European Offshore Wind Deployment Centre
Environmental Statement

Chapter 22: Salmon and Sea Trout

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22 SALMON AND SEA TROUT

22.1 Introduction

1 This section of the Environmental Statement (ES) summarises the assessment of the potential impacts on salmon and sea trout derived from the construction, operational and decommissioning phases of the proposed European Offshore Wind Deployment Centre (EOWDC). This assessment has been undertaken by Brown and May Marine.

2 The following technical reports support this chapter and can be found as:

- Salmon and Sea Trout Ecology and Fisheries Baseline Technical Report (Appendix 22.1)
- Salmon and Sea Trout Environmental Impact Assessment Technical Report (Appendix 22.2)

22.1.1 Methodology Consultation

3 Consultation meetings were held with all the salmon fishery boards located within the North East region and with representatives of the netting fishery in the North East.

4 These were as follows:

- Ugie District Salmon Fishery Board (26th October 2010)
- Ythan District Salmon Fishery Board (26th October 2010)
- Don District Salmon Fishery Board (27th October 2010)
- Dee District Salmon Fishery Board (17th January 2011)
- Esk District Salmon Fishery Board (27th October 2010)
- Usan Fisheries (Montrose) (17th Fenruary 2011)

5 In addition to the above meetings, questionnaires were circulated to all the District Salmon Fishery Boards in Scotland, through the Association of Salmon Fishery Boards (ASFB), and to netsmen, through the Salmon Net Fishing Association of Scotland. This process was aimed at gathering information at a national level and to note the main concerns of the boards and the netsmen with regards to wind farm developments in Scotland.

22.1.2 Key Guidance Documents

6 The key guidance documents used for the undertaking of the baseline and impact assessment technical reports are as follows:

- Strategic Environmental Assessment (SEA) of Draft Plan for Offshore Wind Energy in Scottish Territorial Waters: Volume 1: Environmental Report; Marine Scotland 2010
- Offshore Wind Farms, Guidance Note for Environmental Impact Assessment in Respect of FEPA and CPA Requirements - Version 2; Cefas, MCUE, DTI, June 2004
- Marine Scotland Scoping Response (December 2010 and January 2011 update)
- Scottish Natural Heritage Scoping Response (29th September 2010)

- Habitats Regulations Appraisal Draft Plan for Offshore Wind Energy in Scottish Territorial Waters: Appropriate Assessment Information Review. Marine Scotland (2011)

22.1.3 Data Information and Sources

- Marine Scotland Review of Migratory routes and behaviour of Atlantic salmon, sea trout and European Eel in Scotland's coastal environment: Implications for the development of marine renewables (Malcolm *et al*., 2010)
- Scottish Natural Heritage Literature review on the potential effect of electromagnetic fields and subsea noise from marine renewable energy developments on Atlantic salmon, sea trout and European eel (Gill and Barlett, 2010)
- Consultation with District Salmon Fishery Boards
- Collaborative Offshore Wind Research Into the Environment (COWRIE) Publications
- Monitoring Surveys undertaken in Operational Wind Farms
- Marine Scotland Science (MSS)
- Association of Salmon Fishery Boards (ASFB)
- Salmon Net Fishing Association of Scotland
- North East Region District Salmon Fishery Boards and Fisheries Trusts
- Atlantic Salmon Trust
- Monitoring Surveys undertaken in Operational Wind Farms
- Other publically available research literature

22.2 Baseline Assessment

7 This section provides a brief description of the salmon and sea trout ecology and fisheries baseline for the EOWDC.

8 The study areas used for the undertaking of the baseline assessment are shown in Figure 22.1. The local area includes the salmon fishery district located in the immediate vicinity of the EOWDC, the Don, whilst the regional area includes all the salmon fishery districts within the North East region: Ugie, Ythan, Don, Dee and Esk. Given the migratory behaviour of salmon and sea trout and the relative importance of the fishery across the country, the baseline also includes a national focus.

9 The behaviour of salmon and sea trout in the marine environment, particularly on the Scottish east coast, is not fully known and a degree of uncertainty exists regarding salmon and sea trout migratory routes, their behaviour in coastal waters and navigation mechanisms.

10 Salmon and sea trout smolts migrate seawards in the spring, generally from April to June. The seaward migration in both species is thought to be an active process with fish swimming close to the surface and these does not appear to be a period of acclimation when moving from fresh to salt water.

11 Salmon post-smolts make limited use of the estuarine environment moving quickly to the open sea towards their feeding grounds. Limited research carried out to date suggests post-smolts may travel relatively close to the coast in the initial phases of their migration.

12 Salmon originating in rivers from Aberdeenshire southwards are thought to migrate back from their feeding grounds through the North Sea, approaching the coast as far south as Northumberland and then starting a northerly coastal migration towards their home rivers. Grilse (one sea winter salmon) enter the rivers from early summer until shortly before spawning in autumn, whilst multi sea winter salmon are those fish that enter the rivers over a greater period of time.

13 Unlike salmon, sea trout post-smolts are not believed to travel to distant waters to feed; instead they generally remain in coastal waters. In the North East region sea trout generally enter the rivers from June to September with peak runs varying between rivers.

14 The right to fish for salmon in Scotland is a heritable right, whether in inland waters or at sea. The fisheries are managed by their owner or leaseholder under a framework of regulations laid down by central government. Under Scottish legislation the term salmon applies to both salmon and sea trout.

15 In the salmon fishery districts located in close proximity to the proposed EOWDC, the Ythan, Don and Dee, the majority of the total salmon and sea trout catch comes from the rod-and-line fishery with some fixed engine (bag and stake) fisheries. Fixed engine fisheries are of greater relative importance in other districts within the regional area, such as the Ugie and more significantly the Esk.

16 The Don is the salmon fishery district located in the immediate vicinity of the proposed EOWDC. The majority of the reported catch in the district is by rod-and-line, a high percentage of which is by catch and release. Reported catches by the net fishery are comparatively low, with no net-and-coble currently taking place in the district and fixed engines recording very low reported catches in recent years.

22.3 Impact Assessment

22.3.1 Impact Assessment Methodology

17 The assessment aims to describe the magnitude of effect of each potential impact and the sensitivity of each environmental receptor based on importance and recoverability. The impact assessment has been carried out taking the installation of eleven 8.5 m diameter monopiles as the worst case scenario. In reality, however, as the EOWDC is an experimental development to trial various foundations types, it is expected that less than eleven monopiles would be installed.

18 As stated above data gaps exist with respect to the salmon and sea trout baseline and therefore for the purposes of the impact assessment certain assumptions have had to have been made.

19 The Rivers Dee, Don and Ythan are closest to the development and the assumption has been made that fish from these rivers are more likely to transit the site. It is also recognised however that fish from other rivers, both within the region (eg North Esk, South Esk, Ugie) and from other Scottish areas (eg Moray Firth, North, etc) may on occasions also be present in the vicinity of the development.

20 The following assumptions based on the behavioural patterns of salmon and sea trout taking a precautionary approach have been made for fish originating in the Dee, Don and Ythan Salmon Fishery Districts:

- juvenile salmon and sea trout transit through, or in close proximity to, the site on their seaward migration
- adult salmon (grilse and MSW) and sea trout transit through, or in close proximity to, the site on their return migration
- sea trout are present in the vicinity of EOWDC and transit the site as part of their foraging activity

21 The criteria used in the assessment are as follows:

- spatial extent of the effect (national, regional, local and site-specific)
- duration of effect (Long term/ permanent (>10 years), medium (5-10 years) short term (1-5 years) or temporary (<1 year))
- scale of effect
- recoverability of the receptor (high, medium, low or none); and
- importance of the Receptor (high, medium, low or none)

22 The impact significance is then given as major, moderate, minor or negligible guided by the matrix in Table 22.1.

TABLE 22.1
Matrix for Significance of Impact

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

23 Where the significance of a potential impact is classified as moderate or major, it is considered to be a potentially significant effect.

24 The same methodology used for the assessment of potential impacts has been used in the cumulative impact assessment. The other developments and activities considered to have potential to result in a cumulative impact are as follows:

- other offshore wind farm developments
- offshore oil and gas developments
- introduction of Marine Protected Areas (MPAs)
- aggregate dredging
- potential Ocean Laboratory
- other offshore works

25 A summary of the significance of the impacts derived from the construction, decommissioning and operational phase of the EOWDC, including cumulative impacts is given in Table 22.2 below.

TABLE 22.2 **Impact Assessment**							
Construction and Decommissioning							
Source of Potential Impact	**Potential Impact**	**Receptor**	**Significance Level**	**Mitigation**	**Residual Significance**	**Cumulative Impact**	**Monitoring**
Noise	Direct Impact: Lethal effects and hearing damage	Adult and juvenile salmon and sea trout	Negligible	Soft-start piling	Negligible	None expected	Appropriate and relevant monitoring would be assessed through discussion with relevant stakeholders and regulators
	Disturbance/ Delay/Barrier to Migration	Salmon and sea trout juveniles	Minor to Moderate	Installation schedule to be discussed with relevant stakeholders and regulators	Negligible to Minor	Negligible	
		Salmon and sea trout adults	Minor	Installation schedule to be discussed with relevant stakeholders and regulators	Negligible to Minor	Negligible	
	Key prey species	Adult sea trout	Negligible	None required	Negligible	None expected	
Increased sediment concentrations	Direct effects/ Disturbance/ Delay/Barrier to Migration	Juvenile and adult salmon and sea trout	Negligible to Minor	None required	Negligible to Minor	None expected	None planned
Operational							
Source of Potential Impact	Potential Impact	Receptor	Significance Level	Mitigation	Residual Significance	Cumulative Impact	Monitoring

TABLE 22.2 **Impact Assessment**							
Noise	Disturbance/ Delay/Barrier to Migration	Adult and juvenile salmon and sea trout	Negligible	None required	Negligible	None expected	None planned
	Feeding						
EMFs	Disturbance/ Delay/Barrier to Migration	Adult and juvenile salmon and sea trout	Negligible to minor	None other than cable burial	Negligible to minor	Negligible	None planned
Presence of Wind Turbines	Disturbance/ Delay/Barrier to Migration	Adult and juvenile salmon and sea trout	Negligible	None required	Negligible	None expected	None planned

26 As stated, the impact assessment has been based on the installation of 11 monopiles. As EOWDC is a test site, the exact type of foundations and installation schedules have yet to be decided. Once the information is available on actual foundation types, any mitigation and monitoring that may be deemed appropriate or necessary would be assessed through discussion with the relevant stakeholders and regulators at the appropriate time.

27 Given the socio-economic importance of the salmon and sea trout fishery in Scottish rivers and coastal waters, the potential for the fishery to be impacted directly through loss of fishing area, restricted access or interference with fishing activities, and indirectly as a result of the ecology of salmon and sea trout being impacted, have been evaluated. A summary of the potential impacts on the salmon and sea trout fishery is given in Table 22.3 below.

TABLE 22.3
Salmon and Sea Trout Fishery Impact Assessment

Construction and Decommissioning				
Potential Impact	**Receptor**	**Potential Impact**	**Mitigation**	**Residual Impact**
Loss of or Restricted Access to Fishing Areas	Coastal netting during cable installation	Moderate	Liaison and consultation with relevant stakeholders	Negligible
	Coastal netting during other construction activities	Negligible		
	Rod and line fisheries			
Interference with fishing activities	Coastal netting during cable installation	Negligible		Negligible
	Coastal netting during other construction activities			
	Rod-and-line fisheries			
Loss or reduction of catch	Netting and rod-and-line fisheries	Negligible to minor		Negligible to minor
Operation				
Potential Impact	Receptor	Potential Impact	Mitigation	Residual Impact
Loss or reduction of catch	Netting and rod-and-line fisheries	Negligible	Liaison and consultation with relevant stakeholders	Negligible

22.4 Summary

28 Scottish salmon populations are recognised as being of national and international importance. In addition to their ecological value, salmon and sea trout are species of importance from a socioeconomic perspective on a local, regional and national level in Scotland.

29 The significance of the impact derived from the construction, operational and decommissioning phases of the proposed EOWDC on salmon and sea trout is not expected to be above minor, provided adequate mitigation measures and consultation with relevant stakeholders are carried out, especially during

construction. It is accepted that there is uncertainty regarding the behaviour of salmon and sea trout and the implications of responses to factors such as noise and EMFs. For this reason, once detailed construction information is available, appropriate and robust mitigation and monitoring would be discussed with the relevant stakeholders and regulators.

30 Similarly, provided that adequate liaison with stakeholders and fishing interest is carried out, it is not expected that the construction/decommissioning and operational phase of the proposed EOWDC would result in direct impacts on salmon and sea trout fisheries (eg loss of fishing area, restricted access, interference with fishing activities).

31 Indirect impacts on the fishery through loss or reduction of salmon and sea trout catches, would in effect, be directly related to the effects on the ecology of the two species as assessed above. As given in Table 22.2 above, the significance of the residual impacts on salmon and sea trout is predicted to range from negligible to minor. It is however recognised that the scale and magnitude of the potential impacts would vary between districts and would be primarily related to the relative value of the rod and line fisheries within individual districts and the timing and importance of runs within specific rivers.

32 The Atlantic Salmon (*Salmo salar*) is a qualifying species for the River Dee SAC and River South Esk SAC. Atlantic salmon from the relevant SACs may also occur in either the proposed developments in the Moray Firth or the Firth of Forth.

33 Assuming mitigation, in-combination impacts ie cumulative impacts of plans or projects on a European site, are not anticipated (see Appendix 29.1 Information to Inform the HRA).