Offshore wind farms and their effects on plaice (*Pleuronectes platessa*) distribution and density

Buyse Jolien[1,2], Hostens Kris[1], Degraer Steven[3] and De Backer Annelies[1]

[1] Instituut voor Landbouw-, Visserij- en Voedingsonderzoek, Ankerstraat 1, 8400 Oostende, Belgium
E-mail: jolien.buyse@ilvo.vlaanderen.be
[2] Vakgroep Biologie, Faculteit Wetenschappen, Universiteit Gent, Karel Lodewijk Ledeganckstraat 35, 9000 Gent, Belgium
[3] Royal Belgian Institute of Natural Sciences, Vautierstraat 29, 1000 Brussels, Belgium

Offshore wind farms (OWFs) are built at high speed in European waters to meet with the targets for renewable energy production. The introduction of hard structures and their scour protection layers in sandy environments such as the Belgian part of the North Sea (BPNS) entails various opportunities for reef-associated species. For example, local attraction towards hard substrates and even increased local production in OWFs was found for pouting and cod, which was explained mainly by an increase in food availability (Reubens *et al.*, 2013 & 2014, van Hal., 2017). For flatfish species, which often prefer soft sediment habitats, knowledge about their affinity or aversity towards wind farms is still scarce. Therefore, this effect was studied for plaice (Pleuronectes platessa), a commercially important species in the BPNS, at two different spatial scales: large- (wind farm) and small-scale (turbine). Large scale attraction was investigated with a BACI (Before/After-Control/Impact)-design study using beam trawl data from within and outside two Belgian OWFs. The analysis of the data showed a significant wind farm effect for one wind farm, while no such effect was found for a second wind farm. The small-scale effect, on the other hand, was studied by standardized visual diving censuses that were carried out close to the wind turbines in the second wind farm. Using Generalized Linear Models, we could show that the number of plaice was higher on the scour protection layer compared to the surrounding sand habitat, thus showing an attraction effect towards the hard substrate. Furthermore, preliminary small-scale telemetry results of tagged plaice individuals in the same OWF indicated high residency and site fidelity of plaice during the summer period. We concluded that plaice is attracted to OWFs at both the small and large scale, but this effect can differ between wind farms.

Keywords: Offshore wind farms; North Sea; Flatfish; Attraction; Plaice