



Lifetime extension of Nysted Offshore Windfarm

Natura 2000-screening

Ørsted

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Contents

1.	Background.....	3
1.1	Legal basis.....	3
1.2	Method.....	4
2.	Nysted Offshore Windfarm	5
2.1	Existing Operation.....	5
2.2	Planned Operation.....	5
3.	Marine Natura 2000 areas and potential impacts	6
3.1	Marine habitat types.....	7
3.2	Marine mammals.....	7
3.3	Birds.....	8
3.4	Bats.....	8
3.5	Summary.....	8
4.	Natura 2000 site N173 (Smålandsfarvandet nord for Lolland, Guldborgsund, Bøtø Nor og Hyllekrog-Rødsand)	9
4.1	Basis for designation.....	10
4.2	Objectives of conservation	11
5.	Natura 2000 screening.....	12
5.1	Marine mammals.....	12
5.1.1	Harbour porpoise.....	12
5.1.2	Grey and harbour seal.....	13
5.2	Birds.....	14
5.2.1	Displacement.....	19
5.2.2	Collision.....	22
5.3	Bats.....	24
5.3.1	Western barbastelle.....	25
5.3.2	Pond bat.....	26
6.	Cumulative impacts.....	27
7.	Conclusions.....	28
8.	References.....	30

1. Background

Ørsted is applying the Danish Energy Agency (DEA) for a permit to continue the operation of Nysted Offshore Windfarm (NHP). The lifetime extension does not involve the replacement of parts of the offshore wind turbines, coating etc., which could result in significant changes to the current operation of the offshore wind farm.

The aim of the application is lifetime extension of Nysted Offshore Windfarm for an additional period of up to 10 years. The current production license is due to expire on 10th of June 2028. To continue operation of the windfarm beyond the expiry date, a permit according to Section 29, Subsection (1), of the Renewable Energy Act is required from the DEA. As part of the application process is conducting a Natura 2000 screening of protected habitats and species according to the Habitat Directive.

The current document contains a Natura 2000-screening of the lifetime extension of Nysted Offshore Windfarm. Conclusions from the screening are briefly presented in chapter 7. The conclusion of the Annex IV species assessment can be found in a separate document.

1.1 Legal basis

Pursuant to § 29 in the Act of Renewable Energy (VE-loven) (LBK nr 132 af 06/02/2024), an application on lifetime extension must be submitted to the Danish energy Agency (DEA). An application for a lifetime extension with no operational changes requires sufficient information to support an assessment in relation to the EU Habitats Directive and the EU Birds Directive. These directives require EU member states to preserve species and habitat types:

- The EU Habitats Directive (Council Directive No. 92/43/1992) aims to protect species and habitat types that are characteristic, threatened, vulnerable or rare in the EU. Each EU country must designate areas that can serve as safe habitats for the habitat types and species, which are listed in Annexes I and II of the Habitat Directive. These habitat areas are called Special Areas of Conservation (SAC).
- The EU Birds Directive (Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009) aims to protect habitats and resting areas for birds that are rare, threatened, or sensitive to habitats changes within the EU. Each EU country must designate areas to protect birds covered by the Birds Directive. These bird protection areas are called Special Protection Areas (SPA).

Natura 2000 is the name of the international network of SACs and SPAs in the EU. For each Natura 2000 site, there is a list with habitat types and species, that the specific area is designated for. The purpose of the Natura 2000 network is to ensure a favourable conservation status for the species and habitat types that the specific Natura 2000 sites are designated to protect. Also, the Habitats Directive obliges Member States to provide general protection for designated animal and plant species listed in Annex IV of the directive.

According to the guideline: "*Vejledning om ansøgnings- og tilladelsesprocessen for repowering og forlængelse af elproduktionstilladelse (levetidsforlængelse) af bestående elproduktionsanlæg på havet*" (Energistyrelsen, 2024), when applying for repowering, repowering in combination with a lifetime extension, or applying for an extension of the electricity production permit (lifetime extension), without any technical and physical changes to the existing facility, the owner of the OWF must submit a Natura 2000-screening (væsentlighedsvurdering), as well

as an assessment of Annex IV species according to the European Habitat and Bird Directives. The screening and assessment should be carried out in accordance with the Bekendtgørelse om administration af internationale naturbeskyttelsesområder og beskyttelse af visse arter vedrørende projekter om etablering m.v. af elproduktionsanlæg og elforsyningsnet på havet (BEK nr 812 af 21/06/2024).

A Natura 2000-screening (væsentlighedsvurdering), based on the latest knowledge, outlining the potential impacts of the project on Natura 2000 sites must be prepared according to mentioned relevant legislation. This also applies in situations where a time-limited permit is to be extended, even if permission is sought to continue an unchanged activity. If it cannot be excluded that the project may affect the conservation objectives of a Natura 2000 site, an appropriate impact assessment (konsekvensvurdering) must be prepared. Authorities are required to process cases based on informed knowledge, and therefore new relevant knowledge must be included.

There is no clear line between the Natura 2000-screening and the appropriate assessment. However, it is stated in the guidance to Article 6 of the Habitat Directive that mitigating measures (i.e., measures to avoid or reduce negative effects) cannot be included in Natura 2000-screenings when assessing whether a plan or project will cause significant impacts (Europa-kommissionen, 2019). This has been further specified in a decision by the Danish Environment and Food Board of Appeal in relation to construction of Vesterhav Syd OWF (Miljø- og Fødevarerklagenævnet, 2021). Therefore, if mitigating measures are necessary to prevent significant impact on a Natura 2000 site an appropriate Natura 2000 impact assessment must be conducted.

1.2 Method

The Natura 2000-screening is based on existing knowledge about the areas and the designated habitat types and species that may potentially be affected. For mapping of the nearby Natura 2000 site the following has been used:

- Environmental GIS for Natura 2000 plans 2022-2027
- Environmental Impact Assessment for Nysted Offshore Windfarm (SEAS, 2000)
- Environmental Monitoring (1999-2005 (birds pre- and post construction) (Masden, Haydon, Fox, Furness, & Bullman, 2009), NOVANA 2018-2023)

For the screening, an overall description based on the Natura 2000 areas that occur within the region which is followed by a description of the occurrence and distribution of the species and habitat types in the basis for designation for relevant Natura 2000 areas.

Data on the distribution, conservation status and state of designated habitat types and species are based on basic analyses (2022-2027) as well as Natura 2000 plans (2022-2027) for relevant Natura 2000 sites.

In the screening it is assessed whether lifetime extension could affect the conservation objectives of a Natura 2000 site. The screening considers existing conditions, as well as any cumulative effects with other plans and projects.

2. Nysted Offshore Windfarm

2.1 Existing Operation

Nysted Offshore Windfarm is located south of Lolland and the Rødsand lagoon. The windfarm was built in 2003 and consists of 72 2.3 MW wind turbine generators with a total capacity of 165.6 MW. See Figure 2.1. The closest turbine is located approx. 10 km from land.

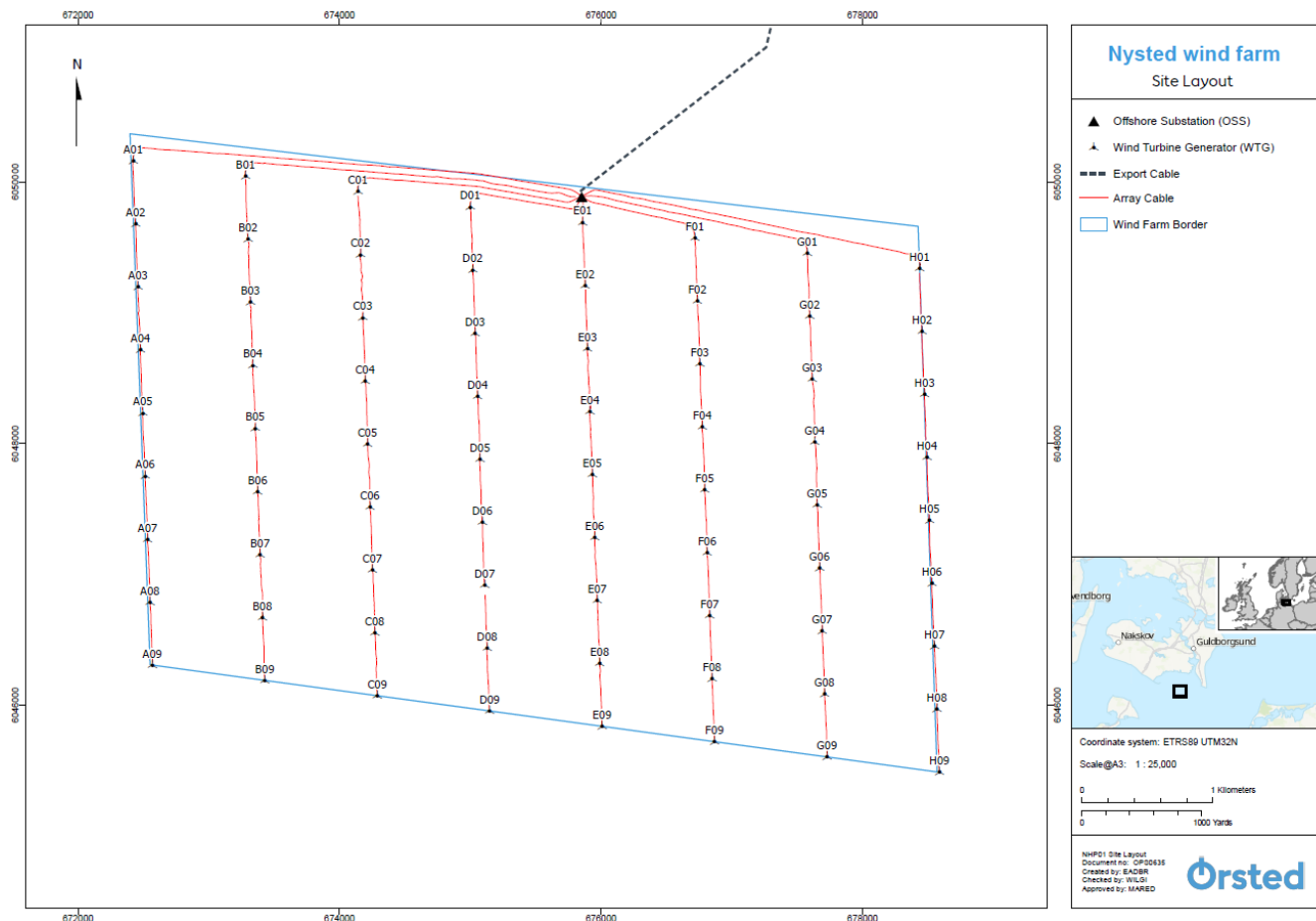


Figure 2.1: Site layout of NHP including turbine numbers, array, and export cables. Map from Ørsted.

The turbines are placed in eight rows each with 9 turbines. The windfarm is connected by internal cables laid out in straight lines between the turbines. The distance between the rows is 850 meters and the distance between the turbines in the individual rows is 480 meters. An export cable connects the windfarm to the onshore grid. The water depth inside the windfarm area varies between 5 and 15 meters.

An overview of the technical specifications of the wind farm is provided in Figure 2.2.

2.2 Planned Operation

The production license grants the right to operate Nysted Offshore Windfarm for 25 years with an expiry of June 2028. A lifetime extension of the windfarm does not involve the replacement of any parts of the offshore

wind turbines, coating etc. Furthermore, no technical, physical nor operational changes to the offshore wind farm are planned with the lifetime extension.

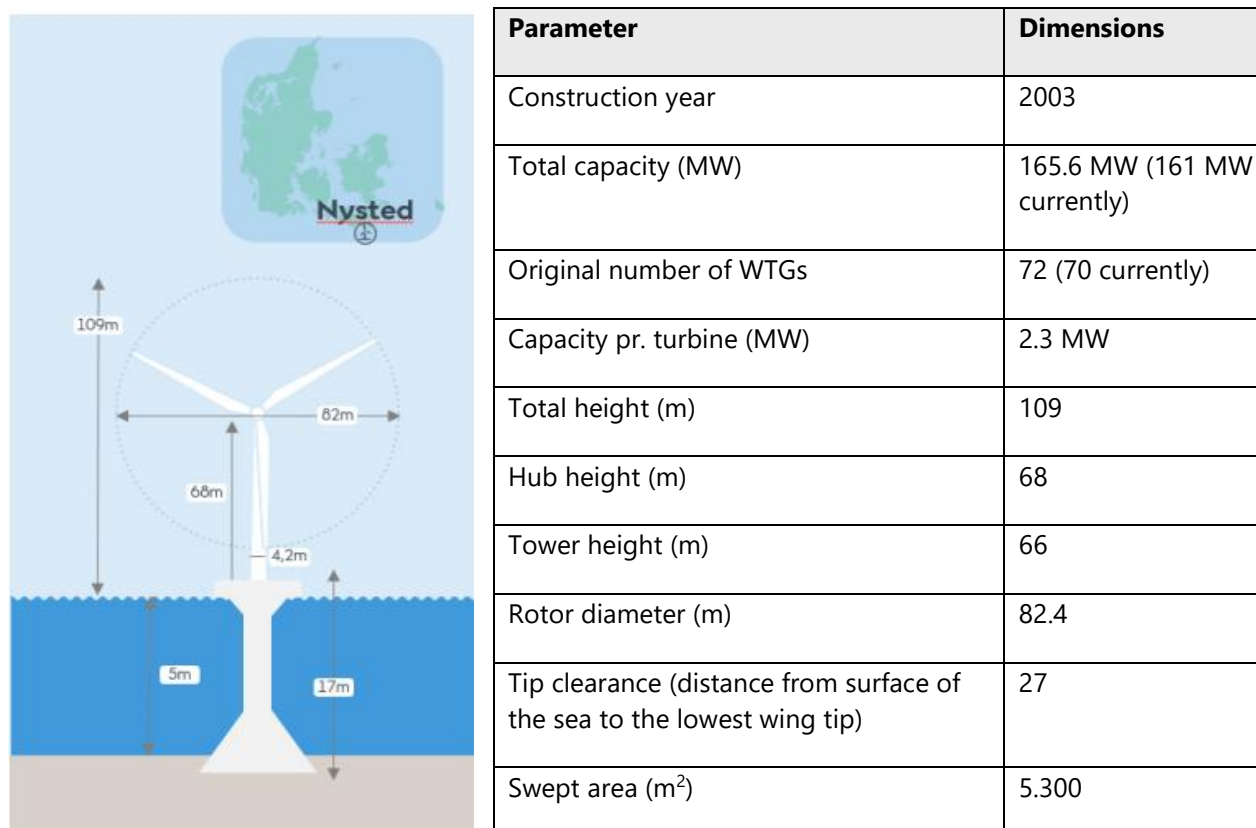


Figure 2.2 Design of WTG and foundations at NHP. The turbines are placed on gravitation foundations cast in concrete; cone-shaped concrete benches that stand on the seabed and protrude above the sea surface

3. Marine Natura 2000 areas and potential impacts

The following describes nearby Natura 2000 sites that must be considered in the Natura 2000 screening.

As shown in Figure 3.1, there are numerous Natura 2000 sites nearby Nysted Offshore Windfarm in both Danish and German territory. The closest Natura 2000 sites are N173 (approx. 200 m north of NHP), N177 (approx. 1.6 km north of NHP), DE1332301 (approx. 1.7 km southwest of NHP), DE1533301 (approx. 2.5 km southwest of NHP) and DE13339301 (approx. 2.6 km east of NHP). However, not all areas are relevant in relation to the lifetime extension of Nysted Offshore Windfarm as the potential effects of the windfarm is limited in time and space and depend on what the various sites are designated to protect.

The designation basis for Natura 2000 sites, which could potentially be affected by the lifetime extension of Nysted Offshore Windfarm, includes: marine habitat types, marine mammals, birds, and bats. In the following sections, it is described and assessed whether marine habitat types, marine mammals, birds, and bats could possibly be impacted from the lifetime extension of the offshore windfarm and therefore is included in the screening.

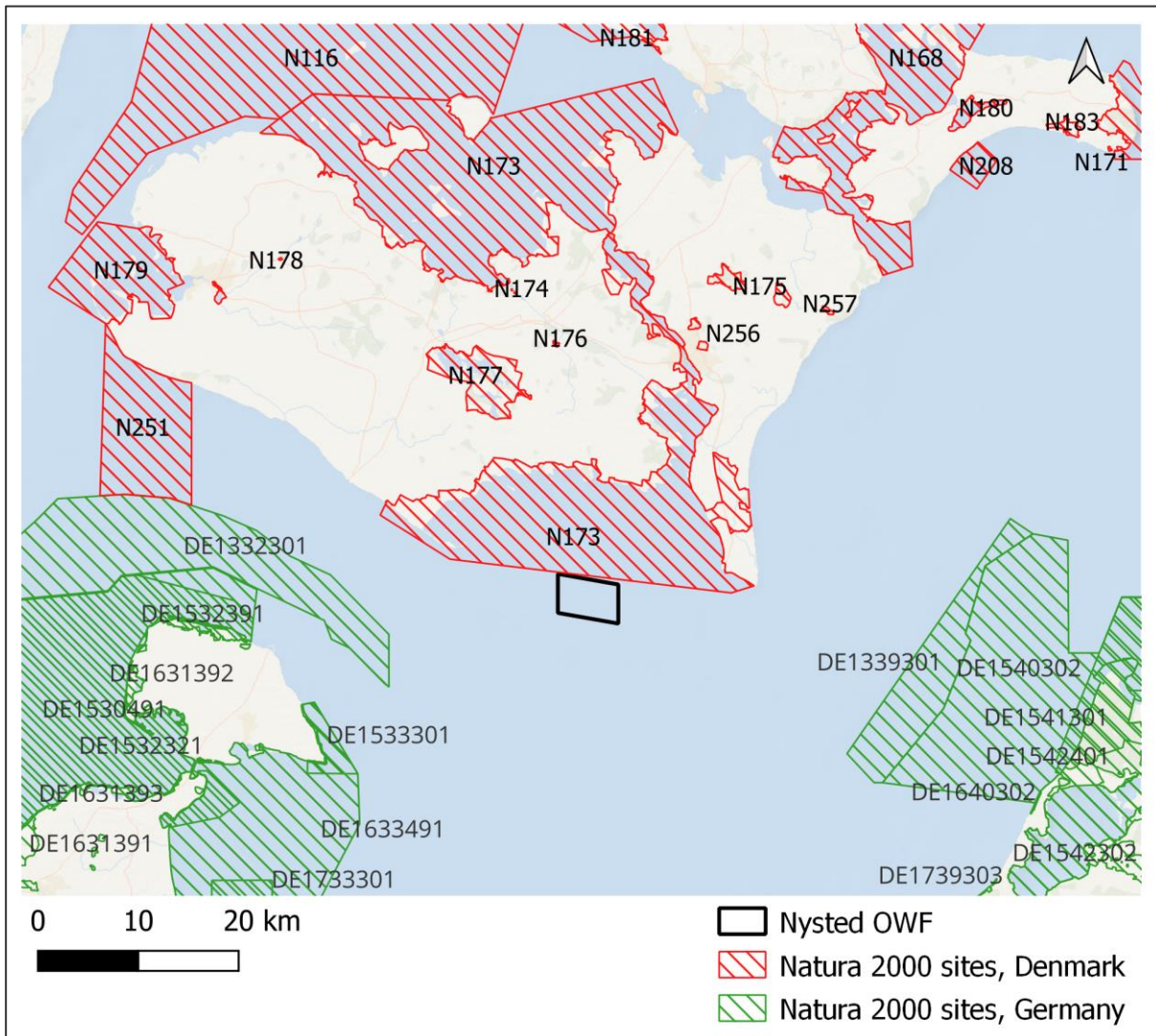


Figure 3.1 Nysted Offshore Windfarm and surrounding Natura 2000 sites in Denmark and Germany

Current knowledge of the relevant Natura 2000 sites and the habitats and species they are designed to protect are reviewed in the following and for the sites, which could be affected from the lifetime extension of Nysted Offshore Windfarm, a Natura 2000 screening is conducted.

3.1 Marine habitat types

Nysted Offshore Windfarm is not located within a Natura 2000 site (the nearest Natura 2000 sites are N173 approx. 200 m north of the offshore wind farm area). Furthermore, the lifetime extension does not contain any activity introducing increased levels of suspended sediments, sedimentation, loss of habitat etc. Therefore, there is no risk that a lifetime extension will affect any marine habitat types within any Natura 2000 sites, and marine habitat types are not addressed further.

3.2 Marine mammals

The nearest Natura 2000 site N173 has – besides marine habitat types, birds, and bats - been designated because of the presence of grey seal, harbour seal and harbour porpoise, and these species are also the designation basis for other Natura 2000 sites in the area. Seals and harbour porpoise actively uses sound to navigate and find prey and thus could potentially be affected by changes in underwater noise. Seals and harbour

porpoise is included in the screening in section 5.1. However, since a lifetime extension does not contain any construction activities only operational noise will be addressed as part of the screening.

3.3 Birds

Birds are present within and around the location of Nysted Offshore Windfarm. Collision risk of birds was assessed in the environmental impact assessment (EIA) for the windfarm (SEAS, 2000) and later monitored both pre -and post construction of the wind farm (Petersen, Christensen, Kahlert, Deshom, & Fox, 2006). The environmental impact assessment considered time of year, flight heights and wind directions in the assessment of collision risk. It did not consider possible avoidance behaviour in some bird species post construction of the offshore windfarm.

Several bird species are using the wind farm area or other nearby areas and thus birds are included in the screening in section 5.2. The screening will include collision risk as well as the risk of displacement of birds.

3.4 Bats

Bats are associated with the onshore environment but are also observed offshore. Furthermore, bats from some European populations migrate in autumn (August, September) and spring (April/May) covering hundreds of kilometres between their summer and winter areas (e.g. Ahlen et al. (2007), Lagerveld et al. (2020)).

There is no risk of bats colliding with stationary structures such as an offshore wind turbine in calm weather, but bats have difficulty detecting moving turbine rotors (Rydell, J. et al., 2012; Rydell, Ottvall, Pettersson, & Green, 2017; Therkildsen & Elmeros, 2017) and there is thus a risk of collision during weather conditions where bats fly offshore and turbine rotors are moving. Thus, collisions of bats are a potential risk as bats may not be able to register rotating turbine rotors.

In Denmark, 17 species of bats have been registered (Møller, Baagøe, & Degn, 2013) and 18 if including, the newly observed grey long-eared bat (*Plecotus austriacus*) in northern Jutland (Arter.dk, 2024b). Not all species are relevant for the windfarm area, though. Studies show that the four species nathusius pipistrelle, soprano pipistrelle, parti-coloured bat and common noctule are likely to be found in the NHP area (WSP, 2024a). These species have mostly been registered offshore during periods of migration in Spring and Autumn but during nights of optimal weather conditions (low wind, higher temperatures, and no precipitation) where they may likely use the area for foraging. The surrounding Natura 2000 sites are however not designated to protect these species. During bat surveys in relation to the Fehmarn Belt project in 2009 and 2010 (FEBl, 2013) the pond bat (*Myotis dasycneme*) was detected. Although the pond bat was only detected a single time during the offshore surveys in Fehmarn Belt, the species has previously been documented to forage in the Swedish part of the Baltic Sea (Ahlen, Baagøe, & Bach, 2009) far from NHP. Natura 2000 site no. 173, that is located approx. 200 m north of the offshore wind farm area, is designated to protect pond bat as well as the western barbastelle. These species will be included in the screening in section 5.2.

3.5 Summary

Based on the description of marine Natura 2000 areas and potential impacts from a lifetime extension of Nysted Offshore Windfarm the below Table 3.1 gives an overview of subjects addressed in the Natura 2000 screening. Only Natura 2000 site no. 173: Smålandsfarvandet nord for Lolland, Guldborgsund, Bøtø Nor og Hyllekrog-Rødsand will be included.

Table 3.1 subjects to be included in this Natura 2000 screening of Natura 2000 site no. 173.

Impact	Species group	Included in screening (yes/no)
Underwater noise	Marine mammals	Yes
Collision	Birds	Yes
Displacement	Water birds	Yes
Collision	Bats	Yes

4. Natura 2000 site N173 (Smålandsfarvandet nord for Lolland, Guldborgsund, Bøtø Nor og Hyllekrog-Rødsand)

Natura 2000 site N173 is a coastal marine area with a long, flat, and meandering coastline. It consists of an off-shore area north of Lolland and Falster connected through Guldborgsund to the marine area near Rødsand and Hyllekrog-tangen in the south. The Natura 2000 site covers SAC H152 and the four SPAs SPA no. 82, 83, 85 and 86 (Figure 4.1). The area has a total of 78,850 hectares, of which 69,680 hectares are marine (Miljøstyrelsen, 2021).

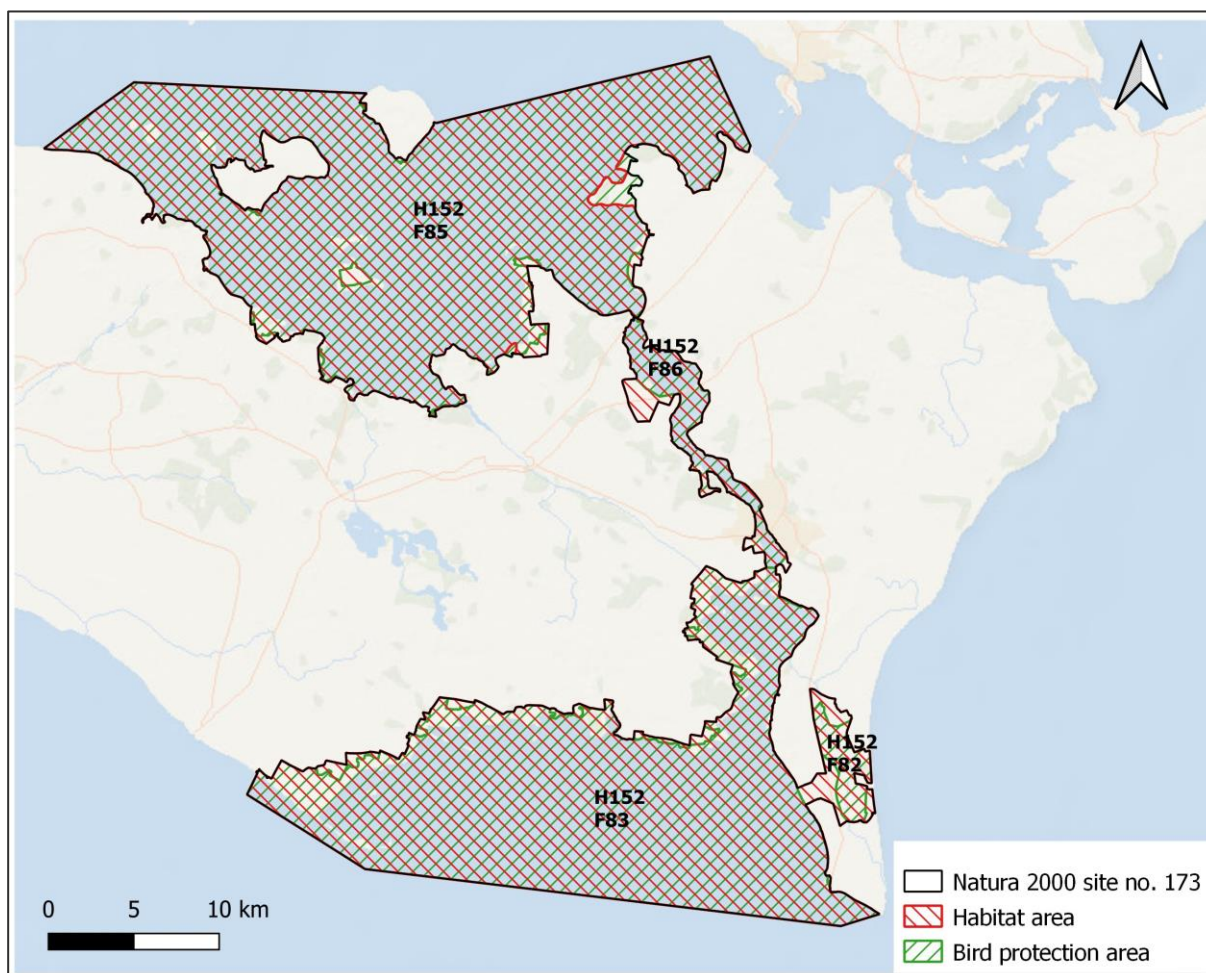


Figure 4.1 Natura 2000 site no. 173 which comprises of SAC no. 152 and the SPAs no. 82, 83, 85 and 86.

4.1 Basis for designation

The basis for designation in N173 covers both habitat types and species. All the habitat types and species that the Natura 2000 area is designated to protect are listed in Table 4.1 for habitat types and species and Table 4.2 for birds.

Species in bold could potentially be impacted by the lifetime extension of Nysted Offshore Windfarm and are included in the following Natura 2000-screening. Besides marine mammals and bats this includes all bird species designated for the nearest SPAs (no. 82 and 83), since these species theoretically could be impacted by lifetime extension of Nysted Offshore Windfarm due to the risk of collision or displacement.

All species marked in bold are described in the Natura 2000 screening in section 5.

Table 4.1 Habitat types and species, for which SAC no. 152 is designated to protect within Natura 2000 site no. 173 (Miljøstyrelsen, 2021). Species in bold are included in the Natura 2000 screening.

Designation for Special Area of Conservation no. 152		
Habitat types	Sandbanks (1110)	Mudflats sandflats (1140)
	Coastal lagoon* (1150)	Large shallow inlets and bays (1160)
	Reef (1170)	Annual vegetation of drift lines (1210)
	Perennial vegetation of stony banks (1220)	Vegetated sea cliffs (1230)
	Annuals colonizing mud and sand (1310)	Atlantic salt meadows (1330)
	Embryonic shifting dunes (2110)	White dunes (2120)
	Grey dunes* (2130)	Humid dune slacks (2190)
	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the <i>Isoëto-Nanojuncetea</i> (3130)	Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara spp.</i> (3140)
	Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> (3150)	Natural dystrophic lakes and ponds (3160)
	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>)* (6210)	Species-rich <i>Nardus</i> grasslands, on silicious substrates in mountain areas* (6230)
	<i>Molinia</i> meadows on calcareous, peaty, or clayey-silt-laden soils (<i>Molinion caeruleae</i>) (6410)	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (6430)
	Alkaline fens (7230)	<i>Luzulo-Fagetum</i> beech forest (9110)
	<i>Asperulo-Fagetum</i> beech forests (9130)	Medio-European limestone beech forests of the <i>Cephalanthero-Fagion</i> (9150)
	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the <i>Carpinion betuli</i> (9160)	Bog woodland* (91D0)
	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> * (91E0)	
Species	Hermit (5380)	Narrow-mouthed whorl snail (1014)
	Desmoulin's whorl snail (1016)	Warty newt (1166)
	Grey seal (1364)	Harbour seal (1365)
	Harbour porpoise (1351)	Barbastelle Bat (1308)
	Pond bat (1318)	

Table 4.2 SPAs and the designated bird species within Natura 2000 site no. 173 (Miljøstyrelsen, 2021). Species in bold are included in the Natura 2000 screening.

Designation for Special protection area no. 82		
Birds	Bittern (Y)	Bean goose (T)
	Greater white-fronted goose (T)	Barnacle goose (T)
	Western marsh harrier (Y)	Corn Crake (Y)
	Spottet crake (Y)	Crane (TY)
	Pied avocet (Y)	Woodlark (Y)
Designation for Special protection area no. 83		
Birds	Cormorant (T)	Bittern (Y)
	Mute swan (T)	Whooper swan (T)
	Bean goose (T)	Barnacle goose (T)
	Dark-bellied brent goose (T)	Common goldeneye (T)
	Smew (T)	White-tailed eagle (TY)
	Goosander (T)	Western marsh harrier (Y)
	Spottet crake (Y)	Eurasian coot (T)
	Pied avocet (Y)	Little tern (Y)
	Sandwich tern (Y)	Common tern (Y)
	Arctic tern (Y)	Short-eared owl (Y)
Red-backed Shrike (Y)		
Designation basis of Special protection area no. 85		
Birds	Bittern (Y)	Mute swan (T)
	Whooper swan (T)	Greylag goose (T)
	Barnacle goose (T)	Northern shoveler (T)
	Tufted duck (T)	Common goldeneye (T)
	Red-breasted merganser (T)	White-tailed eagle (TY)
	Western marsh harrier (Y)	Eurasian coot (T)
	Pied avocet (Y)	Little tern (Y)
	Common tern (Y)	Arctic tern (Y)
Designation basis of Special protection area no. 86		
Birds	Mute swan (T)	Whooper swan (T)
	Greylag goose (T)	Common pochard (T)
	Tufted duck (T)	Common goldeneye (T)
	White-tailed eagle (TY)	Goosander (T)
	Western marsh harrier (Y)	Avocet (Y)
	Red-backed Shrike (Y)	

4.2 Objectives of conservation

In the plan for Natura 2000 site no. 173, several objectives of conservation are listed to help ensure the integrity of the site and to help achieve a favourable conservation status for the species and habitat types that the area is designated for (Miljøstyrelsen, 2023). Relevant objectives for the Natura 2000 site in relation to the lifetime extension of Nysted Offshore Windfarm are listed below. This includes overall objectives and more concrete objectives.

- To ensure that the large marine areas have a rich flora and fauna that provide optimal living conditions for the internationally important occurrences of migratory waterbirds, including mute swan, whooper swan, greylag goose, barnacle goose, as well as tufted duck and Eurasian coot, which are in decline.
- To protect the large number of marine and coastal bird species, as well as the harbour seal and grey seal, which are only found in three Natura 2000 sites, from human disturbances.
- For species without an assessment system on status (e.g., bats), the goal is to contribute to achieving a favourable conservation status at the biogeographical level. The condition of the habitats (assessed from species occurrence and distribution) and the total area must be stable or advancing.
- For migratory birds that may appear in nationally or internationally significant numbers in the SPA, their resting and overnight areas must be secured or advancing, so that the area can continue to support a population of national or international significance.
- For migratory birds that do not appear in nationally or internationally significant numbers in the SPA, the goal is to secure or improve their moulting, resting, and overnight areas.

5. Natura 2000 screening

The following describes the potential impacts that are expected to occur in connection with the lifetime extension. As a basis for the Natura 2000 screening the existing offshore windfarm is being assessed as it is (e.g. no changes in operation as described in section 2.2).

5.1 Marine mammals

Natura 2000 site no. 173 is designated to protect harbour porpoise as well as the grey and harbour seal. These species are described in the following section and a screening of potential impacts from operational underwater noise is conducted.

5.1.1 Harbour porpoise

Harbour porpoises actively use sound, in the form of echolocation, to navigate and find prey. The porpoise emits high-frequency sounds (peak frequency at 130 kHz) and listens for the returning echoes (Møhl & Andersen, 1973). Porpoises hear well in the frequency range of 10-160 kHz. Underwater noise from offshore wind turbines is low frequent and primarily below 1kHz (Bellmann, Müller, Scheiblich, & Betke, 2023). It derives primarily from mechanical vibrations in the nacelle (gearbox etc.), which are transmitted through the tower and radiated into the surrounding water. There is a strong dependency between wind speeds and radiated noise levels (Pangerc, Theobald, Wang, Robinson, & Lepper, 2016). At the lowest wind speeds, below the cut-in, there is no noise from the turbine. Above cut-in, there is a pronounced increase in the noise level with increasing wind speed, until the noise peaks when nominal capacity is reached in output from the turbine (Pangerc, Theobald, Wang, Robinson, & Lepper, 2016). For the planned Thor OWF, where much larger wind turbines are expected to be installed (14 MW versus 2.3 MW at NHP) the impact distances from underwater noise on marine mammals were modelled (NIRAS, 2023). Impact distances on behaviour of harbour porpoises were all estimated to be below 100 m from any individual turbine within the operational offshore wind farm. Hence, it is reasonable to expect that an impact distance from underwater noise on harbour porpoise behaviour at Nysted Offshore Windfarm will not exceed (and likely be less than) the distance below 100 m modelled for Thor OWF. Figure 5.1 shows the estimated impact zones of underwater noise. Given that the Natura 2000 site no 173 are not located within 100 meters of Nysted Offshore Windfarm, operational underwater noise will not propagate into this Natura 2000 site (or any other Natura 2000 sites designated for harbour porpoise) and therefore there is no risk that the lifetime extension of Nysted Offshore Windfarm will impact this designated species. The lifetime extension of the windfarm will not prevent maintenance/achievement of favorable conservation status for the harbour porpoise nor prevent fulfilment of conservation objectives for this species in the Natura 2000 site no. 173.

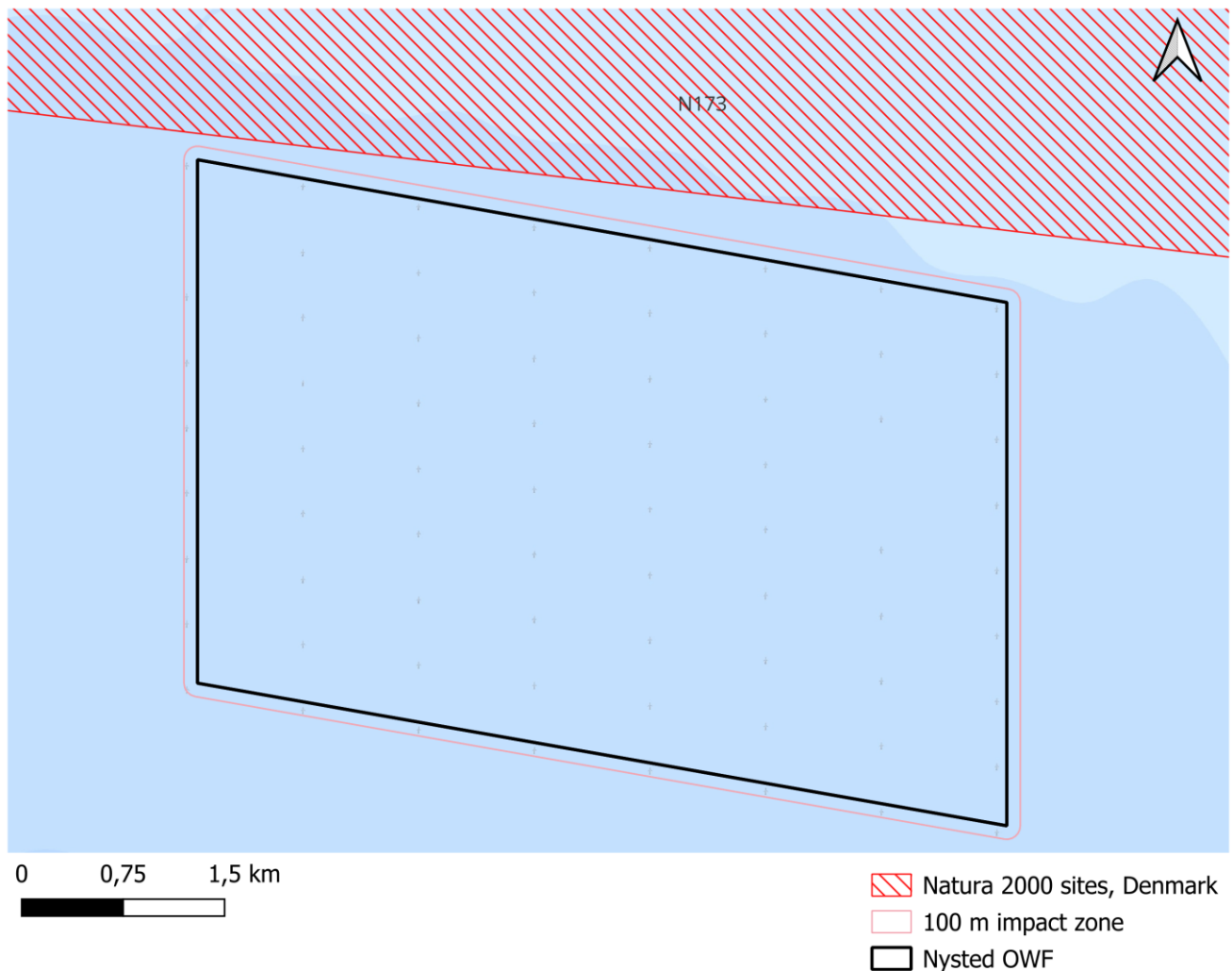


Figure 5.1 Nysted Offshore Windfarm and estimated impact distances of underwater noise.

5.1.2 Grey and harbour seal

Seals have a better hearing in the low-frequency range, compared to harbour porpoises, and will therefore likely be able to hear the underwater noise from the wind turbines in operation at a greater distance. However, seals are more tolerant of underwater noise (Kastlein, 2011; Southall, et al., 2019), and studies have shown that harbour seals directly approach and forage around wind turbine foundations (Russel, et al., 2014). Seal tolerance towards offshore wind farms is supported by the seal monitoring program that was conducted in relation to construction and operation of Nysted Offshore Windfarm. The study found that the presence of Nysted Offshore Windfarm had no or potential positive effects on seals (Teilmann, Tougaard, Carstensen, & Dietz, 2006).

The Natura 2000 site 173 is not located within 100 meters of the offshore windfarm, and therefore operational underwater noise will not propagate into the Natura 2000 site (or any other Natura 2000 sites designated for grey and/or harbour seal) - and thereby there is no risk that the lifetime extension will impact designated species.

The lifetime extension of Nysted Offshore Windfarm will not prevent maintenance/achievement of favorable conservation status for grey or harbour seal nor prevent fulfilment of conservation objectives for these species in the Natura 2000 site no. 173.

5.2 Birds

As seen in Table 4.2, Natura 2000 site N173 is designated to protect a number of different bird species. Theoretically, all the species designated for SPA F83 can interact with the Nysted Offshore Windfarm and collide with the turbines when they move in and out of the SPA or be affected due to the risk of displacement. In the following sections each of the bird species designated for SPA F83 is described. Afterwards, a screening of potential impacts from displacement and collision for these species is conducted.

Mute swan

The mute swan is common in Denmark all year round and numbers are continuing to increase (Nielsen, et al., 2024). As a migrant species it is spread along the coast in shallow waters and in inland lakes. The population is stable both national and in the special protection area (SPA). The population in the SPA varies between a few hundred to several thousands. All the SPAs inside the Natura 2000-site N173 consists of some of the most important Danish wintering areas as the shallow waters near Lolland is very undisturbed and suitable for the species (Miljøstyrelsen, 2021). Environmental status of the species is good within the general Baltic Sea region (HELCOM, 2023).

Whooper swan

The whooper swan breeds in northern Europe and Russia and winters in northwestern Europe mainly in Denmark. The wintering birds used to be found in shallow fjords and sheltered bays with sufficient underwater vegetation but are today mainly found inland on winter crops in fields (Miljøstyrelsen, 2021). The wintering population in Denmark is around 60,000 and increasing (Nielsen, et al., 2023) and with up to 1,000 wintering individuals in the SPA 83 (Miljøstyrelsen, 2021). Environmental status of the species is good within the general Baltic Sea region (HELCOM, 2023).

Common goldeneye

The common goldeneye rarely breeds in Denmark, but it commonly over-winters and is found in most Danish waters – especially the larger fjords (e.g. Limfjorden, Roskilde Fjord etc.) (Nielsen, et al., 2024). Their abundance is highly variable and in the period 2004-2017 numbers fluctuated between 5 to 4500 resting birds within SPA no. 83 (Miljøstyrelsen, 2021). The species is depended on undisturbed foraging areas and the SPA offers larger areas with shallow bays and little disturbance and are considered as good a resting habitat for the species (Miljøstyrelsen, 2021). In general, the population in Denmark is stable/fluctuating and the environmental status is good within the general Baltic Sea region (HELCOM, 2023) (Nielsen, et al., 2024).

Smew

The smew does not breed in Denmark, but winters in larger lakes and protected bays. The number of wintering smews in Danish waters has been increasing since 2004 but has also shown large fluctuations depending on the severity of the winter in Denmark (Miljøstyrelsen, 2021). The species is however a widespread winter visitor in Danish waters (Nielsen, et al., 2024). It forages on small fish in shallow sea areas close to shore and as SPA no. 83 contains large shallow bays with little disturbance, it is assessed that there are currently no threats to the species in the area (Miljøstyrelsen, 2021). Environmental status of the species is good within the general Baltic Sea region (HELCOM, 2023).

Goosander

The goosander is a common winter resident in most of the country but is only found breeding in low numbers. Along with other shallow fjords and bays, SPA no. 83 constitutes an important wintering area for the species (Miljøstyrelsen, 2021). The number of wintering goosanders in Danish waters fluctuates considerably but the population trend is stable (Nielsen, et al., 2024). Also within SPA no. 83 numbers fluctuate but here, an

increasing trend is seen (Miljøstyrelsen, 2021) and in the general Baltic sea region the goosander has a good environmental status (HELCOM, 2023).

Eurasian coot

The Eurasian coot is a common breeding bird in Denmark and the species is also a numerous winter guest. The species primarily feeds on aquatic plants and is found very close to shore in shallow water along the coasts. The shallow bays, sandbanks, and nearby salt marshes within the SPA F83 provide the necessary feeding grounds for the species (Miljøstyrelsen, 2021). Like the smew, their presence is greatly affected by the severity of the winter and if water areas are covered by ice many coots die (Miljøstyrelsen, 2021). The population usually returns to a similar level after a few years and from the period 2010-2021 the population trend in Denmark has been stable (Nielsen, et al., 2024). Within the Natura 2000 site no. 173 the number of resting birds highly varies from year to year and has fluctuated between 600 to almost 11,000 in individual years but often more than 2,000 resting individuals are found (Miljøstyrelsen, 2021). In the general Baltic Sea region, the population has a declining trend and environmental status is poor (HELCOM, 2023).

Cormorant

The cormorant can be found in marine, coastal and freshwater areas all over Denmark where they feed exclusively on any fish of the right size. The species is widely distributed as a breeding bird in Denmark and a numerous migratory guest. Cormorants occur in the greatest numbers along the coasts, but individuals and smaller flocks are also seen in lakes and streams. In winter, the largest concentrations are typically seen in the inland waters, where most breeding colonies are also found. The number of cormorants wintering in Danish waters is increasing, but with large variations from year to year. From 1991-2023, the nationwide midwinter counts fluctuated between approx. 12,300 and 35,000 cormorants (Nielsen, et al., 2024). In the SPA F83 there have previously been 2,000-3,000 cormorants but in later years usually between 500 and 1,000 (Clausen, Petersen, Bregnballe, & Nielsen, 2019).

Bittern

Bitterns are strongly associated with localities with large water-covered reedbeds by lakes, fjords, and streams. The species is predominantly sedentary but can migrate southwest in connection with severe winters. Bittern is found breeding all over Denmark with an estimated population of 505 pairs (Nielsen, et al., 2024). Bittern do not breed in SPA 83 and in the Natura 2000 site 173 only in the nearby SPA 82, Bøtø Nor, in low numbers (1-2 pairs). Despite the low numbers, bitterns have good, suitable habitat in the SPA (Miljøstyrelsen, 2021).

Spotted crake

Spotted crake breeds in fresh swamp areas where the water depth does not exceed 30 cm. The species appears prefer the carex-zone of the water bodies but is also registered in uncultivated meadow areas in river valleys with occasional flooding. The species has always had a highly fluctuating occurrence in Denmark estimated to 69-168 pairs (Nielsen, et al., 2024). Spotted crake has been breeding in SPA F83 on a coastal stretch at Hyllekrog-Rødsand. The species was last recorded breeding in 2015 at Billitse Mølle Lake near Saksfjed. The habitat in the SPA 83 is assessed to be suitable for the species and the occurrence is dependant of influx of breeding birds from the central Europe (Miljøstyrelsen, 2021)

Red-backed shrike

Red-backed shrike breeds all over Denmark in more or less open habitats, including heaths, grasslands, cleared or storm-fallen forest areas and river valleys under overgrowth. The Danish breeding population was estimated at 1500 pairs with a stable trend (Nielsen, et al., 2024). The species is a migratory bird that winters in East and South Africa. The species is breeding in SPA F83 with 3 at Saksfjed in 2019 (Miljøstyrelsen, 2021) and similar 2 pairs in 2022 (Nielsen, et al., 2024). But it is not yet possible to determine the local population trend.

Little tern:

In Denmark, the little terns breed predominantly on open vegetation and rocky beaches and a bird that winters along the coasts of West Africa. Little terns breed most often in colonies but is also found solitary breeding. The Danish breeding population is 610 pairs (Nielsen, et al., 2024). In the SPA F83 the entire breeding population can be seen at Rødsand. Based on data from the monitoring, it is estimated that stable breeding population of 20-30 pairs on Rødsand within the Natura 2000 area. The breeding sites are characterised by being vegetation-free or with low vegetation and without disturbance. Thus, there are not considered to be significant, current threats to the species' breeding occurrence in the area. (Miljøstyrelsen, 2021)

Sandwich tern:

Sandwich tern breed in Denmark, usually on smaller islands and islets with lower vegetation, often in association with black-headed gull colonies. The national breeding population has since the late 1990s fluctuated quite a bit with most in the mid-2000s, since then the breeding population has been stable with 3,000-4,000 pairs but exhibits large year-to-year and geographic variations. The species is a migratory bird that winters along the west coast of Africa. Sandwich tern is designation for SPA F83 where it is found at Rødsand. Here it was last recorded breeding in 2017 with 91 pairs, whereas it was not found breeding at the same location in 2019 (Miljøstyrelsen, 2021). In 2023 it was breeding with less than 100 pairs at Hyldekrog (Nielsen, et al., 2024).

Common tern:

Common tern breed in colonies on islands and islets along the coast, often in the company of arctic terns or black-headed gull or inland with black-headed gull. The species is migratory and winters along the coasts of West Africa. The Danish population have since 2006 been increasing to the present 1,500 pairs which is similar to the population in late 1980s (Nielsen, et al., 2024). In SPA F83 monitoring data shows that breeding numbers varies greatly from year to year. In both 2017 and 2019, however, a somewhat higher number than before, which may indicate an increase in the species' local population (Miljøstyrelsen, 2021). In 2023 a population of 50-100 was counted at Hyldekrog (Nielsen, et al., 2024).

Arctic tern:

Arctic terns breed in Denmark mainly on small uninhabited islands and sandbars with sparse vegetation. The species is a migratory bird that winters in the open water belt around Antarctica. The Arctic tern is Denmark's most common breeding tern species and occurs in colonies scattered along the Danish coasts and fjords except on Bornholm. The Danish breeding population has declined both in number and in distribution since the 1990s where the national population was 8,000-10,000 pairs. Now the national population is estimated to app. 2,000 pairs in 2023 (Nielsen, et al., 2024). The breeding population in SPA F83 show great variation in the number of breeding pairs from year to year. However, it can be stated that there is a more permanent breeding populations in the area of 50-100 pairs (Miljøstyrelsen, 2021) (Nielsen, et al., 2024).

Pied avocet:

The pied avocet breeds mainly in colonies, primarily along shallow fjord coasts and in salts or brackish coastal lagoons where there is shallow water on mudflats and open meadows with short vegetation. The nests are often placed on small islands, preferably where they are safe from foxes and other predators. The species is a migratory bird that winters in southwestern Europe and in West Africa. The national breeding population shows a decline between 2009 and 2014, after which the species has increased. The population estimate for the total Danish breeding population of 3,400 pairs in 2009, decreasing to approximately 2,500 pairs in 2014, after which the breeding population in the years 2017 to 2023 has been relatively stable with between 2,800 and 3,000 breeding pairs (Nielsen, et al., 2024). In the SPA F83 pied avocet population is fluctuating but has a stable trend in the last 20 years. In 2019 75 breeding pairs was registered, which is somewhat higher than in 2017, when 27 pairs were registered (Miljøstyrelsen, 2021) but similar to the current 50-150 pairs in 2023 (Nielsen, et al., 2024).

Bean goose:

The Danish population of bean geese consists of two different breeds – the Taiga Bean Goose and the Tundra Bean Goose. In the Natura 2000 plan for N173 there is made no distinction between these two species (Miljøstyrelsen, 2021). The Taiga Bean Goose occurs in a few places in Jutland, where the majority most often are found in the Lille Vildmose area, and somewhat fewer birds in Thy. The Taiga Bean Goose also occurs in the eastern part of Denmark, where they often occur in mixed flocks with tundra bean goose. It is presumed that the small population in the North and Central Jutland is an independent, separate population from the Taiga Bean Geese found elsewhere in the country. Tundra Bean Goose was previously rare in Denmark, but after 2000 it has appeared in larger flocks mainly in Eastern Denmark. The bean goose populations have fluctuated over the years. It is estimated the total national migratory population of the Taiga Bean Goose has shown some decline in Denmark and the latest estimates is 2,000-4,000 taiga bean geese in 2022 and 2023 (Nielsen, et al., 2024). In Denmark, the population of tundra bean goose has been fluctuating since 2005 but have for the last years increased to app. 4,000 tundra bean geese on mainly Lolland and Falster (Nielsen, et al., 2024). Bean geese are primarily seen in the southern part of the Natura 2000-site and in SPA F83 the highest number of resting individuals in the last 6 years was 1,261 at Hyllekrog-Rødsand in 2014 (Miljøstyrelsen, 2021).

Barnacle goose:

The barnacle geese that come to Denmark during the migration season primarily come from the breeding grounds in Siberia. The species used to have its main occurrence in the Wadden Sea area, but within the last few decades the species has expanded its wintering area to include West and North Jutland and is now registered in large numbers in Eastern Denmark. Since the mid-1980s, the number of barnacle geese has been increasing rapidly in Denmark to a wintering population of up to 343,397 in 2022 (Nielsen, et al., 2024). In SPA F83 barnacle goose grazes on adjacent salt marshes and fields. At night, the water surfaces are used as a safe and undisturbed area for overnighting. Monitoring data show a varying number of resting barnacle geese from year to year in the areas with up to 14,000 barnacle geese on Rødsand in 2023 (Nielsen, et al., 2024). It is assessed that the areas generally meet the species' requirements for food as well as requirements for safe, undisturbed rest and overnight accommodation. Thus, there are no immediate threats to the species in SPAs F83 and F82.

Dark-bellied brent goose:

Dark-bellied brent goose breeds in Siberia and is found in Denmark as a migratory and winter guest on salt meadow areas and in shallow areas with underwater vegetation. In Denmark, the most important is area of the Wadden Sea with scattered occurrences in other coastal areas of the country. The Danish winter population of dark-bellied brent goose is to a large extent completely dependent on the winter's hardness. At the spring counts, the populations have fluctuated over the years, but have been fairly stable. The national population is estimated at 17,903-21,257 in the spring (Nielsen, et al., 2024). The SPA F83 have a population between 0-1,000 resting individuals with around a 1,000 in the latest counts in 2022 and 2023 (Nielsen, et al., 2024). At Hyllekrog-Rødsand, the species most often uses the shallow sea areas as well as adjacent salt marshes and fields on its way further south to the Netherlands and France, where the majority of the population overwinters. The surrounding fields and the area's salt marshes and large open water surfaces generally meet the species' requirements for food, and its requirements for safe and undisturbed rest and overnight areas.

White-tailed eagle:

White-tailed eagle is a rare breeding bird that is found scattered all over Denmark except Bornholm. After The return of the white-tailed eagle as a Danish breeding bird in the mid-1990s, the population has been increasing and in 2023, 151 breeding pairs were registered in Denmark (Nielsen, et al., 2024). The breeding sites of the species consist of coastal areas or by larger lakes with forests and foraging areas in the form of flat-water coastal areas, lagoons and other bodies of water. The nest is usually placed in a large tree with good visibility

and few man-made disturbances, especially at the beginning of the breeding season. The majority of the Danish white-tailed eagle pairs are found on Lolland and South Zealand, but the species has gradually established stable populations in the other parts of the country. White-tailed eagle is a breeding bird in SPA F83 with 12 breeding pairs on the south coast of Lolland in the period 2004-2019. On the basis of monitoring data, the presence of breeding white-tailed eagles is assessed to be stable in N173 (Miljøstyrelsen, 2021).

Western march harrier:

March harrier breeds primarily in wetlands with well-developed reedbeds and often forages over cultivated fields, meadows, and grasslands. The total Danish breeding population was calculated in the 1980s to approx. 600 breeding pairs but has increased to 800-1,100 pairs in 2023 (Nielsen, et al., 2024). The species is migratory, and the Danish population overwinters in Mediterranean and sub-Saharan Africa. In 2017, 2019 and 2023 1-2 breeding pairs was registered in F83 (Miljøstyrelsen, 2021) (Nielsen, et al., 2024).

Short-eared owl:

Short-eared owl breeds in Denmark on uncultivated areas such as salt meadows, heaths, river valleys and other areas cultural grasslands. It has previously been more common in Denmark, but after 1950 has declined sharply and now occurs only very locally with very few breeding pairs in The Wadden Sea area, and in some years it is certainly found breeding in few other places in the country. The short-eared owl has a fluctuating breeding occurrence in Denmark, but it has for a long time has been a very rare breeding bird for a number of years with now only 1 pair (Nielsen, et al., 2024). The short-eared owl designated for the SPA F83 where the last recorded breeding in 2015 with 1 pair. The breeding occurrence of the species is very sporadic and based on the monitoring results, it is estimated that the species hardly has a permanent breeding population within the SPA F83 (Miljøstyrelsen, 2021).

Greater white-fronted goose:

Greater white-fronted goose breeds circumpolar in the Arctic and winters scattered around Europe from Great Britain to the Black Sea and on to the Middle East. The greater white-fronted geese that are found in Denmark breed high north on the tundra in Siberia and all the way north on to Yuzhny island in the Barents Sea. In Denmark, the overwintering population has been increasing for a number of years with a wintering population of 5,692-25,387 (2018-2023) and a spring population up to 50,583 (2022) (Nielsen, et al., 2024). The greater white-fronted goose arrives in Denmark from breeding grounds in October, where several flocks in mild winters stay in the country, while others move on to other parts of Europe. In Denmark, the areas around Ringkøbing Fjord, in the Wadden Sea and several areas on Zealand are especially and Lolland-Falster the most important resting and wintering areas. In SPA F82 greater white-fronted geese graze on the adjacent grassy and field areas, at night the water surfaces are used as a safe and undisturbed area for overnighting. Monitoring data show a varying number of resting white-fronted geese from year to year in the area but in later years around 1,000 (Nielsen, et al., 2024).

Corn crake:

In Denmark, corncrake is found in moist meadows with a natural and varied flora and relatively tall grass vegetation without trees and shrubs. The species is widespread in Europe and winters in sub-Saharan Africa. The corncrake was previously a fairly common Danish breeding bird and widespread throughout the country, but during the 1900s the species gradually declined and had probably disappeared completely for a short period at the end of the century. The species has since returned to a number of areas with a national population of 31-320 pairs and a increasing population trend (Nielsen, et al., 2024). It is assessed not to be present in the SPA F82 (Miljøstyrelsen, 2021).

Crane:

Cranes breed in Denmark in more or less open, undisturbed bogs, heath bogs and other Wetlands. In recent years, it has also been recorded breeding in even very small localities, where it can have its nest without disturbance from predators. The crane disappeared from Denmark as a breeding bird in mid-1800s. In 1980 there was a single Danish breeding pair and until about the year 2000 the population was relatively small. Since then, a significant increase has been noted in the number of breeding cranes, and it is estimated that the population is still increasing with the latest estimated nation population of 583-900 pairs in 2023 (Nielsen, et al., 2024). Danish cranes are predominantly migratory birds, which winters in Spain, but in mild winters some birds can overwinter in this country. Crane is found in SPA F82 and since 2005, 1 breeding pair has been observed at the site. In 2023 a second pair was registered in the SPA F82 (Nielsen, et al., 2024). Based on monitoring data, it is assessed to be a permanent breeding site.

Woodlark:

Woodlarks breed in open, sandy areas with little scattered vegetation, such as heaths, dune heaths and cleared or storm-fallen areas in coniferous forests. The Danish breeding population was calculated in the 1990s to approx. 300 breeding pairs but has since grown to 650-850 pairs in 2022 (Nielsen, et al., 2024). The species is migratory which overwinters in southwestern Europe. Woodlark is widely distributed in Jutland, but only in patches found on the central and eastern Danish islands. Woodlark is found in SPA F82, and is registered breeding in the area with 2 pairs in 2019 (Miljøstyrelsen, 2021) and in similar numbers in the latest surveys (Nielsen, et al., 2024).

5.2.1 Displacement

Displacement of water birds and the distances at which they react to OWFs have been addressed in several studies and the individual bird species react differently. Welcker and Nehls (2016) has made a review table of impact distances of different bird groups in relation to OWFs and impact distances range from 1 to 6 km (Figure 5.2). More recent studies, however, show that loons (*Gavia sp.*) belong to the most sensitive bird group with respect to the avoidance of OWFs. In loons, impact ranges vary from 5 km to 16 km from OWFs in the North Sea (Garthe, et al., 2023; Heinänen, et al., 2020; Petersen, Nielsen, & Mackenzie, 2014). These distances are much longer than the impact ranges listed for other bird species in Figure 5.2 and in this screening 16 km has been chosen as the (worst case) range within which an impact of displacement may occur. As the possible displacement range is set at 16 km it does not overlap with the two northern SPAs (SPA no. 85 and no. 86) of Natura 2000 site no. 173 and no impact from displacement is assessed to occur here. The two northern SPAs are not included in the screening. The two southern SPAs (SPA no. 82 and no. 83) and the impact zone overlap, and SPA no. 82 and SPA no. 83 will be included in the screening of impacts on birds from displacement.

	Response	Estimated response distance	Offshore wind farm	Reference
Divers	-	1.5 km	Alpha ventus	Present study
	-	2-6 km	Lincs	Webb et al. (2015)
	-	1 km ^a	Kentish Flats	Percival (2014)
	-	5-6 km ^b	Horns Rev II	Petersen et al. (2014)
	- / -		Egmond aan Zee / Princess Amalia	Leopold et al. (2011, 2013)
	-	0 km	Thanet	Percival (2013)
	(-) / - / (-)	2 km	Robin Rigg Horns Rev I / Nysted	Walls et al. (2013) Petersen et al. (2006), Petersen & Fox (2007)
Gannets (<i>Morus bassanus</i>)	(-)		Alpha ventus	Present study
	-		Lincs	Webb et al. (2015)
	(-) / -	3 km	Thorntonbank / Bligh Bank	Vanermen et al. (2013, 2015)
	- / -		Egmond aan Zee / Princess Amalia	Leopold et al. (2011, 2013)
	0		Thanet	Percival (2013)
	(-)		Robin Rigg	Walls et al. (2013)
	0		Kentish Flats	Gill et al. (2008)
(-)		Horns Rev I	Petersen et al. (2006)	
Little gulls (<i>Hydrocoloeus minutus</i>)	-	1.5 km	Alpha ventus	Present study
	0		Lincs	Webb et al. (2015)
	(+) / (-)		Thorntonbank / Bligh Bank	Vanermen et al. (2013, 2015)
	- / -		Egmond aan Zee / Princess Amalia	Leopold et al. (2011, 2013)
	-		Horns Rev I	Petersen & Fox (2007)
0		Horns Rev I	Petersen et al. (2006)	
*No statistical effect outside wind farm, 1 km suggested by author; ^b Statistical effect up to 13 km — authors suggest effect up to 5-6 km;				

	Response	Estimated response distance	Offshore wind farm	Reference
Terns	-	1.5 km	Alpha ventus	Present study
	0		Lincs	Webb et al. (2015)
	- ^c / 0		Egmond aan Zee / Princess Amalia	Leopold et al. (2013)
	+ ^d / 0		Thorntonbank / Bligh Bank	Vanermen et al. (2011, 2013)
	0		Kentish Flats	Gill et al. (2008)
	(-)		Horns Rev I	Petersen et al. (2006)
Alcids	-	2.5 km	Alpha ventus	Present study
	-	4 km	Lincs	Webb et al. (2015)
	- / - ^e	3 km	Bligh Bank	Vanermen et al. (2015)
	- / - ^e		Egmond aan Zee / Princess Amalia	Leopold et al. (2011, 2013)
	(-)		Thanet	Percival (2013)
	(-)		Robin Rigg	Walls et al. (2013)
	0		Kentish Flats	Gill et al. (2008)
	0		Thorntonbank	Vanermen et al. (2013)
	-	2 km	Horns Rev I	Petersen et al. (2006), Petersen & Fox (2007)
^c Effect found for common/arctic terns; ^d Effect found for common and sandwich terns; ^e Significant negative effect in common guillemots and razorbills				

Figure 5.2 Impact distances of OWFs on different groups of birds. Modified from Welcker and Nehls (2016).

Figure 5.3 shows the estimated impact zones of bird displacement (and underwater noise from operation phase).

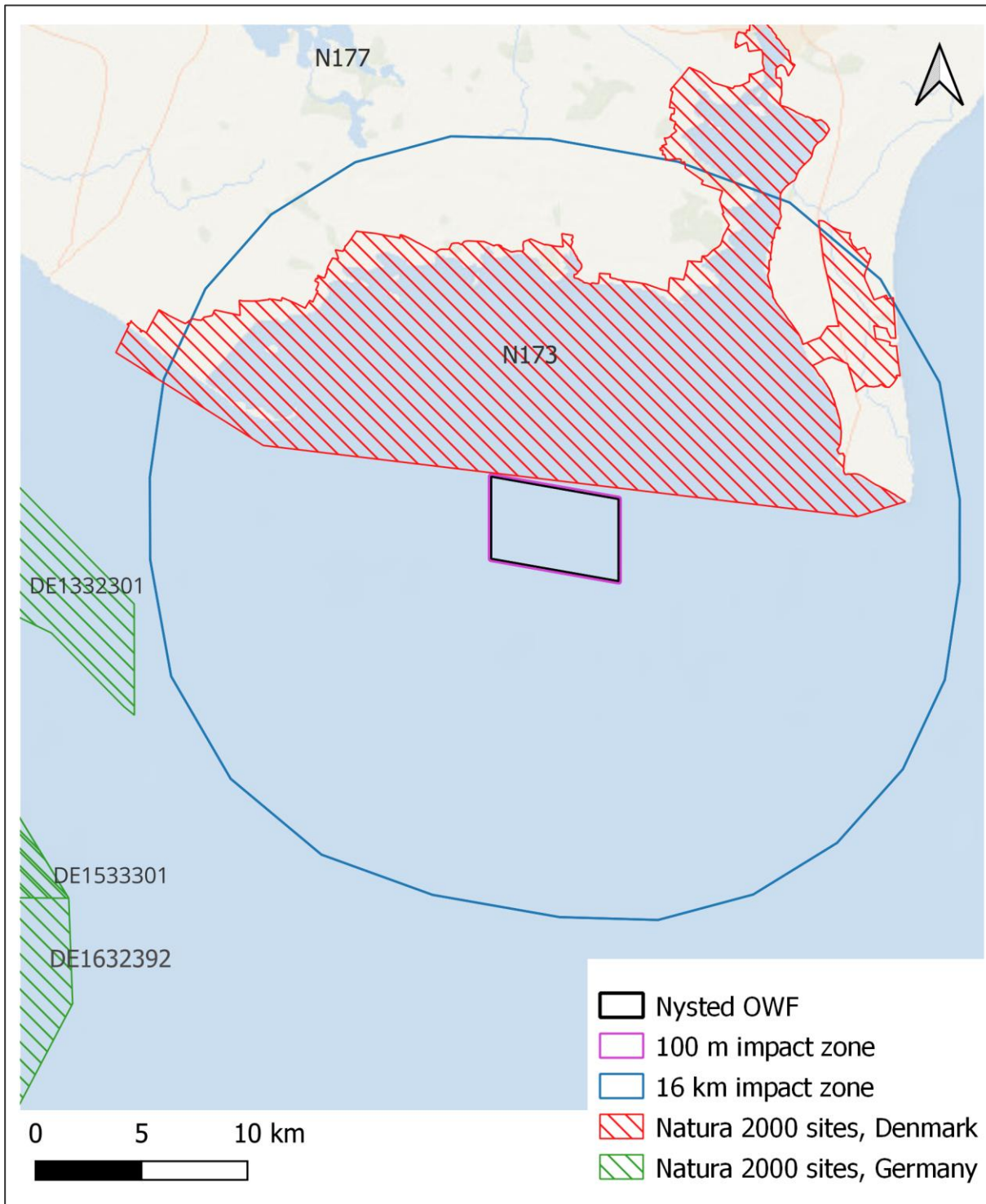


Figure 5.3 NHP and the estimated impact distances of underwater noise (pink) and bird displacement (blue).

Based on the above, only some of the species in Table 4.2 are included in the screening in relation to displacement. This includes all water birds that forage at sea (mute swan, whooper swan, common goldeneye, smew, goosander, Eurasian coot) except cormorants and terns as these species show very little response to OWFs and are generally not displaced (Petersen, Christensen, Kahlert, Deshom, & Fox, 2006; Dierschke, Furness, & Garthe, 2016). Also, all land birds (bittern, western marsh harrier, spottet crane, pied avocet, corn crane, crane, woodlark,

white-tailed eagle, red-backed shrike, short-eared owl) along with geese that feed on land will not be affected by displacement in relation to the lifetime extension.

In general, for all species mentioned above population trends within the Natura 2000 site has been stable or increasing following the years of operation of Nysted Offshore Windfarm. Furthermore, the general distribution and the largest abundances of the species mentioned are found close to shore on shallow waters. In the study by Petersen et al. (2006) it was found that the vast majority of mute swans found in the Natura 2000 site were located near shore in shallow waters no deeper than 2 meters. Furthermore, the whooper swan is mainly found on land. The same general picture was seen for the goldeneyes that were mainly found at 0-4 meters in the western part of the lagoon and very rarely offshore.

Nysted Offshore Windfarm borders the most southern part of the SPA, with deeper waters. It is therefore expected that the part of the SPA close to the offshore windfarm has a low density of the described bird's species. According to studies of displacement of birds in relation to wind farms, impact distances have been found to be very short and vary between 100 m – 600 m for swans (Marques, Batalha, & Bernardino, 2021; Rees, 2012). For divers, the impact distance varies from 0-6 km (Welcker & Nehls, Displacement of seabirds by an offshore wind farm in the North Sea, 2016). The nearest wind turbine is located more than 200 meters from the boarder of the SPA with a distance to shore ranging from 10 km and upwards.

Because of the very short displacement impact distances and that the species mentioned are primarily coastal species as well as the distance between the nearest turbine and the boarder of the SPA is more than 200 meters, it is assessed that the lifetime extension of the windfarm will cause a limited negligible displacement of birds in the SPA. This is supported by the fact that, no declining trend in abundance has been observed during NOVANA monitoring within the Natura 2000 site following the operation of the offshore windfarm.

Based on the above, there is no risk that displacement from the lifetime extension of Nysted Offshore Windfarm will impact this designated species. The lifetime extension of the windfarm will not prevent maintenance/achievement of favorable conservation status for the relevant bird species nor prevent fulfilment of conservation objectives for these species in the Natura 2000 site no. 173.

5.2.2 Collision

The environmental impact assessment (EIA) for Nysted Offshore Windfarm found the seabird migration in the windfarm area was dominated by eider duck and therefore most of the findings in the assessment was based on eider duck (SEAS, 2000). The EIA estimated that approximately 2% of the eider ducks that migrate through the area would potentially fly into the OWF and be exposed to collision risk. The 2% were transferred to other similar bird groups (dabbling ducks, divers, grebes, and little gulls). This is possible as the species in similar bird groups show similar behaviour towards wind farms (Petersen, Christensen, Kahlert, Deshom, & Fox, 2006; Petersen & Fox, 2019; Rydell, Ottvall, Pettersson, & Green, 2017; Therkildsen, et al., 2024), which have been confirmed in later surveys (Skov, et al., 2018; WSP, 2024b; Tjørnløv, et al., 2023). The estimated proportion of birds that migrate through the area and would potentially fly into the OWF for birds of prey, loons, geese, waders, doves, and small birds was lower than for eiders and similar species. Monitoring however showed that although migration was maintained through the area, an overall avoidance behaviour was seen with a clear response to the wind farm at 1 km in most species. Cormorants, and some species of gulls and dabbling ducks were however attracted by the wind farm (Petersen, Christensen, Kahlert, Deshom, & Fox, 2006). From the monitoring program it was further calculated that the general risk of collision for e.g., waterbirds passing Nysted Offshore Windfarm was between 0.018% and 0.020%. At the time of the study this was equivalent to less than 0.05% of the annual hunt in Denmark.

For migrating landbirds the majority of the migration follow land over Gedser Odde or Hyldekrog and only a very small proportion of the migration occur between these peninsulas (EON, 2007). Also migrating land birds (birds of prey, pigeons, and passerines) showed strong overall avoidance behaviour in relation to wind turbines at Nysted Offshore Windfarm (Petersen, Christensen, Kahlert, Deshom, & Fox, 2006). This high avoidance of offshore wind turbines have been confirmed by the newest studies (Jensen, Ringgaard, Blew, & Jacobsen, 2016; Rydell, Ottvall, Pettersson, & Green, 2017; WSP, 2024c; NatureScot, 2024). Based on this, the assumptions on collision risk of migrating landbirds is comparatively as low as the collision risk of waterbirds. Additionally, there is no indication that breeding or resting landbirds on the designation of the surrounding Natura 2000 sites occur in or around Nysted Offshore Windfarm (Petersen, Christensen, Kahlert, Deshom, & Fox, 2006; SEAS distribution A.m.b.A, 2000; EON, 2007; Miljøstyrelsen, 2021).

All the species designated for SPA F82 and F83 can theoretically interact with the Nysted Offshore Windfarm and collide with the turbines when they move in and out of the SPA. But during daily movements the birds in the SPA are unlikely to move offshore of the sandbank, Rødsand, due to the species' general behaviour and habitat preferences, with the exception of cormorant. Cormorant is therefore described separately in the following. As the designated birds mainly move in and out of the SPA during migration it is possible to group the rest of the designated species into four categories of migratory behaviour: night migrants, terns and waders, waterfowl and birds of prey. In the following each group is described and assessed in detail based on general knowledge about the species and their migration as described in the beginning of section 5.2.2.

Cormorant

Cormorants from the SPA often feed outside the SPA and are often found on the foundations of the wind turbines in Nysted Offshore Windfarm. Cormorants normally fly low over water both when feeding at sea and when migrating. Cormorants normally only fly higher when migrating over land. Because cormorants fly low at sea there is a low collision risk (NatureScot, 2024). Furthermore, cormorants have so far been using the area of the windfarm without it causing a decline in the designated population of the SPA. It is therefore assessed that there is no risk that the lifetime extension of Nysted Offshore Windfarm will impact cormorants. The lifetime extension of the windfarm will not prevent favorable conservation status nor prevent fulfilment of conservation objectives for this species in the Natura 2000 site no. 173.

Night migrants (Bittern, eurasian coot, spottet crane, corn crane, woodlark, red-backed shrike)

Birds migrating during the night often migrate over a broad range and do not follow any features of the landscape. This is especially the case for passerines (i.e. woodlark and red-backed shrike). These species also often fly higher than the wind turbines. Often above 1,000 m and seldom below 300 meters (Welcker & Vilela, 2019). This is also the case for coots and cranes. Most of the bitterns are stationary but a few migrate at similar heights during nights. The night migrants are therefore flying at a height where it can be concluded that they migrate over the Nysted Offshore Windfarm, and there is no risk that the lifetime extension of Nysted Offshore Windfarm will impact night migrants i.e. the following species: bittern, eurasian coot, spottet crane, corn crane, woodlark and red-backed shrike. The lifetime extension of the windfarm will not prevent favorable conservation status nor prevent fulfilment of conservation objectives for these species in the Natura 2000 site no. 173.

Terns and waders (little tern, sandwich tern, common tern, arctic tern, pied avocet)

The terns and waders are designated as breeding birds and do not feed so far away from the colony that they will enter the Nysted Offshore Windfarm (Thaxter, et al., 2012). Most waders and terns also fly under the rotor swept area and therefore they are unlikely to collide with the wind turbines. Only sandwich tern fly at heights where they are at risk of collisions, but sandwich terns have high avoidance rates and thereby low collision risk (SNH, 2018). It is therefore assessed that there is no risk that the lifetime extension of Nysted Offshore Windfarm will impact terns and waders designated for this Natura 2000 site. The lifetime extension of the windfarm

will not prevent favorable conservation status nor prevent fulfilment of conservation objectives for these species in the Natura 2000 site no. 173.

Waterfowl (Mute swan, whooper swan, bean goose, barnacle goose, dark-bellied brent goose, greater white-fronted goose, common goldeneye, smew, goosander)

Studies from Nysted Offshore Windfarm have shown that waterfowl have very low collision risk with offshore wind turbines as they both fly low and are able to avoid the turbines. (Petersen, Christensen, Kahlert, Deshom, & Fox, 2006; Petersen & Fox, 2019; Rydell, Ottvall, Pettersson, & Green, 2017; Therkildsen, et al., 2024). This has also been concluded in studies from other wind farms both in Denmark and abroad (Skov, et al., 2018; WSP, 2024b; Tjørnløv, et al., 2023). The monitoring showed that although migration was maintained through the area, an overall avoidance behaviour was seen with a clear response to the wind farm at 1 km in most species and the species either avoided entering the wind farm or chose the path through the wind farm furthest from the wind turbines. Furthermore, the waterfowl wintering in the SPAs mainly breed to the northeast in Russia and fly directly towards the breeding ground, thus not passing Nysted Offshore Windfarm along the way. It is therefore assessed that there is no risk that the lifetime extension of Nysted Offshore Windfarm will impact waterfouls designated for this Natura 2000 site. The lifetime extension of the windfarm will not prevent favorable conservation status nor prevent fulfilment of conservation objectives for these species in the Natura 2000 site no. 173.

Birds of prey and crane (white-tailed eagle, western march harrier, short-eared owl, crane)

Most new studies have shown that raptors and cranes have high avoidance to offshore wind farms and wind turbines. The majority of migrating landbirds leave land over Gedser Odde or Hyldekrog flying directly towards Germany, and only a very small proportion of the migration occur between these peninsulas (EON, 2007). Furthermore, migrating land birds (birds of prey and cranes) have shown a strong avoidance behaviour in relation to wind turbines at Nysted Offshore Windfarm (Petersen, Christensen, Kahlert, Deshom, & Fox, 2006). The high avoidance of offshore wind turbines has also been confirmed by newer studies (Jensen, Ringgaard, Blew, & Jacobsen, 2016; Rydell, Ottvall, Pettersson, & Green, 2017; WSP, 2024c; NatureScot, 2024). Based on the combination of a very limited percentage of the birds of prey and cranes entering the wind farm and the high avoidance rate there is no risk that the lifetime extension of Nysted Offshore Windfarm will impact birds of prey and cranes designated for this Natura 2000 site. The lifetime extension of the windfarm will not prevent favourable conservation status nor prevent fulfilment of conservation objectives for these species in the Natura 2000 site N173.

Summary

Based on the above, there is no risk that collision from the lifetime extension of Nysted Offshore Windfarm will impact the designated bird species on Natura 2000 site N173. The lifetime extension of the windfarm will not prevent maintenance/achievement of favourable conservation status for the relevant bird species nor prevent fulfilment of conservation objectives for these species in the Natura 2000 site N173.

5.3 Bats

Natura 2000 site N173 is designated to protect pond bat as well as the western barbastelle. These species are described in the following section and a screening of potential impacts from lifetime extension of is conducted.

In general, bats can be divided into three groups in relation to migrating distances (see Figure 5.4). Group 1 are long distance migrants, which have all been documented offshore. Group 2 are species, which typically migrate or stray short or semi long distances and may appear offshore where group 3 are species, which only move short distances from their breeding sites, typically across land and are not expected to appear offshore.

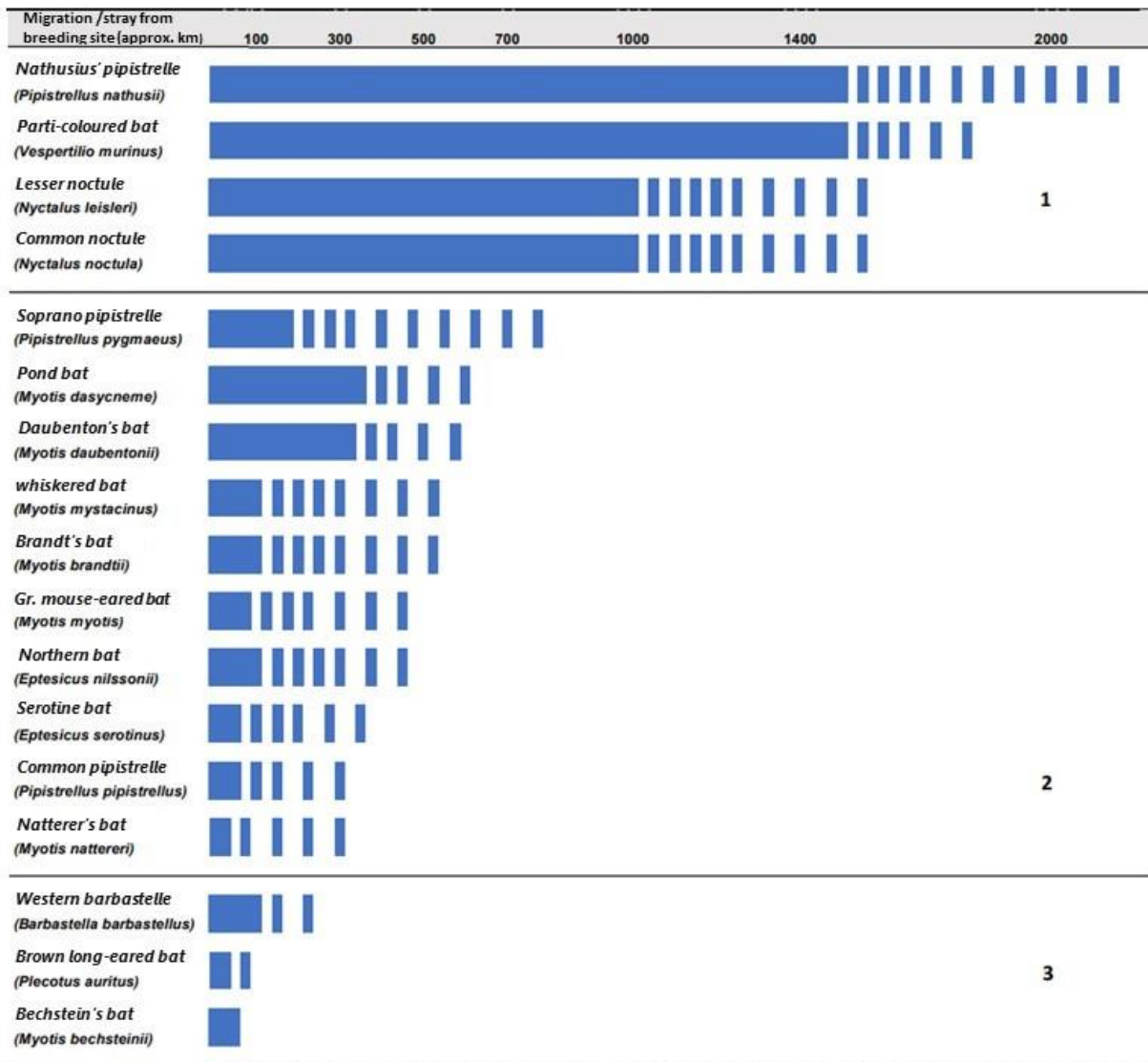


Figure 5.4 The Danish species of bats (except gray long-eared bat) divided into groups according to length of migration. Group 1 are long distance migrants, which have all been documented offshore. Group 2 are species, which migrate or stray short or semi long distances and may appear offshore. Group 3 are species, which only move short distances from their breeding sites, typically across land and are not expected to appear offshore. Continuous blue bars represent typical migration distances whereas the intermittent blue bars represent single documented observations. Modified from WSP (2023).

5.3.1 Western barbastelle

As seen on Figure 5.4, western barbastelle typically are not expected to appear offshore. The western barbastelle is relatively rare with a limited distribution in the southeast of Denmark (Elmeros, et al., 2024). A large part of the bats is therefore found within this Natura 2000 site and bats use the area during all parts of their life cycle. However, monitoring of the species shows an increase in distribution outside the habitat area, and they are starting to appear in other parts of east Denmark as well (Kjær, et al., 2023). Their summer habitat consists of old deciduous trees in open areas. Trees can also make up their winter habitat but usually the species overwinter in cool, frost-free, underground areas (Kjær, et al., 2023). Western barbastelles can travel far but the species is primary sedentary (Elmeros, et al., 2024) with low dispersal. The species has been registered in coastal areas but not offshore (Ahlen, Baagøe, & Bach, 2009). Due to the small population size and fragmented distribution, the

species is listed as near threatened (NT) on the Danish Red list (Moeslund, et al., 2019). The conservation status is however favourable in the continental region (Fredshavn, et al., 2019) with increasing abundance.

Since western barbastelle does not appear offshore and has not been registered offshore during any of the studies conducted in the areas around Nysted Offshore Windfarm (WSP, 2024a; Seebens-Hoyer, et al., 2021; FEBI, 2013) there is no risk that the lifetime extension of the windfarm will impact this designated species. The lifetime extension of Nysted Offshore Windfarm will not prevent maintenance/achievement of favorable conservation status for western barbastelle nor prevent fulfilment of conservation objectives for these species in the Natura 2000 site no. 173.

5.3.2 Pond bat

As seen on Figure 5.4, pond bat can appear offshore even though it is not a long distance migrant. Pond bat is mostly found in Jutland, but it does also occur sporadically in other areas and a small population exists around Guldborgsund (Elmeros, et al., 2024). It is relatively rare in Europe, and Denmark is considered as one of its key habitats. As the name reveals, it is a species that usually forage across ponds, lakes, larger streams, bays, and inlets, however during Autumn they have been found offshore where they were likely foraging (Ahlen, Baagøe, & Bach, 2009). During foraging they usually fly very low (2-5 meters above the terrain), which also seems to be the case, when travelling at sea (Elmeros, et al., 2024; Ahlen, Baagøe, & Bach, 2009). The pond bat winters underground in lime pits and bunkers and the lime pits in Jutland (Mønsted, Daugbjerg and Thingbæk) are likely fundamental overwintering habitats for the pond bats (Elmeros, et al., 2024). Only few overwintering individuals have been found in other areas of the country. As most of the populations overwinter at the same few locations in Denmark, the species is listed as vulnerable (VU) on the Danish Red list (Moeslund, et al., 2019). However, conservation status is favourable in the continental region (Fredshavn, et al., 2019).

Pond bats within Natura 2000 site no 173 constitute a small population that within recent years has increased and spread to the surrounding areas in the south of Zealand (Fredshavn, et al., 2019; Kjær, et al., 2023). They are found spread out across the Natura 2000 site and are not restricted to a specific area (Arter.dk, 2024a). Population size is unknown, and it is unknown where the species from this area overwinter. However, as they can travel longer distances, they may likely overwinter in the lime pits in Jutland as most of the populations overwinter at the same few locations in Jutland.

Only one unverified registration of a pond bat was made at Kriegers Flak (WSP, 2024a) and only one verified registration offshore in Fehmarn Belt in 2009 (FEBI, 2013). It is assessed that the area of Nysted Offshore Windfarm is not important for the species. Monitoring from 2018-2021 show, that the small population in Guldborgsund has increased in numbers and dispersed to other areas in the south of Zealand (Fredshavn, et al., 2019; Kjær, et al., 2023).

The nearby presence of a pond bat offshore has only been verified in one single occasion in 2009 in relation to the Fehmarn Belt project (FEBI, 2013) located more than 20 km from the Nysted Offshore Windfarm area. Based on this and the description of the species above it is assessed that there is no risk that the lifetime extension of Nysted Offshore Windfarm will impact this species. Pond bat has a favourable conservation status, and the lifetime extension of the windfarm will not prevent maintenance/achievement of favorable conservation status for the pond bat nor prevent fulfilment of conservation objectives for this species in the Natura 2000 site no. 173.

6. Cumulative impacts

According to the Habitat Directive assessments of the impacts on Natura 2000 sites from a plan or project must also include an evaluation of the impacts in conjunction with other plans or projects. This is referred to as cumulative effects. A cumulative assessment for marine mammals, bats and birds included in the Natura 2000 screening in section 5 is conducted in the following section. The cumulative impact assessment is based on projects that could be relevant in cumulation with the lifetime extension of Nysted Offshore Windfarm.

Fehmarn Belt fixed link

Fehmarn Belt fixed link is a tunnel connecting Denmark (Rødbyhavn) and Germany (Puttgarden). The Femern-belt tunnel is located approximately 22 km West of Nysted Offshore Windfarm.

The establishment of Fehmarn Belt fixed link has the following timeline (Femern A/S, 2025):

- Port in Denmark established in 2024
- Port in Germany established in 2025
- The first tunnel element will be immersed in 2025
- All construction work completed, and operation starts in 2029

The possible impacts on marine mammals, bats and birds from the Fehmarn Belt fixed link will mainly occur during the construction phase of the Fehmarn Belt tunnel. The distance between the Fehmarn Belt fixed link and Nysted Offshore Windfarm is more than 20 km, and the majority of the construction work should be completed prior to 2028, where the lifetime extension is planned. The lifetime extension of the windfarm and the Fehmarn Belt fixed link will not cause cumulative impacts on the Natura 2000 site no. 173.

Rødsand 2 OWF

Rødsand 2 is a 207 MW offshore wind farm 4.6 km west of Nysted Offshore Windfarm. The OWF is operated by RWE (RWE, 2024). An electricity production permit was granted in 2010 for 25 years of operation, i.e., until 2035. It is assumed that the park's operation will continue as usual. It is currently unknown if this park will apply for a lifetime extension. There are no immediate shared activities or joint operations between Nysted Offshore Windfarm and Rødsand 2 OWF.

Rødsand 2 OWF and Nysted Offshore Windfarm has been operating in the same area since 2010 when Rødsand 2 was commissioned. Thus, the presence of both windfarms is reflected in the baseline analyses for Natura 2000 site no. 173 and as well as other nearby Natura 2000 sites. Therefore, the conclusions made in section 5.2 and 5.3 for birds and bats are already founded in the current situation where the two adjacent offshore wind farms are in operation. The lifetime extension of Nysted Offshore Windfarm in cumulation with the operation of Rødsand OWF is therefore assessed not to affect marine mammals, bats, or birds.

Based on this, and since it is also assessed that lifetime extension of Nysted Offshore Windfarm will not cause significant impacts on Natura 2000 sites, it can be concluded that the lifetime extension of Nysted Offshore Windfarm and the operation of Rødsand 2 OWF will not cause cumulative impacts on Natura 2000 sites.

Wind Farm Projects in early planning

European Energy has applied for preliminary investigation permits for the Lolland South (12/5 2022) and Guldborgsund (22/6 2022) OWF. Lolland South OWF is planned to be located approximately 40 km west of Nysted Offshore Windfarm, and Guldborgsund OWF is planned to be located approximately 18 km northeast of Nysted Offshore Windfarm. The Danish Energy Agency has denied the permits in both cases, as the area is not

deemed relevant for renewable energy exploitation, according to Section 23, Paragraph 4, cf. Section 22, Paragraph 7 of the Renewable Energy Act.

European Energy appealed both decisions to the Energy Board of Appeal, which on 6/5 2024 ruled in favor of European Energy, thus overturning the Danish Energy Agency's decisions, and remanding the cases for reconsideration. Therefore, the applications have returned to Danish Energy Agency, where they are currently being processed. If preliminary investigation permits are granted, European Energy will have one year to complete them, then three months to decide whether to proceed with the projects, and six months after the approved preliminary investigation report to apply for an establishment permit. It is estimated that the projects could be built 3-4 years thereafter. Considering the projects' original timeline and approximately one year of delay, the parks could potentially be in the construction phase around 2027-2028 and operational around 2029-2030.

Copenhagen Energy applied for a preliminary investigation permit for the Fehmarn offshore wind farm on 14/6 2022. Fehmarn OWF is planned to be located approximately 8 km southwest of Nysted Offshore Windfarm. The rejection from the Danish Energy Agency for this project was also appealed, and on 6/5 2024, the Energy Board of Appeal made the same decision as for European Energy's two projects.

Whether Lolland South, Guldborgsund and/or Fehmarn OWF will be realized is very uncertain at this time and whether the construction and operation of Nysted Offshore Windfarm together with the planned wind farm projects can cause cumulative impacts on marine mammals, birds and bats designated for Natura 2000 site no. 173 is not possible to determine with the limited current knowledge about these OWF in early planning stage. But should preliminary investigation permit for one or more of these projects be granted the assessment of cumulative effects should be prioritized in the environmental assessments, when further details about the planned OWF is provided.

7. Conclusions

Ørsted is applying the Danish Energy Agency (DEA) for a permit to continue the operation of Nysted Offshore Windfarm for an additional period of up to 10 years. The lifetime extension does not involve the replacement of parts of the offshore wind turbines, coating etc., which could result in significant changes to the current operation of the offshore wind farm. To continue operations beyond this date, a permit according to Section 29, Subsection (1), of the Renewable Energy Act is required from the Danish Energy Agency. Part of the application process includes a Natura 2000 screening of protected habitats and species according to the Habitat Directive.

A Natura 2000-screening concerning lifetime extension of Nysted Offshore Windfarm has been conducted within this document. The conclusions are briefly listed in the following section.

There are several both Danish and German Natura 2000 sites in close proximity to Nysted Offshore Windfarm but based on the potential impacts caused by a lifetime extension, only Natura 2000 site N173 is relevant as part of the Natura 2000 screening. The relevant designated species, that could be impacted by a lifetime extension are the following: harbour porpoise, grey and harbour seal, pond bat, western barbastelle and the following birds: cormorant, bittern, mute swan, whooper swan, bean goose, barnacle goose, dark-bellied brent goose, common goldeneye, smew, white-tailed eagle, goosander, western marsh harrier, spottet crane, eurasian coot, pied avocet, little tern, sandwich tern, common tern, arctic tern, short-eared owl and red-backed shrike. These species are included in the Natura 2000 screening.

Nysted Offshore Windfarm is not located within a Natura 2000 site, and lifetime extension does not contain new activities, changes in noise levels, increased levels of suspended sediments etc. Based on the above and

knowledge concerning relevant designated species, the Natura 2000 screening concludes, that lifetime extension of Nysted Offshore Windfarm in itself or in cumulation with other relevant projects will not impact marine mammals, bats or birds designated for Natura 2000 site N173 nor prevent fulfilment of conservation objectives for these species in the Natura 2000 site N173.

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