Awel y Môr Offshore Wind Farm

Fish and Shellfish Clarification Note

Marine Licence Submission 1

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Fferm Wynt Alltraeth
AWEL Y MÔR
Offshore Wind Farm

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1 Introduction

1 Awel y Môr Offshore Wind Farm Limited (hereafter 'the Applicant') has submitted a Development Consent Order (DCO) application to the Planning Inspectorate (PINS), supported by a range of plans and documents including an Environmental Statement (ES) which set out the results of the Environmental Impact Assessment (EIA) on the Awel y Môr Offshore Wind Farm (AyM OWF) and its associated infrastructure.

2 To inform the assessment of potential disturbance effects on spawning activity of key fish receptors (sole, sandeel, plaice, mackerel, cod and whiting) within the Fish and Shellfish Ecology chapter (APP-052) of the ES, spawning potentials were defined. This enabled the worst-case potential spatial impacts to be contextualised in terms of their temporal overlap with spawning periods. This approach has been previously adopted for UK offshore wind farm projects including Walney Extension and Gwynt y Môr, specifically with consideration of potential effects on sole (Gwynt y Môr) and herring (Walney Extension).

3 Within the Natural Resources Wales (NRW) Relevant Representation (RR-015 2.6.5) and technical consultation response on the Marine Licence application, it is noted that NRW agrees with the methodology and assessment conclusions with regard to potential effects on spawning fish resource (that there will not be any significant impact on these receptors). The Applicant welcomes this agreement.

4 Within its response NRW does go on to highlight inaccuracies within the spawning potential calculations, and has raised queries over the assumptions used to inform the calculations, whilst noting that it will not affect the overall conclusion of the assessment, as detailed below:

5 "*…There are, however, some inaccuracies in the assessment, for example: there appears to be an error used in the calculation of affected spawning area for sandeel (Table 18, in Chapter 6: (APP- 052)), where the figure from Worst Case Scenario (WCS) monopile piling NW location scenario has been adopted, rather than temporal Maximum Design Scenario (MDS) for multi-leg foundation modelling at the NW location.*

6 *Furthermore, we do not consider that the assumptions used when modelling spawning fish as fleeing receptors are realistic, for example, we do not consider a sustained swim speed of 1.5 m/s-1 is realistic for spawning sole.*

7 *Consequently, it is our view that the figures presented for the Valued Ecological Receptor (VER) affected spawning potential do not represent realistic scenarios for some fish receptors, such as sole, plaice, cod and whiting. Nonetheless, NRW recognises that regardless of this, the resulting area impacted by noise from piling activities remains minor, when compared to the wide available spawning habitat in the region. NRW agrees that the significance of effect on VERs remain 'minor adverse' and are therefore not significant in EIA terms.*"

8 Section 2 of this Clarification Note addresses these specific queries.

2 Revised Spawning Potential Calculations

9 The Applicant has reviewed and revised the spawning potential calculations for key receptors as presented within the Fish and Shellfish Ecology chapter of the Environmental Statement (ES) (APP-052). The revised calculations are presented for Group 1 and Group 3 VERs in Table 1 and Table 2, below.

10 Following review of the revised calculations, the Applicant can confirm that the greatest potential for impacts on spawning potential is 2.136% (see Table 2) for spawning cod, as a stationary receptor. The Applicant considers this value to be minor in terms of the broadscale nature of cod spawning grounds across the Irish Sea. Notwithstanding this, cod are largely considered mobile receptors, due to their pelagic spawning nature, and therefore are considered likely to flee from disturbance. The potential impact on spawning potential for cod is therefore considered highly precautionary. For all other VERs, <1% of spawning potential is calculated as being impacted under either a fleeing or stationary scenario (see Table 1and Table 2 below).

11 Following review of the revised calculations, the Applicant is confident that the significance of effect on the key receptors remains 'minor adverse' and therefore not significant in EIA terms. The Applicant notes that NRW is also content that the conclusion of 'minor adverse' as presented within the Fish and Shellfish Ecology chapter (APP-052). assessments will remain unchanged.

Table 1: Group 1 VERs Spawning Potential Calculations.

GROUP 1 VER SPAWNING POTENTIAL CALCULATIONS		
TOTAL SPAWNING PERIOD		
Sole	Total spawning time (April to June, Ellis et al., 2010) over three years	6,552 hrs
	Total spawning area across Irish Sea (Ellis et al., 2010)	51,263 km^2
	Total Maximum spawning potential	335,875,176 km^2hr
Sandeel	Total spawning time (November to February, Ellis et al., 2012)) over three years	8,064 hrs
	Total spawning area across Irish Sea (Ellis et al., 2010)	55,284 km^2
	Total Maximum spawning potential	445,810,176 km^2hr
Plaice	Total spawning time (Dec to March, Ellis et al., 2012)) over three years	8,640 hrs
	Total spawning area across Irish Sea (Ellis et al., 2010)	36,584 km^2
	Total Maximum spawning potential	316,085,760 km^2hr
Mackerel	Total spawning time (March to July), Ellis et al., 2010) over three years	10,944 hrs
	Total spawning area across Irish Sea (Ellis et al., 2010)	33,202 km^2
	Total Maximum spawning potential	363,364,001 km^2hr

GROUP 1 VER SPAWNING POTENTIAL CALCULATIONS		
PILING TIME		
Max Piling Time over 65 Day period (over 3-year construction period		896 hrs
PILING AREA		
Area of Spawning Grounds Affected by Subsea Piling Noise at 219 dB SEL_{cum}		
Sole	Stationary receptor (Ellis et al., 2012)	13 km^2
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	<0.1 km^2
Sandeel	Stationary receptor (Ellis et al., 2012)	13 km^2
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	<0.1 km^2
Plaice	Stationary receptor (Ellis et al., 2012)	13 km^2
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	<0.1 km^2
Mackerel	Stationary receptor (Ellis et al., 2012)	13 km^2
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	<0.1 km^2
Area of Spawning Grounds Affected by Subsea Piling Noise at 216 dB SEL_{cum}		
Sole	Stationary receptor (Ellis et al., 2012)	28 km^2

GROUP 1 VER SPAWNING POTENTIAL CALCULATIONS		
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	<0.1 km^2
Sandeel	Stationary receptor (Ellis et al., 2012)	28 km^2
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	<0.1 km^2
Plaice	Stationary receptor (Ellis et al., 2012)	28 km^2
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	<0.1 km^2
Mackerel	Stationary receptor (Ellis et al., 2012)	28 km^2
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	<0.1 km^2
Area of Spawning Grounds Affected by Subsea Piling Noise at 186 dB SEL_{cum}		
Sole	Stationary receptor (Ellis et al., 2012)	2400 km^2
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	540 km^2
Sandeel	Stationary receptor (Ellis et al., 2012)	2400 km^2
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	540 km^2
Plaice	Stationary receptor (Ellis et al., 2012)	2400 km^2
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	540 km^2

GROUP 1 VER SPAWNING POTENTIAL CALCULATIONS		
Mackerel	Stationary receptor (Ellis et al., 2012)	2400 km^2
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	540 km^2
AFFECTED SPAWNING POTENTIAL		
Affected Spawning Potential by Subsea Piling Noise at 219 dB SEL_{cum}		
Sole	Stationary receptor (Ellis et al., 2012)	11,648 km^2hr
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	89.6 km^2hr
Sandeel	Stationary receptor (Ellis et al., 2012)	11,648 km^2hr
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	89.6 km^2hr
Plaice	Stationary receptor (Ellis et al., 2012)	11,648 km^2hr
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	89.6 km^2hr
Mackerel	Stationary receptor (Ellis et al., 2012)	11,648 km^2hr
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	89.6 km^2hr
Affected Spawning Potential by Subsea Piling Noise at 216 dB SEL_{cum}		
Sole	Stationary receptor (Ellis et al., 2012)	25,088 km^2hr

GROUP 1 VER SPAWNING POTENTIAL CALCULATIONS		
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	89.6 km^2hr
Sandeel	Stationary receptor (Ellis et al., 2012)	25,088 km^2hr
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	89.6 km^2hr
Plaice	Stationary receptor (Ellis et al., 2012)	25,088 km^2hr
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	89.6 km^2hr
Mackerel	Stationary receptor (Ellis et al., 2012)	25,088 km^2hr
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	89.6 km^2hr
Affected Spawning Potential by Subsea Piling Noise at 186 dB SEL_{cum}		
Sole	Stationary receptor (Ellis et al., 2012)	2,150,400 km^2hr
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	483,840 km^2hr
Sandeel	Stationary receptor (Ellis et al., 2012)	2,150,400 km^2hr
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	483,840 km^2hr
Plaice	Stationary receptor (Ellis et al., 2012)	2,150,400 km^2hr
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	483,840 km^2hr

GROUP 1 VER SPAWNING POTENTIAL CALCULATIONS		
Mackerel	Stationary receptor (Ellis et al., 2012)	2,150,400 km^2hr
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	483,840 km^2hr
% OF TOTAL SPAWNING POTENTIAL AFFECTED BY PILING		
% of Total Spawning Potential Affected by Piling (219 dB SEL_{cum})		
Sole	Stationary receptor (Ellis et al., 2012)	0.003%
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.000%
Sandeel	Stationary receptor (Ellis et al., 2012)	0.003%
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.000%
Plaice	Stationary receptor (Ellis et al., 2012)	0.004%
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.000%
Mackerel	Stationary receptor (Ellis et al., 2012)	0.003%
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.000%
% of Total Spawning Potential Affected by Piling (216 dB SEL_{cum})		
Sole	Stationary receptor (Ellis et al., 2012)	0.007%

GROUP 1 VER SPAWNING POTENTIAL CALCULATIONS		
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.000%
Sandeel	Stationary receptor (Ellis et al., 2012)	0.006%
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.000%
Plaice	Stationary receptor (Ellis et al., 2012)	0.008%
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.000%
Mackerel	Stationary receptor (Ellis et al., 2012)	0.007%
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.000%
% of Total Spawning Potential Affected by Piling (186 dB SEL_{cum})		
Sole	Stationary receptor (Ellis et al., 2012)	0.640%
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.144%
Sandeel	Stationary receptor (Ellis et al., 2012)	0.482%
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.109%
Plaice	Stationary receptor (Ellis et al., 2012)	0.680%
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.153%

GROUP 1 VER SPAWNING POTENTIAL CALCULATIONS		
Mackerel	Stationary receptor (Ellis et al., 2012)	0.592%
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.133%

Table 2: Group 3 VERs Spawning Potential Calculations.

GROUP 3 VER SPAWNING POTENTIAL CALCULATIONS		
TOTAL SPAWNING PERIOD		
Cod	Total spawning time (Jan to April, Ellis et al., 2010) over three years	10,872 hrs
	Total spawning area across Irish Sea (Ellis et al., 2010)	9,261 km^2
	Total Maximum spawning potential	100,685,592 km^2hr
Whiting	Total spawning time (Feb to June, Ellis et al., 2010) over three years	10,728 hrs
	Total spawning area across Irish Sea (Ellis et al., 2010)	38,722 km^2
	Total Maximum spawning potential	415,405,539 km^2hr
PILING TIME		
Max Piling Time over 65 Day period (over 3-year construction period)		896 hrs
PILING AREA		
Area of Spawning Grounds Affected by Subsea Piling Noise at 207 dB SEL_{cum}		
Cod	Stationary receptor (Ellis et al., 2012)	200 km^2
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	<0.1 km^2

GROUP 3 VER SPAWNING POTENTIAL CALCULATIONS		
Whiting	Stationary receptor (Ellis et al., 2012)	200 km^2
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	<0.1 km^2
Area of Spawning Grounds Affected by Subsea Piling Noise at 203 dB SEL_{cum}		
Cod	Stationary receptor (Ellis et al., 2012)	390 km^2
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	<0.1 km^2
Whiting	Stationary receptor (Ellis et al., 2012)	390 km^2
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	<0.1 km^2
Area of Spawning Grounds Affected by Subsea Piling Noise at 186 dB SEL_{cum}		
Cod	Stationary receptor (Ellis et al., 2012)	2400 km^2
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	540 km^2
Whiting	Stationary receptor (Ellis et al., 2012)	2400 km^2
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	540 km^2
AFFECTED SPAWNING POTENTIAL		
Affected Spawning Potential by Subsea Piling Noise at 207 dB SEL_{cum}		

GROUP 3 VER SPAWNING POTENTIAL CALCULATIONS		
Cod	Stationary receptor (Ellis et al., 2012)	179,200 km^2hr
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	89.6 km^2hr
Whiting	Stationary receptor (Ellis et al., 2012)	179,200 km^2hr
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	89.6 km^2hr
Affected Spawning Potential by Subsea Piling Noise at 203 dB SEL_{cum}		
Cod	Stationary receptor (Ellis et al., 2012)	349,440 km^2hr
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	89.6 km^2hr
Whiting	Stationary receptor (Ellis et al., 2012)	349,440 km^2hr
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	89.6 km^2hr
Affected Spawning Potential by Subsea Piling Noise at 186 dB SEL_{cum}		
Cod	Stationary receptor (Ellis et al., 2012)	2,150,400 km^2hr
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	483,840 km^2hr
Whiting	Stationary receptor (Ellis et al., 2012)	2,150,400 km^2hr
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	483,840 km^2hr

GROUP 3 VER SPAWNING POTENTIAL CALCULATIONS		
% OF TOTAL SPAWNING POTENTIAL AFFECTED BY PILING		
% of Total Spawning Potential Affected by Piling (207 dB SEL_{cum})		
Cod	Stationary receptor (Ellis et al., 2012)	0.178%
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.000%
Whiting	Stationary receptor (Ellis et al., 2012)	0.043%
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.000%
% of Total Spawning Potential Affected by Piling (203 dB SEL_{cum})		
Cod	Stationary receptor (Ellis et al., 2012)	0.347%
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.000%
Whiting	Stationary receptor (Ellis et al., 2012)	0.084%
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.000%
% of Total Spawning Potential Affected by Piling (186 dB SEL_{cum})		
Cod	Stationary receptor (Ellis et al., 2012)	2.136%
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.481%

GROUP 3 VER SPAWNING POTENTIAL CALCULATIONS		
Whiting	Stationary receptor (Ellis et al., 2012)	0.518%
	Fleeing Receptor (Assuming 1.5 m/s fleeing speed) (Ellis et al., 2012)	0.116%

3 References

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