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To Whom It May Concern,

Planning Act 2008, Vattenfall Wind Power Limited, Proposed Thanet Extension Offshore Wind Farm

The MMO is an interested party for the examination of Development Consent Order (DCO) applications for Nationally Significant Infrastructure Projects (NSIPs) in the marine area. Should consent be granted for the project, the MMO will be responsible for monitoring, compliance and enforcement of Deemed Marine Licence (DML).

On 30 July 2018, the Marine Management Organisation (MMO) received notice under section 56 of the Planning Act 2008 (the "PA 2008") that the Planning Inspectorate ("PINS") had accepted an application made by Vattenfall Wind Power Limited (the "Applicant") for a development consent order (the "DCO Application") (MMO ref: DCO/2016/00003; PINS ref: EN010084), for the construction, operation and maintenance of the proposed Thanet Extension Offshore Wind Farm (TEOWF).

This document forms the MMO's deadline 7 submission, comprising:

- Comments on the Applicant's responses to the ExA's third written questions (ExQ3)
- Further responses to the ExA's 'Rule 17' letter detailing final written questions
- Comments on the Applicant's Revision F of the dDCO

This written representation is submitted without prejudice to any future representation the MMO may make about the DCO Application throughout the examination process. This representation is also submitted without prejudice to any decision the MMO may make on any associated application for consent, permission, approval or any other type of authorisation submitted to the MMO either for the works in the marine area or for any other authorisation relevant to the proposed development.

Yours faithfully



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1. Comments on the Applicant's response to the ExA's Further Written Questions (ExQ3)

1.1 Potential Construction Noise Effects on Fish

1.1.1 The MMO notes the Applicant's comments on this question and considers that the MMO response provided at deadline 6, and further information within this deadline 7 submission, provides full commentary in response to the points raised.

1.1.2 The MMO would add however that in respect of the Applicant's comment that: "*Natural England have confirmed the modelling and assessment to be fit for purpose for HRA*" – please note that Natural England (NE) is not responsible for providing advice in respect of these specific matters for TEOWF. Indeed, NE would look to the MMO to comment on issues outside of Marine Protected Areas.

2. Response to the ExA's 'Rule 17' Letter Detailing Final Written Questions

2.1.1 The MMO's deadline 6A submission provided responses to the ExA's final written questions. However, for those questions where the ExA stipulated commentary could be provided at deadline 7, this is provided below.

2.2 R17Q4.1.1 – Potential Construction Noise Effects on Fish: submissions and evidence from the MMO

The ExA notes the respective evidence submitted at D6 by both the Applicant and the MMO in respect of the potential noise effects on herring and sole. This remains a contended subject matter with opposing evidence. Whilst progress toward agreement would be preferable, the ExA is mindful of the very limited time remaining in this examination.

In the absence of agreement, the following evidence is sought from the MMO by D7 with comments from the Applicant by D8:

2.2.1 **Sub-question a)** *Does the MMO hold any further evidence from its advisors or stakeholders on this matter that could usefully be submitted into the examination for consideration by the ExA? If so, please submit it at D7. (This could include scientific advice from CEFAS and/or comments from fishing and fisheries representative bodies.)*

2.2.2 The MMO advises that it has submitted all the available evidence in order to justify how its position has been reached. Notwithstanding, there have been further discussions and questions raised by both the Applicant and ExA prior to this deadline. As such, please see final points of consideration below. The MMO also directs the ExA to its extensive commentary submitted at deadline 6 which is not reproduced in full in this submission.

Behavioural Impacts

2.2.3 The MMO acknowledge that based on the updated modelling for a stationary receptor, the potential risk of significant impact in terms of injury or TTS for the Thames Estuary (Herne Bay) herring sub-stock is likely to be low. However, as previously

advised, behavioural effects are more of a concern, hence the rationale for the proposed piling restriction. Behavioural changes can have a significant impact to a population if noise causes fish to move away from foraging or breeding grounds or to cease reproductive activities.

2.2.4 The MMO previously requested that the Applicant should model the received levels of single pulse Sound Exposure Level (SELss) at the spawning grounds and that the modelled piling location/s should be based on the worst-case scenario. This would enable assessment of the potential risks of impact e.g. based on peer reviewed literature available.

2.2.5 Following the MMO's comments, the Applicant submitted a number of clarifications to address concerns with respect to assessing behavioural impacts, these are discussed further as follows.

2.2.6 The Applicant states that they have provided the peak Sound Pressure Level (SPL) which is recognised as more precautionary than SELss in the sense that for a single strike/single pulse the area ensonified is greater.

2.2.7 The Applicant is correct in that the peak SPL is more precautionary than the SELss in this case due to the way this metric is modelled. The MMO acknowledge that the Applicant has provided the peak SPL contours in Annex 6-3 Underwater Noise Assessment ([APP-086](#)). This assessment was previously reviewed as part of the MMO's consultation on the Environmental Statement and nonetheless concerns were raised at the time with respect to behavioural impacts

2.2.8 Figures 4-3 (Appendix A) and 4-4 of Annex 6-3 show contour plots for the modelled unweighted SPL_{peak} values for installing a monopile using a hammer energy of 5,000 kJ, for the East and South West locations respectively. Figures 4-5 and 4-6 show the SPL_{peak} contours for installing pin piles with the lower hammer energy of 2,700 kJ. **However, these maps should show the spawning grounds/International Herring Larvae Survey (IHLS) data, so it is clear what noise levels spawning herring are predicted to be exposed to.**

2.2.9 Secondly, the Applicant has advised that the SELss metric was not remodelled (as requested) as part of the post application phase but was included in Annex 6-3 in addition to SPL_{peak}. *"The SELss contours are shown in page 37 et seq of the report and demonstrate clearly that there is no effect receptor pathway between the proposed project and the Thames stock....I trust this addresses the behavioural concerns with regards the Thames stock west of the Margate Sands sandbank"*.

2.2.10 The MMO acknowledge that some figures showing SELss contours have been provided in Annex 6-3. However, the SELss contour plots the Applicant is referring to relate to various (and limited) SELss thresholds based on marine mammal noise exposure criteria (i.e. see Figure A5 in Appendix A showing the 179 dB and 145 dB SELss contours). **As above, the herring spawning grounds should be clearly shown. To fully assess impact the Applicant should provide a figure (similar to Figure 4-3) of the modelled incremental SELss isopleths/contours, which include the noise levels at the herring spawning grounds.**

2.2.11 The Applicant questions what the merit of further SELss would be, and on what scientific evidence the request is made on. Should the MMO receive the appropriate information, it can determine whether a piling restriction is considered

necessary for the Thames stock. Essentially, the MMO requires sight of either the modelled SPLpeak or SELss noise isopleths overlaid onto herring spawning grounds/appropriate IHLS data for the two modelled locations, in order to make an informed judgement on the potential risk of behavioural effects on spawning herring. Based on the evidence submitted by the Applicant to date, it is currently difficult to ascertain what the predicted noise levels will be at the spawning grounds. In the circumstances, the MMO must adopt a precautionary approach and maintain that the proposed restrictions are fully justified.

Data for spawning

2.2.12 Furthermore, the MMO previously noted that: *“Although the IHLS data suggests that the primary spawning has shifted further south, spawning grounds are known to vary/shift year on year. Thus, there is the potential for the primary spawning to shift further north, closer to the wind farm boundary in future (i.e. there is no guarantee that the primary spawning will remain further south in subsequent years). Given the updated modelling (based on a stationary receptor) demonstrates overlap of the East Channel spawning grounds with the SELcum noise contours for injury and TTS, as a precautionary approach it is recommended that pile driving is not permitted during the herring spawning season.”*

2.2.13 The Applicant has responded that: *“To state that grounds can shift year to year is of course accurate, the data the Applicant has employed is a 10 year IHLS dataset to account for the inter-annual variation in spawning locations. It may be worth the MMO noting that by contrast the Ellis et al 2012 data that Cefas endorse represents a single year of IHLS data from 2008. The Applicant's data therefore includes the 2008, and compliments it with a further 9 years to give a dataset that is robust and accounts for inter-annual variation more comprehensively than the Ellis et al data.”*

2.2.14 Further adding: *“There is an overlap with the polygon identified by Coull et al 1998, not in the IHLS datasets. The Applicant has presented an assessment of the impact on this ground, and used methods of assessment previously endorsed by MMO and as far as we understand Cefas (variations have been agreed for the projects listed).”*

2.2.15 The MMO advise that the updated modelling clearly shows there is overlap with lower density spawning habitat (based on the 10-year IHLS dataset, see Figure 2 in Appendix A for reference). Whilst the MMO acknowledge the primary spawning (higher larval abundance) is further south, the IHLS data indicates that there is still spawning further north (9,400.1 – 27,700 total larval abundance per m²) close to (and actually within) the wind farm boundary. The MMO believe this alone should warrant a precautionary approach.

2.2.16 As previously stated it is not possible to quantify spawning ground movement either spatially (e.g. km²) or over distance (e.g. km²). However to provide further clarity to the ExA and illustrate the point, the MMO have provided IHLS larval density maps from ICES (Appendix B), which demonstrate the extent to which the locations and concentrations of larval densities can vary from year to year. The maps provided cover a period from 2009 – 2017 (except for the 2014-15 survey when 2 out of 3 surveys were cancelled due to inclement weather) with surveys being undertaken in three stages (16th - 31st December, 1st – 15th January and 16th – 31st January each year). This further illustrates the dynamic nature and variability of the spawning grounds.

2.2.17 In addition, whilst it has not been possible in the time allotted to establish the extent to which IHLS sampling locations in the Southern North Sea have been reduced, the MMO can provide the follow comments extracted from the following ICES papers in relation to the IHLS surveys:

- *'However, since the middle of the 1990s, IHLS survey participation and effort is too low to monitor the whole spawning season. In the last two decades, almost only the Netherlands and Germany participated in the herring larvae surveys'* (ICES 2015).
- *'The IHLS has changed over time and for the last decades is being run on a reduced spatial coverage. In addition, there is the perception that the spawning or hatching time of herring in, especially the southern North Sea is more variable if not changing'* (ICES 2016).
- *'The Downs TAC was set up to conserve the spawning aggregation of Downs herring. Uncertainties concerning the status of, and recruitment to, this component of the North Sea herring stock are high, and HAWG is not aware of any evidence to suggest that this measure is inappropriate'* (ICES 2018).

2.2.18 Consequently, as expanded on further in deadline 6, the MMO cannot agree that a particular percentage of a spawning stock affected by noise impact thresholds in any one year is accurate.

2.2.19 **Sub-question b)** *The TOWF licence referred to a seasonal restriction period 'between mid-February and the end of April'. In the interests of precision and enforceability in this case, can the MMO specify particular dates for such restrictions? If so, what would they be and on what basis?*

2.2.20 The MMO advises specific dates, suggested condition wording for the DMLs and justification for the restrictions suggested are supplied at **3.10** at section 3 – commentary on the Applicant's latest iteration of the dDCO.

2.2.21 **Sub-question c)** *As granted, the TOWF licence restricted noisy activities in the mid-February to end of April period, so as to avoid the main spawning period for Thames herring. In addition to a similar provision for this case, the MMO is also recommending a restriction from the end of November to January for the Downs stock. Could the MMO set out the reasons for the different approach in this case?*

2.2.22 The MMO advises that the restriction for the Downs stock and Thames stock relate to different potential impacts, namely injury and TTS with respect to the Downs stock and behavioural effects for the Thames stock.

2.2.23 Regarding the differing recommendations between TOWF and TEOFW this has understandably been raised by the Applicant and is discussed in detail at 2.3.5 in response to sub-question 'e'.

2.2.24 **Sub-question d)** *If the MMO remains of the view that seasonal restrictions are necessary in this case, please could it provide draft wording for inclusion in the DMLs that it considers would provide appropriate security?*

2.2.25 As noted above, the MMO directs the ExA to **3.10** at section 3 - commentary on the Applicant's latest iteration of the dDCO which provides suggested condition wording.

2.2.26 **Sub-question e)** *The Applicant contends that the seasonal restriction forming part of the marine licence condition for the TOWF (referred to in (c) above) was subsequently removed, citing the following document by way of reference ('Review of Environmental Data Associated with Post-Consent Monitoring of Licence Conditions of Offshore Wind Farms', MMO, April 20141 at pg 87). Can the MMO please confirm whether this was indeed the case, and if so, when and why the condition was removed?*

2.2.27 The MMO confirms that the piling restriction licence condition was subsequently removed from TOWF in the year 2008. The MMO in consultation with Cefas agreed to removal of the piling restriction providing the following criteria were met:

- *It is based on the construction of up to 100 turbines.*
- *That construction will be completed during 1st September 2008 and 30th September 2009.*
- *All pile driving will be completed by 30th May 2009.*
- *All foundations are to be installed by pile driving.*
- *Pile driving does not overlap with construction of any other offshore wind farm developments in the outer Thames area during the spawning season.*
- *Only one pile driving vessel is in operation at any point in time during the spawning season.*
- *Pile driving is to start on 1st September 2008.*
- *Piles are inserted at a frequency of approximately 1 every 2-3 days (The duration of piling per foundation to be approximately 5-7 hours).*
- *Cefas would suggest that the developer provides the MFA and Cefas with a weekly update on progress during the spawning season (e.g. number of piles installed per row, rough duration of pile driving activity per pile and any problems or requirements to amend installation schedule). Noise measurements during the pile driving activities would be a useful addition to the monitoring programme and TOW are committed to undertaking underwater noise monitoring along transects 'West 270-1' and 'West 270-2' for the first four monopile installations. Cefas would also suggest monitoring of underwater noise during the spawning season. The methodology for the monitoring would need to be agreed with MFA and Cefas in advance.*
- *A third spawning survey (if possible) during construction would be more statistically robust if all surveys show similar spawning patterns, post construction surveys for up to 3 years after construction would show whether the pile driving has any effect on the distribution and abundance of spawning fish (the type, timing and frequency of such surveys should be agreed with Cefas to minimise any potential adverse impacts on the viability of the spawning population).*

2.2.28 The Applicant has questioned, given some similarities with TOWF, whether the proposed piling restrictions for TEOWF are justified. To ensure clarity and context, whilst each case has been reviewed on its own merit, the MMO wish to highlight some

important points which should be considered when comparing the applications and advices provided for TOWF and TEOWF:

- i. In TOWF application, two seasons of trawl surveys of the Thames herring spawning ground were provided as part of their evidence-based approach to seeking a removal of the condition.
- ii. TOWF had undertaken a noise modelling study of the potential attenuating effects of the Margate Sands complex in relation to the spawning area.

2.2.29 The MMO advise that using the licence application, ES and licence conditions applied to TOWF as rationale and justification to support an application for TEOWF is not appropriate for the following reasons:

2.2.30 Technical advice is sought on a case by case basis using best available evidence in order to consider the potential impacts of a project/development based on the proposed activities **specific to that project**. The MMO would expect an Applicant to do the same for their EIA rather than depend on old assessments/old data and refer to TOWF advice which is over 10 years old.

2.2.31 The additional 34 WTGs being installed for TEOWF will require installation of piles over a wider area, i.e. placement of turbines will extend further North, South, East and West surrounding TOWF, creating an overall larger footprint, and consequently noise and vibration from piling is likely to propagate over a wider area. Consequently, the scale of impacts has the potential to increase when compared to that originally assessed for TOWF.

2.2.32 The advice provided for TOWF was based on best available evidence at that time but there are some key differences to the way in which EIAs have changed since this time:

- It is not clear that IHLS data in heat-mapped form was used to demonstrate concentrations of larval densities for the Downs stock to inform the assessment of impacts from noise. The use of IHLS data is now commonplace for applications for OWFs and aggregate licence applications.
- If IHLS data were used to support the assessment of impacts to the Downs herring population for TOWF, then the data are now over 10 years old and not considered recent enough to support the assessment for TEOWF.
- A key point to note is that the underwater noise modelling undertaken for the EIA for TOWF was done using dB_{ht}. The use of the dB_{ht} metric is no longer considered appropriate in noise impact assessments.

2.2.33 **Sub-question f)** *Does the MMO consider that it is necessary to impose any seasonal restrictions in relation to noise effects on sole spawning grounds? If so, on what basis and what, precisely, would be the restriction period?*

2.2.34 At deadline 6 the MMO advised that to date the Applicant had not provided certain elements of modelling prior to that deadline, in order to draw a fully informed conclusion. The Applicant submitted a number of clarifications in order to try and address this.

2.2.35 The Applicant's clarifications do not negate the need for the evidence requested. Specifically, a figure showing noise contours overlaid onto identified sole spawning grounds is required. To fully assess the impacts to sole the Applicant should provide a figure showing the noise modelling (based on a stationary receptor) for the East and South-West locations overlaid onto identified sole spawning grounds data.

2.2.36 The responses provided by the Applicant in relation to sole so far have focused on the use of calculation of total spawning habitat which, as stated most recently at deadline 6 ([REP6-0XX](#)) is not supported for reasons expanded on in that commentary. Additionally, as stated previously the MMO do not support the assumption of a fleeing fish for use in modelling. The suggestion of fish fleeing from their spawning grounds is one of concern and the MMO would not consider this "a more robust approach" as stated in paragraph 26 of Appendix 7 to their Deadline 4c submission and Annex A.

2.2.37 The noise contours depicted in Figure 3-4 (Appendix A) indicate that noise propagation will travel in a West to East direction i.e. away from the Thames Estuary sole spawning grounds. However, as stated above, as the noise contours have not been overlaid onto identified sole spawning grounds data it is not possible to tell the extent to which sole spawning grounds are likely to be affected. Furthermore, Figure 3-4 is for the East modelling location only, the South-West modelling location is also required due to its proximity to the Thames Estuary and sole spawning grounds.

2.2.38 Based on the current evidence using best judgement and existing knowledge of the extent of high intensity sole spawning grounds within the Thames Estuary, the MMO is inclined to believe that as noise propagation is travelling away from the estuary, a piling restriction **may** not be necessary for sole.

2.2.39 However, the MMO position is that this should be verified through presentation of the appropriate East and South-West noise contour maps with sole spawning grounds data overlaid as outlined in points 5-6. This will provide, the most suitable depiction of the potential impacts of noise in support of concerns raised by the MMO as well as that of other consultees and stakeholders who have a vested interest.

In absence of further modelling to fully assess the possible impacts, the MMO has to adopt a precautionary approach and recommend that a seasonal restriction for sole is imposed at this time – please see details of the restriction at **3.10** of section 3.

2.3 R17Q4.1.2 Potential Construction Noise Effects on Fish: submissions and evidence from the Applicant

Further the issue raised in R17Q4.1.1, in the absence of agreement, the following evidence is sought from the Applicant at D7 with comments from the MMO by D8:

2.3.1 **Sub-question d)** *The Applicant's reservations about the effectiveness and justification for the use of bubble curtains are noted from responses to ExQ1 [REP1-024] and Appendix 27 Annex A of the Applicant's D6 submission. However, could bubble curtains or other 'at source' mitigation techniques be used to remove or limit the extent of seasonal restrictions? If so, how would they be secured within the DCO/DML?*

2.3.2 The MMO agrees that, in principle, bubble curtains and other at source mitigation techniques could be used to remove or limit the extent of seasonal restrictions. However the MMO is unable to assess the extent of impact and provide information on the circumstances of deployment, methodology and effectiveness on TEOFW without further evidence from the Applicant.

2.3.3 Should piling restrictions be conditioned on the marine licence as per the MMO's recommendations, the MMO is willing to consider changes to any conditions through a variation mechanism in light of new supporting evidence.

2.3.4 The MMO advises that bubble curtains or other mitigation techniques would be best secured through inclusion in an existing or new pre-construction plan or document. This would secure the need to implement specific mitigation measures whilst enabling approval of the methodology by the MMO in consultation with the relevant stakeholders prior to commencement of the licensed activities.

2.3.5 **Sub-question e)** *Is there any need for UXO clearance to be similarly seasonally restricted to piling?*

2.3.6 The Applicant has confirmed they are not seeking to undertake UXO clearance as part of the DMLs and current drafting does not allow for this, hence consideration of a restriction is not required. Any future requests to undertake UXO clearance would need to be considered as part of an additional marine licence application.

2.4 R17Q4.8.1 The Certified Environmental Statement (ES)

The Applicant's response to ExQ3.8.1 sets out a list of eight documents that it states: "are intended to form part of the certified Environmental Statement". These eight documents are now included in Schedule 13 of the dDCO. The ExA welcomes this addition and the commitment to update Schedule 13 at each subsequent deadline, if required. However, the ExA notes that the Art 2 definition of the 'Environmental Statement' remains unchanged in the latest dDCO. Due to the extensive use of the Rochdale Envelope approach to offshore design parameters, there are a series of provisions in the dDCO that are limited "to the extent that this has been assessed in the Environmental Statement authorised by this Order" or allowing variation from the order where it "does not give rise to any materially new or different environmental effects to those assessed in the Environmental Statement". The ExA is concerned that the Applicant's new drafting does not fully address the fact that the submitted ES has been updated and clarified to such an extent during the examination that the definition of the 'Environmental Statement' should be broader than simply the original document submitted with that title.

2.4.1 The MMO advises that it shares the concern raised by the ExA in the question above and agrees that the dDCO, as suggested, should be amended to fully reflect the most up to date definition of what comprises the ES.

3. Comments on the Applicant's Draft Development Consent Order (dDCO) Revision F (issued 28 May 2019)

3.1.1 Please note, where applicable the matters below should be considered in respect to both deemed marine licences (DML) presented at schedules 11 and 12.

3.1.2 The MMO provides the following final comments on matters outstanding in acknowledgement that Examination is now near completion.

3.2 Arbitration, Article 36

3.2.1 The MMO notes that that in the latest iteration of the dDCO (Revision F) the arbitration provision remains unchanged. The MMO directs the ExA to its full and most recent commentary on this matter provided at deadline 6 ([REP6-0XX](#)).

3.2.2 In summary, the MMO recognises the intention of the arbitration provision to resolve disputes between the Applicant and third parties; however maintains that this provision is not required nor should it be used to remove the decision making powers from the MMO (as the regulator delegated by Parliament to take such decisions) and place this in the hands of an independent arbiter.

3.2.3 There is no compelling evidence as to why the Applicant in the case of TEOFW should be an exception to the rule and treated differently to any other marine licence holder.

3.3 Deemed Approval Process

3.3.1 **Deemed approval process** - at Revision F of the dDCO, schedule 11, condition 15 and the Applicant has introduced a 'deemed approval process', stipulating:

"...where the MMO fails to determine an application for approval under condition 13 and 14 within the period referred to in sub-paragraph (3) the programme, statement, plan, protocol or scheme is deemed to be approved by the MMO."

3.3.2 The MMO consider this provision to be grossly inappropriate and advise that this fundamentally goes against the parliamentary powers relayed through the Marine and Coastal Access Act 2009 (MCAA 2009). The provision in effect seeks to render the MMO's regulatory role in the competent discharge of conditions redundant and is not commensurate with current marine licensing practice.

3.3.3 The discharge documentation covers a wide range of mitigation that should be applied due to significant environmental and navigational safety risks. This documentation can be highly technical and requiring expert analysis to assist in mitigating risks. Any imposed time limits which could result in expert consultation being rushed to meet the suggested agreed timescales are considered as a fettering of the MMO's authority to effectively discharge licence conditions under the requirements of the MCAA 2009. In this respect the deemed approval of such documents after a set timescale is completely unacceptable to the MMO.

3.3.4 As noted with respect to the arbitration, the MMO again questions what problem will be resolved by the introduction of this provision and where is the comparative precedent to introduce such an approach. The Applicant does not appear to have provided any justification for inclusion of the provision.

3.4 Appeals Procedure for Refusal of an Application

3.4.1 Furthermore, Part 5 at schedule 11 and 12 introduces a new appeals procedure *“to be used following a refusal of an application for approval made under condition 13 or 14”*.

3.4.2 Similarly, the provision appears to be without justification or rationale from the Applicant and the MMO opposes it for much of the same explanation given with respect to arbitration and the deemed approval process.

3.4.3 As highlighted at deadline 6 the MMO is not aware of an occasion whereby any dispute which has arisen in relation to the discharge of a condition under a DML has failed to be resolved satisfactorily between the MMO and the Applicant, without any recourse to an ‘appeal’ mechanism.

3.4.4 The MMO recognises that there may be circumstances where the Applicant submits documents/plans to the MMO for approval and the MMO will decline to approve the documents/plans as submitted. Disputes arising in relation to this are almost always resolved by discussion between the MMO and the Applicant and in the highly unlikely event where agreement cannot be reached the Applicant can seek to challenge this using the established public law process of judicial review. It is the MMO’s position that the Applicant, in trying to introduce arbitration provisions, is attempting to resolve a problem that does not exist.

3.4.5 As outlined above, the MMO cannot see any reason as to why it should be subject to a provision for which there is no precedent and which appears completely unnecessary.

3.4.6 There is no justification for dispensing with the judicial review process that is already available to the Applicant to challenge any public law decision the MMO may take, or fail to take, in determining whether to discharge any conditions under the DMLs.

3.5 Maximum parameters in the DMLs

3.5.1 At deadline 6 the MMO commented that the parameters outlined below should be included in the DMLs to ensure the maximum impacts remain within those assessed and approved in the ES.

3.5.2 The MMO noted that the Applicant had suggested they would accede to this request, however notes their comments on responses to the ExA’s second round of written questions stating otherwise. The MMO does not believe the Applicant responses to date address the concerns raised in respect of securing these parameters on the DMLs. The MMO has provided full commentary on this at deadline 4 ([REP4-031](#)) – see ‘2.2 Action 20 – DML Maximum parameters’, however in summary:

3.5.3 The MMO notes the Applicant’s position that they are ‘generally’ restricted to carrying out the development in accordance with the certified ES which also sets out the maximum parameters of the projects, and therefore as they have to comply with the

certified ES it is unnecessary to repeat maximum parameters on the face of the DML. Whilst this proposition may work for the main body of the DCO; once granted, the marine licence essentially becomes a standalone document from the rest of the DCO and falls back to the MMO to regulate and amend in accordance with part 4 of MACAA2009. In Revision F (RevF) of the DCO, there does not currently appear to be any conditions limiting the works to the parameters defined in the certified ES which would secure their enforceability. Consequently, the MMO expects that on the current drafting the maximum parameters should be set out in the body of the DML.

3.5.4 The MMO would also like to point out that if the maximum parameters are not stated in the DML, but a condition included limiting the works to these, then this could be ultimately more restrictive for the Applicant than the approach outlined in 3.5.3. If the Applicant were required to comply with maximum parameters defined in the certified ES but decided to move outside of these, it would be more procedurally difficult for them than a variation to the parameters on the DML.

3.5.5 The MMO therefore believes it would be more appropriate to transfer the maximum parameters defined in the ES onto the DML (as limits on the authorisation imposed through the licence). These parameters can then be amended, if required, through a variation request (subject to the MMO being satisfied the change in parameters does not result in any materially new or materially different effects from what was assessed in the ES).

3.5.6 The MMO does not feel that the Applicant has put robust arguments as to why it should depart from the general approach. As previously stated at deadline 6, the following parameters should be included on the DMLs:

3.5.7 **Footprint for disposal activities** - The MMO welcomes the inclusion of the disposal volumes, respective activities and disposal sites on the DMLs however requests that the maximum footprint (area) is also included. The footprint is an important metric in assessing the overall impact of an activity in combination with the volume.

3.5.8 **Maximum permitted cable protection footprint**

3.5.9 **Maximum permitted scour protection footprint**

3.5.10 **Maximum number of cable crossings**

3.5.11 **Hammer Energy** – the MMO requests the maximum hammer energy be stated on the DMLs. The maximum hammer energy is an important metric in ensuring that impulsive noise is within the maximum that was assessed in the ES (and potentially the HRA). If the proposed hammer energy is to increase, the implication is that underwater noise impacts will increase, and further modelling would be required to demonstrate the scale of this impact. Such a change would most appropriately be dealt with through a variation to the DML.

The Applicant maintains in their response to interested parties DCO commentary that *“there is an established precedent for hammer energy (amongst other construction methodologies such as cable installation) not being on the face of the DCO, and for it not being necessary to do so.”* This is incorrect; whilst this may have been the case historically, hammer energy now features on a number of recent offshore windfarm DCOs. Most recently, though not consented as yet, it has been included on the Hornsea Project Three Order.

3.6 Timescales for approval of pre-construction and documentation

3.6.1 The MMO suggests condition 15 is amended to allow a six month approval period, except where otherwise agreed in writing by the MMO. A full explanation on the rationale for this request has been provided at deadline 6 ([REP6-0XX](#))

3.7 Dredge Disposal

3.7.1 Sub-paragraph (2) of condition 22 states: *“Any man-made material must be separated from the dredged material and disposed of on land, where reasonably practical.”*

3.7.2 The MMO questions whether the reference to ‘disposed’ could contradict the purpose of the Written Scheme of Investigations (WSI). In addition, were the material to be ‘landed’ the MMO may not have the full power to enforce the WSI.

3.7.3 The MMO has sought clarification on this from the Applicant, however in the absence of a response prior to deadline 7, suggests amendments are made to clarify that only material of non-historical significance, or that would not be in contravention of the WSI is disposed of.

3.8 Certified documents, schedule 13

3.8.1 The MMO welcomes drafting changes made by the Applicant inserting conditions 25 and 28 into schedules 11 and 12 respectively to ensure compliance with certified documents. The MMO further welcomes drafting that will allow minor revisions for those documents where this may be required, provided they do not give rise to any materially new or materially different environmental effects to those assessed in the ES.

3.8.2 The MMO adds that the Operations and Maintenance Plan listed in schedule 13 should be revised to make clear that this is an outline plan. Assuming consent is given, a final plan will be approved prior to commencement of the licensed activities.

3.9 Pre-construction monitoring and surveys in Goodwin Sands

3.9.1 The MMO welcomes revisions made by the Applicant in response to its deadline 6 submission clarifying the circumstances under which monitoring will be undertaken.

3.9.2 The MMO notes the revisions at condition 15 (b) of schedule 12 including the insertion of *“to be”* which makes it clearer that action is required if it is anticipated that cable protection would be installed. However later in the paragraph reference is made to *“...areas where cable protection has been installed...”* The MMO suggests this is revised accordingly so the condition requirements are clear.

3.10 Mitigation for herring and sole spawning grounds

3.10.1 The MMO has provided extensive commentary on the circumstances surrounding proposed mitigation for herring and sole spawning grounds, most recently at deadline 6 ([REP6-0XX](#)), and further in response to the ExA's final written questions at 2.2 and 2.3 respectively.

3.10.2 Taking final matters into account and further to commentary provided at **section 2** - response to the ExA's final written questions, the MMO advise that mitigation for herring and sole spawning grounds should be secured on the DMLs in the form of seasonal restrictions. Such restrictions should be drafted as conditions on the DMLs as follows:

3.10.3 Downs (North Sea) herring stock:

*"No pile driving works shall be carried out by or on behalf of the undertaker as part of or in relation to the authorised scheme between **1st November and 31st January** each year unless the MMO provides written confirmation to the undertaker beforehand that such works can take place, in all or in a specified part of the site, during this period or a part of this period."*

Reason: to minimise the risk of potential impact from underwater noise resulting from piling operations on the Downs herring stock.

3.10.4 Thames herring stock:

*"No pile driving works shall be carried out by or on behalf of the undertaker as part of or in relation to the authorised scheme between **1st February and 30th April** each year unless the MMO provides written confirmation to the undertaker beforehand that such works can take place, in all or in a specified part of the site, during this period or a part of this period."*

Reason: to minimise the risk of potential impact from underwater noise resulting from piling operations on the Thames herring stock.

3.10.5 Dover sole stock:

*"No pile driving works shall be carried out by or on behalf of the undertaker as part of or in relation to the authorised scheme between **1st March and 30th April** each year unless the MMO provides written confirmation to the undertaker beforehand that such works can take place, in all or in a specified part of the site, during this period or a part of this period."*

Reason: to minimise the risk of potential impact from underwater noise resulting from piling operations on the Dover sole stock.

3.10.6 Supporting Notes:

Broad spawning seasons for the aforementioned species are as follows; Downs herring from November to January inclusive, Thames herring from February to April, and Dover

sole from March to May (peaking in April) (Coull *et al.*, 1998). Table 1 provides a summary for a visual overview. Please note that fish may spawn earlier or later in the season in response to environmental changes such as temperature and salinity.

Table 1 - Approximate spawning periods of Downs herring, Thames herring and Dover sole.

| | J | F | M | A | M | J | J | A | S | O | N | D |
|--------|---|---|---|---|---|---|---|---|---|---|---|---|
| Downs | | | | | | | | | | | | |
| Thames | | | | | | | | | | | | |
| Sole | | | | * | | | | | | | | |

*Peak

Note: - the dates given within these options do not cover the whole Dover sole spawning season. However, the MMO consider the recommended period will be adequate mitigation for Dover sole by covering the start (March) and the peak spawning month of April, whilst taking a pragmatic approach to avoid having a prolonged seasonal piling restriction.

3.10.7 The MMO acknowledge that Examination is drawing to a close. However, further to the recommendations by the ExA and subsequent decision by the Secretary of State, the Applicant is encouraged to provide the following information to fully assess potential impacts:

For Sole:

- Predicted injury and Temporary Threshold Shift effect zones (based on a stationary receptor and Popper noise exposure criteria) overlaid onto appropriate sole spawning ground data.
- A figure showing the modelled SPLpeak or SELss noise isopleths overlaid onto sole spawning grounds, for the two locations – East and South-West.

For Herring:

- A figure showing the modelled SPLpeak or SELss noise isopleths overlaid onto herring spawning grounds/appropriate IHLS data - East and South West.

3.10.8 In the event TEOWF is given consent and seasonal restrictions are secured on the DMLs, provision of the above evidence will enable the MMO to fully assess potential effects and advise if and under what circumstances such restrictions could be revised.

4. Appendix A

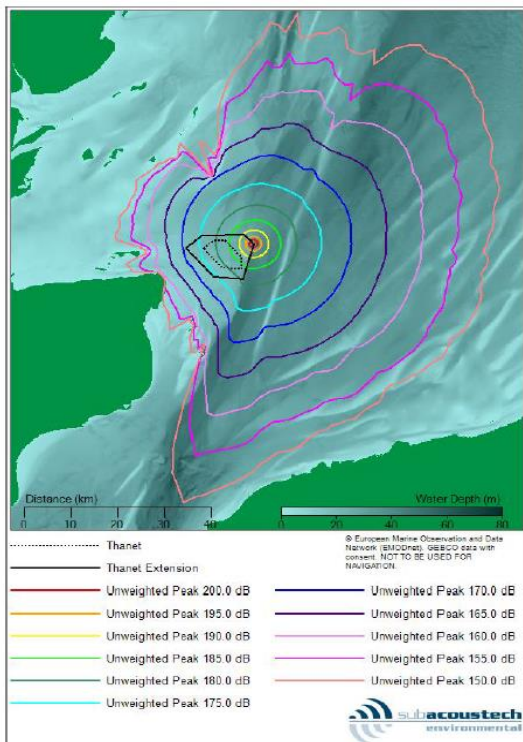


Figure 4-3 Contour plot showing the modelled unweighted SPL_{peak} values for installing a monopile using a maximum blow energy of 5000 kJ at the East modelling location

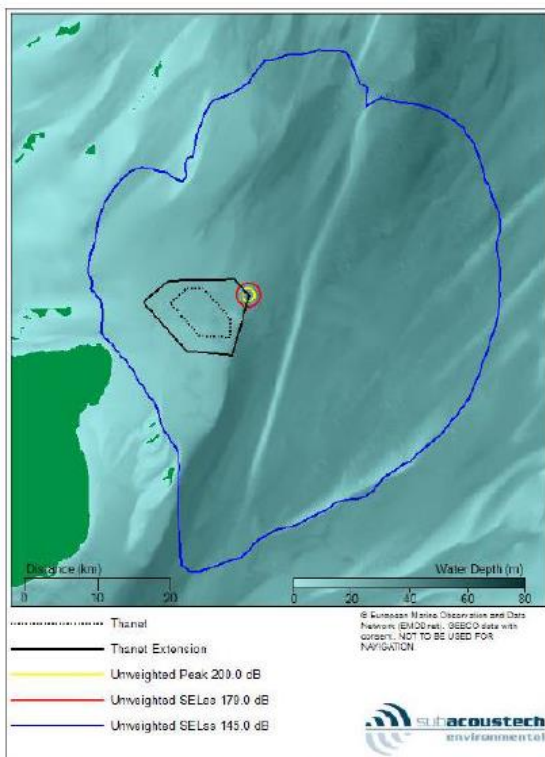


Figure A 5 Contour plot showing the impact ranges for harbour porpoise (Luske et al., 2009) at the east location for installing a monopile with a maximum blow energy of 5000 kJ

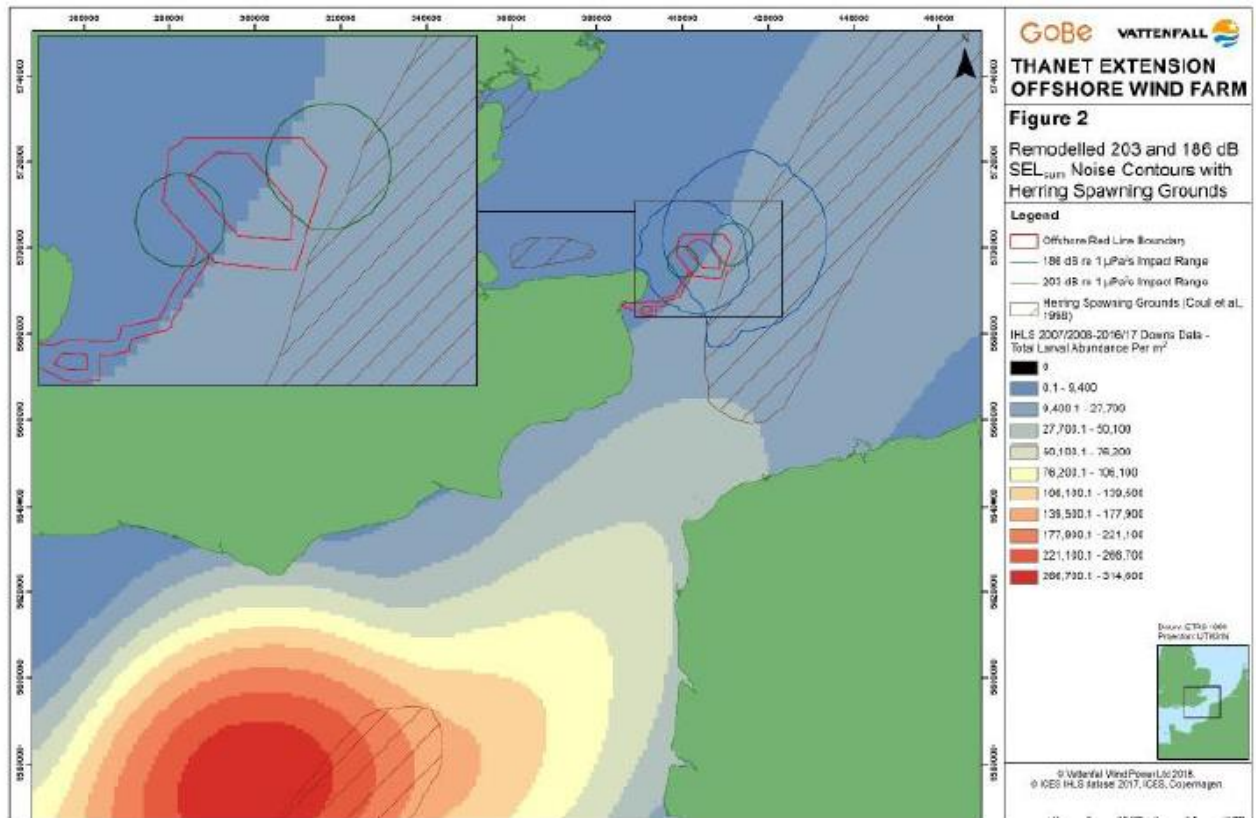


Figure 2 showing the remodelling 203 and 186 dB SEL_{cum} noise contours with herring spawning grounds

5. Appendix B

Figures 2.3.2.2 – 2.3.2.4 Larval abundance from IHLS 16th December 2009 – 31st January 2010.

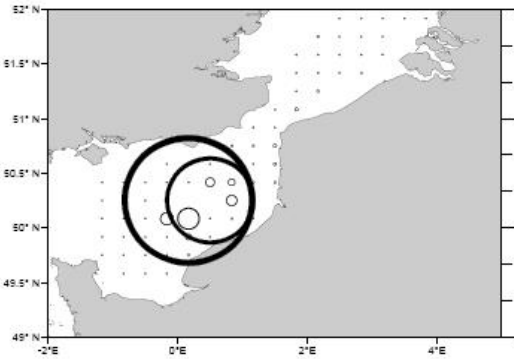


Figure 2.3.2.2: North Sea herring - Abundance of larvae < 11 mm (n/m^2) in the Southern North Sea (16-31 December 2009, maximum value = 23 000 n/m^2).

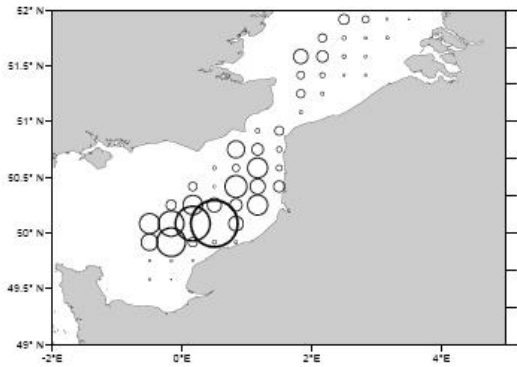


Figure 2.3.2.3: North Sea herring - Abundance of larvae < 11 mm (n/m^2) in the Southern North Sea (01-15 January 2010, maximum value = 8 000 n/m^2).

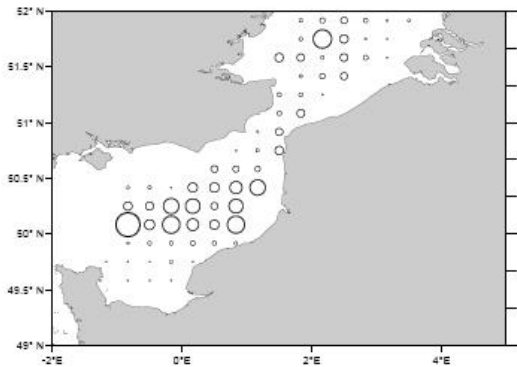


Figure 2.3.2.4: North Sea herring - Abundance of larvae < 11 mm (n/m^2) in the Southern North Sea (16-31 January 2010, maximum value = 740 n/m^2).

Figures 2.3.2.2 – 2.3.2.4 Larval abundance from IHLS 16th December 2010 – 31st January 2011.

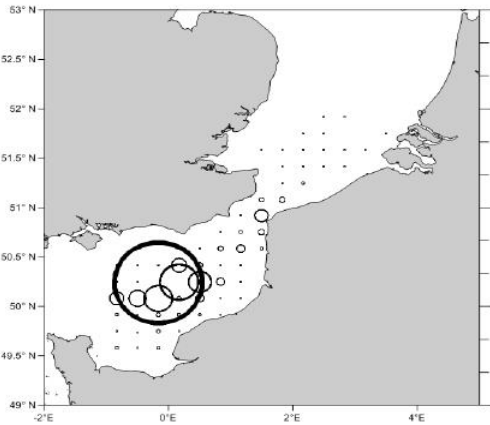


Figure 2.3.2.2. North Sea herring - Abundance of larvae < 11 mm (n/m^2) in the Southern North Sea (16-31 December 2010, scale 0.64 cm = 3 000 n/m^2).

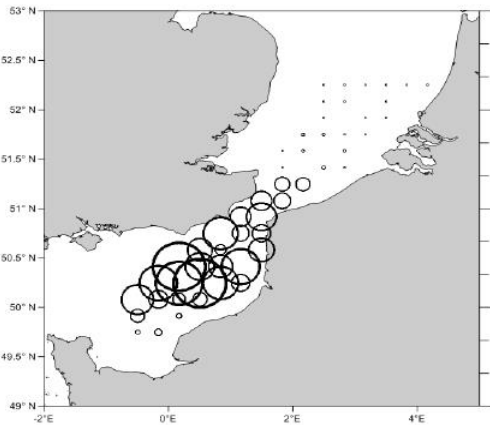


Figure 2.3.2.3. North Sea herring - Abundance of larvae < 11 mm (n/m^2) in the Southern North Sea (01-15 January 2011, scale 0.64 cm = 3 000 n/m^2).

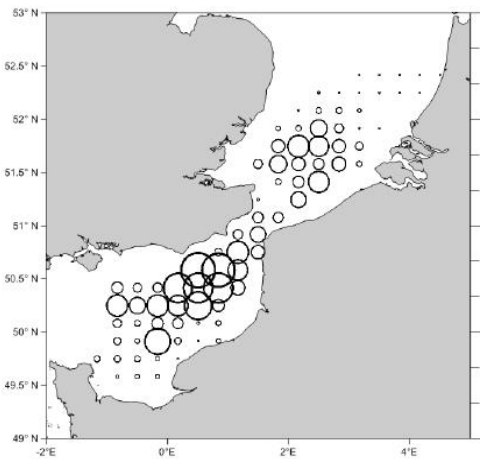


Figure 2.3.2.4. North Sea herring - Abundance of larvae < 11 mm (n/m^2) in the Southern North Sea (16-31 January 2011, scale 0.64 cm = 3 000 n/m^2).

Figures 2.3.2.2 – 2.3.2.4 Larval abundance from IHLS 16th December 2011 – 31st January 2012.

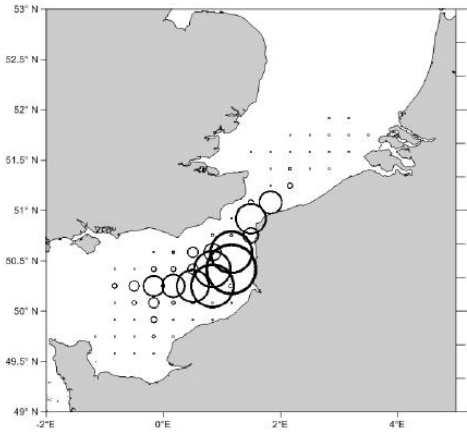


Figure 2.3.2.2. North Sea herring - Abundance of larvae < 11 mm (n/m^2) in the Southern North Sea (16-31 December 2011, scale 0.64 cm = 2 000 n/m^2).

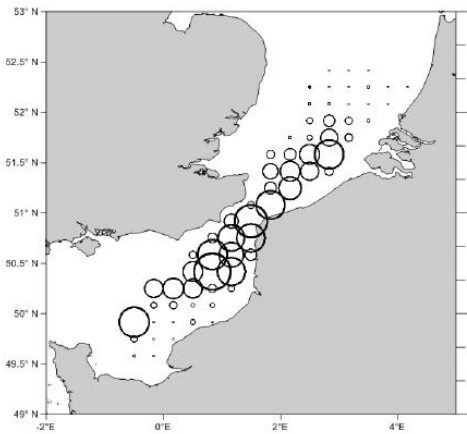


Figure 2.3.2.3. North Sea herring - Abundance of larvae < 11 mm (n/m^2) in the Southern North Sea (01-15 January 2012, scale 0.64 cm = 2 000 n/m^2).

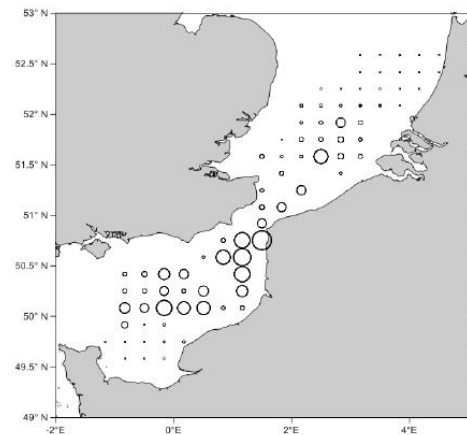


Figure 2.3.2.4. North Sea herring - Abundance of larvae < 11 mm (n/m^2) in the Southern North Sea (16-31 January 2012, scale 0.64 cm = 2 000 n/m^2).

Figures 2.3.2.2 – 2.3.2.4 Larval abundance from IHLS 16th December 2012 – 31st January 2013.

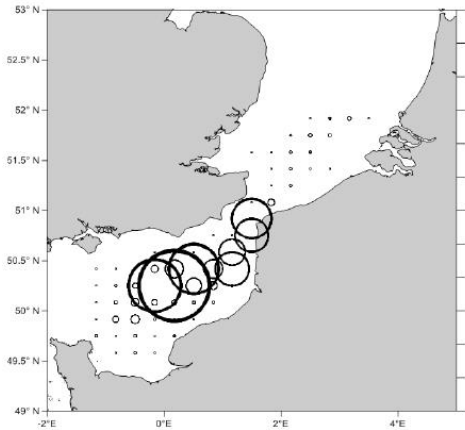


Figure 2.3.2.2. North Sea herring - Abundance of larvae < 11 mm (n/m²) in the Southern North Sea (16-31 December 2012, scale 0.64 cm = 4 000 n/m²).

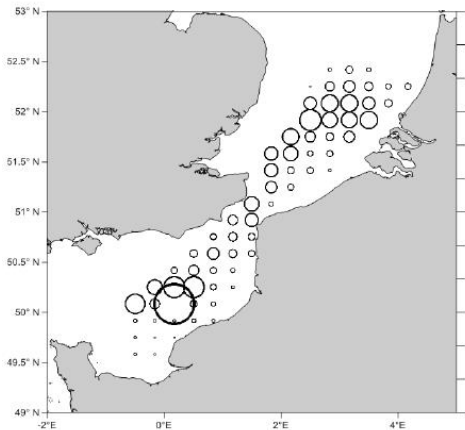


Figure 2.3.2.3. North Sea herring - Abundance of larvae < 11 mm (n/m²) in the Southern North Sea (01-15 January 2013, scale 0.64 cm = 4 000 n/m²).

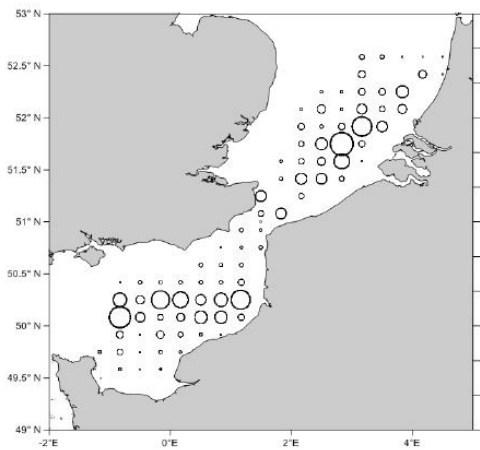


Figure 2.3.2.4. North Sea herring - Abundance of larvae < 11 mm (n/m²) in the Southern North Sea (16-31 January 2013, scale 0.64 cm = 4 000 n/m²).

Figures 2.3.2.2 – 2.3.2.4 Larval abundance from IHLS 16th December 2013 – 31st January 2014.

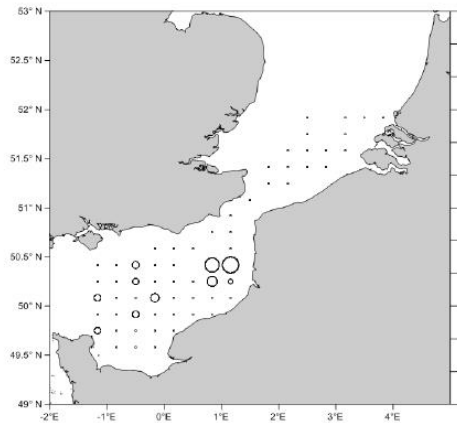


Figure 2.3.2.2. North Sea herring - Abundance of larvae < 11 mm (n/m^2) in the Southern North Sea (16-31 December 2013, maximum= 10 n/m^2).

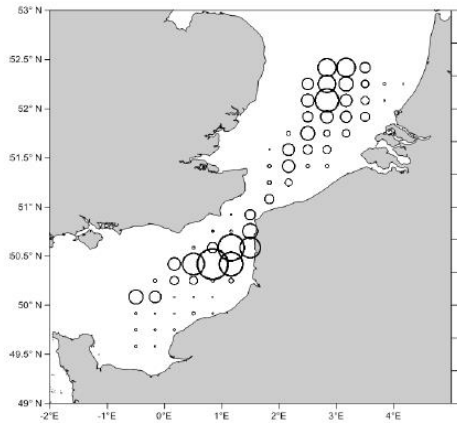


Figure 2.3.2.3. North Sea herring - Abundance of larvae < 11 mm (n/m^2) in the Southern North Sea (01-15 January 2014, maximum = 2 800 n/m^2).

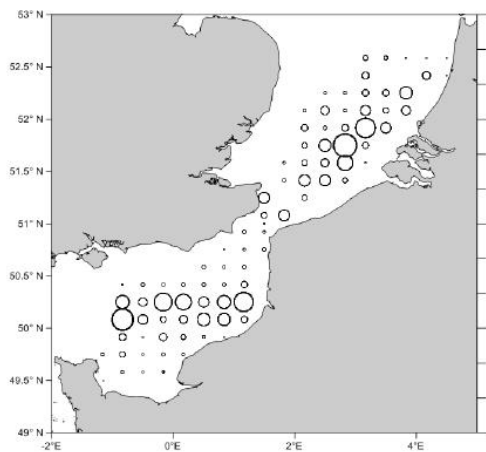


Figure 2.3.2.4. North Sea herring - Abundance of larvae < 11 mm (n/m^2) in the Southern North Sea (16-31 January 2014, maximum = 1 200 n/m^2).

Figures 2.3.2.2 – 2.3.2.4 Larval abundance from IHLS 16th December 2015 – 31st January 2016.

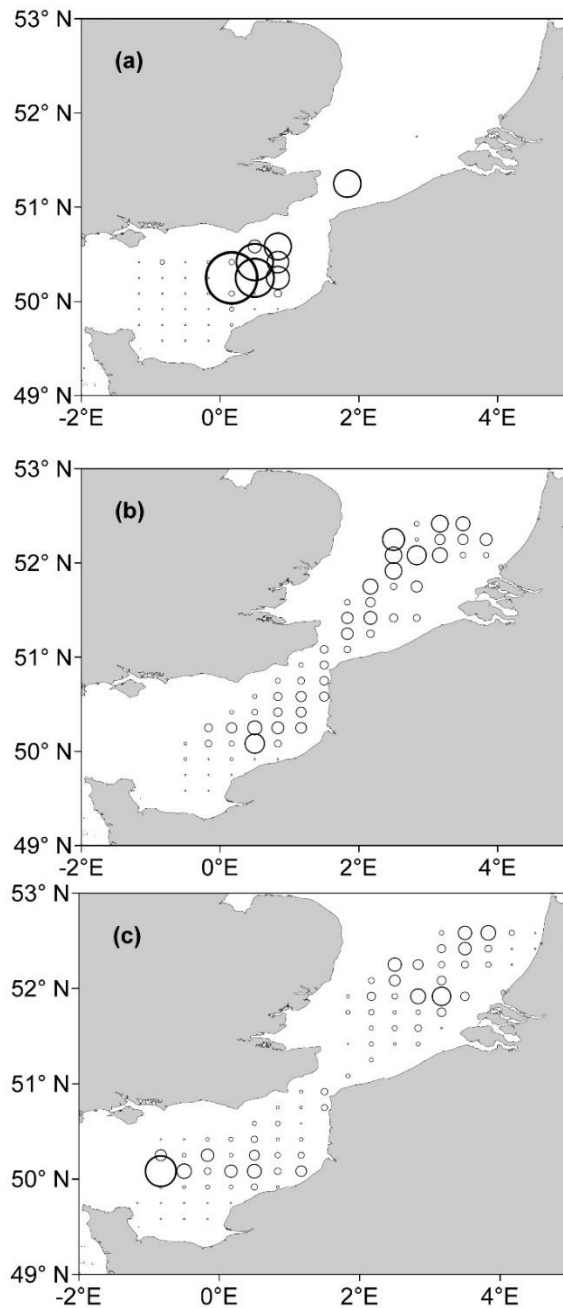


Figure 2.3.2.2 a-c: North Sea herring - Abundance of larvae < 11 mm (n/m^2) in the southern North Sea as obtained from the International Herring Larvae Survey in the second half of December 2015 (a) and in the first (b) and the second half (c) of January 2016 (maximum circle size = 1 600 n/m^2).

Figures 2.3.2.2 – 2.3.2.4 Larval abundance from IHLS 16th December 2016 – 31st January 2017.

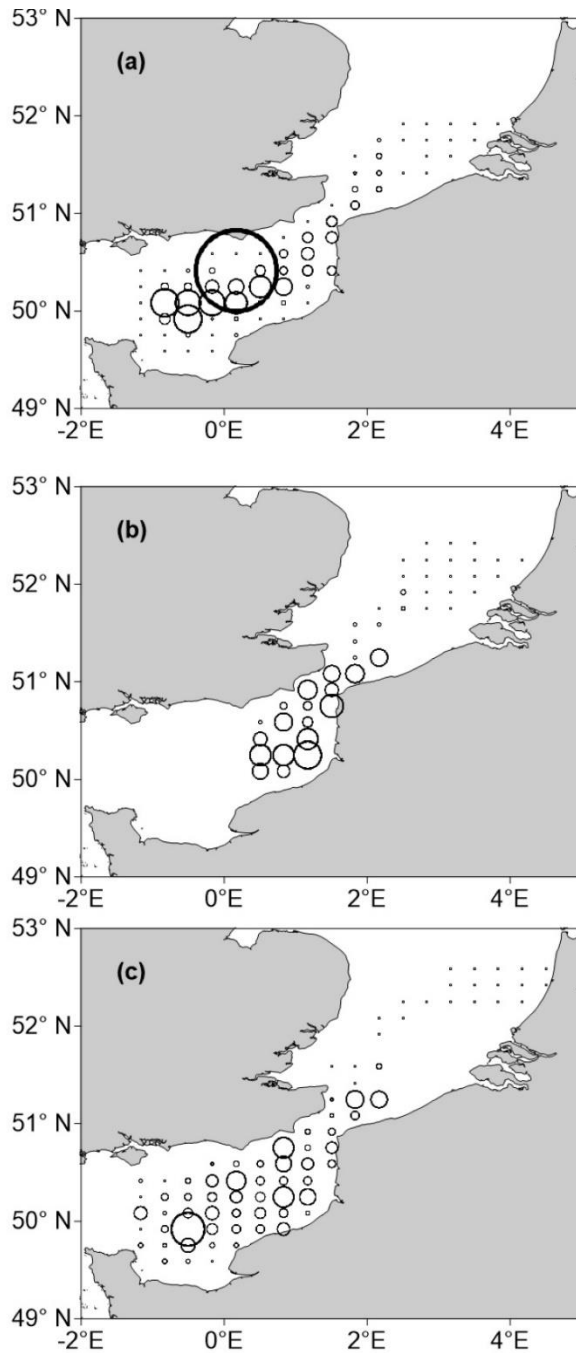


Figure 3.3.2.2 a-c: North Sea herring - Abundance of larvae < 11 mm (n/m^3) in the southern North Sea as obtained from the International Herring Larvae Survey in the second half of December 2016 (a, maximum circle = 30 000 n/m^3) and in the first (b) and the second half (c) of January 2017 (maximum circle size = 2 000 n/m^3).

6. References

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<http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/HAWG/01%20HAWG%20Report%202018.pdf>