Danish Energy Agency

Preliminary Site Investigations for Future Offshore Wind – Bat Survey

Introduction

This report serves as an information sheet for the initial results of a bat survey that is part of the preliminary site investigations for future offshore wind in the North Sea l area. The initial publication of these results is due to general great interest in bat occurrence.

The data were obtained from seven locations in and around the North Sea 1 area, see figure 1.

Project description

Following the 'Climate Agreement June 2022' with ambitions to expand offshore wind by 2023, The Danish Energy Agency has given permission for Energinet to initiate preliminary site investigations for future offshore wind in the North Sea 1 area. The surveys were initiated in 2023 and include geophysical, geotechnical, and biological studies, which will serve as a baseline for further development planning and environmental impact assessments to ensure proper consideration of the natural environment in the area.

The biological baseline investigations are carried out by a consortium of DCE (Danish Centre for Environment and Energy, Aarhus University) and the engineering consultancy NIRAS, and include surveys of birds, fish, marine mammals, and bats. Several bat species are long distance migrants and bats occur offshore in inner Danish waters and southern parts of the North Sea, but little information is available regarding their presence and activity in the Danish part of the North Sea. The bat field surveys for North Sea 1 include passive acoustic monitoring within and around the investigation area to document and map the spatial and temporal presence of bats in the area.

Method description

The field program for offshore passive acoustic monitoring uses SM4BAT FS ultrasonic recorders with SMM-U2 microphones (Wildlife Acoustics), deployed on spar buoys and set to record nightly. Data are recorded in wave file format onto SD memory cards and analyzed using the commercial software SonoChiro (Biotope.fr) for automated detection and identification of bat species. The software was run using south boreal classifier package and the highest sensitivity setting within a frequency band from 10-90 kHz. Any detections output as bat species by the software were evaluated manually. Audio files categorized by the software as including no bat call detections have not been scrutinized.

Location of buoys

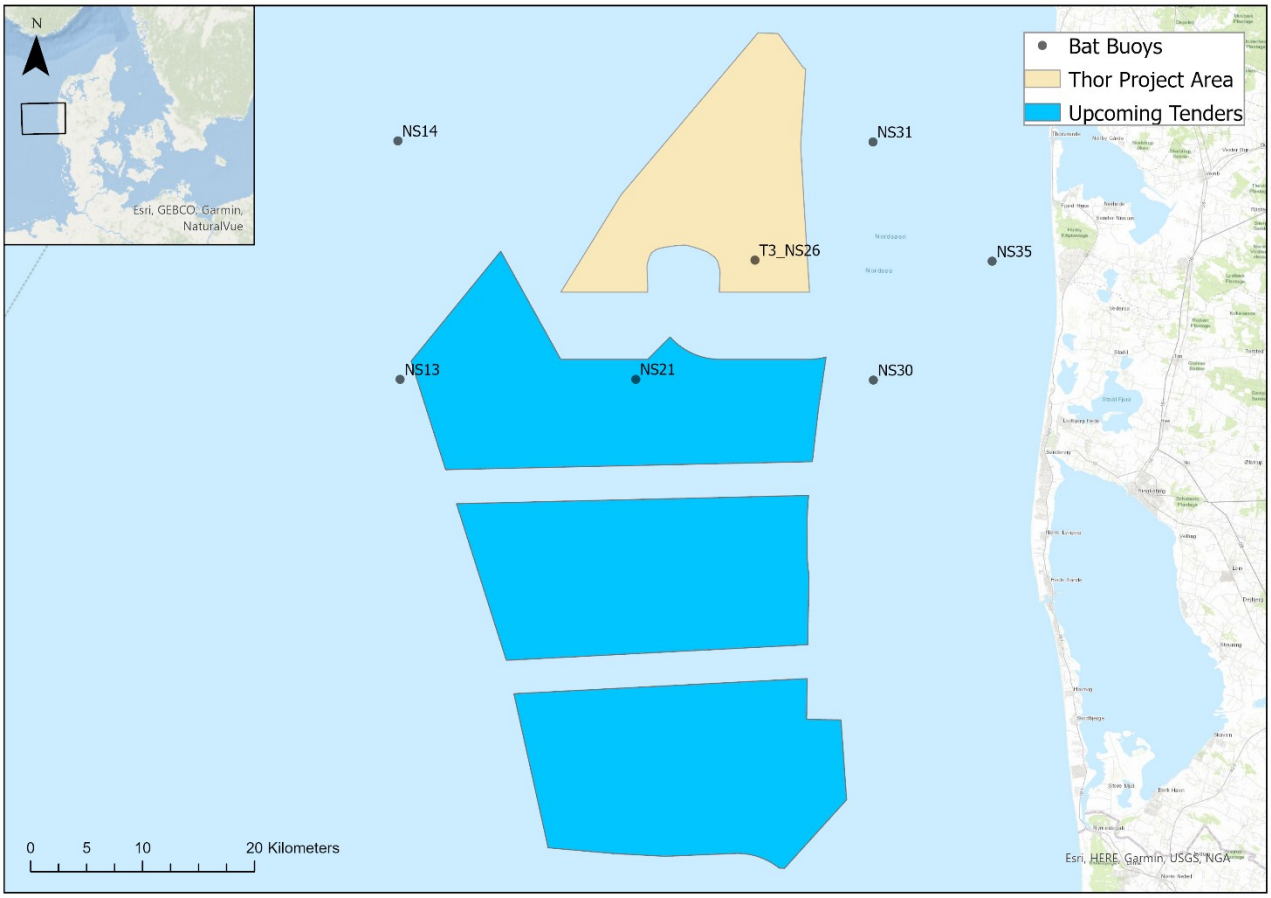

Figure 1: Location of the seven buoys

Results

Buoy ID	Buoy coordinates X	Buoy Coordinates Y	Active monitoring period	Result
T3/NS26	56° 16,244 N	7° 41.685 E	21-04-2023 to 05-06-2023	No bat calls were detected during this active monitoring period at this PAM station
T3/NS26	56° 16.225 N	7° 41.616 E	03-08-2023 to 21-09-2023	Bat calls were detected on 8 audio files, each of 15 s duration, during this active monitoring period at this PAM station. The table in appendix 1 indicates date and time of each record, the species identified, and the number of calls present in each recording and used to manually verify the species. Following a conservative approach, some recordings were not identified beyond species complex (Eptesicus/Nyctalus/Vespertilio sp.)
NS21	56° 10,407 N	7° 31,497 E	21-04-2023 to 01-05-2023 *	No bat calls were detected during this active monitoring period at this PAM station
NS21	56° 10,402 N	7° 31,600 E	Deployed 02-08-2023 but reported drifting towards Norway 05-11-2023	Buoy and data from the Fall 2023 deployment at this station currently unrecovered.
NS30	56° 10,626 N	7° 52.121 E	21-04-2023 to 25-04-2023**	No bat calls were detected during this active monitoring period at this PAM station
NS30	56° 10.582 N	7° 52.127 E	03-08-2023 to 23-10-2023	Bat calls were detected on 10 audio files, each of 15 s duration, during this active monitoring period at this PAM station. The table in appendix 3 indicates date and time of each record, the species identified, and the number of calls present in each recording and used to manually verify the species. Following a conservative approach, some recordings were not identified beyond species complex (Eptesicus/Nyctalus/Vespertilio sp.)
NS31	56º 22,061 N	7º 51,789 E	21-04-2023 to 10-06-2023	No bat calls were detected during this active monitoring period at this PAM station
NS31	56° 22,027 N	7° 51,741 E	03-08-2023 to 01-11-2023	Bat calls were detected on 3 audio files, each of 15 s duration, during this active monitoring period at this PAM

*Short monitoring period, as microphone sensitivity was permanently lost during the day of 01-05-2023

** Short monitoring period, only data until 25-04-2023

				station. The table in appendix 4 indicates date and time of each record, the species identified, and the number of calls present in each recording and used to manually verify the species. Following a conservative approach, some recordings were not identified beyond species complex (Eptesicus/Nyctalus/Vespertilio sp.)
NS35	56º 16,424 N	8º 02,216 E	21-04-2023 to 09-06-2023	No bat calls were detected during this active monitoring period at this PAM station
NS35	56° 16,384 N	8° 02,238 E	03-08-2023 to 05-11-2023	Bat calls were detected on 19 audio files, each of 15 s duration, during this active monitoring period at this PAM station. The table in appendix 5 indicates date and time of each record, the species identified, and the number of calls present in each recording and used to manually verify the species. Following a conservative approach, some recordings were not identified beyond species complex (Eptesicus/Nyctalus/Vespertilio sp.)
NS13	56º10,150 N	7º 11,211 E	20-04-2023 to 29-05-2023	No bat calls were detected during this active monitoring period at this PAM station
NS13	56° 10,127 N	7° 11,275 E	Deployed 02-08-2023 and was found stranded on 15-09- 2023.	No bat calls were recorded while the buoy remained on station or was drifting towards the shore.
NS14	56º 21,573 N	7º 10,593 E	21-04-2023 to 26-05-2023	No bat calls were detected during this active monitoring period at this PAM station
NS14	56° 21,59 N	7° 10,524 E	02-08-2023 to 06-09-2023	No bat calls were detected during this active monitoring period at this PAM station

Appendix

1. **North Sea 1, Station T3/NS26**
2. **North Sea 1, Station NS21**
3. **North Sea 1, Station NS30**
4. **North Sea 1, Station NS31**
5. **North Sea 1, Station NS35**
6. **North Sea 1, Station NS13**
7. **North Sea 1, Station NS14**

*Short monitoring period, as microphone sensitivity was permanently lost during the day of 01-05-2023

** Short monitoring period, only data until 25-04-2023

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Søren Keller
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Results of preliminary data analysis – North Sea 1, Station T3/NS26

DCE - Danish Centre for Environment and Energy

Date: 29 November 2023

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Web: dce.au.dk/en

Sender's CVR no.:
31119103

Survey period: Spring 2023
Buoy ID: T3/NS26
Buoy coordinates:

56 16.244	7 41.685

Active monitoring period: 21-04-2023 to 05-06-2023
No bat calls were detected during this active monitoring period at this PAM station

Brief method description:
The field program for offshore passive acoustic monitoring uses SM4BAT FS ultrasonic recorders with SMM-U2 microphones (Wildlife Acoustics), deployed on spar bouys and set to record nightly. Data are recorded in wave file format onto SD memory cards and analyzed using the commercial software SonoChiro (Biotope.fr) for automated detection and identification of bat species. The software was run using the south boreal classifier package and the highest sensitivity setting within a frequency band from 10-90 kHz. Any detections output as bat species by the software were evaluated manually. Audio files categorized by the software as including no bat call detections have not been scrutinized.

Kind regards

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Results of preliminary data analysis – North Sea 1, Station T3/NS26

DCE - Danish Centre for Environment and Energy

Date: 21 February 2024

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Web: dce.au.dk/en

Sender's CVR no.:
31119103

Survey period: Fall 2023
Buoy ID: T3/NS26
Buoy coordinates (WGS84):

56° 16.225 N	7° 41.616 E

Active monitoring period: 03-08-2023 to 21-09-2023

Bat calls were detected on 8 audio files, each of 15 s duration, during this active monitoring period at this PAM station. The table below indicates date and time of each record, the species identified, and the number of calls present in each recording and used to manually verify the species. Following a conservative approach, some recordings were not identified beyond species complex (*Eptesicus/Nyctalus/Vespertilio sp.*)

Date	UTC Time (hhmmss)	Species (# of calls detected in audio file)
31-08-2023	204717	*Pipistrellus nathusii (60)*
31-08-2023	221417	*Pipistrellus nathusii (66)*
06-09-2023	213232	*Pipistrellus nathusii (2)*
07-09-2023	201132	*Eptesicus/Nyctalus/Vespertilio sp. (20)*
07-09-2023	201147	*Eptesicus/Nyctalus/Vespertilio sp. (9)*
07-09-2023	203602	*Pipistrellus nathusii (42)*
08-09-2023	211732	*Pipistrellus nathusii (32)*
08-09-2023	215747	*Pipistrellus nathusii (12)*

Brief method description:
The field program for offshore passive acoustic monitoring uses SM4BAT FS ultrasonic recorders with SMM-U2 microphones (Wildlife Acoustics), deployed on spar bouys and set to record nightly. Data are recorded in wave file format onto SD memory cards and analyzed using the commercial software SonoChiro (Biotope.fr) for automated detection and identification of bat species. The software was run using the south boreal classifier package and the highest sensitivity setting within a frequency

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band from 10-90 kHz. Any detections output as bat species by the software were evaluated manually. Audio files categorized by the software as including no bat call detections have not been scrutinized.

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Results of preliminary data analysis – North Sea 1, Station NS21

DCE - Danish Centre for Environment and Energy

Date: 11 December 2023

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Sender's CVR no.:
31119103

Survey period: Spring 2023
Buoy ID: NS21
Buoy coordinates (WGS84):

56° 10,407 N	7° 31,497 E

Active monitoring period: 21-04-2023 to 01-05-2023 (Note: short monitoring period, as microphone sensitivity was permanently lost during the day of 01-05-2023)

No bat calls were detected during this active monitoring period at this PAM station

Brief method description:
The field program for offshore passive acoustic monitoring uses SM4BAT FS ultrasonic recorders with SMM-U2 microphones (Wildlife Acoustics), deployed on spar bouys and set to record nightly. Data are recorded in wave file format onto SD memory cards and analyzed using the commercial software SonoChiro (Biotope.fr) for automated detection and identification of bat species. The software was run using the south boreal classifier package and the highest sensitivity setting within a frequency band from 10-90 kHz. Any detections output as bat species by the software were evaluated manually. Audio files categorized by the software as including no bat call detections have not been scrutinized.

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Results of preliminary data analysis – North Sea 1, Station NS21

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Sender's CVR no.:
31119103

Survey period: Fall 2023
Buoy ID: NS21
Buoy coordinates (WGS84):

56° 10,402 N	7° 31,600 E

Deployed 02-08-2023 but reported drifting towards Norway 05-11-2023.

Buoy and data from the Fall 2023 deployment at this station currently unrecovered.

Brief method description:
The field program for offshore passive acoustic monitoring uses SM4BAT FS ultrasonic recorders with SMM-U2 microphones (Wildlife Acoustics), deployed on spar bouys and set to record nightly. Data are recorded in wave file format onto SD memory cards and analyzed using the commercial software SonoChiro (Biotope.fr) for automated detection and identification of bat species. The software was run using the south boreal classifier package and the highest sensitivity setting within a frequency band from 10-90 kHz. Any detections output as bat species by the software were evaluated manually. Audio files categorized by the software as including no bat call detections have not been scrutinized.

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Results of preliminary data analysis – North Sea 1, Station NS30

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Date: 11 December 2023

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Sender's CVR no.:
31119103

Survey period: Spring 2023
Buoy ID: NS30
Buoy coordinates (WGS84):

56° 10.626 N	7° 52.121 E

Active monitoring period: 21-04-2023 to 25-04-2023 (Note: short monitoring period, only data until 25-04-2023)

No bat calls were detected during this active monitoring period at this PAM station

Brief method description:
The field program for offshore passive acoustic monitoring uses SM4BAT FS ultrasonic recorders with SMM-U2 microphones (Wildlife Acoustics), deployed on spar bouys and set to record nightly. Data are recorded in wave file format onto SD memory cards and analyzed using the commercial software SonoChiro (Biotope.fr) for automated detection and identification of bat species. The software was run using the south boreal classifier package and the highest sensitivity setting within a frequency band from 10-90 kHz. Any detections output as bat species by the software were evaluated manually. Audio files categorized by the software as including no bat call detections have not been scrutinized.

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Results of preliminary data analysis – North Sea 1, Station NS30

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Date: 21 February 2024

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Sender's CVR no.:
31119103

Survey period: Fall 2023
Buoy ID: NS30
Buoy coordinates (WGS84):

56° 10.582 N	7° 52.127 E

Active monitoring period: 03-08-2023 to 23-10-2023

Bat calls were detected on 10 audio files, each of 15 s duration, during this active monitoring period at this PAM station. The table below indicates date and time of each record, the species identified, and the number of calls present in each recording and used to manually verify the species. Following a conservative approach, some recordings were not identified beyond species complex (*Eptesicus/Nyctalus/Vespertilio sp*.)

Date	UTC Time (hhmmss)	Species (# of calls detected in audio file)
27-08-2023	205221	*Pipistrellus nathusii (51)*
31-08-2023	210325	*Pipistrellus nathusii (42)*
31-08-2023	220709	*Pipistrellus nathusii (14)*
31-08-2023	222903	*Pipistrellus nathusii (92)*
31-08-2023	222919	*Pipistrellus nathusii (51)*
31-08-2023	235708	*Pipistrellus nathusii (55)*
31-08-2023	235825	*Pipistrellus nathusii (74)*
05-09-2023	210840	*Pipistrellus nathusii (7)*
05-09-2023	211818	*Pipistrellus nathusii (39)*
06-09-2023	221407	*Eptesicus/Nyctalus/Vespertilio sp.* (3)

Brief method description:
The field program for offshore passive acoustic monitoring uses SM4BAT FS ultrasonic recorders with SMM-U2 microphones (Wildlife Acoustics), deployed on spar bouys and set to record nightly. Data are recorded in wave file format onto SD memory cards and analyzed using the commercial software SonoChiro (Biotope.fr) for automated detection and identification of bat species. The software was run using the

south boreal classifier package and the highest sensitivity setting within a frequency band from 10-90 kHz. Any detections output as bat species by the software were evaluated manually. Audio files categorized by the software as including no bat call detections have not been scrutinized.

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Results of preliminary data analysis – North Sea 1, Station NS31

DCE - Danish Centre for Environment and Energy

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Sender's CVR no.:
31119103

Survey period: Spring 2023
Buoy ID: NS31
Buoy coordinates (WGS84):

56° 22,061 N	7° 51,789 E

Active monitoring period: 21-04-2023 to 10-06-2023

No bat calls were detected during this active monitoring period at this PAM station

Brief method description:
The field program for offshore passive acoustic monitoring uses SM4BAT FS ultrasonic recorders with SMM-U2 microphones (Wildlife Acoustics), deployed on spar bouys and set to record nightly. Data are recorded in wave file format onto SD memory cards and analyzed using the commercial software SonoChiro (Biotope.fr) for automated detection and identification of bat species. The software was run using the south boreal classifier package and the highest sensitivity setting within a frequency band from 10-90 kHz. Any detections output as bat species by the software were evaluated manually. Audio files categorized by the software as including no bat call detections have not been scrutinized.

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Sender's CVR no.:
31119103

Survey period: Fall 2023
Buoy ID: NS31
Buoy coordinates (WGS84):

56° 22,027 N	7° 51,741 E

Active monitoring period: 03-08-2023 to 01-11-2023

Bat calls were detected on 3 audio files, each of 15 s duration, during this active monitoring period at this PAM station. The table below indicates date and time of each record, the species identified, and the number of calls present in each recording and used to manually verify the species. Following a conservative approach, some recordings were not identified beyond species complex (*Eptesicus/Nyctalus/Vespertilio sp.*)

Date	UTC Time (hhmmss)	Species (# of calls detected in audio file)
27-08-2023	231548	*Pipistrellus nathusii (35)*
31-08-2023	200539	*Pipistrellus nathusii (41)*
07-09-2023	194322	*Eptesicus/Nyctalus/Vespertilio sp. (23)*

Brief method description:
The field program for offshore passive acoustic monitoring uses SM4BAT FS ultrasonic recorders with SMM-U2 microphones (Wildlife Acoustics), deployed on spar bouys and set to record nightly. Data are recorded in wave file format onto SD memory cards and analyzed using the commercial software SonoChiro (Biotope.fr) for automated detection and identification of bat species. The software was run using the south boreal classifier package and the highest sensitivity setting within a frequency band from 10-90 kHz. Any detections output as bat species by the software were evaluated manually. Audio files categorized by the software as including no bat call detections have not been scrutinized.

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Results of preliminary data analysis – North Sea 1, Station NS35

DCE - Danish Centre for Environment and Energy

Date: 09 January 2024

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Sender's CVR no.:
31119103

Survey period: Spring 2023
Buoy ID: NS35
Buoy coordinates (WGS84):

56° 16,424 N	8° 02,216 E

Active monitoring period: 21-04-2023 to 09-06-2023

No bat calls were detected during this active monitoring period at this PAM station

Brief method description:
The field program for offshore passive acoustic monitoring uses SM4BAT FS ultrasonic recorders with SMM-U2 microphones (Wildlife Acoustics), deployed on spar bouys and set to record nightly. Data are recorded in wave file format onto SD memory cards and analyzed using the commercial software SonoChiro (Biotope.fr) for automated detection and identification of bat species. The software was run using the south boreal classifier package and the highest sensitivity setting within a frequency band from 10-90 kHz. Any detections output as bat species by the software were evaluated manually. Audio files categorized by the software as including no bat call detections have not been scrutinized.

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Results of preliminary data analysis – North Sea 1, Station NS35

DCE - Danish Centre for Environment and Energy

Date: 21 February 2024

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Sender's CVR no.:
31119103

Survey period: Fall 2023
Buoy ID: NS35
Buoy coordinates (WGS84):

56° 16,384 N	8° 02,238 E

Active monitoring period: 03-08-2023 to 05-11-2023

Bat calls were detected on 19 audio files, each of 15 s duration, during this active monitoring period at this PAM station. The table below indicates date and time of each record, the species identified, and the number of calls present in each recording and used to manually verify the species. Following a conservative approach, some recordings were not identified beyond species complex (*Eptesicus/Nyctalus/Vespertilio sp.*)

Date	UTC Time (hhmmss)	Species (# of calls detected in audio file)
19-08-2023	023629	*Plecotus auritus (76)*
25-08-2023	204122	*Pipistrellus nathusii (24)*
25-08-2023	210618	*Pipistrellus nathusii (32)*
27-08-2023	204313	*Pipistrellus nathusii (21)*
27-08-2023	215343	*Pipistrellus nathusii, 2 individuals (39)*
27-08-2023	223407	*Pipistrellus nathusii (14)*
28-08-2023	002703	*Pipistrellus nathusii (34)*
30-08-2023	212456	*Eptesicus/Nyctalus/Vespertilio sp. (21)*
30-08-2023	224100	*Pipistrellus nathusii (70)*
31-08-2023	201406	*Pipistrellus nathusii (49)*
31-08-2023	225156	*Eptesicus/Nyctalus/Vespertilio sp. (13)*
31-08-2023	233514	*Pipistrellus nathusii (71)*
31-08-2023	234250	*Pipistrellus nathusii (131)*
01-09-2023	011006	*Pipistrellus nathusii (50)*
07-09-2023	204548	*Plecotus auritus (43)*
07-09-2023	224739	*Eptesicus/Nyctalus/Vespertilio sp. (1)*
08-09-2023	201303	*Eptesicus/Nyctalus/Vespertilio sp. (10)*
08-09-2023	201315	*Eptesicus/Nyctalus/Vespertilio sp. (18)*
08-09-2023	211317	*Pipistrellus nathusii (83)*

Brief method description:
The field program for offshore passive acoustic monitoring uses SM4BAT FS ultrasonic recorders with SMM-U2 microphones (Wildlife Acoustics), deployed on spar bouys and set to record nightly. Data are recorded in wave file format onto SD memory cards and analyzed using the commercial software SonoChiro (Biotope.fr) for automated detection and identification of bat species. The software was run using the south boreal classifier package and the highest sensitivity setting within a frequency band from 10-90 kHz. Any detections output as bat species by the software were evaluated manually. Audio files categorized by the software as including no bat call detections have not been scrutinized.

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Results of preliminary data analysis – North Sea 1, Station NS13

DCE - Danish Centre for Environment and Energy

Date: 19 January 2024

Direct Tel.: +45 8715 5000
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Web: dce.au.dk/en

Sender's CVR no.:
31119103

Survey period: Spring 2023
Buoy ID: NS13
Buoy coordinates (WGS84):

56° 10,150 N	7° 11,211 E

Active monitoring period: 20-04-2023 to 29-05-2023

No bat calls were detected during this active monitoring period at this PAM station

Brief method description:
The field program for offshore passive acoustic monitoring uses SM4BAT FS ultrasonic recorders with SMM-U2 microphones (Wildlife Acoustics), deployed on spar bouys and set to record nightly. Data are recorded in wave file format onto SD memory cards and analyzed using the commercial software SonoChiro (Biotope.fr) for automated detection and identification of bat species. The software was run using the south boreal classifier package and the highest sensitivity setting within a frequency band from 10-90 kHz. Any detections output as bat species by the software were evaluated manually. Audio files categorized by the software as including no bat call detections have not been scrutinized.

Kind regards

Signe Marie Mygind Brinkløv
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Søren Keller
Special Advisor
Centre for Renewables
The Danish Energy Agency

Results of preliminary data analysis – North Sea 1, Station NS13

DCE - Danish Centre for Environment and Energy

Date: 15 February 2024

Direct Tel.: +45 8715 5000
E-mail: dce@au.dk
Web: dce.au.dk/en

Sender's CVR no.:
31119103

Survey period: Fall 2023
Buoy ID: NS13
Buoy coordinates (WGS84):

56° 10,127 N	7° 11,275 E

Active monitoring period: deployed 02-08-2023 and was found stranded on 15-09-2023.

No bat calls were recorded while the buoy remained on station or was drifting towards the shore.

Brief method description:
The field program for offshore passive acoustic monitoring uses SM4BAT FS ultrasonic recorders with SMM-U2 microphones (Wildlife Acoustics), deployed on spar bouys and set to record nightly. Data are recorded in wave file format onto SD memory cards and analyzed using the commercial software SonoChiro (Biotope.fr) for automated detection and identification of bat species. The software was run using the south boreal classifier package and the highest sensitivity setting within a frequency band from 10-90 kHz. Any detections output as bat species by the software were evaluated manually. Audio files categorized by the software as including no bat call detections have not been scrutinized.

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Søren Keller
Special Advisor
Centre for Renewables
The Danish Energy Agency

Results of preliminary data analysis – North Sea 1, Station NS14

DCE - Danish Centre for Environment and Energy

Date: 19 January 2024

Direct Tel.: +45 8715 5000
E-mail: dce@au.dk
Web: dce.au.dk/en

Sender's CVR no.:
31119103

Survey period: Spring 2023
Buoy ID: NS14
Buoy coordinates (WGS84):

56° 21,573 N	7° 10,593 E

Active monitoring period: 21-04-2023 to 26-05-2023

No bat calls were detected during this active monitoring period at this PAM station

Brief method description:
The field program for offshore passive acoustic monitoring uses SM4BAT FS ultrasonic recorders with SMM-U2 microphones (Wildlife Acoustics), deployed on spar bouys and set to record nightly. Data are recorded in wave file format onto SD memory cards and analyzed using the commercial software SonoChiro (Biotope.fr) for automated detection and identification of bat species. The software was run using the south boreal classifier package and the highest sensitivity setting within a frequency band from 10-90 kHz. Any detections output as bat species by the software were evaluated manually. Audio files categorized by the software as including no bat call detections have not been scrutinized.

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Results of preliminary data analysis – North Sea 1, Station NS14

DCE - Danish Centre for Environment and Energy

Date: 15 February 2024

Direct Tel.: +45 8715 5000
E-mail: dce@au.dk
Web: dce.au.dk/en

Sender's CVR no.:
31119103

Survey period: Fall 2023
Buoy ID: NS14
Buoy coordinates (WGS84):

56° 21,59 N	7° 10,524 E

Active monitoring period: 02-08-2023 to 06-09-2023

No bat calls were detected during this active monitoring period at this PAM station

Brief method description:
The field program for offshore passive acoustic monitoring uses SM4BAT FS ultrasonic recorders with SMM-U2 microphones (Wildlife Acoustics), deployed on spar bouys and set to record nightly. Data are recorded in wave file format onto SD memory cards and analyzed using the commercial software SonoChiro (Biotope.fr) for automated detection and identification of bat species. The software was run using the south boreal classifier package and the highest sensitivity setting within a frequency band from 10-90 kHz. Any detections output as bat species by the software were evaluated manually. Audio files categorized by the software as including no bat call detections have not been scrutinized.

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