



Market consultation

Collisions and avoidance behaviour research on flying birds, in
Luchterduinen windfarm through radar and camera images

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Project description

1. Introduction

In 2016, the Ministry of Economic Affairs commissioned RWS to deploy an integrated research programme on Offshore Wind Energy Ecological ('Wozep').

The main goal of this programme is to reduce the knowledge gaps with regard to the effects of offshore wind farms on the North Sea ecosystem, focusing specifically on ecosystem values supporting juridically protected species.

Background information about Wozep and completed research reports are published on the Noordzeeloket. <https://www.noordzeeloket.nl/en/functions-and-use/offshore-wind-energy/ecology/offshore-wind-ecological-programme-wozep/>

Wozep research results are used in the Ecology and Cumulation Framework (KEC). With the KEC, the cumulative effect of the proposed wind farms together with the existing and planned wind farms on the species with protected status of nature legislation is tested.

From the recent KEC 4.0 report on bird collisions¹, a number of bird species seem vulnerable to collisions with offshore windfarms. Better estimates on the number of collisions per species and actual registrations of collisions would be very useful for future environmental impact assessments. Based on KEC 4.0, the northern gannet and herring gull seem to be the most important species to consider. Other species of interest are: lesser black-backed gull, greater black-backed gull, black-legged kittiwake, little gull and sandwich tern.

In previous projects in Luchterduinen, information was gathered on bird behaviour in and around the offshore windfarm. The project of RWS focused on seabirds and migratory birds, while the project of Eneco focused on large gulls.² The aim of both projects was to measure variables (*i.e.* bird fluxes, flight heights and -speeds) that are needed to improve Collision Risk Models (CRMs) estimates, and also to understand which factors determine the number, species composition and spatial distribution of birds in and around the windfarm. The project of RWS focused on macro- and meso-avoidance of seabirds and migratory birds, while the project of Eneco focused on micro- and meso-avoidance of large gulls. The Eneco-project also registered actual collisions.

Due to large differences in calculated collision victims caused by just minor differences in avoidance rates applied in CRMs, an increasing need is felt to direct our efforts towards direct measurements of collisions. The numbers calculated in KEC 4.0, based on avoidance rate models (in this case the extended Band model), seem rather high, possibly as a result of the indirect calculations based on estimated (and not measured) avoidance rates. Therefore, we want to measure how often actual collisions occur and compare these numbers with estimates based on CRMs with bird behaviour variables (like avoidance rates) in the same wind farm as where input parameters are known (measured). Furthermore, we are interested whether there are certain conditions under which collisions occur more often.

The four cameras and radar of the Eneco-project, that are owned by the Danish Institute 'DHI' and being leased, are still in place in the Luchterduinen wind farm and this set-up could be used for the measurements mentioned above. The cameras do need to be replaced by new, better

¹ Potiek, A., J.J. Leemans, R.P. Middelveld & A. Gyimesi, 2022. Cumulative impact assessment of collisions with existing and planned offshore wind turbines in the southern North Sea. Analysis of additional mortality using collision rate modelling and impact assessment based on population modelling for the KEC 4.0. Report 21-205. Bureau Waardenburg, Culemborg.

² Projects conducted by Waardenburg Ecology and DHI respectively. Both projects will be finalized this year.

performing cameras which are able to provide images which give a better possibility to identify the mentioned seabird species to actual species level.

Key objective

The main purpose of the assignment is to compare actual measured collision numbers with estimated collision numbers, based on input parameters from the same location. This will give us better insight in the questions:

The objective of the assignment is to collect and analyse data (radar and video images) which will give us a better understanding of:

1. how high actual collision rates of seabirds are;
2. How well these can be estimated by CRMs, at least within the specific location of Luchterduinen wind farm.

2. Description of the assignment

We are especially interested in the micro-avoidance rates and actual collisions, because the previous projects in Luchterduinen already paid a lot of attention to meso-avoidance and macro-avoidance. Furthermore, the camera quality was not good enough to specify all gulls to the species level. Updated cameras will provide the opportunity to reach good sample sizes of micro-avoidance rates for the different species of large gulls and possibly also other seabird species frequently occurring in the wind farm. Species composition is relevant to derive species specific fluxes through the wind farm and will also be part of the assignment.

We would like to gain information regarding the following questions:

1. What are the species-specific and total number of actual collisions?
2. What are the circumstances (conditions) under which these collisions occur?
3. What is the species composition and their intensity of flux(es)?
4. What are the species-specific micro avoidance rates?
5. What are the species-specific meso-avoidance, flight speed and flight height?

Species of interest are: large gulls (i.e. herring gull and lesser and greater black-backed gull), northern gannet, kittiwake, little gull and sandwich tern.

We like you to use the information gathered for a comparison of the actual measured collision numbers with estimated collision numbers. Secondly, we would like you to draw conclusions on how good CRM's can estimate collisions rates.

Moreover, an assessment is requested of the representativeness of the findings at Luchterduinen for other (potential) locations for offshore wind farms.

This project will continue for two years, with the possibility for an extension with one or two more years. After each year, a progress report will be produced after which a 'GO/NO GO' decision will be taken by RWS based on the potential usability of the data. Usability of the data, in turn, depends on size and representativeness of the data on actual collisions that can be registered and analysed in comparison to the data on flux sizes and flux species composition and on (weather) conditions in which collisions actually occur.

After showing of interest in this assignment and approval for the token of competence, a more detailed description of the assignment will be provided.

3. Result

This result of the assignment consists of the following products:

- **Implementation plan** describing the work to be done for the different work packages including the research set-up specifically, people, time and finances. This also includes plans for maintenance and actions to be taken in case of malfunction of the hardware.
- **Safety plans, work method statements** and other relevant documents for (maintenance) working in Luchterduinen windfarm and cooperation with the windfarm owner Eneco.
- **Progress reports after each year** which will also be used after two and three years for a GO/NO GO decision for a third or fourth year.
- **Regular updates** on the functioning of the equipment
- **Interim report (optional) and a Final report**, including data analyses and answers and conclusions on the research questions from 1.3.
- **Data delivery**

4 Requirements & boundary conditions:

Contractor must (..):

- Possess ecological knowledge on sea bird species
- -experience: has experience in both camera- and radar research at sea
- *In order to prove suitability of the candidate, he/she must provide Rijkswaterstaat with reference documentation of at least 1 former project on ecological camera- and radar research on sea birds at sea. This should be filled in section D. of the invitation form.*
 - Arrange to be granted a letter of intent ('intentieverklaring') from Eneco with granted permission to 'operate' (install and perform maintenance) to the equipment (being: 4 camera's and 1 radar) at the windfarm of Luchterduinen.
 - Has the right certificates to perform maintenance at offshore sites (should be proven by the contractor later in a work method statement)
 - Equipment (4 camera's and 1 radar), if not leased through DHI, must be suitable for offshore purposes and must have at least a HD resolution.
 - -independency: is independent from any influence (being for example, but not limitatively: subsidies or other economical support, sponsoring) other stakeholders acting in the offshore wind sector (being: windpark owners, energy companies, political parties or Nations) for this specific project.
 - have all equipment up and running within two (2) months after the first day (starting date) of the final contract
 - Must ensure a operationality ('uptime') of at least 95% of time.
*The quality assurance to achieve this minimum performance level should be specified in the work method statement on beforehand;
the actual performance percentage is part of the declaration of the intermediate performance ('prestatieverklaring').*
- *For the candidate to elaborate on why he/she thinks is the most suitable organization to participate in the tendering, he/she can fill out a brief motivation in section C. of the invitation form.*
If the candidate is found to be suitable to participate in the tendering, he/she will be enabled to provide Rijkswaterstaat with a plan of action ('plan van aanpak', describing HOW he/she is planning the execution of the assignment) after receipt of a full demand specification.