TUUL ENERGY OÜ

ENVIRONMENTAL IMPACT ASSESSMENT

OF THE SAARE 2.1 AND SAARE 2.2

OFFSHORE WIND FARM AREAS

EIA Programme, publication on 05.01.2025

ROHE plaan

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1. Introduction

Based on the applications for superficies licences submitted by Deep Wind Offshore AS (Norwegian registry code 925 544 590) on 28 March 2024, the Consumer Protection and Technical Regulatory Authority initiated the superficies licence proceedings and environmental impact assessment (hereinafter referred to as EIA) for the Saare 2.1 area by Decision No 1-7/24-321 of 18 September 2024, and for the Saare 2.2 area by Decision No 1-7/24-329 of 24 September 2024. The Consumer Protection and Technical Regulatory Authority (TTJA) has decided to merge the environmental impact assessment proceedings for the Saare 2.1 and Saare 2.2 areas.

In a letter dated 18.11.2024, Deep Wind Offshore AS submitted a request to the TTJA to change the data of a party to the proceedings in connection with the transfer of the project to Tuul Energy OÜ (registry code 17065305).

The planned Saare 2.1 and Saare 2.2 offshore wind farm areas are located to the west of the western coast of Saaremaa (Sõrve Peninsula), within the open part of the Baltic Sea, in an area designated as suitable for wind energy development under the Estonian Maritime Spatial Plan. According to the superficies licence application, the marine area to be encumbered by the planned offshore wind farm is approximately 252.3 km^2.

The aim of the EIA is to assess the potential environmental impacts of the proposed activity and its alternatives.

Environmental impact means potential, direct or indirect effect of a an activity on the environment, human health and well-being, cultural heritage or property. Environmental impact is significant where it is likely to exceed the environmental capacity of the impact area, cause irreversible changes to the environment, endanger human health and well-being, the environment, cultural heritage or property[1].

The EIA programme has been prepared by Roheplaan OÜ in cooperation with the experts involved (see chapter 8). The leading expert of the EIA is Riin Kutsar (EIA license No. KMH0131).

1 https://www.riigiteataja.ee/akt/103012022010, § 21 ja 22

2. Proposed activity

2.1. Purpose and need for the proposed activity

The number of wind turbines proposed for the offshore wind farm in the Saare 2.1 and Saare 2.2 areas is up to 160, based on the decisions initiating the superficies licence proceedings, and their tip height is a maximum of 365 m above sea level. The maximum nominal capacity of the planned Saare 2.1 and 2.2 offshore wind farm is up to 2400 MW. The implementation of the project depends on optimising its development and construction costs and scale, with energy production planned to commence approximately in 2032.

In addition, the potential future development of up to 6 hydrogen production platforms, along with the necessary facilities for production, and up to 12 algae cultivation facilities is being considered for the designated area. This EIA does not cover hydrogen production or aquaculture solutions.

The proposed activity will help the state achieve its goals of transitioning to renewable energy and ensuring energy security, which include reducing emissions, producing affordable sustainable energy and achieving climate neutrality.

2.2. Location of the proposed activity

The Saare 2.1 and Saare 2.2 offshore wind farm areas are located west of the western coast of Saaremaa (Sõrve Peninsula), within an area designated as suitable for wind energy development under the Estonian Maritime Spatial Plan (see Figure 2-1). The buildable area is located approximately 34 km from the coast of Saaremaa at its nearest point. According to the superficies licence applications, the total encumbered marine area for the Saare 2.1 and Saare 2.2 areas is approximately 252.3 km^2.

The offshore wind farm proposed for the Saare 2.1 and Saare 2.2 areas is located approximately 8 km west of the superficies licence (application) area of Saare Wind Energy (hereinafter SWE) and the superficies licence application area of the ELWIND offshore wind farm. A superficies licence proceeding, along with an EIA, has been initiated for the ELWIND offshore wind farm area. The Environmental Impact Assessment (EIA) report for the offshore wind farm proposed in the SWE superficies licence area was approved by the Ministry of Climate on 10 June 2024, decision number 7-12/24/781-11. The proposed SWE and ELWIND wind farms are taken into account in the assessment of cumulative impacts (see details in chapter 5.3).

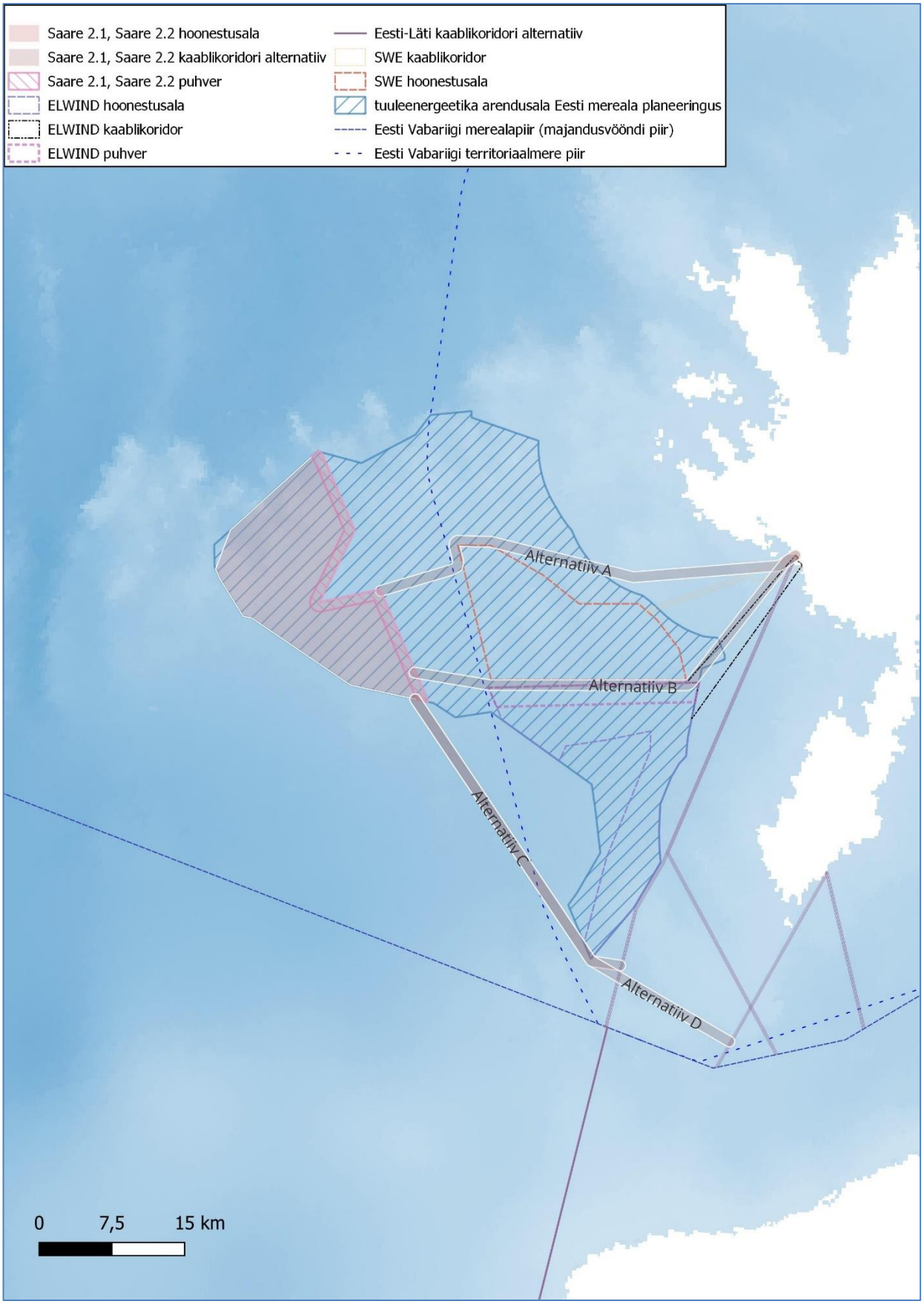

Figure 2-1. *Location of the proposed offshore wind farm*

2.3. Brief description of the proposed activity and reasonable alternatives therefor

2.3.1. Offshore wind farm

According to the decisions initiating the superficies licence proceedings, the total number of wind turbines proposed by Tuule Energy for the Saare 2.1 and Saare 2.2 offshore wind farms is up to 160. The minimum distance between the wind turbines is planned to be 800 metres.

The task of the EIA is to analyse the reasonable alternatives to the proposed activity compared to the existing situation. Based on the information available at the time of preparing the EIA programme, the EIA considers as a realistic alternative the **primary alternative 1, which involves an offshore wind farm area (superficies licence application area) with up to 160 wind turbines and a total capacity of up to 2400 MW.**

The area of the proposed activity has been determined under the decision to initiate the Estonian Maritime Spatial Plan and superficies licence procedure, so it is not possible under this EIA to find or analyse other location alternatives outside the superficies licence application area.

As so-called sub-alternatives to the primary alternative 1 of the proposed activity, the following alternative technical solutions will be considered and evaluated in the course of the EIA:

- **Number of wind turbines**

  The final possible number and placement of the turbines will depend on the environmental constraints identified during the studies conducted within the superficies licence area and the exact technical parameters of the selected turbines. Based on the primary alternative 1 of the EIA, the **maximum number of turbines to be assessed and proposed is up to 160 turbines**.

- **Wind turbine tip height**

  The exact type of wind turbines to be used will be determined during the operational design phase. **During the EIA, turbines with a maximum tip height of up to 365 m above sea level are assessed.**

- **Type of foundation**

  Based on the known bathymetry and soil conditions in the Saare 2.1 and Saare 2.2 areas, several different types of foundations can be applied in the Saare 2.1 and Saare 2.2 offshore wind farms proposed by DWP. The seabed depths in the proposed wind farm area are known to range between 29 and 66 metres, which is suitable for turbines with fixed foundations. The most common types of fixed foundations are monopile, gravity base and jacket foundations. See Figure 2-2.

Gravity base foundation

In areas with a thin sediment layer (0–3.9 m), a gravity base foundation is a suitable alternative. A gravity base foundation cannot be installed directly on soft seabed sediments (eg, clay or sand) due to their limited and uneven load-bearing capacity. Therefore, soft seabed sediments must be removed if necessary. Additionally, the thicker the layer of soft sediments, the more the seabed must be removed and deepened. The exact need for removing soft sediments will be determined during the geotechnical survey.

Jacket foundation

A jacket foundation is considered a suitable option, especially in areas with thicker sediment layers. These foundations are designed with piles having a diameter of at least 2 m to distribute the turbine load over a larger area. Therefore, the design of this foundation type has advantages that are beneficial for use in marine areas with soft sediments and rocky seabeds (including moderate boulders).

Monopile foundation

Monopile foundations are a suitable choice in areas where the layer of soft sediments on the seabed is thicker. Monopile foundations are a popular choice for offshore wind farms as they are easy to manufacture and quick to install. As a result of the geotechnical survey, the required diameter of the monopile foundation will be determined to match the existing seabed geotechnical conditions.

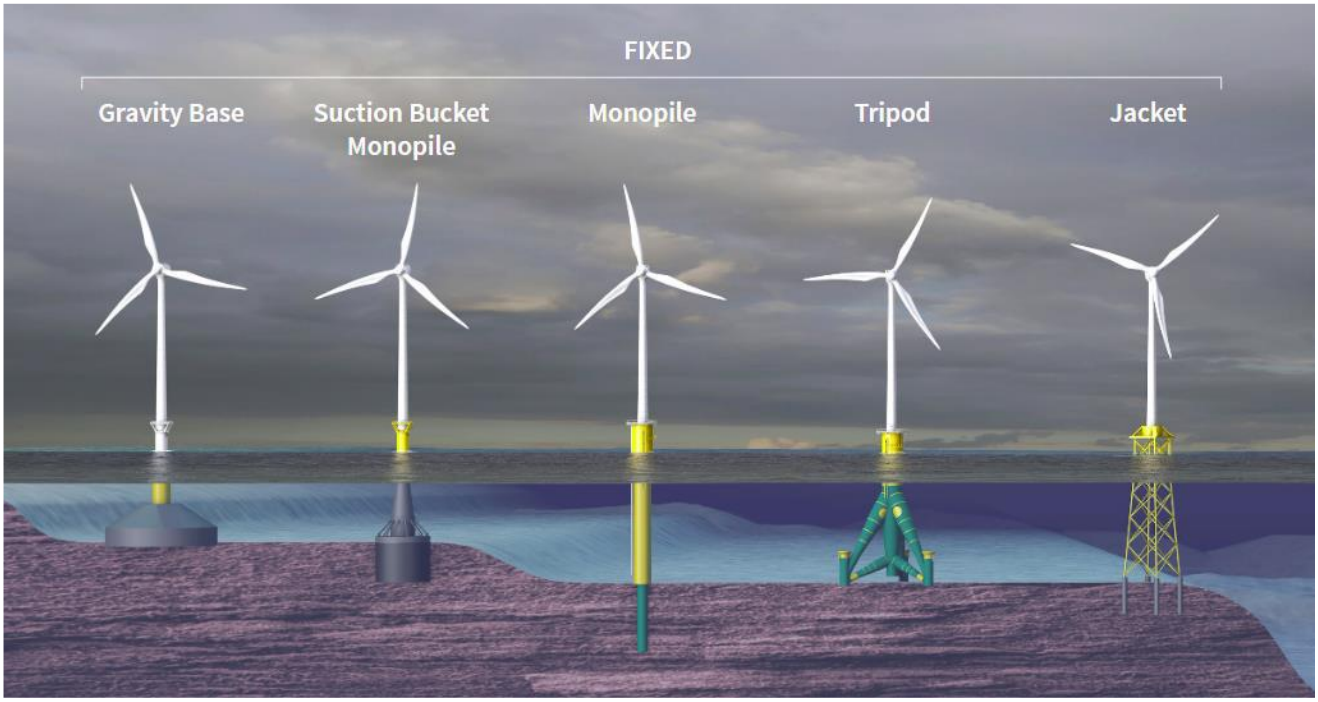

Figure 2-2. *The types of foundations used for wind turbines in offshore wind farms (Figure: Tuule Energy OÜ)*

One of the project developer's objectives is to develop a cost-effective fixed foundation wind energy solution for the conditions of the Baltic Sea (ice load, geotechnical aspects, etc). Therefore, the type of foundation to be used for the proposed wind turbines will be determined after conducting more detailed studies. The types of foundations selected and their associated impacts are discussed in the EIA report.

- **Substations and internal cabling of the wind farm**

The offshore wind farm will be constructed with up to two substations, where the internal cables from the turbines will converge, and where the voltage will be converted to the appropriate level, enabling the transmission of electricity to the mainland or the delivery of electricity to hydrogen production platforms for hydrogen production or directly for export. In principle, research and measurement equipment can be added to the offshore substations, supporting research and development activities in Estonia.

Additionally, an internal underwater cable system connecting the turbines to the substation will be established. The internal electrical cables of the wind farm will be installed in the seabed to a depth of up to 3 metres.

The locations of the selected cable routes and their associated impacts will be assessed in conjunction with the proposed offshore wind farm, including the impacts of the internal infrastructure (substation and internal cabling) of the wind farm.

The analysis and specification of the main alternative and its sub-alternatives will take place in the further EIA report process (including based on the data from studies conducted in the study areas) and during the development of the technical solution in cooperation with the authorities involved in the process and experts in the relevant field. Alternative solutions that arise during the EIA process and/or determining of the best alternative solution (including drafts in regard to the locations of wind farms and parameters) will be described in the EIA report.

Considering the rapid development of technology and the aim to reduce costs and environmental impact, the final configuration of the project and the selection of technologies to be used will, among other factors, be based on the following criteria:

- The chosen market-based approach and the project's/product's competitiveness in the market, which is currently uncertain and needs to be further explored using the applicant's specialised knowledge;
- The results obtained from the EIA, seabed geophysical and geotechnical surveys, environmental studies, etc;
- Existing technologies during the implementation of the detailed design;
- Availability and readiness of the Estonian supply chain;
- Optimisation of the system's overall production and costs, including wake turbulence and energy efficiency assessments, balancing the production of wind turbines with the energy export system and alternative fuel production capabilities.

2.3.2. Connecting cable

To direct the electricity produced by the offshore wind farm into the electricity network, a connection to the transmission network is required. Four possible alternatives have been developed to connect the Tuule Energy offshore wind farm proposed by Tuule Energy to the transmission network (Figure 2-1):

- A radial connection to the substation proposed by Elering AS on the western coast of Saaremaa (alternatives A and B);
- Connection to the proposed Estonia-Latvia interconnector (alternatives C and D).

The best cable route is chosen according to the results of the EIA and surveys, but it also depends on the solution chosen for the Estonia-Latvia electricity connection. The construction of the Estonia-Latvia interconnector and potential onshore substation on Saaremaa is not part of this superficies licence application or EIA (the preparation of this EIA is based, among other things, on the surveys and analyses conducted in the process of the designated national spatial plan for the fourth Estonia-Latvia electricity connection). On 15.02.2024, the Government initiated a designated national spatial plan and strategic environmental assessment for the fourth Estonia-Latvia electricity connection to address onshore connections and substations. The interconnector's offshore cable installation will require a separate superficies licence.

Generally, the maximum transmission capacity of the connection cable is 350 MW, necessitating the installation of up to six parallel cables. The preferred distance between the cables in the sea is approximately 100 metres, resulting in a total corridor width of around 500 metres for six parallel cables. The alternative survey areas for cable corridors are approximately 1 km in width. The exact parameters of the cables (type, number, capacity, etc) will be determined during the further detailed design of the cable line and the offshore wind farm. To prevent mechanical damage to the underwater cable line, the cable will be installed in seabed sediments or covered with material. The installation technique and technology for laying the seabed cable will be specified during the design work and the preparation of the environmental impact assessment report.

2.3.3. Hydrogen production

Later, once the market is ready and it becomes commercially viable, the Tuul Energy will consider the possibility of producing hydrogen (or other alternative fuels) in the electrolysis units located at the wind turbines or on separate offshore hydrogen platform(s) within the proposed offshore wind farm. Conceptually, the plan involves constructing up to six offshore platforms, each with a maximum height of 150 metres above sea level, along with a transport pipeline for hydrogen or alternative fuels that will connect the platforms to the corresponding collector. If hydrogen or alternative fuel production at the wind turbines is selected, an on-site hydrogen or alternative fuel grid must be installed.

The offshore wind farm will be developed such that it could be connected to hydrogen production solutions with minimal modifications. If any of the described options is chosen, an

additional environmental impact assessment may be necessary to assess its impact. For example, if hydrogen production involves the use of water (such as abstraction and return to the sea), additional environmental permits are required. The EIA report thus considers specific development options related to the hydrogen topic only at the conceptual level (ie technical solutions not planned in detail).

2.3.4. Aquaculture

To ensure efficient use of space, the possible development of aquaculture will be considered under the project. In the future, this could include (depending on actual conditions) innovative shellfish and seaweed farming developed in line with the guidelines of the Estonian Maritime Spatial Plan. According to the initial vision, the aquaculture pilot project would include up to 12 offshore installations with a raft foundation, each measuring 120 × 15 m. If a positive decision is taken on the aquaculture pilot project, it would be constructed after the completion of the wind farm. This EIA considers aquaculture solely as a conceptual option.

3. Connection between the proposed activity and strategic planning documents

3.1. The European Green Deal.

The European Green Deal[2] is an umbrella strategy, adopted by the European Commission on 11.12.2019, aimed at achieving a resource-efficient and competitive economy in Europe where by 2050 climate neutrality will have been achieved along with sustainable use of resources along with sufficient economic growth[3]. The goal must be achieved while preserving the natural environment and protecting citizens from dangers and impacts related to environmental pollution.

The European Green Deal focuses on 3 key principles for the clean energy transition, which will help reduce greenhouse gas emissions and enhance the quality of life of citizens:

1. ensuring a secure and affordable EU energy supply;
2. developing a fully integrated, interconnected and digitalised EU energy market;
3. prioritising energy efficiency, improving the energy performance of our buildings and developing a power sector based largely on renewable sources.

In the context of this EIA, the relevant goals set to achieve the previously mentioned principles include:

- build interconnected energy systems and better integrated grids to support renewable energy sources;
- promote innovative technologies and modern infrastructure;
- promote EU energy standards and technologies at global level
- develop the full potential of Europe's offshore wind energy

The proposed activity will directly contribute to achieving transition to pure energy – a goal at the core of the European Green Deal.

3.2. European Union Biodiversity Strategy 2030

On 20.05.2020, the European Commission adopted the Biodiversity Strategy for the European Union for 2030[4], which seeks to contribute to Europe's biodiversity recovery by 2030, benefiting people, the climate and the planet as a whole.

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2 https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_et

[3] *The EU-wide climate target to reduce net greenhouse gas emissions by 55% by 2030 compared to 1990 levels (previously 40%) was agreed upon by the heads of state at the European Council in December 2020. This target, along with the target of climate neutrality, was legally established in the European Climate Law adopted in the summer of 2021.*

4 https://ec.europa.eu/environment/strategy/biodiversity-strategy-2030_et

The most Important topics in the context of this EIA are set out in Chapter 2.2 of the strategy. (EU nature restoration plan: restoring land and marine ecosystems):

- 2.2.5. Win-win solutions for energy generation. Decarbonising the energy system is critical for climate neutrality, as well as for the EU's recovery from the COVID-19 crisis and long-term prosperity. More sustainably sourced renewable energy will be essential to fight climate change and biodiversity loss. The EU will prioritise solutions such as ocean energy, offshore wind, which also allows for fish stock regeneration, solar-panel farms that provide biodiversity-friendly soil cover, and sustainable bioenergy.

- 2.2.6. Restoring the good environmental status of marine ecosystems. Restored and properly protected marine ecosystems bring substantial health, social and economic benefits to coastal communities and the EU as a whole. The need for stronger action is all the more acute as marine and coastal ecosystem biodiversity loss is severely exacerbated by global warming. Achieving good environmental status of marine ecosystems, including through strictly protected areas, must involve the restoration of carbon-rich ecosystems as well as important fish spawning and nursery areas. Some of today's sea uses endanger food security, fishers' livelihoods, and the fishery and seafood sectors. Marine resources must be harvested sustainably and there must be zero-tolerance for illegal practices. In this regard, the full implementation of the EU's Common Fisheries Policy, the Marine Strategy Framework Directive and the Birds and Habitats Directives is essential.

The proposed activity is in line with the EU Biodiversity Strategy.

3.3. National strategy Sustainable Estonia 21

The principles of sustainable development are defined in the national strategy Sustainable Estonia 21[5], which was approved by the Riigikogu on 14.09.2005. Estonian objectives for 2030 were formulated in line with global (Agenda 21) and European Union long-term development visions. Among other things, the need to plan steps for the transition to post-oil shale energy was mentioned.

The proposed offshore wind farm is in line with the national strategy.

3.4. National Strategy Estonian 2035

The national strategy Estonia 2035[6], adopted by the Riigikogu on 12 May 2021, is the country's long-term development strategy, aimed at enhancing and supporting the well-being of our people so that Estonia will be the best place to live and work in twenty years. Estonia 2035 is a strategic management tool that allows for the coordination of the country's long-term strategic planning and financial management, taking into account the possibilities of public finances. The

5 https://www.riigiteataja.ee/akt/940717

6 https://valitsus.ee/strateegia-eesti-2035-arengukavad-ja-planeering/strateegia/materjalid

strategy promotes cooperation between the Riigikogu and the Government of the Republic to ensure the unified management of Estonian development and strengthens the links between various strategic policy documents. The strategy Estonia 2035 is primarily implemented through sectoral development plans and corresponding sectoral programmes. The Estonian 2035 strategy sets five long-term strategic goals, which are value-based goals and serve as the basis for making the country's strategic choices, the implementation of which is facilitated by all Estonian strategic development documents:

- Estonia's people are smart, active and care about their health.
- Estonia's society is caring, cooperative, and open
- Estonia's economy is strong, innovative, and responsible
- Estonia offers a safe and high-quality living environment that takes into account the needs of all its inhabitants
- Estonian is an innovative, reliable and people-centred country.

In order to maintain Estonian fundamental principles, achieve strategic goals and meet development needs, changes are needed in different areas.

In the context of this EIA, the relevant topics are:

- Transition to climate-neutral energy production while ensuring energy security. The transition to climate-neutral energy production, which ensures good air quality, requires considering the possible alternatives and making choices. We must ensure the continuity of energy security and security of supply, both during and before the transition to climate-neutral energy production. In order to increase the share of renewable energy, we will find a solution that takes into account security, environmental protection and the interests of the population. We are open and support new solutions, such as offshore wind energy.

- We will implement a safe, environmental-friendly, competitive, needs-based and sustainable transport and energy infrastructure We are open and support new technologies such as the use of hydrogen. The transition to climate-neutral energy production also requires the construction of supporting infrastructure. To this end, we will synchronise the electricity grid with the continental European frequency band, create the necessary grid connections for renewable energy production, and deploy smart grids, short-term and long-term storage options.

Based on the above, the proposed offshore wind farm will directly contribute to fulfilling the set goals of ensuring sustainable and climate-neutral energy generation.

3.5. National spatial plan Estonian 2030+

The Government of the Republic established the national spatial plan Estonia 2030 [7] on 30.08.2012. According to the plan, one of the most important areas for increasing energy production capacity based on local renewable resources is wind energy and bioenergy. According

7 https://www.rahandusministeerium.ee/et/ruumiline-planeerimine/uleriigiline-planeering

to the plan, it is necessary to increase the share of other energy sources (besides one fossil energy source) in the country's energy balance. The western coastal sea of Estonia is suitable for the construction of offshore wind farms. The main goals of Estonia 2030+ in the field of energy are:

1. When developing electricity generation capacity, it is necessary to focus on ensuring Estonia's energy supply. New energy production units must be placed rationally and sustainably. It is noted that electricity production in Estonia has primarily relied on oil shale energy, which is not competitive in the long term (eg, due to increasing environmental charges). For reasons of energy security and environmental considerations, it is not advisable to have such a large share of a single fossil energy source in the country's energy balance, as this is associated with supply security, energy market and environmental protection risks. Therefore, it is necessary to increase the share of other energy sources and develop infrastructure to trade more extensively in the energy sector with other European Union member states.
2. Estonia's energy supply options must be expanded by creating external connections with the energy networks of the Baltic Sea region.
3. It is necessary to avoid undesirable impacts on the climate, achieve a higher share of renewable energy in the energy supply, and ensure the implementation of energy-saving measures. It is noted that 'it is necessary to consider the possibility and need to establish new onshore or offshore wind farms, as Estonia's good wind potential allows a significant portion of electricity to be produced using wind turbines'.

The proposed offshore wind farm is in alignment with the objectives of the National Development Plan of the Energy Sector until 2030.

3.6. General Principles of Climate Policy until 2050

According to the Foundations of Climate Policy Until 2050[8], approved by the Riigikogu on 5 April 2017, and the update of the Foundations of Climate Policy, approved on 8 February 2022, Estonia's long-term goal is to achieve climate neutrality by 2050.

The fundamentals of climate policy is a vision document, in which the principles and policy directions are set forth to be implemented in the future through the updating of sectoral development plans. Estonia's long-term objective is to transition to a low-carbon economy, which entails gradually transforming the economic and energy systems into more resource-efficient, productive and environmentally sustainable ones. By 2050, Estonian will be a competitive climate-neutral country with a knowledge-based society and economy.

The proposed activity is in line with the Fundamentals of Estonian Climate Policy until 2050 objectives.

8 https://envir.ee/kliimapoliitika-pohialused-aastani-2050

3.7. Estonian Environmental Strategy 2030

Estonian Environmental Strategy 2030 [9] is the development strategy for the environmental sector, guided by the principles of the national sustainable development strategy Sustainable Estonia 21 and serves as an overarching strategy for all sub-sectoral development plans in the environmental field, which must follow the principles outlined in the environmental strategy during their preparation or revision.

The goal of the Estonian Environmental Strategy 2030, approved by the Riigikogu on 14.02.2007, is to define long-term development directions to maintain the good condition of the natural environment, considering the interconnections of the environmental sector with the economic and social sectors and their impacts on the surrounding natural environment and humans. The environmental strategy's objective regarding climate change and air quality is as follows: to produce electricity in volumes that meet Estonia's consumption needs and to develop diverse, low-environmental-impact sustainable production technologies based on various energy sources that also allow for electricity production for export.

The proposed activities are in line with the Estonian Environment Strategy 2030.

3.8. Climate Change Adaptation Development Plan until 2030.

On 2 March 2017, the Government of the Republic adopted the Climate Change Adaptation Development Plan 2030,[10] whose strategic objective is to increase the readiness and ability of the Estonian state, at regional and local level, to adapt to the impacts of climate change.

To prepare the Climate Change Adaptation Development Plan, researchers identified the impact of climate change on Estonia across eight key areas: spatial planning and land use, human health and rescue capability, natural environment, bioeconomy, infrastructure and buildings, energy and energy supply, economy, society, awareness, and cooperation.

In the context of this EIA, the relevant sub-objective in the key area of energy and energy supply is: due to climate change, energy independence, security, supply reliability and the usability of renewable energy resources have not decreased, and the volume of primary energy end-use has not increased. The guiding principle of energy independence is independence from energy carrier imports, reliance on domestic fuels for energy production and renewable fuels in particular, the use of renewable energy sources and the diversification of the energy production portfolio. The best way to ensure energy supply security is through the availability of sufficient and rapidly responsive production capacities and the diversification of energy production. It is important that long-term planning for the development of the energy sector takes into account not only the availability of resources, technologies, and the cost of energy, along with other aspects

9 https://www.riigiteataja.ee/aktilisa/0000/1279/3848/12793882.pdf

10 https://valitsus.ee/strateegia-eesti-2035-arengukavad-ja-planeering/arengukavad/muud-arengudokumendid

affecting the sector's development, but also changing climatic conditions and their impact on energy production and the delivery of electricity to consumers.

The proposed activities are in line with the objectives of the Climate Change Adaptation Development Plan 2030, supporting the achievement of the objectives set for energy and energy supply.

3.9. National Energy and Climate Plan of Estonia 2030

On 19.12.2019, the government approved the National Energy and Climate Plan 2030 [11](NECP 2030), which consolidates Estonia's energy and climate policy objectives and the 71 measures developed to achieve them. The wider objective of the 2030 National Energy and Climate Plan of Estonia (NECP) is to provide precise information to Estonian people, companies, and other EU Member States on the measures that Estonia intends to take to meet the agreed energy and climate policy objectives of the European Union.

The main objectives of NECP 2030, which are relevant in the context of this EIA, are as follows:

- Reduction of Estonian greenhouse gas emissions by 80% by 2050 (including 70% by 2030)
- The share of renewable energy in the total final energy consumption must be at least 42% in 2030: in 2030, renewable energy makes up 16 TWh, ie 50% of the final energy consumption, including renewable electricity 4.3 TWh (2018 = 1.8 TWh), renewable heat 11 TWh (2018 = 9.5 TWh), transport 0.7 TWh (2018 = 0.3 TWh).
- Ensuring energy security by keeping the degree of dependence on imported energy as low as possible: the use of local fuels is kept as high as possible (including increasing the use of fuel-free energy sources), the potential of biomethane production and use must be used.

Estonia's national renewable energy targets are set out in subsection 1 of § 32^1 of the Energy Sector Organisation Act[12], which states that by the year 2030, renewable energy accounts for at least 65 per cent of gross domestic final consumption of energy. Renewable energy accounts for at least 100 per cent of gross final consumption of electricity.

The proposed activity makes a direct contribution to fulfilling the Estonian national energy and climate goals by supporting an increase in the proportion of renewable energy.

3.10. Estonian Energy Sector Development Plan 2035

During the preparation of the EIA programme, the National Energy Sector Development Plan Until 2030[13], approved by the Government of the Republic on 06/10/2016, is still in effect.

11 https://www.mkm.ee/et/eesmargid-tegevused/energeetika/eesti-riiklik-energia-ja-kliimakava-aastani-2030

[12] Energy Sector Organisation Act, RT I, 30.06.2023, 8

13 https://www.mkm.ee/sites/default/files/enmak_2030.pdf

However, a draft[14] of the National Development Plan of the Energy Sector Until 2035 has been completed, and it is appropriate to refer to the updated development plan. The Energy Sector Development Plan Until 2035 sets out the long-term goals (Figure 3-1) and vision for Estonia's energy sector up to 2050.

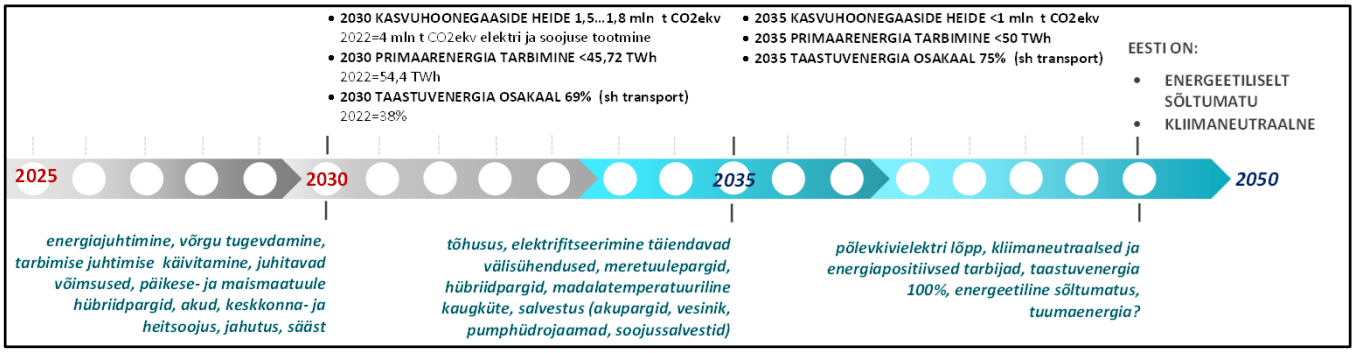

Figure 3-1. *Long-term goals for the Estonian energy economy*[15]

Vision for the Estonian energy sector in 2050 is as follows:

By 2050, Estonia will primarily use domestic resources to meet its energy needs, not only for electricity but also for heat production and the transportation sector. According to the Estonia 2035 strategy (and/or the Climate Act to be drafted, if it sets a different goal), Estonia will ensure energy security by 2050 through climate-neutral energy production. In the established regional gas market, Estonia's locally sourced gas fuels are competitive, and their production potential has been realised.

Estonia has become a country that uses modern and environmentally friendly technologies to apply energy in the most socially optimal way on the European energy market. Estonia's energy independence and its long-term assurance are the main pillars of the economic well-being of the country's residents, the competitiveness of companies operating in Estonia and Estonia's energy security.

The state has developed a solid and long-term vision for resource ownership policy, which supports the development of Estonia's industrial sector. The state revenue generated from the use of renewable energy sources will be directed towards ensuring energy sustainability, thereby guaranteeing the continuation of the country's energy independence after the cessation of fossil fuel use.

State budget funds directed towards energy efficiency, the promotion of domestic fuel production, and the knowledge-based economy are key drivers of economic growth and the long-term competitiveness of the country, through the growth of tax revenue, employment, and improvement of the country's foreign trade balance.

[14] *https://kliimaministeerium.ee/energiamajanduse_arengukava*

[15] *Draft Energy Sector Development Plan until 2035. Estonian Ministry of Climate.*

Investments in Estonia's energy sector are balanced with economic development. New investments are made in good cooperation with new large consumers, providing the necessary assurance to all parties involved. Estonia's energy landscape is diverse, maximally utilising local resources, thus being flexible, ensuring supply security, energy security and remaining within the limits of nature. External connections of the energy infrastructure are of strategic importance in the context of economic development, ensuring greater flexibility for consumers and producers, additional supply security, energy security and supply with fossil-free energy. Estonia has achieved its set goals towards a climate-neutral energy system.

The development plan includes activities related to the production and supply of energy and the improvement of energy efficiency with regard to the following topics:

- Ensuring energy security
- Transition to renewable energy
- Increasing energy efficiency.

The proposed activities are consistent with and contribute directly to the objectives of the Energy Sector Development Plan by supporting the transition to renewable energy and energy security.

3.11. Estonian Marine Strategy

When managing the protection and use of the sea, Estonia, like other EU countries, follows the Marine Strategy Framework Directive (2008/56/EC; MSFD). The main objective of this Directive is to maintain or achieve, by 2020, at the latest, good environmental status (GES) in its marine environment. Each EU country must develop and implement its marine strategy to promote the sustainable use of the seas and preserve marine ecosystems.

The implementation of the marine strategy takes place in six-year cycles, each comprising three main stages: Stage 1 - assessment of the state of the marine area and setting of targets, stage 2 - development and implementation of a marine area monitoring programme, and stage 3 - preparation and implementation of a marine area action plan. Each of the above-mentioned stages of the Marine Strategy will be updated every six years. The assessment of the state of the marine area will be updated this year, 2024. The marine area monitoring programme was updated in 2020. The marine area Action Plan was updated in 2020-2023.

The plan of measures was approved by Minister of the Environment directive no. 16-7/23/5 of 22.02.2023. The aim of updating the Action Plan was to identify shortcomings in achieving good environmental status and, if necessary, to introduce additional measures to control anthropogenic impacts affecting the Estonian marine environment and to achieve the established environmental targets and thus good environmental status of the marine area. Of the measures set out in the Action Plan, the following measures in particular relate to the planning and construction of offshore wind farms:

- Developing compensatory measures for disturbing or destroying the integrity of the seabed (BALEE-M032), which sees the development and establishment of a package of measures to compensate for seabed disturbance and habitat destruction during various

developments and other activities. One of the aims of the package of measures is to ensure that the seabed is disturbed as little as possible and that it is restored to its usual state after use.
- Implementation of the HELCOM regional action plan on underwater noise and necessary regulations in Estonia (BALEE-M055), in the context of which the implementation of the HELCOM marine noise plan in Estonia is organised and coordinated.

The proposed activity is in line with the Estonian Marine Strategy, the EIA programme provides for the assessment of relevant impacts and, where necessary, the implementation of mitigation measures.

3.12. Estonian Maritime Spatial Plan

The Estonian maritime spatial plan is the most recent and strategic spatial planning document that includes all sectors[16]. This is a thematic plan of a national spatial plan, which covers the entire Estonian marine area, except for the marine areas in Pärnu County and Hiiumaa, which were already prepared as county-wide spatial plans.

The objective of the planning of the marine area is to agree on principles for use of the Estonian marine areas in the long term in order to contribute to achieving and preserving good condition of the maritime environment and promoting the maritime economy. The spatial plan determined which parts of the marine area activities can be implemented and on what conditions. In the course of preparing the maritime spatial plan, the combined effect of the activities already taking place in the marine area and still in the planning stage were treated. Their impact on the maritime environment and economy and the activities' social and cultural impact were also assessed. Among other things, the spatial plan also determines the suitable areas, guidelines and conditions for developing wind energy.

In preparing this EIA programme and designing the content of the EIA as a process, the conditions, guidelines and best practices outlined in the Estonian Maritime Spatial Plan have been taken into consideration.

16 http://mereala.hendrikson.ee/

4. Description of the environment expected to be impacted.

4.1. Natural environment

Estonian marine area consists of parts of several major basins of the Baltic Sea, which differ in natural conditions and anthropogenic pressures: the Gulf of Finland, the Gulf of Riga, the open part of the Baltic Sea and Väinameri in the region of the West Estonian archipelago. The area of the Tuule Energy wind farm is in the open part of the Baltic Sea.

4.1.1. Geological conditions

Based on current knowledge, seabed depths in the proposed wind farm areas of Saare 2.1 and Saare 2.2 range from 29 to 66 metres. The average depth of Saare 2.1 area is 43 m, with a minimum depth of 29 m and a maximum depth of 66 m. The Saare 2.2 area has an average depth of 41 m, with a minimum depth of 34 m and a maximum depth of 50 m.

To characterise the geology of the seabed in the wind farm area proposed for Saare 2.1 and Saare 2.2 areas, only indirect data are available at the stage of preparing the EIA programme, accurate geological studies have not yet been carried out. In general, the Silurian limestone bedrock is known to be covered by a variety of Quaternary sediments. In the EMODnet[17] system, data on seabed sediments in the area, compiled from archive materials, date back to the 1980s and contain only very general information.

4.1.2. Hydrometeorological conditions

Temperature. In the open part of the Baltic Sea, the water temperature in the surface layer averages 15–17 °C in July and August. In the near-bottom layer, the water temperature remains between 2–5 °C. Due to the water temperature, seasonal stratification of water occurs in the conditions of the Baltic Sea. This stratification lasts from May to September. The stratification is significant mainly because it inhibits the vertical transport of nutrients and dissolved oxygen.[18]

Salinity. One important factor influencing the distribution of biota in the Baltic Sea is water salinity. Water salinity in the marine area of Estonia ranges from 0 to 8 g/kg. Surface layer salinity varies by region as follows:

- Southeastern Gulf of Finland: 2.5–6 g/kg and Western Gulf of Finland: 4.5–6.5 g/kg
- Open part of the Western Islands: 6–7 g/kg
- Väinameri: 3–6.5 g/kg
- Gulf of Riga: 4–6 g/kg (Pärnu Bay: 3–5.5 g/kg)

Saltwater inflow to the Baltic Sea occurs through the Danish Straits. At the same time, fresh water from rivers is added to the sea. Fresher water remains in the surface layer due to its lower density

17 https://emodnet.ec.europa.eu/en/emodnet-data-layers-catalogue-within-atlas

[18] Environmental status of Estonian marine area 2024. Summary Report (Draft) of the status assessment under MSFD Art 8 to 10.

and flows out of the Baltic Sea in the surface layer, whereas the saltier water from the North Sea submerges into the deeper layers. Consequently, the water column in the Baltic Sea is vertically stratified.[19] The open part of the Baltic Sea, where the Saare 2.1 and Saare 2.2 wind farm area proposed by Tuul Energy is also located, is in a state of continuous stratification.

Wind. Estonia's wind climate is determined by the frequent alternation of low-pressure systems and high-pressure systems typical of the northern part of the temperate zone – cyclonic activity that causes windy weather. The intensity of cyclonic activity in the Baltic Sea region depends on the general atmospheric circulation over the Atlantic Ocean and the Eurasian continent, broadly determining the wind speed and direction in Estonia and its seasonal variability. The strongest winds and most frequent storms are characteristic of the period from October to January, while the period from May to August typically features weaker winds and more calm days.

The long-term average wind energy (energy density, W/m^2) at a height of 150 metres is 810–880 W/m^2 offshore west of Saaremaa, 800–840 W/m^2 near Hiiumaa, 700–780 W/m^2 in the central Gulf of Riga, and decreases from 750 W/m^2 in the western Gulf of Finland to 550 W/m^2 towards the east.[20]

The marine area west of Saaremaa, including the proposed Saare 2.1 and Saare 2.2 offshore wind farm area, has favourable wind conditions. The most frequent winds blow from the southwest (see Figure 4-1), and this direction is also the most energy-rich.

[19] *Environmental status of Estonian marine area 2024. Summary Report (Draft) of the status assessment under MSFD Art 8 to 10.*

20 Estonian Maritime Spatial Plan Impact Assessment Report, to be established in 2021 (https://mereala.hendrikson.ee/dokumendid/Planeeringulahendus/Kehtestamisele/4_MSP_M6jude_hindamise_aruanne.pdf)

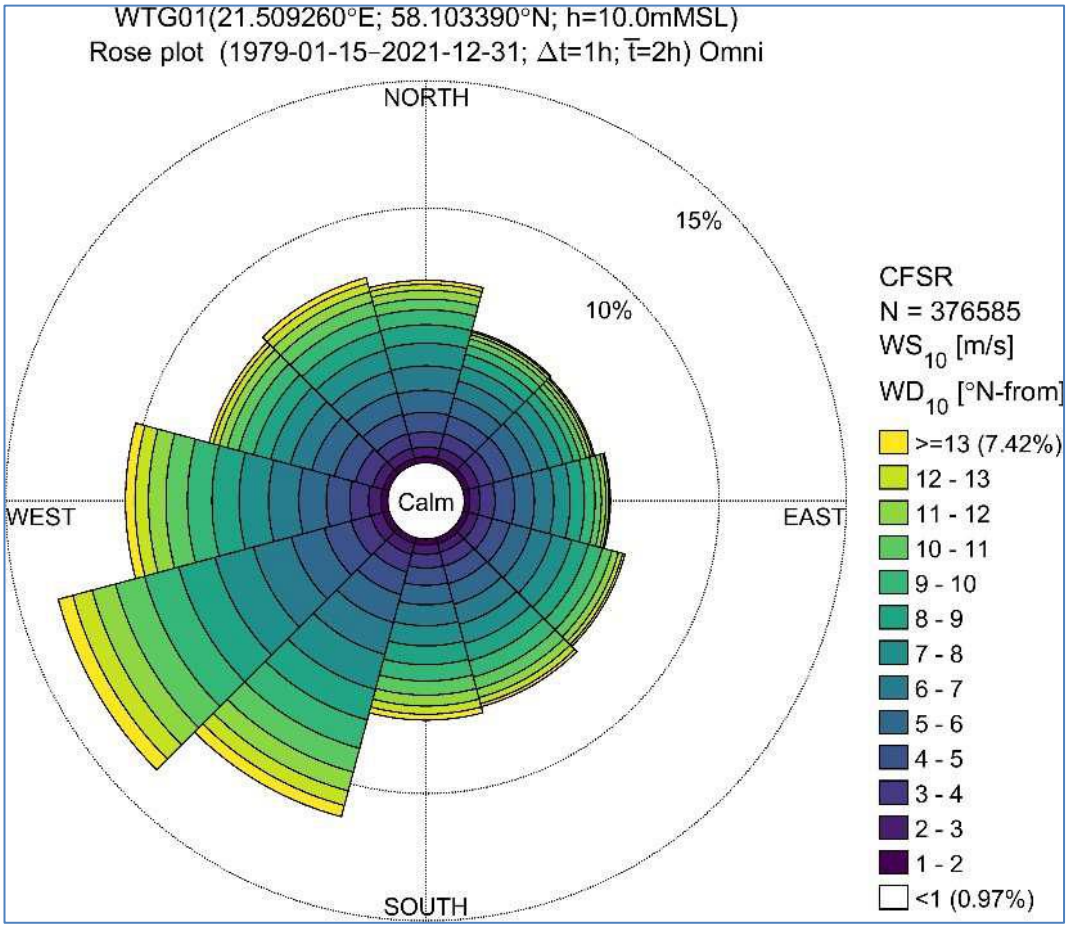

Figure 4-1. *Wind rose for the SWE offshore wind farm area. The analysis period covers from 15.01.1979 to 31.12.2021. (DHI, 2023). (DHI, 2023[21]).*

Waves and currents. The wind climate also shapes the characteristics of waves and currents. Water flow along the Estonian coast is most frequently directed eastwards. The typical speed of the current in the surface layer of the Estonian marine area is 10–20 cm/s[22]. Measurements and modelling[23] conducted in the SWE wind farm area indicate that the direction and speed of currents differ between the surface and the seabed, as surface currents are driven by wind, while bottom currents are influenced by baroclinic processes. The current velocity is less than 0.1 m/s at the bottom and less than 0.3 m/s at the surface. Currents are generally stronger in winter and weaker in summer. The predominant current directions are from the northwest and north.

Wave heights in the Baltic Sea are usually 1–2 metres, reaching 5–6 metres during storms at sea, and up to 10 metres during exceptional westerly storms.[24] The wave roses prepared for the SWE

[21] Saaremaa offshore wind farm. Meteorological and oceanographic conditions. Report. DHI, 2023

22 Vesiviljelus Eesti merealal alusandmed ja uuringud [Aquaculture in Estonian Marine Waters: Basic Data and Studies]. University of Tartu Estonian Marine Institute 2020 (https://pta.agri.ee/media/2129/download)

[23] Saaremaa offshore wind farm. Meteorological and oceanographic conditions. Report. DHI, 2023

[24] Vesiviljelus Eesti merealal alusandmed ja uuringud [Aquaculture in Estonian Marine Waters: Basic Data and Studies]. University of Tartu Estonian Marine Institute 2020 (https://pta.agri.ee/media/2129/download)

wind farm area show that the predominant wave directions are from the southwest and west, and wave heights generally do not exceed 1.5 metres.[25]

Ice conditions. On the basis of the analysis of ice conditions, the marine area of Estonia can be divided into six regions: (i) Väinameri and Pärnu Bay, (ii) open part of the Gulf of Riga, (iii) west coast of Saaremaa and Hiiumaa, (iv) western part of the Gulf of Finland (area north of Hiiumaa and Vormsi), (v) central part of the Gulf of Finland (from Kunda to Paldiski), and (vi) eastern part of the Gulf of Finland (Narva Bay). The offshore wind farm area proposed for Saare 2.1 and Saare 2.2 areas is located in Region III, where ice conditions are the mildest and the probability[26] of ice occurrence is low (see Figure 4-2). An ice cover is present only during severe winters, lasting up to 30 days. Extreme/severe winters occur on average 1–2 times every 10 years in Estonia. During severe winters, drift ice may also occur west of Saaremaa, moving predominantly from north to south with an average speed of up to 0.03 m/s.

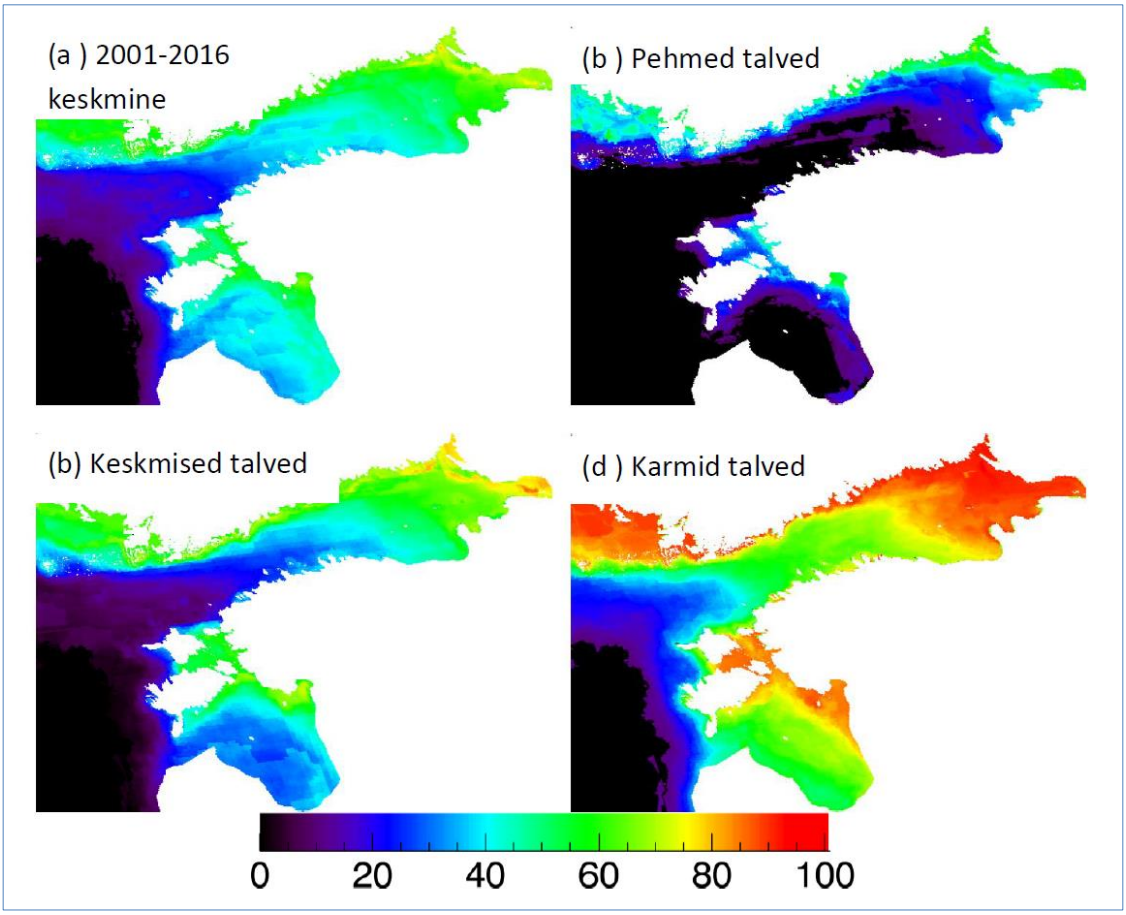

Figure 4-2. *Probability of ice occurrence (%) in the Estonian marine area in the period 2000 to 2016 and in different winter scenarios (Department of Marine Systems at Tallinn University of Technology, 2016[27])*

[25] *Saaremaa offshore wind farm. Meteorological and oceanographic conditions. Report. DHI, 2023*

[26] *The probability of ice occurrence indicates the percentage of days on which there was ice in the given grid point from 15 December to 1 May. If at least 10% of the grid square was covered in ice (ie ice concentration exceeded 10%), the grid point was considered covered in ice.*

[27] *An Analysis of Ice Conditions and Compilation of Maps, Department of Marine Systems at Tallinn University of Technology, 2016*

In the case of an average winter, water temperatures in the wind farm area proposed for Saare 2.1 and Saare 2.2 areas do not fall below 0 degrees Celsius and no ice is formed or forms very briefly. To the west of Saaremaa, the first ice may form only in mid-January, and from there the ice will also disappear at the earliest – in February.[28]

4.1.3. Sea water quality

The open part of the Baltic Sea where the Saare 2.1 and Saare 2.2 wind farm area proposed by Tuul Energy lies is a typical area of the eastern part of the Baltic Sea in terms of sea water quality, with almost no impact of land inflows. In the context of the Estonian coastal waters, it is the marine area least affected by human activity (direct influx of nutrients from land is minimal, there are no local sources of pollution, other uses of the sea are is not intense). The area is hydrodynamically active, and the parameters of the water column are influenced by the movement of water (wind direction) and the time of year (seasonal stratification). [29]

According to the spatial distribution prepared for the assessment of the state of the marine area of Estonia, the buildable areas of Saare 2.1 and Saare 2.2 are situated in the eastern part of the Eastern Gotland Basin marine area (Figure 4-3).

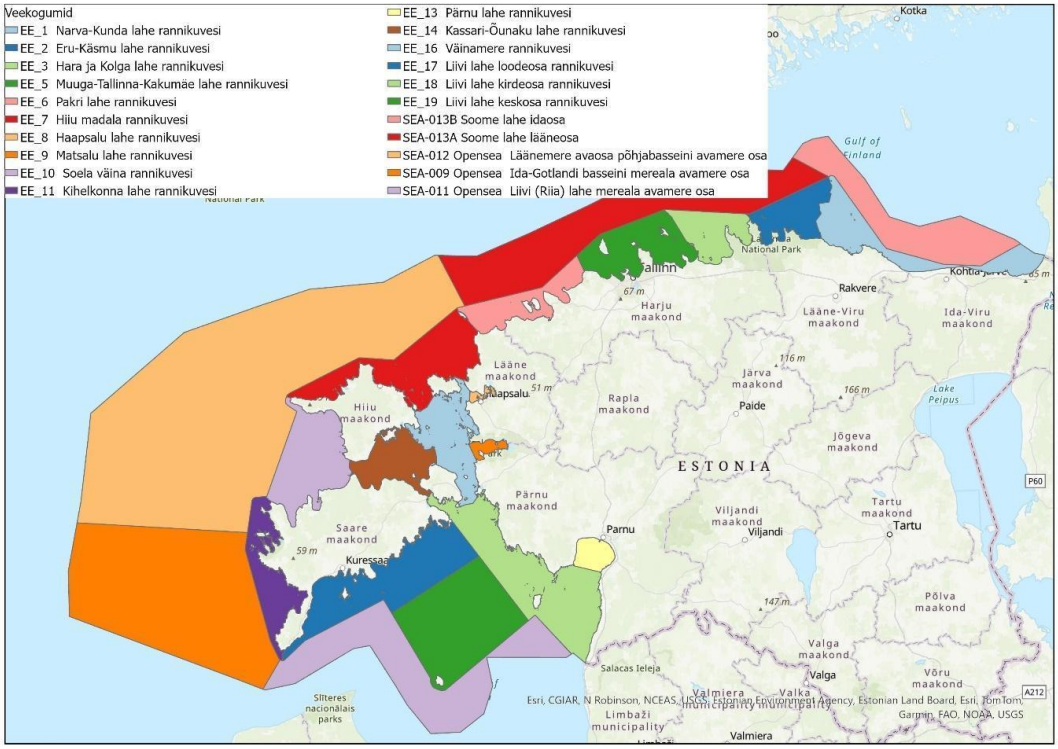

Figure 4-3. *Distribution of Estonian coastal bodies of water and HELCOM offshore assessment units in the marine area of Estonia.* (*Tallinn University of Technology Institute of Marine Systems, 2023.*

[28] *An Analysis of Ice Conditions and Compilation of Maps, Department of Marine Systems at Tallinn University of Technology, 2016*

[29] *Study of seabed biota, habitat and water quality in the proposed SWE wind farm area. Estonian Marine Institute, University of Tartu, 2023*

Assessment of the status of the marine environment according to the EU Marine Strategy Framework Directive (2008/56/EC): descriptor D5 'Eutrophication')

According to the recent (2023) aggregated eutrophication assessment prepared for the marine strategy report, the majority of Estonian marine area assessment units did not achieve a good environmental status (GES) (Figure 4-4). However, the reliability of this assessment is considered average for most marine areas (Figure 4-5). Data on the indicators used to assess eutrophication in the offshore region of the Eastern Gotland Basin are presented in Table 4-1.

These assessments are based on data produced by the national marine environmental monitoring programme and represent relatively large assessment units in terms of area. During the previous (2011–2016) period, the status of marine areas was assessed using a five-class scheme, with the Eastern Gotland Basin classified as 'Poor' in terms of eutrophication (Figure 4-6).

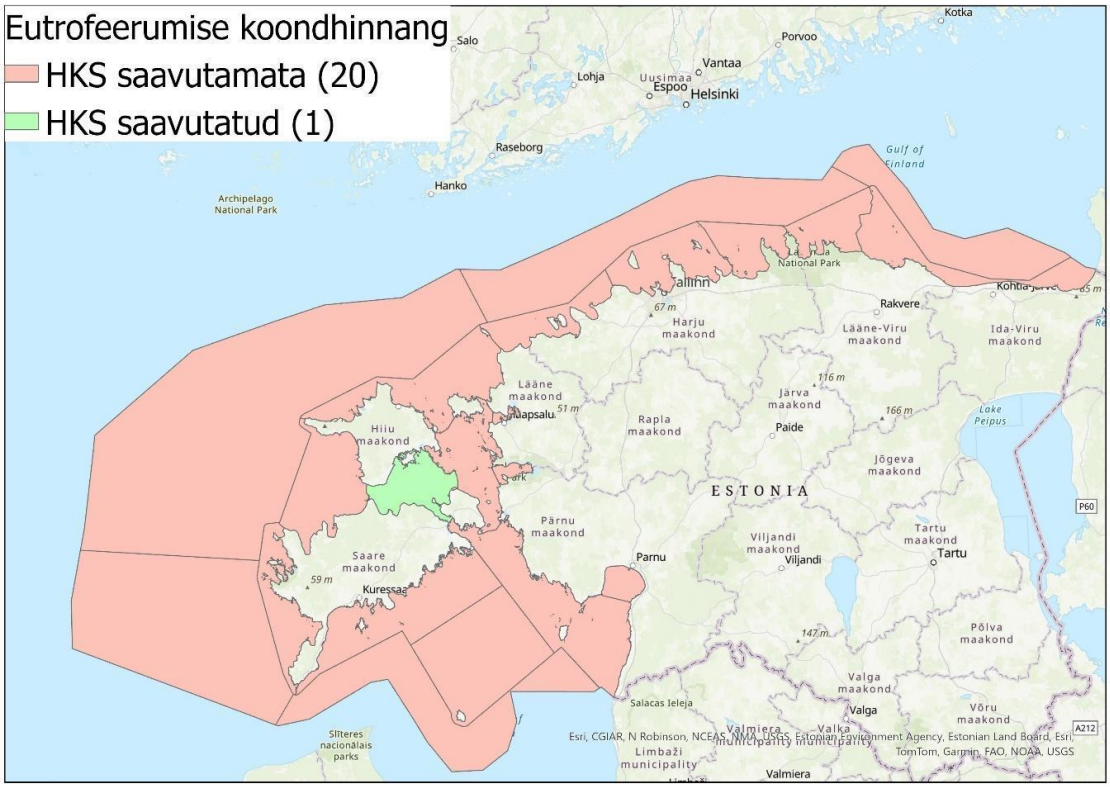

Figure 4-4. *Assessments of eutrophication status in the marine area of Estonia based on coastal bodies of water and offshore assessment units. (Tallinn University of Technology Institute of Marine Systems, 2023. Assessment of the status of the marine environment according to the EU Marine Strategy Framework Directive (2008/56/EC): descriptor D5 'Eutrophication')*

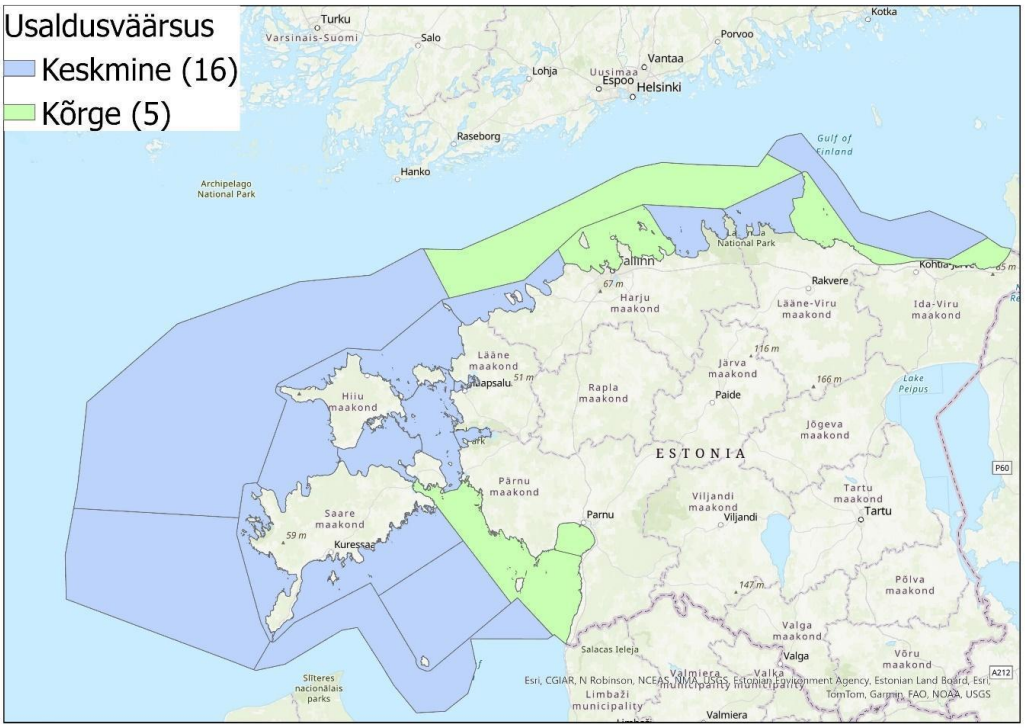

Figure 4-5. *Reliability of aggregated eutrophication assessments in the marine area of Estonia based on coastal bodies of water and offshore assessment units. (Tallinn University of Technology Institute of Marine Systems, 2023. Assessment of the status of the marine environment according to the EU Marine Strategy Framework Directive (2008/56/EC): descriptor D5 'Eutrophication')*

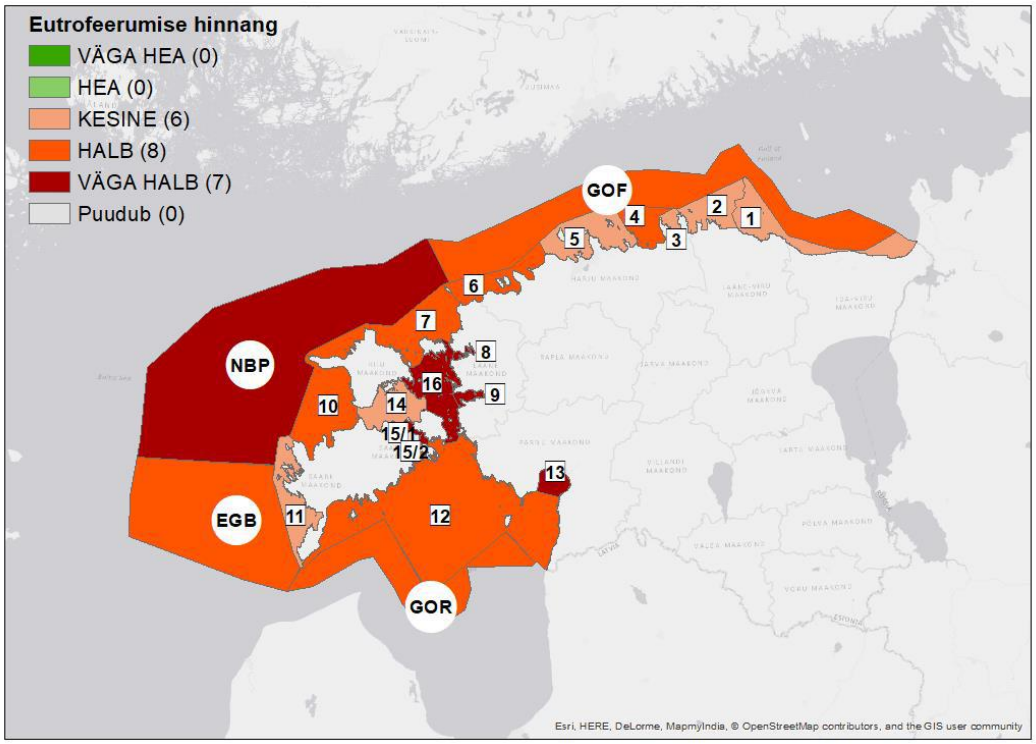

Figure 4-6. *Aggregated assessment of eutrophication status in the previous period of 2011–2016 (Ministry of the Environment, 2019).*

The low water quality in the marine area is mainly due to the overall eutrophication level of the Baltic Sea and the elevated levels of associated indicators. Currently, there are no local anthropogenic sources contributing to eutrophication in the area. For the offshore wind farm development proposed for the Saare 2.1 and Saare 2.2 areas, the potential impact of nutrient loading from seabed sediments on water quality and eutrophication indicators must be assessed.

Table 4-1. Results of the eutrophication status assessment indicators for the Eastern Gotland Basin according to the MSFD report (Tallinn University of Technology Institute of Marine Systems, 2023. Assessment of the status of the marine environment according to the EU Marine Strategy Framework Directive (2008/56/EC): descriptor D5 'Eutrophication').

(DIN – dissolved inorganic nitrogen (winter); DIP – dissolved inorganic phosphorus (phosphates in winter); TN – total nitrogen (coastal sea in summer, open sea annual average); TP – total phosphorus (coastal sea in summer, open sea annual average); CHLA – Chlorophyll-a; FBIOM – phytoplankton biomass; CYAB – cyanobacterial overgrowth index; SECCHI – water transparency; ODEBT – oxygen debt in deep water; SWOI – shallow water oxygen conditions; OP – share of opportunistic species; EPI – Estonian phytobenthos index; ZKI2 – zoobenthos community index; PEHM – soft-bottom fauna; BALT – depth distribution of Macoma balthica.*)*

Criteria group	*Nutrients*				*Direct effects of eutrophication*			*Indirect effects of eutrophication*							
Body of water / indicator and unit	DIN	DIP	TN	TP	CHLA	FBIOM	CYAB	SECCHI	ODEBT	SWOI	OP	EPI	ZKI2	PEHM	BALT
	µmol/l	µmol/l	µmol/l	µmol/l	µg/l	mg/l	no unit	m	mg/l		%	no unit	no unit	no unit	m
SEA-009 Offshore part of the marine area of the Eastern Gotland Basin	4.20	0.70	20.64	0.60	3.77		0.44	4.61	13.29					5.11	67.00

4.1.4. Habitats and biota

Bottom habitats. In terms of the seabed biota, this is a typical area of the open Baltic Sea, with both hard and soft bottoms dominating. The salinity of the seabed here is slightly higher than in coastal areas. The sea depth in the study area ranges from 28 to 68 metres, with an average depth of 43 metres, placing most of the seabed within the aphotic zone.

There is very little data from previous surveys of this specific survey area, with only 42 sites surveyed (mostly video surveys) over nearly thirty years (Figure 4-7). More detailed information is available from the marine areas bordering the survey area to the east, where comprehensive surveys and inventories have been conducted as part of different projects. The most abundant species in these areas was the Baltic macoma (*Macoma balthica*), which appeared at more than 75% of the sample points. The polychaete *Pygospio elegans*, Pacific blue mussel (*Mytilus trossulus*) and Laver spire shell (*Peringia ulvae*) were found at approximately half of the sample points. The most common plant species, with an incidence exceeding 25%, were the brown alga *Batteria arctica* and the red alga *Vertebrata fucoides*. The bivalves with the highest biomass were the Pacific blue mussel, the Baltic macoma and the lagoon cockle (*Cerastoderma glaucum*). Among the flora, the red alga *Vertebrata fucoides* and the brown algae *Pylaiella/Ectocarpus* group exhibited the highest biomass. The benthos of they survey area is likely to differ slightly due to

the greater depths. More detailed information on the seabed biota will be obtained during the inventory of the survey area.

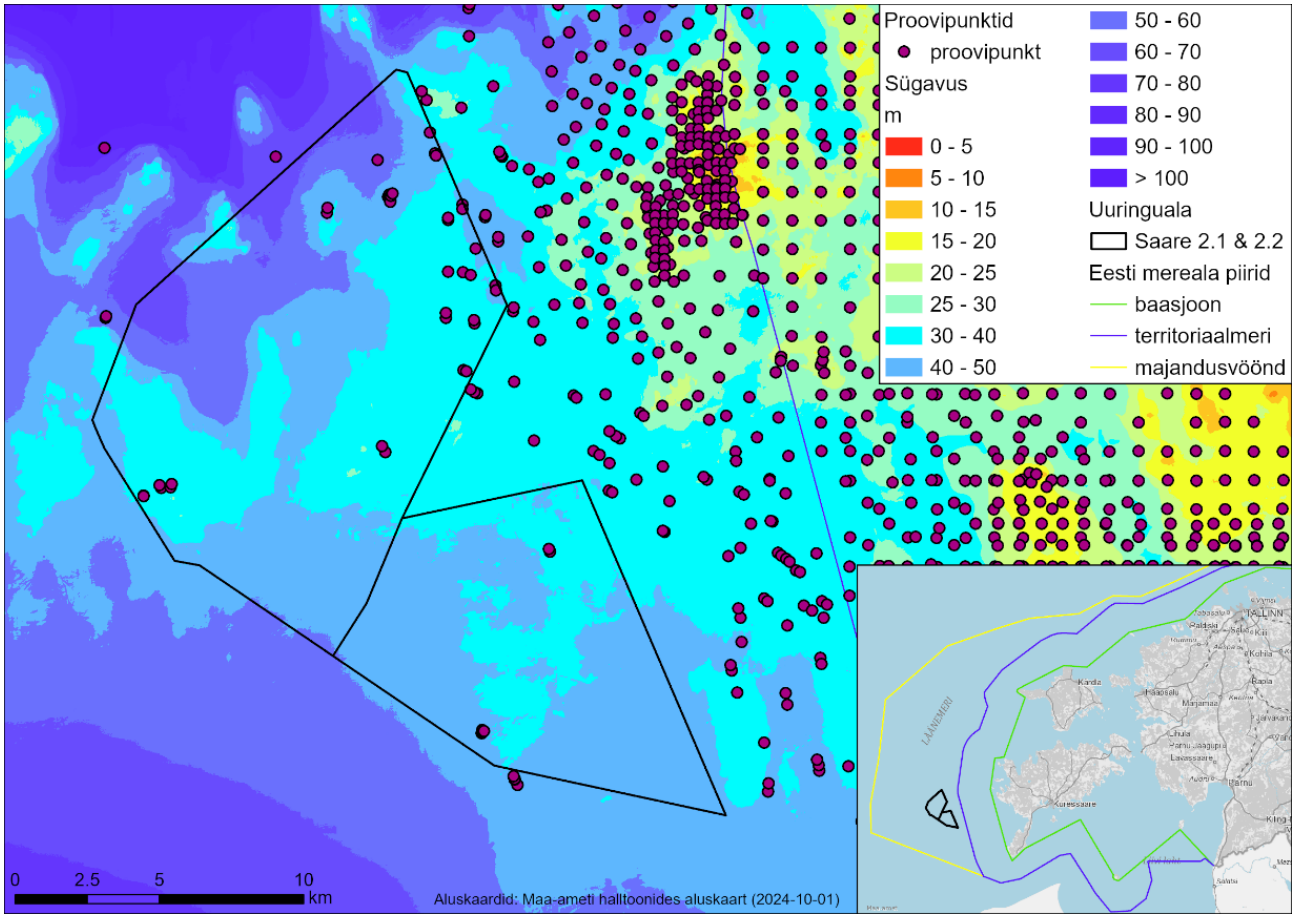

Figure 4-7. *Existing information about the seabed biota and habitats in the survey area. There are 42 coordinates of sample points within the survey area from previous surveys (benthos database of the Estonian Marine Institute).*

Seabed habitats. Fortunately, the entire survey area is covered by modern multibeam sonar depth data. The northern part of the area features the underwater edge of the Baltic Klint. Scratch marks left by boulders pushed by icebergs are visible on the plateau and uplands (Figure 4-8).

Specific modelling of seabed habitat distribution in the survey area has not been conducted. While nationwide surveys have modelled the distribution of habitats using different classification schemes across the Estonian marine area, the accuracy/reliability of these results are low in regions where no real data are available. Such surveys suggest the likelihood of the presence of certain classification units rather than identifying their exact locations.

Previous modelling results have identified the presence of the habitat type ‘Reefs’ of the Annex I of the Habitats Directive in the survey area (Figure 4-9). However, this habitat type is likely to be less abundant in the survey area compared to offshore regions closer to the coast. A detailed survey/inventory will help to pinpoint the exact location of this habitat type in the survey area.

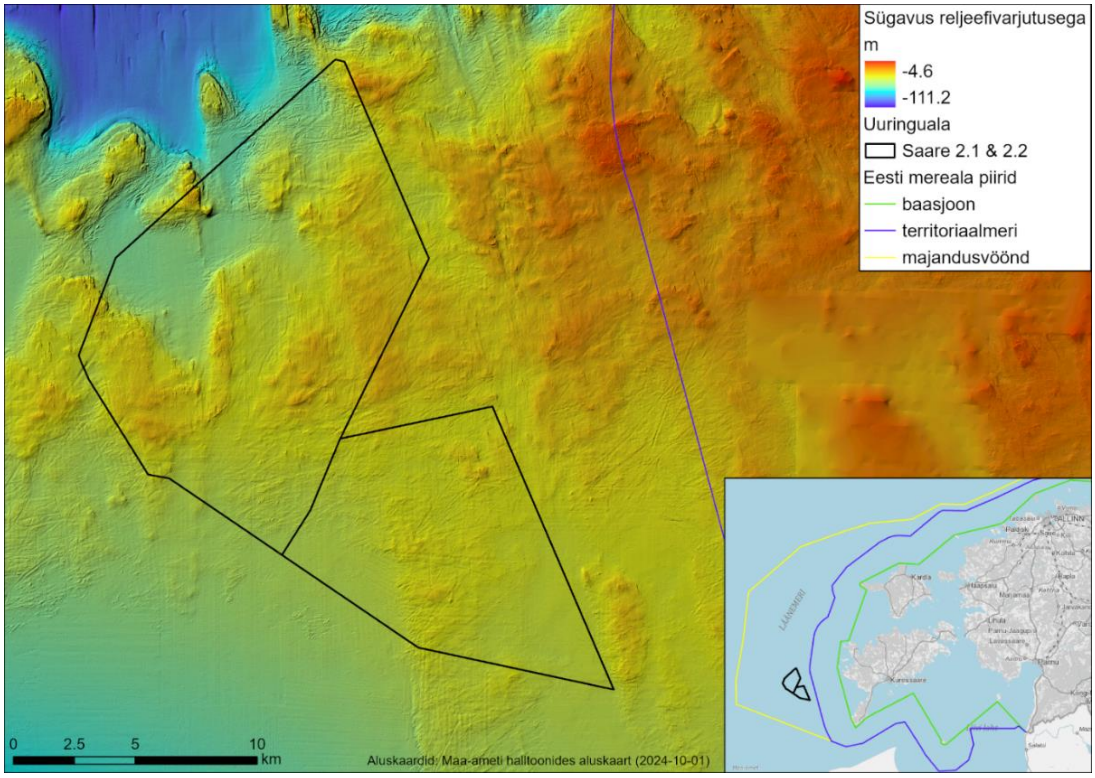

Figure 4-8. *Location and depth data for the survey area (shaded relief)*

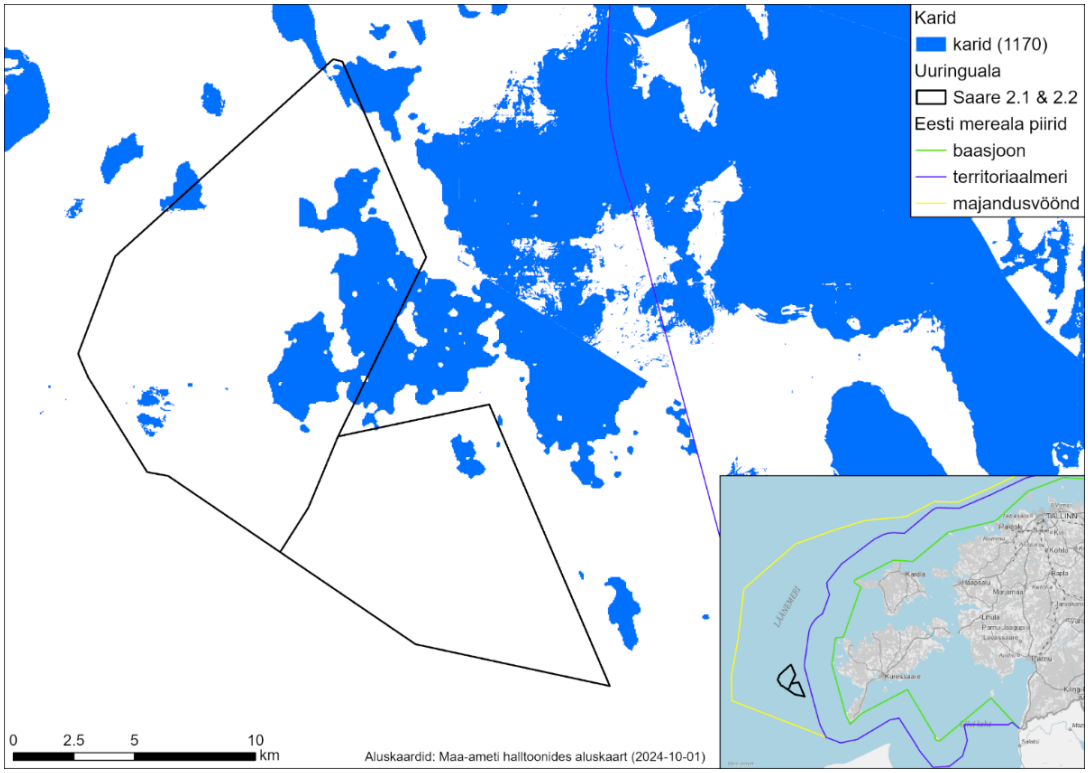

Figure 4-9. *Occurrence of the modelled habitat type of reefs in and around the survey area*

According to the Marine Strategy, the main seabed habitat types in the survey area are expected to be circalittoral mixed sediment and circalittoral mud. In total, modelling has predicted the presence of five key habitat types in the survey area (Figure 4-10).

At Level 5 of the HELCOM HUB classification system, modelling has identified 16 biotopes in the survey area (Figure 4-11). This classification system is essential as it forms the basis for assessing HELCOM RED LIST biotopes. Currently, based on available information, no HELCOM RED LIST biotopes have been identified in the survey area, but their presence cannot be entirely ruled out (there is a certain possibility of the presence of such biotopes). However, a detailed area-specific survey is required for a definitive answer.

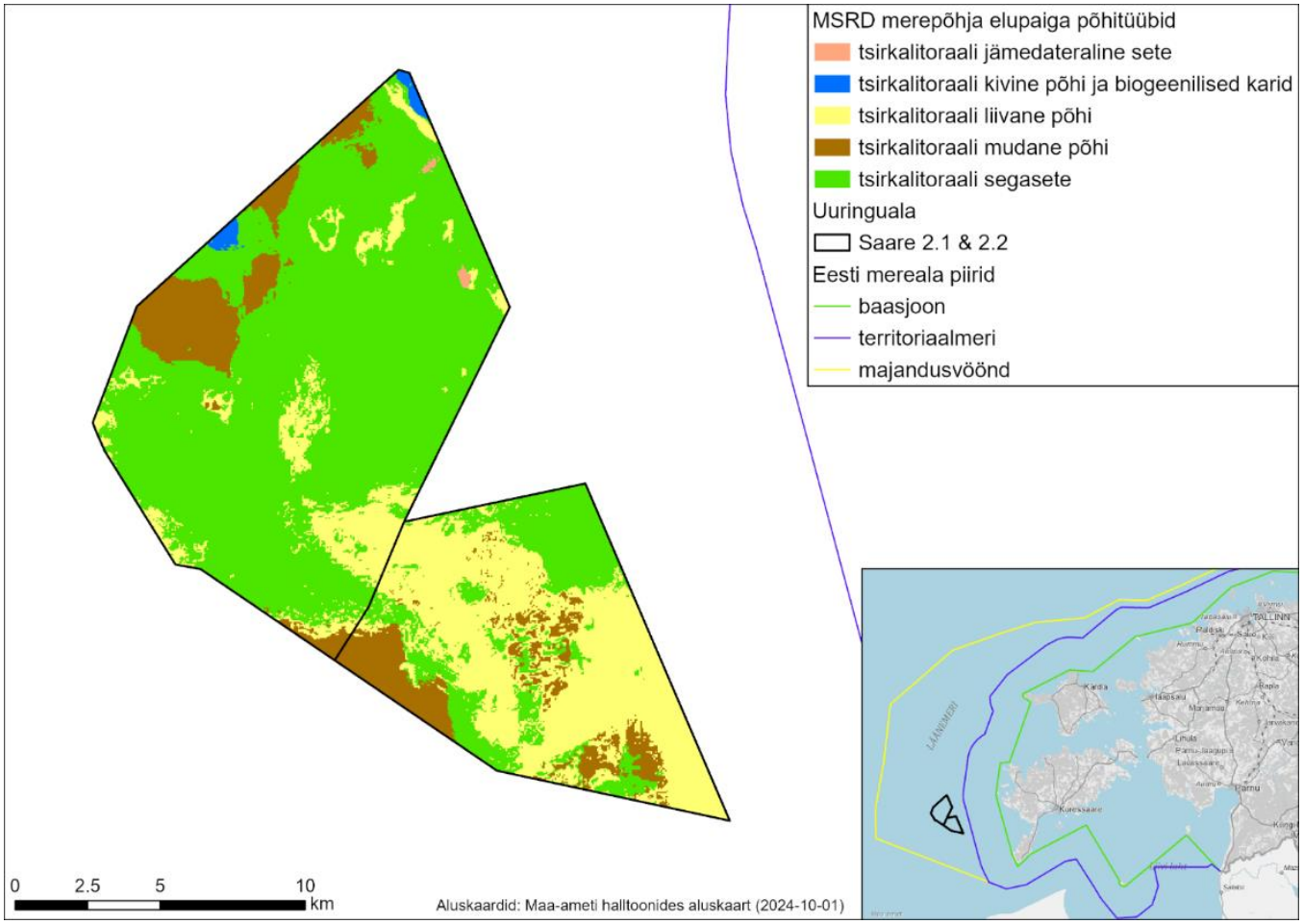

Figure 4-10. *Occurrence of main MSFD seabed habitat types modelled in the survey area*

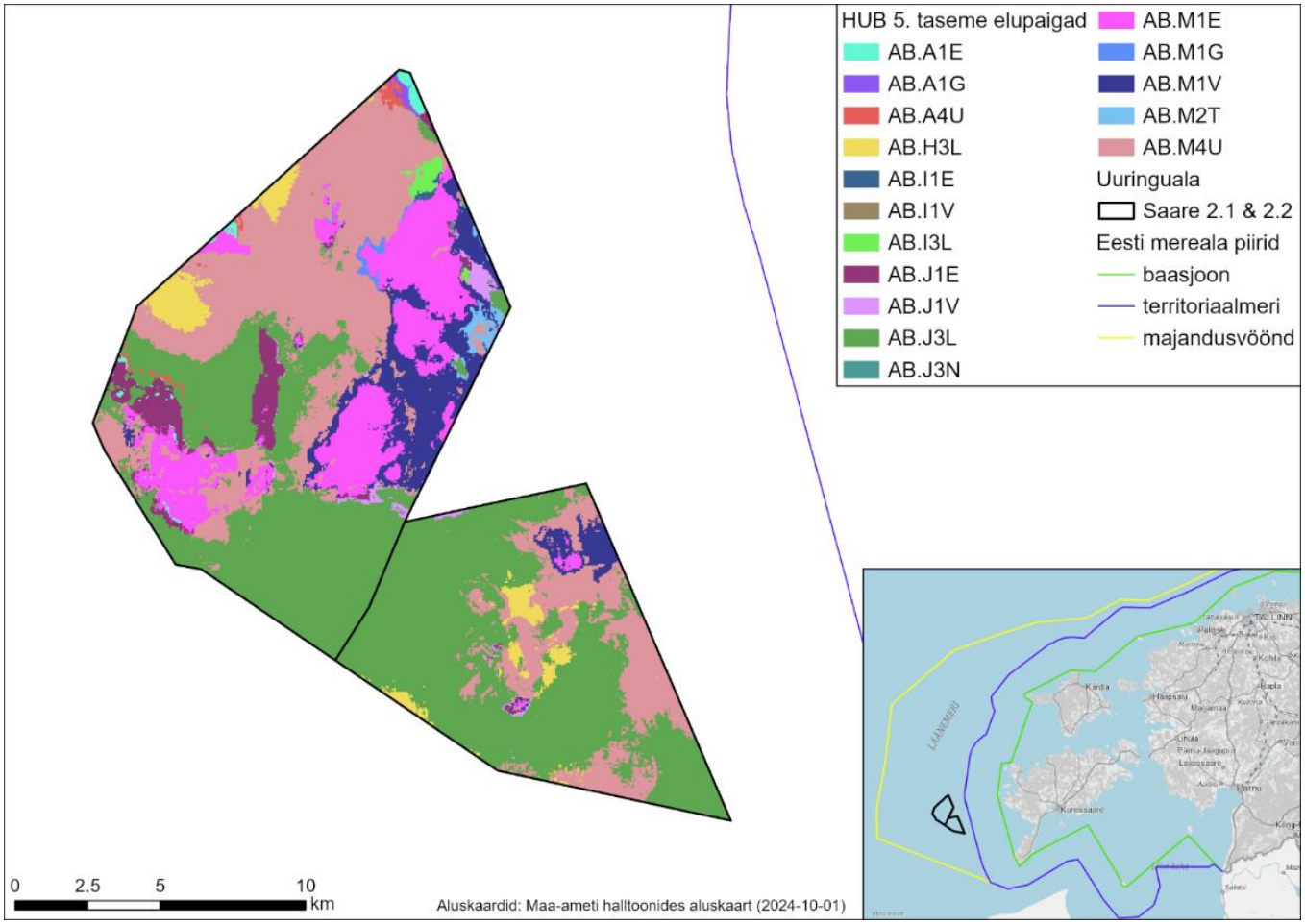

Figure 4-11. *Distribution of modelled HELCOM HUB habitats (level 5) in the survey area*

Fish fauna. The Baltic Sea has low and variable salinity, which restricts the distribution of both marine and freshwater fish species. Consequently, the number of species is lower than in seas with normal salinity. Approximately 30 fish species of marine origin, 10 species of diadromous fish, and about 20 species of freshwater fish are found in Estonia's Baltic Sea waters. The preferences of fish when it comes to habitats and spawning sites vary widely by species: some species require deeper areas of the Baltic to spawn, needing the oxygen and salinity levels found there, while other species are dependent on free access to spawning areas in freshwater or spawn in coastal areas of different depths, with different temperature, salinity, substrate preferences among others.[30]

No fisheries surveys have been carried out so far in the offshore wind farm area proposed for Saare 2.1 and Saare 2.2, but with similar conditions to the fisheries survey carried out in 2021 at the SWE offshore wind farm area[31], it was explained that, characteristic of the offshore location, the region's fish fauna consisted predominantly of marine and estuarine species common in the Baltic Sea. Of the diadromous fish, there were non-large quantities of European smelt. The

30 Estonian Maritime Spatial Plan Impact Assessment Report (https://mereala.hendrikson.ee/dokumendid/Planeeringulahendus/Kehtestamisele/4_MSP_M6jude_hindamise_aruanne.pdf)

[31] *A study of the fish population of the offshore wind farm area proposed by Saare Wind Energy. Estonian Marine Institute, University of Tartu, 2022*

freshwater fish characteristic of the lower coastal seas and bays of Western Saaremaa, such as carp and Percidae, were completely absent. The survey[32] of the SWE cable route, which partially overlaps with alternative A of the cable route for the Saare 2.1 and Saare 2.2 offshore wind farms proposed by Tuul Energy, recorded the presence of 20 fish species. The fish fauna consisted of species belonging to 12 families, with marine species, estuary species living in brackish water, as well as freshwater fish species represented.

In general, shallower (less than 15 m) coastal waters and marine shoals are the most important marine areas for fish. Shallower coastal areas (max. 5 m) are where the majority of dish species' spawning areas and nurseries are found, and are crossed by anadromous species heading to fresh water to spawn. More open marine areas, where the depth is already > 5 m, can serve as spawning grounds for the Baltic herring and Baltic flounder. No spawning area of any economically significant fish species was found in the buildable area of the SWE cable corridors[33].

Seals.[34] The Baltic Sea is permanently inhabited by three species of seals and one cetacean: the grey seal, the ringed seal, the harbour seal and the harbour porpoise. In the open part of the Baltic Sea, west of Saaremaa, only the grey seal is constantly present. Others, according to today's knowledge, are rather in the status of an errant visitor in this part of the sea, because suitable habitats for them are located elsewhere - for harbour porpoises and harbour seals in the southern part of the Baltic Sea, and the closest permanently inhabited habitat of ringed seals is the Väinameri and the Gulf of Riga. The grey seals of the Baltic Sea are a predominantly coastal species bordering the high seas, unlike the ringed seal and the harbour seal, which inhabit the inland sea sides and archipelagoes along articulated coasts. Thus, it is also possible to meet grey seals along the entire coastline in Estonia, but large groups (more than a few dozen individuals) are rather rare in the inner parts of the Väinameri.

Estonian distribution of grey seals can be generally divided into four sub-regions: Gulf of Finland, Northern Hiiumaa, the west coast of the islands and the Gulf of Riga (Figure 4-12). Four breeding grounds are known from the waters of Western Saaremaa, which are regularly used by seals: Laevarahu and Innarahu in Vilsandi National Park, Võrkrahu in Lõu Bay in the Kaugatuma-Lõu limited-conservation area and Vesitükimaa at the tip of the Sõrve Peninsula in the Sääre nature reserve. Of these, Laevarahu on the northwestern border of Vilsandi National Park is the only one in use all year round, while there are periods for other breeding grounds when there are no seals.

[32] *Interim report of the study of the possible ichthyological and fisheries impacts of the cable route of the Saare Wind Energy offshore wind farm. Estonian Marine Institute, University of Tartu, 2022*

[33] *Interim report of the study of the possible ichthyological and fisheries impacts of the cable route of the Saare Wind Energy offshore wind farm. Estonian Marine Institute, University of Tartu, 2022*

[34] *The section is based on the Saare Wind Energy wind farm's seal survey report. MTÜ Pro Mare, 2023*

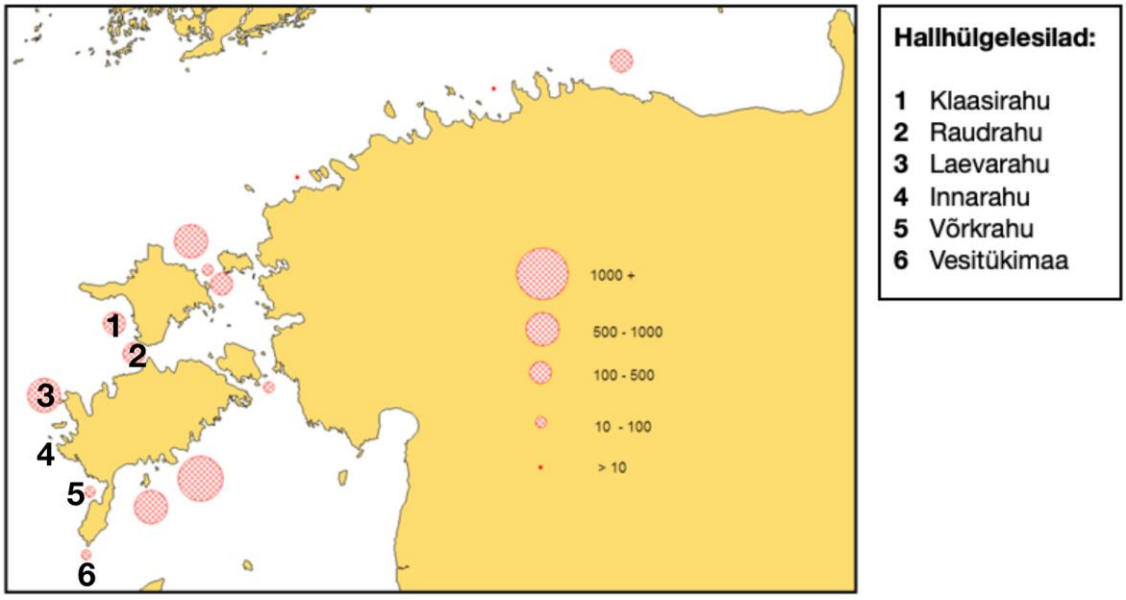

Figure 4-12. *The distribution of grey seals and the size of the populations Estonian coastal waters as counted in national monitoring. Seal breeding grounds on the west coast of the big islands marked with numbers.* [35.]

The abundance of the grey seal in the Baltic Sea has increased to a minimum of 42,000 in 2021 (HELCOM 2021) since its historic low in the 1970s, when the total abundance was estimated at about 3,000 individuals (Hårding et al 2007). The rate of population growth has shown signs of decline over the past five years, but the trend is positive, seals are numerous and the species is not considered endangered based on these indicators. The main anthropogenic hazards that inhibit the growth of the population are related to fishing, and the natural risk factor is low sea ice during the breeding season, which reduces reproductive success through high mortality and malnutrition of pups (Jüssi et al, 2008). In Estonia, the number of grey seals has increased from at least 1,148 (2000) to 6,324 in 2023[36].

As part of the Saare Wind Energy wind farm seal survey, the use of four grey seal breeding grounds related to the west coast of Saaremaa – Laevarahu, Innarahu, Võrkrahu and Vesitüki – was monitored among other things. The number of grey seals is at the highest, approximately 2,000, during the pupping season as grey seals from other areas of the Baltic Sea also gather at Innarahu and Vesitüki. During the moulting period following pupping, the size of the flock to be monitored is approximately 1,000 individuals, as the pupping seals disperse back to their summer habitats. As is characteristic of the open system, rotation takes place throughout the central part of the Baltic Sea, but during the period of intensive feeding, the breeding grounds have no more than a few hundred individuals in total at a time. Flocks increase only in the fall, when seals have maximized their energy reserves. As a generalization, it can be said that West-Saaremaa is associated with ca 1,000 grey seals, which account for a fifth of Estonian and less than 4% of the countable population of the Baltic Sea.

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35 Saare Wind Energy wind farm seal survey report. MTÜ Pro Mare, 2023

[36] *Public procurement 'Riikliku keskkonnaseire elusloodus mitmekesisuse ja maastike seire allprogrammi seiretööd 2023', No 261698, lot 'Hallhülge lennuloendused (4-3/23/17)'*

The good environmental status of the Baltic Sea grey seal in the Estonian marine area has been achieved, considered according to abundance, range and distribution pattern criteria[37].

Avifauna. The significance of the Estonian coastal sea for waterfowl comes primarily from the fact that it is a stop on one of the most important migratory routes in the region, which is called the Eastern Atlantic migratory route. It is used by the majority of Arctic waterfowl en route from Arctic nesting areas in Eurasia to wintering areas, which may extend all the way to southern Africa (eg for the Arctic tern). Estonian marine shallows are known to be suitable migratory stopovers for waterfowl, where they replenish fat stores for the onward migration. Many Arctic waterfowl use the Estonian coastal sea to overwinter. Some parts of the Estonian coastal sea have become important waterfowl moulting areas (eg common eider and scoters). In addition, a number of bird species whose habitat is the coast and coastal sea nest on the coast and sea islands. In addition to waterfowl, many terrestrial birds are also connected to the marine area through migration.

Two thorough overviews of marine-related bird life and potential impacts from various uses of the sea were conducted as part of preparations for the Estonian maritime spatial plan[38]. These were large-scale studies that provide a comprehensive overview of the behavioural patterns of different bird species. On the basis of the studies, sensitive areas for birds (migration, feeding and moulting areas) were identified (Figure 4-13) and areas that from the point of view of avifauna are most suitable for wind energy production, including development area No 2 where the offshore wind farm area proposed for Saare 2.1 and Saare 2.2 is located.

37 Environmental status of Estonian marine area 2024. Summary Report (Draft) of the status assessment under MSFD Art 8 to 10.

38 'Consolidation of existing data on migration corridors of birds located in the Estonian marine area and preparation of an analysis of the impact of wind farms on birds' feeding areas' Estonian Ornithological Society 2016 and 'Analysis of birds' staging areas' Estonian Ornithological Society 2019.

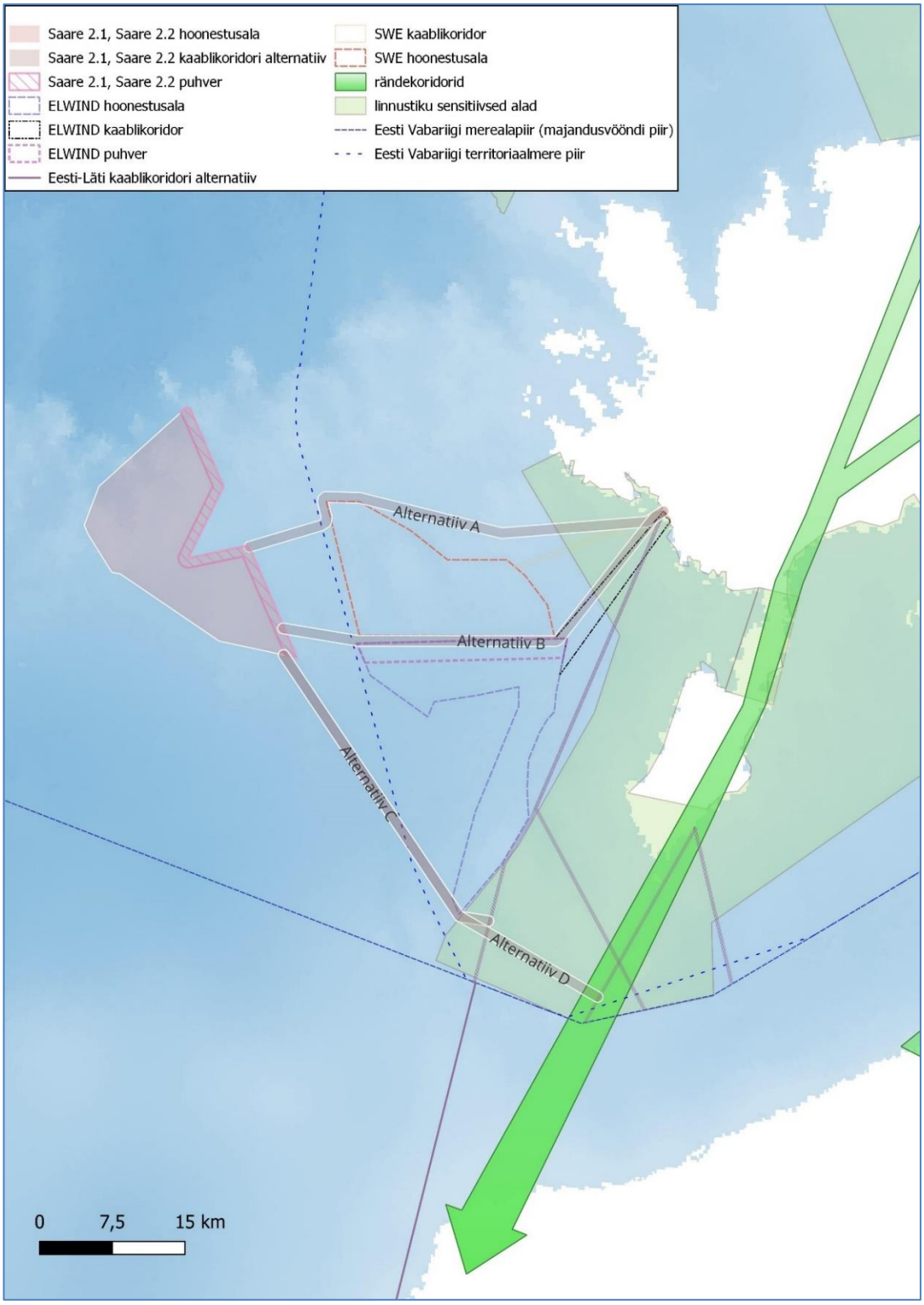

Figure 4-13. *Sensitive bird areas and migration corridors. Source: Impact Assessment Report of the Estonian Maritime Spatial Plan)*[39]

39 https://mereala.hendrikson.ee/dokumendid/Planeeringulahendus/Kehtestamisele/4_MSP_M6jude_hindamise_aruanne.pdf

Following the example of the international organization for the protection of birds BirdLife International (BirdLife International, 2004), the subject of the conservation of seabirds can be divided into four topics:

1) **Concentration and wintering sites of migratory waterfowl.** By type of diet, waterfowl are divided into benthos-eating and fish-eating birds. Benthivorous waterfowl, or benthic foraging waterfowl, use shoals with a suitable depth for diving (up to 20 metres) as feeding areas.
2) **Areas of importance for pelagic species.** Such areas are often associated with special hydrological conditions (rising currents, fronts between water masses), which lead to high biological productivity. Internationally, pelagic species include representatives of the *Procellariiformes* order of storm birds of high conservation value. In Estonia, storm birds occur only as stray guests, while of the pelagic species we have gulls, terns and skuas. Out of these, the little gull (*Hydrocoloeus minuta*) has the highest conservation value in Estonia.
3) **'Bottleneck areas' of the migratory route.** A significant proportion of the populations of several species pass through Estonia. Transit migration of terrestrial birds often follows the coastline, leading to large concentrations at cape peaks and narrow straits. The concentration occurs for the reason that terrestrial bird, especially gliders who use rising air currents for migration, avoid crossing the sea (Falconiformes and white storks). The sea is also an obstacle for migrants active during the day and at night (passerines, woodpeckers, etc). Part of the migration flow along the Estonian coast follows the Sõrve peninsula to the east of the proposed wind farm (Figure 4-8).
4) **Nesting colonies.** Birds nesting on islands and islets use the sea surrounding the islands for food. In previous materials published by BirdLife International, the species have been divided into three groups based on feeding radii: 5 km (little tern, black guillemot), 15 km (Arctic tern, common tern and sandwich tern, mew gull, great cormorant) and 40 km (lesser black-backed gull, razorbill), (BirdLife International, 2004).

In the area of the SWE offshore wind farm north of the offshore wind farm area proposed for Saare 2.1 and Saare 2.2 and the surrounding area, including the northern part of the Saare 2.1 and Saare 2.2 wind farm, in connection with bird surveys of the SWE wind farm[40] the results of the flight census carried out and their analysis confirmed previous estimates[41] [42]that this area is not an important staging area for waterfowl. The only species worthy of attention was the little gull (*Hydrocoloeus minutus*), whose abundance in the region has fluctuated over the years.

The most important issue is the risk of collisions with overflying/migrating birds, the cumulativeness of which is increasing with the addition of wind farms. Bird surveys carried out in the SWE wind farm area[43] established that for all waterfowl observed, with the exception of terns and tufted duck, the seasonal estimate of the abundance of birds migrating through the wind farm area exceeded 1% of the total biogeographical population[44]. In the case of the tufted duck, the estimate of the number of birds passing through the site exceeded the numerical threshold of the area of national importance.

40 Bird population surveys of Saare Wind Energy wind farm. Estonian Ornithological Society, 2023

41Analysis of bird stopover sites. Estonian Ornithological Society, 2019.

42Renewal of Marine Important Bird Areas Estonian Ornithological Society, 2022

43 Bird population surveys of Saare Wind Energy wind farm. Estonian Ornithological Society, 2023

44 1% of the biogeographical population is the threshold for an area of international importance (Wetlands International).

Bats

Estonia is home to 12 bat species, seven of which are resident and overwinter in Estonia. These are five species in the genus *Myotis*, northern bat (*Eptesicus nilssonii*) and the brown long-eared bat (*Plecotus auritus*). The remaining five species are migratory and migrate to central and western Europe for the winter. These species include Nathusius' pipistrelle (*Pipistrellus nathusii*), common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), parti-coloured bat (*Vespertilio murinus*) and common noctule (*Nyctalus noctula*). Some sources suggest that the Estonian bat fauna may also include the lesser noctule (*Nyctalus leisleri*) and western barbastelle (*Barbastella barbastellus*), although their occurrence in Estonia has yet to be confirmed.

Long-distance migratory species can travel more than 2,000 km, while regional migratory species may cover hundreds of kilometres. During migration, they may also cross the Baltic Sea and the North Sea. Migratory species typically arrive in Estonia in May, with only a few individuals observed in April. By the end of May, the bats have gathered in breeding colonies, marking the completion of their migration. The autumn migration in Europe begins at the end of July (for Nathusius' pipistrelle) or early August. Bats migrate solely at night and do not form flocks during migration. However, they may gather in certain places near the coast where they await better weather for crossing the sea.

Bats likely have three migration routes from their northern range in Finland to their winter range in central and western Europe (Figure 4-15):

- across the Gulf of Bothnia, along the coast of Sweden and across the Danish straits or through the islands in the southern Baltic Sea (eg Bornholm);
- across the Gulf of Finland and along the Baltic coast;
- across offshore marine areas, stopping to gather/rest on the West Estonian archipelago.

Figure 4-15. *Main migratory routes of bats in the Baltic Sea region (Gaultier et al 2020)*

Of the three migratory routes, crossing open marine areas is considered the most energy-efficient, as the distances are shorter compared to following the coast. Research has confirmed that crossing the Baltic Sea is within the capabilities of bats. For example, telemetry studies in Germany have shown that a Nathusius' pipistrelle can cover more than 395 km in just over 24 hours. Therefore, crossing the Gulf of Finland (from southwest Finland to the coast of Hiiumaa, approximately 80 km) or flying from Tõstamaa to the Latvian coast (about 100 km) is not an insurmountable challenge for bats. One potential migratory route, which is relatively direct and offers recreational opportunities on land, follows this path: southwest Finland – Hiiumaa – Saaremaa – Courland. This route provides a straightforward crossing of the Baltic Sea, avoiding the jagged shoreline of mainland Estonia. Bats are known to congregate during migration in three areas along this potential migratory route: southwest Finland, Hiiumaa and Pape, Latvia.

The migratory routes of bats over the open sea cannot be considered as narrow corridors. While there is a general direction, migrating bats are likely to disperse over a wider area. For instance, the exact route between Sõrve Cape and the Latvian coast is likely to be influenced by weather

conditions and even a slight change in direction could lead to a significant difference in the final endpoint and the specific route taken over the open sea.

The following bat species have been identified in the open sea areas of Estonia to date: the northern bat, Nathusius' pipistrelle, common noctule, parti-coloured bat and the genus *Myotis*. Bats are most abundant during the autumn migration season but can also be found at sea during spring migration. Surveys conducted in Estonia during the inter-migratory period have recorded occasional migrations over the open sea and offshore areas cannot be considered significant foraging area. Previous surveys have primarily focused on areas east of Saaremaa. Two additional surveys have investigated areas farther west, beyond the boundaries of this planning area. Surveys have shown that bat migration occurs both east and west of Saaremaa. the SWE wind farm survey revealed that bats are most frequently observed at sea during the autumn migration period, with occasional sightings in mid-summer. Approximately 75% of bat passes were recorded between 1 August and 1 September, with around 50% occurring between mid-August and 1 September.

4.1.5. Protected natural objects, including Natura 2000 network areas

Protected natural objects

Pursuant to § 4 of the Nature Conservation Act protected natural objects include protected areas, limited-conservation areas, protected species and fossils, species' protection sites, individual protected natural objects, natural objects protected at the local government level.

There are no protected natural objects directly in the area of the proposed offshore wind farm. The closest one to the buildable area is the proposed Kolgi shoal nature reserve, which is located 2 km to the east. The proposed offshore extension of Vilsandi National Park lies about 15 km to the northeast of the buildable area. The remaining protected areas are situated at least around 30 km from the buildable area. The proposed cable corridor landing point for Alternatives A and B is located between the Riksu coast and the Karala-Pilguse limited-conservation area, while alternatives C and D extend to the Irbe Strait's limited-conservation area and the vicinity of the proposed Irbe lowland nature reserve (approximately 1.4 km). The location of protected natural objects is illustrated in Figure 4-16 and descriptions are given in Table 4-3.

Within the protected areas, sites of various bird species have been recorded (eg tundra swan (protection II), Steller's eider (protection II), etc).

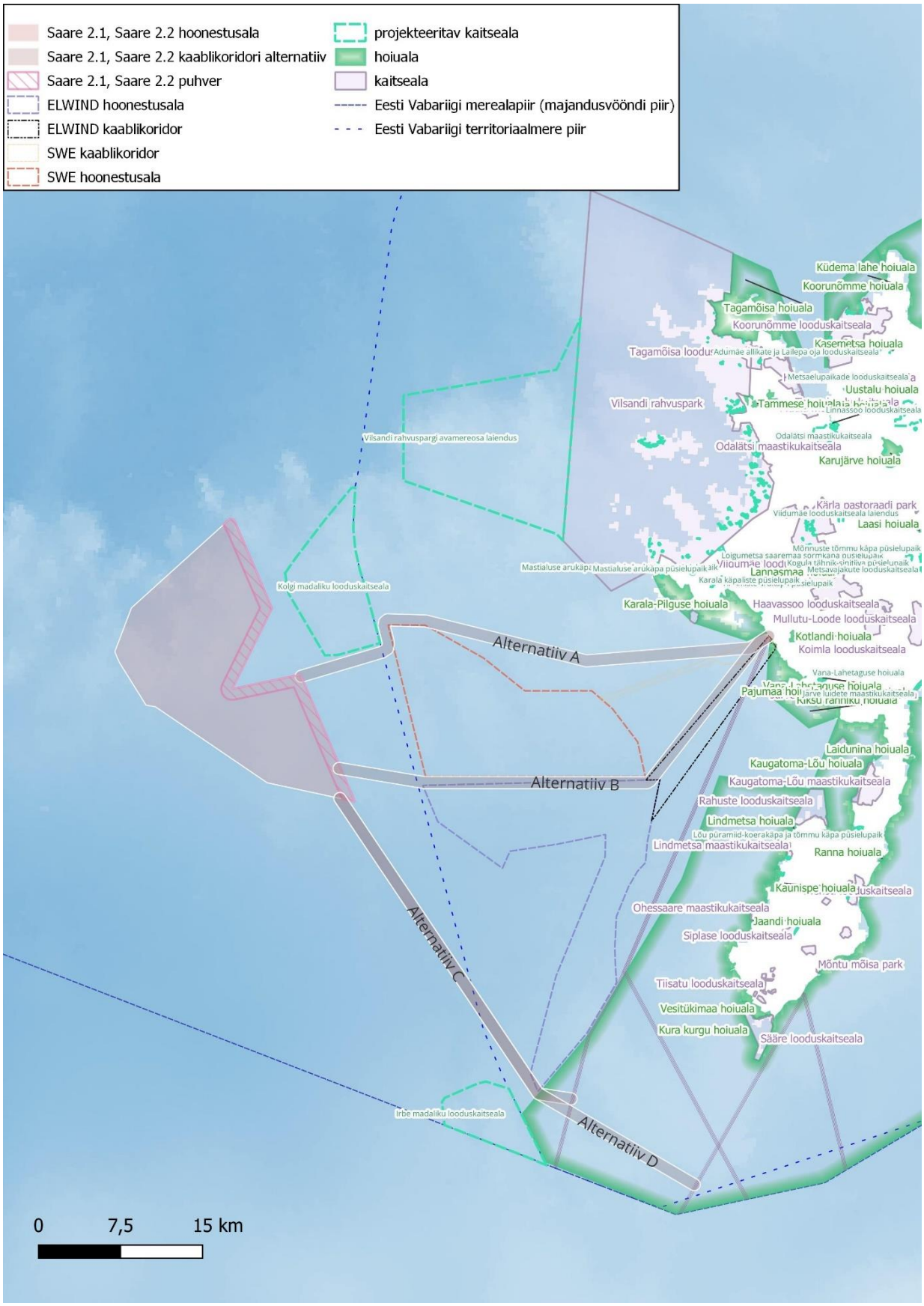

Figure 4-16. *Overview of protected natural objects in the area of impact of the proposed wind farm (Basis: Land Board and EELIS, 2024)*

Table 4-3. *Protected natural objects in the area of the proposed wind farm or cable corridor and their area of impact*

Protected natural object	*Description of the area*
Irbe Strait's limited-conservation area (KLO2000316)	It was placed under protection by the Government of the Republic Regulation No 156 of 18 May 2007 'Amending the Government of the Republic Regulation No 176 'Protection of limited-conservation areas in Saare County' of 27 July 2006'. The Irbe Strait's limited-conservation area covers an area of 189,792.2 ha, of which 189,429.5 ha is the sea, 352.9 ha is land and 9.8 ha are internal bodies of water. The following habitat types specified in Annex I to Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora are under protection: reefs (1170), annual vegetation of drift lines (1210), Boreal Baltic coastal meadows (1630*), Boreal Baltic islets and small islands (1620), Boreal Baltic sandy beaches with perennial vegetation (1640), fixed coastal dunes with herbaceous vegetation ('grey dunes') (2130*) and Molinion caeruleae (6410). In addition, the habitats of the grey seal (*Halichoerus grypus*) as specified in Annex II to the Habitats Directive are protected. In addition, the conservation objective of the Irbe Strait's limited-conservation area is the conservation of the bird species referred to in Annex I to Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds and the habitats of migratory bird species not included in Annex I. The species under protection are: red-throated loon (*Gavia stellata*), Arctic Loon (*Gavia arctica*), great cormorant (*Phalacrocorax carbo*), mute swan (*Cygnus olor*), tundra swan *(Cygnus columbianus bewickii*), greylag goose (*Anser anser*), barnacle goose (*Branta leucopsis*), brent goose (*Branta bernicla*), Eurasian wigeon (*Anas penelope*), common teal (*Anas crecca*), mallard (*Anas platyrhynchos*), northern pintail (*Anas acuta*), northern shoveler (*Anas clypeata*), gadwall (*Anas strepera*), greater scaup (*Aythya marila*), common eider (*Somateria mollissima*), long-tailed duck (*Clangula hyemalis*), velvet scoter (*Melanitta fusca*), common goldeneye (*Bucephala clangula*), smew (*Mergus albellus*), red-breasted merganser (*Mergus serrator*), goosander (*Mergus merganser*), pied avocet (*Recurvirostra avosetta*), common ringed plover (*Charadrius hiaticula*), grey plover (*Pluvialis squatarola*), red knot (*Calidris canutus*), little stint (*Calidris minuta*), dunlin (*Calidris alpina*), bar-tailed godwit (*Limosa lapponica*), spotted redshank (*Tringa erythropus*), ruddy turnstone (*Arenaria interpres*), razorbill (*Alca torda*) and black guillemot (*Cepphus grylle*). The area is also part of HELCOM Baltic Sea Protected Areas network as HELCOM area of Irbe Strait (registry code RAH0000670, international code 95, approved on 09.04.2010) and is also an Important Bird Area (IBA area) of European Union (Irbe Strait; code 049).
Vilsandi National Park (KLO1000250)	Vilsandi nature reserve was reorganised into a national park in 1993. The protection rules approved by the Government of the Republic Regulation No 29 of 17.03.2023 apply. The conservation objective is to protect: 1) the coastal landscape and marine nature of the Western Estonian archipelago, including natural and semi-natural communities, protected species, bird nesting, moulting, wintering, feeding and staging areas and cultural heritage, including folk culture, heritage landscapes, farm architecture and settlement structure, ensuring their preservation, restoration, research and demonstration; 2) habitat types listed in Annex I to Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.07.1992, p. 7–50). These are sandbanks which are slightly covered by sea water all the time (1110)[3], mudflats and sandflats not covered by seawater at low tide (1140), coastal lagoons (1150*), large shallow bays (1160), reefs (1170), annual vegetation of drift lines (1210), perennial vegetation of stony banks (1220), vegetated sea cliffs of the Atlantic and Baltic Coasts (1230), salicornia and other annuals colonizing mud and sand (1310), Boreal Baltic islets and small islands (1620), Boreal Baltic coastal meadows (1630*), Boreal Baltic sandy beaches with perennial vegetation (1640), embryonic shifting dunes (2110), shifting dunes along the shoreline with Ammophila arenaria ('white dunes') (2120), fixed coastal dunes with herbaceous vegetation ('grey dunes') (2130*), wooded dunes of the Atlantic, Continental and Boreal region (2180), humid dune slacks (2190), hard oligo-mesotrophic

Protected natural object	*Description of the area*
	waters with benthic vegetation of *Chara spp.* (3140), water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (3260), *Juniperus communis* formations (5130), mountain *Cytisus purgans* formations (6210*), Fennoscandian lowland species-rich dry to mesic grasslands (6270*), Nordic alvar and precambrian calcareous flatrocks (6280*), Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) (6410), Hydrophilous tall herb fringe communities of plains (6430), Northern boreal alluvial meadows (6450), Fennoscandian wooded meadows (6530*), transition mires and quaking bogs (7140), Fennoscandian mineral-rich springs and springfens (7160), Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae (7210*), petrifying springs with tufa formation (*Cratoneurion*) (7220*), Alkaline fens (7230), limestone pavements (8240*), Western Taïga (9010*), fennoscandian hemiboreal natural old broad-leaved deciduous forests (*Quercus, Tilia, Acer, Fraxinus* or *Ulmus*) rich in epiphytes (9020*), Fennoscandian wooded pastures (9070), Fennoscandian deciduous swamp woods (9080*), Tilio-Acerion forests of slopes, screes and ravines (9180*); 3) protected species listed in Annex II of Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, and their habitats. These species are *Cypripedium calceolus*, *Halichoerus grypus*, *Liparis loeselii, Rhinanthus rumelicus*subsp.*osiliensis* and*Sisymbrium supinum*; 4) fish species listed in Annex II of Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, and their habitats. This species is *Lampetra fluviatilis*; 5) protected animal species and their habitats. These species are *Bufo calamita* and *Hirudo medicinalis*; 6) protected plant species and their habitats. These species are *Anacamptis pyramidalis, Artemisia maritima, Asplenium trichomanes, Asplenium ruta-muraria, Berula erecta, Bromus benekenii, Buxbaumia viridis, Carex extensa, Cephalanthera longifolia, Cephalanthera rubra, Cochlearia danica, Corallorhiza trifida, Corydalis intermedia, Dactylorhiza baltica, Dactylorhiza incarnata subsp. cruenta, Dactylorhiza osiliensis, Dactylorhiza russowii, Draba muralis, Elymus farctus, Eryngium maritimum, Exsertotheca crispa, Festuca altissima, Geranium lucidum, Hedera helix, Herminium monorchis, Hydrocotyle vulgaris, Hypericum montanum, Listera cordata, Littorella uniflora, Malaxis monophyllos, Ophrys insectifera, Orchis mascula, Orchis morio, Orchis ustulata, Polystichum aculeatum, Prunus spinosa, Sagina maritima, Salix repens, Samolus valerandi, Schoenus nigricans, Spergularia media, Suaeda maritima, Taxus baccata, Trifolium campestre, Viola pumila*. 7) protected lichen species and their habitats. These species are *Chaenotheca gracilenta, Sclerophora peronella, Squamarina lentigera;* 8) protected mushroom species and their habitats. These species are *Bankera violascens* and *Sparassis crispa*; 9) the protected bird species listed in Annex I to Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (OJ L 20, 26.01.2010, pp 7–25) and their habitats. The species are: tawny pipit (*Anthus campestris*), barnacle goose (*Branta leucopsis*), Eurasian eagle-owl (*Bubo bubo*), southern dunlin (*Calidris alpina schinzii*), corncrake (*Crex crex*), tundra swan (*Cygnus columbianus*), whooper swan (*Cygnus cygnus*), Eurasian crane (*Grus grus*), white-tailed eagle (*Haliaeetus albicilla*), Caspian tern (*Hydroprogne caspia*), red-backed shrike (*Lanius collurio*), little gull (*Larus minutus*), woodlark (*Lullula arborea*), smew (*Mergus albellus*), steller's eider (*Polysticta stelleri*), spotted crake (*Porzana porzana*), pied avocet (*Recurvirostra avosetta*), little tern (*Sterna albifrons*), common tern (*Sterna hirundo*), Arctic tern (*Sterna paradisaea*), sandwich tern (*Sterna sandvicensis*), red-breasted flycatcher (*Ficedula parva*) and barred warbler (*Sylvia nisoria*); 10) protected bird species and their habitats. The species are: razorbill (*Alca torda*), rock pipit (*Anthus petrosus*), ruddy turnstone (*Arenaria interpres*), greater scaup (*Aythya marila*), purple sandpiper (*Calidris maritima*), common ringed plover (*Charadrius*

Protected natural object	*Description of the area*
	hiaticula), black guillemot (*Cheppus grylle*), lesser black-backed gull (*Larus fuscus*), black-tailed godwit (*Limosa limosa*), velvet scoter (*Melanitta fusca*), common shelduck (*Tadorna tadorna*) and common redshank (*Tringa totanus*); 11) bird species and their habitats. These species are: mallard (*Anas platyrhynchos*), greylag goose (*Anser anser*), tufted duck (*Aythya fuligula*), common goldeneye (*Bucephala clangula*), long-tailed duck (*Clangula hyemalis*), mute swan (*Cygnus olor*), Eurasian oystercatcher (*Haematopus ostralegus*), goosander (*Mergus merganser*), red-breasted merganser (*Mergus serrator*) and common eider (*Somateria mollissima*); 12) the protected natural monument, the Kuralase Oak. The area is also part of HELCOM Baltic Sea Protected Areas network as HELCOM area of Vilsandi (registry code RAH0000002, international code 91).
Karala-Pilguse limited-conservation area (KLO2000310)	It was placed under protection by the Government of the Republic with Regulation No. 156 of 18 May 2007, amending Regulation No. 176 of 27 July 2006, 'Protection of limited-conservation areas in Saare County'. The area of the limited-conservation area is 2507.5 ha, including 1055.2 ha of land, 136 ha of internal bodies of water and 1316.3 ha of marine part. The following habitat types listed in Annex I to Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora are placed under protection in the Karala-Pilguse limited-conservation area: coastal lagoons (1150*), annual vegetation of drift lines (1210), vegetated sea cliffs of the Atlantic and Baltic Coasts (1230), Boreal Baltic islets and small islands (1620), Boreal Baltic coastal meadows (1630*), Boreal Baltic sandy beaches with perennial vegetation (1640), 'white dunes' (shifting dunes along the shoreline – 2120), 'grey dunes' (fixed coastal dunes – *2130), *Juniperus communis* formations (5130), semi-natural dry grasslands on calcareous substrates (6210*), Nordic alvar (6280*), Molinion caeruleae (6410), Calcareous fens with *Cladium mariscus* (*7210), alkaline fens (7230), Western Taïga (*9010). In addition, the habitats of the species *Cypripedium calceolus,* as specified in Annex II to the Habitats Directive, and the bird species referred to in Annex I to Directive 2009/147/EC of the European Parliament and of the Council and the habitats of migratory bird species not included in Annex I are being protected. The species of birds whose habitats are protected are: mute swan (*Cygnus olor*), barnacle goose (*Branta leucopsis*), common teal (*Anas crecca*), mallard (*Anas platyrhynchos*), northern shoveler (*Anas clypeata*), common goldeneye (*Bucephala clangula*), white-tailed eagle (Haliaeetus albicilla), Eurasian crane (*Grus grus*), pied avocet (*Recurvirostra avosetta*), common ringed plover (*Charadrius hiaticula*), northern lapwing (*Vanellus vanellus*), southern dunlin (*Calidris alpina schinzii*), ruff (*Philomachus pugnax*), common redshank (*Tringa totanus*), Eurasian eagle-owl (*Bubo bubo*), woodlark (*Lullula arborea*), barred warbler (*Sylvia nisoria*) and red-backed shrike (*Lanius collurio*).
Riksu coast limited-conservation area (KLO2000327)	It was placed under protection by the 18.05.2007 amendment (by Regulation No 156) of Government of the Republic Regulation No. 176 'Protection of limited-conservation areas in Saare County' of 27.07.2006. The total area of the limited-conservation area is 2,188 hectares, of which 1,683.4 hectares are water and 504.6 hectares are land. The conservation objective of the Riksu coast limited-conservation area is to protect the habitat types specified in Annex I to Council Directive 92/43/EEC: coastal lagoons (1150*), annual vegetation of drift lines (1210), perennial vegetation of stony banks (1220), Boreal Baltic islets and small islands (1620), Boreal Baltic coastal meadows (1630*), Boreal Baltic sandy beaches with perennial vegetation (1640), 'grey dunes' or fixed coastal dunes (2130*), *Juniperus communis* formations (5130), semi-natural dry grasslands on calcareous substrates (6210*), Nordic alvar (6280*), Molinion caeruleae (6410), Fennoscandian wooded pastures (9070), and the bird species referred to in Annex I to Council Directive 79/409/EEC and the habitats of migratory bird species not included in Annex I. The species of birds whose habitats are protected are: red-necked grebe (*Podiceps grisegena*), horned grebe (*Podiceps auritus*), mute swan (*Cygnus olor*), whooper swan (*Cygnus cygnus*), lesser white-fronted goose (*Anser erythropus*), barnacle goose (*Branta leucopsis*), mallard (*Anas platyrhynchos*), tufted duck (*Aythya fuligula*), common eider (*Somateria mollissima*), long-tailed duck (*Clangula hyemalis*), black scoter

Protected natural object	*Description of the area*
	(*Melanitta nigra*), velvet scoter (*Melanitta nigra*), common goldeneye (*Bucephala clangula*), smew (*Mergus albellus*), red-breasted merganser (*Mergus serrator*), goosander (*Mergus merganser*), western marsh-harrier (*Circus aeruginosus*), common ringed plover (*Charadrius hiaticula*), northern lapwing (*Vanellus vanellus*), southern dunlin (*Calidris alpina schinzii*), *Calidris alpina alpina*, ruff (*Philomachus pugnax*), spotted redshank (*Tringa erythropus*), common redshank (*Tringa totanus*), common greenshank (*Tringa nebularia*), Arctic tern (*Sterna paradisaea*), barred warbler (*Sylvia nisoria*) and red-backed shrike (*Lanius collurio*).
Extension of the offshore part of Vilsandi National Park	Designed protected area. Offshore staging area for the steller's eider *(Polysticta stelleri)*, long-tailed duck *(Clangula hyemalis)* and common eider *(Somateria mollissima)*[45].
Kolgi shoal nature reserve	Designed protected area. the objective for placing the natural object under protection[46]; Protect the following EU Habitats Directive habitat types: 1170 'Reefs' – to ensure the distribution of the habitat type and a favourable conservation status in the Estonian exclusive economic zone. Protection of the spawning and feeding areas of fish. Protection of an Important Bird Area.
Irbe shoal nature reserve	Designed protected area. the objective for placing the natural object under protection[47]; Protect the following EU Habitats Directive habitat types: 1170 'Reefs' – to ensure the distribution of the habitat type and a favourable conservation status in the Estonian exclusive economic zone. Protection of the spawning and feeding areas of fish. Protection of the habitat of the European bullhead (*Cottus gobio*). Protection of an Important Bird Area.

The Natura 2000 areas are covered in more detail in chapter 6 of the EIA programme, preliminary Natura assessment.

4.2. Social and economic environment

4.2.1. Settlement and employment

The proposed activity is entirely located in the marine area, with the nearest settlement approximately 35 km away on Saaremaa. According to the Population Register, as of 01.01.2024, there were 32,129 inhabitants in Saaremaa municipality, of which 12,632, or nearly 40%, live in Kuressaare.

In 2023, according to Statistics Estonia, 69.3% of the working-age population (ages 15-74) in Saare County were employed (compared to the Estonian average of 69.2%). The average monthly gross income of an employee in the fourth quarter of 2023 was €1,449 euros, even lower only in Valga County (while the average in Estonia was €1,904 and €2,121 in Harju County). In 2022, the

[45] *Renewal of Marine Important Bird Areas Estonian Ornithological Society, 2022*
[46] *Ministry of the Environment Letter No 16-3/22/3326 of 18.07.2022*
[47] *Ministry of the Environment Letter No 16-3/22/3326 of 18.07.2022*

GDP per capita was 61.4% of the Estonian average, indicating that workers in the Saare County generate nearly 40% less value compared to the national average.

In terms of the number of employees, labour taxes and exports, the most important sector in Saaremaa Parish is manufacturing industries (see Table 4-4). Approximately a quarter of employees are engaged in manufacturing industries, followed by the public sector with about 20%.

Table 4-4. *Entrepreneurship and employment indicators in Saaremaa Rural Municipality in March 2024 according to the Estonian Tax and Customs Board*[48]

Field of activity	*Number of active enterprises*	*Number of enterprises with employees*	*Export (in euros)*	*Number of employees:*	*Declared labour taxes (in euros)*
Manufacturing	211	158	1,362,827	2,498	1,820,923
public administration and national defence; compulsory social security			0	1640	1,346,584
Wholesale and retail trade, repair of motor vehicles and motorcycles	290	188	177,334	1134	720,517
Construction	292	227	1939	774	437,998
Human health and social work activities	30	29	0	744	742,759
Accommodation and food service activities	111	72	288	687	327,911
Transportation and storage	85	62	0	563	363,715
Agriculture, forestry and fishing	188	116	10,323	516	336,906
Professional, scientific and technical activities	217	132	0	247	172,050
Education	20	15	10	225	172,282
Other service activities	80	68	0	188	76,880
Arts, entertainment and recreation	43	30	4358	128	64,926
Real estate activities	121	44	0	112	65,554
Administrative and support service activities	96	53	0	105	41,010
Information and communication	85	53	0	104	78,941
Electricity, gas, steam and air conditioning supply	22	8	0	49	41521
Water supply; sewerage, waste management and remediation activities	5	3	0	43	33,346
Mining and quarrying	5	3	0	18	9406
Financial and insurance activities	5	3	0	5	7202

[48] *https://www.emta.ee/eraklient/amet-uudised-ja-kontakt/uudised-pressiinfo-statistika/statistika-ja-avaandmed#ettevotluse-statistika-uldinfo*

Field of activity	*Number of active enterprises*	*Number of enterprises with employees*	*Export (in euros)*	*Number of employees:*	*Declared labour taxes (in euros)*
total	1695	1106	1,557,079	9780	6,860,431

4.2.2. Local benefits

Under the Environmental Charges Act[49] a charge for compensation for environmental nuisances caused by a wind farm, ie a charge for the production of electricity from wind energy, is paid. The charge for the production of electricity from wind energy of an offshore wind farm must be transferred to the local authority located in impact area of the offshore wind farm. The impact area of the offshore wind farm encompasses the area of Estonia, which extends up to 20 kilometres from the centre of the tower of the wind turbine in the sea. The proposed offshore wind farm in the Saare 2.1 and Saare 2.2 areas is located approximately 32 kilometres from Saaremaa at its closest point. As a result, the region does not qualify for any charge for the production of electricity from wind energy. However, the Tuul Energy is open to negotiating with the local government and the local community to discuss the social and economic benefits the wind farm could bring to Saaremaa rural municipality and the West Saaremaa region.

4.2.3. Fishery

Fishing, which has been an important source of subsistence for coastal dwellers throughout history, takes place in the entire Estonian marine area, except for areas with fishing restrictions. Fishing in the Baltic Sea can be divided into trawling and coastal fishing. Coastal fishing at sea generally takes place within 12 nautical miles or up to the 20-meter isobath, and the fishing is serviced by local fishing ports and landing sites. According to the Republic of Estonia Government Regulation No. 65 Fishing Rules of 16.06.2016, trawling is only permitted in marine areas that are deeper than 20 metres.

As the area of the proposed offshore wind farm in the Saare 2.1 and Saare 2.2 areas is located in waters deeper than 20 metres and beyond 12 nautical miles from the coast, there will be no coastal fishing. Additionally, the Automatic Identification System (AIS) data indicates that trawling does not occur in the area (Figure 4-17).

The area of the wind farm is in fishing square 28-2, which covers the entire open part of the Baltic Sea west of Saaremaa up to the border of the exclusive economic zone. Compared to other trawling areas in the Estonian marine area, fishing in the fishing square 28-2 is modest, being almost three times smaller than in the Gulf of Riga (Table 4-5).

Table 4-5. *Commercial fishing under a fishing authorisation of fishing vessel (with trawlers) in the Baltic Sea in 2023*[50]

[49] *Environmental Charges Act, RT I, 09.08.2022, 1*

[50] https://pta.agri.ee/ettevotjale-tootjale-ja-turustajale/kutseline-kalapuuk/puugistatistika#item-7

Fish species	*28-1 Gulf of Riga*	*28-2 Central Baltic Sea*	*29 Central Baltic Sea*	*32 Gulf of Finland*	*Tons in total*
European eelpout	12.098	-	-	-	12.098
European sprat	354.698	3,301.898	7,198.762	14,509.136	25,364.494
European smelt	51.303	-	-	-	51.303
Baltic herring	12,417.183	755.953	2,214.146	4,651.311	20,038.593
Fourhorn sculpin	13.235	-	-	-	13.235
Three-spined stickleback	4.404	-	-	0.276	4.680
Shorthorn sculpin	3.269	-	-	-	3.269
Summary	12,856.190	4,057.851	9,412.908	19,160.723	45,487.672

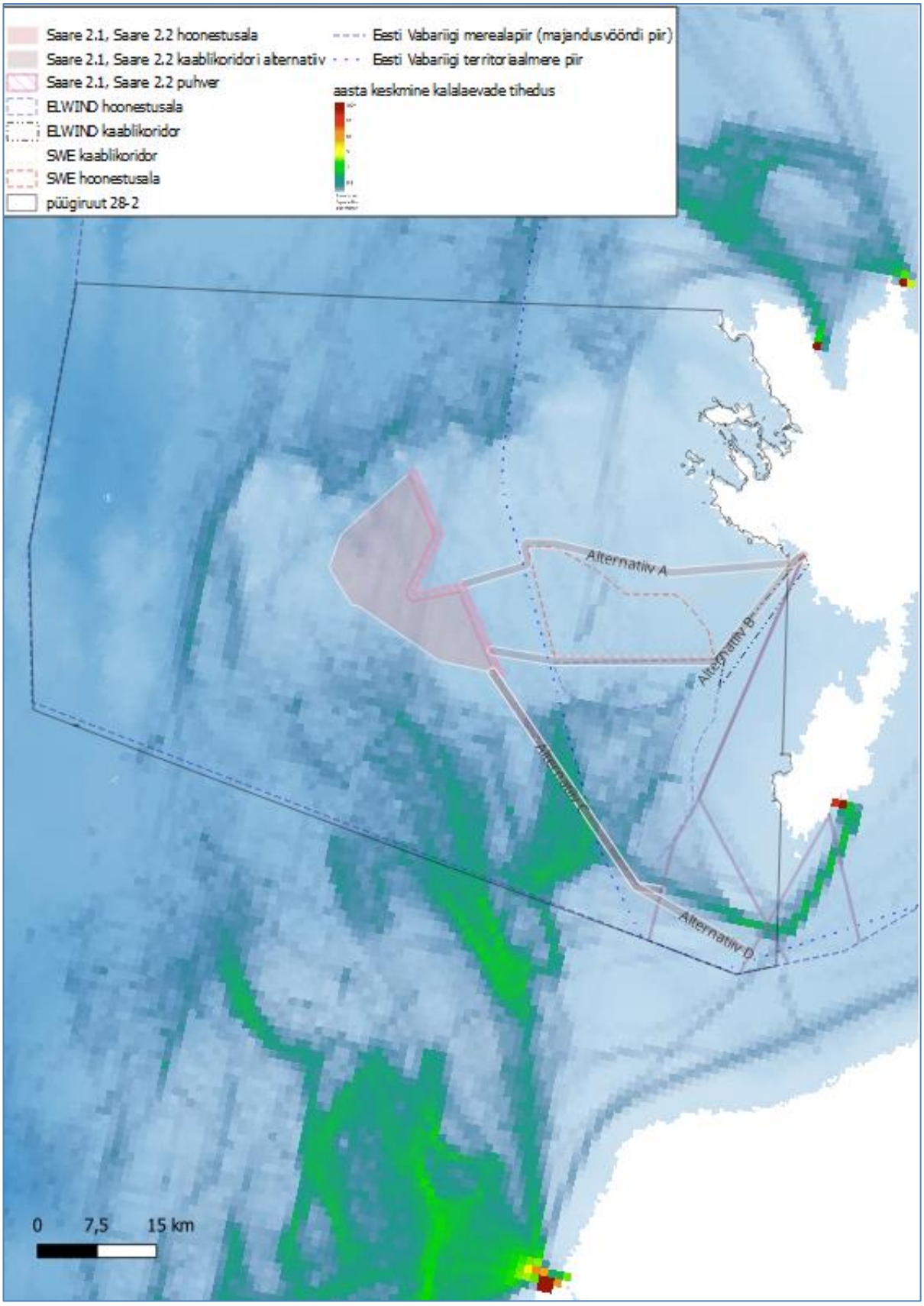

Figure 4-17. *Annual average fishing vessel density from 2017 to 2023 according to EMODnet data. The map is based on AIS data and shows the density of vessel traffic in a 1 × 1 km grid.*

4.2.4. Water traffic

Vessel traffic in the territorial waters of Estonia is not very frequent and there are no direct fairways in the immediate vicinity of the proposed offshore wind farm. Currently, vessels navigate in the area primarily when heading from the open Baltic Sea toward the Gulf of Riga. The proposed offshore wind farm also lies near a deep-water fairway in the northwestern part of the site, which is the closest IMO (International Maritime Organisation) vessel traffic management measure, located approximately 17 km away. This deep-water fairway, approximately six nautical miles wide, connects the traffic separation scheme northwest of Hiiumaa (near Kõpu Peninsula) and northwest of Bornholm Island. Vessels with a draught of more than 12 metres, travelling to or from the northeastern Baltic Sea and passing to the east and south of Gotland, are advised to use this deep-water fairway.

Figure 4-18 illustrates that vessel traffic in the proposed wind farm area is relatively light. The primary traffic in the area consists of cargo vessels heading to the ports of the Gulf of Riga. The depths in the proposed offshore wind farm area range from 30 to 40 meters, meaning the bathymetry will not pose issues for vessel traffic.

Although vessel traffic is relatively light in the area, the presence of new facilities, such as the proposed offshore wind farm, could potentially impact maritime safety. The construction of the wind farm could lead to the diversion of ships from existing routes, potentially resulting in the reorganisation of vessel traffic. Considering other proposed developments in the area, this could reduce available space for vessel movement, increasing the risk of collisions and necessitating additional measures to ensure the safety of vessel traffic.

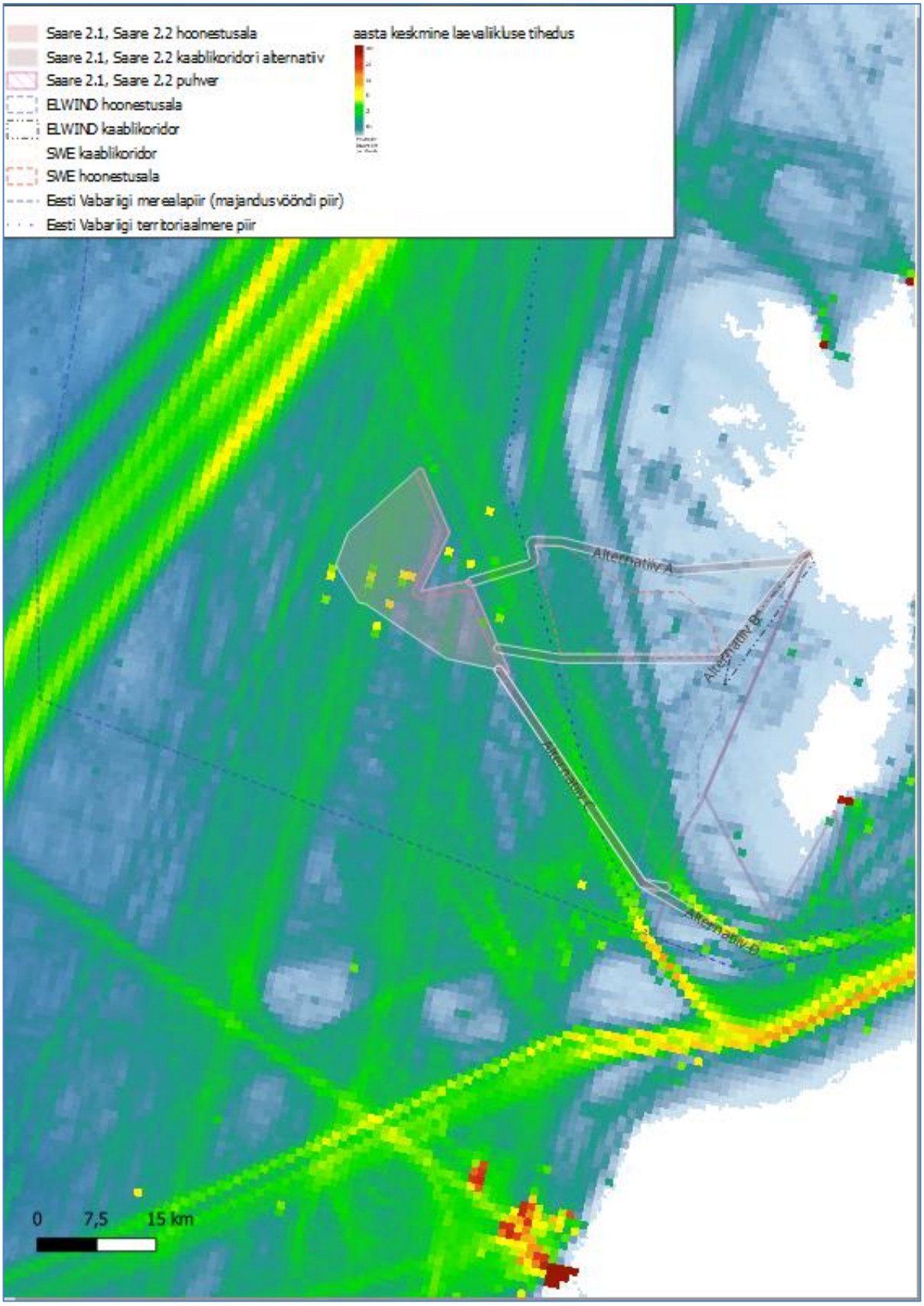

Figure 4-18. *Annual average vessel traffic density from 2017 to 2023 according to EMODnet data. The map is based on AIS data and shows the density of vessel traffic in a 1 × 1 km grid.*

4.3. Underwater cultural heritage

The Estonian marine area contains shipwrecks registered as cultural monuments, as well as ones that lack cultural monument status. At the same time, all of the objects have a significant role in Estonian maritime cultural heritage. According to data from the hydrographic information system (HIS)[51] of the Estonian Transport Administration, there are three wrecks in the superficies licence area applied for by Tuul Energy: unnamed 59, unnamed 382 and unnamed 188. Additionally, one wreck, unnamed 122, is located within the Alternative C cable corridor (Figure 4-19). None of the wrecks are cultural monuments and HIS does not provide more detailed information about their type, construction time, etc, except that unnamed wreck 188 is known to be a steamer.

No underwater obstacles have been identified in the area of the proposed offshore wind farm. In the case of cable corridor alternative D, one obstacle at a depth of 9 metres.

[51] *https://his.vta.ee:8443/HIS/Avalik?REQUEST=Main&WIDTH=1280&HEIGHT=551, külastatud 09.05.24*

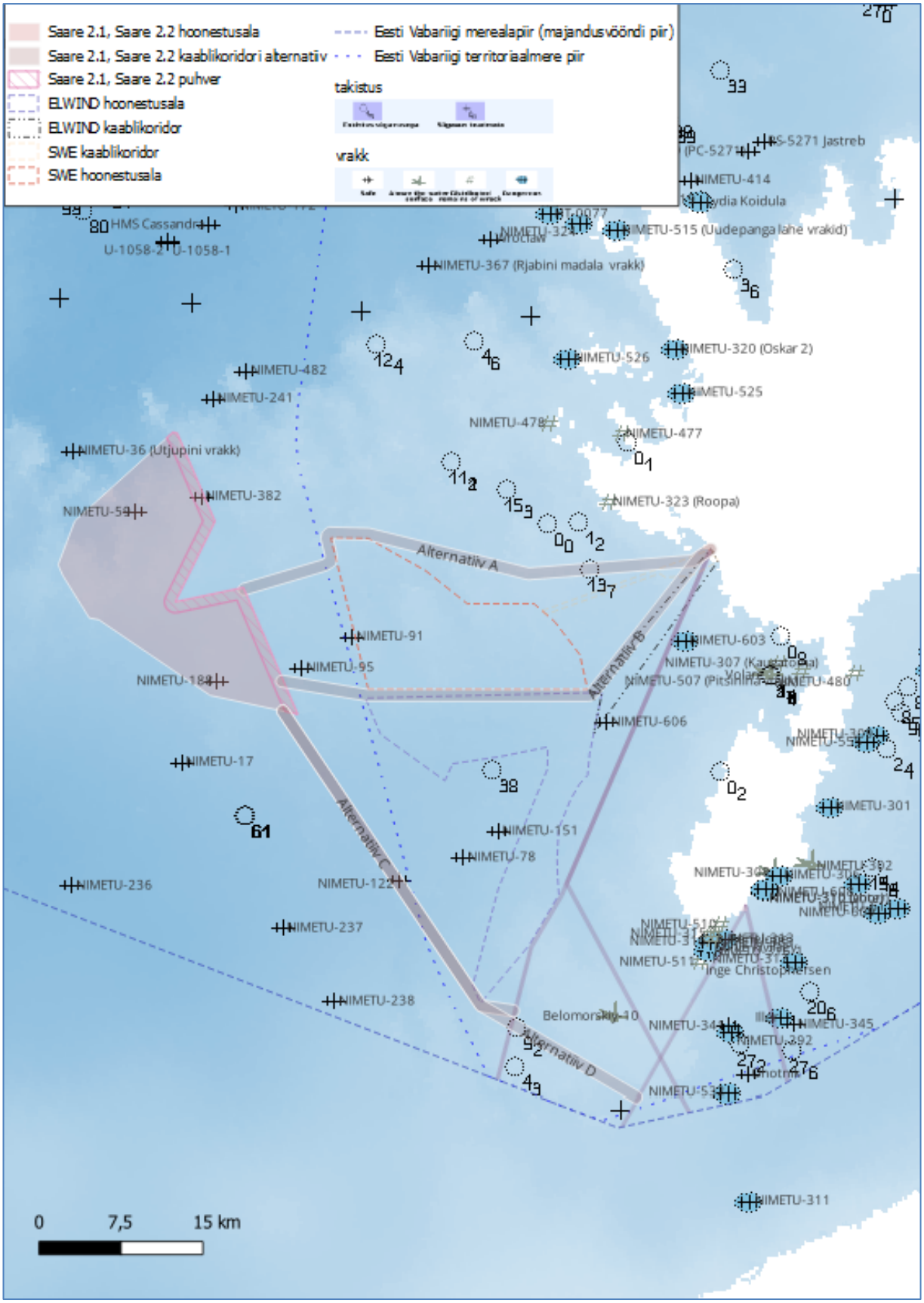

Figure 4-19. *Wrecks and obstacles identified in the area of the proposed offshore wind farm* (*Basemap Hydrographic database of the Estonian Transport Administration)*

5. Significant environmental impact expected to result from the proposed activity

5.1. Assessment methodology

In assessing environmental impact and preparing the report, the expert group proceeds from the Environmental Impact Assessment and Environmental Management System Act currently in force and its implementing acts and follows good practices for environmental impact assessment[52]. Valid environmental legal acts and the restrictions provided for therein are taken into consideration in carrying out the EIA.

The environmental impact assessment process has two phases: Preparation of the EIA programme; and carrying out the EIA and preparation of the report. The stages of the process arising from the Environmental Impact Assessment and Environmental Management System Act are set forth in Chapter 7.

The **EIA programme** (this document) is part of the planning stage, outlining the approach for conducting the environmental impact assessment, including a description of the proposed activity area, identification of anticipated significant impact areas, the schedule for the assessment, and the communication plan with the parties involved in the impact assessment process.

The EIA report is the final document that summarizes the whole process. The report is prepared taking into account the requirements of the Environmental Impact Assessment and Environmental Management System Act and the decision to initiate the EIA, as well as the environmental issues related to the documents concerning the offshore wind farm as a complete site (ie permits required for onshore civil engineering works / buildings, etc).

The purpose of the EIA is to assess and describe significant environmental impacts expected to result from the implementation of the proposed activity, analyse possibilities for avoiding and/or alleviating its impact and make a proposal for the selection of a more suitable alternative (including for size of area, volume and technological aspects). The alternatives covered are described in the EIA report. Environmental impact means potential, direct or indirect effect of a proposed activity on the environment, human health and well-being, cultural heritage or property.

Table 5-1 below presents the environmental elements impacted by the implementation of the proposed offshore wind farm and its related infrastructure, the sources of impact, the anticipated significant effects (with adjustments to the sizes of impact areas if necessary), and the methods used to predict these impacts, including the need for studies/expert assessments and their methodologies for impact assessment. The anticipated environmental impact is assessed in relation to the construction and operation of the offshore wind farm and submarine cable, while

52 Good practices for environmental impact assessment personnel. Estonian Environmental Impact Assessment Association (www.iaea.eu). Annex 1.

also evaluating the impact of turbine removal as a preliminary assessment, as far as current information allows.

The principle for impact assessment is that changes in the environment resulting from carrying out the proposed activities must be assessed. To do this, it is important to know the consequences (aspects) related to the activity that may lead to changes in environmental elements. The spatial extent of the environmental impact is additionally assessed in the area surrounding the proposed activity area – in so doing, it is assessed in regard to various impacts in differing spatial extent where a specific impact can be considered significant. Where possible and appropriate, this environmental impact assessment is also carried out with appropriate precision for the activities planned on land. For example, if possible, the impacts of the location and construction of the submarine cable at sea-land transition sites and its immediate vicinity will be assessed in order to determine for the developer the perspective of the network connection's functionality and fundamental locations of land-based activities. In this way, duplication of the same procedures, which is essentially unnecessary and unnecessarily burdensome for administrative organisation, is avoided.

The expected impact area comprises the wind farm development area and the submarine cable route area, ie the direct area of the proposed activity and its immediate surroundings. The size of the impact area depends on the specific impact factor (eg noise, disturbances during construction, visual impact, etc). The impact area also varies depending on the natural environment component affected (aquatic environment, seabed habitats, marine biota, etc).

Both a quantitative and qualitative (comparative) analytical method are used to assess environmental impact, according to which activities and alleviatory measures are analysed by each of the various environmental elements (eg conformity to a specific standard). If no goals or indicators exist for environmental elements, subjective experience-based (EIA expert group members' opinions and expert assessments) and objective assessments (results of studies etc) will be used.

The EIA methodology consists of comparing the forecasted environmental impacts (including alternative solutions) caused by proposed activity, with the limits established in legal acts and giving recommendations for implementing the optimum/best option. In the preparation of the EIA report, data sources are used, among other things, from the map application of the Land Board and EELIS (Estonian Nature Information System, Environmental Agency) data, specialised and scientific literature, previously collected research data, analogies, strategic documents and legal acts of the Republic of Estonia and other available (relevant) information that allows to ensure adequacy of conclusions. Consultation takes place with various relevant institutions, organizations and persons.

Additional studies and modelling will be performed in the course of the superficies licence and EIA, and expert opinions described in Table 5-1 will be prepared. Carrying out studies/expert assessments and dealing with the topics that arise can also take place in the context of other projects or activities (such as merger with other development projects, national study and monitoring etc) and as an integrated part of the EIA (ie not as a standalone study). In carrying out various studies, cooperation between scientists and research groups takes place for creating interdisciplinary value added and achieving higher-quality research results.

As part of the EIA, a Natura assessment will be conducted, and this EIA will primarily rely on the guidance provided in Guidelines for carrying out *Natura assessment upon implementation of Article 6 (3) of the Habitats Directive in Estonia*[53]. Chapter 6 describes in more detail the process of Natura assessment and the methodology used.

The environmental impact assessment is a public process. All parties who feel that their interests may be impacted by the proposed activity can intervene in the EIA process and present reasoned recommendations, proposals and comments. At minimum, interested parties can participate in the public release of the EIA programme, the assessment process and the publication of the report. The decision-maker, developer and environmental impact assessment staff can be contacted with proposals, objections and questions.

5.2. Environmental elements impacted and studies conducted

The methods used to forecast the impacts in each field of impact and of all environmental elements (that the proposed activity may impact through impact sources) are described in Table 5-1.

The Consumer Protection and Technical Regulatory Authority's decision to initiate superficies licence proceedings and EIA (see Annex 1) provides for a number of studies and/or expert assessments. In this EIA programme, the list of studies stipulated in the decision to initiate has been fully considered, supplemented, and refined with the methodology and scope of studies and expert assessments to the extent known at the time of preparing this EIA programme.

Table 5-1. *The expected material impacts of the proposed activity, their forecasting and assessment methods and studies to be carried out*

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
1	**Impact on the natural environment**		
1.1.	Impact on the sea's hydrodynamics (including currents, waves).	The construction of the wind farm can impact the local wind, currents and wave regime, as well as the vertical mixing of water. This is expected to be an insignificant impact. The offshore wind farm area for Saare 2.1 and Saare 2.2 areas proposed by Tuul Energy is located in a region where ice conditions are the mildest and the probability of ice occurrence is low. An ice cover is present only during severe winters, lasting up to 30	As the basis of the EIA assessment, the **modelling of currents, waves, the vertical mixing of water and changes in wind conditions (including shadow-flicker) must be carried out within the wind farm and its impact area.** The modelling is based on data from hydrometeorological surveys and models. Models of currents, waves and wind conditions are an input to other studies, such as the spread of suspended solids

53 *Kutsar, R.; Eschbaum, K. ja Aunapuu, A. 2019. Instructions for carrying out Natura assessment in the implementation of Article 6(3) of the Habitats Directive in Estonia. Client: Environmental Board. https://envir.ee/media/4372/download*

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
		days. The risk to installations from ice conditions is modelled during the technical design phase. The impacts are related to the offshore wind farm area and its immediate surroundings.	during construction and the spread of oil spill in the event of an accident. The EIA report must assess (including model) the cumulative impact in conjunction with other offshore wind farms located in development area No 2, for which surveys and EIAs have been completed by the time the EIA report for the Saare 2.1 and Saare 2.2 offshore wind farms, proposed by Tuul Energy, is prepared. In other words, inputs from existing development projects must be incorporated into the modelling.
1.2.	Impact on seawater quality, including suspended solids	The impact of the offshore wind farm on seawater quality may primarily occur during the construction phase through the release of seabed sediments and suspended solids into the water column during the installation of turbine foundations and cables. The amount of suspended solids primarily depends on the composition of the seabed sediments, followed by the number, size, type, and installation technology of the foundations, as well as the length and installation technology of the submarine cables. The impact on seawater quality may also materialize upon release of nutrients and hazardous substances into the water column, if such compounds are present in the sediments in significant quantity. During the EIA, an approximate volume of dredging, dumping and placement of solid materials will be determined, which will serve as the basis for assessing the impacts. Seawater quality can also be impacted if a potential emergency situation occurs, which could lead to the risk of an oil spill. The risk of oil pollution exists during both the	Sea water quality in the wind energy development area No 2 as designated by the Estonian Maritime Spatial Plan has been studied previously by the Estonian Marine Institute as part of the 'Survey of seabed biota and habitats to assess the distribution of Natura and HELCOM habitat types and to elucidate the CO2 sequestration potential of the sea' (Estonian Marine Institute, University of Tartu, 2020) and during the EIA of the SWE offshore wind farm. Based on the same methodology a **survey of the state of sea water in the Saare 2.1 and Saare 2.2 offshore wind farm area must be carried out.** In the course of the survey, the following parameters are evaluated: water transparency, oxygen concentration, chlorophyll concentration, total nitrogen, total phosphorus, nitrates, nitrite, ammonium, phosphates, silicon, CTD profiles. **In the proposed area of Saare 2.1 and Saare 2.2, seabed soil samples must be taken, sediment integration must be determined and chemical analyses carried out to check the content of** heavy metals, petroleum products, tributyltin compounds, polyaromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB) and nutrients. Soil sample

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
		construction and operational phases of the wind farm. To prevent the occurrence of oil pollution, safety regulations must be followed during construction and maintenance work. The impacts relate to the area surrounding the offshore wind farm and the sea cables and its immediate surroundings.	analyses should comply with the requirements outlined in the HELCOM Guidelines[54] for Management of Dredged Material at Sea. Based on the surveys and analyses carried out, the impact of construction activities on the quality of sea water is assessed, including whether and how much hazardous pollutants or substances causing eutrophication may be released during construction work, and **modelling the distribution of sediments and suspended solids released during construction work, including due to vertical mixing, in the wind farm area and its impact area. The spread of possible oil spills must also be modelled** (see also clause 5.3). If the dumping of dredging spoil is to take place, a suitable dumping site must be identified during the EIA. The HELCOM Guidelines for Management of Dredged Material at Sea [55] must be taken into account when choosing the dumping site. The spread of oil pollution must be assessed (modelled) in the EIA report cumulatively in conjunction with other offshore wind farms located in development area No 2, for which surveys and EIAs have been completed by the time the EIA report for the Saare 2.1 and Saare 2.2 offshore wind farms, proposed by Tuul Energy, is prepared. In other words, inputs from existing development projects must be incorporated into the modelling.

[54] *HELCOM-Guidelines-for-Management-of-Dredged-Material-at-Sea.pdf*

[55] *https://helcom.fi/wp-content/uploads/2016/11/HELCOM-Guidelines-for-Management-of-Dredged-Material-at-Sea.pdf*

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
1.3	Impact on habitats and biota on the seabed	The impact of the offshore wind farm on seabed habitats and biota may primarily occur due to the turbine foundations and submarine cables. During the construction phase, the biotic communities and habitats located directly under and in the immediate vicinity of the turbine foundations will be destroyed. Construction activity will impact the communities on the seabed above all through suspended solids and changes in water transparency. As a measure that will reduce and alleviate the impact, the turbine foundations must be installed, where possible, in places where there is no or little (valuable) seabed biota and habitats. The wind turbine foundation will be placed on the seabed and the existing natural seabed in foundation area (and if necessary, the material placed for protecting it) will be transformed. The significance and extent of the impact primarily depend on the number, dimensions, and type of foundations (for example, a gravity foundation for a similar turbine has a much larger seabed footprint than a monopile foundation) as well as the composition of the seabed sediments. A method frequently used for installing submarine cables on soft seabed substrates is burying the cable in bottom sediments using special equipment that will help to avoid potential damage (economic impact) and which also alleviates the materialization of environmental impacts (reduced transmission of electromagnetic radiation and heat around the cable). The burial of submarine cables will disturb the existing seabed during construction. The long-term effects of this disturbance will depend on the	In the area of the proposed wind farm and cable corridors a study of seabed biota and habitats must be carried out, with the aim to map the distribution of seabed biota (phytobenthos and zoobenthos) within the proposed area and potential impact area (area of the offshore wind farm and undersea cables + buffer zone) and the distribution of seabed habitats and biotopes in the area (Annex I habitat types to the Habitats Directive, MSFD broad habitat types, HELCOM HUB biotopes, HELCOM Red List biotopes). The objective of the study is to gather *in situ* information on the range of benthic species and communities and habitats in the project area and use that information to describe (model) range of species, habitats and biotopes in the proposed area. Based on the results of the study, it will be possible to assess the impact of the specific technology and location choices for the turbine foundations on seabed communities and, if necessary, propose measures to minimise potential negative impacts. In the proposed area, seabed baseline measurements must be conducted using acoustic remote sensing (eg, with a multibeam sonar), collecting both depth data and audio signal backscatter data. These measurements should be combined with semi-quantitative (coverage estimates using video systems or diving) and quantitative (biomass estimates) point observations. The research methodology must align with that used in similar surveys in adjacent areas to enable the assessment of cumulative impacts. The EIA report must assess the cumulative impact in conjunction with other offshore wind farms located in development area No 2, for which surveys and EIAs have been completed by the time the EIA report for the Saare 2.1 and Saare 2.2 offshore wind

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
		characteristics of the seabed and the type of substrate. In areas with soft substrates, recovery will occur over time, while in areas with hard substrates, the disturbance may be long-lasting or even permanent. It is also possible to use directional drilling of cables under the seabed (especially in the sea-land zone of cables) for laying cables in areas sensitive in terms of nature conservation. This means that before reaching an area sensitive in terms of nature conservation, the cable is brought down to the seabed, and in this way negative impacts on the seabed biota can be avoided. Establishing a wind farm involves placing an artificial substrate throughout the entire water column, which creates an opportunity for various communities of sessile species to arise. Colonization of the free artificial substrate depends on very many different local environmental factors and it is not possible to transpose experience from other marine areas for assessing the impact of the specific wind farm. To assess the environmental impact of establishing and operating the wind farm, it is necessary to know the local peculiarities of the "reef effect" and assess the importance of the wind farm in promoting the spread of non-native species. The impact area can be confined primarily to the area of the wind farm and cable corridors.	farms, proposed by Tuul Energy, is prepared.
1.4	Seabed, seabed sediments Coastal processes	The impact of the wind farm may be manifested in the storm wave regime and dynamics of sediments through changes in the seabed structure. It is not expected to be a significant impact: since the nature of the relief	**A general geological and geophysical seabed survey must be carried out in the proposed area** to clarify the state of the seabed (mineral composition of sediments, sediment deposit, bedrock characteristics, etc).

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
		of the seabed will not be modified in the course of the construction for establishing the wind farms (lowering/raising the relief), no significant changes are expected in the hydrodynamic regime that could impact the nature of waves on the surface in the near-coastal area. In the course of construction of the foundations and embedding the cables in the seabed, the sediments will be moved and resuspension will take place. Its impact will be felt in a limited area and for a short term. The estimated volumes of dredging (including dumping or placement of solid materials) depend on both the number of turbines and their foundations, dimensions and the length, location of the submarine cables and the technology selected for installing them. Establishing a wind farm > 30 km from the coast will not impact the nature of coastal processes, their intensification or abatement. In the zone near the coast, the material is carried forward by waves, lifting it into the water column and also carrying it along the coastline. Modelling of the SWE wind farm showed that the wind farm reduces wave heights by 1 to 2%. Therefore, a wind farm located more than 30 km from the coast cannot affect coastal processes. In the case of connecting cables, the impact is limited to the construction phase, meaning it is a one-time and short-term effect. Natural processes (waves and storms) typically cause much greater sediment displacement than short-term construction activities.	The EIA process will assess the impact associated with different types of foundations and, if necessary, develop environmental measures (including monitoring). As a summary, an expert assessment will be prepared for the EIA report based on previous studies, scientific literature and other studies conducted during this EIA process. The EIA report must assess the cumulative impact in conjunction with other offshore wind farms located in development area No 2, for which surveys and EIAs have been completed by the time the EIA report for the Saare 2.1 and Saare 2.2 offshore wind farms, proposed by Tuul Energy, is prepared.

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
1.5.	Impact on fish populations	During construction of the offshore wind farm, ship traffic in the area will increase and the installation of offshore wind farm foundations and sea cables in the water environment will take place. Depending on the nature of the seabed, type of foundation and installation technology, the installation of the foundation will involve noise emissions and introduction of seabed sediments into the water column (resulting in suspended solids). Disturbance of the seabed sediments and noise topics are also important when it comes to installation of submarine cables. During operation, a positive impact from offshore wind farms has also frequently been noted. Foundations offer a habitat for marine life, which are a food source for various fish. The level of underwater marine noise from operating turbines and their impact on fish have not proved significant or negative based on the studies conducted on existing operating offshore wind farms. The impact during construction and operation can be avoided and significantly reduced through implementing suitable measures. Technical and organizational techniques that have been used include adapting the construction period to fish spawning, use of noise-mitigating measures when installing foundations (such as avoiding pile-driving or use of noise-dampening measures during foundation installation), embedding the submarine cables in the seabed sediments, etc.	In order to assess the environmental impacts, the current state of the fish population of the proposed wind farm area must be ascertained: seasonal incidence, abundance, significance of the area as a spawning, migration or feeding area for different species. **Inventory of fish stocks and surveys of spring herring must be carried out** to ascertain the migration corridors of the Baltic herring in the area of the proposed activity. The results of the survey must be evaluated and compared with the results of other relevant fish population surveys in the open and coastal seas. Fish stocks inventory in the wind farm area should be carried out in spring and summer using a standardised sequence of nets in accordance with the requirements for international monitoring of coastal fish population (HELCOM, 2015). During the spring period, the survey focuses on possible spawning areas located in the survey area and fish migration corridors for spawning grounds. Mainly permanent fish populations are studied in the summer period when the fish are less migratory and use the area under survey for feeding. An inventory of fish stocks and spawning grounds must be carried out for two consecutive years in both spring and summer. The spring herring migration must be analysed in the context of a hydroacoustic study. The aim of the survey is to map the main migration routes of spring herring and to assess how much they overlap with the location of the proposed offshore wind farm. Information on the location of the main migration corridors and their variability in the area is currently lacking and a survey is essential to assess the potential impact of large-scale facilities on Baltic herring migration.

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
		The impact area is expected to be confined directly to the area encompassed by the offshore wind farm and the area for laying an undersea cable.	**To assess the impact of the electromagnetic field from connection cables, an expert assessment must be prepared in collaboration with fishery experts**, taking into account similar projects, studies conducted on those projects and existing data. In 2022 to 2024, it is planned to hold a project funded from the state budget that determines how noise impacts Baltic herring biology, above all migration and reproductive behaviour. The EIA report relies on this topic on the findings of the nationwide study. In addition, underwater noise (sound level) modelling should be conducted in the wind farm area both during construction (including the installation of different types of foundations) and during operation, to assess the potential impact on Baltic herring. The EIA report must assess the cumulative impact in conjunction with other offshore wind farms located in development area No 2, for which surveys and EIAs have been completed by the time the EIA report for the Saare 2.1 and Saare 2.2 offshore wind farms, proposed by Tuul Energy, is prepared.
1.6	Impact on marine mammals (seals)	The main aspect of offshore wind farm development that may impact seals is underwater noise, above all from construction of the offshore wind farm. A disturbance for seals may also be a temporary change in seawater quality stemming from disturbing of marine sediments upon installing foundations and submarine cables. The quantity of suspended solids generated depends on the geology of the seabed, the foundation type	In order to assess the impacts of the proposed wind farm, it is necessary to collect and supplement the base data related to seals in order to be able to assess the existing situation before the construction of the wind farm and the future temporal and spatial impacts of the use of marine areas. For this **a survey on grey seals must be carried out** in the following parts: 1) Monitoring of seal abundance as point counts on important grey seal breeding areas located within the potential direct

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
		used and the technological process of installation of the foundation and submarine cable. During the offshore wind farm park operating phase, a disturbance for seals may stem from regular ship traffic used for maintenance. The impact area is expected to be confined directly to the area encompassed by the offshore wind farm and its immediate surroundings.	and indirect impact area of the proposed offshore wind farm: Vesitükimaa (Irbe Strait), Ooslamaa (Ariste Bay) and Innarahu (Vilsandi National Park). A point count must be carried out at Vesitükimaa and Innarahu to determine the number of grey seals calving separately. The main method is aerial photographs taken from a drone. The material collected complements national monitoring and habitat surveys with telemetric methods (see clause 2) and is necessary for assessing the impact of park areas. 2) Marine usage study using telemetry tags, with the goal of tagging up to five seals. The priorities are to catch grey seals at the Vesitükimaa breeding ground from the regularly populated location closest to the offshore wind farm area. The assessment is based on the entire spatial dataset of grey seals related to the west coast of Saaremaa. 3) Observations of the number of pupping grey seals, given that no ice cover is formed and the seals give birth on the islets of the West Saaremaa region. Observations should be conducted in at least three counts during the pupping period (February–March) to capture the total number of pups born. The counts are based on vertical drone photos to calculate the number of pups born throughout the pupping season. Observations and mapping are also necessary in the event that ice forms in the farm area and its serves as a potential pupping platform for grey seals overwintering in this part of the sea. Field studies must cover at least one full year, since there are significant seasonal differences in seal locations and activity patterns.

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
			Underwater noise (sound level) modelling should be conducted in the wind farm area both during construction (including the installation of different types of foundations) and during operation, to assess the potential impact on seals. The EIA report must assess the cumulative impact in conjunction with other offshore wind farms located in development area No 2, for which surveys and EIAs have been completed by the time the EIA report for the Saare 2.1 and Saare 2.2 offshore wind farms, proposed by Tuul Energy, is prepared.
1.7	Impact on avifauna	The potential impact of offshore wind farms on birds primarily is that birds are driven out of the preferred stopover sites, birds are killed in collisions with turbines and the barrier effect on bird nutrition. The impacts are related to the offshore wind farm area and its vicinity.	To identify the impacts on birds **a survey of both stopping/staging and overflying/migrating birds must be carried out according to the internationally used STUK4 methodology based on flight and radar-based censuses.** Observations of migratory birds . Observations must be made from a vessel at anchor at two different points in the research area. The observations must include visual and radar observations and night-time audio recording of the stopover birds. The surveys must be carried out in two years, both in spring and autumn. Censuses of waterfowl that make stopovers. To be conducted as a flight census. The census route must cover the proposed wind farm area along with its immediate surroundings to obtain comparative data. In total, up to 20 flight censuses must be conducted in two years. Considering the potential for significant year-to-year variation in the number of waterfowl making stopovers, censuses must be repeated over two years.

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
			As a summary, an expert assessment will be prepared for the EIA report based on previous studies, scientific literature and studies conducted during this EIA process. The EIA report must assess the cumulative impact in conjunction with other offshore wind farms located in the marine area of Estonia, for which surveys and EIAs have been completed by the time the EIA report for the Saare 2.1 and Saare 2.2 offshore wind farms, proposed by Tuul Energy, is prepared.
1.8	Impact on bats	The impact of the offshore wind farm wind farm on bats may materialize if the offshore wind farm is located in a bat feeding area or migratory route. The best known scientific information was taken into account in the preparation of the Estonian Marine Spatial Plan and on the basis of this the expected bat migration areas at sea were identified, one of the places of concentration of bats is probably the tip of the Sõrve peninsula, from where the crossing of the Irbe Strait takes place. The impacts are related to the offshore wind farm area and its vicinity.	In order to assess the impacts of the proposed wind farm, it is necessary to collect additional information on bat distribution data in the open sea area and conduct a *Chiroptera* survey. As a result of the survey, potential bat movements in the area of the proposed offshore wind farm will be determined. To monitor the migration of bats, mainly automatic bat recorders are used. The research methodology provides for the collection bio-acoustic data using stationary observation points both at sea and on shore (land). Up to eight stationary bat recorders must be placed in the area of the offshore wind farm. Temporary buoys installed for the survey should be used for the installation of equipment since there are no permanent signs in the planning area. The placement of sea signs must be carried out in cooperation with the Estonian Transport Administration and the State Fleet (Riigilaevastik). Field work will cover spring and autumn bat migration periods, and stationary observation points will also be in operation in the summer period. In addition to observations at sea, data must be collected during the spring and autumn migration period at two coastal land observation points in Saaremaa.

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
			Comparing the dynamics of the relative abundance of bats migrating by land with those recorded above the sea, one can give an estimate of the presence of migration at sea. At least two land registrars must be used to assess synchronicity. As a summary, an expert assessment will be prepared for the EIA report based on previous studies, scientific literature and studies conducted during this EIA process. The analysis must assess the impact of weather conditions on bat sightings in the open sea. The EIA report must assess the cumulative impact in conjunction with other offshore wind farms located in development area No 2, for which surveys and EIAs have been completed by the time the EIA report for the Saare 2.1 and Saare 2.2 offshore wind farms, proposed by Tuul Energy, is prepared.
1.9	Impact on protected natural objects	There are no protected natural objects within the area of the proposed offshore wind farm, but the proposed Koigi shoal nature reserve and the extension of the offshore part of the Vilsandi National Park fall within the impact area. Depending on the chosen alternative, the construction of the connecting cable may have an impact on these protected areas. The impacts are related to the wind farm area and the location of the connecting cable and their immediate surroundings.	Analysis of map layers and expert assessment on the basis of previous studies, the Estonian Nature Information System (EELIS), inventories conducted, species protection action plans, scientific literature and studies carried out in the course of this EIA. The EIA report must assess the cumulative impact in conjunction with other offshore wind farms located in development area No 2, for which surveys and EIAs have been completed by the time the EIA report for the Saare 2.1 and Saare 2.2 offshore wind farms, proposed by Tuul Energy, is prepared.
1.10	Impact on Natura 2000 areas – Natura assessment	The majority of the protected objects in the marine area are also internationally protected, being part of the Natura 2000 network of nature and/or bird areas.	Analysis of map layers and expert assessment on the basis of previous studies, the Estonian Nature Information System (EELIS), inventories conducted, species protection action plans, scientific

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
		The possible special area of conservation and special protection area for birds in the Natura 2000 network within the impact area of the planned offshore wind farm and its cable corridors are set out in Chapter 6. The impact on Natura areas will be separately assessed in the relevant Natural assessment expressed as a separate chapter of the EIA report.	literature and studies carried out in the course of this EIA. A Natura assessment will be conducted for all conservation objectives of Natura 2000 area within the impact area. See Chapter 6 on the preliminary Natura assessment. The EIA report must assess the cumulative impact in conjunction with other offshore wind farms located in development area No 2 and, where necessary, also those located in the marine area of Estonia, for which surveys and EIAs have been completed by the time the EIA report for the Saare 2.1 and Saare 2.2 offshore wind farms, proposed by Tuul Energy, is prepared.
1.11	Impacts on the climate	The impact of wind farms on the climate can be considered at different levels. The impact of wind farms is positive, both globally and nationally, as the impact on the climate, due to reducing greenhouse gas emissions by replacing fossil energy sources with renewable ones, is positive. At the local level, participants have suggested that wind farms can impact the local climate, especially winds and rainfall. The so-called shadow-flicker produced by the wind farm is modelled together with other hydro-meteorological indicators (see clause 1.1).	An expert assessment will be compiled based on previous studies, scientific literature, professional literature and expert knowledge. This EIA does not analyse fundamental issues of climate change. The official position of the European Union and therefore also of the Republic of Estonia will used as the basis in the matter of the existence of climate change, the need to mitigate changes and adapt to changes. The EIA must address the impacts of the microclimate and relevant modelling must be carried out. The EIA provides an overview of the results of modelling and of known and comparable scientific research. The EIA report must assess the cumulative impact in conjunction with other offshore wind farms located in development area No 2, for which surveys and EIAs have been completed by the time the EIA report for the Saare 2.1 and Saare 2.2 offshore wind farms, proposed by Tuul Energy, is prepared.

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
2	**Impact on cultural heritage**		
2.1	Impact on objects under heritage conservation, including shipwrecks	The construction of an offshore wind farm is expected to have a direct physical impact on the wrecks: eg the activity may endanger the preservation or good condition of the wreck. This is expected to be an insignificant impact. An impact may also be manifested through potential destruction, damage or impeded access to cultural heritage and the spread of sediments on to heritage conservation assets. In order to mitigate the impact, the locations of the wind turbines must be chosen in such a way as to ensure the preservation of valuable shipwrecks and access to them. The impact is directly related to the area of the wind farm and submarine cables (primarily the area directly under the specific structures).	During the preparation of the EIA, **a sonar survey should first be carried out to determine whether there are any other underwater objects in addition to the known ones**, including potential underwater objects of cultural value and cultural layers (at least in the vicinity of the proposed turbine foundations and possible cable corridors). Where possible, areas that do not coincide with potential objects of cultural value will be preferred for locations of turbine foundation and cable corridors. Prior to construction (during the design process), a separate underwater archaeological investigation is to be performed – if the proposed construction activity (establishment of wind turbine foundations and cables) and/or their impact area coincides with objects with cultural value and/or cultural layer determined in advance, and could jeopardise the survival of the underwater cultural heritage (subsections 2–3 of § 32 of the Heritage Conservation Act, § 10 of the Minister of Culture regulation no. 25 of 15.05.2019). In the course of the underwater archaeological investigation, objects and cultural layer of cultural value will be documented and their condition and scope of their preservation will be assessed. Additionally, if necessary, the potential impacts (environmental pollution) resulting from changes in the condition of historically hazardous wrecks will be assessed. The information collected by sonar investigations will be used if possible in investigations by other disciplines: determining seabed habitats and initial

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
			identification of potential historical UXO (and other hazardous objects). Based on previous studies, scientific literature and studies carried out in the course of the present EIA, an expert assessment will be prepared.
3	**Social and economic environment, including impact on human health, well-being and assets**		
3.1	Noise (including infrasound, low-frequency sound) and vibration	The nearest wind turbines to the wind farm are a minimum of 32 km from Saaremaa, which means that noise and vibration levels above the limit values are not expected to reach the nearest residential buildings. During the use of the wind farm, infrasound and low-frequency noise can be expected as well. Sounds with frequencies below 20 hertz (Hz) are called infrasound. Infrasound is not predominantly audible to the human ear. Low-frequency noise refers to sound waves with frequencies ranging from 10 to 200 hertz (Hz).	To assess noise during construction, operation and demolishing of the turbines, **modelling will be performed and a noise map will be compiled** on the basis of the Minister of the Environment regulation No 71 'Normal noise levels transmitted in ambient air and methods for measurement, determination and assessment of noise level' of 16.12.2016. The impact of infrasound, low-frequent sound and vibration is described on the basis of scientific literature and previous studies, including a comparison of the characteristics and distribution of infrasound caused by ships and wind turbines. The EIA report must assess the cumulative impact in conjunction with other offshore wind farms located in development area No 2, for which surveys and EIAs have been completed by the time the EIA report for the Saare 2.1 and Saare 2.2 offshore wind farms, proposed by Tuul Energy, is prepared.
3.2	Visual impact	It is not possible to establish an offshore wind farm that is not visible at sea. The magnitude of the visual impact depends on the physical size of the offshore wind farm, location, spatial solution (eg positioning wind turbines in rows etc) and technical solutions (eg the colour of the wind	To determine the visual impact more objectively and to create additional information, a **visualisation of the offshore wind farm** from different points in Western Saaremaa and the Sõrve peninsula, as well as a visibility analysis (ZTV – Zone of Theoretical Visibility), must be performed. The EIA will assess the visual impact of the turbine colours (eg, whether colours other than white are

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
		turbines and marking the turbines with lights). The extent of the impact is the wind farm's nearest coastal areas in Western Saaremaa and the Sõrve peninsula.	preferred) and the restriction of the spread of aviation safety lights to the mainland. The assessment of visual impacts will rely on the guidelines and methodology developed in the course of the Estonian Maritime Spatial Plan. The requested area can be seen from the coastal sections defined in the Estonian Maritime Spatial Plan, where it is necessary to look for ways to leave an area free of wind turbines at the EIA level. The visual impact study must include an analysis of the possibility, location and extent of leaving areas free of wind turbines. The visual impact study must include an assessment of the possible change in the value of real property due to changes in the landscape. A static visualization from different viewpoints and assessment of the impacts on changes in the views will be prepared for the EIA report. The EIA report must assess (model) the cumulative impact in conjunction with other offshore wind farms located in development area No 2, for which surveys and EIAs have been completed by the time the EIA report for the Saare 2.1 and Saare 2.2 offshore wind farms, proposed by Tuul Energy, is prepared.
3.3	Impact on human health and well-being or property	Impact on human health and well-being. The impact of the proposed wind farm on human health and welfare can be associated with potential noise and visual disturbance from the wind turbines, described in advance in 3.1 and 3.2 of the table.	The assessment of possible changes in the value of real estate is derived from studies of noise and visual impact (see clauses 3.1 and 3.2). The EIA report must assess the cumulative impact in conjunction with other offshore wind farms located in development area No 2, for which surveys and EIAs have been completed by the time the EIA

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
		One of the negative expectations of people regarding wind farms is the possible decrease in the price of real estate due to possible noise disturbance and changes in views.	report for the Saare 2.1 and Saare 2.2 offshore wind farms, proposed by Tuul Energy, is prepared.
3.3	Social and economic aspects – employment, fisheries, impact on the local community, tourism, electricity supply.	<u>Impact on economy and employment, including the fisheries sector</u>. The proposed offshore wind farm may exert an impact on fisheries and thereby on fisheries both during construction and operation of the offshore wind farm. <u>Impact on the local community.</u> <u>Impact on tourism.</u> There are no examples of the negative impact of offshore wind farms on tourism from the case studies conducted around the world, but rather they are seen as expanding tourism opportunities (new tourist attractions, increasing demand for services). <u>Power supply</u>. The proposed Saare 2.1 and Saare 2.2 wind farm will not directly affect the power supply to the islands. The strengthening of the electricity supply is carried out by the Estonian-Latvian fourth connection, for which a separate designated national spatial plan and a strategic assessment of its environmental impact have been initiated. The impact area is expected to be limited to the Saaremaa rural municipality, but there may also be positive effects on the Latvian economy through the use of Latvian ports.	An expert assessment will be carried out, based on a fish population study to be prepared (see clause 1.5), scientific literature sources and previous research data. The data is combined with data gathered in the course of focus group encounters and interviews with and surveys of stakeholders. Within the framework of the superficies licence and EIA process, additional cooperation takes place with various stakeholders and the Saaremaa Rural Municipality. Additional input will be obtained from proposals received during the publication of the EIA programme and from meetings with the local community. The EIA report must assess the cumulative impact in conjunction with other offshore wind farms located in development area No 2, for which surveys and EIAs have been completed by the time the EIA report for the Saare 2.1 and Saare 2.2 offshore wind farms, proposed by Tuul Energy, is prepared.
4	**Other aspects**		

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
4.1	Impact of historical underwater ordnance	This topic will be covered in the EIA as much as necessary.	Regarding the known locations and identification of historical underwater ordnance, cooperation will be carried out with the Ministry of Defence (including the Estonian Navy) during the superficies licence and EIA process.
4.2	Impact on navigation systems and impact on ship traffic and navigational safety	The construction and use of the wind farm may have an impact on air and ship traffic as well and cooperation will take place with the Estonian Transport Administration and the Police and Border Guard to map and assess it. The presence of a wind farm can affect rescue and search operations.	**A navigation risk analysis must be conducted**, addressing the impact of the wind farm on vessel traffic and related areas. Key considerations include the impact of the wind farm on different types of vessels during both construction and operation of the wind farm, as well as potential impacts on marine communications and surveillance systems, AIS equipment, ship radars and search and rescue operations. The impact of the wind farm must be analysed under both ice-free and ice conditions, considering the specific weather conditions in the area. Additionally, the analysis of vessel traffic must also consider future trends in vessel traffic changes. In addition, **an expert assessment / risk analysis of flight safety must be carried out**, which addresses the width of the potential air traffic corridor, taking into account the different possible weather events, aircraft types and speeds. The analyses are prepared in cooperation with the Estonian Transport Administration. The methodology will be introduced to the Estonian Transport Administration.
4.3	Potential emergency situations	Impact on seawater quality can also be altered in the event of a potential emergency situation, which could lead to the risk of an oil spill or release of elegas into the environment. The risk of oil pollution exists during both the construction and operational phases of the wind farm. To prevent the occurrence of oil pollution, safety	**Modelling of potential oil slick dispersion must be carried out.** An expert assessment of the potential environmental impact of an oil spill and the necessary measures to prevent it will be provided.

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
		regulations must be followed during construction and maintenance work.	
4.4	Waste generation and the circular economy	Waste is generated during the construction of wind farms mainly in the building and demolition stages, and to a small extent also in the operation stage. The organisation of waste management during the construction stage of the wind farm is comparable to normal construction activities, where the generation of waste must be minimised as much as possible in order to reduce the environmental impact and, if possible, waste be recovered as much as possible. During both the construction and demolition phases, the maximum amount of waste must be recovered (or taken for recovery). The waste generated that is not suitable for recovery must be treated in accordance with applicable legislation. Waste that cannot be recovered at the source must be handed over to a licenced person with the appropriate environmental protection permit. Waste that cannot be recovered elsewhere must be disposed of in accordance with applicable legislation. In the operational stage, the waste consists mainly of the parts that are replaced and the lubricants and chemicals that are changed. More waste is generated during the demolition stage of the wind farm: technical equipment – electronic waste, wind turbine blades – fibre plastic and wind turbine tower –	The EIA report provides a wind turbine life-cycle analysis (LCA).

No	*Impact field (ie environmental elements impacted)*	*Expected significant impacts (including area, sources of the impact)*	*Impact forecasting and assessment methods and description of the necessary studies*
		concrete and metal. On average, the life expectancy guaranteed by the manufacturer of modern wind turbines is 30 years. Modern wind turbines are predominantly easy to demolish, and a large part of their composition is recoverable. Upon demolishing wind turbines, it is important to separate the maximum possible amount of waste, including metal, concrete, plastic and other composite materials, electronic equipment, hazardous waste. Waste management, especially at the construction stage, requires an environmental permit corresponding to the activity, including a water permit and waste permit. If waste management is properly organised, it is not expected to have a significant environmental impact.	

5.3. Cumulative impact

Cumulative impacts refer to the combined effect of one or more activities that may manifest through an accumulation of similar impacts, where there may be many different activities and where a change occurring as a consequence of addition of activities is an important aspect[56]. The cumulative impact may appear if due to the spatial plan(s) and its proposed activities, a territorial or temporal overlap between impacts take place, resources are repeatedly removed or added, or the landscape is altered repeatedly[57].

In preparing the EIA report, it is possible when assessing cumulative impacts to consider similar projects or other proposed projects that will lead to accumulation of similar impacts from multiple activities, which have by the time of the preparation of the EIA report have reached at least the same assessment stage – in other words, it is possible to consider the study data gathered and published regarding the other project.

56 Peterson, K., Kutsar, R., Metspalu, P., Vahtrus, S. ja Kalle, H. 2017. Strategic Environmental Assessment Handbook. Ministry of Environment, 137 pp.

57 Cooper, L. M. 2004. Guidelines for Cumulative Effects Assessment in SEA of Plans. EPMG Occasional Paper 04/LMC/CEA. imperial College London.

The proposed Saare 2.1 and Saare 2.2 offshore wind farm area is located in wind energy development area No 2.1 following the Estonian Maritime Spatial Plan. The EIA report must assess the cumulative impact in conjunction with other offshore wind farms located in development area No 2, for which surveys and EIAs have been completed by the time the EIA report for the Saare 2.1 and Saare 2.2 offshore wind farms, proposed by Tuul Energy, is prepared. To date, the superficies licence and EIA process, including surveys, have been carried out for the same area encompassing the proposed SWE offshore wind farm and its connecting cable, located to the north of Saare 21 and Saare 2.2 area (Figure 2-1). An EIA programme for ELWIND area has been prepared and published. If, at the time of preparation of the EIA report for this offshore wind farm, other potential offshore wind farms and other projects (including the designated national spatial plan for the fourth Estonia-Latvia electricity connection) proposed for marine spatial planning development area 2 have reached a phase similar to the impact assessment and studies, the combined impact of these projects will be assessed, if possible, in order to avoid cumulative impacts in the marine area, including on marine biota, migration bottlenecks and/or obstacles.

Cumulative impacts cannot be assessed in the EIA report in regard to spatial plans and projects that are still in the superficies licence proceeding Initiation or EIA programme stage – ie where the realistic and feasible alternative solution and volume have not been clarified.

6. Preliminary Natura assessment

Natura 2000 is a Europe-wide network of protected areas that aims to ensure the conservation of rare or endangered animals, birds and plants, and their habitats, or, if necessary, to restore endangered species and habitats to a favourable status across Europe. Natura 2000 special areas of conservation and special protection areas for birds were formed based on Council of the European Union directives 92/43/EEC (known as Habitats Directive) and 2009/147/EC (known as the Birds Directive).

A Natura assessment will be conducted as part of the EIA. The Natura assessment is a procedural process carried out pursuant to Article 6 (3) and (4) of the Habitats Directive, 92/43/EEC. This work draws on European Commission guidance entitled "Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC"[58], to the "Instructions for carrying out a Natura assessment in regard to implementation of Article 6 (3) of the nature directive in Estonia"[59] and the guidance on "Wind energy developments and Natura 2000" (European Union, 2021)[60].

On the basis of the Environmental Impact Assessment and Environmental Management System Act and the Nature Conservation Act, a Natura assessment will take place as part of the proceedings on the environmental impact assessment. Pursuant to clause 2 of subsection 1 of § 3 of the Environmental Impact Assessment and Environmental Management System Act, environmental impact is assessed an activity alone or in conjunction with other activities may potentially adversely impact the conservation objective of a Natura 2000 site. When it comes to Natura assessment, it is important that assessment is of the impact likely to materialize based solely on the conservation objectives of the area. The impacts of an activity are considered unfavourable if as a result of carrying out the activity, the state of Natura 2000 area(s') conservation objectives becomes worse or as a result of carrying out the activity it is not possible to achieve the protection objective.

The first stage in the Natura assessment is the preliminary Natura assessment, which is aimed at forecasting the likely impacts of the proposed activity, as a result of which it can be decided whether and to what extent it is necessary to progress to the full assessment stage. In the full assessment, a detailed assessment of the likely adverse impact on the Natura area is conducted and if necessary, alleviatory measures will be designed.

This preliminary assessment is prepared based on existing information. Existing materials are used regarding the Natura 2000 network area and conservation objectives (Natura area standard data form information, EELIS etc).

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58 Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'. Brussels, *28.9.2021*

59 Kutsar, R.; Eschbaum, K. and Aunapuu, A. 2019. Instructions for carrying out Natura assessment in the implementation of Article 6(3) of the Habitats Directive in Estonia. Client: Environmental Board. https://www.envir.ee/sites/default/files/KKO/KMH/kemu_natura_hindamise_juhendi_uuendus_2020.pdf

60 https://op.europa.eu/en/publication-detail/-/publication/2b08de80-5ad4-11eb-b59f-01aa75ed71a1

Linkage between proposed activity and protection management

The proposed activity is not associated with the protection management of any Natura 2000 network area and does not contribute directly or indirectly to achievement of the conservation objectives of the areas.

Information on the proposed activity

The proposed activity is the construction of an offshore wind farm with 160 turbines with a maximum tip height of 365 metres above sea level. The planned maximum capacity of one wind turbine is 25 MW and the nominal capacity of the planned offshore wind farm is 2,400 MW.

The purpose, location, and detailed description of the proposed activity can be found in Chapter 2 of the EIA programme (see Figure 2-1).

Description of the Natura 2000 sites within the impact area of the proposed activity

The following Natura 2000 network sites are within the potential impact area of the proposed offshore wind farm and cable corridor: Irbe Strait special protection area for birds, Riksu Coast special area of conservation and special protection area for birds, Karala-Pilguse special area of conservation and special protection area for birds, Vilsandi special area of conservation and special protection area for birds, Tagamõisa special area of conservation, Vesitükimaa special area of conservation (see Figure 6-1).

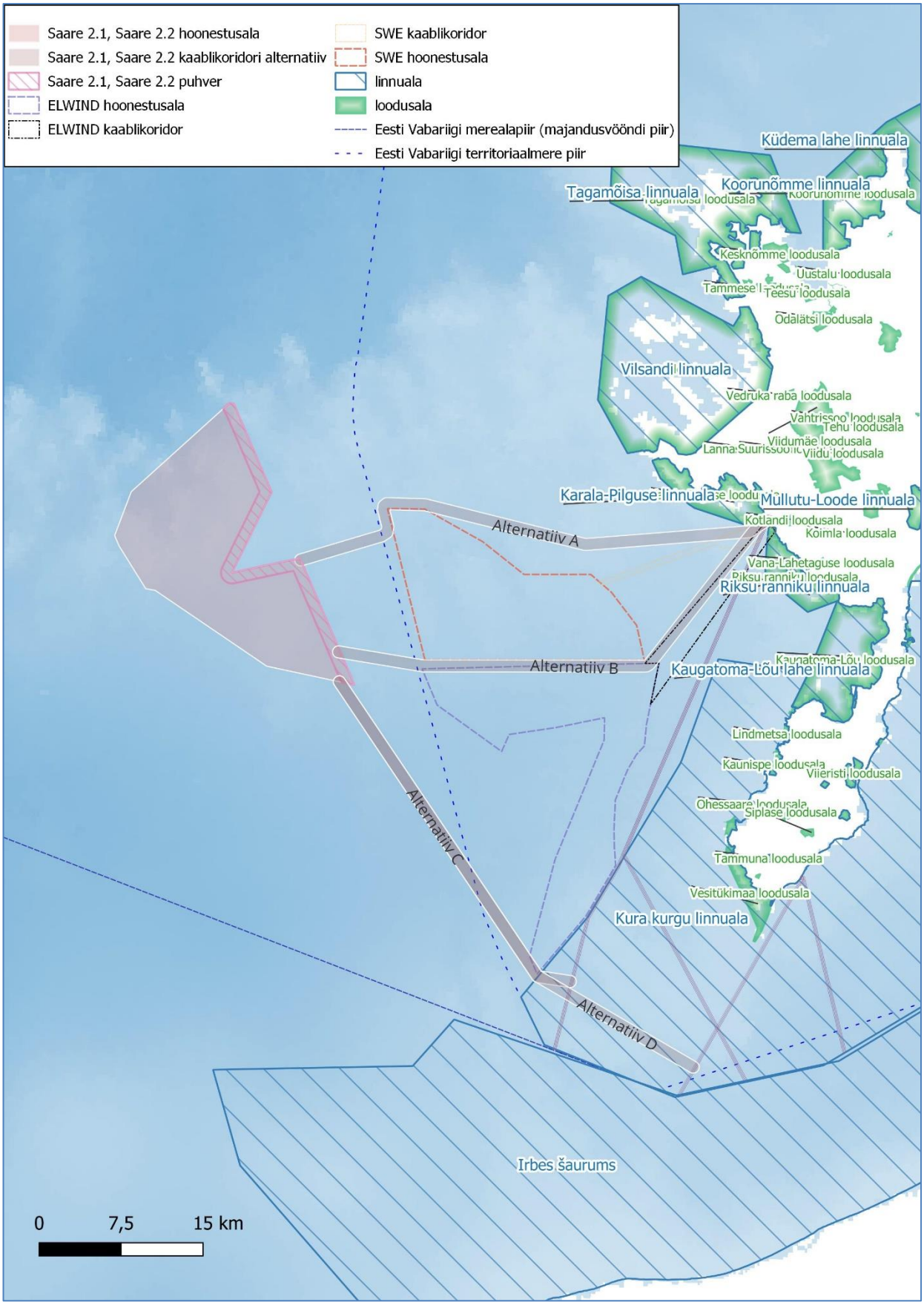

Figure 6-1. *Overview of Natura 2000 network areas in the impact area of the proposed wind farm area (Basis: Land Board and EELIS, 2024)*

A more detailed description of areas along with forecasting the expected impact for Natura 2000 conservation objectives is provided in Table 6-1.

Forecasting likely adverse impacts for Natura site(s)' conservation objectives

The following table, 6-1, sets out the protection objectives for the Natura areas and a forecast of the impact expected to be manifested.

Table 6-1. *Protection objectives for the Natura 2000 areas and forecasting the impact expected to be manifested.*

Name of Natura area	*Protection objectives for the area*	*Forecasting impact*	Results of the Natura preliminary assessment
Irbe Strait' s special protection area for birds EE0040434	razorbill (*Alca torda*), northern pintail (*Anas acuta*), northern shoveler (*Anas clypeata*), common teal (*Anas crecca*), Eurasian wigeon (*Anas penelope*), mallard duck (*Anas platyrhynchos*), gadwall (*Anas strepera*), greylag goose (*Anser anser*), grey heron (*Ardea cinerea*), ruddy turnstone (*Arenaria interpres*), greater scaup (*Aythya marila*), brent goose (*Branta bernicla*), barnacle goose (*Branta leucopsis*), common goldeneye (*Bucephala clangula*), southern dunlin (*Calidris alpina schinzii*), redknot (*Calidris canutus*), little stint (*Calidris minuta*), black guillemot (*Cepphus grylle*), common ringed plover (*Charadrius hiaticula*), long-tailed duck (*Clangula hyemalis*), tundra swan (*Cygnus columbianus bewickii*), mute swan (*Cygnus olor*), red-throated loon (*Gavia stellata*), white-tailed eagle (*Haliaeetus albicilla*), lesser black-backed gull (*Larus fuscus*), bar-tailed godwit (*Limosa lapponica*), velvet scoter (*Melanitta fusca*), smew (*Mergus albellus*), goosander (*Mergus merganser*), red-breasted merganser (*Mergus serrator*), great cormorant (*Phalacrocorax carbo*), grey plover (*Pluvialis squatarola*), horned grebe (*Podiceps auritus*), great crested grebe (*Podiceps cristatus*), pied avocet (*Recurvirostra avosetta*), common eider (*Somateria mollissima*), Caspian tern (*Sterna caspia*) and spotted redshank (*Tringa erythropus*).	The area of the proposed offshore wind farm is located approximately 30 km from the Irbe Strait special protection area for birds. However, the special protection area for birds may be affected by alternatives C and D of the connecting cable, which could impact the special protection area for birds and its conservation objectives during construction (noise, etc). The impact during service-life (collision risk) may also affect the species that are the conservation objective of Irbe Strait special protection area for birds.	**As part of the EIA report, an appropriate Natura assessment must be conducted.**

Name of Natura area	*Protection objectives for the area*	*Forecasting impact*	Results of the Natura preliminary assessment
Vilsandi special area of conservation EE0040496	The protected habitat types are: sandbanks (*1110), mudflats and sandflats not covered by seawater at low tide (1140), coastal lagoons (*1150), large shallow bays (1160), annual vegetation of drift lines (1210), perennial vegetation of stony banks (1220), Salicornia and other annuals colonizing mud and sand (1310), Boreal Baltic islets and small islands (1620), Boreal Baltic coastal meadows (*1630), *Juniperus communis* formations (5130), Nordic alvar (*6280) Fennoscandian wooded meadows (*6530), springs and springfens (7160), calcareous fens with *Cladium mariscus* (*7210), alkaline fens (7230), limestone pavements (*8240), Western Taïga (*9010) and Fennoscandian hemiboreal natural old broad-leaved deciduous forests (*9020); and the species listed in Annex II whose habitat is protected are the grey seal (*Halichoerus grypus*), *Cypripedium calceolus*, *Liparis loeselii*, *Rhinanthus osiliensis*, *Sisymbrium supinum* and the European river lamprey (*Lampetra fluviatilis*).	No activities are planned in or near the special area of conservation. The buildable area is located approximately 30 km from the special area of conservation. One of the conservation objectives of the Vilsandi special area of conservation is also the grey seal and the habitats of that species. The Innarahu grey seal rookery lies within the special area of conservation. Given the wide-ranging movement of the grey seal and its potential sensitivity to noise, the impact cannot be completely ruled out.	**An additional preliminary Natura assessment will be carried out as part of the EIA report. If it appears that the area's conservation objectives are likely to be adversely impacted, the appropriate assessment will be continued.**

Name of Natura area	*Protection objectives for the area*	*Forecasting impact*	Results of the Natura preliminary assessment
Vilsandi special protection area for birds EE0040496	Common teal (*Anas crecca),* mallard (*Anas platyrhynchos),* greylag goose *(Anser anser),* *greater scaup (Aythya marila),* *barnacle goose (Branta leucopsis),* common goldeneye *(Bucephala clangula),* common ringed plover *(Charadrius hiaticula),* mute swan *(Cygnus olor),* Eurasian crane *(Grus grus),* goosander *(Mergus merganser),* red-breasted merganser *(Mergus serrator),* steller's eider *(Polysticta stelleri),* common eider *(Somateria mollissima).*	No activities are planned in or near the special protection area for birds. The Vilsandi special protection area for birds is located approximately 30 km from the buildable area, which is expected to exclude direct impacts on the special protection area for birds and its conservation objectives during construction. The impact during service-life (collision risk) may also affect the species that are the conservation objective of the Vilsandi special protection area for birds.	**A full Natura assessment has to be carried out as part of the EIA report.**

Tagamõisa special area of conservation EE0040476	The protected habitat types listed in Annex I are: coastal lagoons (*1150), reefs (1170), annual vegetation of drift lines (1210), perennial vegetation of stony banks (1220), vegetated sea cliffs of the Atlantic and Baltic Coasts (1230), Boreal Baltic coastal meadows (*1630), Boreal Baltic sandy beaches with perennial vegetation (1640), embryonic shifting dunes (2110), 'white dunes' (shifting dunes along the shoreline – 2120), 'grey dunes' (fixed coastal dunes – *2130), wooded dunes (2180), humid dune slacks (2190), hard oligo-mesotrophic waters with benthic vegetation of *Chara spp.* (3140*), Juniperus communis* formations (5130), semi-natural dry grasslands on calcareous substrates (*important orchid sites – 6210), Fennoscandian lowland species-rich dry to mesic grasslands (*6270), Nordic alvar (*6280), lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) (6510), Fennoscandian wooded meadows (*6530), transition mires and quaking bogs (7140), calcareous fens with Cladium mariscus (*7210), alkaline fens (7230), Western Taïga (*9010), Fennoscandian hemiboreal natural old broad-leaved deciduous forests (*9020), coniferous forests on, or connected to, glaciofluvial eskers (9060), Fennoscandian wooded pastures (9070) and Fennoscandian deciduous swamp woods (*9080); and the species listed in Annex II whose habitat is protected are the grey seal (*Halichoerus grypus*), *Cypripedium calceolus*, *Liparis loeselii* and *Sisymbrium supinum*.	No activities are planned in or near the special area of conservation. The wind farm is approximately 40 km from the special area of conservation. One of the conservation objectives of the Tagamõisa special area of conservation is also the grey seal and the habitats of that species. Given the wide-ranging movement of the grey seal and its potential sensitivity to noise, the impact cannot be completely ruled out.	**An additional preliminary Natura assessment will be carried out as part of the EIA report. If it appears that the area's conservation objectives are likely to be adversely impacted, the appropriate assessment will be continued.**

Name of Natura area	*Protection objectives for the area*	*Forecasting impact*	Results of the Natura preliminary assessment
Vesitükimaa special area of conservation EE0040490	The habitat types to be protected are reefs (1170), annual vegetation of drift lines (1210), perennial vegetation of stony banks (1220), salicornia and other annuals colonizing mud and sand (1310), Boreal Baltic islets and small islands (1620), Boreal Baltic coastal meadows (*1630), Boreal Baltic sandy beaches with perennial vegetation (1640), fixed coastal dunes with herbaceous vegetation ('grey dunes') (2130), Nordic alvar and precambrian calcareous flatrocks (*6280), Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) (6410), calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* (*7210) and Fennoscandian deciduous swamp woods (*9080); species listed in Annex II, whose habitats are protected, include the grey seal (*Halichoerus grypus*) and marsh angelica (*Angelica palustris*).	No activities are planned in or near the special area of conservation. The wind farm will be located at least 40 km from the special area of conservation and 12 km from cable corridor alternative D. One of the conservation objectives of the Vesitükimaa special area of conservation is also the grey seal and the habitats of that species. Given the wide-ranging movement of the grey seal and its potential sensitivity to noise, the impact cannot be ruled out.	**An additional preliminary Natura assessment will be carried out as part of the EIA report. If it appears that the area's conservation objectives are likely to be adversely impacted, the appropriate assessment will be continued.**

Name of Natura area	*Protection objectives for the area*	*Forecasting impact*	Results of the Natura preliminary assessment
Riksu coast special area of conservation EE0040461	The conservation objectives are to protect the habitat types listed in Annex I to Council Directive 92/43/EEC: coastal lagoons (*1150), annual vegetation of drift lines (1210), perennial vegetation of stony banks (1220), Boreal Baltic islets and small islands (1620), Boreal Baltic coastal meadows (*1630), Boreal Baltic sandy beaches with perennial vegetation (1640), 'grey dunes' (fixed coastal dunes – *2130), *Juniperus communis* formations (5130), semi-natural dry grasslands on calcareous substrates (*important orchid sites – 6210), Nordic alvar (*6280), Molinion caeruleae (6410) and Fennoscandian wooded pastures (9070).	The connecting cable corridor alternatives A and B of the proposed offshore wind farm are located within the Riksu Coast special area of conservation and its adjacent area. The construction of the proposed cables connections in areas near the special area of conservation may in certain instances have temporary impacts during construction on the conservation objectives of the special area of conservation (suspended solids, etc). These are likely to be temporary and insignificant for the special area of conservation.	**An additional preliminary Natura assessment must be carried out as part of the EIA report. If it appears that the area's conservation objectives are likely to be adversely impacted, the appropriate Natura assessment must be continued, if necessary.**

Name of Natura area	*Protection objectives for the area*	*Forecasting impact*	Results of the Natura preliminary assessment
Riksu coast special protection area for birds EE0040461	barnacle goose (*Branta leucopsis*), southern dunlin (*Calidris alpina schinzii*), mute swan (*Cygnus olor*), velvet scoter (*Melanitta fusca*), red-breasted merganser (*Mergus serrator*), ruff (*Philomachus pugnax*), common eider (*Somateria mollissima*) and common redshank (*Tringa totanus*).	The connecting cable corridor alternatives A and B of the proposed offshore wind farm are located within the Riksu Coast special area of conservation and its adjacent area. The building of the wind farm's cables connections may in certain instances cause temporary/indirect impacts on the conservation objectives of the special protection area for birds (suspended solids, noise disturbance during construction, etc). This has probably a temporary and insignificant impact. The wind farm's impact during service-life (collision risk) may also have an adverse impact on the species that are the conservation objective of the Riksu coast special protection area for birds.	**As part of the EIA report, an appropriate Natura 2000 assessment must be conducted.**

Name of Natura area	*Protection objectives for the area*	*Forecasting impact*	Results of the Natura preliminary assessment
Karala-Pilguse special area of conservation EE0040414	The conservation objective is to protect the protected habitat types listed in Annex I: coastal lagoons (*1150), annual vegetation of drift lines (1210), perennial vegetation of stony banks (1220), vegetated sea cliffs of the Atlantic and Baltic Coasts (1230), Boreal Baltic islets and small islands (1620), Boreal Baltic coastal meadows (*1630), Boreal Baltic sandy beaches with perennial vegetation (1640), 'white dunes' (shifting dunes along the shoreline – 2120), 'grey dunes' (fixed coastal dunes – *2130), *Juniperus communis* formations (5130), semi-natural dry grasslands on calcareous substrates (*important orchid sites – 6210), Nordic alvar (*6280), Molinion caeruleae (6410), Calcareous fens with *Cladium mariscus* (*7210), alkaline fens (7230), Western Taïga (*9010), Fennoscandian hemiboreal natural old broad-leaved deciduous forests (*9020) and Fennoscandian deciduous swamp woods (*9080); the species listed in Annex II whose habitat is protected is the *Cypripedium calceolus*.	Neither the area of the proposed offshore wind farm nor the cable corridors overlap with the Karala-Pilguse special area of conservation. However, Alternatives A and B for the connecting cable are located in close proximity to a small part of the special area of conservation. The construction of the proposed cables connections in areas near the special area of conservation may in certain instances have temporary impacts during construction on the conservation objectives of the special area of conservation (suspended solids, etc). These are likely to be temporary and insignificant for the special area of conservation.	**An additional preliminary Natura assessment must be carried out as part of the EIA report. If it appears that the area's conservation objectives are likely to be adversely impacted, the appropriate Natura assessment must be continued, if necessary.**

Name of Natura area	*Protection objectives for the area*	*Forecasting impact*	Results of the Natura preliminary assessment
Karala-Pilguse special protection area for birds EE0040414	Northern shoveler (*Anas clypeata*), common teal (*Anas crecca*), Eurasian wigeon (*Anas penelope*), mallard (*Anas platyrhynchos*), barnacle goose (*Branta leucopsis*), common goldeneye (*Bucephala clangula*), mute swan (*Cygnus olor*), white-tailed eagle (*Haliaeetus albicilla*), pied avocet (*Recurvirostra avosetta*), common redshank (*Tringa totanus*) and northern lapwing (*Vanellus vanellus).*	The proposed offshore wind farm area does not overlap with the Karala-Pilguse special protection area for birds and thus there will be no direct physical impact on the area's conservation objectives. However, cable corridor alternatives A and B are located in its immediate vicinity, and the construction of cable connections near the Natura special protection area for birds may in some cases also have temporary/indirect impacts, eg temporary impacts during construction on the conservation objectives of the special protection area for birds (suspended solids, noise disturbances during construction, etc). This has probably a temporary and insignificant impact on the special protection area for birds. The wind farm's impact during service-life (collision risk) may also have an adverse impact on the species that are the conservation objective of the Karala-Pilguse special protection area for birds.	**As part of the EIA report, an appropriate Natura assessment must be conducted.**

Name of Natura area	*Protection objectives for the area*	*Forecasting impact*	Results of the Natura preliminary assessment
Irbes saurums special protection area for birds	Razorbill (*Alca torda*), mallard (*Anas platyrhynchos*), grey heron (*Ardea cinerea*), tufted duck (*Aythya fuligula*), greater scaup (*Aythya marila*), common goldeneye (*Bucephala clangula*), black guillemot (*Cepphus grylle*), long-tailed duck (*Clangula hyemalis*), whooper swan (*Cygnus cygnus*), mute swan (*Cygnus olor*), Arctic loon (Gavia arctica), red-throated loon (*Gavia stellata*), white-tailed eagle (*Haliaeetus albicilla*), European herring gull (*Larus argentatus*), mew gull (*Larus canus*), Great black-backed gull (*Larus marinus*), black-headed gull (*Larus ridibundus*), velvet scoter (*Melanitta fusca*), black scoter (*Melanitta nigra*), smew (*Mergus albellus*), goosander (*Mergus merganser*), red-breasted merganser (*Mergus serrator*), great cormorant (*Phalacrocorax carbo*), great crested grebe (*Podiceps cristatus*), Caspian tern (*Sterna caspia*), common tern (*Sterna hirundo*), sandwich tern (*Sterna sandvicensis*), Eurasian crane (*Grus grus*) and common shelduck (*Tadorna tadorna*).	The proposed offshore wind farm area does not overlap with the Irbes Saurums special protection area for birds. The wind farm's impact during service-life (collision risk) may also have an adverse impact on the species that are the conservation objective of the Irbes Saurums special protection area for birds.	**An additional preliminary Natura assessment must be carried out as part of the EIA report. If it appears that the area's conservation objectives are likely to be adversely impacted, the appropriate Natura assessment must be continued, if necessary.**

Result of Natura assessment and conclusions

The technical solution for the offshore wind farm will be clarified in the subsequent EIA process and in technical design development in cooperation with experts in the relevant field. The objective is to establish an offshore wind farm and related infrastructure such that it lacks an adverse impact on achieving the conservation objectives of the Natura areas.

An additional full Natura assessment will be carried out as part of the EIA in regard to the likely impacted Natura areas and their conservation objectives.

7. The environmental impact assessment process and timetable

The exact timeline of the EIA process is difficult to specify when preparing the EIA programme; therefore, the timings of activities provided in the schedule should be considered approximate. Further details on public involvement and the exact time of the public consultation on the EIA programme and report is given in accordance with legislation.

The stages of carrying out the EIA are given in the following table.

Table 7-1. *Stages in carrying out the EIA and expected timetable*

EIA stage	*Content of stage and duration*	*Expected term for carrying out the stage*[61]
Initiation of EIA		Saare 2.1 area: by decision No 1-7/24-321 of 18 September 2024; Saare 2.2: by decision No 1-7/24-329 of 24 September 2024
Preparation of the EIA programme.	The EIA expert group will prepare the EIA programme.	September–November 2024
	The EIA programme will be submitted to the decision-maker.	December 2024
EIA programme publication and consultation of the authorities concerned.	The decision-maker checks the compliance of the EIA programme within 10 days.	December 2024
	The decision-maker provides notification within 14 days regarding the public display and public consultation.	January 2025
	The decision-maker organises a public display lasting at least 21 days and forwards the programme to the authorities concerned for their opinion.	January–February 2025
Transboundary involvement and publication	The neighbouring countries involved organise a national publication and submit the programme for the submission of views (30 days + 30 days).	January–March 2025
Publication of EIA programme	Public consultation of the EIA programme and an overview of received proposals will take place.	February–March 2025
Supplementation of the EIA programme and submission for verifying	Within 14 days of the public consultation, the decision-maker will review the proposals submitted during the publication and the views of the authorities concerned and give the developer its views on the possible need to supplement the EIA programme.	February–March 2025

61 The optimum duration of the stage arising from the Environmental Impact Assessment and Environmental Management System Act valid on the date on which the EIA was initiated is taken into account for each stage in the EIA process. As of 21.06.2024, a new version of the Environmental Impact Assessment and Environmental Management System Act (https://www.riigiteataja.ee/akt/111062024007?leiaKehtiv) entered into force, which shortened the various stages of the EIA procedure, which apply, among other things, to EIA proceedings initiated earlier; see the basis set out in subsection 15 of § 56 of the current Environmental Impact Assessment and Environmental Management System Act.

EIA stage	*Content of stage and duration*	*Expected term for carrying out the stage*[61]
conformity to the requirements	The EIA expert group will, on the basis of proposals and objections made regarding the EIA programme, make the necessary corrections and addenda, clarify that the proposals and objections have been taken into consideration, or provide reasoning for why they were not considered, and respond to questions submitted.	March–April 2025
	The corrected EIA programme will be submitted to the decision-maker for verifying conformity to the requirements.	
Verification and declaration of the conformity of the EIA programme to the requirements	The decision-maker will, within 30 days, verify the conformity of the EIA programme, relevancy and sufficiency of the programme for assessing the environmental impact of the proposed activity. The decision-maker makes the decision to declare the EIA programme in conformity to the requirements.	April–May 2025
Carrying out studies and surveys		*In 2025–2026*
Preparation and proceedings of the EIA report	*Based on the EIA programme, the EIA expert group will prepare the EIA report.*	*In 2026–2027*
	The EIA report will be submitted to the decision-maker for further proceedings as provided for in the Environmental Impact Assessment and Environmental Management System Act.	

8. Parties to the EIA and composition of the expert group

The parties to the EIA process in accordance with the Environmental Impact Assessment and Environmental Management System Act are the developer, expert and decision-maker (table 8-1).

Table 8-1. *Parties to the EIA*

Decision-maker, processor of superficies licence	*Developer*	Preparer of the EIA programme
Consumer Protection and Technical Regulatory Authority A: Endla 10a, 10142 Tallinn	**Tuul Energy OÜ** A: Telliskivi tn 60/5 Tallinn, 74011	**Roheplaan OÜ** A: Koidu 20, Tallinn 10316
Contact: Liina Roosimägi E: liina.roosimagi@ttja.ee P: +372 667 2004	Contact: Kjetil Jacobsen Email: kjetil.jacobsen@deepwindoffshore.com	Contact: Riin Kutsar E: riin@roheplaan.ee

The EIA programme has been prepared under the leadership of the environmental consulting company Roheplaan OÜ in cooperation with other experts. The lead expert of the EIA is licensed EIA Riin Kutsar (EIA licence no. KMH0131). The expert group that prepared the EIA programme includes the members shown in Table 8-2.

Table 8-2. *Members of the expert group on the preparation of the EIA programme*

Member of the working group	*Field/competence*	*Authority*
Riin Kutsar	EIA Leading Expert (license KMH0131) Role: Process and team management, impact on natural environment, Natura assessment, assessment of the social and economic environment	Roheplaan OÜ
Agne Peetersoo	Environmental Expert. Expert on social an economic impacts. Role: drafting of general parts, impacts of the natural environment, assessment of the social and economic environment	Roheplaan OÜ
Georg Martin	Expert on benthic life and habitats Role: Impact on phytobenthos, zoobenthos, marine water quality	Estonian Marine Institute, University of Tartu.
Redik Eschbaum	Fisheries expert Role: Impact on fisheries and fishing, including spawning areas	Estonian Marine Institute, University of Tartu.

Member of the working group	*Field/competence*	*Authority*
Andrus Kuus	Avifauna expert Role: Impact on avifauna	Eesti Ornitoloogiaühing MTÜ
Mart Jüssi	Expert on seals Role: Impact on seals	MTÜ Pro Mare
Rauno Kalda	Expert on bats Role: Impact on bats	Elustik OÜ
Piret Toonpere	Noise and vibration expert Role: noise, vibration	Lemme OÜ
Kerttu Ots	Landscape architect, visual impact expert Role: Visual impact assessment	RPS | Consulting UK & Ireland
Inga Zaitseva-Pärnaste	Maritime transport expert Role: impact of the wind farm on maritime traffic, marine communication and surveillance systems, AIS devices, and ship radars.	TalTech
To be specified	*Impact on hydrodynamics, wave action, wind conditions, spread of suspended solids, volume of sediments and hazardous substance content, ice-related risks, potential oil spill spread forecast*	
To be specified	*Submarine archaeology*	
To be specified	*Underwater noise*	
To be specified	*Impact on air traffic*	
To be specified	*Microclimate impacts and changes*	

The compilers of the EIA report and surveys will be identified in the future once the first stage of the EIA, ie the EIA programme, has been declared compliant with the requirements. The expert group for preparing the EIA report must cover at least the impact fields listed in Table 8-2.

9. Public engagement and overview of the publication of the EIA programme

9.1. Authorities concerned and stakeholders

Under legislation, publication of the EIA is in the remit and the task of the decision-maker. Parties to the proceedings, and information channels through which the notifications will presumably be sent out in the course of the EIA:

- *Ametlikud Teadaanded* (initiation, public display of programme and report, approval of programme and report).
- Newspaper (public display and discussion of programme and report).
- The public display and public consultation of the EIA programme and report are announced by letter pursuant to subsection 3 of § 16 of the Environmental Impact Assessment and Environmental Management System Act.

A list of the interested institutions and persons is provided in Table 9-1. The definition of authorities concerned was initially based on the specifications of the decision to initiate EIA and supplemented upon preparation of this programme. The list submitted is the proposal on the part of the EIA programme compiler regarding, at minimum, the parties to be notified by letter. The decision-maker makes the final decision on who is to be notified.

Table 9-1. *A list of the interested institutions and persons.*

Institution or person	*Reason for involving them in the proceedings*	*Notification form*
Ministry of Regional Affairs and Agriculture	Responsible for spatial planning in the country. Fisheries and aquaculture	To be notified by email
Estonian Ministry of Climate	Energy sector Nature conservation Maritime policy, ports, water traffic.	To be notified by email
Environmental Board	Manager of protected natural objects	To be notified by email
Ministry of Defence	National Defence	To be notified by email
Ministry of the Interior	Internal security	To be notified by email
Estonian Transport Administration	Ports, waterways, port basins, anchorages and navigational markings; aviation safety	To be notified by email

Institution or person	*Reason for involving them in the proceedings*	*Notification form*
National Heritage Board	Cultural assets, including underwater cultural heritage	To be notified by email
Police and Border Guard Board	Border guard and security Organisation of maritime search and rescue operations, and the detection, containment, and elimination of marine pollution.	To be notified by email
Estonian Environment Agency	Organizer of national environmental monitoring	To be notified by email
Agriculture and Food Board	Organization of professional fishing	To be notified by email
Estonian Health Board	Health protection and safety	To be notified by email
Saaremaa Municipality Government	Municipality within the impact area of the wind farm	To be notified by email
Estonian Council of Environmental NGOs	Association of NGOs Promoting Environmental Protection	To be notified by email
Eesti Kalurite Liit MTÜ Saarte Kalandus MTÜ	Fishermen's lobby groups	To be notified by email
MTÜ Saare Rannarahva Selts	Local's lobby groups	To be notified by email
Area inhabitants	The proposed activity may impact inhabitants in the region	Notified through the newspaper and local media.

9.2. Transboundary environmental impact and transboundary involvement

Considering the size and location of the proposed wind farm, approximately 6 km from the maritime border of the Republic of Latvia, it may be an activity with potential transboundary impacts and therefore requires a transboundary environmental impact assessment.

Transboundary environmental impact may occur as follows:

- Possible adverse transboundary environmental impact on birdlife during the construction and operation of the offshore wind farm may arise from migration barriers as well as the loss of feeding and stopover sites.

- Possible adverse transboundary environmental impacts on fish and seals during the construction phase of the proposed activities (noise, etc).

The environmental impact assessment in a transboundary context is organised in accordance with procedure set forth in international agreements, the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo convention) and the Environmental Impact Assessment and Environmental Management System Act. The process of environmental impact assessment in a transboundary context and the involvement are managed by the Ministry of Climate; all relevant notification and feedback documents are provided in Annex 2 of this document.

Considering the proposed wind farm's size and location, the Ministry of Climate sent a notice in accordance with the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) to Latvia, Lithuania, Sweden, and Finland on 22 October 2024. By the deadline for inclusion in the transboundary procedure (23 December 2024), Latvia and Lithuania responded that they wish to participate in the current EIA procedure. Finland wishes to receive additional information during the EIA programme stage before making a final decision on participation, and the EIA programme will also be sent to them.

Table 9-2. *Feedback from neighbouring countries on the assessment of potential transboundary environmental impacts following the initiation of the EIA programme*

Topic in need of attention	*EIA response*
LATVIA	
The Environment State Bureau announced that Latvia would like to participate in EIA and transboundary consultations as an affected party.	The proposal will be taken into account.
The Ministry of Transport of the Republic of Latvia	
The offshore wind farm planned for the Saare 2.1 area is located near the maritime transit route leading from Latvian waters to the Gulf of Finland. Therefore, it is proposed to assess the impact on vessel traffic and conduct a cumulative impact study on shipping corridors. The areas reserved for vessel traffic in Estonian waters should be connected to the existing corridors reserved for vessel traffic in Latvian waters.	The impact on vessel traffic is assessed and the analyses are prepared in cooperation with the Estonian Transport Administration.
A proposal to establish a 2-nautical-mile safety zone between the shipping corridor and the offshore wind farm.	The proposal will be considered in cooperation with the Estonian Transport Administration.
The State Environmental Service	

Topic in need of attention	*EIA response*
It is also necessary to assess the impact of the project in the context of the Latvian maritime spatial plan.	The proposal will be taken into account.
Special attention must be paid to the impact on birds and bats (including the study of their migration routes), fish and marine animals (including the study of their feeding and spawning grounds).	In the course of the EIA, appropriate ornithological and *Chiroptera* (bat) studies will be carried out (see chapter 5.2). In the proposed offshore wind farm area (and reference area), the impact is assessed at the populations level.
Assess current practice in preventing pollution risks (eg with petroleum products) during the construction and operation of wind farms	The proposal has been taken into account. In the course of the EIA, the movement of an oil slick is modelled.
Assess the risks and consequences of the planned infrastructure, including in the event of malicious damage.	The proposed infrastructure is cabling within the wind farm and an underwater cable connecting the wind farm to the transmission network, which is expected to be built covered with sediment, including to avoid possible risks. We note that the fourth connection between Estonian and Latvia is not part of this project and the EIA.
The Nature Conservation Agency of the Republic of Latvia	
Assess the impact on the Natura 2000 site 'Irbes šaurums' (LV0900300). Assess the impact on migrating and wintering birds in the area.	The proposal has been taken into account. Natura 2000 assessment is part of the EIA under Estonian law. In the course of the EIA, a study of the migratory and feeding areas of birds is carried out.
The cumulative impact on biodiversity of wind farms planned in the area should be assessed in the EIA report, with particular attention to bird migration corridors. The agency notes that, in cooperation with partners, it has initiated studies in the waters of Latvia's exclusive economic zone with the aim of establishing a new marine Natura 2000 protected area (as part of the LIFE REEF project).	The assessment of cumulative impacts is a standard part of the EIA.
The areas of the proposed wind farms also potentially overlap with the migration and wintering areas of important birds. The counts of birds making stopovers in Estonia and Latvia are conducted using a unified methodology, providing data on the density patterns of these birds, which should be considered in the impact	In the course of the EIA, a study of the migratory and feeding areas of birds is carried out. Where possible, cooperation will be undertaken with Latvian parties, taking into account, among other things, the results of studies conducted there.

Topic in need of attention	*EIA response*
assessment of the project and the preparation of the EIA report.	
The agency requests that the EIA report include cartographic materials, including geospatial data, showing all existing and proposed wind farms in the area. The agency requests that the scientific names of species be indicated in Latin.	The proposal will be taken into account where possible.
The Ministry of Health of the Republic of Latvia	
The project has no impact on human health.	Noted.
The Ministry of Agriculture of the Republic of Latvia	
The initiation of the EIA procedure includes sufficiently detailed information about the fish stock studies planned as part of the project's EIA.	Taken under advisement.
The Kurzeme Planning Region	
Potential assessment of cumulative impacts.	The assessment of cumulative impacts is a standard part of the EIA. See the full EIA programme (English version, chapters 5.2 and 5.3).
The direct and long-term impacts of the project on the fields of national defence and security interests of the Republic of Latvia.	The developer will cooperate with the Ministry of Defence throughout the process.
Assess the impact on the Natura 2000 site 'Irbes šaurums'.	The proposal has been taken into account.
Assess the impact on the potential biodiversity research area (B5) 'Zēģelnieku Sēklis', identified in Latvia's maritime spatial plan and currently being analysed as part of the LIFE REEF project.	The proposal will be taken into account where possible, provided there is sufficient information about the proposed research area.
Assess the impact on vessel traffic, its safety, shipping zones and regimes in the Baltic Sea, as well as accessibility to and from Latvian ports.	The EIA will address the impact on vessel traffic and maritime safety. An appropriately detailed risk assessment is part of the EIA.
The impact on seawater, fish and bird populations and marine mammals, as well as potential pollution risks during the construction and operation of the offshore wind farm.	The proposal will be taken into account; the mentioned impact areas are covered and described in the EIA programme.
The Ministry of Smart Administration and Regional Development	
The Ministry is interested in the assessment results, particularly information related to maritime spatial data, which could be useful for	Taken under advisement.

Topic in need of attention	*EIA response*
the planned update of Latvia's Maritime Spatial Plan 2030 and in the event that adverse transboundary impacts are identified during the EIA process.	
The Ventspils State City municipality	
Wishes to participate in the EIA and transboundary consultations as an affected party.	The proposal will be taken into account.
LITHUANIA	
The Lithuanian Ministry of Environment wishes to participate in the transboundary consultation process as an affected party, particularly concerning the potential impact of wind farms on migratory bird populations.	The proposal will be taken into account.
The State Protected Area Service considers it important to conduct an environmental impact assessment on the potential effects of wind farms on migratory bird populations and to identify effective mitigation measures to prevent significant bird mortality, substantial disturbance, and/or displacement from their wintering habitats.	The impact on birds will be considered in the EIA report. In the course of the EIA, a study of the migratory and feeding areas of birds is carried out.
The Ministry of Energy wishes to receive information about the progress of the wind farm project and its solutions for connection to the electrical network, if these are known.	Taken under advisement.
The Environmental Protection Agency requests an assessment of the potential impact on international shipping, commercial fishing, bird and bat migration, marine mammals, and potential accident risks.	The proposal will be taken into account; the mentioned impact areas are covered and described in the EIA programme.
FINLAND	
Finnish Environment Institute	
Will decide on participation in the EIA process and, if necessary, provide comments after the EIA programme stage has been completed.	Noted.
As hydrogen production and algae cultivation are planned alongside the offshore wind farm, the Finnish Environment Institute emphasises the	Please note that the EIA report addresses the topics related to hydrogen production and algae cultivation only at a conceptual level (ie, not

Topic in need of attention	*EIA response*
importance of comprehensively assessing the environmental impacts of the proposed activities.	detailed technical solutions, which are not covered within the scope of this project).

9.3. Publication and consultation of the authorities concerned

The chapter will be fleshed out after the EIA programme has been made public and after the authorities have been consulted.

Annexes

Annex 1. Application for superficies licence. Decision on initiation of superficies licence procedure and EIA (added as a separate file directory)

Annex 2. EIA transboundary notification and feedback (added as a separate file directory)

Annex 3. EIA programme publication notices (added as a separate file directory)

Annex 4. Views of the authorities concerned and proposals received upon publication and their response letters regarding the EIA programme (to be added as a separate directory)

Annex 5. Materials of the public consultation of the EIA programme (added as a separate file directory)