

Outer Dowsing Offshore Wind

Sabellaria spinulosa reef supporting habitat Technical Note

Deadline 4a

Date: February 2025

Document Reference: 22.1

Rev: 1.0

Company:		Outer Dowsing Offshore Wind		Asset:		Whole Asset	
Project:		Whole Wind Farm		Sub Project/Package:		Whole Asset	
Document Title or Description:		22.11 Sabellaria spinulosa reef supporting habitat Technical Note					
Internal Document Number:		PP1-ODOW-DEV-CS-TCN-0003		3 rd Party Doc No (If applicable):		N/A	
Rev No.	Date	Status / Reason for Issue	Author	Checked by	Reviewed by		Approved by
1.0	February 2025	Deadline 4a	GoBe	Outer Dowsing	Shepherd & Wedderburn		Outer Dowsing

Executive Summary

The Offshore Export Cable Corridor (ECC) of Outer Dowsing Offshore Wind (ODOW) (“the Project”) passes through the Inner Dowsing, Race Bank and North Ridge Special Area of Conservation (IDRBNR SAC) which includes a range of marine habitats and is designated for the Annex I habitats of sandbanks and biogenic reef. Within the IDRBNR SAC, the currently known reef forming species is the Ross worm (*Sabellaria spinulosa*).

Natural England (NE) provided Deadline 3 submissions Appendix C2 [REP3-067] and Appendix C3 [REP3-068] concerning supporting habitats and processes for Annex I *S. spinulosa* reef, including, a recommendation of how to define supporting habitat within [REP3-067]. Based on this methodology, the Applicant has undertaken a mapping exercise to identify supporting habitat for *S. spinulosa* reef within the Offshore Export Cable Corridor (Offshore ECC) that crosses over with IDNRRB SAC, with a view to defining areas where removable cable protection could be deployed based on the advice provided by NE.

The mapped output demonstrated that habitat that is potentially suitable for supporting *S. spinulosa* reef were present within four distinct areas. The identification of this potential supporting habitat will inform further discussions regarding the delineation of “supporting habitat” and any decisions relating to the need for any further mitigation. The exercise has been undertaken to reach agreement on the interpretations of the methodology and results of the mapping exercise undertaken by the Applicant.

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Acronyms & Definitions

Abbreviations / Acronyms

Abbreviation / Acronym	Description
ECC	Export Cable Corridor
EIA	Environmental Impact Assessment
ES	Environmental Statement
IDRBNR SAC	Inner Dowsing, Race Bank, and North Ridge Special Area of Conservation
JNCC	Joint Nature Conservation Committee
MBES	Multibeam echosounder
ODOW	Outer Dowsing Offshore Wind
PSA	Particle Size Analysis
RIAA	Report to Inform Appropriate Assessment
SAC	Special Area of Conservation
SSS	Side-scan sonar
SBP	Sub-bottom profiler
UHRS	Ultra-high resolution seismic

Terminology

Term	Definition
Environmental Impact Assessment (EIA)	A statutory process whereby planned projects must be assessed before a formal decision to proceed can be made. It involves assessment requirements on the EIA Directive and EIA Regulations, including the collection and consideration of environmental information, which fulfils the publication of an Environmental Impact Assessment Report (EIAR).
Environmental Statement (ES)	Produced as part of an EIA for projects in English waters.
Inner Dowsing, Race Bank, and North Ridge Special Area of Conservation (IDRBNR SAC)	The Inner Dowsing, Race Bank and North Ridge Special Area of Conservation site is located off the south Lincolnshire coast in the vicinity of Skegness, extending eastwards and north from Burnham Flats on the North Norfolk coast, occupying The Wash Approaches.
Multibeam echosounder (MBES)	A multibeam echosounder (MBES) is a type of sonar that is used to map the seabed. It emits acoustic waves in a fan shape beneath its transceiver. The time it takes for the sound waves to reflect off the seabed and return to the receiver is used to calculate the water depth.
Offshore Export Cable Corridor (ECC)	The Offshore Export Cable Corridor (Offshore ECC) is the area within the Order Limits within which the export cables running from the array to landfall will be situated.
Outer Dowsing Offshore Wind (ODOW)	The Project.
The Applicant	GT R4 Ltd. The Applicant making the application for a DCO. The Applicant is GT R4 Limited (a joint venture between Corio Generation (and its affiliates), TotalEnergies and Gulf Energy Development (GULF)), trading as

Term	Definition
	Outer Dowsing Offshore Wind. The project is being developed by Corio Generation, TotalEnergies and GULF.
The Project	Outer Dowsing Offshore Wind, an offshore wind generating station together with associated onshore and offshore infrastructure.

1 Introduction

0. The Offshore Export Cable Corridor (ECC) of Outer Dowsing Offshore Wind (ODOW) ("the Project") passes through the Inner Dowsing, Race Bank and North Ridge Special Area of Conservation (IDRBNR SAC) which includes a range of marine habitats and is designated for sandbanks and biogenic reef. These are Annex 1 habitats that are protected under The Conservation of Habitats and Species Regulations 2017 and The Conservation of Offshore Marine Habitats and Species Regulations 2017.
1. Biogenic reef as a feature can be formed by a number of species. Within the IDRBNR SAC, the currently known reef forming species is *Sabellaria spinulosa*. *S. spinulosa* can form as biogenic reefs (a feature of the IDRBNR SAC) although they are often found individually and present in numbers which are not sufficient to develop reef structures. Aggregations may only last for a season (and is often ephemeral), so presence can be highly variable both spatially and temporally. However, when conditions are favourable (including where pressures have been removed) dense aggregations may be found to persist over several years.
1. Natural England provided Deadline 3 submissions Appendix C2 [REP3-067] and Appendix C3 [REP3-068] concerning supporting habitats and processes for Annex I *S. spinulosa* reef. This advice is supplemented by Natural England's comments at Deadline 4 (Appendix C4 to the Natural England Deadline 4 Submission (REP4-134)) summarised in the following paragraphs:
 2. *"Under the Supporting Processes attribute for IDRBNR SAC there is a 'Restore' target for the environmental conditions in those locations that are known, or which become known, to be important for S. spinulosa reef formation. NE consider any lasting change/loss of supporting habitat for Annex I S. spinulosa reef from the placement of cable protection will hinder the recovery of this feature and therefore the ability to meet the conservation objectives for the site and would require compensation...."*
 3. *Natural England advises the Applicant undertakes and submits into examination an assessment of supporting habitats and processes for potential Annex I S. spinulosa reef, to demonstrate that the recovery of this feature will not be hindered by the installation of the export cable and/or the lasting placement of cable protection. This will provide the Secretary of State comfort an adverse effect on integrity to IDRBNR SAC Annex I reef features and habitats/processes in which it relies upon will be avoided."*
2. Based on this, the Applicant has undertaken the analysis of supporting habitat for *S. spinulosa* reef with a view to defining areas where removable cable protection could be deployed based on the advice provided by NE.
4. This report provides details of a mapping exercise which the Applicant has undertaken to determine the extent of potential supporting habitat for *S. spinulosa* reef within the Offshore ECC that crosses within the IDNRRB SAC, based on the criteria set out within REP3-068. The exercise has been undertaken in order to reach agreement on the interpretations of the methodology and results of the mapping exercise undertaken by Applicant. This was issued to Natural England on the 18th of February for review.

2 Natural England methodology

5. The following method was developed by Natural England to define supporting habitat for *S. spinulosa* reef (Natural England, 2025) and was used as the foundations for this assessment. The information was first provided to the Applicant at Deadline 3 (13th December, 2024) within Appendix C3 of the Natural England Deadline 3 response (REP3-067). This approach builds upon numerous studies which have researched the environmental characteristics that support *S. spinulosa* reef, including those in Table 1.

3. Natural England state that:

"S. spinulosa reef listed as a feature/sub-feature, could be considered likely to support Annex I *S. spinulosa* reef where: **BOTH of the 'essential' environmental parameters listed below are present together with at least one of the 'optional' parameters** (Please see footnotes for further information and/or rationale). Note that the greater the number of additional 'optional' parameters met within a given area, the higher the quality the supporting habitat is likely to be".

1. ESSENTIAL - Location is subject to moderate to strong tidal flows/wave action.
2. ESSENTIAL - Sediment character meets one or more of the descriptions within Table 1.

AND EITHER

1. OPTIONAL – Location is within an area of sand waves/sandbanks OR within 2 km of sandbanks in any direction OR within 3km in direction of tidal stream, whichever is the greater¹.
 - OPTIONAL – Location is within an area where *S. spinulosa* reef may currently be absent, but where reef OR the SS.SBR.PoR.SspiMx biotope (EUNIS A5.611) has been previously identified in one or more sampling events (with a moderate or high level of confidence).
 - OPTIONAL - Individual *S. spinulosa* count is >375 per 0.1m² within a given sediment type polygon^{2,3}
 - OPTIONAL – Location is within an area/polygon mapped as the SS.SBR.PoR.SspiMx biotope (EUNIS A5.611)⁴.

¹ These distances have been based on results from a review of sandy sediment transport studies conducted by Spearman (2015), as well as the results of data analysis within HHW SAC (Natural England, 2024 – In draft).

² Abundance threshold has been based on a study by Envision in The Wash (Foster-Smith and Sotheran, 1999 in Limpenny et al., 2010) which reported that reef structures were associated with samples containing densities of *S. spinulosa* individuals greater than 375 per 0.1m²

³ Count data should not be overruled by DDV evidence because positional accuracy during surveys is highly unlikely to be sufficient to permit a direct cross reference between the data generated from the two different survey methods.

⁴ Where the SS.SBR.PoR.SspiMx (EUNIS A5.611) biotope appears transitional and/or questionable, the precautionary approach should be applied and the area should be considered potentially supporting if the 'essential' parameters above are present.

2. OPTIONAL - Elevation of dead OR living tubes is $\geq 5\text{cm}$ (average) but where reef has not been defined, owing to low percentage cover/patchiness⁵.”
 - OPTIONAL – Where extent of encrusting *S. spinulosa* tubes (dead OR alive) are $>10,000\text{m}^2$ but where average elevation has not been sufficient to categorise the area as Annex I reef according to Gubbay (2007)⁶.

Table 1 Review of sediment characteristics reported to support *S. spinulosa* reef (Natural England, 2025)

Sediment Character	Reference
“Mixed sediment”	<ul style="list-style-type: none"> ▪ Connor <i>et al.</i>, (1997) ▪ Gibb <i>et al.</i>, (2014) ▪ OSPAR 2010 ▪ NRW (2019)
“Typical shell (especially oyster valves), sandy gravel”	<ul style="list-style-type: none"> ▪ Rees and Dare (1993)
“Sandy gravel”	<ul style="list-style-type: none"> ▪ Newell <i>et al.</i>, (2001) ▪ Seiderer and Newell (1999)
“Sandy and mixed coarser sediments”	<ul style="list-style-type: none"> ▪ Gubbay (2007)
“Essentially sandy”	<ul style="list-style-type: none"> ▪ Schafer (1972) ▪ Warren (1973) ▪ Warren and Sheldon (1967)
“Medium fine sand, but favours silty, cobble/gravel habitats rather than purely sandy habitats”	<ul style="list-style-type: none"> ▪ Limpenny <i>et al.</i>, (2010)
“Grave; ribbons next to mobile sand features, thin veneers of mobile sand over gravel lags and sides of shelly sand banks”	
“Medium to coarse sand dominated”	<ul style="list-style-type: none"> ▪ Natural England <i>in draft</i> (due for publication in 2025)
“Sandy and coarse sediments”	<ul style="list-style-type: none"> ▪ Natural England (2019)

⁵ This optional parameter has been added on the basis that areas of reef which are sufficiently elevated to qualify as reef according to Gubbay (2007) but demonstrate a high degree of patchiness could represent areas of reef that have been moderated by fishing impacts. Greater elevation suggests greater potential as high-quality supporting habitat.

⁶ This optional parameter has been added on the basis that extensive areas of encrusting *S. spinulosa* may suggest that the location has good potential as supporting habitat in the absence of anthropogenic pressures. However, we suggest that at least one other ‘Optional’ parameter would also be required to provide the necessary weight to any decision making.

2.1 Review of available data

6. The Applicant reviewed available datasets that were required as both ‘Essential’ and ‘Optional’ by Natural England’s methodology (Natural England, 2025) for the Offshore ECC where the IDRBNR SAC overlaps. The data identified in Table 2 was collated and a review undertaken.

Table 2 Parameters and datasets used to inform this assessment

Natural England Parameters	Natural England Description	Parameter	Identified relevant dataset and description	Parameter incorporated into assessment?
Essential parameter 1	Location is subject to moderate to strong tidal flows/wave action.		There is moderate to strong tidal flows/wave action across the site (ABPmer, 2025)	Yes, parameter threshold is met across the whole of the Offshore ECC.
Essential parameter 2	Sediment character meets one or more of the descriptions within Table 1.		<p>Site-specific data were collected across the Offshore ECC (GEOxyz, 2022):</p> <ul style="list-style-type: none"> Geophysical survey using multibeam echosounder (MBES), side-scan sonar (SSS), sub-bottom profiler (SBP), magnetometry and ultra-high resolution seismic (UHRS). Benthic sediment grab samples were collected with 0.1m² Hamon grab at locations within the Offshore ECC (59 stations). All benthic grab samples were subject to infaunal species analysis and Particle Size Analysis (PSA) as well as chemical contaminants analysis stations and video footage stations. <p>The sediment character presented in Figure 1 that match the review of sediment</p>	Yes, sediment character (seabed features) has been presented in Figure 1.

Natural Parameters	England	Natural Description	England	Parameter	Identified relevant dataset and description	Parameter incorporated into assessment?
					<p>characteristics reported to support <i>S. spinulosa</i> reef (Table 1) include:</p> <ul style="list-style-type: none"> • Circalittoral coarse sand (sand with shell gravel) • Circalittoral coarse sand (sand with shell, pebbles and cobbles) • Circalittoral mixed sediment • <i>S. spinulosa</i> on stable circalittoral mixed sediment <p>‘Circalittoral muddy sand’ was the only sediment character that did not meet the description identified within Table 1. Circalittoral muddy sand’ was the only sediment character that did not meet the description identified within Table 1. Furthermore, <i>S. spinulosa</i> is not known to form reef directly on sandbanks and so these areas were not included in the assessment.</p>	
Optional parameter 1		Location is within an area of sand waves/sandbanks OR within 2 km of sandbanks in any direction OR within 3 km in direction of tidal stream, whichever is the greater.			Annex I sandbanks are present in the west, mid-section, and east of the site (JNCC, 2025) and locations within 2 km of sandbank features have been identified. Given that the primary tidal stream direction in this region is north-south, specifying '3 km in the direction of the tidal stream' would encompass only a small portion of the Race Bank and North Ridge sandbanks. Therefore, we have	Yes, Annex I Sandbanks have been presented in Figure 1 and the distance within 2 km to the sandbanks have been applied and presented.

Natural Parameters	England	Natural Description	England	Parameter	Identified relevant dataset and description	Parameter incorporated into assessment?
					adopted the 'within 2 km of sandbanks' approach, as it covers a broader area.	
Optional parameter 2		Location is within an area where <i>S. spinulosa</i> reef may currently be absent, but where reef OR the SS.SBR.PoR.SspiMx biotope (EUNIS A5.611) has been previously identified in one or more sampling events (with a moderate or high level of confidence).			An analysis of site-specific benthic sample data (GEOxyz, 2022) demonstrates that the biotope <i>S. spinulosa</i> on stable circalittoral mixed sediment (SS.SBR.PoR.SspiMx) occurs within the Offshore ECC.	Yes, areas of the biotope SS.SBR.PoR.SspiMx are presented in Figure 1.
Optional parameter 3		Individual <i>S. spinulosa</i> count is >375 per 0.1m ² within a given sediment type polygon.			This count threshold was met at 3/8 grab sample stations that were spread throughout the offshore ECC (ENVISION, 2024b).	Yes, count data is presented in Figure 1.
Optional parameter 4		Location is within an area/polygon mapped as the SS.SBR.PoR.SspiMx biotope (EUNIS A5.611)			Present within the central area of the Offshore ECC that overlaps the SAC (GEOxyz, 2022).	Yes, areas of the biotope SS.SBR.PoR.SspiMx are presented in Figure 1.
Optional parameter 5		Elevation of dead OR living tubes is ≥ 5cm (average) but where reef has not been defined, owing to low percentage cover/patchiness.			The site-specific data evidenced that average tube height was ≤ 5 cm at all sites where video assessment took place within the Offshore ECC (ENVISION, 2024b).	Yes, but parameter threshold <i>is not</i> met from available historic data within site, so data is not mapped.
Optional parameter 6		Where extent of encrusting <i>S. spinulosa</i> tubes (dead OR alive) are >10,000 m ² but where average elevation has not been sufficient to categorise the area as Annex I reef according to Gubbay (2007).			The extent of <i>S. spinulosa</i> doesn't reach this threshold across the site from the historic datasets (ENVISION, 2024b), therefore not relevant to this assessment.	Yes, but parameter threshold <i>is not</i> met across site from available historic data, so data is not mapped.

3 Results

7. Figure 1 shows areas of habitat that are potentially suitable for supporting *S. spinulosa* reef within the section of the Offshore ECC that crosses with the IDRBNR SAC. Supporting habitat was located within four distinct areas. Within these areas, variable bed features (sediment types) were present (as determined by the site-specific data (GEOxyz, 2022)), including “circalittoral coarse sand (sand with shell and gravel)”, “circalittoral mixed sediment”, “circalittoral muddy sand” and “*Sabellaria spinulosa* on stable circalittoral mixed sediment”.
8. The mapping exercise has identified the following areas:
 - Supporting Habitat: 28.59 km²
 - Non-Supporting Habitat: 13.13 km²
9. Supporting habitat was mainly identified within 2 km of the sandbanks, and a smaller area just outside of this buffer (approximately 3-4 km from the sandbank) within the mid-section of the Offshore ECC.
4. Non-supporting habitat was also present within the Offshore ECC, lying outside of the 2 km buffer around the sandbanks in areas with variable bed features (sediment types) in line with the Natural England methodologies (Natural England, 2025).



Figure 1. Habitat suitability for *Sabellaria spinulosa* reef within the Outer Dowsing Offshore Windfarm Export Cable Corridor (ECC) and Inner Dowsing, Race Bank and North Ridge Special Area of Conservation (IDRBNR SAC).

4 Conclusions

5. Following the assessment of supporting habitat for *S. spinulosa* reef using Natural England's approach, potential supporting habitat for *S. spinulosa* reef is present as shown in Figure 1.
10. The Applicant notes that the assumption was made within the RIAA and EIA process that supporting habitat was present. This identification of the potential supporting habitat is presented herein to gain agreement with Natural England as to the delineation of "supporting habitat" to facilitate discussions on the need for any further mitigation.

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