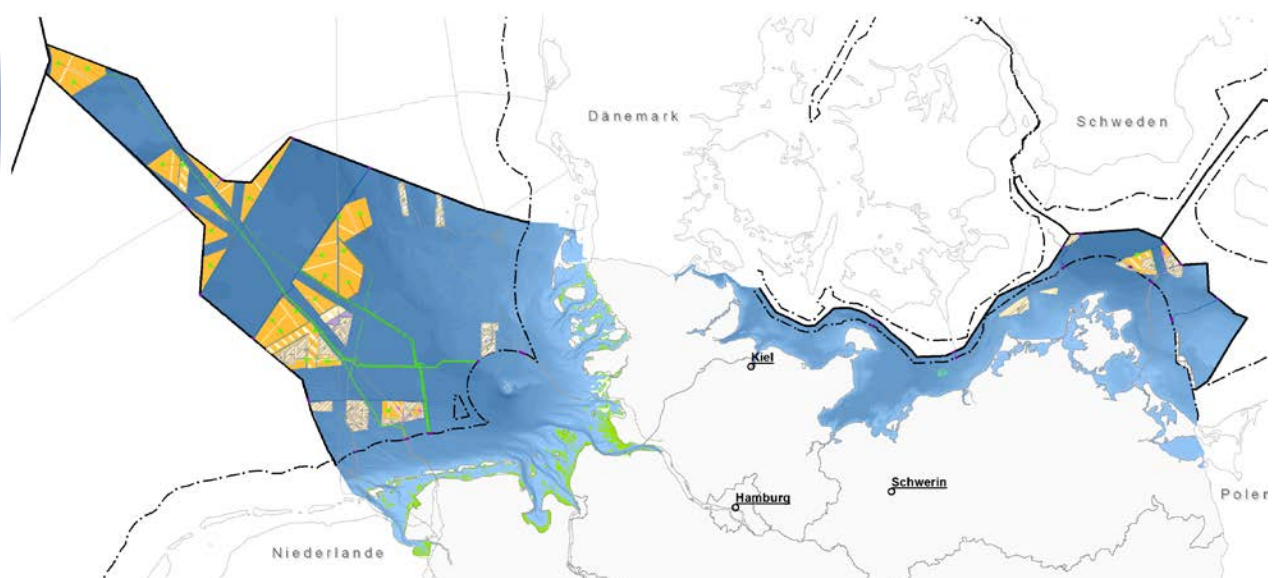




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Environmental Report: Baltic Sea Draft Site Development Plan

- unofficial translation -



Hamburg, 1 July 2022

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List of abbreviations

EEZ	Exclusive Economic Zone
BfN	Federal Agency for Nature Conservation
BGBI	Federal Law Gazette
BNatSchG	Act on Nature Conservation and Landscape Management (Federal Nature Conservation Act)
FNA	Bundesnetzagentur (Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway)
BSH	Federal Maritime and Hydrographic Agency
F&E	Research and development
SDP	Site development plan
FFH	Flora Fauna Habitat
Habitats Directive	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive)
HELCOM	Helsinki Convention
ICES	International Council for the Exploration of the Sea
IfAÖ	Institute for Applied Ecosystem Research
IOW	Leibniz Institute for Baltic Sea Research, Warnemünde
IUCN	International Union for Conservation of Nature and Natural Resources (World Conservation Union)
K	Kelvin
OWF	Offshore wind farm
POD	Porpoise Click Detector
PSU	Practical Salinity Units
RL	Red List
ROP 2021	Maritime spatial plan of the EEZ (dated 19 August 2021)
SAMBAH	Static Acoustic Monitoring of the Baltic Sea Harbour Porpoise
SCANS	Small Cetacean Abundance in the North Sea and Adjacent Waters
SEL	Sound exposure level
SPA	Special Protected Area
SPEC	Species of European Conservation Concern
SEA	Strategic environmental assessment
SEA DIRECTIVE	Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the environmental impacts of certain plans and programmes (SEA Directive)
UBA	Umweltbundesamt (Federal Environment Agency)
Environmental Impact Assessment Act	Environmental Impact Assessment Act
EIA	Environmental Impact Assessment
Birds Directive	Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (Birds Directive)
WT	Wind turbine
WindSeeG	Offshore Wind Energy Act (WindSeeG)

Preliminary remarks: *This environmental report, like the underlying scope (published on 30 June 2022), the Strategic Environmental Assessment and the draft Site Development Plan (SDP), is based on the Federal Government's draft bill of a second law to update the Offshore Wind Energy Act and other regulations (BT-Drs. 20/1634 of 2 May 2022, hereinafter: **WindSeeG-E**).*

The draft law contains updates that are relevant for the designations in the SDP as well as for reviews and assessments within the framework of the Strategic Environmental Assessment.

The final version of the new WindSeeG is expected for the period of finalisation of the SDP (3rd and 4th quarter 2022). Therefore, the final environmental reports published with the final SDP will also be able to take into consideration all legal changes in the WindSeeG – in addition to the SDP itself – until its expected publication in early 2023.

1 Introduction

A Strategic Environmental Assessment (SEA) is carried out as part of the revision and update of the SDP. This environmental report documents the result of the SEA for the EEZ of the Baltic Sea.

1.1 Legal basis and tasks of the environmental assessment

According to Sec.s 4et seq. WindSeeG-E, the BSH prepares an SDP in agreement with the Federal Network Agency (BNetzA) and in coordination with the Federal Agency for Nature Conservation (BfN), the Directorate-General for Waterways and Shipping (GDWS) and the coastal states. The SDP was last updated in 2020.

On 17 December 2021, the renewed revision of

the SDP was initiated. This revision procedure incorporates the amendment procedure for the SDP 2020, which was initiated with the announcement of 17 September 2021 (cf the associated BSH announcement of 1 July 2022). The contents of the preliminary assessment of the individual case from the aforementioned procedure are included in the present SEA accordingly (cf Chapter 4.12 of the present environmental report).

When the SDP was preparation, a detailed environmental assessment was carried out in accordance with the Environmental Impact Assessment Act (UVPG)¹, in what is termed the Strategic Environmental Assessment (SEA). The environmental reports were published together with the SDP on 28 June 2019. The implementation of an SEA with the preparation of an environmental report is based on Sec. 35, para. 1, No. 1 UVPG in conjunction with Appendix 5, No. 1.17 UVPG because site development plans are subject to the SEA obligation within the meaning of Sec. 5 WindSeeG. In principle, this also applies if the SDP is updated or amended.

In the context of the revision initiated on 17 December 2021, in order to implement the statutory expansion targets for offshore wind energy, which have been defined since October 2021 by the coalition agreement and subsequently enshrined in the draft bill for the amendment of the WindSeeG (Sec. 1, para. 2 WindSeeG-E), areas and sites that go beyond SDP 2020 and were therefore not included in the SEA carried out in previous preparation, update, and revision procedures of the SDP are designated.

Unlike the last revision of the SDP, the completion of the revision procedure for maritime spatial planning means that an up-to-date maritime spatial plan is now available: The maritime spatial plan for the German EEZ of the North Sea

¹ Environmental Impact Assessment Act (UVPG) in the version published on 18 March 2021 (Federal Law Gazette I p. 540) last amended by Art. 14 AufbauhilfeG

2021 of 10 September 2021 (Federal Law Gazette I p. 4147

and Baltic Sea (ROP)², which came into force on 1 September 2021. As part of the maritime spatial planning revision procedure, a comprehensive SEA was carried out and an environmental report was prepared for each of the German EEZs in the North Sea and the Baltic Sea.

The revision of the SDP will essentially build on the designations of the maritime spatial planning for offshore wind energy and subsea cables and pipelines and develop them in terms of sectoral planning.

Against this background, the SEA for the revision of the SDP will also be largely based on the results of the SEA carried out in the maritime spatial planning revision procedure. According to Sec. 5, para. 3, sentences 5–7 WindSeeG-E, it must be determined at which stage certain environmental assessments are to be focussed in order to avoid multiple assessments in multi-stage planning and approval processes. The nature and extent of the environmental impacts and technical requirements as well as the content and subject matter of the site development plan shall be taken into account. The environmental assessment shall be limited to additional or other significant impacts on the environment as well as to necessary updates and elaborations.

In accordance with Sec. 72, para. 1 WindSeeG-E, the assessment of the environmental impact of offshore wind turbines or other energy production installations according to the provisions of the UVPG on the basis of an SEA already carried out according to Sec.s 5 to 12 WindSeeG-E for the site development plan or the site investigation shall be limited to additional or other significant impacts on the environment as well as to any necessary updates and elaborations.

Accordingly, the SEA to be carried out in the procedure for the update and revision of the SDP is to be limited to additional or other significant environmental impacts and to necessary updates and elaborations compared with the SEA for ROP 2021 (in this respect, in accordance with Sec. 5, para. 3, sentences 5–7 WindSeeG-E) and compared with more recent results from site investigations or from SDP 2019 or SDP 2020 (in this respect, in accordance with Sec. 72, para. 1 WindSeeG-E).

Accordingly, the SEA for the revision of the SDP is also based on the environmental reports for the preparation and revision of the SDP from 2019 and 2020. Insofar as new knowledge on existing designations is available and relevant, this will also be taken into consideration.

In the following, the scope of the assessment is therefore limited to additional or other significant environmental impacts as well as to necessary updates and elaborations.

In accordance with Art. 1 of Directive 2001/42/EC on the assessment of the impacts on the environment of certain plans and programmes on the environment (SEA Directive)³, the SEA Directive aims to ensure a high level of environmental protection in order to promote sustainable development and to contribute to the proper integration of environmental considerations into the preparation and adoption of plans well in advance of the actual planning of projects.

The SEA has the task of identifying the likely significant impacts on the environment of implementing the plan, describing them at an early stage in an environmental report, and assessing them. It serves as an effective environmental precaution according to the applicable

² Ordinance on Spatial Planning in the German Exclusive Economic Zone in the North Sea and the Baltic Sea of 19 August 2021, Federal Law Gazette I p. 3886.

³ Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the environmental impacts of certain plans and programmes (OJ L 197 p. 30).

laws and is implemented according to consistent principles, and with public participation. In accordance with Sec. 2, para. 1 UVPG, the following protected assets are to be considered:

- Population & human health, in particular human health,
- fauna, flora, and biodiversity,
- Land, soil, water, air, climate, and seascape,
- Cultural heritage and other material assets as well as
- the interrelationships between the aforementioned protected assets.

The main content document of the Strategic Environmental Assessment is this Environmental Report. It identifies, describes, and assesses the likely significant impacts that the implementation of the SDP will have on the environment and possible alternative planning options, taking into consideration the essential purposes of the plan.

As part of the assessment of the impacts on the protected assets within the meaning of Sec. 2, para. 1 UVPG, the SEA also included the nature conservation law assessments for statutory biotope, site, and species protection, especially according to Sec. 30, 34, and 44 BNatSchG⁴. The special provisions of Sec. 72, para. 2 WindSeeG-E (for marine biotopes) and Sec. 5, para. 3, No. 5 WindSeeG-E were also taken into consideration.

1.2 Brief description of the content and most important objectives of the Site Development Plan

According to Sec. 4, para. 1 WindSeeG, the purpose of the SDP is to make offshore grid

planning designations for the exclusive economic zone (EEZ) of the Federal Republic of Germany.

Sec. 4, para. 2 WindSeeG-E stipulates that for the development of offshore wind turbines and the offshore grid connections required for this purpose, the SDP shall make designations with the objective of

- achieving the (now increased) expansion targets according to Sec. 1, para. 2, sentence 1 WindSeeG-E,
- expanding power generation from offshore wind turbines in a spatially ordered and space-saving manner, and
- ensuring an orderly and efficient use and utilisation of offshore grid connections, and planning, erecting, commissioning, and using offshore grid connections in parallel with the development of power generation from offshore wind turbines.

According to the legal mandate of Sec. 5, para. 1 WindSeeG-E, the SDP contains designations for the period from 2026 for the German EEZ and, subject to the following provisions, for the territorial sea:

1. areas; in the territorial sea, areas may be designated only if the competent country has designated the areas as a possible subject of the Site Development Plan,
2. sites in the areas designated according to Number 1; in the territorial sea, sites can be designated only if the competent state has identified the sites as a possible subject of the site development plan
3. the chronological order in which the designated sites are to be put out to tender according to Sec.s 2, 4, and 5 of Part 3, including the designation of the

⁴ Nature Conservation and Landscape Management Act (Federal Nature Conservation Act - BNatSchG) dated 29 July 2009 (BGBl. I p. 2542), last amended by Art. 1 Act on the Protection of Insect Diversity in Germany and on the

Amendment of Other Provisions dated 18 August 2021 (Federal Law Gazette I p. 3908).

- respective calendar years, and whether the area is to be centrally pre-screened,
4. the calendar years including the quarter in the respective calendar year in which the surcharged offshore wind turbines and the corresponding offshore grid connections are to be commissioned on the specified sites as well as the quarters in the respective calendar year in which the cable of the inner park cabling of the subsidised offshore wind turbines is to be connected to the converter or transformer platform,
 5. the expected generation capacity of offshore wind turbines to be installed in the designated areas and on the designated sites,
 6. locations of converter platforms, collector platforms and, where possible, substations,
 7. routes or route corridors for offshore grid connecting cables,
 8. locations at which the offshore grid connecting cables cross the boundary between the exclusive economic zone and the territorial sea
 9. corridors for cross-border electricity lines,
 10. corridors for possible connections between the installations mentioned in points 1, 2, 6, 7, and 9, and
 11. Standard technical principles and planning principles

For areas in the German EEZ and in the territorial sea, the SDP may designate available grid connection capacities on existing offshore grid connections or on offshore grid connections to be completed in the following years; these may be allocated to pilot offshore wind turbines according to Sec. 95, para. 2 WindSeeG-E. The SDP may make spatial designations for the construction of pilot offshore wind turbines in areas and designate the technical

conditions of the offshore grid connection and resulting technical requirements for the grid connection of pilot offshore wind turbines.

In accordance with Sec. 5, para. 2a WindSeeG-E, the SDP may designate areas for other forms of energy generation outside of areas.

In accordance with Sec. 3, No. 8 WindSeeG-E, an area for other forms of energy generation is an area outside of areas on which offshore wind turbines and plants for other forms of energy generation, each of which is not connected to the grid, can be installed in spatial coherence and which is subject to the approval procedure according to Sec. 2 of the Maritime Facilities Act. According to Sec. 4, para. 3, sentence 1 WindSeeG-E, the objective of these designations is to enable the practical testing and implementation of innovative concepts for energy generation not connected to the grid in a spatially ordered and land-saving manner.

In the context of the SEA, a “classic” offshore wind farm is assumed based on the findings to date with regard to electricity generation within the areas for other forms of energy generation. Impacts on the environment going beyond this are highly dependent on the respective type of use and should therefore be comprehensively examined at the approval level. In this respect, the SEA for the areas for other forms of energy generation is carried out in the same way as the assessment of sites for offshore wind energy.

1.3 Relationship with other relevant plans, programmes, and projects

The SDP is related to other plans and programmes within the Exclusive Economic Zone (EEZ) and adjacent areas, in particular in the territorial sea, as well as to plans and projects at upstream and downstream planning and licensing levels. Detailed information can be found in the scope for the current SEA dated 30 June 2022 to which reference is made here.

1.4 Presentation and consideration of the environmental conservation objectives

The update and revision of the SDP and the implementation of the SEA will be carried out with due consideration for the environmental conservation objectives. These provide information on the state of the environment to be aimed for (environmental quality objectives). The environmental conservation objectives can be seen in an overall view of the international, Community, and national conventions and regulations that deal with marine environmental protection and based on which the Federal Republic of Germany has committed itself to certain principles and objectives.

These are explained in detail in the scope for the current SEA. Please refer to the statements in Chapter 3 of the scope of 30 June 2022.

The environmental reports on ROP 2021 contain a description of how compliance with the aforementioned relevant international, EU, and national regulations and recommendations is checked and implemented and which designations are made or which measures are taken. Should there be a need for updating or changes in this respect in the context of the revision of the SDP, a supplementary presentation will be made in this environmental report.

1.5 Methodology of the Strategic Environmental Assessment

When carrying out the Strategic Environmental Assessment, various approaches to the planning status can be considered within the framework of the methodology. This Environmental Report builds on the methodology used in the Strategic Environmental Assessments of SDP 2019 and SDP 2020.

The methodology is based primarily on the designations of the plan to be examined. Within the framework of this SEA, it is determined, described, and evaluated for each of the designations whether the designations have likely sig-

nificant impacts on the protected assets concerned. In accordance with Sec. 1, para. 4 UVPG in conjunction with Sec. 40, para. 3 UVPG, in the environmental report the competent authority provisionally assesses the environmental impacts of the designations with regard to effective environmental precautions in accordance with applicable laws. According to the special legal standard of Sec. 5, para. 3, sentence 1, No. 2 WindSeeG, the designations may not pose a threat to the marine environment. In addition, the provisions of Sec. 5, para. 3, sentence 1, No. 5 WindSeeG-E (protected areas) and Sec. 72, para. 2 WindSeeG (marine biotopes) must be observed in particular.

The subject of the environmental report corresponds to the designations of the SDP as listed in Sec. 5, para. 1 and 2a WindSeeG (see 1.2).

The methodology of the Strategic Environmental Assessment is comprehensively explained in the scope for the current SEA. Reference is made at this point to the defined scope of 30 June 2022.

Area of investigation

The SUP area of investigation covers the German EEZ of the Baltic Sea. The adjacent territorial sea and the adjacent areas of the neighbouring states are not directly the subject of this plan; however, they are considered as part of the cumulative and transboundary consideration of this SEA where necessary.

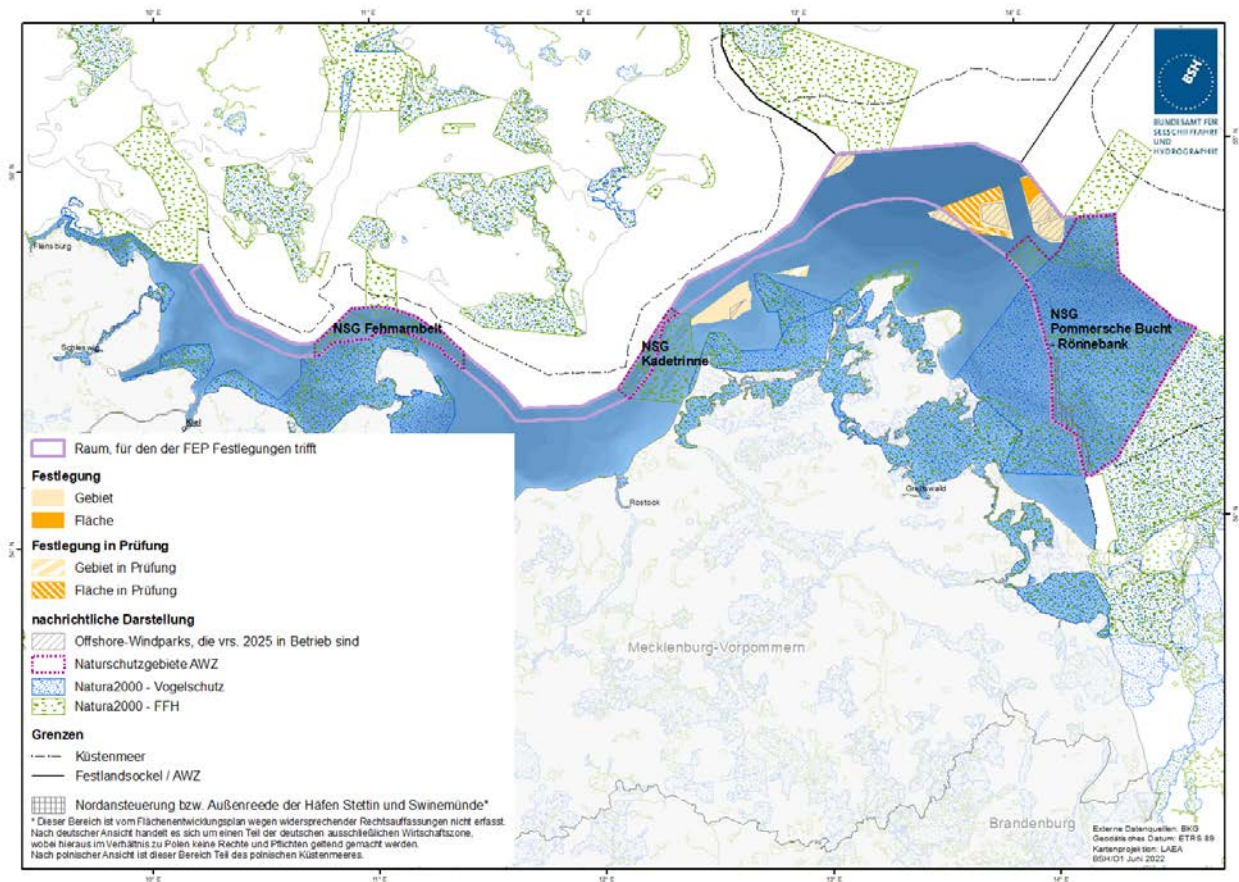


Figure 1: Delimitation of the area of investigation for the SEA of the site development plan – in this case, the EEZ of the Baltic Sea.

1.6 Data sources and indications of difficulties in compiling the documents

With regard to the data and knowledge bases for the SEA, please refer to Chapter 5 of the scope for the current SEA dated 30 June 2022.

Indications of difficulties in compiling the documents

Indications of difficulties arising when compiling the data (e.g. as technical gaps or lack of knowledge) are to be presented according to Sec. 40, para. 2, number 7 UVPG. There are still gaps in knowledge in places, especially with regard to the following points:

- Long-term effects from the operation of offshore wind farms
- Effects of shipping on individual protected assets
- Effects of research activities
- Data for assessing the environmental status of the various protected assets for the area of the outer EEZ
- Cumulative effects

In principle, forecasts on the development of the living marine environment after implementation of the SEA for ROP 2021 remain subject to certain uncertainties. There is often a lack of long-term data series or analytical methods (e.g. for the intersection of extensive information on biotic

and abiotic factors) in order to better understand complex interactions of the marine ecosystem.

In particular, there is a lack of detailed area-wide sediment and biotope mapping outside the nature conservation areas of the EEZ. As a result, there is a lack of a scientific basis on which to assess the impacts of the possible use of strictly protected biotope structures. Currently, a sediment and biotope mapping with a spatial focus on the nature conservation areas is being carried out on behalf of the BfN and in cooperation with the BSH, research and university institutions, and an environmental agency.

Furthermore, there are no scientific assessment criteria for some protected assets, both with regard to the assessment of their status and with regard to the impacts of anthropogenic activities on the development of the living marine environment, to allow cumulative effects to be considered in both temporal and spatial terms.

Various R&D studies on assessment approaches, including for underwater noise, are currently being developed on behalf of the Federal Maritime and Hydrographic Agency. These projects are being used for continuous refinement of a consistent, quality-assured basis of information on the marine environment for assessment of possible impacts of offshore installations.

The environmental report will also list specific information gaps or difficulties in compiling the documents for the individual protected assets.

2 Description and assessment of the environmental status

According to Sec. 40, para. 2, number 3 UVPG, the environmental report includes a description of the characteristics of the environment and the current environmental status in the area of investigation of the SEA. The description of the current state of the environment is required in order to be able to forecast its change upon implementation of the plan. The subject of the inventory are the protected assets listed in Sec. 2, para. 1, sentence 2, Nos. 1 to 4 UVPG as well as interrelationships between them. The information is presented in a problem-oriented fashion. The focus is thus on possible existing impacts, environmental elements requiring special protection, and on the protected assets that will be most affected by the implementation of the plan. In spatial terms, the description of the environment is oriented towards the respective environmental impacts of the plan.

In accordance with Sec. 5, para. 3, sentence 5 WindSeeG-E, the description and estimation of the environmental status is to be limited to additional or other significant impacts on the environment as well as to necessary updates and elaborations. Within the framework of the present SEA, it was examined in detail whether there are any updates or elaborations with regard to the state of the environment. Insofar as no updates or elaborations are required in comparison with the environmental reports on ROP 2021, for the respective protected assets, please refer to the corresponding statements in Chapter 2 of the Baltic Sea Environmental Report on ROP 2021.

2.1 Area

For the protected asset space (Sec. 2, para. 1, No. 3 UVPG), the consumption of land must be considered in particular. Land economy is therefore also reflected in the guidelines and principles of ROP 2021.

The basis for the designations of the current draft of the SDP is the increased statutory expansion targets from Sec. 1, para. 2, sentence 1 WindSeeG-E, which envisage an achievement of 30 GW by 2030, 45 GW by 2035, and 70 GW by 2045. Against the background of the limited availability of land in the German EEZ of the North Sea and Baltic Sea, it must be taken into consideration when designating the expected installed capacity that these expansion targets can be achieved as far as possible with the sites available. In order to achieve the statutory expansion targets, it is therefore imperative that the sites available for offshore wind energy are developed sparingly.

A land-saving development is achieved by designating the expected installed capacity on the sites. As part of the revision of the SDP, the output on individual sites was increased considerably compared with the designations of SDP 2020 in order to achieve efficient land use with regard to the increased expansion targets. Furthermore, this can be ensured by bundling subsea cables as much as possible in the sense of parallel routing as well as routing them parallel to existing structures and built facilities (Sec. 6.4 Draft SDP). On the other hand, an efficient use of land can be achieved by designating technical principles such as the use of more efficient grid connection technologies (Chapter 5 Draft SDP), which can greatly reduce the number of grid connection systems required.

Another aspect of sustainable and efficient use of land resources is the obligation to deconstruct installations, submarine cables, and the like after the end of their operating life so that these sites are available for subsequent use (Chapter 6.1.5 Draft SDP).

2.2 Soil

With regard to the status description and status assessment of the protected asset soil, please refer to the statements in Chapter 2.2 of the Baltic Sea Environmental Report on ROP 2021.

With regard to the data availability on sediment distribution on the soil, there is updated information from the Sediment Mapping in the EEZ project of the BSG, which is being carried out in cooperation with the BfN. Here, the level of knowledge has increased compared with ROP 2021. The current data availability of the – compared with existing maps (e.g. BSH/IOW, 2012) – more detailed maps is shown in Figure 2.

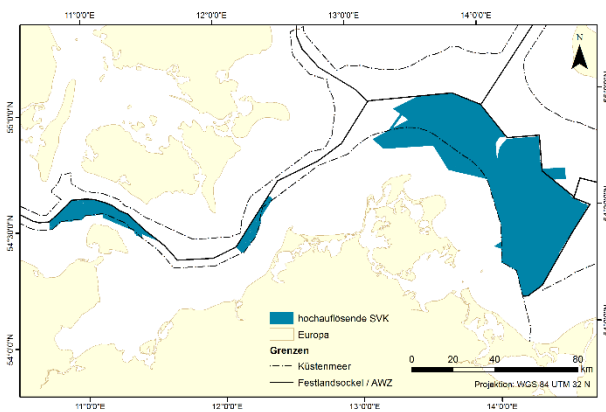


Figure 2: Detailed sediment distribution maps scale 1:10,000 (current data availability).

The current investigations confirm the statements in Chapter 2.2 of the Baltic Sea Environmental Report on ROP 2021.

2.3 Water

With regard to the status description and status assessment of the protected asset water, please refer to the statements in Chapter 2.3 of the Baltic Sea Environmental Report on ROP 2021. Any updates or elaborations of the status description are not apparent compared with the SEA for ROP 2021.

2.4 Plankton

With regard to the status description and status assessment of the protected asset plankton, please refer to the statements in Chapter 2.4 of the Baltic Sea Environmental Report on ROP 2021. Compared with the SEA for ROP 2021, only updates are to be presented.

2.5 Biotopes

With regard to the data availability and status description of the protected asset biotopes, please refer to the statements in Chapter 2.5 of the Baltic Sea Environmental Report on ROP 2021. Compared with the SEA for ROP 2021, only necessary updates or elaborations are to be presented. The new Site O-2.2 to be considered in Area O-2, which has changed in its extent and location compared with SDP 2020, is also included because the same biotopes as in the already considered Area O-2 are expected because of the natural conditions or are already included in the original Site O-2.2 considered in the environmental report on SDP 2020.

Within the framework of the current draft of the SDP, which is published according to the WindSeeG-E, the following standard for assessing the compatibility of the designations with legally protected biotopes results from Sec. 72, para. 2 WindSeeG-E: Sec. 30, para. 2, sentence 1 BNatSchG shall be applied to projects under the WindSeeG with the proviso that a significant adverse effect on biotopes within the meaning of Sec. 30, para. 2, sentence 1 BNatSchG shall be avoided as far as possible.

A consideration of the potential occurrence and potential adverse effect on legally protected biotopes in the areas, sites, and platform sites as well as the routes for subsea cables is provided in Chapter 4.14.

2.6 Benthos

With regard to the status description and status assessment of the protected asset benthos, please refer to the statements in Chapter 2.6 of the Baltic Sea Environmental Report on ROP 2021. Compared with the SEA for ROP 2021, only updates or elaborations are to be presented. The assessment of the status described there is supplemented by the findings from newly collected data described below.

Area O-1.3

For Site O-1.3, new findings are available from investigations carried out in autumn 2018 and spring 2019 (IFAÖ 2019); these largely confirm the statements made in the Baltic Sea Environmental Report on ROP 2021 and the Environmental Report on SDP 2020. Thereafter, the area is colonised by a community of silt-rich soft-bottom fauna below the halocline. For Site O-1.3, one Red List species is added from the investigations. This is the polychaet *Platynereis dumerilii* (RL category G).

Area O-2, Site O-2.2

With regard to Area O-2, results from baseline studies on the “Baltic Eagle” project in 2018-2019 can be used as a supplement (MARILIM 2019, MARILIM 2020); these data largely confirm the statements made in the Baltic Sea Environmental Report on ROP 2021 and the Environmental Report on SDP 2020. For Area O-2, two Red List species are added from the investigations. These are the bryozoe *Alcyonidium gelatinosum* (RL category 3) and the hydrozoe *Sertularia cupressina* (RL category G). They increase the number of endangered species in Area O-2 to three. However, both species are sessile hard-bottom dwellers and not typical representatives of the silt community typical of Area O-2, and were limited to isolated finds.

Compared with SDP 2020, the location and size of Site O-2.2 located in Area O-2 has changed. Based on the location and the same abiotic conditions, it is assumed here that the settlement by

the benthos is largely the same and please refer to the statements on Area O-2 in the Baltic Sea Environmental Report on ROP 2021 and in the Environmental Report on SDP 2020 as well as the additions here above.

2.7 Fish

With regard to the status description and status assessment of the protected asset fish, please refer to the statements in Chapter 2.7 of the Baltic Sea Environmental Report on ROP 2021. Compared with the SEA for ROP 2021, only updates or elaborations are to be presented.

For Site O-1.3, current results from the site investigations (campaign in autumn 2018, spring and autumn 2019) confirm a characteristic fish community of the south-western Baltic Sea with a stable species and dominance structure (IFAÖ 2019).

2.8 Marine mammals

With regard to the status description and status assessment of the protected asset marine mammals, please refer to the statements in Chapter 2.8 of the Baltic Sea Environmental Report on ROP 2021. Compared with the SEA for ROP 2021, only updates or elaborations are to be presented.

The most up-to-date data on the status of harbour porpoise populations in the Baltic Sea are provided by investigations from MiniSCANS II (Unger et al., 2021) for the Belt Sea area as well as data from Danish, Swedish, and Polish monitoring programmes for the Central Baltic Sea population (Swistún et al., 2019, Owen et al., 2021, ICES 2020). In addition, the data from the SAMBAH project were evaluated with updated models and published (Amundin et al. 2022).

The Mini-SCANS II data indicate a decreasing trend in the Belt Sea since 2011; however, this still needs to be confirmed by trend analysis. Current abundance (Mini-SCANS II) in the Belt

Sea is estimated at 17,301 (95% CI: 11,695–25,688) individuals (Unger et al, 2021).

The population of the central Baltic Sea is estimated at 491 (95% CI: 71–1,105) individuals according to Amundin et al. (2022), and a continued negative trend has been predicted in population models (North Atlantic Marine Mammal Commission and the Norwegian Institute of Marine Research, 2019). However, new acoustic data from Sweden, Denmark, and Poland indicate that the population of the central Baltic Sea is not declining further; with large uncertainties, the data may even indicate a slight increase (Owen et al, 2021, Swistun et al, 2019, ICES, 2020).

Taking these data into consideration, there are no changes in the assessment of the importance of Areas O-1 and O-2: The two areas are of medium importance for the harbour porpoise. The high seasonal importance of the areas results from the possible use by individuals of the separate and highly endangered Baltic Sea population of harbour porpoise during the winter months. Area O-3 is of medium importance.

Seals and grey seals

For the four stock units of harbour seals subdivided according to HELCOM and ICES, the following data are available from the current censuses: in the Limfjord, 1,378 individuals, in Kattegat and the Danish Belt Sea, 8,023, in the south-western Baltic Sea, 1182, and in Kalmarsund, 1778 individuals in 2019 (Kalmarsund) or 2020 (all other stock units) (ICES, 2021).

The grey seal population in the Baltic Sea is estimated at 40,000 animals, thereby confirming a further increase in the stock (ICES, 2021).

The description and assessment of the status of seals does not change with respect to the statements in Chapter 2.8 of the Baltic Sea Environmental Report on ROP 2021. Areas O-1 and O-2 are of low to at most medium importance for seals, and Area O-3 is of low importance.

2.9 Seabirds and resting birds

With regard to the status description and status assessment of the protected asset status and resting birds, please refer to the statements in Chapter 2.9 of the Baltic Sea Environmental Report on ROP 2021. Compared with the SEA for ROP 2021, only necessary updates or elaborations are to be presented.

In addition, current investigations are now available for Areas O-1 and O-2 within the framework of the benchmark assessment and the site investigation. These investigations confirm the already known species composition, its spatial distribution, and the seasonality of the seabird species occurring there (BIOCONSULT SH, IBL & IFAÖ 2020, BIOCONSULT SH & IFAÖ 2020, 2021a, b).

In the meantime, an updated version of the “European Red List of Birds” is available; this contains only one list for Europe and no longer distinguishes between continental Europe (EU) and the area of the 27 member states (EU27) (BIRDLIFE INTERNATIONAL 2021). The red-necked grebe, the velvet scoter, and the black scoter are listed as Vulnerable (VU); the red-necked grebe is newly listed in this category (formerly LC). The long-tailed duck is no longer classified as vulnerable (VU) but rather only as least concern (LC) as are the little gull, the herring gull, the guillemot, and the razorbill (all previously classified as NT - near-threatened) The table was supplemented by the SPEC categories, which categorise the conservation needs of the species (BIRDLIFE INTERNATIONAL 2017). However, these changes do not lead to a changed assessment of the criterion conservation status for the areas under consideration in the overall assessment, especially because of the unchanged status of the species mentioned in the “HELCOM Red List of Baltic Sea Species” (HELCOM 2013).

Table 1 summarises the classification of the most common resting bird species in the EEZ into current national and international threat categories.

Table 1: Assignment of the most important seabird and resting bird species of the German EEZ in the Baltic Sea to the current national and international endangerment categories.

Definition according to IUCN: LC = least concern; NT = near-threatened; VU = vulnerable; EN = endangered; CR = critically endangered (BIRDLIFE INTERNATIONAL 2021). Definition according to SPEC: SPEC 1 = European species requiring global conservation measures (i.e. classified as CR, EN, VU, or NT on a global scale). SPEC 2 = Species WITH, SPEC 3 = Species WITHOUT a distribution focus in Europe, which require Europe-wide conservation measures (i.e. are classified on a European scale as Regionally Extinct, CR, EN, VU, NT or as having a declining or depleted population or as rare; BIRDLIFE INTERNATIONAL 2017).

Common name (<i>Scientific name</i>)	Appendix I of V-RL ¹	European Red List of Birds ²	HELCOM Red List of Baltic Sea Species ³	SPEC Category ⁴
Red-throated diver (<i>Gavia stellata</i>)	X	LC	CR	3 _a
Black-throated diver (<i>Gavia</i>)	X	LC	CR	3 _a
Slavonian grebe (<i>Podiceps auritus</i>)	X	NT	NT	1 _{a+b}
Red-necked grebe (<i>Podiceps grisegena</i>)		VU	EN	
Little gull (<i>Hydrocoloeus minutus</i>)	X	LC	NT	3 _{a+b}
Herring gull (<i>Larus argentatus</i>)		LC		2 _b
Greater black-backed gull (<i>Larus marinus</i>)		LC		
Common gull (<i>Larus canus</i>)		LC		
Long-tailed duck (<i>Clangula</i>)		LC	EN	1 _a
Velvet scoter (<i>Melanitta</i>)		VU	EN	1 _a
Black scoter (<i>Melanitta</i>)		VU	EN	
Black guillemot (<i>Cepphus</i>)		LC	NT	
Guillemot (<i>Uria aalge</i>)		LC		3 _b
Razorbill (<i>Alca</i>)		LC		1 _b

¹ Directive 2009/147/EC of the European Parliament and of the Council

² BIRDLIFE INTERNATIONAL (2021) European Red List of Birds.

³ HELCOM (2013) HELCOM Red List of Baltic Sea species in danger of becoming extinct.

⁴ BIRDLIFE INTERNATIONAL (2017) European Birds of Conservation Concern

a hibernating

b breeding

Compared with the Baltic Sea Environmental Report on ROP 2021, there have been no changes in the state of knowledge on the occurrence and distribution of species in the area under consideration and on the status assessment.

According to current knowledge, the assessments in the Baltic Sea Environmental Report on ROP 2021 remain valid.

2.10 Migratory birds

With regard to the status description and status assessment of the protected asset migratory birds, please refer to the statements in Chapter 2.10 of the Baltic Sea Environmental Report on ROP 2021. Compared with the SEA for ROP 2021, only necessary updates or elaborations are to be presented. The status assessment of these areas and sites continues to be valid – even against the background of the designations of the present draft of the SDP.

2.11 Bats and bat migration

For a status description and status assessment of the protected asset bats, please refer to Chapter 2.11 of the Baltic Sea Environmental Report on ROP 2021. Compared with the SEA for ROP 2021, only necessary updates or elaborations are to be presented.

In addition, current findings from the BfN research project “BATMOVE” (FKZ 3515 821900) are now available (SEEBENS – HOYER et al. 2021). As part of the research project, acoustic data on the occurrence of bat migration was collected at seven stations in the German Baltic Sea. The westernmost station was on the Fehmarn Belt, the easternmost on the Arkona platform. Overall, bat activity was measured at all stations. The Arkona platform showed the least bat activity. However, the authors point out that at some stations, including the Arkona platform, data were collected only over a short period of time so far. Further years of investigation are necessary. In addition, the current data sources are not sufficient in order to be able to identify geographical patterns in the sense of potential densification areas over the Baltic Sea. Overall, the BATMOVE research project confirms the current state of knowledge about bat migration over the Baltic Sea. Further investigations are needed in order to be able to describe this in more detail.

Compared with the Baltic Sea Environmental Report on ROP 2021, there have been no fundamental changes in the state of knowledge on the occurrence and intensity of bat migration. According to current knowledge, the estimates in the Baltic Sea Environmental Report on ROP 2021 remain valid.

2.12 Biological diversity

With regard to the status description status and assessment of biodiversity, please refer to the statements in Chapter 2.12 in the Baltic Sea Environmental Report on ROP 2021. The SEA has shown that no necessary updates or elaborations are apparent in this respect.

2.13 Air

With regard to the status description and estimation of the protected asset air, please refer to the statements in Chapter 2.13 of the Baltic Sea Environmental Report on ROP 2021. The SEA has shown that no necessary updates or elaborations are apparent in this respect.

2.14 Climate

With regard to the status description and status assessment of the protected asset climate, please refer to the statements in Chapter 2.14 of the Baltic Sea Environmental Report on ROP 2021. The SEA has shown that no necessary updates or elaborations are apparent in this respect.

2.15 Seascape

With regard to the status description and status assessment of the protected asset seascape, please refer to the statements in Chapter 2.15 of the Baltic Sea Environmental Report on ROP 2021. The SEA has shown that no necessary updates or elaborations are apparent in this respect.

2.16 Cultural heritage and other material assets

With regard to the status description and status assessment of the protected asset cultural heritage and other material assets, please refer to the statements in Chapter 2.16 in the Baltic Sea Environmental Report on ROP 2021. The SEA has shown that no necessary updates or elaborations are apparent in this respect.

2.17 Protected asset human beings, including human health

With regard to the status description and status assessment of the protected asset humans, please refer to the statements in Chapter 2.17 of the Baltic Sea Environmental Report on ROP 2021. The SEA has shown that no necessary updates or elaborations are apparent in this respect.

2.18 Interrelationships between the protected assets

With regard to the interrelationships of the various components with each other, please refer to the statements in Chapter 2.18 in the Baltic Sea Environmental Report on ROP 2021. The SEA has shown that no necessary updates or elaborations are apparent in this respect.

3 Expected development in the event of non-implementation of the plan

The development of offshore wind energy plays a key role in meeting the climate protection and energy policy objectives of the German government. This is also reflected in the statutory expansion targets for offshore wind energy (Sec. 1, para. 2, sentence 1 WindSeeG).

The purpose of the SDP is to spatially define the areas and sites for wind turbines as well as the expected installed capacity on them and the necessary routes and locations for the entire required grid infrastructure or grid topology in the EEZ (Sec. 4, para. 2, Sec. 5 WindSeeG-E). Furthermore, the SDP also develops the temporal component of the development by determining the temporal sequence of the calls for tender for the sites for offshore wind turbines and the calendar years of the commissioning of grid connections. The SDP also specifies which site is to be centrally pre-surveyed and which is not in accordance with Sec. 5, para. 1, sentence 1, No. 3 WindSeeG-E). In addition, areas for other forms of energy generation can also be spatially designated for the practical testing and implementation of innovative concepts.

In accordance with the explanatory memorandum to WindSeeG-E, there are no alternatives (BT-Drs. 20/1634, p. 60). The law is necessary to achieve Germany's ambitious expansion targets for offshore wind energy as a significant contribution to the climate targets. On 3 February 2022, nature conservation issues relating to the development of offshore wind energy were discussed with nature conservation associations together with the Federal Minister for Environment, Nature Conservation, Nuclear Safety and Consumer Protection. On 8 February 2022, the existing offshore dialogue process was continued at ministerial level with the participation of the

Federal Ministry for Environment, Nature Conservation and Nuclear Safety, the Federal Ministry for Digital and Transport, the BNetzA, the BSH, the BfN, the transmission system operators, and the offshore industry. A broad consensus emerged for the further development of offshore wind energy and the implementation of the expansion targets.

Against this background and in view of the drastic consequences of climate change – also for the marine environment – which would have to be expected if the climate protection targets were not achieved, the assumption of a zero alternative in which development is assumed without the additional development of offshore wind energy is unrealistic.

In order to meet the expansion targets set out in Sec. 1, para. 2, sentence 1 WindSeeG-E, the construction of offshore wind turbines is necessary. As described above, no viable alternatives with which the climate protection targets could otherwise be achieved are currently apparent. Accordingly, the legislature considered the adverse effects on the marine environment caused by the legally defined expansion targets for offshore wind energy against the achievement of the climate protection targets within the framework of the expansion targets according to Sec. 1, para. 2, sentence 1 WindSeeG-E in favour of the orderly development of wind energy up to those expansion targets. As a result of this decision, the SDP serves the spatially and temporally ordered and efficient development of offshore wind energy with a series of additional regulations designed to minimise the adverse effect on the marine environment of the Baltic Sea.

In order to be able to feed the electricity generated in the offshore wind farms in the EEZ into the onshore extra-high voltage grid, it is absolutely necessary to lay current-carrying subsea cables to the grid connection points on land. In this respect, too, there is no apparent alternative to the planned expansion targets for offshore

wind energy (including its grid connection) because of the need to protect the climate. In this framework, too, comprehensive planning by the SDP promotes the sparing use of land, and further regulations in the WindSeeG ensure that the environmental impacts of the subsea cables and pipelines identified in the SDP are as low as possible in each case.

With regard to the assessment for the individual protected assets, please refer to the statements in Chapter 3 of the Baltic Sea Environmental Report on SDP 2020. In this respect, no additional or other significant impacts are to be expected from the present revision of the plan. Furthermore, the SEA revealed that no required updates or elaborations are apparent with regard to the likely development in the case of the non-implementation of the plan.

4 Description and assessment of likely significant effects on the marine environment of implementing the Site Development Plan

In the following, the description and evaluation of the impacts on the environment concentrate on the protected assets for which significant impacts cannot be excluded from the outset by the implementation of the SDP. This includes the protected assets soil/space, benthos, biotopes, fish, marine mammals, seabirds and resting birds, migratory birds, bats and bat migration, climate, seascape, and cultural heritage and other material assets

According to Sec. 40, para. 1, sentence 2 UVPG, the likely significant impacts on the environment of the implementation of the plan must be assessed. According to Sec. 40, para. 3 UVPG, the environmental impacts of the plan are provisionally assessed with a view to effective environmental precaution. According to Sec. 3, sentence 2 UVPG, the environmental assessment serves to ensure effective environmental precaution according to the applicable laws. According to Sec. 5, para. 3, No. 5 WindSeeG-E, the SDP shall exclude any threat to the marine environment with regard to the designations contained in the plan. The marine environment includes the protected assets and their habitat, including possible interrelationships, described in this environmental report. In the corresponding assessment of adverse effects on the marine environment, the special designations of Sec. 5, para. 3, No. 5 WindSeeG-E (with regard to protected areas) and Sec. 72, Para. 2 WindSeeG-E (with regard to legally protected biotopes) must also be observed.

Protected assets for which a significant adverse effect was ruled out in the environmental report on the SDP 2020 (cf Chapter 2) and for which an assessment of the question of whether there are

indications of additional or other significant environmental impacts or whether updates or elaborations of the SEA already carried out seem necessary for this protected asset are not taken into consideration (Sec. 72 para. 1 WindSeeG-E). This concerns the protected assets plankton, water, and air as well as the protected asset humans, including human health. Possible impacts on the protected asset biological diversity are dealt with under the individual protected biological assets. All the protected assets listed in Sec. 2, para. 1 UVPG are investigated before the reviews for the legal framework governing the conservation of natural habits and species are presented. Statements on the general protection of nature and seascape according to Sec. 13 BNatSchG are also covered in the assessment of the individual protected assets.

4.1 Soil/space

4.1.1 Areas, sites, and platforms

Wind turbines and platforms are still almost exclusively installed as deep foundations. The construction and operation of wind turbines can have various impacts on the protected assets soil and land; these are described in detail in Chapter 4.1.1 of the Baltic Sea Environmental Report on SDP 2020.

Overall, even if the development of offshore wind energy in Area O-2 is extended to include Site O-2.2, there is no reason to worry about any significant impacts on the protected assets soil and land.

4.1.2 Subsea cables

The construction and operation-related impacts caused by submarine cables are described in detail in Chapter 4.1.2 of the Baltic Sea Environmental Report on SDP 2020.

With regard to the protected asset soil, no significant negative impacts are to be expected from the designations in the current draft of the SDP

on subsea cables. On the contrary, adverse impacts are avoided in comparison with non-implementation of the plan because the designations of the plan aim to minimise the use of the soil by reducing and bundling grid connection systems and minimising crossing structures.

With regard to the protected asset land, no significant impacts are to be expected as a result of the designations of the current draft of the SDP. In total, based on the information on the model wind farm (in accordance with Chapter 4.5.3 of the scope of the current SEA), 0.027% of the area of the EEZ of the Baltic Sea is directly taken up by the designations of the current draft of the SDP for Scenario 1 and 0.025% for Scenario 2.

4.2 Benthos

4.2.1 Areas and sites

The construction and operation of wind turbines can have various impacts on the macrobenthos; these are described in detail in Chapter 4.2.1 of the Environmental Report on SDP 2020. These impacts can occur in a comparable manner in all areas designated for wind energy use. The impact on individual benthic species and communities depends on their specific sensitivity to disturbances and, if necessary, must be assessed on a case-by-case basis in the subordinate planning and approval levels based on additionally collected inventory data. Compared with SDP 2020, the current draft of the SDP includes an expanded site for wind energy and is accompanied by partially higher land use on the individual sites. Nevertheless, according to the current state of knowledge, this does not result in any significant impacts on the protected asset benthos. Only small areas (usually 0.1–0.2% of the individual area) outside protected areas will be permanently affected by the project. Overall, the construction-related impacts on the protected asset benthos are assessed as short-term and small-scale; this is confirmed by findings from the operational monitoring of wind farms already in operation.

4.2.2 Platforms

The construction, installation, and operation-related impacts of the converter platforms on the benthic fauna largely correspond to those of the wind turbines and are described in detail in Chapter 4.2.2 of the Environmental Report on SDP 2020. They are spatially or temporally limited so that no significant adverse effects are to be expected. Additional, potentially significant impacts compared with SDP 2020 are not currently expected.

4.2.3 Subsea cables

The laying and operation of subsea cables can also have impacts on the macrozoobenthos. Detailed descriptions can be found in Chapter 4.2.3 of the Environmental Report on SDP 2020. These impacts are small-scale and apply in a comparable way to all transmission line corridors. Taking into consideration the currently already applied preventive and mitigation measures, no significant impacts on the benthic communities are expected from the laying and operation of the subsea cables.

4.3 Biotopes

Possible impacts of the construction and operation of wind turbines and platforms and the laying and operation of subsea cables on the protected asset biotopes correspond to those described in Chapter 4.1 and Chapter 4.2 on the protected assets soil and macrozoobenthos.

They can result from a direct claim on biotopes, a possible cover by sedimentation of material released as a result of construction, and potential habitat changes. Significant construction-related, site-related, and operational impacts for biotopes not protected by law can generally be ruled out based on the assessments described in Chapter 4.1 and Chapter 4.2. Permanent habitat changes caused by the installation are limited to the immediate area of rockfills required in the case of subsea cables.

A special consideration of the possible loss of function and area and thus the significant adverse effect on the legally protected biotopes according to Sec. 30 BNatSchG is given in Chapter 4.14.

4.4 Fish

4.4.1 Areas and sites

According to current knowledge, the development of offshore wind energy is not expected to have any significant impacts on fish fauna as a result of the construction, foundations, and operation of WT. Detailed descriptions can be found in Chapter 4.4.1 of the Baltic Sea Environmental Report on SDP 2020. The statements made there are supported by current findings. For example, investigations from Belgian OWF showed increased fish densities of various species (e.g. plaice, sole, or striped lyrefish) inside the OWFs compared with outside (DEGRAER et al. 2020). In addition to the reef effect, the increased fish abundance could also be related to the restrictions on fishery in the OWF sites. In addition, after nine years of investigation in the Belgian OWF "C-Power", there are first indications of a refuge effect for certain fish species (DEGRAER et al. 2020).

In general, the impact assessments to date are based on the assumption of a navigation ban in the OWF sites and the associated exclusion of active fishery. If these conditions change, an adjustment of the impact assessment for the fish fauna is to be expected.

After reviewing the representations in the environmental reports on SDP 2020, there are, according to current knowledge, no additional or other significant impacts on the protected asset fish for the current draft of the SDP.

4.4.2 Platforms

The construction-, installation- and operation-related impacts of the converter platforms on the fish fauna are spatially and temporally limited;

this no significant adverse effects are to be expected. Detailed descriptions can be found in Chapter 4.4.2 of the Baltic Sea Environmental Report on SDP 2020. No additional or other significant impacts are currently expected as a result of the revision of the plan; furthermore, the SEA revealed that no required updates or elaborations are apparent.

4.4.3 Subsea cables

The general impacts of submarine cables on fish fauna are presented in Chapter 4.4.3 of the Baltic Sea Environmental Report on SDP 2020. The development of subsea cables and pipelines generally takes into consideration the gentlest possible laying methods, the bundling of pipelines, and an optimised cable laying procedure.

Compared with the SEA for SDP 2020, no additional or other significant impacts of subsea cables on the protected asset fish are to be expected as a result of the increased development; furthermore, the SEA revealed that no necessary updates or elaborations are apparent.

4.5 Marine mammals

4.5.1 Areas and sites

The function and importance of the areas for wind energy (O-1 to O-3) in the German EEZ of the Baltic Sea for harbour porpoises were assessed in Chapter 2 according to current knowledge. One change compared with SDP 2020 is the extension of Site O-2.2.

By designating or expanding these areas for offshore wind energy in ecologically suitable locations outside nature conservation areas, negative impacts on marine mammals are avoided and reduced. In addition, designations were made for the protection of the marine environment with regard to the consideration of best environmental practice in accordance with the Helsinki Convention as well as the state of the art. In this context, regulations on the avoidance and

mitigation of negative impacts on marine mammals caused by the construction and operation of wind turbines, in particular in the form of noise mitigation requirements, which may also provide for the coordination of construction work on projects erected at the same time, are to be adopted at the approval level. This corresponds to the current approval practice. By means of measures ordered in the downstream approval procedures and taking into consideration the current state of science and technology in the reduction of impulsive noise immission, significant impacts on the harbour porpoise, the harbour seal, and the grey seal can be excluded. Direct disturbance of marine mammals at the individual level as a result of sound emissions during the construction phase, especially during pile driving, is to be expected on a regional and temporary basis. However, because of the high mobility of the animals and the aforementioned measures to be taken to avoid and reduce intensive noise emissions, significant impacts can almost certainly be ruled out. This is also true from the point of view that shipping could have impacts on marine mammals sensitive to disturbance because these impacts are rather short-lived and local. The formation of sediment plumes is largely to be expected on a local and temporal scale. A habitat loss for marine mammals could thus occur locally and for a limited period of time. Impacts from sediment and benthic changes are insignificant for marine mammals because they forage for their prey organisms predominantly in the water column in widespread areas. Impacts at the population level are not known and are rather unlikely because of predominantly short-term and local effects in the construction phase.

Significant impacts of the wind turbines in Areas O-1 to O-3 on marine mammals during the operational phase can also be excluded with certainty based on current knowledge. Investigations carried out as part of the operational monitoring of offshore wind farms have so far not provided any

indications of avoidance effects on harbour porpoises as a result of the operation of wind farms (BioConsult, 2020; IfAÖ et al., 2020; PGU, 2021). This also includes wind farm-related shipping traffic. Investigations have clearly shown that the underwater noise emitted by the installations cannot be clearly identified from other sound sources (e.g. waves or ship noise) even at short distances. The wind farm-related shipping traffic was also hardly differentiated from the general ambient noise, which is introduced by various sound sources such as other shipping traffic, wind, waves, rain, and other uses (Matuschek et al. 2018). So far, avoidance has been observed only during the installation of the foundations; this may be related to the large number and varying operating conditions of vehicles on the site.

As a result of the SEA, according to current knowledge and taking into consideration the protective measures mentioned above, no significant impacts on the protected asset marine mammals are to be expected from the construction and operation of wind turbines within the areas and sites of the plan.

4.5.2 Platforms

The statements made in Chapter 4.5.1 for areas and sites apply to platforms as well.

4.5.3 Subsea cables

The potential construction- and operation-related impacts from subsea cables are set out in Chapter 4.5.2 of the SEA for SDP 2020. Compared with the SEA for SDP 2020, no additional or other significant impacts of subsea cables on the protected asset marine mammals are to be expected; furthermore, the SEA revealed that no necessary updates or elaborations are apparent.

4.6 Seabirds and resting birds

4.6.1 Areas and sites

The general impacts of the areas and sites on seabirds and resting birds are presented in Chapter 4.6.1 of the Baltic Sea Environmental Report on SDP 2020. Compared with the SEA for SDP 2020, no additional or other significant impacts of subsea cables on the protected asset seabirds and resting birds are to be expected as a result of the extension of Site O-2.2. Furthermore, the SEA revealed that no required updates or elaborations are apparent.

4.6.2 Platforms

The general impacts of platforms on seabirds and resting birds are presented in Chapter 4.6.2 of the Baltic Sea Environmental Report on SDP 2020. Compared with the SEA for SDP 2020, no additional or other significant impacts of platforms on the protected asset seabirds and resting birds are to be expected as a result of the extension of Site O-2.2. Furthermore, the SEA revealed that no required updates or elaborations are apparent.

4.6.3 Subsea cables

The general impacts of submarine cables on seabirds and resting birds are presented in Chapter 4.6.3 of the Baltic Sea Environmental Report on SDP 2020. Compared with the SEA for SDP 2020, no additional or other significant impacts of subsea cables on the protected asset seabirds and resting birds are to be expected. Furthermore, the SEA revealed that no required updates or elaborations are apparent.

4.7 Migratory birds

4.7.1 Areas and sites

The construction and operation of wind turbines can have various impacts on bird migration; these are described in detail in Chapter 4.7.1 of the Baltic Sea Environmental Report on SDP 2020.

With regard to the determination of Area O-2 and Site O-2.2, it is pointed out that an assessment and, if necessary, the designation of measures will be required in the context of the subsequent assessment levels in order to mitigate the potential impacts of a wind farm project implemented on Site O-2.2 on bird migration. This is in line with official practice and the approach taken in the “Baltic Eagle” project, which is also located in Area O-2.

According to the current state of knowledge, the designations of the current draft of the SDP do not result in any additional significant impacts.

4.7.2 Platforms

The construction-, installation-, and operation-related impacts of platforms on bird migration are described in detail in Chapter 4.7.2 of the Baltic Sea Environmental Report on SDP 2020. No additional or other significant impacts are currently expected as a result of this revision of the plan. Furthermore, the SEA revealed that no required updates or elaborations are apparent.

4.7.3 Subsea cables

Installation- and operation-related impacts of the planned subsea cables on migratory birds can be excluded with the necessary certainty. A possible collision risk from construction vehicles can be classified as low because of the short-term nature of the construction phase.

4.8 Bats and bat migration

4.8.1 Areas and sites

The impacts of offshore wind energy projects on bats are described in Chapter 4.8.1 of the Baltic Sea Environmental Report on SDP 2020.

In the BATMOVE research project, the authors estimate that at stations with larger offshore structures, unlike at small buoys, the first signs of exploratory behaviour were recorded on the basis of activity patterns. However, further investigations at suitable locations are required for

quantification and more detailed description (SEEBENS-HOYER et al. 2021).

According to the current state of knowledge, no additional or other significant impacts are to be expected as a result of the present revision of the SDP.

4.8.2 Platforms

The construction-, installation-, and operation-related impacts of platforms on bats are described in Chapter 4.8.2 of the Baltic Sea Environmental Report on SDP 2020. No additional or other significant impacts are expected as a result of this revision of the plan; furthermore, the SEA revealed that no necessary updates or elaborations are apparent.

4.8.3 Subsea cables

Significant impacts on bats from the laying and operation of subsea cables can be ruled out with the required degree of certainty.

4.9 Climate

No significant negative impacts on the climate are to be expected as a result of the designations of the site development plan.

The CO₂ savings associated with the development of offshore wind energy is expected to have positive impacts on the climate in the long term. This can make an important contribution to achieving the climate protection goals of the German government.

Assuming the continuation of the current CO₂ avoidance factor of electricity from offshore wind energy (UBA, 2019), this results in a CO₂ avoidance potential of approx. 67 and 143 Mt CO₂ equivalents per year for 2030 and 2038, respectively. For comparison: Annual emissions from power plants in the energy industry were 294.5 Mt CO₂ equivalents per year in 2016 (BMU, 2019).

Table 2 shows the avoidance potential for the years 2020, 2030, and 2038.

Table 2: Calculation of the CO₂ avoidance potential for the years 2020, 2030, and 2038.

	in- stalle d ca- pac- ity	Full load hour s	Annual electric- ity pro- duction	CO ₂ avoidance factor	CO ₂ avoid- ance per year
	GW	h/a	GWh/a	g CO ₂ eq/k Wh	Mt CO ₂ eq/ a
2020	7.2	3,800	27,360	701	19.2
2030	30	3,200	96,000	701	67.3
2038	60	3,400	204,000	701	143.0

4.10 Seascape

4.10.1 Areas and sites

The impacts of the designations of the SDP on offshore wind energy are described in Chapter 4.10.1 of the Baltic Sea Environmental Report on SDP 2020.

Even with the realisation of an offshore wind farm in the area of Site O-2.2, the adverse effect on the seascape by the planned wind turbines can be classified as low because large areas of Site O-2.2 would be hidden by the development on Site O-2.1.

4.10.2 Submarine cable

For subsea cables, negative impacts on the seascape can be ruled out as a result of the laying as submarine cables.

4.11 Cultural heritage and other material assets

The designations for the planning, construction, and operation of wind turbines and subsea cables and pipelines aim to avoid or reduce construction-related disturbances to the soil affecting discovered and undiscovered cultural heritage by involving the specialist authorities at an early stage. Synergy effects are to be promoted through cooperation in the analysis of subsoil investigations and soil samples; this will be carried out in the context of the large-scale development of marine areas for wind energy and can provide new insights into cultural traces such as submerged seascapes.

The SEA for the SDP does not include a systematic survey or assessment of existing underwater cultural heritage. There is also no systematic survey in the downstream procedures; however, occasion-related investigations can be carried out or ordered. Within the scope of the suitability assessment and determination, in particular the underlying preliminary site investigations of the bathymetry as well as the side scan sonar and the magnetometer are compared and, if necessary, verified by means of Remotely Operated Vehicles (ROV). These results of the site investigation are evaluated with regard to the protected asset soil. Cultural assets identified in this evaluation process (e.g. shipwrecks) are included in the suitability assessment.

In the planning approval procedure (which follows the determination of suitability or, in the case of sites that have not been centrally pre-investigated, the designation as a site in the SDP as the next level with environmental assessment), the BSH regularly orders the following in the event that any cultural and material assets are found: On the part of the developer, it must be ensured through suitable measures and with the involvement of monument protection and monument specialist authorities that scientific investigations and documentation of the properties can be carried out before the start of construction

work and that objects of an archaeological or historical nature can be preserved and conserved either on site or through salvage. Conservation on site should be a priority.

According to the current state of knowledge, there is no reason to fear significant impacts on the protected asset cultural heritage and other material assets.

4.12 Cumulative effects

4.12.1 Soil/space, benthos, and biotopes

A significant part of the impacts on the environment of the areas and sites, platforms, and subsea cables on the soil, benthos, and biota will occur only during the construction period (formation of turbidity plumes, sediment redeposition) and in a spatially narrowly defined area. Because of the gradual implementation of the construction projects, significant construction-related cumulative environmental impacts are not particularly likely. Possible significant cumulative impacts on the soil, which could have a direct impact on the protected asset benthos and biotopes, therefore result primarily from the permanent direct land use of the foundations of the turbines, the scour protection required depending on the site conditions, and in part, from the laid cable systems (crossing structures).

According to the precautionary principle, the maximum values resulting from the range of the model wind farm scenarios were used to calculate the land use (cf Chapter 4.5.3 of the scope for the current SEA of 30 June 2022). The calculation of the loss of function due to interarray cabling was carried out in accordance with the reported capacity, assuming a 1 m wide cable trench. In the area of the cable trench, however, the adverse effect on sediment and benthic organisms will be essentially temporary. In the case of crossing particularly sensitive biotopes such as reefs, a permanent adverse effect would have to be assumed.

Based on this conservative estimate, a maximum of 75.18 ha of area will be claimed for the areas and sites for wind energy use or temporarily impaired in the case of interarray cabling. Of this, 0.06 ha or 600 m² is allotted to a converter platform with associated scour protection.

For the subsea cables, this results in a mostly temporary loss of function over an area of around 40.3 ha. Outside the sensitive biotopes, a permanent loss of area and function as a result of the cable systems results exclusively from the crossing structures that become necessary. Based on an area of approx. 750 m² per crossing structure, the direct land use for approx. 45 crossing structures amounts to approx. 3.38 ha. This means that, in total, approx. 118.8 ha of land will be claimed or, in the case of the submarine cables, temporarily adversely affected; this corresponds to a share of approx. 0.27‰ of the total EEZ area.

In addition to the direct use of the soil and thus of the habitat of the organisms that have settled there, the installation foundations, scour protection, and crossing constructions lead to an additional supply of hard substrate. As a result, hard substrate-loving species untypical of the site can colonise and directly or indirectly influence the natural soft substrate community. In addition, artificial substrates can lead to an altered spread of invasive species, among others. These indirect effects can lead to cumulative effects resulting from the construction of several offshore structures or rockfills in crossing areas of subsea cables and pipelines. However, reliable findings on effects beyond the sites of the wind farms or on the altered connectivity of invasive species are not yet available.

Because the (mainly temporary) land use is below 0.1% of the EEZ area in the cumulative consideration of the grid infrastructure and the wind farm areas, according to current knowledge, no significant adverse effects that lead to a threat to the marine environment with regard to the soil

and the benthos are to be expected – even in the cumulation of indirect effects.

An additional potential site for wind energy in the territorial sea was integrated into the cumulative consideration of the SEA of the current draft of the SDP. This is a testing ground located in the territorial sea of the federal state of Mecklenburg-Vorpommern: Because of the relatively amount of land use by the testing ground in relation to the total area under consideration, according to current knowledge, no significant adverse effects are to be expected – even in cumulation – that would lead to a threat to the marine environment with regard to the protected assets soil/space as well as benthos and biotopes.

4.12.2 Fish

The wind farms of the Baltic Sea can have an additive effect beyond their immediate location; this becomes particularly relevant as the number of farms increases. The impacts of the OWFs are concentrated on the regular navigation bans on active fishery that have been imposed up to now as well as on the change in habitat and the corresponding interrelationships.

The general species composition of the fish fauna could change directly because species with different habitat preferences than the established species (e.g. reef dwellers) find more favourable living conditions and occur more frequently. Possible effects of a large-scale development of offshore wind energy and the associated accumulation of local impacts could be:

- a change in species composition and diversity
- establishment and distribution of fish species adapted to reef structures
- an increase in the number of older individuals as a result of the expected reduction in fishing pressure
- better conditions for the fish as a result of a larger and more diverse food base,

In the event of a change to the previous navigation regulations for OWFs and the associated exclusion of active fishery in the OWF sites, a re-assessment of cumulative effects on fish fauna would be necessary.

Overall, there is a need for research on whether and to what extent cumulative effects of OWFs in the Baltic Sea affect the fish stocks of individual species in the long term.

An additional potential site for wind energy in the territorial sea was integrated into the cumulative consideration of the SEA of the current draft of the SDP. This is a testing ground located in the territorial sea of the federal state of Mecklenburg-Vorpommern: Overall, according to current knowledge and in compliance with the known avoidance and mitigation measures, the construction of a testing ground in the territorial sea will not lead to any significant cumulative effects on fish fauna.

4.12.3 Marine mammals

Cumulative impacts on marine mammals, especially harbour porpoises, may occur mainly because of noise exposure during the installation of deep foundations. For example, marine mammals can be significantly affected by the fact that – if pile driving is carried out simultaneously at different locations within the EEZ – there is not enough equivalent habitat available to avoid and retreat to.

So far, the implementation of offshore wind farms and platforms has been relatively slow and gradual. To date, pile driving has been carried out at three wind farms in the German EEZ of the Baltic Sea. Since 2011, all pile driving work has been carried out using technical noise mitigation measures. Since 2014, the noise emission values have been reliably complied with and even undercut thanks to the successful use of noise mitigation systems. There was no temporal overlap of the three construction sites so far. There was thus no overlapping of sound-intensive pile driving works that could have led to cumulative

impacts. Only in the case of the construction of the “EnBW Baltic 2” wind farm was it necessary to coordinate the pile driving work – including the deterrence measures – because of the installation with two erection vessels.

The analysis of the noise results with regard to noise propagation and the possibly resulting accumulation has shown that the propagation of impulsive noise is strongly limited when effective noise-minimising measures are applied (BRANDT et al. 2018, DÄHNE et al., 2017).

In order to avoid and mitigate cumulative impacts on the harbour porpoise population in the German EEZ, the orders of the downstream approval procedure shall specify a restriction of the sound exposure of habitats to maximum permitted proportions of the EEZ and nature conservation areas (BMU, 2013). According to this, the propagation of sound emissions may not exceed defined areas of the German EEZ and nature conservation areas. This ensures that sufficient suitable habitats are available for the fauna to escape at all times. The ordinance primarily serves to protect marine habitats by preventing and minimising disturbances caused by impulsive noise immission. The ordinance of avoidance and mitigation measures in areas O-1 and O-2 will also focus in particular on the protection of animals of the highly endangered population of the central Baltic Sea.

An additional potential site for wind energy in the territorial sea was integrated into the cumulative consideration of the SEA of the current draft of the SDP. This is a testing ground located in the territorial sea of the federal state of Mecklenburg-Vorpommern:

Significant cumulative effects for marine mammals resulting from the realisation of the test site can be ruled out in consideration of avoidance and mitigation measures. The SDP areas for wind energy in the German EEZ are located at distances of over 70 km from the testing ground

under review. The distance to the nature conservation area “Kadetrinne” is approx. 17 km, impacts resulting from noise immission during pile driving can thus be excluded. The distance of the testing ground in the assessment from the EEZ or shipping routes in the EEZ also suggests that cumulative effects from the WT in the testing ground in the assessment and shipping traffic are also to be classified as not substantial. However, the areas and sites for the development of offshore wind energy in the German EEZ of the Baltic Sea are located at such large distances that even a synchronous installation in the testing ground and in areas of the EEZ could not lead to any cumulative effects as a result of noise immission.

As a result, the current state of knowledge confirms that, through appropriate avoidance and mitigation measures at the approval level, significant impacts as a result of impulsive noise immission during installation work in the testing ground or cumulative impacts as a result of simultaneous installation work with other offshore projects can be ruled out with the necessary certainty.

4.12.4 Seabirds and resting birds

For the protected asset seabirds and resting birds, it was assessed whether additional or other significant environmental impacts arise compared with the SEA for the existing SDP 2020 or the SEA for ROP 2021. In addition, an examination was carried out to determine whether an update and elaboration of the assessment of the impacts on the protected asset seabirds and resting birds was necessary. The assessment has shown that there are no additional or other significant environmental impacts and that, in this respect, no updates or elaborations are required compared with the SEA on SDP 2020.

An additional potential site for wind energy in the territorial sea was integrated into the cumulative consideration of the SEA of the current draft of

the SDP. This is a testing ground located in the territorial sea of the federal state of Mecklenburg-Vorpommern:

Impacts during the construction phase of the testing ground such as scaring and attraction are limited in time and space. Significant cumulative installation- or operation-related impacts can be excluded with the necessary certainty because of the large distances to other wind farm projects. Therefore, according to current knowledge, no significant cumulative effects of the testing ground in the test on seabirds and resting birds are to be assumed.

4.12.5 Migratory birds

For the description and assessment of cumulative effects, please refer to Chapter 4.12.5 of the Baltic Sea Environmental Report on SDP 2020. At the present time, there are no findings to the contrary. The description and assessment of cumulative effects there therefore continue to apply to the designations in the current draft of the SDP. Thus, no additional or other significant impacts are expected as a result of this revision of the SDP; furthermore, the SEA revealed that no necessary updates or elaborations are apparent.

An additional potential site for wind energy in the territorial sea was integrated into the cumulative consideration of the SEA of the current draft of the SDP. This is a testing ground located in the territorial sea of the federal state of Mecklenburg-Vorpommern: For a final assessment on bird migration, the LEP refers to the downstream approval level, where concrete data on bird migration would be available, and points out possibilities for monitoring during operation and ordinances for shut-down periods. The BSH also agrees with this estimation for the testing ground in testing. Based on current knowledge, no significant cumulative impacts are identified. A detailed examination and, if necessary, the ordinance of measures must take place within the framework of the specific approval procedure.

4.13 Interrelationships

With regard to the description and assessment of interrelationships, please refer to the statements in Chapter 4.13 of the Baltic Sea Environmental Report on ROP 2021.

4.14 Review of biotope protection law

In accordance with Sec. 30, para. 2, sentence 1 BNatSchG, all actions that may cause destruction or other significant adverse effect on the biotopes listed in Sec. 30, para. 2, sentence 1 BNatSchG are generally prohibited. In accordance with Sec. 72, para. 2 WindSeeG-E, Sec. 30, para. 2 BNatSchG shall be applied to projects under the WindSeeG with the proviso that a significant adverse effect on biotopes within the meaning of Sec. 30, para. 2, sentence 1 BNatSchG shall be avoided as far as possible.

The direct and permanent utilisation of a biotope, which is protected according to Sec. 30, para. 2 BNatSchG, is generally considered to be a significant adverse effect. Following the methodology of LAMBRECHT & TRAUTNER (2007), an adverse effect can be classified as non-substantial in individual cases if, taking into consideration all impact factors and considering them cumulatively, various qualitative–functional, quantitative–absolute, and relative criteria are met. A central component of this evaluation approach is the orientation values for quantitative-absolute area losses of an affected biotope occurrence, which may not be exceeded depending on its overall size. A maximum value of 1% has been established as a guideline for relative land loss. Because a detailed assessment cannot be carried out within the framework of the SDP because of the lack of biotope mapping for most areas and sites, please refer to the subordinate planning and approval levels. A detailed description of the interventions to be taken into consideration, which could represent significant adverse effects within the meaning of the BNatSchG, has already been provided in the environmental reports on ROP 2021 and SDP

2020. The statements made there on the occurrence and potential impact of the individual areas and sites for wind turbines and transmission line corridors also remain valid.

Compared with the standard of the previous assessment based on Sec. 30, para. 2 BNatSchG, Sec. 72, para. 2 WindSeeG-E sets lower requirements for possibly permissible adverse effects on legally protected biotopes. Therefore, in the absence of indications of additional or other significant impacts, it can be concluded from the result of the SEA on SDP 2020 in the first-law conclusion that the requirements of Sec. 72, para. 2 WindSeeG-E are also met by the designations in the current draft of the SDP.

In the following, only findings that deviate from the representations in the environmental reports for ROP 2021 and SDP 2020 based on new data and new areas and sites included in the SDP are presented. Furthermore, the subsea cables outside the sites and areas are considered separately.

Area O-2

In accordance with the investigations carried out in this area (IFAÖ 2020a, 2020b), no occurrences of legally protected biotopes are to be expected.

Area O-2.2

No occurrences of legally protected biotopes are to be expected in the area of Site O-2.2.

Subsea cables

No statement can be made on the use of specially protected biotopes under Sec. 30, para. 2 BNatSchG because of the lack of a reliable scientific basis. An area-wide sediment and biotope mapping of the EEZ, which is currently being carried out, will provide a more reliable assessment basis.

In practice, protected biotopes are usually bypassed in the course of route planning; significant adverse effects are thus generally avoided.

4.15 Species protection law assessment

With regard to the assessment under species protection law, please refer to the statements in Chapter 5 of the Baltic Sea Environmental Report on ROP 2021. In this context, the SEA in the current revision procedure of the SDP is limited to additional or other significant environmental impacts as well as to necessary updates and elaborations according to Sec. 5, para. 3, sentences 5–7 WindeeG-E.

At the present time, there are no findings that indicate the realisation of prohibited species under species protection law for the species under consideration. With regard to the comments on bird migration and the designation of Site O-2.2, please refer to the comments in Chapter 4.7.1 of this SEA. A detailed audit must be carried out at the downstream audit level.

4.16 Compatibility assessment/review for the legal framework governing the conservation of natural habits

With regard to the review for the legal framework governing the conservation of natural habits, please refer to the statements in Chapter 6 of the Baltic Sea Environmental Report on ROP 2021. In this context, the SEA in the current revision procedure of the SDP is limited to additional or other significant environmental impacts as well as to necessary revision updates and elaborations, which are not identifiable with regard to the habitat protection for the EEZ of the Baltic Sea according to Sec. 5, para. 3, sentences 5–7 WindeeG-E.

4.17 Transboundary impacts

The present SEA concludes that, as things stand at present, the designations of the current draft of the SDP do not have significant impacts on the areas of the neighbouring countries bordering the German EEZ of the Baltic Sea.

For the protected assets soil and water, plankton, benthos, biotopes, seascape, and cultural heritage and other material assets as well as humans, including human health, significant transboundary impacts can generally be excluded. In the area of the German Baltic Sea, significant transboundary impacts could arise for the highly mobile protected biological assets fish, marine mammals, seabirds, and resting birds as well as migratory birds and bats only if considered cumulatively.

For the protected asset fish, the SEA concludes that, according to current knowledge, no significant transboundary impacts on fish are to be expected from the implementation of the SDP because the identifiable and predictable effects are small-scale and temporary in nature.

This also applies to the protected assets marine mammals as well as sea and resting birds. These use the designated areas and sites for offshore wind energy predominantly as migration areas. There is unlikely to be any significant loss of habitat for strictly protected marine and resting bird species. Based on current knowledge and taking into consideration impact-reducing and damage-limiting measures, significant transboundary impacts can be ruled out.

For example, the installation of the foundations of wind turbines and platforms is permitted in the specific approval procedure only if effective noise mitigation measures are implemented. Against the background of the special threat of the separate Baltic Sea population of harbour porpoise, intensive monitoring measures are to be carried out as part of enforcement and, if necessary, the noise mitigation measures are to be adapted or the construction work coordinated in order to exclude any cumulative effects.

For migratory birds, the wind turbines and platforms erected on the sites of the current draft of the SDP may constitute a barrier or a collision risk. The collision risk should be minimised by taking appropriate measures to avoid attraction

effects (e.g. through lighting). With regard to the barrier effect, a conclusive cumulative consideration is not possible with the current state of knowledge.

A cumulative assessment of the hazard risk for bat migration is also not possible at this stage because sufficient knowledge of migration routes, migration heights, and migration intensities is still lacking. It can generally be assumed that any significant transboundary impacts will be prevented by the designations of the SDP in the same way that appropriate avoidance or minimisation measures are applied to bird migration.

5 Evaluation of the overall plan

In summary, with regard to the planned areas and sites, platforms, and submarine cable routes, the orderly, coordinated overall planning of the SDP will minimise impacts on the marine environment as far as possible. With strict adherence to preventive and mitigation measures, in particular noise mitigation during the construction phase and to protect bird migration, significant impacts can be avoided through the implementation of the designated areas and sites as well as platforms.

The laying of subsea cables can be designed to be as environmentally friendly as possible by, among other things, avoiding protected areas and biotopes and choosing a minimally disruptive cable laying procedure. The planning principle for the increase of sediment temperature should ensure that significant negative impacts of cable heat-up on benthic communities are prevented. Avoiding crossings of subsea cables with each other as far as possible also serves to prevent negative impacts on the marine environment, in particular on the protected assets soil, benthos, and biotopes.

Based on the above descriptions and assessments, it must be concluded for the SEA, also with regard to any interrelationships, that, according to the current state of knowledge and at the comparatively abstract level of sectoral planning, no significant impacts on the marine environment within the area of investigation are to be expected as a result of the planned designations. The potential impacts are frequently small-scale and mostly short-term because they are limited to the construction phase.

Most of the areas and sites lie within the priority areas for wind energy of ROP 2021. Sufficient knowledge is available for these areas. So far, there is a lack of sufficient scientific knowledge and uniform assessment methods for the cumulative assessment of impacts on individual protected assets such as bird migration and bat migration. Therefore, these impacts cannot be conclusively assessed within the framework of the present SEA or are subject to uncertainties and require more detailed examination within the framework of downstream planning stages.

6 Measures envisaged to prevent, reduce, and offset any significant negative impacts of the site development plan on the marine environment

With regard to the measures envisaged to prevent, reduce, and offset any significant adverse impacts of the SDP on the marine environment, please refer to the statements in Chapter 8 of the Baltic Sea Environmental Report on SDP 2020.

7 Examination of reasonable alternatives

In accordance with Art. 5, para. 1, sentence 1 SEA Directive in conjunction with the criteria in Appendix I SEA Directive and Sec. 40, para. 2, No. 8 UVPG, the environmental report contains a brief description of the reasons for the choice of the reasonable alternatives examined. Essentially, different types of alternatives can be considered for an examination of reasonable alternatives; in particular strategic, spatial or technical alternatives. The prerequisite is always that these are reasonable or can be seriously considered.

In principle, it should be noted that preliminary investigation of possible and conceivable alternatives is already inherent in all designations of the SDP in the form of standardised technical and planning principles. As can be seen from the justification of the individual planning principles, the respective principle is already based on a consideration of possible affected public concerns and legal positions so that a “preliminary examination” of possible alternatives has already taken place. There are already many different uses and legally protected concerns in the EEZ. An overall assessment of the uses and functions in the EEZ has already been carried out as part of the preparation and revision of the maritime spatial plan. The objectives and principles of ROP 2021 are to be largely adopted in the SDP and will be reviewed and weighed up with regard to the specific subjects of regulation of the concerns and rights presented in this procedure.

The zero alternative (i.e. not implementing the SDP) is not a reasonable alternative because the development of offshore wind energy is indispensable for achieving the national climate protection goals according to the current state of technology and scientific knowledge in order to avert drastic negative impacts of anthropological climate change – also for the state of the marine

environment. The importance of achieving the expansion targets is now explicitly stated in Sec. 1, para. 3 WindSeeG-E. Accordingly, the construction of offshore wind turbines and offshore grid connections is in the overriding public interest and serves public safety (cf also Chapter 3).

The purpose and aim of introducing a sectoral plan with not only spatial but also temporal designations and standardised technology and planning principles is the precautionary control of the development of offshore wind energy necessary for climate protection. This is intended to ensure at the planning level that the legally defined expansion targets for offshore wind energy can be achieved through a spatially ordered and land-saving development (Sec. 4, para. 2, No. 2 WindSeeG-E) and that environmental concerns are also examined at the planning level.

A strategic alternative (e.g. with regard to the targets of the federal government on which the planning is based) is not currently being considered for the SDP because the statutory expansion targets of the federal government represent the planning horizon for the current draft of the SDP. The expansion targets result from the legal requirement in Sec. 1, para. 2, sentence 1 WindSeeG-E. These are classified as imperative for climate protection; they are in the overriding public interest and serve public safety. Furthermore, they are also an essential basis for the demand planning of the onshore grid expansion. Because a coordinated approach to onshore and offshore grid and capacity expansion to mitigate vacancies or curtailments appears to make sense, choosing an alternative expansion strategy in this context is out of the question.

Spatial alternatives are rare in view of the underlying territorial context of ROP 2021 and against the backdrop of the considerably increased expansion targets. In accordance with Sec. 1, para. 2 WindSeeG-E, the aim of the WindSeeG is to increase the installed capacity of offshore wind turbines connected to the grid to at least 30 GW by 2030, to at least 40 GW by 2035, and to at least 70 GW by 2045.

As is clear from the designations of the current draft of the SDP, the designated sites are not sufficient to achieve the long-term expansion target of at least 70 GW. In order to keep the need for additional potential areas as low as possible, a comparatively high power density is assumed on the designated sites. Compared with SDP 2020, this has been considerably increased for some sites in the current draft of the SDP. This is based on the results of an accompanying expert report on the SDP revision procedure on behalf of the BSH (Dörenkämper et al., 2022). To determine the expected annual energy production and the influence of shading effects on the electricity yield, extensive modelling was carried out in various development scenarios as part of a scientific report.

As a result, the power density on the sites is considerably increased – even if this reduces the expected full load hours. Thus, a higher overall output is possible on the sites defined in the current draft of the SDP. On the area map of ROP 2021, this leads to a total installed capacity of 57.5 GW (taking into consideration the areas under assessment, N-21 and N-22, around 60 GW) compared with the assumptions in the revision procedure for the ROP. In ROP 2021, a capacity potential of 40 GW was assumed to achieve the statutory expansion target. From an environmental and nature conservation point of view, an increase in power density seems preferable to the alternative of having to develop additional and possibly environmentally sensitive areas.

8 Measures envisaged for monitoring environmental impacts of implementing the site development plan

With regard to the planned monitoring measures, please refer to the statements in Chapter 10 of the Baltic Sea Environmental Report on SDP 2020 and Chapter 10 of the Baltic Sea Environmental Report on the maritime spatial plan of the EEZ.

9 Non-technical summary

9.1 Subject and occasion

In the context of the revision of the SDP initiated on 17 December 2021, areas and sites are defined for the implementation of the statutory expansion targets for offshore wind energy that go beyond SDP 2020 and were therefore not included in the SEA carried out in previous preparation, update, and revision procedures of the SDP.

In contrast to the last revision of the SDP, with the conclusion of the revision procedure for maritime spatial planning, there is now an up-to-date maritime spatial plan, the ROP 2021, including SEA. The revision of the SDP will essentially build on the designations of the maritime spatial planning for offshore wind energy and subsea cables and pipelines and develop them in terms of sectoral planning.

Against this background, the SEA for the revision of the SDP will also be largely based on the results of the SEA carried out in the maritime spatial planning revision procedure. According to Sec. 5, para. 3, sentences 5–7 WindSeeG-E, it must be determined at which stage certain environmental assessments are to be focussed in order to avoid multiple assessments in multi-stage planning and approval processes. The environmental assessment shall be limited to additional or other significant impacts on the environment as well as to necessary updates and elaborations.

In accordance with Sec. 72, para. 1 WindSeeG-E, the assessment of the environmental impact of offshore wind turbines or plants for other forms of energy generation according to the provisions of the UVPG based on an SEA already carried out according to Sec.s 5 to 12 WindSeeG-E for the site development plan or the site investigation shall be limited to additional or other significant impacts on the environment as well as to any necessary updates and elaborations.

Accordingly, the SEA to be carried out in the procedure for the update and revision of the SDP is to be limited to additional or other significant environmental impacts and to necessary updates and elaborations compared with the SEA for ROP 2021 and compared with more recent results from site investigations or from SDP 2020.

In the following, the scope of the assessment is therefore limited to additional or other significant environmental impacts as well as to necessary updates and elaborations.

The main document of the SEA is the present Environmental Report. It identifies, describes, and assesses the likely significant impacts that the implementation of the SDP will have on the environment and possible alternative planning options, taking into consideration the essential purposes of the plan. The update and revision of the SDP and the implementation of the SEA will be carried out with due consideration for the environmental conservation objectives.

9.2 Methodology of the Strategic Environmental Assessment

The methodology is based primarily on the designations of the plan to be examined. Within the framework of this SEA, it is determined, described, and evaluated for each of the designations whether the designations have likely significant impacts on the protected assets concerned. In accordance with Sec. 1, para. 4 UVPG in conjunction with Sec. 40, para. 3 UVPG, in the environmental report the competent authority provisionally assesses the environmental impacts of the designations with regard to effective environmental precautions in accordance with applicable laws. According to the special legal standard of Sec. 5, para. 3, sentence 1, No. 2 WindSeeG, the designations may not pose a threat to the marine environment. In addition, the provisions of Sec. 5, para. 3, sentence 1, No. 5 WindSeeG-E (protected areas) and Sec. 72, para. 2 WindSeeG (marine biotopes) must be observed in particular.

The methodology of the Strategic Environmental Assessment is comprehensively explained in the scope for the current SEA. Reference is made at this point to the defined scope of 30 June 2022.

Data sources

With regard to the data and knowledge basis for the SEA and any difficulties in compiling the documents, please refer to Chapter 5 of the scope of the current SEA of 30 June 2022.

9.3 Summary of the tests related to the protected assets

Area

For the protected asset space (Sec. 2, para. 1, No. 3 UVPG), the consumption of land must be considered in particular.

Against the background of the limited availability of land in the German EEZ of the North Sea and Baltic Sea, it must be taken into consideration when designating the expected installed capacity that these expansion targets can be achieved as far as possible with the sites available. In order to achieve the statutory expansion targets, it is therefore imperative that the sites available for offshore wind energy are developed sparingly.

In view of the increased expansion targets, the basis for a land-saving development is an efficient use of the areas available for offshore wind energy.

In total, depending on the scenario, 0.025% to 0.027% of the area of the EEZ of the Baltic Sea is directly taken up by the designations of the current draft of the SDP. Against this backdrop, there is no reason to worry about significant impacts on the protected asset space.

Soil

With regard to the status description and status assessment of the protected asset soil, please refer to the statements in Chapter 2.2 of the Baltic Sea Environmental Report on ROP 2021. The current investigations of the EEZ sediment mapping project confirm the statements in the aforementioned environmental report.

Overall, there are no significant impacts on the protected asset soil. For details on the assessment of potential impacts, please refer to the Baltic Sea Environmental Report on SDP 2020.

Water

With regard to the status description and status assessment of the protected asset water, please refer to the statements in Chapter 2.3 of the Baltic Sea Environmental Report on ROP 2021. Any updates or elaborations of the status description are not apparent compared with the SEA for ROP 2021.

According to the current state of knowledge, there is no reason to worry about significant impacts on the protection objective water.

Benthos

With regard to the status description and estimation of the protected asset benthos, please refer to the statements in Chapter 2.6 of the Baltic Sea Environmental Report on ROP 2021. The assessment of the status described there is supplemented by the findings from newly collected data described below.

For Site O-1.3, new findings are available from investigations carried out in autumn 2018 and spring 2019 (IFAÖ 2019); these largely confirm the statements made in the Baltic Sea Environmental Report on ROP 2021 and the Environmental Report on SDP 2020. Thereafter, the area is colonised by a community of silt-rich soft-bottom fauna below the halocline.

For Site O-1.3, one Red List species is added from the investigations. This is the polychaet *Platynereis dumerilii* (RL category G).

With regard to Area O-2, results from baseline studies on the “Baltic Eagle” project in 2018-2019 can be used as a supplement (MARILIM 2019, MARILIM 2020); these data largely confirm the statements made in the Baltic Sea Environmental Report on ROP 2021 and the Environmental Report on SDP 2020. For Area O-2, two Red List species are added from the investigations. These are the bryozoe *Alcyonidium gelatinosum* (RL category 3) and the hydrozoe *Sertularia cupressina* (RL category G). They increase the number of endangered species in Area O-2 to three. However, both species are sessile hard-bottom dwellers and not typical representatives of the silt community typical of Area O-2, and were limited to isolated finds.

Compared with SDP 2020, the location and size of Site O-2.2 located in Area O-2 has changed. Based on the location and the same abiotic conditions, it is assumed here that the settlement by the benthos is largely the same and please refer to the statements on Area O-2 in the Baltic Sea Environmental Report on ROP 2021 and in the Environmental Report on SDP 2020 as well as the additions here above.

The construction-, installation-, and operation-related impacts of the wind turbines, converter platforms, and subsea cables on benthic fauna are described in detail in Chapter 4.2 of the Environmental Report on SDP 2020. They are spatially or temporally limited so that no significant adverse effects are to be expected. Additional, potentially significant impacts compared with SDP 2020 are not currently expected.

Biotopes

With regard to the data availability and status description of the protected asset biotopes, please refer to the statements in Chapter 2.5 of the Baltic Sea Environmental Report on ROP 2021. The new Site O-2.2 to be considered in Area O-2, which has changed in its extent and location compared with SDP 2020, is also included because the same biotopes as in the already considered Area O-2 are expected because of the natural conditions or are already included in the original Site O-2.2 considered in the environmental report on SDP 2020.

Possible impacts of the construction and operation of wind turbines and platforms and the laying and operation of subsea cables on the protected asset biotopes correspond to those described in Chapter 4.1 and Chapter 4.2 on the protected assets soil and macrozoobenthos.

They can result from a direct claim on biotopes, a possible cover by sedimentation of material released as a result of construction, and potential habitat changes. Significant construction-, installation-, and operation-related impacts on biotopes not protected by law can generally be ruled out. In subsea cables, permanent habitat changes caused by the installation are limited to the immediate area of artificial hard substrates, which become necessary in the case of crossings.

A summary of the potential occurrence and potential impact of the legally protected biotopes according to Sec. 30 BNatSchG in the areas and sites as well as the corridors of the subsea cables is provided in the following section “Biotope protection”.

Fish

According to current knowledge, the fish communities typical of the habitat occur in the German EEZ. The pelagic fish community, represented by herring, sprat, salmon, and sea trout, has been identified, as has the demersal fish community, consisting of large fish species such as cod, plaice, flounder and dab. Because of the habitat-typical fish communities, the fish fauna is of average importance with regard to species uniqueness.

According to current knowledge, the planned sites do not represent a preferred habitat for any of the protected fish species. As a result, the fish stock in the planning area is not of outstanding ecological importance compared with adjacent marine areas. According to current knowledge, the planned construction of wind farms and the associated platforms and submarine cable routes are not expected to have a significant adverse effect on the protected asset fish. The impacts on the fish fauna during the construction of the wind farms, platforms, and subsea cables are limited in space and time.

During the construction phase of the foundations, the platforms and the laying of the subsea cables, the fish fauna may be temporarily subjected to adverse effects in small areas by sediment turbulence and the formation of turbidity plumes. Because of the prevailing sediment and current conditions, the turbidity of the water is expected to decrease again quickly. Based on the current state of knowledge, the adverse effects will therefore remain small-scale and temporary. Overall, small-scale adverse effects on adult fish can be expected to be minimal. In addition, the fish fauna is adapted to the natural sediment turbulence caused by storms that are typical here. Furthermore, during the construction phase, noise and vibrations may lead to the temporary repellence of fish. Noise during the construction phase must be reduced by appropriate measures.

Further impacts on the fish fauna may come from the additionally introduced hard substrates. Recent scientific investigations from Belgian OWFs in the North Sea showed increased fish densities of various species (e.g. plaice, sole, and striped lyrefish) inside the OWFs compared with outside (DEGRAER et al. 2020). In addition to the reef effect, the increased fish abundance could additionally be related to the restrictions on fishery as a result of the previous navigation regulations in the OWF sites. The increase of sediment temperature and magnetic fields that could emanate from submarine cables are also not expected to have any lasting impacts on mobile fish fauna.

In general, the impact assessments to date are based on the assumption of a navigation ban in the OWF sites and the associated exclusion of active fishery. If these conditions change, an adjustment of the impact assessment for the fish fauna is to be expected.

According to current knowledge, the planned construction of wind farms and the associated converter platforms and submarine cable routes is not expected to have a significant adverse effect on the protected asset fish.

Marine mammals

With regard to the status description and estimation of the protected asset marine mammals, please refer to the statements in Chapter 2.9 of the Baltic Sea Environmental Report on ROP 2021.

Taking into consideration current knowledge, nothing changes in the status assessment and evaluation. Areas O-1 and O-2 are of medium importance for harbour porpoise and seasonally (winter months) of high importance. For seals, these two areas are of low to at most medium importance; Area O-3 is of low importance. Area O-3 is of medium importance for the harbour porpoise. The seasonally high importance of Areas O-1 and O-2 for the harbour porpoise is due to the fact that they are probably animals of the

highly endangered population of the central Baltic Sea.

Significant impacts from the construction of wind turbines in the sites covered by the current draft of the SDP can be ruled out for the harbour porpoise, harbour seal, and grey seal provided that noise mitigation measures are taken in the downstream approval procedures, taking into consideration the current state of science and technology in reducing impulsive noise emission.

Significant impacts of the wind turbines in Areas O-1 to O-3 on marine mammals during the operational phase can also be excluded with certainty based on current knowledge.

Seabirds and resting birds

With regard to the status description and status assessment of the protected asset seabirds and resting birds, please refer to the statements in Chapter 2.9 of the Baltic Sea Environmental Report on ROP 2021.

In addition, current preliminary investigations of sites now available for Areas O-1 and O-2 within the framework of the benchmark assessment and the preliminary site investigation. These investigations confirm the already known species composition, its spatial distribution, and the seasonality of the seabird species found there. In general, the occurrences of all species show strong intra- and interannual fluctuations. (BIOCONSULT SH, IBL & IFAÖ 2020, BIOCONSULT SH & IFAÖ 2020, 2021a, b).

An update of the “European Red List of Birds” (BIRDLIFE INTERNATIONAL 2017) has not led to any change in the assessment of the criterion conservation status for the areas under consideration.

The construction-, installation-, and operation-related impacts of the wind turbines, converter platforms, and subsea cables on sea and resting birds are described in detail in Chapter 4.6 of the

Environmental Report on SDP 2020 for the Baltic Sea. They are spatially or temporally limited so that no significant adverse effects are to be expected. Additional, potentially significant impacts compared with SDP 2020 are not currently expected.

Migratory birds

With regard to the status description and status assessment of the protected asset migratory birds, please refer to the statements in Chapter 2.10 of the Baltic Sea Environmental Report on ROP 2021. The status assessment of these areas and sites continues to be valid – even against the background of the designations of the current draft of the SDP.

The construction and operation of wind turbines can have various impacts on bird migration; these are described in detail in Chapter 4.7.1 of the Baltic Sea Environmental Report on SDP 2020.

With regard to the determination of Area O-2 and Site O-2.2, it is pointed out that an assessment and, if, the designation of measures will be required in the context of the subsequent assessment levels in order to mitigate the potential impacts of a wind farm project implemented on Site O-2.2 on bird migration. This is in line with official practice and the approach taken in the “Baltic Eagle” project, which is also located in Area O-2.

According to the current state of knowledge, the designations of the current draft of the SDP for areas and sites do not result in any additional significant impacts. The same applies to subsea cables and platforms.

Bats

For a status description and status assessment of the protected asset bats, please refer to Chapter 2.11 of the Baltic Sea Environmental Report on ROP 2021.

In addition, current findings from the BfN research project “Batmove” (FKZ 3515 821900) are now available (SEEBENS – HOYER et al. 2021). As part of the research project, acoustic data on the occurrence of bat migration was collected at seven stations in the German Baltic Sea. The westernmost station was on the Fehmarn Belt, the easternmost on the Arkona platform. Overall, bat activity was measured at all stations. The Arkona platform showed the least bat activity. However, the authors point out that at some stations, including the Arkona platform, data were collected only over a short period of time so far. Further years of investigation are necessary. In addition, the current data sources are not sufficient in order to be able to identify geographical patterns in the sense of potential densification areas over the Baltic Sea. Overall, the BATMOVE research project confirms the current state of knowledge about bat migration over the Baltic Sea. Further investigations are needed in order to be able to describe this in more detail.

Compared with the Baltic Sea Environmental Report on ROP 2021, there have been no fundamental changes in the state of knowledge on the occurrence and intensity of bat migration. According to current knowledge, the estimates in the Baltic Sea Environmental Report on ROP 2021 remain valid.

The impacts of offshore wind energy projects on bats are described in Chapter 4.8.1 of the Baltic Sea Environmental Report on SDP 2020.

In the BATMOVE research project, the authors estimate that at stations with larger offshore structures, unlike at small buoys, the first signs of exploratory behaviour were recorded on the

basis of activity patterns. However, further investigations at suitable locations are required for quantification and more detailed description (SEEBENS-HOYER et al. 2021).

However, according to the current state of knowledge, no additional or other significant impacts are to be expected as a result of the current draft of the SDP.

Air

The SEA has shown that, compared with the statements in the Baltic Sea Environmental Report on ROP 2021, no necessary updates or elaborations of protected asset air are apparent. This applies accordingly to the assessment of environmental impacts on the protected asset. Here, too, please refer to the Baltic Sea Environmental Report on ROP 2021. Overall, the designations of the current draft of the SDP do not result in any measurable impacts on the protected asset air.

Climate

The SEA has shown that, compared with the statements in the Baltic Sea Environmental Report on ROP 2021, no necessary updates or elaborations of protected asset climate are apparent. This applies accordingly to the assessment of environmental impacts on the protected asset. Here, too, please refer to the Baltic Sea Environmental Report on ROP 2021. Negative impacts on the climate are not expected; on the contrary, the CO₂ savings associated with the development of offshore wind energy can be expected to have positive impacts on the climate in the long term.

Seascape

The SEA has shown that, compared with the statements in the Baltic Sea Environmental Report on ROP 2021, no necessary updates or elaborations of the protected asset seascape are apparent. This applies accordingly to the assessment of environmental impacts on the protected asset. Here, too, please refer to the Baltic Sea Environmental Report on ROP 2021. Overall, no significant impacts on the protected asset seascape can be assumed.

Cultural heritage and other material assets

With regard to the status description and status assessment of the protected asset cultural heritage and other material assets, please refer to the statements in Chapter 2.16 in the Baltic Sea Environmental Report on ROP 2021.

The SEA for the SDP does not include a systematic survey or assessment of existing underwater cultural heritage. The same applies to downstream procedures. However, investigations may be carried out or ordered on an *ad hoc* basis.

According to the current state of knowledge, there is no reason to fear significant impacts on the protected asset cultural heritage and other material assets.

Humans, including human health

The SEA has shown that, compared with the statements in the Baltic Sea Environmental Report on ROP 2021, no necessary updates or elaborations of protected asset humans are apparent. This applies accordingly to the assessment of environmental impacts on the protected asset. Here, too, please refer to the Baltic Sea Environmental Report on SDP 2020. Overall, no significant impacts on the protected asset “humans” are to be expected.

9.4 Cumulative impacts

In the cumulative consideration of the SEA of the current draft of the SDP, the assessment for the testing ground in the territorial sea of Mecklenburg-Western Pomerania was integrated. Significant cumulative effects resulting from the realisation of the testing ground can be ruled out in consideration of avoidance and mitigation measures. According to the current state of knowledge, no significant cumulative impacts can be identified for the protected asset migratory birds. Here, however, a detailed examination and, if necessary, ordering of measures must take place within the framework of the concrete approval procedure.

Soil, benthos, and biotopes

Significant construction-related cumulative adverse effects on the protected assets soil, benthos, and biotopes are not to be expected because of the fundamental small-scale nature of the respective effects and the gradual development of the wind farms and the grid connection systems.

Possible cumulative impacts on the soil, which could also have a direct impact on the protected asset benthos and on specially protected biotopes, result from the permanent direct land use of the foundations of the wind energy installations and platforms and from the cable systems laid. According to the precautionary principle, the maximum values resulting from the range of the model wind farm scenarios were used to calculate the land use.

Based on this conservative estimate, a maximum of 75.18 ha of area will be claimed for the areas and sites for wind energy use or temporarily impaired in the case of interarray cabling. Of this, 0.06 ha or 600 m² is allotted to a converter platform with associated scour protection.

For the subsea cables, this results in a mostly temporary loss of function over an area of around 40.3 ha. Outside the sensitive biotopes, a permanent loss of area and function as a result of the cable systems results exclusively from the crossing structures that become necessary. Based on an area of approx. 750 m² per crossing structure, the direct land use for approx. 45 crossing structures amounts to approx. 3.38 ha. This means that, in total, approx. 118.8 ha of land will be claimed or, in the case of the submarine cables, temporarily adversely affected; this corresponds to a share of approx. 0.27‰ of the total EEZ area.

In addition to direct use, installation foundations, scour protection, and crossing structures lead to an additional supply of hard substrate. As a result, hard substrate-loving species untypical of the site can colonise and exert an influence on the community of natural soft substrates. In addition, artificial substrates can lead to an altered spread of invasive species, among others. These indirect effects can lead to cumulative effects resulting from the construction of several offshore structures or rockfills in crossing areas of subsea cables and pipelines. However, reliable findings on effects beyond the sites of the wind farms or on the altered connectivity of invasive species are not yet available. Because the (mainly temporary) land use is below 0.1% of the EEZ area in the cumulative consideration of the grid infrastructure and the wind farm areas, according to current knowledge, no significant adverse effects that lead to a threat to the marine environment with regard to the soil and the benthos are to be expected – even in the cumulation of indirect effects.

Fish

The wind farms of the Baltic Sea can have an additive effect beyond their immediate location; this becomes particularly relevant as the number of farms increases. The impacts of the OWFs are concentrated on the regular navigation bans on fishery that have been imposed up to now as well

as on the change in habitat and the corresponding interrelationships.

The general species composition of the fish fauna could change directly because species with different habitat preferences than the established species (e.g. reef dwellers) find more favourable living conditions and occur more frequently.

In the event of a change to the previous navigation regulations for OWFs and the associated exclusion of active fishery in the OWF sites, a re-assessment of cumulative effects on fish fauna would be necessary.

Overall, there is a need for research on whether and to what extent cumulative effects of OWFs in the Baltic Sea affect the fish stocks of individual species in the long term.

Marine mammals

Cumulative impacts on marine mammals, especially harbour porpoises, may occur mainly because of noise exposure during the installation of deep foundations. For example, marine mammals can be significantly affected by the fact that – if pile driving is carried out simultaneously at different locations within the EEZ – there is not enough equivalent habitat available to avoid and retreat to.

In order to avoid and mitigate cumulative impacts on the harbour porpoise population in the German EEZ of the Baltic Sea, the orders of the downstream approval procedure shall therefore specify a restriction of the sound exposure of habitats to maximum permitted proportions of the EEZ and nature conservation areas (BMU, 2013).

Seabirds and resting birds

With regard to the cumulative effects on the protected asset seabirds and resting birds, please refer to the statements in Chapter 4.11.4 of the Baltic Sea Environmental Report on ROP 2021 and in Chapter 4.12.4 of the Baltic Sea Environmental Report on SDP 2020.

Migratory birds

For the description and assessment of cumulative effects, please refer to Chapter 4.12.5 of the Baltic Sea Environmental Report on SDP 2020. At the present time, there are no findings to the contrary. The description and assessment of cumulative effects there thus continue to apply to the current draft of the SDP.

9.5 Result of the nature conservation assessments

Review of biotope protection law

In accordance with Sec. 30, para. 2, sentence 1 BNatSchG, all actions that may cause destruction or other significant adverse effect on the biotopes listed in Sec. 30, para. 2, sentence 1 BNatSchG are generally prohibited. In accordance with Sec. 72, para. 2 WindSeeG-E, Sec. 30, para. 2, sentence 1 BNatSchG shall be applied to projects under the WindSeeG with the proviso that a significant adverse effect on biotopes within the meaning of Sec. 30, para. 2, sentence 1 BNatSchG shall be avoided as far as possible. The direct and permanent use of a biotope protected under Sec. 30, para. 2 BNatSchG is generally considered to have a significant adverse effect if it has significant negative impacts on the biotope in question. Following the methodology of LAMBRECHT & TRAUTNER (2007), an adverse effect can be classified as non-substantial in individual cases if, taking into consideration all impact factors and considering them cumulatively, various qualitative–functional, quantitative–absolute, and relative criteria are met. Because a detailed assessment is not

possible within the framework of the SDP because of the lack of biotope mapping for most areas and sites, please refer to the subordinate planning and approval levels. A detailed description of the interventions to be taken into consideration, which could represent significant adverse effects within the meaning of the BNatSchG, has already been provided in the environmental reports on ROP 2021 and SDP 2020. The statements made there on the occurrence and potential impact of the individual areas and sites for wind turbines and transmission line corridors also remain valid.

In accordance with the investigations carried out, no occurrences of legally protected biotopes are to be expected in Area O-2 or Site O-2.2. With regard to the subsea cables, no statement can be made on the use of specially protected biotopes according to Sec. 30, para. 2 BNatSchG because of the lack of a reliable scientific basis. An area-wide sediment and biotope mapping of the EEZ, which is currently being carried out, will provide a more reliable assessment basis.

In practice, protected biotopes are usually bypassed in the course of route planning; significant adverse effects are thus generally avoided. In view of the designations of the current draft of the SDP, significant adverse effects on biotopes within the meaning of Sec. 30, para. 2 BNatSchG are avoided as much as possible so that the requirements of Sec. 72, para. 2 WindSeeG-E are met.

Species protection law assessment

With regard to the assessment under species protection law, please refer to the statements in Chapter 5 of the Baltic Sea Environmental Report on ROP 2021.

At the present time, there are no findings that indicate the realisation of prohibited species under species protection law for the species under consideration. With regard to the comments on bird migration and the designation of Site O-2.2, please refer to the comments in Chapter 4.7.1 of

this SEA. A detailed audit must be carried out at the downstream audit level.

Review for the legal framework governing the conservation of natural habits

With regard to the review for the legal framework governing the conservation of natural habits, please refer to the statements in Chapter 6 of the Baltic Sea Environmental Report on ROP 2021. In this context, the SEA in the current revision procedure of the SDP is limited to additional or other significant environmental impacts as well as to necessary revision updates and elaborations, which are not identifiable with regard to the habitat protection for the EEZ of the Baltic Sea according to Sec. 5, para. 3, sentences 5–7 WindeeG-E.

9.6 Transboundary impacts

The present SEA concludes that, as things stand at present, the designations of the current draft of the SDP do not have significant impacts on the areas of the neighbouring countries bordering the German EEZ of the Baltic Sea.

For the protected assets soil and water, plankton, benthos, biotopes, seascape, and cultural heritage and other material assets as well as humans, including human health, significant transboundary impacts can generally be excluded. In the area of the German Baltic Sea, significant transboundary impacts could arise for the highly mobile protected biological assets fish, marine mammals, seabirds, and resting birds as well as migratory birds and bats only if considered cumulatively.

For the protected asset fish, marine mammals, and seabirds and resting birds, the SEA concludes that, according to current knowledge, no significant transboundary impacts on fish are to be expected from the implementation of the SDP because the identifiable and predictable effects are small-scale and temporary in nature. Marine mammals as well as seabirds and resting birds use the areas mainly as migration areas. There

is unlikely to be any significant loss of habitat for strictly protected marine and resting bird species. Based on current knowledge and taking into consideration impact-reducing and damage-limiting measures, significant transboundary impacts can be ruled out. For example, the installation of the foundations of wind turbines and platforms is permitted in the specific approval procedure only if effective noise mitigation measures are implemented. Against the background of the special threat of the separate Baltic Sea population of harbour porpoise, intensive monitoring measures are to be carried out as part of enforcement and, if necessary, the noise mitigation measures are to be adapted or the construction work coordinated in order to exclude any cumulative effects.

For migratory birds, the wind turbines and platforms erected on the sites of the current draft of the SDP may constitute a barrier or a collision risk. The collision risk should be minimised by taking appropriate measures to avoid attraction effects (e.g. through lighting). With regard to the barrier effect, a conclusive cumulative consideration is not possible with the current state of knowledge.

A cumulative assessment of the hazard risk for bat migration is also not possible at this stage because sufficient knowledge of migration routes, migration heights, and migration intensities is still lacking. It can generally be assumed that any significant transboundary impacts will be prevented by the designations of the current draft of the SDP in the same way that appropriate avoidance or minimisation measures are applied to bird migration.

9.7 Measures to prevent, reduce, and offset significant negative impacts of the SDP on the marine environment

With regard to the measures envisaged to prevent, reduce, and offset any significant negative

impacts of the SDP on the marine environment, please refer to the statements in Chapter 8 of the Baltic Sea Environmental Report on SDP 2020 (BSH 2020).

9.8 Examination of reasonable alternatives

In accordance with Art. 5, para. 1, sentence 1 SEA Directive in conjunction with the criteria in Appendix I SEA Directive and Sec. 40, para. 2, No. 8 UVPG, the environmental report contains a brief description of the reasons for the choice of the reasonable alternatives examined. Essentially, different types of alternatives can be considered for an examination of reasonable alternatives; in particular strategic, spatial or technical alternatives.

The zero alternative (i.e. not implementing the SDP) is not a reasonable alternative because the development of offshore wind energy is indispensable for achieving the national climate protection goals according to the current state of technology and scientific knowledge in order to avert drastic negative impacts of anthropological climate change – also for the state of the marine environment. The importance of achieving the expansion targets is now explicitly stated in Sec. 1, para. 3 WindSeeG-E. Accordingly, the construction of offshore wind turbines and offshore grid connections is in the overriding public interest and serves public safety (cf also Chapter 3).

The purpose of the introduction of a sectoral plan is the precautionary control of the development of offshore wind energy, which is necessary for climate protection.

A strategic alternative (e.g. with regard to the targets of the federal government on which the planning is based) is not currently being considered for the SDP because the expansion targets of the federal government represent the planning horizon for the current draft of the SDP. The expansion targets result from the legal requirement in Sec. 1, para. 2, sentence 1 WindSeeG-E.

Spatial alternatives are rare in view of the underlying territorial context of ROP 2021 and against the backdrop of the considerably increased expansion targets.

For possible reasonable alternatives in detail, please refer to Chapter 9 of the Baltic Sea Environmental Report on SDP 2020.

9.9 Measures envisaged for monitoring environmental impacts of implementing the SDP

With regard to the planned monitoring measures, please refer to the statements in Chapter 10 of the Baltic Sea Environmental Report on SDP 2020 (BSH 2020) and Chapter 10 of the Baltic Sea Environmental Report on the maritime spatial plan of the EEZ (BSH 2021).

9.10 Evaluation of the overall plan

In summary, with regard to the planned areas and sites, platforms, and submarine cable routes, the orderly, coordinated overall planning of the SDP will minimise impacts on the marine environment as far as possible. With strict adherence to preventive and mitigation measures, in particular noise mitigation during the construction phase and to protect bird migration, significant impacts can be avoided through the implementation of the designated areas and sites as well as platforms.

The laying of subsea cables can be designed to be as environmentally friendly as possible by, among other things, avoiding protected areas and biotopes and choosing a minimally disruptive cable laying procedure. The planning principle for the increase of sediment temperature should ensure that significant negative impacts of cable heat-up on benthic communities are prevented. Avoiding crossings of subsea cables with each other as far as possible also serves to prevent negative impacts on the marine environment, in particular on the protected assets soil, benthos, and biotopes.

Based on the above descriptions and assessments, it must be concluded for the SEA, also with regard to any interrelationships, that, according to the current state of knowledge and at the comparatively abstract level of sectoral planning, no significant impacts on the marine environment within the area of investigation are to be expected as a result of the planned designations. The potential impacts are frequently small-scale and mostly short-term because they are limited to the construction phase.

Most of the areas and sites lie within the priority areas for wind energy of ROP 2021. Sufficient knowledge is available for these areas. So far, there is a lack of sufficient scientific knowledge and uniform assessment methods for the cumulative assessment of impacts on individual protected assets such as bird migration and bat migration. Therefore, these impacts cannot be conclusively assessed within the framework of the present SEA or are subject to uncertainties and require more detailed examination within the framework of downstream planning stages.

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