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Seagreen - Offshore Wind Farm Piling Strategy – Request for MSS comments

Marine Scotland Science has reviewed the submitted pro forma and has provided the following comments.

**No Comments = "We have considered the request and have no advice to provide."*

Marine Mammals
MSS have reviewed Seagreen Offshore Wind Farm Piling Strategy, document reference number: LF000009-CST-OF-PLN-0022, dated 5/2/2020. We have also had sight of the SNH comments on this document. With regard to marine mammals we have the following comments.

MSS agree with SNH that in light of the information from Beatrice Wind Farm noise monitoring, namely the soft-start anomaly in terms of source level, the modelling results are likely to be underestimated. However, MSS are satisfied that revising the modelling would not alter the overall outcome of the assessment. MSS are content that, with the mitigation measures in place, there will be negligible risk of PTS to marine mammals during piling activities at Seagreen Offshore Wind Farm.

Marine Fish Ecology

MSS has reviewed Seagreen's piling strategy for their Offshore Windfarm with respect to marine fish, in particular cod and herring.

MSS note that piling is proposed to take place from April to July in 2023. These time periods are out with the peak spawning period for cod but there is a limited overlap with the start of the herring spawning period. Modelling carried out by the developer also shows that the temporary threshold shift (TTS) contours overlap peripheral areas of the main herring spawning stock to the north. However the timing of piling is largely outside the main spawning period for herring (July to September) and piling is predicted to occur over a short duration (26 days total).

In terms of impact ranges for impulsive piling, cod and herring are at risk of mortality or mortal injury above 207 dB re 1 µPa (Peak) (Popper et al., 2014). The developers noise modelling predicts that for the soft start hammer strike at 300 kJ, fish mortality and hearing impairment will be over a maximum range of 29 m. When the maximum hammer strike energy is used (2,300 kJ), fish mortality and hearing impairment will be over a maximum range of 100 m. Cumulative exposure to multiple piles (four piles in a 24-hour period) suggested that mortality could occur out to a range of 1,309 m for cod and herring and 804 m for the eggs and larvae of all fish species.

The proposed mitigation includes a soft-start and the use of ADDs which may deter hearing-sensitive fish species from the impact zone. MSS note that the conclusion stated in Appendix D – Piling Mitigation Protocol, Section 3 'Fish' where it states that '*Fish are likely to move away from the source on commencement of soft start piling and will continue to do so as piling ramps up*' may not be correct, as papers such as Harding *et al.* (2016) have shown that there is no clear evidence of a startle response of Atlantic salmon in relation to piling driving noises. However, since the noise modelling carried out by Cefas assumed that fish are stationary and do not flee the impact zone, MSS are content that this has been taken into account.

Overall, the predicted impacts from the current assessment are similar or lower than predicted in the consented 2012 ES, and piling of the offshore wind farm foundations is occurring for a shorter duration largely outwith spawning periods for cod and herring. MSS are therefore content with Seagreen's piling strategy for their offshore wind farm with regard to marine fish.

Diadromous Fish

Several important Atlantic salmon rivers discharge close to this development. MSS consider that the most sensitive stage for salmon may be emigrating salmon smolts as they will migrate out in shoals over a relatively short period, probably in May. An estimation on the basis of the limited information currently to hand, indicates that the density of emigrating salmon smolts could be 300 smolts per km2 off the east coast of Scotland in the main part of the smolt run.

The report predicts that at the maximum hammer energy, instantaneous mortality of salmon and other fish species could occur out to a range of 100 m and that cumulative exposure to multiple piling events (four piles in a 24 hour period) could result in mortality out to a range of 804 m for salmon, and recoverable injury out to 2.518 km. The main risk to salmon smolts is therefore from cumulative exposure to piling noise.

Smolts are now known to migrate quickly through coastal waters (a typical figure might be 15 km per day) which will reduce the potential for cumulative exposure. Nonetheless, if cumulative exposure is the primary risk to salmon smolts, there is the potential for mortalities, if pile driving takes place in May as is currently proposed. In this connection, MSS agree with SNH's response that the number of piles to be installed in a day needs clarified. MSS request further information to help assess which range of impact (i.e. for instantaneous mortality, cumulative mortality, or recoverable injury) should be considered to have the highest impact to salmon smolts. MSS request that the developer provides any available information on the proportion of salmon smolts likely to be killed or injured by this worst-case area of impact.

MSS note that the modelling does not make any allowance for fish fleeing the piling and ADD deployment (which is primarily intended to reduce injury risk for marine mammals). MSS consider that this assumption is correct, although several times in the report it is stated that fish are likely to move away from the source on commencement of soft-start piling and will continue to do so as piling ramps up. MSS consider it unlikely that salmon will flee from piling noise or the ADD (see also the Marine Fish Ecology section of this response which includes the relevant Harding et al. (2016) reference).

On Page 4 of Appendix D Piling Mitigation Protocol, it is stated that, because fish are likely to move away from the source on commencement of soft-start piling and continue to do so as piling ramps up, that no additional mitigation measures were considered necessary to reduce piling noise impacts on fish and that, "This has been accepted by Marine Scotland Licensing Operations Team (MS-LOT), Marine Scotland Science (MSS) and Scottish Natural Heritage (SNH) (meeting 29/10/2019)." No MSS fish advisor was present at the meeting referred to and MSS consider it unlikely that the advisors present would have made any comment on the likelihood of mitigations being suitable for fish.

MSS welcome the commitment of Seagreen in 9. Fish Monitoring to investigate with Marine Scotland the potential for participation in relevant strategic studies, to contribute to the ScotMER diadromous fish programme, with the aim of furthering understanding of Atlantic salmon ecology and behaviour in relation to offshore wind farm construction and operation.

SNH commented on the Strategy in an email of 12 March. Their comments did not include anything on diadromous fish.

References

Harding, H., Radford, A. N. and Simpson, S. D. (2016) Measurement of Hearing in the Atlantic salmon (*Salmo salar*) Part 2 The impact of pile-driving playback on the behaviour and physiology of Atlantic Salmon (*Salmo salar*). Scottish Marine and Freshwater Science Vol 7 No. 11.

Popper, A. N., A. D. Hawkins, R. R. Fay, D. A. Mann, S. Bartol, T. J. Carlson, S. Coombs, W. T. Ellison, R. L. Gentry, and M. B. Halvorsen (2014). Sound exposure guidelines for fishes and sea turtles: A technical report prepared by ANSI-Accredited standards committee S3/SC1 and registered with ANSI. Springer.

Hopefully these comments are helpful to you. If you wish to discuss any matters further contact the REEA Advice in-box at MSS_Advice@gov.scot.

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Seagreen - Offshore Transmission Asset & Offshore Wind Farm Piling Strategies

Marine Scotland Science has reviewed the relevant documentation and has provided the following comments.

Diadromous fish
MSS is content with the revisions regarding diadromous fish to the OTA and OWF piling strategies following MSS's responses of February and March 2020. MSS consider that the strategies are fit for purpose regarding diadromous fish. Our earlier responses should still remain in place as they provide comment on material which did not need to be revisited.

We would note that greater densities of salmon smolts than those assumed in the modelling *could* be present locally. MSS smolt trawling studies in 2018 and 2019 off the east coast of Scotland showed that smolts were not evenly distributed and that there was some consistency in the pattern between years.

Hopefully these comments are helpful to you. If you wish to discuss any matters further then please contact the REEA Advice inbox at MSS_Advice@gov.scot

Yours sincerely,

Renewable Energy Environmental Advice group
Marine Scotland Science

Lees E (Emma)

From: Karen Taylor <Karen.Taylor@nature.scot>
Sent: 12 March 2020 16:42
To: MS Marine Renewables; MARINEENERGY
Cc: Wilson J (Jessica)
Subject: RE: Seagreen Alpha & Bravo Offshore Wind Farm - Offshore Wind Farm Piling Strategy - Consultation

Dear Emma,

Thank you for your consultation on the Offshore Wind Farm Piling Strategy (PS) for Seagreen Alpha & Bravo wind farms provided by Seagreen Wind Energy Ltd in order to satisfy consent condition 11 of the section 36 consents (as varied). We have reviewed the document provided (LF000009-CST-OF-PLN-0022) and consider it to be fit for purpose subject to the following advice as outlined below.

Instantaneous PTS onset
Noise modelling carried out by CEFAS has predicted the instantaneous PTS-onset range to be <50m for all species as described in section 6 and Appendix C. While we consider this range to be an underestimate, in light of experience gained through acoustic monitoring carried out during the construction of Beatrice offshore wind farm in the Moray Firth, we acknowledge that this information has yet to be published. Despite this, we are content that the residual uncertainty that the experience at Beatrice highlights will be covered by the proposed mitigation and so we do not see any value in undertaking any further modelling.

Cumulative PTS onset
We note the maximum cumulative PTS-onset impact range for minke whales was predicted to be 6.75km as per section 6.1.2, page 20. The Piling Mitigation Protocol (PMP) described on page 26 proposes the use of ADDs prior to soft start. This mitigation, together with the relatively short duration of piling (i.e. 6 hrs of piling within each 24hr period for 36 days) and the relatively low likelihood of minke whales being present, is such that we would consider the risk of injury to be minimal. An EPS licence for injury under Conservation of Offshore Marine Habitats Regulations 2017 is therefore not required.

Disturbance
We agree, as per Table 3-5 on page 21 of Appendix C, that in relation to the Conservation of Offshore Marine Habitats Regulations 2017 which apply beyond 12 NM, that there is no significant disturbance of the species (or local population). However the underwater noise generated by the piling activity is likely to travel into the Scottish Territorial Water zone and as such an EPS licence for disturbance is required under the Conservation (Natural Habitats, &c.) Regulations 1994, as amended.

Piling Mitigation Protocol (PMP)
We have reviewed the piling mitigation protocol described in section 10 and summarised in Figure 10.1 on page 27. We are satisfied with the approach outlined in particular the 5-10 min ADD duration and agree with the approach outlined to deal with inevitable breaks in piling.

I trust this is of assistance.
Best wishes,
Karen

Karen Taylor | Marine Sustainability Adviser
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