



OWSMRF Scope of Work

Feasibility review for catching black-legged kittiwakes at sea

(Research Opportunity 2.4a)

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This document should be cited as: JNCC (2022) OWSMRF Research Opportunity 2.4: Feasibility review for catching black-legged kittiwake at sea. Joint Nature Conservation Committee, Peterborough.

Contents

1	Background.....	1
1.1	Connectivity between OWF and SPA populations	2
2	Aims and objectives	2
2.1	Aim.....	3
2.2	Objective 1	3
2.3	Objective 2	3
2.4	Objective 3	3
2.5	Objective 4 (please cost separately)	3
3	Detailed tasks	3
3.1	Literature review.....	3
3.2	Contacting experts.....	5
3.3	Produce material to support trials	5
3.4	Plan a detailed trial (please cost separately).....	6
4	Outputs	6
5	Timescale	7
6	Contractor requirements	7
7	References.....	8

1 Background

Offshore wind farms (OWF) are seen as a key part of efforts to combat climate change (Snyder & Kaiser 2009). However, there are a number of concerns about the potential for these wind farms to have a negative impact on wildlife and biodiversity, particularly in relation to birds (Drewitt & Langston 2006; Gibson *et al.* 2017). To inform the planning process of the potential impacts of the effects associated with wind farms, new proposed developments require detailed Environmental Impact Assessments (EIAs) and Habitats Regulations Appraisal (HRA). EIAs assess impacts to the wider environment, whilst HRAs assess whether a plan or project will have an adverse effect on a site protected under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2019, the Conservation (Natural Habitats, &c.) (Northern Ireland) Regulations 1995 (as amended), and/or The Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended). As the number of wind energy developments increase globally both onshore and offshore, the potential associated environmental impacts are receiving considerable attention, particularly avian impacts. This is of particular concern at the cumulative scale, i.e. considering impacts of windfarms combined rather than of individual developments in isolation. As the scale of offshore windfarm development expands, the risk of reaching unacceptable levels of cumulative impacts increases. In order to undertake meaningful cumulative impact assessments, there is a need for improved understanding of how birds respond to offshore windfarms and how to quantify the risk to populations of concern. Without such information, decision making is necessarily precautionary, and there is a risk that offshore windfarms may not be deployed at sufficient scale to contribute fully to emission reduction targets and ambitions.

The OWSMRF (Offshore Wind Strategic Monitoring and Research Forum) identified uncertainty around in-combination and cumulative impacts of offshore wind development on black-legged kittiwake (*Rissa tridactyla*) populations as currently posing the greatest uncertainty (see <https://jncc.gov.uk/our-work/owsmrf/> for more information). Three knowledge gaps (KG) to inform cumulative/in-combination assessments for black-legged kittiwake were identified:

- KG1: reducing uncertainty around estimates of windfarm collision mortality
- KG2: improving understanding of connectivity between OWF and SPAs;
- KG3: improving confidence in modelling population consequences of windfarm effects

As part of the impact assessment process, the likely effects (e.g. collision, barrier effects and/or displacement effects) of a planned offshore windfarm on birds are estimated (KG1). Once the magnitude of these effects has been estimated, it is necessary to understand which SPA colonies (if any) and wider populations these affected birds originate from (KG2). Finally, the potential SPA population (for HRA assessments) and/or wider population (for EIA assessments) response to these OWF effects (i.e. reduced productivity or increased mortality) are assessed using population modelling (KG3). Data to inform this process are frequently scant, leading to high uncertainty in magnitude of effects and a lack of confidence in predicted population response to effects. It should be noted, that the primary 'population' of relevance to assessing the environmental impacts of OWF is an SPA population. Most of the kittiwake SPAs are large breeding colonies, designated for the interest feature using the colony during the breeding season. This means that we need to consider whether individual kittiwakes using a windfarm footprint are from a particular colony SPA, and if so we need to understand what proportion of individuals seen within the windfarm footprint are associated with each linked SPA (in each different season).

1.1 Connectivity between OWF and SPA populations

Given the wide-ranging pelagic nature of kittiwakes, it is rarely, if ever, clear how many of the individuals interacting with a particular windfarm are from which SPA population. Better empirical evidence regarding the provenance of kittiwakes in and around OWFs is needed to inform approaches to apportioning effects on individuals observed using a windfarm footprint to appropriate SPAs (and wider populations). This is recognised as a problem for many wide-ranging oceanic species and understanding of connectivity is critical to ensuring management measures are appropriate for the level of risk associated with different degrees of connectivity (Dunn *et al.* 2019). This scope of work describes work required that could lead to improvements in the way individuals interacting with windfarms are apportioned to colonies and wider populations. Although there may be tracking data available from nearby SPAs and other colonies showing whether breeding birds from the colony use the windfarm footprint, this kind of data is not on its own sufficient to allow an assessment of the proportion of birds affected by a particular windfarm that are from a/each relevant colony.

Black & Ruffino (2020) describes several research opportunities (ROs) which could improve the evidence base for attributing effects of an offshore windfarm to relevant populations for black-legged kittiwake. These ROs were developed with the aid of an expert workshop. This work was funded by The Offshore Wind Strategic Monitoring and Research Forum (OWSMRF) (<https://jncc.gov.uk/our-work/owsmrf/>). OWSMRF Developer Group, after discussions with the OWSMRF stakeholder group, have asked JNCC to produce detailed scopes of work for a selection of research opportunities, including RO2.4 described in Black & Ruffino (2020). These scopes of work will provide additional detail regarding the project aims and objectives, possible methods that might be anticipated and aspects that would be included/considered. It should provide the information that is required in order to draft an invitation to tender and to judge the quality of applications, should OWSMRF or others wish to proceed with any of these projects.

2 Aims and objectives

This scope of work aims to explore catching kittiwakes at sea as a means of increasing the evidence base of where kittiwakes seen in a windfarm footprint have originated from, and which population(s) they are from. It is based on OWSMRF RO2.4 as described in Black & Ruffino (2020). Being able to catch kittiwakes at sea is a technique that would assist with undertaking other research opportunities such as OWSMRF RO2.3 which explores the use of mark-recapture technology (such as colour ringing, PIT or VHF tags) to better assess connectivity between OWF and SPA populations (Black & Ruffino 2020) and OWSMRF RO3.3 which uses mark-recapture approaches to improve empirical estimates of key demographic rates (Ruffino *et al.* 2020). Although those projects are not reliant on catching of kittiwakes at-sea in order to proceed, having a means to do so could improve the power of strategic research such as described in those research opportunities. It also might provide opportunities for future windfarm developments, as part of pre-application surveys, to undertake tracking from the windfarm footprint to identify which SPAs are linked to the footprint, as a complement to studies such as Wakefield *et al.* (2017) and ongoing GPS tagging studies throughout the east of UK including Flamborough and Filey Coast (Wischniewski *et al.* 2018), St Abbs Head and Fowlsheugh (Wischniewski pers comm). Such direct tracking from a windfarm footprint might potentially provide empirical evidence for apportioning, where kittiwakes from several colonies are using a windfarm footprint.

Whilst the primary purpose of catching kittiwakes at sea would be to attach tracking or mark-recapture devices, there is additional information which could be obtained such as age

estimates or samples for stable isotope or genetic analyses. The devices that are attached, and measurements or samples that might be obtained, are beyond the scope of this feasibility study. This study focuses on the ability to catch kittiwakes at sea safely and how this might be best achieved. The scope of work described here is a desk-based study. Successful outputs from this work could inform a potential trial of catching methods at a later date.

2.1 Aim

This is a desk-based study, with the overall aim to explore the feasibility of catching kittiwakes at sea, largely for the purposes of attaching devices but potentially also for taking various observations/measurements.

Four objectives are described below, and bidders are asked to submit a separate cost for objective 4. Depending on the outcomes of objectives 1-3, objective 4 may or may not be deemed appropriate.

2.2 Objective 1

What methods have been used with other species, and which of these might be suitable for kittiwakes? Review different methods of catching birds at sea, with particular focus on small gulls.

2.3 Objective 2

Explore practical and logistical requirements for working with birds at sea. This would involve reviewing literature, webpages and contacting appropriate expertise and organisations.

2.4 Objective 3

Support a trial of different catching methods. Provide material to guide and support a trial of catching kittiwakes and deploying devices at-sea.

2.5 Objective 4 (please cost separately)

Study design for an extensive trial of appropriate methods. Provide detailed plan for how a trial could be progressed.

3 Detailed tasks

3.1 Literature review

This pertains largely to objective 1, but would provide information of relevance to objectives 2 and 3. Catching seabirds at sea has already been shown to work for other species, particularly those which can be attracted to boats for food (which kittiwakes are known to do). Very little evidence seems to be available regarding catching kittiwakes at-sea hence the review will necessarily need to focus on other species. This should as far as possible, focus on species which have similar behaviour to kittiwakes, such as small gulls. This involves reviewing published methods for catching birds at sea. It should include any relevant reviews of methods such as Rippen *et al.* (2017) for large gulls, as well as method

development papers; for example Ronconi *et al.* (2010) developed methods for capturing shearwaters, mist nets have been used with auks and seaducks (Hull *et al.* 2001), Bugoni *et al.* (2008) used cast nets to capture a range of species, and gull and other species have been captured using spotlighting (Whitworth *et al.* 1997, Heinänen *et al.* 2020) and hoop nets (Suryan *et al.* 2007). Dip-nets have been used on kittiwakes close to shore (Robbins pers comm) and methods using dip-nets documented for other species (e.g. Gulka *et al.* 2017). Projectile net approach has been developed for tubenoses in the Pacific and western Atlantic (Donato pers comm).

An additional review of grey literature can inform objective 2. For example, the BTO have extensive material to help ringers on their webpages, including information on licence requirements and health and safety for fieldworkers. The Maritime and Coastguard Agency has information on certification requirements for working at sea, maritime safety, vessel and crew requirements etc. It should be assumed that the work could be undertaken in any waters within UK jurisdiction, and therefore could potentially be far from shore. There may be different licence requirements for working further offshore compared with closer to the coast, and this should be explored and clearly detailed.

The literature review would need to consider various aspects under these three objectives, including:

- methods of catching,
- evidence of success with small gulls such as kittiwakes,
- hypothetical potential for success with kittiwakes where this has not been evidenced,
- potential sources of bias in the sample,
- sample size capabilities per unit of effort (e.g. per boat-day),
- number of personnel required, and their relevant expertise (e.g. are they all experienced ringers/handlers?),
- location/country affiliation for the work,
- equipment used,
- sampling/tag attachments undertaken (e.g. were tags or marks attached to the birds, were feathers or other samples taken for e.g. stable isotope analysis or genetic profiling. were the birds aged or sexed or otherwise categorised),
- animal welfare issues or incidents including mortality rate during and subsequent to marking, where known,
- licence requirements for handling and potential marking or attaching devices to, wild birds,
- boat/skipper requirements, including vessel size, deck height, access to sea surface, skipper qualifications and navigation/vessel/maritime licence requirements, and how these differ amongst different countries,
- health and safety considerations,
- practical considerations at-sea such as navigation, proximity to structures such as oil and gas or windfarm structures, other vessel traffic, contact with coast etc
- operational restrictions,
- feasibility across different seasons and environments, and
- existing opportunities; vessels already used by operational windfarms or for pre-application surveys and which might have capacity to support either trials, or full deployment; are they suitable, and is this a feasible option?

3.2 Contacting experts

This would support all three objectives, in particular objective 2, but would provide information to support objective 1 where details may not necessarily be available from published or grey literature. In effect, this would provide additional information on the list of considerations above. For example, local ringing groups (including outside of UK) may have some experience of catching at-sea or using methods which may transfer to at-sea, British Trust for Ornithology (BTO) might be able to supply additional information and context around licence requirements. Skippers and marine tour-operators may have useful perspectives on feasibility in different conditions/environments and be able to point out practical logistical or licence considerations that might otherwise be overlooked.

Developers and ecological consultants involved in pre-application and baseline surveys for the offshore wind industry should also be contacted to understand whether there are existing vessel trips with capacity to support work involving catching of kittiwakes at sea. For example, do service vessels have spare time whilst waiting on personnel undertaking maintenance work, and if so are the vessels and crew suitable for work involving catching of kittiwakes at-sea?

If experts have previously trialled methods of catching kittiwakes at sea which are deemed not appropriate nor worth pursuing further, a list of these (in e.g. a spreadsheet or word document) with reasons why deemed unsuitable should be created. This will prove a useful addition to the guidance document below, as well as a general reference material to avoid the need to re-visit unsuitable methods (e.g. it could be added as an Annex to the literature review, as well as kept as a live document based on further experience).

3.3 Produce material to support trials

This would use the information gathered in the first two tasks to short-list catching methods that might be suitable for black-legged kittiwakes at-sea around the UK (in particular in the North Sea) and provide information to support a trial of these methods. This would describe each of the methods along with equipment required and how to use it with as much information as possible to allow a practitioner to plan, prepare and execute a trial of each method. It would include suggestions for avoiding animal welfare concerns and keeping handling time to a minimum, bearing in mind that it is assumed the primary purpose of catching kittiwakes is to attach devices such as GPS, PIT or VHF tags, potentially also colour rings, but there is a possibility that additional handling may be required e.g. in order to age the individual birds or take samples for stable isotope or genetic analysis. It would also make suggestions for selecting birds for capturing and how to avoid/minimise sample biases.

It would provide a detailed practical/logistics section including information on various practical issues including:

- safety considerations under a variety of locations, working environments and weather conditions,
- minimum requirements regarding boats, skippers, licences etc, and guidance for practitioners to commission appropriate vessel and personnel (e.g. skipper, crew)
- training requirements of skippers, crew, practitioners (e.g. safety training for working offshore), and
- information to guide practitioners through the licence process; which licences to check with boat skippers (e.g. maritime or safety related licences), and which might the practitioner apply for directly (e.g. home office or BTO special methods permissions), where to apply, turn-around times, information that may be required during application process.

It would provide suggested scoring criteria for assessing suitability of each method for kittiwakes and performance under differing environmental and weather conditions.

It should be structured and framed such that it can be easily updated as experience is gained, and further information becomes available; for example, methods which are shown not to be appropriate for kittiwakes would be removed from the material, but added to the live list of 'unsuitable' methods. Further detail around practicalities in different weather conditions or distances from shore might be added to the material.

3.4 Plan a detailed trial (please cost separately)

This would provide a detailed plan for a trial of the methods shortlisted under objective 3. It would explore maps of kittiwake distributions in different seasons to identify locations for which suitable numbers might be available at different distances from coast and different seasons. It would provide a suggested step-by-step approach with each step building on previous. For example, it might be recommended to start close to shore and/or in favourable weather conditions, and to build on these for the methods proving most appropriate in easier conditions.

As this is a trial of methods rather than a monitoring or apportioning study per se, then it is not essential for the work to be undertaken in a specific area/windfarm footprint etc. Rather, the trial should be focussed on areas where there are sufficient kittiwakes to fully test methods, and where the resources required to undertake the trial are minimised. For example, there may be suitable service vessels working in an area of high kittiwake densities and with capacity to support a trial. This task would therefore combine information on kittiwake distributions with the outcomes of previous tasks around logistical considerations such as licence requirements, opportunities to use existing vessel traffic, vessel and skipper requirements and availability etc. It would use this combined information to make recommendations as to where in the North Sea it might be most logistically feasible to undertake trials. It would also make suggestions for personnel that would be suitably experienced in handling wild birds and have suitable expertise in kittiwake behaviour to undertake the trials and develop the method(s) for kittiwakes.

These recommendations should, combined, form a survey plan to complement the guidance already developed in previous task. The outputs from these two tasks combined should provide all of the information that is required to commission and undertake a detailed trial of catching kittiwakes at sea.

The costing for this task should include an update of the guidance produced in the previous task, to take account of lessons learnt during the trial and focus only on successful methods and proven requirements.

4 Outputs

It is envisaged that the main outputs would be:

Report detailing the review methods and sources, and outcomes of the feasibility study (objectives 1 and 2). It would categorise different methods that have been described in the literature and provide as much of the detail as possible for each to indicate whether they might be suitable for kittiwakes and potential issues to be aware of, and provide justification for those that are proposed to be included within a trial.

A clear audit of sources (including websites where information was obtained, and experts contacted) will be required (e.g. a spreadsheet or supplementary table) so that practitioners can see where to find more information or who to contact if they require additional detail or assistance (e.g. with licence requirements).

Material to support trials. This material would support skippers and catchers/handlers involved in a trial, and those responsible for planning and preparing for such trials. The format of this guidance will be agreed with the contractor at the start of the contract, but it might include factsheets for each method proposed to trial and a series of 'essentials' flow charts to guide practitioners through licences, practical requirements, equipment needs, and other preparations that may be required.

Study design and plan (please cost separately). If this is desired/appropriate, the format of this will be further discussed with the successful bidder.

5 Timescale

It is expected that this work will take approximately three to four months to complete. An indicative timeline is provided below, but this is to be confirmed:

- Week 1: start-up meeting
- Weeks 2–7: literature review, contacting experts, progress meeting, draft outputs.
- Weeks 8–9: expert review of draft outputs, second draft prepared
- Weeks 10–12: funder review of second draft outputs
- Week 13: final outputs and project close
- Weeks 14–16: UNCOMFIRMED survey design/plan

6 Contractor requirements

The contractor would need to demonstrate the following expertise:

- detailed knowledge of black-legged kittiwake ecology, in particular behaviour at-sea,
- experience of handling birds of similar size and using similar methods to those which might be reviewed in this work (can be on-land although at-sea would be a distinct advantage),
- understanding of licence requirements and process for both working at-sea, and handling/disturbing/ringing/markings wild birds, across the North Sea,
- ability to access relevant literature, including scientific journals and grey literature (e.g. industry, NGO or government reports), and
- ability to identify and contact relevant experts for further information.

7 References

- Bugoni, L., Neves, T., Peppes, F. & Furness, R. 2008. An effective method for trapping scavenging seabirds at sea. *Journal of Field Ornithology*, **79**, 308-313.
- Cook, A.S.C.P., Humphreys, E.M., Bennet, F., Masden, E.A. & Burton, N.H.K. 2018. Quantifying avian avoidance of offshore wind turbines: Current evidence and key knowledge gaps. *Marine Environmental Research*, **140**, 278–288.
- Drewitt, A.L. & Langston, R.H.W. 2006. Assessing the impacts of wind farms on birds. *Ibis*, **148**, 29–42.
- Dunn, D.C., Harrison, A.L., Curtice, C., DeLand, S., Donnelly, B., Fujioka, E.I., ... & Halpin, P. N. 2019. The importance of migratory connectivity for global ocean policy. *Proceedings of the Royal Society B*, **286**, 20191472.
- Gibson, L., Wilman, E.N. & Laurance, W.F. 2017. How Green is “Green” Energy? *Trends in ecology & evolution*, **32**, 922–935.
- Gulka, J., Carvalho, P.C., Jenkins, E., Johnson, K., Maynard, L. & Davoren, G.K. 2017. Dietary niche shifts of multiple marine predators under varying prey availability on the northeast Newfoundland coast. *Frontiers in Marine Science*, **4**, 324.
- Heinänen, S., Ramūnas, Z., Birgit, K., Dorsch, M., Burger, C., Morkūnas, J., Quillfeldt, P. & Nehls, G. 2020. Satellite telemetry and digital aerial surveys show strong displacement of red-throated divers (*Gavia stellata*) from offshore wind farms. *Marine environmental research*, **160**, 104989.
- Hull, C.L., Kaiser, G.W., Loughheed, C., Boyd, S. & Cooke, F. 2001. Intra-specific variation in commuting distance of Marbled Murrelets *Brachyramphus marmoratus*: ecological and energetic consequences of nesting further inland. *Auk*, **118**, 1036-1046.
- Rippen, A.D., van der Zee, E. & Brenninkmeijer, A. 2017. Quicksan opportunities and constraints catching gulls at sea. Altenburg & Wymenga ecological consultants, Feanwâlden, A&W report 2356.
- RSPB Open Data <https://opendata-rspb.opendata.arcgis.com/search?sort=name&tags=Tracking%20Data>
- Ruffino L., Thompson, D. & O’Brien, S. 2020. Black-legged kittiwake population dynamics and wider drivers of population change in the context of offshore wind development. *JNCC Report No. 651*. JNCC, Peterborough, ISSN 0963-8091.
- Snyder, B. & Kaiser, M.J., 2009. A comparison of offshore wind power development in Europe and the U.S.: Patterns and drivers of development. *Applied Energy*, **86**, 1845-1856.
- Suryan, R.M., Dietrich, K.S., Melvin, E.F., Balogh, G.R., Sato, F. & Ozaki, K. 2007. Migratory routes of Shorttailed Albatrosses: use of exclusive economic zones of North Pacific Rim countries and spatial overlap with commercial fisheries in Alaska. *Biological Conservation*, **137**, 450-460.
- Whitworth, D.L., Takekawa, J.Y., Carter, H.R. & McIver, W.R. 1997. A night-lighting technique for at-sea capture of Xantus’ Murrelets. *Colonial Waterbirds*, **20**, 525-531.

Wischnewski, S., Fox, D.S., McCluskie, A. & Wright, L.J., 2018. Seabird tracking at the Flamborough & Filey Coast: Assessing the impacts of offshore wind turbines. Ørsted Hornsea Project Three, Appendix 7 to Deadline 2 Submission.