MORAY EAST
OFFSHORE WINDFARM

# Offshore Transmission Infrastructure Project Environmental Monitoring Programme

## Moray East Offshore Wind Farm

**June 2023**

Moray Offshore Windfarm (East) Limited

| Produced by Moray Offshore Windfarm (East) Limited | |
|---|---|
| **Produced by** | [Redacted] |
| **Reviewed by** | [Redacted] |
| **Document Status** | Version 2 |
| **File Name** | 8460001-PCA0010-MWE-REP-017 |
| **Document Purpose** | Set out the measures for environmental monitoring throughout the Moray East Offshore Transmission Infrastructure lifespan |
| **Date** | 22/06/2023 |

| **Version** | **Date** | **Summary of Changes** |
|---|---|---|
| 1 | 15 Feb 2023 | For submission to MS-LOT (now MD-LOT) – Updated from the existing PEMP for the Development Version 2, to consider completion of the installation works, and to split in WF PEMP and OFTI PEMP |
| 2 | 22/06/23 | Incorporates stakeholder comments following consultation on Version 1 |

## Review / Approval

| **Offshore Consents Manager** | **Legal Review** |
|---|---|
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| **Moray East** |
|---|
| [Redacted]<br>[Asset Director] |

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## List of Abbreviations

| Abbreviation | Description |
|---|---|
| **AC** | Alternating Current |
| **ADD** | Acoustic Deterrent Device |
| **ASFB** | Association of Salmon Fishery Boards |
| **AST** | Atlantic Salmon Trust |
| **BOWL** | Beatrice Offshore Wind Farm Limited |
| **CaP** | Cable Plan |
| **cMMMP** | Construction Marine Mammal Monitoring Programme |
| **CPOD** | Continuous Porpoise Detectors |
| **CPS** | Cable Protection System |
| **DSFB** | District Salmon Fishery Boards |
| **EDA** | Eastern Development Area |
| **EMF** | Electromagnetic Field |
| **EMP** | Environmental Management Plan |
| **ES** | Environmental Statement |
| **FMS** | Fisheries Management Scotland |
| **JNCC** | Joint Nature Conservation Committee |
| **MBES** | Multi-beam Echo Sounder |
| **MFRAG** | Moray Firth Regional Advisory Group |
| **MFRAG – MM** | Moray Firth Regional Advisory Group – Marine Mammals Subgroup |
| **MFRAG-O** | Moray Firth Regional Advisory Group – Ornithology Subgroup |
| **MMMP** | Marine Mammal Monitoring Programme |
| **MMO** | Marine Management Organisation |
| **MD-LOT** | Marine Directorate - Licensing Operations Team (formerly MS-LOT) |
| **MS-LOT** | Marine Scotland - Licensing Operations Team (now MS-LOT) |
| **MSS** | Marine Scotland Science |
| **NM** | Nautical Miles |
| **OfTI** | Offshore Transmission Infrastructure |
| **OfTO** | Offshore Transmission Operator |
| **OnTI** | Onshore Transmission Infrastructure |
| **O&M** | Operation and Maintenance |
| **OSP** | Offshore Substation Platform |
| **PAM** | Passive Acoustic Monitoring |
| **PEMP** | Project Environmental Monitoring Programme |
| **PMF** | Priority Marine Feature |
| **PrePARED** | Predators and Prey Around Renewable Energy Developments |

| Abbreviation | Description |
|---|---|
| **PS** | Piling Strategy |
| **ROV** | Remotely Operated Vehicle |
| **RSPB** | Royal Society for the Protection of Birds |
| **SAC** | Special Area of Conservation |
| **SCENE** | Scottish Centre for Ecology and the Natural Environment |
| **SNCB** | Statutory Nature Conservation Body |
| **SNH** | Scottish Natural Heritage (now NatureScot) |
| **SpORRAn** | Scottish Offshore Renewables Research Framework |
| **SSS** | Side Scan Sonars |
| **TI** | Transmission Infrastructure |
| **ToR** | Terms of Reference |
| **UAV** | Unoccupied Aerial Vehicle |
| **ULS** | Ultimate Limit State |
| **UoA** | University of Aberdeen |
| **VMP** | Vessel Management Plan |
| **WDC** | Whale and Dolphin Conservation |
| **WF** | Wind Farm |
| **WP** | Work Package |
| **WTG** | Wind Turbine Generator |

## Definitions

The following definitions have been used throughout this document with respect to the company, the consented wind farms and how these definitions have changed since submission of the Moray East Environmental Statement (ES) in 2012 and the Moray East Modified Transmission Infrastructure ES in 2014 and the Moray East Offshore Substation Platform (OSP) Environmental Report in 2017.

**Moray Offshore Windfarm (East) Limited (formerly known as Moray Offshore Renewables Limited)** – the legal entity submitting this Project Environmental Monitoring Programme (PEMP);

**Moray East Offshore Wind Farm** - the wind farm that has been developed in the Moray East site (also referred as the Wind Farm);

**The Moray East site** - the area in which the Moray East Offshore Wind Farm is located. Section 36 Consents and associated Marine Licences to develop and operate up to three generating stations on the Moray East site were granted in March 2014. At that time the Moray East site was known as the "Eastern Development Area (EDA)" and was made up of three sites known as the Telford, Stevenson and MacColl offshore wind farm sites. The Section 36 Consents and Marine Licences were subsequently varied in March 2018, with the Marine Licences additionally varied in July 2018, July 2019, April 2020, October (MacColl)/November (Telford & Stevenson) 2020, and January 2022;

**Telford, Stevenson and MacColl wind farms** – these names refer to the three consented offshore wind farm sites located within the Moray East site;

**Transmission Infrastructure (TI)** - includes both offshore and onshore electricity transmission infrastructure for the consented Telford, Stevenson and MacColl wind farms. Includes connection to the national electricity transmission system near New Deer in Aberdeenshire encompassing Alternating Current (AC), offshore substation platforms (OSPs), AC export cables offshore to landfall point at Inverboyndie and AC export cables onshore to the AC collector station (onshore substation), and the additional regional transmission operator substation near New Deer. A Marine Licence for the offshore TI was granted in September 2014 (Modified Offshore Transmission Infrastructure (OfTI) Marine Licence). A further Marine Licence for two additional distributed OSPs was granted in September 2017. Both Licences were subsequently varied in July 2019 and the Marine Licence for the offshore TI was additionally varied in December 2020, and January 2022. The onshore TI (OnTI) was awarded Planning Permission in Principle in September 2014 by Aberdeenshire Council and a Planning Permission in Principle under Section 42 in June 2015. In June 2018 Aberdeenshire Council granted Approval of Matters Specified in Conditions for both the cable route and substation;

**Offshore Transmission Infrastructure (OfTI)** – the offshore elements of the transmission infrastructure, comprising AC OSPs, and AC export cables offshore to landfall (for the avoidance of doubts some elements of the OfTI are installed in the Moray East site);

**Onshore Transmission Infrastructure (OnTI)** – The onshore transmission infrastructure required for the transmission of electricity from the Moray East Offshore Wind Farm including the substations, cable circuits, landfall area and ancillary permanent infrastructure together with all temporary works.

**Moray East ES 2012** – The ES for the Telford, Stevenson and MacColl wind farms and Associated Transmission Infrastructure, submitted August 2012;

**Moray East Modified TI ES 2014** – the ES for the TI works in respect to the Telford, Stevenson and MacColl wind farms, submitted June 2014;

**Moray East OSP Environmental Report 2017** – the environmental report comprising of the "Statement Regarding Implications for the Modified TI ES 2014 and HRA". The report was produced in support of the application submitted in May 2017 for the Moray East OSP Marine Licence;

**The Development** – the Moray East Offshore Wind Farm and OfTI;

**Design Envelope** - the range of design parameters used to inform the assessment of impacts;

**OfTI Corridor** – the export cable route corridor, i.e. the OfTI area as assessed in the Moray East Modified TI ES 2014 excluding the Moray East site;

**The Applications** – (1) the Application letters and ES submitted to the Scottish Ministers on behalf of Telford Offshore Windfarm Limited, Stevenson Offshore Windfarm Limited and MacColl Offshore Windfarm Limited, on 2 August 2012 and the Additional Ornithology Information submitted to the Scottish Ministers by Moray Offshore Renewables Limited on the 17 June 2013; (2) the Section 36 Consents Variation Application Report for Telford, Stevenson and MacColl Offshore Wind Farms dated December 2017 and (3) the Marine Licence Applications and associated documents submitted for the OfTI and OSP Licences in April 2014 and May 2017 respectively;

**Moray East Offshore Wind Farm Section 36 Consents and Marine Licences** – are comprised of the following:

**Section 36 Consents:**

- Section 36 consent for the Telford Offshore Wind Farm (as varied) - consent under section 36 of the Electricity Act 1989 for the construction and operation of the Telford Offshore Wind Farm assigned to Moray East on 19 June 2018.
- Section 36 consent for the Stevenson Offshore Wind Farm (as varied) - consent under section 36 of the Electricity Act 1989 for the construction and operation of the Stevenson Offshore Wind Farm assigned to Moray East on 19 June 2018.
- Section 36 consent for the MacColl Offshore Wind Farm (as varied) - consent under section 36 of the Electricity Act 1989 for the construction and operation of the MacColl Offshore Wind Farm assigned to Moray East on 19 June 2018.

**Marine Licences**

- Marine Licence for the Telford Offshore Wind Farm (as varied) - Licence Number: MS-00009426 (formerly MS-00009051 and 04629/20/0) granted under the Marine (Scotland) Act 2010 & Marine and Coastal Access Act 2009, Part 4 marine licensing for marine renewables construction works and deposits of substances or objects in the Scottish Marine Area and the United Kingdom Marine Licensing Area transferred to Moray East on 19 July 2018.
- Marine Licence for the Stevenson Offshore Wind Farm (as varied) - Licence Number: MS-00009425 (formerly MS-00008985 and 04627/20/0) granted under the Marine (Scotland) Act 2010 & Marine and Coastal Access Act 2009, Part 4 marine licensing for marine renewables construction works and deposits of substances or objects in the Scottish Marine Area and the United Kingdom Marine Licensing Area transferred to Moray East on 19 July 2018.
- Marine Licence for the MacColl Offshore Wind Farm (as varied) - Licence Number: MS-00009424 (formerly MS-00008972 and 04628/20/0) granted under the Marine (Scotland) Act 2010 & Marine and Coastal Access Act 2009, Part 4 marine licensing for marine renewables construction works and deposits of substances or objects in the Scottish Marine Area and the United Kingdom Marine Licensing Area transferred to Moray East on 19 July 2018.

**OfTI Marine Licences** – are comprised of the following:

- Marine Licence for the Offshore Transmission infrastructure (as varied) – Licence Number MS-00009423 (formerly MS-00008919 and 05340/19/0) - granted under the Marine (Scotland) Act 2010 & Marine and Coastal Access Act 2009, Part 4 marine licensing for marine renewables construction works and deposits of substances or objects in the Scottish Marine Area and the United Kingdom Marine Licensing Area (referred to as the "OfTI Marine Licence").
- Marine Licence for two additional distributed OSPs (as varied) – Licence Number 06347/19/0 (formerly 06347/17/1) granted under the Marine (Scotland) Act 2010 & Marine and Coastal Access Act 2009, Part 4 marine licensing for marine renewables construction, operation and

maintenance works and the deposit of substances or objects in the Scottish Marine Area and the United Kingdom Marine Licensing Area (referred to as the "OSP Marine Licence").

- Marine Licence for Moray Offshore Windfarm (East) Limited – Licence Number Licence Number MS-00010188 (formerly MS-00010009) – granted under the Marine (Scotland) Act 2010 & Marine and Coastal Access Act 2009, Part 4 marine licensing for the Installation of grouted supports under the Cable Protection Systems (CPS) of the export cables entering each of the 3 OSPs within the Moray East Offshore Wind Farm.

## Executive Summary

Moray Offshore Windfarm (East) Limited (Moray East) is a joint venture partnership between OceanWinds Offshore, Diamond Generating Europe and China Three Gorges and has been established to develop, finance, construct, operate, maintain and decommission the Moray East Offshore Wind Farm.

The Moray East Offshore Wind Farm is located on the Smith Bank in the outer Moray Firth. It is located 12 nautical miles (NM) (approx. 22 km) from the Caithness Coast, covers an area of 86 square nautical miles or 295 square km, and ranges from 37 - 57 m in water depth.

The Development consists of 100 Wind Turbine Generators (WTGs), three Offshore Substation Platforms (OSPs), inter-array and interconnector cable circuits within the Wind Farm, and three offshore export cable circuits, in addition to onshore infrastructure. The three export cable circuits run from the Moray East Wind Farm to a landfall location in Boyndie Bay on the Aberdeenshire Coast.

The Moray East Offshore and Onshore Transmission Infrastructure (TI) will be transferred to an Offshore Transmission Operator (OfTO) in early 2023, and thereafter any responsibility related to these assets will be transferred to the OfTO following the sale transaction.

This Offshore Transmission Infrastructure (OfTI) Project Environmental Monitoring Programme (PEMP) has been prepared by Moray East to inform Marine Scotland and relevant stakeholders of the proposed environmental monitoring for the OfTI assets, comprising the 3 OSPs and export cables. Moray East seeks agreement that the information provided meets the requirements of the relevant conditions attached to the Moray East OfTI Consents (as set out in more detail in Table 1-1 below).

A separate PEMP has been prepared to address the environmental monitoring programme referent to the Moray East Offshore Wind Farm (including the WTGs, inter-array and interconnector cables), the Wind Farm (WF) PEMP.

The scope of monitoring for this PEMP includes seabed scour and local sediment deposition, benthic communities, diadromous fish, and marine mammals, in line with the relevant conditions discussed in Section 1.5.

This OfTI PEMP has been prepared taking into account the information presented within the Environmental Statements associated with the Moray East Wind Farm and associated OfTI, including the Moray East ES (2012), Moray East Modified TI ES (2014) and the Moray East Offshore Substation Platform Environmental Report (2017), as well as feedback received by the Moray Firth Regional Advisory Group (MFRAG).

Relevant links to other Moray East Offshore TI marine licence condition plans (Piling Strategy, Environmental Management Plan, Vessel Management Plan, Operations and Maintenance Programme and Cable Plan) are highlighted as relevant.

The OfTI PEMP is a live document and will be kept up to date as appropriate in accordance with the consent conditions.

## Acknowledgments

Moray East would like to thank the following people/organisations for their input and continuous support into this PEMP:

- Prof Paul Thompson and the Lighthouse Field Station staff (University of Aberdeen) for their input into the Construction Marine Mammal Monitoring Programme (cMMMP) and Marine Mammal Monitoring Programme (MMMP);
- Paul English (Fugro) for their input into the benthic monitoring approach; and
- The Scottish Centre for Ecology and the Natural Environment (SCENE) and the Atlantic Salmon Trust (AST) for the development of the salmon monitoring programme completed in 2019.

# 1 Introduction

## 1.1 Background

In March 2014, Section 36 Consents and associated Marine Licences were granted for three offshore wind farms (Telford, Stevenson and MacColl) within the Moray East site (see Figure 1-1 below), together these are referred as the Moray East Offshore Wind Farm Consents. The Moray East Consents were varied in March 2018. The Marine Licences for Telford, Stevenson and MacColl were subsequently varied in July 2018, July 2019, April 2020, October (MacColl) and November (Telford & Stevenson) 2020, and January 2022.

A Marine Licence for the Modified Offshore Transmission Infrastructure (OfTI) associated with the Moray East Offshore Wind Farm was granted in September 2014, subsequently varied in 2019, December 2020, and January 2022 (Modified OfTI Licence), and a Marine Licence for two additional distributed offshore substation platforms (OSPs) was granted in September 2017, subsequently varied in July 2019. Together these are referred to as the OfTI Marine Licences.

The Moray East Offshore Wind Farm (the Wind Farm) is located in the outer Moray Firth more than 22 km from shore at its closest point. The three consented wind farms comprised in the Moray East (Telford, Stevenson and MacColl) have been developed as a single wind farm, consisting of 100 Wind Turbine Generators (WTGs), with inter-array and interconnector cable circuits within the Wind Farm site. The Wind Farm is supported by the Offshore Transmission Infrastructure (OfTI), comprising three OSPs within the Wind Farm site and three offshore export cable circuits, which together form the Development.

Figure 1-1 below shows the location of the Development, comprising the wind farm and the OfTI assets. The Final Commissioning of the Development was completed on 1st April 2022, giving start to the Operation and Maintenance (O&M) phase of the Development. This OfTI Project Environmental Monitoring Programme (PEMP) relates to the Moray East OfTI assets only, and it is submitted in accordance with the Moray East Offshore OfTI Marine Licences. The OFTI assets comprise the three OSPs and three export cables. A separate PEMP, the WF PEMP, has been prepared in line with the Moray East Offshore Wind Farm Consents to address monitoring requirements at the wind farm site, which comprise the WTG, inter array and interconnector cables.

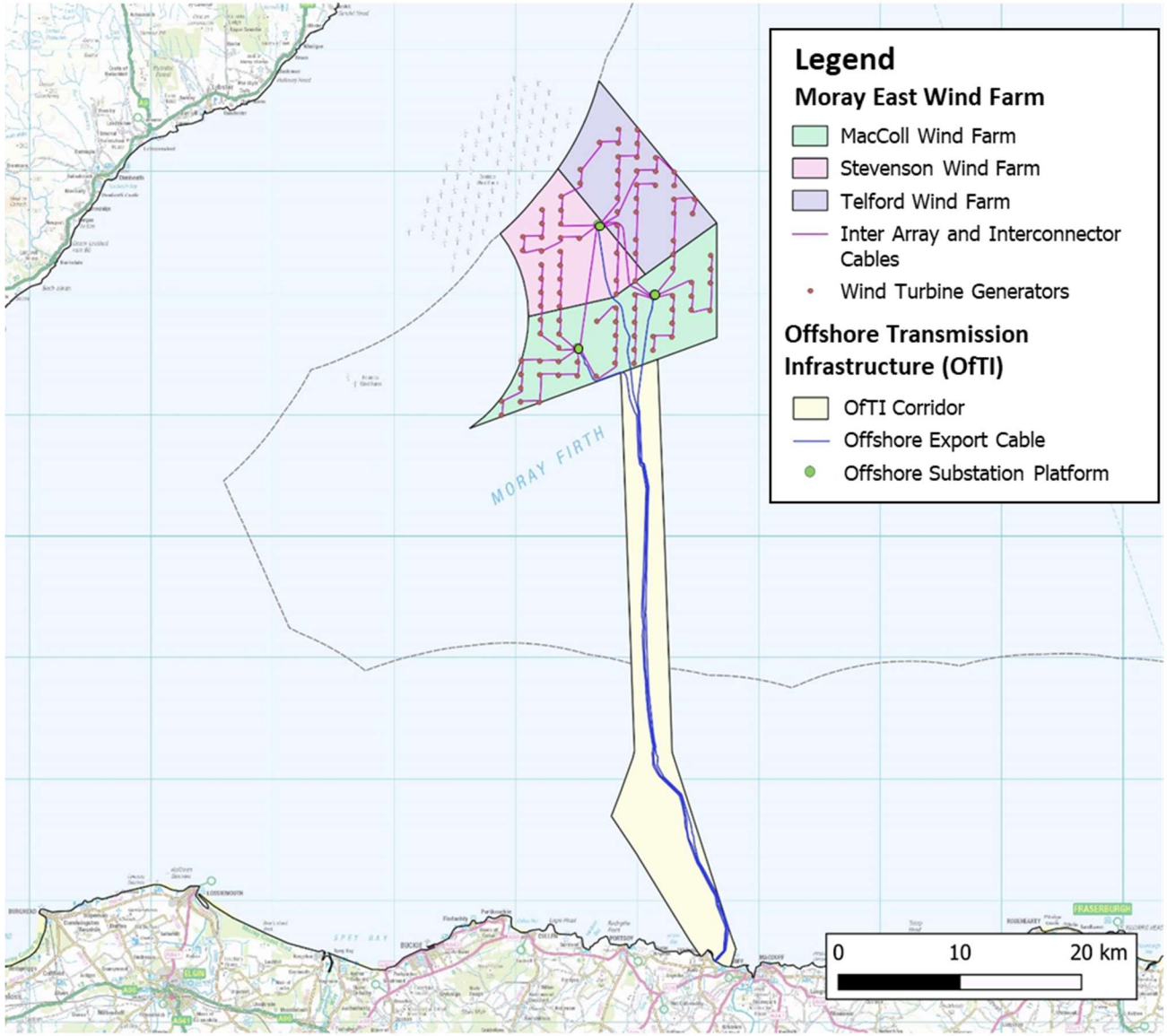


**Figure 1-1: Location of Moray East Wind Farm and OfTI assets**

## 1.2 Purpose of the Project Environmental Monitoring Programme

The purpose of the PEMP is to detail the proposed environmental monitoring throughout the lifespan of the Development. This OfTI PEMP describes the monitoring associated with the OfTI assets completed during the pre-construction and construction phase of the Development, and details future monitoring proposed for the post-construction phase.

The OfTI PEMP has been produced in line with the requirements of condition 3.2.1.1 of the Marine Licences for the OfTI and OSPs and aims to seek approval on Moray East updates and refinement to previously agreed post-construction environmental monitoring.

As established in the relevant marine licence conditions (see section 1.5), the '*monitoring should be done in such a way as to ensure that the data which is collected allows useful and valid comparisons as between different phases of the Works*', while '*monitoring may also serve the purpose of verifying key predictions in the Application*'. Where appropriate, consultation with Moray Firth Regional Advisory Group (MFRAG) will be undertaken prior to approval of the PEMP. According to MFRAG Terms of Reference (ToR), the PEMP aims to 'ensure that appropriate and effective monitoring of the impacts of the Development is undertaken'.

The Moray East Modified Environmental Statement 2014 and the OSP Environmental Report 2017 which accompanied the Marine Licence application for the Moray East OfTI provided a description of the environmental sensitivities and impact assessment (including mitigation and commitments for monitoring as relevant) for the development of the Moray East Wind Farm OfTI and interconnector cables connecting the OSPs.

## 1.3 Document Control

This OfTI PEMP is a 'live document' and will be kept up to date as appropriate in accordance with the Marine Licence conditions. Amendments to this document may result from the need to review the scope of monitoring / close out of monitoring requirements in light of:

- Structural or operational Changes to the Development; or
- New information from:
    a) Monitoring reports (associated with monitoring carried out as part of the PEMP); and
    b) Research or other monitoring programmes of relevance to the marine licence conditions for Moray East. For instance, monitoring results for the adjacent Beatrice Offshore Windfarm Limited (BOWL) and Moray West Offshore Wind Farm are expected to be of particular relevance as detailed throughout this document.

## 1.4 Consultation Requirements

There is a requirement to consult with the MFRAG on the scope of monitoring, reporting of results, and discharge of the PEMP conditions. As referred above in section 1.3, the PEMP is a live document and amendments to the PEMP will also be subject to consultation with MFRAG as appropriate.

The aims and objectives of MFRAG are detailed within the group's Terms of Reference (ToR) (MFRAG, 2019). The main objective is to facilitate the wind farm developers in the Moray Firth to comply with relevant conditions, ensure that appropriate and effective monitoring of the impacts of the development is undertaken, encourage collaboration between developers in order to deliver strategic monitoring, and advise on closure and sign-off of components of the PEMPs and Environmental Management Plans (EMPs) amongst others. The MFRAG membership includes representatives from:

- Marine Directorate Licensing Operations Team (MD-LOT), formerly Marine Scotland Licensing Operations Team (MS-LOT);
- Marine Scotland Science (MSS)

- Marine Scotland Renewables and Offshore Wind Policy
- NatureScot (formerly Scottish Natural Heritage (SNH));
- Moray East Offshore Wind Farm;
- Moray West Offshore Wind Farm;
- BOWL;
- Royal Society for the Protection of Birds Scotland (RSPB Scotland);
- Whale and Dolphin Conservation (WDC); and
- Fisheries Management Scotland (FMS)[1].

A member of the Joint Nature Conservation Committee (JNCC) is welcome to attend the MFRAG if they so wish, but only as an observer to proceedings.

Two additional subgroups to the main MFRAG group have also been set up (and have been active since the end of 2014). These are the MFRAG – Ornithology Subgroup (MFRAG-O) and MFRAG – Marine Mammals Subgroup (MFRAG-MM). The aim of these subgroups is to create a forum through which detailed discussions on specialist disciplines are held. The subgroups also have the authority to directly advise the Scottish Ministers (i.e., via MD-LOT) and the main MFRAG on aspects related to the discharge of the PEMP conditions for their specialist disciplines.

Consultations already carried out via the main MFRAG and the MFRAG subgroups are detailed within the relevant discipline sections in this PEMP. Consultation records are also available on the Marine Scotland Website[2].

## 1.5 Overview of consent condition requirements

Table 1-1 below details the condition requirements and refers to the relevant section of the PEMP where information has been provided to address the requirements.

**Table 1-1: Condition requirements and how they are addressed within the PEMP**

| Condition Text | Relevant Section of this PEMP |
|---|---|
| **OfTI Marine Licence MS-00009423 – condition 3.2.1.1 {& OSP Marine Licence 06347/19/0 – condition 3.2.1.1}[3]** | |
| The Licensee must, no later than 6 months prior to the Commencement of the Works, submit a PEMP, in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Licensing Authority with the Joint Nature Conservation Committee ("JNCC"), Scottish Natural Heritage ("SNH"), Whale and Dolphin Conservation ("WDC"), the Association of Salmon Fishery Boards ("ASFB") {*ASFB replaced by Fisheries Management Scotland ("FMS") within OSP Marine Licence*} and any other ecological advisors as required at the discretion of the Licensing Authority. The PEMP must be in accordance with the Application as it relates to environmental monitoring. | The Moray East Development PEMP was approved by the Scottish Ministers on 2 November 2018. |

[1] Fisheries Management Scotland (FMS) replaced the Association of Salmon Fisheries Board (ASFB) as a member of the MFRAG in 2017.
[2] Moray Firth Regional Advisory Group (MFRAG) | Marine Scotland Information
[3] The OfTI Marine Licence and the OSP Marine Licence conditions are the same except where {additional} text from the OSP Marine Licence conditions has been added as indicated.

| Condition Text | Relevant Section of this PEMP |
|---|---|
| The PEMP must set out measures by which the Licensee must monitor the environmental impacts of the Works. Monitoring is required throughout the lifespan of the Works where this is deemed necessary by the Licensing Authority and specifically, monitoring for cable exposure as specified in condition 3.2.2.10 parts f and g {*cable exposure not part of OSP Marine Licence*}. Lifespan in this context includes pre-construction, construction, operational and decommissioning phases. | Sections 2 to 4 |
| Monitoring should be done in such a way as to ensure that the data which is collected allows useful and valid comparisons as between different phases of the Works. Monitoring may also serve the purpose of verifying key predictions in the Application. Additional monitoring may be required in the event that further potential adverse environmental effects are identified for which no predictions were made in the Application. | Sections 2 to 5 |
| The Licensing Authority may agree that monitoring may cease before the end of the lifespan of the Works. | Sections 1.3 and 2 to 5 |
| The PEMP must cover, but not be limited to the following matters:<br>a. Pre-construction, construction (if considered appropriate by the Licensing Authority) and post-construction monitoring surveys as relevant in terms of the Application and any subsequent surveys for:<br>1. Diadromous fish;<br>2. Benthic communities; and<br>3. Seabed scour and local sediment deposition.<br>b. The participation by the Licensee in surveys to be carried out in relation to marine mammals as set out in the Marine Mammal Mitigation Programme. | Sections 2 to 5 |
| All the initial methodologies for the above monitoring must be approved, in writing, by the Licensing Authority and, where appropriate, in consultation with the Moray Firth Regional Advisory Group ("MFRAG") referred to in conditions 3.2.2.18 and 3.2.3.10 {*3.2.3.10 replaced by 3.2.3.7 within OSP Marine Licence*} of this licence. | Sections 2 to 5 |
| Any pre-consent surveys carried out by Licensee to address any of the above species may be used in part to discharge this condition. | Sections 2 to 5 |
| The PEMP is a live document and must be regularly reviewed by the Licensing Authority at timescales to be determined by the Licensing Authority, in consultation with the MFRAG to identify the appropriateness of on-going monitoring. Following such reviews, the Licensing Authority may, in consultation with the MFRAG, require the Licensee to amend the PEMP and submit such an amended PEMP, in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation with MFRAG and any other ecological, or such advisors as may be required at the discretion of the Licensing Authority. The PEMP, as amended from time to time, must be fully implemented by the Licensee at all times. | Sections 1.3 and 1.4 |
| The Licensee must submit written reports of such monitoring surveys to the Licensing Authority at timescales to be determined by the Licensing Authority in consultation with the MFRAG. Subject to any legal restrictions regarding the treatment of the information, the results are to be made publicly available by the Licensing Authority, or by such other party appointed at their discretion. | Sections 2 to 5 |

The PEMP has also been written to address the following conditions:

**Table 1-2: Other marine licence conditions relevant to the PEMP**

| Condition | Summary of Condition | Relevant Section of this PEMP |
|---|---|---|
| OfTI Marine Licence: Conditions 3.2.2.18 and 3.3.3.10<br>OSP Marine Licence: Condition 3.2.1.9 | **Participation in MFRAG**<br>"The Company must participate in any Moray Firth Regional Advisory Group ("MFRAG") established by the Scottish Ministers for the purpose of advising the Scottish Ministers on research, monitoring and mitigation programmes for, but not limited to, ornithology, diadromous fish, marine mammals and commercial fish." | Sections 2 to 5 |
| OfTI Marine Licence: Condition 3.2.1.3 | **Participation in Scottish Atlantic Salmon, Sea Trout and European Eel Monitoring Strategy**<br>"The Company must, to the satisfaction of the Scottish Ministers, participate in the monitoring requirements as laid out in the 'Scottish Atlantic Salmon, Sea Trout and European Eel Monitoring Strategy' so far as they apply at a local level (the Moray Firth)." | Section 4 |

In addition to the above, there are also a number of linkages to other marine licence condition plans. An overview of these links is provided in Table 1-3 below and further detail is provided in sections 2 to 5 as it relates to individual monitoring programmes.

**Table 1-3: PEMP Linkages with Other Consent Plans**

| Condition | Consent Plan | Consistency with / linkage with PEMP |
|---|---|---|
| OfTI Marine Licence: Condition 3.2.2.5;<br>OSP Marine Licence: Condition 3.2.2.6 | Piling Strategy (PS) | The PS included details of mitigation and monitoring employed during pile driving, during the construction phase, as agreed with the Scottish Ministers. The monitoring for cod, Atlantic Salmon, herring and marine mammals are considered within the PS (Moray East, 2019).<br>The PS is consistent with the PEMP, so far as is reasonably practicable. |
| OfTI Marine Licences: Condition 3.2.1.2 | Environmental Management plan (EMP) | The EMP sets out the environmental management framework for the Development during construction and operation.<br>The EMP must be informed, so far as is reasonably practicable, by the baseline surveys undertaken as part of the ES and the PEMP. |
| OfTI Marine Licence: Condition 3.2.2.8;<br>OSP Marine Licence: Condition 3.2.2.9 | Vessel Management Plan (VMP) | The VMP considers mitigation to disturbance or impact to marine mammals and birds. The VMP describes how the vessel traffic will be managed during construction and operation.<br>The VMP must, so far as is reasonably practicable, be consistent with the PEMP. |
| OfTI Marine Licence: Condition 3.2.3.2 /3.2.4.9;<br>OSP Marine Licence: Condition 3.2.3.1 /3.2.4.8 | OfTI Operations and Maintenance Programme (OMP) | The OfTI OMP sets out the programme for operation and maintenance of the Development.<br>The OMP must, so far as is reasonably practicable, be consistent with the PEMP. |
| OfTI Marine Licence: Condition 3.2.2.10 | OfTI Cable Plan (CaP) | The OfTI CaP provides details on cable specification, installation and cable protection, their interactions with the environment |

| Condition | Consent Plan | Consistency with / linkage with PEMP |
|---|---|---|
| | | and safety considerations. The approach for scour monitoring and analysis of geophysical data in the context of benthic habitats will help inform cable routing. Details are provided within sections 2 and 3 of this PEMP. |

### 1.6 Responsibilities for the Delivery of the PEMP

The Moray East Offshore Wind Farm and associated OfTI has been constructed and is currently operated by Moray East, and therefore it will be its responsibility to deliver the wind farm monitoring programme as set out in this OfTI PEMP.

The Moray East OfTI assets will be transferred to an Offshore Transmission Operator (OfTO) in early 2023. Following the completion of the sale transaction, the environmental monitoring as set out in this PEMP will be the responsibility of the OfTO. The OfTO will also be responsible for updating the OfTI PEMP.

The environmental monitoring of the Wind Farm assets is considered in a separate document (WF PEMP), the environmental monitoring as set out in that document is the responsibility of Moray East.

## 2 Seabed Scour and Local Sediment Deposition

### 2.1 Monitoring Requirements

The marine licence conditions relevant to seabed scour and local sediment deposition are summarised in Table 2-1 below.

**Table 2-1: Seabed scour and local sediment deposition monitoring conditions**

| Condition | Monitoring requirement |
|---|---|
| PEMP OfTI and OSP Marine Licences: Condition 3.2.1.1 a | The PEMP must cover pre-construction, construction (if considered appropriate by the Licencing authority) and post-construction monitoring surveys as relevant in terms of the Application and any subsequent surveys for seabed scour and local sediment deposition. |
| CaP<br>OfTI Marine Licence: Condition 3.2.2.10 | The CaP must detail measures to address exposure of any cables. |

The CaP condition is relevant to the approach for monitoring seabed scour and local sediment deposition and it has been designed considering information collected to inform the OfTI CaP.

### 2.2 Monitoring Approach

As previously defined in the PEMP, Moray East will use data collected during engineering monitoring surveys to meet the requirements of seabed scour and local sediment deposition monitoring. This approach has been highlighted in the review of post consent offshore wind farm monitoring commissioned by the Marine Management Organisation (MMO) (MMO, 2014).

The surveys/inspections programme for asset integrity and maintenance purposes use a risk-based approach, supported by a number of factors, including:

- analysis of previous geophysical and geotechnical surveys;
- foundation design (including any scour protection);
- cable burial design; and

- the results of foundation integrity and cable burial risk assessments.

### *2.2.1 OSP foundations and CPS*

Local scouring is closely linked to wave and tidal activity and the interaction of these hydrological processes with the structure and surrounding soil conditions.

The monitoring of seabed scour around foundations is important from an engineering perspective to ensure that seabed sediments required for the structural integrity of the foundation are not being undermined beyond design parameters. The monitoring of potential environmental effects associated with seabed scour will be included as part of the structural integrity monitoring programme when significant changes in seabed sediment characteristics have occurred.

The scour monitoring programme near the foundations was considered during the design phase of the Development. During the design phase, the likely extent of seabed scour around the foundations was assessed taking into consideration the soil, wave and tidal conditions at each of the OSP locations. This analysis, in conjunction with the foundation design, was used to determine whether there was a need to install scour protection in the form of rock armour, concrete mattresses or other seabed stabilisation measures. Scour protection was installed at all three OSPs.

According to the Moray East O&M Manual for OSP Foundations (Mareval, 2021), which provides the necessary information for the safe operation and maintenance of Moray East foundations, monitoring is recommended at scour protection locations a minimum of once a year for the first three years. After this period, the frequency of monitoring will be determined according to the results obtained.

In addition to the recommendations of the O&M manual for foundations, a survey at the cable protection system (CPS) entering the OSP foundations will also be undertaken to check the status of the CPS and any excessive scour.

An ultimate limit state (ULS) restraint sensitivity analysis for the CPS (Agilitek, 2020) concluded that the cables at the Moray East foundations are protected under ULS conditions throughout the operational period of the Wind Farm, provided they are restrained as per one of the recommended configurations. This restraint has been achieved during installation through the burial of the CPS and the supplementary restraint with rock bags for the extended CPS lengths. In addition, a desktop Risk Assessment for CPS abrasion determined the level of risk of abrasion as low.

The scour surveys at the foundations have been defined based on O&M manuals, the achieved restraint and risk assessment for CPS abrasion. These will be undertaken at all OSPs, which have installed scour protection. In addition, the CPS survey campaigns are planned to take place every six months within the first 18 months of the Development, and then again after 12 months (i.e. a total of 4 inspections within the first 3 years).

These post-construction inspections aim to monitor the seabed interface around the jackets to ensure that the expected level of scour taken at the design stage is validated and that any scour protection measures deployed are proving effective.

Previous bathymetric surveys were undertaken during the construction phase and Remotely Operated Vehicle (ROV) footage of the seabed collected immediately following the installation of all foundation structures will be used to provide a baseline of information for comparison with future surveys.

The outcomes of the previous and future seabed surveys planned for the next three years described above will be used to further refine the risk-based inspection methodology throughout the lifespan of the Development. At the time of writing, it is assumed to be at least once every five years. It is noted that the OSPs will be transferred to an OfTO in early 2023, including any responsibility for future surveys. The approach to monitoring the OSP foundations may, therefore, be revisited by the OfTO.

### *2.2.2 Export Cables*

Cable burial risk assessments have been undertaken during the pre-construction phase of the Development. These were informed by soil types across the site and other surveys undertaken across the cable routes (Cathie Associates, 2020). These assessments were used to determine cable burial requirements for the Development to assure that the export cable systems are adequately protected and to minimise hazards to other users of the sea. Further detail is provided within the Wind Farm CaP (Moray East, 2021).

Following the completion of the cable installation, an 'as built' survey was undertaken to record post-installation baseline conditions. Post-construction surveys will continue to be undertaken to identify any changes in seabed bathymetry that may affect the burial protection of the cables. Where excessive scour is detected, further investigation would be undertaken.

Burial monitoring at the export cables is divided into two elements: (1) burial at the CPS approaching the OSP, which is covered in Section 2.2.1 above; and (2) burial along the export cable length.

The cable burial monitoring along the offshore export cable system will focus on the cable sections with a higher risk of exposure, as indicated in the Cable Integrity Risk Assessment (CIRA) which assessed the as-built condition of the export cables and the residual risks for the asset (Cathie Associates, 2020). For each one of the three export cables, a bathymetric survey will cover a length of approximately 3 km at the cable landfall, 500 m at cable crossings, and 500 m at the approach to the OSPs. It is noted that the export cable and OSPs will be transferred to an OfTO by early 2023, including any responsibility for future surveys. The approach to monitoring may, therefore, be revisited by the OfTO.

## 2.3 Monitoring Objectives

The objectives of monitoring will be:

- To monitor the development and extent of local scouring effects that may occur around the OSP assets; and
- Detect the exposure of previously buried subsea cables associated with the Moray East OfTI.

## 2.4 Survey Methodology

The monitoring of changes in seabed topography will indicate the amount of sediment erosion or accretion that is occurring. The extent of the seabed over which scour is occurring will indicate the extent of the areas over which physical processes are being affected.

The presence of significant local scouring around installed assets, such as foundations and cabling, will indicate potential changes to seabed hydrodynamic conditions as a result of the presence of the installed item(s), which in turn may consequentially lead to changes in the local physical processes. The detection of significant changes in topography, therefore, will be a potential indicator of the extent to which physical processes are being affected.

### *2.4.1 Scour monitoring at foundations scour protection and CPS*

Scour survey campaigns at the CPS and scour protection at the OSP foundations will be undertaken every six months for 18 months, and then again after 12 months (i.e., four campaigns within the three first years).

The methods to be used during the campaigns include ROV using HD pan / tilt colour camera and/or sonar survey systems (e.g., blue view) deployed off appropriate survey vessels or, less likely, directly from the substructure.

The surveys will allow the identification of changes in seabed topography, and visually record the appearance of surface sediments and soil conditions, to be compared with unaffected areas and/or

previous surveys. Changes in the soil aspect may provide indications of whether there are any obvious changes to surface megafauna which in turn would indicate a potential change in benthic communities.

Where significant scour is identified, the data collected as part of the scour monitoring will also be analysed to determine if significant changes in seabed sediment characteristics and surface soils have occurred. Further evaluation may be undertaken by an environmental specialist to determine the impact, if any, on benthic communities.

It is noted that ROV footage has been undertaken during / immediately following jacket installation to give a visual confirmation of the condition/status of the seabed around the substructures. This provides baseline records for the identification of changes.

Whichever method is utilised, it would be assumed that where the extent of scour is not significant, seabed processes and benthic habitats will not have been affected.

### *2.4.2 Cable Depth of Burial Monitoring*

The burial status of cables will be monitored by using bathymetric survey techniques to monitor the seabed topography along the cable routes (e.g., Multi-Beam Echo Sounder (MBES) and Side Scan Sonar (SSS)). The bathymetric levels will be analysed against the as-installed data to ensure that any changes to the seabed topography do not present a risk to the cable system.

A post-installation bathymetric survey at selected sections of the export cables was completed in September 2022. For each one of the three export cables, surveys covered a length of approximately 3 km at the cable landfall, 500 m at cable crossings, and 500 m at the approach to the OSPs.

It is noted that the export cable and OSPs will be transferred to an OfTO in early 2023, including any responsibility for future surveys. The approach to monitoring may, therefore, be revisited by the OfTO.

The results of the surveys undertaken will help defining the frequency and design of surveys for the rest of the operational life of the OfTI.

## 2.5 Survey Programme

An indicative post-construction scour surveys programme to be undertaken during the O&M phase of the OfTI assets is presented in Table 2-2 below.

**Table 2-2: Indicative monitoring programme for scour survey**

| Item | Description | Frequency / Programmed surveys |
|---|---|---|
| Scour around OSP substructure foundations and CPS | Inspection at the CPS at the three OSP substructures. Scour around the foundation will also be inspected during the planned surveys. | Three campaigns within the first 18 months (approximately every six months), and a fourth campaign in the following 12 months.<br>The surveys have / are expected to take place in the following periods:<br>• 1st campaign: April 2022<br>• 2nd campaign: Sep 2022<br>• 3rd campaign: May 2023<br>• 4th campaign: May 2024<br>Future campaigns at the OSP are to be defined by the OfTO. |
| Subsea cable bathymetric survey – Export Cables | Bathymetric survey of selected sections. For each one of the three export cables, surveys will cover approximately 3 km | One campaign completed in September 2022. |

| Item | Description | Frequency / Programmed surveys |
|---|---|---|
| | at the cable landfall, 500 m at cable crossings, and 500 m at the approach to the OSPs. | Future campaigns to be defined by the OfTO. |

## 2.6 Reporting

A number of geophysical and geotechnical surveys have been undertaken during pre-construction and construction phases of the Development. The results of the 2010 geophysical and geotechnical surveys have been included within the Moray East ES 2012 and Modified OfTI ES 2014. A summary of the subsequent pre-construction and construction phase surveys for both wind farm and OfTI assets have been provided through periodic reports (8460001-PCA0010-MWE-REP-007 in September 2019; 8460001-PCA0010-MWE-REP-010 in December 2020; 8460001-PCA0010-MWE-REP-013 in August 2021; and 8460001-PCA0010-MWE-REP-015 in April 2022).

A summary of the scour survey reports described in this section will be submitted to MD-LOT in periodic intervals as agreed with MD-LOT. The summary report is also to be shared with NatureScot.

# 3 Benthic Communities

## 3.1 Monitoring Requirements

The marine licence conditions relevant to monitoring of benthic communities are summarised in Table 3-1 below.

**Table 3-1: Benthic Communities Monitoring Conditions**

| Condition | Monitoring requirement |
|---|---|
| PEMP<br>OfTI and OSP Licences: Condition 3.2.1.1 a | The PEMP must cover pre-construction, construction (if considered appropriate by the Licencing authority) and post-construction monitoring surveys as relevant in terms of the Application and any subsequent surveys for benthic communities. |
| CaP<br>OfTI Marine Licence: Condition 3.2.2.10 b | The CaP must include the results of survey work (including geophysical, geotechnical and benthic surveys) which will help inform cable routing. |

## 3.2 Monitoring Approach

### *3.2.1 Moray East OfTI*

A review of offshore wind farm post-consent environmental data carried out on behalf of the MMO (MMO, 2014) highlighted the following key principles of monitoring:

- Monitoring objectives should reflect the likely significance of the effect as described in the ES and/or where there is a high level of uncertainty;
- Conditions should present a clear hypothesis where a sensitive receptor is identified;
- Specific focused studies are required on conservation / biologically important features;
- The emphasis of the post consent monitoring should be placed on the ability to reduce uncertainty of the predictions made in the ES; and
- Each licence should be more focused on the site-specific EIA, and monitoring requirements therein, tailored to the evident areas of probable significant effect, but also taking account of the level of uncertainty.

In addition to the MMO review, both Cefas (Judd, 2011) and OSPAR (2008) highlight that monitoring should be designed to answer questions raised in the ES where significant effects have been identified.

Considerable quantities of benthic ecological data have been collected for the Moray East Environmental Impact Assessment (EIA) 2012 and Modified TI ES 2014. These data have been collected from literature review and site-specific survey involving grab and scientific trawl sampling and seabed video surveillance. Given the local complexity of the seabed habitats in some places, additional finer scale biotope assessment was undertaken along the export cable route in 2018 (Fugro 2018), which supported micro siting of the cable route to minimise interference with valued seabed features including a Scottish Priority Marine Feature (PMF) and an Annex I (EC Habitats Directive) habitat. No rare or protected species with respect to the EC Habitats Directive 92/43/EEC and / or the Wildlife & Countryside Act 1981, were found within the boundaries of the Moray East site.

In addition to the surveys described above, Moray East proposes to utilise the results of the geophysical surveys plus ROV surveys undertaken for engineering monitoring purposes (see section 2 above for an overview of proposed surveys for monitoring of seabed scour and local sediment deposition). Separate

post-construction benthic surveys in relation to the Moray East OfTI are not considered necessary. Where significant scour is identified during the regular inspections (as described in Section 2), data collected will also be analysed to determine if significant changes in seabed sediment characteristics and surface soils have occurred. Further evaluation may be undertaken by an environmental specialist to determine the impact, if any, on benthic communities.

The rationale for this approach also takes into account the monitoring proposals of the adjacent BOWL wind farm and the outcome of literature reviews on benthic monitoring at offshore wind farms.

## 3.3 Conclusions

Where scour surveys show significant changes in the seabed, data collected as part of scour monitoring (section 2) will be analysed by an environmental specialist in the context of benthic monitoring (to confirm that no changes to benthic communities have occurred).

Taking the above into consideration, Moray East does not propose to undertake any further targeted benthic monitoring on the basis of the following:

- Extensive baseline data collected to date (Moray East ES 2012, Moray East Modified TI ES 2014, and Export Cable Route Biotope Assessment (Fugro,2018));
- No effects of moderate or major significance were identified in the ES (Moray East ES 2012, Moray East Modified TI ES 2014));
- No designated sites were identified within the Moray East wind farm site (Moray East ES 2012);
- Previous monitoring at offshore wind farms support no detectable broad-scale effects of offshore wind farm construction and operation on benthic communities;
- Approach to benthic community monitoring at neighbouring development (BOWL); and
- Additional data collection undertaken as described in Section 2 above.

# 4 Diadromous Fish

## 4.1 Monitoring Requirements

The marine licence conditions relevant to diadromous fish monitoring are summarised in Table 4-1 below.

**Table 4-1: Diadromous Fish Monitoring Conditions**

| Condition | Monitoring requirement |
|---|---|
| PEMP<br>OfTI and OSP Licences: Condition 3.2.1.1 a | The PEMP must cover pre-construction, construction (if considered appropriate by the Licencing authority) and post-construction monitoring surveys as relevant in terms of the Application and any subsequent surveys for diadromous fish. |
| OfTI Marine Licence: Condition 3.2.1.3 | Participation in Scottish Atlantic Salmon, Sea Trout and European Eel Monitoring Strategy |

## 4.2 Monitoring Approach

Moray East's approach for the diadromous fish monitoring has evolved since consents and licences were awarded due to uncertainties on project timescales. An initial monitoring proposal was approved in 2015 by MS-LOT[4] following discussions with MSS and MFRAG (see relevant minutes of meeting within Marine Scotland Website[5]). However, due to project delays there was a need to revisit the scope of the proposed monitoring. Following earlier consultation with MFRAG and Marine Scotland, it was agreed that the conditions related to diadromous fish monitoring would be satisfied through a contribution towards the Moray Firth Tracking Project, now referred to as the 'Missing Salmon Project'. This project was coordinated by the Atlantic Salmon Trust (AST) and the Centre for Ecology & the Natural Environment (SCENE) at the University of Glasgow.

The project scope, including aims and objectives, and its progress were discussed with MFRAG. A summary of the discussions is provided in Table 4-2 below.

**Table 4-2: Stakeholder consultation of reference to diadromous fish monitoring**

| Consultee | Scope of consultation / consultation response | Date | Moray East comments |
|---|---|---|---|
| MFRAG | **MFRAG meeting:**<br>• Moray East's proposed approach for diadromous fish monitoring was described at the meeting, highlighting its strategic value but also noting potential constraints.<br>• There was a general agreement on the proposed approach and support for the large-scale project as having potential for a genuinely robust scientific study to increase knowledge of salmon and sea trout behaviour in the marine environment. There was also a need to develop a suitable smaller scale study in case the large-scale proposal could not be implemented. It was noted that results of the study and other relevant studies would be collated by the | 22/02/2018 | Moray East contributed with the Moray Firth Tracking Project in 2019 (see Section 4.4.1). |

[4] As from April 2023, MS-LOT is operating under the name of MD-LOT.
[5] Moray Firth Regional Advisory Group (MFRAG) | Marine Scotland Information

| Consultee | Scope of consultation / consultation response | Date | Moray East comments |
|---|---|---|---|
| | SpORRAn[6] diadromous fish subgroup, chaired by Ross Gardiner from MSS. | | |
| MFRAG | **MFRAG meeting:**<br>• The AST smolt tracking work was presented to MFRAG. This built on the work undertaken along with the BOWL study, which tracked smolts to 30 km from shore. The current AST study which Moray East is co-funding will tag smolts in seven different rivers and monitor out to 70 km from shore in the Moray Firth. The project will be tagging up to 850 fish. Predator tags are being trialled; these change signal when the smolt is being digested.<br>• It was highlighted that Fisheries Management Scotland (FMS) have been working closely with AST on this proposal. | 29/11/2018 | Details on the Moray Firth Tracking Project undertaken in 2019 are presented (see Section 4.4.1) |
| MFRAG | **MFRAG meeting:**<br>• Results on the Moray Firth Tracking Project (referred to as the 'Missing Salmon Project' presented and discussed. | 20/11/2019 | Details on the Moray Firth Tracking Project undertaken in 2019 are presented (see Section 4.4.1) |

## 4.3 Monitoring Objectives

The primary objective of the proposed monitoring programme was to increase knowledge of the behaviour of Atlantic salmon and sea trout in the Moray Firth to contribute to the National Strategy for Monitoring of Diadromous Fish.

Questions explored as part of the Moray Firth Tracking Project which are relevant to Moray East included:

- What migration routes were used by migrating smolts once they leave the river?
- What cues do smolts use to determine this migration pathway?

In addition, pre- and post-construction cable burial monitoring, outlined in the following sections, will allow burial levels to be monitored and ensure that Electromagnetic Fields (EMF) impacts on diadromous fish remain as assessed within the Moray East Modified TI ES (2014).

## 4.4 Survey Methodology

### *4.4.1 Moray Firth Tracking Project (Completed)*

The Moray Firth Tracking Project consisted of a partnership, led by the AST in collaboration with Glasgow University, the six District Salmon Fishery Boards (DSFBs) / Fishery Trusts in the Moray Firth and Marine Scotland, and co-funded by Moray East for surveys undertaken in 2019.

The monitoring project was developed to contribute towards the understanding of salmon movements within the Moray Firth, and fill gaps initially identified through the Missing Salmon Project launched in

[6] SpORRAn has been later replaced by ScotMer

April 2018. As part of this project, the Likely Suspects Framework has highlighted that there is a lack of information on how salmon smolts migrate down river and out to sea. The Moray Firth Tracking Project aimed to fill these gaps in knowledge (AST, 2018).

The fieldwork for the Moray Firth Tracking Project was undertaken in spring 2019. A total of 358 receivers were placed in seven rivers (Deveron, Spey, Findhorn, Ness, Conon, Oykel, and Shin) and in three lines across the inner and outer Moray Firth (see Figure 4-1 below).

A total of 850 smolts were tagged with acoustic transmitters. The progress of these smolts were tracked as they crossed the three fixed position acoustic receiver arrays in the inner Moray Firth, the outer Moray Firth and the Dornoch Firth (see Figure 4-1 below). Analysis of results indicated higher than expected losses of smolts before they reach the sea and fewer losses out at sea. These results supported the next phases of the Missing Salmon Project.

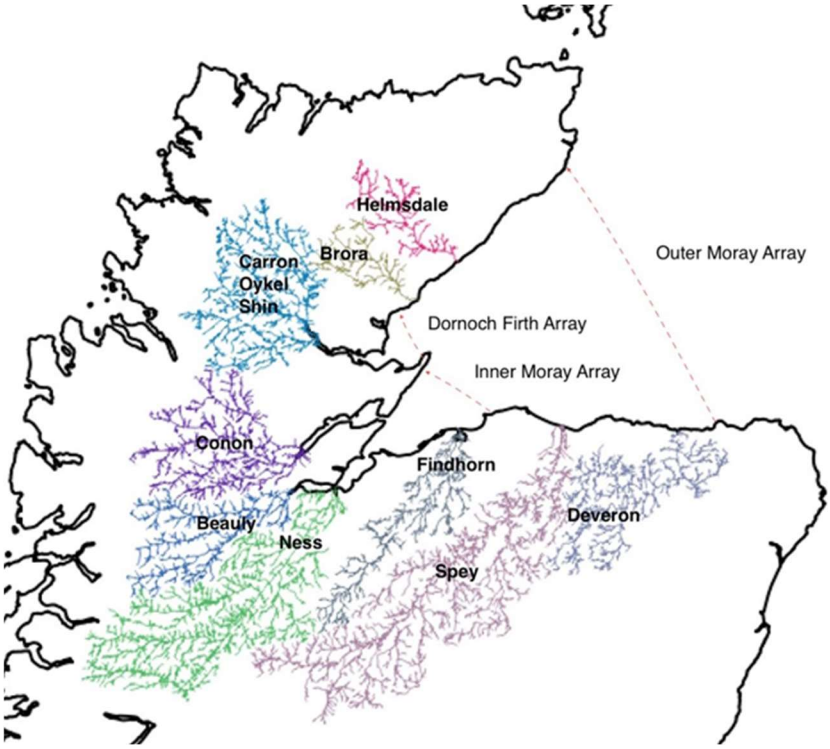


**Figure 4-1: Array locations identified by red dotted line in relation to salmon rivers which feed into the Moray Firth (NB not all rivers shown) [modified from Moray Firth Project proposal, 2018 (AST, 2018)]**

### *4.4.2 Other Pre- and Post-Construction Monitoring (EMF)*

The Moray East Modified TI ES (2014) assessed EMF strengths from the export cables. It was concluded that burial or protection of the cables will reduce exposure of diadromous fish to the strongest EMFs and that impacts would be minor.

Pre-construction desk-based assessment of predicted attenuation of EMF strength and shielding was undertaken to ensure that impacts on diadromous fish remain as assessed within the Moray East Modified TI ES (2014). This was presented in the OfTI Cable Plan (OfTI CaP), approved by MS-LOT in August 2021.

Post-construction cable burial monitoring will be undertaken to ensure that the burial depths and/or cable protection remains as detailed in the OfTI CaP. Section 2 above details the post-construction monitoring of the burial depths of the export cables.

## 4.5 Survey Programme

Diadromous fish monitoring through the Moray Firth Tracking Project (Missing Salmon Project) was completed in 2019 (AST, 2020), no further diadromous fish monitoring will be undertaken.

Cable burial post-construction monitoring will be undertaken as part of the asset integrity surveys, to ensure that cables remain buried / protected. The monitoring survey programme for cable burial is detailed in section 2 above.

## 4.6 Reporting

Moray Firth Tracking Project (Missing Salmon Project) reports with the findings for each of the seven rivers Deveron, Spey, Findhorn, Ness, Conon, Oykel and Shin) were submitted to MS-LOT on 31 March 2020 (AST, 2020), and approved on 5 May 2020.

Post-construction cable burial monitoring will be provided as described in Section 2.

# 5 Marine Mammals

## 5.1 Monitoring Requirements

The marine licence conditions relevant to marine mammal monitoring are summarised in Table 5-1 below.

**Table 5-1: Marine Mammals Monitoring Conditions**

| Condition | Monitoring requirement |
|---|---|
| PEMP<br>OfTI ML: Condition 3.2.1.1 (b)<br>OSP ML: Condition 3.2.1.1 (b) | The PEMP must cover, but not be limited to the following matters:<br>[…] b) The participation by the Licensee in surveys to be carried out the in relation to marine mammals as set out in the Marine Mammal Monitoring Programme. |

The approach, objectives and commitments with future marine mammal monitoring works described in this chapter have been agreed for the Moray East Development. Following the completion of the OfTO sale transaction, expected in early 2023, specific approach, objectives and commitments in relation to the OfTI assets will be proposed and agreed through Moray Firth Regional Advisory Group Marine Mammal Subgroup (MFRAG-MM).

## 5.2 Monitoring Approach

Moray East's participation and approach with the Moray Firth Marine Mammal Monitoring Programme (MMMP) have been defined through consultations with stakeholders at the MFRAG-MM.

The overall objectives and workplan for the pre-construction and construction MMMP were initially outlined in the documents dated 25 March 2014 (Thompson, 2014) and 27 June 2016 (Thompson, 2016), respectively. In July 2018, an addendum to the construction MMMP (cMMMP) workplans was approved by MS-LOT in consultation with MFRAG-MM. This was in response to key findings from BOWL monitoring and through discussions with MFRAG-MM, in order to balance elements of on-going long-term monitoring with more detailed studies exploring remaining areas of uncertainty.

The MMMP work packages were reviewed in 2021 and 2022 to integrate construction monitoring at the Moray West Offshore Wind Farm with ongoing post-construction monitoring at BOWL and Moray East Offshore Wind Farms (Thompson, 2021; Thompson, 2022). The reviews considered NatureScot guidance note issued to MFRAG-MM, outlining how NatureScot and MSS would expect the MMMP to be adapted to meet future construction and post-construction consent monitoring requirements (NatureScot, 2021). The principles proposed in the MMMP review 2022 (Thompson, 2022) have been agreed with MFRAG-MM.

MFRAG-MM meeting minutes and documents for discussion are publicly available within the Marine Scotland Website[7].

A summary of the key agreements from each MFRAG-MM meetings are summarised in Table 5-2 below. It should be noted that this is an ongoing process and further consultation with stakeholders will be made available through the Marine Scotland Website as detailed above.

**Table 5-2: Stakeholder consultation of reference to marine mammals monitoring**

| Consultee | Scope of consultation / consultation response | Date | Moray East comments |
|---|---|---|---|
| MS-LOT (MSS, SNH, | **Submission of Pre-construction Marine Mammal Monitoring Programme (MMMP).** | 02/04/2014 | Comments taken into account in final pre-construction MMMP |

[7] www.gov.scot/Topics/marine/Licensing/marine/scoping/mfrag/marine-mammals

| Consultee | Scope of consultation / consultation response | Date | Moray East comments |
|---|---|---|---|
| JNCC, WDC and ASFB) | • Document issued by MS-LOT for consultation with MSS, SNH, JNCC, WDC and ASFB.<br>• MSS, SNH, JNCC, WDC confirmed they were content with the scope of the pre-construction monitoring and would welcome engagement on the monitoring methodologies through stakeholder meetings.<br>• SNH and JNCC provided comments on aspects related to strategic monitoring.<br>• MSS provided specific comments on the proposed Continuous Porpoise Detectors (CPOD) deployment design.<br>• No comments received from ASFB.<br>• Formal approval received from MS-LOT on the pre-construction MMMP (email of 10 October 2014) as submitted. | | report (Thompson, 2014) |
| MS-LOT / MSS | • Moray East met with MS-LOT and MSS to discuss the potential for a restriction on piling in night time and low visibility to be lifted,<br>• The meeting set out to discuss MS-LOT and MSS's concerns regarding night time piling, discuss what mitigation could be considered suitable protection of marine mammals during piling at night time or low visibility conditions and to discuss whether the use of appropriate mitigation would be sufficient to allow piling in night time and low visibility conditions. | 13/01/2015 | This meeting was undertaken before the formal start of MFRAG and outlined the basis for later discussions about during construction mitigation. |
| MFRAG-MM | **MFRAG-MM Meeting:**<br>• Moray East and BOWL provided outline of risks of injury for harbour porpoise and harbour seal with refined project parameters. Discussion with Statutory Nature Conservation Bodies (SNCB's) to determine alternative approaches to using marine mammal observers/Passive Acoustic Monitoring (PAM)- primarily the use of Acoustic Deterrent Devices (ADDs).<br>• It was agreed that harbour seal, bottlenose dolphins where high priority species and harbour porpoise were medium priority for consideration in the construction and post construction MMMP. | 03/05/2015 | The MMMP was developed based on the principles outlined in the meeting, focusing on harbour seals, bottlenose dolphins and harbour porpoise. |
| MFRAG-MM | **MFRAG-MM Meeting:**<br>• Meeting formalised the creation of the MFRAG-MM subgroup.<br>• It was agreed that the purpose of the piling mitigation was to mitigate instantaneous death rather than displacement of marine mammals. | 19/06/2015 | Comments from the MFRAG-MM were taken into account in the development of the PS issued in 2016 and updated in 2019 (Moray East, 2019) and the MMMP. |

| Consultee | Scope of consultation / consultation response | Date | Moray East comments |
|---|---|---|---|
| | • ADDs, whilst potentially useful mitigation are not fully tested. SNH is open to use but devices would need to be trialled to monitor effectiveness.<br>• It was agreed that use of ADD should be minimised to 10-15 minutes of activation prior to soft start.<br>• SNH confirmed that they were happy with the principal of proposed methods but would need to see an interim step to demonstrate ADDs work effectively.<br>• JNCC confirmed that if no mitigation method is deemed appropriate, a risk based approach could be undertaken. If the conclusion from the group was that there was low risk without mitigation, approach was likely to be acceptable. | | |
| MS-LOT / MSS / SNH / JNCC | • Meeting to discuss project specific approach to piling and how monitoring can be implemented during Moray East's phased construction period. The meeting was mainly focused on the content of the Piling Strategy but also outlined Moray East's mitigation and monitoring strategy. | 11/09/2015 | Monitoring principles discussed at meeting taken into the development of the PS issued in 2016 and updated in 2019 (Moray East, 2019) and the MMMP. |
| MFRAG-MM | **MFRAG-MM Meeting:**<br>• It was confirmed that harbour seals were a priority species for Moray East site.<br>• Concern was voiced that the inclusion of SpORRAn into the process would result in delays to agreeing monitoring requirements.<br>• Focus on post-construction monitoring based on the results of construction monitoring. Development of post- construction methodology to be iterative. | 16/12/2015 | Moray East agreed to continuing work with the University of Aberdeen and BOWL to develop monitoring methods for agreement by MFRAG-MM subgroup. Monitoring methods to focus on harbour seal and harbour porpoise. |
| MFRAG-MM | **Consultation on construction MMMP:**<br>• Construction MMMP submitted for consultation to MFRAG-MM and discussed at a number of MFRAG-MM meetings (summary of discussions provided above).<br>• Construction MMMP updated in line of comments received. Final version dated 27 June 2016 (Thompson, 2016). | March 2015 (first version)<br>27/06/2016 (final version) | Comments taken into account in final pre-construction MMMP report (Thompson, 2016) |
| MFRAG-MM | **MFRAG-MM Meeting:**<br>• A summary of the approved pre-construction strategic MMMP was presented at the meeting.<br>• Discussions around the development of a detailed construction MMMP based on the | 17/11/2016 | Final pre-construction MMMP dated 27/06/2016 (Thompson, 2016). |

| Consultee | Scope of consultation / consultation response | Date | Moray East comments |
|---|---|---|---|
| | scope of the pre-construction MMMP and aims of the construction monitoring. | | |
| MFRAG-MM | **MFRAG-MM Meeting:**<br>• The focus of this meeting was mainly to provide an update on BOWL's construction MMMP. | 20/06/2017 | Lessons learned from the BOWL MMMP to be taken by Moray East during the design of the Moray East construction MMMP |
| MFRAG-MM | **MFRAG-MM Meeting:**<br>• The focus of this meeting was mainly to provide an update on BOWL's construction MMMP and to highlight that Moray East would be planning on starting its construction monitoring during 2019.<br>• It was agreed that a further meeting would take place during early summer 2018 to discuss Moray East's construction MMMP. | 21/02/2018 | Lessons learned from the BOWL MMMP to be taken by Moray East during the design of the Moray East construction MMMP |
| MFRAG-MM | **MFRAG-MM meeting**<br>• Moray East gave a project update and went further to provide an overview of the proposed cMMMP scope. The results of BOWL's construction monitoring have been taken into account to further adapt the monitoring scope.<br>• Moray East tasked to provide updated monitoring proposal to the next MFRAG-MM meeting. | 26/07/2018 | Moray east to consider identified uncertainties from the result of BOWL's monitoring.<br><br>An addendum to the cMMMP was completed on 19 September 2018 (Thompson, 2018). |
| MFRAG-MM | **MFRAG-MM Meeting**<br>• An update on the monitoring currently underway was provided, which included photo-id for harbour seals and Bottlenose Dolphins and CPOD monitoring (long-term low density and short-term high-density arrays) for harbour porpoise and dolphins.<br>• A novel piece of work was introduced to assess finer scale of harbour porpoise responses to construction vessels vs piling. This focused on the development of PAM studies where additional acoustic monitoring used multi-channel "sound trap" recorders. | 10/06/2019 | Updates provided on ongoing monitoring, in line with cMMMP (Thompson, 2018). |
| MFRAG-MM | **MFRAG-MM Meeting**<br>• Scope of Moray East post-construction marine mammal monitoring potentially to be based on population monitoring. | 26/05/2021 | |
| MFRAG-MM | **MFRAG-MM Meeting**<br>• Outcome of meeting with NatureScot / MSS outlines Bottlenose dolphins and harbour seals | 25/08/2021 | Advise from NatureScot issued on 16 September 2021 (NatureScot, 2021). |

| Consultee | Scope of consultation / consultation response | Date | Moray East comments |
|---|---|---|---|
| | as key species for post-construction monitoring for Moray East.<br>• A summary note outlining how NatureScot and MSS would expect the MMMP to be adapted to meet future construction and post-construction consent monitoring requirements to be issued. | | |
| MFRAG-MM | **MFRAG-MM Meeting**<br>• The addendum to the MMMP issued on 2 December 2021 (Thompson, 2021) was presented and discussed. This was issued in response to NatureScot guidance (NatureScot, 2021).<br>• NatureScot confirmed agreement on MMMP principles. | 09/02/2022 | NatureScot confirmed broad agreement on MMMP Addendum by email on 15 Feb 2022, subject to audit trail of clarification on key issues.<br>University of Aberdeen (UoA) circulated final Addendum and track changed copy clarifying NatureScot queries on 19th April 2022 (Thompson, 2022) |
| MFRAG-MM | **MFRAG-MM Meeting**<br>• MSS and NatureScot confirmed they are content with the MMMP Addendum 2022 (Thompson, 2022)<br>• Progress on MMMP works presented. | 22/09/2022 | |

## 5.3 Monitoring Objectives

As highlighted in Table 5-2 above, the pre-construction MMMP was approved by MS-LOT following consultation with MSS, JNCC, SNH and WDC. The relevant surveys commenced soon after approval (in May 2014) and were completed and approved by the MFRAG-MM. The primary objective of the pre-construction MMMP was to collect baseline data on the distribution, abundance and vital rates of harbour seal and bottlenose dolphin.

Full details of the pre-construction MMMP objectives are presented within "Proposal for a strategic regional Pre-Construction Marine Mammal Monitoring Programme in respect of the BOWL and MORL [Moray East] Wind Farm Developments" (Thompson, 2014).

A description of construction monitoring objectives, rationales and work packages are provided within "A strategic regional Marine Mammal Monitoring Programme for assessing the population consequences of constructing the BOWL and MORL [Moray East] Wind Farm Developments" (Thompson, 2016), now referred to as the cMMMP. This is complemented through the "Addendum to the Moray Firth MMMP outlining studies to be conducted during construction of the Moray East Offshore Wind Farm" (Thompson, 2018).

Post-construction MMMP work packages were initially proposed in 2021 and updated in 2022 (Thompson, 2021; Thompson, 2022) following meetings with key stakeholders and in response to the emerging policy questions highlighted in the NatureScot (2021). Each of these work packages addresses objectives identified for pre, during and post-construction monitoring for developments in the Moray Firth, as outlined below.

The following MMMP proposed objectives and work packages (WP) are specifically relevant and applicable to the Moray East Development post-construction phase (Thompson, 2022):

WP 1.1: Monitoring harbour seals population size, structure and vital rates;

WP 1.2: Assessing temporal changes in harbour seal foraging distribution;

WP 2.1: Monitoring bottlenose dolphin population size, structure and vital rates;

WP 2.2: Assessing bottlenose dolphin temporal change in use of, and connectivity with, key foraging areas; and

WP 4.1: Monitoring marine mammal responses to wind farm operation and foraging behaviour around structures.

It is noted that the objectives discussed above are relevant and applicable to Moray East Development. Following the transference of the OfTI assets to an OfTO, specific objectives relevant to the OfTI will be discussed and agreed through MFRAG-MM.

## 5.4 Survey Methodology

The methodology agreed for the pre-construction survey is presented within the pre-construction MMMP (Thompson, 2014). The survey approach has been designed to address the monitoring objectives agreed with MFRAG for the pre-construction phase of the Development, as well as to complement the existing datasets within the Moray Firth and wider region for harbour seal and bottlenose dolphin. The pre-construction monitoring has been completed and appropriately reported upon MFRAG and approved by the Scottish Ministers (Graham *et al*., 2015; Graham *et al*., 2016; Graham *et al*., 2017).

The methodology applied during the construction survey is presented within the cMMMP (Thompson, 2016), and amended in July 2018 (Thompson, 2018). Surveys undertaken during the construction phase included core population studies for harbour porpoises and bottlenose dolphins and noise monitoring throughout construction campaign. During the different phases of construction, a low density CPOD array was deployed across Moray East and BOWL to monitor long-term responses of porpoises. The construction monitoring was completed in 2021 (Graham *et al*., 2020; Graham *et al*., 2021).

The post-construction methodology and scope of work has been reviewed through an addendum to the Moray Firth MMMP, which integrated construction monitoring at the Moray West Offshore Wind Farm with ongoing post-construction monitoring at BOWL and Moray East Offshore Wind Farm (Thompson, 2022). The proposed methodology, in line with the WP described in Section 5.3 above, includes:

- Unoccupied Aerial Vehicle (UAV) surveys to monitor harbour seal population, size, structure and vital rates (WP 1.1.);
- Tagging a sample of harbour seal individuals from the Loch Fleet (WP 1.2);
- Boat-based photo-ID surveys to monitor population size, structure and vital rates of Bottlenose Dolphin at the Moray Firth Special Area of Conservation (SAC) (WP 2.1);
- PAM monitoring (CPODs array) to assess temporal change in use of, and connectivity with, key foraging areas for bottlenose dolphin Monitoring (WP 2.2); and
- PAM monitoring (CPODs array) to assess marine mammal responses and wind farm operation and foraging around structures (WP 4.1).

The data acquired through the MMMP works at the wind farm site, such as the CPODs array installed to assess marine mammals' response to wind farm operation (WP 4.1) and other packages related to pilling during Moray West construction, will be integrated with the Predators and Prey Around Renewable Energy Developments (PrePARED) project. The PrePARED project is a collaborative research programme, led by Scottish Government's Marine Directorate and co-funded by Crown Estate Scotland. It aims to study predator (seabird and marine mammal) and prey (fish) distribution and behaviour in and around offshore wind farms, providing critical insight into cumulative effects from large scale development for

key species. The PrePARED work stream B, in particular, aims to improve understanding of changes in fish communities, as well as marine mammals response to prey, at offshore wind farm developments in the Moray Firth. It is noted that the PrePARED project is an independent research programme, and therefore it is not part of the scope of works proposed to be undertaken through this PEMP.

## 5.5 Survey Programme

Moray East's monitoring during pre-construction and construction took place during 2014-2016 and 2019-2021, respectively (Graham *et al.*, 2015; Graham *et al.*, 2016; Graham *et al.*, 2017; Graham *et al.*, 2020a; Graham *et al.*, 2020b; Graham *et al.*, 2021) as reported and approved by MS-LOT.

The programme for the Moray East post-construction monitoring has been initially proposed by Thompson (2022) and will be subject to further review and discussions through MFRAG-MM as these results become available and compared against the relevant questions driving the monitoring. Planned monitoring for the next three years is shown in Table 5-3 below.

**Table 5-3: MMMP work packages schedule**

| Work Package | | Year | | |
|---|---|---|---|---|
| | | 2022 | 2023 | 2024 |
| **WP 1** | 1.1 - Monitoring harbour seals population size, structure and vital rates | ✓ | ✓ | ✓ |
| | 1.2 - Assessing temporal changes in harbour seal foraging distribution | | ✓ | |
| **WP 2** | 2.1 - Monitoring bottlenose dolphin population size, structure and vital rates | ✓ | ✓ | ✓ |
| | 2.2 - Assessing bottlenose dolphin temporal change in use of, and connectivity with, key foraging areas | ✓ | ✓ | ✓ |
| **WP 3** | 3.1 – Minke Whale Spatial and Temporal Variation in Occurrence | ✓ | | |
| **WP 4** | 4.1 - Monitoring marine mammal responses to wind farm operation and foraging behaviour around structures | ✓ | ✓ | |
| | 4.2 - Responses to Piling and Other Anthropogenic Noise Sources | | ✓ | |
| **WP 5** | 5.1 Characterisation of Received Noise Levels from Monopile Installation | | ✓ | |

*Work packages relevant to Moray East Development are highlighted in yellow. No WP have been specifically assigned to OfTI assets.

## 5.6 Reporting

The results of the pre-construction and construction monitoring are detailed within the "Strategic Regional Pre-Construction Marine Mammal Monitoring Programme Annual Report 2015" (Graham *et al.*, 2015), "Strategic Regional Pre-Construction Marine Mammal Monitoring Programme Annual Report 2016" (Graham *et al.*, 2016), "Strategic Regional Pre-Construction Marine Mammal Monitoring Programme Annual Report 2017" (Graham *et al.*, 2017), "Construction Marine Mammal Monitoring Programme Fieldwork Report 2019" (Graham *et al.*, 2020a), "Construction Marine Mammal Monitoring Programme Fieldwork Report 2020" (Graham *et al.*, 2020b), and "Construction Marine Mammal

Monitoring Programme Fieldwork Report 2021" (Graham *et al*., 2021). These have been discussed and recommended for approval of the Scottish Ministers by MFRAG-MM. Approval has since been received.

Two workshops were organised in 2021 to report results from some of the surveys/studies carried out during construction. University of Aberdeen presented results on the effects of vessel activities and construction on the occurrence of harbour porpoises and ambient noise prior to pile driving activities at both Moray East and BOWL sites on 19 February 2021, and the preliminary results of piling noise and porpoise responses at Moray East on 30 April 2021. Further survey reports will be submitted to the Scottish Ministers for approval at timescales determined through MFRAG.

# 6 References

Agilitek (2020) Restraint sensitivity Rev a. FB000041-TEK-BSCF-TN-0011

AST (2018) Moray Firth Tracking Project - Internal Report & Proposal For Trustees October 2018.

AST (2020) Missing Salmon Project 2019 Reports (individual reports issued for each river: Deveron, Spey, Findhorn, Ness, Conon, Oykel, and Shin. Reports compiled by the Scottish Centre for Ecology and the Natural Environment, University of Glasgow & Atlantic Salmon Trust. 8460001-PCA0010-MWE-REP-014. Moray East Offshore Windfarm - Project Environmental Monitoring Programme (PEMP) | Marine Scotland Information

Cathie Associates (2018). Moray East Wind Farm Array Cables CBRA Report – C950R01- Revision A – 17/08/18

Cathie Associates (2020). Cable Integrity Risk Assessment. Moray East Export Cable. Report No. C950R06-02. 10/12/2020.

Fugro GB Marine (2018). Export Cable Route Biotope Assessment. Produced by Fugro GB Marine Ltd on behalf of Moray Offshore Windfarm (East) Limited. 8460001-PCA0010-FUG-REP-017

Graham, I.M., Cheney, B., Hewitt, R.C., Barton, T.R., and Thompson, P.M. (2020b). Construction Marine Mammal Monitoring Programme Fieldwork Report 2020, University of Aberdeen, 19 April 2020.

Graham, I.M., Cheney, B., Hewitt, R.C., Cordes, L.S., Hastie, G.D., Russell, D.J.F, Arso Civil, M., Hammond, P.S. and Thompson, P.M. (2016). Strategic Regional Pre-Construction Marine Mammal Monitoring Programme Annual Report 2016, University of Aberdeen, 16 May 2016.

Graham, I.M., Cheney, B., Hewitt, R.C., Cordes, L.S., Hastie, G.D., and Thompson, P.M. (2017). Strategic Regional Pre-Construction Marine Mammal Monitoring Programme Annual Report 2017, University of Aberdeen, 29 May 2017.

Graham, I.M., Cheney, B., Hewitt, R.C., Barton, T.R, and Thompson, P.M. (2020a). Strategic Regional Pre-Construction Marine Mammal Monitoring Programme Annual Report 2019, University of Aberdeen, 31 Mar 2020.

Graham, I.M., Cheney, B., Hewitt, R.C., Fernandez-Betelu, O., and Thompson, P.M. (2021). Construction Marine Mammal Monitoring Programme Fieldwork Report 2021, University of Aberdeen, 1 December 2021. 8460001-PCA0010-MOR-REP-018Graham, I.M., Cheney, B., Hewitt, R.C., Hastie, G.D. and Thompson, P.M. (2015). Strategic Regional Pre-Construction Marine Mammal Monitoring Programme Annual Report 2015, University of Aberdeen, 6 May 2015.

Judd, A. (2011). Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects. Cefas contract report: ME5403 – Module 15.

MFRAG (2019). Terms of Reference (Version 6) for the Moray Firth Regional Advisory Group. Available on MFRAG - Main Group - Terms of Reference - 20/11/2019 | Marine Scotland Information

MMO (2014). Review of post-consent offshore wind farm monitoring data associated with licence conditions. A report produced for the Marine Management Organisation, pp 194. MMO Project No: 1031. ISBN: 978-1-909452-24-4.

Moray East (2018). C950RO2-03 Moray East Offshore Windfarm Export Cable CBRA 08-10-2018 Rev 03

Moray East (2022). Wind Farm Cable Plan. Moray East Offshore Wind Farm. Version 3. 8460001-PCA0010-MWE-REP-006.

Moray East (2019). Wind Farm Piling Strategy Moray East Offshore Wind Farm. Version 4. 8460001-PCA0010-MOR-REP-007.

Moray East (2021). Offshore Transmission Infrastructure Cable Plan. Moray East Offshore Wind Farm OfTI. 846001-PCA0030-MWE-REP-001.

Moray East (2021). Piling Strategy Implementation Report. Produced by HaskoningDHV on behalf of Moray Offshore Windfarm (East) Limited. Code 8460001-PCA0010-MWE-REP-012.

MORL (2012). Telford, Stevenson, MacColl Wind Farms and associated Transmission Infrastructure Environmental Statement [Moray East ES 2012].

MORL (2014). Modified Transmission Infrastructure for Telford, Stevenson and MacColl Wind Farms [Moray East Modified Transmission Infrastructure ES 2014].

OSPAR (2008). Guidance on Environmental Considerations for Offshore Wind Farm Development.

Thompson, P. (2014). Proposal for a strategic regional Pre-Construction Marine Mammal Monitoring Programme in respect of the BOWL and MORL Wind Farm Developments, University of Aberdeen, 25 March 2014.

Thompson, P. (2016). A strategic regional Marine Mammal Monitoring Programme for assessing the population consequences of constructing the BOWL and MORL [Moray East] Wind Farm Developments, University of Aberdeen, 27th June 2016.

Thompson, P.M. (2018) MFRAG - Marine Mammals - Moray East Offshore Wind farm - Addendum to the Construction Marine Mammals Monitoring Programme 19 September 2018. https://marine.gov.scot/data/mfrag-marine-mammals-moray-east-offshore-windfarm-addendum-construction-marine-mammals

Thompson, P.M. (2021) MFRAG - Addendum to the Moray Firth MMMP to integrate construction monitoring at the Moray West Offshore Wind Farm with ongoing post-construction monitoring at Beatrice and Moray East Offshore Wind farms. Issued on 2 December 2021.

Thompson, P.M. (2022) Addendum to the Moray Firth MMMP to integrate construction monitoring at the Moray West Offshore Wind Farm with ongoing post-construction monitoring at Beatrice and Moray East Offshore Wind farms. Review form 15 April 2022.

NatureScot (2021) Memo to MFRAG on Marine mammal monitoring. 16 September 2021.

Mareval AG (2021) O&M Manual OSP Foundations. Code 5413-GSMEC-QA-MAN-00002(05)

MMO (2014). Review of post-consent offshore wind farm monitoring data associated with licence conditions. A report produced for the Marine Management Organisation, pp 194. MMO Project No: 1031. ISBN: 978-1-909452-24-4.

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