

Neart na Gaoithe Offshore Wind Farm

Project Environmental Monitoring Programme

Revision 2.0

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Neart na Gaoithe Offshore Wind Farm Project Environmental Monitoring Programme

Pursuant to Section 36 Consent Condition 23 and the Marine Licence (Offshore Transmission Works) Condition 3.2.2.14

For the approval of the Scottish Ministers

Document Control

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Plan Overview

Purpose and Objectives of the Plan

This Project Environmental Monitoring Plan (PEMP) document has been prepared to address the specific requirements of the relevant conditions attached to the Section 36 (S36) consent and Marine Licences (collectively referred to as the Offshore consents) issued to Neart na Gaoithe Offshore Wind Limited (NnGOWL).

The overall objective of the PEMP is to outline and define the approach NnGOWL, its survey contractors and advisors will take with respect to the environmental monitoring of the project required under the S36 Consent and Marine Licence conditions. The plan sets out the approach to monitoring for each environmental topic listed in the S36 Consent and OfTW Marine Licence conditions issued to NnGOWL.

The PEMP is also designed to provide guidance to those involved in the Project, on the monitoring of potential environmental impacts associated with the construction, operation and post-construction phases of the Wind Farm and OfTW.

Scope of the Plan

The PEMP provides the overarching framework for the offshore environmental monitoring required by Condition 23 of the S36 Consent and Condition 3.2.2.14 of the OfTW Marine Licence. The PEMP includes:

- Details on the environmental monitoring proposed for the pre-construction, during construction (if considered appropriate by Scottish Ministers) and, where relevant, post construction phases of the Development on;
 - Seabirds;
 - Marine Mammals;
 - Commercial Fisheries;
 - Marine fish;
 - Diadromous fish;
 - Benthic communities; and
 - Seabed scour and local sediment deposition.
- The objectives and methodologies for the monitoring surveys;
- Evidence of consultation on and approval of monitoring approach and survey methodology; and
- The programme for proposed monitoring surveys and reporting.

Structure of the Plan

The PEMP is structured as follows:

Sections 1 to 2 set out the scope and objectives of the PEMP, statements of compliance and provide an overview of the Project.

Section 4 summarises the overarching approach to developing the PEMP and the roles and responsibilities for delivering the monitoring programme.

Sections 4 to 10 summarise the approach to monitoring for each topic identified in the S36 Consent and OfTW Marine Licence PEMP conditions. These sections also detail the background in developing the receptor specific monitoring strategy, the focus of the monitoring approach and the survey methodology for those receptors scoped into the PEMP. For those receptors where there were no significant impacts or uncertainty in the EIA or scoping determinations each section presents justification for not undertaking further monitoring.

Section 11 demonstrates NnGOWL's compliance with the monitoring measures proposed in the Application.

Plan Audience

The PEMP document is intended to be referred to by personnel involved in the construction of the Project, including NnGOWL personnel and Contractors.

This PEMP is intended to summarise NnGOWL's environmental monitoring programme for stakeholders and regulators.

Compliance with this PEMP will be monitored by the NnGOWL Environmental Clerk of Works (ECoW), and reported to the Licensing Authority.

Plan Locations

Copies of this PEMP are to be held in the following locations:

- NnGOWL Project Office;
- With NnGOWL's ECoW.

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Acronyms and Abbreviations

TERM	DESCRIPTION
AC	Alternating Currents
ADD	Acoustic Deterrent Device
ECOMMAS	East Coast Marine Mammal Acoustic Study
ECoW	Environmental Clerk of Works
FLO	Fisheries Liaison Officer
FTRAG	Forth & Tay Regional Advisory Group
FTRAG-O	Forth & Tay Regional Advisory Group – Ornithology Subgroup
FTRAG -MM	Forth & Tay Regional Advisory Group – Marine Mammal Subgroup
ICES	International Council for the Exploration of the Sea
JNCC	Joint Nature Conservation Committee
MMO	Marine Mammal Observer
MSS	Marine Scotland Science
MS-LOT	Marine Scotland Licensing Operations Team
MW	Megawatts
OSP	Offshore Substation Platforms
PAM	Passive Acoustic Monitoring
PMF	Priority Marine Feature
RSPB	Royal Society for the Protection of Birds
ROV	Remote Operated Vehicle
SEPA	Scottish Environmental Protection Agency
SNH	Scottish Natural Heritage
SPA	Special Protection Area
VMS	Vessel Monitoring System
WDC	Whale and Dolphin Conservation

Defined Terms

TERM	DESCRIPTION
Addendum	The Addendum of Additional Information submitted to the Scottish Ministers by NnGOWL on 26 July 2018.
Application	The Environmental Impact Assessment Report, Habitats Regulations Appraisal Report and supporting documents submitted to the Scottish Ministers by NnGOWL on 16 March 2018; the Addendum of Additional Information submitted to the Scottish Ministers by NnGOWL on 26 July 2018 and the Section 36 Consent Variation Report dated 08 January 2019.
Company	Neart na Gaoithe Offshore Wind Limited (NnGOWL) (Company Number SC356223).
Consent Conditions	The terms that are imposed on the Company under the Offshore Consents that must be complied with.
Consent Plans	The plans, programmes or strategies required to be approved by the Scottish Ministers (in consultation with appropriate stakeholders) in order to discharge the Consent Conditions.
Contractors	Any Contractor/Supplier (individual or firm) working on the Project, hired by NnGOWL.
EIA Report	The Environmental Impact Assessment Report, dated March 2018, submitted to the Scottish Ministers by NnGOWL as part of the Application.
Inter-array Cables	The offshore cables connecting the wind turbines to one another and to the OSPs.
Interconnector Cables	The offshore cables connecting the OSPs to one another.
Marine Licences	The written consents granted by the Scottish Ministers under the Marine (Scotland) Act 2010, for construction works and deposits of substances or objects in the Scottish Marine Area in relation to the Wind Farm (Licence Number 06677/19/0) and the OfTW (Licence Number 06678/19/1), dated 4 June 2019 and 5 June 2019 respectively.
Offshore Consents	The Section 36 Consent and the Marine Licences.
Offshore Export Cable Corridor	The area within which the offshore export cables are to be located.
Offshore Export Cables	The offshore export cables connecting the OSPs to the landfall site.
OfTW	The Offshore Transmission Works comprising the OSPs, offshore interconnector cables and offshore export cables required to connect the Wind Farm to the Onshore Transmission Works at the landfall.
OfTW Area	The area outlined in red and blue in Figure 1 attached to Part 4 of the OfTW Marine Licence.
OnTW	The onshore transmission works from landfall and above Mean High Water Springs, consisting of onshore export cables and the onshore substation.

TERM	DESCRIPTION
Project	The Wind Farm and the OFTW.
Section 36 Consent	The written consent granted on 3 December 2018 by the Scottish Ministers under Section 36 of The Electricity Act 1989 to construct and operate the Wind Farm, as varied by the Scottish Ministers under section 36C of the Electricity Act 1989 on 4 June 2019.
Section 36 Consent Variation Report	The Section 36 Consent Variation Report submitted to the Scottish Ministers by NnGOWL as part of the Application as defined above on 08 January 2019.
Subcontractors	Any Contractor/Supplier (individual or firm) providing services to the Project, hired by the Contractors (not NnGOWL).
Wind Farm	The offshore array as assessed in the Application including wind turbines, their foundations and inter-array cabling.
Wind Farm Area	The area outlined in black in Figure 1 attached to the Section 36 Consent Annex 1, and the area outlined in red in Figure 1 attached to Part 4 of the Wind Farm Marine Licence.

Consent Plans

CONSENT PLAN	ABBREVIATION	DOCUMENT REFERENCE NUMBER
Decommissioning Programme	DP	NNG-NNG-ECF-PLN-0016
Construction Programme and Construction Method Statement	CoP and CMS	NNG-NNG-ECF-PLN-0002
Piling Strategy	PS	NNG-NNG-ECF-PLN-0011
Development Specification and Layout Plan	DSLP	NNG-NNG-ECF-PLN-0003
Design Statement	DS	NNG-NNG-ECF-PLN-0004
Environmental Management Plan	EMP	NNG-NNG-ECF-PLN-0006
Operation and Maintenance Programme	OMP	NNG-NNG-ECF-PLN-0012
Navigational Safety Plan and Vessel Management Plan	NSVMP	NNG-NNG-ECF-PLN-0010
Emergency Response Cooperation Plan	ERCoP	NNG-NNG-ECF-PLN-0015
Cable Plan	CaP	NNG-NNG-ECF-PLN-0007
Lighting and Marking Plan	LMP	NNG-NNG-ECF-PLN-0009
Project Environmental Monitoring Programme	PEMP	NNG-NNG-ECF-PLN-0013

Fisheries Management and Mitigation Strategy	FMMS	NNG-NNG-ECF-PLN-0008
Written Scheme of Investigation and Protocol for Archaeological Discovery	WSI and PAD	NNG-NNG-ECF-PLN-0005
Construction Traffic Management Plan	CTMP	NNG-NNG-ECF-PLN-0014

1 Introduction

1.1 Background

1. The Neart na Gaoithe Offshore Wind Farm (Revised Design) received consent under Section 36 of the Electricity Act 1989 from the Scottish Ministers on 03 December 2018 and was granted two Marine Licences by the Scottish Ministers, for the Wind Farm and the associated Offshore Transmission Works (OfTW), on 03 December 2018. The S36 consent and Wind Farm Marine Licence were revised by issue of a variation to the S36 Consent and Marine Licence 06677/19/0 on 4 June 2019, and the OfTW Marine Licence by the issue of Marine Licence 06678/19/1 on the 5 June 2019. The revised S36 Consent and associated Marine Licences are collectively referred to as 'the Offshore Consents'.
2. The Project is being developed by Neart na Gaoithe Offshore Wind Limited (NnGOWL).

1.2 Objectives of the Plan

3. The S36 Consent and Marine Licences contain a variety of conditions that must be discharged through approval by the Scottish Ministers prior to the commencement of offshore construction. One such requirement is the approval of a Project Environmental Monitoring Programme (PEMP) the purpose of which is to provide the over-arching framework by which NnGOWL will monitor the environmental effects of the Project. The relevant conditions setting out the requirement for a PEMP for approval, and which are to be discharged by issue and approval of this PEMP, are set out in full in Table 1-1.
4. This PEMP is intended to satisfy the requirements of the relevant S36 Consent and OfTW Marine Licence conditions by setting out NnGOWL's approach to environmental monitoring.

Table 1-1 Consent conditions to be discharged by this PEMP.

OFFSHORE CONSENTS REFERENCE	CONDITION TEXT	REFERENCE TO RELEVANT SECTION OF THIS PEMP
S36 Consent, Condition 23	The Company must, no later than six months prior to the Commencement of the Project, submit a Project Environmental Monitoring Programme ("PEMP"), in writing, to the Scottish Ministers for their written approval.	This document sets out the PEMP for approval by the Scottish Ministers
	Such approval may only be granted following consultation by the Scottish Ministers with SNH, RSPB Scotland, WDC, SFF, FMS, RTC, Tay DSFB, Esk DSFB, Forth DSFB, and any other environmental advisors or organisations as required at the discretion of the Scottish Ministers.	Consultation to be undertaken by the Scottish Ministers
	The PEMP must be in accordance with the Application as it relates to environmental monitoring.	Appendix A
	The PEMP must set out measures by which the Company must monitor the environmental impacts of the Project. Monitoring is required throughout the lifespan of the Project where this is deemed necessary by the Scottish Ministers. Lifespan in this context includes pre-construction, construction, operational and decommissioning phases.	Section 3

OFFSHORE CONSETS REFERENCE	CONDITION TEXT	REFERENCE TO RELEVANT SECTION OF THIS PEMP
	The Scottish Ministers must approve all initial methodologies for the above monitoring, in writing and, where appropriate, in consultation with the FTRAG referred to in condition 24 of this consent.	Through consultation of this PEMP
	Monitoring must be done in such a way so as to ensure that the data which is collected allows useful and valid comparisons between different phases of the Development. Monitoring may also serve the purpose of verifying key predictions in the Application. In the event that further potential adverse environmental effects are identified, for which no predictions were made in the Application, the Scottish Ministers may require the Company to undertake additional monitoring	Sections 4 to 10
	<p>The PEMP must cover, but not be limited to, the following matters:</p> <ul style="list-style-type: none"> a. Pre-construction, construction (if considered appropriate by the Scottish Ministers) and post-construction monitoring or data collection as relevant in terms of the Application, and any subsequent monitoring or data collection for: <ul style="list-style-type: none"> 1. Birds; 2. Marine mammals; 3. Commercial fisheries; 4. Marine fish; 5. Diadromous fish; 6. Benthic communities; and 7. Seabed scour and local sediment deposition. 	Sections 4 to 10
	<ul style="list-style-type: none"> b. The participation by the Company to contribute to data collection or monitoring of wider strategic relevance, identified and agreed by the Scottish Ministers 	Sections 4 to 10
	Due consideration must be given to the Scottish Marine Energy Research ("ScotMER") programme.	Sections 4 to 10, where relevant
	Any pre-consent monitoring or data collection carried out by the Company to address any of the above issues may be used in part to discharge this condition subject to the written approval of the Scottish Ministers.	n/a
	The PEMP is a live document and which will be regularly reviewed by the Scottish Ministers, at timescales to be determined by them to identify the appropriateness of on-going monitoring. Following such reviews, the Scottish Ministers may, in consultation with the FTRAG, require the Company to amend the PEMP and submit such an amended PEMP, in writing, to the Scottish Ministers, for their written approval. Such approval may only be granted following consultation with FTRAG, and any other environmental, or such other advisors as may be required at the discretion of the Scottish Ministers.	Section 3

OFFSHORE CONSETS REFERENCE	CONDITION TEXT	REFERENCE TO RELEVANT SECTION OF THIS PEMP
	The Company must submit written reports and associated raw and processed data of such monitoring or data collection to the Scottish Ministers at timescales to be determined by them. Consideration should be given to data storage, analysis and reporting and be to MEDIN data standards	Sections 4 to 10
	Subject to any legal restrictions regarding the treatment of the information, the results are to be made publicly available by the Scottish Ministers, or by such other party appointed at their discretion	n/a
	The Scottish Ministers may agree, in writing, that monitoring may be reduced or ceased before the end of the lifespan of the Development.	n/a
OfTW Marine Licence Condition 3.2.2.14	The Licensee must, no later than six months prior to the Commencement of the Works, submit a PEMP, in writing, to the Licensing Authority for its written approval.	This document sets out the PEMP for approval by the Scottish Ministers
	Such approval may only be granted following consultation by the Licensing Authority with SNH, RSPB Scotland, WDC, SFF, FMS, RTC, Tay DSFB, Esk DSFB, Forth DSFB, and any other environmental advisors or organisations as required at the discretion of the Licensing Authority.	Consultation to be undertaken by the Scottish Ministers
	Commencement of the works may not take place until such approval is granted.	n/a
	The PEMP must be in accordance with the Application as it relates to environmental monitoring.	Appendix A
	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. Lifespan in this context includes pre-construction, construction, operational and decommissioning phases.	Section 3
	The Licensing Authority must approve all initial methodologies for the above monitoring, in writing and, where appropriate, in consultation with FTRAG.	Through consultation of this PEMP
	Monitoring must be done in such a way so as to ensure that the data which is collected allows useful and valid comparisons between different phases of the Works.	Sections 4 to 10
	Monitoring may also serve the purpose of verifying key predictions in the Application.	Sections 4 to 10
	In the event that further potential adverse environmental effects are identified, for which no predictions were made in the Application, the Licensing Authority may require the Licensee to undertake additional monitoring.	Sections 4 to 10

OFFSHORE CONSETS REFERENCE	CONDITION TEXT	REFERENCE TO RELEVANT SECTION OF THIS PEMP
	<p>Unless agreed otherwise with Licensing Authority, the PEMP must cover, but not be limited to, the following matters:</p> <ul style="list-style-type: none"> a. Pre-construction, construction (if considered appropriate by the Licensing Authority) and post-construction monitoring or data collection as relevant in terms of the Application, and any subsequent monitoring or data collection for: <ul style="list-style-type: none"> 1. Birds; 2. Marine mammals 3. Commercial fisheries; 4. Marine fish; 5. Diadromous fish; 6. Benthic communities; and 7. Seabed scour and local sediment deposition. b. The participation by the Licensee to contribute to data collection or monitoring of wider strategic relevance, identified and agreed by the Licensing Authority. 	Sections 4 to 10, where relevant
	Due consideration must be given to the ScotMER programme.	n/a
	Any monitoring or data collection carried out by the Licensee to address any of the above issues prior to the determination of this marine licence may be used in part to discharge this condition subject to the written approval of the Licensing Authority.	Section 3
	The PEMP is a live document and must be regularly reviewed by the Licensing Authority, at timescales to be determined by the Licensing Authority to identify the appropriateness of on-going monitoring. Following such reviews, the Licensing Authority may, in consultation with the FTRAG, require the Licensee to amend the PEMP and submit such an amended PEMP, in writing, to the Licensing Authority, for its written approval. Such approval may only be granted following consultation with the FTRAG, and any other environmental, or such other advisors as may be required at the discretion of the Licensing Authority.	Sections 4 to 10
	The Licensee must submit written reports and associated raw and processed data of such monitoring or data collection to the Licensing Authority at timescales to be determined by the Licensing Authority. Consideration should be given to data storage, analysis and reporting and be to MEDIN data standards, or suitable equivalent to be agreed with the Licensing Authority. 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 its discretion.	n/a

OFFSHORE CONSENTS REFERENCE	CONDITION TEXT	REFERENCE TO RELEVANT SECTION OF THIS PEMP
	Upon a request from the Licensee, the Licensing Authority may agree, in writing, that monitoring may be reduced or ceased before the end of the lifespan of the Works.	n/a

5. This PEMP also includes information related to a number of other consent conditions which are linked to environmental monitoring. These are set out in Table 1-2 with references to where these are addressed.

Table 1-2 Other consent conditions relevant to this PEMP

OFFSHORE CONSENTS REFERENCE	SUMMARY OF CONDITION	WHERE ADDRESSED
S36 Condition 11 / OfTW Marine Licence 3.2.2.9	The Piling Strategy (PS) must include the following: d. Details of any mitigation such as Passive Acoustic Monitoring ("PAM"), Marine Mammal Observers ("MMO"), use of Acoustic Deterrent Devices ("ADD") and monitoring to be employed during pile-driving, as agreed by the Scottish Ministers.	Section 5
S36 Condition 19 / OfTW Marine Licence 3.2.2.8	The Cable Plan (CaP) must include the following: b. The results of monitoring or data collection work (including geophysical, geotechnical and benthic surveys) which will help inform cable routing;	Section 10
S36 Consent Condition 24	Participation in Regional Advisory Group The Company must participate in any Forth and Tay Regional Advisory Group ("FTRAG") or any successor group, 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, marine mammals, diadromous and commercial fish. The extent and nature of the Company's participation in the Regional Advisory Group is to be agreed by the Scottish Ministers.	Sections 3

1.3 PEMP Document Structure

6. The PEMP document structure is set out in Table 1-3.

Table 1-3 PEMP document structure.

SECTION	TITLE	OVERVIEW
1	Introduction	Background to consent requirements and overview of the PEMP scope and structure; Identifies links with other relevant Consent Plans; and Statement of Compliance
2	Project Overview	Provides an overview of the Project and key programme milestones.

SECTION	TITLE	OVERVIEW
3	Approach to the PEMP	Outlines NnGOWL's general approach to developing the monitoring programme detailed within this PEMP and sets out the relevant roles and responsibilities for delivering the monitoring.
4	Birds	Summarises the monitoring strategy and programme (and any subsequent surveys) in respect of birds.
5	Marine Mammals	Summarises the monitoring strategy and programme (and any subsequent surveys) in respect of marine mammals.
6	Commercial Fisheries	Summarises the monitoring strategy and programme (and any subsequent surveys) in respect of commercial fisheries.
7	Marine Fish	Summarises the monitoring strategy and programme (and any subsequent surveys) in respect of marine fish.
8	Diadromous Fish	Summarises the monitoring strategy and results in respect of migratory fish species.
9	Benthic Communities	Summarises the monitoring strategy and programme (and any subsequent surveys) in respect of benthic communities.
10	Seabed Scour and Local Sediment Deposition	Summarises the monitoring strategy and programme (and any subsequent surveys) in respect of seabed scour and local sediment deposition.
11	Compliance with the Application, EIA Report and the Addendum	Demonstrates that the programme of monitoring set out in this PEMP is consistent with that proposed in the EIA Report and the Addendum.
Appendix A	Application Commitments	Sets out the monitoring commitments made in the Application.

1.4 Statements of Compliance

7. Environmental monitoring undertaken by NnGOWL will comply with this PEMP as approved by the Scottish Ministers (and as updated or amended from time to time).
8. Where updates or amendments to this PEMP are required, NnGOWL will ensure the Scottish Ministers are informed as soon as reasonably practicable and where necessary the PEMP will be updated.

2 Project Overview

9. The Wind Farm Area is located to the northeast of the Firth of Forth, 15.5 km directly east of Fife Ness on the east coast of Scotland (see Figure 3-1). The Wind Farm Area covers approximately 105 km². Offshore Export Cables will be located within the 300 m wide Offshore Export Cable Corridor, running in an approximately southwest direction from the Wind Farm Area, making landfall at Thorntonloch beach to the south of Torness Power Station in East Lothian. Figure 3-1 shows the Wind Farm Area and Offshore Export Cable Corridor.
10. The Offshore Consents allow for the construction and operation of the following main components, which together comprise the Project:
 - 54 wind turbines generating a maximum generating output of around 450 Megawatts (MW);
 - 54 jacket substructures installed on pre-piled foundations, to support the wind turbines;
 - Two alternating current (AC) substation platforms, referred to as Offshore Substation Platforms (OSPs), to collect the generated electricity and transform the electricity from 66kV to 220 kV for transmission to shore;
 - Two jacket substructures installed on piled foundations, to support the OSPs;
 - A network of inter-array subsea cables, buried and/or mechanically protected, to connect strings of turbines together and to connect the turbines to the OSPs;
 - One interconnector cable connecting the OSPs to each other;
 - Two buried and/or mechanically protected subsea export cables to transmit the electricity from the OSPs to the landfall at Thorntonloch and connecting to the onshore buried export cables for transmission to the onshore substation and connection to the National Grid network; and
 - Minor ancillary works such as the deployment of metocean buoys and permanent navigational marks.

2.1 Timing of Construction Works

11. It is currently anticipated that offshore construction will commence in Quarter 2 (Q2) 2020. Details of the construction programme are provided in the NnGOWL Construction Programme (CoP).

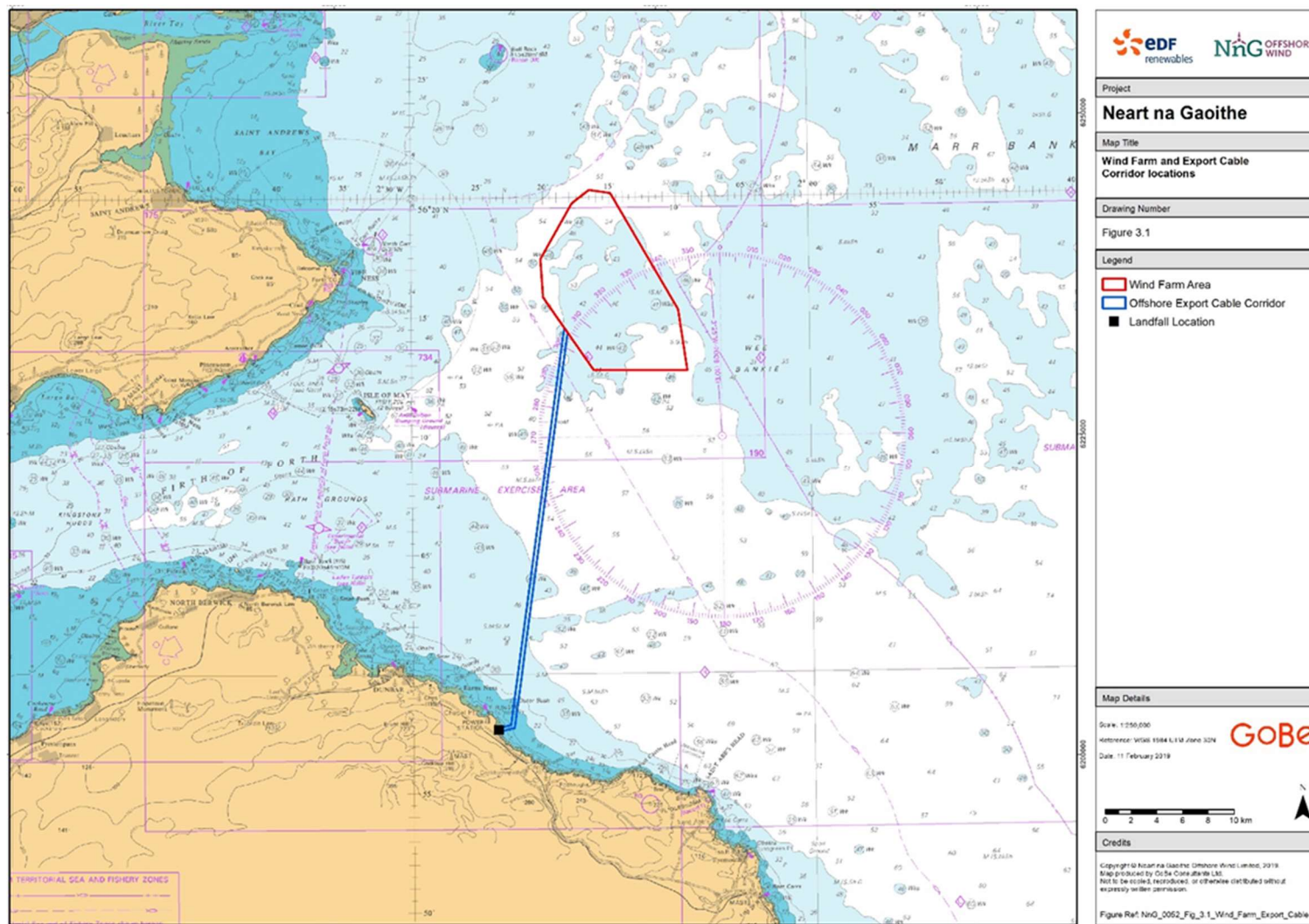


Figure 2-1: Wind Farm Area and Offshore Export Cable Corridor locations

3 Approach to this PEMP

3.1 Approach

12. This PEMP summarises the proposed approach to environmental monitoring, with the subsequent chapters setting out the approach for each environmental topic. Where separate documents such as technical survey reports are available, reference to these is made and a brief summary is provided.
13. In line with the rationale for post-consent monitoring presented in the Marine Management Organisation's (MMO's) strategic review of offshore wind farm environmental monitoring (MMO, 2014), monitoring proposals set out in this document aim to:
 - Validate, or reduce uncertainty in predictions on environmental impacts recorded in Environmental Impact Assessments (EIAs) and Habitats Regulations Assessments (HRAs); and
 - Allow the identification of any unforeseen impacts.
14. The Offshore Consents require NnGOWL to undertake and/or participate in strategic, regional and project-specific monitoring. Whilst the focus of the PEMP is on project-specific monitoring, commitments to participate in regional and strategic monitoring are also noted where relevant.

3.2 Roles and Responsibilities

3.2.1 NnGOWL Consents

15. The NnGOWL consents team will have overall responsibility for the following:
 - Maintaining and updating the PEMP document (if necessary), in consultation with and as required by the relevant authorities;
 - Requiring that all environmental monitoring or specialist studies required under the PEMP, are undertaken at the appropriate time;
 - Reviewing the monitoring reports and submitting the reports to either the FTRAG or the appropriate subgroup for consultation before submission to the Scottish Ministers; and
 - Liaising with the relevant consultees, including the FTRAG, on matters related to this PEMP.

3.2.2 Environmental Clerk of Works (ECOW)

16. The ECOW is responsible for monitoring compliance of the project with the consents and Consent Plans, and for reporting on compliance and environmental issues to NnGOWL and to MS-LOT.
17. Reporting on the PEMP will be led by NnGOWL rather than the ECOW; however, the ECOW Monthly Compliance reporting will contain a summary of PEMP related activities.

3.2.3 Environmental Contractors

18. NnGOWL has employed several specialist environmental contractors to inform methods and to undertake field work. Table 3-1 details the subcontractors employed to date and topics where contractors are yet to be employed.

Table 3-1 Specialist contractors currently involved in the delivery of monitoring surveys

RECEPTOR	SPECIALIST CONTRACTOR
Birds	Digital Aerial Surveys: HiDef GPS tracking studies: Centre for Ecology & Hydrology (CEH) Collision and/or avoidance study: TBC Gannet adult survival: TBC
Marine Mammals	Digital Aerial Surveys: Hi-Def Photo-identification Surveys: SMRU Consulting Acoustic monitoring deployment and analysis: SMRU Consulting
Commercial Fisheries	Collation and analysis of fisheries data: Poseidon Aquatic Resource Management Ltd Including (but not limited to): <ul style="list-style-type: none"> Annual data by International Council for the Exploration of the Seas (ICES) statistical rectangle (MMO iFish database) Monthly data by port of landing (MMO iFish database) Including post consent, pre-construction, construction and post-construction
Marine Fish	None required (See Section 7).
Diadromous Fish	None required (See Section 8).
Benthic Communities	None proposed (see Section 9)
Seabed Scour and Local Sediment Deposition	None proposed (see Section 10)

4 Seabirds

4.1 Introduction and Background

19. This chapter summarises the proposed approach to monitoring potential effects on seabirds. The FTRAG ornithology subgroup (FTRAG-O) was set up to agree appropriate seabird monitoring for the Forth and Tay offshore wind farms (NnG, Inch Cape and Seagreen One). In addition to the developers of the wind farms, the following organisations are represented on FTRAG-O: Marine Scotland Science (MSS), Scottish Natural Heritage (SNH), Joint Nature Conservation Committee (JNCC) and the Royal Society for the Protection of Birds (RSPB).
20. A summary of FTRAG-O discussions to date is provided in Table 4-1. Meeting agendas and minutes referred to in Table 4-1 can be obtained on the Marine Scotland website¹ (unless stated otherwise).

Table 4-1 FTRAG ornithology subgroup discussions and agreements on monitoring.

DATE	SUMMARY OF KEY DISCUSSIONS AND AGREEMENTS	REFERENCE
29th June 2015	<p>Terms of Reference discussed.</p> <p>MSS' document '<i>Key Post Consent Monitoring Questions in the Forth & Tay</i>' (MSS, 2015) was discussed and questions to be answered by agreed monitoring.</p> <p>Key species were also discussed.</p>	<p>Minutes of meeting – 29/06/2015: available on Scottish Government website</p>
3rd September 2015	<p>The MSS '<i>Key Post Consent Monitoring Questions in the Forth & Tay</i>' document was revised and formed basis of discussions.</p> <p>Key species for monitoring discussed; gannet, kittiwake, guillemot, razorbill and puffin.</p> <p>Key SPAs were identified; Forth Islands SPA and Fowlsheugh SPA. The Outer Firth of Forth and St Andrews Bay Complex dSPA (now pSPA) was discussed for inclusion.</p> <p>Monitoring suggested to focus on Collision Risk and Displacement Effects.</p>	<p>Minutes of meeting – 03/09/2015: available on Scottish Government website</p>
17th November 2015	<p>Update of gannet tagging study in 2015 and 2016 was provided.</p> <p>Further versions made to MSS '<i>Key Post Consent Monitoring Questions in the Forth & Tay</i>' document. Detailed discussions on the questions to be answered by monitoring.</p> <p>NnGOWL spoke to the Centre of Ecology and Hydrology (CEH) to develop appropriate monitoring techniques to assess displacement and barrier effects. Note from CEH circulated prior to meeting.</p> <p>NnGOWL agreed to prepare a pre-consent monitoring discussion paper (NnGOWL, 2016).</p>	<p>Minutes of meeting – 17/11/2015: available on Scottish Government website</p>

¹ <https://www2.gov.scot/Topics/marine/Licensing/marine/scoping/ftrag/ornithology>

DATE	SUMMARY OF KEY DISCUSSIONS AND AGREEMENTS	REFERENCE
26th January 2016	<p>Guest presentations: Bob Furness – Gannet ringing on the Bass Rock; Keith Hamer – Flight Height of Gannets; Francis Daunt – Seabird Tagging Studies on the Isle of May</p> <p>NnGOWL provided update on pre-construction monitoring strategy under production.</p> <p>Discussions over further versions to MSS ‘Key Post Consent Monitoring Questions in the Forth & Tay’ document.</p>	<p>Minutes of meeting – 26/01/2016: available on Scottish Government website</p>
23rd March 2016	<p>NnGOWL’s ‘Pre-Construction Ornithology Monitoring Proposal’ circulated on the 10th March 2016.</p> <p>FTRAG-O group broadly agree with the proposed monitoring approach produced by NnGOWL.</p>	<p>Minutes of meeting – 23/03/2016: available on Scottish Government website</p> <p>Document:</p> <p>UK02-0504-0584-CEC-BIRD MONITORING PROPOSAL-RPT-A1</p>
4th October 2018	<p>NnGOWL provided update on the ongoing digital aerial surveys that commenced in June 2018.</p> <p>Francis Daunt (CEH) presented preliminary seabird GPS tracking results from 2018 breeding season on Isle of May. Device effects on puffins were discussed with an action taken by NnGOWL and RSPB to consider whether to continue in 2019.</p> <p>NnGOWL advised that options to monitor collision and/or avoidance behaviour e.g. radar, human observers or cameras were still under consideration but noted that turbines will not be operational for approximately 3 years so there is still time for new technologies to become available, therefore the selection of a preferred monitoring approach is not imminent.</p>	<p>Minutes of meeting 04/10/2018 (not yet available online).</p>
28th January 2019	<p>Meeting with NnGOWL, RSPB and CEH to agree approach to tracking puffins. All FTRAG-O members subsequently agreed by email.</p>	<p>Paper circulated to FTRAG-O 05/03/2015 (not yet online).</p>
2nd July 2019	<p>NnGOWL’s Pre-construction Monitoring Strategy circulated June 2019.</p> <p>No comments were received on the Monitoring Strategy.</p> <p>FTRAG was advised of the collaborative aerial bird surveys being undertaken across all wind farms in the Forth and Tay area, which commenced in April 2019. This follows on from the separate monthly surveys undertaken since June 2018. The approach to combined surveys was welcomed by the group.</p>	<p>Minutes of meeting 02/07/2019 (not yet available online).</p>
30th January 2020	<p>NnGOWL and the other Forth and Tay Developers provided the group with general project updates.</p> <p>The group was briefed on the aerial survey work completed in 2018 and 2019 and advised of the survey work planned throughout 2020.</p>	<p>Minutes of meeting</p> <p>In preparation as of March 2020.</p>

DATE	SUMMARY OF KEY DISCUSSIONS AND AGREEMENTS	REFERENCE
	<p>CEH presented the results of the initial analysis undertaken on the 2019 seabird tagging studies and the planned work for 2020.</p> <p>Discussions took place on the adult Gannet colour-ringing study, including updates on proposed 2020 work on the Bass Rock and Grassholm colonies, plus a discussion on the potential of a 2nd control colony.</p> <p>Discussions took place on the progression of a collision / avoidance study which will be implemented during O&M.</p> <p>An update was provided by MSS on the ScotMER ornithology programme.</p>	

4.2 Focus of Monitoring

21. NnGOWL's seabird monitoring programme seeks to improve the understanding of seabird interactions with offshore wind farms and to validate assumptions made in the EIA. The focus is on monitoring effects on species and SPAs which were identified as potentially significant in the EIA. The following sections detail the key species and potential effects where the EIA determined potentially significant cumulative effects.
22. As the potentially significant impact predictions were cumulative, it is considered appropriate that the following focus areas are addressed collaboratively with the other Forth and Tay developers. NnGOWL will continue to engage with the FTRAG-O to ensure future monitoring efforts compliment the objectives of this monitoring programme.
23. Complimentary studies developed by the other Forth and Tay developers through the FTRAG-O may seek to monitor colonies from different SPAs in the region. Furthermore, a collaborative approach will seek to synergise monitoring efforts where significant studies relevant to all Projects may be implemented at one project location.

4.2.1 Key Species, SPAs and Effects

24. Table 4-2 below presents the key species, SPAs and potential effects which were previously agreed by FTRAG-O as being relevant to NnGOWL.

Table 4-2: NnGOWL monitoring priorities (as set out in the NnGOWL Monitoring Proposal, March 2016)

SPECIES	PRIORITY	SPA	POTENTIAL EFFECT
Gannet	High	Forth Islands SPA (Bass Rock)	Collision
Kittiwake	High	Forth Islands SPA St Abb's Head to Fast Castle SPA	Collision, Displacement and Barrier Collision and Displacement
Razorbill	High	Forth Islands SPA	Displacement (cumulative)
Puffin	High	Forth Islands SPA	Displacement and Barrier
Guillemot	Low	Forth Islands SPA	Displacement

25. The NnGOWL monitoring programme will focus on the species, SPAs and effects identified above. In some instances, proposed monitoring is anticipated to be undertaken in collaboration with other organisations e.g. developers, government bodies or NGOs. For these species, a review of foraging ranges has recently been published (Woodward *et al.* 2019). This review presents revised foraging ranges of 25 seabird species, based on a wider source of tracking studies than was used in previous reports e.g. Thaxter *et al.* (2012). Although this review provides much needed additional information on foraging ranges, it is considered that for the species and SPAs considered in the NnGOWL monitoring studies, specific tagging data based on individuals from these SPAs over several breeding seasons will provide more relevant information than using more generic data collated from several sites, as presented in Woodward *et al.* (2019). This is supported in the Woodward report, which states in its conclusions that “where site-specific tracking data suggests that birds may travel further than the generic mean, or mean maximum, foraging range, the precautionary approach would be to use the site-specific values, regardless of whether these meet the criteria outlined above relating to sample size and the number of years data available. In such circumstances, tracking data from the colony concerned showing potential overlap with a wind farm would reflect a realistic worst case scenario.”
26. Monitoring of different species, SPAs and effects is currently at different stages, with some studies underway and others not yet procured. This PEMP provides a high level summary of the proposed approach to each and seeks approval for these. It is not proposed to update this document each time more detail is available. Instead it is proposed that agreement will be sought through FTRAG-O.

4.3 Approaches to Monitoring Potential Effects

4.3.1 Displacement and Barrier effects

27. The following questions were identified through FTRAG-O as being important to any proposed monitoring methods:
- Is there a significant difference in foraging activity inside and outside the Wind Farm, and can this be associated with the presence of the Wind Farm?
 - Is there evidence of connectivity between breeding birds from specific colonies and the Wind Farm footprint?
 - What percentage of birds avoid the Wind Farm boundary?
 - Can a significant change in densities of kittiwake, puffin, razorbill and guillemot in the wind farm be identified?
 - Can a significant change in densities of kittiwake, puffin, razorbill and guillemot be attributed to the wind farm?
 - Do densities of kittiwake, puffin, razorbill and guillemot inside the wind farm change with time from construction (i.e. due to habituation)?
28. Two approaches have been taken forward (in agreement with FTRAG-O) to address the above questions:
- Digital aerial surveys to monitor displacement.
 - GPS tracking of breeding kittiwake, puffin, guillemot and razorbill on the Isle of May of to monitor both displacement and barrier effects.

29. Monthly digital aerial surveys commenced in June 2018 and have been ongoing since. Construction is anticipated to commence in May 2020, meaning approximately two years of pre-construction aerial data will be available for analysis. It is proposed that monthly surveys with the same design will continue throughout the construction phase and for a period following the completion of construction. In the first instance it is proposed to undertake two years post-construction monitoring as a minimum. The extent of post-construction monitoring will be established at a future date, will be informed by analysis (e.g. power analysis) and will be agreed in discussion with FTRAG-O.
30. GPS tracking of breeding kittiwake, puffin, guillemot and razorbill on the Isle of May has been undertaken in the 2018 and 2019 breeding seasons. As with digital aerial surveys, it is proposed to continue with annual GPS tracking of these four species on the Isle of May in the breeding season throughout construction and for a period into the operational phase. Similarly, it is anticipated that a minimum of two years post-construction data will be collected but that the cessation of monitoring will be informed by analysis and agreed in discussion with FTRAG-O.
31. A summary of methods is provided in section 4.4

4.3.2 Collision and Avoidance

32. It is proposed that a study of collision and/or avoidance behaviour is taken forward, with a focus on gannet and kittiwake.
33. As collision and avoidance behaviour can only be analysed when turbines are operational, pre-construction data is not required and methods have not yet been decided upon.
34. A number of collision/avoidance research questions were initially raised by MSS (in 2015) for consideration by FTRAG-O. However, it was agreed that these questions were not a priority for focused monitoring and in some instances these questions have been superseded by subsequent research. Nonetheless, any flight height data collected as part of the wider ornithology monitoring programme will be reviewed for availability and accuracy and if deemed adequate will be analysed or made available for further analysis to address the questions below.
35. Gannet and kittiwake avoidance behaviour:
 - Does collision occur and are there empirical methods to record seabird collisions at offshore wind farms?
 - What are the collision rates,
or,
• What are the micro, meso and macro avoidance rates?
36. Specific methods will be confirmed through a competitive tender process. Based on similar previous projects at Thanet and Aberdeen offshore wind farms, it is anticipated that radar and/or cameras will be deployed at a number of locations for a fixed period (e.g. one or two breeding seasons) early in the operational phase of the Project. Similar questions to those above will be set in the Invitation to Tender (ITT) and refined following the appointment of the selected contractor.
37. To ensure that such a study is appropriately resourced, it is NnGOWL's view that it would be best taken forward in collaboration with other developers. It is noted that the ability to achieve a

collaborative study is dependent on timescales of other projects and whether commercial terms can be agreed.

38. Based on experiences of Thanet and Aberdeen studies, it is proposed that a small and independent expert advisory panel is established to support this study. The panel could provide technical advice during the procurement and design of the study, including on proposed analysis methods.

4.3.3 Flight height

39. Three further potential questions regarding flight height were also raised by MSS in 2015, and these are provided below for information:
- Do flight height distributions differ significantly between weather conditions?
 - Do flight height distributions differ significantly between birds inside or outside wind farms?
 - Do flight height distributions change over time as birds habituate to the presence of wind turbines?
40. It is NnGOWL's view that whilst an important factor in assessments, flight height is a generic issue for wind farm assessments and should not form the primary focus of individual project monitoring. Therefore, while these additional questions will not be specifically addressed by the NnGOWL monitoring programme, if methods selected for monitoring effects can also provide flight height information (e.g. GPS tags, radar, or digital aerial surveys), this will be considered and relevant data will be shared. NnGOWL is also open to participating in strategic studies focused on flight height e.g. through ScotMER, and will provide relevant data to these studies, where possible. Table 4-3 below indicates where data from the NnGOWL monitoring studies could potentially be used to inform ScotMER knowledge gaps.

Table 4-3: Areas of NnGOWL monitoring studies that could feed in to ScotMER knowledge gaps, as presented in version 1 of the published ScotMER evidence map, dated October 2018

POST-CONSTRUCTION STUDY	ID	SCOTMER KNOWLEDGE GAP
Digital Aerial Surveys	OR.01	Baseline at sea distribution and abundance
	OR.14	Seabird flight heights
	OR.20	Degree of habituation to effect
GPS tracking	OR.07	Variation in distribution, abundance, and behaviour with weather conditions and diel cycle
	OR.08	Level and type of nocturnal activity at sea, and variation across space and time
	OR.09	Colony of origin of birds at sea during the breeding season
	OR.14	Seabird flight heights
	OR.15	Seabird dive behaviour

POST-CONSTRUCTION STUDY	ID	SCOTMER KNOWLEDGE GAP
	OR.23	Change in demographic rates resulting from displacement/ barrier effect
	OR.30	Technologies to allow tracking species/ during seasons of interest
Collision and avoidance study	OR.17	Mortality rate of birds colliding

4.3.4 Population Effects

41. The following potential research questions were raised by MSS in 2015, and these are provided below for information:
 - What is the rate of adult productivity for each of the key species at the key SPAs for those species?
 - What is the rate of adult survival for each of the key species at the key SPAs for those species?
 - Where it is possible to compare between SPAs, are there differences in the rates of adult productivity and survival for the key species at these SPAs?
42. Similar to the collision-related questions, these have been partly superseded by more recent discussions and research. However, NnGOWL recognises the importance of addressing the fundamental question of how wind farm effects (displacement, barrier and collision) – if they occur – could affect SPA populations. NnGOWL is committed to monitoring population effects and work is underway with other developers to agree a preferred approach (before then approaching FTRAG-O). This includes ongoing work with CEH and the RSPB in relation to monitoring kittiwake, puffin, guillemot and razorbill populations at relevant SPAs.
43. In relation to monitoring gannet populations, an approach proposed by Bob Furness at a previous FTRAG-O meeting has been further developed in discussion with the Universities of Leeds and Exeter. The proposal focuses on measuring adult gannet survival by colour ringing at the Bass Rock and comparing this with adult survival at one or two other UK breeding colonies. This would likely be a long-term study and would relate to influences which are wider than just wind farm effects, such as climate change, fishing practices, marine pollution and influences from further afield. This may be more appropriate as a strategic study with contributions from wind farm developers (including developers outside the Forth and Tay but within the foraging range of the Bass Rock).
44. Papers for both proposals will be circulated to the FTRAG-O for discussion in the coming months.

4.4 Monitoring Methods

4.4.1 Digital Aerial Surveys

45. Pre-construction digital aerial surveys of the Wind Farm Area and a 12 km buffer commenced in June 2018. In addition, Seagreen One and Inch Cape commenced surveys using the same method in April 2020 with an initial commitment to continue for 12 months.
46. The primary aims of the digital aerial surveys are:

- To collect seabird distribution data during the breeding season to permit spatial modelling of seabird distributions and the estimation of abundance both before and after construction and thereby estimate the magnitude (if any) of displacement resulting from avoidance of the Wind Farm;
- Estimate the extent of connectivity between seabirds using the Wind Farm footprint and the SPA colonies (Forth Islands and St Abb's Head to Fast Castle) in the vicinity through analysis of flight direction.

4.4.2 Combined approach to digital aerial surveys

47. The primary aim of the combined approach is:

- To ensure data is collected across all sites increasing the validity of any subsequent temporal or spatial comparisons of bird densities and distribution across the larger area.

48. It is likely that 2019 will be the last year in which there is no offshore construction activity for some years. Construction at NnGOWL is likely to be ongoing during the 12-18 months prior to the commencement of construction at Seagreen One and possibly Inch Cape, which would be the period during which pre-construction monitoring for these latter projects would ideally take place. This, in turn, could affect the post-construction comparisons of bird densities and distributions recorded during the operational periods of these wind farms.

49. Combining survey areas for the different projects will ensure that each project has access to baseline data that derive from a wider area than would be the case if baseline surveys were undertaken separately by each project. This will provide an enhanced platform for developing the subsequent post-construction/operational monitoring programmes and will potentially give greater power for detecting change attributable to the offshore wind farms in the region. Additionally, establishing the survey area and transects at this stage will increase the potential for deriving comparable post-construction/operational monitoring data from the respective projects.

4.5 Monitoring Survey Methodology

4.5.1 Digital Aerial Surveys

50. Following construction of the Wind Farm, data will be collected using the same methodology for comparison with the pre-construction baseline data.

4.5.1.1 Survey area

51. The survey area for the digital aerial surveys has been defined as the NnGOWL Wind Farm Area plus a 12 km buffer area (see Figure 4-1). Digital aerial surveys are being undertaken by HiDef Aerial Surveying Ltd and commenced in June 2018. Within the survey area 14 transects are aligned approximately in a north-west to south-east orientation, similar to those of the baseline boat-based surveys.

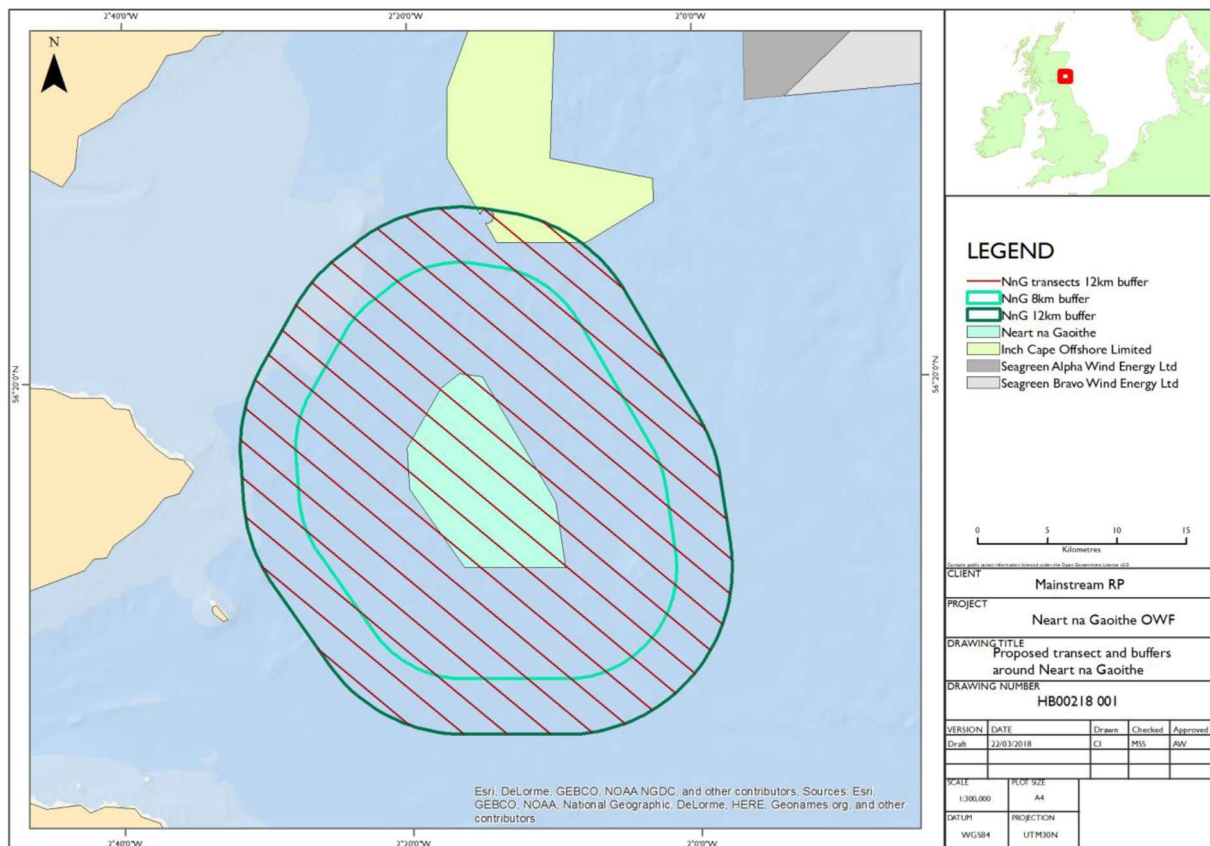


Figure 4-1: NnG Digital Aerial Survey Area

4.5.1.2 Survey design

52. A 2 km transect spacing was used as it is considered that this will capture the habitat complexity that exists across the study area. The surveys cover 250 m wide transects to ensure over 12.5% coverage of the survey area.
53. Surveys are being conducted using HiDef's GENII 4 camera rig mounted on a fixed wing DA42 low emissions aircraft.
54. The GENII camera rig contains four extreme high resolution digital video cameras and is operated at a survey altitude of approximately 550 m. At this altitude each camera will survey a strip approximately 125 m in width with a Ground Sample Distance (GSD) resolution of 2 cm. When combined, the 4-camera rig is capable of sampling a total transect width of 500 m. Surveys are flown at a ground speed of 220 km/hr.

4.5.1.3 Analysis and reporting

55. Following completion of the pre-construction aerial survey, the following data will be analysed and compiled into a pre-construction monitoring report:
 - Bird locations (including corrections for availability bias as appropriate) for all species; and
 - Direction of travel for the five key species (gannet, kittiwake, puffin, guillemot and razorbill).

56. Methods to account for availability bias for diving species will be applied and may be informed by results of foraging behaviour of GPS tagged birds.
57. Data will be analysed from two of the cameras to determine seabird distribution, with data from the remaining two cameras being stored in case needed.
58. Results will be reported in a pre-construction monitoring report that will be circulated to FTRAG-O and MS-LOT.

4.5.2 Combined Approach for Pre-construction Aerial Surveys 2019/20

4.5.2.1 Survey area

59. Inch Cape and Seagreen One commenced surveys using the same method as NnG and incorporating significant buffers. The current survey area extends across the respective project sites and incorporates the existing 12 km buffer around the NnG site and Seagreen One and a 4 km buffer around Inch Cape. The total survey area encompassing the combined sites effectively provide a continuous area of approximately 3,204 km². The total survey area and transects is presented in Figure 4-2

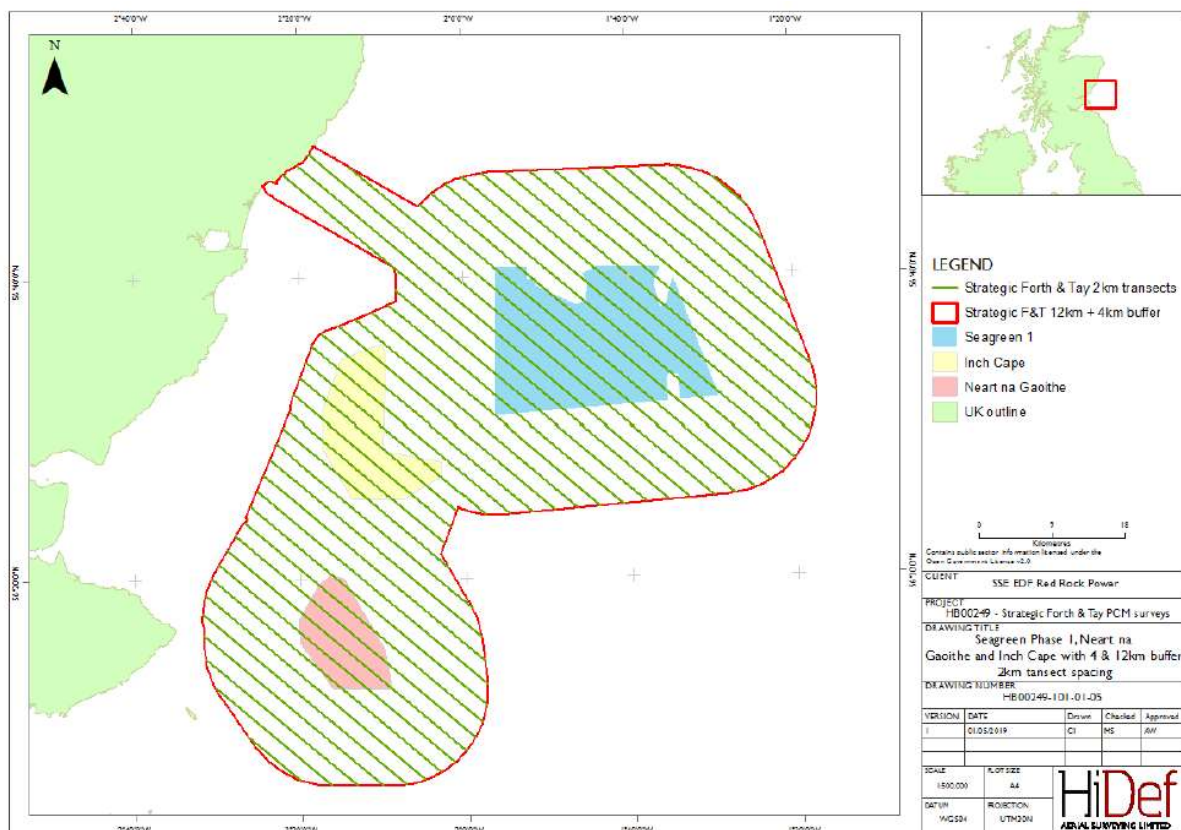


Figure 4-2: Forth and Tay combined digital aerial surveys

4.5.2.2 Survey design

60. Combined surveys commenced in April 2019 and will continue to April 2020. Each of the surveys of this extended area have been planned to be undertaken over as short a period of time as possible, in order to reduce potential sources of error affecting the determination of densities and distribution (e.g. short-term fluctuations and the risk of double counting).
61. The same broad survey methods are being used across the combined survey area. This consistency in methods and approach is important to ensure that the resulting data from across the NnGOWL site (and buffer) remain comparable between years, and also with the data collected for Inch Cape and Seagreen One, as well as realising the benefits outlined above.

4.5.3 GPS Tracking Study

62. GPS tracking is a useful method of obtaining detailed at-sea distribution data of individual breeding adult seabirds from SPA sites in foraging range of an offshore wind farm site. Location fixes can be partitioned into flying and non-flying activity, which enables foraging distribution and horizontal flight lines to be mapped accurately. Baseline information on at-sea distribution is fundamental to interpreting the distribution of seabirds during the operation of an offshore wind farm. Thus, pre-construction monitoring is a key strand of the structured before-during-after design proposed.

4.5.3.1 GPS deployment

63. In the 2018 breeding season, GPS data loggers were deployed on adult kittiwake, puffin, guillemot and razorbills breeding on the Isle of May. The number of tagged birds and number of trips recorded is shown in Table 4-4.

Table 4-4: Number of tracked birds from the Isle of May in 2018 (Source: CEH)

SPECIES	NUMBER DEPLOYED	NUMBER RETRIEVED	NUMBER OF TRIPS
Guillemot	25	24	185
Razorbill	15	14	123
Kittiwake	16	16	65
Puffin	26	25	120+

64. A further breeding season of pre-construction tracking studies for the above four species was undertaken in 2019, with similar target sample sizes as for 2018. 2019 is currently being processed.

4.5.3.2 Device effects in puffins, and 2019 breeding season tracking

65. Based on previous studies (e.g. Harris et al., 2012) it is known that puffins are sensitive to disturbance from handling and/or carrying data loggers. A feasibility study has been undertaken to consider device effects on puffins to ensure bird welfare is not compromised and data representativeness is maintained.

66. Based on the findings of the feasibility study, the following recommendations from CEH and RSPB (Daunt, 2019), were discussed at a meeting between NnGOWL, CEH and RSPB in January 2019 and were circulated to FTRAG-O members, who agreed to conduct additional puffin tracking with caution during the 2019 breeding season:

- *Capture method*: Reverting to the previous method of capturing birds at burrows is recommended, since no reduction in responses using the mist-net method were detected, and there are two clear advantages of capturing in burrows - all study burrows are known, so supplementary feeding can be provided universally, and deploying on both members of a pair can be avoided;
- *Logger size*: provisioning rates of birds with 4.1 g loggers was slightly higher suggesting that using loggers that are as small as possible could be beneficial;
- *Deployment method*: It is recommended that deployment takes place at the capture site and that the protocol is reduced down to the absolute minimum of activities (i.e. deployment of devices and colour ringing only). It is also recommended that the number of strips of tape is reduced from four to three to shorten the duration of the deployment procedure as much as possible;
- *Supplementary feeding*: It is recommended that supplementary feeding is commenced immediately and continues until it is shown that both the adults are supplying food, or the chick has fledged. Further, it is recommended that work is undertaken from mid chick-rearing onwards so that chicks are an age where they can tolerate lower provisioning rates; and
- *Data representativeness*: It is recommended that observations are undertaken of control pairs during deployment periods, as was done in 2018. It is also recommended that opportunities for combining GPS tracking data and data from unmanipulated birds e.g. on trip durations and provisioning rates in assessments of effects of renewable developments on puffins are explored.

4.5.3.3 Data download

67. Data is downloaded using a series of fixed base stations placed along the cliffs (for kittiwakes, guillemots and razorbills) and in the puffin nesting habitat. These stations download data automatically when tagged birds pass within range, and data are then transferred manually to a laptop computer. The number of successful deployments during previous tagging surveys has been high, demonstrating that the remote download stations work well.

4.5.3.4 Analysis and Reporting

68. The GPS data is processed, whereby data errors and locations when the data logger is not on the bird are removed. Secondly, flight data is partitioned to differentiate locations recorded during flights from locations recorded during non-flight periods at sea (which constitute foraging or resting). This partitioning is achieved by plotting a histogram of speeds and is only possible if bimodality (with the different peaks representing flight and non-flight respectively) is detected.
69. Density distribution at sea is determined using kernel density estimation for each species, using the R package *adehabitatHR* (Calenge, 2006). Kernel maps with 50 and 90% density contours (the former representing the core area of use, the latter the active area of use) will be produced for each species with separate maps for all fixes and non-flight fixes.

70. To compare the overlap between population range and wind farm footprint, the proportion of 50% and 90% kernels for each species within the NnG wind farm site will be calculated. Overlaps will be presented both as a proportion of the kernels that overlaps with the footprint and proportion of the footprint that overlaps with kernels.
71. Bootstrapping will be utilised to determine if the sample size is adequate to estimate the population at-sea range (see Daunt et al., 2010 and Bogdanova et al., 2014 for analysis details).
72. Identified flights will be mapped as horizontal flight lines. The extent to which the wind farm footprint is transited by commuting birds will be quantified as the proportion of birds, trips and flights passing through each site.
73. Analysis of the tracking data may also be used to further investigate any displacement effects. For kittiwake this could include further analysis of any macro-avoidance.
74. The results of the 2019 pre-construction tracking study will be compiled and presented in a report, which will be provided to FTRAG-O and MS-LOT.

4.6 Reporting

75. NnGOWL intends to submit survey reports to the FTRAG-O subgroup for consultation within three months of receipt of the final report from the survey contractors. Once the reports have been subject to consultation with FTRAG-O subgroup, NnGOWL will finalise and issue the reports to MS-LOT (on behalf of the Scottish Ministers).

5 Marine Mammals

5.1 Introduction and Background

76. This chapter summarises the proposed approach to monitoring effects on marine mammals.
77. The FTRAG Marine Mammal subgroup (FTRAG-MM) was set up to agree appropriate marine mammal monitoring for the Forth and Tay offshore wind farms (NnG, Inch Cape and Seagreen One). In addition to the developers of the wind farms, the following organisations are represented on FTRAG-MM: MSS, SNH, JNCC and Whale and Dolphin Conservation (WDC).
78. A summary of FTRAG-MM consultation and meetings to date is provided in Table 5-1. Meeting agendas and minutes referred to in Table 5-1 can be obtained on the Marine Scotland website (unless stated otherwise).

Table 5-1. Summary of key consultation meetings and agreements for marine mammal monitoring.

DATE	SUMMARY OF DISCUSSION AND AGREEMENTS	REFERENCE
19th August 2015	ToR discussed. Key species for monitoring discussed; bottlenose dolphin, harbour seals, grey seals, harbour porpoise, minke whale and white beaked dolphin.	Minutes of Meeting – 19/08/2015 available on the Scottish Government website
2nd December 2015	Piling mitigation discussed. Key species for monitoring finalised: bottlenose dolphin, harbour seal and grey seal.	Minutes of Meeting – 02/12/2015 available on the Scottish Government website
2nd July 2019	Seagreen One and NnGOWL set out their marine mammal monitoring approach. Both approaches focused on acoustic monitoring using deployment of C-POD devices in accordance with the ongoing regional ECOMMAS monitoring study. NnGOWL presented potential deployment arrays and the group agreed that the preference would be to extend the St Andrews ECOMMAS array eastwards around the NnGOWL Wind Farm. AreMSS proposed that regional bottlenose dolphin photo identification studies would be useful to monitor effects on the Moray Firth SAC bottlenose dolphin population. Developers agreed to consider the extension of ongoing bottlenose dolphin photo ID work. .	Minutes of meeting 02/07/2019 (not currently available online).
30th January 2020	Seagreen One and NnGOWL provided an update on their marine mammal monitoring studies. The group was briefed on the deployments of acoustic monitoring device completed in 2019 and the planned monitoring scheduled for 2020. SMRU presented the preliminary results of analysis of the acoustic data collected at the Seagreen One C-POD array. An update was given on the ScotMER research framework and evidence maps and there was a discussion on how the PEMP will feed into this programme.	Minutes of meeting are in preparation (as of March 2020).

5.2 Focus of Monitoring

79. NnGOWL's PEMP seeks to improve the understanding of marine mammal interactions with offshore wind farms and to validate assumptions made in the EIA. The focus of the PEMP is to monitor effects on species of marine mammals where there was uncertainty in the EIA predictions and in line with the discussions of the FTRAG-MM as set out in Table 5-1.
80. Through discussion with FTRAG-MM it was agreed that the primary focus species for monitoring during the pre-construction and construction phases should be bottlenose dolphins, harbour seals and grey seals.

5.3 Approach to Monitoring Effects

5.3.1 Marine Mammal Distribution Pre-, During and Post-Construction

81. The PEMP aims to determine whether there are any significant changes in the distribution or abundance of marine mammals within the wind farm area and adjacent waters pre, during and post construction. The findings aim to inform whether construction activities cause significant displacement of marine mammals.

5.3.2 Residency, Fecundity and Survival of Bottlenose Dolphin in the Forth and Tay

82. The monitoring programme aims to determine whether cumulative effects of impact-driving noise from construction activities could impact on bottlenose dolphin occurring in the nearshore waters of the Forth and Tay and, if so, whether the impact effects their fecundity or survival.

5.3.3 Far-Field Disturbance of Bottlenose Dolphin due to Impact Driving

83. Results from noise propagation modelling conducted to inform the Application and the Piling Strategy (PS) indicates that noise from impact driving could potentially cause disturbance to bottlenose dolphin occurring in nearshore waters of the Firth of Forth and St Andrews Bay. The PEMP has been developed to determine whether the effects of impact driving during construction results in notable far field disturbance effects to the resident population of bottlenose dolphin.

5.4 Monitoring Survey Methodology

5.4.1 Marine Mammal Distribution Pre-, During and Post-Construction

84. Monthly digital aerial surveys have been undertaken by Hi-Def (simultaneously with the digital aerial bird surveys detailed under Section 4.5.1 for full details) across the wind farm area and a 12 km zone around the wind farm site, since June 2018. As detailed above, the surveys are based on transects spaced 2 km apart that allow survey coverage across 12.5% of the survey area.
85. This approach allows a relatively large area to be surveyed over a shorter period of time and minimises the risk that data are collected during changeable viewing conditions, that would affect the ability to detect marine mammals. This ensures a consistency in the number of marine mammals recorded during any one survey period.
86. Construction is anticipated to commence in May 2020, meaning almost two years of pre-construction data will be available for analysis. It is proposed that monthly surveys with the same design continue throughout the construction phase and for a period following the completion of

construction. This data will be used to help determine whether any significant changes in the distribution or abundance of marine mammals occur during the construction phase of the project.

87. The results from these surveys will be analysed to determine whether any significant changes in the abundance and distribution of marine mammals occurs during the construction period.

5.4.2 Residency, Fecundity and Survival of Bottlenose Dolphins in the Forth and Tay

88. It is proposed that regular boat surveys within the Firth of Forth and St Andrews Bay region using photo identification techniques are conducted that will allow the recognition of individual dolphins based on their distinguishing features. Surveys are to be undertaken each year between May and September, the number of Forth and Tay developer funded surveys to be undertaken is to be agreed with the surveyors and with MSS/SNH.
89. In order to assess the fecundity and survival of bottlenose dolphins in the region a long-term data set will be required. The extent of the data collection required is to be agreed with SNH and MSS, alongside a discussion regarding the appropriate funding organisations. It is understood that funding is in place for a number of surveys per year and that developer contributions would allow for additional surveys.
90. The data obtained will be pooled with the existing regional data and data obtained in the Moray Firth to allow a larger data set to monitor potential changes in fecundity and mortality rate across the east coast of Scotland.

5.4.3 Far Field Displacement of Bottlenose Dolphins and Other Cetaceans by Impact Driving Noise

91. The ECOMMAS (East Coast Marine Mammal Acoustic Study) project has been on-going since 2013. The project monitors the distribution and population of bottlenose dolphin and harbour porpoise through the use of acoustic monitoring devices (C-PODs). C-PODs are located in groups of three at 10 locations along the east coast of Scotland; 30 C-PODs are deployed in total. At each location the C-PODs are located approximately 5 km, 10 km and 15 km from shore. In addition to the C-PODs there is one broad spectrum recorder deployed at each group of three C-PODs. The closest two C-POD arrays are located off St Andrews to the north off Arbroath and south at St Abb's. Data are recorded as dolphin detection-positive-days (DPD) and detection-positive-hours (DPH), from these it is possible to monitor temporal and spatial variations in rates of vocalisation which can be used as proxy for the presence or absence of bottlenose dolphins.
92. NnGOWL will supplement the existing ECOMMAS deployments by installing four additional C-PODs, as part of the pre-construction monitoring. The locations are presented in Figure 5-1. These additional C-PODs will aim to detect bottlenose dolphin occurrence in the vicinity of the Wind Farm Area. The pre-, during and post-construction detections can then be compared to determine whether there was a significant change in DPH and DPD during impact driving. Supplementary analysis of broad spectrum recordings will also be undertaken to differentiate between dolphin species recorded within the vicinity of the acoustic recorders. The broad pattern of these deployments was agreed with FTRAG-MM and follow up discussions with MSS.

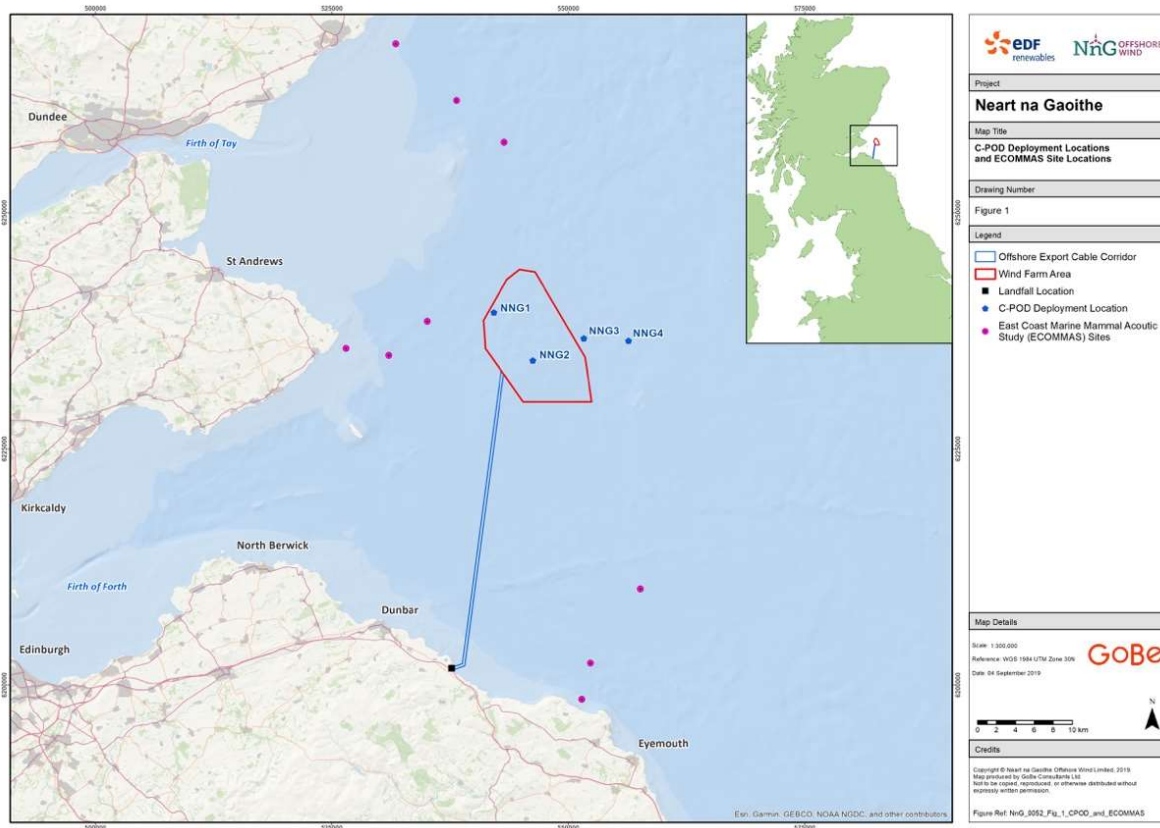


Figure 5-1: Location of additional C-PODs

5.5 Reporting

93. NnGOWL intends to submit survey reports to the FTRAG-MM subgroup for consultation within three months of receipt of the final report from the survey contractors. Once the reports have been subject to consultation with FTRAG-MM subgroup, NnGOWL will finalise and issue the reports to MS-LOT (on behalf of the Scottish Ministers).

6 Commercial Fisheries

6.1 Introduction and Background

94. This chapter summarises NnGOWL's position on the scope of project monitoring relevant to the PEMP. A summary of relevant consultations and meetings undertaken to date to define the scope of monitoring in respect of commercial fisheries is detailed in Table 6-1.

Table 6-1 Summary of key consultation meetings and agreements for commercial fisheries monitoring

DATE	SUMMARY OF DISCUSSIONS AND AGREEMENTS	REFERENCE
28th January 2020	NNGOWL presented the approach to commercial fisheries monitoring in line with the methods set out in Section 6.2 and 6.3. No objections were raised with regards to the proposed desk based study.	Minutes of meeting in preparation (as of March 2020)

6.2 Focus of Monitoring

95. The aim of commercial fisheries monitoring is to understand variations in commercial fisheries activity in response to the construction of the wind farm and use this to inform updates to the FMMS. The key objectives are to:
- Collate data on commercial fisheries landings and activity by ICES rectangle, including landing statistics and Vessel Monitoring System (VMS) data with the objective to extend the baseline assessment provided within the EIA and Commercial Fisheries Technical Report.
 - Collate data on commercial fisheries landings by port on a monthly basis;
 - Collate such other sources of evidence of commercial fisheries activity as may be reasonably available on a regular basis; and
 - Monitor available data and evidence to better understand any variations and patterns in commercial fisheries activity.
96. NnGOWL has prepared a Fisheries Management and Monitoring Strategy (FMMS). The FMMS sets out plans for fisheries liaison during construction. Mitigation and/or any updates to the FMMS may be informed by an understanding of any changes in fishing activity as picked up by the monitoring proposed within the PEMP.

6.3 Monitoring Survey Methodology

97. Monitoring will involve:
- Review of MMO landings data by port to allow monitoring of size, target species, tonnage of catch and first sales value monthly.
 - For each port, monthly data will be analysed to determine live weight of key species landed by all vessels, specifically for nephrops, brown crab, lobster and squid fisheries
 - Inter annual variations between monthly landings will be examined

- Additional sources of information will be reviewed to corroborate findings of the analysis of the MMO landing statistics and identify trends not detected by the MMO landings data.
- Analysis of Offshore Fisheries Liaison Officer and guard vessel records (where available);
- Analysis of the 2018 and 2019 marine traffic surveys in respect of fishing vessel activity;
- Analysis of Marine Coordination Centre (MCC) records in respect of fishing vessel activity;
- Analysis of VMS data in respect of fishing vessel activity, based on annual geographic datasets produced by MMO for VMS on UK vessels; and
- Consultation with the commercial fishing industry via the onshore company FLO.

6.4 Reporting

98. Data will be collated quarterly, to examine monthly landings and activity over that preceding period. It is proposed that reporting outputs will be delivered to cover monitoring results for the following phases:
- Post-consent phase (provided as a continuation of the baseline): 2017 to April 2019;
 - Pre-construction phase: May 2019 to beginning of construction;
 - During construction phase: Start of construction to end of construction, including reporting on a 6-monthly basis; and
 - Post-construction phase: End of construction to three years after the completion of construction.

7 Marine Fish

7.1 Introduction and Background

99. This chapter summarises NnGOWL's position on the scope of project monitoring relevant to the PEMP. A summary of relevant consultations and meetings undertaken to date to define the scope of monitoring in respect of marine fish is detailed in Table 7-1.

Table 7-1 Summary of key consultation meetings and agreements for marine fish monitoring

DATE	SUMMARY OF DISCUSSIONS AND AGREEMENTS	REFERENCE
December 2015	<p>Neart na Gaoithe Offshore Wind Farm, Discussion Paper - Marine Fish circulated to MS-LOT, SNH and JNCC</p> <p>Comments received 20 January and 26th January 2016 by SNH and MSS respectively. SNH and MSS confirmed that they do not require NnGOWL to undertake project monitoring in respect of marine fish.</p> <p>It was noted that Condition 11 of the S36 Consent requires consideration of mitigation measures in relation to herring and cod within a project Piling Strategy. NnGOWL will include consideration of environmental sensitivities and mitigation measures within the Piling Strategy which will be submitted to MS-LOT for approval prior to the commencement of construction, as required by the conditions of consent.</p>	UK02-0504-0565-GOB-PEMP MAR FISH DISC PAPER-RPT-A1
4th February 2016	Meeting to discuss the strategy in respect to marine fish, MSS and SNH confirmed their position. NnGOWL agreed to submit the discussion paper plus supporting information to the FTRAG for approval on the final scope of PEMP.	NnGOWL Meeting Minutes - Neart na Gaoithe Offshore Wind Farm, Project Environmental Monitoring Programme Discussion Papers
24th June 2019	<p>FTRAG main group meeting</p> <p>NnGOWL proposed that no monitoring would be undertaken for marine fish in accordance with earlier discussion documents.</p>	Minutes of meeting – 24/06/2019 (not yet available online)
28th January 2020	NnGOWL reiterated their approach to monitoring of marine fish. The approach was accepted by the group but it was agreed to keep marine fish on the agenda at future FTRAG meetings to take account of any changes or developments relevant to this receptor.	Minutes of meeting in preparation (as of March 2020)

7.2 PEMP Approach

100. NnGOWL circulated discussion papers for consultation to SNH, MS-LOT and MSS to agree the monitoring scope as required by Condition 23 of the S36 Consent and Condition 3.2.2.14 of the OfTW Marine Licence.
101. The discussion papers demonstrated, following review of the refined design envelope and based on more recent data, that the impacts from the construction and operation and maintenance of Neart na Gaoithe offshore wind farm would not have a significant impact on marine fish. These

conclusions remain valid and relevant to monitoring in respect of the project design envelope covered by the Offshore Consents issued in December 2018.

102. Based on the lack of significant effects and the confidence within the assessments, NnGOWL has concluded that project-specific marine fish monitoring should be removed from the scope of the PEMP. This approach was proposed again at the FTRAG meeting held on 24th June 2019 and 28th January 2020.

8 Diadromous Fish

8.1 Introduction and Background

103. This chapter summarises NnGOWL's position on the scope of project monitoring relevant to the PEMP. A summary of relevant consultations and meetings undertaken to date to define the scope of monitoring in respect of diadromous fish is detailed in Table 8-1.

Table 8-1 Summary of key consultation meetings and agreements for diadromous fish monitoring.

DATE	SUMMARY OF KEY DISCUSSIONS AND AGREEMENTS	REFERENCE
January 2016	Neart na Gaoithe Offshore Wind Farm, Discussion Paper - Diadromous Fish circulated to MS-LOT, SNH and JNCC Comments received 20 January and 26 th January 2016 by SNH and MSS respectively.	UK02-0504-0567-GOB-PEMP DIAD FISH DISC PAPER-RPT-A1
4th February 2016	Meeting to discuss the strategy in respect to marine and diadromous fish. MSS and SNH confirmed their position outlined in comments received. NnGOWL agreed to submit the discussion paper plus supporting information to the FTRAG for approval on the final scope of PEMP.	NnGOWL Meeting Minutes - Neart na Gaoithe Offshore Wind Farm, Project Environmental Monitoring Programme Discussion Papers
24th June 2019	FTRAG main group meeting NnGOWL proposed that no project specific monitoring would be undertaken for diadromous fish in accordance with earlier discussion documents.	Minutes of meeting – 24/06/2019
31st October 2019	Meeting to discuss the diadromous fish monitoring approach with reference to the 2016 discussion documents. NnGOWL reiterated the position that there is no project specific monitoring proposed in relation to diadromous fish. NnGOWL agreed to consider how regional strategic monitoring can be delivered collaboratively in accordance with the ScotMER evidence map for diadromous fish.	Minutes of meeting – TBC
28th January 2020	Diadromous fish monitoring was discussed at the FTRAG main group meeting. All participants of the group agreed that monitoring is best addressed through a strategic study developed through the ScotMER programme. MSS took an action to develop project ideas through the diadromous fish ScotMER group. NnGOWL agreed to continue to engage and participate in discussions around developing a suitable monitoring project through ScotMER.	Minutes of meeting in preparation (as of March 2020)

8.2 PEMP Approach

104. On the basis that no significant impacts were predicted in the EIA and in light of the reduction in the project design envelope, and the body of evidence that indicates EMF effects are not significant, the 2016 discussion paper concluded that there was no basis for undertaking project-specific monitoring in respect of diadromous fish. It is NnGOWL's position that previous discussions in relation to the scope of project monitoring of diadromous fish, remains valid and relevant to the 2018 Offshore Consents.
105. In response to the Diadromous Fish Discussion Paper, SNH confirmed that they do not require NnGOWL to undertake project monitoring in respect of diadromous fish, as there are no outstanding concerns regarding the Projects impact on diadromous fish in the vicinity of both the Wind Farm and OfTW.
106. MSS initially disagreed that there was sufficient grounds to remove diadromous fish monitoring from the scope of the PEMP but suggested that research would be better conducted at a strategic level. In October 2019, MSS reiterated this position that research may be better focused on strategic projects, such as those being developed through the ScotMER programme.
107. Based on the lack of significant effects and the confidence within the assessments, NnGOWL conclude that project-specific diadromous fish monitoring should be removed from the scope of the PEMP where it relates to Condition 23 of the S36 Consent and Condition 3.2.2.16 of the OfTW Marine Licence for the Project. This approach was stated at the FTRAG meeting held on 24th June 2019 with NnGOWL noting an openness to participate in further discussions for contributing to strategic studies e.g. through the ScotMER programme.
108. NnGOWL instead propose to continue engaging on how a collaborative approach to monitoring can be delivered through ScotMER or other strategic partnerships, in line with MSS advice.

9 Benthic Communities

9.1 Introduction and Background

109. This chapter summarises NnGOWL's position on the scope of project monitoring relevant to the PEMP. A summary of relevant consultations and meetings undertaken to date to define the scope of monitoring in respect of benthic communities is detailed in Table 9-1.

Table 9-1: Summary of key consultation meeting and agreements for benthic monitoring

DATE	SUMMARY OF KEY DISCUSSIONS AND AGREEMENTS	REFERENCE
December 2015	Neart na Gaoithe Offshore Wind Farm, Discussion Paper – Benthic Communities circulated to MS-LOT, SNH and JNCC Comments received 20 January and 26th January 2016 by SNH and MSS respectively.	UK02-0504-0566-GOB-PEMP BENTHIC DISC PAPER-RPT-A1
4th February 2016	Meeting to discuss the strategy in respect to benthic communities. MSS and SNH confirmed their position outlined in comments received. NnGOWL agreed to submit the discussion paper plus supporting information to the FTRAG for approval on the final scope of PEMP.	NnGOWL Meeting Minutes - Neart na Gaoithe Offshore Wind Farm, Project Environmental Monitoring Programme Discussion Papers
24th June 2019	FTRAG meeting to discuss future monitoring in respect of the PEMP for Forth and Tay developers. NnGOWL confirmed that no monitoring for benthic communities is proposed. SNH queried whether there was justification for monitoring of drill arisings within the pSPA boundary.	Minutes of meeting – 24/06/2019 (not currently available online).
10th September 2019	NnG Review of PEMP scope: Benthic Communities circulated to MS-LOT and MSS	NNG-GOB-ECF-PLN-0001
31st October 2019	Meeting to discuss the benthic communities monitoring approach with reference to the 2019 consultation document on the scope of the PEMP. NnGOWL reiterated the position that there is no project specific monitoring proposed in relation to benthic fish.	Minutes of meeting – TBC
28th January 2020	NnGOWL reiterated their approach to monitoring of benthic communities. The approach was accepted by the group but it was agreed to keep benthic communities on the agenda at future FTRAG meetings to take account of any changes or developments relevant to this receptor.	Minutes of meeting in preparation (as of March 2020)

9.2 PEMP Approach

110. The Benthic Communities Discussion Paper identified the Priority Marine Feature (PMF) 'Burrowed Mud' and the component biotope Seapens and burrowing megafauna in circalittoral fine mud 'SS.SMu.CFiMu.SpnMeg' present within the study areas. In the 2015 paper, NnGOWL

proposed undertaking a monitoring programme using geophysical survey methods to identify any change in the distribution and extent of SS.SMu.CFiMu.SpMmeg following the construction of the Project. It was proposed that benthic community monitoring would comprise of sidescan sonar data collection and analysis or would utilise backscatter derived from multibeam echo sounder data. Comparisons would be made between pre-construction and post-construction surveys with a focus on the SS.SMu.CFiMu.SpMmeg habitat.

111. SNH's response stated that monitoring of benthic interests would be more productive if conducted at a strategic level, focusing on known knowledge gaps rather than undertaken on a project specific basis and recommended that monitoring studies be co-ordinated at an industry level to address specific impact concerns on specific habitat types that have been identified as important. It was proposed that any monitoring be discussed further through the Scottish Offshore Renewables Research Framework (SpORRAn) group (now superseded by ScotMER).
112. MSS's position stated that SS.SMx.CMx.OphMx (*Ophiothrix fragilis* and/or *Ophiocomina nigra* brittlestar beds on sublittoral mixed sediment) and the bivalve *Arctica islandica* should also be considered for targeted monitoring utilising a Remote Operated Vehicle (ROV) and / or other video system. The monitoring programme should consider direct sampling of the fauna with the number of required samples being determined by an appropriate power analysis.
113. At the follow-up meeting on 04 February, the position of MSS and SNH as detailed in their consultation response was confirmed. Following discussions MSS agreed that monitoring of benthic communities should predominately utilise geophysical techniques.
114. Since this date, a further review of benthic monitoring at offshore wind farms has reiterated that the effects of wind farm infrastructure on soft sediment communities are limited, thus further supporting the conclusions of no significant effects reached in the NnGOWL Original ES. In addition, the revised design envelope for the project has been refined with further reductions in the footprint of installed infrastructure. This position was accepted during scoping for the recent EIA conducted in 2018, whereby Benthic Ecology was scoped out of the Project EIA.
115. This approach was presented at the FTRAG meeting held on 24th June 2019.
116. As detailed in the Scope of the PEMP: Benthic Communities consultation document circulated in September 2019 and presented at the follow up meeting in October 2019 it is NnGOWL's position that based on the lack of significant impacts and low uncertainty in the EIA and Scoping determinations no project-specific monitoring is required in relation to benthic communities. NnGOWL conclude that project-specific benthic community monitoring should be removed from the scope of the PEMP where it relates to Condition 23 of the S36 Consent and Condition 3.2.2.16 of the OfTW Marine Licence for the Project.
117. NnGOWL is open to sharing data with stakeholders, if it would be useful in any strategic projects, such as those taken forward via ScotMER.

10 Seabed Scour and Local Sediment Deposition

10.1 Introduction and Background

118. This chapter summarises NnGOWL's position on the scope of project monitoring relevant to the PEMP. A summary of relevant consultations and meetings undertaken to date to define the scope of monitoring in respect of seabed scour and local sediment deposition is detailed in Table 10-1.

Table 10-1. Summary of key consultation meetings and agreements for seabed scour and local sediment deposition monitoring.

DATE	SUMMARY OF DISCUSSION AND AGREEMENTS	REFERENCE
December 2015	Neart na Gaoithe Offshore Wind Farm, Discussion Paper – Seabed Scour and Local Sediment Deposition circulated to MS-LOT, SNH and MSS Comments received 20 January and 26th January 2016 by SNH and MSS respectively.	UK02-0504-0562-GOB-PEMP SCOUR DISC PAPER-RPT-A1
4 February 2016	Meeting to discuss the strategy in respect to seabed scour, the attendees confirmed that NnGOWL's proposals to monitor for seabed scour as part of ongoing operation and maintenance checks was sufficient to satisfy the requirements of the Consents conditions.	Minutes available on the Marine Scotland website
24th June 2019	FTRAG meeting to discuss future monitoring in respect of the PEMP for Forth and Tay developers. NnGOWL confirmed that no environmental monitoring for seabed scour and local sediment deposition is proposed. Instead monitoring would be driven by engineering requirements to maintain the structural integrity of installed infrastructure.	Minutes of meeting – 24/06/2019 (not currently available online).
28th January 2020	NNGOWL reiterated their approach to monitoring of seabed scour and local sediment deposition. The approach was accepted by the group but it was agreed to keep scour and seabed depositions on the agenda at future FTRAG meetings to take account of any changes or developments relevant to this receptor.	Minutes of meeting in preparation (as of March 2020)

10.2 PEMP Approach

119. NnGOWL considers seabed scour and local sediment deposition an engineering issue and is not specifically linked to a sensitive environmental receptor. The Marine Management Organisation (MMO) have undertaken a review of post-consent offshore wind farm monitoring (MMO, 2014). This report noted that monitoring of scour should only be required in relation to maintaining the structural integrity of foundations or other associated infrastructure over the lifetime of the project.
120. The discussion paper circulated in December 2015 confirmed that NnGOWL project-specific monitoring of seabed scour and local sediment sedimentation should be driven by engineering requirements rather than in response to potential effects on the physical environment. This approach was presented at the FTRAG meeting held on 24th June 2019.

121. NnGOWL has concluded that seabed scour and local sediment deposition monitoring for environmental purposes should be removed from the PEMP.

11 Compliance with the Application, EIA Report and Addendum

122. Part of Condition 23 of the S36 Consent states:

The PEMP must be in accordance with the Application as it relates to environmental monitoring.

123. Within the EIA Report and the Addendum, NnGOWL made a number of commitments to the environmental monitoring of the Project. Commitments made are presented in full in Appendix A, which also identifies how each commitment has been addressed within this PEMP.

124. Condition 8 of the S36 Consent states:

Except as otherwise required by the terms of this consent, the Project must be constructed and operated in accordance with the Application (as supplemented by the additional environmental information ("EIA Addendum"), submitted by the Company on 26 July 2018) and any other documentation lodged in support of the Application.

125. Condition 3.1.1 of the Wind Farm and OfTW Marine Licence states:

The Licensee must at all times construct, operate and maintain the Works in accordance with this licence, the Application and the plans and programmes approved by the Licensing Authority.

126. Since the Application for consents was made, NnGOWL's approach to environmental monitoring has been refined and commitments made in the EIA Report and the Addendum are in some cases superseded by the monitoring approach presented in this PEMP.

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Appendix A – Application Commitments

RECEPTOR	EIA COMMITMENT	PURPOSE	RELEVANT SECTION OF THIS PEMP
Ornithology	Following consent, a Project Environmental Monitoring Plan (PEMP) will be developed and agreed with MS-LOT, in discussion with the Forth and Tay Regional Advisory Group (FTRAG).	To ensure a robust and appropriate monitoring strategy	Section 4
Marine Mammals	A detailed monitoring programme will be developed through consultation with Marine Scotland and SNH.	To ensure a robust and appropriate monitoring strategy	Section 5
	NnGOWL will also participate in regional and national fora such as the Forth and Tay Regional Advisory Groups (FTRAG) and the Scottish Strategic Marine Environment Group (SSMEG) [or similar as superseded], through which a strategic monitoring plan will be developed.	To ensure a robust and appropriate monitoring strategy	Section 3.
Fish and Shellfish	Final monitoring proposals will be discussed with the FTRAG as part of the approval process for the Project Environmental Monitoring Plan (PEMP).	To ensure a robust and appropriate monitoring strategy	Sections 7 and 8
Benthic Ecology	Conduct a pre-construction cable route survey to identify any sensitive seabed habitats.	To mitigate the effects on benthic habitats	Addressed in the Cable Plan