moray offshore renewables ltd

Environmental Statement

Technical Appendix 1.3 C - Draft ES Consultation Responses

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TO: National Marine Fisheries Service (NMFS) Office of Protected Resources

FROM: Christopher Clark, David Mann, Patrick Miller, Doug Nowacek, Brandon Southall

SUBJECT: Comments on Arctic Ocean Draft Environmental Impact Statement

DATE: 28 February 2012

NMFS,

Please consider the following general and specific comments regarding the Effects of Oil and Gas Activities in the Arctic Ocean Draft Environmental Impact Statement (DEIS). These comments represent the combined views of five scientific collaborators identified below on some of the key topics regarding the issues specifically in the DEIS and the Arctic. We believe, however, that some of the issues raised herein are also more broadly relevant to how these issues are assessed and managed generally. The underlying science and complexity of analytical approaches has evolved rapidly over the last decade. The decision-making processes regulating such exploration activities, particularly in large areas of critically important biological habitat, must continue to evolve as well. While there are some promising aspects of the DEIS (*e.g.*, the recognition of the importance of aggregate exposure and interacting effects) the overarching analysis still suffers in many ways from an increasingly outdated way of considering potential impacts. As marine mammal scientists with expertise in bioacoustics, we believe that the scale of the potential acoustic risks requires an integrated scientific, regulatory, and industry approach consistent with our current understanding of marine mammals, and how they respond to and are influenced or impacted by combinations of impulsive and continuous sounds from a variety of sound sources. Our comments here are organized according to four key issues.

Cumulative effects

Impact assessments in MMPA authorizations for both oil and gas and scientific research seismic exploration activities have typically been limited to a specific survey, and the assessment has typically been limited to just the loudest sound source (*e.g.*, seismic airgun array). Given our rapidly evolving understandings and quantifications of the spatial, temporal and spectral scales of the acoustic footprints generated by these seismic activities as well as their potential and measured biological effects, this single-source regulatory approach is no longer appropriate. It is a positive step that the DEIS appears to recognize this fact and spends considerable time in considering the complexities and challenges of assessing aggregate sound exposures and interacting/cumulative impacts. It is the responsibility of regulators charged with implementing the MMPA to ensure that activities have no greater than a negligible impact on species and populations, to prescribe mitigations that reduce those impacts to the lowest possible level, and to ensure the availability of species for subsistence hunters. While the DEIS does expend considerable energy in describing and considering these issues, it fails to develop a coherent analytical framework by which impacts are assessed and how decisions are made. In short, this appears to be effectively a hollow consideration of these issues rather than an actual assessment of

the potential aggregate impacts of many overlapping or sequential activities and their potential impacts. We clearly realize these are difficult issues to handle and that a quantitative methodology or unifying principle to precisely define acoustic takes from cumulative effects is unlikely to emerge soon, if ever. However, some means of cumulative impact assessment is needed, even if it is only a qualitative risk assessment of factors such as timing of operations, variability in animal or environmental patterns, and overlapping stressors. Framing this in the context of a risk assessment methodology is a much more realistic and meaningful way of qualitatively assessing and constraining the uncertainty associated with these issues. By not adequately assessing the cumulative impacts and potentially interacting influences from the full complex of industry activities taking place in the same region, the DEIS seems at present to fall short of what is needed to allow NMFS to meet its statutory obligations for considering the combined activities being proposed.

Appropriate impact thresholds

The continued reliance on overly simplified, scientifically outdated, and artificially rigid impact thresholds used in MMPA rulemakings and environmental assessments to predict potential impacts of discrete events associated with seismic exploration is of great concern. The working assumption that impulsive noise never disrupts marine mammal behavior at levels below 160 dB (RMS), and disrupts behavior with 100% probability at higher levels has been repeatedly demonstrated to be incorrect, including in cases involving the sources and areas being considered in the Arctic DEIS. That 160 dB (RMS) threshold level originated from the California HESS panel report in the late 1990s[1] and was based on best available data from reactions to seismic surveys measured in the 1980s. Since then considerable evidence has accumulated, and these newer data indicate that behavioral disruptions from pulsed sources can occur well below that 160 dB (RMS) threshold and are influenced by behavioral and contextual co-variates. For example, migrating bowheads are known to avoid seismic airgun surveys in the Arctic at distances beyond 20 kilometers, where received levels are approximately 120-130 dB (RMS)[2]. Fin and humpback whales, in some circumstances, have been shown to cease vocalizing and vacate habitat in response to airguns over scales of 10,000 and 100,000 sq. mi., corresponding to relatively low levels of sound (Clark, pers. comm.). In sperm whales, airguns have been associated with a substantial decline in buzz rate, a proxy for prey capture attempts, at received levels on the order of 135-147 dB (RMS)[3] Finally, research in the Arctic has also shown that very few belugas in feeding areas occurred within 20 km of a full-scale seismic survey, but that there was an unexpectedly high density of

[1] High Energy Seismic Survey (HESS). (1999). *High Energy Seismic Survey review process and interim operational guidelines for marine surveys offshore Southern California*. Camarillo, CA: Rep. from High Energy Seismic Survey Team for Calif. State Lands Comm. and U.S. Minerals Manage. Serv. 39 pp. Available at: www.mms.gov/omm/pacific/lease/fullhessrept.pdf.

[2] Richardson, W. J., Miller, G. W., & Greene, Jr., C. R. (1999). Displacement of migrating bowhead whales by sounds from seismic surveys in shallow waters of the Beaufort Sea. *Journal of the Acoustical Society of America,* 106, 2281.

[3] Miller, P.J.O. M.P. Johnson, P.T. Madsen, N. Biassoni, M. Quero, and P.L. Tyack. (2009). Using at-sea experiments to study the effects of airguns on the foraging behavior of sperm whales in the Gulf of Mexico. Deep-Sea Research I 56, 1168–1181.

belugas at 20-30 km ranges[4]. Based on the site-specific propagation conditions, this suggests animals were displaced over quite large areas at distances for which the received level was ~ < 130 dB (RMS).

These are just a few examples of cases involving seismic airgun noise demonstrating significant deviation from the 160 dB step-function threshold approach historically used by NMFS[5]. There are of course other examples for which animals appear to have received levels exceeding 160 dB RMS with little or no apparent behavioral response, including some in the Arctic involving airgun noise. However, care should be taken in interpreting these cases since clearly the lack of observed avoidance is not necessarily indicative of a lack of impact (*e.g.*, animals that have a learned tolerance of sound and remain in biologically important areas may still incur physiological (stress) costs from exposure or suffer significant communication masking). The clear point of these observations is that behavioral response in nature clearly follows more of a probabilistic function that changes based on the species in question, behavioral state and other contextual issues. It has become painfully obvious that the use of received level alone is seriously limited in terms of reliably predicting impacts of sound exposure. However, if NMFS intends to continue to define takes accordingly, a more representative probabilistic approach would be more defensible. A risk function with a 50% midpoint at 140 dB (RMS) that accounts, even qualitatively, for contextual issues likely affecting response probability, comes much closer to reflecting the existing data for marine mammals, including those in the Arctic, than the 160 dB (RMS) step-function that has previously been used and is again relied upon in the Arctic DEIS.

Additional baseline data

As a simple observation in support of conclusions reached within the DEIS, we believe the extreme lack of sufficient baseline data on many key biological questions central to issues in the DEIS make an adequate assessment of impacts very difficult. The information gaps in many areas with relatively new and expanding exploration activities are extensive and severe enough that we believe it is too difficult for regulators to reach scientifically reliable conclusions about the risks to marine mammals from oil and gas activities.

Monitoring and mitigation

Under conditions when exploitation is determined to be acceptable, monitoring and mitigation plans on a wide range of temporal scales should become both a standard requirement and industry practice. These must be designed in a manner specific to the nature of the operation and the environment to minimize the risks of both acute impacts (*i.e.*, direct, short-term, small-scale harm as predicted from

[4] Miller, G. W., Moulton, J. D., Davis, R. A., Holst, M., Millman, P., MacGillvray, A., & Hannay, D. (2005). Monitoring seismic effects on marine mammals – southeastern Beaufort Sea, 2001-2002. In S. L. Armsworthy, P. J. Cranford & K. Lee (Eds.), *Offshore oil and gas environmental effects monitoring/Approaches and technologies* (pp. 511-542). Columbus, OH: Battelle Press.

[5] For further discussion and examples of this issue, please see:
Southall, B. L., A. E. Bowles, W. T. Ellison, J. J. Finneran, R. L. Gentry, C. R. Greene Jr., D. Kastak, D. R. Ketten, J. H. Miller, P. E. Nachtigall, W. J. Richardson, J. A. Thomas, and P. L. Tyack. (2007). Marine mammal noise exposure criteria: Initial scientific recommendations. Aquatic Mammals 33, 411-521.

Ellison, W.E., Southall, B.L., Clark, C.W. and Frankel, A.F. (2011). A new context-based approach to assess marine mammal behavioral responses to anthropogenic sounds. Conservation Biology, Volume **, No. *, 1–8. DOI: 10.1111/j.1523-1739.2011.01803.x

estimates of noise exposure on individuals) and to measure/minimize chronic effects (*i.e.*, cumulative, long-term, large-scale adverse effects on populations as predicted from contextually mediated behavioral responses or the loss of acoustic habitat). To date, standard practices for individual seismic surveys and other activities have been of questionable efficacy for monitoring or mitigating direct physical impacts (*i.e.*, acute impacts on injury or hearing) and have essentially failed to address chronic, population level impacts from masking and other long-term, large-scale effects, which most likely are the greatest risk to long-term population health and viability.

More meaningful monitoring and mitigation measures that should be more fully considered and implemented in the programmatic plans for the Arctic include:

1) Considerations of time and area restrictions based on known sensitive periods/areas;

2) Sustained acoustic monitoring, both autonomous and real-time, of key habitat areas to assess species presence and cumulative noise exposure with direct federal involvement and oversight;

3) Support or incentives for research to develop and apply metrics for a population's health, such as measures of vital rates, prey availability, ranging patterns, and body condition;

4) Specified spatial-temporal separation zones between intense acoustic events; and

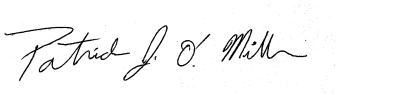
5) Requirements or incentives for the reduction of acoustic footprints of intense noise sources.

Sincerely,

Christopher Clark, Cornell University

David Mann, Loggerhead Instruments

Patrick Miller, University of St. Andrews



Douglas P. Nowacek, Duke University

Brandon Southall, SEA, Inc, UC Santa Cruz

FW: DRAFT Response to the MORL environmental reports.doc mar 2012..doc, Michael Wigan
Josephine
para:
Catarina Rei, Andrew Hamilton
29/03/2012 10:04
cc:
Stephen Appleby, Jennifer Wilmes, Sara Xoubanova
Mostrar detalles

Historial: Este mensaje ha sido respondido.

Dear all,

Please find below an email response from Michael Wigan to the draft ES chapter. Perhaps we should have a telecon to discuss.

Regards

Josephine

Josephine Henniker-Major

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From: Michael Wigan [mailto:mwigan@borrobol.co.uk]
Sent: 29 March 2012 09:58
To: Josephine
Subject: Fw: DRAFT Response to the MORL environmental reports.doc mar 2012..doc, Michael Wigan

----- Original Message -----
From: Michael Wigan
To: Jamie.McGrigor.msp@scottish.parliament.uk
Sent: Monday, March 26, 2012 10:17 AM
Subject: Fw: DRAFT Response to the MORL environmental reports.doc mar 2012..doc, Michael Wigan

----- Original Message -----
From: Michael Wigan
To: keith.williams7@tesco.net
Sent: Saturday, March 24, 2012 10:18 AM
Subject: Fw: DRAFT Response to the MORL environmental reports.doc mar 2012..doc, Michael Wigan

----- Original Message -----
From: Michael Wigan
To: Keith Williams
Sent: Wednesday, March 21, 2012 11:47 AM

Subject: Fw: DRAFT Response to the MORL environmental reports.doc mar 2012..doc, Michael Wigan

----- Original Message -----
From: Michael Wigan
To: Keith Williams
Sent: Wednesday, March 21, 2012 11:15 AM
Subject: Fw: DRAFT Response to the MORL environmental reports.doc mar 2012..doc, Michael Wigan

----- Original Message -----
From: Michael Wigan
To: keith.williams7@tesco.web
Sent: Wednesday, March 21, 2012 11:10 AM
Subject: DRAFT Response to the MORL environmental reports.doc mar 2012..doc, Michael Wigan

Response to the MORL environmental reports.

1. The sandeel survey done off Holland was commissioned by the 'owners' of the wind farm and is therefore not objective, secondly the wind farm is not described so the size of any impact is impossible to compare. This is an inadequate paper in the context.

2. The papers fail to understand salmon and sea-trout relevance in that there is no discussion of smolts. At the meeting held with river interests in Inverness it was made clear that the threat to smolts is paramount for salmon angling interests. Unless they are protected there are no salmon. This appears not to have sunk in. There is reference to elvers or young common eels, but these are fish returning to freshwater not leaving it. It is the impact on smolt's feeding as they leave rivers which needed attention and does not get it. At the meeting it was requested that development managers consider the possibility of not doing seismic and drilling work during the smolt run: this idea is omitted.

3 There is no mention of the considerable economic value of salmon fishings in the preface sections. They are treated the same as lampreys, or creatures without economic significance.

4 On the all-important matter of sandeels (basic feeding for outgoing smolts), the report concedes that nothing is known and then offers no precautionary suggestion about mitigating impacts.

5 Despite the admitted lack of knowledge about adult salmon migrations no proposals are made to lower impacts on them. The theme is, let's plough on regardless.

6 In the Biological Environment section there is mention of salmon's ability to respond to electro-magnetic pulses but apparently no understanding of the fact that they possess magnetite in their lateral line. Electro-magnetic orientation is part of the make-up, as identified in the multi-million pound international research done and recently published under SALSEA. Indeed, there is no indication the authors made any effort to acquaint themselves with SALSEA or are even aware of its existence.

7 It is mentioned that salmon swim in the upper water surface. This is incorrect. An acquaintance with current knowledge would disabuse the authors of this assumption. In fact, salmon dive deep. In any case in the Moray Firth project the

water on the sandbanks is shallow, so there would be very little water beneath any fish swimming through the development zone anyway.

8 The gobbledegook gives an impression of incoherent waffle. For example, the sentence, 'Indirect impacts may however occur if the ecology of the species is adversely affected' is meaningless and reduces any confidence that the authors adequately understand their subject.

In sum, this series of reports affords no comfort to migratory fish interests that their subjects are being catered for or afforded adequate protection.

Michael Wigan.
Manager: Helmsdale River Board.

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Mr Peter Moore
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By email: peter.moore@edpr.com

Our ref: AMN/16/H
Our Case ID: 201106710

26 March 2012

Dear Mr Moore

Moray Offshore Renewables Ltd Draft Environmental Statement Package 2: Offshore Human Environment and Onshore Environment
Pre-application consultation

I refer to your letter dated 31 January 2012 to Philip Robertson requesting our comments on the draft Environmental Statement (ES) prepared for the eastern section of the offshore development in the outer Moray Firth. It is our understanding that the project comprises the three proposed wind farms (Telford, Stevenson and MacColl) and the proposed OFTO cable route from the wind farms to Peterhead Power Station.

Our comments here relate to our statutory remit for scheduled monuments and their settings, category A listed buildings and their settings, gardens and designed landscapes appearing in the Inventory and designated wreck sites (Protection of Wrecks Act 1973).

Please find below the answers to the questions posed in your letter:

1. I can confirm that we agree with the primary, secondary and sensitivity assessment approach undertaken for purposes of the EIA.

2. We are content that the regulatory requirements for this project have been appropriately identified.

3. From our point of view the matrix approach using sensitivity of the receptor vs. magnitude of impact would be preferable for the assessment methodology.

4. We broadly concur with the conclusions reached in this draft ES in terms of the predicted impacts on heritage assets within our remit. With regard to marine assets, we confirmed in our previous letter of 15 November 2011 that there are no designations within our statutory remit located within the Inner and Outer Study Areas. However, there are some charted wrecks along the offshore subsea export cable route. We are satisfied that a Protocol for Archaeological Discoveries (PAD) will be put in place to mitigate construction impacts in the event of any unexpected

archaeological discoveries. In terms of the onshore heritage assets that can experience indirect impacts as a result of the offshore wind farms, given the distances involved we do not consider that these impacts would be of such a significance to warrant an objection from Historic Scotland. While a number of turbines may be visible from some nationally important heritage assets, in our view this would not have a major adverse impact on the key aspects of their setting. Notwithstanding this, please note that our comments here are provisional and we would need to see the ES and planning application to give our final view on the proposal.

5. We understand that the route of the onshore underground cable and location of the substation have yet to be finalised. We would welcome further consultation in relation to how these aspects of the proposal can impact on the onshore heritage assets within our remit in due course.

6. N/a.

7. Hard copy would be preferable.

I hope that this letter is of assistance to you. Please do not hesitate to contact me should you wish to discuss any of the issues raised in this letter.

Yours sincerely

Szupszynska

Urszula Szupszynska
Senior Heritage Management Officer

JNCC queries regarding the population modelling for developments in the Moray Firth

This brief has been produced following early review of the draft ES submitted by MORL, and aims to bring to the attention of Marine Scotland and the developer some fundamental issues that we recommend are considered at the earliest opportunity. We have a number of additional comments regarding the population modelling approach itself which we will articulate fully in further communication on the draft ES.

MORL have conducted population modelling to examine the population level impacts on a number of key species: gannet, fulmar, kittiwake, great black backed gull, guillemot, razorbill and puffin). These species are SPA features which are present at the MORL development sites, and are predicted to experience collision mortality and/or displacement/disturbance effects and hence will trigger the HRA process.

(We note that herring gull has not been modelled, however this species will also trigger the HRA process)

JNCC have not had sight of the draft ES for the adjacent Beatrice offshore wind farm, but we understand that they have also conducted population modelling, on presumably the same suite of species (or at least a significant number of them). However, we understand the modelling approach and hence outputs are different from that undertaken by MORL which presents challenges in consenting on the basis of these outputs, as detailed below.

Consistency

While we recognise that there is currently limited guidance on population modelling, and that developers use different experts at their requirements, interpreting outputs from differing population models for the same SPA populations raises questions regarding the validity of the models used.

The requirement for population models of the species listed will be common to a number of wind farm developments (albeit it for different SPA populations), and we suggest that ultimately the structure of population models for key species should be agreed upon across Scottish developments, including appropriate demographic rates.

For the projects currently in the consenting process, there is a need to establish the validity of the models used to support sound decision making. While we (SNH/JNCC) can provide feedback on the BOWL and MORL population models separately, we would be aiming to ensure that the most scientifically robust modelling technique has been applied, with consistency in the parameters. As has been supported throughout project development, we therefore urge collaboration between developers to ensure the population modelling is both consistent and informative.

Modelling the population impact of in-combination and cumulative effects

There are further implications for the assessment of cumulative or in-combination effects, which is a crucial aspect of both HRA and EIA. Cumulative effects are anticipated from Beatrice and MORL, including direct effects on the same SPA populations, and therefore both need to be considered through the in-combination effects aspect of appropriate assessment. This requires consistency in the derivation of conclusions on anticipated effects, and a consideration of the effects of other projects in the modelling.

Currently, the population modelling conducted by MORL does not take account of in combination effects of collision mortality or displacement/disturbance from Beatrice (or any

other development). The exclusion of in-combination effects from the population modelling will underestimate the impact to a population, and will not provide adequate information to support the undertaking of an appropriate assessment.

As an example, the predicted mortality for great black-backed gull arising from the Moray eastern development sites alone is 49 birds per year. However, if the predicted mortality arising from Beatrice and the western development area is included, the cumulative total is 225 birds per year. The outputs from the MORL PVA for this species appears to present that even the mortality from the eastern moray sites ALONE cause a 100% increase in probability of the population declining by 75%.

Recommendations

To account for the potential effects of other projects, we recommend modelling a range of scenarios and their implications for demographic rates (changes to survival and productivity), to include the predicted effects from the development site alone (including mitigation scenarios), and all combinations with other proposed projects (BOWL and he Western Development Area).

We therefore consider that action is needed to address the differences between the models from BOWL and MORL, with collaborative effort (and direction from Marine Scotland) to ensure that the applications are appropriate for supporting decision making.

There are a number of other questions regarding the population modelling which we will raise prior to the ornithological meeting on the 29th March.

There are some preliminary comments regarding the actual PVA work,

1. Neither the methods or results section are sufficiently detailed
2. Demographic rates will need to be carefully reviewed.
3. We query the use of standard error as a suitable proxy to model environmental stochasticity
4. There has been no model validation
5. No sensitivity analysis
6. No attempt to examine if the models built match the current population trends being exhibited by the populations under consideration
7. The starting population sizes largely originate from seabird 2000, and consequently are not current
8. The approach of halving the impact of displacement on productivity is questionable, the breeding pair will fail, irrespective of whether it is a male or female being displaced.

MORL draft ES – JNCC Comments on Appendix 9.7A – 22nd March 2012

JNCC have reviewed part of the ornithological aspects of the draft ES, and we present our comments in brief here, to enable the developer to make appropriate amendments. These comments specifically address Sections 1, 2 and 3.1 as refinements of these would mean that the consequent interpretative chapters may change and therefore we have not focussed on the conclusions made. We will look to provide further comments following discussion with the developer and Marine Scotland around the issues raised here.

Comments on the ES

Designated Sites

1. The process of initially defining a search area (and then refining with foraging range) applies predominantly in the breeding season. Seabirds in the non-breeding seasons and non-seabirds will require a different approach and should be accounted for.

2. For breeding seabirds, MORL use mean maximum foraging ranges which is ok but it would be good if they included some kind of buffer – a % or a SD of the mean max, to include SPAs close to boundary of mean max.

3. Maps would be really helpful to illustrate the SPA selection.

4. Foraging ranges should extend from boundaries of the wind farm site (s).

5. SPA list
    a. There are up to date population estimates for some SPAs – why have these not been used?
    b. They should account for trend
    c. What about FCM?
    d. Why is there 'no data' for a number of sites?

6. There are a number of species (most listed in Table 3) that have SPAs somewhere in the network. There needs to be some consideration of a process of account for the potential impact of the developments on SPA features from further afield, particularly for seabirds in the passage seasons (e.g. skua sp, tern sp).

7. 1.4 - Species on Annex 1 AND regularly occurring migratory species are protected within the network of SPA sites.

8. There is not a difference in level of protection between Annex 1 and ROM at a site level – therefore perhaps no point in distinguishing.

9. Table 3 – please define the meanings on the table headings

10. Why is Gannet not identified as 'SPA feature'?

11. How is 'SPA feature' defined – presumably this means SPAs within some area – foraging range perhaps? Or the generic 100km?

12. Could explanations be provided for the terminology used, i.e. what is the difference between 'frequent' and 'regular'; and how is 'regularly recorded' defined?

Impact Assessment

13. 1.5 -Impacts due to construction noise – what does this mean in terms of birds? Impacts to prey? Impacts to diving birds – is this distinguishable from disturbance/displacement during construction?

Data Collection

14. The primary data source is from boat based surveying. We have consulted on this during scoping and are satisfied that if conducted to ESAS standard the data will be adequate.

Data Analysis

Density analysis

15. This section outlines the method for calculating density of birds on the water. We request explanation of a) how densities of birds in flight were calculated, and b) how estimates of birds in flight and on the water were combined to produced overall density and abundance. If population estimates are produced from the on-water data alone (excluding birds in flight), these will under-estimate (in some cases considerably so) the total number of birds.

16. It is stated that recommendations from CREEM were incorporated into the methodology – could these recommendations be expanded upon?

17. It is noted that Distance analysis was not used to calculate density for species with fewer than 60-80 observations. What method was used instead to estimate density? We note that herring gull, with 58 observations, was excluded from distance analysis – we suggest in some cases it may be possible to fit a reliable detection function with less that 60 obs, and encourage MORL to examine the data on this species.

18. Table 10 - Presumably the numbers presented in this table refer only to birds recorded on the water (as only these would be eligible for Distance analysis). We note that 86 Arctic tern were recorded, can it be confirmed these were on the water?

19. Segments of transects – we query if the process of dividing transects into segments, and using the 48 segments as replicates has been checked with CREEM? The segments will not be independent sampling units.

20. Detection functions – for species with large number of observations (e.g. auk sp), it may be preferable to use a survey specific detection function, as opposed to a global one.

21. Were any covariates used to improve the detection functions?

22. The methodology section for Density surface modelling should be considerably expanded, it currently does not contain sufficient information to review the method used, however, a few initial comments:

23. The aims of using DSM should be made clearer - in what way will this process refine the estimates (better precision? Ability to produce estimates for sub-areas? Etc)

24. The term ‘usage’ would be better replaced with ‘density and distribution’ – usage suggests some added level of detail (e.g. birds were foraging).

25. Please expand on the preparation of the data - effort data needs to be segmented and sightings assigned to segments. The detection function is then used to correct counts on each segment and estimate density per segment (knowing the effective strip half width). Then density (or abundance) per segment in the response variable in the GAM

26. What is the effect of including covariates in both Distance stage, and the DSM stage (i.e. sea state?)

27. Please expand (and reference) the process of model selection.

28. Please detail the spatial resolution of the covariates.

29. How was autocorrelation in the data dealt with?

30. Methods for calculating both CIs and CVs should be detailed (for both Distance estimates and DSM).

31. Results - Tables (e.g. table 24) present both Distance-only and DSM data . No CIs are presented for DSM – why not? Presumably the 'DSM' column is abundance, nothing explains this in the table legends or column headers.

Collision Risk

32. More detail is required in this section – MORL offer to supply spreadsheets of the analysis for each species – we agree it would be useful to supply one or two example spreadsheets.

33. The statement 'Flights observed at PCH were extrapolated up in order to estimate the number of individuals that would be likely to pass through the risk area per year', is not very clear and seems to suggest that density of birds in flight was not used to calculate collision risk. If using the Band 2011 recommendations, density would be the correct metric.

Displacement analysis

34. Does the mean breeding season population estimate include birds in flight?

35. The proportion of non-breeders (at 50%) was suggested by JNCC/SNH if there was an absence of species specific data – has this been found to be the case for the species modelled? Have age classes been used to examine the % of pre-breeders, for example pre-adult gannets should be distinguishable and recorded.

36. We note that the 'realistic approach' (nice choice of phrase) is based on the Robin Rigg data set that JNCC have not seen. Until the data set is available (with accompanying methodology and sample sizes) then we cannot comment on it's general applicability. It is encouraging however, that the 'realistic approach' figures fall within the range of displacement we suggested be modelled.

Population modelling

(We attach a separate document detailing our concerns relating to the population modelling).

Migration work

JNCC Comments on the **Moray Offshore Renewables Ltd Draft Environmental Statement Package** and additional questions in relation to Marine Mammals.

JNCC have briefly reviewed the draft ES, but aim here to provide high level, general advice to influence the final ES. We have focussed on answering the questions as posed by MORL as they focus on the key issues.

Original questions relevant to marine mammals

1. **Do you agree with the primary (assessment of the three wind farms as one overall unit), secondary (assessment of the individual wind farms) and sensitivity assessment (of combinations of the individual wind farms where geographic differences are present) approach to the EIA?** YES

4. **Do you have any comments on the results of the impact assessments or the mitigation and monitoring proposed?**

Given some areas of uncertainty in the framework (e.g. harbour seal and bottlenose dolphin behavioural responses to pile driving) we may advise the regulator that a research and monitoring programme should be put in place by the regulator in collaboration with the developers in the area to increase the evidence in those areas. In particular, the evidence on seal and dolphin behavioural responses to piling noise is limited and research could be put in place to help address this.

5. **Have the most likely and significant effects been identified and assessed in the draft ES? Are there any others that should be considered for inclusion in the final ES and if so why?** YES

6. **Potential effects on designated sites and species have been considered within each relevant ES chapter (e.g. marine mammals, ornithology). Are you happy with this form of presentation, or would it be beneficial to collate and present separately the information that may be used to inform Habitats Regulations Appraisal?** YES

Additional questions

1. **Are you satisfied with the rationale given for not using a 186 Db threshold for permanent threshold shift (PTS) onset in seals. If you do not agree with our suggested use of a 198 dB threshold, what value would you suggest is more appropriate and why?**

Whilst we are satisfied with the rationale given for not using the 186 Db threshold for permanent threshold shift (PTS) onset in seals, we remain unconvinced that there is more supporting evidence for using 198 Db for seals. Therefore we would advice MORL to also present the assessment using the 186 Db threshold so that it provides an idea of the range of potential impacts and a visualisation of this unlikely scenario. This should also demonstrate how sensitive is the assessment framework outputs to this parameter. We currently think it is reasonable to assume that the true average threshold for the onset of PTS might lie somewhere between the 186 and the 198 Db thresholds and therefore it would be useful to see what difference to the overall conclusions that would make.

2. **Are you satisfied that the methodology described in the seal assessment framework is clearly explained and represents a logical and robust framework for assessment of potential noise impacts upon harbour seals from piling activities within the Moray Firth? If not, how would you prefer to see these impacts assessed?**

We are in general satisfied that the approach undertaken by MORL is the best currently possible and it is presented in a logical and robust framework that we anticipate will enable SNCB's advice and decisions by the regulator to be made with a reasonable level of confidence. However, we await the conclusions of the peer review process that will highlight any areas that might benefit from further exploration.

We welcome the incorporation of SAFESIMM and an exploration of possible piling scenarios and seal recovery times in the final ES. We would also welcome clarification of how appropriate it is to use the percentages of population per 4x4 cell to estimate those individuals affected by disturbance, i.e. is it a reasonable assumption that in one year the maximum number of animals that could be displaced correspond to the sum of percentages from the 4x4 cells within the noise impact footprint?

We assume that for the final ES different piling locations will be used in the model. It will be useful to see some discussion around the representativeness of any chosen piling location, i.e. would this represent an average scenario in terms of the number of animals displaced/injured? Would another location make much difference to the outputs?

In line with some of the comments above, we would welcome the exploration of the sensitivity of the final outputs to different parameters in order to identify those that seem to have a greater influence in the final outputs. In particular, it might be useful to see a number of different simulations using a different range of values, for those datasets and parameters for which the confidence is medium to very low.

3. **The seal assessment framework discusses how this approach could be applicable to other marine mammal species within the Moray Firth. Which other species do you consider this approach should be used for, and what alternative approach should be used for the remaining species of interest?**

The approach as it is or variations of it could be used for all species of concern, although acknowledging that the quantity and quality of data will vary and will result in varying needs for expert judgement and consequently the level of confidence in the assessments. We are keen to see this approach adapted for the east coast bottlenose dolphin population and acknowledge the additional information presented that will be considered for the final ES. We would expect to see an assessment of the potential cumulative effects on the east coast bottlenose dolphin population from all windfarm developments within the range of this population, not just that potentially arising from concurrent periods of construction but also subsequent ones.

For species which are part of wide ranging larger populations (harbour porpoise, minke whale, whitebeaked dolphins), although we acknowledge the usefulness of such approach we advise that the assessment of potential population level effects needs to be carried out at the strategic level by the regulator taking into account several developments within the large ranges of the populations and not by individual developers as given the number and scale of developments this would not be feasible. However, in the final ES we would expect to see an estimation of what potential contribution will the MORL development do the overall potential impact (i.e. how many days/area affected by piling and how many individuals could be affected and in what way) as presented in the draft ES. This should be then put in the context of population estimates and Favourable Conservation Status assessments (from 2007).

4. **Do you agree that a 25 year timescale (with the rationale as described in the seal assessment framework paper) is appropriate as a period of assessment for the population modelling that has been undertaken? If not, what timescale do you consider more appropriate?**

Yes, we agree with the 25 year timescale and the rationale behind it.

MORL draft ES package 2: -MCA comment

Graeme Proctor to: Peter Moore 20/03/2012 15:00
Cc: "Paul Townsend"

Peter

The draft ES has been reviewed the following structural comments are offered:

The first point is one of presentation, the structure of the document makes it extremely hard to navigate around, it took some time to work out the inter relationship between the sections, you have the main ES within which I find the appendix on Shipping & Navigation inside that are technical appendices and further appendices to the appendices!. Reading back, this sentence is clearly difficult to interpret, which reflects precisely the problems with the structure of the overall ES, to assist future readers I suggest this needs to be addressed before the document is finalised.

Moving onto more technical issues, the ES and NRA have been reviewed against MGN 371, the compliance checklist details noted, the following comments are provided:

It is noted you have adopted the Rochdale Envelope approach to scenario development for turbine and OSP layout. Unfortunately this does not lend itself to supporting a constructive NRA review, scenario 1 & 3 place substations in odd isolated locations, which does not sit well from the NRA perspective. The shape of McColl places isolated turbines at the NE corner and more pronounced isolated structures to the SW arm which raises significant concerns from the risk perspective, and should be avoided. The general issues identified with the proposed scenarios have been used to apply the NRA review, consent will be subject to submission of finalised layout plans against which conditions will then be applied. It would be helpful if the scenarios adopted a more realistic rather than the current purely generic approach to help address the NRA issues.

It is of concern that turbine layout may not be homogonous across the zone, para 4.4.2 of the ES referring to different turbine ratings for each of the three wind farms, this raises a number of issues regarding the development, which is now effectively three separate wind farms. ID marking may become interrupted and confusing, WTG grouping may result in isolated or separated blocks, MCA would seek assurances that the three windfarms are planned to ensure structures are effectively blocked together as per suggested groupings at 4.4.2.but taking due cognisance of concerns raised in previous par

In developing the ERCOP, the distinct and separate wind farm developments within the licence area need to ensure that a cohesive approach is developed ensuring a single ERCOP provides full cover across the development area, this will have to include the operation and management of the OSPs which may be under the control of a third party.

If the semi submersible approach to OSP is undertaken the NRA will need to address any impacts from the mooring arrangements which will also require the provision of a Third Party Verification (TPV), it is essential that any deployed mooring arrangement or cable arch does not impact drafts for shipping or general fishing activity.

Cable routes and burial indices need to be carefully addressed, where trenching cannot be achieved to the required depth, any protection

methods that produce a reduction in available water depth should be such as to ensure that no impact is placed on surface navigation of transiting vessels. Cable routes need to ensure existing anchorages are not impacted it is noted the proposed route passes through a recognised anchorage in Fraserburgh Bay. Comment at 13.3.2.3 that vessels will migrate away from the anchorage once the cables are laid cannot be assumed, It is a charted 'recommended anchorage' as such MORL will have to ensure adequate sea room for vessels to effectively use it.

Any proposed operational safety zones will require formal justification as part of the application process upon which the MCA will consider the application.

Para 3.3 of the NRA refers to the clearance height of 22m above HAT, this is correctly reported in figure 3.5, but in the sentence that immediately precedes the figure the reference is above LAT and needs to be corrected.

Despite earlier comment, the NRA section on salvage and SAR remains incorrect, currently placing the full burden of response on the MCA, furthermore ETV contracts have now lapsed and therefore need to be removed.The Shipping Minister has made it very clear that wind farms will need to be able to manage a self help response to handle an emergency within their development. The emphasis of the statements needs rewording to place responsibility for 1st response with the developer/operator, for both emergency tug provision and initial evacuation/SAR activity. Details of that response resource should be provided in this section.

I hope this information is helpful in progressing the production of the final Environmental Statement, please let me know if you require any clarification on the points raised.

Regards

Graeme

Graeme Proctor
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>>> Peter Moore <Peter.Moore@edpr.com> 31/01/2012 19:08 >>>
Dear Sir/Madam,

Moray Offshore Renewables Ltd (MORL) recognise the scale of the project

that we are proposing is large. Therefore, as agreed following the positive consultation undertaken to date, and in order to address the concerns of as many organisations as possible, we are including the additional step of publishing and consulting on a draft Environmental Statement. We appreciate that this may mean additional work for your organisation, however it will allow concerns to be better addressed and

provide more time for potential solutions to be found prior to our formal
submission of the planning application to Marine Scotland in July 2012.

Please find below a link to the draft ES for the offshore human environment of the three proposed wind farms (Telford, Stevenson and MacColl) in the outer Moray Firth and the onshore assessments for the associated OFTO route (from the wind farms to Peterhead Power Station). A
CD copy is also in the post.

https://www.yousendit.com/sharedFolder?phi_action=app/orchestrateSharedFolder&id=gnE2o63b7N5G_fASQu7jDJKEvO5LgdGv_SE3_BSRBVI

The link contains the following ES chapters and relevant appendices:

- Introduction (previously submitted)
- Regulatory and Policy Context (previously submitted)
- EIA (previously submitted)
- Project Description (previously submitted)
- Public Engagement(previously submitted)
- Metocean and coastal processes (previously submitted)
- Designated sites baseline (previously submitted)
- Commercial Fisheries
- Underwater noise baseline (previously submitted)
- Natural fish (previously submitted)
- Shipping and Navigation
- Archaeology
- Socio-economics, Recreation and Tourism
- Onshore Ecology
- Onshore Hydrology.

The draft Project Environmental Management Plan is also included. The draft Decommissioning Plan will not be released as part of this stakeholder engagement programme. As detailed above, several chapters are
included here that were previously submitted to relevant consultees in the
first draft package. These chapters have not changed, but have been included for ease of reference as they feed into some of the newly submitted chapters (e.g. the natural fish chapters are included as they

are referred to in the Commercial Fish chapters).

We would particularly appreciate written feedback on the following questions please:
Do you agree with the primary (assessment of the three wind farms as one
overall unit), secondary (assessment of the individual wind farms) and

sensitivity assessment (of combinations of the individual wind farms where
geographic differences are present) approach to the EIA?
Have all the regulatory requirements that the project should be taking

into account been identified?
Two approaches to the impact assessment methodology have been used; the

matrix approach and the IEEM guidance 2010 approach. Please confirm which
approach should be used within the final ES?
Do you have any comments on the results of the impact assessments or the
mitigation and monitoring proposed?
Have the most likely and significant effects been identified and assessed
in the draft ES? Are there any others that should be considered for inclusion in the final ES and if so why?
Potential effects on designated sites and species have been considered

within each relevant ES chapter (e.g. marine mammals, ornithology). Are
you happy with this form of presentation, or would it be beneficial to

collate and present separately the information that may be used to inform
Habitats Regulations Appraisal?
Would you prefer to receive the final ES and technical appendices in hard
copy, on CD or both?
The Seascape, Landscape and Visual Impact Assessment (SLVIA) will be issued as the third and final standalone package to relevant stakeholders
on 17 February.
Please note that this does not constitute a formal planning application

but is intended as a pre-application consultation and as such its circulation is limited to key stakeholders. Please contact us if you wish
to consult with any external individuals or organisations. We are keen to
consult on this through February and March and it would be very helpful if
you could let me know what dates you are/are not available towards the end
of February and in March.
Please contact me at the below address if you require any further information or would like to discuss any aspect of the proposals. Please
note that I will be on leave for three weeks in February, please contact
my colleagues catarina.rei@edpr.com, sarah.wright@edpr.com or andrew.hamilton@edpr.com in the meantime.
Best wishes,
Peter

Peter Moore
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If you are interested in finding out more about the service,
please visit our website at
http://www.btignite.com/internetservices/btnet/products_virusscreen.htm

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Marine Scotland Science comments on the MORL draft Environmental Statement Phase 1.

Marine Scotland Science has reviewed the documents submitted to MS LOT and provided the following comments on the marine and physical environment, benthic ecology and fish, shellfish and commercial fisheries.

Marine Physical and Environment

Chapter 7 Pages 66 – 72, Chapter 11 pages 187 – 197, and Chapter 13 pages 266 – 272 of the environmental statement (ES) were reviewed with particular attention to potential changes to the physical environment. These chapters were found to be well written, generally well organised, and considered all the relevant physical environmental impacts. There were a number of references to technical appendices, which were not supplied. We would be happy to review these technical appendices, ABPmer (2011 a, b, and c), in addition to the core of the ES. The comments below refer only to the core of the ES.

Chapter 11 - Offshore Generating Station

We have some concerns over the statement at the end of page 194, "Given no significant effect on the driving parameters, there can be no corresponding difference in the potential rates and directions of sediment transport through the site". The effect on the driving parameters is expected to be, according to this ES, up to 19% decrease in the significant wave height. The ES argues that this decrease is within the range of natural variability, and that therefore there is no significant effect on the driving parameters. This could well be the case, it would be useful to review the relevant technical appendix to find out more, but it could also mean that some of the largest naturally occurring waves, for example 1 in 1 year storm waves, are reduced significantly. The ES mentions in section 7.5.4.1 (p. 71) that such storm waves are responsible for much of the wave driven transport of the coarser sediment. This may lead to a degree of sediment retention, i.e. net accretion, in the area. This is acknowledged to an extent at the beginning of page 195, but we would recommend that the statement above be altered slightly to acknowledge this possible effect of the reduction in significant wave heights. We would also recommend the removal, or alteration, of the statement "However, as stated above, the absolute difference in sediment transport attributable to the wind farm is less than the potential for natural variability over the same period" near the beginning of page 195. We would question the validity of the developer's conclusion that there will be "no effect on the form and function of Smith Bank" (p. 195). It is acknowledged that the 19% change is a worst case scenario given particular wave forcing conditions, and that the possible effect is therefore very slight. It should still be acknowledged in the ES though. We would suggest that there is a potential danger here, when assuming that just because something is 'within natural variability' it is okay. In particular, this is a dangerous assumption when it is the extremes of the natural variability that are potentially the most important/significant, as is the case in this example. Figure 1 illustrates the above issue.

The section on 'designated coastal habitats' (p. 195) relies, to an extent, on the above assumptions. There may, therefore, need to be some rewording in this section to account for any changes made in response to the above concerns.

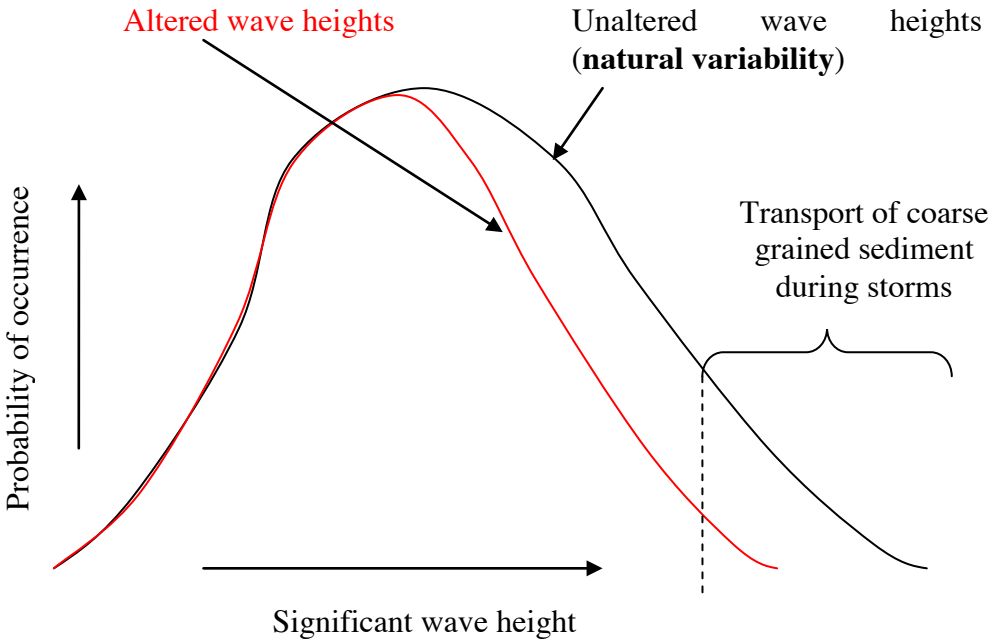

Figure 1. Illustration of the potential change in the entrainment of coarse grained sediments during storms.

Chapter 13 – Offshore Transmission Infrastructure

The cable landfall may change the rates of longshore sediment transport and should therefore be considered of minor significance.

Minor suggested edits:

- p. 193 suggest rephrasing the second bullet w.r.t drilling to "A maximum increase in SSC above ambient levels of 20 mg/l or less, 500 to 1000m downstream, and 10 mg/l or less, 2000 to 3000m downstream"
- p. 193 consider rephrasing "Impacts are generally of a magnitude less than the natural range of variability…" to "Impacts are generally an order of magnitude less than the natural range of variability…"

Marine Fish, Shellfish and Commercial Fisheries

Chapter 9 pages 115 – 133, Chapter 11 pages 210 – 237, Chapter 13 pages 280 – 291 and Chapter 17 pages 319 – 322 have been reviewed and the following comments provided. These comments are primarily given with respect to marine fish, shellfish and commercial fisheries. Generally the ES draft is well written, organised and has covered the majority of the key issues and impacts that could potentially be encountered as a result of developing this site.

Fish baseline

When describing commercial species/fisheries it would be worth while including figures with average value landed in £ as this will give a better indication of the commercial importance of the species to the fishing industry.

Other than the mention of freshwater pearl mussels, there is very little information of any other shellfish of conservation importance. *Arctica islandica* are listed on the OSPAR list as an important species and are known to be present in the Moray Firth area.

General comments
The table headings nomenclature appears to start at 17 and carry on. Would this not be better starting at 1 for this section as in previous sections i.e. 9.3.1 instead of 9.3.17?

Wind farm site

Table 11.2.2.2. Ensure that units are supplied for all the parameters. Several have been missed out in the draft. (diameter of GBS given as 65 this should say 65m).

When describing 'Loss of habitat' in table 11.2.2.2, will the affected area not be 125m diameter (dredger affected diameter table 4.1) instead of the 65m diameter as quoted, Its noted that the 65m would be net loss but this is assuming that the 125m area that is initially disturbed y ground preparation/dredging is suitable for re-colonisation by similar organisms post disturbance, and that this re-colonisation actually takes place.

Has there been any consideration for maintenance noise?

When considering 'Changes to fishing activity' the inter array cabling and cable route should also be considered as this may affect types of fishing that can occur and may exclude fishing on parts of the ground depending on whether/what cable protection systems are used rather than deep burial of the cables.

Disturbance during construction
How long will construction take? We agree that a short, low level of sedimentation will only have a minor negative effect but if the construction and associated sedimentation will be taking place over a prolonged period of time then this may in fact pose a more significant impact. Especially when looking at early life stages of fish and also on sandeels in general.

Is 264 days of activity over 4 years really short term?

More information, specifically around timing and length of construction, would be useful to help clarify the significance of potential herring, sandeel and cod impacts.

The important question with regards to habitat disturbance/loss for sandeels and herring is what proportion of suitable habitat in the area will be disturbed/lost? Not what proportion of the whole wind farm site will be disturbed, as indicated by the 2.03% figure given on page 214.

Noise
We agree with the developer's assumption that salmon and sea trout will transit and forage within and around the proposed site. As a result we would recommend that the developer take a precautionary approach to the assessment of the potential of impact and change this to minor-moderate significance and probably.

Has the developer considered that due the possibility that the herrings drive for reproduction overrides its avoidance to noise that this may result in fish entering areas of noise which may be harmful and would have otherwise been avoided?

Unless the developer can prove that cod are not present in/around the site we would again recommend the developer re-assess the potential for impact of noise on cod to probable. Especially as the impact has been considered of moderate-major significance. This could apply to both construction and operational noise.

Loss of habitat
As mentioned above the loss of habitat should look at the percentage loss of suitable sand/gravel habitat and not just the loss against the whole wind farm site. We would recommend that this is assessed before the potential impact can be considered as of minor significance and unlikely.

There is a limited ability for sandeels to cope with loss of habitat or any other form of direct impact as they tend not to move from settled locations. Until locations of actual turbines can be given its difficult to see how the impact on sandeels can be assessed accurately. We would recommend that this impact be considered as minor-moderate significance and probable pending the results from the sandeel survey.

General comments
Several errors in references/citations as follows:

Berge cited as 1979 but referenced as 1978.
Birtwell cited as 1991 but referenced as 1999.
de Groot 1980 citation should have a capital D.
Hawkins and Johnston 1978 cited on pg 215 but not referenced.
Brown 1961 cited on pg 230 but not referenced.
Leonhard and Peterson 2005 cited on page 225 should be Leonhard and Pederson 2005.

Transmission works

Disturbance
As discussed in the wind farm section above, we would recommend the total area of disturbance and not just the net disturbance be assessed for impact.

General comments
Several errors in references/citations as follows:

Berge cited as 1979 but referenced as 1978.
Ellis cited as 2011 but referenced as 2010.
Hvidt cited as 2005 but referenced as 2006.
Viana 2009 cited but not referenced.
Moore 1990 cited but not referenced.

Cumulative impacts (17.2)

Table 17.2.1 Commercial fisheries should be included if displacement is likely to occur.

Noise
It is misleading to class the overall cumulative impact of noise as minor when salmon and sea trout may be minor-moderate, herring is moderate and cod moderate to major.

Changes to fishing activity
Displacement and changes to fishing activity should not be classed as not significant if it has been stated that the potential for impact is dependent on the level of activity that is resumed.

This implies an impact could occur and if fishing is displaced as a result this could mean a moderate to major impact both on the fishers who will have increased competition but also on the fishing grounds themselves as there may be increased fishing pressure on a smaller fishing area resulting on increased pressure on the fishery/stock. For example, in terms of the scallop fishery, if the areas where the vessels are displaced to are a source for spawning then this could result in a detrimental impact on the scallop stocks in the area.

Commercial fisheries

The statement that squid tend to be fished on hard ground appears to be contradicted by the map depicting the various squid vessels fishing grounds. A large proportion of which are within the proposed site and on predominantly softer/sandy sediments.

We would also recommend that the developer looks at the value in £s of landings rather than just the weight as the value will provide a clearer indication of commercial value/importance of the various fisheries and species.

Complete exclusion of fishing by the scallop fleet from the MORL site due to inter array cabling would pose a significant impact to the fleet and potentially to the stocks if displacement caused increased pressures on scallop stocks.

Benthic Ecology and the Biological Environment

Chapter 9 pages 100-108, Chapter 11 pages 198-209 and chapter 13 pages 273-279 have been reviewed and the following comments and suggestions have been provided below. The developer has covered most of the key issues with only a few exceptions however we would recommend that there be some quality checking done on the document as there are several grammatical and spelling mistakes along with missed references.

Benthic Ecology
On page 103 can the developer provide the species names for the sandeels recorded within the beam trawl.

On page 106, Para. 2, the full scientific name should be provided for Salmacina and Filograna as it is later on in the paragraph.

In table 9.2.4, the developer should check the name spacing in table – *Hippasterias phrygiana*

General comments
QA section as there are several grammatical/spelling and italic errors.

When using scientific names for the first time in a section these should provided in full, after which the genus name can be abbreviated. (e.g. *Lumbrineris gracilis* not *L.gracilis*)

Nomenclature of figures and references in the text do not appear to be consistent. (e.g. Plate 9.2.2 is this plate 2)

Johnston *et al* 2002 cited p100 but not referenced.
Greathead *et al* 2007 cited on pg 101 but not referenced.
Ware, S., J & Kenny, A., J., 2011 is referenced but not cited in the text.

Biological Environment – Wind Farm Site
We do not agree with the examples given of fast burrowing polychaetes, both *Magelona* and *Spiophanes* are accepted as being sedentary polychaetes, which we do not believe to be particularly fast burrowing.

When the developer is assessing the potential significance of sediment disturbance on page 2004 Para. 1, they have established that there will be an impact however this will only be a minor impact. Yet the developer has highlighted this as not significant. We would recommend this is changed to minor as there is a perceived impact therefore it must be above no significance.

Can the developer provide evidence to support the claim that "Active borrowers will be able to re-locate to preferred feeding depths following burial and those which feed upon surface and sub-surface deposits may actually benefit from raised SSCs as a result of increased food availability."

The deposition of sediment to 5.1m is considered to be a significant amount. We would therefore consider this to be a significant, admittedly localised, impact. We would also dispute the statement that all crabs and prawns are highly mobile. Some will be buried and the developer should note this.

The developer should consider that the change in benthic species diversity as a result of creating artificial reef from the rock armour/scour protection and the turbine structures themselves may constitute a significant impact. These communities are likely to very different to the natural occurring communities that are indigenous to the site.

The spreading on NIS is a very important issue and of high importance. We would recommend taking a precautionary approach and reassessing this impact as moderately significant.

The developer has concluded that "Potential effects on physical conditions and related biological changes due to the operation of the wind farm are therefore anticipated to be not significant". This assessment does not reflect the significant amounts of disturbed sediments. This is a significant impact; therefore we recommend this be raise to moderate.

When assessing decommissioning of the turbines. There has been no mention of the effects or problems associated with the build up of dead shells and other debris around the bases of the turbines. Are these deposits to be removed on decommissioning?

General comments
MORL 2010 cited on pg 106 but not referenced.
Picken 1986 cited on pg 205 but not referenced.
None of the references on pg 205 Para. 8 are not in the reference list.
Olenin *et al* and DEFRA report 2011b cited on pg 206 not in the reference list.
Hitchcock *et al* 1996 referenced but not cited in the text.
Hitchcock *et al* 2004 referenced but not cited in the text.

Is the Tyler-Watts 2008 citation on pg 203 the same as the Tyler-Walters reference as given in reference list?

Biological Environment - Transmission Works
The Annex 1 stony reef and *Sabellaria spinulosa* reef are protected habitats; theoretically no trenching or disturbance that had a damaging effect on these habitats would be permitted under current legislation.

The developer has assessed the impact significance of this as moderate but we would conclude that a detrimental impact to an Annex 1 habitat would constitute an impact of major significance.

In paragraph 2 on page 277, the reduction of habitat and subsequent reduction in species diversity expected as a consequence of mattressing/rock dumping along the cable route etc would constitute a negative impact. The developer should highlight this.

Due to the limited evidence supplied supporting claims that the annex 1 habitats are patch and not continuous we would recommend that it would be difficult to say that micro-siting of the cables would have only a minor impact. If the developer could provide sufficient supporting evidence for these claims then this impact may be reduced by mitigation but as the evidence stands this is difficult to claim.

The "change to the ambient sedimentary habitats to a more heterogeneous course, hard substrate" could be assessed as minor rather than not significant if the increase in species biodiversity is to the determent of indigenous species.

General comments
Is the Tyler-Watts 2008 citation on pg 203 the same as the Tyler-Walters reference as given in reference list?

Geology – Physical Environment
Chapter 6
More information on the percentage distribution of sediment size fractions for the sediment samples collected would be really useful. %>1 mm, %<1 mm - > 0.5 mm, %<0.5 mm >0.25 mm and so on.

The information presented in Chapter Six referenced the Technical Appendix Chapters for 11, 12 and 15. Based on the information provided in the sections 2.5.2, 2.5.3 and 3.1 of the appendix, I have made the following comments.

Will individual turbines installed using GBS be located only at sites that have 5 m or more surface marine sediments?

The rates of extraction quoted in section 2.5.3 are based on the aggregate extraction of unconsolidated sand and gravels. How would the rates of 3 to 4 hours to fill a 5,000m3 hopper compare to sediments comprising:

- ☐ Lower Cretaceous Clay
- ☐ Glacial till
- ☐ Finer materials associated with deeper waters.

If elements of the above are likely to be encountered during the preparation for the installation of the gravity based structures, how would this influence the time required to extract almost 40,000m3 per installation? Have the potential impacts associated with prolonged sediment extraction been taken into consideration? What disposal options have been considered for the extracted sediment? What will be the potential impacts arising from the disposal of 1,200,000 m3 of sediment (300 x 40,000m3). The maximum sea disposal operation in Scottish waters is the Grangemouth Harbour operation which would still be less than the proposed volume being considered for the MORL. Will the sediment be reused as ballast in the GBS?

Were boreholes collected from the application sites to ground truth the sub-bottom profiling? Were samples taken to assess the physical properties of the glacial till and Cretaceous Clay?

Section 3.1
Will sediment mobilisation occur at the sea bed during dredging/extraction as well as resulting from the discharge of overspill at the surface?

Section 13.1.3
The information within section 13.1.3 refers mostly to the terrestrial environment. However, I have a couple of comments related to Section 13.1.3.4.

Increase of Coastal Flood Risk
The potential for flood risk could be easily assessed using GIS or through information held by SEPA. Can the developer demonstrate why the cable construction route through the dunes is unlikely to affect the integrity of coastal flood protection systems?

Damage to Geological or Geomorphological SSSI sites
Can the developer put the excavated area into the context of the areal extent of the SSSI?

DRAFT MARINE, PHYSICAL AND BIOLOGICAL ENVIRONMENTAL STATEMENT BY MORAY OFFSHORE RENEWABLES

We note that the area around the Moray Firth contains a number of SACs for salmon and is probably an important area in terms of migration for salmon, sea trout and eels, with the potential to affect rivers greatly distant from the actual development.

16. Right pane. The references to Chapter 9.2 icw fish and fisheries should be to Chapter 9.3
78 - 79 We note that Hawkins and Johnstone (1978) is provided as the reference on noise reception for salmon. The developer should confirm that this is still the best source of information and that there are not additional sources of information e.g. Knudsen et al., (1994). They should also clarify whether they have read and considered the review of EMF and noise impacts commissioned by SNH
http://www.snh.org.uk/pdfs/publications/commissioned_reports/401.pdf

Table on 94. River Spey SAC. Why is lamprey not listed as an EIA receptor? We assume SNH will have a particular interest in this area.

114-115. We note that there is ongoing consultation with local Trusts and Boards which is good.

131 - 132. 131 Right pane. This distinguishes between species interests in SACs which were selected as primary interests from those selected as secondary interests. This is unnecessary as both types are dealt with identically in the legislation.
131 Right pane. Chapter 13.2.5 should I think be Chapter 13.2.6.
211 lists the general potential impacts, these seem reasonable and lists all the diadromous species that FL is interested in.
214 – 216 relates to the potential impact of sediment mobilization and noise during construction We will consider when we have had time to review Appendix 7.6A in detail.
226 - 234 The likely impacts are often assessed as probable, but minor and negative. The biological information on which this is based is very limited (as noted by the SNH commissioned review by Gill). As such we do not consider that a confident assessment can be made. The developer should therefore identify that this assessment is associated with a low level of confidence.
283 We have still to look at the terrestrial appendix, which will consider the potential impacts of the landfall works on nearby rivers of importance to anadromous
285 - 290 The current understanding of EMF effects on diadromous fish is still relatively unknown. However, we note the current research by MSS in this area, which will improve the knowledge base in due course.
319 The potential cumulative impacts of other developments on salmon and sea trout will be an important consideration. This is especially true for fish migrating a long distance around the Scottish coast. The developer should also consider cumulative impacts associated with other developments including tidal turbine developments in the Pentland firth etc. The developer should note that there is substantial uncertainty in relation to cumulative effects.

Given the substantial uncertainty associated with potential impacts on fish migration and consequences for individual rivers, the developer / MS LOT, may wish to consider the need for monitoring of fish movement through the area and / or the health of salmon populations.

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Ness & Beauly Fisheries Trust

Peter Moore
Project Development
EDP Renewables
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10th April 2012

MORL Draft Environmental Impact Assessment

APPENDIX 1.3 C

Dear Sir,

Many thanks for your email requesting views on the draft documentation provided in respect of the environmental assessment of the impact of the MORL development. This response has been written on behalf of the Moray & Pentland Firths Salmon Protection Group. Taking your specific questions in turn:

1. Do you agree with the primary (assessment of the three wind farms as one overall unit), secondary (assessment of the individual wind farms) and sensitivity assessment (of combinations of the individual wind farms where geographic differences are present) approach to the EIA?

No comment.

2. Have all the regulatory requirements that the project should be taking into account been identified?

It is our understanding that the major regulatory issue associated with salmon is the undertaking of an appropriate assessment by Marine Scotland with regards to the risk of the proposed development in order that the requirements of the Habitats Directive can be met. Furthermore, we note that the initial scoping response to the developers from Marine Scotland Science strongly suggested that in order for an EIA to be fit for purpose it should include detailed information on the utilisation of the development area by salmon and that if such information was lacking then a suitable monitoring strategy should be devised (as evidenced by the response outlined in Chapter 3 of your document). It is clear from the documents provided that neither of these two approaches will be adopted. We further note that Marine Scotland Science regard the

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monitoring undertaken at existing offshore developments such as Robin Rigg as yielding unsatisfactory results in respect of fish, therefore we find the proposed lack of meaningful monitoring in the present proposals equally unsatisfactory. It is currently difficult to give a reasoned opinion on the draft assessment as there is little detailed information provided on issues such as the actual likely size of the scheme, the type of devices to be deployed and the degree of confidence attached to the assessment of impacts. As an example, the assessment as it stands suggests that the loss of sandeel habitat due to the presence of the structures will be negative, of minor-moderate magnitude and to be probable-unlikely (i.e. confidence levels are 5-95%). While we accept that some additional research will be undertaken in respect of sandeels in 2012, it is clear that the assessment as it stands is inherently weak. Similarly, the assessment of construction noise on salmon and sea trout does not instil confidence, particularly as no mitigation is proposed to offset any potential effects. We note that the SNH commissioned report on the effects of electromagnetic fields and noise on fish concludes that there is considerable uncertainty with regard to the findings of the research that has been undertaken so far and that more research is required. Given these levels of uncertainty, it is inappropriate to not fully utilise mitigation measures where they are available. Rather, we feel that a precautionary approach is advisable.

Whilst the monitoring of sandeels pre and post construction has considerable merit in assessing impacts on the sandeel populations themselves within the development area, its use as a surrogate species for salmonids is inherently flawed given the large differences in the life cycle of salmonid and sandeel species, particularly the physiological and behavioural differences. For example, the effects of noise on a fish with a swim bladder (salmon) may well differ considerably from fish that lack a developed swim bladder (sandeels). Should the approach of monitoring what is considered to be a 'surrogate species' in sandeels reveal a decline in that species within the area will it be automatically assumed that there will be a proportionate impact on the status of salmon SAC rivers? If so, what measures will be taken to mitigate for these impacts? Additionally, what measures will be taken to ensure that the sandeel information is backed up by monitoring of adult salmon and sea trout populations in their native rivers?

3. Two approaches to the impact assessment methodology have been used; the matrix approach and the IEEM guidance 2010 approach. Please confirm which approach should be used within the final ES?

Given the paucity of information available in respect of salmon in sea trout it would appear that the choice of approach will make little difference.

4. Do you have any comments on the results of the impact assessments or the mitigation and monitoring proposed?

The impact assessment has been formulated without fundamental knowledge of the usage, or otherwise, of the area by salmon and sea trout as well as other key species such as sandeel and as such it is difficult to be confident in its findings as currently presented. Additionally, the results of key research programmes such as the behaviour of salmonids in relation to electromagnetic fields are not yet available while other potential impacts such as noise still remain poorly understood. In terms of the proposed mitigation, the document explicitly states

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that no specific mitigation is proposed for salmon and sea trout. Thus the effects of construction activities on migrating smolts, a critical period during the life history of both salmon and sea trout, is apparently not considered to be worthy of mitigation despite the fact that potential measures are available in the form of the avoidance of sensitive activities during such crucial periods. There appears to be nothing in the document to suggest that there will be any effort to obtain baseline information in respect of salmon and sea trout movements, abundance, swimming depth, feeding behaviour etc and without this any post construction monitoring in the wind farm area would be rendered extremely difficult. Whilst the results of the assessment as they stand appear to be in accordance with those previously published by the Scottish Government i.e. *Habitat Regulations Appraisal of Draft Plan for Offshore Wind Energy in Scotland Territorial Waters Appropriate Assessment Review* we view the contents of that document as deficient in a number of key aspects and to be subordinate to other work commissioned by Government agencies. There appears to remain a fundamental contradiction between the initial scoping advice from Marine Scotland Science and the sensitivity that has been assigned to the receptors in the aforementioned document published by the Scottish Government.

In respect of the burying of cables as a mitigation for possible issues regarding electromagnetic fields it is considered vital that the document clearly states that as a mitigation **all** cables will either be buried to a suitable depth or have a suitable material placed over them and that there will be **no** exceptions to this irrespective of any technical differences that may arise.

5. Have the most likely and significant effects been identified and assessed in the draft ES? Are there any others that should be considered for inclusion in the final ES and if so why?

The majority of the most likely significant effects have been identified. However, some aspects of the proposal which are considered to be generally ecologically beneficial such as the creation of physical structures facilitating an environment conducive to increased fish assemblages may actually represent a new predation 'pinch point' for migrating smolts on what, given the lack of any evidence to the contrary, can only be considered a key migration route for salmon and a key feeding area for sea trout.

6. Would you prefer to receive the final ES and technical appendices in hard copy, on CD or both?

It is likely that different fishery boards and trusts will have different preferences in this respect.

Additional Comments

Overall the approach taken to the EIA appears to have ignored the scoping advice issued by Marine Scotland Science in regard to the baseline information on salmon and sea trout required. During discussions between our group and the representatives of the developers the impression was given that the approach would be modified to assume that salmon and sea trout were present in the area, therefore the appropriate response would be to mitigate for any potential ill effects to the maximum degree practicable. We now see from the EIA that, with the exception of electromagnetic fields, there is no intention to mitigate even when measures such as the timing

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of sensitive works are available. It should be emphasised that if such an approach is adopted, DSFBs and Fishery Trusts will have no option but to assume that the entire run of salmon or sea trout from the river in question will use the area under development, and assess any application on that basis. It would appear that there is an over reliance on the published documentation from the Scottish Government despite the fact that there are considerable uncertainties associated with the science underpinning that documentation. This reliance is further undermined by the suggestion that monitoring will only be undertaken in respect of a surrogate species. Given that there are also other potential impacts that cannot be mitigated for, it appears that residual risk levels will largely be a function of the degree of utilisation of the proposed development area, and the behavioural patterns within that area, by salmon and sea trout.

Should you require clarification of any elements of this response please do not hesitate to get in touch.

Yours Faithfully,

Dr Keith Williams
Spokesman, Moray & Pentland Firths Salmon Protection Group.

(The initial meeting of the Moray & Pentland Firths Salmon Protection Group included representatives from The Spey District Salmon Fishery Board, Findhorn, Nairn & Lossie Fisheries Trust, Ness District Salmon Fishery Board, Beauly District Fishery Board, Ness & Beauly Fisheries Trust, Cromarty Firth Fisheries Trust, Cromarty Firth District Salmon Fishery Board, Kyle of Sutherland District Salmon Fishery Board, Kyle of Sutherland Fisheries Trust, Helmsdale District Salmon Fishery Board, Caithness District Salmon Fishery Board, Naver Fishery with additional input from the Deveron, Bogie and Isla Fisheries Trust).

Northern Lighthouse Board

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Your Ref: Dan Finch - 310112
Our Ref: AJ/OPS/CPA/O6_01_108

Mr Dan Finch
MORL Project Director
Moray Offshore Renewables Ltd
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22 Feb 2012

Dear Dan

Consultation on the Moray Offshore Renewables Ltd Draft Environmental Statement Package 2: Offshore Human Environment and Onshore Environment.

Thank you for your letter dated 31 January 2012 regarding the Moray Firth Offshore Wind Farm Draft Environmental Statement and the request for comment prior to the formal application.

With regard to the consultation and the scope of the assessment, we would only comment on any part relating to Shipping and Navigational Safety contained within the supporting documentation.

We would advise that the Northern Lighthouse Board has commented previously through Marine Scotland and directly to MORL in several letters and note that the requirements and proposals are addressed within the relevant sections of this draft Environmental Statement.

We would reply to your specific request for written feedback to the questions on page 2 of your letter as follows;

1. We agree with the primary, secondary and sensitivity assessment approach to the EIA and the investigation of impacts on the varying scenarios that may be encountered.

2. Regulatory requirements relating to Navigational Safety have been complied with to date.

3. Either of the suggested methodologies is acceptable to the NLB.

4. The observations to mitigation and monitoring previously supplied by the Northern Lighthouse Board have been made in response to proposed site layouts and methodology for establishing the sites. We would however reiterate that we will recommend marking and lighting regimes for all stages of the development once a final turbine layout has been agreed.

APPENDIX 1.3 C

5. The significant or likely effects have been identified within the Shipping and Navigation Sections of the Environmental Statement on which we have previously commented. We would not comment on any other considerations.

6. We would not comment on the impact or effects upon Habitats within the development.

7. We would prefer the final Environmental Statement in hard copy and CD as this allows easier solution for both study/assessment and storage.

Any further communication to the Northern Lighthouse Board can be sent via fax on 0131 220 0235, e-mail to navigation@nlb.org.uk or our postal address as per the letterhead.

Mr Dan Finch
Moray Offshore Renewables Ltd
40 Princes Street
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15 March 2012.

Dear Mr Finch

Moray Offshore Renewable Ltd – Round 3 site.

Further to my letter to you dated 28 March 2012 I write to provide further comment on your ES and re-emphasise certain points based on input from Dr Mark Bolton, RSPB seabird conservation scientist

Representativeness of bird tracking data

It cannot be overemphasised that tracking data from East Caithness Cliffs SPA have been obtained from a small sample of birds and cover only a limited period in a single year. Any extrapolation of results must be done with caution. Other data sets, such as that from the FAME project, show that relative usage of different foraging locations may differ from year to year. For example, data collected on Orkney by the FAME project has shown a higher incidence of seabirds travelling to feed off the Aberdeenshire coast in 2010 than during 2011. Maps of seabird tracking data from the FAME project will shortly be available to view and download from the RSPB website. If similar variation exists among birds from the Caithness cliffs, then one might expect a greater proportion of birds to be heading south-east to the Aberdeenshire coast, and potentially commuting through the development area, than was found in 2011. An additional consideration is that the assumption is made that birds fitted with tracking devices behave normally. This point is acknowledged in the report: "*As there was only a 50% re-sighting rate for tagged Kittiwakes there must have been a significant effect of device attachment on the behaviour of the birds leading to nest abandonment*." This is a very high rate of nest desertion – much higher than that found in most other studies, which leads to the possibility of substantial bias in the data. There is also the possibility that birds which desert following tag deployment may be wholly, or disproportionately, of one particular age or sex class (e.g. younger females) whose foraging pattern may therefore be under-represented by this study. Other studies have shown gender differences in seabird foraging locations, so data presented here may be biased.
.

Birds transiting windfarm site

This issue is explored for East Caithness Cliffs birds but not for birds from other colonies, such as those further north on the Caithness cliffs, as well as those in Orkney and Fair Isle which, as noted above, feed off Aberdeenshire. Birds tracked from colonies in Orkney by the FAME

project have transited through the MORL site. Movements of North Caithness Cliffs SPA birds are unknown and it is quite likely that they also pass through the site.

Modelling Work

We welcome the use of modelling to try to overcome some of the shortcomings of observational and tracking work. The methods section suggests that information on colony size and location were combined with tracking and oceanographic data to predict at-sea densities of seabirds. However, it is not clear from the results that this combination of approaches has in fact been achieved. Instead separate maps are presented for colony-based distributions (Fig. 3) and distributions based on habitat association with tracking data (Fig. 4). It would be highly instructive to combine these two approaches.

Two important shortcomings of modelling are referred to on page 18: the projections do not account for transiting behaviour which will be important if birds fly through the windfarm (when they will be exposed to collision risk) or, if they avoid the windfarm by skirting round it, their energy budgets may be adversely affected. Further consideration of these matters in respect of the modelling work may be required. Secondly, the lack of a fulmar projection (because the low Nagelkerke value indicates a low explanatory power of this model) is perhaps all the more important in view of the finding that, of all four species investigated, this one appears to make most use of the MORL site either for foraging or in transit.

We seek clarification of the term “maximum mean” (with reference to foraging trips on page 10 and in the legend to Fig 3 on page 14). Does it refer to the mean of each tracked individual’s recorded maximum foraging distance? If so, this is more usually referred to as “mean maximum” in the scientific literature.

I trust these comments are helpful and look forward to studying the forthcoming application and finalised ES.

Yours sincerely

Peter R Gordon

RSPB Conservation Planning Officer

RSPB nature's voice

29 FEB 2012

RSPB SCOTLAND

Mr Dan Finch
Moray Offshore Renewables Ltd
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28 February 2012.

Dear Mr Finch

Moray Offshore Renewable Ltd – Round 3 site.

Thank you for consulting with RSPB Scotland over this Draft ES. I write to confirm a number of queries which I raised at our recent meeting. I have been promised additional internal comments from one of RSPB Scotland's specialist staff and will forward these are soon as they are available as I understand you wish to proceed towards a July submission of your Application.

The vast majority of these comments are trivial in nature but I bring them to your attention in order that they may be addressed in the final ES. By and large we consider that the approach of the ES is as sound as can be expected given the uncertainty surrounding the impact of marine wind farms on the environment, especially seabird populations.

Draft Environmental Statement Chapter 9 Biological Environment

Fig 9.1.2 Pentland Firth Islands SPA is missing from this map. It may be judged that the site's qualifying interest (breeding Arctic terns) is unlikely to be affected by these proposals, in which case it should be made explicit that the map is selective.

9.7.2 Final bullet point should refer to Scottish Planning Policy (SPP).

Table 9.7.4 Great skua is omitted.

Table 9.7.7 transect width (300m?) should be specified

9.7.4.5 We discussed how sound the 15% estimate of nocturnal goose flights might be. It was explained that this figure was derived from radar studies off the Lincolnshire coast. I suggested the frequency of night-time flights over the Moray Firth, especially during autumn migration, might be higher as they could include non-stop flights from Iceland. This was considered unlikely as birds would have stopped off in Orkney or Caithness. I have checked with RSPB colleagues who confirm that autumn fights of pink-footed geese are largely straight through these areas with few birds stopping off – certainly nothing like the numbers arriving at Loch of

APPENDIX 1.3 C

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Strathbeg. I suggest there is a case for making a greater allowance for nocturnal flights across the Moray Firth, at least in autumn. In spring, there is staging of birds in north Scotland awaiting favourable winds and suspect birds will follow the land unless they can see the Sutherland/Caithness coast from the south side of the Moray Firth.

Table 9.7.9 It is not clear whether the numbers in this table refer to birds flying over the windfarm site at all heights and "possible" and "probables" require explanation.

11.2.4 Baseline How reliable are Robin Rigg rates of displacement with data from only one year post-construction?

We are pleased to note that predictions involving a range of collision avoidance rates, including the currently accepted 98% figure, are presented.

Table 11.2.4.10 As discussed, the "% reduction from baseline" and "75%, 85%, 95%" labels require clarification, perhaps by making figures 25%, 15% and 5%?

Technical Appendix 9.7C Seabird Tracking and Modelling

Seabird Tracking Technical Report (Draft)

I wonder whether the attachment of tracking devices might have altered birds' propensity for making long, or short, flights? Or is it just a case of abandonment of nests? The assumption that birds fitted with devices behave normally is fundamental to any extrapolation from data obtained in this way.

Discussion

"*Resighting rates of ~50% for kittiwakes and guillemots 40% for fulmars suggest nest abandonment or at least prolonged periods of absenteeism, which is not typical.*" It would be informative to provide evidence of how long birds may be away from nests if not caught and fitted with tracking devices but I appreciate that fish shortage in recent years may cloud this issue.

A contrast is made between the recovery rates of razorbill (high) and guillemot and fulmar (low). These species are of comparable body mass but were weights or fat scores of birds taken on capture? Bodily condition could account for this difference although this would beg the question of why razorbills were healthier.

Seabird Modelling Technical Report (Draft)

Table 1 With 24 tags deployed on kittiwakes, and 15 retrieved, how can you have <1% lost tags when tail-mounted?

Chapter 9.2 Benthic Ecology

Although we have a number of detailed comments (see Appendix 1) to make on matters which we consider could be addressed fairly easily in the final ES, on the whole we consider the

approach to this topic to be sound. We would point out that, once disturbed, any benthic assemblage is highly unlikely to return to the same community structure that was present initially: as communities are dynamic it is pointless to expect simple bounce-back. Should these developments be consented, we would expect to see comprehensive monitoring programmes which include good reference sites and use Before-After-Control-Impact approaches to sampling design.

Chapter 9.3 Fish and Shellfish Ecology
A similar comment applies to this chapter. We agree that impacts at the scale of the North Sea, and even the Moray Firth, are negligible but would suggest that at the scale of the windfarm they are potentially more severe than is suggested. In particular, perturbation of seabed ecology is likely to have longer-lasting impacts if works go ahead in late spring/early summer in a year with calm weather but this cannot be mitigated for such a large-scale project in a harsh physical environment. Nevertheless, within the timescale of the development most of the localised effects of construction activity will have worn off. Whilst the creation of new habitat for new or different species is certain, e.g. artificial reef creation, a bigger impact on local fish stocks is likely to arise from the restriction of trawling among the towers. If trawlers are excluded there will be significant benefits to the environment that will more than offset construction damage.

Chapter 9.5 Intertidal Ecology
As rocky shore assemblages are subject to annual changes, there should be some statement about sampling dates.

I trust these comments are helpful to you and await with interest the submission of an Application and final ES. I will forward any additional comments as soon as possible.

Yours sincerely

Peter R Gordon

Peter Gordon
RSPB Conservation Planning Officer

Appendix 1 Detailed Comments
I acknowledge here the contribution of Dr Mike Kendall.

Draft ES Chapter 9.2 Benthic Ecology

Paragraph 9.2.4.1 Whilst studies associated with the Beatrice Oilfield and the Beatrice Demonstrator Project are relevant, extrapolation from a site which is some distance away must be done with caution and conditions can change substantially over a 30 year period.

Page 101 *et seq* This sampling scheme misses out many key ecosystem components. Grabs quantify small bodied animals (and occasionally collect bigger ones) in the top 10-20cm of sediment but sample very small areas. Video and trawling methods overlap by quantifying larger animals living at the sediment surface but neither method collects large bodied deep burrowing animals such as thalassinid shrimps or larger bivalves, important in ecosystem function. Close examination of high quality, near bottom video can reveal the holes such animals produce but identification and quantification of species is extremely difficult. Fig 9.2.4 has 2 images of sea-floor with large numbers of burrowing shrimps but yet they are not part of the species list and not used in the classification process. Large box cores, extracted over a 5mm mesh which sample to the depth that the shrimps live would have been useful.

Page 102 It should be acknowledged that in a coarse sediment a substantial part of the biodiversity is small annelids *e.g. Syllidae* which will pass through a 1mm mesh.

Page 102 PRIMER has no univariate elements

Page 102 *et seq* It should be acknowledged that not all 5-minute video tows are the same and data quality is very much sea-condition dependent

Paragraph 9.2.4.5 It is unclear whether biotope boundaries derived from acoustic data are real or a function of the analytical tools used for their interpretation.

Page 188 It should be acknowledged that foundations laid on the seafloor are likely to have an impact on local current speed and turbulence and hence on sediment grain size and species composition. In addition, the displacement of one meter or more (up to 5m) of sand would smother the benthos and, while some recovery would be rapid, longer-lived species might take some years to recover. Seven mm of mud would smother a substantial proportion of the benthic fauna that underpin local fisheries. Comments on normal variation in the level of the seafloor are rather generalised and would seem to pertain more to a mobile sandy bottom rather than a mud or muddy sand. However, we concede that, if the area impacted is truly less than 2km^2 then it is of little more than local concern.

Technical Appendix 9.2A Benthic Ecology Characterisation Survey

2.2.13 *"Each trawl tow was approximately 500 m distance at a speed of 2-3 knots."* – as fast currents or high winds can tow up the net from the bottom, it would be helpful to give an indication of how long the beam trawl was effectively trawling the sea floor.

3.2.4 The conclusion here may be less sound than is suggested as the sampling procedure for burrow megafauna is poor (see comments above).

End.

RSPB nature's voice

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23rd March 2012

Dear Mr Finch,

Moray Offshore Renewables Ltd Draft Environmental Statement Package 2: offshore human environment and onshore environment

Thank you for your letter of 31st January 2012, together with a copy of the draft Environmental Statement for the offshore human environment and onshore environment. The comments below relate to the potential impact on the onshore environment.

Seven Valued Ecological Receptors were identified for assessment, four of which relate to ornithological interests: Loch of Strathbeg SPA, terrestrial breeding birds, coastal wintering birds and habitats.

Loch of Strathbeg SPA

The cable route will not pass through the SPA itself, therefore, RSPB Scotland concurs that there will be no direct habitat loss or damage to the SPA. At its closest point, the cable route lies 1.2 km away from the SPA. As such, we also accept that species disturbance or displacement within the boundary of the SPA is unlikely.

As the draft ES identifies, the main impact on the SPA is likely to be the loss of adjacent foraging habitat used by the Loch of Strathbeg goose population, as well as potential goose disturbance/displacement from foraging areas during the construction and decommissioning phases of the development. RSPB Scotland concurs with the conclusion of the draft ES that any impacts will be of a temporary and reversible nature and that alternative foraging habitat is available elsewhere within the vicinity of the development area.

Any impact will be further reduced by the proposed mitigation and by the phasing of construction and decommissioning works along the length of the cable route.

APPENDIX 1.3 C

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Terrestrial Breeding Birds

The birds recorded during the breeding bird surveys are typical of the species present in lowland Aberdeenshire. Although there will be a loss of potential breeding habitat during construction and decommissioning, it is accepted that this will be temporary, reversible and will cover a relatively small area. Therefore, the impact of direct habitat loss on breeding birds is not expected to be significant.

As is stated in the draft ES, works must comply with the Wildlife and Countryside Act 1981, as amended by the Nature Conservation (Scotland) Act 2004. Wherever possible, groundworks should take place out-with the breeding season in order to minimise the risk of damage and/or disturbance to breeding birds. Where this is not possible, the risks should be minimised by the proposed mitigation, namely to follow SNH Best Practice Guidance, the detail of which is described on page 412 of the draft ES.

Coastal Wintering Birds

Construction and decommissioning will result in the temporary loss of a small area of foraging and/or roosting habitat. The work is also likely to result in disturbance to coastal birds using the shoreline within the immediate vicinity of the development site. However, RSPB Scotland accepts that these impacts will be temporary, reversible and will cover a relatively small area of the locally available habitat. Therefore, RSPB Scotland agrees that the impact on coastal wintering birds is likely to be low.

The potential impact on coastal wintering birds will be minimised by the proposed mitigation to undertake coastal works during the summer months, however, please see the point below regarding the potential impact of construction on the Buchan Ness to Collieston SPA.

Habitats

Buchan Ness to Collieston SPA

Buchan Ness to Collieston SPA abuts the south end of the joint route. Page 409 of the draft ES identifies the potential for construction works to cause disturbance to the qualifying ornithological features of the SPA, however the draft ES makes little assessment of the impact of any disturbance. Therefore, there is currently insufficient evidence to conclude that the construction works will not have a negative impact on SPA seabird populations.

Disturbance to breeding seabirds could largely be avoided by undertaking work on this section during the winter months. If construction work is to take place during the breeding season, an Appropriate Assessment under the terms of the Habitats Regulations will be required. Most of the cliff-nesting species would not be affected by on-shore construction activity but breeding

Herring Gulls, a qualifying feature of the Buchan Ness to Collieston SPA, forage in agricultural land in the Buchan area. The impact on foraging Herring Gulls is anticipated to be similar to that of wintering geese, namely a temporary and reversible loss of foraging habitat and some displacement within the immediate vicinity of works.

Loch of Strathbeg

Page 409 notes that the cable route may abut the Loch of Strathbeg SSSI. The impact of potential disturbance to the ornithological qualifying features of Loch of Strathbeg SSSI, as well as any damage to qualifying habitat features, should be assessed in greater detail.

The impact on water quality at the Loch of Strathbeg is not expected to be significant after the mitigation described.

Overall, RSPB Scotland does not have serious concerns about the proposed development but recommends that further consideration is given to the potential impact on the Buchan Ness to Collieston SPA and the Loch of Strathbeg SSSI.

Thank you for consulting RSPB Scotland.

Yours Sincerely,

Kathleen Sinclair.

Kathleen Sinclair
Assistant Conservation Officer, RSPB North East Scotland

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Royal Yachting Association Scotland

28 FEB 2012

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Mr D Finch
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27 February 2012

Dear Mr Finch

I am responding on behalf of RYA Scotland to your letter of January 31. A meeting has already been arranged for 5 March to discuss the draft ES with me. In relation to the questions posed:

1. We agree with the primary, secondary and sensitivity assessment approach to the EIA.

2. No comment as it is not within my area of competence.

3. You may be aware that I was a member of the IEEM group that produced the ***Guidelines for Ecological Impact Assessment in Britain and Ireland: Marine and Coastal.*** **We had a long discussion about the matrix approach. Since then I have experienced a number of cases where I felt that the matrix approach underplayed some important impacts. The matrix approach works well where risks are moderate and the impacts not too severe. The problem comes where impacts are potentially very severe but the probability is assessed as low. In these cases it is easy for potentially very serious impacts to be diminished. The risk of an accident like the Braer shipwreck on Shetland was very low but the impact was severe. Moreover, the risk and impact may depend on any mitigating measures put in place. If the crew of a vessel for example is keeping a good watch as required by the ColRegs, risks of collision should be very low. However, if they are not (which reference to the MAIB case studies will demonstrate can happen) then the risks increase significantly. Finally, there may be an interaction between probability and impact in that it is less easy to prepare adequately for rare events. For these reasons we support the use of a maximum credible accident scenario with an action plan for each eventuality. However, there may be a role for matrices in scoping out activities that do not need to be considered.**

4. I agree with the impacts on recreational boating although there are some details that should be clarified. It is clear that some recreational craft will pass through the windfarm site and that this could be by day or night. In 10.2.4.7 it is noted that 45% of the recreational craft passing through the site in summer

were picked up on AIS. Although there are no formal records of the percentage of craft equipped with AIS, the figure is much higher than is thought to be the case by RYA. Of course it may be that vessels choosing to attempt the route are more highly equipped than cruising vessels in general. As the survey was by radar and AIS it is possible that some recreational vessels were not detected. Nevertheless these comments do not invalidate the conclusions drawn. Note that the Cruising Routes are not advisory routes but rather the best assessment by knowledgeable sailors of where vessels normally go. The actual routes chosen will depend on the wind and wave conditions at the time and whether a vessel is under power or under sail. The statements in Section 10.11.4.3 sailing require to be interpreted with caution. For example, the route north to the Northern Isles is well advertised, e.g. by Sail Scotland and Orkney Islands Council even if the area is not thought to be well known. The number of berths in a marina is a global figure. It is really the number of berths for visitors that is significant as local boat owners quickly learn to adapt to changes. The 2011 publication *Sailing Tourism in Scotland* (downloadable from www.tourism-intelligence.co.uk) provides useful background to sailing tourism. In Table 11.3.2.1 the assumptions for recreational craft include a maximum air draft of 22 m, rather than a minimum as correctly stated elsewhere in the document. Finally, in section 18.2.3 it is stated that there is unlikely to be a cumulative impact from all the windfarms on the east coast of Scotland. It is quite possible that some skippers may be discouraged from travelling up or down the east coast of Scotland if they have to pass through several windfarm sites. Making a direct passage can be hard work, particularly if areas of activity have to be passed at night. For example, a prudent skipper will ensure there is more than one person on lookout when passing Aberdeen by night, which has implications for watchkeeping.

5. Yes

6. The most likely impacts on recreational boating have been identified.

7. RYA has no view on this. However, I sit on the Steering Group for the HRA for wave and tidal schemes, which is currently being carried out, and it might be useful to ask Marine Scotland whether there would be benefit in presenting information for the HRA in a standard format.

8. I would prefer to receive the final report on CD.

Yours sincerely,

pp Dr G Russell FRMetS MIEEM
Planning and Environment Officer, RYA Scotland

SE and HIE comments on the Economic Impact Assessment of the Draft MORL ES

SE Comments
The method seems sound and reasonable to me.

Some comments:

Intro chapter p2 need for the project - agree with your comment that economic devt should be listed as a 'need' and a prominent one

Socio-economics:

p344 offshore transmission works impact - haven't seen this section (ref says reported separately in its own socio-economic chapter) - why? - and when headline impact estimates are presented, these should state that they exclude the OTW impacts, or include them… is it usual to assess/ report OTW impact separately?

p348 base case 20%, high case 50%... Cian Conroy was mentioning an 8%(?) figure from somewhere (DECC?) as a low supply chain input number… good to confirm that 20% is reasonable/ achievable without supply chain stimulation (ie not ambitious). Report mentions just one Tier 1 supplier located in local area - I imagine contracting (or not) with a local Tier 1 supplier could have a large bearing on ultimate economic impact?

Cian forwarded an impact doc on Robin Rigg attached (off Cumbria/ Dumf & Gall) stating 37% UK supply chain share (11% Scotland (only 0.2% D&G), 5% NW England). This also quoted 48% UK share for Scroby Sands (East of England) and 50% for Ormonde (Cumbria), and 10-20% for London/ Thanet (tier 1 only).

p348 Table 11.3.1.5 and subsequently in text/ tables - consultants need to clarify at each mention that 'Scotland' includes the 'local area', and also where they put 'rest of the UK' whether this really is rest of UK, or UK including Scotland/local area

p350 Magnitude first para, at end, after 'over 1,000 jobs' add 'during construction'

p350 in the presentation of the impacts, two things might be useful: a) a high case minus base case set of numbers, showing the potential scale of impact that might be achievable if we get our act together on the supply chain front; b) a comparison of the job estimates with levels of local sectoral employment currently… eg making point that if x jobs got located in the local area (excl Aberdeen), the scale of these are significant for the local labour market; could also supplement this with consideration of ave/ median salaries that might be expected relative to local area (non-Aberdeen) averages - ie no/% of high value (>£34k) of higher than ave salary jobs expected (these additions might be more for SE/HIE casemaking rather than a requirement of the EIA, but they help to make the numbers more real

general on tourism impact… I expect it to be positive overall, since there won't be measurable negative impact (to the extent that there is even an element of negative impact, as long as the dolphins don't flea the firth!), and there will be impact as mentioned in local guesthouses of contractor overnights, and possibly ultimately tourism impact associated with eg sea trips around the turbines).

On the components of net economic impact modelling, the approach seems reasonable:

deadweight and displacement - what would happen otherwise: reasonable to exclude 'macro' factors such as effects on net impact on energy market by: distortion through subsidies to renewables or displacement of eg oil & gas economic activity by this renewables project (growing energy demand/ markets and displacement of eg imported gas rather than N Sea oil & gas are two arguments for thinking local displacement would be negligible. The skills consideration may be worth flagging up - ie if skilled labour is in short supply and the project hired this labour from other local companies, this could have a negative effect on them in terms of bidding up salaries and recruitment - but I'd expect people to move to where the jobs are in a recession, and the public sector knows it needs to ramp up on the skills side - and is doing so - eg Nigg Skills Academy, so I don't think we need worry too much about labour displacement either

leakage - the modeling accounts for this explicitly by defining the local and Scotland areas and the base and high case content %s

multipliers - the ones used and the adjustments made seem appropriate (good if the paper set these out in a table)

HIE comments

I agree with the SE economist that overall approach seems reasonable as there are still many uncertainties at this point in time. I would have liked to see a bit more digging done on the local/Scottish content side, as the supply chain activities are very important for the region in particular. A bit more qualitative analysis could help inform future efforts of the development agencies.

Socio-economic overview

p. 240 - 3d bullet point after the table - should read HIE (rather than Caithness and Sutherland!)

10.11.3. - I would add a reference to the HM Green Book guidance used by all public sector in the UK.

p. 243 - GVA and in particular ASHE earnings data are not reliable at sub-regional levels. This is true in particular for Moray, where RAF wages are not accounted for in surveys - a caveat should be provided.

p. 244 - SIMD is not a great measure for rural region like Highland, it applies to urban, densely populated areas.

p. 247 - Supply development - 1st para - add an update on WTL at Machrihanish and Nigg.
Skills - more detail needed on the relevant geographic area's labour market capacity and skills available locally (current and future). Need to highlight where the potential required labour might come from. Any potential displacement issues (this might need covered later in the impacts section).

Impacts

p. 343 - Whilst mentioned that it is not within the scope of the study to address impacts of electricity generation activity I think it is important to highlight the significance of these impacts.

p. 344 - More analysis and evidence is needed here on the chosen options for 'base case' and 'high case' scenarios.

Table 11.3.1.1. - Can we add the timespan for phases and sub-phases of the development.

p. 346 - How much insight does the detailed sensitivity analysis add to the overall assessment in this case?

11.3.11.3 - 1st para - the ratio used from Renewables UK - I have seen a different rule of thumb used in other sources: 'for every megawatt installed, approximately £1 million of economic expenditure occurs, of which a portion will be within the local area' (DTI, 2002). This was actually mentioned in a piece of work for MORL (courtesy of Google). How does this compare to the one used in the study?

p. 349 - the overall employment figure seems a bit low considering the scale of the developments. Can we sense check these figures against company's projections/expectations? Any info on incomes?

p. 350 - GVA - would be useful to add a comment on composition of GVA and how much of it occurs locally (considering the ownership of the company and where the profits are likely to be retained).

A bit more clarity would be useful on the overall impacts - maybe put them together in a table and highlight the impacts from the particular phases of the proposed developments (incl. OTI).

More generally, wider socio-economic impacts should also be considered and mentioned in the study (e.g. impacts on communities, landscapes and sceneries etc - this might have partly been covered in the environmental assessment?).

Scottish Environment Protection Agency

Our ref: PCS/118404
Your ref: MORL Draft ES package

Peter Moore
EDP Renewables
4th floor
40 Princes Street
Edinburgh
EH2 2BY

If telephoning ask for:
Nicola Abrams

27 March 2012

By email only to: Peter.Moore@edpr.com

Dear Peter

Pre-planning enquiry
PROPOSED SECTION 36 APPLICATION FOR MORAY OFFSHORE RENEWABLES LTD, TELFORD, STEVENSON AND MACCOLL OFFSHORE WINDFARMS AND OFFSHORE TRANSMISSION WORKS, MORAY FIRTH - Draft Environmental Statement
Moray Firth

APPENDIX 1.3 C

Thank you for consulting SEPA on the above proposal. We welcome the opportunity to comment on draft sections of the ES. My apologies for the delay in responding to you. Zoe Griffin will shortly be taking a leave of absence from SEPA for a year or so and I will now be dealing with the proposals. We would be happy to meet with you to discuss any of the issues raised in this letter. We are pleased to note that many of the issues raised at the Scoping stage have been taken on board in the preparation of the draft ES.

We welcome pre-application engagement, but please be aware that our advice at this stage is based on emerging proposals and we cannot rule out potential further information requests as the project develops. Similarly, our advice is given without prejudice to our formal planning response, or any decision made on elements of the proposal regulated by us, which may take into account factors not considered at the pre-application or planning stage.

We have responded to the specific questions you set out in your covering letter below where applicable. In addition we also provide further comments on the draft ES which I trust will be helpful at this stage. In the interests of clarity we have structured those comments under the same headings as used in the Scoping response

1. Do you agree with the primary (assessment of the three wind farms as one overall unit), secondary (assessment of the individual wind farms) and sensitivity assessment (of combinations of the individual wind farms where geographic differences are present) approach to the EIA? *No comments to make*.

2. Have all the regulatory requirements that the project should be taking into account been

identified? *In general yes please see further detailed comments in Appendix 1.*

3. Two approaches to the impact assessment methodology have been used; the matrix approach and the IEEM guidance 2010 approach. Please confirm which approach should be used within the final ES? *No comments to make*

4. Do you have any comments on the results of the impact assessments or the mitigation and monitoring proposed?

   SEPA is satisfied that the Phase 1 and NVC surveys of terrestrial and freshwater habitats have been carried out using correct methods and protocols. A number of freshwater and wetland type habitats were identified in the phase one survey including running water, blanket bog, acid/neutral flush and spring, swamp and marshy grassland. With the exception of running waters (does not require NVC survey), the other habitats listed were subsequently surveyed using NVC methodology as recommended be SEPA in previous communications. However, the ES does not provide maps of the NVC habitat types identified. These maps are required to give an overview of the habitats present in the corridors and should be reference to the Target Notes detailed in the finalised ES. In addition there has been no assessment of whether the identified wetland habitats are groundwater dependant terrestrial ecosystems (GWDTE). The ES must identify all GWTDE within 100m of cable trenches and other associated transmission infrastructure and provide and assessment of the likely impacts of the proposed development.

   The current survey corridors for the potential onshore cabling routes are wide as the exact cabling route within these corridors have not yet been identified. For GWDTE, other wetlands, deep peat and riparian woodland, a much more precise indication of the location of the cable trench would be required to accurately assess impact or a commitment that these habitats will be avoided. In addition the location of watercourse crossings will be required. It is understood that there will be a maximum 10m width working zone when cable laying and the ES states that the final trench route will be micro-sited to minimise environmental impacts. Any habitat restoration options of the ecological receptors detailed above and on watercourses should be agreed with SEPA prior to the commencement of the works.

   The Fraserburgh onshore cable route potentially crosses the upper portions of the Burn of Savoch which flows into Loch of Strathbeg. The route also crosses the Ellie Burn, a tributary of the Savoch Burn. Sediment transport from the Strathbeg catchment (which is largely agricultural) has contributed to the currently enriched state of the loch, which in turn is affecting the survival of species of interest, including macrophyte species. If possible, avoidance of these tributaries would be advised, but if that is not possible it is imperative that sediment controls are strictly adhered to during construction as an incident risks undermining years of inter-agency work to improve the status of the Burn of Savoch and Loch of Strathbeg.

   As indicated in 8.1.4.3 the Fraserburgh cabling route follows a long length of the North Ugie Water (ca. 4.5km). Trenching for a considerable length alongside the burn could increase the risk for this watercourse from excessive sedimentation and/or alter the local hydrology compared to burns where perpendicular crossings are controlled. The River Ugie has been assessed as affected by phosphorus delivered to the watercourse in part on sediment particles. There was evidence of alteration of the invertebrate community has been altered as a result[1]. The Ugie Catchment is one of the first catchments in Scotland to be part of the Priority Catchment initiative, which aims to detect and eradicate agricultural practices which

[1] http://www.sepa.org.uk/water/river_basin_planning/dp_priority_catchments/river_ugie_catchment.aspx

prevent the River Ugie meeting Good status for the Water Framework Directive. Extensive ground works adjacent to this watercourse would result in increased risk of fine sediment input to the watercourse. In siting the cable trench, the potential to add to the fine sediment load of the Ugie should be carefully considered.

The ES doesn't make reference to the two EC Designated bathing waters at Fraserburgh, Fraserburgh Tigerhill and Fraserburgh Philorth with regard to minimising water quality impacts during construction and amenity impacts.

The second bullet point in the summary section on page 80 of Technical Appendix 7.4A states that 'Any onshore infrastructure (jointing bays, etc) should be sited at least 100m behind the present day coastline at Fraserburgh and at least 200 m behind the present day coastline at Rattray Head.' The appendix does not seem to include an assessment of the likely rates of coastal retreat at the two landfall options over the lifetime of the project to support these limits.

5. Have the most likely and significant effects been identified and assessed in the draft ES? Are there any others that should be considered for inclusion in the final ES and if so why? *See comments under 4 above and in Appendix 1.*

6. Potential effects on designated sites and species have been considered within each relevant ES chapter (e.g. marine mammals, ornithology). Are you happy with this form of presentation, or would it be beneficial to collate and present separately the information that may be used to inform Habitats Regulations Appraisal? *We are content with this method of presentation.*

7. Would you prefer to receive the final ES and technical appendices in hard copy, on CD or both? *We would be grateful to receive the finalised ES in both hard copy and CD in order to allow distribution between the relevant in house SEPA specialists.*

I trust these comments are helpful at this stage, if you have any queries relating to this letter, please contact me by telephone on 01224 266698 or by e-mail to planning.aberdeen@sepa.org.uk.

Yours Sincerely

Nicola Abrams
Senior Planning Officer
Planning Service

APPENDIX 1- Additional Comments on Draft ES

1. Site layout and nature of construction

1.1 The Fraserburgh onshore cable route potentially crosses the upper portions of the Burn of Savoch which flows into Loch of Strathbeg. The route also crosses the Ellie Burn, a tributary of the Savoch. Sediment transport from the Strathbeg catchment (which is largely agricultural) has contributed to the currently enriched state of the loch, which in turn is affecting the survival of species of interest, including macrophyte species. If possible, avoidance of these tributaries would be advised, but if that is not possible it is imperative that sediment controls are strictly adhered to during construction as an incident risks undermining years of inter-agency work to improve the status of the Burn of Savoch and Loch of Strathbeg.

1.2 As indicated in 8.1.4.3 the Fraserburgh cabling route follows a long length of the North Ugie Water (*ca*. 4.5km). Trenching for a considerable length alongside the burn could increase the risk for this watercourse from excessive sedimentation and/or alter the local hydrology compared to burns where perpendicular crossings are controlled. The River Ugie has been assessed as affected by phosphorus delivered to the watercourse in part on sediment particles. There was evidence of alteration of the invertebrate community as a result[2]. The Ugie Catchment is one of the first catchments in Scotland to be part of the Priority Catchment initiative, which aims to detect and eradicate agricultural practices which prevent the River Ugie meeting Good status for the Water Framework Directive. Extensive ground works adjacent to this watercourse would result in increased risk of fine sediment input to the watercourse. This should be considered in the design and layout of the scheme as well as in any environmental management plan.

2. River Basin Management Planning

2.1 We are the lead authority with regard to the River Basin Management Planning process established under the Water Environment and Water Services (Scotland) Act 2003. Under the Water Framework Directive (WFD) the UK is now required to ensure that 'Good Ecological Status (GES)' is maintained in all surface waters, including transitional and coastal waters, out to 3nm, and that there is no downgrade in status. This includes the consideration of ecological, chemical and hydromorphological parameters in transitional and coastal water bodies.

2.2 In general, our previous consultation comments regarding recognition of River Basin Management Planning objectives and data have been incorporated into this draft. However, it would be helpful to note in the finalised ES that the requirements of the Water Framework Directive (WFD) are to ensure that all surface water bodies, including transitional and coastal waters, out to 3nm, achieve 'Good Ecological Status' and that there is no deterioration in status. This includes the consideration of ecological, chemical and hydromorphological parameters in transitional and coastal water bodies.

2.3 Chapter 8 - Physical Environment (Onshore) describes the ecological status classification of the terrestrial water bodies in the study area but the same has not been done for the coastal water bodies in Chapter 15 Physical Environment (Offshore), this should be addressed in the finalised ES.

[2] http://www.sepa.org.uk/water/river_basin_planning/dp_priority_catchments/river_ugie_catchment.aspx

2.4 The offshore physical environment scoping chapter should refer to coastal water bodies (Rosehearty to Cairnbulg Point, and Cairnbulg Point to the Ugie Estuary) and their associated datasheets (see our website at www.sepa.org.uk/water/river_basin_planning.aspx).

2.5 In Chapter 8, we have noted the recognition of rivers and groundwater bodies, and the use of RBMP classification data. The Loch of Strathbeg (a water body at bad ecological status because of diffuse source pollution) should also be considered here, and it may also be appropriate to refer to Bathing Water designations in the Fraserburgh area.

2.6 The onshore infrastructure proposals have the potential to create morphological and diffuse pollution impacts on water bodies, on the River Ugie catchment and the Burn of Savoch in particular. It will be important to follow best practice to prevent any deterioration in the ecological status of water bodies.

3. Construction Environmental Management Document (CEMD) and pollution prevention

3.1 We note that Table 5.3 in the CEMP mentions a post construction survey will be carried out to determine the colonisation of sub-structures by non-indigenous species.

3.2 Section 9.6.4.4 in the draft ES discusses terrestrial invasive species (Japanese Knotweed) but there does not seem to be an equivalent section discussing MNNS and how the potential for introduction of these to the area will be minimised during the construction phase in the ES. SEPA recommends that, in line with WFD and MSFD objectives, the developers draw up and adopt a protocol to minimise risks of introducing marine invasive species to the area via attachment on marine plant and specialised equipment transported to the area before the constructional phase begins. Guidance that maybe drawn on to inform the development of the protocol is listed below:-

- Marine Non-Native Species guidance produced by the Oil & Gas Industries can be found here: (**http://www.ogp.org.uk/pubs/436.pdf**);
- Marine Non-Native Species guidance from The Green Blue (recreation advice): http://www.thegreenblue.org.uk/clubs_and_training_centres/antifoul_and_invasive_species/best_practice_invasive_species.aspx;
- SNH advice: http://www.snh.gov.uk/land-and-sea/managing-coasts-and-sea/marine-nonnatives/

3.3 In addition the CEMP does not outline monitoring and mitigation measures for works through sand dunes and does not include reference to CIRIA C584 – Coastal and Marine Environmental Site Guide, this should be addressed in the finalised ER.

4. Marine Processes

4.1 The second bullet point in the summary section of Technical Appendix 7.4A states that 'Any onshore infrastructure (jointing bays, etc) should be sited at least 100m behind the present day coastline at Fraserburgh and at least 200 m behind the present day coastline at Rattray Head.' The appendix does not seem to include an assessment of the likely rates of coastal retreat at the two landfall options over the lifetime of the project to support these limit, this should be included in the finalised ES.

4.2 The maps showing the surface water features and ecological and geological designated sites (Technical Appendix 8.1A – Hydrology Technical Report Figures 9 and 10) do not seem to be included in this appendix. Are these available?

5. Marine/ Wetland ecology

5.1 It is not clear which landfall option will be taken forward as the preferred option at this stage. Nevertheless, whatever the preferred option, it is important that the coastal dunes should be left in as natural a condition as possible.

5.2 The habitat loss section in section 12.2.4.3 (page 411) states that HDD will be used as the preferred technique to install the cable across large water courses. Section 4.6.4.3 – cable landfall, page 57, discusses the trenching and HDD techniques to install the cable across the sand dunes but does not appear to identify a preferred option to cross the sand dunes at this stage.

5.3 Use of the HDD technique beneath the sand dunes would be our preferred option with regard to minimising impacts to the sand dune habitats and any water dependent features (e.g. dune slacks) and maintaining dune integrity in the longer term.

5.4 Should trenching through the dunes be taken forward as the preferred option then justification for this should be provided in the finalised ES describing how the dune habitats will be restored and the potential for erosional problems avoided in the future.

5.5 Section 13.1.2.3 mentions the need for 'any fixed onshore infrastructure, such as an underground jointing pit, is located onshore of the high-water mark, which may move landward due to coastal retreat'. It is important that the coastal dunes should be left in as natural a condition as possible with any hard engineering kept to a minimum. Information on what the installation of the pit would actually entail in term of construction should be provided in the finalised ES.

5.6 SEPA is satisfied with the Phase 1 and NVC surveys of terrestrial and freshwater habitats have been carried out using correct methods and protocols. A number of freshwater and wetland type habitats were identified in the phase one survey including running water, blanket bog, acid/neutral flush and spring, swamp and marshy grassland. With the exception of running waters (does not require NVC survey), the other habitats listed were subsequently surveyed using NVC methodology as recommended be SEPA in previous communications. However, the draft ES does not provide maps of the NVC habitat types identified. These maps are required to give an overview of the habitats present in the corridors and should be reference to the Target Notes detailed in the ES. In addition there has been no assessment of whether the identified wetland habitats are groundwater dependant terrestrial ecosystems (GWDTE). The finalised ES must identify all GWTDE within 100m of cable trenches and other associated transmission infrastructure and provide and assessment of the likely impacts of the proposed development.

5.7 The current survey corridors for the potential onshore cabling routes are wide as the exact cabling route within these corridors have not yet been identified. For GWDTE, other wetlands, deep peat and riparian woodland, SEPA requests a more precise indication of the location of the cable trench to assess impact or a commitment that these habitats will be avoided. In addition the location of watercourse crossings will be required. It is understood that there will be a maximum 10m width working zone when cable laying and

the ES states that the final trench route will be micro-sited to minimise environmental impacts. Any habitat restoration options of the ecological receptors detailed above and on watercourses should be agreed with SEPA prior to the commencement of the works.

6. Waste management

6.1 The re-use of soils for backfilling excavations is acceptable. If excess soils exist that need to be spread other than from the area they were excavated then they should be directed to an appropriate Landfill or a Waste Management Licence Exemption will need to be obtained.

7. Flood risk

7.1 We would agree with the proposal given in 13.1.3.5 that flood plains as shown by the Indicative River & Coastal Flood Map (Scotland) should be avoided where possible. In those situations where avoidance is not an option, we would recommend storage of excavated material where possible, to be made outwith the flood plain, so that the ability of the flood plain to store and convey water would not be compromised.

7.2 If it is necessary to store excavated material close to the proposed cable trench for a considerable period of time then we would recommend that a risk based approach is adopted on a site by site basis and that if the site is in a flood sensitive area such as close to houses or buildings then further analysis is undertaken.

7.3 Post the construction and completion of the trench along the cable route, pre-construction ground levels must be reinstated in the flood plain in order to avoid impacts on flood plain storage and flood flows.

7.4 For those locations where watercourses will be disturbed we would recommend a risk approach is also adopted on a site by site basis and that if the site is in a flood sensitive area such as close to houses or buildings then further analysis of risk is made.

7.5 If any small buildings to house infrastructure are proposed along the cable route, consideration should be given to whether or not they lie within the Indicative River & Coastal Flood Map (Scotland) and if possible be located outwith the flood plain.

7.6 In Appendix 3a- Export Cable Feasibility Study of the ES it states that “Land Site Investigations” with regard to flooding will need to be carried out and as yet site visits have not yet been taken to the proposed land corridors or substations. In addition a Flood Risk Assessment would be required for any development within the Indicative Coastal Flood Map (Scotland) unless it can be shown that the proposed development is above the estimated 0.5% (1 in 200 year) annual probability water levels (in relation to metres above ordnance datum) derived from the for the *Coastal Flood Boundary Conditions for UK Mainland’s and Island’s*, February 2011. These levels have already been provided from SEPA (see appendix 4) for Sandford Bay 0.5% = 2.86m AOD; South of Rattray Head 0.5% = 2.83m AOD and Fraserburgh Bay 0.5% = 2.85m AOD. These are still water levels and do not account for uncertainties involved in flood design and physical imponderables such as post construction settlement, storm surge, wave action or sea level rise.

7.7 If any part of the application site lies within the 1 in 200 year (0.5% annual probability) flood envelope of the Indicative River & Coastal Flood Map (Scotland), it may be at medium to high risk of flooding. Scottish Planning Policy states in paragraph 203, that “For planning purposes the functional flood plain will generally have a greater than 0.5% (1:200)

probability of flooding in any year. Development on the functional flood plain will not only be at risk itself, but will add to the risk elsewhere." Built development should not therefore take place on the functional flood plain.

Caveats & Additional Information for Applicant

7.8 The Indicative River & Coastal Flood Map (Scotland) has been produced following a consistent, nationally-applied methodology for catchment areas equal to or greater than 3km^2 using a Digital Terrain Model (DTM) to define river cross-sections and low-lying coastal land. The outlines do not account for flooding arising from sources such as surface water runoff, surcharged culverts or drainage systems. The methodology was not designed to quantify the impacts of factors such as flood alleviation measures, buildings and transport infrastructure on flood conveyance & storage. The Indicative River & Coastal Flood Map (Scotland) is designed to be used as a national strategic assessment of flood risk to support planning policy in Scotland. For further information please visit www.sepa.org.uk/flooding/flood_map.aspx.

7.9 We refer the applicant to the document entitled: "*Technical Flood Risk Guidance for Stakeholders*". This document provides generic requirements for undertaking Flood Risk Assessments and can be downloaded from www.sepa.org.uk/flooding/flood_risk/planning__flooding.aspx. Please note that this document should be read in conjunction with Annex B in SEPA Policy 41: "*Development at Risk of Flooding, Advice and Consultation – a SEPA Planning Authority Protocol*", available from www.sepa.org.uk/flooding/flood_risk.aspx.

7.10 The advice contained in this letter is supplied to you by SEPA in terms of Section 72 (1) of the Flood Risk Management (Scotland) Act 2009 on the basis of information held by SEPA as at the date hereof. It is intended as advice solely to Aberdeenshire Council as Planning Authority in terms of the said Section 72 (1). Our briefing note entitled: "*Flood Risk Management (Scotland) Act 2009: Flood risk advice to planning authorities*" outlines the transitional changes to the basis of our advice inline with the phases of this legislation and can be downloaded from www.sepa.org.uk/flooding/flood_risk/planning__flooding.aspx.

Scottish Natural Heritage
All of nature for all of Scotland

SNH COMMENTS ON MORL DRAFT ES
FISH AND SHELLFISH ECOLOGY

We have reviewed the draft ES and accompanying technical reports from MORL on 'Fish and Shellfish Ecology' for the Moray Firth Round 3 zone. We welcome the opportunity to provide these pre-application comments and hope that they are helpful for the finalisation of the ES.

Overall, we consider that key potential impacts on fish and shellfish have been identified and discussed in this draft impact assessment. However, we note that impacts potentially arising from the cable route have not been addressed in detail, and it does not appear that offshore substation platforms have been addressed at all. We are also concerned about the conclusion to Section 11.2.2.4 which states that "in general terms the likely impacts on fish and shellfish ecology are considered of minor significance..". This clearly does not apply to all species and impact-types. With regard to the range of potential impacts (based on use of a Rochdale envelope) it is not yet possible to categorically state that mitigation will not be required, and we recommend that the full range of possible mitigation measures is explored in the ES.

Evaluation of the Environmental Effects: Chapter 11.2.2 – Fish & Shellfish Ecology

We have the following comments and recommendations:

Noise

- It would be helpful if possible to have some quantified measure of confidence or variability in the input parameters to noise models and the subsequent outputs. We recommend, as a minimum, that some information on device calibration is provided.
- It is important to know the expected timing and duration of activities that will generate noise, and for noise impacts to be considered in respect of key periods of sensitivity for each species. For example, in respect of Atlantic salmon we would wish to be able to determine whether there is any possibility of extensive piling coinciding with the bulk of the smolt run.
- In respect of salmonids the draft states that 'areas in the immediate vicinity of the rivers will not be affected (by noise) and hence fish will not be disturbed immediately prior to river entry or immediately after leaving the rivers…'. Figure 11.2.2.3 indicates that a significant area of the Moray Firth would be affected by the 75 dBht (salmo salar) noise level, so possible impact on fish outside of the areas 'immediately' offshore should also be considered.
- The study on herring referenced in Section 11.2.2.3 is not relevant as vessel noise is not comparable to the noise arising from piling or drilling.
- Currently the underwater noise modelling assumes that such noise is halted when it reaches the shore. While much of the noise is likely to be absorbed by land or dissipates to the surface in shallow water, it is not clear how noise waves behave when being 'funnelled' into shallow water (e.g. into the narrower part of the firth) or to what extent noise is reflected back into open water. While we acknowledge the difficulty of modelling such effects, the ES would benefit from discussion of this.
- We would welcome further detail on the noise modelling for simultaneous piling events. Does this simply result in a larger area (but shorter period) of impact, or does it mean that animals may be exposed to louder noises? (i.e. do multiple noise sources combine, and if so, is this in an additive, synergistic or reductionistic manner?).
- In respect of Table 11.2.2.12, other mitigation options besides soft-start piling should be considered – it is too early, and there is too little detail available with regard to the construction programme, to be able to categorically state, at this stage, that mitigation is not required.

Suspended sediment concentrations

- We would find it helpful if sediment concentrations (as discussed on page 213) were mapped in order to consider possible impacts on fish (including Atlantic salmon migration to and from relevant SACs in the area).
- As we have previously advised, increases in suspended sediment concentrations cannot simply be dismissed as less than natural background conditions. It is important to consider seasonality and to understand that peaks in concentrations due to windfarm construction may occur at different times of year compared to natural peaks, and may coincide with periods of particular sensitivity in species' lifecycles. For example, the period of greatest sensitivity for herring is likely to be during and subsequent to their spawning in late summer and autumn. Peaks in the natural range of suspended sediment mostly occur over the winter and therefore are less likely to coincide with herring spawning, whereas increased levels from windfarm construction might do and therefore need evaluation.
- For each turbine it would be helpful to have an estimate for the (maximum) total duration of seabed preparation and piling / drilling activity, as well as timings (year round?).
- We would welcome estimates for the higher levels of suspended sediment relating to 'local effects around construction vessels' and 'inter-array cable installation'. Again we would welcome further detail on these activities – number of vessels required, likely duration etc.
- Further detail should be provided in respect of any required dredging, including that for turbines with gravity bases and for the offshore substation platforms. It is also not apparent how dredged material is to be brought to the surface and where it might be disposed of.

EMF

- We recommend presenting quantitative information on induced electric fields (iE) as well as on magnetic fields (i.e. produce a table for iE equivalent to Table 13.2.2.6 for magnetic fields). It is thought that teleost fish show no response to iE fields <6V/m, but that elasmobranchs can be sensitive to DC iE fields ranging from 0.5-1000 µV/m (smaller range for AC).
- With regard to diadromous fish, we consider it will be important to evaluate cable burial in shallower waters, where these fish could be expected to be in closer proximity to emitted EMF.

Sandeel habitat mapping

- We note that potential impacts on sandeels will need to be re-assessed once the results of the sandeel survey are available.

SNH
5 April 2012

To: Simon Martin, Optimised Environments

From : Krystyna Campbell

c.c. Catriona Gall

23rd March 2012

Outline comments re draft SLVIA : Outer Moray Firth Wind Energy, Eastern Development Area (Telford, Stevenson, MacColl)

I have looked through the draft ES, SLVIA chapters – at the methodology, visualisations, ZTVs and assessments for both the MORL schemes, and the cumulative assessment.

The relevant information is presented very clearly and concisely. I confirm that the methodology appears to cover and define the coastal and seascape character well, such that the relevant issues and characteristics are covered. This makes for a sound definition of the baseline – covering both landscape, coastal and seascape receptors, visual receptors and consideration of sequential movement within the area.

The overall analysis of the baseline clearly demonstrates the range of impacts and where these are most concentrated/spread - the horizontal angle ZTV is especially useful when read alongside the VP information.

The information on how the parameters of the likely development (the 'Rochdale Envelope') are defined, and consideration of how to model and portray these, is important and clearly stated.

There is a wide range of relevant information and analysis of this. Together with those aspects outstanding, to be included in the final ES – atmospheric visibility, night-time effects etc as outlined in 11.3.9.8 – this proves to be a useful draft assessment of the Development's likely impacts. From my review of this draft SLVIA I cannot make substantive comments about any apparent 'lack' of information or assessment that should be included. I look forward to receiving the completed SLVIA, which would appear to be well on track to presenting the likely seascape, landscape and visual effects of the Development.

WDCS comments on MORL draft Environmental Statement

9th March 2012

Summary of overarching points of significance

We recognise the timeframes within which the industry is required to build in order to meet targets is tight, the existing technological limitations to using alternative sources to pile driving and the lack of established mitigation measures. However, the requirement to understand and mitigate impacts remains and Appendix 11.2.3C of the draft ES is a very helpful approach towards achieving this. However, recognising the considerable amount of uncertainty surrounding the acoustic threshold and behavioural data available; that a long-term analysis hasn't been completed for any cetacean species yet; and adding to this, the additional level of uncertainty surrounding population trends, movements and potential impacts; overall, we do not believe that it is possible to be as confident about the significance of impacts on cetaceans as the draft ES concludes. Some significant impacts have been identified and then dismissed without reasonable evidence.

Given all of these uncertainties, if developments are allowed to proceed, it is important that a well-considered research monitoring strategy is in place to understand and recognise potential individual and population level impacts on both nationally and internationally important species. Further, an adaptive approach will be key in the event that unanticipated but significant impacts are observed.

In addition, we expand on the following key points in the document below:

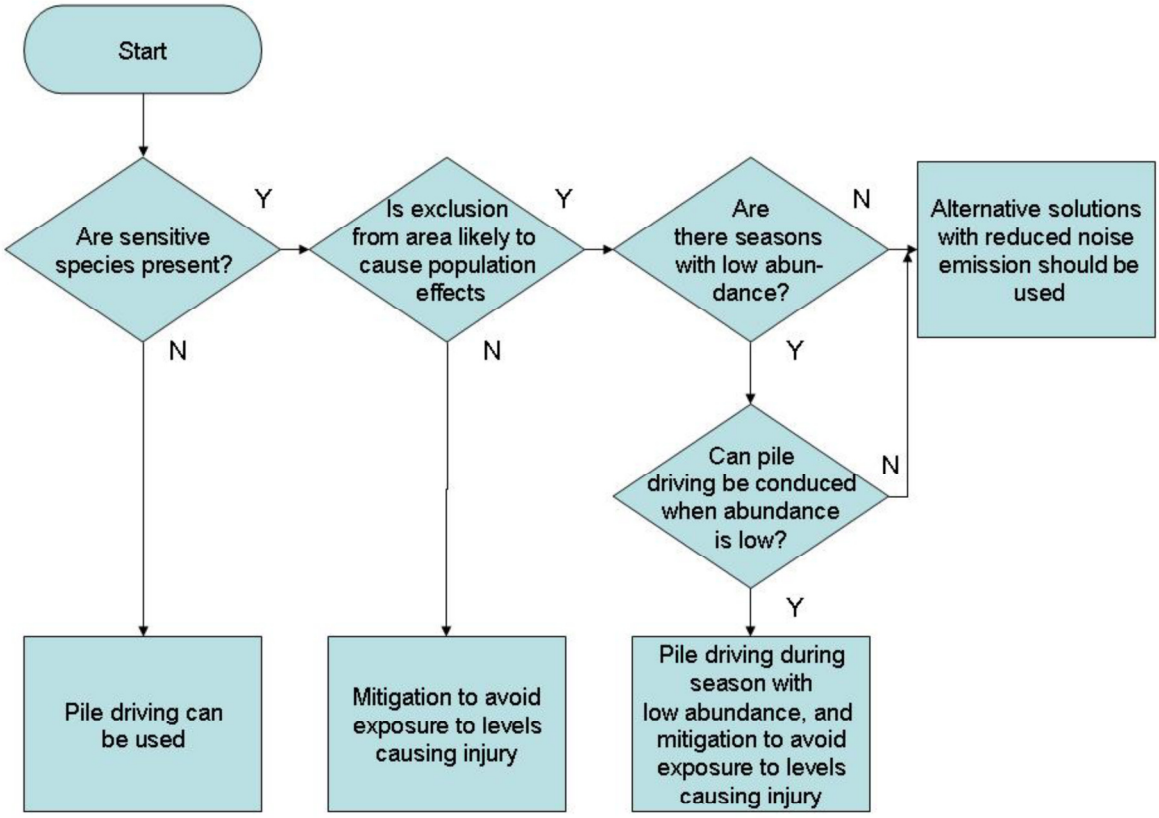
- We acknowledge that monopiles are not being used but we have considerable concerns surrounding the noise generated from the use of pin piles;
- The cumulative assessment beyond the Moray Firth should include minke whales and harbour porpoises;
- We consider Appendix 11.2.3C to be an important contribution. However we have some reservations, which we have detailed below; and,
- There is a general confusion in the document about the difference between management measures and mitigation measures. No mitigation at all is proposed in the draft ES, as far as we can tell.

General comments from elsewhere in the world

Before considering the draft ES itself, we would like to draw your attention to the response of five world-leading marine mammal scientists to the US Arctic Ocean Draft Environmental Impact Statement (DEIS) (attached). This short statement, whilst focused on oil and gas activities in the Arctic, raises the key issues surrounding cumulative impacts, use of appropriate impact thresholds, additional baseline data and appropriate monitoring and mitigation for marine mammals, that are just as relevant for pile driving activities, including suggestions for meaningful monitoring and mitigation measures that should be more fully considered and implemented in this draft ES.

In addition, the ICES-Working Group on marine mammal ecology (WGMME) produced a "Review of the effects of wind farm construction and operation on marine mammals and provide advice on

monitoring and mitigation schemes" in 2010. We believe the following simple flow diagram (in addition to the detailed advice) from section 4.5.2 of the WGMME Review to be particularly helpful.



The steps undertaken in such an approach are clearly laid out and therefore aid transparency and scrutiny. The draft ES appears to have made a number of assumptions in various sections, such as assuming the outcomes of the Framework for assessing impacts on harbour seal would be the same for all cetacean species without doing this work, which then allows determinations to be made about the lack of significance of activities without evidence at all in some cases.

Specific comments on the draft ES

The Moray Firth is in a unique situation in that it is the most comprehensively studied region for cetaceans in Scottish waters in recent years. Whilst this effort may have been initiated due to seismic survey work that has been carried out in the region, associated with the oil and gas industry, this provides a solid baseline to inform decision making for all marine users. We are aware that the wind developers have worked closely with cetacean scientists in continuing and developing a suitable monitoring plan to understand the distribution of cetaceans and other species in the region. The baseline monitoring has incorporated boat-based, aerial and acoustic monitoring and whilst the detailed results have not been seen, appears to have been thorough for pinnipeds and odontocetes (sections 3.5 and 9.4).

Minke whales are an important migratory species that resides in the Moray Firth during the summer months to forage. Baseline data collection (section 9.4.4) occurred for minke whales, however we note the low numbers recorded. It's not clear whether these low numbers are because data have been pooled to provide a population and density estimate over a whole year. This may not be appropriate for seasonal visitors like minke whales. You might expect the density estimate from the SCANS survey, which was undertaken in July when minke whales are anticipated to be in the region, to be higher than a wider analysis that includes winter months, when no minke whales are anticipated to be encountered (section 9.4.4.9).

We consider visual surveys to be an important component of ongoing monitoring work to understand potential impacts. Firstly, no studies currently exist to understand the potential impacts of wind developments for minke whales and secondly, minke whales are resident in Scottish waters seasonally and we can anticipate that they may move between the Moray Firth and the Firth of Forth developments, making it very important that we can monitor levels of potential displacement and put this in to a context of understanding both potential individual and population level impacts.

We note that it was not possible to calculate densities for any species other than harbour porpoises, which raises questions about the requirement to adequately focus research questions and resulting survey techniques.

WDCS responded to the Scoping Opinion and yet our comments and subsequently, MORL's approach taken, do not appear in Table 3.1.

We note that pin pile foundations or gravity based structures are planned (section 1.3.2) for the wind turbines and the potential offshore transmission infrastructure. We acknowledge that monopoles will not be used. It is our hope that this will reduce the noise levels during construction. However the diameter of the pin piles is still considerable and so noise levels can be anticipated to be an issue. Noise levels during construction remains a key concern and, as a very minimum, should be monitored. All noise modelling should be ground-truthed.

Crown Estate recently held a workshop on Marine Mammals and Noise at the Royal Society in London and many presenters, including scientists and industry representatives, highlighted alternatives to pile driving as being desirable. WDCS advocates alternatives to pile driving.

We note that the installation of gravity foundation for offshore wind farms have lower overall sound emissions and are to be encouraged in order to reduce acoustic impacts, but may have a greater impact on the seabed (and the associated biota) as well as the environmental costs associated with concrete production.

Given the development size and considerable time-span for construction of this whole development, long term population impacts are a considerable issue. Whilst we have reasonable population estimates for harbour seals and bottlenose dolphins, there is considerable uncertainty about the distribution and population parameters of other species, including minke whales and harbour porpoises.

We acknowledge that an EPS licence is being applied for. We concur that a HRA should be undertaken (section 2.4) and should include bottlenose dolphins and harbour seals.

Some serious questions remain about appropriate and effective mitigation measures. Table 11.2.3.8 identified soft start as the only management measure for marine mammals during construction. The effectiveness of soft start has not been tested. Further, soft start is a management measure and is not a mitigation measure, unless it leads to shutting down the sound source once an animal enters a pre-determined radius of the source. Once again we draw your attention to the US scientists' response to the Arctic DEIS, as mentioned above.

In addition, recent publications on the potential impacts of intense noise sources on baleen species require serious consideration, especially as no data currently exists on impacts of pile driving. A JNCC published study reported that "studies have indicated some level of stress, with alterations in surfacing, respiration and dive cycles being observed in mysticetes in response to the use of seismic airguns, sometimes at considerable distances from the source. Although effects of active airguns on the physiology of the mysticetes found around the UK are largely unknown, in one study, shorter blow intervals indicated an increase in the respiration rate of fin whales within 1km of the airguns during periods of shooting". More recently, for two days after the 9/11 attacks in the US, shipping traffic ground to a halt in the Bay of Fundy, Canada, and underwater noise fell by six decibels. During that time, stress-hormone levels in endangered north Atlantic right whales there were lower than in readings taken during September in the following four years. The implications of similar impacts as a result of continuous pile driving in primary foraging habitat cannot be known but should be considered.

Construction is anticipated to span a continuous six year period, with overlap at two or three sites during construction. This provides no opportunity for broad scale management, such as seasonal restrictions, to minimise impacts on seasonal visitors, especially minke whales.

In section 7.6.4.7 we acknowledge that avoidance is an important behavioural impact to be considered. It may not be the most significant, as is reported in the draft ES, however it may be the most likely to be observable and measurable. Separation of a mother and calf may also have a serious consequence, for example, but would be much more difficult to monitor.

More generally, we note the considerable uncertainty surrounding the thresholds developed by Southall, Nedwell and others. Since the introduction of these criteria more research has increased our understanding and highlighted the sensitivities of some species, predominantly harbour porpoises. On the other hand, we are never likely to increase our knowledge base of auditory impacts for baleen whales, including minke whales. This was also a subject of much discussion at the Crown Estate workshop. Given the considerable time-span of construction, it would be appropriate to ensure an adaptive approach to desk-based review of current literature and impact monitoring to ensure that they remain adequate to offer strict protection to European Protected Species, including cetaceans, and to meet other legal requirements.

Whilst there has been some research in other parts of Europe on the impacts of pile driving on harbour porpoises, none exists for minke whales. The Moray Firth is a primary foraging area for minke whales and the impacts on them are not known at all. They should remain a focus of attention. An adaptive approach to monitoring and mitigation within the lifespan of construction is vital.

As a key species in the region it would have been useful to include minke whales in Table 7.6.5.

For clarity, the tables in this section would benefit from clearer labelling. Does 'impact' refer to behavioural impact or injurious impact? It's not clear if it's the same in all tables in this section.

Section 7.6.5 discusses the cumulative impact of cumulative noise exposure during multiple piling at the same time. However, it doesn't consider the cumulative piling over the lifespan of up to six years of the site construction activity. This is a critical and necessary assessment.

Tables 11.2.3.1/13.2.3.1/1.1 (of Appendix 11.2.3A) include stranding as a result of EMF. However minke whale strandings have been associated with intense noise pollution on a number of occasions in various parts of the world, largely in multi-species strandings. Whilst these have been during documented use of military sonar, and there is no evidence as yet of stranding associated with pile driving, minke whales are clearly vulnerable to intense noise pollution and it would be premature at this stage to rule it out (including in Table 11.2.3.4).

Section 11.2.3.4 suggests that operating the JNCC guidelines will be adequate to mitigate six years of continuous pile driving. As stated above, we do not agree with this.

Section 13.2.3.3 states no impacts for offshore transmission too.

We note in Table 11.2.3.9 that some bottlenose dolphin data will be included at a later date.

Section 11.2.3.8 states that "papers on Permanent Threshold Shift assessment criteria and the seal assessment framework will be revised to incorporate relevant feedback and comments from stakeholder and scientific colleagues as appropriate. This revision may include updating of the rationale for applicability of the seal assessment framework to other species;" We have provided detailed comments on this framework below.

Section 17.3 on cumulative assessment. Seal culls may need to be included in cumulative assessment as PBR quotas for some sites, including in the Moray Firth, as we understand they are at a maximum.

There is evidence of movement of minke whales from the west to east coast, therefore displacement of minke whales from east coast development sites might mean that whales move around to the west coast to forage. As a result, west coast developments, including wave and tidal devices should also be considered in the cumulative assessment (section 17.3.1).

Appendix 11.2.3A

The definition of short term (Appendix 11.2.3A) is somewhat misleading in that construction might last for six years. The maximum longevity of a harbour porpoise in the UK is reported to be about 24 years (Lockyer, 1995), whereas most don't live longer than 10 years (Jefferson *et al*, 2008). Impacts that could span for half an animal's life could not be considered short-term.

Table 4.3 appears to calculate that between 84-89% of minke whales encountered will be impacted by pile driving in year 1. It's unclear whether this impact is assumed to be behavioural or injury.

We look forward to seeing the results of the impact modelling for the bottlenose dolphin (4.2.2.3).

We are concerned about this statement which seems to have no basis in evidence "*It is proposed that, if appropriate information were available to perform similar population prediction models for*

grey seal, porpoises and minke whale (assuming they have at least a similar life span as harbour seals, if not longer), the outputs would produce similar results in that impacts would be temporary and the population would recover once the source of the disturbance was removed."

This information is not available and as a result, we do not believe it is possible with any certainty to agree with the following conclusion of this section "In conclusion, the potential impacts on harbour seals, grey seals, porpoise and minke whales from increased noise due to piling are predicted to be significant, but temporary and reversible in nature, and thus not significant to the long term viability of the populations." No evidence is provided to support this conclusion.

Section 4.2.3 (assessment of significance) seems to be based on no evidence at all and yet the conclusion of this section is key to the whole assessment of impact. Section 7.1.1 links back to Section 4.2.3 to demonstrate the same result, but again without any basis in evidence at all.

As we discuss in detail below in comments on Appendix 11.2.3C we disagree with section 7.1.1. where PTS is used. Where pile driving will be occurring continuously for a number of years, there is the potential for damage from PTS from repeated exposure to TTS. This is therefore a more appropriate threshold to use.

We note in Table 7.2 that a large percentage of the harbour seal population are anticipated to be displaced from the area due to pile driving (56-68%). These figures are even higher for harbour porpoises (83-88%) and minke whales (84-90%), yet no efforts are made to link these significant impacts over considerable time frames, to the overall draft ES finding of "no significant impact". The links are tenuous at best.

We are not confident that there will be no physical injuries as a result of pile driving activities for any of the species listed, especially considering that soft start is the only management measures considered. We acknowledge that the developer has discussed mitigation with the Crown Estate but note that no mitigation at all is planned as far as we can tell from the draft ES.

Given the levels of uncertainty surrounding the proposed framework, we are not certain that such confidence in the long term projection is warranted.

We do not believe it is possible, based on existing evidence to agree with the following conclusions of the cumulative impacts section with any certainty. For example, "In conclusion, the cumulative population impacts of the three MORL sites and those predicted to arise from other offshore projects identified within this assessment are considered significant during the construction periods, but temporary and reversible in all cases and thus not significant to the long term viability of the populations." This is based on almost no evidence at all.

In addition, in section 7.1.2, some of the migratory species that can be expected to be encountered are not restricted to the Moray Firth and so we are pleased to see cumulative impacts consider developments beyond this area. However the assessment does not include some nationally important species, including minke whales and harbour porpoise, which are both EPS and species

that can be anticipated to move between these two regions for foraging behaviour. The assessment should consider these two species.

Appendix 11.2.3B

We have no comments on this document.

Appendix 11.2.3C

In general WDCS support this approach to understand long term impacts (not withstanding a requirement to protect individual animals in the vicinity of activities). However we have serious concerns about some of the considerable data gaps and resulting limitations and assumptions (which are acknowledged within the document).

Given that this is such novel work, and if such an approach is likely to be used, it would benefit from peer-review. Doing so might also assist in the development of this long-term approach, where appropriate, more widely across regions.

We draw your attention to Reichmuth (2009) and Kastak (2008), which may be important references even though they are not formally published. PTS was accidentally induced to this very species (a harbour seal) at a maximum received sound pressure of 184 dB re 1 microPa with a duration of 60 s, so a SEL of 202 dB re 1 microPa/s. With the experimental results from one seal's PTS, the 202 dB SEL would, according to the figure on p. 21, have a probability of occurring at .01. Further, it's disturbing that this seal suffered PTS without any warning at all, indicating a threshold function with no advance notice.

This seal suffered PTS with a pure tone, rather than an impulsive sound, but this is the only real data that exists. To be precautionary that value should be used, unless it can be demonstrated that the same wouldn't have occurred with an impulsive sound. Moreover, if one would prefer to limit oneself to airgun data only, then a TTS onset level of 164.3 dB re 1 microPa^{2}·s for harbour porpoise should be used (Lucke et al., 2009).

dB(ht) is likely not appropriate to use for injury. The idea behind dB(ht) is that animals are sensitive at different frequencies, so their audiogram should be used to calculate injury. However, the curve for injury is not dependent on an animal's audiogram. The injury curve is flattened across frequencies, since when a sound is loud enough, it doesn't matter as much how sensitive an animal is at that frequency (Fletcher and Munson, 1933).

Moreover, an audiogram-based frequency weighting function like dB (ht) would mean that baleen whales are 20-30 dB more sensitive to TTS at lower frequencies than mid-frequency specialists, which seems implausible, given the limited data that do exist, i.e. there is too much filtering with this method at lower frequencies.

The values for intensity that cause PTS are too high. Gedamke (2011) is useful in this regard. Here the authors show what the consequences of inaccuracy in assumptions regarding acoustic sensitivity can look like.

More generally, TTS should be used to consider long-term (as well as short term) effects rather than PTS that is used, as repeated TTS may lead to PTS. In addition, the use of TTS will lead to less uncertainty because more data are available.

Appendix 11.2.3C assumes that "potentially major impacts at close range, .. will be mitigated against using standard procedures." And also that ".. assume that any risk of direct mortality can be avoided by mitigation". However we highlight that, largely, mitigation measures are not tested and are not known to be effective around piling activities for all species concerned. There will therefore need to be a detailed study to investigate and ground-truth this assumption.

We note that the pile diameter used in the Beatrice demonstrator scheme was 1.8m (section 3.2.1) and that the pile diameter for pin piles in the current development is anticipated to be larger. As a consequence, resulting sound exposure may be expected to be higher.

Appendix 11.2.3C relates largely to harbour seals. Whilst section 3.5.3 of the Appendix discussed the application of the framework to bottlenose dolphins and harbour seals, it doesn't discuss displacement or auditory impacts on minke whales. It's therefore unclear how Table 11.2.3.6 can determine the potential impacts as being not significant to long term viability. This is a considerable flaw in the draft ES.

We wonder if it would be challenging to apply the model to those species whose distribution is uncertain, or extends beyond the Moray Firth (whereas the harbour seals are assumed to match the Marine Scotland seal management area) and there the dose-response relationship is unknown (given that these are key components in the flow diagram in Figure 1).

We agree with the conclusions in the report that "There is also a critical need for better data on recovery times after these displacements, particularly as these will affect the cumulative extent of displacement throughout a season of intermittent piling." And would further this by suggesting that the government and Crown Estate should be considering wider regional impacts from one site to the next (i.e. impacts of simultaneous displacement from Moray Firth and Firth of Forth).

Finally, no consideration was given to impacts on prey in the vicinity of the development. In particular, many fish species are sensitive to particle motion, which may be considerable in proximity to the pile driving activity. This is a critical component of assessment that will have a bearing on long term health of marine mammal populations that are currently little known.

In summary, whilst we support the approach, as the report itself states, great care is required regarding available data and as a result, appropriate data to input and resulting outputs. If this approach is taken forward, a commitment should be required to ground-truth the population modelling projections for the life-time of the development. This would require a long term monitoring strategy (as the report suggests in section 3.5) that enables understanding of sufficient power to provide robust assessments of population status. Given the small population size and protected status of this population, there needs to be a commitment to an adaptive approach should the model turn out to be inaccurate within the time-frame.

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