

Mr. Ruari Lean

Our Ref: Co_2022_05_24-423

01 June 2022

Non-material Change Application for Removal of Maximum Export Capacity Limit on Norfolk Boreas Offshore Windfarm Cables.

Dear Mr. Lean,

Thank you for your invitation to provide comment on the proposed removal of maximum export capacity limits on the Norfolk Boreas offshore wind farm cables as outlined in the application, and for providing Eastern IFCA with the associated documents.

The role of the Eastern IFCA is “to lead, champion and manage a sustainable marine environment and inshore fisheries” in our district, which extends from the Humber to Harwich and six nautical miles out to sea. As the application relates to an area within our district, and given the potential for impacts upon inshore fisheries and habitats, it is considered appropriate for Eastern IFCA to provide comment on the proposal.

In all consultation responses, the Authority assesses applications (and pre-applications) according to the Eastern IFCA vision and adherence of those same applications with policies detailed in the relevant marine plan, as directed under section 58(1) of the Marine and Coastal Access Act 2009. The plans relevant to the Authority’s district are the East Inshore and East Offshore Marine Plans. We consider whether proposed developments will have a positive, negative or negligible effect on plan policies related to the IFCA vision to “manage a sustainable marine environment and inshore fisheries”. These considerations also enable the IFCA to provide advice in relation to the need to protect the environment, the need to protect human health and the need to prevent interference with other legitimate users of the sea.

East Marine Plan policy considerations:

The Authority has reviewed the associated documents and have considered the extent to which the application addresses the following policies within Eastern IFCA’s remit:

BIO 1, MPA 1, FISH 2 - *Appropriate weight should be attached to biodiversity taking account of the best available evidence, including on habitats and species that are protected or of conservation concern; Impacts on the overall Marine Protected Area network must be taken account of in strategic level measures and assessments, with due regard given to any current agreed advice on an ecologically coherent network;*

Proposals should demonstrate that they will not have an adverse impact upon spawning and nursery areas and any associated habitat.

Within the project there are aspects of potential impacts on features of Marine Protected Areas. We defer to the advice and comments of the relevant Statutory Nature Conservation Body in connection with these potential impacts, except where there may be an interaction with Eastern IFCA core remit.

In this case, the Eastern IFCA core remit pertains to the management of inshore fisheries to support the conservation objectives for the Haisborough, Hammond & Winterton Special Area of Conservation (HHW SAC), which the export cable corridor passes through. EIFCA understand that the developer has taken necessary precautions avoid the *Sabellaria spinulosa* reefs features present within the SAC, and that compensatory measures are being implemented by the developer to offset the impacts of the cable route on the designated features of the MPA. Eastern IFCA do not consider the proposal to remove the maximum export capacity limit for Norfolk Boreas will affect Eastern IFCA's remit to protect designated MPA features from fisheries damage.

However, the agreed cable route passes through areas of sandy and coarse sediment (which are designated sub-features of the subtidal sandbanks SAC feature) both within the SAC as well as further inshore. These habitats are typically colonized by burrowing fauna of worms, crustaceans, bivalve molluscs and echinoderms (JNCC 2022). These habitats also provide important breeding and nursery grounds for young commercially important fish, including European plaice (*Pleuronectes platessa*), common dab (*Limanda limanda*), and sandeel (*Ammodytes* spp.) (Natural England 2018). EIFCA is concerned about the potential impacts of electromagnetic fields (EMF) created by the Norfolk Boreas cables on both commercial and non-commercial species, and how these impacts may increase due to the increased power transmission resulting from the removal of cable export limits.

It is considered that export cables have higher EMF emissions compared to inter turbine cables, with Thomsen *et al.*, (2015) also finding higher EMF values around export cables than around wind turbine bases. While EMF typically dissipates within 10m of the source, it is not explained in the attached documentation how the removal of the export limit may affect the levels of EMF emitted by the export cables.

It is likely that mobile commercial species such as Edible crab (*Cancer pagurus*), European lobster (*Homarus Gammarus*), European plaice (*Pleuronectes platessa*) and Sandeel (*Ammodytes* spp) will encounter sub-sea power cables and thus be exposed

to EMF. Crustacea in particular are known to inhabit areas around offshore cable burial sites, particularly scour protection zones which can act as artificial reefs. Eastern IFCA acknowledge that the effects of EMF on fish and invertebrates are difficult to study, but that there is some evidence of effects. A study by Scott *et al.*, (2018) found that, in aquarium experiments, *C. pagurus* showed an attraction to the source of EMF as well as a reduction in roaming behaviour, alteration of their natural circadian rhythms and disrupted cycles of metabolic markers. This attraction to the source of EMF emission caused the crabs to spend significant amounts of time within the affected area, which, in-situ may come at the cost of time spent foraging for food, seeking mates and finding shelter, potentially leading to higher predation rates, increased death due to starvation and/or decreased number of successful matings.

Additionally, berried female *C. pagurus* move offshore and spend 6–9 months buried with minimal movement and lower feeding rates (Williamson, 1900; Edwards, 1979; Howard, 1982; Naylor *et al.*, 1997). Given this species' proven attraction to EMF sources, incubation of the eggs may take place around areas with increased EMF emissions. Long term studies are therefore needed to investigate the effects of chronic EMF exposure on egg development, hatching success and larval fitness. As larval stages are critical population bottlenecks, any negative effect of EMF on crab larvae will have a drastic effect on the edible crab fishery (Scott *et al.*, 2018). EMF effects on European lobster larvae have also been recorded in laboratory studies; Harsanyi *et al* (2022) found that exposure to EMF throughout embryonic development resulted in deformities in stage 1 lobster and crabs, specifically decreased carapace height, reduced total length and smaller maximum eye diameters. Lobster larvae exposed to EMF also exhibited reduced swimming abilities. These traits may ultimately affect larval mortality, recruitment and dispersal in European lobsters (Harsanyi *et al.*, 2022) which has the potential to, over time, severely impact the European lobster population within the EIFCA district.

Eastern IFCA therefore recommend the applicant consider undertaking appropriate modelling to calculate the likely EMF emitted from the export cables in the absence of an export limit (if this has not already been done) and/or consider regularly monitoring power transmission from the windfarm and EMF transmission on a regular basis to better understand the relationship between power transmission, cable material and EMF. This would help to inform studies on the effects of EMF on marine organisms and contribute to the very limited evidence base on these interactions. Eastern IFCA understand that the applicant intends to bury the export cables in the seabed, which will have the effect of reducing EMF levels at the seabed compared to surface-laid cables. However, Eastern IFCA is aware of wind farm export cables not remaining buried despite developer's intentions and ask whether additional measures have been considered ensure burial of cables is maintained (which would help minimise increases

in EMF transmission caused by the removal of the export limit) such as increased cable burial depth, cable material, cable layout and sheathing. Eastern IFCA therefore urge that EMF impacts are given full consideration before a decision is made on the removal of maximum export capacity limits.

Hopefully you will find these comments useful, but please contact me should you have any queries on the above response.

Yours sincerely,

Zoe Pearson

Marine Science Officer

Eastern IFCA is continually seeking to improve how we respond to consultations, both in terms of efficiency and meaningful content. Therefore, if any of the points raised in this response are reflected in the license outcome, we would appreciate being informed.

References

Edwards, E., 1979. *edible crab and its fishery in British waters*. Fishing News Books.

Harsanyi, P., Scott, K., Easton, B.A., de la Cruz Ortiz, G., Chapman, E.C., Piper, A.J., Rochas, C.M. and Lyndon, A.R., 2022. The Effects of Anthropogenic Electromagnetic Fields (EMF) on the Early Development of Two Commercially Important Crustaceans, European Lobster, *Homarus gammarus* (L.) and Edible Crab, *Cancer pagurus* (L.). *Journal of Marine Science and Engineering*, 10(5), p.564.

Howard, A.E., 1982. The distribution and behaviour of ovigerous edible crabs (*Cancer pagurus*), and consequent sampling bias. *ICES Journal of Marine Science*, 40(3), pp.259-261.

JNCC., 2022. 1110 Sandbanks which are slightly covered by sea water all the time. Available at: <https://sac.jncc.gov.uk/habitat/H1110/>. Accessed 26/05/2022

Natural England., 2018. Natural England and JNCC Conservation Advice for Marine Protected Areas Haisborough, Hammond and Winterton SAC. Available at [REDACTED]. Accessed 26/05/2022.

Naylor, J.K., Taylor, E.W. and Bennett, D.B., 1997. The oxygen uptake of ovigerous edible crabs (*Cancer pagurus*)(L.) and their eggs. *Marine & Freshwater Behaviour & Phy*, 30(1), pp.29-44.

Scott, K., Harsanyi, P. and Lyndon, A.R., 2018. Understanding the effects of electromagnetic field emissions from Marine Renewable Energy Devices (MREDs) on the commercially important edible crab, *Cancer pagurus* (L.). *Marine Pollution Bulletin*, 131, pp.580-588.

Williamson, H.C., 1900. *Contributions to the life-history of the edible crab (Cancer pagurus, Linn.)*. Fishery Board of Scotland.