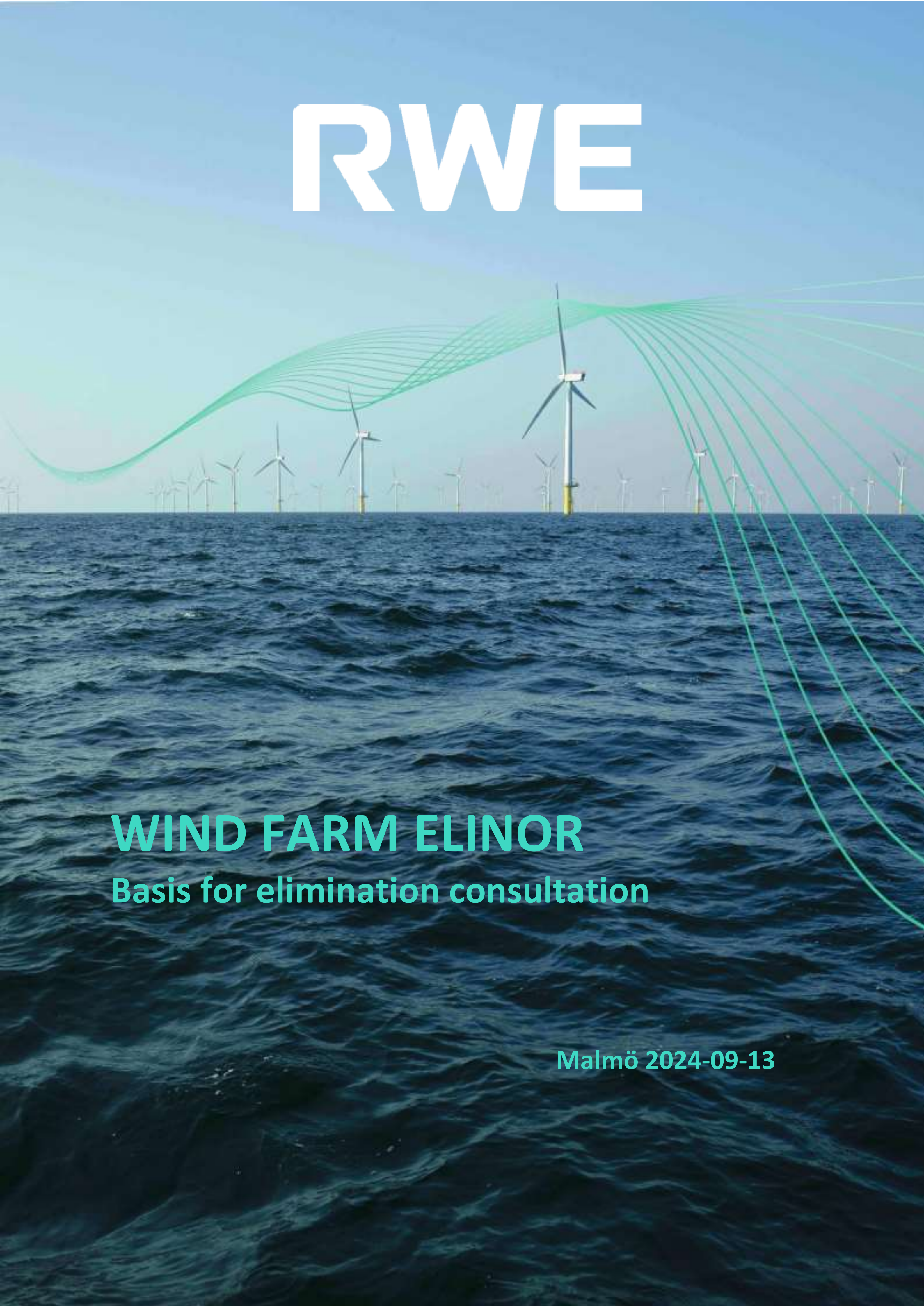
RWE



WIND FARM ELINOR

Basis for elimination consultation

Malmö 2024-09-13

1 Innehåll

Ändringsförteckning

Ver	Date	Description	Reviewed by	Approved by
1	20240514	Samrådsunderlag för interngranskning av Sweco	Lina Sultan	Gabriella Hammar-skjöld
2	20240515	Samrådsunderlag uppdaterat för granskning av RWE	Gabriella Hammar-skjöld	Gabriella Hammar-skjöld
3	20240524	Uppdatering av samrådsunderlag efter granskning av RWE	Gabriella Hammar-skjöld	Gabriella Hammar-skjöld
4	20240528	Uppdatering av samrådsunderlag efter granskning av RWE	Gabriella Hammar-skjöld	Gabriella Hammar-skjöld
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3 Background

3.1 About RWE

RWE Renewables Sweden AB (hereinafter referred to as RWE or the company) intends to establish the Elinor wind farm in the Baltic Sea, approx. 25 km northwest of Gotland, see section 3.2.

RWE is the world's second largest operator of offshore wind farms with over 20 years of experience in developing, building and operating offshore wind power projects. In the Nordics, RWE operates approx. 300 megawatts (MW) of wind power, with onshore and offshore wind farms in Sweden and Denmark. The Nordic development portfolio has a potential of over 10 gigawatts (GW). The RWE Group owns and operates Kårehamn, one of Sweden's two offshore wind farms in operation.

RWE is expanding the renewable electricity production in order to contribute to the electrification of society, climate change and strengthen the competitiveness of Swedish industry. Electricity use in Sweden will double by 2040, largely due to the electrification of the industrial and transport sectors, which today account for two-thirds of Sweden's total emissions. Wind power can be built quickly and can thus meet the increased demand for electricity when industry and transport are electrified. It also contributes to keeping the electricity price down. Each terawatt hour (TWh) of new electricity production from wind power in Sweden can reduce greenhouse gas emissions by around 600,000 tons. RWE's goal is to reach net zero emissions by 2040.

3.2 About Elinor wind farm

The Elinor wind farm is planned to be built approximately 25 km northwest of Gotland and 60 km east of Södermanland County and 65 km east of Kalmar and Östergötland County. The area of the wind farm (hereinafter referred to as the project area) is located Swedish territorial waters and within the Swedish exclusive economic zone. The planned capacity amounts to about 3 GW, which is produced by up to 200 turbines. The planned facility also includes internal cable networks and up to 6 sea-based transformer stations. More information about the Elinor wind farm can be found in the operational description in Chapter 5. The Elinor wind farm can be an important addition to strengthening the energy supply on Gotland and in south-west Sweden, where there is a great need for new electricity production.

4 Consultation and permit processes

This document forms the basis for delimitation consultations prior to future applications for permits under the Swedish Economic Zone Act (1992:1140) and the Continental Shelf Act (1966:314) for the construction, operation and decommissioning of the Elinor offshore wind farm, including the associated inter array cables, as well as for carrying out the surveys required to investigate the planned wind farm area. The wind farm is located far from the closest the Natura 2000 area. A special Natura 2000 review in accordance with Chapter 7, § 28a of the Environmental Code is not considered to be required for the wind farm, the inter array cables, or the surveys. If future investigations show that a Natura 2000 permit is nevertheless needed, the consultation will be carried out so that it can form the basis for such a review.

4.1 Consultation procedure

The planned activity is assumed to have a significant environmental impact, which is why a scoping consultation, in accordance with Chapter 6, §§ 29–33 of the Environmental Code, shall be carried out for the specific environmental assessment process. Any prior investigation consultation, to decide whether the activity entails significant environmental impact or not, in accordance with Chapter 6, § 24 of the Envi-ronmental Code, has therefore not been implemented.

The consultation document has been prepared in accordance with §§ 8-9 of the Environmental Assessment Ordinance and contains information on the location, scope, and design of the planned wind farm, identified interests and values in the area, the anticipated environmental impact and proposals for the content and design of the EIA (Environmental Impact Assessment).

Consultations are advertised in local newspapers. A list of the proposed stakeholders can be found in section 13.3. Consultation with the County Administrative Board of Gotland is planned to be carried out through a meeting during June 2024. The national consultation with other authorities, municipalities, organizations, individuals affected, such as owners of infrastructure within the wind farm and nearby planned wind power projects, as well as with the public is planned to take place in writing during June to August 2024.

Comments, facts, and questions received during the consultation are an important basis for RWE's work on the project and, together with results from in-depth studies and inventories, will form the basis for the project's continued design and delimitation.

The consultation will be described in a consultation report that describes how the consultation was carried out, what comments were received and a general description of how the comments are considered in the design of the project or what is addressed in the EIA.

The project area is located in the southern Baltic Sea and from certain aspects cross-border impacts cannot be ruled out. The company considers that a notification under the Convention on Environmental Impact Assessment in a Transboundary Context, the Esbo Convention, is appropriate. A so-called Esbo consultation is administered separately by the Swedish Environmental Protection Agency.

4.2 Legal context and scope of consultation

The consultation covers construction, operation and decommissioning of the planned wind farm, including the internal cable network, as well as carrying out surveys of the seabed, through environmental surveys and geophysical and geotechnical survey methods.

The wind farm is entirely located outside Sweden's maritime territory and within Sweden's economic zone. Permits to build and operate a wind farm with associated facilities are therefore tested according to the Swedish Economic Zone (SEZ) Act (1992:1140). Permits are granted by the government.

The laying of the submarine cables connecting the wind turbines as well as offshore substations and converter stations within the wind farm (so-called inter array cables) requires a permit in accordance with the Continental Shelf Act (1966:314) (KSL). Permits are granted by the government.

Investigations of the continental shelf also require permission according to KSL. As a general rule, such permits are tested by the Geological Survey of Sweden (SGU). Investigations prior to the construction of an offshore wind farm can be carried out with different methods and scope, and at different stages in the project's development work. The studies included in this consultation are the extensive studies required for the detailed design of the wind farm. In parallel with this delimitation consultation, an investigation consultation regarding certain limited and early investigations is also ongoing and a separate consultation document has been produced and provided to the Gotland County Administrative Board. A description of the investigations that may become relevant prior to the detailed design, and which is meant by the current demarcation consultation, is given in section 4.7.

RWE currently assesses that a special Natura 2000 assessment in accordance with Chapter 7, § 28a of the Environmental Code is not required for the wind farm, the internal cable network or the investigations, see further chapter 7 If future investigations show that a Natura 2000 permit is nevertheless needed, the current consultation is carried out in such a way that it can form the basis for such a review. A possible Natura 2000 permit is issued by the county board whose county the area in question is closest to.

In addition to the above-mentioned permits, other permits, exemptions or approvals may be required. The laying and operation of export cables, which transmit electricity from the wind farm to land, equires a permit under KSL and a concession under the Electricity Act, as well as a permit for water operations under Chapter 11, Environmental Code. However, the location of the connection cables will not be determined until a later stage of the project. These reviews will therefore take place in separate processes and are not covered by the current consultation. However, the installations and measures and activities linked to the export cables are described in general terms in this consultation document.

4.3 Review

For the current permit applications, an EIA must be drawn up in accordance with the provisions of the Environmental Code. A specific environmental assessment must be carried out with the aim of obtaining the right knowledge of the project, delimiting the investigative work and the impact statement to include what is essential and to investigate various alternative locations and designs of the planned activities. The specific environmental assessment also aims to gather information about the conditions for planned activities and the effects thereof. As part of the specific environmental assessment, scoping consultations are carried out, see section 4.1.

Once the application with the EIA and technical description has been submitted to the government and any other review authorities, a supplementary and consultation procedure will be initiated, during which it will also be possible to submit statements and views on planned activities.

5 Description of operations

5.1 Localisation

Elinor wind farm is planned outside Swedish territorial waters within the Swedish exclusive economic zone. The project area is located in the sea east of Östergötland and Kalmar counties, as well as northwest of Gotland County (Figure 1). The project area is approximately 563 km^2. The area has an average wind speed of approx. 9.3 m/s at an altitude of 160 m. The dominant wind direction is from the southwest. The water depth is estimated to vary between 59 and 205 m with an average depth of approx. 124 m.

The project area is deemed to have favorable environmental, regulatory and technical conditions for the development of an offshore wind farm. The location is deemed to cause less impact than other nearby alternatives. This assessment is based on avoiding disturbance to protected natural areas, shipping lanes, military areas and minimizing visual impact from land.

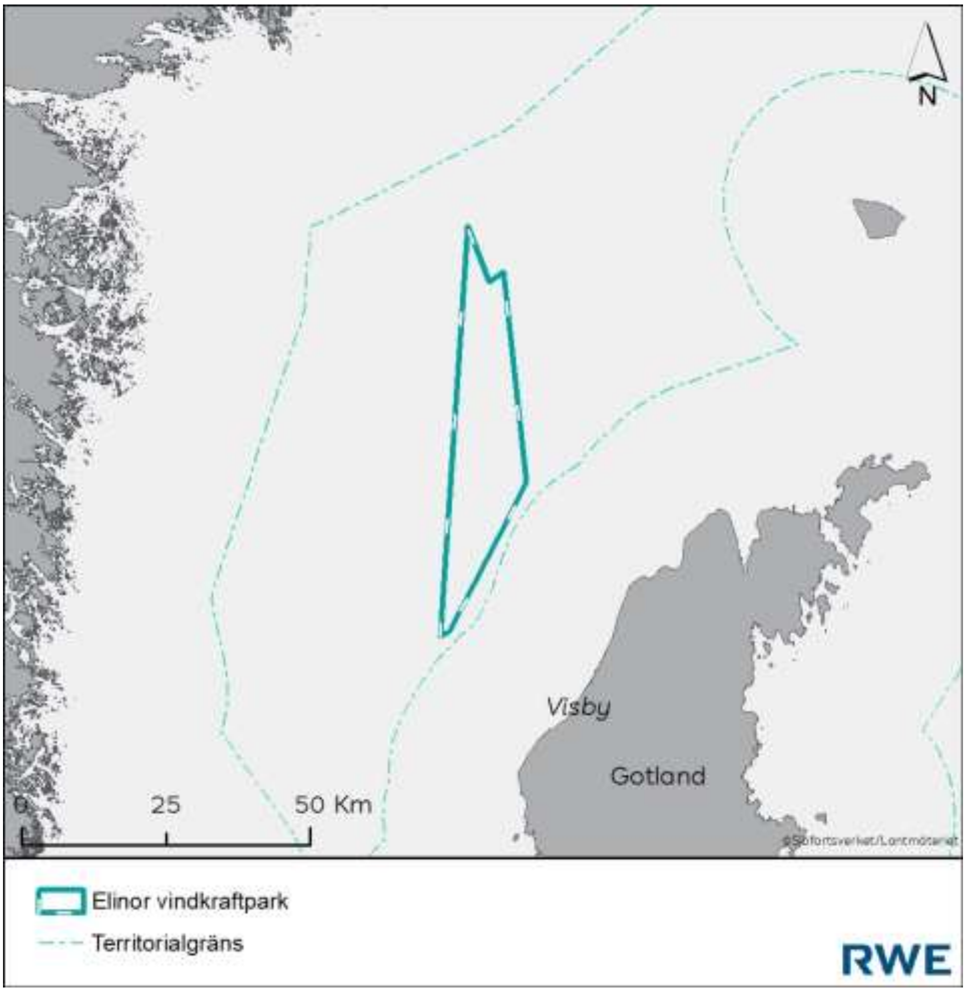


Figure 1. Location and project area for wind farm Elinor marked in dark turquoise. Sweden's territorial boundaries can be seen in a lighter turquoise.

5.2 Design and scope of the wind farm

In total, the installed power in the Elinor wind farm is estimated to be around 3 GW. The wind farm will consist of up to 200 wind turbines. The maximum height of the wind turbines is planned to be 400 m above sea level. In addition to the wind turbines, the wind farm also includes the inter array cables that connect´s the wind turbines to offshore substations or converter stations anchored to platforms. See Table 1. for overview information on planned wind farm.

Table 1. Overview table of the parameters that comprise the planned wind farm.

Parameters	
Total installed power	Approx. 3 GW
Area	Approx. 563 km2
Number of wind turbines	Maximum 200
Height of wind turbines (including rotor blades)	Max 400 m
Distance between rotor blade and sea surface	Approx. 20–30 m
Number of platforms for offshore substations or converter stations	Max. 6

Due to the rapid technological development in offshore wind power, the final choice of wind turbine and its design has not yet been determined. Regarding the number of wind turbines and their height as well as the number of platforms for transformer stations, however, the parameters specified above will not be exceeded.

The final placement of individual wind turbines within the park area is decided in connection with the detailed design of the wind farm and cannot be specified at this stage. The location of individual wind turbines is influenced by parameters such as wind conditions, water depth, geology, environmental values, optimization of the internal cable network's route and the size of the wind turbines.

Several structures in a wind farm can be adapted to increase biodiversity. RWE is interested in investigating potential biodiversity solutions within the Elinor project area. This may include the design of erosion protection but also, for example, additional structures in the water/on the bottom for seaweed cultivation or other biodiversity-enhancing structures.

5.3 Wind turbines

A wind turbine is composed of three major components: a tower, a nacelle, and a rotor (Figure 2). The rotor blades capture the kinetic energy from the wind and transfer it to the generator that produces electricity. The generator is mounted in the engine housing of the turbine The rotor captures the kinetic energy from the wind and transfers it to the generator which produces green electricity. The generator is mounted in the turbine's nacelle. The tower is supported by the floating foundation. Section 4.5 describes different types of fixed and floating foundations. On top of the tower, the nacelle and the hub are mounted. The hub connects the blades that jointly make up the rotor of the turbine.

The wind turbines will be equipped with markings and lights for identification purposes and visibility from vessels and aircrafts. These will comply with the legal framework valid at the time of installation as established by international, national and local authorities.

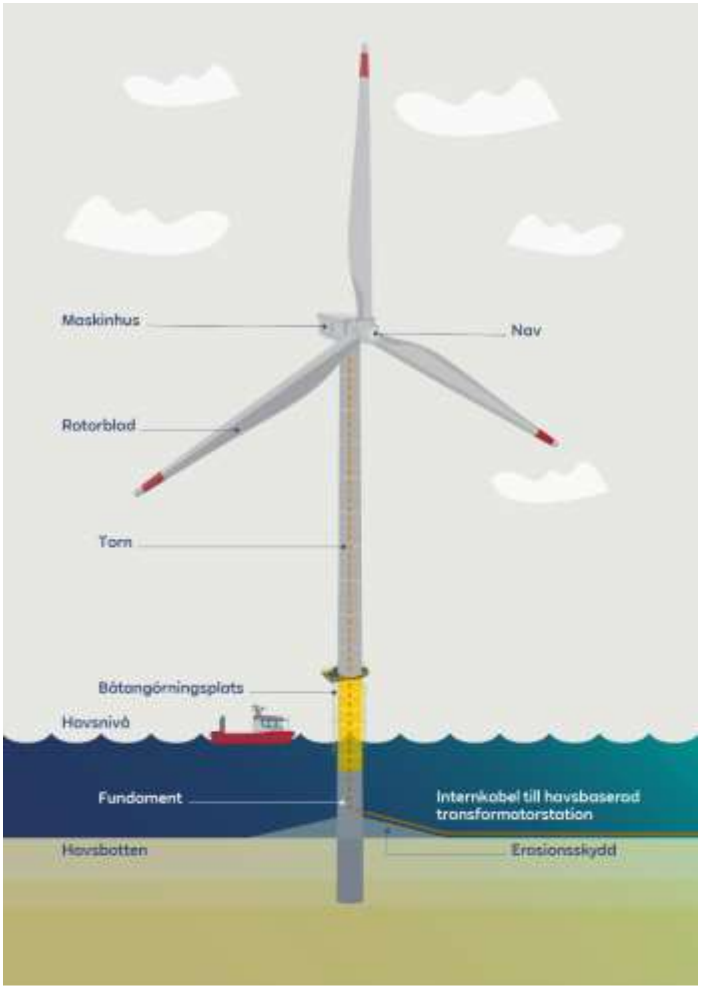


Figure 2. Illustration of the main components of a wind turbine.

5.4 Offshore substation

The electricity is generated as alternating current in the wind turbines. Before the transmission from the wind farm to the electricity grid, the current is converted to a higher voltage level in a transformer station, so that the number of connection cables and energy losses can be minimized. The connection between the substation and the power grid (usually on the mainland) can be made with either high-voltage alternating current or high-voltage direct current, see Figure 3.

Typical main components of an offshore substation are a foundation and a top structure. The foundations of the stations are usually anchored using similar techniques as the wind turbines with floating or fixed foundations, for example jacket foundation. The top structure houses the electrical power system and auxiliary systems, such as switchgear equipment, transformers and backup power units, but also a platform for embarking and disembarking from boats and sometimes a helipad.

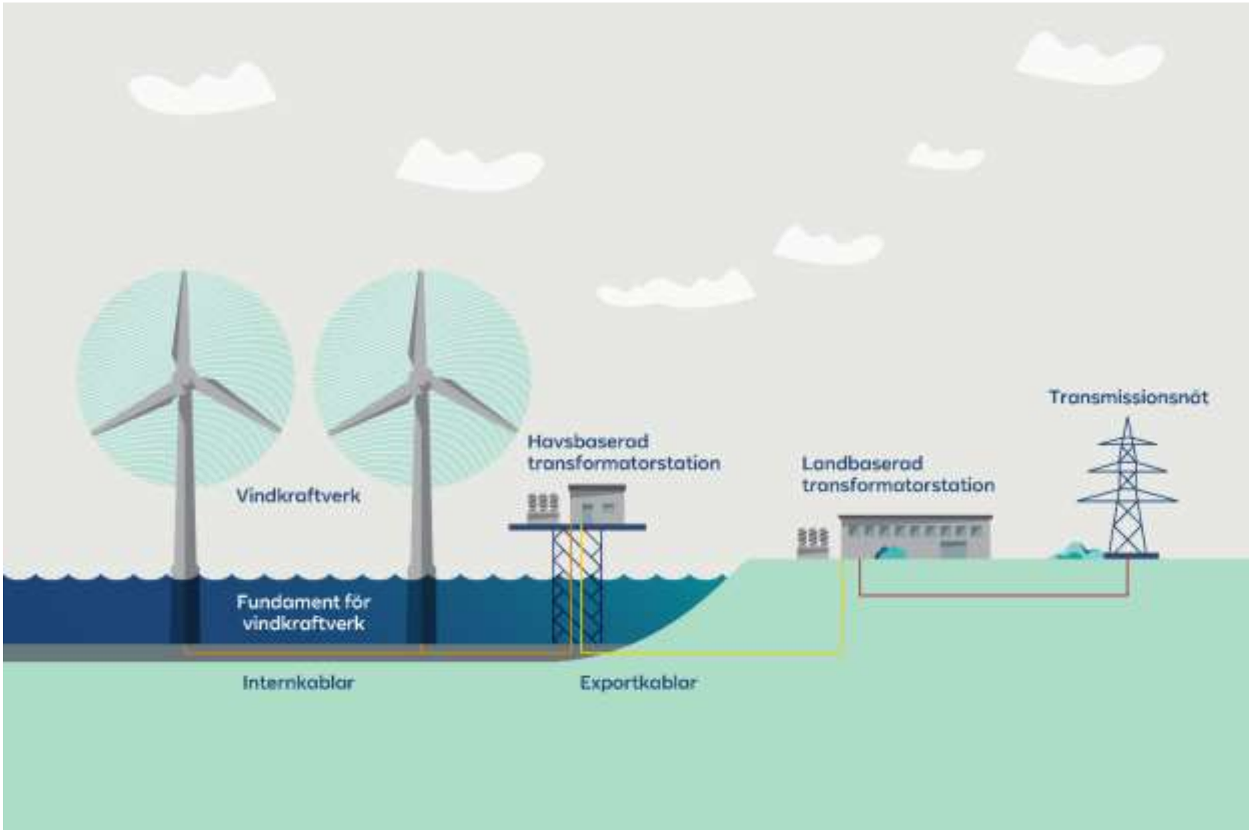


Figure 3. Principle sketch of a wind farm connected to a land-based substation.

Foundations

The wind turbines are anchored to the bottom of the sea via foundations to obtain stability. There are both fixed- bottom and floating foundations, see Figure 4. The different types of fixed-bottom and floating foundations are described in this section.

The main factors influencing the choice of foundations are water depth, seabed properties and meteorological and oceanographic loads such as wind, currents and waves. Due to the depth conditions within the Elinor wind farm, anchoring of the wind turbines with floating foundations is being considered, while both fixed and floating foundations are being considered for the substations.

5.4.1 Fixed-bottom foundations

Bottom fixed jacket foundations are being considered for the substations. Jacket foundations are made of a steel lattice structure, usually with three or four legs, consisting of tubular steel elements and welded joints. The foundation can be placed in medium to deeper water. The foundation is attached to the seabed using piling and suction chambers.

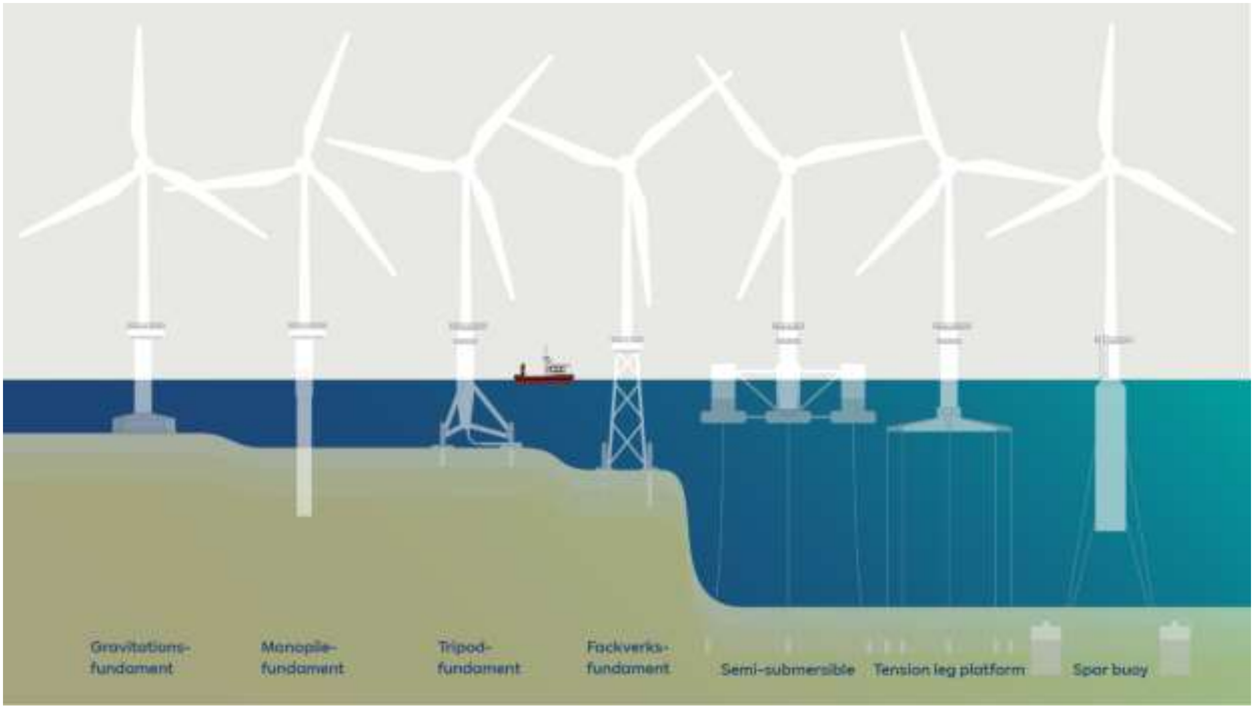


Figure 4. Different types of foundations.

All types of fixed-bottom foundations need scour protection, similar to bridge support structures. This consists of a layer of rocks or other environmentally friendly material that stabilizes the seabed and avoids erosion caused by the motion of the water (waves and currents) around the structure. The erosion protection can be adapted to benefit and promote the habitat for deep-sea species and organisms, for example through providing substrates and structures.

5.4.2 Floating foundations

Floating foundations are being considered for the wind turbines at Elinor. This type of foundation may also be used for the substations as an alternative to a fixed-bottom foundation. Floating foundation technology makes it possible to install wind turbines at much greater depths than is possible with fixed foundations. Suitable water depths for floating foundations range from approx. 60–800 m.

A floating foundation consists of a substructure that gives the wind turbine buoyancy and stability, as well as a mooring system that attaches the structure to the seabed. Currently, there are five main types of floating foundations: semi-submersible, barge, spar buoy, tension leg platform, and suspended counterweight, see Figure 5, but more types are under development.

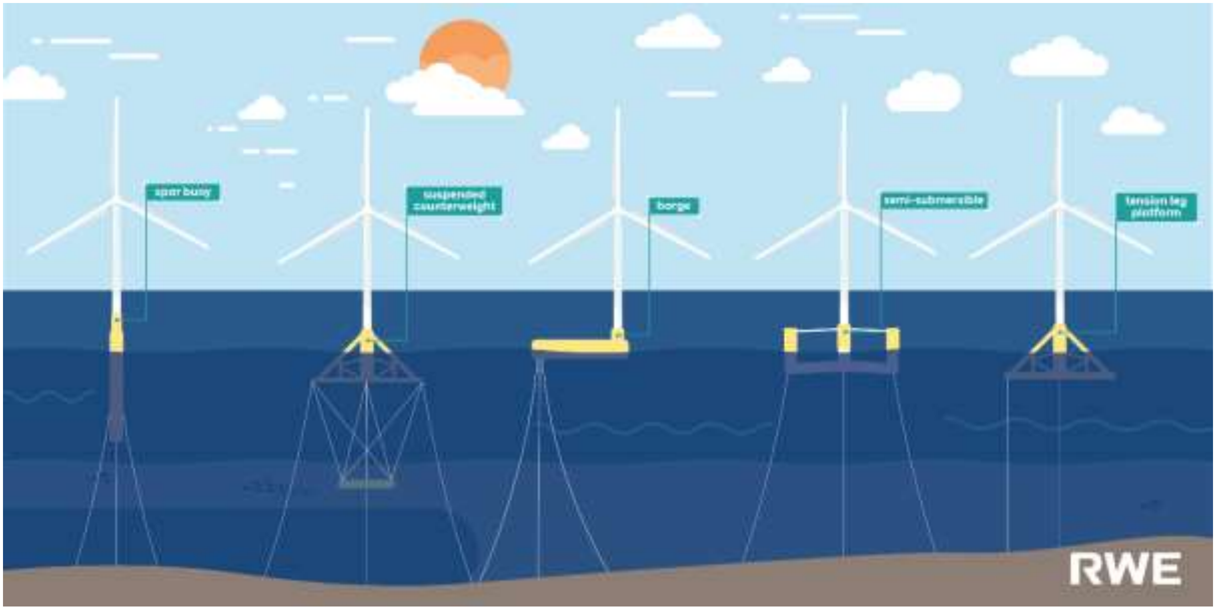


Figure 5. Different types of floating foundations.

The type of floating foundation that can be used is mainly influenced by local restrictions at the installation port, water depth and the area's wind, wave, and climate conditions. Decisions on the type of floating foundation planned for the wind turbines in Elinor will be made when there is more detailed knowledge of site conditions including the seabed and oceanographic conditions.

Floating foundations require a mooring system that fixes the floating structure to the seabed and maintains its position within the wind farm. The design of the mooring system allows some movement of the structure, but this movement must be limited to protect the foundation and inter-array cables. A mooring system consists of mooring lines and anchors as well as other smaller components. Mooring lines are usually made of either chain or synthetic rope, and sometimes additional accessories such as buoyancy elements and counterweights are required to keep the rig in the correct position in the water column and on the seabed. There are several different types of mooring systems depending on the conditions of the area, see Figure 6.

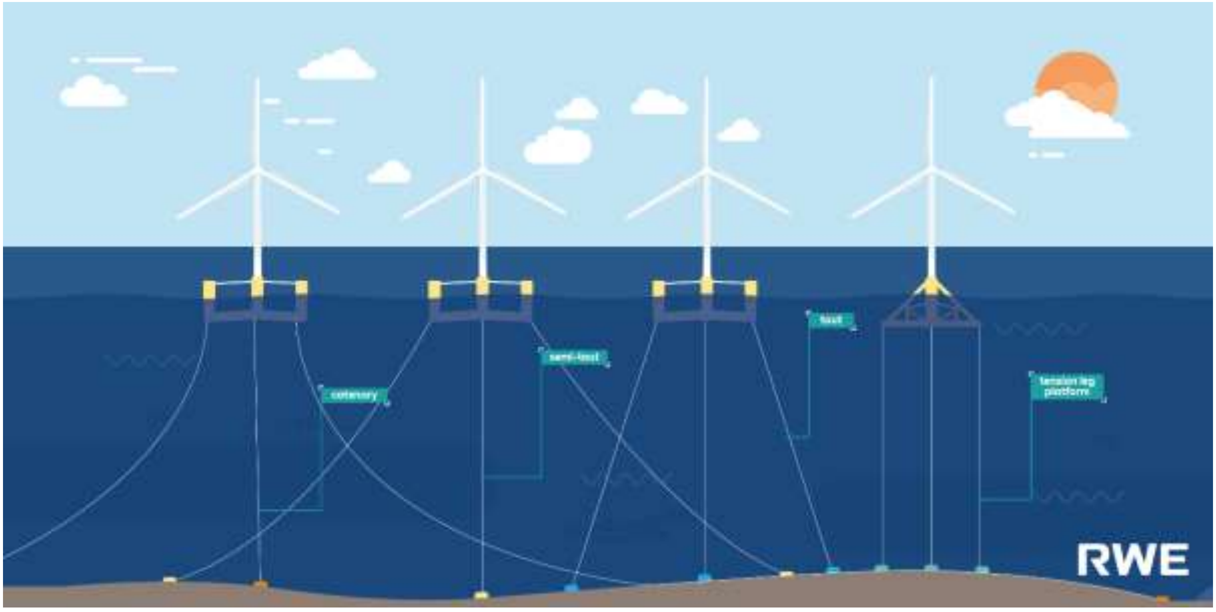


Figure 6. Various mooring systems for floating foundations.

The mooring line is attached to the anchor at one end and the substructure at the other. The anchor fixes the mooring lines to the seabed, see Figure 7 for different types of anchoring systems. The most important factors influencing the choice of anchor are the seabed conditions and the loads that will act on the anchor. The decision on the most suitable floating foundation, mooring system and anchor for the wind farm will be made once detailed site conditions, such as seabed information and oceanographic measurements have been mapped.

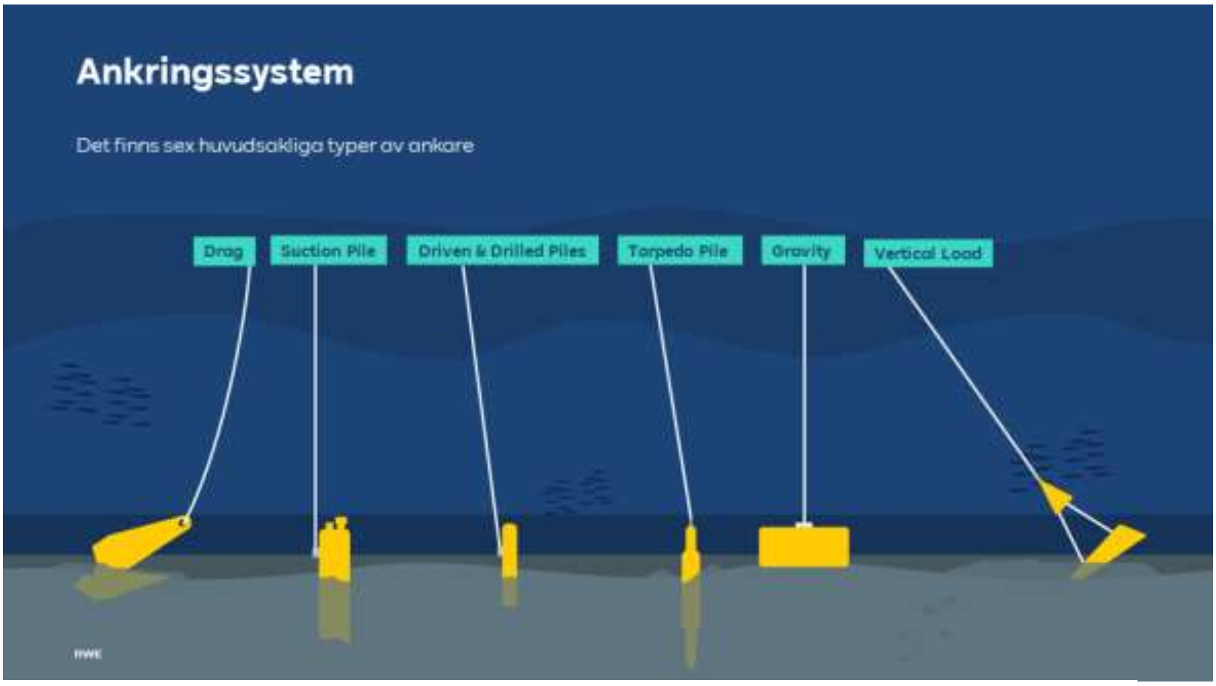


Figure 7. Various anchoring systems for floating foundations.

5.5 Inter array cables

The inter array cable network leads the current from the wind turbines to the transformer stations to then be transferred to land via connection cables, see Figure 8 for an example of how the Inter array cable network can look. To protect the underwater cables on the seabed from damage, these can either be buried in trenches or covered with suitable protective layers, such as stones or cable mats. Cables used for fixed- bottom foundations are static and attached to the foundation itself, while floating foundations require dynamic cables designed to withstand the load of movement from the floating structure. The cables on the seabed can be either dynamic or static.

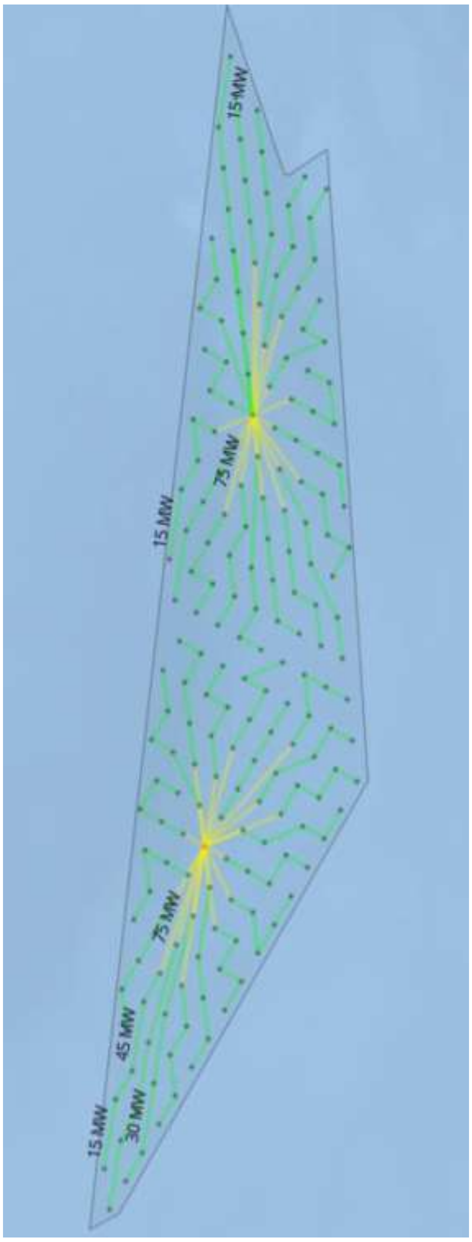


Figure 8. Example layout of inter array cable network.

5.6 Investigations and surveys

Preparatory surveys to better understand the conditions of the park area will be carried out in the form of benthic studies as well as meteorological and oceanographic measurements.

The design of the wind farm requires detailed knowledge of the seabed and the wind and wave conditions at the site. Data needs to be collected within the proposed park area for various technical and environmental purposes, including:

- Understanding of the environmental conditions at the planned wind farm.
- Selection of the appropriate foundation type for the wind farm.
- Selection of the final inter-array cable routes.
- Determination of the most appropriate methods of installation of the structures and laying of the cables.
- Finalization of the layout of the wind farm.

Planned investigations are briefly described below. The methods that will be used may deviate slightly from the description, for example due to advancements in technology at the time the surveys will take place.

5.6.1 Benthic studies

Environmental surveys are carried out in the project area to determine the habitat and the composition of the seabed as well as possible pollution. Examples of benthic studies that may be carried out include:

- Grab-samples are taken from the seabed at a number of locations. The number of samples will be determined based on seabed type and fauna.
- Video transects are carried out with a video/still camera that is lowered from the vessel. Alternatively, an ROV (Remotely Operated Vehicle) is used, which is an underwater robot that is remotely controlled from the ship and is equipped with cameras and sometimes collection tools for samples. Pictures/video are taken to identify bottom structures and habitats along with any vegetation or reefs. The number of video transects required will depend on the type of seabed and fauna.

5.6.2 Geophysical surveys

Geophysical surveys are carried out to examine the properties of the seabed, water depth and identify risk areas on the seabed. Geophysical data is collected from a ship moving along parallel transects across the park area. Below are examples of different geophysical investigation methods that may be used:

- 2D or 3D Ultra-High Resolution Seismic (UHRS) including Sparker: performed by a single, dual, or triple acoustic source emitting a pulse of sound. The reflected signals provide information about the geology below the ground. UHRS typically uses frequencies between about 50 Hz to 5 kHz.

- Sub Bottom Profiler (SBP): a single source and receiver setup emitting a pulse and/or continuous sound waves. There are various techniques/equipment that fall within the SBP category, each suitable for specific purposes, such as geological imaging, identification of sediment and bedrock layering, shallow or deep soil investigations, etc. SBP usually uses frequencies between about 85-115 kHz.

- Sonar technology such as Side Scan Sonar (SSS) and Multi-bean Echo Sounder (MBES): used to extract the underwater topography. MBES using frequencies of 200-400 kHz and SSS 300/600 KHz or 300/900 kHz.

- Magnetometer: a passive instrument often towed behind the survey vessel measuring differences in the earth's magnetic field that could be caused by cables, unexploded ordnance (UXO), wrecks or other objects.

5.6.3 Geotechnical investigations

Geotechnical investigations are carried out to investigate the firmness and load-bearing capacity of the seabed. It is both surface and deep measurements and sampling and includes the following methods:

- Borehole sampling: performed on a number of locations to obtain a detailed knowledge of the seabed structure and its physical characteristics.

- Vibrocores: used to determine the material composition and population sequences of sea sediments.

- Cone Penetration Test (CPT): adopted to obtain information about the seabed soil layer sequence and the resistance and strength of the seabed material.

The locations selected for test drilling, CPT's and vibrocores are scanned with a magnetometer prior to commencing those activities, to avoid collision with unexploded ordinances (UXO). Test drilling and CPT are normally carried out at the selected location for a turbine as the information is needed for the design of the foundations and other components. Normally, one borehole is required per turbine location and one CPT sample is required for each mooring. For the internal cable network, one CPT and one vibrocore per km of cable are needed.

5.6.4 Meteorological and oceanographic measurements

Detailed site-specific knowledge of meteorological and oceanographic characteristics, such as wind, currents and waves, is needed to optimize the wind farm design and perform a detailed assessment of the energy yield, appropriate design and installation on site based on site-specific conditions. The survey is usually collected using a floating buoy that is used at the site for 1–2 years. The buoy is usually equipped with:

- LiDAR: the instrument emits low intensity laser beams and measures the time it takes for light to be reflected by the air (and/or water) particles. Wind (and/or current) speeds are extracted by calculating the doppler shift caused by the movement of the backscattering particles.

- Accelerometers: by measuring the 6-axis (translational and rotational) motion of the buoy, wave length and wave height can be extracted.

A fixed meteorological mast structure, which houses various types of equipment, can be used when technical or regulatory constraints prevent the use of the floating buoy.

5.7 Construction stage

The installation of the wind farm is planned to take about 4 years. For offshore wind farms with floating foundations the typical installation process consists of the following steps: construction of onshore substation and connection cable, construction and installation of offshore substation and internal cable network, installation of anchor and mooring lines, towing of wind turbines from port to the premises of the wind farm and connection of wind turbines for anchor and mooring lines as well as internal cable networks.

5.7.1 Floating foundations and wind turbines

Techniques and methods used to install floating foundations are constantly evolving and will differ based on the foundation chosen. In general, turbines and towers are mounted on foundations in harbors or in sheltered waters before being towed to the site of the wind farm. Once at the site, pre-installed anchor and mooring lines and internal cable networks are assembled and connected to the wind turbine.

5.7.2 Inter array cable installation

The installation phase of the inter array cable network includes preparation of the seabed, cable laying, burying, retracting and finally testing and commissioning. Preparation of the seabed, in the form of clearing boulders and other obstacles, is often necessary to create good conditions for the cable installation.

For wind farms with floating foundations, the inter array cable network can be installed either before or after installation of the floating foundations. When installing the inter array cable network after the installation of the floating foundation, the procedure starts with cable laying at the substation or foundation. Flotation devices are attached to the cables on a cable-laying vessel before the cables are lowered into the water. With the help of the floating devices, parts of the cable are held between the foundation and the seabed in a so-called "lazy wave" formation. This cable formation prevents the cable from being damaged when the foundation moves through wave motion. The cables emanating from the foundation can then be buried to a depth of approx. 1 meter below the seabed, see Figure 9. The burial method can include ploughing, flushing, milling or dredging. Alternatively, cables can be anchored and stabilized on the seabed using stones or concrete masses. The choice of method will depend on local bottom conditions.

Figure 9. Overview of floating foundations with dynamic cables.

In the case of pre-installed internal cable networks, the cable laying is carried out as above, but the cable ends are laid on the seabed until they are to be connected. When connecting, each cable end is retrieved by a remotely operated underwater vehicle to a vessel for installation of flotation devices and then the cable is connected to a wind turbine or substation.

5.7.3 Offshore substation installation

Installation of substations with jacket foundations generally does not require any preparatory work on the seabed. However, clearing of boulders may be necessary. The jacket foundations are transported to the installation site by ship and placed by crane at the chosen location. Depending on the nature of the seabed, different techniques can be used to attach the foundation to the seabed. These techniques include, for example, piling, milling, drilling and/or vibrating down the piles. An alternative is the use of suction buckets which are attached to the seabed by pumping out water, whereby the created negative pressure causes the buckets to enter and attach to the seabed. The alternative is considered gentle as it spreads less of both underwater noise and sediment compared to other techniques.

Substation on jacket foundations can be seen in Figure 10. If the substation is to rest on a floating foundation, the underwater construction is similar to that for floating foundations regarding wind power turbines (see above section 5.7.1).

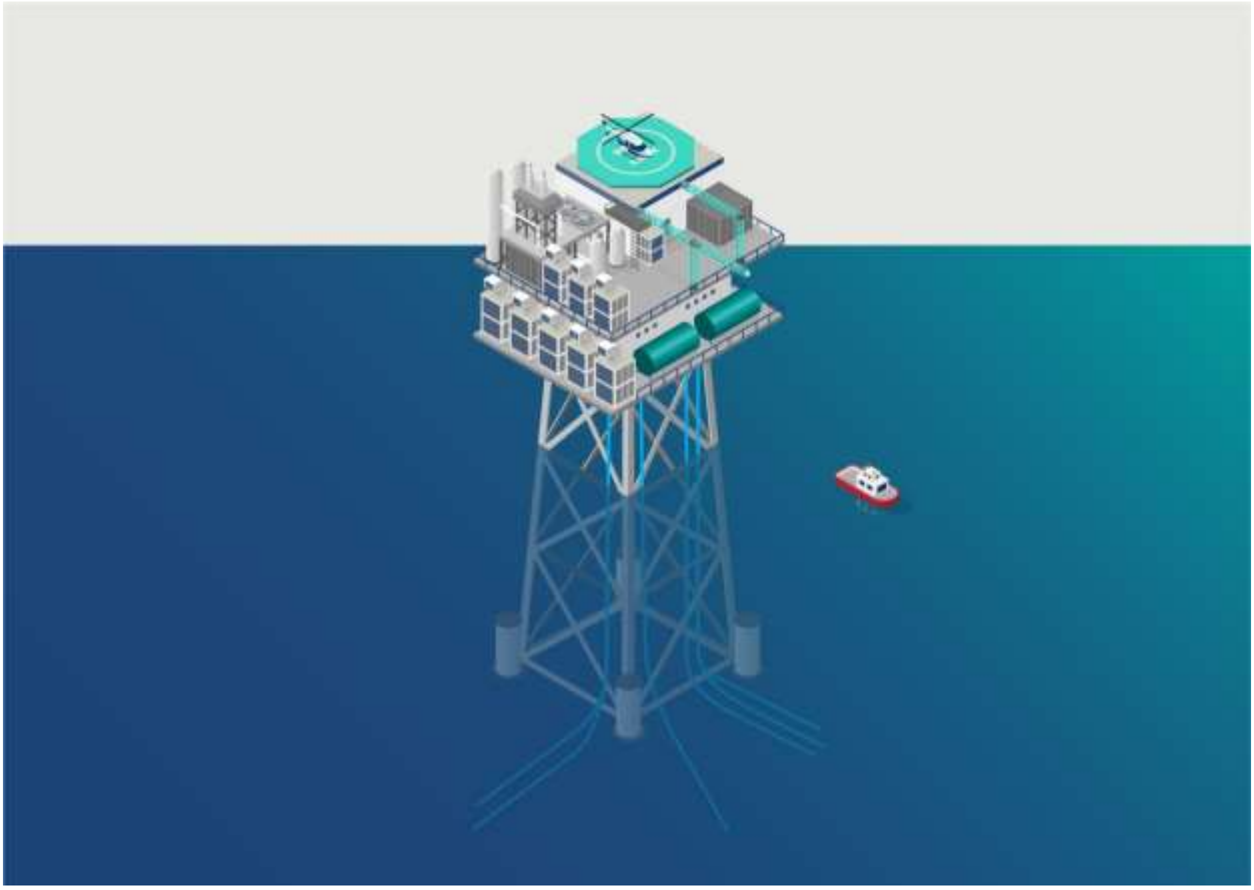


Figure 10. Illustration of substation on jacket foundation.

After installation of the foundation, a platform is installed intended for the placement of the electrical high-voltage substation. The top structure for the substations is then lifted up to the platform with a crane vessel, and then fixed.

5.7.4 Vessel movements

Several ships will need to move in the area, as well as between the area and various ports, during the construction period to transport personnel as well as equipment and materials. Ship operations and transport are coordinated as much as possible to minimize the number of vehicle movements and increase safety. A more accurate assessment of the number of necessary vessels, number of site visits and operating hours to install the entire project can only be made during the detailed design.

An advantage of floating foundations is that large parts of the installation and commissioning work can be done in port before the works are transported to the park area. However, this means that the floating constructions need to be shipped out in their entirety, or in very large parts. The size of the components means fewer components on each ship, which in turn means many transport movements. The size of floating wind foundations and their sub-components is significant, so port utilization and maritime traffic are important considerations.

5.8 Operation

During the operational phase, regular monitoring and maintenance of the wind farm takes place. During normal operation, the wind turbines and transformer stations are unmanned and controlled remotely by trained personnel. Regular site visits are required for both inspection and maintenance. Transport of personnel to and from the park area is done by ship and possibly by helicopter.

Monitoring and maintenance of the wind farm will be necessary throughout its lifetime, starting from facilities at a port. The design and execution of operation and maintenance will be determined at a later stage.

If extensive repair work is needed, the various plant parts can be transported to the port where the repairs can be made.

5.9 Decommissioning

The expected lifespan of the planned wind farm is between 35–40 years. It is then phased out. In general, the decommissioning is carried out in reverse order compared to the construction and involves a similar impact as in the construction phase. The decommissioning phase and its effects can currently be described based on today's practices, techniques and methods, but these may have changed when the decommissioning is to be carried out, as it takes place far in the future.

5.10 Accompanying activities

The establishment of the wind farm will entail other necessary activities, so-called consequential activities. These are described briefly below.

5.10.1 Export cable and onshore substation

The electricity generated is transmitted from the wind farm's substations via connection cables to a land-based high-voltage station, where it is converted to mains voltage and connected to the electricity grid. Underwater cables are used to transport the electricity from the wind farm to land, where it transitions to land cables (ground cable or overhead line) for further transmission to the land-based station.

5.10.2 Handling of dredged masses

The extent of any dredged masses and how they are to be handled will be determined at a later stage of the project and handled in accordance with current regulations. Handling of any dredged masses will be described in the EIA.

5.11 Preliminary timetable

The timetable for the construction of an offshore wind farm includes several project phases that begin with the permit process. A complete detailed design can normally only be done after all the necessary permits have been notified. The permit processes continue for several years.

The construction phase can usually begin a few years after all permits have been obtained and the detailed design has been completed. Taking delivery times and availability of contractors into account, however, it may take longer before the work and detailed planning can start. Preliminarily, the construction work is estimated to last for four years. In summary, it can take about ten years to plan and build a wind farm. The Elinor wind farm is estimated to be in operation for approximately 35–40 years and will then be decommissioned. The winding-up phase is tentatively estimated to last for a couple of years. For an estimate of the timetable see Figure 11.

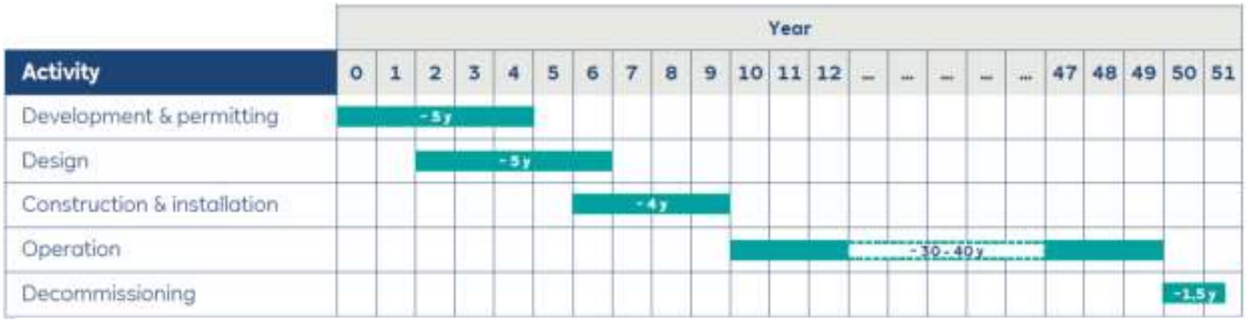


Figure 11. Overview schedule for the life of the wind farm.

6 Alternatives

6.1 Main Alternative

The main alternative involves the location and design of the wind farm in accordance with the description chapter 4, where floating foundations are used for the wind turbines, while both floating, bottom fixed or a combination are possible alternatives for the transformer stations.

Impact, effects and consequences during investigations, construction, operation and decommissioning will be assessed in the EIA. A preliminary assessment of influencing factors and effects is made in Chapter 8.

6.2 Alternative localisation

RWE has investigated possible locations for the planned Elinor wind farm. The starting point has been the Environmental Code's rules on choosing a location for an activity or measure according to Chapter 2 § 6 of the Environmental Code. Alternative locations have been evaluated based on technical conditions, impact on protected areas and natural values, and impact on other interests. Parameters taken into account include size of the project area, sea depth, wind speed, electricity connection and coexistence with nature conservation interests and other interests, for example shipping, defense interests and the fishing industry.

Based on available information about the current area and technical conditions, RWE has identified the proposed location as suitable for the establishment of an offshore wind farm. The area for the wind farm is far from land and overlaps to a very small extent with national interests for total defense and commercial fishing, no other national interests lie within the project area.

In the EIA, alternative locations for the wind farm will be described.

6.3 Alternative design

RWE examines the area's conditions and various technical solutions to work out the best design for the wind farm. The selected alternative and the motives for that design are described in the upcoming EIA.

6.4 Zero alternative

The zero alternative means that the wind farm will not be built. There is therefore no environmental or other impact as a result of the project (positive or negative). Furthermore, the zero alternative means that the business's contribution to renewable electricity production in order to electrify society, contribute to the climate transition and strengthen the competitiveness of Swedish industry will not occur. The zero alternative will be described in the upcoming EIA.

7 Marine spatial plans

7.1 Marine spatial plan

Marine spatial plans have been drawn up for the North Sea, the Gulf of Bothnia and the Baltic Sea and should provide guidance on the appropriate use of different areas. Among other things, the marine spatial plans should contribute to reaching the societal goal of 100% fossil-free electricity production by 2040. In general, the technical possibilities for wind farms in the Baltic Sea are good. The project area for Elinor is located within the Baltic Sea plan area, Middle Baltic Sea area, Ö226. In the existing marine spatial plan, general use for the area is mainly specified (Havs- och Vattenmyndigheten, 2024), see Figure 12.

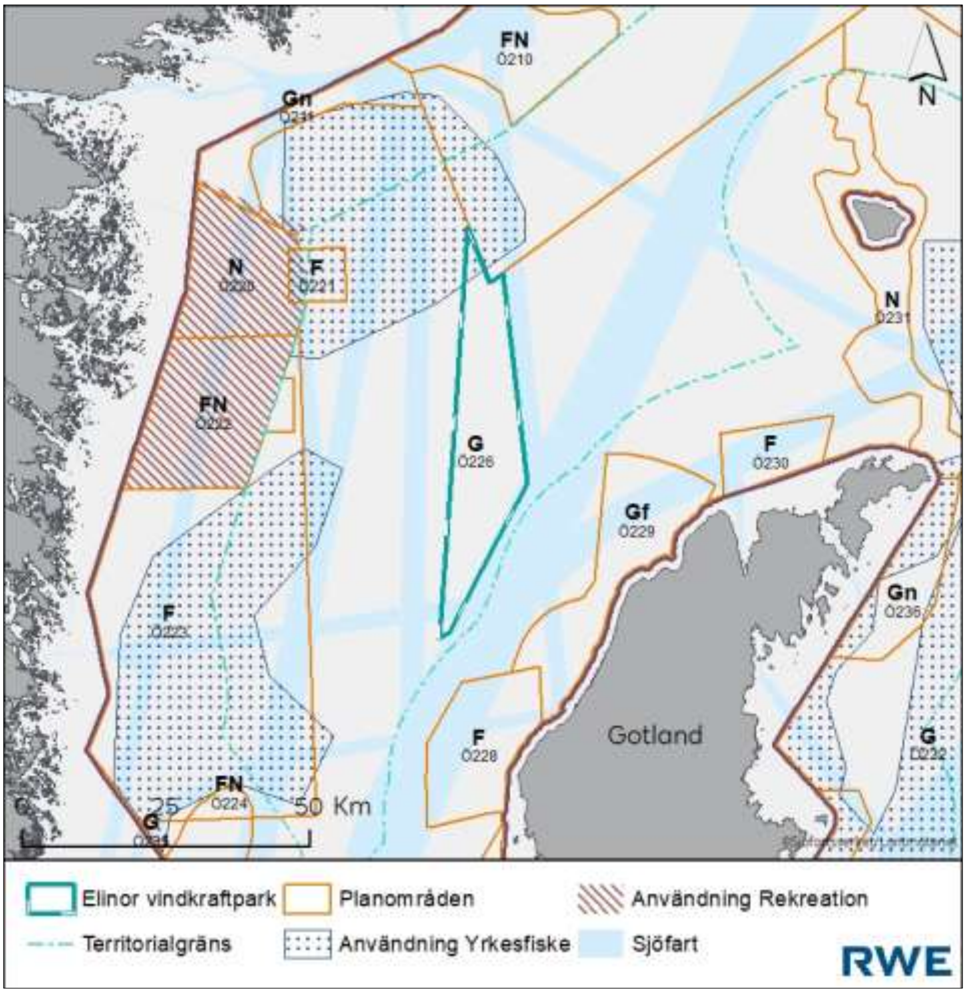


Figure 12. Existing marine spatial plan. Blue dotted areas is commercial fishing, red lined areas recreational use, light blue corridors shipping, yellow areas other use.

New marine spatial plans are drawn up to, among other things, meet the need for increased energy extraction at sea. These are in a consultation stage and are planned to be submitted to the government for a decision no later than 31 December 2024 (Havs- och Vattenmyndigheten, 2024). According to the current proposal, the project area for Elinor, Ö276, is singled out as the investigation area of energy extraction with special regard to the interests of the total defense and high cultural environmental values. The project area overlaps, to a small extent in the north-west corner, with area Ö208 where General use and Commercial fishing use are specified as areas of use (Havs- och Vattenmyndigheten, 2024), see Figure 13.

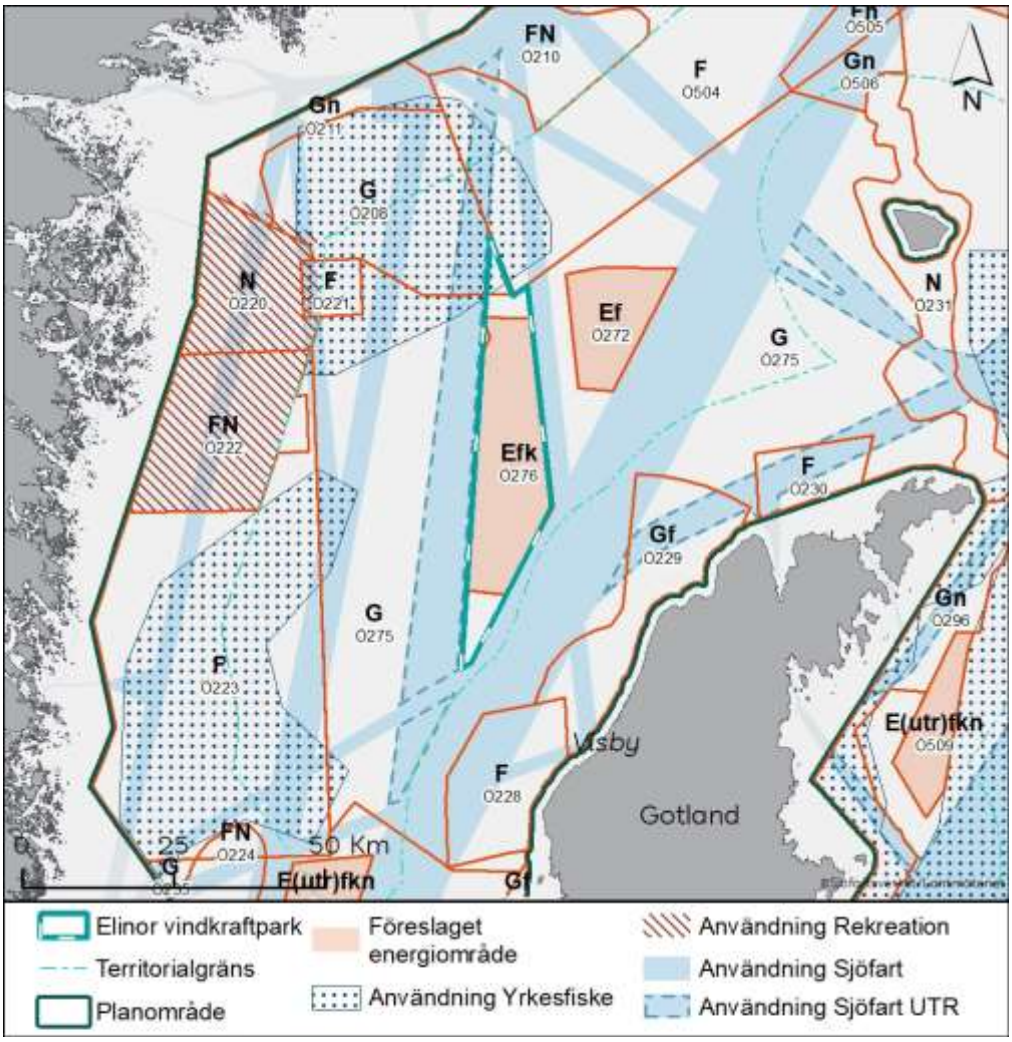


Figure 13. Proposed marine spatial plan. Blue dotted areas is commercial fishing, red lined areas recreational use, light blue corridors shipping, orange areas other use, peach areas proposed energy production areas.

8 Area description and possible effects

8.1 Depth conditions and hydrology

8.1.1 Description of the current situation

The project area for Elinor has a water depth that varies between approx. 80–200 m, with the exception of Nielsengrund, which is located in the northwestern part of the project area. Nielsengrund has a minimum depth of approx. 60 m, see Figure 14.

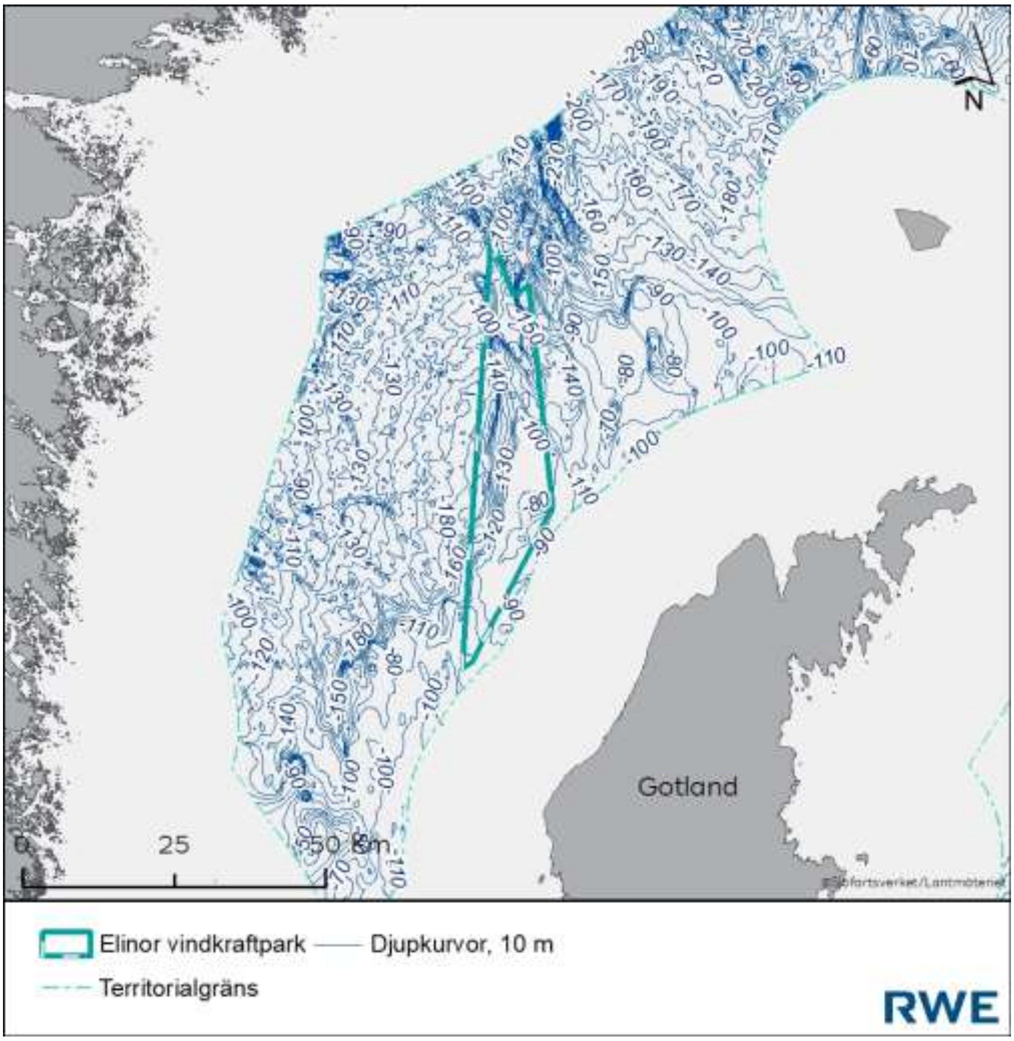


Figure 14. Depth conditions in and around that Elinor project area.

The Baltic Sea is a brackish inland sea, with more saline water in the south to a higher amount of fresh water in the north. The salinity also varies according to the currents and with the depth. In the project area, the salinity in deeper parts can exceed 10 ‰, while the surface water is generally below 7 ‰. The oxygen conditions in the upper water column are good but start to drop at a depth of 60–70 m. At a depth of 80–90 meters and deeper, the oxygen content is zero or close to zero. This applies to large parts of the deeper areas in the Baltic Sea and around the entire project area, see Figure 15.

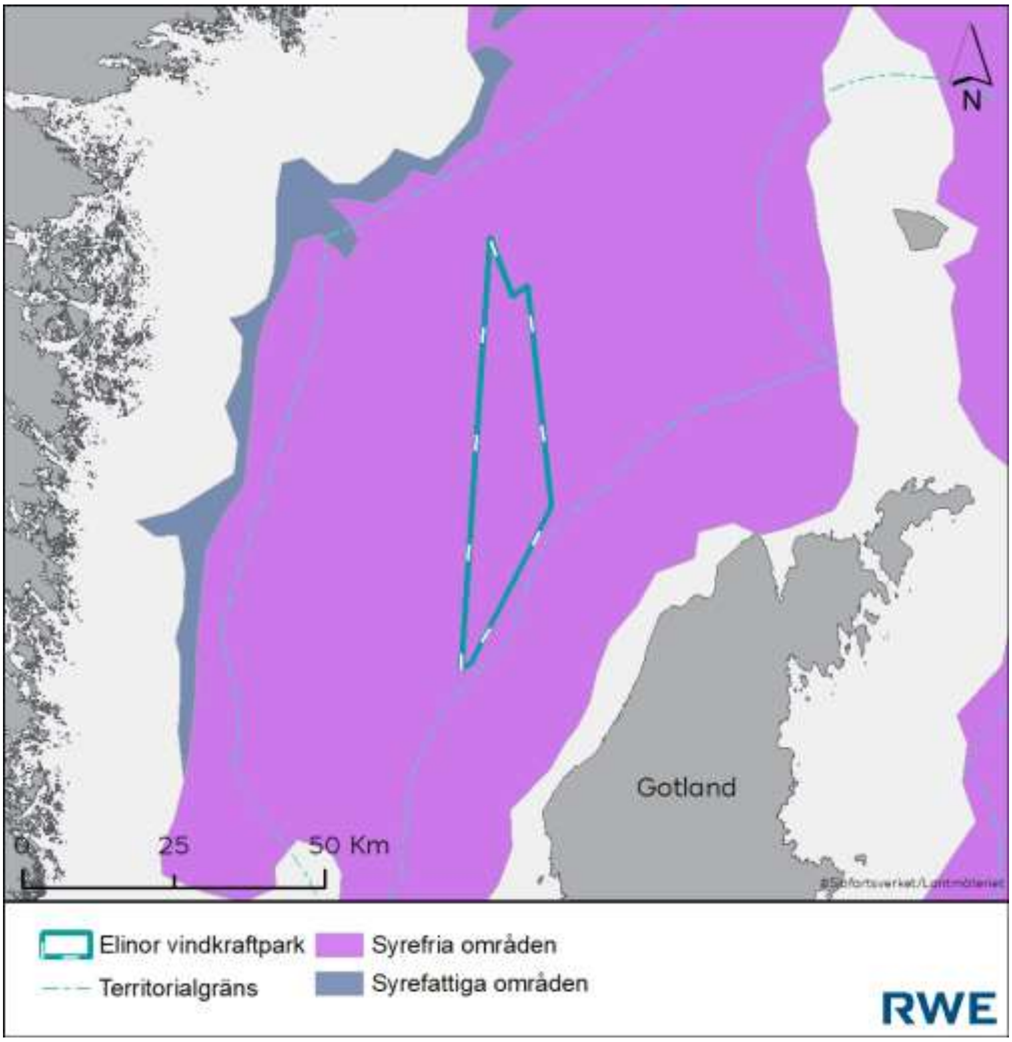


Figure 15. Distribution of dead bottom (oxygen free) visualized in magenta and near dead bottom (poor oxygen) visualized in blue.

The currents in the Baltic Sea depend partly on fresh water flowing out of watercourses (these currents are weaker during the summer months when the inflow decreases), partly on more saline water coming in from Kattegat. Even the wind and the water level change affect the surface water currents (SMHI, SMHI, 2024). The tide in the Baltic Sea is marginal and only varies by a few centimetres, it affects the currents to some extent but otherwise it lacks practical significance (SMHI, SMHI, 2024).

8.1.2 Possible effects

Offshore wind turbines can potentially affect wind conditions, which by extension can cause local effects below the sea surface such as changes in currents and stratification. The foundations can also have a direct impact on local current and wave conditions, by reducing the water speed and wave height on the leeward side of the foundations. This will be described and assessed in the upcoming EIA.

8.2 Bottom conditions and sediments

8.2.1 Description of the current situation

The seabed material within the project area for Elinor is primarily glacial clay with elements of postglacial clay, mud clay and clay mud, moraine clay, muddy moraine and sedimentary bedrock (SGU, 2024), see Figure 16.

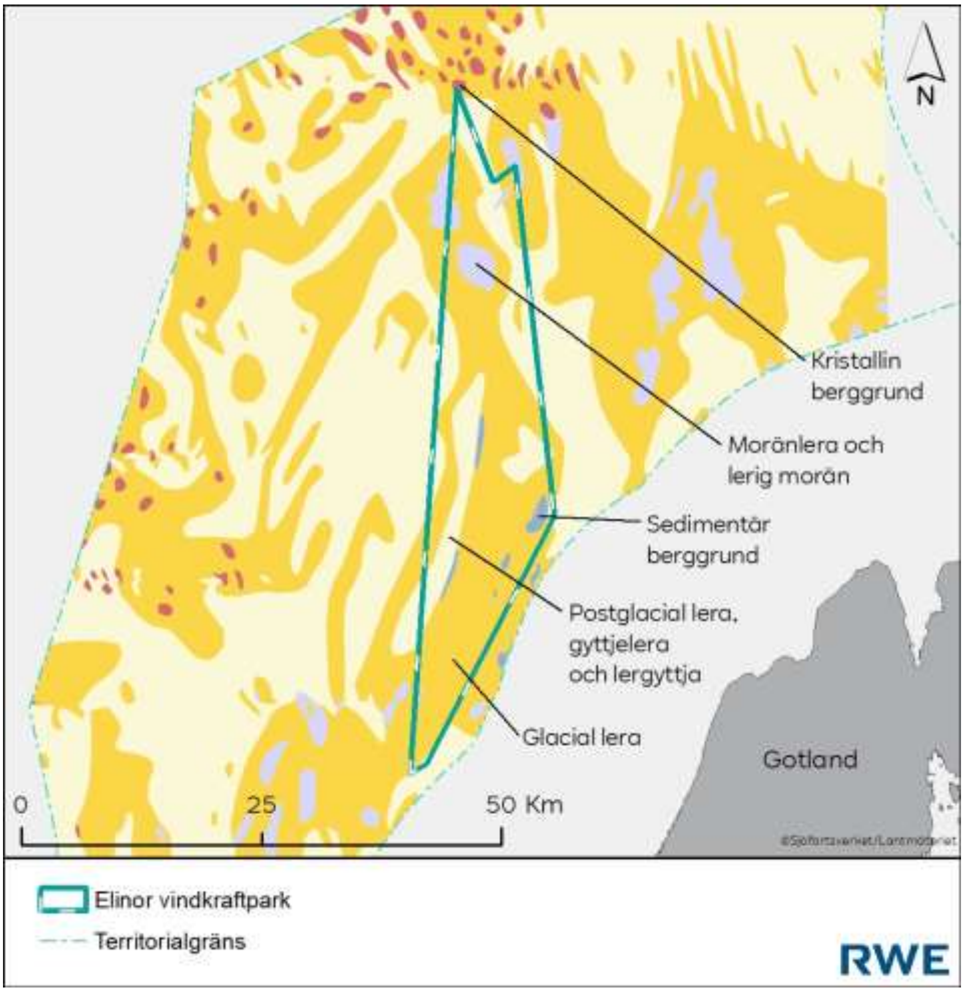


Figure 16. The geology within the project area. Bright yellow glacial clay, light yellow postglacial clay, mud clay and clay mud, light blue moraine clay/muddy moraine, dark blue sedimentary bedrock and red crystalline bedrock.

8.2.2 Possible effects

The planned wind farm can potentially cause the spread of sediments during surveys and during the construction and decommissioning phases. Sediment dispersion is generally less during the decommissioning of wind turbines than at the installation (Isæus, 2022). Furthermore, the extent of sediment spreading depends on the type of foundation used. Even the construction of the internal cable network can cause sediment spreading.

During the operational phase, bottom-fixed foundations normally do not cause any spread of sediment (Isæus, 2022). Floating foundations, on the other hand, can cause the spread of sediment, if its anchorage drags across the bottom when the platforms move. This will be described and assessed in the upcoming EIA.

8.3 National interests and protected areas

National interests are singled out over geographical areas because they contain nationally important values and qualities. There are two types of national interests, larger areas that the government has decided on and areas which are decided by national authorities.

8.3.1 National interest for Total Defence

The armed forces are responsible for identifying areas that are of national interest for the military facilities of the total defence, as well as Chapter 3 § 9 of the Environmental Code. The national interests for total defence and military interests are located on coasts and in the sea, such as areas for training activities and signals intelligence. Ports and waterways are also important resources. Certain interests are subject to confidentiality. RWE's ambition is to engage in dialogue with the Swedish Armed Forces.

8.3.1.1 Description of the current situation

In the vicinity of the project area there are several areas that are of interest to the Armed Forces and the total defence. As seen Figure 17 the project area overlaps with an MSA area (Minimum Safe Altitude). These are areas that specify a minimum height around a military airport within which it is safe to carry out inflows and outflows. In the vicinity of the project area there are four naval training areas. Naval training areas are used for both ships, submarines and aircraft.

Nearby there is also a stopping area for tall objects around Visby Airport and an area of influence for weather radar.

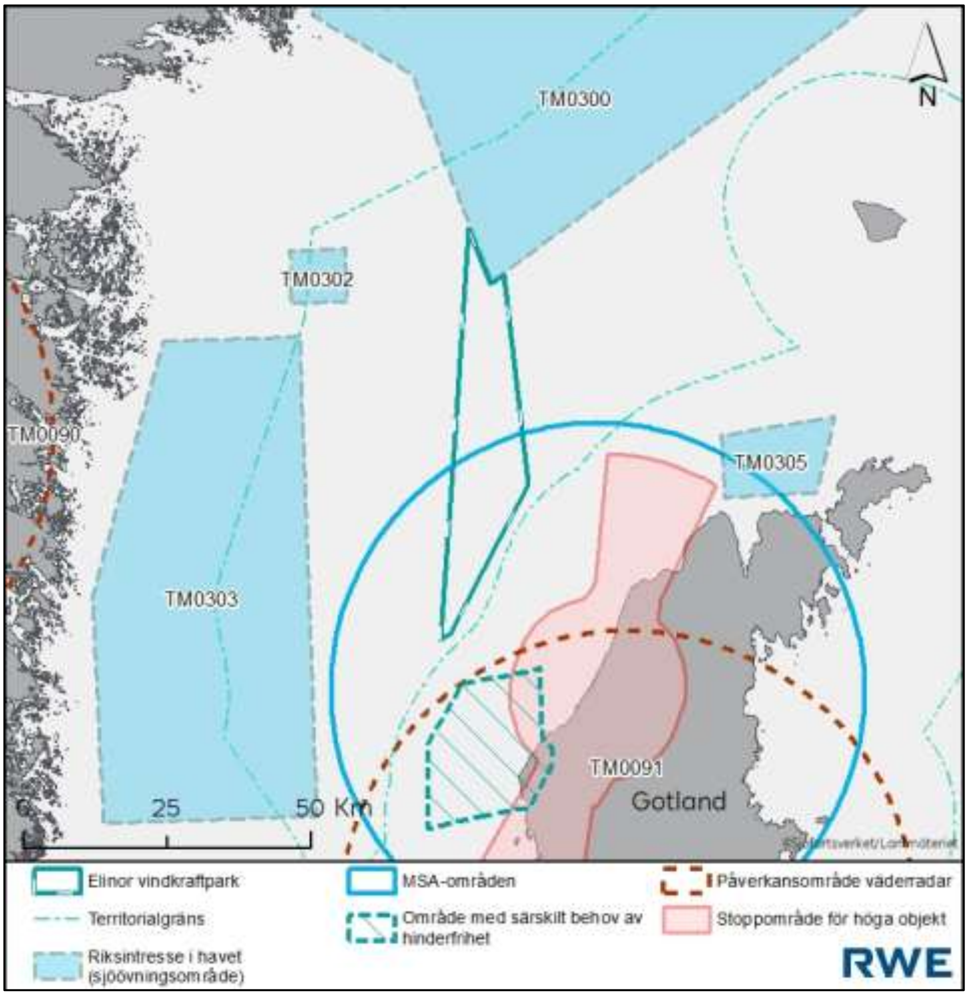


Figure 17. National interests for total defense. Light blue areas are naval training areas, blue lined area MSA-area.

8.3.1.2 Possible effects

Tall objects, such as wind turbines, risk affecting the national interests of the Armed Forces and total defense as the flight height can be affected. The MSA area overlaps with the project area. Other national interests for total defense lie outside the project area. The impact will be described and assessed in the upcoming EIA.

8.3.2 National interest for shipping

The Swedish Transport Administration is responsible for national interest claims regarding the traffic act's facilities, including ports and waterways, according to Chapter 3 § 8 of the Environmental Code.

8.3.2.1 Description of the current situation

The project area is in direct contact to several waterways that are included in the national interest for shipping, see Figure 18. The four waterways that are directly connected to the project area are Nynäshamn – Gdansk in the west, Visby – Nynäshamn in the east and Öland's southern base – Svenska Björn and Kalmar Sund – Stenkyrkehuk in south/southeast (Boverket, 2024).

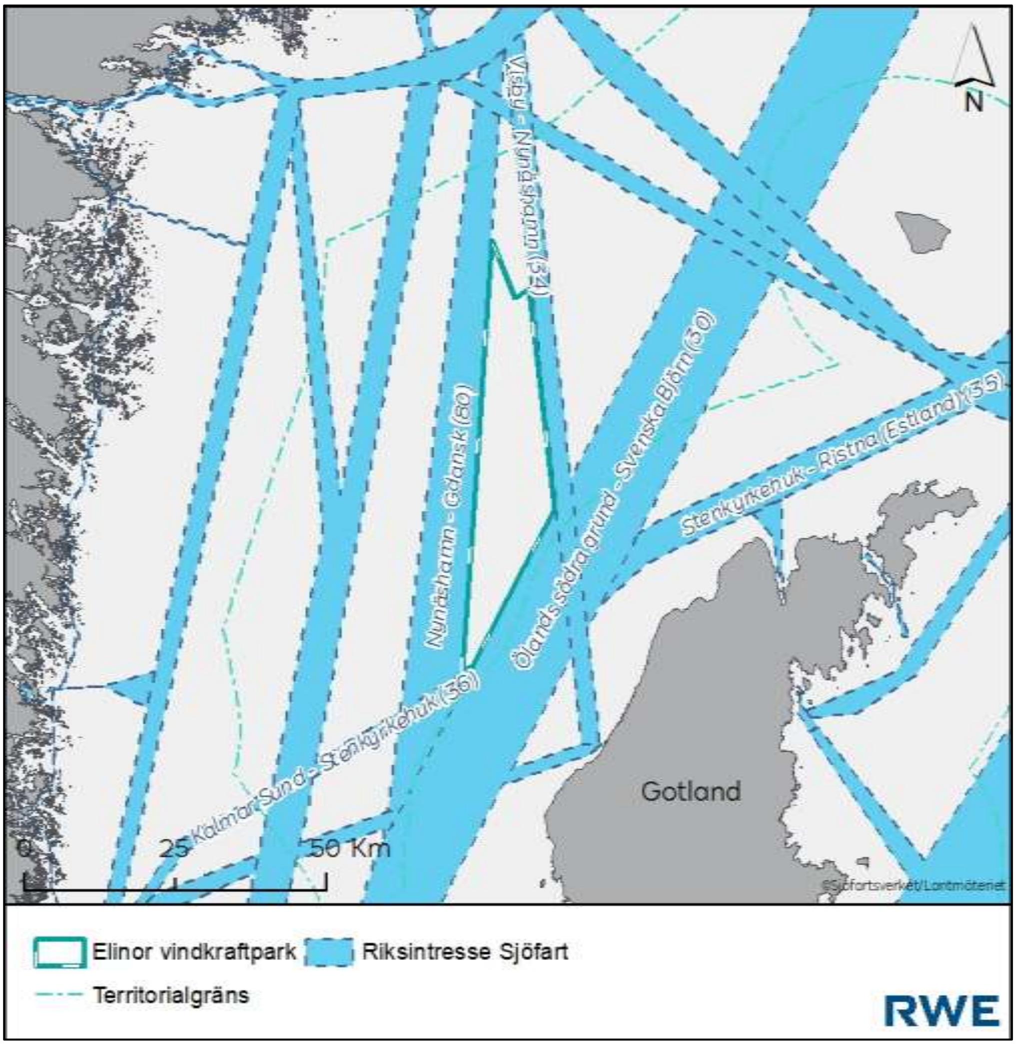


Figure 18. National interest for shipping (visualized in blue).

8.3.2.2 Possible effects

The planned wind farm is located outside designated shipping lanes but could affect national interests for shipping because the project area is between four areas of national interest for shipping. During the construction and decommissioning phase, vessels related to the project will operate in the area of, and directly adjacent to, the planned wind farm, which could affect nearby shipping. The impact on national interests for shipping will be described and assessed in the upcoming EIA.

8.3.3 National interest for commercial fishing

Areas of national interest for commercial fishing are designated within sea areas, lakes and waterways and for fishing ports. It is the Swedish Agency for Marine and Water Management that provides information on areas that are of national interest for professional fishing according to Chapter 3 § 5 of the Environmental Code.

8.3.3.1 Description of the current situation

For areas that are classified as of national interest for commercial fishing, the fishing sector's access to catch areas must be ensured. The location of the planned wind farm overlaps to a small extent in the north-western part with an area designated as national interest for commercial fishing, Gustaf Dalén. Two more areas are located near the project area; the closest, Västervik coastal area, approx. 19 km south-west of the project area and Salvorev/Midsjöbank east of the project area, see Figure 19.

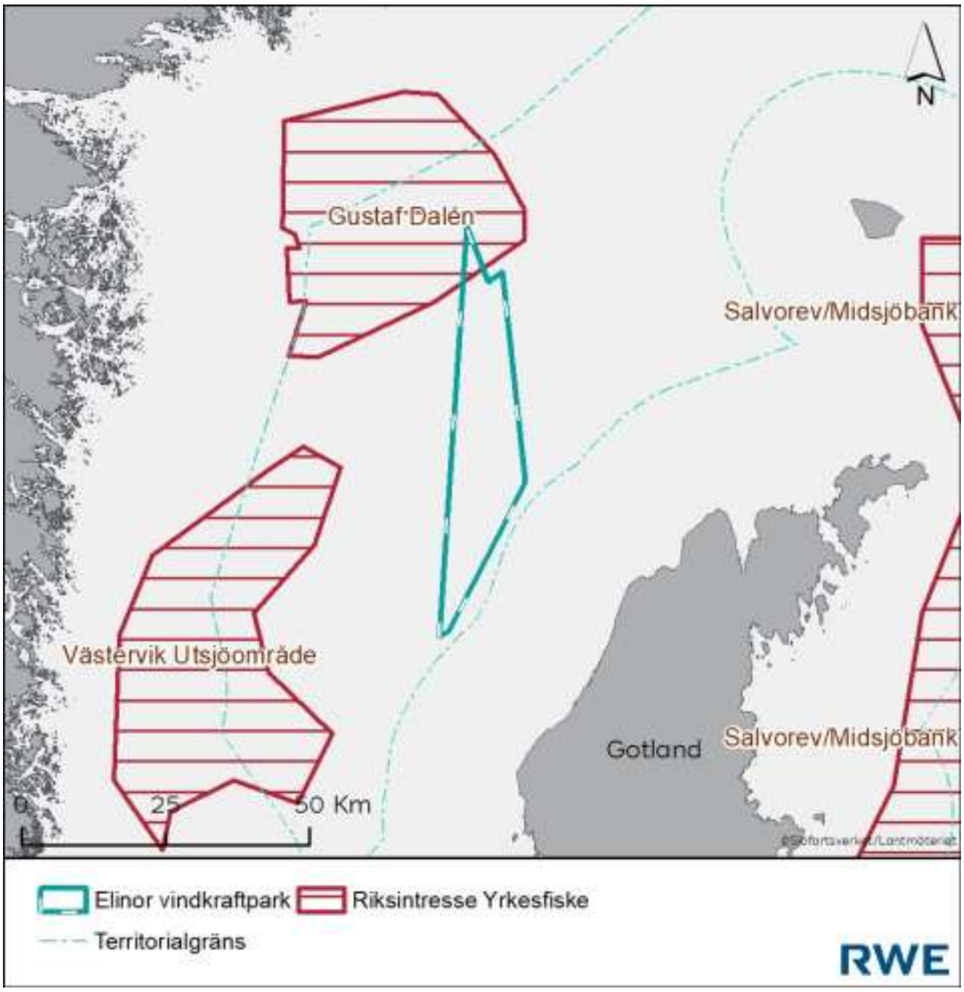


Figure 19. National interests for commercial fishing in the vicinity of the planned Elinor wind farm (visualized with red lined areas).

8.3.3.2 Possible effects

There may be restrictions on how accessible certain fishing areas become, as commercial fishermen do not have the same opportunity to reach the fishing areas that the project area overlaps with, especially during the construction phase. However, this is a limited time and aims to ensure the safety of professional fishermen. How the impact looks like in the operational phase depends on the location of turbines, substations, cables, etc. The impact on commercial fishing and the national interest will be described and assessed in the upcoming EIA.

8.3.4 National interest for cultural heritage conservation

8.3.4.1 Description of the current situation

The closest area of national interest for cultural heritage conservation to the project area is Lickershamn, 25 km east on Gotland's north-west coast. The area is protected, among other things, for its Viking-era burial grounds, Stone Age settlements and ancient castles. Other national interests for cultural heritage conservation are located at least 40 km from the project area.

8.3.4.2 Possible effects

The wind farm can be visible from areas of national interest. Due to the large distance from the planned wind farm, no impact on the national interest in the cultural heritage conservation is anticipated. This will be described and assessed in the upcoming EIA.

8.3.5 National interest outdoor life and active outdoor life

For an area to be of national interest for outdoor life, it must have great outdoor values seen from a national perspective. The Swedish Environmental Protection Agency and the Maritime and Water Authority are responsible for reporting areas deemed to be of national interest for outdoor life according to Chapter 3 § 6 of the Environmental Code. Areas of national interest for active outdoor life are designated by the Parliament in Chapter 4 § 2 of the Environmental Code.

8.3.5.1 Description of the current situation

Active outdoor life of national interest covers the entire coast of Gotland as well as the mainland coast west of Elinor, see Figure 20. Areas designated for active outdoor life are areas with good conditions for people to stay and experience natural and cultural landscapes. The various areas of national interest for outdoor life are designated for, among other things, swimming, boating, canoeing, cultural experiences, hiking, cycling and ice skating.

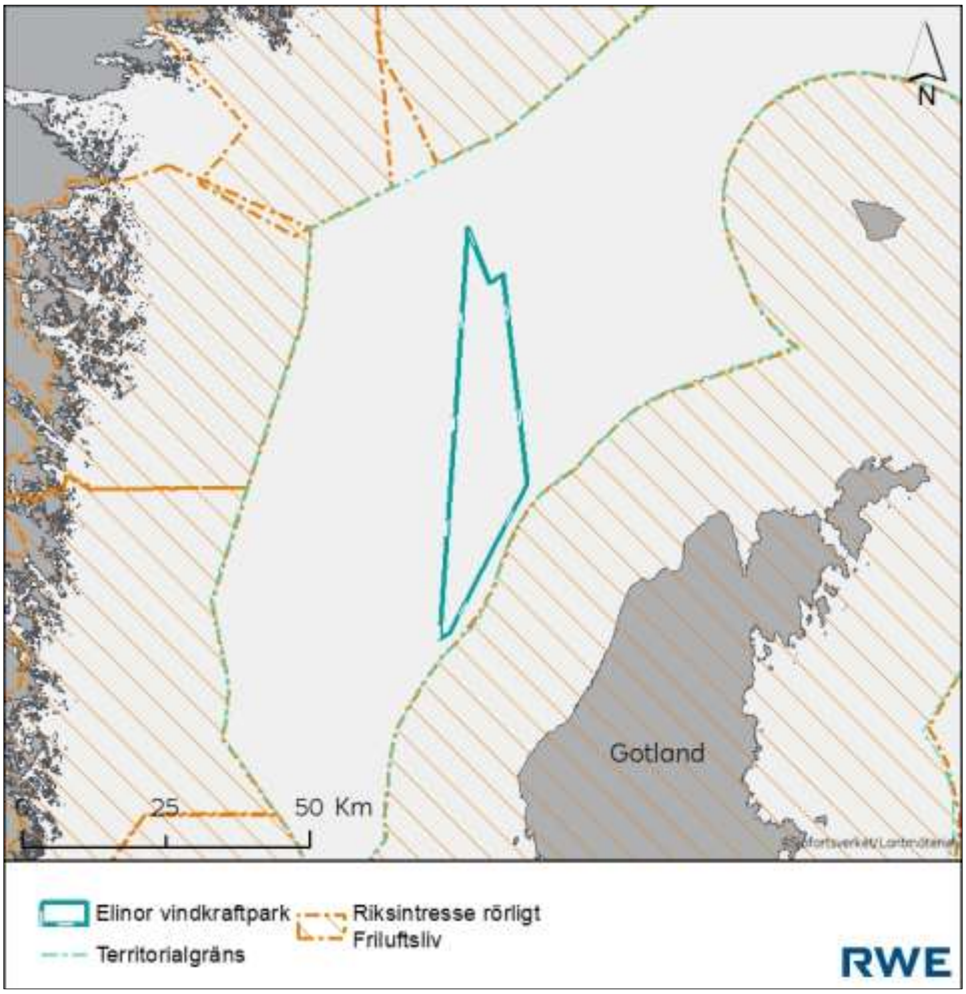


Figure 20. National interest mobile outdoor life (visualized with orange lined areas).

8.3.5.2 Possible effects

The project area is located outside the national interests for outdoor life. The impact that could occur consists of a change in the landscape. This will be described and assessed in the upcoming EIA.

8.3.6 National interest for nature conservation

Nature conservation's areas of national interest represent the main features of Swedish nature and are the most valuable areas from a national perspective. It is the Swedish Environmental Protection Agency that is responsible for reporting areas deemed to be of national interest for nature conservation according to Chapter 3 § 6 of the Environmental Code.

8.3.6.1 Description of the current situation

Large parts of Gotland's coast, the area around the Gotska sandön (Salvorev-Kopparstenarna) and the mainland coast west of Elinor are designated as national interest for nature conservation, see Figure 21. The areas are protected based on, among other things, wetlands, agricultural landscapes, their specific flora and fauna and archipelago environments at large.

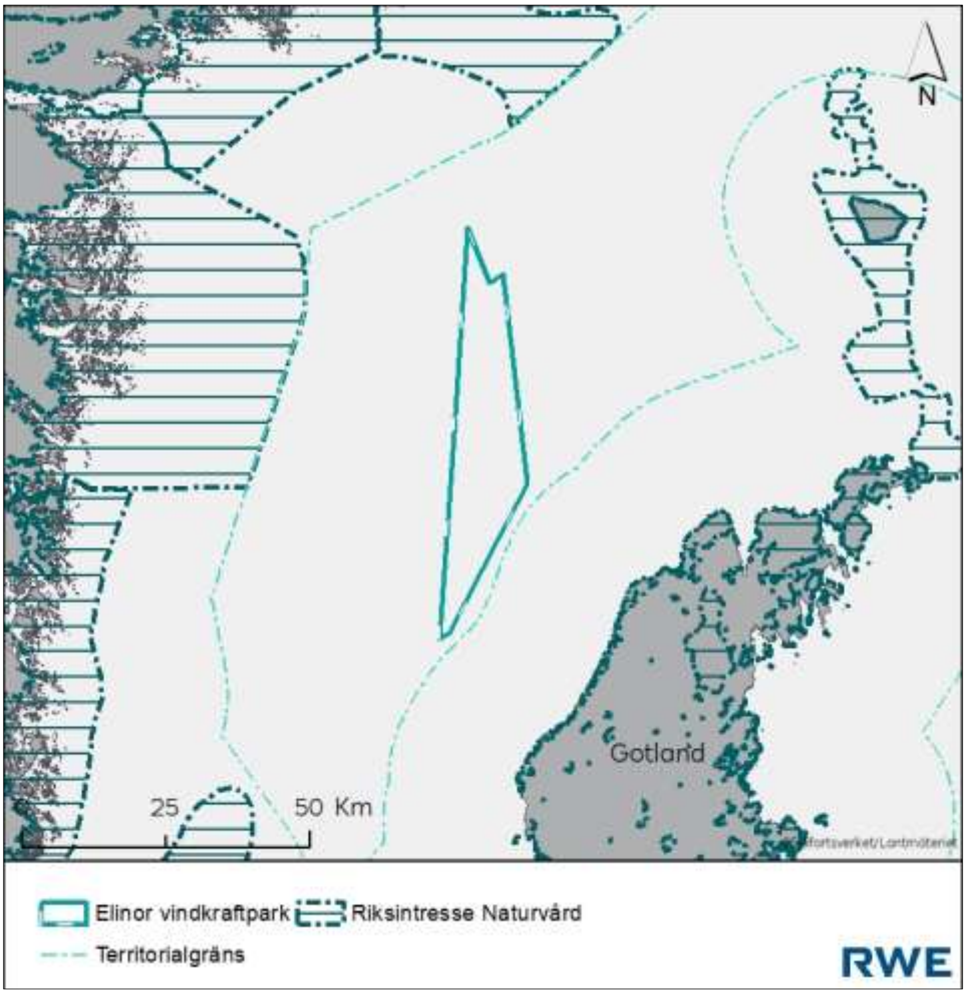


Figure 21. National interest for nature conservation (visualized with dark turquoise lined areas).

8.3.6.2 Possible effects

In the national interest for nature conservation, measures that can significantly damage the natural or cultural environment may not be carried out. The project area is not within a designated area. The nearest area is located approx. 25 km away. However, the wind farm may be visible from the areas of national interest. This will be described and assessed in the upcoming EIA.

8.3.7 Natura 2000 sites

Natura 2000 is a network of protected areas within the EU. Natura 2000 sites are established to protect natural areas that are considered particularly worthy of protection from a European perspective. Natura 2000 sites can be designated as a protected area according to the Habitats Directive (SCI) and the Birds Directive (SPA).

8.3.7.1 Description of the current situation

There are several Natura 2000 sites around the project area, but these are located at great distances from the project area, see Figure 22 and Table 2. Terrestrial areas have been demarcated as these are not deemed to be affected due to the great distance. The closest aquatic Natura 2000 areas is Skärgårdsreservaten, Hävringe-Källskaren, Gotska Sandön – Salvorev, Sankt Anna and Gryts archipelagos, Åsvikelandet-Kvädö and Örö Sankor. The areas are designated according to the SCI and the SPA. The designated aquatic habitats are sandbars, reefs, sandy beaches of the Baltic Sea, dune wetlands, lagoons, large shallow bays and straits, vegetation-covered sea cliffs, seashore meadows of the Baltic Sea type, sandy beaches with perennial vegetation in the Baltic Sea, skerries and small islands in the Baltic Sea, perennial vegetation on stony beaches, sea cliffs, skerries in the Baltic Sea, coastal meadows by the Baltic Sea and smaller watercourses. Designated aquatic species are the gray seal (*Halichoerus grypus*) and the rock goby (*Cottus gobio*) as well as a number of seabirds.

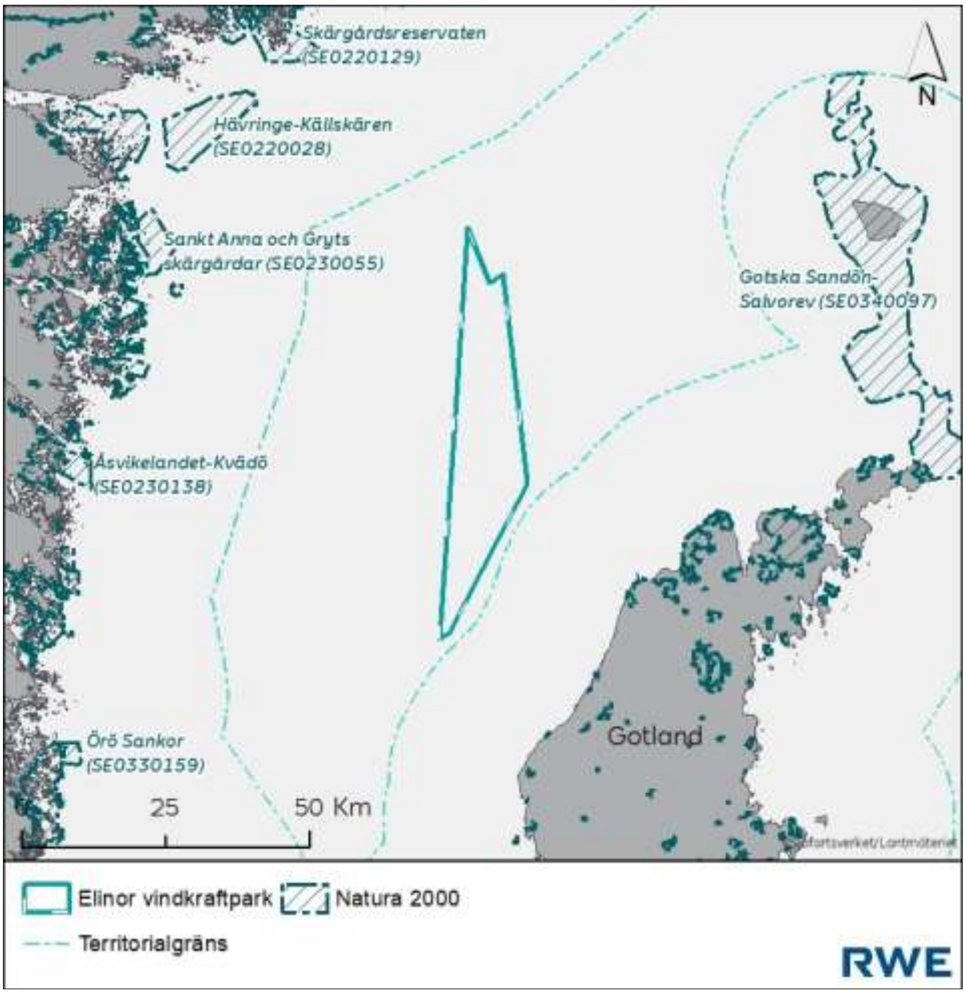
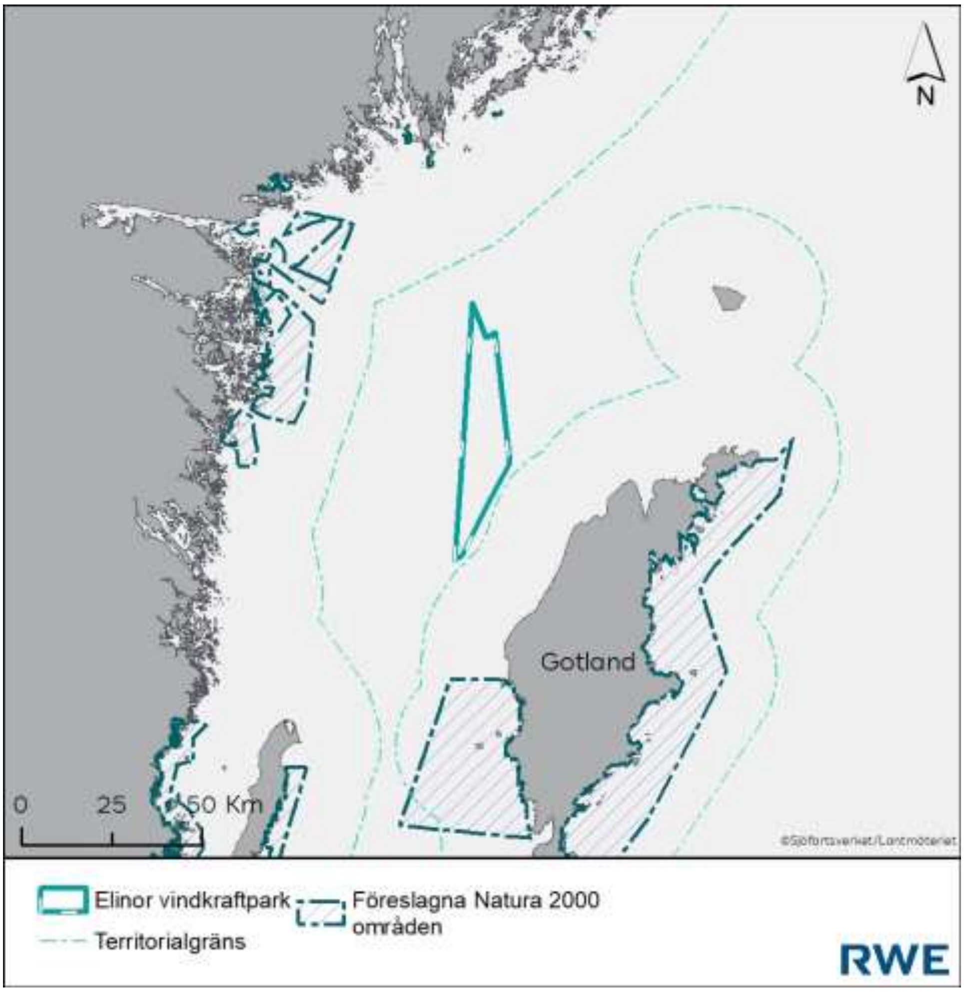


Figure 22. Existing Natura 2000 sites (visualized with dark turquoise lined areas), nearby aquatic Natura 2000 sites have been named in the map.

Table 2. Nearby aquatic Natura 2000 sites to the project area.

Name	Area code	Distance to project area
Skärgårdsreservaten	SE0220129	40 km
Hävringe-Källskären	SE0220028	45 km
Sankt Anna och Gryts skärgårdar	SE0230055	50 km
Gotska Sandön-Salvorev	SE0340097	55 km
Åsvikelandet-Kvädö	SE0230138	60 km
Örö Sankor	SE0330159	65 km

There are also several proposed Natura 2000 sites around the project area that have not yet been determined. One of these covers the entire east coast of Gotland and will be connected with Gotska Sandön - Salvorev. A larger area on the southwest coast of Gotland is also proposed to be protected. For both areas, birds are the primarily designated species (Gotland, 2024). A number of new areas have also been designated in Kalmar and Östergötland counties. For new proposed areas see Figur 23.



Figur 23. New proposed Natura 2000 areas (visualized with dark turquoise lined areas).

8.3.7.2 Possible effects

Wind farms can, among other things, give rise to noise, change in wind directions, displacement, barrier effect and collision risk for designated species. The project area is located far from Natura 2000 sites, the nearest approx. 40 km northwest of the project area, see Table 2, direct impact on nature values is therefore not likely to occur. Any impact, in and in connection with the Natura 2000 sites and designated species, will be described and assessed in the upcoming EIA.

8.3.8 Nature reserves and national parks

8.3.8.1 Description of the current situation

There are several nature reserves around the project area, see Figure 24. Most of the nearby nature reserves are located on Gotland and designated to protect terrestrial environments where the conservation values mainly consist of plants, birds, pastures or tourist destinations. In Kalmar and Östergötland's archipelago there are several coastal and marine nature reserves designated for fish, mussel banks, red algae, shipwrecks and other aquatic values. One of the larger nature reserves is the Salvorev-Kopparstenarna north of Gotland, which also surrounds the national park Gotska Sandön. Gotska Sandön is made up of flying sand, which makes the island hilly to be a sand island. There are several depressions with deciduous forest, but most of the island consists of pine forest with old trees with an age of up to 500 years, which provides good habitat for, for example, rare beetles (Länsstyrelsen Gotlands län, 2024).

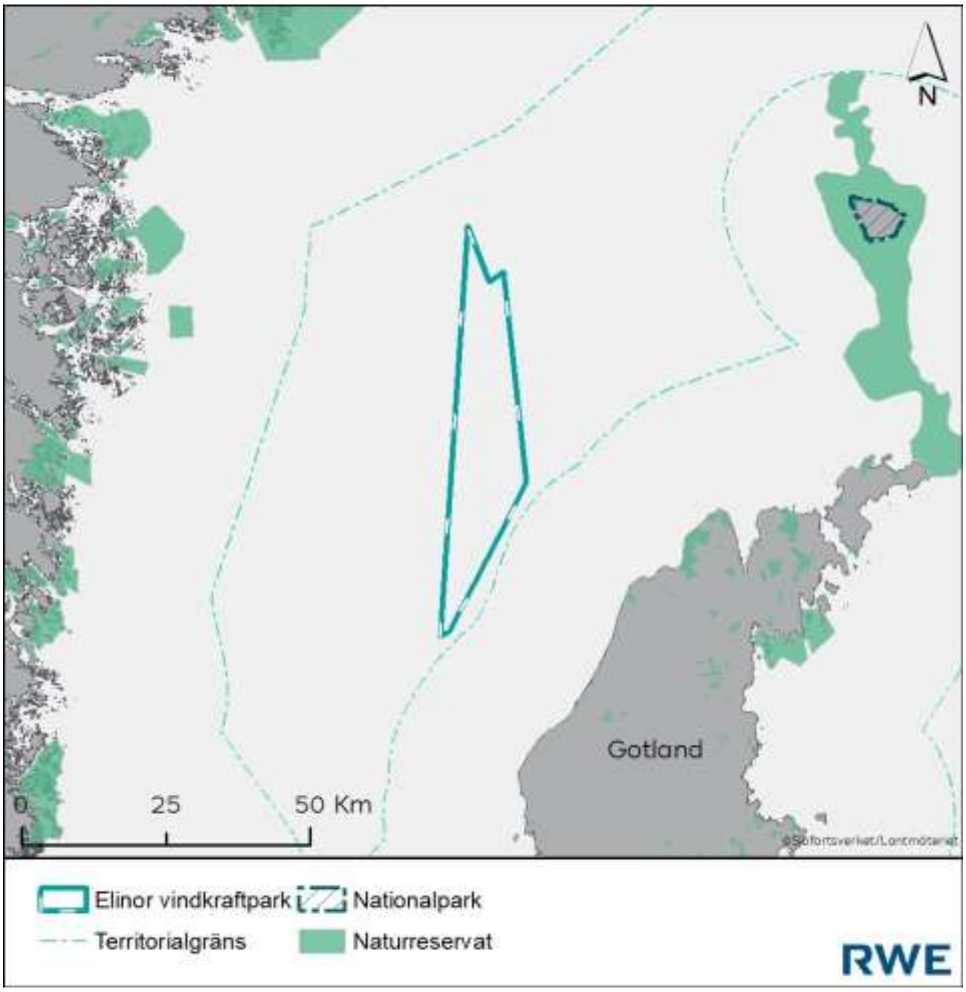


Figure 24. Nature reserves (green) and national parks (dark turquoise lined) in the vicinity of the Elinor project area.

8.3.8.2 Possible effects

The project area is located far from the nearest nature reserve and Gotska Sandön national park, approx. 25 and 55 km respectively. No direct impact on these values is therefore expected to occur. The impact that may become relevant is on the landscape from a visitor destination perspective. This will be described and assessed in the upcoming EIA.

8.4 Benthic flora and fauna

8.4.1 Description of the current situation

The main factor limiting the distribution of aquatic plants is the availability of light, since light is necessary for photosynthesis. Red algae are the group of algae with the greatest depth distribution. They have been observed down to depths of 38 m (Kågesten, Baumgartner, & Freire, 2020). The planned wind farm is planned in deep water areas (approx. 60–200 m) that lie outside the photic zone, where the light does not reach down and thus does not enable photosynthesis, see Figure 25. The vegetation that could occur in the project area is drifting fine filamentous algae that have been transported there from shallower areas.

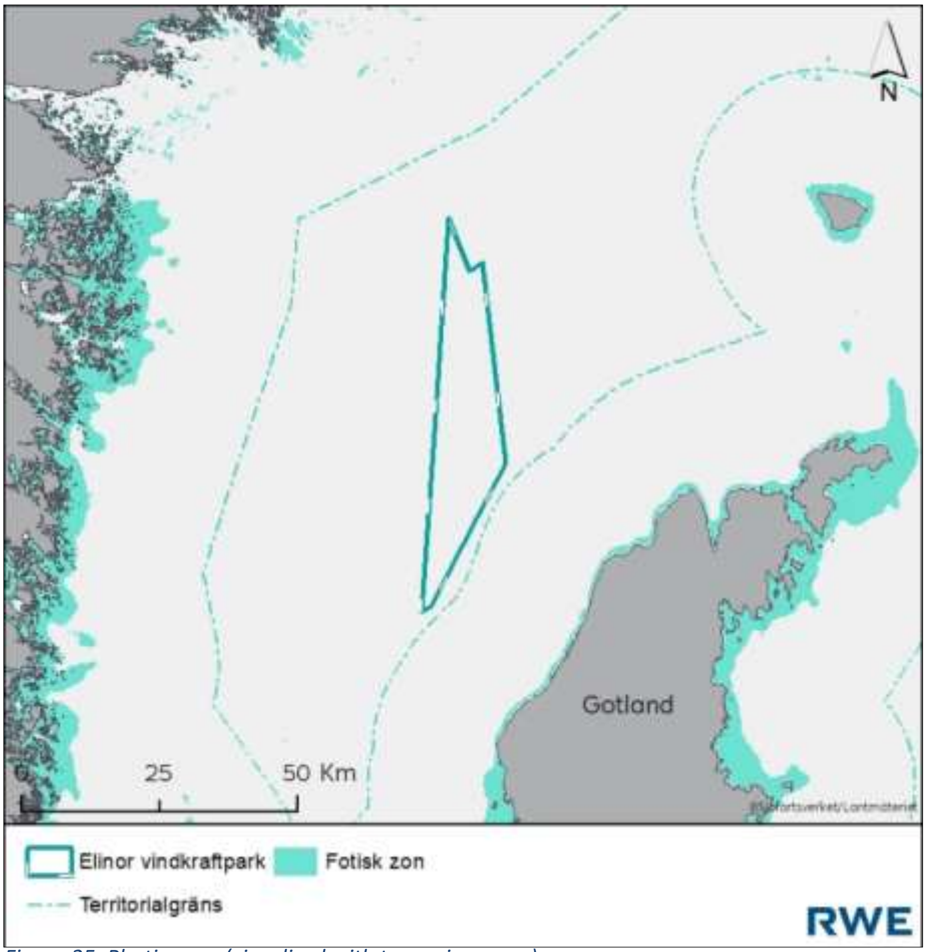


Figure 25. Photic zone (visualized with turquoise areas).

Benthic fauna refers to all animals that live on or in the bottom substrate. This includes species that live on the surface of the sediment as well as those that burrow or live in the sediment (infauna). Benthic fauna includes a wide range of organisms, including insects, crustaceans, worms, snails and other invertebrates. Benthic fauna can also include bottom-dwelling fish and other larger animals that interact with the bottom environment.

8.4.2 Possible effects

Since the project area is located outside the photic zone, it is not expected that there will be any significant benthic flora in the area.

Benthic fauna, on the other hand, can potentially be affected. This can happen during the construction of the park if constructions are placed on/in the seabed and during decommissioning when these constructions are removed. The impact can also occur through the spread of sediment, the possible release of pollutants and sediment deposition during the build-up and decommissioning phase. However, while the park is in operation, bottom fixed foundations for the substations can provide new habitats for species that prefer hard substrates, an effect similar to that of a reef, which can have a positive impact.

The impact on any benthic flora and fauna will be described and assessed in the upcoming EIA.

8.5 Fish

8.5.1 Description of the current situation

The planned wind park is located within ICES catch area 27 for fishing. The three species that have been fished in the highest quantities in this area are sprat, herring and European eel with an average of approx. 2,000, 340 and 100 tonnes each per year during 2006–2021. However, the variation between years has been very large. Smaller catches are also found of common food fish such as perch, pike, cod, zander and turbot (approx. 2–19 tonnes/year each) (ICES, 2024). Perch, pike and zander occur close to the coast and are not considered to use the project area in any life stage.

Spawning areas for various fish species in the Baltic Sea have been developed by HELCOM (HELCOM, 2024). It is only likely that sprats spawn within the area. The project area constitutes a very small part of the sprat's total spawning area, see Figure 26.

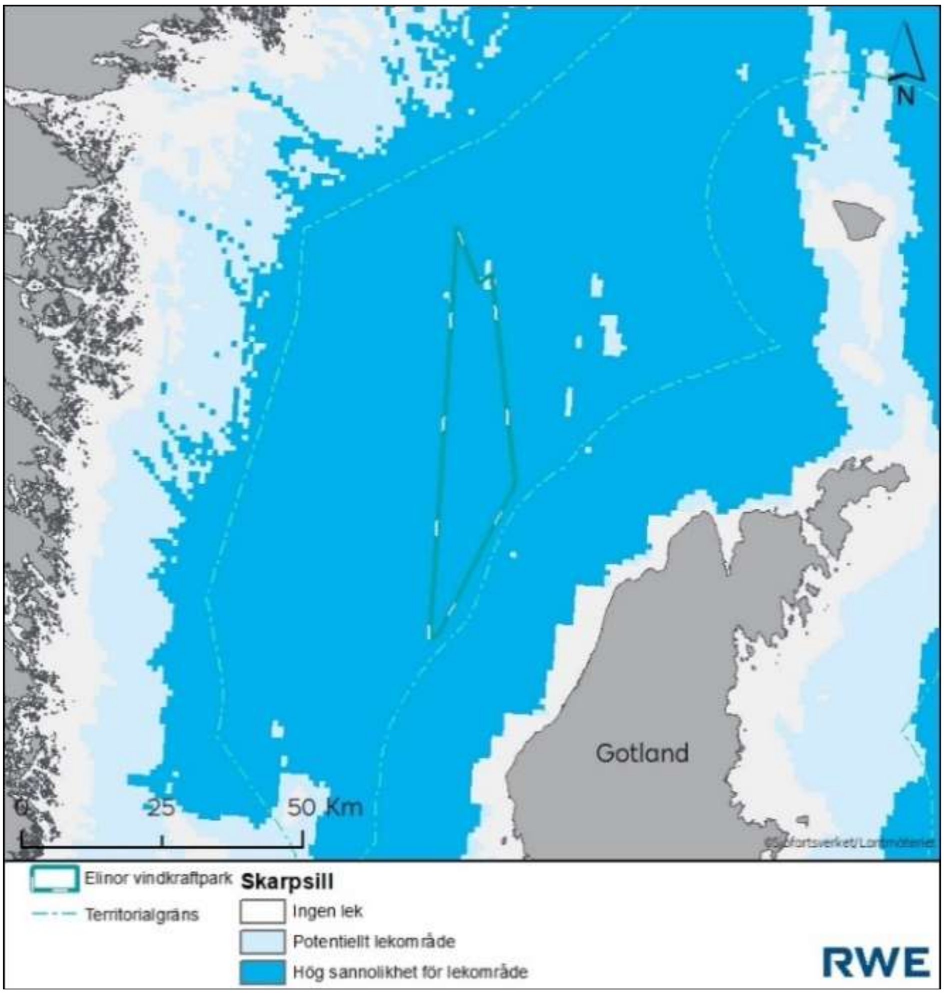


Figure 26. Spawning areas for sprats occur with a high probability within the planned wind farm. High probably is visualized with dark blue, potential areas with light blue and non-spawning areas with white.

For cod, flounder and herring, the project area does not constitute a potential spawning area (HELCOM, 2024), see Figure 27Figure 28 and Figure 29. Turbot spawns on sandy bottoms down to 10 meters deep, why not this species either have play areas within the project area.

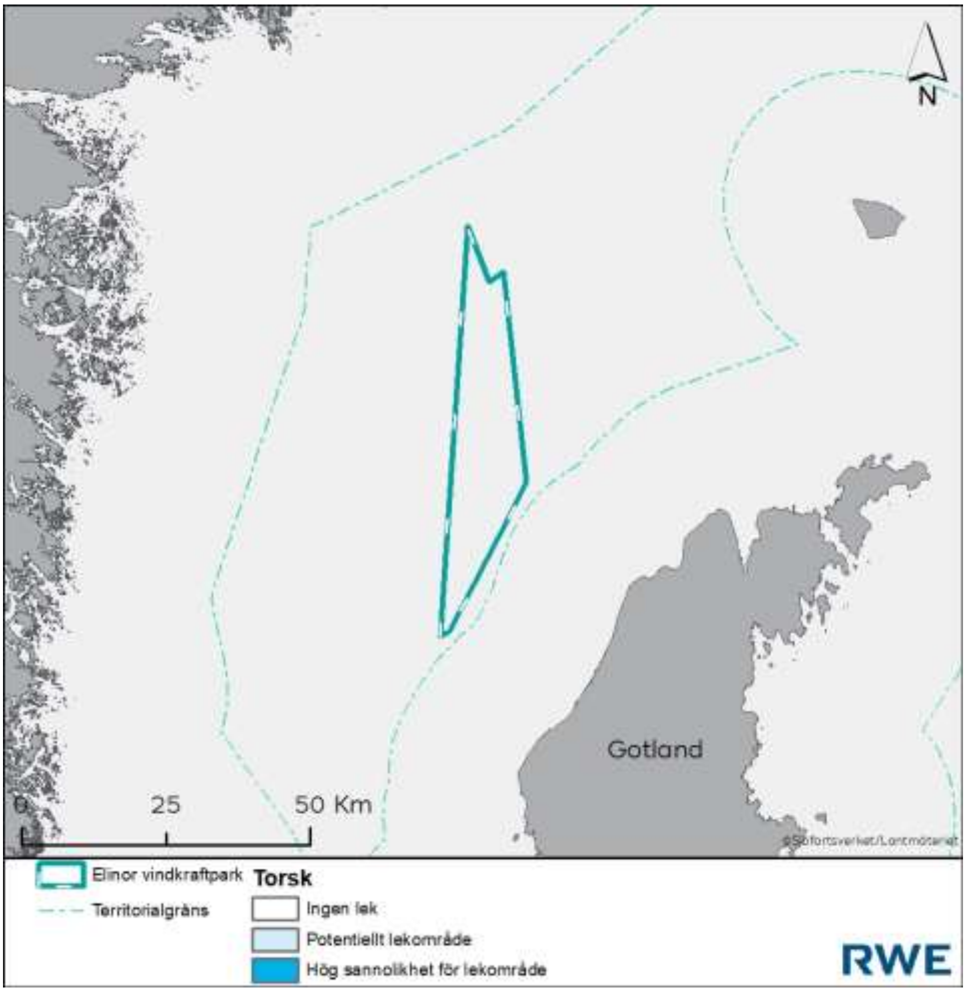


Figure 27. No spawning grounds for cod have been identified in the vicinity of the project area. High probably is visualized with dark blue, potential areas with light blue and non-spawning areas with white.

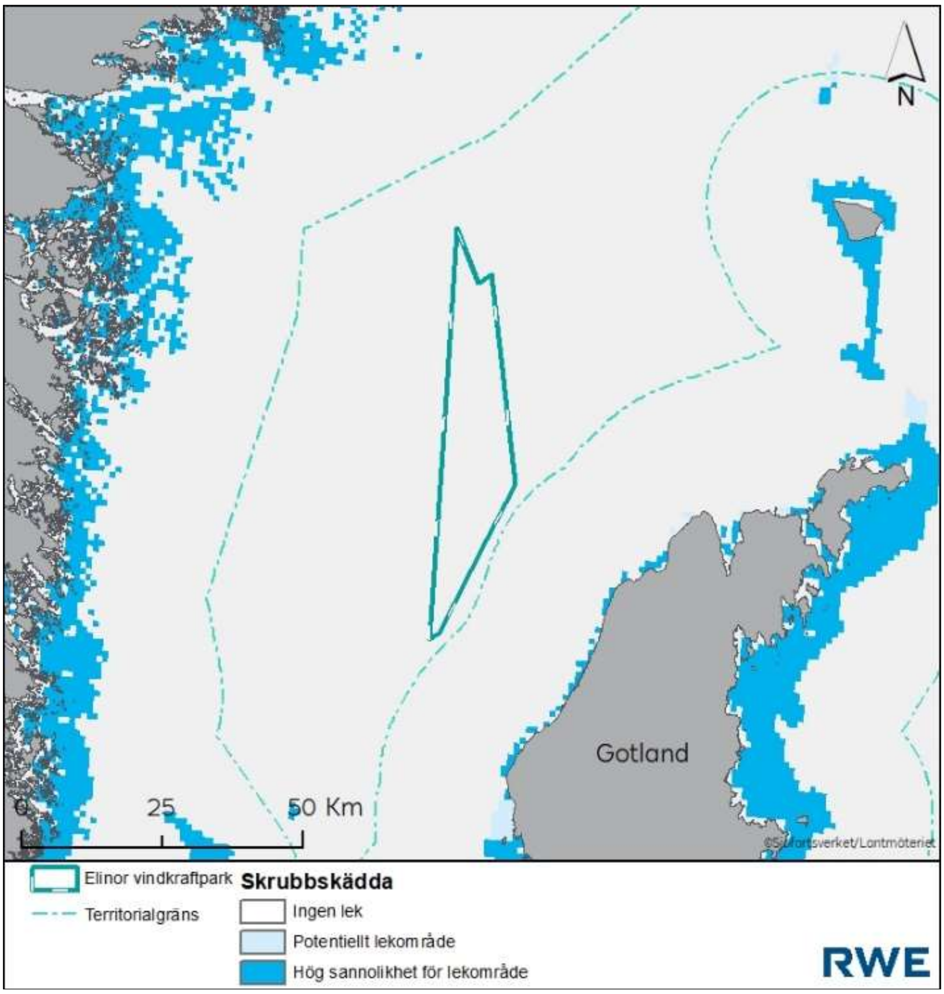


Figure 28. Spawning areas for flounder are primarily found in coastal areas. High probably is visualized with dark blue, potential areas with light blue and non-spawning areas with white.

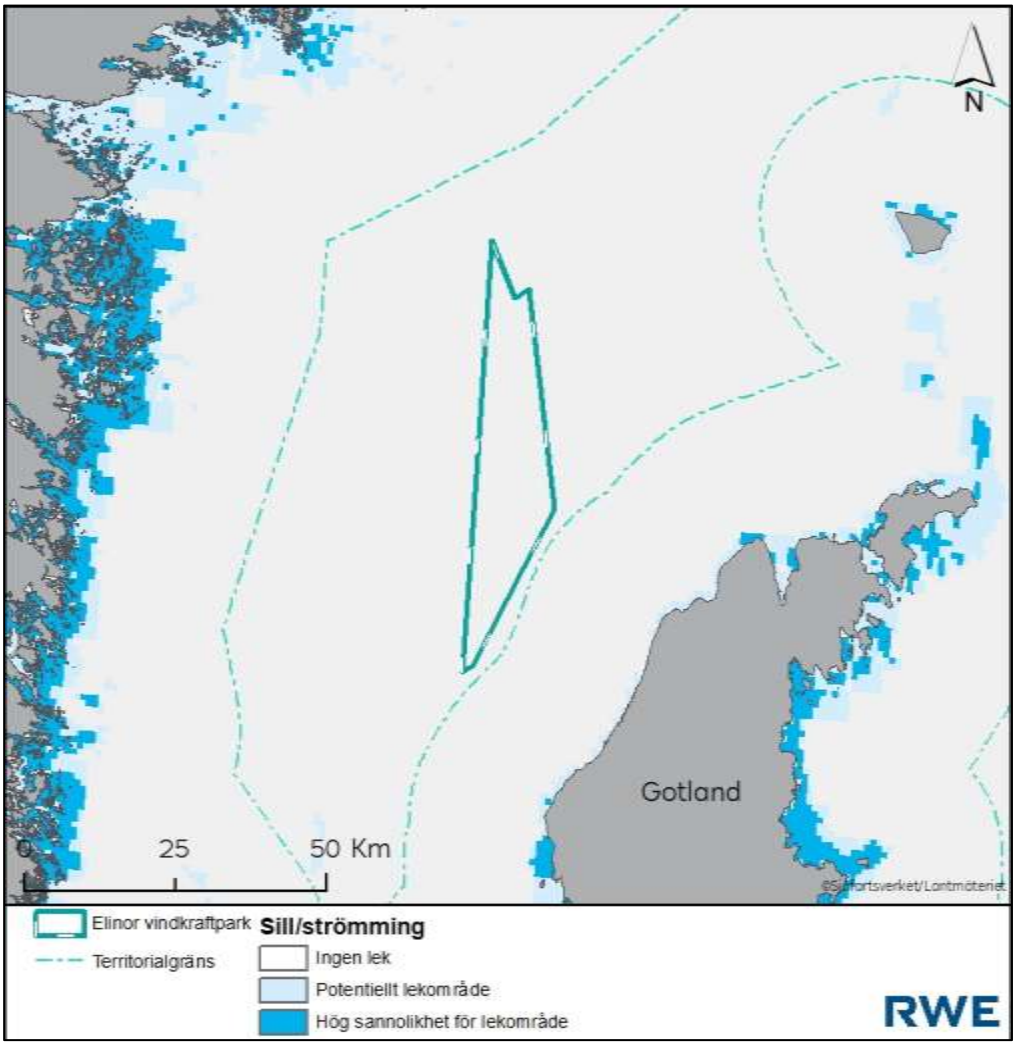


Figure 29. No spawning grounds for herring have been identified in the vicinity of the project area. High probably is visualized with dark blue, potential areas with light blue and non-spawning areas with white.

The project area is within two conservation areas for fishing; one for commercial fishing for flounder (may not take place 15 February – 15 May) and one regarding that recreational fishing for salmon may not take place (Länsstyrelsena, 2024).

8.5.2 Possible effects

Effects on fish from offshore wind power vary between the different phases of the park and the investigations that need to be done. In the construction phase, there may be noise and sediment spreading, which may have negative effects on fish. In the operational phase, electromagnetic fields from the cable network can occur and noise in the form of operating noise can have a negative impact, while turbine parts can act as artificial reefs, which can be positive for the fish community (Lena Bergström, 2022). It is not possible to rule out an impact on sprat spawning as it could occur within the project area.

The impact on fish will be described and assessed in the upcoming EIA.

8.6 Marine mammals

The marine mammals that live in the Baltic Sea are seals and porpoises.

8.6.1 Description of the current situation

8.6.1.1 Porpoises

The project area is located in an area where the probability of the occurrence of porpoises is low throughout the year. The probability of porpoises occurring is 0–20% within the project area. Within the entire area around the project area, the probability of porpoise occurrence is 0–20% during May to October, see Figure 30. On the mainland coast and to some extent on the Gotland coast and north of Gotska Sandön, the probability of porpoise occurrence is higher during November-April, see Figure 31.

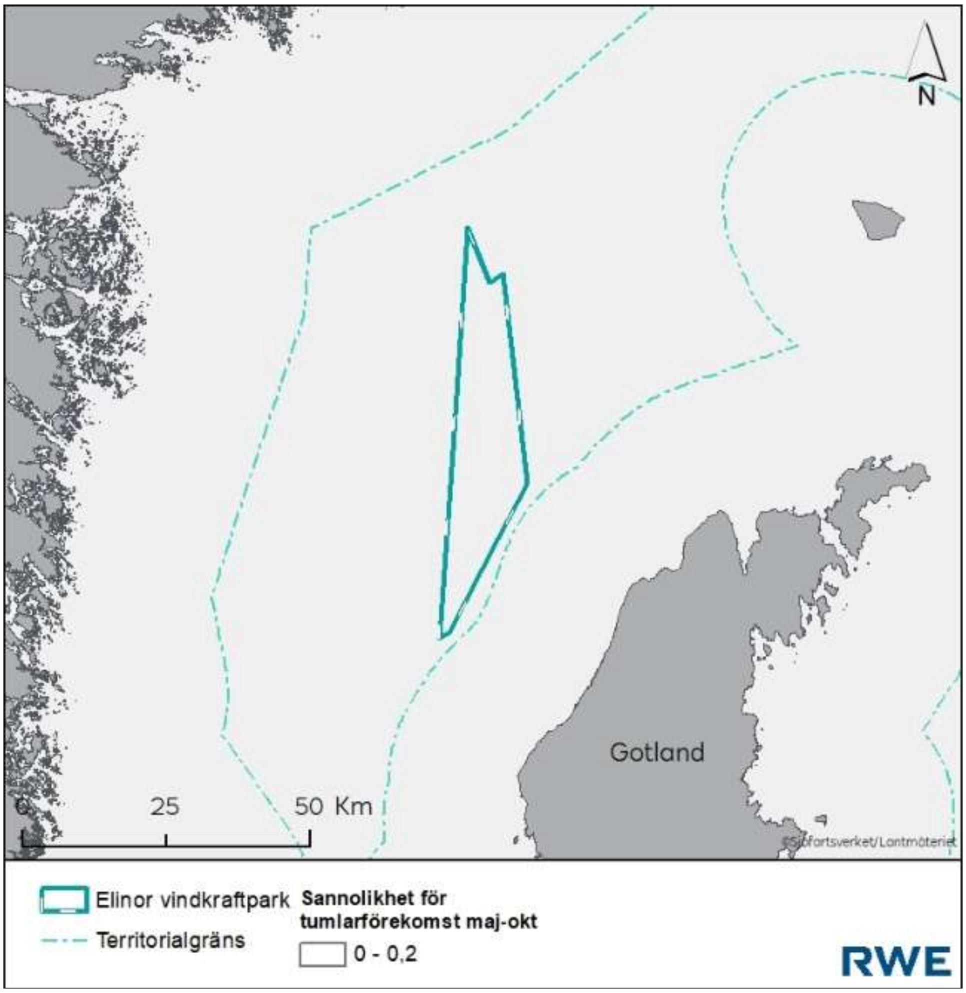


Figure 30. Probability of porpoise occurrence during the period May-October. The probability is measured as a percentage and is for the area 0–20% for the occurrence of porpoises during May-October for the survey area and the surrounding area.

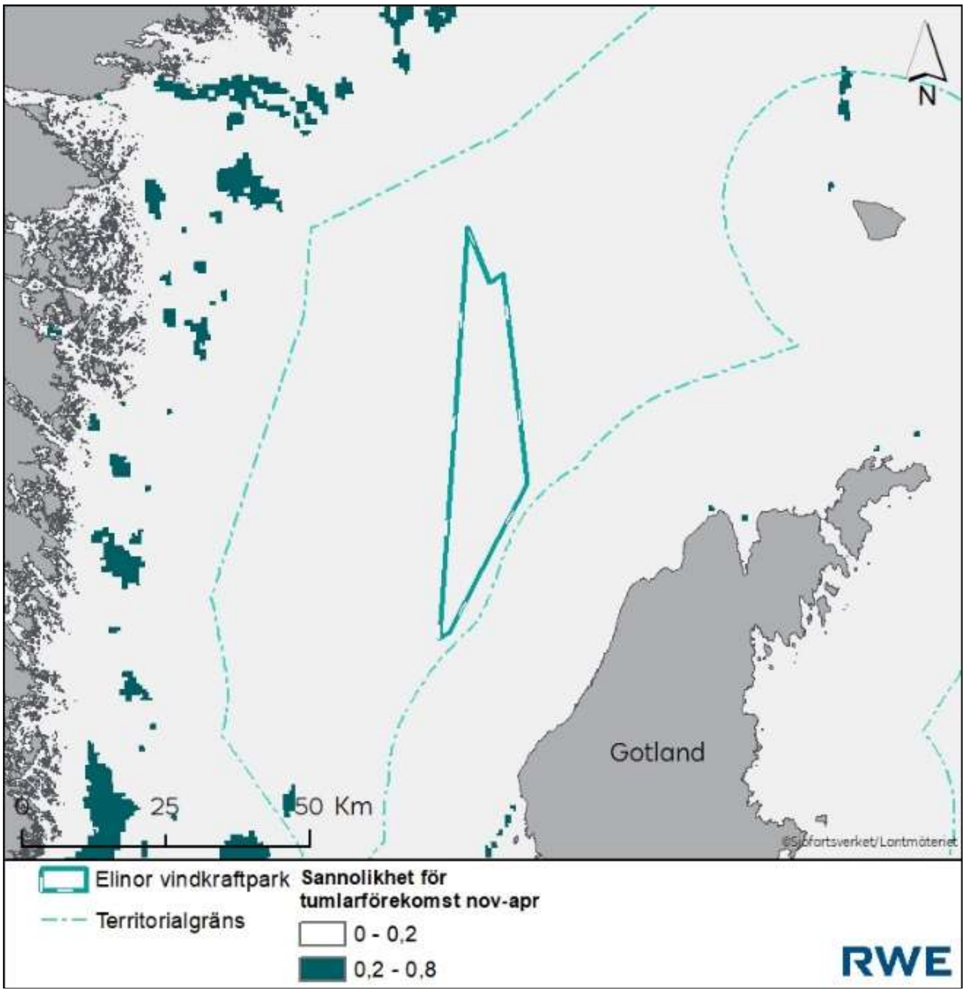


Figure 31. Probability of porpoise occurrence. The probability is measured as a percentage and is the survey area and its surrounding area 0–20% for the occurrence of porpoises during the time period November-April. In more coastal areas, as well as north of Gotska Sandön, the probability is 20–80% during the same time period (visualized with dark turquoise).

The Baltic Sea population of porpoises is classified as critically endangered (Artdatabanken, 2020) and marine mammals, including porpoises, are considered to have a generally poor status in the Baltic Sea (HELCOM, 2023). Helcom assesses the Elinor area as a less important area for porpoises. The coasts, especially the mainland coast, are considered more important areas for the species. Evidence for the assessment of porpoise occurrence is, however, limited (HELCOM, 2024).

8.6.1.2 Seal

There are three species of seals around the project area. Ringed seals and gray seals are classified as viable, while the harbor seal in the Baltic Sea is considered vulnerable (Artdatabanken, 2020).

According to HELCOM, gray seals occur widely in the area and also use it for mating. Mating time for gray seals is March-April, pups are born in February-March of the following year. Seals give birth to their pups close to the coast on rocks, where they also grow up (Havs- och vattenmyndigheten, 2024), which means that the investigation area, with its depth distribution, is not a suitable rearing area for gray seals. Ringed seals and harbor seals occur very rarely or infrequently within the project area or its vicinity as they primarily stay close to the coast and where they also have their breeding grounds (HELCOM, 2023).

8.6.2 Possible effects

During the surveys, the construction phase, and during decommissioning work, marine mammals can potentially be affected by underwater noise, which can result in behavioral changes, escape behavior or auditory effects. During the operational phase, the wind farm will bring about a changed soundscape in the affected area. During the operational phase, at the same time, reef effects can attract fish to the area, which in turn can be positive for marine mammals. The impact on marine mammals will be described and assessed in the upcoming EIA.

8.7 Birds

8.7.1 Description of the current situation

South of the project area is the Natura 2000 site Stora Karlsö (SE0340023) and the Natura 2000 site Lilla Karlsö (SE0340025). On Stora Karlsö there is, among other things, the Baltic Sea's largest colony of common murre, which are an indicator species for how the Baltic Sea environment around Stora Karlsö is doing. The lesser black-backed gull and grayling species in the Baltic Sea are red-listed (WWF, 2021; Könönen, 2021). In the north of Gotland is the Natura 2000 site Hall-Hangvar (SE0340090). Common cranes, black grouse, golden eagles, northern goshawks, Eurasian hobby, Eurasian eagle-owl, boreal owls and ravens, European nightjar and woodlark nest in the area (Länsstyrelsen Gotlands län, 2018).

Around Öland's coast, the Böda Bay and on the coast of Gotland near the Karlsöarna, there have been reports of long-tailed duck, common scoter, velvet scoter, red-breasted merganser, goosander, common goldeneye, tufted duck, common eiders, red-throated diver, Arctic loon, greylag geese, great cormorants, razorbill, common murre, black guillemot, common gull, black-headed gull, black-legged kittiwake, herring gull and great black-backed gull (Ottvall, 2021). Around 10,000 long-tailed ducks were found in total along Öland's northern base and at Bödabukten. Böda bay is partly included in the Natura 2000 site Bödakusten östra (SE0330121). However, the largest wintering area for long-tailed duck in the Baltic Sea is at Hoburgsbank and Midsjöbankarna south of Öland (Larsson 2018).

8.7.2 Possible effects

Possible effects from wind farm that can affect seabirds are displacement, barrier effect and risk of collision. However, the main risks for seabirds from offshore wind farms are displacement of wintering species, for example long-tailed duck and red-throated diver, as well as the impact on colonies of nesting birds. Offshore wind power located at water depths greater than 30 m is expected to have a lower impact on seabirds, as fewer species are affected and it does not compete with foraging areas for nesting birds (Bergström et al, 2022).

The impact on birds, primarily based on displacement, barrier effects and collision risk, will be described and assessed in the upcoming EIA.

8.8 Bats

8.8.1 Description of the current situation

Occurrence of bats at offshore wind farms has been investigated and shown that bats go to wind turbines both in coastal areas and further out to sea to forage and migrate across the sea. The wind turbines are used both as direct foraging sites and for resting (Ingemar Ahlén, 2007).

8.8.2 Possible effects

Similar to land-based wind turbines, there is a risk of collision and if the turbines are placed too close to the bats' concentrated flight paths, this risk increases. When flying long distances, however, they usually fly so low that it does not pose a problem (Ingemar Ahlén, 2007). The impact on bats will be assessed and described, above all in relation to displacement, barrier effect and collision risk, in the upcoming EIA.

8.9 Cultural heritage conservation and marine archaeology

8.9.1 Description of the current situation

Gotska Sandön northeast of the project area is protected as national interest for cultural heritage conservation. This takes into account the island's history and environment, which comes from the isolated location in the Baltic Sea and traces from the Viking Age. To the west lies Gryt's archipelago with a valuable coastal and archipelago environment and Tjust archipelago, which is characterized by an archipelago landscape with industries from the Middle Ages to the 2000s. To the north is Ringsö-Hartsö whose archipelago environment has been important for shipping and coastal defense since the Middle Ages and still functioning archipelago and fishing ports.

Northwest and west of the planned project area is the island of Hävringe, former lighthouse and pilotage site, and the islands of Arkö–Aspöja–Äspholm. These have visual protection values that must be protected from wind farms at too close a distance. Distances of approx. 15–20 km outside the boundary of the value area should be avoided. Further from the value area, the sensitivity to exploitation is assessed to be less, but the impact cannot be excluded (Länsstyrelsen Gotlands län, 2024). The planned project area is not located within 20 km of any of the value areas.

The Hanseatic city of Visby is a UNESCO World Heritage Site because it is a unique example of a medieval European trading city. The city has very well-preserved historical structures that stretch all the way back to the Viking Age and is judged to be of international importance (UNESCO, 2024).

In addition to cultural heritage areas, there is a large amount of ship/boat remains as well as information about shipwrecks in the Baltic Sea. The vast majority are relatively close to the coast. In an area northwest of, and partly within the planned project area, there is a larger area that has been marked as an investigation area for possible ancient remains (Fredholm, 2023; Riksantikvarieämbetet, 2022). Within the project area there is one potential remains and in the immediate vicinity another eight remains and one reported shipwreck. See Figure 32 for all remains and Figure 33 for remains in and in the immediate vicinity of the project area. Table 3 contains detailed information about the remains from Figure 33.

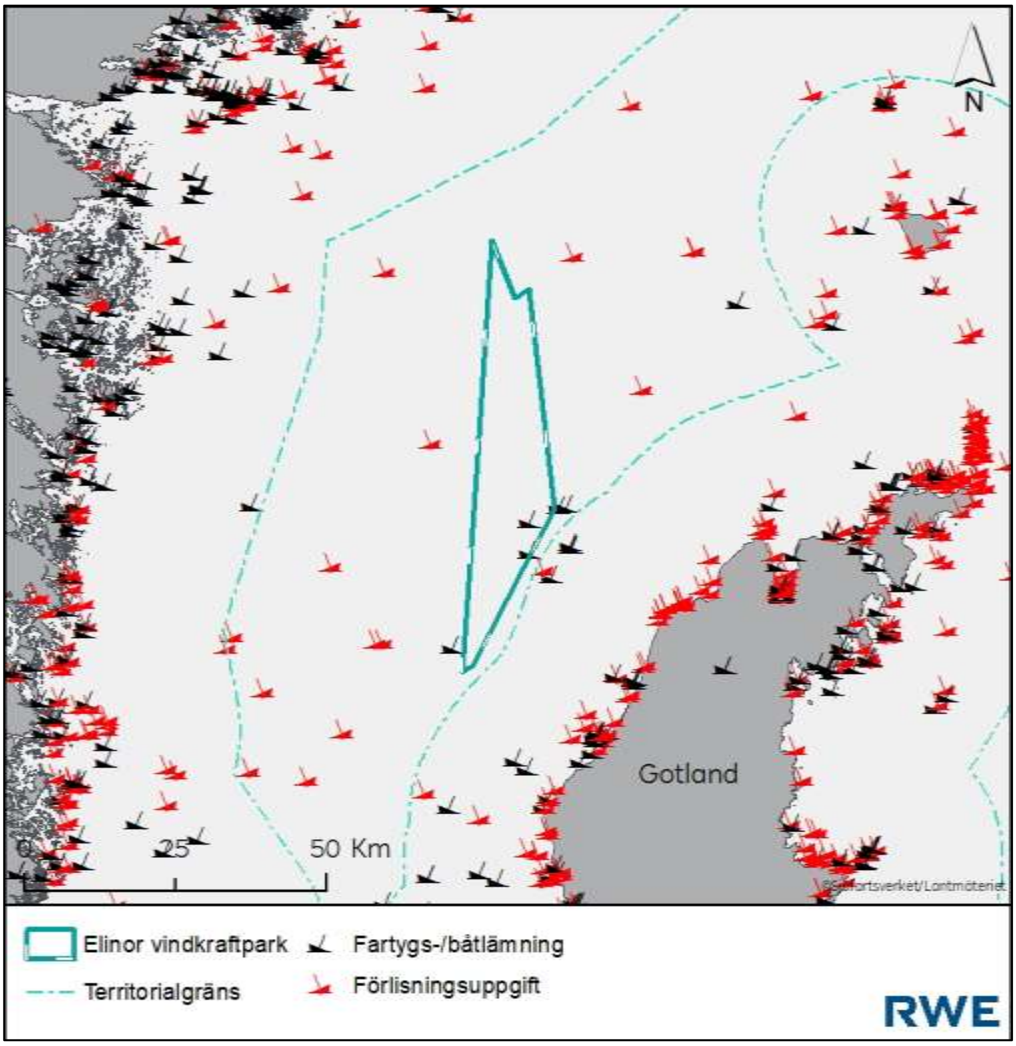


Figure 32. Ship/boat remains (black) and reports on shipwreck (red) in and around the project area.

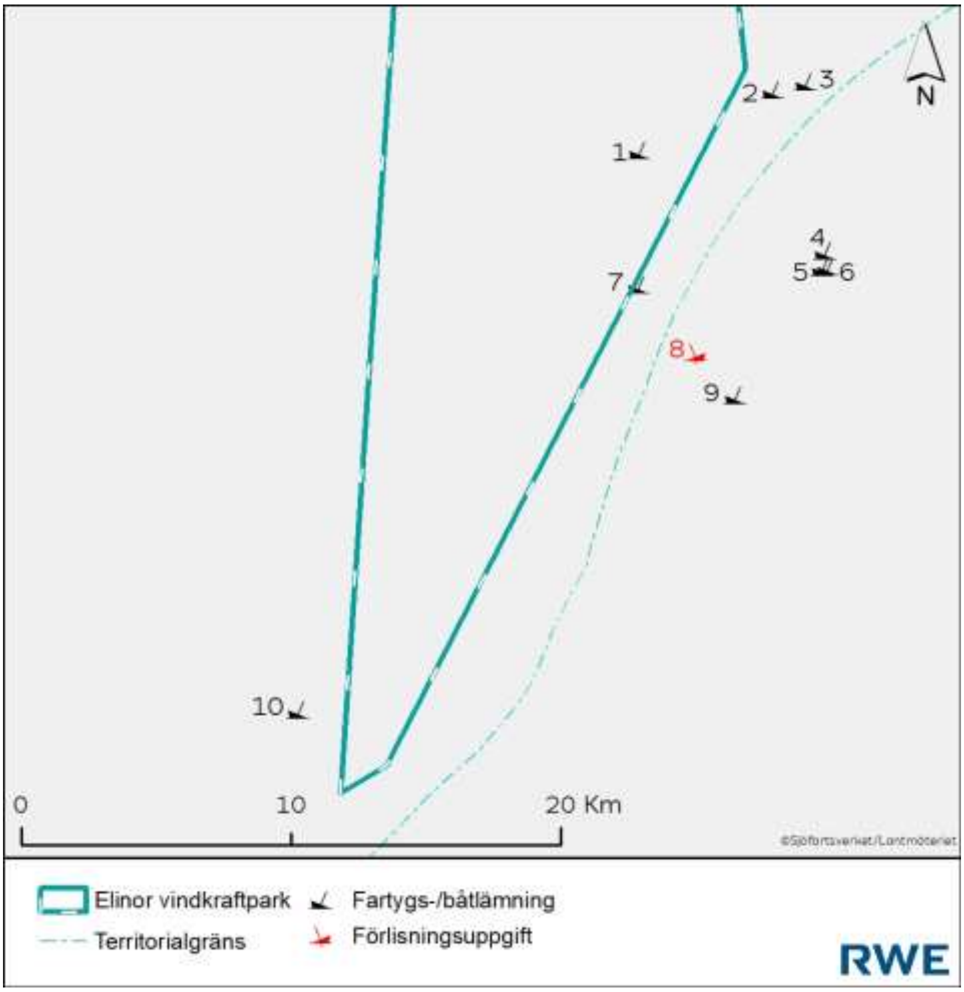


Figure 33. Remains in and in the immediate vicinity of the project area (black) and report on shipwreck (red). Information about each remain can be found in Table 3.

Table 3. Ship/boat wrecks and reports on shipwrecks in and in the immediate vicinity of the project area. Ship abandonment number 1 in the table is the only one within the project area.

Num-ber	Type of le-gacy	Diary num-ber RAÄ num-ber	Description	Status
1	Ship/boat abandonment	L1934:3894 72:12	Ship delivery, 51x10m. Consisting of a possible shipwreck, which has a height above the bottom of 7m.	Information about leaving, not confirmed in the field
2	Ship/boat abandonment	L1934:3893 72:10	Possible ship drop, 68x12m. Consisting of a possible ship-wreck with a height above the bottom of 5m.	Information about leaving, not confirmed in the field
3	Ship/boat abandonment	L1934:4171 731:020	Ship delivery, information about size is missing. The remains of the ship S/S Hansa. The wreck is in two parts 50 meters apart.	Assessed, not examined in the field
4	Ship/boat abandonment	L1975:8545 72:11	Ship delivery, 38x11m.	Other cultural-historic re-mains, not in-vestigated in the field
5	Ship/boat abandonment	L1975:6337 731:60	Probably double registered with L1975:8545/731:60	No antiquarian assessment
6	Ship/boat abandonment	L1975:6424 73:755	Ship delivery, 30x23m. Consisting of the fore and aft bottom tanks of an icebreaker. Part of L1975:8545/72:11.	Other cultural-historic re-mains, not in-vestigated in the field
7	Ship/boat abandonment	L1975:6538 FÖR 7048	Ship delivery, 39x7m (NNV-SSO). Consisting of a hull with a height above the bottom of 6m. The mast is still standing. The two holds in the forward ship are open and remains of the cargo are visible. The rudder is missing and only the propeller shaft is sticking out. The steering wheel remains on the wreckage. The timber from the superstructure has disap-peared.	Other cultural-historic re-mains, not in-vestigated in the field
8	Ship/boat abandonment t	L1975:6335 731:58	Shipwreck task, wooden boat	Information about leaving, not confirmed in the field
9	Ship/boat abandonment	L1975:6744 731:025	Ship delivery, 16x5m (E-W). Consisting of a hull with an over-hang above the bottom of 3m.	Possible an-cient remains, not investi-gated in the field
10	Ship/boat abandonment	L1934:3966 731:013	Ship delivery, 29x6m (SSO-NNV). Consisting of a hull with a height above the bottom of 6m	Other cultural-historic re-mains, not in-vestigated in the field

8.9.2 Possible effects

Negative effects that may arise for the cultural environment are considered to be that the wind farm is built too close to areas of value, world heritage or the impact on underwater marine archaeological remains during construction work.

Prior to detailed design, the seabed will be investigated for any cultural-historical remains in the project area, which enables the location of structures and cables to be adapted to minimize the impact. The project area is located within the so-called adjacent zone, which means the Cultural Environment Act (1988:950) applies there.

Description and assessment of any impact on cultural environmental values will be made in connection with the preparation of the EIA.

8.10 Outdoor activities

8.10.1 Description of the current situation

The sea is generally an important part of people's opportunity to carry out activities linked to outdoor life and recreation (Havs- och vattenmyndigheten, 2022). In addition, extensive sport and sport fishing is conducted along the entire Baltic coast and in the Baltic Sea (ICES, 2022). For national interest regarding mobile outdoor life, see section 8.3.5.

8.10.2 Possible effects

The planned wind farm is located far out to sea and is not expected to negatively affect recreation and outdoor life. The impact will be described and assessed in the upcoming EIA.

8.11 Landscape

8.11.1 Description of the current situation

The Landscape Convention's definition of landscape is "an area as perceived by people and whose character is the result of the influence of interaction between natural and human factors". The landscape reflects both an aesthetic starting point but can also provide a historical dimension. The landscape in the immediate vicinity of the project area is defined as open sea. The nearest coastline is approximately 25 km away in a south-westerly direction and consists of Gotland's north-west coastline.

8.11.2 Possible effects

Offshore wind farms, with proximity to the coast, can change a previously natural view of the sea. When they are located several miles out to sea, clear weather is usually needed for them to be noticed and dominate the field of vision from the coastline. With the help of photomontage, it can be visualized how the planned wind farm might be seen from the coast. This helps assess views that may be important to the overall impression.

Design, cohesion and pattern are also important for the viewer. A pattern with intersecting lines between the respective wind turbines creates contrasts that can be perceived as more disturbing than a pattern with wind turbines in groups or lines.

Wind turbines also need to be marked out with light signals to illuminate the facility with due regard for flight safety reasons, which can have a disturbing effect on the landscape.

The planned wind farm is expected, as a result of the large distance to land, to be visible only to a limited extent from land. Description and assessment of any impact will be made in connection with the preparation of the EIA.

8.12 Human health

8.12.1 Description of the current situation

Elinor wind farm is located approx. 25 km from the nearest coast (northwest Gotland) and the nearest settlement.

8.12.2 Possible effects

People can potentially be affected by noise, shadowing and light from wind farms. The greater the distance from land a wind farm is located, the less the people's living environment is affected in terms of noise, shadowing and light. No impact on human health is anticipated due to the large distance to land, this aspect will be described and assessed in the upcoming EIA.

8.13 Commercial fishing

8.13.1 Description of the current situation

The planned wind farm is partially located within an area of national interest for commercial fishing, see section 7.3.3. In addition to the geographical area designated for national interest, commercial fishing is also conducted outside this area (ICES, 2022). Which fish species have been found in the area are described in section 8.5.

8.13.2 Possible effects

During the various phases of construction, decommissioning and operation of the facility, it may be necessary to restrict access to certain areas within the park to maintain safety. This may affect commercial fishermen by changing where and when they can operate. The impact on commercial fishing will be described and assessed in the upcoming EIA.

8.14 Sites for extraction of raw materials

8.14.1 Description of the current situation

Sites for the extraction of raw materials aim to extract sand or gravel from the seabed. According to the marine spatial plan (both existing and proposed) for the area, sand extraction is not carried out within or near the project area, see Figure 12 and Figure 13. The area is also not located within an area where conditions for extraction of marine sand and gravel exist (SGU, 2017). The planned area for the Elinor wind farm is also not within the possible area for carbon dioxide storage (Havs- och vattenmyndigheten, 2022).

8.14.2 Possible effects

The planned wind farm is not expected to have any impact on places for extraction of raw materials, which is why this aspect is deemed to be able to be delineated in further examination.

8.15 Infrastructure and other operations

8.15.1 Description of the current situation

There are no currently known electricity, telecom cables or the like within the planned area for the wind farm, the nearest known cables are located more than 8 and 9 km respectively south and north of the project area, see Figure 34. The project area overlaps with the Visby airport MSA area (minimum safe altitude), see section 8.3.1 and Figure 17. A number of other wind farms are planned in whole or in part within the same area and in the immediate area, see Chapter 12.

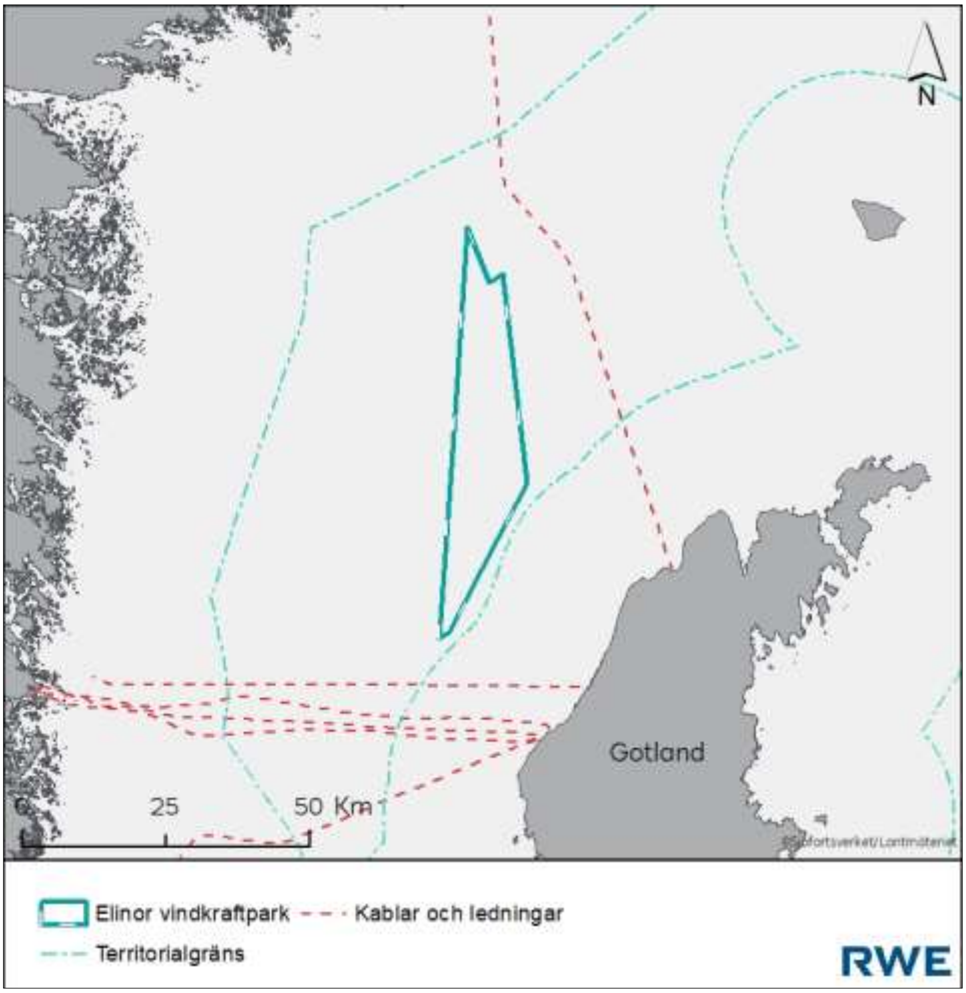


Figure 34 Cables and wires (red lines) in the vicinity of the planned wind farm

8.15.2 Possible effects

Tall wind turbines can affect an airport's entry and exit routes, which means that air traffic may have to take detours. This, as well as further descriptions of other infrastructure and other activities, will be described and any impact assessed in the upcoming EIA.

8.16 Environmental monitoring stations

8.16.1 Description of the current situation

Regular sampling is carried out in both sediment and the water column for environmental monitoring. Sampling of metals and organic environmental toxins in sediment takes place at the sampling point called Norrköping Deep, which is located within the project area. Nearby there is also BY32 Norrköpingsdj for sampling the water column. These two points are used as test points for assessment in the national environmental monitoring which is the responsibility of the Swedish Environmental Protection Agency and the Swedish Maritime and Water Authority. Further south, but still within the planned area for the wind farm, is the measuring station TF0240 where sampling in the water column takes place. It is HELCOM that uses the station for sampling. The position of said stations is shown in Figure 35.

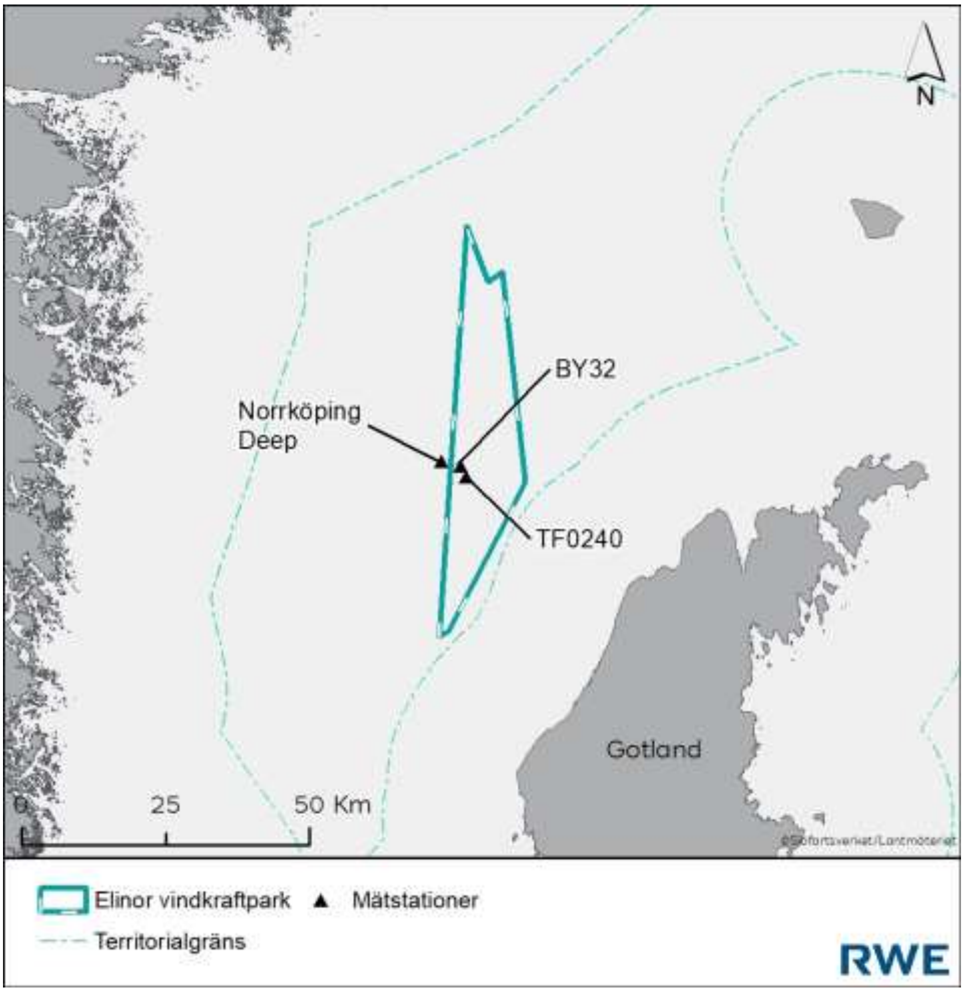


Figure 35 Environmental monitoring stations within the project area.

8.16.2 Possible effects

During the various phases of construction, decommissioning and operation of the facility, it may be necessary to restrict access to certain areas within the park to maintain safety. This may affect the availability of being able to carry out sampling in the aforementioned stations. Description and assessment of the impact will be made in connection with the preparation of the EIA.

9 Climate

Wind power represents a renewable energy source that can play a major role in the transition to more sustainable electricity production. It is also an important part of Sweden's endeavor to achieve its energy policy ambitions. The Swedish government has set goals to have a completely fossil-free electricity production by the year 2040 and that Sweden should have reduced its energy use by 50% until the year 2023, in comparison with the levels from the year 2005 (Regeringskansliet, u.å.).

Although wind turbines do not produce direct emissions during electricity production, processes such as the manufacture, transport and installation of wind turbines contribute to the environmental impact. The Swedish Energy Agency has produced a report that examines the use of resources in the wind power sector, with a particular focus on a life cycle perspective. The report states that an overall analysis of a wind farm's environmental impact includes the manufacture of wind turbines, the extraction of the metals and materials used, as well as the dismantling and restoration of the area after use (Energimyndigheten, 2021).

Both the impact, linked to the Elinor wind farm, on and from climate change will be described and assessed in the upcoming EIA.

10 Marine Strategy Framework Directive

10.1 Marine Environment Directive

The EU's Marine Strategy Framework Directive (2008/56/EU) is the Union's common framework for the marine environment, the purpose of which is to achieve or maintain a good environmental status in Europe's seas (Havs- och Vattenmyndigheten, u.å.a). The directive was incorporated into Swedish legislation in 2010 via the Marine Strategy Framework Ordinance (2010:1341). The directive covers the sea area from the shoreline to the outermost limit of the economic zone, i.e. the water categories coastal waters and offshore waters.

The Swedish Maritime and Water Authority's regulations on what characterizes good environmental status and environmental quality standards with indicators for the North Sea and the Baltic Sea (HVMFS 2012:18) establish what characterizes good environmental status for the North Sea and the Baltic Sea. The regulations also establish environmental quality standards and indicators. The environmental quality standards are the goals that have been decided and which must ensure that good environmental status is achieved or maintained in the marine environment. Indicators are linked to the environmental quality standards, which show the current status of the marine environment.

The regulations divide Sweden's sea areas into assessment areas, which differ depending on what is assessed. The project area lies within (in increasing detail) administrative area the Baltic Sea, the sea basin Västra Gotlandshavet, and the offshore waters Part of the Västra Gotlandshavet's offshore waters.

The impact of the planned activities on established environmental quality standards will be described and assessed in the EIA.

10.2 The Water Directive

The EU framework directive for water (or the water directive) (2000/60/EC) and the subsidiary directive on environmental quality standards (2008/105/EC), define the Swedish (and European) goals for the management of all forms of water. The goals have been incorporated into Swedish legislation through Chapter 5. in the Environmental Code, the ordinance (2004:660) on management of the quality of the water environment (water management ordinance) as well as the by-law (2017:868) with county board instructions.

Sweden's surface water is today divided into geographical sub-areas called water bodies and five water delegations (also called water authorities) have made decisions on quality requirements (environmental quality standards) for ecological status and chemical surface water status for the water bodies within the respective districts. The current status of the occurrences is assessed and updated continuously.

The purpose of the environmental quality standards is that the condition of our waters should not deteriorate and that all waters should achieve a certain environmental quality. The basic rule is that the environmental quality standard must be set to "good status", and that the standard must be achieved before the end of the current management cycle. Depending on the current status of the water body, the water delegations can determine quality requirements at a level that is lower than good status, alternatively that the time for when good status must be achieved is postponed. A decision on a deadline of up to 2027 is only relevant in cases where it was not technically possible or that achieving good status by 2021 involved unreasonable socio-economic costs. A deadline of 2033, 2039 or 2045 can be decided when measures in the water are completed and as nature's own recovery takes time.

The project area is not located in any established water body. The impact of the planned activity on nearby identified water bodies, its environmental quality standards and respective quality factor will be described in more detail and assessed in the EIA.

11 Risk and safety

RWE plans to carry out risk analyzes to identify any risks that may arise during investigations, the construction phase, operation and decommissioning phase. This includes, among other things, nautical hazard analysis and hazard identification (HAZAD), flight obstacle analysis, mapping of contaminated sediments and UXO.

No direct emissions of environmentally hazardous substances arise from the operation.

12 Cumulative effects and transboundary impacts

Cumulative effects refer to effects that could arise as a result of effects of other projects or activities interacting with effects of the current project. Cumulative effects could lead to effects from different activities that individually have acceptable consequences together could have unacceptable negative consequences.

In the upcoming EIA, an identification and evaluation of cumulative effects will be carried out. The activities with which the planned activity can potentially create cumulative effects include shipping, underwater cables and the wind farms that have already received permission or are already in operation.

Currently, there are no existing or licensed wind farms in the vicinity of planned operations. However, there are plans for several wind farms in the sea area in question. The Kapheira wind farm (consultation prior to the permit application, consultation documents submitted in Feb 2024) and Dyning (permit application submitted in Oct 2023) are planned entirely and partly within the same area as planned operations. Northeast of the Elinor wind farm, the Baltic Offshore Alpha wind farm is planned (consultation before the permit application, consultation document submitted Jan 2022). Information on the status of the permit processes is taken from Vinbrukskollen 24 May 2024 (Vindbrukskollen). Dyning and Baltic Offshore Alpha have been granted exploration permits. See Figure 36 for geographic areas. Slite and Skidbladner are judged to be so far from Elinor that no cumulative effects occur. The planned wind power projects should be taken into account in the calculation of cumulative effects, especially if they have been granted permission at the time the environmental assessment is carried out. If Elinor comes to fruition, Kapheira and the overlapping part of Dyning cannot be realized.

The project area is located in the southern Baltic Sea and from certain aspects cross-border impacts cannot be ruled out. The company assesses that a notification according to the convention on environmental impact statements in a cross-border context, the Espoo Convention, is relevant.

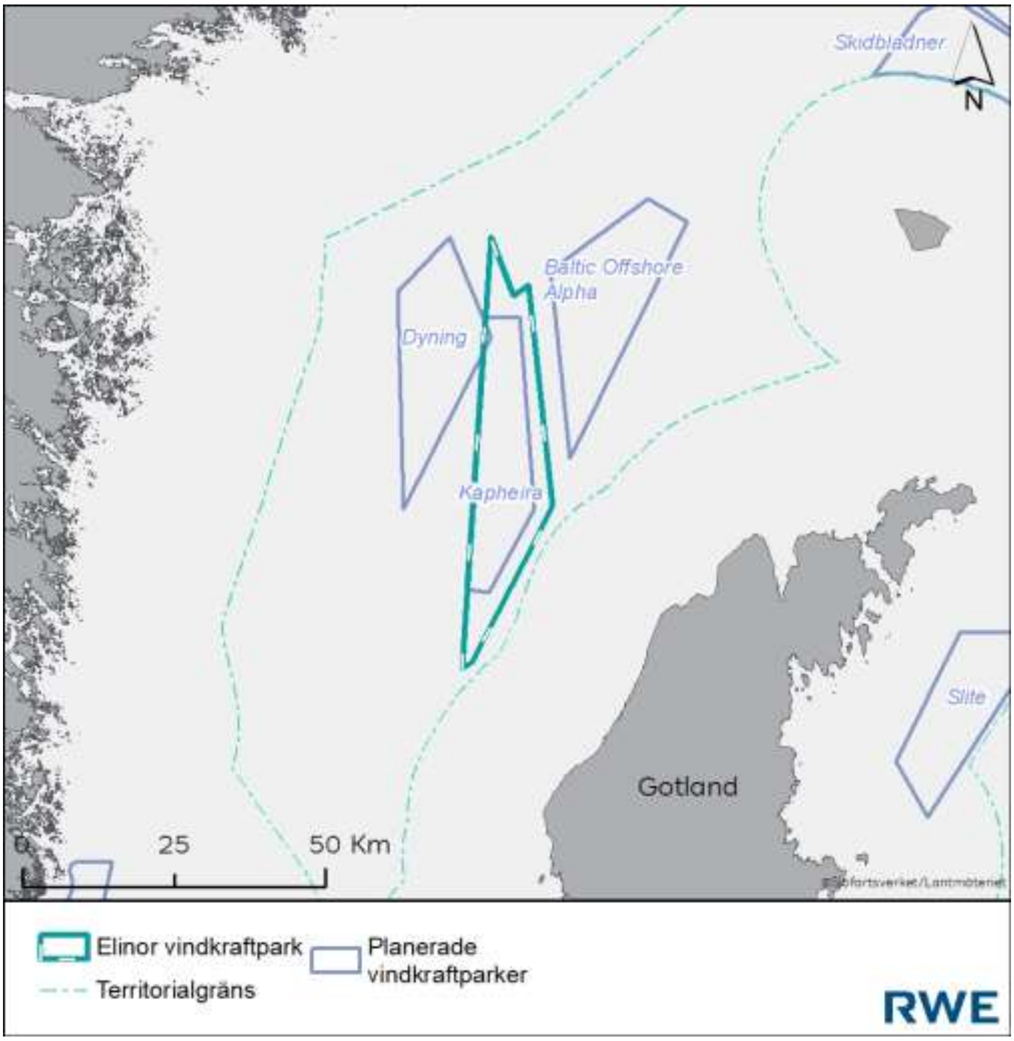


Figure 36. Planned wind farms in the vicinity of planned wind farm Elinor.

13 Scope of EIA and consultation

13.1 Scope of environmental impact statement

Chapter 6 §§ 35, -36 of the Environmental Code states what an EIA must contain. The information that must be included in an EIA must have the scope and degree of detail that is reasonable with regard to current knowledge and assessment methods and that is needed to provide an overall assessment of the significant environmental effects that the activity or measure can be assumed to entail (Chapter 6 § 37 of the Environmental Code).

The EIA is tentatively proposed to have the following content and structure:

- Non-technical summary
- Administrative information
- Introduction
- Methodology and delimitation
- Location and area description
- Description of activities
- Alternative
- Conditions, effects and environmental consequences
- Cumulative and transboundary effects
- Risk and safety
- Marine Strategy Framework Directive
- Overall assessment
- Monitoring and follow-up
- Declaration of expertise
- References

13.2 Surveys and investigations

A number of surveys and investigations will be drawn up and form the basis for the assessments made in the EIA. The investigations the company plans to carry out based on the current state of knowledge are reported below.

- Modeling of underwater sound/noise
- Modeling of sediment dispersion
- Desktop Study of Marine Archaeology
- Desktop studies of biological values (benthic fauna and flora, marine mammals, fish, birds and bats)
- Desktop study of pollutants in sediments
- Desktop study of bathymetry
- Desktop study of oceanography, hydrography and currents - produced in model
- Desktop study of fishing
- Landscape and visual impact including photomontage
- Nautical risk analysis (including HAZID)
- Risk analysis UXO chemical warfare agents
- Desktop study of marine infrastructure
- Flight obstacle analysis

13.3 Stakeholders

RWE proposes that the stakeholders, that will be contacted by e-mail or letter, should consist of the fol-low-ing parties.

State and municipal authorities	
Borgholms municipality	Nynäshamns municipality
The Housing Authority	Oskarshamn municipality
The Energy Agency	Oxelösund municipality

Swedish Armed Forces	The police authority
Haninge municipality	Mail and telephoneboard
The Sea and Water Authority	Region Gotland
The Swedish Agency for Agriculture	The National Antiquities Office
Chamber college	Maritime Administration
The Coast Guard	Svenska kraftnät
Civil Aviation Authority	The Swedish Geotechnical Institute (SGI)
The County Board of Gotland	The state's maritime and transport history museums
The County Board of Södermanlands	Geological Survey of Sweden (SGU)
The County Board of Östergötland	Swedish Meteorological and Hydrological Institute
The County Board of Kalmar	Söderköping municipality
The authority for social security and preparedness	Total Defense Research Institute
The National Museum of Natural History	The Swedish Transport Administration
The Swedish Environmental Protection Agency	The Swedish Transport Agency
Norrköping municipality	Trosa municipality
Nyköping municipality	Valdemarsviks municipality
Västervik municipality	
Associations, organisations and businesses	
Birdlife Sweden, Swedish Ornithological Association	Statkraft
Coalition Clean Baltic	The Swedish Boating Union
Fishing country Gotland	The Swedish cruiser club

Greenpeace	Swedish Fishermen's Producers' Organization (SPFO)
Gotland Energi AB	Sweden's ports
Gotland's ports	Swedish Pelagic Federation producentorganisation (SPFPO)
Sea and coastal fishermen's producer organization	South Swedish Chamber of Industry and Commerce
Helcom	Vattenfall eldistribution
The Nature Conservation Society	Visby airport
Rederi AB Gotland	Visit Gotland
Swedish sport divers	WWF
Swedish anglers	
Others	
Blekinge Institute of Technology	Maritime University
The Marine Environment Institute	Stockholm University's Baltic Sea Centre
Linnaeus University	Swedish University of Agriculture
Lunds university	World Maritime University
Particularly concerned	
Freja Offshore AB (the wind farm Dyning)	Statkraft Sverige AB (the wind farm Baltic Offshore Alpha)
Zephyr Baltic Offshore AB (the wind farm Kapheria)	

Announcement will be made in the following newspapers; Gotlands Allehanda, Gotlands Tidningar Norrköpings Tidningar, Nynäshamns Posten, Post- och Inrikes Tidningar, Södermanlands Nyheter and Västerviks-Tidningen.

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