



PrePARED
Predators + Prey Around Renewable Energy Developments

Quarterly Report: Q2 2025

Date: 30/06/2025

Project Overview

This quarter includes the successful final data collection survey and also focussed on data processing and analyses, and modelling. There were also new reports released including peer-reviewed papers, and reports 007 and 008 – please find these on our webpage [here](#).



PrePARED Report No. 008

Predicted and observed responses of harbour porpoises to pile driving noise at Moray West Offshore Wind Farm



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Funded by:

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Summary of activities undertaken in Q2 2025

Task 1.1 Broadscale fish response to OWF in Forth: Produced fish abundance layers from 2024 data and provided to BioSS. RoxAnn data from all 2024 surveys (PrePARED and others) used to refine the seabed hardness and roughness layers (maps) and are now used to model fish distributions. New data being collected on the 2025 surveys to further update the layers. First of 2025 survey was successful.

Task 1.2 Finescale fish response to OWF in Forth: Baited camera (SBRUVS) videos and trap data have been analysed and are now used to model fish distributions.

Task 2.1 Seabird spatial distribution in Forth: Produced preliminary maps of kittiwake distribution in the Forth and Tay and delivered output layers from predator-prey spatial models to UKCEH. Integrated prey maps from Task 1.1 with seabird GPS tracking data into spatial modelling framework and provided document workflow and outputs in multiple formats to UKCEH for integration into Task 7.2 (tool development).

Task 2.2 Seabird movement models in Forth: Different approaches to structuring the movement models have been considered. This is relevant for both (i) understanding the predator-prey relationships in the collected data, and (ii) parameterising the IBMs to appropriately simulate movements. Continuing to develop approaches to integrate the prey data into these models.

Task 2.3 Simulating realistic foraging tracks in IBMs: Methodology for validating Individual Based Models (IBMs) was explored, building towards developing a formal framework for comparing simulated to real data in this project. Began shortlisting key summary statistics (parameters) for characterising seabird movement across data analyses and simulations.

Task 3.1 Broad-scale fish distribution in Moray: Analyses of fisheries acoustic and trawl data is ongoing. Species distribution models for the Moray Firth based on these data is being produced by SGMD.

Task 3.2 Fine-scale fish distribution in Moray (reef effects): Preliminary analysis of the BRUV data now complete (by both the human analyst and an AI computer vision model). Results demonstrate declining abundance and biomass as distance increases from turbine structures. Preliminary analysis of AI camera video reveals the imagery to be contaminated by red light; this has arisen due to incorrect filters on the camera. As such, our existing AI-based fish detector is struggling to count fish and the detector needs retraining. The AI detector is rather essential as each data is 24 hours in duration, equivalent to x48 longer than out standard videos. Retraining the detector is underway, but will take another 6-8 weeks to complete and validate.

Task 3.3 Fish acoustic telemetry in Moray: The retrieval of the tracking array from the seabed is for the majority complete. However, 1 unit remains on the seabed presumed lost, but if found will need intervention using a Remotely Operated Vehicle (ROV). Cannot move to the analytical phase of the work until there is confirmation

that the final unit is confirmed to be either permanently lost or recovered. The units were not serviced at the 6-month interval, so each unit contains a year of data, which means data processing, including quality control is anticipated to take longer than originally projected.

Task 4.1 Drivers of broadscale marine mammal distribution: Harbour seal report not yet completed. This was an additional output for this Task following re-shaping of deliverables to focus on harbour porpoise data following departure of the original Task lead. Recent discussions with OWEC over a PrePARED extension have highlighted that analyses of seal-predator data are not a priority, so any further work on this Task has been halted to prioritise outputs and impacts from Task 4.2 and Task 4.3.

Task 4.2 Finescale marine mammal distribution in response to OWF and prey fields in Moray: Analyses of PAM and AIS vessel-tracking data to investigate variation in fine-scale porpoise occurrence and activity after exposure to disturbance at operating OWFs and reference areas. Analyses conducted for presentation at CWW2025.

Task 4.3 Dose response curves in Moray: Draft dose-response report deliverable not complete. Work has continued on the additional deliverable (PrePARED Report 008) comparing Moray West EIA predictions with observed data. Report was reviewed positively by the MG and PAG, and was published on 27th June 2025.

Task 4.4 Fish nutritional value: Analysis continued on PrePARED and other fish samples to further enhance the database. The processing of PrePARED 2023 samples remains ongoing, with the final priority species currently being analysed. To date, we have over 580 new energy density estimates across 33 prey species, out of the 37 species for which we have samples. Significant progress has been made in developing a prey energy database for use within PrePARED, with the ongoing long-term goal of integrating published data to create a comprehensive database of energy estimates in the North Sea.

Task 5.1 Generalities in fish response to OWF: Progressing with evaluation of data between sites for broad- and fine-scale comparisons. This involves the use of fisheries acoustic and trawl data to compare species distribution models at each site and BRUV data for investigating wind farm level effects.

Task 5.2 Generalities in marine mammal response to OWF: Analyses have been completed and a full draft of the manuscript (on the effect of PAM array design on dose response functions for harbour porpoises) has been shared with a few key experts for initial input. Revisions are planned late in Q2 before sharing with co-authors for final input before submission. Analyses focus on establishing rules for truncation distances for the functions (i.e. the range from the source at which to truncate the data) have been completed using data from Beatrice and Moray East wind farms (and this can be replicated for other sites). Collaboration with the University of Aberdeen team continues to streamline these efforts and maximise impact. This work highlights the importance of survey design in using PAM stations for dose-response estimation (and the benefits and challenges of PAM stations at large distances from the source). Work on seals continues, via Philippa Wright's PhD

– exploring energetic aspects of seal/prey dynamics and the foraging behaviour of seals in relation to prey distributions and energyscapes.

Task 6.1 Minimum data requirements for seabird distribution and movement models: BioSS now have a dedicated colleague to take up the work to build spatial and temporal variability into the sandeel map. They finalised a remit of work and have begun to adapt example code provided by Rebecca Langton to generate (bootstrap) uncertainty layers for sandeel map predictions. They are currently investigating run time as they are computationally intensive to produce.

Task 6.2 Minimum data requirements for marine mammal distribution models: No updates

Task 6.4 Survey design for predator-prey studies: The short report has been drafted and is being reviewed within SMRUC at the end of Q2. Expected delivery in Q3

Task 7.1 IPCoD and DEPONS integration of new data and testing: Draft report on track for delivery at the end of June 2025 for review and input from the MG and PAG.

Task 7.2 Adding biological realism to SeabORD and testing: Movement simulation developments to capture "generic" seabird movement have been completed, capturing essential behaviours like land avoidance and equivalent movement modes to SeabORD (e.g., travel and ARS) to facilitate integration of the two models. The next step is to run the approximate Bayesian computation (ABC) methods determined in Task 2.3 to attain a set of parameters for each of the four SeabORD species (razorbill, kittiwake, guillemot & puffin) with the result of four respective movement models aligning with key characteristics of each species. Discussions on the best way to integrate realistic track simulations into SeabORD with key staff from UKCEH and BioSS were also commenced.

Task 7.3 Testing and validating SeabORD in the FoF and at UK SPAs: Following a training day with Natural England to provide more detail on SeabORD 2.0 (current R release), UKCEH have reached out to have a meeting to finalise which settings should be used to run SeabORD, e.g. use of RSPB's GPS tracking data. Once this is determined UKCEH can work on completing simulation runs and writing a report to disseminate the findings.

Task 7.4 Integration of PrePARED findings for harbour porpoise CIA: Initial report finalized (report 007) and two additional case studies now being drafted to support the initial report, with planned delivery at the end of June for case study 1 and the end of the year for case study 2.

Task 7.5 Integration of PrePARED findings for seabird Cumulative Impact Assessment: Initial meetings between project partners involved in fish-seabird work have taken place to identify the main empirical outcomes and links to the impact assessment process.

Task 9.1 Annual knowledge exchange workshops: Webinars have replaced the AKEM in 2025, the first webinar based on Report 006 was successful with 60 attendees from a variety of stakeholder groups including SNCBs, industry, academia and government. The next webinar will take place in July 2025 linked to Report 007.

Task 9.2 Dissemination of project findings: Project outputs are being disseminated on the website, blog, mailing list, through the PAG, social media and webinars.

Task 9.3 Organise symposium: We have asked OWEC for any suggestions on The Crown Estate buildings/facilities to host the scientific symposium in London in late 2026/early 2027. We have also spoken to key stakeholders to determine what other events will happen at the same time of year

Task 9.4 Website and social media: The website continues to be regularly maintained and updated. Social media has been reduced due to changes in the central comms team at SGMD, however, this was raised to OWEC and discussions are planned to support future comms.

Summary of activities to be undertaken in Q3 2025

Task 1.1 Broad scale fish response to OWF in Forth: Finish 2025 fieldwork

Task 2.1 Seabird spatial distribution models in Forth: Final version of distribution models and preparation of journal article

Task 2.2 Seabird movement models in Forth: 1) Begin incorporating all available prey data into movement models, 2) Begin preparation of journal article, 3) Update on: Deliverable: initial models for seabird movement

Task 2.3 Simulating realistic foraging tracks in IBMs: Identify key parameters and data required for parameterising IBMs

Task 3.1 Large-scale fish distribution in Moray: Analyses of acoustic and trawl data

Task 3.2 Fine-scale fish distribution in Moray (reef effects): Resolution of contaminated footage, data analyses and downstream provision

Task 3.3 Fish acoustic telemetry in Moray: Tag ping data analyses

Task 4.2 Finescale marine mammal distribution in response to OWF and prey fields in Moray: Integration of prey data (from Task 3.1 and 3.2) to explore drivers of porpoise activity at OWF

Task 4.3 Dose response curves in Moray: Dissemination of Report 008

Task 4.4 Fish nutritional value: Continued focus on addressing the priority prey species identified for each of the predators highlighted in the PrePARED project. This will involve progressing to the analysis of the 2024 PrePARED samples, as well as continuing to refine data on both large and small size classes to improve the generated length-weight and length-energy relationships. These relationships will be integrated with distribution and biomass maps produced from Task 1.1 and Task 3.1 to create energyscapes for the Firth of Forth and Moray Firth and applied to BRUV biomass estimates to investigate total energy availability around OWF turbines in the Moray Firth.

Task 5.1: Generalities in fish response to OWF: Delivery of draft report

Task 5.2 Generalities in marine mammal response to OWF: Delivery of draft report

Task 6.1 Minimum data requirements for seabird distribution and movement models: Compare revised version of model against that derived using F-T prey data and update on Deliverable: framework for predicting joint seabird-prey distributions in new regions

Task 6.4 Survey design for predator-prey studies: Delivery of final report

Task 7.1 IPCoD and DEPONS integration of new data and testing: Delivery of the final report

Task 7.2 Adding biological realism to SeabORD and testing: 1) Release of standalone updated SeabORD version. 2) Extension C3 - development of initial parameterisation to work with joint predator-prey maps

Task 7.4 Integration of PrePARED findings for harbour porpoise CIA: Work on case study 2

Task 7.5 Integration of PrePARED findings for seabird Cumulative Impact Assessment: Literature review summarising relevant approaches for performing cumulative impact assessments for seabirds and offshore wind

Task 9.1 Annual knowledge exchange workshops: continue organising webinars following PrePARED outputs

Task 9.2 Dissemination of project findings: Support for technical and non-technical dissemination of project findings

Task 9.3 PrePARED project scientific symposium: organise symposium

Task 9.4 website and social media: Maintain project website and social media comms.

External Communications and Engagement

In Q2 2025:

- Poster presentation of tracking comparison paper at the R-INLA past, present, future workshop at the University of Glasgow Release of Report 006: Habitat Similarity Assessment in February 2025.
- Presentation at the Centre for Statistics Annual Conference in University of Edinburgh
- Highlighted emerging PrePARED findings in relation to implementation of DEFRA Noise Policy at SOWEC meeting.
- Presentation on SeabORD model at workshop in Leiden, Netherlands.
- [PrePARED Website blog](#)
- Webinar for Report 006, MS Teams Webinar, 21/05/2025

Planned for Q3 2025

- Presentations at CWW25
 - Seabird-fish presentation
 - Task 4.2 presentation
 - Report 008 presentation
 - Task 5.2 and 7.4 presentation
- Presentations at Aquatic Noise 2025
 - Poster and speed talk on harbour porpoise
 - Presentation on Tasks 5.2 and 7.4