

Hywind Scotland Pilot Park Project Project Environmental Monitoring Programme (PEMP)

Title: Hywind Scotland Pilot Park Project Project Environmental Monitoring Programme (PEMP)

Document no.: C178-HYS-Z-GA-00003	Contract no.:	Project: Hywind Scotland Pilot Park
---------------------------------------------	---------------	-----------------------------------------------

Classification: Open	Distribution: Open
Expiry date: 2017-12-31	Status: Final

Distribution date:	Revision no.:	Copy no.:
--------------------	---------------	-----------

Author(s)/Source(s): Steinar Eldøy	
Subjects: Project Environmental Monitoring Programme (PEMP)	
Remarks (e.g. reason for revision):	
Valid from:	Updated:
Responsible publisher:	Authority to approve deviations:

Techn. responsible (Organisation unit / Name): Hywind Scotland, Statoil Ove Vold, Consenting and stakeholder manager	Date/Signature: [redacted]
Responsible (Organisation unit/ Name): Hywind Scotland, Statoil Håkon Graven, SUS & Consenting Manager	Date/Signature: [redacted]
Recommended (Organisation unit/ Name):	Date/Signature: [redacted]
Approved by (Organisation unit/ Name): Hywind Scotland, Statoil Leif Delp, Project Director	Date/Signature: [redacted]

Table of Contents

1	Introduction	4
2	Bird monitoring	5
3	Non-native species	8
4	Diadromous fish.....	9
5	Benthic communities.....	10
6	Seabed scour and local sediment deposition.....	10
7	Participation in advisory and/or coordination groups	10

1 Introduction

Statoil ASA received a Marine Licence on the 30th October 2015 to develop the Hywind Scotland Pilot Park Project ("Hywind Scotland"). Five floating wind turbines (FWTs) will be installed, each with a generating capacity of 6 MW giving a total generating capacity of 30 MW, approximately 25 km off the coast of Peterhead. Each turbine will be anchored by a three-point mooring spread, and they will be connected by inter-array cables (figure 1.1). An export cable will transport the generated electricity to the shore. The application, Marine Licence decision documents and other documentation are placed on Marine Scotland's web page¹.

The Marine Licence requires (re. condition 3.2.1.1) that a Project Environmental Monitoring Programme (PEMP) must be submitted to the Licensing Authority for their written approval following consultation with by the Licensing Authority with the Joint Nature Conservation Committee ("JNCC"), the Scottish Natural Heritage ("SNH"), Marine Scotland Science ("MSS"), the Dee District Salmon Fishery Board ("DeeDSFB") and any other ecological advisors or organisations as required at the discretion of the Licensing Authority. Statoil has agreed with Marine Scotland Licensing Operations Team (MS LOT) that the PEMP should be submitted by the end of the year 2016.

The Marine Licence stipulates that the PEMP must cover, but not be limited to the following matters:

a) Pre-construction, construction (if considered appropriate by the Licensing Authority) and post-construction monitoring surveys as relevant in terms of the Application and any subsequent surveys for:

1. birds;
2. non-native species;
3. diadromous fish;
4. benthic communities; and
5. seabed scour and local sediment deposition.

All initial methodologies for the above monitoring must be approved, in writing, by the Licensing Authority and, where appropriate, in consultation with the Forth and Tay Regional Advisory Group ("FTRAG"), referred to in condition 3.2.1.4. of this licence. Any pre-consent surveys carried out by the Licensee to address any of the above species may be used in part to discharge this condition subject to the written approval by the Scottish Ministers.

The PEMP is a live document and must be regularly reviewed by the Licensing Authority, at timescales to be determined by the Licensing Authority, in consultation with the FTRAG to identify the appropriateness of on-going monitoring. Furthermore, written reports and associated raw data of such monitoring surveys to the Licensing Authority at timescales to be determined by the Licensing Authority in consultation with the FTRAG. Subject to any legal restrictions regarding the treatment of

¹ <http://www.gov.scot/Topics/marine/Licensing/marine/scoping/Hywind>

the information, the results are to be made publicly available by the Licensing Authority, or by such other party appointed at their discretion.

Statoil is also required to participate in different advisory and/or coordination groups:

1. Forth and Tay Regional Advisory Group ("FTRAG") – ref. condition 3.2.1.4.
2. Scottish Strategic Marine Environment Group ("SSMEG") – ref. condition 3.2.1.5.
3. National Research and Monitoring Strategy for Diadromous Fish ("NRMSD")- ref. condition 3.2.1.6.

Statoil has consulted the Joint Nature Conservation Committee (JNCC), the Scottish Natural Heritage (SNH), Marine Scotland Science (MSS) prior to submission of this PEMP, and have got written confirmation from JNCC and SNH that the project monitoring in their view should focus on seabird interests, and an indication "in principle" that they support the suggested tracking project (see below).

2 Bird monitoring

Statoil has discussed options for ornithological monitoring linked to the Hywind Scotland Pilot Park with Centre for Ecology and Hydrology (CEH), and has received a proposal focusing on the over-wintering ecology of Scottish seabirds. Seabird surveys made in the Hywind Scotland project area indicated that there might be elevated densities of Common Guillemots and Razorbills in the area after breeding. This was observed in one of the two years when boat based surveys were done (ref. chapter 11 in the Hywind Scotland Environmental Statement).

Statoil has been involved in the Norwegian national seabird monitoring and research programme SEAPOP, and has also represented the oil and gas industry in the steering committee for the programme. Furthermore, Statoil has also supported a tagging study involving GLS loggers for tagging seabirds in colonies both in Norway, Russia, Island, the Faroe Island and Scotland. This tagging programme is linked to SEAPOP, and is called SEATRACK. It includes tagging of guillemots, puffins, shags and kittiwakes at Isle of May and tagging of fulmars at the Orkneys. Results from tagging of Guillemots indicate a significant annual variability in the distribution of birds from Isle of May outside the breeding season.

Both with reference to the results from the SEATRACK programme (birds from Isle of May as well as birds from colonies in other countries) it is our view that traditional surveys of seabirds at sea (boat based as well as aerial surveys) are not suitable for monitoring impacts of offshore wind farms. The natural variability in distribution and densities, uncertainties in recording number of birds and the fact that it is not possible to determine the origin of the birds recorded makes such surveys questionable for monitoring purposes.

Therefore, Statoil wish to go for an alternative approach using GLS loggers. Ecological studies of different seabird species is well established on the Isle of May, and as mentioned Guillemots have been equipped with GLS loggers for several years. As the Buchan Ness colony is the nearest larger seabird colony to the Hywind Scotland project area, we consider including studies there as a valuable addition. To improve the ability to quantify variation in over-wintering distribution and activity among colonies we also propose to include a third colony a similar distance further along the east coast, at North Sutor. Furthermore, as Razorbill was the other seabird species with elevated densities in the project area, we also propose to add GLS logging of Razorbills at all three colonies. Further details on the approach are given below (proposal developed for Statoil by CEH, Francis Daunt).

The over-wintering ecology of Scottish seabirds (SEATRACK extension)

Background

CEH is a partner in SEATRACK and currently deploys geolocation (GLS) loggers on four species of seabird on the Isle of May: Guillemot, puffin, kittiwake, and shag. The core goal of SEATRACK is to quantify the distribution, timing of movements and activity of seabirds during the non-breeding season, including key periods such as moult when seabirds will be under tight energetic constraints. The multi-colony approach of SEATRACK enables space use and activity to be compared among populations in the north-east Atlantic. This project is ambitious and innovative, and will lead to important new insights in the year-round ecology of seabirds in the region.

However, two potential limitations of SEATRACK exist in the context of the over-wintering ecology of seabirds breeding in north-east Scotland:

- The Isle of May is the only UK colony represented in SEATRACK working on the above four species. There would be considerable benefit gained on the extent of migration scheduling and aggregation (or segregation) during late summer moult and mid-winter of nearby UK colonies if additional colonies could be added to the suite, and to test whether the Isle of May is representative of colonies along the east coast of Scotland.
- SEATRACK does not include razorbill, a species of high conservation importance in the UK that shows strongly contrasting foraging and population ecology to its sister species, the common guillemot. It would thus provide considerable added value to SEATRACK if this species could be added to the suite.

We believe that this proposal provides the opportunity to fill these knowledge gaps, by adding razorbill to the list of species currently studied in SEATRACK on the Isle of May, and to commence a new logger deployment study on guillemots and razorbills at two nearby colonies (Buchan Ness to Collieston Coast, close to the town of Peterhead, ca. 140 km coastal distance from the Isle of May and North Sutor, close to the town of Tain, ca. 280km coastal distance from the Isle of May). These are locally important colonies, located at appropriate distances to test for among-colony variation in wintering ecology, and where it is known from bird ringing that such work is feasible. The project would fund the staff time for project management, field planning, data collection and analysis of the

GLS data (for razorbill at all three colonies, and for common guillemot at Buchan Ness and North Sutor), the travel and subsistence for fieldwork, and GLS loggers. We would use standard field protocols for which CEH has long-standing expertise.

We propose to undertake the study over three years in the first instance, comprising two deployments (in year 1 and year 2) and two retrievals (in year 2 and year 3). Two winters of data are important to test for inter-annual variation in the extent of overlap in distribution and activity among colonies, and to improve overall sample sizes. After the 2018 field season has taken place, an assessment will be undertaken of the success of the work to date to establish the need for a third deployment/retrieval campaign. This contingency will be actioned if the retrieval rates in 2018 are sufficiently moderate to conclude, based on the best available information, that a third deployment is required to achieve sufficient sample sizes.

Strength is gained from combining data on demography and year-round distribution and activity by increasing our understanding of the effects of North Sea winter and summer conditions on population dynamics, such as recent work where we have shown such a link in relation to probability of breeding in Isle of May guillemots. This is a rich source of future research. We consider that an important initial research question is year-round energetic budgets, since energetics is a central currency in demography; we would seek to complement the locational data with analyses of energetics to identify key bottlenecks in the annual cycle of these birds, and where these bottlenecks are located (using a new paradigm called 'energy landscapes') based on activity data that the GLS loggers record.

Furthermore, the Seabird Monitoring Programme is a national programme of monitoring of the demography and diet of UK seabirds. It is the UK's equivalent to Norway's SEAPOP programme. The SMP monitors many sites around the UK, at a considerable range of intensities from very intensive sites, in particular the Isle of May, where population size, adult survival, juvenile survival, breeding success, diet and phenology are recorded annually in multiple species, to low intensity sites that are counted once every ~15 years, to coincide with national censuses. There is considerable current interest in the colonies on the east coast of Scotland because of proposed offshore wind farms in the region. For many, including North Sutor and Buchan Ness, the quality of count data is moderate to good. However, there is a paucity of diet data. Given the regional significance of these colonies, it is therefore strategically important to increase the intensity of diet monitoring so that any assessments of population change can be undertaken with a better understanding of predator-prey relationships. This project could fulfil this goal by supporting annual monitoring of diet of guillemots and razorbills at Buchan Ness and North Sutor to complement existing data collection on the Isle of May, using standard protocols for these species and for which CEH has long-standing expertise.

Project timetable

2017

The project will commence in 2017, with GLS loggers deployed on the two species at the three colonies during the breeding season ($n = 40$ guillemots at all colonies; $n = 30$ razorbills on Isle of

May and North Sutor and n = 20 razorbills at Buchan Ness; sample sizes determined by availability of accessible birds). Diet delivered to chicks will be quantified using standard approaches.

2018

First retrieval will be undertaken in the 2018 breeding season. A second set of deployments will also take place (same sample sizes as above). Analyses of the geolocation data (location and activity) will be undertaken after the field season is complete, using the same protocols established in the SEATRACK project. All data will be uploaded to the SEATRACK database and web portal. After the 2018 field season has taken place, an assessment will be undertaken of the success of the work to date to establish the need for a third deployment/retrieval round.

2019

Second retrieval will be undertaken in the 2019 breeding season. Analyses of the geolocation data (location and activity) will be undertaken after the field season is complete, using the same protocols established in the SEATRACK project. All data will be uploaded to the SEATRACK database and web portal. If the contingency plan has been actioned in 2018, then a third deployment will be undertaken in the 2019 breeding season.

2020

If the contingency plan has been actioned in 2018, a third retrieval will take place in the 2020 breeding season. Analyses of the geolocation data (location and activity) will be undertaken after the field season is complete, using the same protocols established in the SEATRACK project. All data will be uploaded to the SEATRACK database and web portal.

Reporting and publishing

Results from the tagging will be analysed and reported on an annual basis. Data will as mentioned be integrated and published on a specific SEATRACK web page linked to the Norwegian SEAPOP project (<http://www.seapop.no>), and the aim is also that the results will be published in peer reviewed scientific papers.

3 Non-native species

Invasive non-native species (INNS) are considered as one of the greatest threats to biodiversity, especially in marine ecosystems. Over the past 30 years, offshore wind farms (OWFs) have introduced unprecedented levels of hard substrate into the North Sea, significantly changing the biota of the coastline around the British Isles. However, little data exists on which invasive taxa are present, particularly in the North Coast of Scotland. Statoil has therefore agreed to support a PhD study performed by Ian Campbell, University of Highlands and Islands (UHI), looking into the issue of introduction of non-native species. Ian Campbell is a postgraduate from Brunel University London in Climate Change Impacts and Sustainability. His works will be supported over a period of 3.5 years, starting from January 2016.

Research Objectives

The primary outcome of this methodology will be the delivery of a fully independent observational review by the PhD student, of the environmental monitoring techniques and enhanced biosecurity measures for supporting future floating and offshore marine developments. It is hoped this will increase an understanding of what environmental monitoring measures will be required by the research community for informing future management actions and the mitigation measures for reducing the risk of the unintentional introduction of invasive non-native species (INNS).

Methodology

1. Conduct a comprehensive literature review into past INNS surveys, records and bio-fouling of man-made floating structures in Scotland and Norway which includes;
slow moving 'wet towed' structures, wind farms (both floating and fixed) and floating production, storage and offloading units (FPSO's) as vectors for 'hitchhiking' INNS
2. Baseline four biofouling communities; port of assembly, turbine deployment area, port of installation and maintenance and non-impacted reference areas on both the east coast of Scotland and the Norwegian west coast.
3. Identify the pelagic larval duration of Norwegian INNS and their dispersal distance in the North Sea.
4. Operational monitoring of INNS on the FWTs at the turbine deployment site.
5. Translate these research findings into governance by preparing advice for supporting and influencing the licensing conditions for FWT's and other floating marine devices.

Reporting

Results of the works will be reported to Statoil on an annual basis. A final report will be prepared upon completion of the works. The final report will be shared with Marine Scotland.

4 Diadromous fish

At the application stage of the Hywind Scotland Pilot Park project, it was not concluded whether it would be possible to go for an export cable landfall solution with HDD (Horizontal Directional Drilling) or an open trench to shore. Given that the HDD solution was chosen, there were no disruption of the nearshore area out to the HDD exit point. Impacts on diadromous fish were in the Environmental Statement in general considered to be insignificant, and the HDD solution is assumed to have even less significant impacts compared to an open trench solution.

With regard to electromagnetic fields (EMF) the cable manufacturer Nexans has calculated the magnetic field from the buried static cable will be 15 μ T 500 mm from the cable surface, and 13 μ T 500mm from the dynamic cable surface. This is well below the natural background magnetic field (which is between 30 and 70 μ T). As the static cable will be buried, the magnetic field will be even further reduced. Therefore, any impact on diadromous fish and other marine life is highly unlikely.

With reference to what is described above, Statoil does not consider monitoring of potential impacts on diadromous fish to be relevant.

5 Benthic communities

Surveys done during the planning phase of Hywind Scotland Pilot Park project identified smaller areas with *Sabellaria* reefs along a potential cable corridor for the export cable, but route optimisation did make it possible to avoid most of these areas. Other areas with Annex I benthic species or habitats have not been identified, and therefore Statoil does not consider monitoring of benthic communities to be required.

6 Seabed scour and local sediment deposition

The Environmental Statement discussed the potential for seabed scouring and possible sedimentation in the project area, particularly linked to the anchoring system for the floating wind turbines. This is not considered to be a significant impact, but seabed monitoring using ROV's and video recording is planned during the operational phase to monitor potential scouring (see the Operation and Maintenance Plan, OMP, for further details).

7 Participation in advisory and/or coordination groups

Statoil does intend to participate in the different advisory and/or coordination groups referred to in the Marine Licence – the Forth and Tay Regional Advisory Group (FTRAG), Scottish Strategic Marine Environment Group (SSMEG), and the National Research and Monitoring Strategy for Diadromous Fish (NRMSD).

At the time being the groups are still in an infancy/resting state, and only the National Research and Monitoring Strategy for Diadromous Fish (NRMSD) has met over the last of year. Statoil did attend a meeting of NRMSD on 8 December 2015.

Statoil does consider the planned tagging project on razorbill and guillemot to fit into a strategic monitoring approach as referred to as regional and/or strategic bird monitoring in Licence condition 3.1.2.1, with reference to the National Strategic Bird Monitoring Framework (NSBMF). Also the PhD study on non-native species fit into a strategically approach to build knowledge more than just monitoring impacts of the Hywind Scotland Pilot Park project alone. Statoil will be happy to share the results from these studies as well as other studies in which the company is involved with the different groups mentioned.