

SITE FIDELITY AND MOVEMENTS OF COD (GADUS MORHUA) AT A WIND FARM USING ACOUSTIC TELEMETRY

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A substantial expansion of offshore wind farms in the Belgian part of the North Sea (BPNS) has been planned, inducing a growing interest in the possible effects of these artificial habitats on the marine environment. To date however, little research has been done to consider the possible effects on the ichthyofauna. Reubens *et al.* (in press) demonstrated that wind turbines built at sea may attract fish populations considerably, possibly related to the enhanced provision of resident food items on the turbines. However, no information is available on migration patterns or residency of fish species. This study, which is the first in the BPNS using passive acoustic telemetry, aims to improve our knowledge of cod (*Gadus morhua*, Linnaeus 1758) site fidelity and movement within a wind farm in the BPNS.

Passive acoustic telemetry is an often used technique to investigate small scale movement patterns, habitat selection and activity patterns of fish over an extended period of time (Jadot *et al.*, 2006; Collins *et al.*, 2007; Bellquist *et al.* 2008). A VR2W Positioning system (VPS) study provided by Vemco was set up. The VPS is a low cost, non-real-time underwater acoustic fine-scale positioning system. An array of 11 acoustic hydrophones was deployed at the C-Power wind farm in August 2010 to track movements of 19 cod. Data were uploaded manually from the hydrophones every 2-3 months.

The first results indicated a variable residency, depending upon the specimen. The variability in detection rates between individuals indicated that there were no consistent behavioural patterns for day/night preferences. The study however clearly revealed habitat preferences. Most detections of all specimens were closely related to the artificial hard substrates, indicating the aggregation effect of the windmill artificial reef on cod.

Recording is currently going on and longer term investigation may reveal possible seasonal migration patterns.

References

- Bellquist L.F., C.G. Lowe and J.E. Caselle. 2008. Fine-scale movement patterns, site fidelity, and habitat selection of ocean whitefish (*Caulolatilus princeps*). *Fisheries Research* 91:325-335.
- Collins A.B., M.R. Heupel and P.J. Motta. 2007. Residence and movement patterns of cownose rays *Rhinoptera bonasus* within a south-west Florida Estuary. *Journal of Fish Biology* 71:1159-1178.
- Jadot C., A. Donnay, M.L. Acolas, Y Cornet, and M.L. Bégout Anras. 2006. Activity patterns, home-range size, and habitat utilization of *Sarpa salpa* (Teleostei: Sparidae) in the Mediterranean Sea. *ICES Journal of Marine Science* 63:128.
- Reubens J., S. Degraer and M. Vincx. 2011. Aggregation and feeding behaviour of pouting (*Trisopterus luscus*) at wind turbines in the Belgian part of the North Sea. *Fisheries Research* 108:223-227.