this survey and assessment work as directed by Marine Scotland, following further discussion with the Ornithology Working Group (to be established upon adoption of the Plan).</p> <p>Developers are able to pursue a licence/consent application without first completing the regional-level survey and assessment work, however, it is likely that the Responsible Authority would be unable to conclude no AEOSI with any reasonable certainty and further survey and assessment would be required (unless Scottish Ministers opt to pursue a derogation under the Habitats Regulations).</p>

5. Consultation responses

- 5.1.1 Detailed comments were received from SNH, RSPB Scotland and JNCC. The main points by each of the respondents that included HRA specific comments are summarised below. It should be noted that SNH rebranded to NatureScot during August 2020.

5.2 SNH (now NatureScot)

- 5.2.1 SNH provided a response to the scoping phase on 17 July 2018.⁸ SNH indicated it was content with the scope and level of detail proposed for the environmental report and provided comments on the scoping in/out of topics. SNH considered that Invasive Non-Native Species and impacts on prey species should be scoped into the assessment. SNH also advised that an additional objective, “to avoid significant adverse physical damage to coastal geodiversity sites from coastal infrastructure”.
- 5.2.2 SNH provided a consultation response to the draft Plan and HRA Report on 25 March 2020,⁹ which was accompanied by Landscape and Visual Impact Appraisal and Design Guidance. SNH also provided the same response via the Scottish Government Strategic Environmental Assessment (“SEA”) Gateway. Following further discussion with Marine Scotland regarding the implications of the removal of NE4 and NE5 on the status of NE6, and wider discussions regarding NE6, SNH provided additional advice on 11 May 2020.
- 5.2.3 In its response dated 25 March 2020, SNH advised that, broadly speaking, it agreed with and endorsed the conclusions of the HRA Report and the recommendations made. In particular, it endorsed the finding that ‘appropriate and meaningful mitigation measures’ are required to ensure no AEOSI arises from Plan related activity, and the range of measures that are set out in the draft Plan and Sustainability Appraisal to secure this. SNH considered that the Plan level mitigation measures, relating to the temporary restriction on windfarm development in DPOs E3 and NE2-NE6, the additional survey work required for DPOs E1-2 and the establishment of the IPR process and Technical Advisory Group are critical measures to avoid AEOSI.

Ornithology

⁸ Available on the Scottish Government Strategic Environmental Assessment Gateway here: <https://www2.gov.scot/seag/details.aspx?sid=5&id=SEA\01392> (Last accessed: 09/09/2020)

⁹ SNH, *Draft Sectoral Marine Plan for Offshore Wind Energy (2019) – Response and comments from SNH* (25 March 2020). Available at: <https://www.nature.scot/sites/default/files/2020-04/Sectoral%20Plan%20Consultation%20-%20SNH%20Response%20Summary.pdf> (Last accessed: 19/06/20)

DPOs E3 and NE2-NE6

- 5.2.4 SNH advised that it strongly supports the need for temporary restriction on windfarm development in DPOs E3 and NE2-NE6, *“until such time as enough evidence on the environmental capacity for seabirds exists to reduce the risk to an acceptable level.”* SNH advised that, due to concerns regarding the predicted in-combination impacts of existing and consented offshore windfarms (“OWF”) on specific east coast SPAs and seabird species, *“no development should be permitted until and unless research and post consent monitoring of existing OWF in eastern Scotland demonstrate that capacity for further development, with respect to SPA interests, exists.”* SNH further advised that the same criteria regarding mitigation measures should not be applied to all six DPOs. SNH advised that, in its opinion, the research and monitoring should be completed to inform future ornithological impact assessments and understanding regarding ornithological impacts, *“rather than bypassing this through derogation.”*

DPOs E1 and E2

- 5.2.5 SNH advised that it strongly supports the specific Plan level mitigation identified for DPOs E1 and E2, *“in recognition that kittiwakes, gannets and razorbills, with potential connectivity to East Coast SPAs, may be foraging in these areas.”* SNH advised that, at this stage, it would be unable to advise that there would no AEOSI arising from development in these DPOs in-combination with existing consented OWF development in this region. SNH advised that it considers it necessary for *“regional surveys on seabird density and SPA connectivity to be undertaken in these DPOs to establish whether these species are present in sufficient numbers for some or all of the sea area within E1 and E2 to be subject to the same temporary restriction on development as applied at E3 and NE2-NE6 or whether and where they are sufficiently low as to enable leasing and consenting to proceed with no further Plan mitigation measures required.”* SNH advised that the recently published updated foraging ranges¹⁰ further supported the application of this mitigation measure and the increased mean-max foraging ranges for both kittiwakes and razorbills (as well as gannets). SNH advised that these updated foraging ranges should be used to support future iterations of the Plan and in any project-level assessment for development arising from the current Plan.

Technical Advisory Group and addressing knowledge gaps

¹⁰ Woodward, I., Thaxter, C.B., Owen, E., and Cook, A.S.C.P., *Desk-based revision of seabird foraging ranges used for HRA screening* (2019). BTO Research Report Number 724.

- 5.2.6 SNH highlighted that it had concerns regarding inconsistencies in the documentation presented for consultation regarding the plan-level mitigation measures for ornithology and the role and function of the (as named) Advisory Group and Stakeholder Project Steering Group(s) referred to in the documentation. SNH highlighted the establishment of the Advisory Group should not be delayed until plan adoption and that it wished to be represented on this grouping. SNH are represented on both the Technical Advisory Group and Ornithology Working Group to be established upon adoption of the Plan (see further, Post Adoption Statement (2020)).
- 5.2.7 SNH highlighted that more data and detailed analyses around flight heights over water would be particularly valuable in assessment of (cumulative) risk and noted that migratory pathways of Whooper swans from Iceland could also potentially transect POs (in particular, N2, N3 and N4), further supporting the need for a wider updated review of migratory pathways. This knowledge gap has been highlighted within the Post Adoption Statement and will be addressed via existing research fora (e.g. the ScotMER Ornithology Sub-Group) as well as the Ornithology Working Group (to be formed upon adoption of the Plan).
- 5.2.8 SNH advised that existing plans for post-consent monitoring are likely to include proposals for bird tracking and collision/behaviour monitoring. SNH advised that it considers that, whilst extra resources to support/expand this work would be welcomed, it would need to be planned and co-ordinated with other developer(s) and the relevant Regional Advisory Group(s) to ensure best-value.
- 5.2.9 SNH advised that the reference to the further collection of oceanographic and ecological data is sensible, but that the scale at which such data is collected must be appropriate, to enable understanding of seabird movement (i.e. relate to the foraging or migratory range of the species being considered). SNH advised that there may be a significant amount of such information which is already being routinely recorded, particularly in relation to fisheries science, which could be used to consider seabird distribution.

Migratory bird species (all regions)

- 5.2.10 SNH stated that the recommendation included at section 10.7.11 of the HRA Report, “*to consider possible in-combination effects arising from development within DPO SW1, with respect to Whooper swan feature of the classified Upper Solway Flats and Marshes SPA and the proposed marine extension, as further detail of the Round 4 leasing emerges*” should be included as a mitigation measure. As SW1 has now been removed from further

consideration, this has not been recommended as a mitigation measure as a result of this AA.

Ornithology - general

- 5.2.11 SNH advised that it considers that the assessment of sensitivity for collision impacts for species such as kittiwake and gannet has been underestimated. SNH consider that the assessment of sensitivity included at Section 6 and Table 9 of the HRA Report should be 'High' and not 'Medium', given that collision impacts are the driver for the conclusion of AEOSI for a number of developments located in the Forth and Tay and Moray Firth regions. SNH consider the statement provided in the HRA Report that, "*sensitivities at a population level are also likely to be inherently lower than for individuals*" is misleading, as it is both individual risk of mortality from collision and status of impacted, including SPA, populations which determines overall sensitivities.
- 5.2.12 SNH further consider that the categorisation of seabirds provided at Table 8 of the HRA Report (categorising seabirds by foraging mode, nocturnal flight/diving activity and nesting location) may present an over-simplification of the impacts and may be potentially misleading. SNH advised that there is a growing recognition of the importance of understanding the extent of nocturnal and twilight activity when assessing collision risk to seabirds and that this may vary between season, age class and breeding status.¹¹ SNH further advised that it is unclear what basis has been used for scoring within Table 8 as no supporting references are provided. SNH advised that the scoring for Arctic skua, great skua and Arctic tern ('No' for Nocturnal Activity) contradicts Furness and Wade (2012). SNH advised that the information presented in the Table is too simplistic and the conclusions are not sufficiently evidenced or supported by the latest available information. SNH advised that this is an increasingly important area of impact assessment and therefore, this should be given further consideration in any future or revised HRA Report, including more nuanced categorisations. ABPmer have advised that the divergence from the figures provided in Furness and Wade (2012) is due to the use of different references. ABPmer agree that Table 8 could be amended to present a more nuanced characterisation and updated references, but consider that this does not alter the conclusions of the assessment presented. ABPmer consider that the information above Table 9 provides sufficient detail regarding references/sources.
- 5.2.13 SNH consider it is unclear why some impact pathways have been given a lower sensitivity score, particularly;

¹¹ See further, Paragraph 47 of SNH advice (25 March 2020)

- Presence of structures resulting in an exclusion/displacement of species from the area; and
- Visual disturbance and exclusion from areas, as a result of surveying, cable and device installation/operation and decommissioning activities and movements of vessels.

5.2.14 SNH consider that the score of ‘medium low’ during the operational phase does not reflect evidence presented in the HRA Report regarding large scale displacement from operational OWF and the high sensitivity to visual disturbance for certain species (e.g. divers).

5.2.15 SNH further stated that it considers that the HRA Report does not acknowledge the terrestrial aspect which will be required to fully cover large gull activity within assessment.

Marine Mammals

5.2.16 SNH advised that it considers that the delivery of OWF developments under the Plan would be greatly facilitated by the completion of regional ‘strategic’ marine mammal surveys, to inform licensing and consenting decisions, rather than relying on site-specific surveys (linked to individual projects). These surveys would be used to characterise and quantify marine mammal usage and cover broader areas (e.g. around clusters of POs) and incorporate sound recorders. The need for further strategic-level survey work has been highlighted within the Post Adoption Statement and will be discussed and considered via the existing research mechanisms, such as the ScotMER Marine Mammal specialist receptor group.

5.2.17 SNH commented that the information presented in Tables 14 and 15 of the HRA Report is not clear whether it is displaying sensitivity or risk.

5.2.18 SNH advised that the greatest level of impacts will arise during the construction phase of the Plan. SNH welcomed the commitment to require plan-level HRA to identify necessary mitigation mitigations and consent/licence conditions.

5.2.19 SNH advised that there would be no adverse effect on the integrity of any SAC or cSAC with marine mammal qualifying interests from the Plan alone or in-combination with other projects.

5.3 Joint Nature Conservation Committee (“JNCC”)

- 5.3.1 In its response, dated 25 March 2020, JNCC¹² advised that it supported the systemic and iterative planning process undertaken to date. JNCC consider that the consistent application of plan-level mitigation measures will be critical to the success of the Plan.
- 5.3.2 JNCC stated it is fully supportive of the iterative plan process (as outlined in the HRA Report at section 11.4-11.5) and requested further clarity regarding the ‘ownership’ of the various parts of the iterative plan review process. JNCC indicated that further clarity was sought regarding what would trigger (adequate justification) earlier review of the Plan. JNCC provided further comments on the Advisory Group (as named), including its membership and the need for Terms of Reference and the potential need for further receptor-specific groups (i.e. marine mammals). Further detail regarding the iterative plan review process and Technical Advisory Group is provided in the final Plan and Post Adoption Statement.
- 5.3.3 JNCC further stated that it considers that Marine Scotland and Crown Estate Scotland should consider the recent work undertaken by The Crown Estate in relation to a Cable Route Protocol. The Plan and HRA Report do not consider cable routes to shore in detail and these matters will be addressed at a project-level, via project-level assessment and licence/consent conditions (as appropriate).

Ornithology responses

- 5.3.4 JNCC stated that it strongly supports the plan-level mitigation proposed for DPOs NE2-NE6 and E3, although it considered that this would effectively “delay consent in these DPOs until the scientific evidence from research and post consent monitoring suggests further capacity... may be feasible.” JNCC sought further clarity on how this process would be undertaken by the Advisory Group (as named). JNCC also stated that there were discrepancies in the terminology around plan-level mitigation measures for these DPOs between the various documents presented for consultation.
- 5.3.5 JNCC stated that it considers DPOs E1 and E2 should be subject to the same mitigation measure as DPOs E3 and NE2-NE6 but did acknowledge that the evidence required in order to facilitate opening up these DPOs, or parts of these DPOs, to developers may be less onerous than the other DPOs. JNCC stated that it considers a first step would be to establish the presence, and numbers of, birds within and across these DPOs and potential connectivity to

¹² Available here: https://consult.gov.scot/marine-scotland/draft-sectoral-marine-plan-for-offshore-wind/consultation/view_respondent?show_all_questions=0&sort=submitted&order=ascending&q_text=Bird&uuld=587437195 (Last accessed: 04/09/20)

relevant SPAs. This might highlight whether ongoing restriction was necessary across whole of, or only parts of, these DPOs. Such evidence could be available within a few years, as opposed to the likely longer timeframes that would be required to collect strategic evidence of impacts that would be required to re-evaluate the other DPOs within the temporal moratorium. JNCC stated that it would be keen to work with Marine Scotland and other relevant parties to help define the regional- level survey work required in this region.

5.3.6 JNCC queried why the following pSPAs (for which it has responsibility) had not been screened into the assessment, which it considers meet the outlined criteria:

Table 6 JNCC comments - pSPA not screened in

DPO	pSPA
N1	Seas off Kilda pSPA Seas off Foula pSPA (Fulmar (breeding))
N3	Seas off Kilda pSPA Seas off Foula pSPA (Fulmar (breeding))
N4	Seas off Kilda pSPA Seas off Foula pSPA (Fulmar (breeding))
E1	Seas off Kilda pSPA Outer Firth of Forth and St Andrews Bay Complex pSPA Seas off Foula pSPA (Fulmar (breeding))
E2	Seas off Kilda pSPA Outer Firth of Forth and St Andrews Bay Complex pSPA Seas off Foula pSPA (Fulmar (breeding))

5.3.7 JNCC, however, noted that that the inclusion of these pSPAs would not alter the conclusions of the Plan regarding AEOSI, given the conservation objectives of the pSPAs impacted.

5.3.8 JNCC further queried the statement provided at section 6.3.4 regarding the potential impacts of loss of habitat (also raised by RSPB Scotland) and how the avoidance of key feeding sites would be ensured. JNCC stated, given the conservation objectives of the marine pSPAs, it is important to ensure that development (inside or outside of the pSPAs) does not affect prey availability within the pSPAs such that AEOSI occurs. JNCC therefore, suggest that sites should not damage key sources of prey which then might become available

within pSPAs (e.g. breeding or nursing grounds for key forage species that are known to be linked to prey availability within pSPAs).

- 5.3.9 JNCC provided suggested amendments to the text for additional clarity. JNCC further queried to what extent previous research has considered marine birds and underwater noise (sections 6.7.7 to 6.7.11 of the HRA Report) and how this understanding relates to the type of noise disturbance generating by windfarm construction, operation and decommissioning.
- 5.3.10 JNCC advised that Table 9 of the HRA Report should indicate a degree of variability of sensitivity to pressures between species (e.g. physical damage to species or exclusion/displacement from non-physical disturbance may be higher for certain species than others).
- 5.3.11 JNCC further highlighted that concerns regarding in-combination assessment relate to “*existing and therefore any further*” offshore wind development (i.e. not just existing development). JNCC further stated that it considers section 11.6.4 of the HRA Report is an inaccurate portrayal of JNCC advice and that DPOs E1 and E2 should be subject to the same ‘temporal mitigation’ measure as DPOs E3 and NE2-NE6. JNCC consider that surveys are required to establish numbers and distributions of key species within E1 and E2 and connectivity with SPAs, in order to determine if/or which parts of the DPOs warrant ongoing moratorium with E3 and NE2-NE6.
- 5.3.12 JNCC consider that additional knowledge gaps exist in relation to accurate and robust estimates of flight height and speeds for key species affected by collision (e.g. from a combination of tracking or LiDAR or other appropriate methods). JNCC further highlighted that it may be helpful to document evidence needs at a project-level for proposals within certain DPOs (e.g. impacts on certain migratory species), particularly where these needs have not been apparent from previous/existing developments.

Marine mammals responses

- 5.3.13 JNCC stated that it considers that the North and North East regions are already subject to consider offshore activity and further development in these regions could result in prolonged disturbance from the construction of consecutive projects. JNCC stated that the potential impacts of such prolonged disturbance on marine mammal populations are unknown. JNCC highlighted the need for strategic-level research into the impacts of multiple projects to marine mammal populations.

- 5.3.14 JNCC provided comments only for the SACs for which it has responsibility, e.g. harbour porpoise. JNCC stated that it defers to comments from SNH on the inshore sites (see above).
- 5.3.15 JNCC stated that it has no concerns regarding impact pathways resulting from potential development, given the distance between the DPOs and the harbour porpoise SACs and lack of overlap between the area of disturbance and SACs. JNCC advised that there would be no LSE on the harbour porpoise SACs as a result of development within the DPOs.
- 5.3.16 JNCC provided advice regarding DPO SW1 and the North Channel SAC, which is located adjacent to the DPO, however, this DPO has not been progressed as a final Plan Option and this advice has not been considered within this AA.
- 5.3.17 JNCC provided comments regarding potential impacts from the clearance of unexploded ordnance associated with development. JNCC agree that this impacts should be assessed and mitigated at a project-level but stated that, currently, potential injury from large devices cannot be mitigated to negligible levels, without the use of noise abatement measures or deflagration. If those alternatives/mitigation measures are not feasible, devices should be cleared in conjunction with a European Protected Species (“EPS”) licence for injury. JNCC provided detailed comments on how these issues should be considered and assessed at a project-level.

5.4 Royal Society for the Protection of Birds (Scotland) (“RSPB Scotland”)

- 5.4.1 In its response,¹³ RSPB Scotland highlighted that it considers project-level assessment will be essential for all DPOs. RSPB Scotland welcomed the fact that several proposed DPOs are located further from shore, in deeper waters, which is it considers “is likely to reduce the impacts to seabirds, particularly during the breeding season.”
- 5.4.2 RSPB Scotland provided general comments on the planning process, as well as specific comments on the DPOs and Sustainability Appraisal reports. RSPB Scotland stated that it considers that, in addition to a strong plan-led approach, further investment and effort is required in relation to environmental monitoring and research to support decision-making processes and protect the marine environment. RSPB Scotland reiterated that it considers the cumulative impacts from approved offshore wind projects in UK waters

¹³ Available here: https://consult.gov.scot/marine-scotland/draft-sectoral-marine-plan-for-offshore-wind/consultation/view_respondent?show_all_questions=0&sort=submitted&order=ascending&q_t=xt=Bird&uuld=152126641 (Last accessed: 04/09/20)

already pose a risk to the long-term conservation status of several seabird populations.

5.4.3 RSPB Scotland reiterated that its previously submitted comment that nearshore areas are used more intensely by a range of seabird species, especially during the breeding season, thus indicating that these areas are of greater ecological sensitivity (particularly during this season). RSPB Scotland highlighted that some DPOs overlap with these higher-utilised areas, presenting a clear additional risk to some seabird populations (e.g. those DPOs located in the Moray Firth). RSPB highlighted that the cumulative impacts of the DPOs, with the existing Scottish and rest of UK offshore wind farm projects (including those consented, operational and in planning), often located closer to shore and/or in shallow sites, will be a major and necessary consideration in future assessment(s).

5.4.4 RSPB Scotland provided comments on DPOs and NE5 and SW1 which have not been included in the final Plan and, therefore, these comments have not been included in this AA. Detailed comments on each of the DPOs were provided, as summarised below:

Table 7 RSPB Scotland - Consultation Responses - Individual DPOs

DPO	RSPB Scotland comments
W1	<p>The site is a migratory flyway – significant numbers of geese, ducks and waders and other key species (e.g. corncrake) transit this area, with some being nocturnal migrants.</p> <p>Area is subject to breeding and passage seabird movements, passage events can be high in numbers and birds are weather driven, so it is difficult to predict/model a storm-blown seabird interaction. In-combination barrier effects are likely to occur.</p> <p>The area overlaps with areas known to be utilised by species sensitive to offshore wind development, including kittiwake, razorbill and guillemot.</p>
North	<p>Development across multiple DPOs in this region will require careful consideration of cumulative impacts on bird species, particularly focussing on migratory species and flyways, with increased turbine heights, as well as the consideration of collision risk, displacement and barrier effects to seabird populations.</p> <p>Migration pathways for migratory bird species transiting from the UK towards the Faroe Islands and Iceland intersect DPOs in this region and development within multiple DPOs could result in cumulative barrier</p>

DPO	RSPB Scotland comments
	effects, increased collision risk and increased energetic requirements for these birds.
N1	<p>This area overlaps with areas known to be utilised by species sensitive to offshore wind development including kittiwake, guillemot and razorbill. Potential connectivity to several SPAs as outlined in the SEA. Scandinavian-Russia migratory species (passerines, geese, waders etc) pass through these areas and potential impacts are difficult to predict but will require specific consideration in any project level assessments. Consideration of turbine height, as outlined in the SEA, will be necessary.</p>
N2	<p>This DPO is in a major migratory flyway - significant numbers of ducks, geese and waders transit this area with some being nocturnal migrants. Areas subject to breeding and passage seabird movements, passage events can be in high numbers and birds are weather driven so difficult to predict/model a storm blown seabird interaction. N2 considered to be poorly located in the context of these migratory flyways. In combination barrier effects are also likely to be a key concern requiring specific assessment. N2 and N3 are close to the North Rona and Sula Sgeir Seabird SPA. Most of the qualifying seabird features are in unfavourable declining condition with the exception of gannet and storm petrel.</p> <p>This DPO also overlaps with areas known to be utilised by species sensitive to offshore wind development including kittiwake, guillemot and razorbill.</p>
N3	Comments as per N2 above. Further research and specific mitigation will be necessary, as set out in the SEA
N4	<p>There is a possibility that there could be impacts on red-throated diver breeding on the Lewis Peatlands SPA and commuting between feeding grounds in or around N4 and breeding grounds on the peatlands. N4 is also quite close to the Flannan Isle seabird SPA.</p> <p>This DPO is located close to migratory pathways especially for species breeding in Iceland and wintering in the UK, including wildfowl and whooper swans. N4 is also an area used heavily by foraging and migrating gannets.</p>
North East	We agree that within the North East region, development across multiple DPOs could result in significant cumulative collision risk and displacement impacts on key seabird species. We also consider there

DPO	RSPB Scotland comments
	<p>may be potential impacts to birds on migratory pathways. These concerns are detailed in full in the HRA Report and DPOs NE2, NE3, NE4, NE5 and NE6 are therefore classed as being 'DPOs subject to higher levels of ornithological constraint' and require that sufficient scientific evidence, which reduces the level of risk to an acceptable level, is made available. We also agree that this should therefore delay the progression of licence and consent applications within these DPOs, until such time that further evidence, research and knowledge around mitigation is available to support decision-making in this region.</p> <p>It is proposed, therefore, that development will only be able to progress at DPOs NE2-6 where sufficient scientific evidence can be provided to enable a further assessment of the environmental risks. RSPB Scotland understand this further assessment will be in the form of a renewed Habitats Regulations Appraisal (HRA) of the plan and for these sites to proceed then the Appropriate Assessment is required to reach a conclusion of no adverse effects on site integrity to the Natura 2000 network. Need bird monitoring.</p>
NE1	<p>The Plan acknowledges that inshore waters east of Shetland are of high importance and used by high numbers of seabirds. The SEA states that bird usage of NE1 is generally low but does also acknowledge there are hotspots of high bird activity overlapping with SE extent of NE1.</p> <p>In view of the above, we recommend an adjustment is made to the extent of DPO NE1 to remove the section with high seabird records, thereby reducing potential for impacts on these species.</p> <p>There is mention of migratory bird species in transit through NE1 but no detail is given. Scandinavian-Russia migratory species (passerines, geese, waders etc) pass through these areas. This activity and the risks posed to these species is a specific issue requiring further consideration for this DPO.</p>
NE2-NE8	<p>These span a vast area of sea with the easternmost sites located further from shore.</p> <p>Seabird distribution estimates indicate that this region is used during the breeding season, particularly for species transiting north south. Scandinavian-Russia migratory species (passerines, geese, waders etc.) pass through these areas and potential impacts are difficult to predict. NE4 & NE5 are highly sensitive due to potential in-combination impacts with existing Moray Firth offshore wind projects that are either</p>

DPO	RSPB Scotland comments
	being constructed, consented but not yet built and in planning, all impacting the same receptor colonies.
East	<p>These DPOs pose risks to bird species, including collision risk and displacement, as well as potential impacts to birds on migratory pathways. There is a need to take into account existing and planned offshore wind farms, specifically the potential for increased in-combination impacts to seabirds.</p> <p>The HRA report identifies these concerns regarding the scale of the potential in-combination impacts on key seabird species from development at DPOs E1 and E2. We agree therefore that further regional survey effort and discussion will be required (as outlined in section 5.2.2) before development can progress in these DPOs.</p>
E1-E3	<p>DPOs E1, E2 and E3 present a particularly high risk of additional seabird population impacts to the cumulative pressures posed by the consented and planned offshore wind development in the Firth of Forth and Tay (and other east coast demonstration projects).</p> <p>Furthermore, Scandinavian-Russia migratory species (passerines, geese, waders etc.) are likely to pass through these DPO areas. Potential impacts on these species are likely to require further assessment at the project level and should be considered further via the plan level mitigation process. We support the need for further regional-level survey effort and consultation would be required.</p>

5.4.5 Further, RSPB Scotland provided detailed comments on the mitigation measures proposed in relation to DPOs E1 and E2, and E3 and NE2-NE6. RSPB Scotland stated that the DPOs E3 and NE2-NE6 are subject to high levels of ornithological constraint due to the predicted in-combination impacts associated with consented and existing operational offshore wind farm projects. Other DPOs, including but not limited to NE7-8 and E1-2 will present additional risks to the same receptor seabird colonies where cumulative impacts are currently significant. This additional risk may be less pronounced during the breeding season as seabirds are constrained to the vicinity of their colony. However, the non-breeding season impacts may occur at these DPOs as individual birds disperse from their colonies. The whole lifecycle effects must be considered in the cumulative impact assessment. RSPB Scotland consider that the cumulative impacts, for some species, from existing operational and consented offshore wind farms in Scotland and wider UK waters presents risks of UK population level effects. RSPB Scotland consider

that this issue must remain a key consideration as the Plan progresses and stated that it supports the need for further spatial planning with the regions.

- 5.4.6 RSPB Scotland consider that impacts from non-marine (terrestrial) development should have been included within the scope of the HRA assessment, given the potential for onshore development and offshore development to have cumulative impacts on certain species, such as divers. Divers may be impacted at their terrestrial breeding grounds and/or their offshore feeding grounds.
- 5.4.7 RSPB Scotland consider that the caveat included at section 6.3.4 of the HRA Report is unfounded and not consistent with the statements made at section 6.3.1. Section 6.3.4 states, "*However, while all species are considered to be of high sensitivity to this risk [direct loss of seabed habitat during construction and operation], sites would only occupy a small proportion of the foraging ranges and avoid key feeding areas, therefore the residual significance of such effects would likely be at most medium.*" RSPB Scotland consider that there is the potential for habitat loss to cause significant risks, particularly if the extent and distribution of supporting habitats is limited.
- 5.4.8 Further, RSPB Scotland consider that the summary provided at sections 6.6.5 and 6.6.8 of the HRA Report do not acknowledge issues associated with comparability, or lack of outputs from empirical data sets and models. These sections provide a summary of recent research/monitoring examining collision rates. RSPB Scotland further consider that the statements at section 6.6.11 are unsupported. Section 6.6.11 states, "*At this time, the sensitivity of seabirds to collision risk during the operational phase is considered to be medium: however, it is acknowledged that this is a developing area of research with several recent studies indicating a much greater avoidance behaviour... Sensitivities at a population-level are also likely to be inherently lower than for individuals.*"
- 5.4.9 RSPB Scotland stated that the proposed mitigation measures required clarification and that any review of the Plan must include an updated environmental assessment, including updated HRA, to take account of new data, evidence and research outputs. Any amendments to the Plan must be supported by the updated HRA. The Plan will be reviewed at Year 2 after adoption and further assessment will take place at this juncture, if amendments are required. Scottish Ministers may choose to undertake the review process at an earlier juncture, if sufficient evidence is produced to justify this change in timescale.

6. Publication of updated seabird foraging ranges (December 2019)

6.1.1 During the preparation of the HRA Report, stakeholders highlighted that updated foraging ranges for key seabird species were due to be published by The Crown Estate, as part of its enabling actions to support the Round 4 Leasing Programme. The updated foraging ranges were published in December 2019 (Woodward *et al* 2019),¹⁴ after the publication of the HRA Report and were therefore not used in the assessment presented for consultation. The HRA Report highlighted the imminent publication of these foraging ranges and stated that “*consideration of any updates will be incorporated into the iterative plan review cycle*”.¹⁵

6.2 HRA Update Note & Technical Appendix

6.2.1 Following consideration of the consultation responses received, a HRA Update Note has been drafted by ABPmer, outlining the changes made to the DPOs and the implications of the publication of the updated foraging ranges (as outlined above). The HRA Update Note has been included at Appendix Six for further information. The HRA Update Note states that the publication of updated foraging ranges in 2019 provides further scientific evidence regarding the scale of potential impacts arising from development within the DPOs and the need to apply plan-level mitigation measures to address concerns regarding potential impacts on key seabird species and colonies. The HRA Update Note concludes that no further mitigation measures are considered to be necessary and that the conclusions of the plan level HRA remain valid.

6.2.2 The HRA Report was been completed using the historic data (a synthesis of available tracking studies published by Thaxter *et al* in 2012).¹⁶ These data, principally focussed on mean max. foraging ranges, have been referred to across multiple plan and project-level HRAs to support the screening process.

6.2.3 A 100 km buffer was used in the screening process (as agreed with the Steering Groups), which captured all sites within the buffer, irrespective of the foraging ranges of the designated species. Where Thaxter *et al* identified species with mean max. foraging ranges larger than the 100 km buffer, the mean max. foraging ranges were used to screen in additional SPA and Ramsar sites, including;

- Atlantic puffin (105 km);
- Lesser black-backed gull (141 km);

¹⁴ Woodward, I., Thaxter, C.B., Owen, E. & Cook, A.S.C.P. 2019. Desk-based revision of seabird foraging ranges used for HRA screening, Report of work carried out by the British Trust for Ornithology on behalf of NIRAS and The Crown Estate, ISBN 978-1-912642-12-0.

¹⁵ See further, paragraph 2.3.10 (page 47).

¹⁶ Thaxter, C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W. and Burton, N.H.K *Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas* (2012). *Biological Conservation* 156: 53-61.

- Manx Shearwater (330 km);
- Northern Fulmar (400 km); and
- Northern Gannet (229 km).

6.2.4 These foraging ranges were referred within the HRA Report to support the assessment of LSE on seabird species, in addition to species or location specific spatial evidence such as the RSPB seabird utilisation study.¹⁷

6.2.5 The Woodward et al (2019) study has resulted in a number of changes to the foraging ranges of seabirds, including the provision of foraging ranges for species where none had previously been presented. ABPmer carried out a comparison of the mean max. foraging ranges presented by Woodward et al (2019) (see further, Technical Note at Appendix 5) and identified that mean max. foraging ranges for the following species had significantly increased;

Table 8 Comparison of Thaxter et al 2012 and Woodward et al 2019 mean max. foraging ranges (\pm one standard deviation) for seabirds

Species	Thaxter et al (2012) – as used in the HRA Report	Woodward et al (2019)
Black-legged kittiwake	60 \pm 23.3	156.1 \pm 144.5 km
Razorbill	48.5 \pm 35.0 km	88.7 \pm 75.9 km
Great skua	86.4 km	443.3 \pm 487.9 km
Great black backed gull	N/A	73 km

6.2.6 The Technical Note considers the potential implications of these increased foraging ranges for the conclusions presented in the HRA Report, in addition to the spatial data utilised in the HRA Report (e.g. Cleasby et al 2020).

6.2.7 The Technical Note concludes that, whilst the increased foraging ranges presented have the potential to impact on sections of the HRA Report methodology utilised (e.g. increasing the number of DPOs which fall within the buffered SPA foraging ranges), the conclusions of the HRA Report are considered to remain valid. It is anticipated that the increased foraging ranges will be used to inform future project-level assessment.

¹⁷ Cleasby, I., Owen, E., Wilson, L., Wakefield E.D., O’Connell, P., Bolton, M. 2020. Identifying important at-sea areas for seabirds using species distribution models and hotspot mapping. Biological Conservation. Volume 241, January 2020, 108375 and Wakefield, E.D., Owen, E., Baer, J., Carroll, M.J., Daunt, F., Dodd, S.G., Green, J.A., Guilford, T., Mavor, R.A., Miller, P.I., Newell, M.A., Newton, S.F., Robertson, G.S., Shoji, A., Soanes, L.M., Votier, S.C., Wanless, S., Bolton, M. 2017. Breeding density, fine-scale tracking, and large-scale modelling reveal the regional distribution of four seabird species. Ecological Applications, 27(7), 2017, pp. 2074–2091.

Black-legged kittiwake

- 6.2.8 The increased foraging range for black-legged kittiwake would have resulted in four additional DPOs being included in the screening buffer (NE7, NE8, E1 and E2). The Technical Report does not consider that the application of plan-level ornithological mitigation measures (see later discussion re: mitigation measures) is required, however, consideration of additional spatial data provided by Cleasby demonstrates that, whilst there is potential for usage by black-legged kittiwake within these DPOs, this usage is less dense than other DPOs and therefore, application of the same level of mitigation would not be proportionate.

Razorbill

- 6.2.9 For razorbill, the increase in foraging range would lead to greater overlap with DPO areas, however, the increased foraging range still falls within the 100 km buffer utilised. Spatial distribution data demonstrates that for razorbill the areas of greater concern are generally restricted to coastal areas of shallower water.

Great skua

- 6.2.10 The single Scottish pSPA for which great skua is a designated feature, was already screened into the HRA Report due to its proximity to NE1. The increased foraging range will lead to an overlap with all DPOs (with the exception of SW1 and W1). Great skua are generally considered to be at lower risk from offshore wind development and, whilst the extended foraging range covers a greater area with more overlap with DPOs areas, the increase in risk is uncertain and spatial distribution of great skua is uncertain.

Great black-backed gull

- 6.2.11 Woodward et al (2019) provides the first published foraging range, based on tracking studies, for great black-backed gull. The new foraging range presented, however, falls within the 100 km buffer used within the HRA Report. The North East DPOs which overlap with the great black-backed gull foraging range (NE2, NE3, NE4, NE5 and NE6) are already included in the plan-level mitigation measures proposed as a result of impacts on kittiwake, which require the provision of additional information of bird distribution in this region. The Technical Note identifies that for DPOs in the North region located in close proximity to the North Rona and Sula Sgeir SPA (N2 and N3) and Hoy SPA (N1), further consideration and assessment will be required at a project-level.

6.3 SNCB response to updated seabird foraging ranges

- 6.3.1 In its response, dated 25 March 2020, SNH advised that the updated foraging ranges “*should be applied in future revisions to the Plan as well as in all OWF consenting arising from the Plan*”. SNH further advised that the publication of updated foraging ranges further justifies the need for further regional-level survey work of seabirds within DPOs E1 and E2 (as proposed in the draft Plan) to establish if and where kittiwake, gannet and razorbills exist in sufficient numbers to contribute to the cumulative impact on East Coast SPAs.
- 6.3.2 In response to the publication of the updated seabird foraging ranges, and other developments in relation to impact assessment, key stakeholders met on 20 February 2020 to discuss current bird guidance and tools for impact assessment.¹⁸ The outputs from this workshop will be used to produce guidance for developers in connection with development within the Plan Options identified, including the development of guidance relating to the use of updated foraging ranges presented by Woodward et al (2019). The Workshop Report notes that SNH recommends the use of Woodward et al (2019) for impact assessments.

6.4 Further consultation (post March 2020)

- 6.4.1 Following receipt and consideration of the formal consultation responses, further discussions took place with SNH, RSPB and JNCC (on 23, 24 and 29 April 2020 respectively) to discuss options to amend DPOs NE4 and NE5 and the potential implications of any changes to these DPOs for NE6. In particular, whether the removal of either or both of these DPOs would provide sufficient capacity for NE6 to proceed without the application of plan-level mitigation measures.
- 6.4.2 JNCC, SNH and RSPB confirmed that, due to the publication of updated foraging ranges since the publication of the HRA report, NE6 should be subject to plan-level mitigation – regardless of the status of DPOs NE4 and NE5.
- 6.4.3 SNH indicated that it may be beneficial to have targeted aerial breeding season survey data for NE6 and/or kittiwake tracking data from the Troup, Pennan and Lion’s Heads SPA to inform future decision-making processes.

¹⁸ For further information, including copies of workshop presentations and the Workshop Report (May 2020), please visit: <https://www.nature.scot/bird-impact-assessment-guidance-workshop-offshore-wind-report-and-presentations>

6.4.4 Following further consideration of consultation feedback on the draft Plan, Scottish Ministers have taken the decision to remove NE5 from the Plan. The removal of NE5 has not resulted in any amendments to the application of mitigation measures to NE6.

7. Amendments made to Appropriate Assessment following consultation with SNH

7.1.1 Consultation on draft AA was undertaken with SNH prior to adoption on 25 September 2020 (in accordance with the guidance noted above) and responded on 30 September 2020, providing a for statement of support for, and agreement with, the conclusions drawn in the draft AA.

7.1.2 SNH highlighted a number of minor points which require updates to be made to the draft AA, however, it confirmed its agreement with the broad conclusions of the AA are not dependent on these comments being addressed. Officials are currently working to address these comments, prior to the anticipated publication of the final Plan. An excerpt from their formal statement of support is provided below for reference,

“While we offer a few minor comments below, we are pleased to be able to agree with the conclusion of the Assessment (as set out in S1.4 and S15) that there will be no adverse effect on the site integrity of any European sites or European marine sites arising from the Plan, either in isolation or in-combination with other plans or projects, providing that the mitigation set out in S1.4.1 and S16 of this AA is adhered to.

In addition we are pleased to offer our strong support for the proposed establishment of an Ornithological Working Group (OWG), including the remit set out for it in S2.5, for the process proposed for iterative plan review and update, as set out in S2.4-2.7, and for the planned governance structure described in S2.5.

Other than that:

- We agree with the removal from the Plan of DPOs SW1 and NE5 and with your contention that, in spite of removal of DPO NE5, DPO NE6 should still be subject to the plan level mitigation identified for DPOs E3, NE2, NE3 and NE4.*

- We fully support the ‘central principle’, set out in S15.1.4: “there needs to be a clear process for the implementation of the Plan. In particular, the process needs to involve a phased and iterative process to further offshore wind deployment, linked to ongoing monitoring and research effort”.*

SECTION 2: INFORMATION ON NATURA SITES

8. Background information and qualifying interests for the relevant Natura sites

- 8.1.1 The screening process identified a total 468 European/Ramsar sites for which there was LSE (or where the potential for LSE could not be excluded). This comprises of a total of 267 SACs, SCIs and cSACs, 150 SPAs and pSPAs and a further 51 Ramsar sites with qualifying feature interests which were screened in. The relevant qualifying features within these sites included a range of coastal, intertidal and sublittoral habitats. Habitats within SPAs also warrant consideration and are considered in this AA (dealing with impacts to seabird features).
- 8.1.2 During the previous HRAs for the Draft Plan for Offshore Wind Energy in Scottish Waters and the Draft Sectoral Marine Plan for Offshore Wind Energy (ABPmer, 2011a: 2017) it was agreed with the overseeing Project Steering Group that it was not possible to identify and review the individual and specific objectives for each European/Ramsar site, because of the large number of sites screened into the assessment. Therefore, a series of typical and generic objectives were identified which could be applied across all European/Ramsar sites. The same approach has been taken in this instance.
- 8.1.3 This section provides links to the SNH Interactive website, where background information on the sites being considered in this assessment is available. The qualifying interests for the sites are listed below at Table 5 and the conservation objectives at Table 6.
- 8.1.4 The Figures provided at Annex 3 detail the SPA, pSPA, cSAC and SAC screened in to the assessment for each DPO.

Table 9 Name of Natura sites affected and current status

Details of the Natura sites which were screened in to the assessment are provided in Table C1 of the HRA Report.¹⁹

Appendix D of the HRA Report provides details of the Natura sites and qualifying interests screened in per DPO.²⁰

¹⁹ Appendix C: Screening Table, Table C1, Available here: <https://www.gov.scot/publications/draft-sectoral-marine-plan-offshore-wind-energy-habitat-regulations-appraisal/pages/19/> (Last accessed: 15/09/20)

²⁰ Appendix D, Available here: <https://www.gov.scot/publications/draft-sectoral-marine-plan-offshore-wind-energy-habitat-regulations-appraisal/pages/20/> (Last accessed: 24/09/20)

Table 10 European qualifying interests

SAC and cSAC:

- Morphological features encompassing a range of habitats;
- Estuaries (1130) which will encompass sub-feature habitats such as saltmarsh, eelgrass, mussel beds, as well as many other Annex I habitats (cited separately below); and
- Large shallow inlets and bays (1160) which, as with estuaries, encompass a range of other feature and sub-feature habitats.
- Sub-tidal habitats with typically soft-sediment habitat;
Subtidal sandbanks (i.e. sandbanks which are slightly covered by seawater at all time' 1110)
 - Subtidal habitats with typically hard-substratum habitat:
 - Reefs (1170);
 - Submarine structures made by leaking gases (1180); and
 - Submerged or partially submerged sea caves (8330).
 - Intertidal habitats (including saltmarshes):
 - Intertidal mudflats and sandflats (i.e. 'Mudflats and sandflats not covered by seawater at low tide' 1140);
 - Annual vegetation of drift lines (1210);
 - *Salicornia* and other annuals colonising mud and sand (1310);
 - *Spartina* swards (1320);
 - Atlantic salt meadows (1330); and
 - Mediterranean and thermo-Atlantic halophilous scrubs.
 - Supralittoral habitats:
 - Coastal lagoons (1150);
 - Supralittoral dune habitats encompassing the following
 - 2130 Fixed dunes with herbaceous vegetation ('grey dunes');
 - 2150 Atlantic decalcified fixed dunes *Calluno-Ulicetea*;
 - 2170 Dunes with *Salix repens* spp. *argentea* *Salicion arenariae*;
 - 2250 Coastal dunes with *Juniperus* spp;
 - 2120 Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes');
 - Perennial vegetation of stony banks (1220);
 - Vegetated sea cliffs.
 - Harbour seal *Phoca vitulina*;
 - Grey seal *Halichoerus grypus*;
 - Bottlenose dolphin *Tursiops truncatus*;

- Harbour porpoise *Phocoena phocoena*;
- Atlantic salmon *Salmo salar*;
- Sea lamprey *Petromyzon marinus*;
- River lamprey *Lamprata fluviatilis*;
- Allis shad *Alosa alosa*;
- Twaite shad *Alosa fallax*; and
- Freshwater pearl mussel *Margaritifera margaritifera*.

SPA and pSPA:

- | | |
|---------------------------------|-------------------------------------|
| • Arctic skua | <i>Stercorarius parasiticus</i> |
| • Arctic tern | <i>Sterna paradisaea</i> |
| • Atlantic puffin | <i>Fratercula arctica</i> |
| • Barnacle goose | <i>Branta leucopsis</i> |
| • Bar-tailed godwit | <i>Limosa lapponica</i> |
| • Black (common) scoter | <i>Melanitta nigra</i> |
| • Black-legged kittiwake | <i>Rissa tridactyla</i> |
| • Black-tailed godwit | <i>Limosa limosa islandica</i> |
| • Black-throated diver | <i>Gavia arctica</i> |
| • Common eider | <i>Somateria mollissima</i> |
| • Common goldeneye | <i>Bucephala clangula</i> |
| • Common greenshank | <i>Tringa nebularia</i> |
| • Common guillemot | <i>Uria aalge</i> |
| • Common pochard | <i>Aythya ferina</i> |
| • Common redshank | <i>Tringa totanus</i> |
| • Common shelduck | <i>Tadorna tadorna</i> |
| • Common tern | <i>Sterna hirundo</i> |
| • Corn crake | <i>Crex crex</i> |
| • Dunlin | <i>Calidris alpina alpina</i> |
| • Dunlin | <i>Calidris alpina schinzii</i> |
| • Eurasian curlew | <i>Numenius arquata</i> |
| • Eurasian oystercatcher | <i>Haematopus ostralegus</i> |
| • Eurasian teal | <i>Anas crecca</i> |
| • Eurasian wigeon | <i>Anas penelope</i> |
| • European golden plover | <i>Pluvialis apricaria</i> |
| • European shag | <i>Phalacrocorax aristotelis</i> |
| • European storm-petrel | <i>Hydrobates pelagicus</i> |
| • Golden eagle | <i>Aquila chrysaetos</i> |
| • Goosander | <i>Mergus merganser</i> |
| • Great black-backed gull | <i>Larus marinus</i> |
| • Great cormorant | <i>Phalacrocorax carbo</i> |
| • Great crested grebe | <i>Podiceps cristatus</i> |
| • Great northern diver | <i>Gavia immer</i> |
| • Great skua | <i>Catharacta skua</i> |
| • Greater scaup | <i>Aythya marila</i> |
| • Greenland white-fronted goose | <i>Anser albifrons flavirostris</i> |

• Grey plover	<i>Pluvialis squatarola</i>
• Greylag goose	<i>Anser anser</i>
• Hen harrier	<i>Circus cyaneus</i>
• Herring gull	<i>Larus argentatus</i>
• Leach's Storm Petrel	<i>Oceanodroma leucorhoa</i>
• Lesser black-backed gull	<i>Larus fuscus</i>
• Light-bellied brent goose	<i>Branta bernicla hrota</i>
• Little egret	<i>Egretta garzetta</i>
• Little gull	<i>Larus minutus</i>
• Little tern	<i>Sterna albifrons</i>
• Long-tailed duck	<i>Clangula hyemalis</i>
• Mallard	<i>Anas platyrhynchos</i>
• Manx shearwater	<i>Puffinus puffinus</i>
• Mediterranean gull	<i>Larus melanocephalus</i>
• Mew gull	<i>Larus canus</i>
• Northern fulmar	<i>Fulmarus glacialis</i>
• Northern gannet	<i>Morus bassanus</i>
• Northern lapwing	<i>Vanellus vanellus</i>
• Northern pintail	<i>Anas acuta</i>
• Northern shoveler	<i>Anas clypeata</i>
• Pale-bellied Brent Goose	<i>Branta bernicla hrota</i>
• Osprey	<i>Pandion haliaetus</i>
• Pink-footed goose	<i>Anser brachyrhynchus</i>
• Purple sandpiper	<i>Calidris maritima</i>
• Razorbill	<i>Alca torda</i>
• Red knot	<i>Calidris canutus</i>
• Red-breasted merganser	<i>Mergus serrator</i>
• Red-necked phalarope	<i>Phalaropus lobatus</i>
• Red-throated diver	<i>Gavia stellata</i>
• Ringed plover	<i>Charadrius hiaticula</i>
• Roseate tern	<i>Sterna dougallii</i>
• Ruddy turnstone	<i>Arenaria interpres</i>
• Ruff	<i>Philomachus pugnax</i>
• Sanderling	<i>Calidris alba</i>
• Sandwich tern	<i>Sterna sandvicensis</i>
• Seabird assemblage	
• Slavonian grebe	<i>Podiceps auritus</i>
• Tufted duck	<i>Aythya fuligula</i>
• Tundra swan	<i>Cygnus columbianus bewickii</i>
• Velvet scoter	<i>Melanitta fusca</i>
• Whimbrel	<i>Numenius phaeopus</i>
• Whooper swan	<i>Cygnus cygnus</i>

Table 11 Conservation objectives

During the previous HRAs for the Draft Plan for Offshore Wind Energy in Scottish Waters and the Draft Sectoral Marine Plan for Offshore Wind Energy (ABPmer, 2011a: 2017) it was agreed with the overseeing Project Steering Group that it was not possible to identify and review the individual and specific objectives for each European/Ramsar site, because of the large number of sites screened into the assessment. Therefore, a series of typical and generic objectives were identified which could be applied across all European/Ramsar sites. The same approach has been taken in this instance.

The following conservation objections have been used in the assessment:

Coastal and marine habitat features:

To avoid deterioration of the habitats of the qualifying species, or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and
To ensure that for qualifying habitats the following are maintained in the long term;

- Extent of the habitat within the site;
- Distribution of habitat within the site;
- Structure and function of the habitat;
- Processes supporting the habitat;
- Distribution of typical species of the habitat;
- Viability of typical species as components of the habitat; and
- No significant disturbance of the habitat.

Marine mammal qualifying interests:

To avoid deterioration of the habitats of the qualifying species, or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and

To ensure for the qualifying species that the following are maintained in the long term;

- Population of the species as a viable component of the site;
- Distribution of the species within site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species; and

- No significant disturbance of the species.

Fish and freshwater pearl mussel qualifying features:

To avoid deterioration of the habitats of the qualifying species, or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and
To ensure that for qualifying habitats the following are maintained in the long term;

- Population of the species, including range of genetic types for salmon, as a viable component of the site;
- Distribution of the species within site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species;
- No significant disturbance of the species;
- Distribution and viability of the species' host species (e.g. freshwater pearl mussel); and
- Structure, function and supporting processes of habitats supporting the species' host species.

Seabird qualifying features:

To avoid deterioration of the habitats of the qualifying species, or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
To ensure that for qualifying habitats the following are maintained in the long term;

- Population of the species as a viable component of the site;
- Distribution of the species within site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species; and
- No significance disturbance of the species.

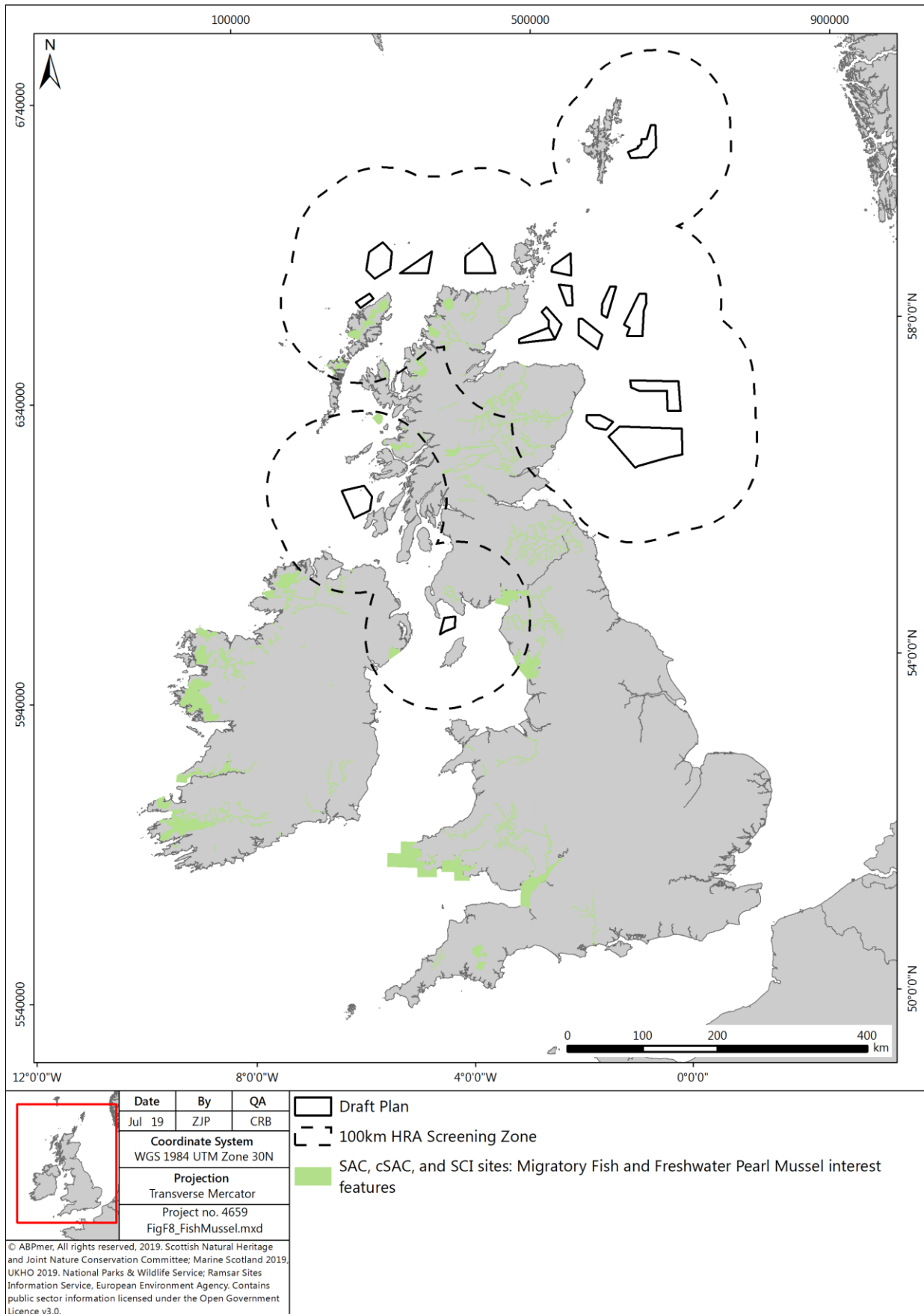


Figure 7 SAC, cSAC and SCI sites; Migratory Fish and Freshwater Pearl Mussel Interest Features (Screening map)

SECTION 3: ASSESSMENT IN RELATION TO REGULATION 48 OF THE CONSERVATION (NATURAL HABITATS, &C.) REGULATIONS 1994 (AS AMENDED) AND REGULATION 63 OF THE CONSERVATION OF HABITATS AND SPECIES REGULATIONS 2017

Requirement for appropriate assessment

- 9. Is the whole of the Plan directly connected with or necessary to the management of a European site for nature conservation purposes?**
 - 9.1.1 The Plan is not directly connected with or necessary to the management of any European site for nature conservation purposes.

- 10. Is the Plan a 'strategic development plan' or 'local development plan' or 'supplementary guidance' or a 'core path plan' or a revision thereof?**
 - 10.1.1 The Plan is not considered a Scottish 'land use plan' under Part IVA of The Conservation (Natural Habitats, & c). Regulations 1994 (as amended) (Regulations 85A-85E).

- 11. Does the Plan provide a framework for deciding applications for project consents and/or does it influence decision makers on the outcome of applications for project consents?**
 - 11.1.1 Yes, the Plan from provides a framework for future applications for seabed leases under the ScotWind leasing process, marine licence applications (under the Marine and Coastal Access Act 2009 and the Marine (Scotland) Act 2010), applications for consent under section 36 of the Electricity Act 1989 and deemed planning under the Town and Country Planning (Scotland) Act 1997.

- 12. Is the Plan likely to have a significant effect on the qualifying interests?**
 - 12.1.1 The Pre-Screening and Scoping reports identified that the Plan is likely to have a significant effect on a range of qualifying interests. A summary of the broad impact pathways is provided below. Table 18 (Appendix Four) provides an overview of the generic impact pathways associated with the Plan, which can be broadly split into the following categories:
 - Physical loss/gain of habitats from removal or smothering;

- Physical damage of habitats and species from siltation, erosion or physical injury/death;
- Non-physical (indirect) disturbance from noise or visual presence and reduced availability or exclusion/displacement of species, including prey;
- Toxic contamination from the introduction of synthetic compounds, introduction of non-synthetic compounds;
- Non-toxic contamination from nutrient enrichment, organic enrichment, changes in suspended sediment and turbidity, changes in salinity or changes to the thermal regime; and
- Biological disturbance from introduction of microbial pathogens, the introduction of invasive non-native species (“INNS”) and translocation, or from selective extraction of selected species.

12.2 HABITAT

12.2.1 Given the size of the area covered by the draft Plan, a large number of European/Ramsar sites were identified where it was not possible to rule out LSE from development under the draft Plan for some, or all, of the qualifying interests. It was concluded that, given the scale of the Plan, it was not necessary to individually review the full list of sites and the qualifying seabed interests they support. The screening phase concluded it was not possible to rule out LSE for a range of Annex I qualifying habitats features, as follows:

- Morphological features encompassing a range of habitats;
 - Estuaries (1130) which will encompass sub-feature habitats such as saltmarsh, eelgrass, mussel beds, as well as many other Annex I habitats (cited separately below); and
 - Large shallow inlets and bays (1160) which, as with estuaries, encompass a range of other feature and sub-feature habitats.
- Sub-tidal habitats with typically soft-sediment habitat; Subtidal sandbanks (i.e. sandbanks which are slightly covered by seawater at all time’ 1110)
- Subtidal habitats with typically hard-substratum habitat:
 - Reefs (1170);
 - Submarine structures made by leaking gases (1180); and
 - Submerged or partially submerged sea caves (8330).
- Intertidal habitats (including saltmarshes):
 - Intertidal mudflats and sandflats (i.e. ‘Mudflats and sandflats not covered by seawater at low tide’ 1140);
 - Annual vegetation of drift lines (1210);
 - *Salicornia* and other annuals colonising mud and sand (1310);
 - *Spartina* swards (1320);

- Atlantic salt meadows (1330); and
- Mediterranean and thermo-Atlantic halophilous scrubs.
- Supralittoral habitats:
 - Coastal lagoons (1150);
 - Supralittoral dune habitats encompassing the following
 - 2130 Fixed dunes with herbaceous vegetation ('grey dunes');
 - 2150 Atlantic decalcified fixed dunes *Calluno-Ulicetea*;
 - 2170 Dunes with *Salix repens* spp. *argentea* Salicion *arenariae*;
 - 2250 Coastal dunes with *Juniperus* spp;
 - 2120 Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes');
 - Perennial vegetation of stony banks (1220); and
 - Vegetated sea cliffs.

12.2.2 In addition to these habitats, there are individual habitats that are identified within Ramsar citations (e.g. "sand and shingle spit") although these individual features are not listed. There are also sub-features of SACs which include a range of habitats and fish species, which have not been cited as qualifying features;

- Rocky shore communities;
- Kelp forest communities;
- Sublittoral faunal turf communities;
- Mussel bed communities;
- Eelgrass communities;
- Intertidal sea cave communities;
- Subtidal sea cave communities;
- Rocky and coarse sediment shores;
- Extensive reedbeds in the inner Firth of Tay;
- A population of nationally rare fish 'smelt' (or sparring) in the Firth of Tay;
- Rocky scar communities; and
- Infralittoral gravel and sand communities.

12.2.3 The impact pathways for these supporting features are considered to be the same as for the qualifying habitat interest features (with particular distinctions being possible between soft sediment, hard substratum, intertidal and supralittoral categories, as identified above). Therefore, the impacts to these specific habitats were not considered separately within the HRA Report.

12.2.4 For the purposes of the HRA Report, these habitat and sub-habitat features were divided into four distinct categories (reefs, subtidal sandflats, intertidal (including saltmarsh) and supralittoral habitats), thus ensuring Annex I

habitats 'estuaries' and 'large shallow inlets and bays' are not considered separately, as these habitats encompass a range of the component features.

12.2.5 The HRA Report identifies that the habitat interest features may be subject to LSE as a result of the following impact pathways:

- Physical loss/gain of habitat (loss of onshore or offshore habitat);
- Physical damage to habitat (damage of onshore or offshore habitat);
- Toxic contamination (contamination and spillages);
- Non-toxic contamination (elevated turbidity); and
- Biological disturbance (introduction of non-native species).

12.3 MARINE MAMMALS

12.3.1 For screening, all relevant SAC and Ramsar sites located within the 100 km buffer of the DPOs were included. A total of 99 SACs with qualifying marine mammal interest features were screened into the assessment given the number of DPOs and the extensive ranges of some marine mammals. Figures F6 and F7 of the HRA Report show the SACs screened in for harbour porpoise and bottlenose dolphin.²¹

12.3.2 The screening phase concluded that there was a possibility of LSE (or that it was not possible to rule out the risk of LSE) for the following four qualifying marine mammal interest features:

- Harbour seal *Phoca vitulina*;
- Grey seal *Halichoerus grypus*;
- Bottlenose dolphin *Tursiops truncatus*; and
- Harbour porpoise *Phocoena phocoena*.

12.3.3 The HRA Report identified the following impact pathways may result in LSE for the marine mammal qualifying interests of the sites;

- Physical loss/gain of habitat (loss of foraging area);
- Physical loss/gain of habitat (fish aggregating effects);
- Physical damage to habitat (reduction in foraging habitat quality);
- Physical damage to species (damage to seal haul-outs);
- Physical damage to species (collision risk);
- Non-physical disturbance (noise/visual disturbance causing barrier and exclusion effects);

²¹ Available here: <https://www.gov.scot/publications/draft-sectoral-marine-plan-offshore-wind-energy-habitat-regulations-appraisal/pages/21/>

- Non-physical disturbance (Electromagnetic fields);
- Toxic contamination (contamination and spillages); and
- Non-toxic contamination (increased turbidity).

12.3.4 In its advice, dated 25 March 2020, JNCC advised that there would be no LSE on SACs designated for harbour porpoise, due to the distance between the DPOs and harbour porpoise SACs and the lack of overlap of the area of disturbance and SACs. SNH concur with this view for SACs located outwith Scottish waters, but that LSE does still exist within the Inner Hebrides and Minches SAC (depending on the route of offshore export cables associated with development).

12.3.5 JNCC provided comments regarding potential impacts from the clearance of unexploded ordnance associated with development. JNCC agree that this impacts should be assessed and mitigated at a project-level but stated that, currently, potential injury from large devices cannot be mitigated to negligible levels, without the use of noise abatement measures or deflagration. If those alternatives/mitigation measures are not feasible, devices should be cleared in conjunction with a European Protected Species (“EPS”) licence for injury. JNCC provided detailed comments on how these issues should be considered and assessed at a project-level.

12.4 ORNITHOLOGY

12.4.1 The screening phase concluded that there was a possibility of LSE (or that it was not possible to rule out the risk of LSE) from the draft Plan for some, or all, of the qualifying bird interest features for 135 SPAs, 15 pSPAs and a further 51 Ramsar sites (with qualifying bird or habitat interest features).

12.4.2 An individual review of the full list of screened in sites has not been undertaken, given the scale of the Plan and uncertainties surrounding future development, but consideration has been given at a regional level of the potential for cumulative impacts on identified seabird species of concern given the recent consultation responses for OWF development in the Moray, Forth and Tay regions (see later, Section 14.3).

12.4.3 The screening phase identified that LSE was possible for seabird qualifying interests set out in Table 10.

12.4.4 SPA and Ramsar sites also contained other interest features for which it could not be concluded that there was no LSE (e.g. eelgrass) and/or the habitats within them are an important component of the functionality of the European/Ramsar sites (e.g. provision of foraging area for bird species) and have, therefore, been assigned conservation objectives.

12.4.5 The HRA Report identified that the following impact pathways may result in LSE for the qualifying interests of these SPA, pSPA and Ramsar sites:

- Physical loss/gain of habitat (foraging and onshore habitat loss);
- Physical loss/gain of habitat (fish aggregation or artificial reef);
- Physical damage to habitat (reduction in habitat quality);
- Physical damage to species (collision risk);
- Non-physical disturbance (noise/visual disturbance causing exclusion effects);
- Toxic contamination (contamination and spillages); and
- Non-toxic contamination (increased turbidity).

12.5 DIADROMOUS FISH AND FRESHWATER PEARL MUSSEL FEATURES

12.5.1 Given the size of the area covered by the draft Plan, a large number of European/Ramsar sites were identified where it was not possible to rule out LSE from development under the draft Plan on qualifying diadromous fish and freshwater pearl mussel interest features. Although some diadromous fish species such as Atlantic salmon migrate much further than 100 km from their natal rivers in the absence of detailed information on migration routes a 100 km buffer was used for screening. Figure 7 provides an overview of the SAC, cSAC and SCI sites screened in using the 100 km buffer.

12.5.2 It was concluded that, given the scale of the Plan, it was not necessary to individually review the full list of sites and the qualifying diadromous fish and freshwater pearl mussel interest features that they support within the HRA Report. European sites support additional fish species as 'typical species of habitat' features, for example, sparring (the European smelt *Osmerus operlanus*). The impact pathways for these supporting features are considered to be the same as the qualifying interest fish features and, therefore, have not been considered separately in the HRA Report or this AA. It is recognised that differences in their life histories may mean they are more or less susceptible to impacts than other species and that this may influence the level of risk of impact and project-level mitigation measures.

12.5.3 The screening phase concluded that there was a possibility of LSE (or that it was not possible to conclude no LSE) for the following fish and freshwater pearl mussel features:

- Atlantic salmon *Salmo salar*;
- Sea lamprey *Petromyzon marinus*;
- River lamprey *Lampreta fluviatilis*;

- Allis shad *Alosa alosa*;
- Twaité shad *Alosa fallax*; and
- Freshwater pearl mussel *Margaritifera margaritifera*.

12.5.4 The HRA Report identified the following key effects on the qualifying interests;

- Physical loss/gain of habitat (loss of onshore and offshore habitat);
- Physical loss/gain of habitat (fish aggregating effects);
- Physical damage to habitat (reduction in foraging habitat quality);
- Physical damage to species (collision risk);
- Non-physical disturbance (noise disturbance causing barrier and exclusion effects);
- Non-physical disturbance (Electromagnetic fields);
- Toxic contamination (contamination and spillages); and
- Non-toxic contamination (increased turbidity).

12.6 LSE Conclusion

12.6.1 Scottish Ministers have undertaken an AA for the qualifying interests and sites listed above.

13. Appropriate assessment of the implications for the site in view of the site's conservation objectives.

13.1.1 The following assessment is based upon the information contained in the HRA Report and the advice received from SNH, JNCC and MSS. Consideration has also been given to other consultation responses detailed above. Consideration of the effect on site integrity for each European site or European offshore marine site and qualifying interest(s) follows below.

13.1.2 For each of the qualifying interests identified, the worst-case scenario ("WCS") has been considered and details of the WCS for each receptor have been provided in the HRA Report. As detailed above, generic conservation objectives have been applied in this assessment.

13.2 Coastal and marine habitat features

13.2.1 The following generic conservation objectives ("GCO") ensure that for qualifying habitats the following are maintained in the long term;

- Extent of the habitat within the site (GCO-CMH1);
- Distribution of habitat within the site (GCO-CMH2);
- Structure and function of the habitat (GCO-CMH3);
- Processes supporting the habitat (GCO-CMH4);
- Distribution of typical species of the habitat (GCO-CMH5);
- Viability of typical species as components of the habitat (GCO-CMH6); and
- No significant disturbance of the habitat (GCO-CMH7).

13.2.2 Intertidal, subtidal and supralittoral interest feature habitats are sensitive to physical loss or gain of habitat, where new structures are introduced to or removed from the seabed or coastal habitats. Development under the Plan may result in the introduction of permanent or temporary structures (either lying on the seabed or protruding from the seabed), causing a direct loss (either temporary or permanent) of habitat. The installation, presence and/or removal of WTG foundations could result in habitat loss or gain, where WTG foundations are located within the area of an interest feature habitat. It should be noted that no Plan Options overlap with these areas, although several POs do abut European/Ramsar sites.

13.2.3 In addition, works associated with the installation or removal of cables (or cable armouring) may also result in direct loss. At present, detail regarding cable routes to shore are not available and any European/Ramsar sites which support coastal or marine habitat features and lie within 100 km of the DPOs

were screened into the assessment (except those located well seaward of the DPOs).

- 13.2.4 The sensitivity of habitats from direct effects and the magnitude of any effects are dependent on a range of factors, including; the habitat type impacted, the extent of the habitat impacted, the location and nature of the activities and the temporal nature of the activities. The potential for AEOSI on the qualifying marine and coastal habitat features from the generic impact pathways (Table 18) is considered below in Table 12.

Habitats - conclusion

- 13.2.5 Direct habitat loss or gain can be mitigated by avoiding habitat interest features within European/Ramsar sites at the project-planning stage (i.e. careful cable routing and landfall, as well as further spatial planning within POs). Standard licence conditions pertaining to toxic contamination and introduction of INNS may mitigate the risk of AEOSI.
- 13.2.6 Scottish Ministers consider that the Plan will not cause an adverse effect on the integrity on the coastal and marine habitat features of any SAC or cSAC, provided the mitigation measures set out in Section 4 of this AA are complied with (i.e. the completion of further project-level assessment which considers the timing, scale, nature and location of future activities).

Table 12 Coastal and marine habitat features - consideration of AEOSI

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (see above for reference)	Conclusion
<ul style="list-style-type: none"> • Morphological features encompassing a range of habitats • Subtidal habitats (with typically soft-sediment habitat) • Subtidal habitats with typically hard-substratum habitat (reefs) • Intertidal habitats (including saltmarshes) • Supralittoral habitats 	<p>Physical loss/gain of habitat</p> <p>Loss of coastal and offshore habitat – under footprint of devices, cables and cable armouring.</p> <p>During the installation, operation and decommissioning phases of any works.</p>	<p>GCO-CMH1 GCO-CMH2 GCO-CMH3 GCO-CMH5 GCO-CMH6 GCO-CMH7</p> <p>No direct overlap between POs and relevant sites, therefore, no direct habitat loss.</p> <p>Cable alignment and landfall may cause LSE (physical loss/gain of qualifying habitat features).</p>	<p>Possibility of AEOSI due to inherent uncertainties at Plan-level.</p> <p>Mitigation measures include further spatial planning at project-level to avoid habitats and minimise exposure/risk (e.g. cable routeing, installation methods such as HDD at landfall).</p> <p>No AEOSI, provided mitigation measures set out in Section 4 of this AA are complied with.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (see above for reference)	Conclusion
<ul style="list-style-type: none"> • Morphological features encompassing a range of habitats • Subtidal habitats (with typically soft-sediment habitat) • Subtidal habitats with typically hard-substratum habitat (reefs) • Intertidal habitats (including saltmarshes) • Supralittoral habitats 	<p>Physical damage to habitat</p> <p>Damage from baseline surveys (e.g. boreholes/trawls), from equipment use causing abrasion, damage or smothering during installation, maintenance and removal of cables and devices (e.g. from jack-up legs, vessel anchors, mooring chains).</p>	<p>GCO-CMH2 GCO-CMH5 GCO-CMH6 GCO-CMH7</p> <p>Survey phases likely to be of shorter duration – with localised changes. Impacts may be lessened due to small volume of material extracted and short duration of activity (when compared to construction).</p> <p>Works during installation, maintenance and decommissioning phases may be more significant, but are likely to still result in short-term, localised impacts. E.g. increased suspended sediments and turbidity.</p>	<p>Possibility of AEOSI due to inherent uncertainties at Plan-level.</p> <p>No AEOSI, provided mitigation measures set out in Section 4 of this AA are complied with.</p> <p>Mitigation measures include further spatial planning at project-level to avoid habitats and minimise exposure/risk (e.g. cable routeing, installation methods such as HDD at landfall).</p> <p>Effects of construction activity and cable routing likely to be localised and temporary. Careful alignment of cable routes to mitigate impacts.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (see above for reference)	Conclusion
		Disposal of construction material may damage habitats (e.g. sediment deposition on habitat features)	
<ul style="list-style-type: none"> • Morphological features encompassing a range of habitats • Subtidal habitats (with typically soft-sediment habitat) • Subtidal habitats with typically hard-substratum habitat (reefs) • Intertidal habitats (including saltmarshes) 	<p>Physical damage to habitat</p> <p>Changes to coastal and offshore habitat as a result of alterations to the wave climate or hydrodynamic regime, from the presence of devices or cable armouring causing physical changes (including changes to sediment transport and/or sediment scour).</p>	<p>GCO-CMH1 GCO-CMH2 GCO-CMH3 GCO-CMH4 GCO-CMH5 GCO-CMH6 GCO-CMH7</p> <p>Extent will be influenced by type and location of devices.</p> <p>Deposition of fine sediment may occur in areas of reduced tidal flow and scouring of benthic communities may result on the seabed around the base of WTG. Cumulative impacts of multiple devices likely to be additive.</p>	<p>Possibility of AEOSI due to inherent uncertainties at Plan-level.</p> <p>No AEOSI, provided mitigation measures set out in Section 4 of this AA are complied with.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (see above for reference)	Conclusion
		<p>Extent of effect defined in the HRA Report as being 1 tidal excursion distance from the DPO.</p> <p>Effects of scour around devices and associated moorings considered to be of generally low significance and highly localised.</p> <p>Resultant changes in coastal processes and, potentially, sediment transport are likely to have the greatest risks of impact in areas of medium to high energy. Consideration of impacts required at a project-level.</p>	
<ul style="list-style-type: none"> Morphological features encompassing 	Toxic contamination (reduction in water quality)	GCO-CMH5 GCO-CMH6 GCO-CMH7	No AEOSI, provided mitigation measures set out at Section 4 of this AA are complied with.

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (see above for reference)	Conclusion
<p>a range of habitats</p> <ul style="list-style-type: none"> • Subtidal habitats (with typically soft-sediment habitat) • Subtidal habitats with typically hard-substratum habitat (reefs) • Intertidal habitats (including saltmarshes) • Supralittoral habitats 	<p>Spillage of fluids and/or construction materials during installation, removal, survey or maintenance of structures</p> <p>Release of contaminants associated with dispersion of suspended sediments during installation or removal of structures (devices and cables).</p>	<p>Potential for accidental spillage during all phases of the works. Likelihood of spillage is comparatively low (due to standard safety measures deployed and licence/consent conditions). No direct overlap between DPOs and European/Ramsar sites – although may be overlap with cable routing and landfall activities.</p> <p>Low likelihood of contaminated sediments within DPOs. The receiving waterbody will provide high levels of dilution.</p> <p>Inshore cable routes and landfalls may be associated with areas of higher contaminants.</p>	<p>Mitigation measures include further spatial planning at project-level to avoid habitats and minimise exposure/risk (e.g. cable routing, environmental management procedures, vessel management plans).</p> <p>Careful alignment of cable routes and landfalls (and selection of installation methods) to mitigate impacts.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (see above for reference)	Conclusion
<ul style="list-style-type: none"> • Morphological features encompassing a range of habitats • Subtidal habitats (with typically soft-sediment habitat) • Subtidal habitats with typically hard-substratum habitat (reefs) • Intertidal habitats (including saltmarshes) 	<p>Non-Toxic contamination</p> <p>Elevated turbidity</p> <p>Increase in turbidity associated with release of suspended sediments during installation or removal of structures</p>	<p>GCO–CMH5 GCO–CMH6 GCO -CMH7</p> <p>Excavation work has the potential to cause redistribution of sediment and potential adverse effects on surrounding habitats. Extent of effect defined in the HRA Report as being 1 tidal excursion distance from the DPO.</p> <p>No direct overlap with DPO and European/Ramsar sites but cable routing/landfall activities may overlap.</p> <p>Tidal excursions of several DPOs overlap with European/Ramsar sites. Disposal of construction material from installations and</p>	<p>Possibility of AEOSI due to inherent uncertainties at Plan-level.</p> <p>No AEOSI, provided mitigation measures set out in Section 4 of this AA are complied with.</p> <p>Effects are likely to be localised and temporary. Spatial planning with DPOs to mitigate potential impacts.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (see above for reference)	Conclusion
		piled devices may have the potential increase turbidity levels.	
<ul style="list-style-type: none"> • Morphological features encompassing a range of habitats • Subtidal habitats (with typically soft-sediment habitat) • Subtidal habitats with typically hard-substratum habitat (reefs) • Intertidal habitats (including saltmarshes) 	<p>Biological disturbance</p> <p>Introduction of non-native species (“INNS”)</p> <p>Introduction of new substructures, providing new substratum, facilitates the colonisation and ingress of INNS.</p> <p>Introduction and ingress of INNS as biofouling species on the surfaces of vessels/construction plant.</p>	<p>GCO–CMH5 GCO–CMH6 GCO -CMH7</p> <p>No direct overlap with DPO and European/Ramsar sites but cable routing/landfall activities may overlap.</p> <p>Placement of structures underwater introduces new, potentially barren, surfaces which have the potential to facilitate spread of INNS.</p> <p>Difficult to quantify risk of INNS. Assumption that current spread of species limited by prevailing physical regime and lack of new colonizing</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p> <p>Standard licence/consent conditions, including the requirement to prepare and adhere to a biosecurity plan to reduce risk of introduction and spread of INNS.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (see above for reference)	Conclusion
		<p>substrate, the options which cause the greatest change in physical processes and provide the greatest amount of colonizing space would be expected to pose the greatest risk.</p> <p>INNS may be introduced by plant/vessels used during the construction, operational and decommissioning phases. Likelihood considered low due to regular maintenance and cleaning regimes (provided these are undertaken).</p>	

13.3 Marine Mammals

- 13.3.1 In its response, dated 25 March 2020, SNH advised that there would be no adverse effect on the integrity of any SAC or cSAC with marine mammal qualifying interests from the Plan alone or in-combination with other projects.
- 13.3.2 The HRA Report considers the potential for AEOSI from Section 7 (page 28) onwards. Potential effects were considered against the following generic conservation measures for the qualifying species;
- Population of the species as a viable component of the site (GCO-MM-1);
 - Distribution of the species within site (GCO-MM-2);
 - Distribution and extent of habitats supporting the species (GCO-MM3);
 - Structure, function and supporting processes of habitats supporting the species (GCO-MM4); and
 - No significant disturbance of the species (GCO-MM5).
- 13.3.3 Marine mammals have extensive ranges and cover large distances to forage in the pelagic environment. Critical habitat areas are those which are essential for day-to-day well-being and survival, as well as maintaining population growth. These critical habitat areas will be the most sensitive parts of a marine mammal's range to any loss (or gain) of habitat.
- 13.3.4 Foraging areas are critical habitat for marine mammals and these may encompass large areas, however, marine mammals may aggregate in hotspots (where prey resources found in high densities). Spawning and nursery sites for prey species will be particularly sensitive to any environmental change and such spawning/nursery grounds may be impacted by activities such as piling/noise/vibration.
- 13.3.5 There is the potential for collision risk to occur with underwater structures, although as underwater structures are essentially static (for floating and fixed technologies), the risk is considered low.²² Further, marine mammals have the potential to become entangled with rope and/or lines. The risk factors for entanglement are associated with the biological characteristics of the marine mammals and the physical features of the mooring lines. Current evidence suggests that entanglement in mooring lines is unlikely to be a significant issue and high visibility mooring lines may mitigate potential risks. As further deployment of floating offshore wind technologies take place, it is expected that understanding of the potential risks and impacts of entanglement and efficacy of mitigation measures will become available.

²² See further, HRA Report (2019), Section 7.7

- 13.3.6 Marine mammals are sensitive to acoustic disturbance in the marine environment and the hearing sensitivity and frequency range of marine mammals varies between species and physiology. The impacts of noise on marine mammals can broadly be split into lethal and physical injury, auditory injury and behavioural response. Chronic stress related disorders can also occur with long-term, repeated exposure to a noise source. Very high exposure levels (e.g. associated with offshore impact piling, underwater explosive operations) it is possible for lethality and physical damage to occur. Permanent threshold shift (“PTS”) can occur as a result of prolonged exposure to noise or very intensive noise, with temporary threshold shift – a temporary reduction in hearing capability – occurring as a result exposure to underwater noise. Levels of PTS and TTS will depend on the species and physiology.
- 13.3.7 The HRA Report considers marine mammals are at low sensitivity to all generic impact pathways during all phases of the works, with the exception of non-physical disturbance during the construction phase, i.e. as a result of pile driving, seismic survey, UXO clearance, vessel movements. The level of risk will be dependent on the level of exposure (i.e. exposure may be higher if development takes place closer to a designated site). As it is not possible to predict the level of exposure a WCS has been assumed in the HRA Report.
- 13.3.8 The HRA Report considered that there was the potential for AEOSI from certain activities, but these could be mitigated via appropriate and meaningful mitigation measures at a project-level. The potential for AEOSI from the generic impact pathways is summarised below in Table 13.

Conclusions – Marine Mammals

- 13.3.9 In the event that concurrent construction noise in a particular geographic region requires further consideration, then there is the potential to implement sequencing of developments within the same broad geographical region. This approach could, however, extend the duration of effects (depending on the nature and type of activity and receptors impacted). It is, therefore, considered appropriate that such risks are most appropriately and effectively managed at a project-level, once the necessary details are available and there is greater certainty regarding the nature and timings of potential impacts. As further deployment of floating offshore wind technologies takes place, it is anticipated that an increased understanding of the potential risks of entanglement with mooring lines will take place and the potential effects of this impact pathway will need to be considered within future project-level HRAs (as appropriate to the proposal).
- 13.3.10 Scottish Ministers concur with the view of SNH, that the Plan will not cause an adverse effect on the integrity on the marine mammal qualifying interests of

any SAC or cSAC, provided the mitigation measures set out in Section 4 of this AA are complied with (i.e. the completion of further project-level assessment which considers the timing, scale, nature and location of future activities).

Table 13 Marine mammals - consideration of AEOSI

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
<ul style="list-style-type: none"> • Common seal • Grey seal • Bottlenose dolphin • Harbour porpoise 	<p>Physical loss/gain of habitat</p> <p>Potential for loss of foraging areas from reduction in coastal and offshore habitat due to installation of devices and cable armouring (both at the development footprint and outside these areas from associated scour and indirectly from changes to the hydrodynamic regime, as well as from chains anchoring devices disturbing seabed habitat during operation).</p>	<p>GCO-MM4 GCO-MM3</p> <p>Marine mammals are highly mobile and have large foraging ranges.</p> <p>Any loss of habitat from development is likely to only constitute a small part of the available foraging range and, therefore, sufficient alternative habitat likely to be available.</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with</p>
<ul style="list-style-type: none"> • Common seal • Grey seal • Bottlenose dolphin • Harbour porpoise 	<p>Physical loss/gain of habitat</p> <p>Presence of structures on seabed for duration of project may result in changes to prey and species behaviour (e.g. acting as fish aggregating device (“FAD”), artificial reef or bird roost).</p>	<p>GCO-MM2 GCO-MM3 GCO-MM4</p> <p>Turbine bases could act as artificial reefs and FADs for prey species (e.g. increase in biomass resulting in positive feeding opportunities).</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>The size of the array will be key consideration – and devices with the highest FAD potential are those with large elements, e.g. large mooring points or floating structures.</p> <p>Devices with large moorings may provide additional shelter and food (habitat) for small demersal fish such as territorial biennies and gobles). Increases in demersal fish have been found around piles of OWF.</p> <p>Empirical data regarding this impact is currently limited.</p>	
<ul style="list-style-type: none"> • Common seal • Grey seal • Bottlenose dolphin 	<p>Damage to habitat</p> <p>Reduction in quality of foraging areas, as a result of damage to coastal and offshore habitat from survey activities</p>	<p>GCO-MM3 GCO-MM4</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
<ul style="list-style-type: none"> Harbour porpoise 	<p>(i.e. borehole and trawls) and equipment use causing abrasion, damage or smothering during installation, maintenance or removal of cables/devices or from scour, sediment transport and hydrodynamic change during operation.</p>	<p>Marine mammals are highly mobile and have large foraging ranges.</p> <p>The extent of habitat reduced in quality is likely to constitute on a small proportion of the available foraging habitat and, therefore, sufficient alternative habitat likely to be available.</p>	<p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with</p>
<ul style="list-style-type: none"> Common seal Grey seal 	<p>Physical damage to habitat</p> <p>Damage to seal haul out locations during installation, decommissioning and operation of cables and cable armouring</p>	<p>Seal haul-out sites are generally located in remote areas and are highly sensitive to damage and disturbance (particularly during the breeding season).</p> <p>Cable routes most likely to make landfall near existing infrastructure. Most seal haul-outs are not located close to this infrastructure, therefore, impacts unlikely.</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p> <p>Spatial planning of cable routes to avoid sensitive areas/mitigate potential impacts.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
<ul style="list-style-type: none"> • Common seal • Grey seal • Bottlenose dolphin • Harbour porpoise 	<p>Damage to species</p> <p>Collision risk and possible mortality – due to presence of devices or vessels transiting to/from the development site (including above and below water) and the influence of lighting.</p> <p>Risk of entanglement following a collision with power cables or mooring elements.</p>	<p>GCO-MM1 GCO-MM2 GCO-MM5</p> <p>Pinnipeds and cetaceans may collide with construction vessel propellers and machinery (leading to physical injury/fatality). Juvenile grey seal pups most vulnerable to collision risks.</p> <p>Ships travelling at >14 knots more likely to cause lethal/serious injuries. Vessels used during the construction phase are likely to be travelling at lower speeds or be stationary, thereby reducing risks.</p> <p>Marine mammals have the potential to become entangled with ropes and/or lines. Risk factors are related to</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p> <p>Deployment of high visibility mooring lines to mitigate risk of entanglement. Systemic inspection of mooring and anchor lines to check for presence of ghost gear and arrangement for removal.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>biological characteristics of marine mammals (body size, flexibility, ability to detect moorings and mode of feeding) and the physical features of the mooring lines.</p> <p>Marine mammals may become entangled if the animal's ability to detect the object is compromised (e.g. particular environmental conditions such as low light or storm conditions) or when distracted while feeding on mobile prey species.</p> <p>Entanglement risk may be mitigated by using high visibility mooring lines.</p> <p>Ghost fishing gear (where abandoned or lost fishing gear becomes entangled in lines and cables), thereby creating</p>	

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>a potential entanglement risk for marine mammals, fish and seabirds. Systemic inspection of mooring and anchor lines to check for the presence of ghost gear and removal of gear may mitigate this risk.</p> <p>Behavioural responses to wind farm development may either be long-range avoidance or close-range evasion, depending upon the distance at which the threat is perceived and the subsequent behavioural response. Collision risk with WTG structures is considered to be low.</p>	
<ul style="list-style-type: none"> • Common seal • Grey seal 	Non-physical disturbance	GCO-MM2 GCO-MM3	Possibility of AEOSI due to inherent uncertainties at a Plan-level.

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
<ul style="list-style-type: none"> • Bottlenose dolphin • Harbour porpoise 	<p>Barrier to movement – presence of sub-surface structures and disturbance (noise or visual) which may block migratory pathways or access to feeding grounds</p>	<p>Potential for barrier effect will be dependent on the extent to which noise and visual cues from the device cause an avoidance response. Dependent on ability of marine mammal to navigate around devices.</p> <p>Significance of obstruction will depend on spatial confines and size of array.</p> <p>Marine mammals are highly manoeuvrable and offshore location of DPOs, sensitivity considered low.</p>	<p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with</p>
<ul style="list-style-type: none"> • Common seal • Grey seal • Bottlenose dolphin • Harbour porpoise 	<p>Non-physical disturbance</p> <p>Visual disturbance and exclusion from areas as a result of surveying, cable and device installation, operation and decommissioning and vessel movements.</p>	<p>GCO-MM2 GCO-MM5</p> <p>Visual disturbance during all phases of works considered to be short-term.</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		Level of impact dependent on distance from seal haul-out sites and key foraging areas.	
<ul style="list-style-type: none"> • Common seal • Grey seal • Bottlenose dolphin • Harbour porpoise 	<p>Non-physical disturbance</p> <p>Noise/vibration disturbance and exclusion from areas as a result of vessels and other activities during survey work (e.g. seismic exploration and geophysical surveys), construction (e.g. piling, drilling, cable laying), operation (e.g. device noise), maintenance or decommissioning works.</p>	<p>GCO-MM2 GCO-MM5</p> <p>Sensitivity during construction phase considered to be high (particularly if piling activity undertaken), but low/medium during other phases.</p> <p>Geophysical surveys involving side scan sonar may cause acoustic disturbance.</p> <p>Effects from vessel noise are not clear, with both attraction and avoidance reactions having been observed.</p> <p>Key sources of noise during construction and installation include;</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p> <p>Standard licence/consent conditions, including the requirement to prepare and adhere to a Piling Strategy, Construction Method Statement, Vessel Management Plan and the requirement to obtain and adhere to European Protected Species licenses (if appropriate) to mitigate potential impacts.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>Shipping and machinery; Dredging; Pile-driving and drilling.</p> <p>Cable burial may require use of trenching, jetting machinery or rock cutting machinery depending on habitat type (or laying of mattresses/rock protection).</p>	
<ul style="list-style-type: none"> • Bottlenose dolphin • Harbour porpoise 	<p>Non-physical disturbance</p> <p>Impacts from EMF on electromagnetically sensitive fish and cetaceans, interfering with prey location and mate detection in some species and creating barriers to migration, during the operational phase.</p>	<p>GCO-MM2 GCO-MM5</p> <p>It is assumed cetaceans may be sensitive to electromagnetic cables, but that anticipated magnetic fields from cables is likely to be very small. Sensitivity considered low.</p> <p>Risk can be mitigated via cable</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p> <p>Standard licence/consent conditions, including the requirement to prepare and adhere to a Cable Laying Strategy (and associated</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		armouring/protection/burial methods.	burial/protection/armouring) to mitigate potential impacts.
<ul style="list-style-type: none"> • Common seal • Grey seal • Harbour porpoise • Bottlenose dolphin 	<p>Toxic contamination (reduction in water quality)</p> <p>Spillage of fluids and/or construction materials during installation, removal, survey or maintenance of structures</p> <p>Release of contaminants associated with dispersion of suspended sediments during installation or removal of structures (devices and cables).</p>	<p>GCO-MM1 GCO-MM2 GCO-MM5</p> <p>Potential for accidental spillage during all phases of the works. Likelihood of spillage is comparatively low (due to standard safety measures deployed and licence/consent conditions). May include anti-fouling paints, accidental leakage of fluids and/or spillage fuels or cargo from vessels.</p> <p>Quantities and toxicities associated with sacrificial anodes and antifouling coatings are considered to be extremely low, therefore</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI, provided mitigation measures set out at Section 4 of this AA are complied with.</p> <p>Mitigation measures include further spatial planning at project-level to avoid habitats and minimise exposure/risk (e.g. cable routeing, environmental management procedures, vessel management plans).</p> <p>Careful alignment of cable routes and landfalls (and selection of installation methods) to mitigate impacts.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>impact considered negligible significance.</p> <p>Low likelihood of contaminated sediments within DPOs. The receiving waterbody will provide high levels of dilution. Impacts likely to be extremely localised, thus minimising impact on water quality.</p>	
<ul style="list-style-type: none"> • Common seal • Grey seal • Harbour porpoise • Bottlenose dolphin 	<p>Non-toxic contamination</p> <p>Elevated turbidity</p> <p>Increase in turbidity associated with release of suspended sediments during installation or removal of structures</p>	<p>Local suspended sediment concentrations may increase as a result of drilling activity, burial of power export cables and disposal of drill cuttings.</p> <p>Increased turbidity could affect foraging, social and predator/prey interactions of marine mammals (although marine mammals around UK regularly recorded foraging in highly turbid environments).</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		All features considered to have low sensitivity to this impact pathway.	

13.4 Diadromous fish and freshwater pearl mussel features

13.4.1 The HRA Report considers the potential for AEOSI at Section 8 (page 183 onwards). Potential effects were considered against the following generic conservation measures for the qualifying species and interests;

- Population of the species, including range of genetic types for salmon, as a viable component of the site (GCO-FF1);
- Distribution of the species within site (GCO-FF2);
- Distribution and extent of habitats supporting the species (GCO-FF3);
- Structure, function and supporting processes of habitats supporting the species (GCO-FF4);
- No significant disturbance of the species (GCO-FF5);
- Distribution and viability of the species' host species (e.g. freshwater pearl mussel) (GCO-FF6); and
- Structure, function and supporting processes of habitats supporting the species' host species (GCO-FF7).

13.4.2 Although direct loss of freshwater habitats may occur as a result of cable installation or landside infrastructure works, potential effects from non-marine development are outwith the scope of the HRA Report and this AA. There is, however, the potential for loss of migratory fish foraging areas or pearl mussel habitat in marine and estuarine environments. It is anticipated that any sensitive habitats should be avoided where possible (e.g. via further spatial-planning at a project-level) and that during the construction period the WCS would involve temporary effects. Damage to the offshore habitats during the operational phase may influence the foraging area for migratory fish species, however, the high mobility and ranges of this group may enable them to utilise other foraging areas (if required).

13.4.3 There are several migratory diadromous fish species found within Scottish waters and which use Scottish rivers for spawning, including Atlantic salmon, sea trout, sea lamprey, river lamprey and shad, plus European eel which spawns at sea. Many migratory species are protected, generally through SAC in riverine environments. Scotland is a stronghold for Atlantic salmon with nearly all rivers which are accessible to upstream migrating salmon other than those with poor water quality containing salmon populations (see further, the Regional Locational Guidance). The largest salmon rivers with the largest populations of salmon are on the east coast. The sea feeding grounds are remote from Scottish marine waters which the outgoing smolts and returning adult fish must pass through

- 13.4.4 There is now some information on the migration paths of the outgoing salmon smolts from acoustic tagging and research trawling studies and the likely migration routes of the returning adult salmon, mainly from traditional tagging studies, particularly close to the coast. Outgoing smolts or returning adults are likely to migrate through all Plan Options but there remain uncertainties about the relative numbers passing through particular Plan Options. These impacts will need to be considered and assessed at a Project-level.
- 13.4.5 Potential impacts on salmon associated with offshore wind development include those which could arise from high impact piling and detonation of unexploded ordnance during construction, possible increased predator abundance at structures, and subtle changes to magnetic fields stemming from cables conducting electricity affecting the migratory behaviour of salmon using geomagnetic cues. The salmon populations associated with each river vary in their productivity and resilience to any impacts, with some populations, but not others, able to accommodate some losses.
- 13.4.6 A summary of the consideration of the potential of AEOSI from the generic impact pathways on the fish and freshwater mussel features is provided at Table 14 below.

Fish and freshwater pearl mussel features – conclusion

- 13.4.7 There is the potential for AEOSI on fish and freshwater pearl mussel qualifying interests of SACs and cSACs as a result of development under this Plan. Non-physical disturbance presents the highest risk of effects (of all assessed impact pathways) for these qualifying interests. Mitigation measures relating to spatial planning within POs, array layout, restrictions on piling activities (including timing, duration and frequency) and cable routing will need further consideration at a project-level (as appropriate). Further, it is anticipated that further evidence regarding migratory routes will become available and can be used to inform future plan and project-level assessments.
- 13.4.8 Scottish Ministers consider that the Plan will not cause an adverse effect on the integrity of the fish and freshwater pearl mussel features of any SAC or cSAC, provided the mitigation measures set out in Section 4 of this AA are complied with (e.g. the completion of further project-level assessment which considers the timing, scale, location and nature of future activities).

Table 14 Fish and freshwater pearl mussel features - consideration of AEOSI

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
<ul style="list-style-type: none"> • Atlantic salmon • Sea lamprey • River lamprey • Allis shad • Twaite shad • Freshwater pearl mussel (indirectly) 	<p>Physical loss/gain of habitat</p> <p>Potential for loss of foraging areas from reduction in coastal and offshore habitat due to installation of devices and cable armouring (both at the development footprint and outside these areas from associated scour and indirectly from changes to the hydrodynamic regime, as well as from chains anchoring devices disturbing seabed habitat during operation.</p>	<p>GCO-FF3 GCO-FF7</p> <p>Atlantic salmon and shad are highly mobile, migratory species – undergo large shifts in distribution during the marine phase of their lifecycle, with a pelagic lifestyle at sea (little association with the seabed). Atlantic salmon and shad considered to be transient within DPOs – therefore, potential damage to seabed in deployment locations will be of negligible significance.</p> <p>Sea lamprey are highly mobile migratory species which are widely distributed at sea - therefore, potential damage to seabed in deployment</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>locations will be of negligible significance.</p> <p>River lamprey adults live primarily in estuaries, before migrating upstream to spawn in freshwater. Therefore, no direct overlap of POs and river lamprey habitat/foraging areas.</p>	
<ul style="list-style-type: none"> • Atlantic salmon • Sea lamprey • River lamprey • Allis shad • Twaite shad • Freshwater pearl mussel (indirectly) 	<p>Physical loss/habitat gain</p> <p>Direct change to habitat around the development footprint</p> <p>Presence of structures on the seabed for the duration of the project, resulting in changes to local predator abundance and behaviour (e.g. acting as FAD, artificial reef or bird roost).</p>	<p>GCO-FF1 GCO-FF2 GCO-FF3 GCO-FF4 GCO-FF5 GCO-FF6 GCO-FF7</p> <p>Empirical evidence has shown greater presence of fish around WTG foundations.</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>Wilhelmsson et al²³ investigated the potential for WTG to function as artificial reefs and FADs. Fish abundance was found to be greater in the vicinity of the WTG, whilst species richness and Shannon-Wiener diversity (<i>H</i>) were similar. On the monopiles of foundations, fish community structure was different and total fish abundance was greater, while species richness and diversity (<i>H</i>) were lower on the surrounding seabed. Blue mussels and barnacles covered most of the submerged parts of the WTG. On the seabed, more blue mussels and less red algae were recorded (compared to adjacent areas).</p>	

²³ Wilhelmsson, D., Malm, T., and Ohman, M., 2006. The influence of offshore wind power on demersal fish. ICES Journal of Marine Science 63, 775-784

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>A gill netting survey at the Svante OWF (Sweden) found higher numbers of cod present within 200 metres of an operational WTG, compared to surrounding open waters, and higher numbers when the WTG was non-operational.</p> <p>Diver-held video surveys of the North Hoyle OWF piles found extremely high densities of juvenile whiting, feeding on dense populations of amphipods amongst the fouling biota on the piles.</p>	
<ul style="list-style-type: none"> • Atlantic salmon • Sea lamprey • River lamprey • Allis shad • Twaite shad 	<p>Physical damage to habitat</p> <p>Indirect and temporary damage</p> <p>Reduction in quality of foraging areas, due to damage to coastal and offshore habitat from baseline surveys (e.g.</p>	<p>GCO-FF3 GCO-FF7</p> <p>Atlantic salmon and shad are highly mobile, migratory species – undergo large shifts in distribution during the</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
<ul style="list-style-type: none"> Freshwater pearl mussel (indirectly) 	<p>boreholes and trawls), from equipment use causing abrasion, damage or smothering during installation, from maintenance and removal of cables/devices or from scour, sediment transport and hydrodynamic change and damage from chains anchoring devices during operation.</p>	<p>marine phase of their lifecycle, with a pelagic lifestyle at sea (little association with the seabed). Atlantic salmon and shad considered to be transient within DPOs – therefore, potential damage to seabed in deployment locations will be of negligible significance.</p> <p>Sea lamprey are highly mobile migratory species which are widely distributed at sea - therefore, potential damage to seabed in deployment locations will be of negligible significance.</p> <p>River lamprey adults live primarily in estuaries, before migrating upstream to spawn in freshwater. Therefore, no direct overlap of POs and river</p>	

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		lamprey habitat/foraging areas.	
<ul style="list-style-type: none"> • Atlantic salmon • Sea lamprey • River lamprey • Allis shad • Twaite shad • Freshwater pearl mussel (indirectly) 	<p>Physical damage</p> <p>Direct damage to species from collision risk</p> <p>Collision risk and possible mortality due to presence of devices or from vessels transiting to/from site (including above and below water collision risk and the influence of lighting), risk of entanglement following a collision with power cables or mooring elements.</p>	<p>GCO-FF1 GCO-FF2 GCO-FF5 GCO-FF6 GCO-FF7</p> <p>Behavioural responses in fish to perceived threats may be demonstrated: Long range avoidance (i.e. avoiding the area within the vicinity of the device) or close-range evasion (dependent on distance at which device perceived and subsequent behavioural response). Fish which are actively migrating on a fixed heading may be less likely to be displaced.</p> <p>Long range response is considered distances beyond</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>which visual response can be undertaken (e.g. noise and vibration cues). Close range evasion would occur where primary stimulus is visual reaction to physical characteristics of the device.</p> <p>The essentially static base of the WTG (regardless of technology type) means that collision risk is unlikely. Fish have been recorded colliding with anthropogenic structures, but generally in areas of poor visibility.</p>	
<ul style="list-style-type: none"> • Atlantic salmon • Sea lamprey • River lamprey • Allis shad • Twaite shad 	<p>Non-physical disturbance</p> <p>Barrier to movement from presence of sub-surface structures and disturbance (noise or visual) which may block migratory pathways or access to</p>	<p>GCO-FF1 GCO-FF2 GCO-FF5 GCO-FF6 GCO-FF7</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
<ul style="list-style-type: none"> Freshwater pearl mussel (indirectly) 	feeding grounds depending on array design	<p>It is considered WTG arrays will pose minimal barrier effects to the highly mobile migratory fish species.</p> <p>Significance of obstructions dependent on spatial confines and size of devices/arrays (e.g. whether it spans the entire mouth of an estuary) and the functional use of the area by the fish species.</p>	
<ul style="list-style-type: none"> Atlantic salmon Sea lamprey River lamprey Allis shad Twaite shad Freshwater pearl mussel (indirectly) 	<p>Non-physical disturbance</p> <p>Noise/vibration disturbance from vessels and other activities during survey work (e.g. seismic exploration and geophysical surveys), construction (e.g. piling, drilling, cable laying), operation (e.g. device noise), maintenance or decommissioning.</p>	<p>GCO-FF1 GCO-FF2 GCO-FF5 GCO-FF6 GCO-FF7</p> <p>Noise from installation activities could arise from vessel traffic, possible requirements for bed levelling, driving and drilling of piles,</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p> <p>Project-level mitigation measures may include the requirement to prepare and</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>installation of power export cables (i.e. ploughing sediment, rock cutting hard seabed areas, bolting to the seabed and/or directional drilling).</p> <p>Understanding of source noise impacts and frequencies is increasing.</p> <p>Impacts from pile driving and the use of explosives are of most concern to these qualifying interests. Some exposures can result in changes/damage to sensory structures or hearing capabilities, with the potential for mortality.</p> <p>Behaviour changes may result in animals avoiding migratory routes or leaving feeding or reproduction grounds, with</p>	<p>adhere to a Piling Strategy and consideration of timing of activities and migratory patterns.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>potential population-level consequences. Biologically important sounds can be masked where received levels are marginally above existing background levels.²⁴ The ability to detect and localise the source of sound is of considerable biological importance to these qualifying interests.</p> <p>Disturbance effects on migratory fish from noise are most likely during the construction phase of works. The potential for activities such as impact piling means it is concluded that migratory fish are highly sensitive to construction noise.</p>	

²⁴ Hawkins, A.D. & Myrberg Jr, A. A., 1983. Hearing and sound communication under water. In: Bioacoustics: A comparative approach (Ed. By B. Lewis), pp. 347-405: Academic Press.

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
<ul style="list-style-type: none"> • Atlantic salmon • Sea lamprey • River lamprey • Allis shad • Twaite shad • Freshwater pearl mussel (indirectly) 	<p>Non-physical disturbance</p> <p>Impacts from EMF and thermal emissions on benthic invertebrates and electromagnetically sensitive fish and cetaceans interfering with prey location and mate detection in some species and creating barriers to migration.</p>	<p>GCO-FF1 GCO-FF2 GCO-FF5 GCO-FF6 GCO-FF7</p> <p>The generated magnetic fields from OWF and associated cables are likely to be perceived by Atlantic salmon and other migratory species as a new localised addition to the heterogeneous pattern of geomagnetic anomalies already in existence.</p> <p>The expected magnetic field from cables is expected to be very small (when compared to the Earth's own magnetic field). Although, very small differences in the earth's local magnetic field have been shown to be used as cues by geomagnetically navigating</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>Pacific salmon, the modified fields only exist relatively close to OWF and associated cables.</p> <p>The conclusion of most project-specific EIA to-date is that, whilst there could be an interaction between these species and subsea cables, the result is unlikely to be of significance at a population-level.²⁵</p>	
<ul style="list-style-type: none"> • Atlantic salmon • Sea lamprey • River lamprey • Allis shad • Twaite shad 	<p>Toxic contamination</p> <p>Spillage of fluids and/or construction materials during installation or removal of structures (devices and cables) or during survey/maintenance works.</p>	<p>GCO-FF1 GCO-FF2 GCO-FF5 GCO-FF6 GCO-FF7</p> <p>There is the potential for accidental discharge/spillages</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p>

²⁵ DECC, 2009. UK Offshore Energy Strategic Assessment. Future leasing for Offshore Wind Farms and Licensing for Offshore Oil & Gas and Gas Storage. Environmental Report.

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
<ul style="list-style-type: none"> Freshwater pearl mussel (indirectly) 		<p>during all phases of works. Adoption of standard safety measures would reduce the likelihood of this occurrence.</p> <p>Quantities and toxicities associated with sacrificial anodes and antifouling coatings are generally expected to be small, therefore, potential effects will likely be of negligible significance.</p> <p>Should toxic contamination occur, it is not possible to make an estimation of the geographic extent of any impact, due to the large number of potential variables (e.g. metocean conditions, quantities leaked).</p> <p>Accidental leakage of hydraulic fluids may be more</p>	<p>Project-level mitigation measures may include the need to prepare and adhere to the terms of a Vessel Management Plan and Environmental Management Plan to minimise and mitigate any risks associated with toxic contamination.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>significant, however, the probability of large quantities of oil or hydraulic fluids entering the environment is low.</p>	
<ul style="list-style-type: none"> • Atlantic salmon • Sea lamprey • River lamprey • Allis shad • Twaite shad • Freshwater pearl mussel (indirectly) 	<p>Toxic contamination</p> <p>Release of contaminants associated with dispersion of suspended sediments during the installation or removal of structures (devices and cables).</p>	<p>GCO-FF1 GCO-FF2 GCO-FF5 GCO-FF6 GCO-FF7</p> <p>Sediments within DPOs are generally expected to be low in contaminant concentrations, given the high-energy environments in which the WTG will be located.</p> <p>Large volumes of water and highly dispersive and diluting nature of the surrounding environment will reduce potential effects on water quality, should contaminants be re-suspended.</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI, provided mitigation measures set out at Section 4 of this AA are complied with.</p> <p>Careful alignment of cable routes and landfalls (and selection of installation methods) to mitigate impacts.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>There is the potential for contaminated sediments to be re-suspended during cable routing and landfall works, depending on the contaminant levels of the sediment. Impacts are likely to be highly localised, thus minimising impact on water quality.</p>	
<ul style="list-style-type: none"> • Atlantic salmon • Sea lamprey • River lamprey • Allis shad • Twaite shad • Freshwater pearl mussel (indirectly) 	<p>Non-toxic contamination</p> <p>Increase in turbidity associated with the release of suspended sediments during the installation or removal of structures (devices and cables).</p>	<p>GCO-FF1 GCO-FF2 GCO-FF5 GCO-FF6 GCO-FF7</p> <p>Migratory fish regularly transit through estuaries with high levels of suspended sediment and are relatively tolerant of turbid conditions (unless associated with reduced oxygen levels or the presence</p>	<p>No AEOSI, provided mitigation measures set out at Section 4 of this AA are complied with.</p> <p>Careful alignment of cable routes and landfalls (and selection of installation methods) to mitigate impacts.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>of toxic materials). The characteristically high-energy offshore environments in which the POs are located will assist in the dispersion of any localised increases in turbidity, thus minimising any impacts on water quality.</p>	

13.5 Seabird SPAs and pSPAs

- 13.5.1 The HRA Report considers the potential for AEOSI for seabird qualifying interests of SPAs and pSPAs at Section 8 (page 183 onwards) Potential effects on the qualifying bird species listed in Table 10 were considered in light of the following generic conservation objectives;
- 13.5.2 To avoid deterioration of the habitats of the qualifying species, or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
To ensure that for qualifying habitats the following are maintained in the long term;
- Population of the species as a viable component of the site (GCO-ON1);
 - Distribution of the species within site (GCO-ON2);
 - Distribution and extent of habitats supporting the species (GCO-ON3);
 - Structure, function and supporting processes of habitats supporting the species (GCO-ON4); and
 - No significance disturbance of the species (GCO-ON5).
- 13.5.3 General characteristics and sensitivities of relevant bird features were presented and reviewed against OWF development activities. Different species will have different sensitivities to effects, according to several factors, including;
- Their foraging strategy, e.g. pursuit divers or surface feeders;
 - Daily activity patterns across seasons, e.g. nocturnal, crepuscular or diurnal activity; and
 - Their life-history and breeding ecology, e.g. diving species such as auk species may incur increased energetic costs (individual fitness) and/or subsequent effects to breeding success via barrier or displacement effects.
- 13.5.4 For example, diving species may be at increased risk from the effects of increased turbidity, due to predator-prey interactions. Species with higher energy cost burdens of flight and foraging (such as auks) may find it harder to increase their foraging ranges in response to barrier effects resulting during the operational phase.

Collision risk and displacement are considered to be the key impact pathways for seabird qualifying interests, particularly as a result of in-combination effects with other consented/operational OWF in the Moray, Forth and Tay regions. All species scoped into the assessment are considered to be at collision risk

during all phases of the works, although this will differ according to the nature of the environment and species foraging modes. The HRA Report concluded that large gulls, such as a great black-backed gull, herring gull, lesser black-backed gull, northern gannet and black-legged kittiwake are most sensitive to the risk of collision mortality, as these species tend to spend a comparatively higher proportion of their flying time at an altitude that overlaps with blade height.²⁶ The HRA Report presents a detailed consideration of the models used to assess and predict collision risk. The current predicted levels of in-combination collision risk arising from consented/operational development in the North East and East regions has resulted in the application of Plan-level mitigation measures, as discussed later in this AA.

- 13.5.5 Displacement and barrier effects may result in AEOSI for the seabird qualifying interests of designated sites during all phases of the works. Exclusion from habitats prevents access to prey sources (although such exclusion could reduce other effects, such as collision risk). Reductions in the availability of habitat and access to prey could lead to changes in seabird foraging behaviour, including increased individual stress levels and alterations to individual time budgets (owing to increased foraging distances), with consequent population-level impacts (i.e. decreases in breeding success and individual fitness).²⁷ The level of impact will be dependent on the project specifics (i.e. location, timing of activity, scale of development), the availability of areas of alternative habitat, the number of disturbance occurrences and the status of the conditions that are prevalent.
- 13.5.6 SNH advised that, at this stage, at the Plan-level, it would be unable to advise that there would be no AEOSI arising from development within DPOs E1 and E2, alongside existing consented OWF development in this region. SNH advised that considers it, “*necessary for regional studies of seabird density and SPA connectivity to be undertaken within these DPOs to establish whether these species are present in sufficient numbers for some or all of the sea area within E1 and E2 to be subject to the same temporary restriction on development as applied at E3 and NE2-NE6 or whether and where they are sufficiently low as to enable leasing and consenting to proceed with no further Plan mitigation measures required.*”
- 13.5.7 Further, SNH advised that it strongly supported the need for temporary restriction on OWF development within DPOs E3 and NE2-NE6, until such time “*that enough evidence on the environmental capacity for seabirds exists to reduce the risk to an acceptable level.*” SNH advised that, due to concerns regarding the predicted in-combination impacts of existing and consented

²⁶ See further discussion, HRA Report (2019), Section 6.6

²⁷ See further discussion, HRA Report (2019), Section 6.7.12

OWF on specific east coast SPAs and seabird species, no development should be permitted until and unless research and post-consent monitoring of existing OWFs in eastern Scotland demonstrate that “*capacity for further development, with respect to SPA impacts, exists.*” SNH strongly advised that the research and monitoring requirements outlined be completed, to improve understanding regarding the impacts of OWF development, and that derogations should be pursued only in circumstances where such research and monitoring effort has been undertaken and is unable to demonstrate further capacity of OWF development.

13.5.8 Potential applicants will be able to submit licence and consent applications for the POs covered by Plan-level mitigation before the removal of the mitigation at a Plan-level (via the iterative plan review process). Such applications, however, will be subject to further project-level assessment and consideration. A consent/licence will not be granted unless it can be concluded that the project will not have an AEOSI, or Scottish Ministers opt to pursue a derogation under the Habitats Regulations. Given the current predicted in-combination levels of collision and displacement impacts and level of uncertainty regarding the presence and distribution of key seabird species within certain DPOs, it is unlikely that Scottish Ministers would be able to conclude that development within these DPOs would not result in an AEOSI. Should applicants wish to pursue this consenting route, they are encouraged to undertake early and sustained engagement with Scottish Ministers and the SNCBs.

13.5.9 Developers who are successful in obtaining Option Agreements for POs E1 and E2 are expected to discuss the parameters of the necessary survey and assessment work with the Ornithology Working Group (to be established upon the adoption of the Plan, see Table 2 for further detail) prior to undertaking any such work. The outputs will need to be provided in the manner/format and timescales set out by Marine Scotland, before the submission of any licence or consent application(s). The continued application of these mitigation measures will be considered via the iterative plan review process.

13.5.10 The HRA Report highlights that there may, in some cases, be a lack of evidence regarding nocturnal activities and, therefore, “*future project level HRAs should consider individual species behaviour and current research.*”²⁸ SNH stated that it considered that the information regarding nocturnal behaviour (provided at Table 8 of the HRA Report) was potentially misleading as the categorisation presented was too simplistic. ABPmer have considered this response and consider that, whilst future HRA Reports should include a

²⁸ See further, HRA Report (2019), Section 6, Page 91

more nuanced categorisation of impacts, this would not alter the conclusions regarding the significance of this impact.

Ornithology – conclusions

13.5.11 Scottish Ministers consider that the Plan, in-isolation, will not cause an adverse effect on the integrity of the seabird qualifying features of any SPA or pSPA, provided the mitigation measures set out in Section 4 of this AA are complied with (e.g. the completion of further project-level assessment which considers the timing, scale, location and nature of future activities). Further consideration of potential in-combination impacts follows at section 14.3 below.

Table 15 Seabird qualifying interests - consideration of AEOSI

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
<ul style="list-style-type: none"> All seabird species 	<p>Physical loss/gain of habitat</p> <p>Potential for loss of foraging areas from reduction in coastal and offshore habitat due to installation of devices and cable armouring (both at the development footprint and outside these areas from associated scour and indirectly from changes to the hydrodynamic regime, as well as from chains anchoring devices disturbing seabed habitat during operation.</p>	<p>GCO-ON3 GCO-ON4</p> <p>All seabird species are considered sensitive to this effect during the operational phase of works.</p> <p>Effects dependent on quality and location of habitat impacted, e.g. loss of sandy sediments within DPOs may have greatest impacts due to importance for sandeels (prey species). Loss of intertidal habitat due to cable installation works could potentially affect foraging areas for over-wintering birds.</p> <p>Dependent on the array size, if the area lost represents a small proportion of the available habitat, there may</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>be sufficient alternative habitat available thereby resulting in no AEOSI.</p>	
<ul style="list-style-type: none"> All seabird species 	<p>Physical loss/gain of habitat</p> <p>Presence of structures on seabed for duration of project may result in changes to prey and species behaviour (e.g. acting as FAD), artificial reef or bird roost).</p>	<p>GCO-ON3 GCO-ON4</p> <p>Underwater structures may provide new foraging opportunities for diving species.</p> <p>Construction of OWF and structures above water (with a stable platform) may serve as an additional resting and/or breeding habitat for gulls and terns.</p> <p>Extent of this habitat creation effect and potential implications for increased collision risk (negative effect) are unknown at present. It is</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		considered sensitivity is likely to be low.	
<ul style="list-style-type: none"> All seabird species 	<p>Damage to habitat</p> <p>Reduction in quality of foraging areas, as a result of damage to coastal and offshore habitat from survey activities (i.e. borehole and trawls) and equipment use causing abrasion, damage or smothering during installation, maintenance or removal of cables/devices or from scour, sediment transport and hydrodynamic change during operation.</p>	<p>GCO-ON3 GCO-ON4</p> <p>HRA Report considered all species of low to medium sensitivity to this impact. Higher sensitivities occurring during the construction and decommissioning phases of works.</p> <p>Effect dependent on quality and location of impacted habitat and its function.</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with</p>
<ul style="list-style-type: none"> All seabird species 	<p>Damage to species</p> <p>Collision risk and possible mortality – due to presence of devices or vessels transiting to/from the development site (including above and below water) and the influence of lighting.</p>	<p>All conservation objectives relevant.</p> <p>Deployment of WTG leading to creation of ‘barrier effect’ – deviation of flight routes to avoid structures.</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>Evidence of birds exhibiting avoidance behaviour by increasing flight height has been obtained via post consent monitoring at Robin Rigg and Barrow OWF.</p> <p>Seabirds flying and foraging at night are considered to have medium sensitivity to collision risk. Diurnally foraging species considered to be of low sensitivity to risk of collision mortality.</p>	
<ul style="list-style-type: none"> All seabird species 	<p>Non-physical disturbance</p> <p>Barrier to movement – presence of sub-surface structures and disturbance (noise or visual) which may block migratory pathways or access to feeding grounds (depending on array design).</p>	<p>GCO-ON2 GCO-ON3 GCO-ON4</p> <p>Empirical evidence regarding sensitivity of species to barrier effects and their ability to alter flight heights is limited.</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		<p>Avoidance behaviour may lead to increased energy expenditure – potentially leading to disruption of linkages between distant feeding, breeding, moulting and roosting areas which otherwise would be unaffected.</p>	<p>Anticipated further evidence and research regarding seabird behaviour at sea and energetics will come forward.</p>
<ul style="list-style-type: none"> All seabird species 	<p>Non-physical disturbance</p> <p>Visual disturbance and exclusion from areas as a result of surveying, cable and device installation, operation and decommissioning and vessel movements.</p>	<p>GCO-ON2 GCO-ON5</p> <p>Potential to occur during survey, cable lay and device installation works. May occur during operation and decommissioning.</p> <p>Greatest disturbance likely to be caused by human presence, which may lead to displacement of seabirds.</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
<ul style="list-style-type: none"> All seabird species 	<p>Non-physical disturbance</p> <p>Noise/vibration disturbance and exclusion from areas as a result of vessels and other activities during survey work (e.g. seismic exploration and geophysical surveys), construction (e.g. piling, drilling, cable laying), operation (e.g. device noise), maintenance or decommissioning works.</p>	<p>GCO-ON1 GCO-ON2 GCO-ON4 GCO-ON5</p> <p>Potential effects during cable and device installation, operation and decommissioning. Lesser effects anticipated during pre-construction survey phase.</p> <p>Sensitivity of airborne birds to construction noise is considered to be low/medium (given their ability to habituate to continual noises such as piling).</p> <p>Sensitivity of species to underwater noise is unknown, but likely to be greater for diving species and sea surface foragers. Potential for displacement impacts as a</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
		result of noise/vibration disturbance.	
<ul style="list-style-type: none"> All seabird species 	<p>Non-physical disturbance</p> <p>Presence of structures resulting in an exclusion/displacement of a species from the area.</p>	<p>GCO-ON2 GCO-ON3 GCO-ON4</p> <p>Exclusion or displacement from foraging areas may result in increased energy burdens for seabird species. HRA Report considers that surface feeding species will have a low sensitivity to this effect, compared to medium sensitivity for diving birds.</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p>
<ul style="list-style-type: none"> All seabird species 	<p>Toxic contamination (reduction in water quality)</p> <p>Spillage of fluids and/or construction materials during installation, removal, survey or maintenance of structures</p>	<p>GCO-ON2 GCO-ON4 GCO-ON5</p> <p>Potential for accidental spillage during all phases of the works. Likelihood of spillage is comparatively low</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI, provided mitigation measures set out at Section 4 of this AA are complied with.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
	<p>Release of contaminants associated with dispersion of suspended sediments during installation or removal of structures (devices and cables).</p>	<p>(due to standard safety measures deployed and licence/consent conditions). May include anti-fouling paints, accidental leakage of fluids and/or spillage fuels or cargo from vessels.</p> <p>Quantities and toxicities associated with sacrificial anodes and antifouling coatings are considered to be extremely low, therefore impact considered negligible significance.</p> <p>Low likelihood of contaminated sediments within DPOs. The receiving waterbody will provide high levels of dilution. Impacts likely to be extremely localised, thus minimising impact on water quality.</p>	<p>Mitigation measures include further spatial planning at project-level to avoid habitats and minimise exposure/risk (e.g. cable routeing, environmental management procedures, vessel management plans).</p> <p>Careful alignment of cable routes and landfalls (and selection of installation methods) to mitigate impacts.</p>

Qualifying and supporting feature	Impact pathway	Sensitivity and relevant generic conservation objectives (listed above)	Conclusion
<ul style="list-style-type: none"> All seabird species 	<p>Non-toxic contamination</p> <p>Elevated turbidity</p> <p>Increase in turbidity associated with release of suspended sediments during installation or removal of structures</p>	<p>GCO-ON2 GCO-ON4 GCO-ON5</p> <p>Local suspended sediment concentrations may increase as a result of drilling activity, burial of power export cables and disposal of drill cuttings.</p> <p>Impact may occur during construction or decommissioning phases.</p> <p>Increased turbidity could affect foraging and predator-prey interactions.</p>	<p>Possibility of AEOSI due to inherent uncertainties at a Plan-level.</p> <p>No AEOSI provided mitigation measures set out in Section 4 of this AA are complied with.</p>

14. In-combination effects

- 14.1.1 In-combination effects arising from the draft Plan have been considered in the HRA Report. Consideration of in-combination effects included development between DPOs and / or other plans or projects with connectivity to the same qualifying interests of European/Ramsar sites.
- 14.1.2 The HRA Report assumed that OWF development would occur in all 17 DPOs (as a WCS) and thereby considered potential effects arising from development within any or all DPOs, in tandem with potential effects arising from other plans or projects. The HRA Report used the maximum realistic development scenarios (as set out above in this AA), as it is not possible to predict the degree of development which will occur (if any) within each DPO. The HRA Report assumed that development could potentially occur in any part of the DPO (although it is recognised that development will not take place across the entirety of any DPO).
- 14.1.3 The other plans and projects considered in the in-combination assessment are outlined in Annex 1 (Table 17) and Annex 2. Assessments completed for other currently consented or operational windfarms identified the following key impact pathways;
- Direct and indirect damage to habitats;
 - Physical damage and mortality to species, especially birds, due to collision risk;
 - Non-physical disturbance to species due to displacement effects, noise and vibration effects and effects from EMF; and
 - Non-toxic contamination due to elevated turbidity.
- 14.1.4 The key concerns raised in relation to other plans and projects primarily relate to direct and indirect damage to habitat (within and adjacent to the OWF) and potential impacts to mobile species due to collision risk, displacement and disturbance (noise, visual and vibration). These impacts may occur during the survey, construction, operation and/or maintenance phases and may, therefore, overlap in terms of timing.
- 14.1.5 The direct and indirect effects to benthic habitats and species in the vicinity of individual projects are well-understood. These impacts are relatively localised and can be addressed/offset through mitigation measures, if required, if they result in an adverse effect on a European site or European marine site. Although DPOs do not directly overlap these sites, there is the potential for direct impacts to occur due to cable routing and landfall locations.

- 14.1.6 Further spatial-planning within DPOs at a project-level (in order to avoid or minimise impacts) and array design will be a key measure to mitigating potential impacts to qualifying interests and features.
- 14.1.7 The greatest risk of in-combination effects (between DPOs and with other existing/consented OWF) are for mobile features. There is the potential for AOESI to occur for these receptors, particularly seabird qualifying interests, due to a variety of impact pathways and activities, during different phases of development. In particular, there is the potential for an AEOSI to occur for seabird colonies on the East and North East coasts due to in-combination displacement and collision risk impacts for a number of seabird species (as discussed above).
- 14.1.8 In-combination impacts with non-OWF projects (e.g. harbour redevelopment works) may also occur, for example as a result of prolonged periods of underwater noise associated with piling activity. Non-marine activities for developments may have the potential to impact river SACs, resulting in potential in-combination effects on Atlantic salmon, freshwater pearl mussel and otter interest features. Within the offshore environment, potential in-combination effects may occur where there are a number of developments over a range of sectors (e.g. fishing, oil and gas), resulting in impacts on habitats and foraging species. In addition, there is the potential for in-combination effects as a result of seismic survey activity (associated with oil and gas activity), which are generally of a greater magnitude than survey activity associated with OWF development.

14.2 Marine mammals

- 14.2.1 Key risks to marine mammals are considered to occur during the construction phase and, therefore, there is greater opportunity for project-level mitigation measures to minimise, reduce or avoid impacts (e.g. the requirement to prepare and adhere to Piling Strategies).
- 14.2.2 The HRA Report considered the SNCB responses to project-level HRAs for Inch Cape, Moray West, Seagreen, Neart na Gaoithe and Dounreay Tri. SNCB consultation responses have consistently indicated that, “*compliance with consent conditions would be sufficient to result in no adverse effect on marine mammals as qualifying interests of designated sites, either alone or in-combination with other developments.*”²⁹
- 14.2.3 There is scope, however, for additive cumulative effect resulting from temporal overlap between construction works (e.g. underwater noise from piling

²⁹ HRA Report (2019), Section 10.7.14 (Page 263)

activities) within the same region, as highlighted by JNCC in its consultation response (see Section 5). These in-combination effects could be mitigated via measures such as temporal sequencing of development to avoid additive effects, although such an approach could result in an extension to the duration of effects. Therefore, Scottish Ministers consider that these risks are most appropriately managed at a project-level, when further detail regarding the location, scale, duration and nature of activities can be provided and assessed. Furthermore, there is the potential for additive in-combination effects to occur as a result of oil and gas survey activity (e.g. seismic survey). The level of future activity cannot be predicted at this time and therefore, Scottish Ministers consider that these risks can only be appropriately and effectively managed at a project-level.

14.2.4 In its consultation response, SNH highlighted that it considers that development under the Plan could be facilitated by the conduct of regional strategic marine mammal surveys to inform consenting (rather than reliance on site-specific survey effort linked to specific projects which may be unable to characterise and quantify marine mammal usage of the proposed development area). These survey outputs could be used to inform modelling of population-level impacts and further Plan and project-level assessment. Since completion of the HRA Report, a report has been published which collates and presents the most up-to-date information on the abundance and distribution of marine mammal species in the Scottish Northern North Sea Region and Scottish Atlantic waters, with a specific focus on the DPOs.³⁰ The report identifies data and evidence gaps and provides recommendations on how such gaps can be addressed. The information and recommendations presented in this report will be useful in informing further research and assessment, at both strategic and project-levels. Further recent research reports of relevance to future plan and project-level assessment have examined the use of dynamic energy budget models (and their potential for integration into the iPCoD framework)³¹ and parameterisation and sensitivity analysis for disturbance assessments.³²

14.2.5 Scottish Ministers therefore concluded that this Plan will not result in adverse effects on the marine mammal qualifying interests of designated sites, either

³⁰ E L Hague, R R Sinclair and C E Sparling. 2020. Regional baselines for marine mammal knowledge across the North Sea and Atlantic areas of Scottish waters. *Scottish Marine and Freshwater Science* Vol 11 No 12

³¹ Harwood, J., Booth, C., Sinclair, R. and Hague, E. 2020. Developing marine mammal Dynamic Energy Budget models and their potential for integration into the iPCoD framework. *Scottish Marine and Freshwater Science* Vol 11 No 11, 74pp. DOI: 10.7489/12328-1

³² R R Sinclair, C E Sparling and J Harwood. 2020. Review Of Demographic Parameters And Sensitivity Analysis To Inform Inputs And Outputs Of Population Consequences Of Disturbance Assessments For Marine Mammals. *Scottish Marine and Freshwater Science* Vol 11 No 14, 74pp. DOI: 10.7489/12331-1

alone or in-combination with other plans or projects, provided the mitigation measures set out in Section 4 are adhered to.

14.3 Ornithology

- 14.3.1 Key risks to ornithology interests are considered to occur during the operational phase (i.e. collision risk and displacement) and, therefore, there is less opportunity for project-level mitigation measures to minimise, reduce or avoid impacts (when compared to receptors most impacted during the construction phases, for example).
- 14.3.2 SNH advised that, in relation to DPOs E3 and NE2-NE6, due to concerns regarding the current *“predicted in-combination impacts of existing and consented OWF on specific east coast SPAs and seabird species, no development should be permitted until and unless research and post consent monitoring of existing OWFs in eastern Scotland demonstrate that capacity for further development, with respect to SPA impacts, exists.”* Further, SNH advised that they are unable to conclude, at the Plan level, *“no in-combination AEOSI arising from developments in these DPOs (E1 and E2) alongside those of existing consented OWF development in this region.”* JNCC and RSPB Scotland provided similar statements in their responses to the consultation on the draft Plan.
- 14.3.3 The HRA Report (section 10, page 259 onwards) provides an overview of the SNCB responses to recent OWF applications for large scale commercial OWF proposals in the Forth, Tay and Moray Firths. Consents have been granted for these proposals (and revised proposals) (Inch Cape, Neart na Gaoithe, Seagreen, Moray West) in the past 3 years. The assessments presented in the HRA Reports for Inch Cape, Neart na Goaithe and Seagreen utilised a WCS approach, looking at the existing consents granted in 2014 for the other OWF when considering in-combination impacts with the new (2017) proposals. The AAs prepared for these consents acknowledge the highly precautionary nature of these assessments when considering the potential for AEOSI. The concerns raised by the SNCBs are summarised briefly below (see Table 23, Page 260 of the HRA Report for further detail);

Table 16 SNCB responses to recent applications - Forth, Tay and Moray

Region	Proposal	SNH consultation response
Moray	Moray West – Up to 85 WTG	Objection – in-combination impacts with Moray East and Beatrice will have AEOSI for: North Caithness Cliffs SPA – Kittiwake (collision risk); and

		East Caithness Cliffs SPA – Great black-backed gull (collision risk)
Forth	Seagreen Alpha and Bravo (Phase 1 (Revised)) – 120 WTG	Objection – in-combination impacts with Neart na Gaoithe and Inch Cap, likely AEOSI for: Forth Islands SPA – Black-legged kittiwake and northern gannet (collision risk); and Fowlsheugh SPA – Black-legged kittiwake (collision risk)
Tay	Inch Cape (Revised) – 72 WTG	Objection – in-combination impacts with Seagreen and Neart na Gaoithe will have AEOSI for: Forth Islands SPA – Black-legged kittiwake and northern gannet (collision risk) and razorbill (displacement); and Fowlsheugh SPA – Black-legged kittiwake (collision risk) and razorbill (displacement)
Tay	Neart na Gaoithe (Revised) – 54 WTG	Objection – in-combination impacts with Seagreen and Inch Cape will have AEOSI for: Forth Islands SPA – Black-legged kittiwake and northern gannet (collision risk) and razorbill (displacement); Fowlsheugh SPA – Black-legged kittiwake (collision risk) and razorbill (displacement); and St Abbs Head to Fast Castle SPA – Black-legged kittiwake (collision)

14.3.4 Based on the responses provided by the SNCBs to the HRA Report and the OWF applications outlined above, Scottish Minister consider that it is reasonable to conclude that further development in the Forth, Tay and Moray Firth regions will result in an AEOSI on kittiwakes as a qualifying feature of designated sites as a result of development within POs E3, NE2-NE4 and NE6. The HRA Report concluded that development within NE6 would result in an AEOSI on kittiwake as a qualifying feature of the Troup, Pennan and Lion's Heads SPA (as a result of existing development in the Moray Firth region) if development were to also occur in NE4 and NE5. Scottish Ministers have not chosen to include NE5 as a final PO and consideration has been given to whether this amends the conclusion of AEOSI for NE6 and the requirement for mitigation measures within NE6. Scottish Ministers have considered the implications of the updated foraging ranges (published after the completion of the HRA Report) and consider that the evidence presented justifies the

continued application of the plan-level ornithological mitigation measure, in spite of the removal of NE6 (See earlier discussion, section 6).

- 14.3.5 Consideration has been given to potential in-combination effects as a result of development within PO E1 and E2, as a result of existing and consented OWF and other POs. These sites are generally beyond the mean max foraging ranges for Kittiwake and Razorbill, and therefore a LSE has not been identified. However, if the more precautionary measure of mean max foraging range in addition to one standard deviation is considered this would include more significant areas of the two sites. Based on this, although the extent to which developments in sites E1 and E2 would increase currently assessed cumulative impacts for east coast SPAs is unclear, the sites may overlap with the foraging distribution for some seabird species from east coast SPAs, especially the western parts of E1 and E2 that are more inshore. Therefore, whilst not classed in the same risk category as POs E3, NE2-NE4 and NE6, there will be a requirement for the collection and assessment of regional-level ornithology survey data (e.g. from digital aerial surveys) in this region. This would improve confidence in assessing the likely level of effects from collision, displacement, and barrier effects from any developments. The potential for LSE on east coast SPAs could be further understood by tracking studies of seabirds from these SPAs. Such information would improve confidence in assessing what proportion of any effects at the two sites should be apportioned to these SPAs and hence support project level HRA.
- 14.3.6 It is anticipated that further empirical data and research regarding seabird behaviour at sea, connectivity with colonies, foraging activity etc. will become available as further OWF development takes place and research is completed. These outputs may allow the current estimations of impact to be revised downwards, thereby facilitating further development in these regions, or may result in these estimations being revised upwards – indicating that no further carrying capacity exists. These conclusions regarding potential in-combination impacts have led to POs E3, NE2-NE4 and NE6 being classed as 'being subject to high levels of ornithological constraint' (Plan-level mitigation measure).
- 14.3.7 There is the potential for in-combination effects relating to collision risk for migratory birds, seabirds and non-seabirds, including the impact of multiple developments along the migratory passage route for Whooper Swan. A key migration flyway for Whooper Swan encompasses the Cumbrian coast, Solway Firth and North Channel and extends along the west coast of Scotland, with 50% of Whooper Swan estimated to fly at collision risk height. In-combination effects of PO W1 with proposed and operational OWF (Robin Rigg, Ormonde, Walney, Barrow and Burbo Bank) may increase collision risk and lead to an AEOSI for sites with the relevant qualifying interest. Further,

development progressed as a result of The Crown Estate's Round 4 Leasing may result in further in-combination effects. As such, SNH has highlighted the need to consider updating the guidance for the assessment of collision risk for migratory bird species and this work will be progressed to inform future project-level assessment and the iterative plan review process.

- 14.3.8 Scottish Ministers therefore conclude that this Plan will not result in adverse effects on the ornithology qualifying interests of designated sites, either alone or in-combination with other plans or projects, provided the mitigation measures set out in Section 4 are adhered to.

14.4 Fish and freshwater pearl mussel qualifying interests

- 14.4.1 The HRA Report considered the SNCB responses to project-level HRAs for Inch Cape, Moray West, Seagreen, Neart na Gaoithe and Dounreay Tri. SNCB consultation responses have consistently indicated that, "compliance with consent conditions would be sufficient to result in no adverse effect on diadromous (migratory) fish and freshwater pearl mussel as qualifying interests of designated sites, either alone or in-combination with other developments."³³
- 14.4.2 There is scope, however, for additive cumulative effect resulting from temporal overlap between construction works (e.g. non-physical disturbance – piling noise and vibration) within the same region. These in-combination effects could be mitigated via measures such as temporal sequencing of development to avoid additive effects, although such an approach could result in an extension to the duration of effects. Therefore, Scottish Ministers consider that these risks are most appropriately managed at a project-level, when further detail regarding the location, scale, duration and nature of activities can be provided and assessed.
- 14.4.3 Scottish Ministers therefore concluded that this Plan will not result in adverse effects on the fish and freshwater pearl mussel qualifying interests of designated sites, either alone or in-combination with other plans or projects, provided the mitigation measures set out in Section 4 are adhered to.

15. Overall Conclusion

- 15.1.1 The assessment presented in the HRA Report concluded that it is not possible to be certain of No Adverse Effect on Site Integrity, due to uncertainties that exist about the Plan and other plans and projects. These uncertainties relate to several aspects, including;

³³ HRA Report (2019), Section 10.7.18 (Page 264)

- The detail of the Sectoral Offshore Wind Plan implementation process;
- Future generation capacities;
- The location, scale and densities of development;
- The proposed technologies to be used, and future advances in these technologies;
- The scale of the effects arising via some of the defined impact pathways; and
- The efficacy of some project-level mitigation measures.

15.1.2 The level of certainty required under the Habitats Regulations to conclude that there will be no AEOSI cannot be achieved, as it cannot be guaranteed there will be no analysis gaps or a lack of evidence between the different assessment processes and methods leading to in-combination effects (even though each assessment considers these effects).

15.1.3 Based on lessons learnt and approaches followed in past plan-level HRAs, key mitigation measures are proposed in the Plan to provide the necessary assurances that the adopted Plan as whole will have no AEOSI on European/Ramsar sites, either alone or in-combination with other plans or projects. These mitigation measures include;

- The requirement for further project-level HRA and assessment;
- The application of iterative plan-review (to ensure the Plan remains reflective of current and emerging scientific knowledge and understanding);
- Development within individual POs being constrained to the assessed 'maximum realistic development scenarios' (which provide sufficient flexibility for further spatial planning at a project-level);
- The requirement for the completion of regional-level survey and assessment effort prior to development within POs E1 and E2, due to
 - Uncertainty regarding the potential scale of cumulative impacts in this region on seabird species (resulting from collision, displacement and barrier effects); and
 - A lack of information regarding seabird densities and behaviours in the offshore region during the non-breeding season; and
- POs E3, NE2-NE4 and NE6 being classed as 'subject to high levels of ornithological constraint', whereby development cannot proceed until "such time that enough evidence on the environmental capacity for seabird exists to reduce the risk to an acceptable level". Development can only progress in these POs if sufficient scientific evidence can be provided to demonstrate this, unless it can be determined that there are imperative reasons of overriding

public interest that require development to proceed and Scottish Ministers opt to pursue a derogation under the Habitats Regulations.

- 15.1.4 The central principle of these measures is that there needs to be a clear process for the implementation of the Plan. In particular, the process needs to involve a phased process and iterative process to further offshore wind deployment, linked to ongoing monitoring and research effort.
- 15.1.5 Each individual project will need to undergo project-level HRA (where possibility of LSE cannot be excluded on the basis of the currently available information), in accordance with the Habitats Regulations. These project-level assessments will reflect the precise location, scale, nature and design of the proposals, which cannot be predicted at this stage. This Plan-level AA, however, provides direction to these future project-level AAs and HRA, by identifying measures which may be required at a project-level to avoid AEOSI and potential impacts. The outputs of project-level assessments and associated monitoring will be used to inform the iterative plan review process for the Plan, to ensure that the Plan remains reflective of current scientific knowledge and understanding.
- 15.1.6 Applicants who are successful in obtaining Option and Lease Agreements via the ScotWind leasing round will need to re-examine the issues identified in the Plan-level HRA and this AA when progressing their proposals, to ensure that they adhere to the mitigation measures outlined therein. The exact manner of implementation of these measures will be identified in project-level HRA. It is recognised, therefore, that not all measures identified in the Plan-level HRA and this AA will be applicable to every proposed project.
- 15.1.7 Development within certain POs may pose a greater risk of impacts to designated sites and features, when compared to other POs, due to their proximity to designated sites (i.e. located adjacent to or within tidal excursion distance). Development located within these POs may, therefore, require the implementation of additional/more mitigation measures when compared to other POs - at possibly greater cost and time commitments for assessment, consenting and monitoring. Inherently, it is recognised that development located close to or within designated sites is more likely to have an AEOSI than development located further away. Mobile features from nearby and remote designated sites, however, may be present in POs and therefore, detailed assessment and consideration of mitigation measures (and their efficacy) will be required if such species are likely to be impacted by the proposed development.
- 15.1.8 Cable routes and landfall points have the potential to cause both indirect and direct effects and further spatial planning at a project-level can mitigate these

risks (i.e. by avoiding sensitive areas or timing of activity to avoid sensitive periods). There is no presumption within this HRA or the Habitats Regulations that designated sites will not or cannot be affected, although the risks of impact and associated requirement for mitigation measures are likely to be greater where designated sites may be impacted. It is, therefore, expected that developers will seek to avoid designated sites in the first instance.

SECTION 4: MITIGATION MEASURES

16. Mitigation measures

16.1.1 Key mitigation measures have been implemented to provide the necessary assurances that the Plan will not have an adverse effect on any European site or European marine site, either alone or in-combination with other plans and projects. These mitigation measures are outlined in the Plan document itself and have been identified via the Habitats Regulations Appraisal. The mitigation measures are set out below.

16.2 Monitoring and review

16.2.1 The iterative plan review (“IPR”) process will involve a phased and iterative approach to plan-implementation which is linked to ongoing project developments and their associated post-consent monitoring work, with the findings from such project-level work feeding back into the next phases of Plan implementation.

16.2.2 This is required so that results from post consent monitoring for consented projects and ongoing research programmes (such as ScotMER) can be fed into subsequent developments, in order for lessons learnt to be shared and evidence gaps filled, thus reducing potential impacts to these sites. Further detail regarding monitoring and review is provided in the Post Adoption Statement (2020).

16.3 Project-level HRA

16.3.1 Individual applications for marine licence and/or s.36 consent for commercial-scale offshore wind development within the POs will be required to under the HRA process prior to the grant of any consent/licence, in accordance with the Habitats Regulations. Project-level HRA must be informed by the current best available scientific knowledge and understanding. In addition, developers should note that the screening process for project-level HRA may identify sites or features which have been screened out of the HRA Report for the Plan.

16.3.2 This project-level HRA will be informed by the information contained in the HRA Report and this AA. Project-level HRA will identify more precisely the nature, scale, duration and location of the proposed development, and thus its potential effects, than is possible at a Plan-level.

16.3.3 Project-level HRA should take into consideration the mitigation measures outlined in the HRA Report, but may identify additional/alternative mitigation

measures, dependent on the nature of the predicted impacts of the individual project. The final decision on the need for, and sufficiency of project-level specific measures, will be undertaken at a project-level and will be a matter for the consenting body to determine.

16.3.4 Information that will need to be provided in project-level HRAs will include (but not be limited to);

- Updates on the location and status of new European/Ramsar designations;
- New information on interest feature sensitivities, distributions, abundance and connectivity (in the context of latest scientific understanding) (baseline conditions);
- Assessment of effects during all phases of the works (survey, construction, operation, maintenance and decommissioning), including in-combination effects with other plans and projects; and
- Proposed mitigation measures.

16.3.5 The outputs of project-level HRA will be used to inform the iterative plan review process.

16.4 Maximum realistic development scenarios

16.4.1 Development within individual Plan Options shall not exceed the 'maximum realistic development scenario' for that Plan Option, set out in the Plan (see Table 3 above). The use of maximum realistic development scenarios within the overall boundary of the PO provides flexibility over the exact location, nature and scale of the proposal to enable adverse effects on site integrity to be avoided at a project-level.

16.5 Plan Options subject to high-levels of ornithological constraint

16.5.1 Plan Options E3, NE2, NE3, NE4 and NE6 (as shown in green in Figure 8) are subject to Plan-level mitigation and are deemed as being 'subject to high levels of ornithological constraint'. Development within these Plan Options can only progress where sufficient scientific evidence can be provided to reduce the risk to an acceptable level (unless it can be determined that there are imperative reasons of overriding public interest that require development to proceed). This scientific evidence would thereby facilitate either;

- a) Revision to the Plan (via the iterative plan review process) which removes the application of this mitigation measure at a Plan level; or
- b) The granting of a licence or consent for the project, where it can be concluded by the competent authority that there would be no adverse

effect on the integrity of any European site(s) or European marine site(s).

16.5.2 The HRA Report provides an outline of the research gaps/uncertainties at section 11.6. The Ornithology Working Group will establish the research and evidence gaps and work required to address said gaps following the adoption of the Plan.

16.6 Plan Options subject to the need for further regional level survey and assessment

16.6.1 Plan Options E1 and E2 (as shown in orange in Figure 8) are subject to the need for the completion of further regional level survey, research and assessment work. This regional survey work should cover the region(s) which will be likely impacted by the development and should not solely be limited to the Plan Option area or the offshore region in which the Plan Option is located. This regional level survey, research and assessment work is required to address:

- Uncertainty regarding the potential scale of cumulative impacts in this region on seabird species (resulting from collision, displacement and barrier effects); and
- A lack of information regarding seabird densities and behaviours in the offshore region during the non-breeding season.

16.6.2 Any developers which secure Option Agreements for Plan Options E1 and/or E2 should discuss and establish the parameters of the required survey work and the assessment of survey outputs with the Ornithology Working Group prior to commencing any such works. Marine Scotland will then provide direction as to the scope and format of the survey, research and assessment work and how the outputs should be provided.

16.6.3 This regional level survey and assessment activity could incorporate, for example, an initial study to identify foraging areas for key seabird species SPA populations and at-sea densities. This study could then be supplemented by regional level survey effort, which could incorporate elements such as aerial surveys or possibly seabird tagging work at key colonies.

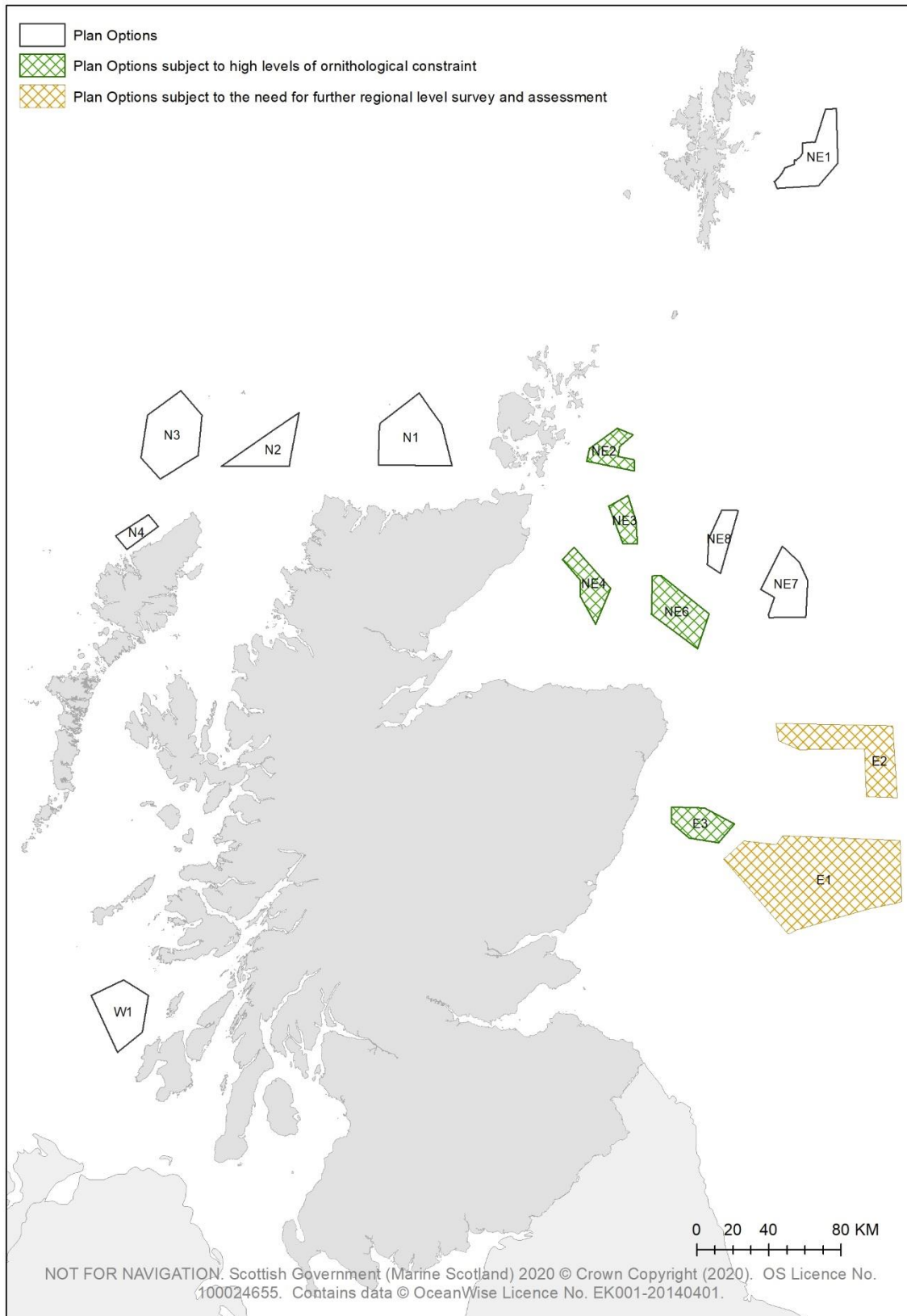


Figure 8 Plan Options subject to ornithology mitigation measures

APPENDIX 1: IN-COMBINATION ASSESSMENT – OFFSHORE WIND FARMS

Table 17 below provides a summary of the operational and planned offshore wind, tidal and wave renewable energy projects within Scottish Territorial Waters taken into account in this AA. This list was current at time of publication of the HRA Report (December 2019).

Table 17 Summary of operational and planned offshore wind, tidal and wave renewable energy projects within Scottish Territorial Waters

Energy Type	Name/ Location	Company (Project Website)	Status	Capacity (MW)
Wind	Robin Rigg	E.ON https://www.eonenergy.com/About-eon/our-company/generation/our-current-portfolio/wind/offshore/robin-rigg	Fully operational since September 2010.	174
Wind	Beatrice Demonstrator	SSE Renewables / Talisman	Entering decommissioning (2024 – 2027)	10
Wind	Levenmouth Turbine	ORE Catapult https://ore.catapult.org.uk/press-releases/levenmouth-turbine-offers-unrivalled-opportunity-for-renewable-energy-rd/	Fully operational	7
Wind	Hywind	Equinor / Masdar http://www.statoil.com/en/environment/society/environment/impactassessments/newenergy/intwind/pages/hywindscotland.aspx	Fully operational	30
Wind	Aberdeen Bay (EOWDC)	Vattenfall http://www.statoil.com/en/environment/society/environment/impactassessments/newenergy/intwind/pages/hywindscotland.aspx	Fully operational	93.2

Energy Type	Name/ Location	Company (Project Website)	Status	Capacity (MW)
Wind	Beatrice	SSE Renewables / SDIC / Copenhagen Infrastructure Partners https://www.sserenewables.com/offshore-wind/	Fully operational	588
Wind	Near na Gaoithe	EDF Renewables https://nngoffshorewind.com/about/	Consented December 2018 (Varied June 2019).	450
Wind	Firth of Forth 1 (Seagreen Alpha and Bravo)	SSE Renewables http://www.seagreenwindenergy.com	Consent granted October 2014 (varied August 2018 to remove maximum capacity). Updated application for optimised project submitted September 2018. Construction anticipated to commence by 2022.	1500
Wind	Moray East	EDPR http://www.morayoffshore renewables.com/Home.aspx	Consent granted in March 2014. Delivery expected early 2020s.	950
Wind	Inch Cape	SDIC http://www.inchcapewind.com	New application submitted August 2018.	700
Wind	Kincardine	Atkins / Pilot Offshore Renewables http://pilot-renewables.com/	Consent received 2017. Currently under construction (one turbine operational)	49.6

Energy Type	Name/ Location	Company (Project Website)	Status	Capacity (MW)
Wind	Dounreay Tri Demonstration Project	Hexicon https://www.hexicon.eu/dounreay-tri/	Currently on hold, delivery expected 2020 (company in administration)	12
Wind	Firth of Forth 2 (Charlie)	SSE Renewables http://www.seagreenwindenergy.com	In planning	1800
Wind	Firth of Forth 3 (Delta)	SSE Renewables http://www.seagreenwindenergy.com	In planning	800
Wind	Moray Firth Western Development Area	EDPR https://www.moraywest.com	Consented June 2019. Delivery potential in mid 2020s	850
Wind	Forthwind OWF, Methil	Forthwind Ltd	Consented, (Consent varied May 2019 to increase capacity)	29.9
Wind Total				8209.7
Tidal Stream	North Yell, Bluemull Sound, Shetland	Nova Innovation (https://www.novainnovation.com/bluemull-sound)	Fully operational since 2017. Expansion to 0.6 MW planned.	0.3
Tidal Stream	Sound of Islay	Scottish Power Renewables (https://www.scottishpowerrenewables.com)	Consent granted in March 2011. Pre-construction. (not currently active as a project)	10
Tidal Stream	Ness of Duncansby, Pentland Firth	Scottish Power Renewables (https://www.scottishpowerrenewables.com)	In early stages of planning. Agreement to lease secured.	95
Tidal Stream	Westray South,	DP Energy (http://www.dpenergy.com/)	In development. Agreement to	200

Energy Type	Name/ Location	Company (Project Website)	Status	Capacity (MW)
	Pentland Firth	projects/tidal/westray-south)	lease secured. Scoping Report submitted November 2011.	
Tidal Stream	Brough Ness, Pentland Firth	Simec Atlantis Energy (https://simecatlantis.com/projects)	In development.	100
Tidal Stream	Inner Sound, Pentland Firth	Simec Atlantis Energy (https://simecatlantis.com/projects/meygen/)	Phase 1 (6 MW) in operation.	398
Tidal Stream	Mull of Kintyre, Argyll	Argyll Tidal Ltd (https://www.webarchive.org.uk/wayback/archive/20180529225408/http://www.gov.scot/Topics/marine/Licensing/marine/scoping/ArgyllTidalArray)	Consent granted in May 2014 for one demonstration turbine (0.5MW) to be installed. Pre-construction.	0.5
Tidal Stream	Isle of Islay, Islay	DP Marine Energy Ltd (http://www.dpenergy.com/projects)	In development. Agreement to lease secured. Consent received 2017.	30
Tidal Stream	Lashy Sound	Scotrenewables Tidal Power Limited (SRTP) (https://www2.gov.scot/Topics/marine/Licensing/marine/scoping/LashySound)	In development. Agreement to lease secured. Scoping Report submitted in July 2014.	10
Tidal Stream	Brims Tidal Array (formerly Cantick Head)	SSE Renewables and OpenHydro Group Ltd	In development. Agreement to lease secured. EIA submitted 2016 (company in administration)	200

Energy Type	Name/ Location	Company (Project Website)	Status	Capacity (MW)
Tidal Stream	Mull of Galloway	Marine Current Turbines (https://simecatlantis.com/projects/galloway/)	In planning. Agreement to lease secured.	30
Tidal Stream	Fall of Warness	European Marine Energy Centre Ltd	Test site. Operational Feb 2019.	N/A
Tidal Stream	Shapinsay Sound	European Marine Energy Centre Ltd	Test site.	N/A
Tidal Stream	Islay Demonstration Zone	European Marine Energy Centre Ltd	Test site.	N/A
Tidal Stream	Stronsay Firth	European Marine Energy Centre Ltd	Test site.	N/A
Tidal Total				1,073
Wave	Billia Croo	European Marine Energy Centre Ltd	Test site	N/A
Wave	Scapa Flow	European Marine Energy Centre Ltd		N/A
Wave	Scottish Sea Farms (MANTA) - Teisti Geo	Scottish Sea Farms	Marine Licence Granted May 2018 (Operational)	0.262
Wave	WaveNet Mingary	Wavenet Energy Mingary Ltd.	Marine Licence issued – operational	0.45
Wave	Harris Demonstration Zone	European Marine Energy Centre Ltd	Test site	N/A
Wave Total				0.712
Hybrid	Katanes Floating Energy Park	Katanes Floating Energy Ltd	Screening opinion issued November 2017	11.6
Hybrid Total				11.6

APPENDIX TWO: IN-COMBINATION ASSESSMENT – OTHER PLANS AND PROJECTS (NON OFFSHORE WINDFARMS)

In addition to the offshore wind projects outlined above, a wide range of other plans and projects are potentially relevant to this Plan, including:

- Marine Renewables Infrastructure Plan
- National Renewables Infrastructure Plan (“N-RIP”)
- The National Planning Framework for Scotland (“NPF3”)
- The Crown Estate Scotland (ScotWind) Leasing Round (2020)
- The Crown Estate Offshore Wind Leasing – Round 4 (2019)
- Waterfront regeneration projects (e.g. Helensburgh)
- Harbour expansion plans (e.g. Aberdeen)
- Onshore wind farms
- Increased vessel activity from all other sources (no specific plan), including offshore development and shipping from other ports
- ISLES project
- ISLES II project
- Proposals for the offshore grid and other proposed cable routes
- Container transshipment hub at Scapa Flow
- Other proposals included within the Pentland Firth and Orkney Waters Marine Spatial Plan
- Oil and gas development activities
- Port and marine developments (e.g. Granton)
- Aquaculture developments
- Fishing activities
- Military activities
- Non-marine developments potentially affecting Atlantic Salmon, freshwater pearl mussel or other features associated with SAC rivers

An overarching National Marine Plan was introduced in Scotland through the Marine (Scotland) Act 2010. The plan, adopted in March 2015, is designed to inform decision making in the marine environment by governing more detailed planning at the regional level and informing marine licensing and other decision-making functions. An HRA was carried out for this Plan and following the screening stage of that process it was concluded that an AA was not required. Having followed SNH guidance, this view was taken in respect of both the Plan’s ‘cross-cutting’ and ‘sector-specific’ policies as follows:

- The cross-cutting policies are general in direction, as they apply to all activities and development in the marine environment. In consequence, no

connectivity or direct pathway for impact was identified between these and specific European sites.

- The sector-specific policies are general in direction, as they do not direct development or activities to a particular location and do not have a pathway for impact on specific European sites. For those which could have a significant effect on the integrity of European sites, mitigation measures have been recommended in the form of changes to the wording of the policies.

In conclusion, the National Marine Plan was considered to have no significant effect on the integrity of European sites, and for the same reason there will be no in-combination effects between the Sectoral Offshore Wind Plan and the National Marine Plan. The Sectoral Offshore Wind Plan provides the spatial strategy for developing offshore wind energy at the national and regional level. This spatial strategy has been assessed within this plan-level HRA. Future developments which take place within these areas will be assessed against the proposals and policies contained within the National Marine Plan at the project licensing stage.

It should also be noted that in the coming years regional Marine Plans will be developed (e.g. Clyde Regional Marine Plan). These regional plans will include more focused policies for the coastal regions and, as such, an HRA for these plans may be required.

APPENDIX THREE: SCREENING MAPS – PER DPO

The figures below provide an overview of the screening maps per DPO (please note, maps for DPOs SW1 and NE5 have not been included here as these DPOs have not been chosen to progress as final Plan Options).

A 100 km buffer was used in the screening process (as agreed with the Steering Groups), which captured all sites within the buffer, irrespective of the foraging ranges of the designated species. Where Thaxter et al identified species with mean max. foraging ranges larger than the 100 km buffer, the mean max. foraging ranges were used to screen in additional SPA and Ramsar sites, including;

- Atlantic puffin (105 km);
- Lesser black-backed gull (141 km);
- Manx Shearwater (330 km);
- Northern Fulmar (400 km); and
- Northern Gannet (229 km).

These maps are also included at Appendix E of the HRA Report (2019) and can be viewed online here:

<https://www.gov.scot/publications/draft-sectoral-marine-plan-offshore-wind-energy-habitat-regulations-appraisal/pages/21/>

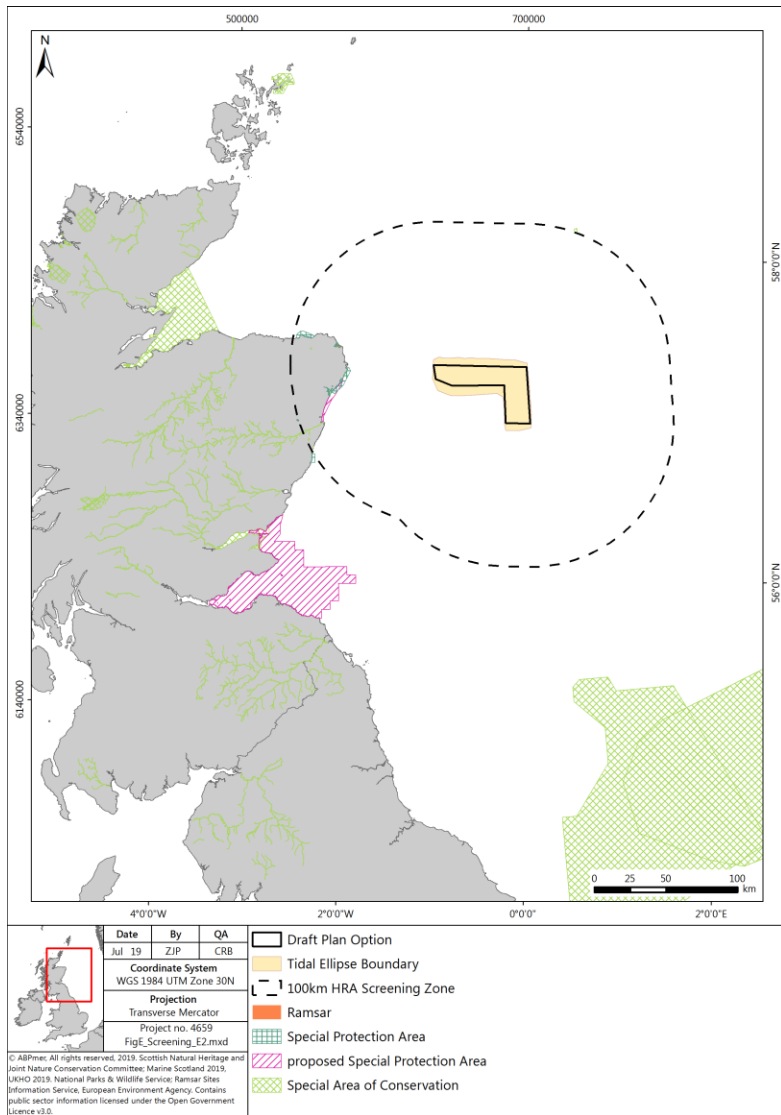


Figure 9 Screening map - DPO E2

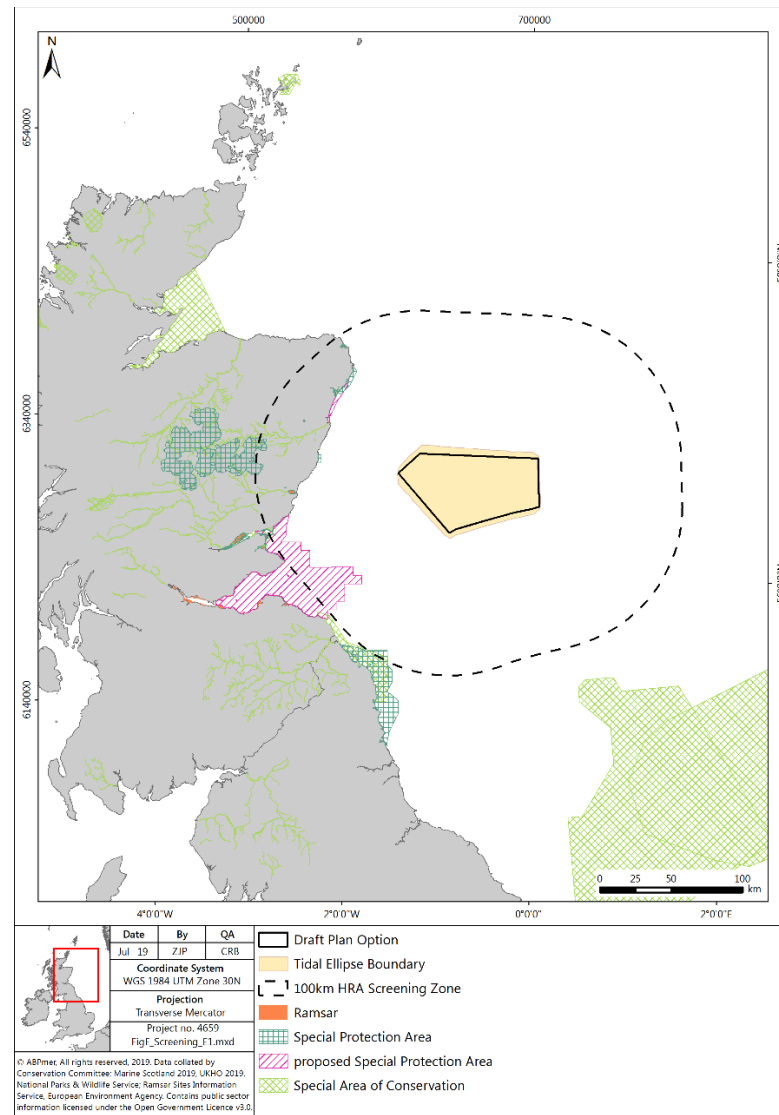


Figure 10 Screening table - DPO E1

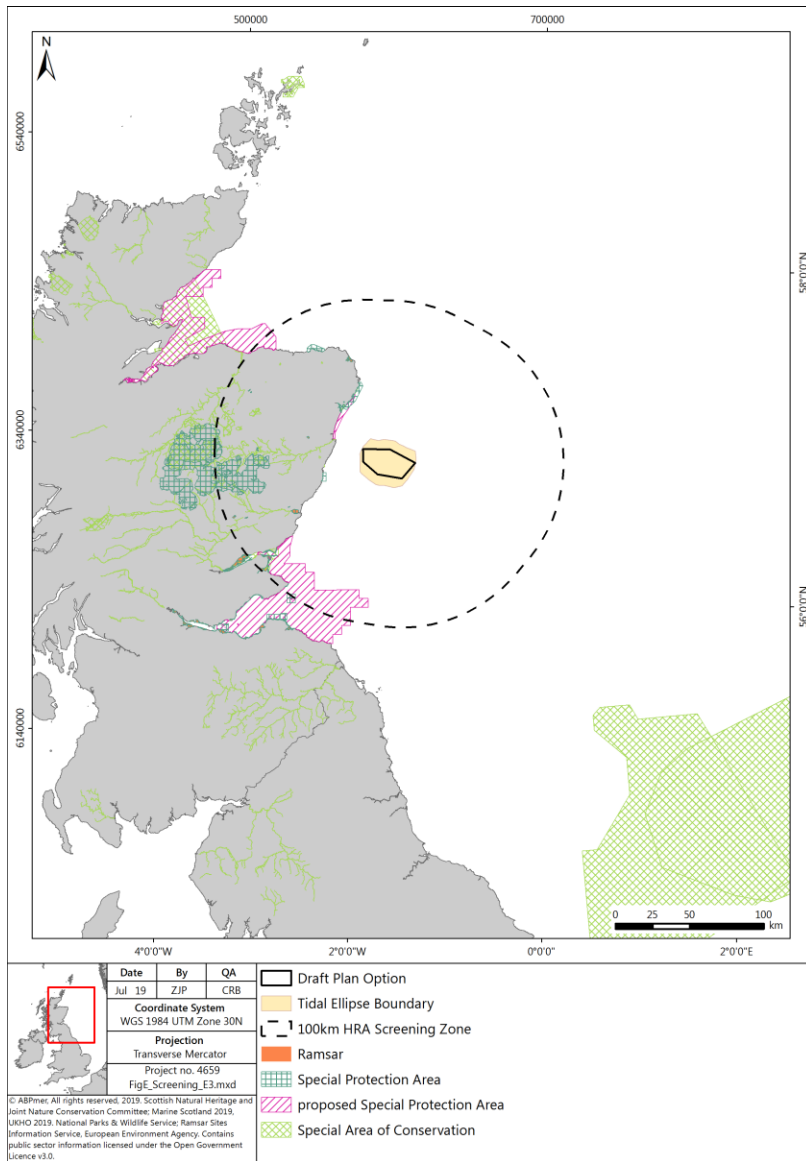


Figure 11 Screening map - DPO E3

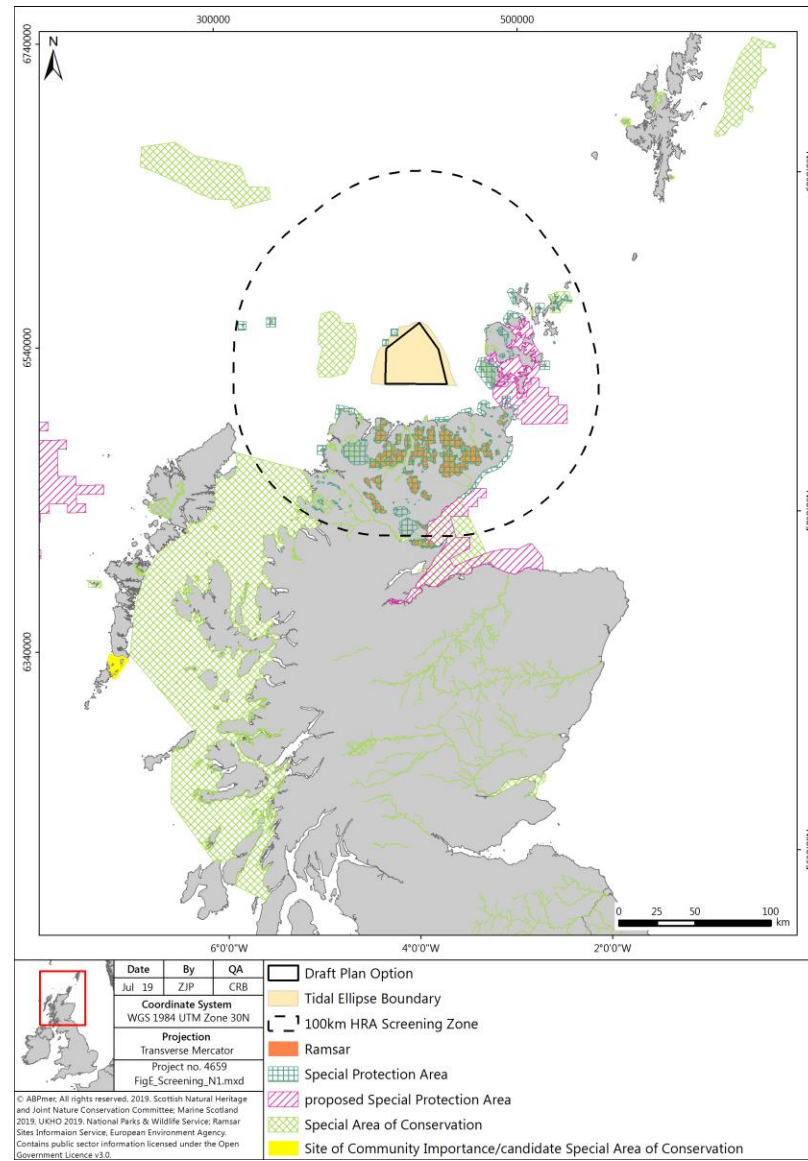


Figure 12 Screening map - DPO N1

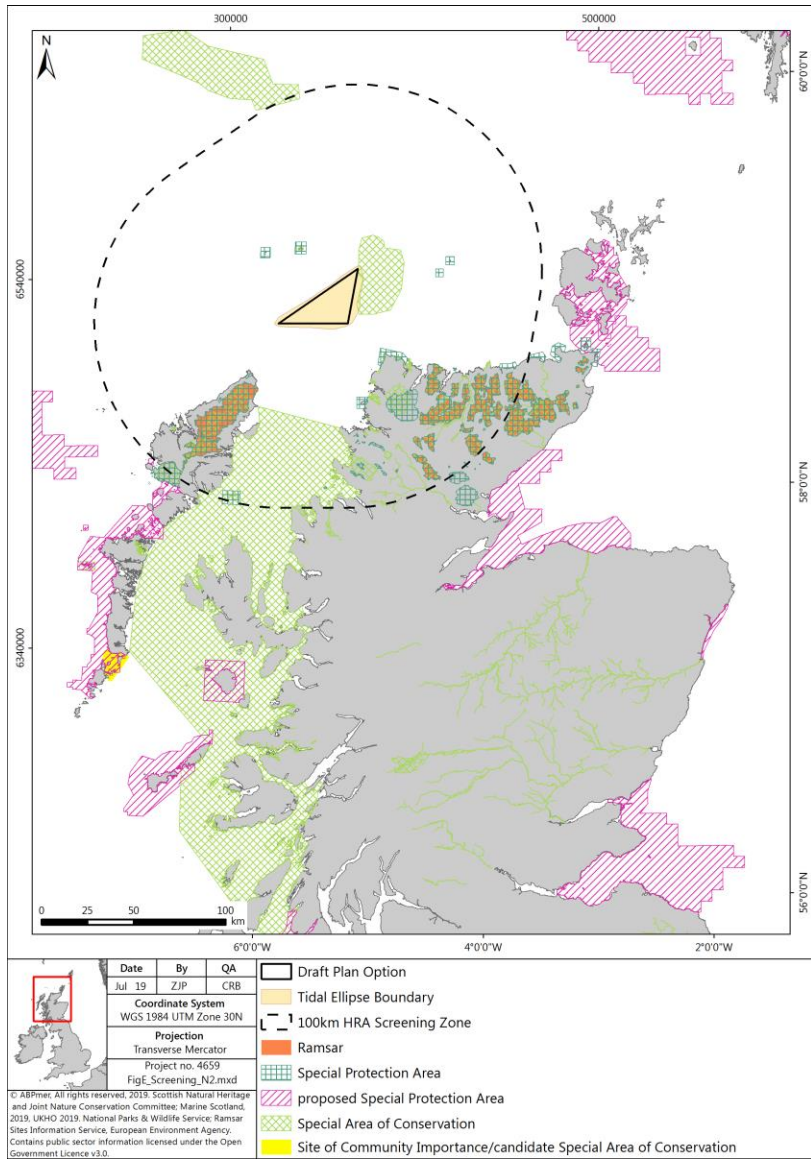


Figure 13 Screening map - DPO N2

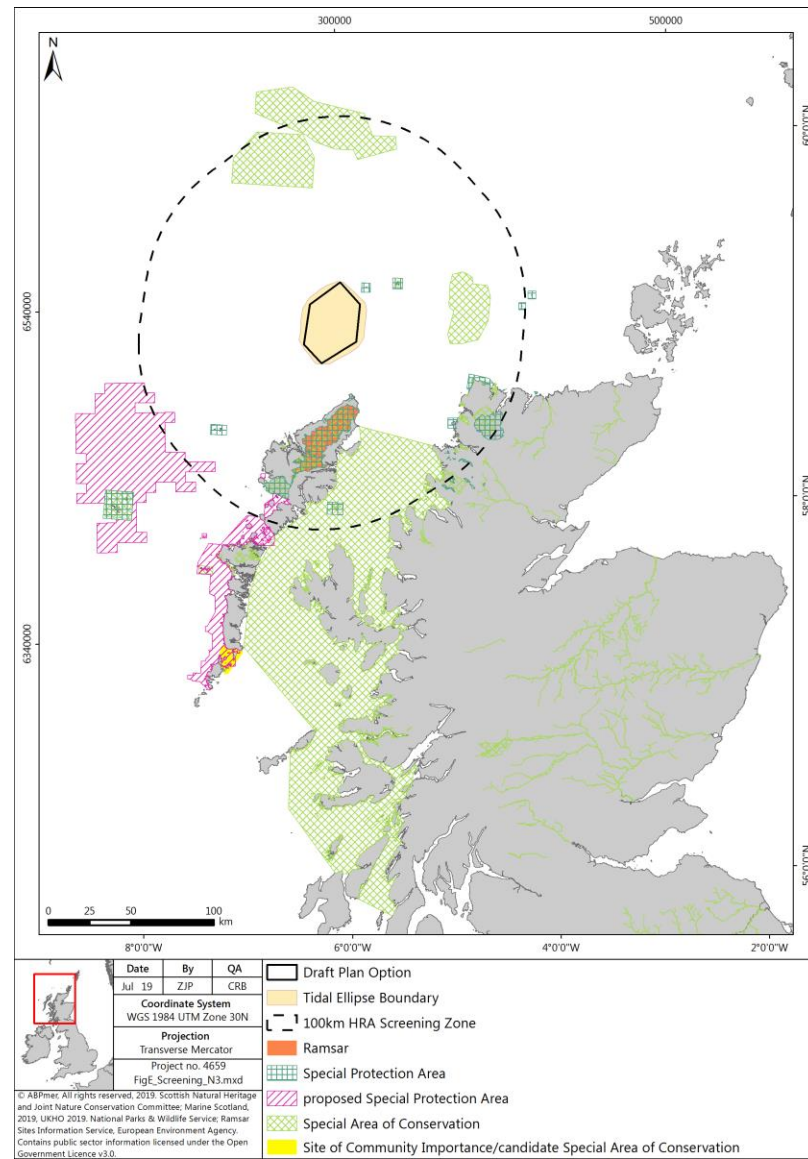


Figure 14 Screening map - DPO N3

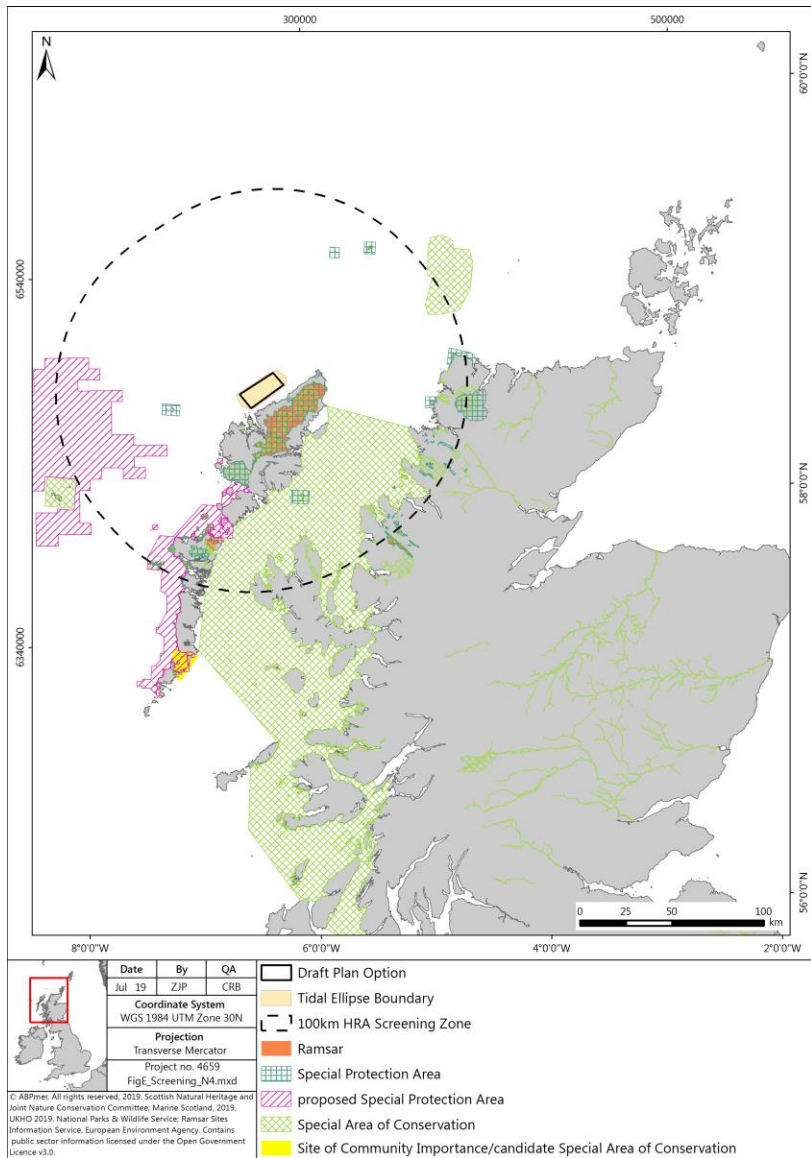


Figure 15 Screening map - DPO N4

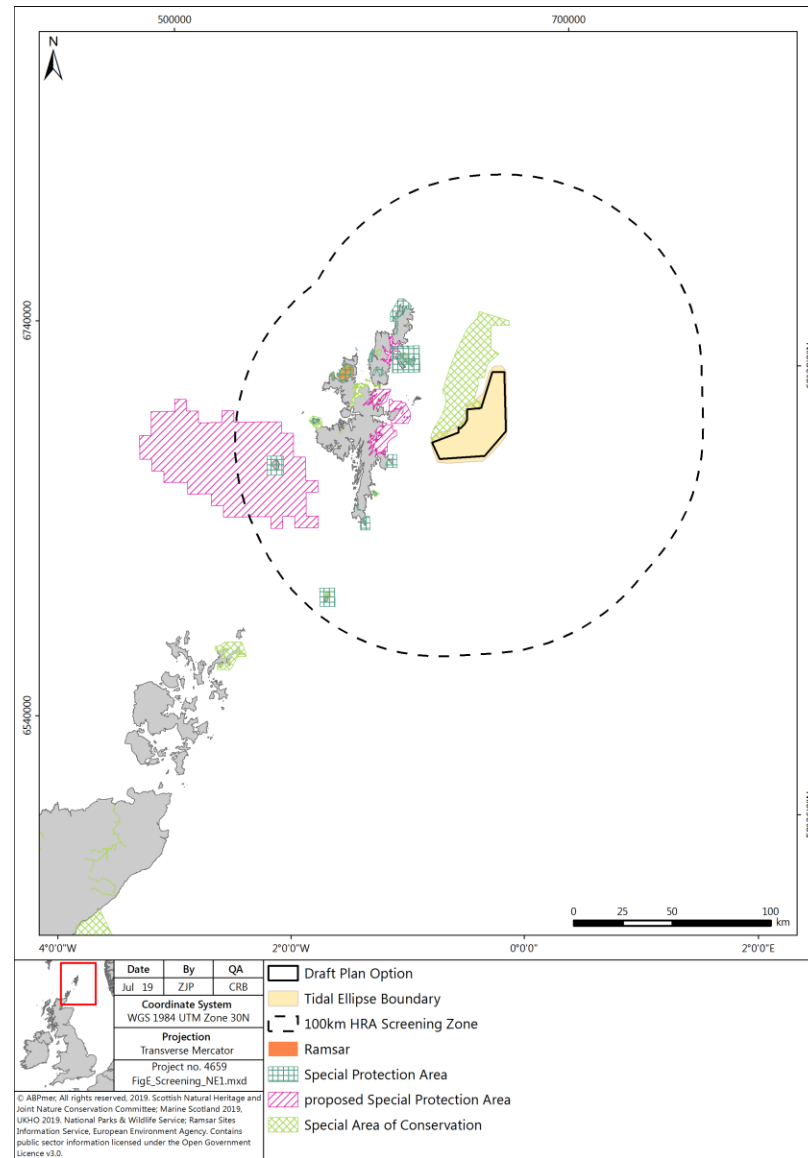


Figure 16 Screening map - DPO NE1

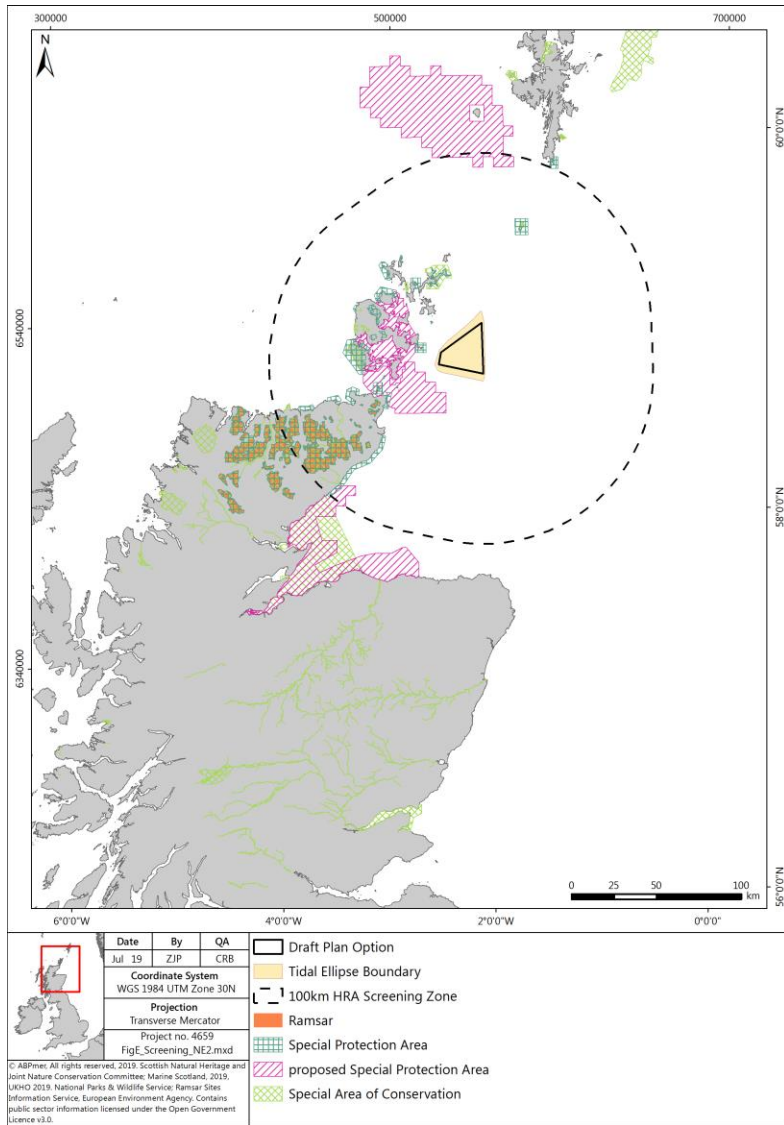


Figure 17 Screening map - DPO NE2

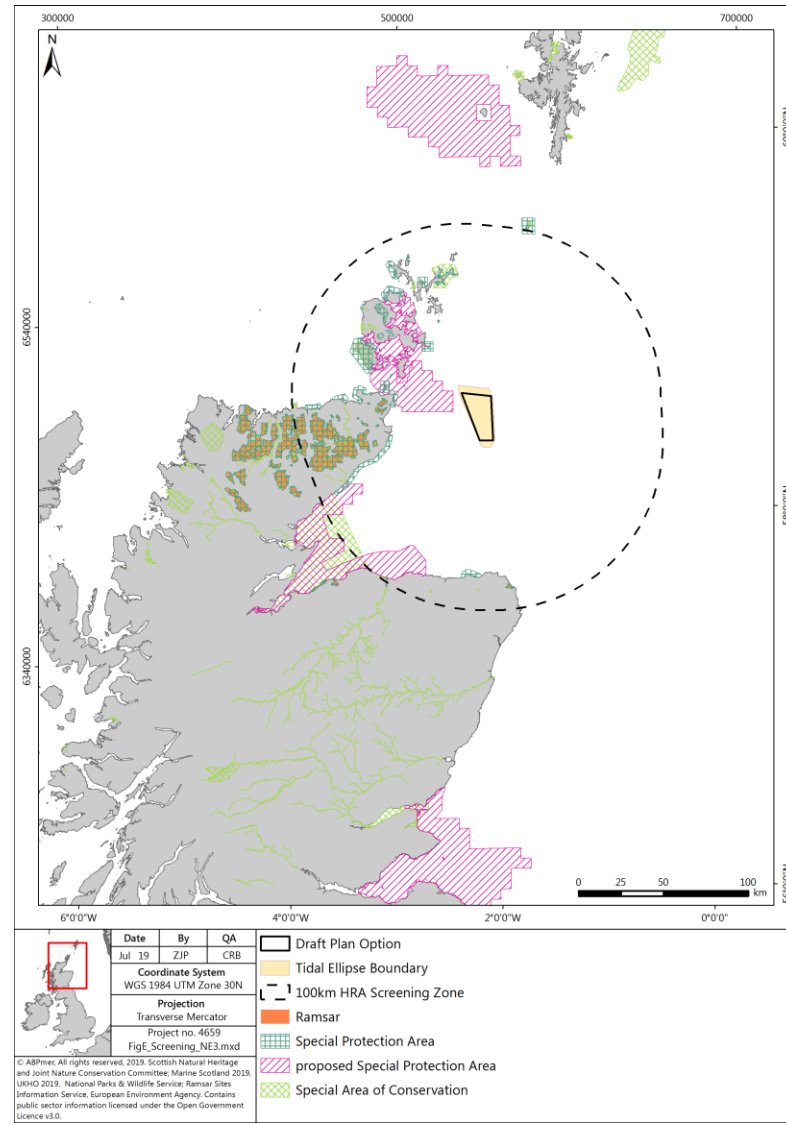


Figure 18 Screening map - DPO NE3

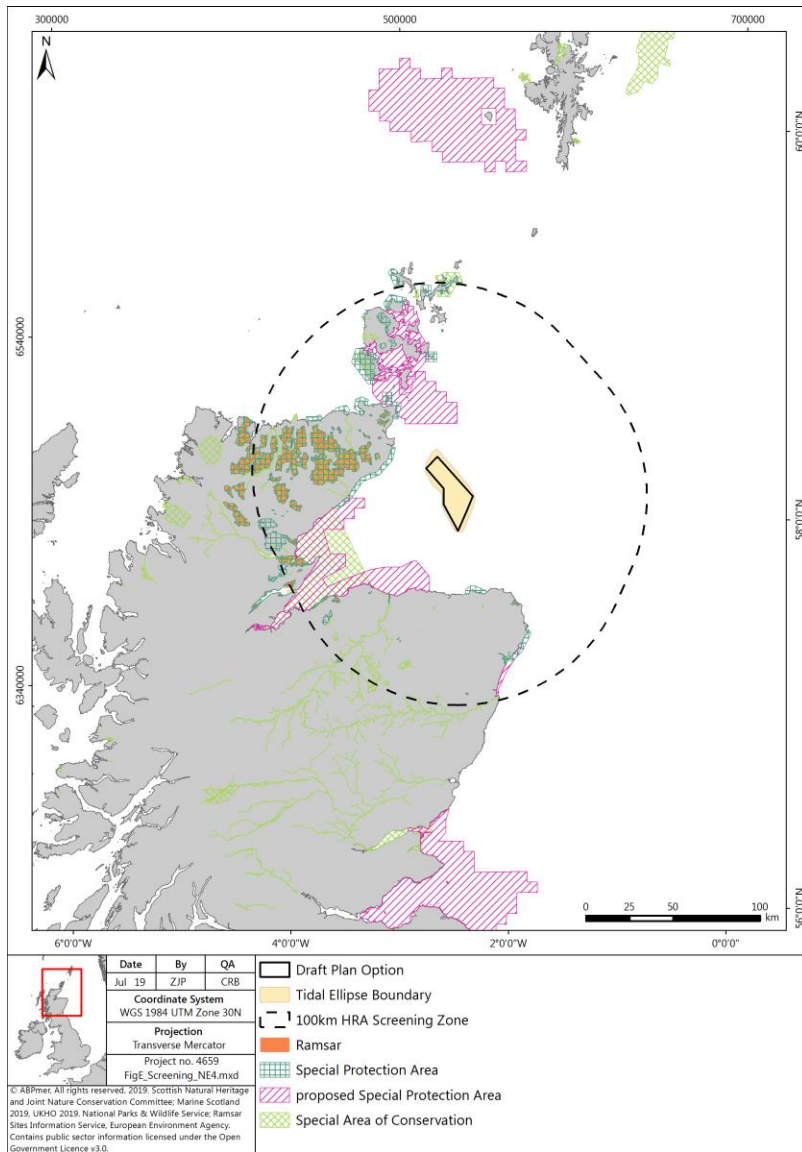


Figure 19 Screening map - DPO NE4

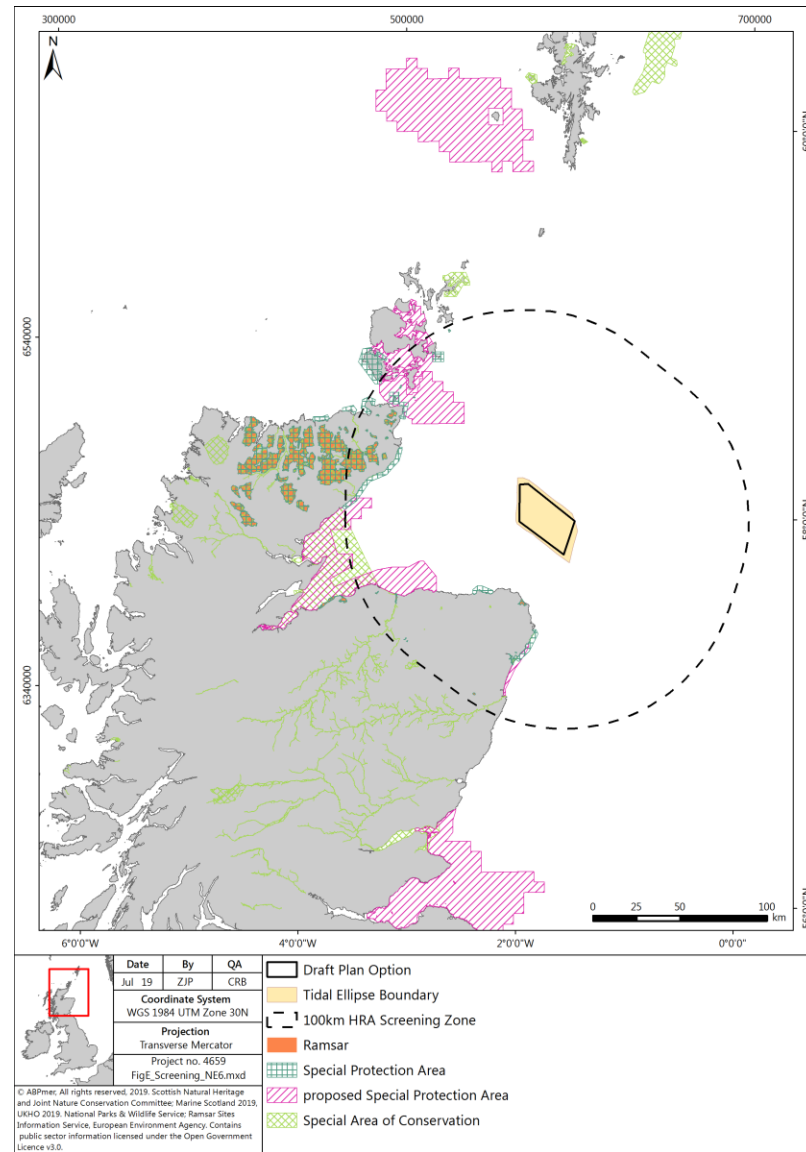


Figure 20 Screening map - DPO NE6

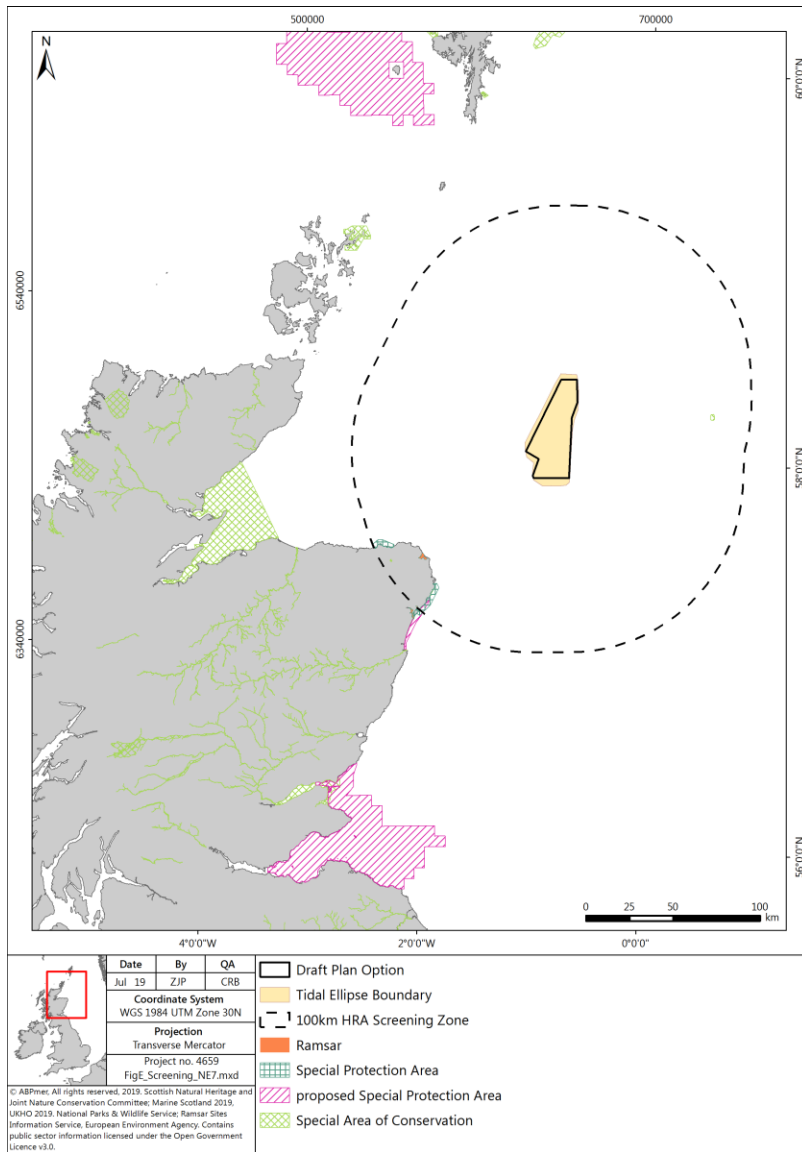


Figure 21 Screening map - DPO NE7

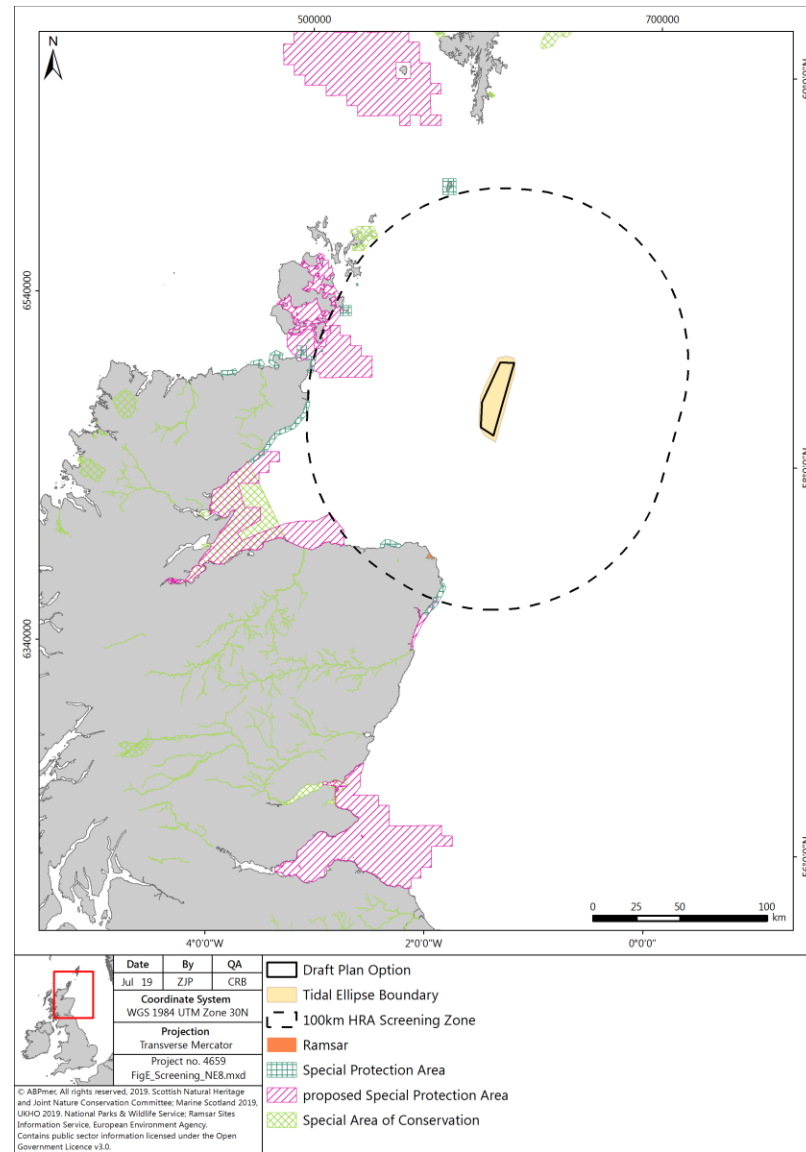


Figure 22 Screening map - DPO NE8

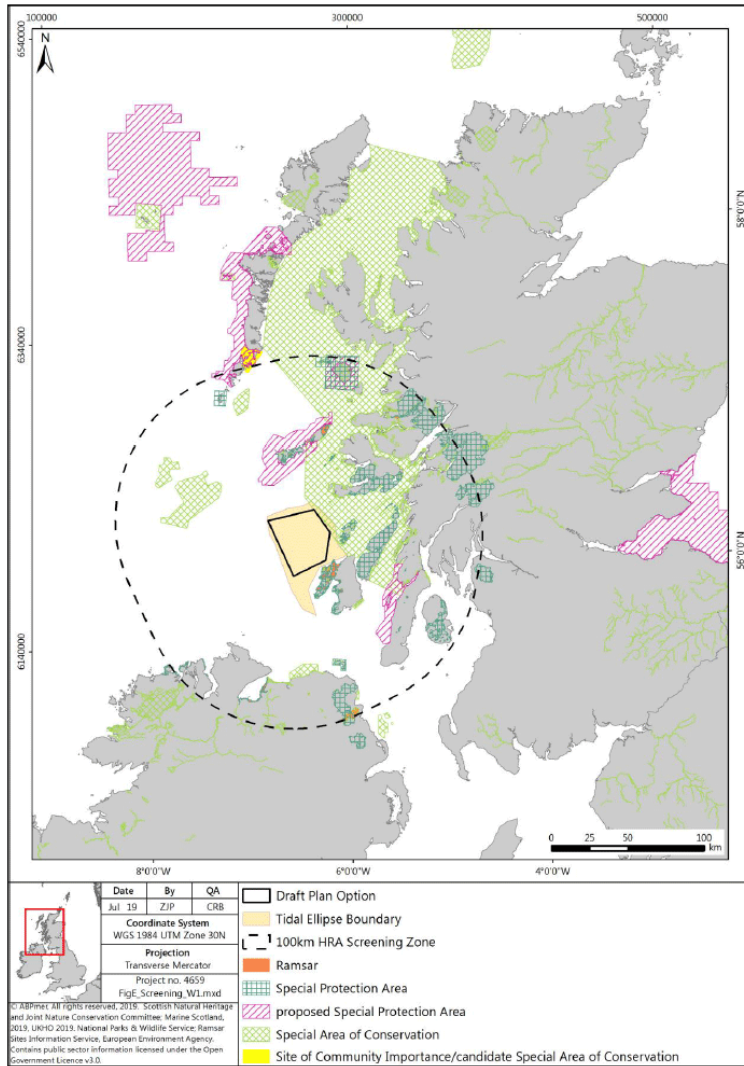


Figure 23 Screening map - DPO W1

APPENDIX FOUR: GENERIC IMPACT PATHWAYS ASSOCIATED WITH THE PLAN

Table 18 Generic impact pathways associated with the Plan

Pathway Ref No.	Potential Issue/Sensitivity Category		Impact Pathway	Impact Summary
	Categories to Deterioration or Disturbance	Code	Impacts arising from Plan Activity (Summary Impact Pathway Description)	
1	Physical Loss/Gain of habitat (loss of habitat in development footprint)	PLG	Loss of coastal and offshore habitat due to installation of devices, cables and cable armouring from the installation, operation and decommissioning of these structures.	Loss of coastal/offshore seabed within development footprint
2	Physical Loss/Gain of habitat (direct change to habitat around the development footprint)	PLG	Loss of foraging areas from reduction in coastal and offshore habitat due to installation of devices and cable armouring both at the development footprint and outside these areas from associated scour and indirectly from changes to the hydrodynamic regime, as well as from chains anchoring devices disturbing seabed habitat during operation.	Loss of coastal/offshore foraging areas within development footprint
3	Physical Loss/Gain of habitat (direct change to habitat around the development footprint)	PLG	Presence of structures on or above seabed for the duration of the project resulting in changes to prey and species behaviour (e.g. acting as FAD (Fish Aggregating Device), artificial reef or bird roost).	Loss or gain of habitat from introduced structures causing species change
4	Physical Damage to habitat (indirect and temporary damage to marine habitat)	PD	Changes to coastal and offshore habitat as result of damage from baseline surveys (e.g. boreholes/trawls); from equipment use causing abrasion, damage or smothering during installation	Damage to coastal/offshore seabed during all project phases

Pathway Ref No.	Potential Issue/Sensitivity Category		Impact Pathway	Impact Summary
	Categories to Deterioration or Disturbance	Code	Impacts arising from Plan Activity (Summary Impact Pathway Description)	
			and from maintenance and removal of cables/devices (e.g. jack-up legs, vessels, anchors, mooring chain).	
5	Physical Damage to habitat (indirect and longer-term damage to habitat)	PD	Changes to coastal and offshore habitat as a result of alterations to the wave climate or hydrodynamic regime from the presence of devices, power cables or cable armouring causing physical changes (including changes to sediment transport and/or sediment scour.	Damage to coastal/offshore seabed from hydrodynamic changes
6	Physical Damage to habitat (indirect and temporary damage to habitat)	PD	Reduction in quality of foraging areas as result of damage to coastal and offshore habitat from baseline surveys (e.g. boreholes and trawls); from equipment use causing abrasion, damage or smothering during installation; from maintenance and removal of cables/devices or from scour, sediment transport and hydrodynamic change, and damage from chains anchoring devices during operation.	Damage to coastal/offshore foraging areas during all project phases
7	Physical Damage to species (direct and temporary damage to habitat)	PD	Damage to seal haul out locations during the installation, decommissioning and operation of the cables and cable armouring.	Damage to seal haul out from cables or pipelines
8	Physical Damage to species (direct damage)	PD	Collision risk and possible mortality of species due to the presence of devices or from vessels travelling to and from the site (including above and below water	Damage to species from collision, entanglement or disorientation

Pathway Ref No.	Potential Issue/Sensitivity Category		Impact Pathway	Impact Summary
	Categories to Deterioration or Disturbance	Code	Impacts arising from Plan Activity (Summary Impact Pathway Description)	
	to species from collision risk)		collision risk and the influence of lighting); risk of entanglement following a collision with power cables or mooring elements.	
9	Non-Physical disturbance (barrier to species movement)	NPD	Presence of structures or disturbance (noise or visual) resulting in a barrier to movement, migratory pathways and/or access to feeding grounds depending on array design.	Disturbance from introduced structures causing barrier to mobile species movement
10	Non-Physical disturbance (disturbance to species)	NPD	Visual disturbance and exclusion from areas as a result of surveying, cable and device installation/operation and decommissioning activities and movements of vessels.	Disturbance (visual) from activities during all project phases
11	Non-Physical disturbance (disturbance to species)	NPD	Noise/vibration disturbance and exclusion from areas as a result of vessels and other activities during survey work (e.g. seismic exploration and geophysical surveys), construction (e.g. piling, drilling, cable laying), operation (e.g. device noise), maintenance or decommissioning.	Disturbance (noise) from activities during all project phases
12	Non-Physical disturbance (disturbance to ³⁴ species)	NPD	Impacts from Electromagnetic Fields (EMF) and thermal emissions on benthic invertebrates and electromagnetically sensitive fish and cetaceans	Disturbance (EMF and thermal emissions) from activities during all project phases

³⁴ Source: ABPmer, *Sectoral Marine Plan for Offshore Wind Energy HRA Report* (2019), Table 2 (Page 51)

Pathway Ref No.	Potential Issue/Sensitivity Category		Impact Pathway	Impact Summary
	Categories to Deterioration or Disturbance	Code	Impacts arising from Plan Activity (Summary Impact Pathway Description)	
			interfering with prey location and mate detection in some species and creating barriers to migration.	
13	Non-Physical disturbance (exclusion/displacement of species)	NPD	Presence of structures resulting in an exclusion/displacement of a species from the area.	Disturbance from introduced structures causing exclusion/displacement of species
14	Toxic Contamination (reduction in water quality)	TC	Spillage of fluids, fuels and/or construction materials during installation or removal of structures (devices and cables) or during survey/maintenance.	Contamination during surveys or maintenance activities
15	Toxic Contamination (reduction in water quality)	TC	Release of contaminants associated with the dispersion of suspended sediments during installation or removal of structures (devices and cables).	Contamination during installations/removal of structures
16	Non-Toxic Contamination (elevated turbidity)	NTC	Increase in turbidity (and possibly reduced dissolved oxygen) associated with the release of suspended sediments during installation or removal of structures (devices and cables).	Non-toxic contamination from increases in turbidity
17	Biological Disturbance (introduction of non-native species)	BD	Introduction of new structures on the seabed providing new substratum that facilitates the colonisation and ingress of invasive non-native species.	Biological disturbance from non-native species on substratum

Pathway Ref No.	Potential Issue/Sensitivity Category		Impact Pathway	Impact Summary
	Categories to Deterioration or Disturbance	Code	Impacts arising from Plan Activity (Summary Impact Pathway Description)	
18	Biological Disturbance (introduction of non-native species)	BD	Introduction and ingress of invasive non-native species as biofouling species on the surfaces of vessels or construction plant.	Biological disturbance from non-native species on vessels

APPENDIX FIVE – DRAFT OFFSHORE WIND PLAN TECHNICAL NOTE: UPDATED BIRD FORAGING RANGES (MARCH 2020)

Marine Scotland

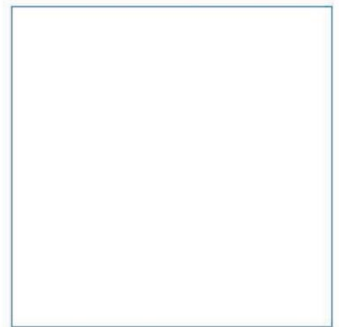
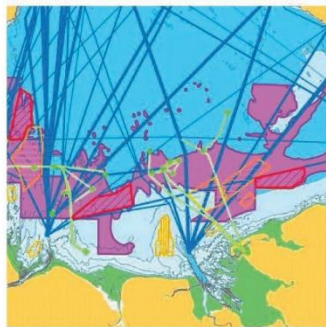
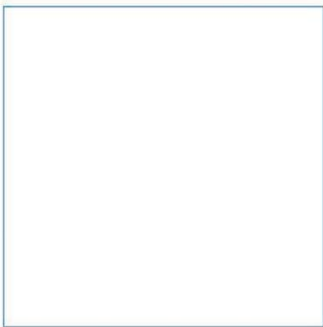
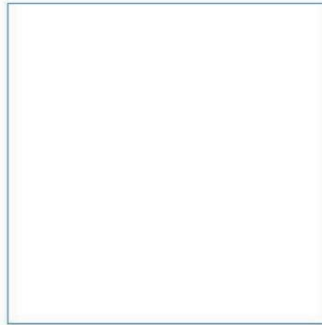
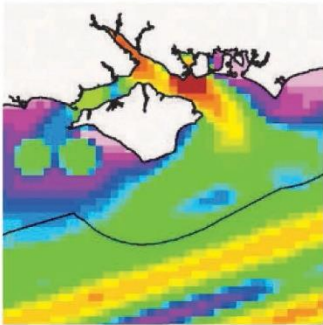
Draft Offshore Wind Plan

Technical Note: Updated Bird Foraging Ranges

Suggested Citation

ABPmer, (2020). Draft Offshore Wind Plan, Technical Note: Updated Bird Foraging Ranges, ABPmer Report No. R.3379/TN. A report produced by ABPmer for Marine Scotland

March 2020



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1 Introduction

This note has been prepared following the recent release of an update to the seabird foraging ranges historically used in HRA screening of offshore wind projects.

The historic data, a synthesis of available tracking studies was published by Thaxter *et al.* in 2012. These data, principally focussed on mean maximum foraging ranges, have subsequently been referred to across multiple project and plan level HRA to support screening of Special Protection Areas (SPA) for bird species receptors.

Within the HRA produced for the Scottish Sectoral Marine Plan for Offshore Wind, pre-screening of SPA sites was based on a 100 km buffer, therefore capturing all sites within the buffer irrespective of the foraging ranges of the designated species (Figure 1). However, there are a number of seabird species that forage over greater distances, beyond the 100 km pre-screening buffer. Based on the Thaxter *et al.* (2012) mean maximum foraging ranges, the species included were:

- Atlantic Puffin (105 km)
- Lesser Black-backed Gull (141 km)
- Manx Shearwater (330 km)
- Northern Fulmar (400 km)
- Northern Gannet (229 km)

Thus, the mean maximum foraging ranges of these species (according to Thaxter *et al.*, 2012) were used to screen in additional SPA and Ramsar sites beyond the 100 km pre-screening buffer.

During the HRA, these foraging ranges were then referred to, supporting assessment of likely impact for bird species in addition to species or location specific spatial evidence such as the RSPB seabird utilisation study (Cleasby *et al.*, 2018).

An updated synthesis of seabird tracking studies was released in early 2020 which incorporates both the studies considered in the Thaxter *et al.* paper, and those undertaken from 2012 to 2019 (Woodward *et al.*, 2019). The Woodward *et al.* (2019) study has resulted in a number of changes to the foraging ranges of seabirds, including the provision of a range where none had previously been presented. These revisions are of note to those seabird species considered particularly sensitive to the potential impacts from offshore windfarms.

Upon review of the updated data we have identified significant increases in mean maximum foraging ranges for Black-legged kittiwake, Razorbill, Great skua and Great black backed gull (Table 1) which warrant further consideration and discussion, contained herein.

Table 1. Foraging ranges for the focus species

Species	Thaxter et al., 2012	Woodward et al., 2019
Black-legged kittiwake	60 ± 23.3 km	156.1 ± 144.5 km
Razorbill	48.5 ± 35.0 km	88.7 ± 75.9 km
Great skua	86.4 km	443.3 ± 487.9 km
Great black backed gull	N/A	73 km

Source: Woodward *et al.*, 2019

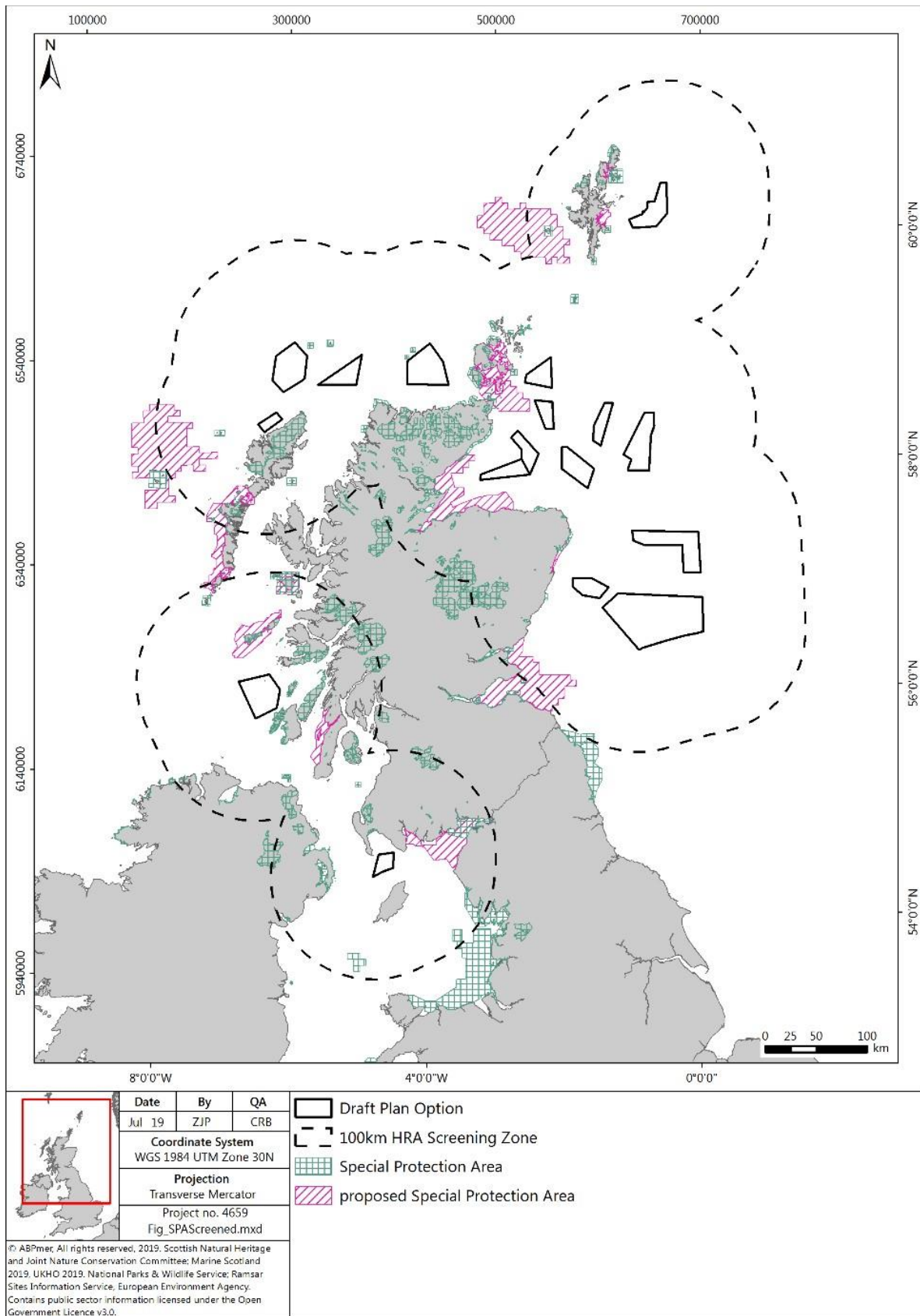


Figure 1. SPA Screened in by 100 km buffer

2 Black-legged kittiwake

- Black-legged kittiwake are of particular concern when considering the impact of offshore wind farms due to the currently observed declines in populations, particularly on the east coast of the UK. As a result, for DPO areas (NE2, NE3, NE4, NE5, NE6 and E3) within the Thaxter *et al.*, (2012) foraging range (60 km) on the east coast, 'temporal mitigation' was proposed within the HRA, to postpone any development until such a time that sufficient data around likely collision risk and kittiwake distribution is available to support a conclusion of no adverse effect.
- The increase in foraging range from 60 km to 156 km increases the number of DPO which fall within the buffered SPA foraging ranges, and therefore the question may be raised as to whether it is appropriate to incorporate these additional DPO areas into the 'temporal mitigation'. Figure 2 shows all SPA with Kittiwake as an interest feature buffered out to both the 60 km and 156 km ranges, showing that four DPO areas off the east coast of Scotland which were previously outwith the foraging ranges, are now wholly within the extended buffer (i.e. NE7, NE8, E1 and E2.)
- However, based on the consideration of other spatial data, as reported in Cleasby *et al.* (2018) it is our view that these sites should not be included in the temporal mitigation policy. These hotspot maps, based on utilisation distribution reported in Wakefield *et al.* (2017) (Figure 4), show that whilst there is potential for some usage by Black-legged kittiwake within these additional DPO areas, it is considerably lower density than the other north east and east DPO sites, and therefore grouping all east coast sites into the same mitigation measures would not be considered proportionate.
- It should be recognised, however, that at a project level, these increased foraging ranges will be used for HRA screening. This will likely result in additional SPA/Ramsar being screened to those during the plan level HRA, For example, offshore windfarm proposals in E2 will screen in the Firth of Forth SPA
- Overall, for Black-legged kittiwake, whilst the increase in foraging range has the potential to impact on sections of the HRA methodology, the conclusions of the HRA are considered to remain valid.

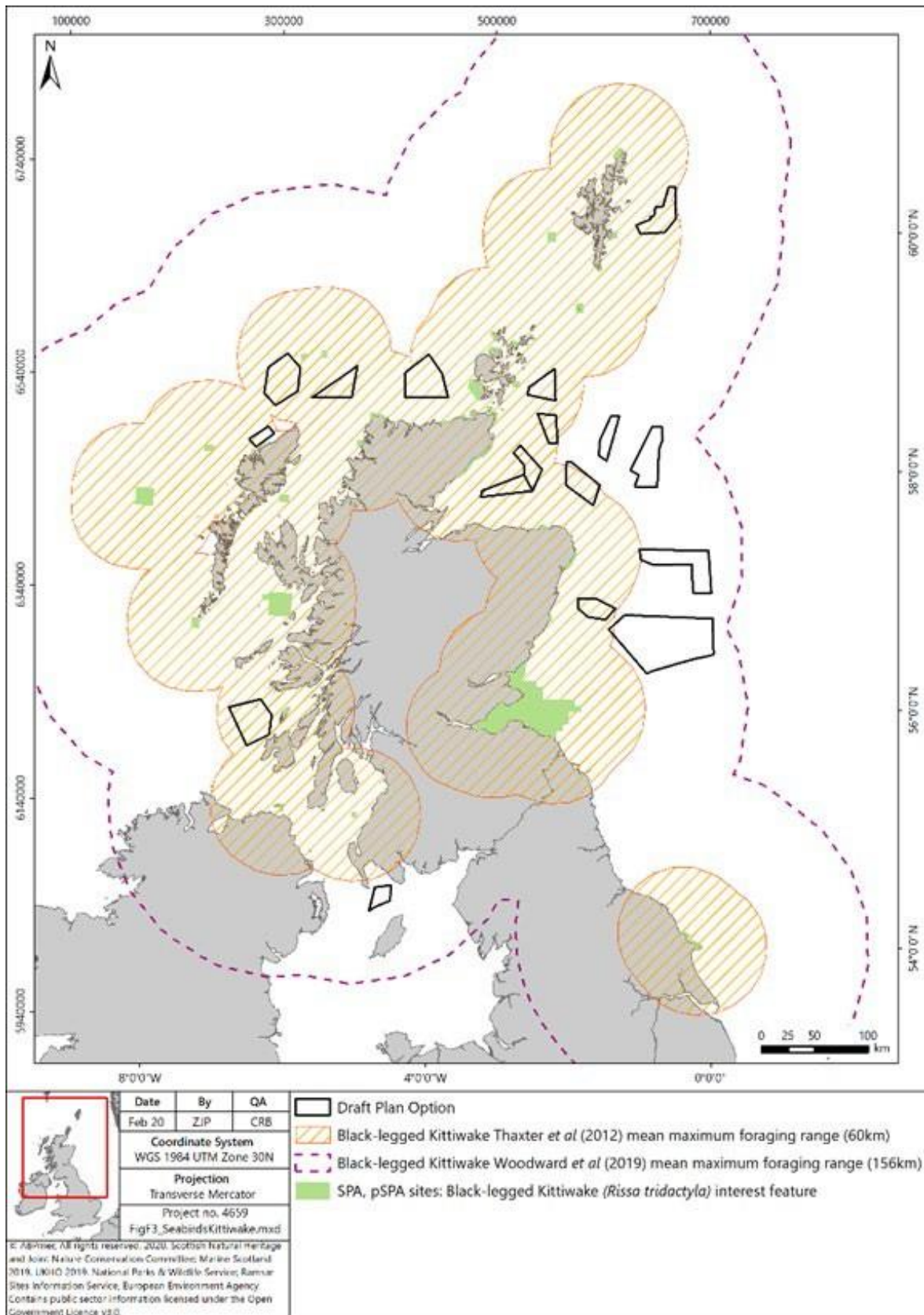


Figure 2. Black-legged kittiwake SPA foraging buffers

3 Razorbill

- Similar to Black-legged kittiwake, Razorbill was considered to be a higher risk species from offshore windfarms during assessment for the purposes of HRA, although, this risk is primarily due to displacement rather than collision risk as synthesised within the HRA for the Sectoral Marine Plan for Offshore Wind. The increase in mean maximum foraging range from 48.5 km to 88.7 km would lead to greater overlap with DPO areas (Figure 3). However, whilst this may influence minor changes in the assessment of risk to Razorbill, the screening process will not be impacted, as all sites within 100 km were already screened in.
- In addition, from the use of spatial distribution data for Razorbill, as presented in Cleasby *et al* (2020) and Wakefield *et al* (2017), it is clear that for Razorbill (Figure 4), areas of concern are generally restricted to coastal areas of shallower water. Consequently, the conclusions of the HRA remain valid.

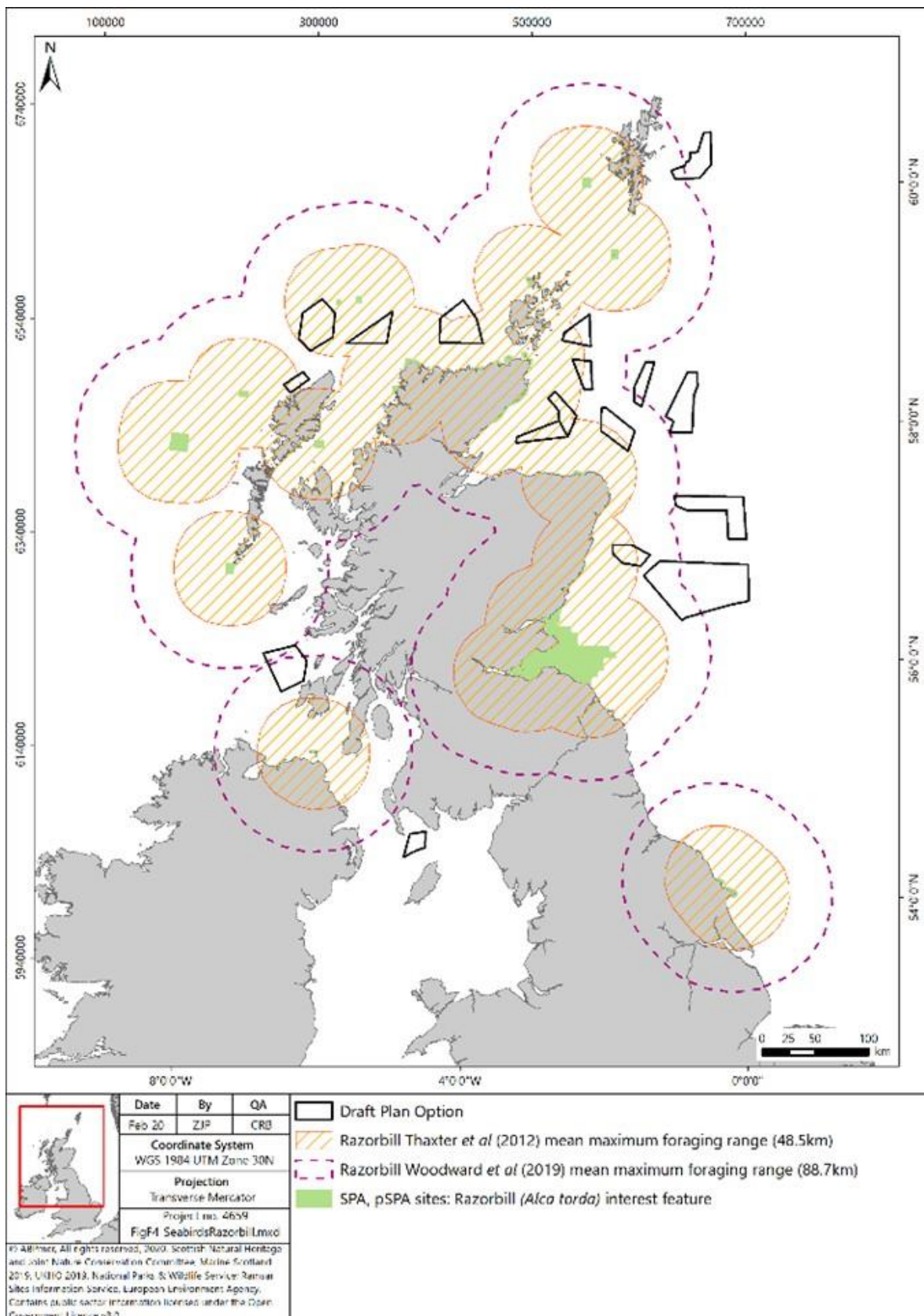


Figure 3 Razorbill SPA foraging buffers

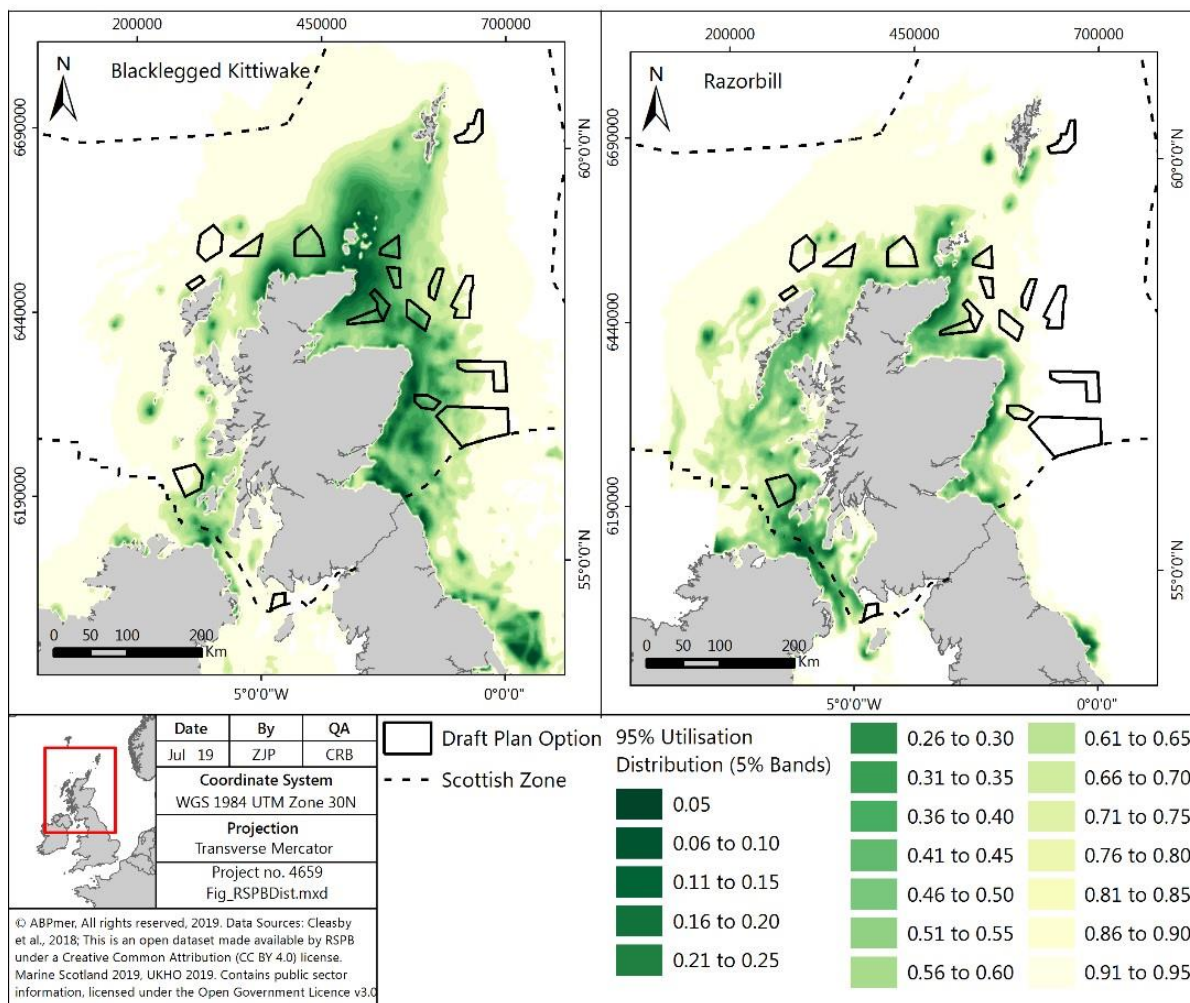


Figure 4 Black-legged kittiwake and Razorbill utilisation distribution data

4 Great skua

- There is a single proposed SPA (pSPA) in Scotland, for which Great skua are a designated feature (Seas off Foula pSPA). This site was previously screened in, based on proximity to site NE1 (Figure 5). The increased foraging range will lead to an overlap with all DPO areas except SW1 and W1.
- Great skua is generally considered of lower risk from offshore wind development compared to other species such as Black-legged kittiwake (Furness *et al.* 2013). Therefore, whilst the extended foraging range covers a significantly greater area with more overlap with DPOs the increase in risk from offshore wind development is uncertain. In addition, the significant area covered by the foraging range indicates that whilst there may be potential for usage throughout the range, the spatial distribution of Great skua throughout this area is uncertain, with data collected by Pollock *et al* (2000) indicating that areas of highest usage is more likely to be in areas within the initial foraging range of 80 km with lower usage towards the edges of the updated range.
- Therefore, whilst there is potential for minor changes to the assessment process for Great Skua, the conclusions of the HRA are considered to remain valid.

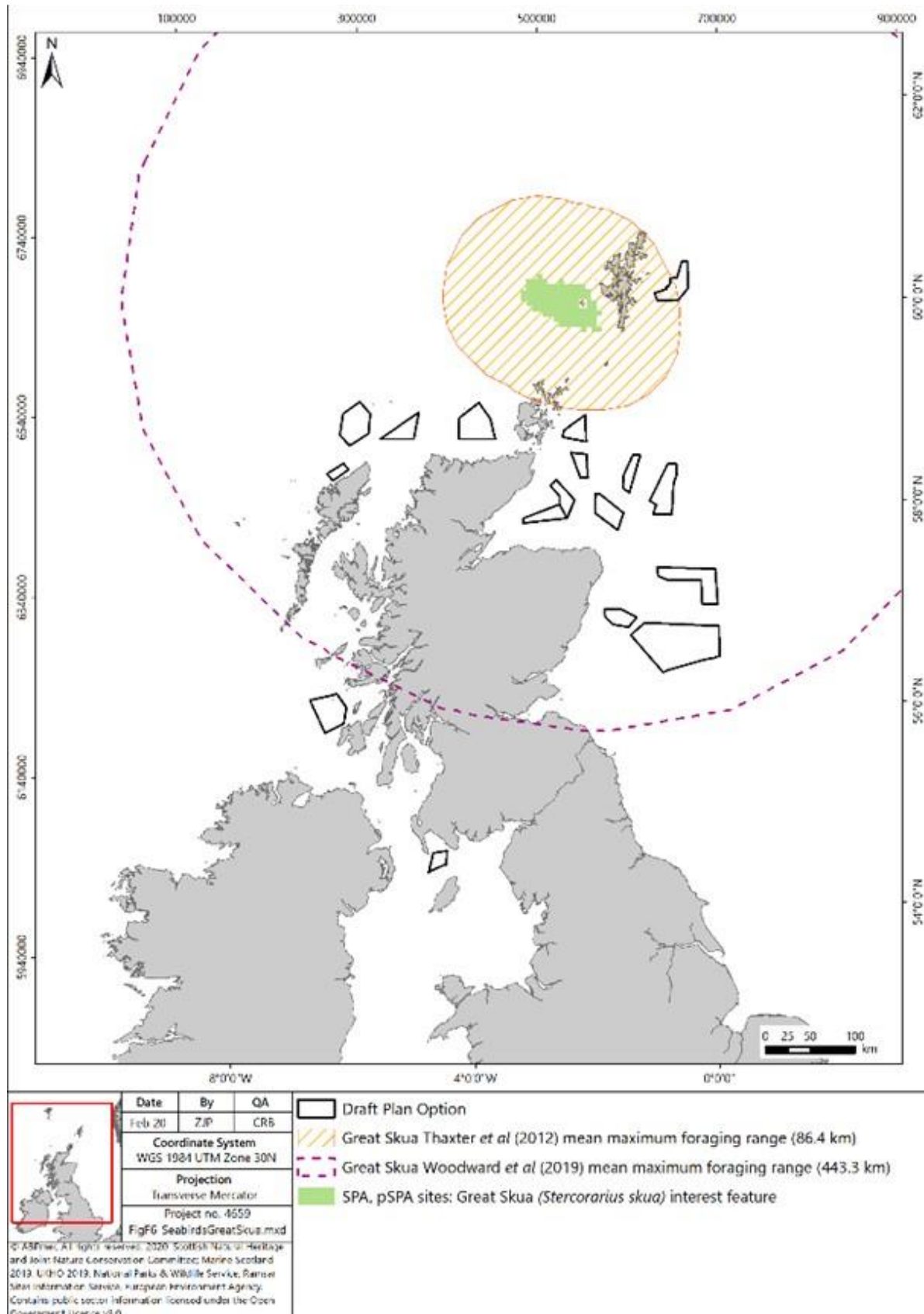


Figure 5 Great skua SPA foraging buffers

5 Great black-backed gull

- Great black-backed gull did not previously have a published foraging range based on tracking study evidence. Therefore, all sites within 100 km were screened in and, as a result the new foraging range of 73 km would not impact this step.
- Large gull species are generally considered to be of higher risk to collision with offshore wind farms, based on the results of the ORJIP study (Skov *et al*, 2018).
- The new foraging range, whilst giving an indication of potential overlaps between the foraging ranges from SPA and some DPOs (Figure 6), does not include any consideration of the distribution or usage density for Great black-backed gull.
- The NE DPOs within the Moray Firth which overlap with the GBBG foraging range (NE2, NE3, NE4, NE5 and NE6) are already included in the mitigation proposed for kittiwake within the HRA. Hence, concerns regarding Great black-backed gull would be managed through further work required to provide additional information on bird distribution in this area to address the mitigation requirement.
- However, for sites in the north, particularly N2 and N3 which are in close proximity to the North Rona and Sula Sgeir SPA and N1 in proximity to Hoy SPA, consideration will be required at a project level as to the usage of the seas by Great black-backed gull for foraging.
- The conclusion of the HRA for Great black-backed gull, that work required for the purposes of project level HRA would identify areas of concern and support avoidance of significant adverse effects, will remain valid.

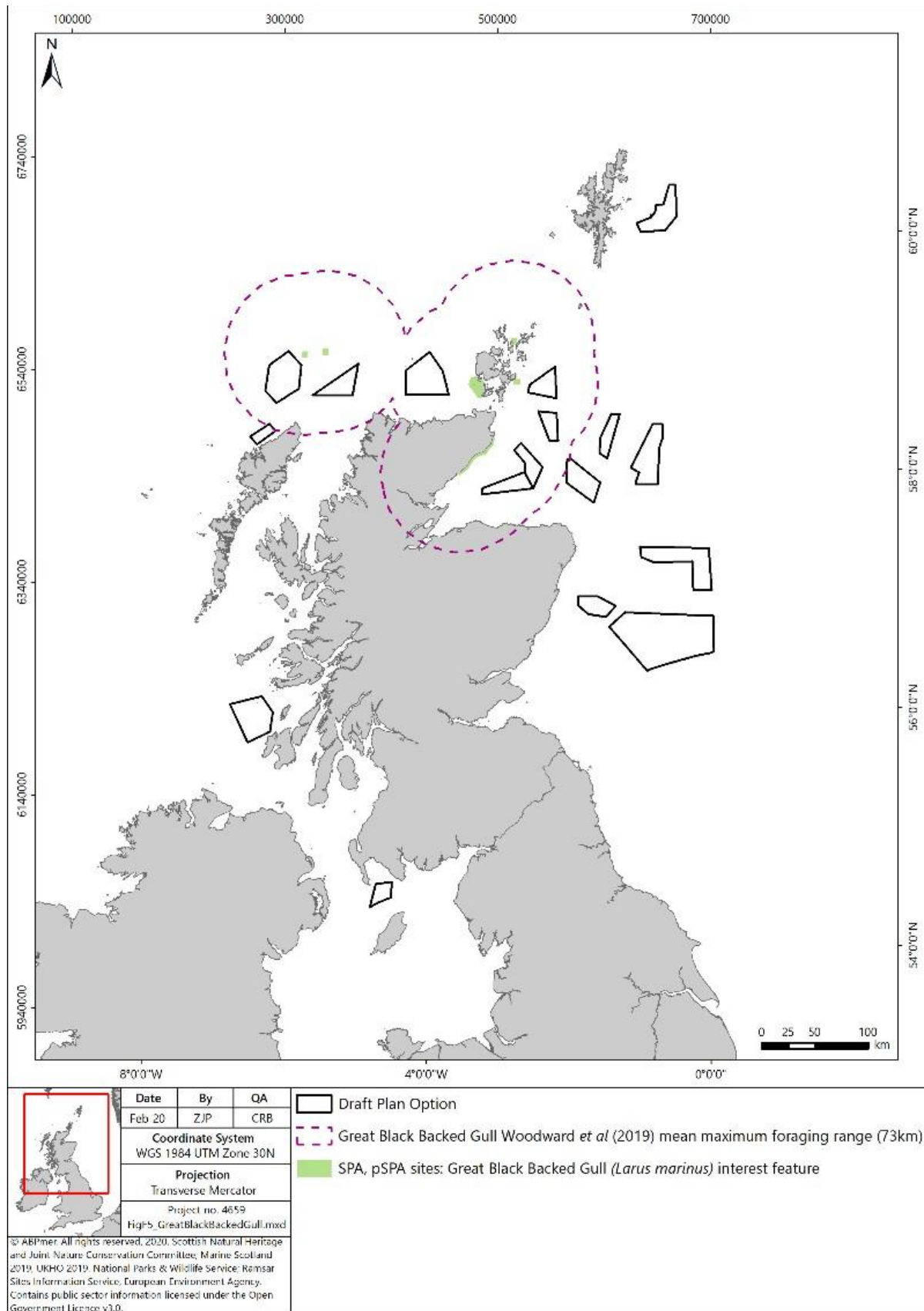


Figure 6 Great black backed gull SPA foraging buffers

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APPENDIX SIX: HRA UPDATE NOTE

A.1 Implications of updated Plan Options / data

This HRA update note provides a review of the changes made to DPOs and the implication of scientific evidence on seabird foraging ranges that has emerged since publication of the draft Sectoral Marine Plan for Offshore Wind Energy in December 2019.

A.1.1 Updates to Plan Options

The changes that have been made in developing Plan Options (Figure 1) from the DPOs (Figure 2), following consultation of the Draft Plan for Offshore Wind Energy and summarised below. The implications of these changes on the conclusions of the plan level HRA are also discussed.

DPOs removed

SW1 DPO has not been chosen for progression as a final Plan Option, due to concerns regarding the potential scale of negative socio-economic impacts in this region (including negative impacts on seascape, landscape and coastal character).

NE5 DPO has not been chosen to progress as a final Plan Option due to the potential cumulative impacts on the fishing sector arising from development in this DPO, in-combination with existing and consented projects and other DPOs.

It can reasonably be concluded that the removal of SW1 and NE5 from the Offshore Wind Plan will reduce the potential in-combination effect with any currently operational or consented developments on mobile interest features of European/Ramsar sites. This is particularly the case for DPOs off the North East coast of Scotland where risks relating to impacts on Black-legged Kittiwake interest features of SPAs in the region were identified in the plan level HRA for the Draft Offshore Wind Plan. Whilst the risk of in-combination effects on Black-legged Kittiwake will reduce as a result of the removal of NE5, there remains uncertainty regarding whether this is sufficient to avoid an adverse effect on integrity (AEOI) and therefore there is still considered to be a need for 'temporal mitigation'³⁵ for NE4 and NE6 until further evidence is available.

³⁵ 'Temporal mitigation' on development was required for a number of DPOs (NE2, NE3, NE4, NE5, NE6 and E3). It was proposed that this would restrict development and would remain in place until such time that sufficient evidence was available regarding likely collision risk and kittiwake distribution to demonstrate that no AEOI would occur.

DPOs boundaries amended or reduced

W1 DPO has been chosen for progression as a final Plan Option, but has been reduced in area across all boundaries, in order to mitigate potential negative impacts on a range of sectors, including commercial shipping and seascape, landscape and coastal character.

NE1 DPO has been chosen for progression as a final Plan Option, but the portion of the site which overlaps with the Shetland Island Council's jurisdiction has been removed to reduce potential administrative burdens.

NE2, NE3, NE7, NE8 and E1 have been chosen for inclusion as final Plan Options, but have been reduced in area in order to avoid the areas of highest existing fishing activity highlighted by the fishing sector. In the case of NE3 the fishing sector had proposed a greater reduction in the area of the DPO, however, this would render the site commercially unviable and limit opportunities to mitigate impacts on other receptors (as required) at a project-level.

The reduction in the area of DPOs has the potential to reduce the in-combination effect on mobile interest features of European/Ramsar sites, in particular bird interest features of DPOs located in proximity to each other (e.g. NE2 and NE3). Although the potential for in-combination effects will reduce as a result of the reduced area comprising these DPOs, there is still uncertainty regarding whether an AEOI will be avoided and therefore there is still considered to be a need for 'temporal mitigation'³⁶ for NE2 and NE3 until further evidence is available.

DPOs no amendments made

N1, N2, N3, N4, NE4, NE6, E2 and E3 have been chosen for progression as final Plan Options without amendments. This will have no potential implications to the outcomes of the plan-level HRA.

A.1.2 Updates to foraging ranges

The draft Sectoral Marine Plan Offshore Wind Energy HRA that was published in December 2019³⁷ used the synthesis of available seabird tracking data that was available at the time of publication (Thaxter *et al.*, 2012) to determine the mean maximum foraging ranges to support the screening of SPA/Ramsar site bird interest features. The HRA initially applied a pre-screening 100 km buffer to capture all

³⁶ 'Temporal mitigation' on development was required for a number of DPOs (NE2, NE3, NE4, NE5, NE6 and E3). It was proposed that this would restrict development and would remain in place until such time that sufficient evidence was available to demonstrate that no AEOI would be realised.

³⁷ Draft Sectoral Marine Plan for Offshore Wind Energy: Strategic Habitats Regulations Appraisal. Available at: <https://www.gov.scot/publications/draft-sectoral-marine-plan-offshore-wind-energy-habitat-regulations-appraisal/> (accessed July 2020).

European/Ramsar sites within the buffer irrespective of the foraging ranges of the interest features. The mean maximum foraging ranges of species from Thaxter *et al.* (2012) that extended beyond the 100 km pre-screening buffer were used to screen in additional SPA/Ramsar sites into the HRA, specifically:

- Atlantic Puffin (105 km);
- Lesser Black-backed Gull (141 km);
- Manx Shearwater (330 km);
- Northern Fulmar (400 km); and
- Northern Gannet (229 km).

An updated synthesis of seabird tracking studies published at the end of 2019 as part of The Crown Estate's Round 4 Enabling Actions programme³⁸ incorporates the tracking studies considered by Thaxter *et al.*³⁹, and those undertaken from 2012 to 2019. This latest 2019 study provides updated foraging ranges for a number of seabirds, including the provision of a foraging range for Great Black-backed Gull which had not featured in the previous 2012 study. In particular, this latest study has identified significant increases in the mean maximum foraging ranges for Black-legged Kittiwake, Razorbill, Great Skua and Great Black-backed Gull. The implications of these updated foraging ranges on the conclusions of the plan level HRA are reviewed in the following sub-sections.

Black-legged Kittiwake

The extended mean maximum foraging range of Black-legged Kittiwake in the latest 2019 study means that a number of additional DPOs fall within the foraging ranges of SPA seabirds (specifically NE7, NE8, E1 and E2). Based on a review of other available spatial data^{40,41}, and the considerably lower density of Black-legged Kittiwakes that utilise these additional DPOs, it is not considered proportionate to apply the same plan level mitigation measures (e.g. temporal mitigation) that have been recommended for other DPOs (NE2, NE3, NE4, NE6 and E3) to these

³⁸ Woodward, I., Thaxter, C.B., Owen, E. & Cook, A.S.C.P. 2019. Desk-based revision of seabird foraging ranges used for HRA screening, Report of work carried out by the British Trust for Ornithology on behalf of NIRAS and The Crown Estate, ISBN 978-1-912642-12-0.

³⁹ Thaxter, C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolon, M., Langston, R.H.W. & Burton, N.H.K. 2012. Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. *Biological Conservation* 156: 53-61.

⁴⁰ Cleasby, I., Owen, E., Wilson, L., Wakefield E.D., O'Connell, P., Bolton, M. 2020. Identifying important at-sea areas for seabirds using species distribution models and hotspot mapping. *Biological Conservation*. Volume 241, January 2020, 108375

⁴¹ Wakefield, E.D., Owen, E., Baer, J., Carroll, M.J., Daunt, F., Dodd, S.G., Green, J.A., Guilford, T., Mavor, R.A., Miller, P.I., Newell, M.A., Newton, S.F., Robertson, G.S., Shoji, A., Soanes, L.M., Votier, S.C., Wanless, S., Bolton, M. 2017. Breeding density, fine-scale tracking, and large-scale modelling reveal the regional distribution of four seabird species. *Ecological Applications*, 27(7), 2017, pp. 2074–2091.

additional DPOs. Overall, therefore, the conclusions of the plan level HRA remain valid and do not require any changes.

It should be noted that individual project-level HRAs for offshore wind farm development will need to consider the implications of the increased mean maximum foraging range from the latest study⁴². This could result in additional SPA/Ramsar sites being screened into the project level HRA compared to the plan level HRA.

Razorbill

The extended mean maximum foraging range of Razorbill in the latest 2019 study is less than the 100 km pre-screening buffer that has been applied to the DPOs in the plan level HRA. This means that there is no change to the SPA/Ramsar sites that fall within this buffer. In addition, other available spatial data ^{43,44}, indicates that areas used by Razorbill are generally restricted to coastal areas of shallower water and are therefore unlikely to be affected by any additional DPOs to those already identified in the plan level HRA. Consequently, the conclusions of the HRA remain valid.

Great Skua

Great skua is generally considered of lower risk from offshore wind development compared to other species such as Black-legged Kittiwake and Razorbill⁴⁵. Therefore, whilst the extended foraging range of the latest 2019 study covers a greater area with more overlap with DPOs, the spatial distribution of Great skua throughout this area is uncertain and therefore the increase in risk from offshore wind development is not clear. Data collected by Pollock *et al.*⁴⁶ indicates that areas of highest usage are more likely to be in areas within the smaller foraging range of the previous 2012 study with lower usage towards the extended areas of the updated range. Therefore, whilst there is potential for minor changes to the assessment

⁴² Woodward, I., Thaxter, C.B., Owen, E. & Cook, A.S.C.P. 2019. Desk-based revision of seabird foraging ranges used for HRA screening, Report of work carried out by the British Trust for Ornithology on behalf of NIRAS and The Crown Estate, ISBN 978-1-912642-12-0.

⁴³ Cleasby, I., Owen, E., Wilson, L., Wakefield E.D., O'Connell, P., Bolton, M. 2020. Identifying important at-sea areas for seabirds using species distribution models and hotspot mapping. *Biological Conservation*. Volume 241, January 2020, 108375

⁴⁴ Wakefield, E.D., Owen, E., Baer, J., Carroll, M.J., Daunt, F., Dodd, S.G., Green, J.A., Guilford, T., Mavor, R.A., Miller, P.I., Newell, M.A., Newton, S.F., Robertson, G.S., Shoji, A., Soanes, L.M., Votier, S.C., Wanless, S., Bolton, M. 2017. Breeding density, fine-scale tracking, and large-scale modelling reveal the regional distribution of four seabird species. *Ecological Applications*, 27(7), 2017, pp. 2074–2091.

⁴⁵ Furness, R.W., Wade, H.M. and Masden, E.A., 2013. Assessing vulnerability of marine bird populations to offshore wind farms. *Journal of environmental management*, 119, pp.56-66.

⁴⁶ Pollock, C.M., Mavor, R., Weir, C.R., Reid, A., White, R.W., Tasker, M.L., Webb, A. and Reid, J.B., 2000. The distribution of seabirds and marine mammals in the Atlantic Frontier, north and west of Scotland. *The distribution of seabirds and marine mammals in the Atlantic Frontier, north and west of Scotland*, pp.1-92.

process for Great Skua, the conclusions of the plan level HRA are considered to remain valid.

Great Black-backed Gull

The latest 2019 study includes a foraging range for Great Black-backed Gull which did not feature in the previous 2012 study. This foraging range is less than the 100 km pre-screening buffer that has been applied to the DPOs in the plan level HRA and therefore there are no additional SPA/Ramsar sites that need to be screened into the assessment.

The DPOs within the Moray Firth which overlap with the foraging range for Great Black-backed Gull (NE2, NE3, NE4 and NE6) are already subject to the plan level mitigation proposed for Black-legged Kittiwake (i.e. temporal mitigation). Hence, concerns regarding Great black-backed gull would be managed through further work required to provide additional information on bird distribution in this area to address the mitigation requirement.

It is recognised that further consideration will be required at a project level of the foraging use by Great Black-backed Gull of sites in the north (i.e. N2 and N3). The plan level HRA concluded that that work required for the purposes of project level HRA would identify any areas of concern and support avoidance of significant adverse effects and these conclusions remain valid.

A.1.3 Further information raised during consultation

A number of stakeholder organisations (5) highlighted the requirement for HRA updates to be undertaken upon receipt of new evidence, such as the updated bird foraging ranges⁴⁷ which have been taken into account in this HRA update note (see Section D.1.2). No further information was provided during consultation that has any implications to the conclusions of the plan level HRA.

A.2 Summary

The DPOs that have been retained and/or modified as part of the final Plan remain subject to the application of plan-level mitigation measures. The Regional Locational Guidance and final Plan will highlight the need for consideration of adequate project-level mitigation measures to address any significant negative impacts identified by further assessment.

The publication of updated foraging ranges in 2019 provides further scientific evidence regarding the scale of potential impacts arising from development within the DPOs and the need to apply plan-level mitigation measures to address concerns

⁴⁷ Woodward, I., Thaxter, C.B., Owen, E. & Cook, A.S.C.P. 2019. Desk-based revision of seabird foraging ranges used for HRA screening, Report of work carried out by the British Trust for Ornithology on behalf of NIRAS and The Crown Estate, ISBN 978-1-912642-12-0.

regarding potential impacts on key seabird species and colonies. No further mitigation measures are considered to be necessary and the conclusions of the plan level HRA remain valid.

The Scottish Government, as the Responsible Authority, is currently preparing the Appropriate Assessment for the final Plan. This Appropriate Assessment will consider the potential likely significant effects of the Plan and includes consideration of the implications of the updated foraging ranges for the assessment undertaken.

Where data gaps have been highlighted by respondents, for example regarding migratory birds, further consideration of these issues will take place via the iterative plan review process, Technical Advisory Group and Ornithology Working Group. Annex E, in the Post Adoption Statement, provides further detail regarding how the iterative plan review process will be undertaken and the governance structure for the Plan.



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