Bat activity in Dutch offshore wind farms

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Background

In the past decades there have been several records of bats found on oil platforms in the North Sea. Bats have also been observed during bird migration counts along the Dutch coast and surveys at sea. Genetic research has shown an exchange of genes of Nathusius' pipistrelle *Pipistrellus nathusii* between populations in the UK and mainland Europe indicating movements across the North Sea. The occurrence of bats at the North Sea area however, has never been investigated systematically.

If and how bats use the North Sea is a relevant question, considering that the number of offshore wind farms in the North Sea is increasing and that several onshore studies have shown that wind turbines can cause high fatality rates amongst bats.

Figure 1 Nathusius' pipistrelle *Pipistrellus nathusii*

Objectives

- Assess the presence of bats at sea.
- Assess why bats occur at sea. Hypotheses:
  - Regular migrants
  - Drift migrants
  - Disorientated migrants
  - Foraging area
  - Roosts
- Test the performance of ultrasonic recorders at sea.

Material and Methods

Pilot study in autumn 2012 in two Dutch offshore wind farms:

- Offshore wind farm Egmond aan Zee (OWEZ); situated in the territorial sea 15 km offshore. Monitoring period: 29 August - 20 October 2012.
- Princess Amalia wind farm (PAWP); situated in the EEZ 23 km offshore. Monitoring period 4 - 23 September 2012.

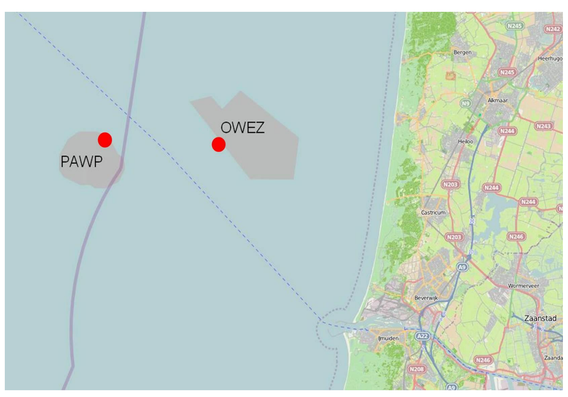

Figure 2 Locations of the offshore wind farms and the locations of the recorders

Figure 3 Recorder at the OWEZ Meteo mast

Results

- Bats were recorded in both wind farms.
- 214 call sequences in total; 98% Nathusius' pipistrelle *Pipistrellus nathusii* and 2% Noctule *Nyctalus noctula.*
- Bat activity was strongly correlated with the weather conditions. Bats were only recorded during nights with low or moderate wind speeds, no precipitation and high ambient pressure.
- The observed pattern indicates that the observations of Nathusius' pipistrelle refer to migrants and the observations of Noctule concerned migrants and/or foraging individuals from the mainland.
- There are no indications that the observations refer to disorientated or drift migrants.
- There are no indications that roosts were present in the vicinity of the recorders.

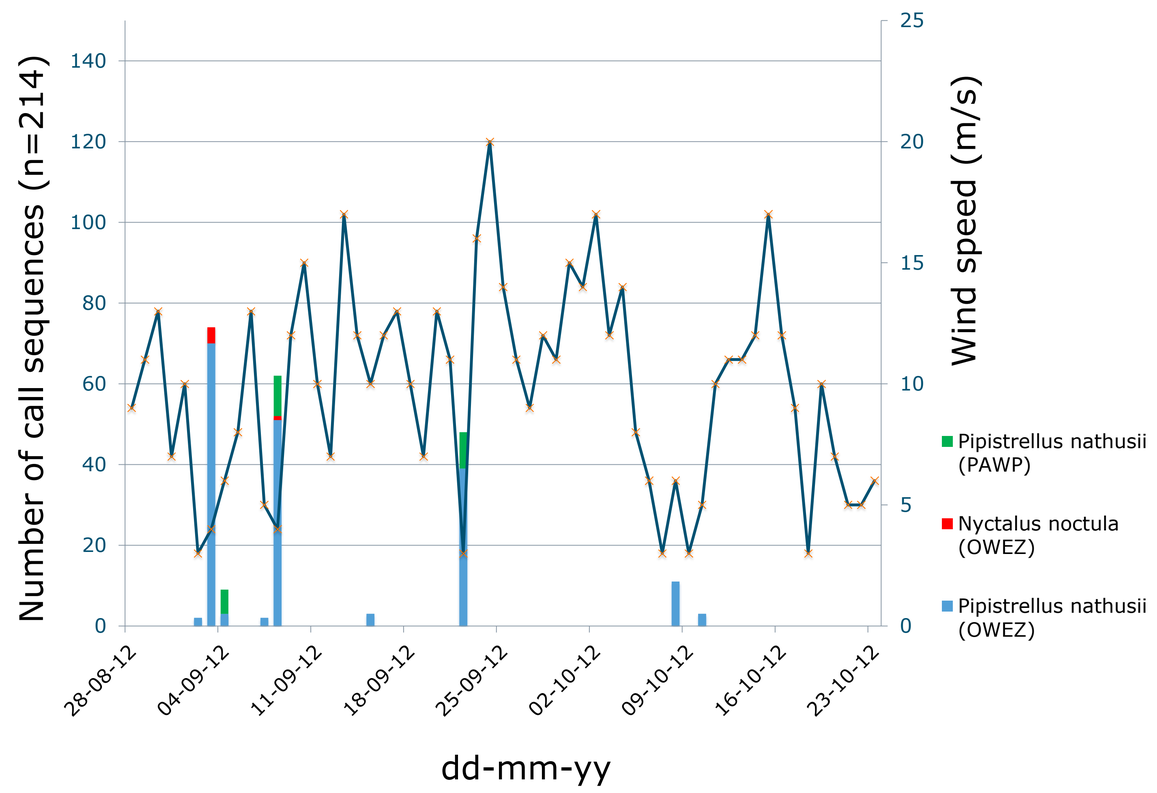

Figure 4 Bat activity and average wind speed

Conclusions

- This study provides the first evidence that bats are present in Dutch offshore wind farms.
- The observed pattern of occurrence indicates that the observations refer to regular migrants and possibly to individuals foraging offshore.
- Other possible reasons of the offshore occurrence of bats cannot be excluded due to the short monitoring period.
- Bats should be considered during the spatial planning and operation of offshore wind parks.
- The recorders proved to be suitable for offshore monitoring.

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