

# European Offshore Wind Deployment Centre Environmental Statement

## Chapter 9: Marine Ecology, Intertidal Ecology, Sediment and Water Quality





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## 9 MARINE ECOLOGY, INTERTIDAL ECOLOGY AND SEDIMENT AND WATER QUALITY

### 9.1 Introduction

- 1 The construction, operation and decommissioning of an offshore wind farm will inevitably have some impact upon the physical properties of the seabed in the near vicinity of the wind turbines and cables, as well as on the nature of the overlying water. Consequently, this could have impacts upon the benthic communities, fish and, ultimately, on their predators (marine mammals and birds). The Institute of Estuarine and Coastal Studies (IECS) at the University of Hull was commissioned by the Applicant to assess the impact of the proposed European Offshore Wind Deployment Centre (EOWDC) in Aberdeen Bay on the marine ecology of the area. The assessment was carried out using a combination of knowledge of the existing environment (baseline conditions), the proposed project design (worst case) and the likely response of the environment to any potential changes (impacts) from the development (construction, operation and decommissioning).
- 2 The assessment covers all the aspects of the EOWDC development (wind turbines, foundations, cabling). The potential Ocean Laboratory would be subject to a separate consent application and is therefore considered within the assessment of cumulative impacts only.
- 3 The following technical reports support this chapter:
  - Marine Ecology, Intertidal Ecology and Sediment and Water Quality Baseline Technical Report (Appendix 9.1)
  - Marine Ecology, Intertidal Ecology and Sediment and Water Quality Environmental Impact Assessment Technical Report (Appendix 9.2)

#### *9.1.1 Methodology Consultation*

- 4 In order to investigate the potential effects on benthic, fish and shellfish communities in the proposed development area, consultation with appropriate regulatory and other key institutes and organisations was undertaken. Consultees included Scottish Natural Heritage (SNH), Marine Scotland, Scottish Environmental Protection Agency (SEPA) and Aberdeen City Council. A detailed list of consultees is reported in the EIA Technical Report (Appendix 9.2).

#### *9.1.2 Key Guidance Documents*

- 5 The key guidance documents used for the baseline and impact assessment are as follows:
  - IEEM, 2010. Guidelines for Ecological Impact Assessment in the United Kingdom. Final document.
  - Environmental impact assessment: guide to procedures  
<http://www.communities.gov.uk/documents/planningandbuilding/pdf/157989.pdf>
  - CEFAS, 2004. Offshore wind farms: Guidance note for Environmental Impact Assessment in respect of FEPA and CPA requirements. Version

2. Prepared by the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) on behalf of the Marine Consents Unit (MCEU). 45pp.
- SNH, 2010. Renewable energy and the natural environment. SNH.

6 Further key guidance documents are indicated in Appendix 9.2.

### 9.1.3 Data Information and Sources

7 The principal data information and sources were:

- EOWDC Baseline Technical Report for the European Offshore Wind Development Centre ( Appendix 9.1)
- OSPAR, 2006. Review of the Current State of Knowledge on the Environmental Impacts of the Location, Operation and Removal/Disposal of Offshore Wind-Farms. Publication Number: 278/2006
- OSPAR, 2008. Assessment of the environmental impact of offshore wind-farms. Publication Number: 385/2008

8 The EOWDC Baseline Technical Report includes the results of site specific surveys undertaken. These include:

- EMU Ltd (2007) Geophysical and seabed habitat assessment of the then Aberdeen Offshore Wind Farm
- OSIRIS Projects Ltd (2010) Geophysical survey of the EOWDC
- Centre for Marine and Coastal Studies Ltd (CMACS Ltd) (2011) Benthic survey of the EOWDC

9 Further baseline data sources are indicated in the EIA Technical Report (Appendix 9.2).

## 9.2 Baseline Assessment

10 The seabed sediments in the proposed EOWDC are largely homogeneous, with a gradation related to depth and distance from the shore. At inshore stations, medium-fine well-sorted sands dominate, whereas sediments further offshore and at deeper sites are dominated by fine-very fine muddy sands.

11 Overall, sediment contamination in the area is in line with the background contamination levels reported for the North East Atlantic Sea. The concentrations of all contaminants measured during the site specific survey were below the Probable Effects Level (PEL) throughout the area. All hydrocarbons, organotin and polychlorinated biphenyls (PCB) concentrations were below the limit of detection.

12 The intertidal substratum is mainly comprised of sandy shores with an intertidal fauna dominated by mobile crustaceans (such as haustoriid amphipods). Sedentary species are less abundant as would be expected given the moderate exposure of the shores in this area.

13 The sublittoral benthic community changes mainly along the gradient of depth/distance offshore. Lower numbers of species and abundance are found in the infaunal community of the inshore shallower stations, where the polychaetes *Nephtys cirrosa* and amphipods dominate. Higher numbers of species and abundance are present further offshore, where the polychaetes

*Notomastus latericeus*, the bivalves *Nucula nitidosa* and *Tellina fabula* and brittle stars *Ophiura* spp. dominate. These two communities are described by the two biotopes: SS.SSA.IFiSa.NcirBat (inshore) and SS.SSA.CMuSa.AalbNuc (offshore).

- 14 The invertebrate epifaunal community present in the proposed project area is sparse and composed mainly of brittle stars, brown shrimp (*Crangon crangon*) and swimming crab (*Liocarcinus holsatus*). The most common and abundant fish species are dab (*Limanda limanda*) and plaice (*Pleuronectes platessa*). These species are more abundant as juveniles at shallower inshore stations suggesting the possible presence of nursery grounds in the area. Other common fish species in the area are whiting (*Merlangius merlangus*) and hooknose (*Agonus cataphractus*), these more abundant offshore. Commercially important species (e.g. whiting, cod *Gadus morhua*, Norway pout *Trisopterus esmarki*), although present in the proposed development area, are associated mainly with deeper waters.
- 15 No known spawning grounds are present in the proposed development area. Spawning grounds do occur: further offshore (for herring (*Clupea harengus*)), on coarser sediments (for sandeel (*Ammodytes marinus*)) or on muddier sediments (for *Nephrops*) than those present in the proposed development site.
- 16 No statutory designated marine protected areas have been identified within the proposed development area. There are however several protected species that are known to use the area. These include Atlantic Salmon (*Salmo salar*) which is a Annex II species listed on the Habitats Directive and which requires the establishment of Special Areas of Conservation (SACs). Atlantic Salmon have been addressed further within Chapter 22 Salmon and Sea Trout. The River Dee SAC also contains populations of the freshwater pearl mussel (*Margaritifera margaritifera*). This is a rare and threatened species, being one of the primary reasons for the selection of the River Dee SAC. It is highly dependent on the presence on Atlantic salmon and sea trout (*Salmo trutta*) as hosts for their larvae and therefore has the potential to be affected by the EOWDC.

### 9.3 Impact Assessment

#### 9.3.1 Impact Assessment Methodology

- 17 The assessment has used the combination of development options which is considered to have the greatest potential for detrimental impact on the marine ecology of the area. The impacts assessed are therefore considered to be the worst case and assume that the development would comprise 11 wind turbines of 10 MW capacity constructed over a single phase. The foundation and scour protection options have been assessed using a worst case for each receptor group.
- 18 The various receptors that may be affected by the development (namely intertidal benthos, subtidal benthos, epibenthos, shellfish and fish) have been considered in relation to the phases of the EOWDC lifecycle, ie construction, operation and decommissioning. Impacts arising from decommissioning activities have been assumed to be similar to those generated from

construction works, although in most cases the magnitude of potential impact would be considerably lower.

- 19 In order to assess the magnitude of an effect, its spatial extent, duration and scale have been taken into account by gathering this information from available literature and previous assessments of similar effects. The assessment of the sensitivity of a receptor has been based on its importance and recoverability, as gathered from the baseline technical report, and, where available, from additional assessments of impacts on the same or similar receptor.
- 20 The evaluation of the magnitude of effect and of the sensitivity of receptor has then been combined in a final assessment of the impact significance, following the matrix in Table 9.1.

		<b>Sensitivity of Receptor</b>			
		<b>Very High</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>
<b>Magnitude of Effect based on spatial, duration and scale of effect</b>	<b>Very High</b>	Major	Major	Major	Moderate
	<b>High</b>	Major	Major	Moderate	Minor
	<b>Medium</b>	Major	Moderate	Moderate	Minor
	<b>Low</b>	Moderate	Minor	Minor	Negligible
	<b>Negligible</b>	Minor	Negligible	Negligible	Negligible

### 9.3.2 Impact Assessment

- 21 Impacts on intertidal and subtidal benthic assemblages have been assessed in relation to: the release of toxic material, sediment disturbance, re-suspension and re-deposition, underwater noise, vibrations and Electromagnetic Field (EMF) emissions, hydrographic modifications, temperature increase (around the cable routes) and habitat loss (either temporary and permanent) and gain (introduction of artificial habitats). For benthic and epibenthic communities, these impacts have been assessed as being of negligible to minor significance, due to their general low to medium magnitude and to the high recoverability of the receptors.
- 22 Impacts on fish from piling noise during construction/decommissioning have been assessed as of minor to potentially moderate significance (Table 9.2). This is based on the precautionary approach adopted in the assessment of the possible effect on herring spawning grounds, given the lack of specific data on their local distribution within the area of influence of the impact.
- 23 Potential impacts on the River Dee SAC populations of freshwater pearl mussel (*Margaritifera margaritifera*) are directly related to impacts on salmon and sea trout which are discussed in Chapter 22 Salmon and Sea Trout. Impacts on salmon and sea trout are not expected to be above minor provided adequate mitigation measures and consultation with relevant stakeholders is carried out, particularly for the construction phases of the project.

<b>TABLE 9.2 Summary of Impact Assessment</b>				
<b>Potential Impact</b>	<b>Significance Level</b>	<b>Mitigation</b>	<b>Residual Significance</b>	<b>Monitoring</b>
Construction / Decommissioning				
Underwater noise and vibration on Fish	Minor to Moderate	Noise mitigation at source (eg soft-start procedure)	Minor to Moderate	Monitoring would be agreed with the relevant statutory authorities

### 9.3.3 Cumulative and In-Combination Impact Assessment

- 24 The only foreseeable development in Aberdeen Bay that has been considered in the context of cumulative assessment is the potential Ocean Laboratory, which is anticipated to result in a negligible/minor adverse impact. The impacts arising from the construction, operation and decommissioning of this structure are likely to be broadly similar (in type) to those assessed for the proposed EOWDC. However, given the smaller scale of the potential Ocean Laboratory, these impacts are likely to be of lower magnitude compared to those from the proposed EOWDC. Any additive effects are considered to be minimal in the context of existing predicted impacts. There are no other activities or developments that are in close proximity to the development that are anticipated to result in any adverse cumulative or in-combination impacts.

## 9.4 Summary

- 25 The proposed site contains physical, chemical and biological characteristics which resemble those of much of the surrounding area of Aberdeen Bay. No important sensitivities have been identified, except for the possible presence of salmonid migration routes and associated freshwater pearl mussel populations, addressed within Chapter 22 Salmon and Sea Trout, and of herring spawning grounds (which occur within the influence of piling noise during the construction of the proposed development).
- 26 Potential impacts on the marine ecology of the area arising from the construction, operation and decommissioning of the proposed development are generally considered to be of negligible to minor significance, and no significant cumulative impacts have been identified. Although the potential for moderate impacts on sensitive fish has been identified from the piling noise generated during construction, the basis for this assessment level is largely precautionary due to information paucity on the actual distribution of specific herring spawning grounds in the area.
- 27 The possibility of cumulative impacts arising from the installation of the proposed Ocean Laboratory on the proposed EOWDC site has been considered, but is expected to be minimal.
- 28 The assessment has not identified any potential adverse impacts on protected species or habitats when the development has been considered in context of other plans or projects.