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Researcher Annemiek Hermans	Supervisor Tinka Murk (WUR)	Promotor Tinka Murk (WUR) Erwin Winter (WMR)
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## Motivation

By understanding if and how the electromagnetic fields from offshore power cables needed to bring wind energy from sea to shore impact sharks and rays, we can (if needed) optimize the design to ensure the continuation of the energy transition using offshore sources without compromising the North Sea elasmobranch populations.

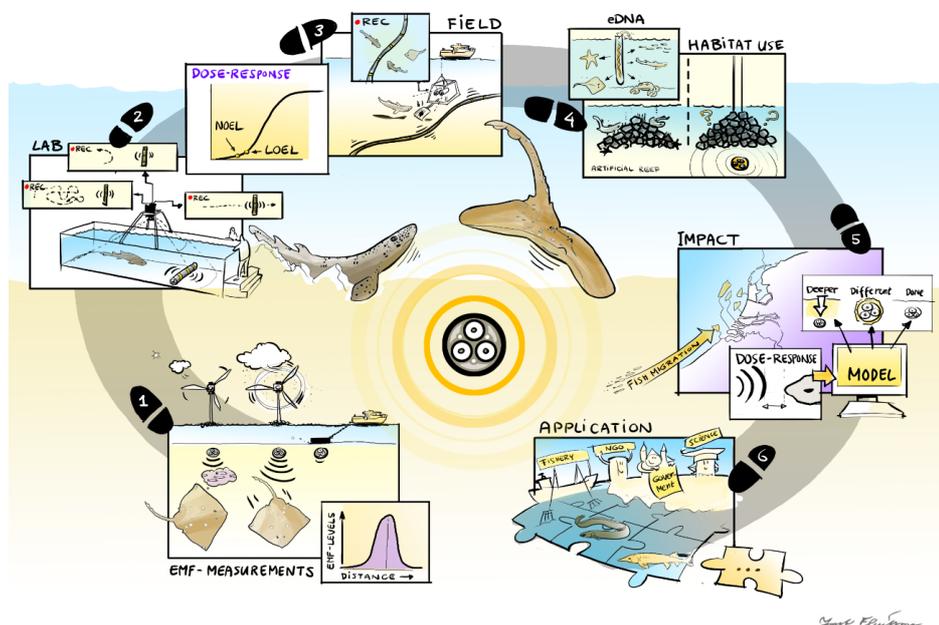
## Aims and Objectives

This study aims to reveal the effects of EMF associated with existing and planned offshore wind power cables on elasmobranchs. The following five aspects will be studied:

- 1) **EMF field levels** - determine actual EMF levels emitted by cables associated with offshore wind including high-voltage alternate current and high-voltage direct current levels and the influence of different variables as burial depth, substrate, power output and currents;
- 2) **Dose-response levels** - determine the avoidance threshold and other behavioral changes in dose-response experiments to EMF levels of typical elasmobranch North Sea species;
- 3) **Field validation** - determine effects of EMFs on relative abundance, biomass and behavior of elasmobranchs in the field using Baited Remote Underwater Video Systems (BRUVs) at different EMF types and levels in an OWF (distances to cables);
- 4) **Habitat use** - determine effects of EMFS on selection of artificial habitat, e.g. scour protection, for egg deposition by elasmobranchs applying field ROV video surveys in OWFs;
- 5) **Impact assessment** - determine the impact ranges of EMFs of existing and future Dutch OWFs on Elasmobranchs using developed models and (if required) advise on potential mitigation measures; and
- 6) **Dissemination** - make the study results available for environmental impact assessment and appropriate decision making by end users.

## Method

This research will be conducted through a combination of laboratory and field work including BRUV's, ROV's and eDNA. The research will be conducted in six steps as detailed on the figure to the right.



Joost Elasmura

CV Researcher Annemiek Hermans  
 Graduated University of Southampton, 2011

Hobbies Beach surveys and diving  
 e-mail Annemiek.hermans@wur.nl  
 tel +31(0)6 86 89 81 10  
 website To be made