Bat migration across the southern North Sea and possible implications for offshore wind farms

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WREN Webinar, 1 March 2016

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- Summary results pilot studies 2012 - 2014
- More extensive monitoring 2015 / 2016
    - Preview of some of the preliminary results
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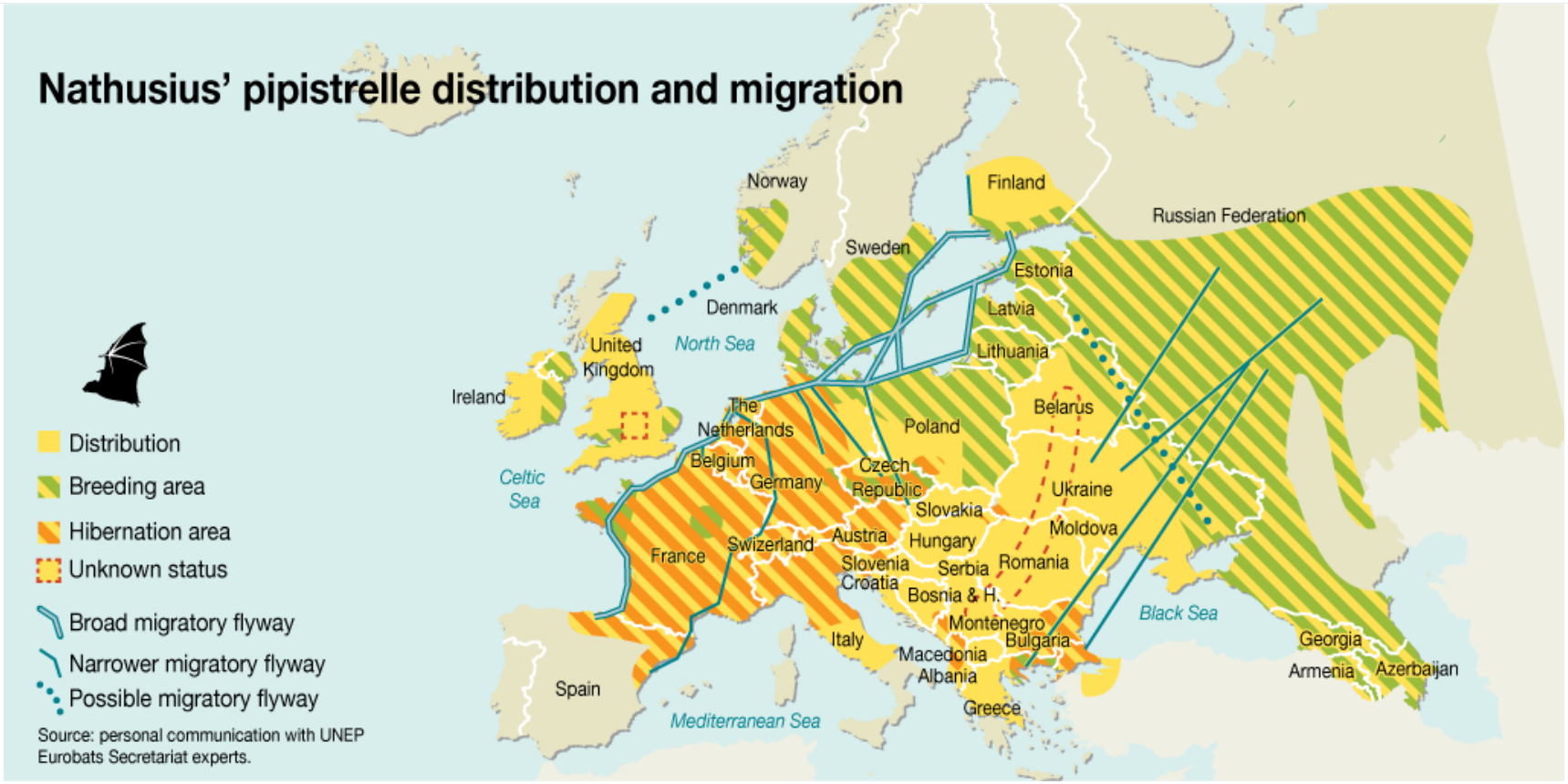
- Bats and offshore wind farms
- Conclusions
- Options for future research

Historical bat observations in and around the southern North Sea

- Records at offshore platforms and ships
- Observations during surveys / onshore 'seawatching' efforts
- Ultrasonic recorders at the coastline
- Records at remote islands (e.g. Faroe Islands, Heligoland etc.)

=> Other regions: offshore bat activity Baltic Sea and off Pacific and Atlantic North America

Migration flyway of Nathusius's Pipistrelle



Reports of banded individuals from UK in The Netherlands and from Latvia in the UK

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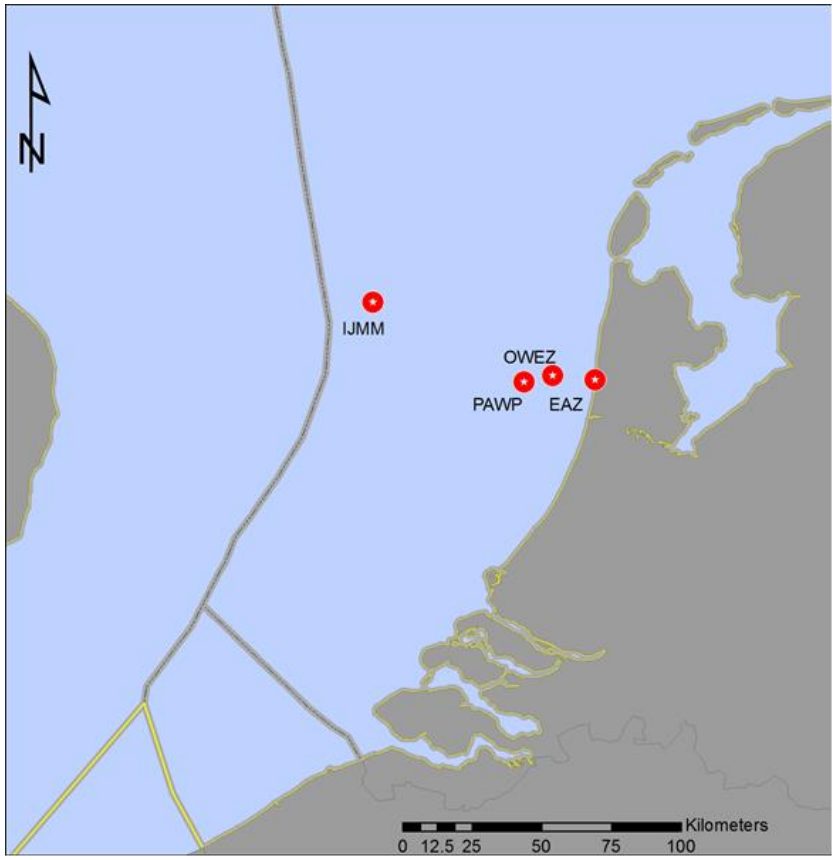
Pilot study with bat detectors, 2012-2014

- One onshore location (EAZ: Beach Egmond aan Zee)
- Three offshore locations:
  - OWEZ: meteo mast
  - PAWP: trafo station
  - IJMM: IJmuiden meteo mast



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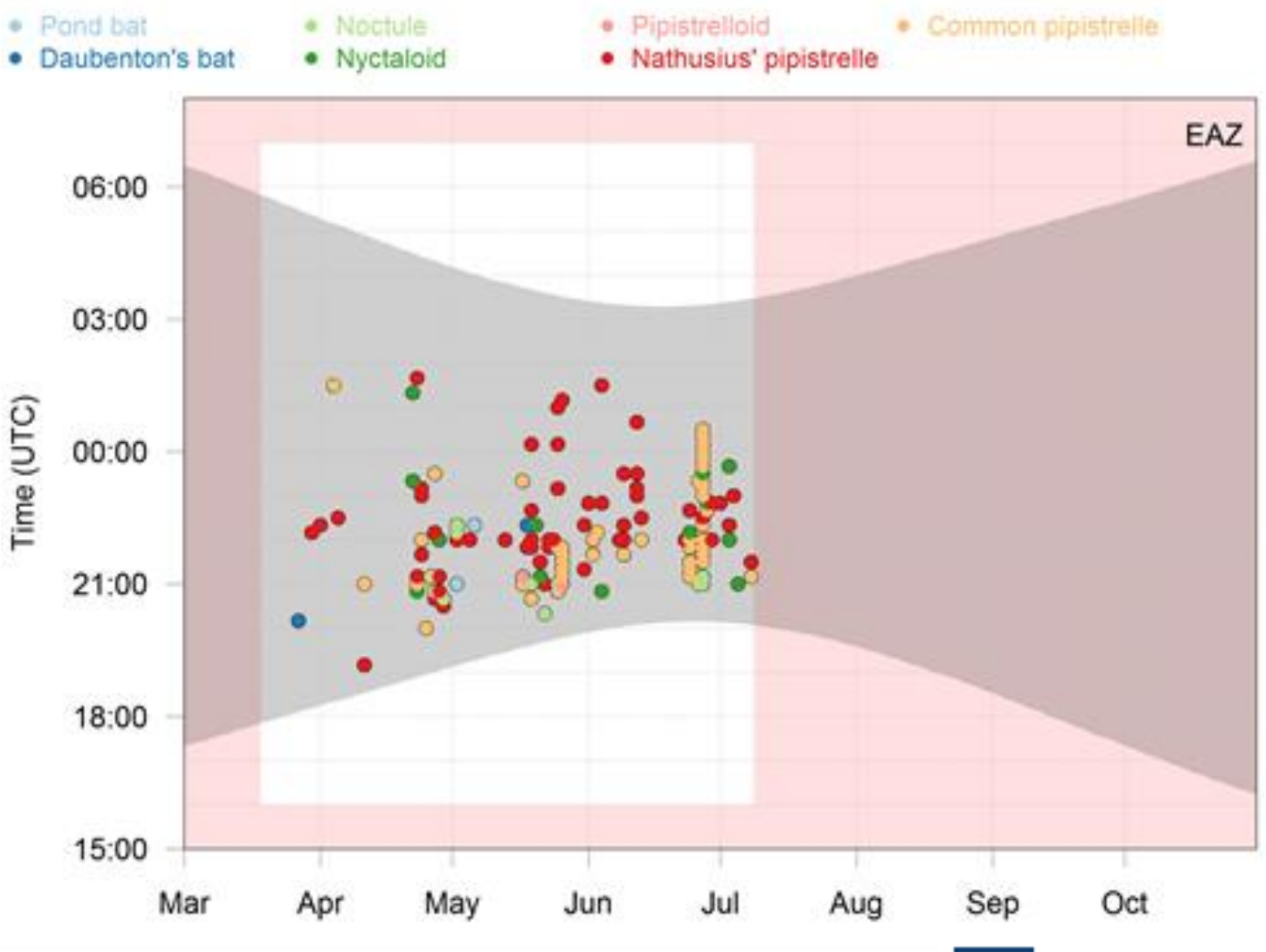
Beach Egmond aan Zee - 2014



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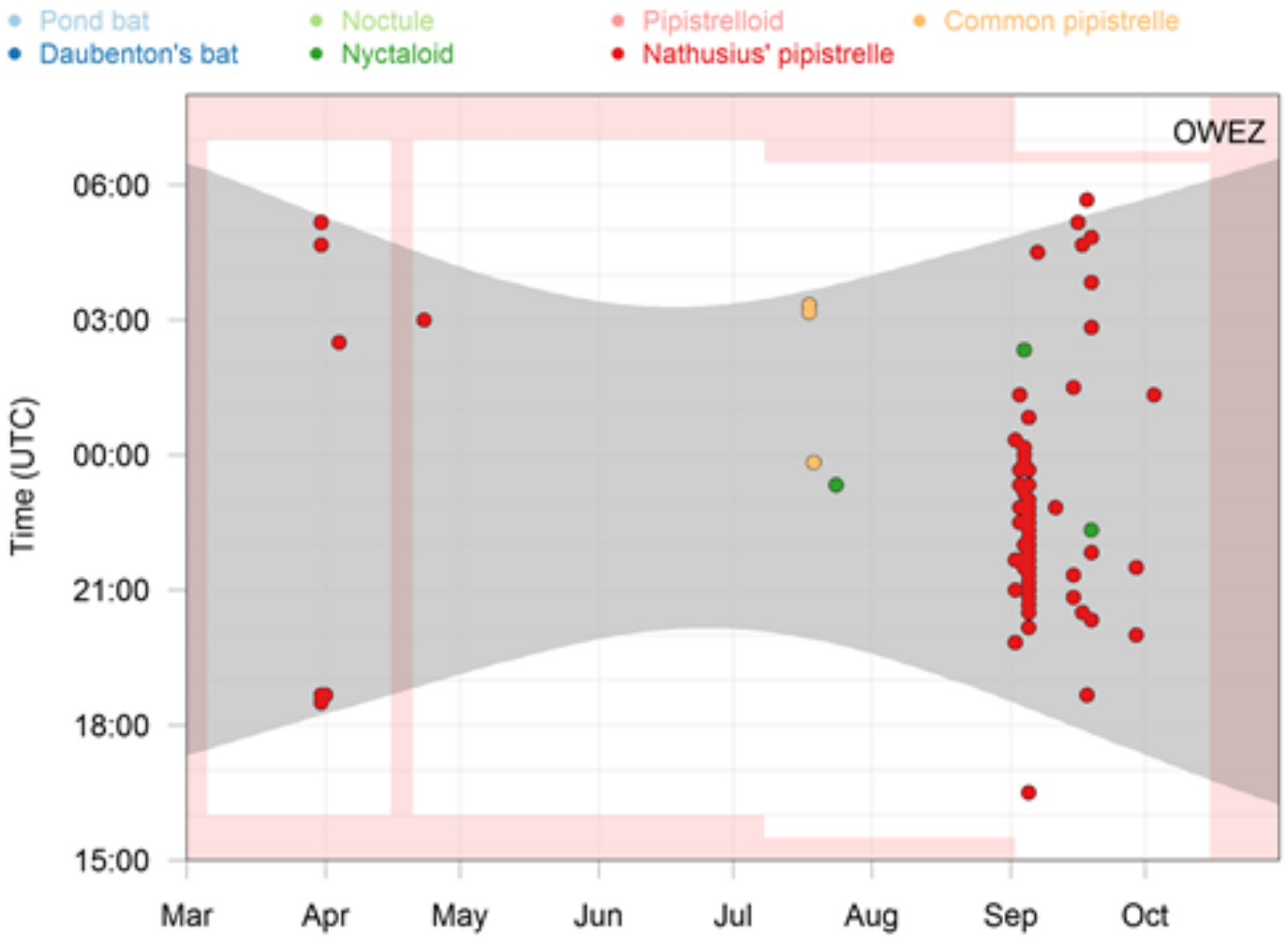
OWF Egmond aan Zee (15 km offshore) - 2014



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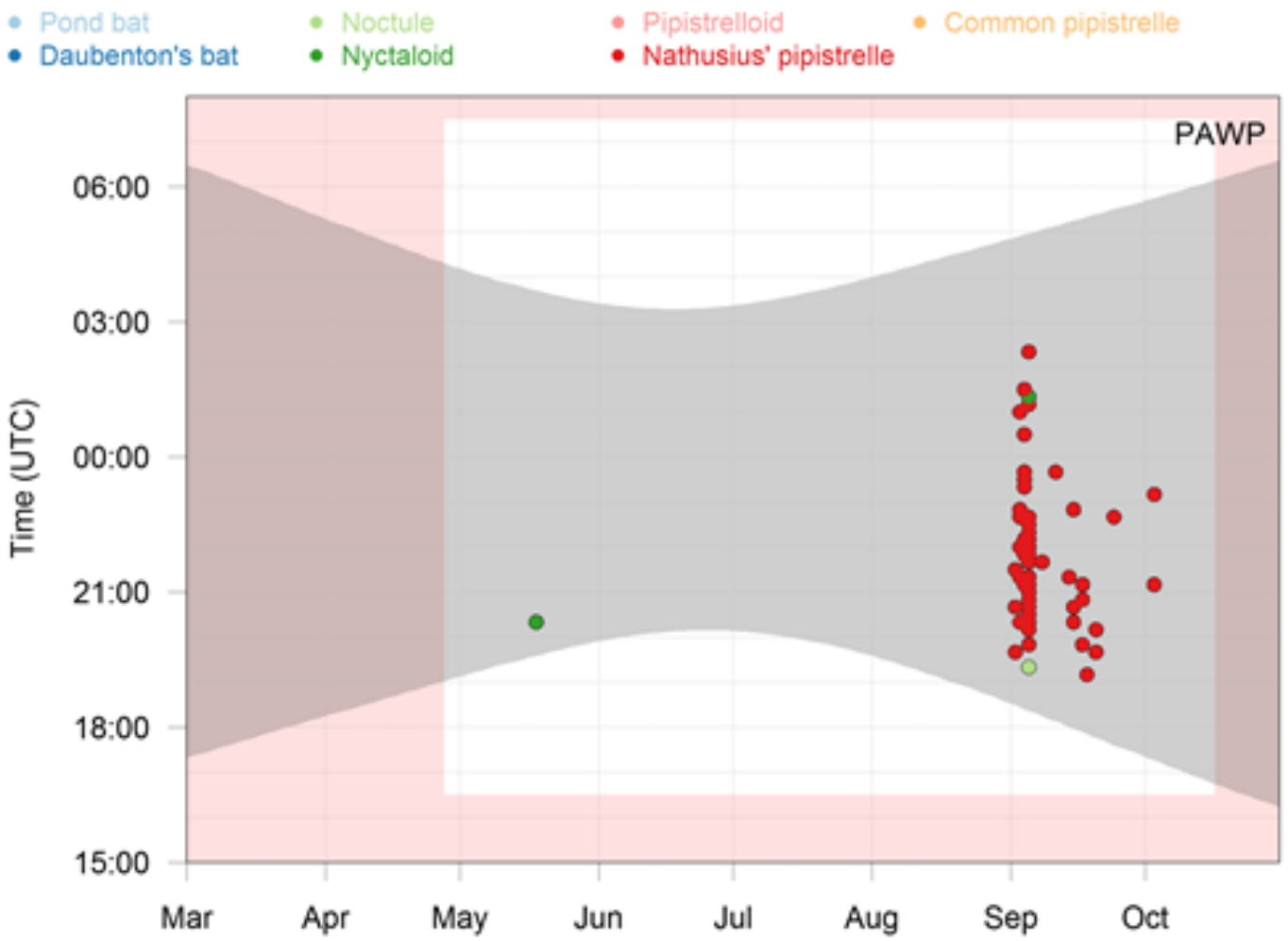
Pr. Amalia Wind Park (23 km offshore) - 2014



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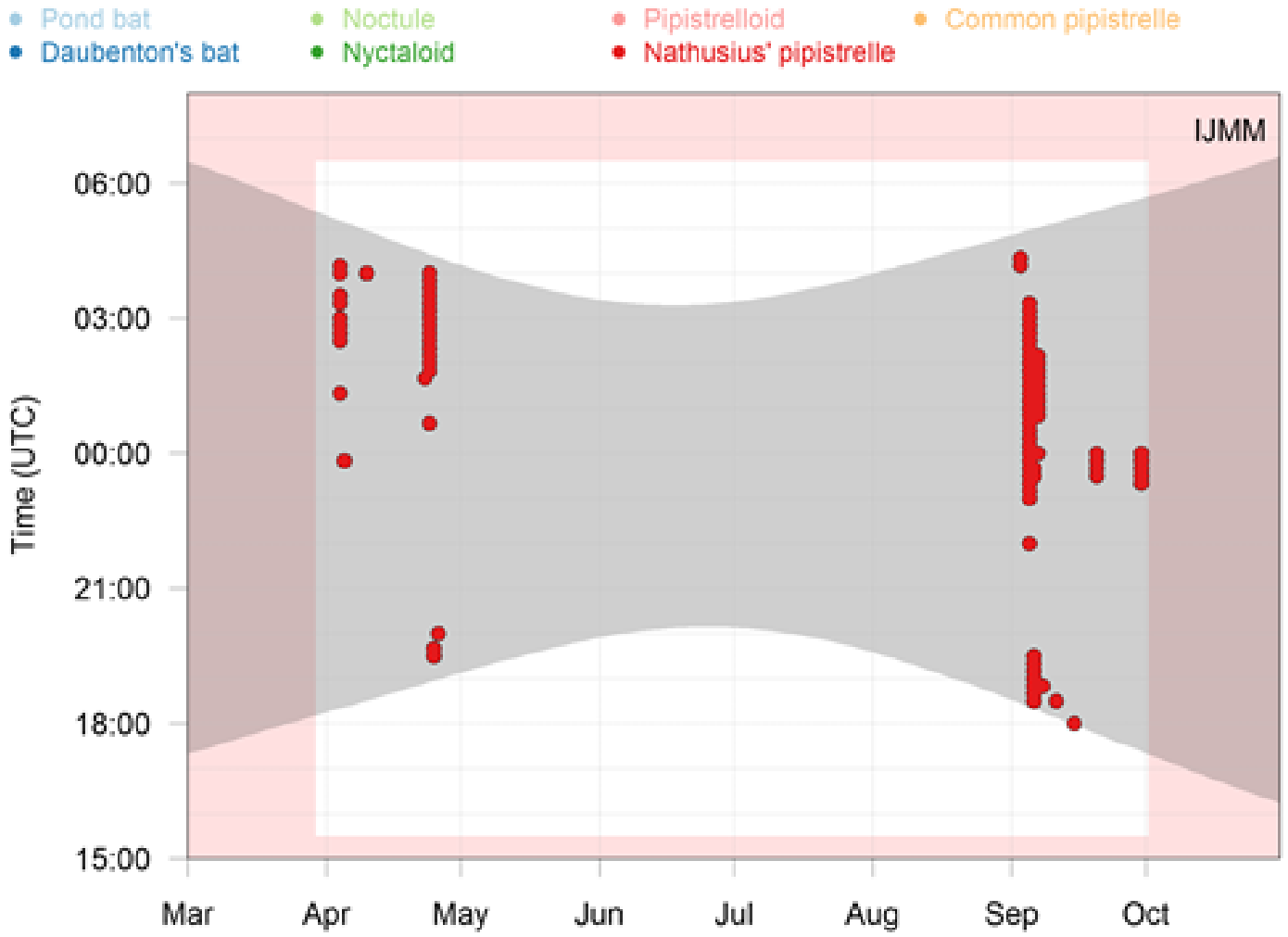
IJmuiden meteo mast (85 km offshore) - 2014



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Monitoring 2015 and 2016

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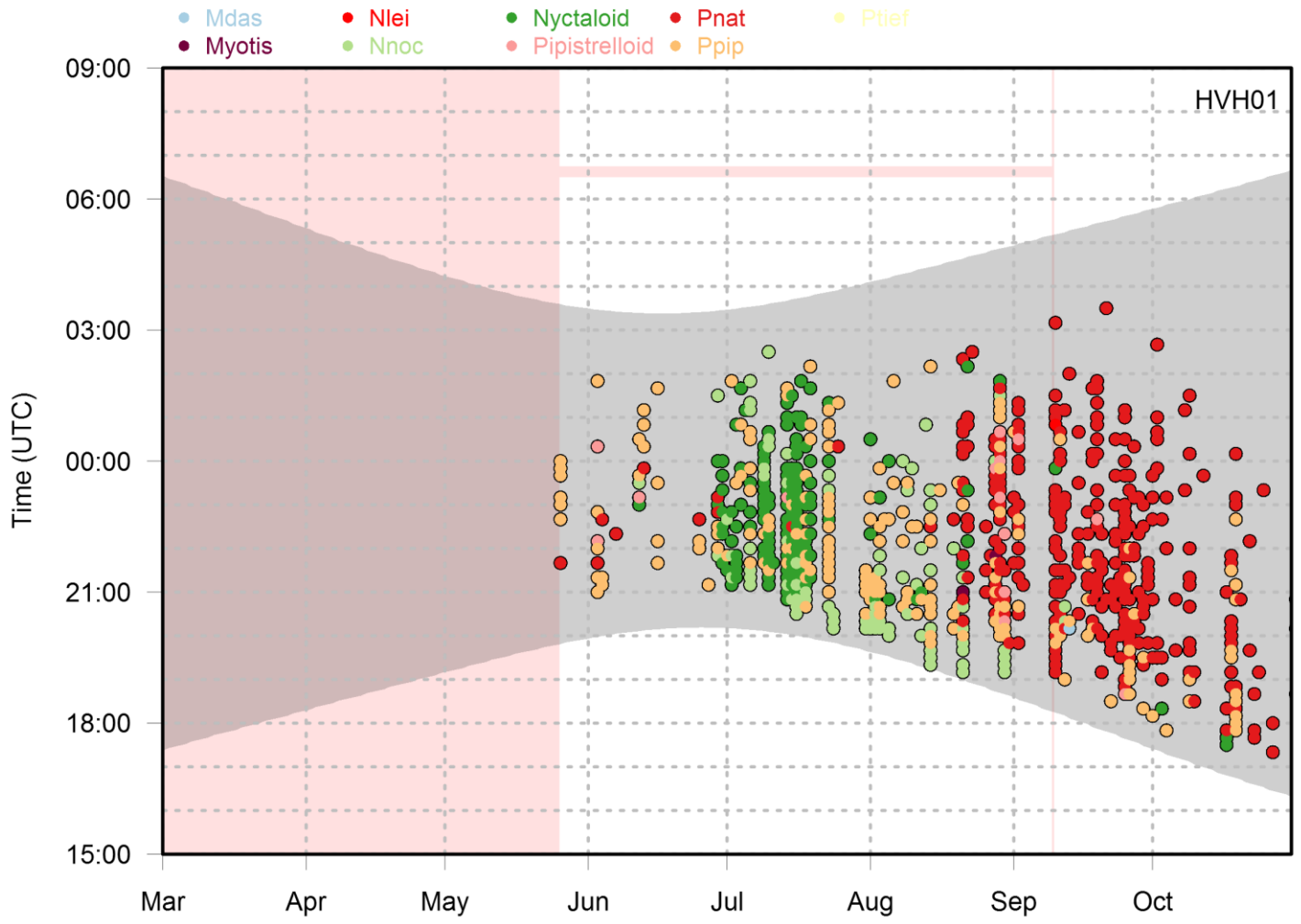
Hoek van Holland (coast) 2015



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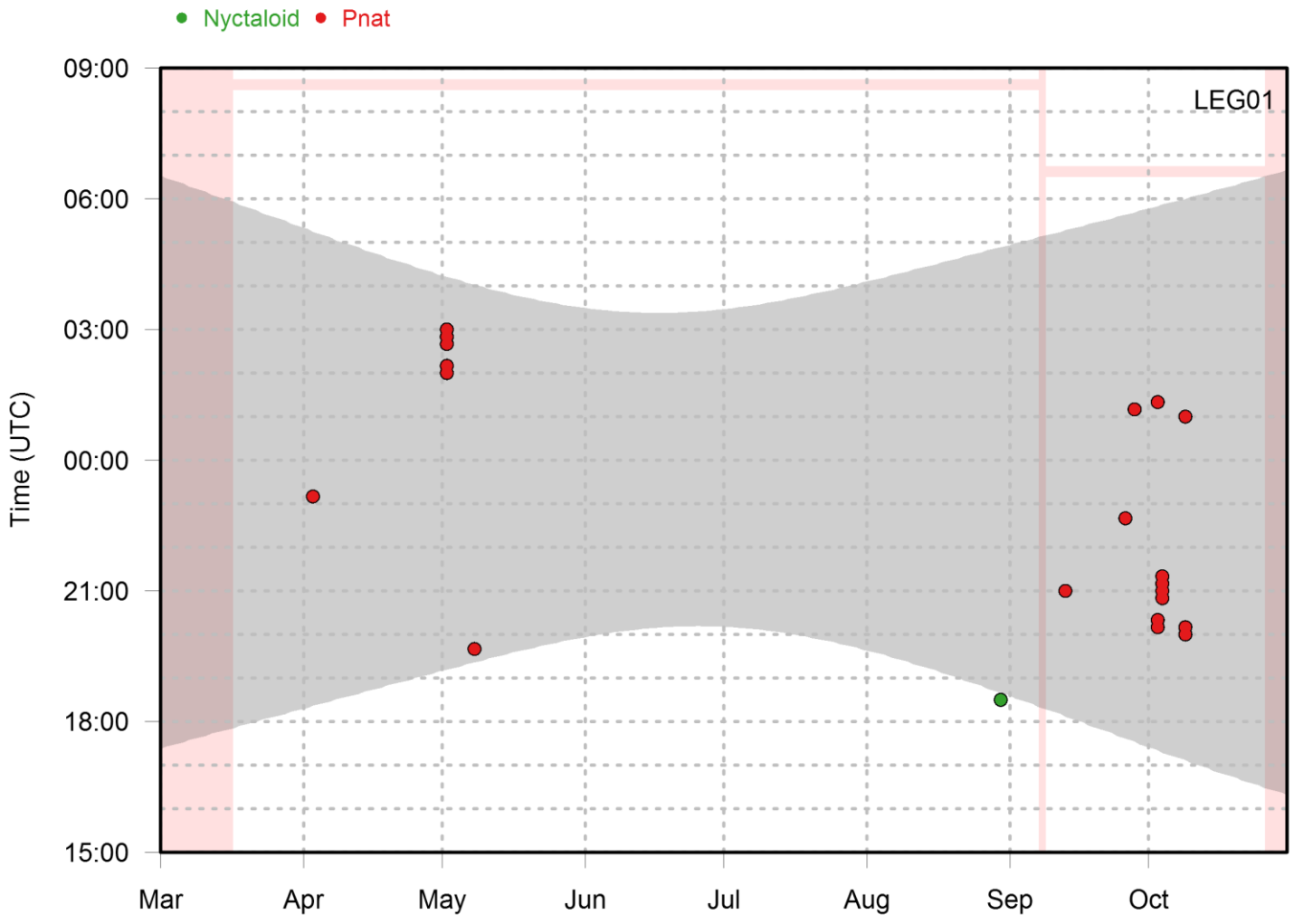
Goeree (c. 30 km offshore) 2015



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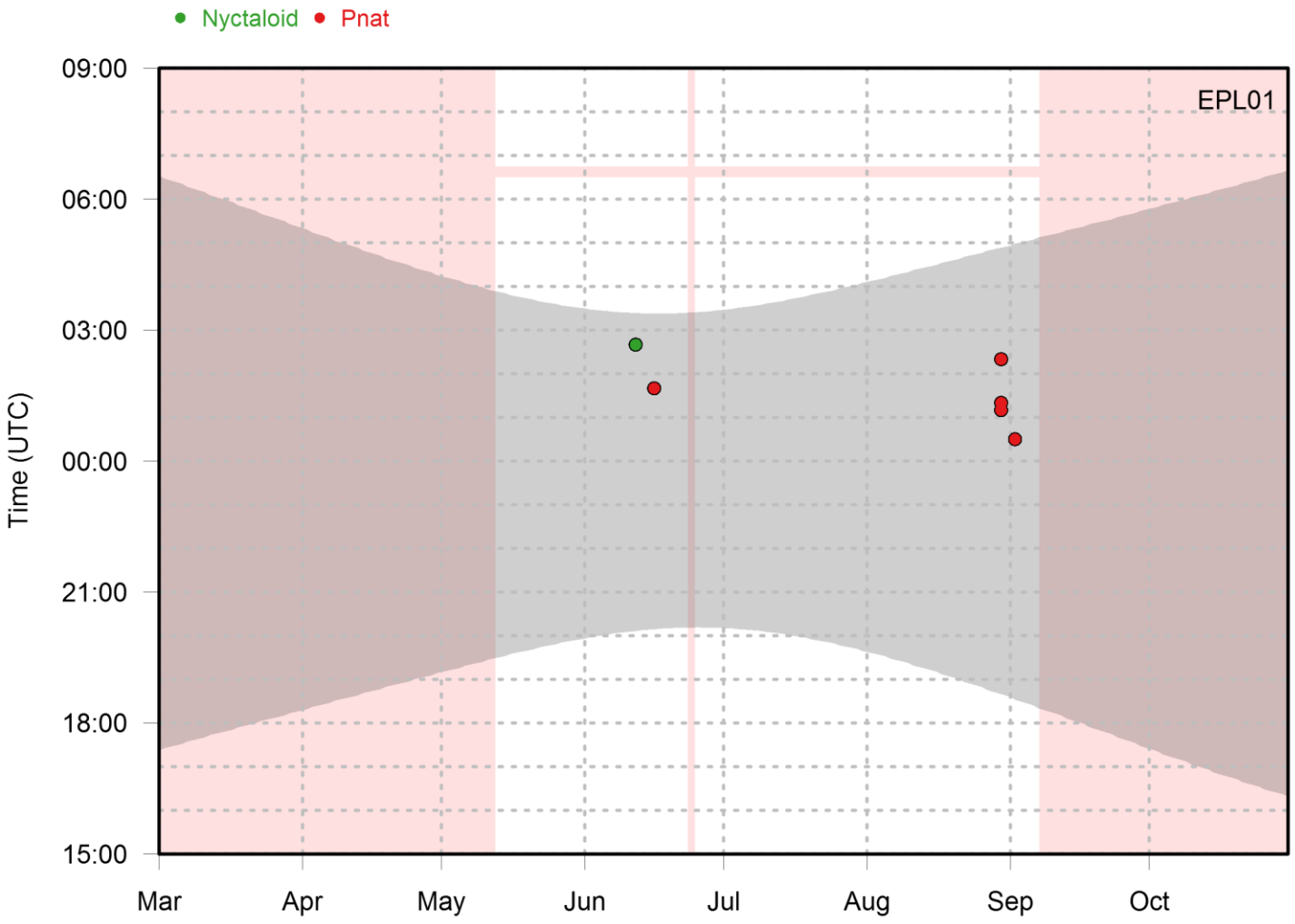
Europlatform (c. 50 km offshore) 2015



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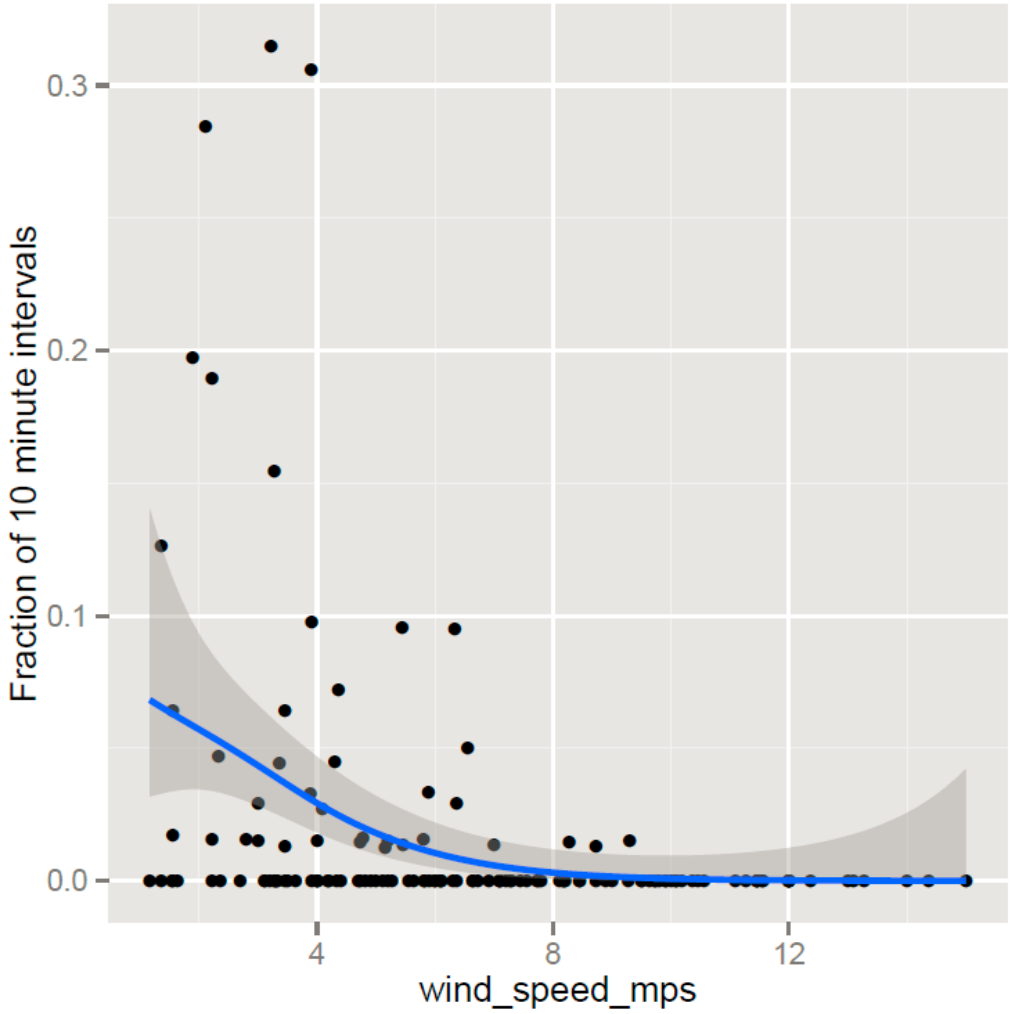
Bat migration and weather conditions

- Focus on Nathusius's Pipistrelle
- Only OWEZ data 2012 - 2014
- Period of 22 Aug – 10 Oct
- Weather data obtained from B11B (75 km offshore) and Valkenburg airport (3 km from coast)
- Weather parameters considered (Wind speed & direction, Humidity, Cloud cover, Visibility, Temperature, Atmospheric pressure, Precipitation)

Preliminary results

- Weather conditions at sea provide better fits than those on land
- Relevant parameters are: wind speed and direction, and visibility
- Link with insect migration?

Wind speed (PB11B)



96% of bat activity

at wind speeds < 7m/s

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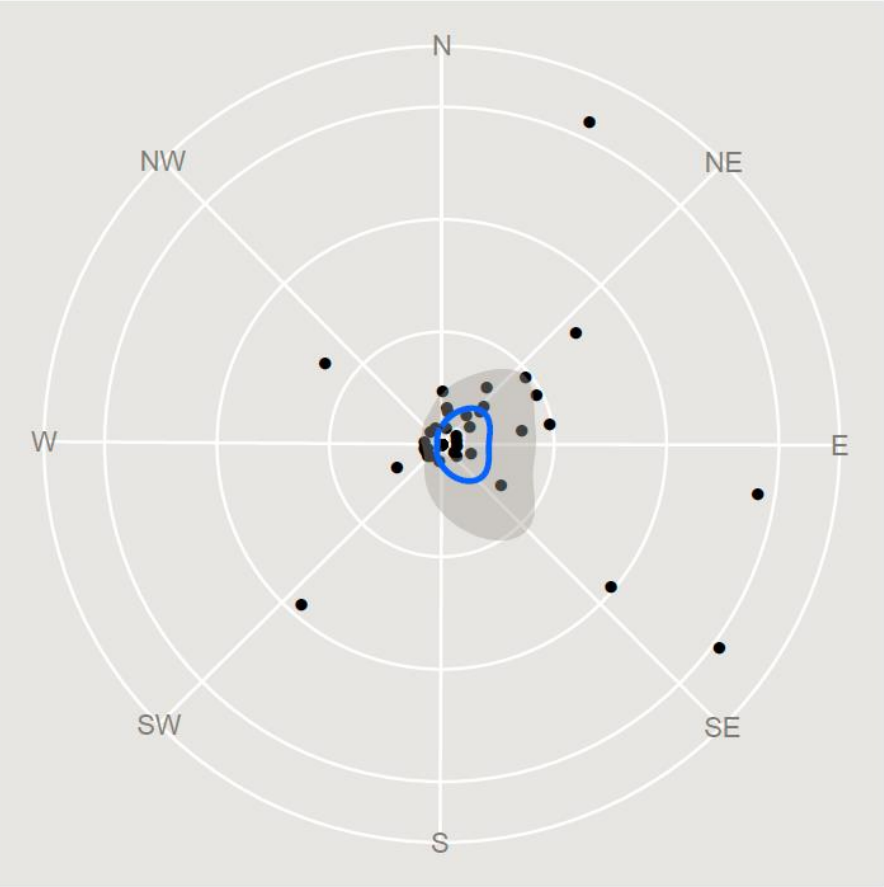
Wind direction (PB11B)



76% of bat activity

at wind directions

between NE en SE

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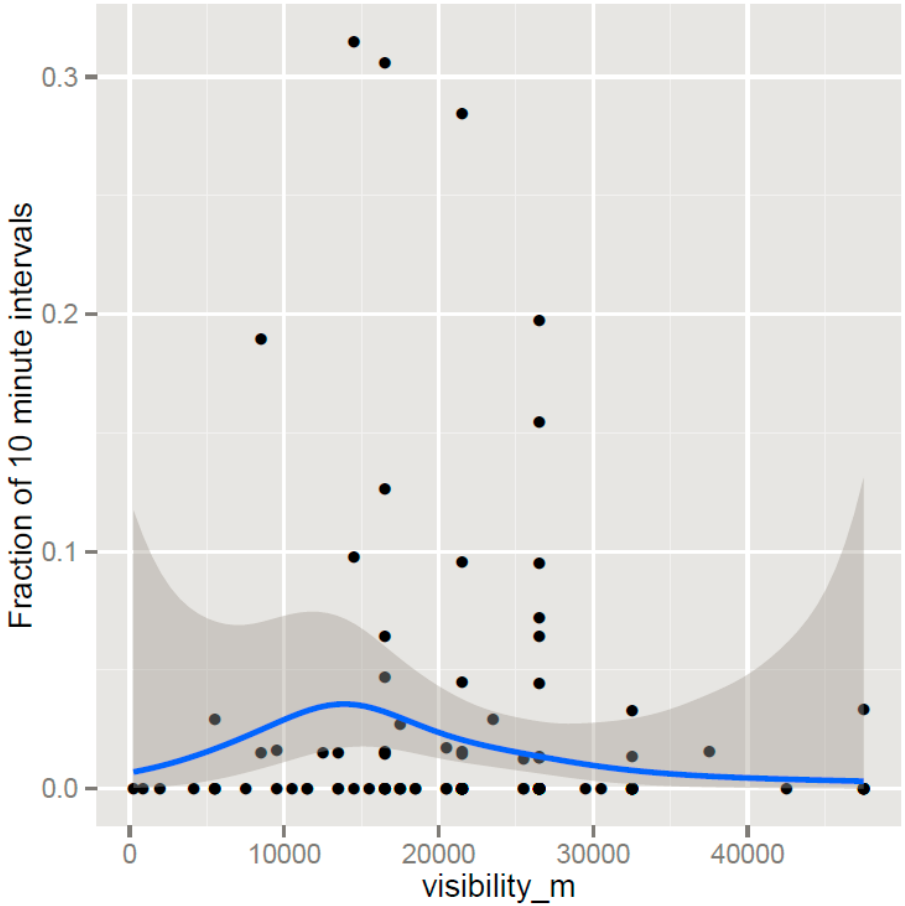
Visibility (PB11B)



98% of bat activity

at visibility > 8500 m

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Bats and offshore wind farms (1)

- Possible attraction to offshore structures
- Possible link with insect availability at sea
- Risks for collision and / or barotrauma
- Fatalities at sea likely
- Mostly migratory species at risk

Bats and offshore wind farms (2)

- Population effects not excluded for at least one species (Leopold *et al.* 2014)
- Therefore, bats relevant in (spatial) planning and operating of offshore wind farms
- Mitigation based on results so far: increase cut-in speed of wind turbines in vulnerable periods, thus resulting in stand-still during low wind speeds
- OWF Borssele (soon to be raised in Dutch North Sea) probably first offshore location in the world with mitigation measures for bats
- Follow-up research to address potential population effects and effectiveness of mitigation measures

Conclusions (1)

- Regular occurrence late Aug – early Oct, less frequently in spring
- Associated with nights with E wind at low speeds and high visibility
- Species composition and timing of occurrence indicate migration (however, occasional feeding flights may also be involved)

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Conclusions (2)

- Nathusius's Pipistrelle the most abundant species
- Other species offshore: Common Noctule, Common Pipistrelle and (prob.) Parti-coloured Bat
- Occurrence of east-west migration
- Frequently spending the day at sea!

Options future research: migration ecology and fatalities at sea

- Modelling necessary, but input data needed

- Input to be obtained by:
  - Behavioural research with a combination of thermal imaging cameras and bat detectors
  - Tracking and tracing of bats
  - Determining insect distribution / migration at sea

Testing thermal imaging cameras

In collaboration with:

the fieldwork company

Eneco

Ministerie van Economische Zaken

VLIZ

museum

RWE

NoordzeeWind

NUON

E-Connection

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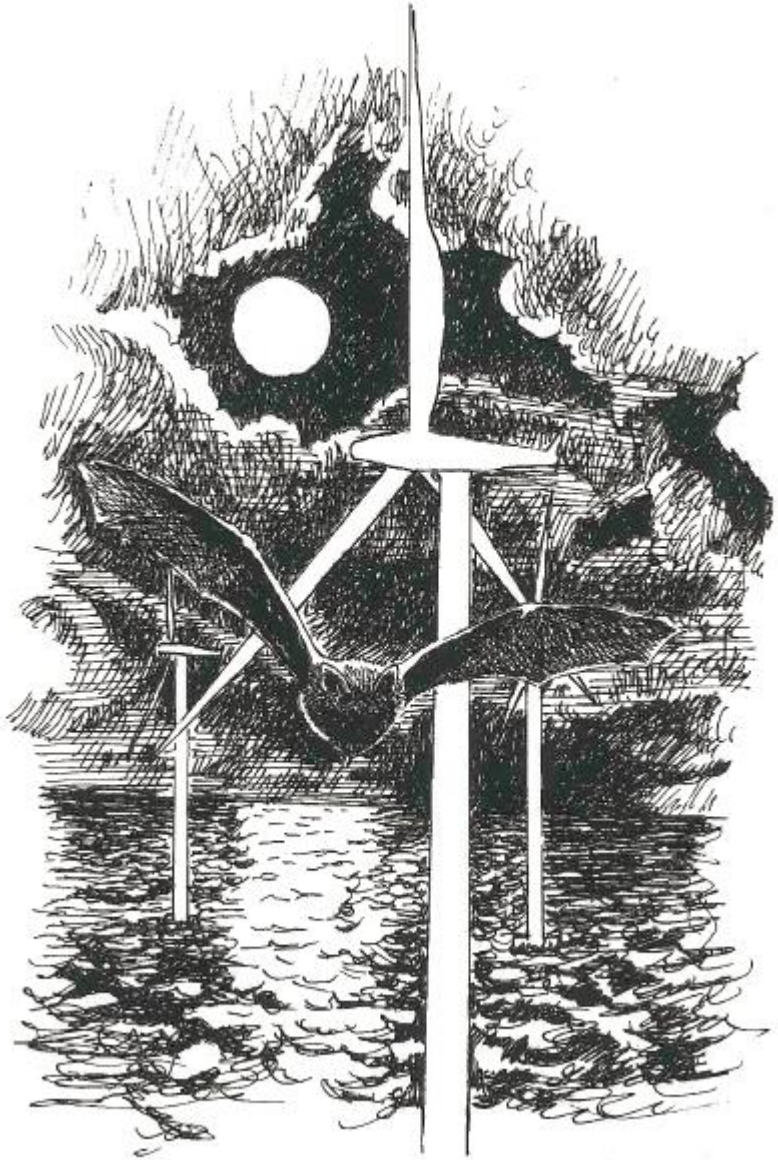
Thanks for your attention!

Any questions?



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