North Sea Wind Power Hub

Planning & Permitting Study
German EEZ

FINAL REPORT
01.07.2019

Client:

North Sea Wind Power Hub

Port of Rotterdam

TenneT Taking power further

TenneT Germany & TenneT Netherlands

ENERGINET

gasunie

Contractor and Authors:

Planungsgemeinschaft Umweltplanung Offshore Windpark

Lead management:
Planungsgruppe Grün GmbH
Rembertistraße 30 • 28203 Bremen
Germany
Phone +49 421–699 025-0
eMail: bremen@pgg.de

Bioconsult GbR
Auf der Muggenburg 30 • 28217 Bremen
Germany
Phone +40 4 21-620 71 08
eMail: info@bioconsult.de

IBL Umweltplanung GmbH
Bahnhofstraße 14 a • 26122 Oldenburg
Germany
Phone +49 441/50 50 17-10
eMail: info@ibl-umweltplanung.de

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1 BACKGROUND AND TASK[1]

The present document comprises a “Planning and Permitting Study” for the German Exclusive Economic Zone (EEZ) (including national waters into the German 12 nm zone) for the North Sea Wind Power Hub (NSWPH) project.

To combat climate change and keep global warming in line with the Paris Agreement and well below 2°C, a full decarbonisation of the power production sector is required. A significant share of the renewable energy generation capacity needed for the North Seas countries will have to be provided by offshore wind. The installed offshore wind capacity for the North Sea countries is - across all scenarios - expected to grow significantly to an estimated 70-150 GW by 2040. Optimizing the spatial and environmental integration of that production system is a major challenge.

TenneT Netherlands, TenneT Germany, Energinet, Gasunie and Port of Rotterdam therefore joined forces to support and propel the development of large scale offshore wind production in the North Sea: The North Sea Wind Power Hub (NSWPH) consortium.

The NSWPH vision pertains to how large scale offshore windparks in the North Sea can be optimally spatially integrated in the North Sea and the surrounding countries’ energy systems, thus facilitating an internationally coordinated roll-out. By developing the NSWPH project, the consortium aims to make the energy transition more feasible from a spatial, environmental and economical point of view. Central to this vision is the construction of one or more hubs at suitable locations in the North Sea for connecting surrounding windparks, and with interconnectors to the North Sea countries (see Chapter 2 for more information on the project).

At this stage, no decision has been taken on any project location or configuration for a possible hub and spoke project. This concerns the location and capacity of the hub and adjacent offshore wind farms (OWFs), the number of hubs to be envisaged, as well as the technology and timetable for realisation. The idea considers a planning horizon towards 2050 and includes the possibility of multiple hubs.

Currently, all areas of the North Sea are considered potentially suitable for the hub location(s). However, in order to have a manageable scope for the necessary studies’ work, project configurations and a set of areas to be explored first were (pre)selected. The locations are A: Dogger Bank area (Dutch EEZ), B: an area south of Dogger Bank (Dutch EEZ), C: an area off the Danish west coast (Danish EEZ) (Figure 1). These exploration areas have been chosen such that they provide a learning potential with respect to defining parameters, e.g. water depths versus design choices, economics, impacts, planning and permitting.

[1] All information in Chapter 1 and 2 was compiled from the following documents and sources provided by the project: Draft Terms of Reference – Planning and permitting Study North Sea Wind Power Hub (Version 0.4, 15.02.2019, Author: Chris Moes); North Seas Offshore Energy Clusters – North Sea Wind Power Hub (Version 30 June 2018, Author: Roland Berger); Homepage of the NSWPH project: https://northseawindpowerhub.eu (April 5th 2019)

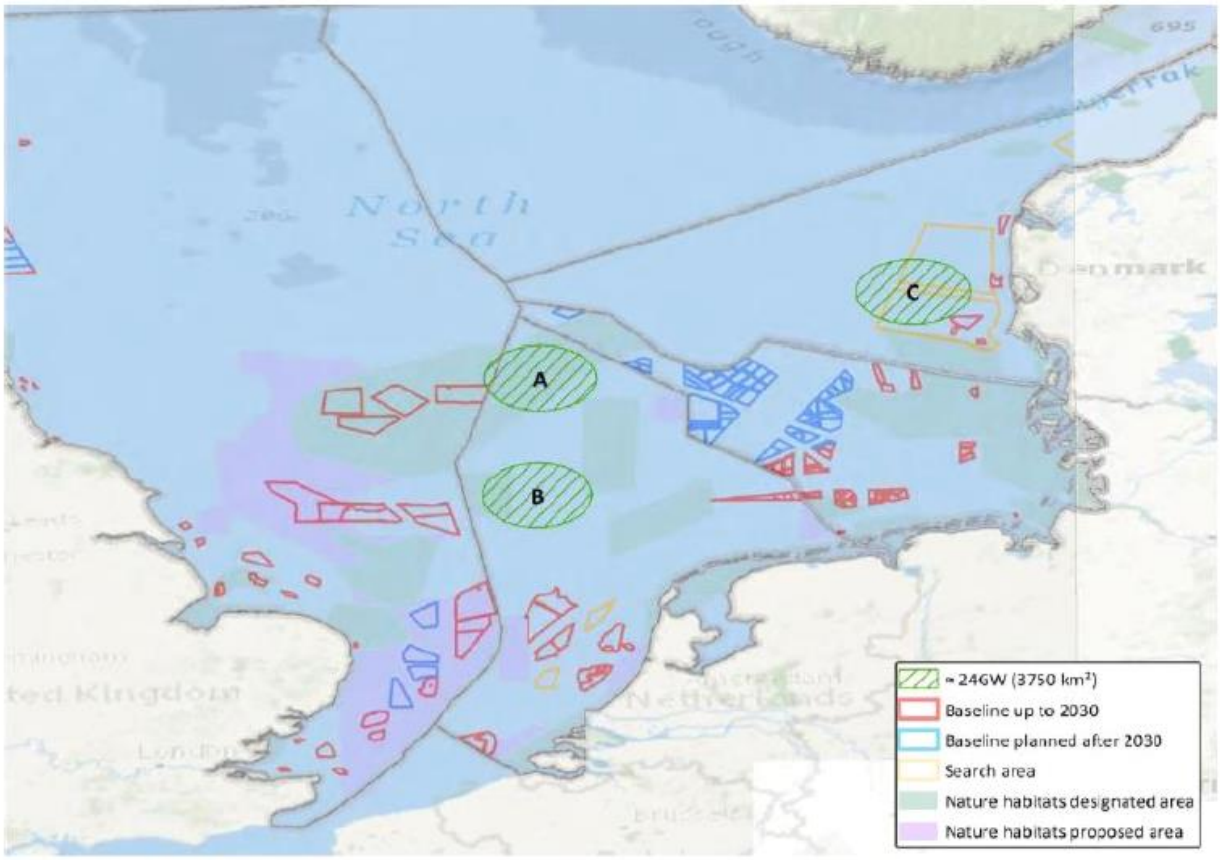

Figure 1: Selected NSWPH test locations (example for a 24 GW hub)

The consortium is currently conducting technical, economical, environmental as well as planning and permitting analyses for these three areas as 'test' locations with potential to develop the hub and spoke concept, based on a set of functional and technical hub configurations. They are used to help identify the drivers and barriers (cost, environmental, construction, permitting issues, etc.) as a base for further analysis and to inform about potentially predominant planning and permitting issues.

The analyses are conducted as desk studies for each national EEZ (for the German case see further explanation and figure below). They deliver a general assessment, taking worst case configurations into account, and focus on legal drivers and barriers.

In the German waters of the North Sea, which the present study is about, no hub area is to be concidered (since these are all within the NL- or DK-sector). This study is therefore limited to adjacent windparks, sandmining as well as cable and pipeline crossing. The planning and permitting period to be considered is 2022 – 2028, assuming first construction activities from 2030 onwards.

Primarily, the present study includes an overwiew of

(1) relevant international and European treaties, regulations and directives and their specific implementation in the German EEZ[2],
(2) relevant national planning & permitting regimes in the German EEZ, including competent authorities, procedures and procedure time lines,
(3) the relevant national policies in the German EEZ related to planning & permitting regimes,

[2] each with inclusion of the 12 nm zone

(4) potentially predominant aspects of these regimes and policies for the locations, configurations and technologies as mentioned above,

as well as

(5) a qualitative assessment of the information needed for planning and permit applications concerning (i) necessity and benefits of hub and spoke projects, (ii) cross-border activities and impacts and (iii) (limiting) the project boundaries and accountable impacts (e.g. can information on necessary grid reinforcements and displacement of production systems and subsequential impacts be omitted?) or (iv) any other specific topics that are key for planning and permit applications,

and

(6) specific national points of attention, e.g. known legal constraints and obstacles or specific procedural risks and requirements, such as requirements for detailed information and monitoring ('front loading') at the start, versus more flexible procedures.

Note for readers

In the majority of chapters and points, the present study subdivides into

a) the German EEZ and
b) the German 12 nm zone (see Figure 2 below for a spatial overview).

In Germany, because of its status as a federal republic, the terminus "EEZ" refers exclusively to the zone outside the 12 nm line , (see Figure 2) and does not additionally cover the 12 nm zone up to the coastline as practised in other countries. Both zones are characterised by very different planning and permitting regimes with completely different federal authorities in most cases.

Therefore, when we speak of the "EEZ" in this study, we only refer to the area outside the 12 nm zone. Similarly, all facts stated for the 12 nm-zone are only valid for the area between the 12 nm line and the coastline.

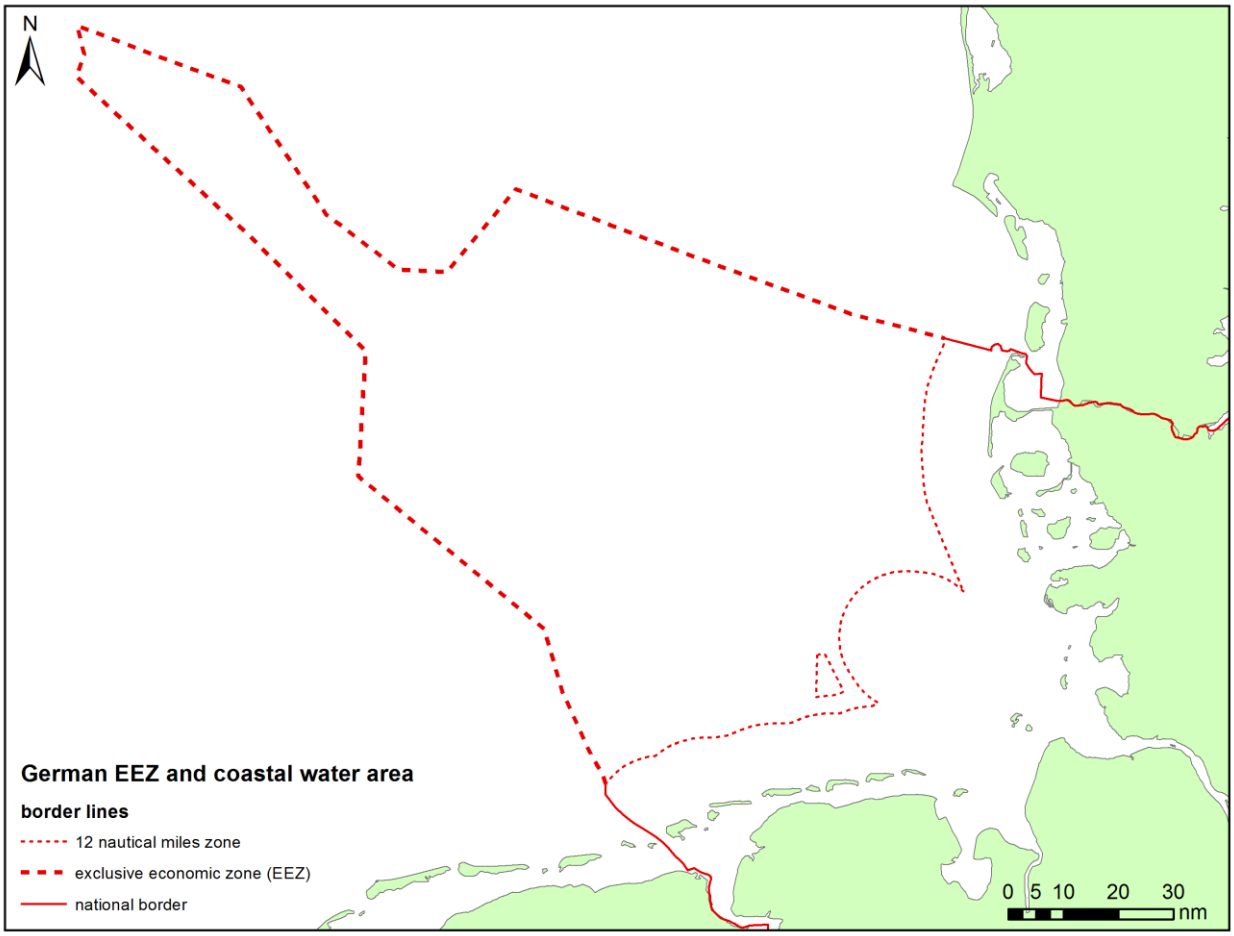

Figure 2: Overview of German EEZ and coastal water area (12 nm zone)

2 NORTH SEA WIND POWER HUB – THE PROJECT

The NSWPH vision pertains to how large scale offshore windparks in the North Sea can be optimally spatially integrated in the North Sea and the surrounding countries' energy systems. Central to this vision is the construction of one or more hubs at suitable locations in the North Sea for connecting surrounding windparks with interconnectors to the North Sea countries.

According to project details, offshore hubs in the North Sea could each connect up to 30 GW wind power and distribute generated power to European markets through direct current (DC) interconnectors (spokes). Several wind farms will connect to the hub through alternating current (AC) cables. From the hub, the generated power will be transmitted to markets around the North Sea based on market signals. Thus, the DC cables will be serving two purposes by both distributing the generated wind power as well as bridging power highways for international trade between price zones.

The whole system may function as a hub for transport of wind energy and as an interconnection hub to the connected countries, but also as a working hub for offshore wind developers (so called O&M activities) and a location for possible Power to Gas solutions. To work as an O&M base, the artificial island has to be extended with facilities such as a harbour, storage, accommodation, runway, etc. To support power conversion and storage and thus to increase the flexibility of the grid, Power to Gas (i.e. creating e.g. hydrogen from wind energy on site) is a solution considered by the project. It can provide balancing capacity as well as long term storage options and provides the possibility of energy transport to shore in the form of electricity, gas, or both.

Figure 3: **Impression of an artificial island in the North Sea**
(https://northseawindpowerhub.eu/wp-content/uploads/2017/11/Concept-Paper-3-Hub-as-an-Island.pdf)

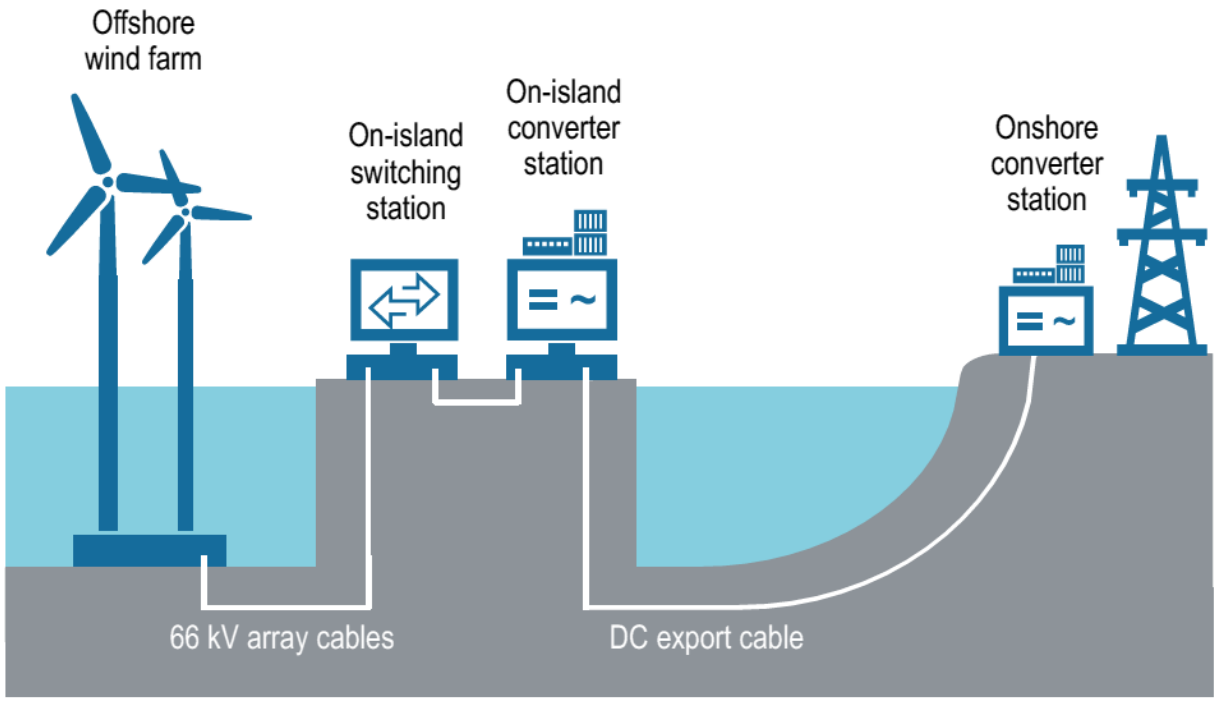

Figure 4: **Schematic technical setup**

At this stage, no decision has been taken on any project location or configuration for a possible hub and spoke project. This regards the location and capacity of the hub and adjacent offshore wind farms (OWFs), the number of hubs to be envisaged, as well as the technology and timetable for realisation. The idea considers a planning horizon towards 2050 and includes the possibility of multiple hubs.

Currently, all areas of the North Sea are considered potentially suitable for the hub location(s). However, in order to have a manageable scope for the necessary studies' work, project

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3 BRIEF CHARACTERIZATION OF PLANNING AREAS

3.1 GERMAN EEZ

After the UN-Convention on the Law of the Sea became effective, the Federal Republic of Germany has declared the establishment of a German Exclusive Economic Zone (German EEZ) with effect as of 1st of January 1995. The relevant german legislations, applicable within the German EEZ, include i.a. the Federal Maritime Responsibilities Act, the Offshore Installations Act, the Federal Mining Act and the Spatial Planning Act.

The North Sea is a shallow marginal sea of the North Atlantic Ocean. The floor generally dips to the north and shows some irregular features. In the south (German EEZ), depths measure less than 35 meters; many shallow, shifting banks, presumably of glacial origin, have been reworked by tidal currents.

The German North Sea sector extends between 53° and 56°N latitude, and 3° and 9°E longitude. The bathymetry shows a central valley in the German Bight with elevated areas northeast and southwest of it. In the offshore areas the German EEZ also comprises part of the Dogger Bank.

In the central German Bight the large channel of the Elbe paleovalley (also referred to as Helgoland or Helgoland Channel) takes place, which was mainly shaped during the Weichselian (last glacial period during the Pleistocene from approx. 110 000 to 10 000 years before present. The origin of this channel is bound to a fault zone.

The water circulation and hydrography of the North Sea is strongly influenced by the adjacent North Atlantic Ocean. The North Atlantic Current brings oceanic water of high salinity into the northern North Sea in two branches: an inflow through the Fair Isle channel off the north of Scotland, and a more significant inflow along the western slope of the Norwegian Trench. Significant are the tidal currents, which are the most energetic feature in the North Sea with tidal stream amplitudes of up to 5 knots. Tidal currents stirring the entire water column in most of the southern North Sea and the English Channel.

The sediments of the Elbe paleovalley and the adjacent plain consist of fine sand with silt and clay contents of up to 50 %, the Holocene sediment thicknesses is up to 16 m in the paleovalley. In the Sylt Outer Reef and Borkum Riffgrund areas the sediments are coarser. Especially in the west on the channel shoulder of the Sylt Outer Reef area to the Elbe paleovalley seabed sediments are made up of coarse to fine sands and gravelly residual sediments with boulders and outcrops of Pleistocene origin (FIGGE 1981[3], Laurer et al. 2014[4]). The present-day seafloor is often characterised by a patchy mosaic.

3 FIGGE, K.,1981: Karte zur Sedimentverteilung in der Deutschen Bucht im Maßstab 1: 250 000. - Deutsches Hydrographisches Institut, Nr. 2900.
4 LAURER, W.-U., NAUMANN, M. & Zeiler, M. 2014. Sedimentverteilung auf dem Meeresboden in der deutschen Nordsee nach der Klassifikation von FIGGE (1981) - Kartenversion 2.1 vom 30.10.2014:

In the shallow parts of the North Sea, intensive sediment movements and associated sediment transport occur frequently, owing to wind-induced currents, tides, and/or wave action. Sea swell is an especially effective agent for resuspension. This leads to changes in seabed topography.

3.2 GERMAN 12 NM ZONE

The 12 nautical mile-zone within the German North Sea refers to the area of coastal waters from the Germain mainland (including the island of Heligoland) up to a distance of 12 nm (Figure 2).

This area is very shallow in most parts and subject to strong tidal influences. The influx of several large rivers, including Weser and Elbe and its estuaries, affects the composition of the coastal waters. Traffic, agricultural run-off and industrial effluent have caused a relatively high concentration of substances such as nitrate, while phosphate concentrations have been decreasing in recent decades. Due to the shallowness of the area, the intermixture and subsequent dilution of substances is comparatively slow. Salinity also varies along the coastline, on the cusp between polyhaline and euhaline waters.

The German coastal waters comprise a unique habitat of wetlands, salt marshes, mudflats, estuaries and the North- and East-Frisian Islands, which support high biodiversity and are an important area for migrating birds on the east atlantic flyway. Parts of the area are protected in a trilateral agreement with the Netherlands and Denmark and are listed as UNESCO World Heritage, including the Lower Saxon Wadden Sea National Park, Hamburg Wadden Sea National Park and Schleswig-Holstein Wadden Sea National Park.

In contrast to the EEZ, the 12 nm zone is administered by the federal states, and not by the Federal Maritime and Hydrographic Agency. The states bordering the North Sea are Lower Saxony, Bremen, Hamburg and Schleswig-Holstein while Lower Saxony and Schleswig-Holstein comprise the longest German coastline sections.

4 RESTRICTED AREAS, HAZARDS AND OBSTRUCTIONS IN GERMAN EEZ AND GERMAN 12 NM ZONE

4.1 MARITIME SPATIAL PLAN (MSP)

4.1.1 PRESENT SITUATION

EEZ

Maritime Spatial Plans exist for the North Sea EEZ and for the territorial sea areas under jurisdiction of the two coastal federal states Lower Saxony and Schleswig-Holstein (source: https://www.msp-platform.eu/countries/germany#1). Since these states have the largest share of the coastline, the study is is focused on these two.

In order to coordinate the growing conflicts of maritime uses, in particular between space required by offshore wind farms and marine environmental protection goals as well as traditional maritime uses such as shipping and fisheries, an integrative and sustainable approach was developed for the German Exclusive Economic Zone (EEZ) of the North Sea.

The MSP makes coordinated specifications for the German EEZ of the North Sea regarding individual uses and functions such as shipping, raw material production, pipelines and cables, scientific marine research, wind power generation, fishing, mariculture and marine conservation.

Priority areas are defined for shipping, pipelines and cables as well as wind energy, in which other uses are excluded, if they are not compatible with the defined priority uses. Furthermore, priority and reserve areas are defined for shipping, pipelines and research, in which a particular emphasis is placed on these uses when evaluating other competing, spatially relevant uses. Military excercise, leisure and tourism as well as areas for sinking ammunition and contributing sediments are further interests regulated in the MSP.

The national legal basis for MSP is the general Spatial Planning Act („Raumordnungsgesetz“/ ROG) which was made applicable to the EEZ in 2004. The MSP was established in the form of a legislative regulation, which came into effect for spatial planning in the German EEZ of the North Sea in September 2009.

National MSP authorities are the German Federal Ministry of the Interior, Building and Community (Directorate-General HIII: Spatial Development and Policy, Division HIII2: Spatial Development; Regional Planning Law, Division HIII3: European Spatial Development Policy) and the Federal Maritime and Hydrographic Agency (BSH).

In 2009, the marine spatial plan for the EEZ in the North Sea (see Figure 6) became effective (BSH in charge of MSP for EEZ; coastal states in charge of MSP for territorial waters). In addition, there is a Spatial Offshore Grid Plans for the German EEZ of the North Sea and a corresponding SEA (see chapter 4.2 and 4.3).

Detailed descriptions of the above mentioned uses in the German EEZ of the North Sea can be found in the following chapters.

For a current overview of the existing and perspective uses including nature conservation in the German EEZ in the North Sea, the CONTIS information system of the BSH can be consulted. As of 05.04.2019, the CONTIS system represents a significant information base for the following chapters.

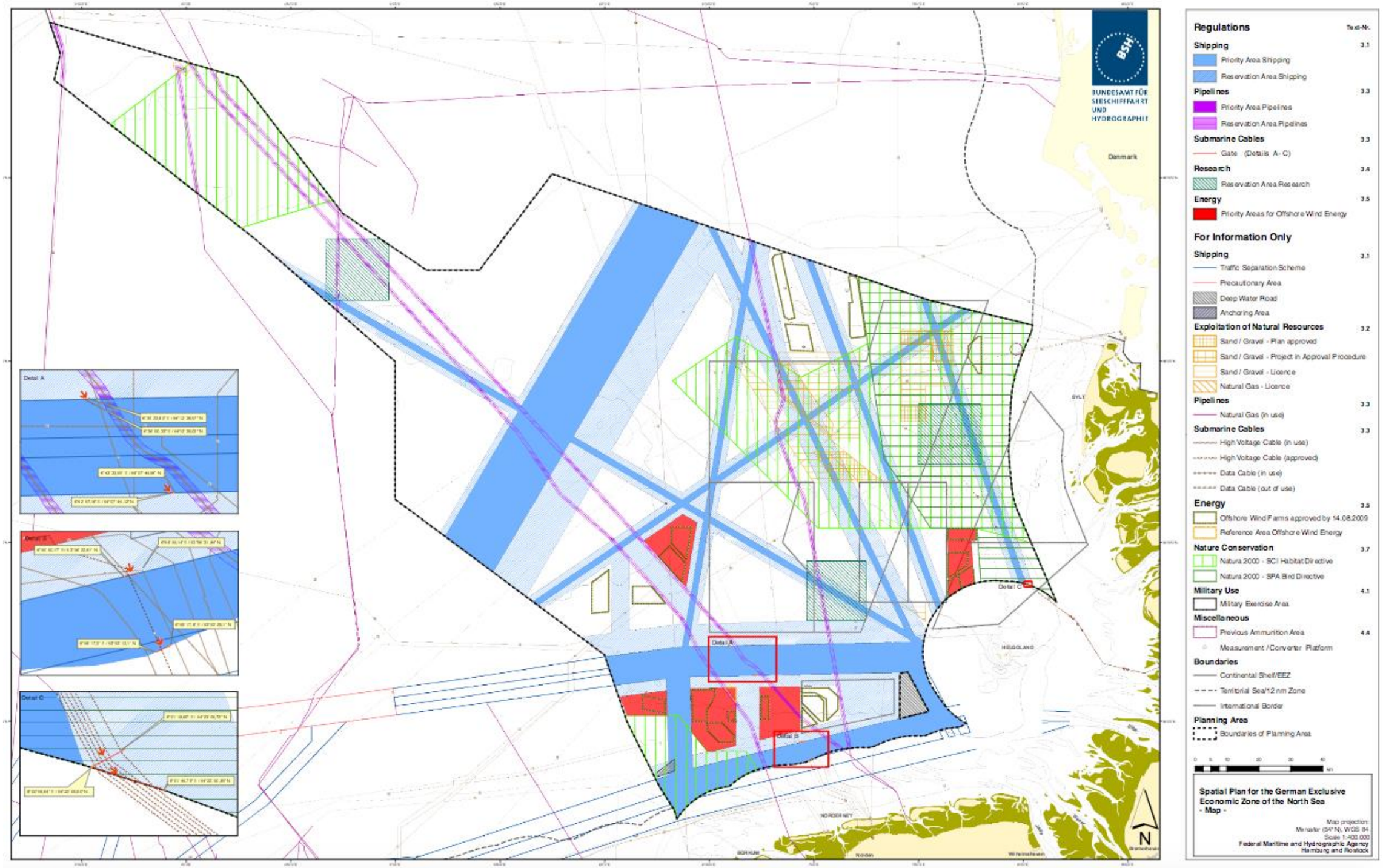


Figure 5: Maritime Spatial Plan for the German EEZ in the North Sea as of 21.09.2009 (source: BSH 2009)

12 nm zone

Apart from national planning (MSP), the territorial waters of the 12 nm zone are an integrated part of the (terrestrial) spatial plans of the coastal federal states. The ROG and the respective spatial planning law of each federal state provide the legal basis for federal and regional plans and programmes (BSH 2019[5]):

- Schleswig Holstein:
    - State Development Plan (Landesentwicklungsplan, LEP[6]) 2010
    - Regional Development Plans (Regionalplan IV (20057) and Regionalplan V (20028)
- Lower Saxony:
    - Spatial Planning Programme (Landes-Raumordnungsprogramm, LROP9) 2008, last amended 2017

However, these plans and programmes contain only a few regulations within the 12 nm zone and are therefore only of subordinate importance for this study.

Furthermore Germany developed an Integrated Coastal Zone Management (ICZM). ICZM is not a formal instrument of planning or decision-making and does not have any direct legal impact. However, it does contain a set of recommendations for regional planning using a multi-stakeholder approach and aims to support the sustainable development of the coastal region through integration, coordination, communication and participation (BfN 2019[10]).

[5] BSH, Bundesamt für Seeschifffahrt und Hydrographie, Federal Office for Marine Shipping and Hydrography (2019): https://www.msp-platform.eu/countries/germany

[6] LEP, "Landesentwicklungsplan Schleswig-Holstein" (2010), by the Innenministerium des Landes Schleswig-Holstein (Ministry of the Interior of the State Schleswig-Holstein): https://www.schleswig-holstein.de/DE/Themen/L/landesentwicklungsplan.html

[7] Regionalplan für den Planungsraum IV, Schleswig-Holstein Süd-West, Kreise Dithmarschen und Steinburg" (2005), by the Ministerium für Inneres, ländliche Räume und Integration (Landesplanung) (Ministry of the Interior of the State Schleswig-Holstein): https://www.schleswig-holstein.de/DE/Fachinhalte/L/landesplanung_raumordnung/raumordnungsplaene/regionalplaene/regionalplan_IV.html

[8] Neufassung des Regionalplans für den Planungsraum V, Landesteil Schleswig (Schleswig-Holstein Nord) des Landes Schleswig-Holstein, Kreisfreie Stadt Flensburg, Kreise Nordfriesland und Schleswig-Flensburg" (2002), by the Ministerium für Inneres, ländliche Räume und Integration (Landesplanung): https://www.schleswig-holstein.de/DE/Fachinhalte/L/landesplanung_raumordnung/raumordnungsplaene/regionalplaene/regionalplan_V.html

[9] LROP, "Landes-Raumordnungsprogramm Niedersachsen" (2008 / 2017), by the Niedersächsisches Ministerium für Ernährung, Landwirtschaft, Verbraucherschutz und Landesentwicklung: https://www.ml.niedersachsen.de/landesraumordnungsprogramm/

[10] BfN, Bundesamt für Naturschutz, Federal Office of Nature Conservation (2019): http://www.ikzm-strategie.de/ikzm.php

Within the scope of this policy, Lower Saxony and Schleswig-Holstein developed regional plans for land-use as well as conservation requirements for their respective coastlines. These plans are:

- Lower Saxony: “Raumordnungskonzept für das niedersächsische Küstenmeer” (ROKK, 2005[11]),
- Schleswig-Holstein: “Raumordnungsbericht Küste und Meer” (ROB, 2005[12])

The mentioned plans and programmes make coordinated specifications for the German 12 nm zone of the North Sea regarding individual uses and priority areas (as the MSP does for the EEZ). The responsible authorities are those listed above as authors of the respective plan. The content of the plans will be discussed below. If one or more islands are involved in any part of a planned project, additional plans have to be considered, especially those which outline the spatial issues of the respective district in Lower Saxony. However, these will not be discussed within this study as they contain no designations for the sea.

4.1.2 FUTURE CHANGES

EEZ

The EEZ plan for the north sea is currently being revised to create an updated version of the MSP by 2021. The timeline for the updating process is shown in Figure 6 below. So far, no preliminary draft has been published by the BSH.

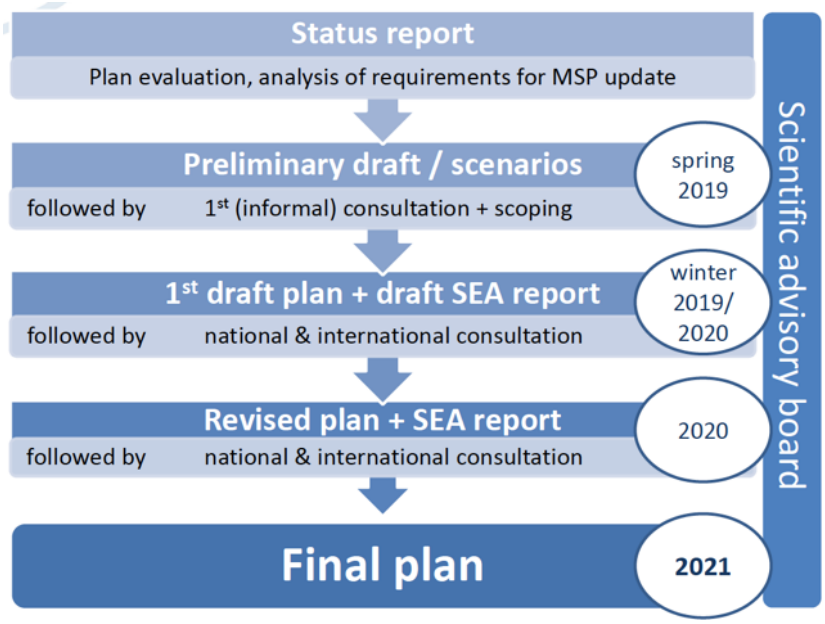


Figure 6: Preliminary timing of the evaluation of the current MSP in the German EEZs (source: PanBalticScope 2018)

[11] ROKK, “Raumordnungskonzept für das niedersächsische Küstenmeer” (2005), by the Niedersächsisches Ministerium für den ländlichen Raum, Ernährung, Landwirtschaft und Verbraucherschutz (Regierungsvertretung Oldenburg): https://www.arl-we.niedersachsen.de/startseite/wir_ueber_uns/strategie_und_planung/raumordnung/raumordnerisches_konzept_niedersaechsische_kuestenmeer_rokk/rokk-125847.html

[12] ROB, “Raumordnungsbericht Küste und Meer” (2005), by the Innenministerium des Landes Schleswig-Holstein (Ministry of the Interior of the State Schleswig-Holstein): https://www.schleswig-holstein.de/DE/Fachinhalte/L/landesplanung_raumordnung/Downloads/rob_kueste_meer_neu.html

12 nm zone

According to the MI SH (2019a[13]), the Regional Development Plans of Schleswig Holstein are going to be updated within the next years, with altered planning bounderies. Currently the LEP (2010) is under adjustment on the stage of public participation (MI SH 2019b[14]). Concerning the other plans and programmes mentioned there is no information about planned updates and changes on hand.

4.1.3 RELEVANCE FOR THE PROJECT

The MSP states guidelines for spatial planning (chapter 2) as well as goals and principles of spatial planning regarding their economic and scientific uses, the guarantee of safety and ease for shipping as well for marine conservation (chapter 3) for the German North Sea EEZ . Therefore, the MPS represents an essential foundation for all planned spatial uses in the EEZ and must be considered mandatorily for all integral parts of the project "NorthSeaWindPowerHub".

The same applies for the plans and programmes of the 12 nm zone.

4.2 CABLES AND PIPELINES (SPATIAL GRID PLAN)

4.2.1 PRESENT SITUATION

Numerous cables, both telecommunication and power cables, and (mainly) gas pipelines are installed in the North Sea area. Pipelines and submarine cables (including platforms) currently present in the German EEZ and 12 nm zone in the North Sea as of 05.04.2019 are shown in Figure 7 below.

The majority of the existing and planned submarine cables are "high-voltage-direct-current" cables ("HGÜ"), which serve the purpose of conveying the power produced in offshore wind farms from the converter platform to the mainland. Three-phase power cables are used for wind-farm-internal cabling, connecting single wind turbines with each other as well as for the connection of individual wind farms to converter platforms. Currently, an operating HVDC cable between Norway and the Netherlands (NorNed) crosses the German EEZ in the North Sea. With the Cobra-cable (DK-NL) and NordLink (NOR-GER), a further two of these so-called "interconnectors" have been approved.

To combine the plans within the EEZ and 12 nm zone with each other reasonably, so-called "gates" on the border of the two planning areas were defined. Submarine cables, which transmit electricity generated in the EEZ to the shore, are to be layed through these gates. They are derived from the target corridors defined in the spatial plans (see LROP 2017 "Norderney corridor", LEP 2010 "Büsum corridor") as well as the higher needs identified in the meantime.

[13] MI SH, Ministerium für Inneres, ländliche Räume und Integration des Landes Schleswig-Holstein, Ministry of the Interior of the State Schleswig-Holstein (2019a): https://www.schleswig-holstein.de/DE/Fachinhalte/L/landesplanung_raumordnung/raumordnungsplaene/regionalplaene/regionalplan_IV.html; https://www.schleswig-holstein.de/DE/Fachinhalte/L/landesplanung_raumordnung/raumordnungsplaene/regionalplaene/regionalplan_V.html

[14] MI SH, Ministerium für Inneres, ländliche Räume und Integration des Landes Schleswig-Holstein, Ministry of the Interior of the State Schleswig-Holstein (2019b): https://www.schleswig-holstein.de/DE/Schwerpunkte/Fortschreibung_LEP/Projekt/projekt_node.html

The latter justifies two more gates according to the "Bundesfachplan Offshore" (BSH 2017[15]) compared to the older spatial plans. The draft of the NEP (BSH 2018) even proposes one more gate (i.e. five in total). These five gates are shown in Figure 8 according to the draft of the NEP.

A number of pipelines run through the German EEZ and 12 nm zone of the North Sea. The most significant are transit pipelines such as e.g. "NORPIPE" and "EUROPIPE I + II" which transport natural gas from Norway to Germany, as well as the gas pipelines "Wintershall (LG)" and "Tyra-Nogat" south of the marine conservation area "Doggerbank".

The status of grid connection (DC Subsea Cables) in the German EEZ of the North Sea is shown in more detail in Table 1 below.

Table 1: Status of grid connection as of 10.04.2019 (source: BSH WMS CONTIS Facilities, Tennet, Deutsche Wind Guard 2018, UL 2018 - data basis: FEP (draft), O-NEP 2030, internal revision)

orange: OWF under construction or still pending in 2019

Grid connection system	Capacity (MW)	Cluster	Availa-bility	Connected OWF projects	OWF capacity (MW)
cable in use					
alpha ventus	62	N-2-1	2009	alpha ventus	62
BorWin 1	400	N-6-1	2010	BARD Offshore 1	400
BorWin 2	800	N-6-2	2015	EnBW Albatros	117
				Deutsche Bucht	269
				Veja Mate	400
DolWin 1	800	N-2-2	2015	Borkum Riffgrund 1	312
				Trianel Windpark Borkum	200
				Trianel Windpark Borkum II	200
DolWin 2	916	N-3-1	2016	Gode Wind 1	332
				Gode Wind 2	252
				Nordsee One	332
DolWin 3	900	N-2-3	2018	Borkum Riffgrund 2	450
				Merkur Offshore	400
HelWin 1	576	N-4-1	2015	Meerwind Süd / Ost	288
				Nordsee Ost	288
HelWin 2	690	N-4-2	2015	Amrumbank West	303
				Kaskasi II	325

[15] BSH, Bundesamt für Seeschifffahrt und Hydrographie, Federal Office of Marine Shipping and Hydrography (2017): "Bundesfachplan Offshore für die deutsche ausschließliche Wirtschaftszone der Nordsee 2016 / 2017 und Umweltbericht": https://www.bsh.de/DE/PUBLIKATIONEN/_Anlagen/Downloads/Offshore/Bundesfachplan-Nordsee/Bundesfachplan-Offshore-Nordsee-2016-2017.pdf?__blob=publicationFile&v=13

SylWin 1	864	N-5-1	2015	Butendiek	288
				DanTysk	288
				Sandbank	288
Nordergründe	111	-	2017	Nordergründe	111
Riffgat	113	-	2014	Riffgat	113
cable under construction					
BorWin 3	900	N-8-1	2019	EnBW Hohe See	500
				Global Tech 1	400 (interim BorWin2)
cable approved					
DolWin 6	900	N-3-3	2023	Gode Wind 3	110
				Gode Wind 4	132

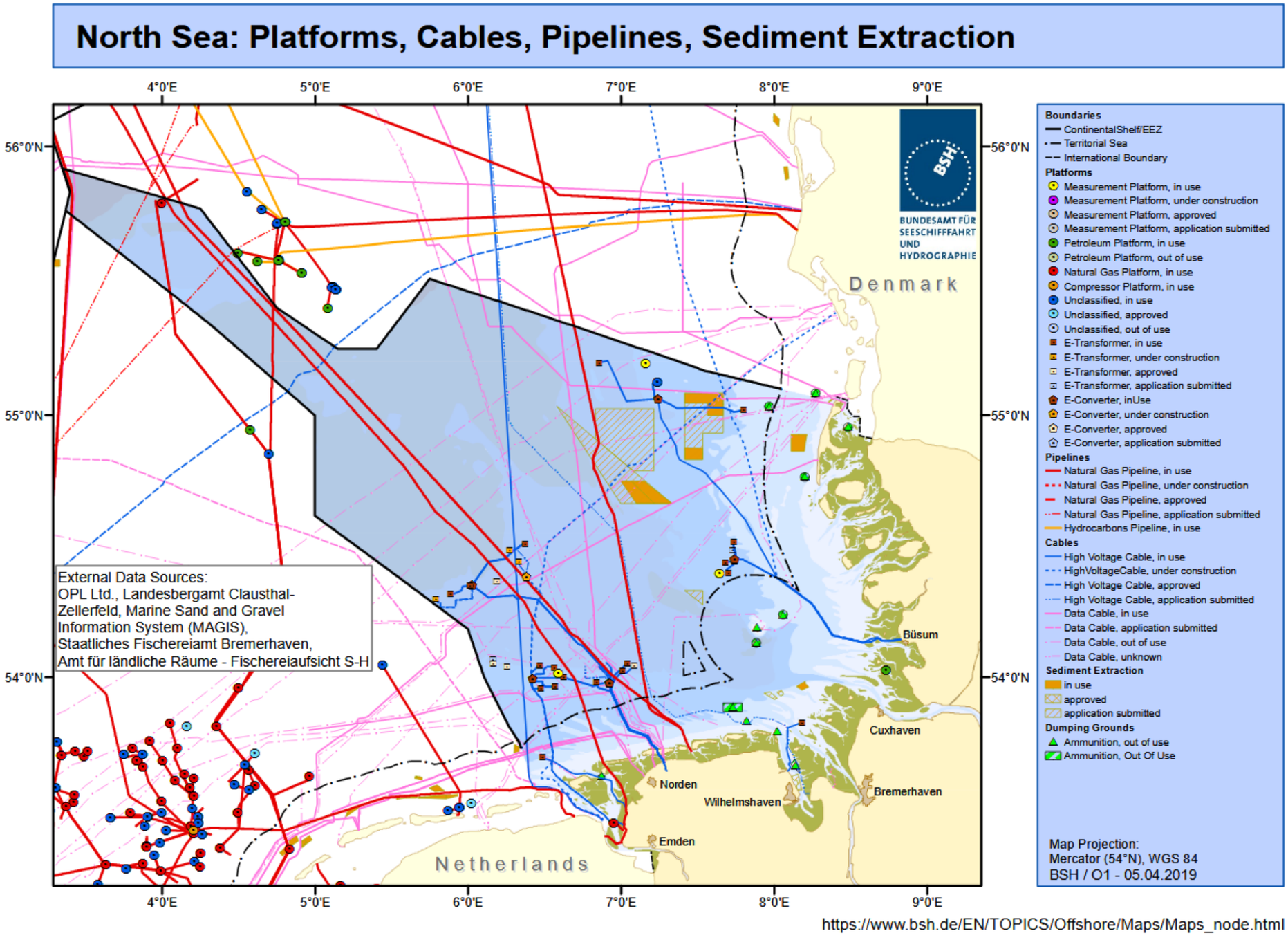


Figure 7: Platforms, cables, pipelines (and sediment extraction) in the German EEZ and 12 nm zone in the North Sea as of 05.04.2019 (source: BSH 2019[16])

[16] https://www.bsh.de/EN/TOPICS/Offshore/Maps/_Anlagen/Downloads/NorthSea_Platforms_Cables_Pipelines_SedimentExtraction.pdf;jsessionid=4C8B143D835642EEAB69DB1E841F1D8C.live21303?__blob=publicationFile&v=2

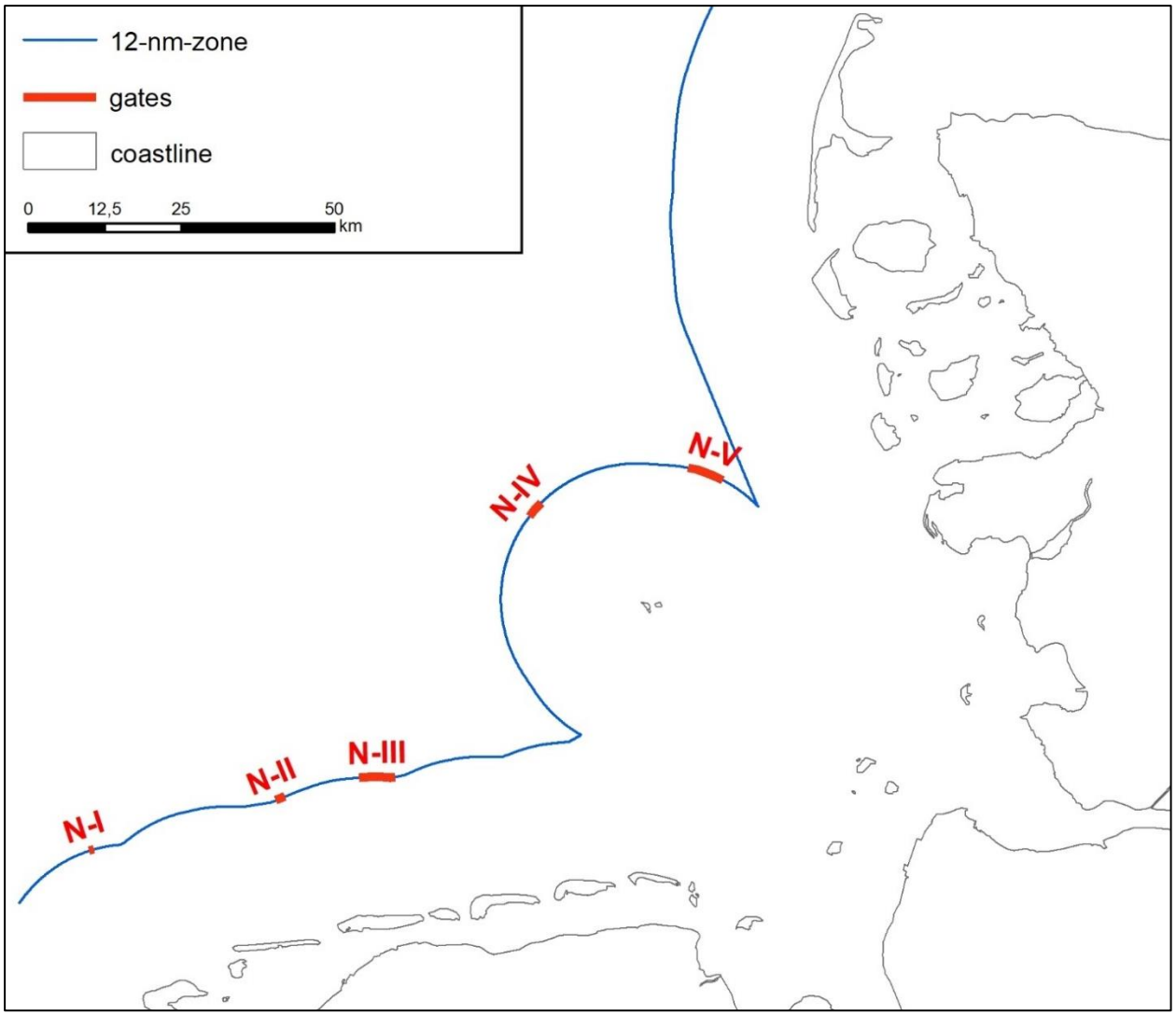


Figure 8: Gates between EEZ and 12 nm zone accordig to BSH (2018[17])

4.2.2 FUTURE CHANGES

Germany's Act on Granting Priority to Renewable Energy ("Erneuerbare Engergie Gesetz – EEG") is an effective and efficient instrument to promote the expansion of renewable energies during the transition towards a sustainable energy system. The share of renewable energy in electricity consumption is constantly rising: from about 6 % in the year 2000 to about 36 % in the year 2017. By the year 2025 about 40 to 50 % of Germany's consumed energy should come from renewable energy sources. To achieve this target, an increase of the installed capacity of offshore wind turbines of 6.500 megawatt by 2020 and 15.000 megawatt by 2030 is planned. Besides the current existing grid conections, with the 2025 point in time of realization, the grid connection route DolWin 6 is currently in planning. Beyond 2025 further grid connections are planed (e.g. BorWin 4, DolWin 4). The cable routes are already running at present in spatially defined corridors.

[17] BSH, Bundesamt für Seeschifffahrt und Hydrographie, Federal Office of Marine Shipping and Hydrography (2018): "Entwurf Flächenentwicklungsplan 2019 für die deutsche Nord- und Ostsee": https://www.bsh.de/DE/THEMEN/Offshore/Meeresfachplanung/_Anlagen/Downloads/Aktuelles_FEP_Entwurf_FEP2.pdf?__blob=publicationFile&v=3

4.2.3 RELEVANCE FOR THE PROJECT

In the designated priority areas for cables and pipelines (corridors), operation and maintenance of cables and pipelines is given priority over other spatially relevant uses. Any spatially relevant plans, measures and projects in these areas that are not compatible with the function of the priority area for cables and pipelines are prohibited.

Pipelines, submarine cables for the transport of power generated and other submarine cables are to cross priority areas for shipping by the shortest route possible if they cannot be run parallel to existing structures. The same applies for priority and reserve areas designated for shipping (see also chapter 4.6).

Furthermore, the intersection of a pre-existing cable or pipeline with a new cable generally involves an increased technical effort (and as a consequence a higher environmental impact). Therefore, crossings are to be avoided, however, they are not necessarily prohibitive to a successful planning permission.

Integrating new cables into an existing run of cables is generally preferred, due to a lower environmental impact.

The International Cable Protection Committee (ICPC) published recommendations for the crossing of submarine cables and pipelines.

4.3 OFFSHORE AND NEARSHORE WIND FARMS (SPATIAL GRID PLAN)

4.3.1 PRESENT SITUATION

Numerous offshore windfarms at different stages (planned, approved, under construction, or in operation) exist within the German EEZ (Figure 9). Within the 12 nm zone, there are only two windfarms in operation (Figure 9). The required converter platforms and grid connections for the transport of produced offshore wind electricity are described further in chapter 4.2. The current status of offshore wind farm planning in the german North Sea is described in Table 2 below.

Table 2: Current status of offshore wind farm development (as of March 2019, source: BfN 2019[18])

		EEZ	12 nm zone	total
Operational	wind farms (n)	16	2	19
	wind turbines (n)	1.004	48	1.052
Under construction	wind farms (n)	5	-	5
	wind turbines (n)	229	-	229
Approved	wind farms (n)	5	-	5
	wind turbines (n)	257	-	257
Planned	wind farms (n)	2	-	2
	wind turbines (n)	77	-	77
Total	wind farms (n)	28	2	30
	wind turbines (n)	1.567	48	1.615

[18] https://www.bfn.de/themen/awz-zulassungen-in-nord-und-ostsee/offshore-windparks.html

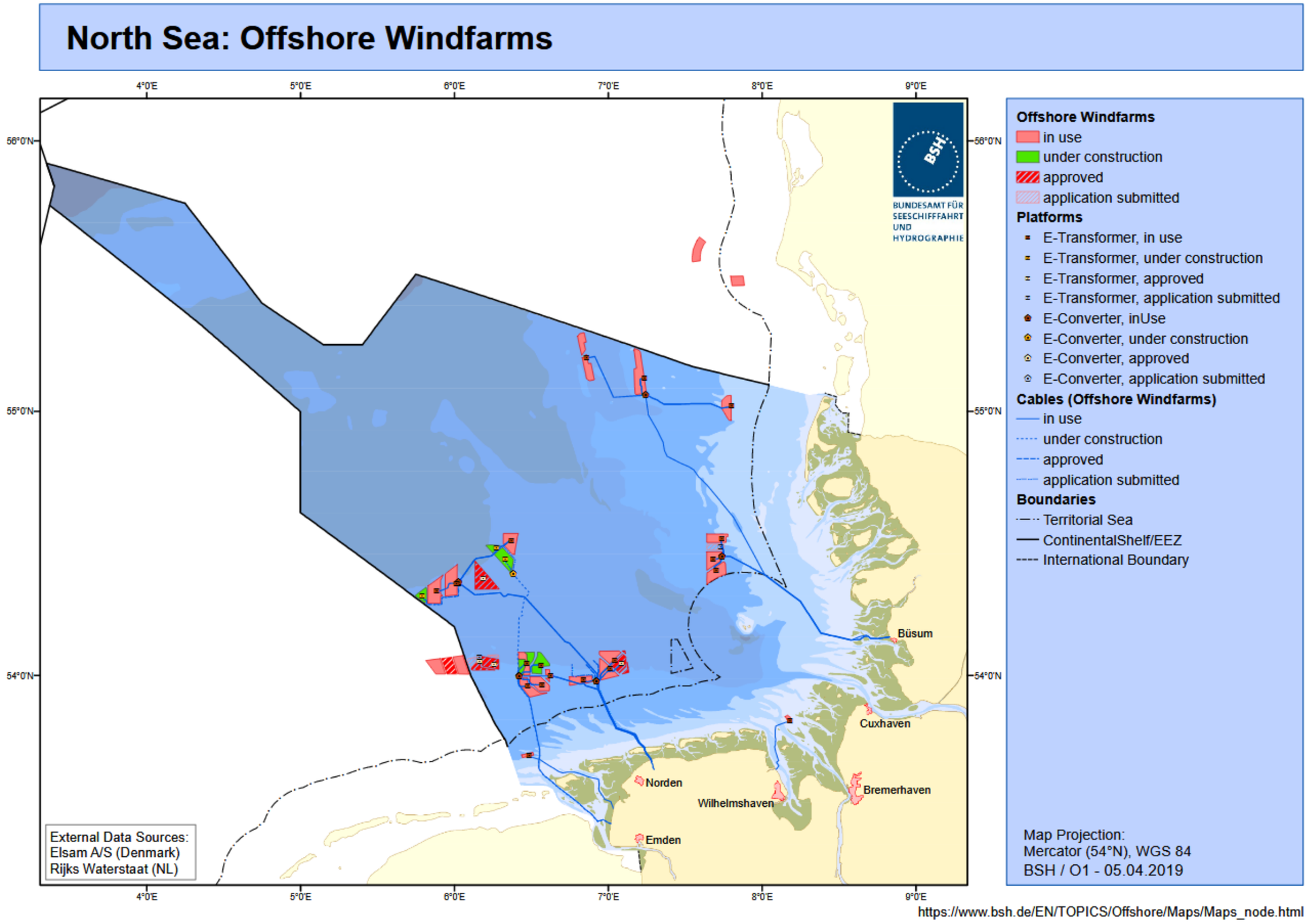


Figure 9: Offshore wind farms in the German EEZ and 12 nm zone of the North Sea as of 05.04.2019 (source: BSH 2019[19])

[19] https://www.bsh.de/EN/TOPICS/Offshore/Maps/_Anlagen/Downloads/NorthSea_OffshoreWindfarms.pdf?__blob=publicationFile&v=2

4.3.2 FUTURE CHANGES

To ensure an environmentally friendly and sustainable energy supply, the federal government is planning a nature-compatible expansion of the use of offshore windenergy by 2020 with 6.5 GW and by 2030 with 15 GW power output (source: BfN 2019[20]).

Today, the defined energy goal for 2020 has almost been achieved. An expansion limit of max. 7,7 GW by 2020 was defined in the German Energy Act ("Energiewirtschaftsgesetz"). This limit of total power output is exhausted by the projects, which have received approval for grid connection prior to the onset of the tender system (source: Deutsche Windguard 2018[21]).

According to the Offshore Wind Energy Act ("WindSeeG"), further projects with a total output of 3,1 GW received approval in the bidding rounds of the transition system in April 2017 and 2018. These projects are scheduled to commence operation between 2021 and 2025. Presumably, an overall output of 10,8 GW will be achieved by 2025. Until 2030, a further 4,2 GW are neccessary to achieve the energy goals defined in the Renewable Energy Act ("EEG"). This capacity should be awarded in bidding rounds according to the central model as of 2021 (Deutsche Windguard 2018). The approved and planned (application submitted) offshore wind farms in the German EEZ in the North Sea are shown in Figure 9 above. Within the 12 nm zone, no further windfarms are currently planned due to various usages and widespread nature protection areas.

The steering planning instrument for the prospective use of wind energy at sea and for power cables is the area development plan ("Flächenentwicklungsplan = FEP"). In this plan, the areas for wind energy at sea and power cables are spatially planned for the time period from 2026 to at least 2030. Certain spaces are defined within these areas and for these spaces, it is specified how much output (megawatt) from wind turbines at sea will likely be installed and activated in each calender year. To ensure synchronisation with the required power cables for wind turbines at sea, the locations for platforms and for power cable routes are defined within the German EEZ. In addition, it is determined in which calender year the planned wind turbines at sea and their power cables become operational. The FEP is currently being prepared for the first time and will be updated usually every four years or when changes occur.

4.3.3 RELEVANCE FOR THE PROJECT

In the designated priority areas for offshore wind energy, operation and maintenance of offshore windfarms is given priority over other spatially relevant uses. Any spatially relevant plans, measures and projects in these areas that are not compatible with the function of the priority area for offshore wind energy are prohibited. Furthermore newly planned cables are not to be laid through existing wind farms. Usually a safety zone of 500 m radius is defined around an existing offshore wind farm.

Which areas in which period of time are priority areas for the expansion of offshore windenergy will be defined in the FEP currently in preparation.

[20] https://www.bfn.de/themen/awz-zulassungen-in-nord-und-ostsee/offshore-windparks.html
[21] Deutsche Windguard (2018): Status des Offshore-Windenergieausbaus in Deutschland. Gesamtjahr 2018.

4.4 MINERAL RESOURCES

4.4.1 PRESENT SITUATION

EEZ

The exploration and exploitation of deposits of non-living resources in the German EEZ is of high significance to the public interest and constitutes an important basis for Germany's future economic development. Resources such as sand and gravel are valuable economic assets. Under spatial planning aspects, large areas are available in the EEZ for the exploration for and production of resources.

Sand and gravel are extracted from the sea bed in the German EEZ of the North Sea. These raw materials are mainly used for construction, for sand deposits on beaches and coastal protection measures. The process of sand and gravel extraction can be differentiated into the initial phase of searching (exploration) and the actual extraction phase (production). The initial geological exploration of marine deposits of mineral resources is carried out by the Federal Institute for geology and raw material (BGR 2016[22]). Based on the results of the geological exploration, sediments of potential marine deposits are examined further by means of cores as well as other seismic procedures.

The mining (production) and transportation of these raw materials is carried out by dredging vessels. In the German EEZ of the North Sea, this procedure involves trailing the suction head from the moving dredging vessel over the ground. Specifications in the respective planning permissions (e.g. maximum of 2 m depth in case of overlapping trails) must be adhered to.

The MSP (see also Figure 5) of the BSH states that the exploitation of raw material resources is to be concentrated in an area and be as small-scale as possible. Existing sand and gravel mining sites are to be exploited to the maximum extent practicable, provided this is compatible with marine environmental concerns and sites keep a remaining sediment layer, which is required for recovery of benthic communities. An expansion of these sites should be preferred to the search for new areas.

The extraction of natural and mineral raw material in the German EEZ of the North Sea largely takes place in the north-eastern part (see Figure 10 below). The state mining authority of Clausthal-Zellerfeld is responsible for the approval of sand and gravel mining (production).

12 nm zone

The procedure of exploration and exploitation of raw materials in the 12 nm zone is similarly organized as in the EEZ. Within the 12 nm zone there are currently two areas in which mineral resources are mined (see Figure 10). The area “Westerland III” is used to extract material for coastal protection measures (ROB 2005). Furthermore, there are two areas with exploration licences.

In addition, serveral dumping grounds have to be considered, which are defined by the German Shipping Administration (WSV). These grounds are used to deposit sediments which are extracted in the course of structural corrective maintenance of shipping lanes. The Development Plans of Lower Saxony do not contain these dumping grounds and within the ROB (2005) they are only partly exhibited („Dumping Ground for Dredged Material“).

[22] Bundesanstalt für Geowissenschaften und Rohstoffe – BGR (2016): Geopotenzial Deutsche Nordsee. Potenziale des unterirdischen Speicher- und Wirtschaftsraumes im Norddeutschen Becken.

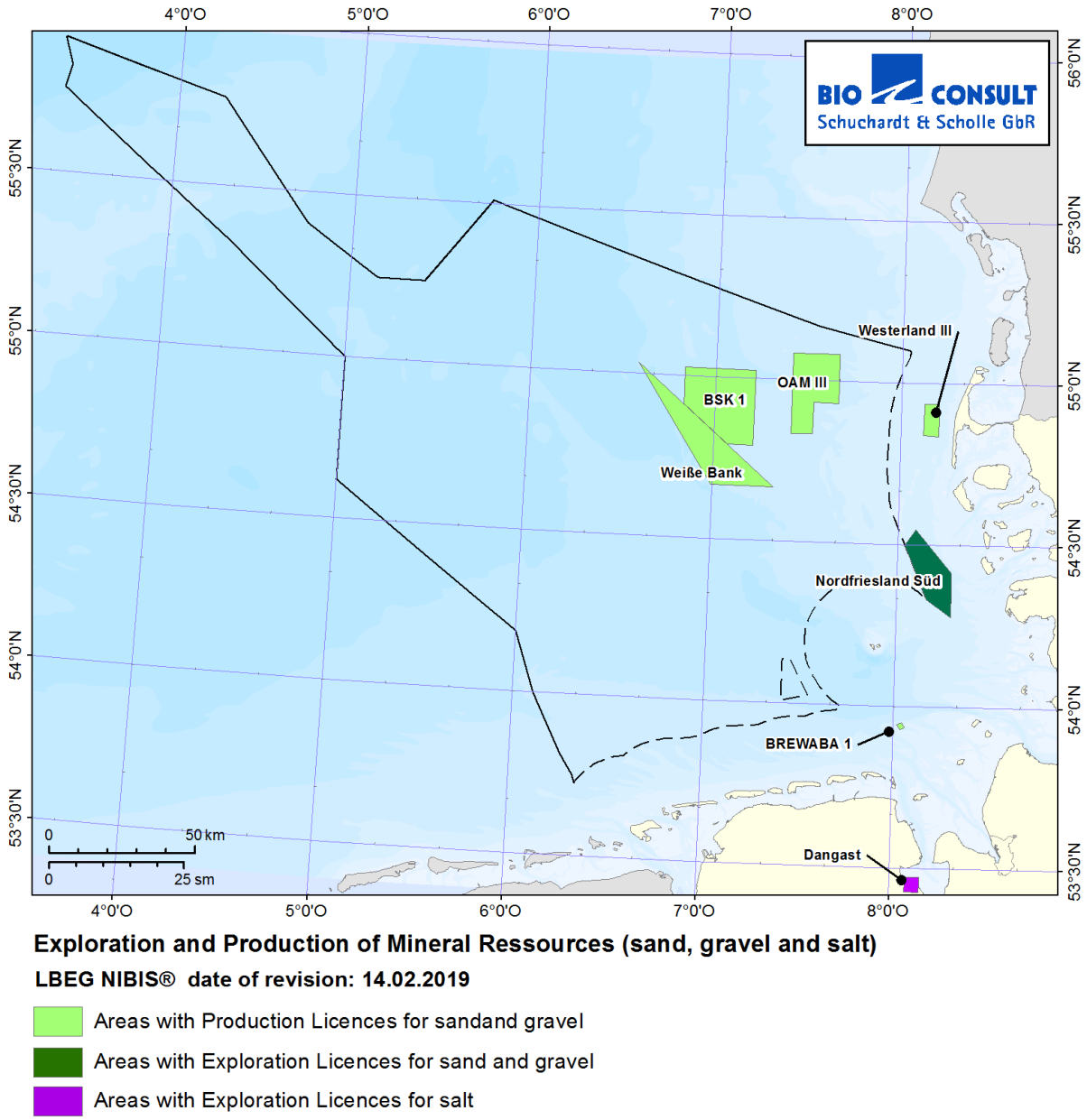


Figure 10: **Exploration and mining (production) areas for sand and gravel extraction in the German EEZ and 12 nm zone of the North Sea**

Table 3: Permissions and approvals for the exploration and mining (production) of stone, sand, gravel, salt and earths in the German EEZ and 12 nm zone of the North Sea

Name of area	Reference Nr.	Holder	Area [km²]	Term until
Exploration licence „Nordfriesland Süd“ (stones and earths)	L2.7/L67211/15-16_02	Schleswig-Holstein Agency for Coastal Defence, National Park and Marine Conservation (LKN)	241	30.04.2023
Production licence „Weiße Bank“ (stones, gravel and sand)	L2.7/L67212/15-01_03	„OAM-DEME Mineralien GmbH“	441	31.03.2039
Production licence „BSK 1“ (sand and gravel)	L2.7/L67212/15-01_03	„BSK Baustoffe und Seekies GmbH“	532	14.07.2033
Production licence „OAM III“ (stones, gravel and sand)	L2.7/L67212/15-01_02	„OAM-DEME Mineralien GmbH“	351	14.05.2051
Production licence „Westerland III“ (sea sand)	L2.7/L67212/15-06_01	Schleswig-Hostein: Agency for rural areas Husum	55	31.12.2030
Production license „BREWABA 1“ (sand)	L2.7/L67212/05-01_01	„Van Oord Deutschland GmbH“	3,7	14.08.2031
Exploration licence „Dangast“ (brine)	L2.7/L67212/03-02_04	City of Varel	25	31.03.2023

4.4.2 FUTURE CHANGES

Since raw materials are becoming more and more limited onshore, it is reasonable to assume that the extraction of raw materials offshore will become more important as an economic sector in the future. Major coastal construction projects (e.g. construction of JadeWeserPorts 2009) and envisaged projects such as “North Sea Wind Power Hub” in the North Sea require a great quantity of sand.

The yearly expected removal of sand due to currents and wind in coastal areas and on islands is offset by sand deposits on beaches. Against the backdrop of climate change and sea-level rise a prospective increase of yearly sand removal is to be expected.

Since the MSP of the BSH states that an expansion of current mining (production) sites should be preferred to the search for new deposit areas, a prospective expansion in these areas can be assumed.

4.4.3 RELEVANCE FOR THE PROJECT

EEZ

In principle, projects like cables an pipelines can be planned and installed in approved sediment extraction areas. However, an agreement with the license holder is required.

Sand and gravel extraction must not take place where cables or pipelines are buried in the seabed. Protection zones are established around existing cables and pipelines.

12 nm zone

According to ROB (2005) the legal framework surrounding sediment extraction is the Federal Mining Act (BundesBergGesetz, BBergG[23]). In the process of planning approval, all legal concerns and public affairs (i.e. offshore wind energy) are to be considered (§ 11 Nr. 10 BBergG), but mineral extraction is given special consideration (§ 48 (1) Satz 2 BBergG).

However, according to § 49 BBergG, there is a special arrangement within coastal waters and the area of the continental shelf: In these areas, the exploration of mineral recources is only permitted if it does not affect the running or maintenance of cables or pipelines.

The dumping grounds of the German Shipping Administration (WSV) mentioned above are generally to be avoided.

4.5 HYDROCARBONS

4.5.1 PRESENT SITUATION

EEZ

The process of exploitation can be differentiated into the initial phase of searching for deposits (exploration) and the actual extraction phase of oil and gas (production). The initial geological exploration of marine deposits of oil and gas is carried out by means of seismic procedures and exploration drillings. The production takes place at oil/gas rigs and transport to the mainland via oil/gas pipelines or vessels.

Deposit areas of hydrocarbon (oil and gas) within the German EEZ of the North Sea are not yet entirely known. In currently four large-scale approved areas for exploration (see Figure 11 below), regular surveys by means of seismic procedures and exploration drillings are being carried out. Oil and gas production is currently taking place in a 15 km² large approved area named „Deutsche Nordsee A6/B4" (see Figure 11). The general situation and the options available for accessing the hydrocarbons industry data are described in the NIBIS® MAP SERVER which represents an available Internet research option. The different terms of permits and approvals are listed in Table 4 below (LBEG 201924).

[23] BBergG, Bundesberggesetz: https://www.gesetze-im-internet.de/bbergg/BBergG.pdf

[24] Landesamt für Bergbau, Energie und Geologie – LBEG (2019): NIBIS® - Kartenserver. http://nibis.lbeg.de/cardomap3/Letzte Abfrage am 11.04.2019 Karten und Daten des Niedersächsischen Bodeninformationssystems. Darstellung der Salzstockkarte mit Genehmigung der Bundesanstalt für Geowissenschaften und Rohstoffe (BGR).

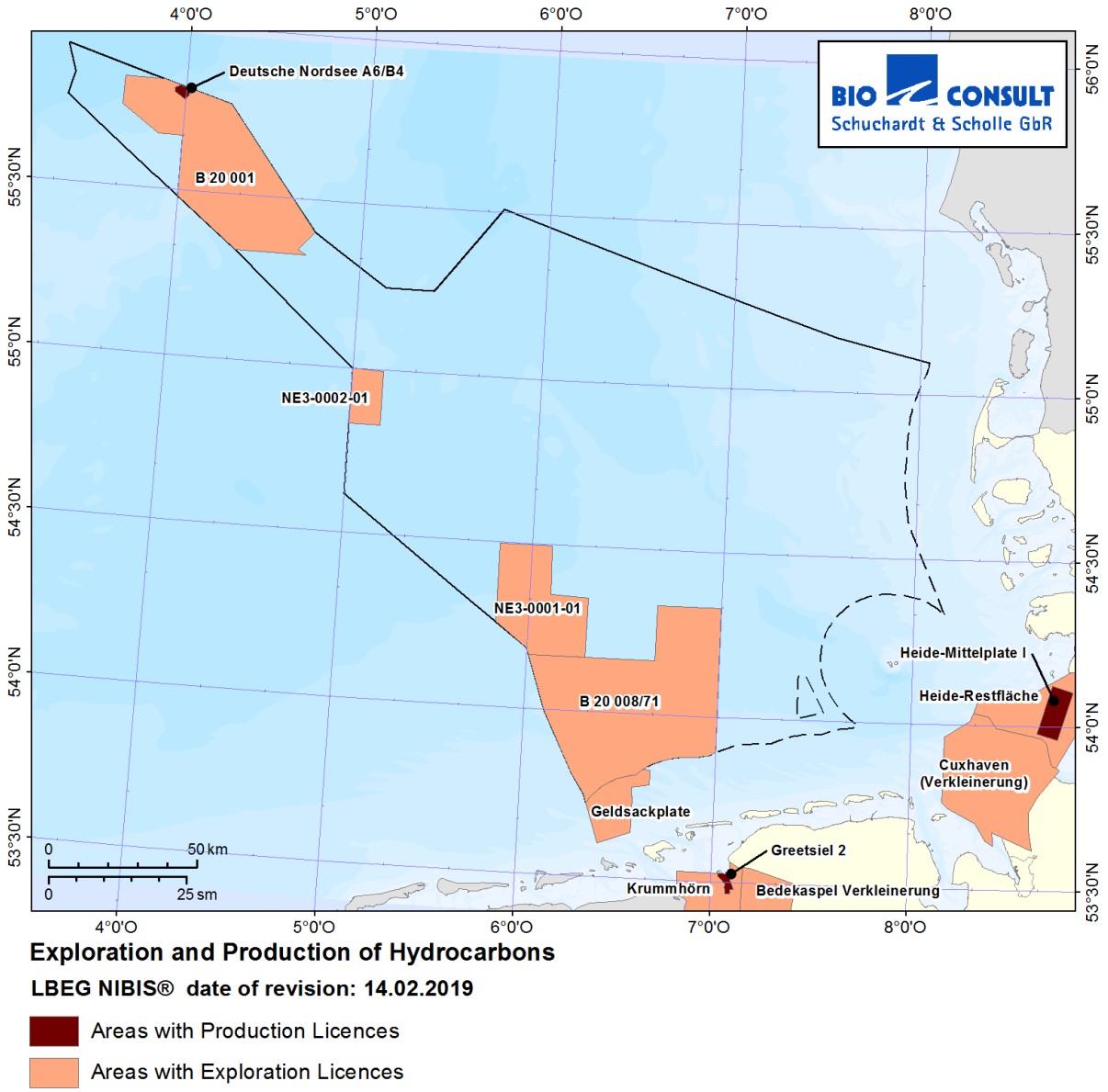


Figure 11: **Areas with exploration licences and production licences of hydrocarbons in the German EEZ and 12 nm zone of the North Sea as of 14.02.2019**

Table 4: Permits and approvals for the exploration and production of hydrocarbon in the German EEZ and 12 nm zone of the North Sea

Name of area	Reference Number	Holder	Area [km²]	Term until
Exploration licence „B 20 001“	L2.7/L67211/41-01_01	Wintershall Holding GmbH, Neptune Energy Deutschland GmbH	1829	30.04.2019
Exploration licence „NE3-0002-01“	L2.7/L67211/41-18_02	Petrogas E&P UK Limited, Danoil Exploration AS	199	31.12.2021
Exploration licence „NE3-0001-01“	L2.7/L67211/41-18_01	Wintershall Holding GmbH	884	31.05.2020
Exploration licence „B 20 008/71“	L2.7/L67211/41-06_01	Wintershall Holding GmbH, Neptune Energy Deutschland GmbH, Hansa Hydrocarbons Limited	2572	31.05.2021
Exploration licence „Geldsackplate“	L2.7/L67211/51-13_01	Oranje-Nassau Energie B.V. und Hansa Hydrocarbons Limited	286	30.06.2020
Exploration licence „Krummhörn“	B 01004-I	BEB Erdgas und Erdöl GmbH & Co. KG	467	30.04.2020
Exploration licence „Cuxhaven (Verkleinerung)“	L2.7/L67211/01-01_17	DEA Deutsche Erdoel AG	1163	31.12.2019
Exploration licence „Heide-Restfläche“	L2.7/L67211/11-01_01	DEA Deutsche Erdoel AG	900	31.12.2020
Production licence „Deutsche Nordsee A6/B4”	L2.7/L67212/41-01_01	Wintershall Holding GmbH	15	31.05.2028
Production licence „Heide-Mittelplatel“	L2.7/L67212/11-01_01	DEA Deutsche Erdoel AG	124	31.12.2041
Production licence „Greetsiel II“	L2.7/L67212/01-15_01	BEB Erdgas und Erdöl GmbH & Co. KG	18	05.07.2025

Currently, one offshore drilling platform „Deutsche Nordsee A6/B4” for the oil and gas production exists in the German EEZ of the North Sea (see Figure 7**,** chapter 4.2).

12 nm zone

Within the German 12 nm zone, permission for the exploration of hydrocarbon is currently granted within four fields (“Geldsackplatte”, “Krummhörn”, “Cuxhaven (Verkleinerung)” and “Heide-Restfläche”, see Figure 11Table 4: Permits and approvals for the exploration and production of hydrocarbon in the German EEZ and 12 nm zone of the North Sea and Table 4). The actual mining of oil and gas is currently restricted to one field. Oil is mined on the platform “Mittelplate” to the west of Friedrichskoog, gas in the Leybucht (field “Greetsiel II”). The field Mittelplate is the most important deposit of oil in Germany (DEA 2019[25]).

4.5.2 FUTURE CHANGES

EEZ

Since deposit areas of hydrocarbon (oil and gas) within the German EEZ of the North Sea are not yet entirely known, it can be assumed that current efforts regarding the exploration and production will continue and potentially even increase in the near and long-term future.

12 nm zone

According to ROB (2005) Mittelplate should operate approximately for another 20 years, i.e. until 2025. However, the operating hours are currently expected to last longer, because the reserves of the technically and economically exploitable oil was upwardly revised (DEA 2019).

Although the LEP (2010) states that up until now no systematic exploration of oil and gas has been conducted in the North Sea, apart from the approved platform „Mittelplate“ no further areas for exploration of raw materials are shown. This is due to the fact that the national park „Schleswig-Holsteinisches Wattenmeer“ (NATURA 2000 site) is a priority area for nature conservation.

Considering the demand of oil and gas as well as the ongoing search for new fields, an extension or relocation of mining should not be completely precluded in the long-term future, even within the 12 nm zone. However, this can be considered as very unlikely in the near future.

4.5.3 RELEVANCE FOR THE PROJECT

In principle, projects like cables and pipelines can be planned and installed in areas where offshore exploration and production licenses have been awarded. However, an agreement with the license holder is required.

Hydrocarbon production is usually flexible enough to avoid proximity to infrastructure in and on the seabed.

4.6 SHIPPING AND OTHER ACTIVITIES

4.6.1 PRESENT SITUATION

EEZ

With regards to the importance of maritime traffic for the economic development in Germany and due to the fact that the North and Baltic Seas are of great importance for international transit shipping, a framework of frequently travelled routes has been defined as priority areas for shipping, bordered by shipping priority and reserve areas, to avoid restrictions to maritime traffic and achieve a maximum level of safety. Designated shipping areas currently existing in the German EEZ of the North Sea are shown in Figure 12 below.

[25] DEA, Deutsche Erdoel AG (2019): https://www.mittelplate.de/de

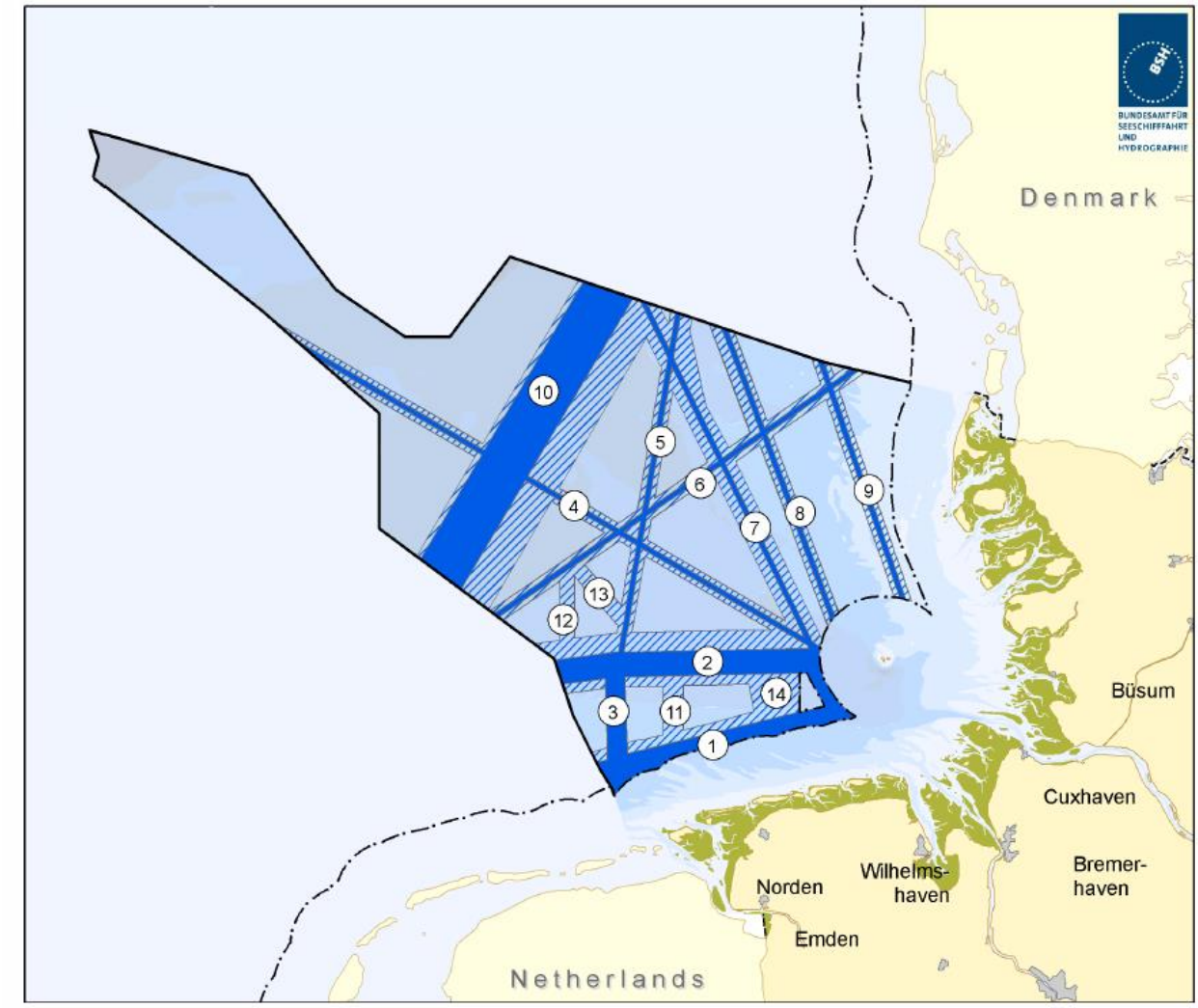


Figure 12: Numbering of designated areas for shipping in the German EEZ of the North Sea (source: BSH 2009). Blue = priority areas; striped blue = priority and reserve areas

Shipping can be classified into maritime traffic (here professional shipping) and shipping for other purposes. Maritime traffic comprises the transport of material goods and persons and is carried out with different types of vessels, e.g. general cargo vessels, tankers, balk carriers, container vessels, heavy-lift carriers as well as ferries and cruise ships. As described above, maritime traffic mainly takes place within designated shipping lanes and –routes.

Overall, the german bight is a heavily used area for shipping and currently the focus of maritime traffic within the German North Sea EEZ lies in the designated areas 1, 2, 7, 8 and 10 according to the MSP of the BSH. Spatially concentrated heavy maritime traffic occurs in the two traffic separation schemes (“VTG”) in the southern part of the German bight (see designated areas 1 and 2 in Figure 12).

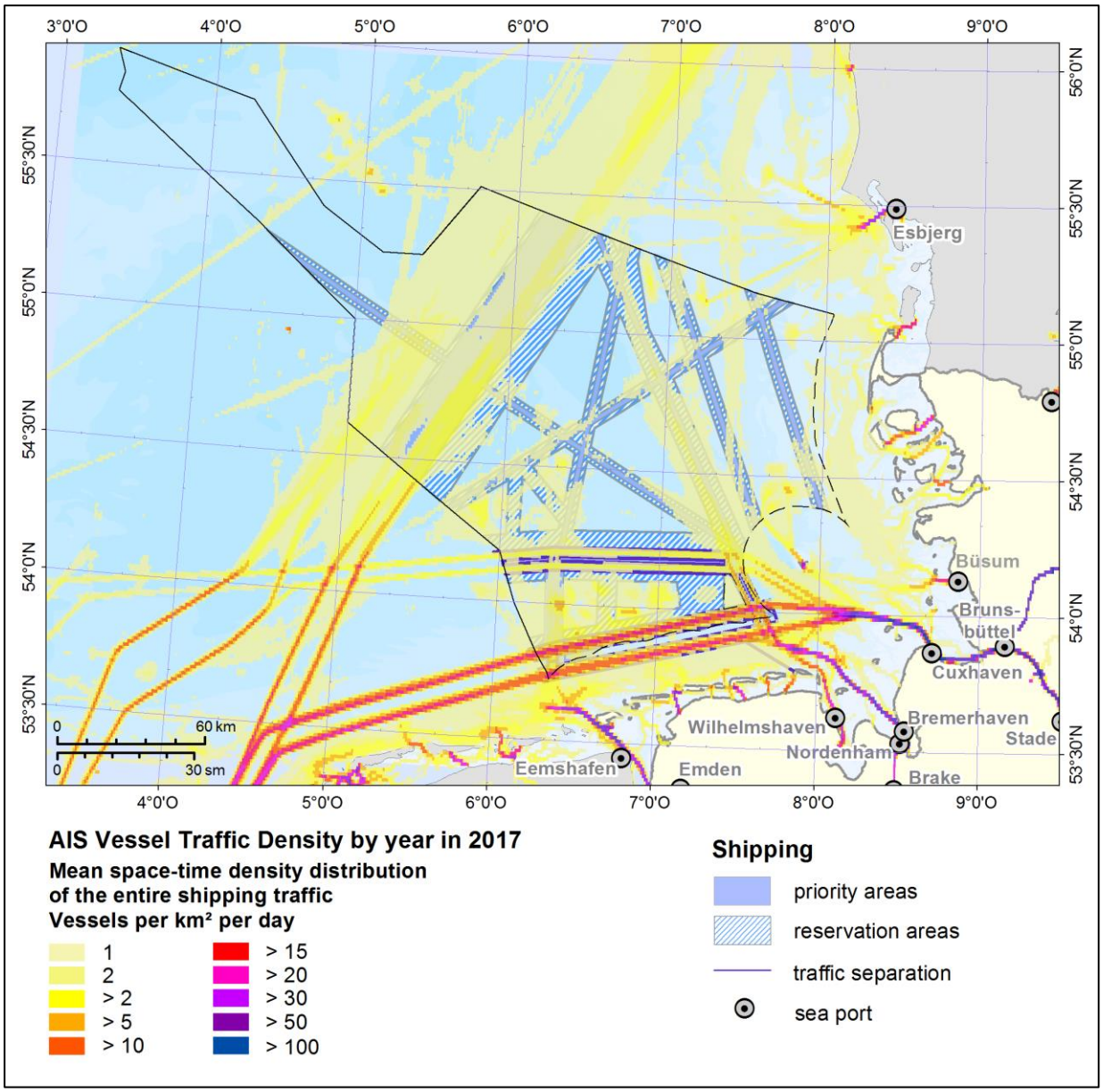


Figure 13: AIS Vessel Traffic Density as of 2017 (source: WMS services of GDI-BSH)

12 nm zone

Within the 12 nm zone, a lot of shipping takes place as well. Apart from the ferry services between the mainland and the islands (see ROB 2005), the main shipping routes are in the coastal waters of Lower Saxony. This can be seen in the data of the BSH (Figure 14), which mainly coincides with the LROP (2008) and the ROB (2005).

Along the border between 12 nm zone and EEZ, there is a traffic seperation scheme. The southern traffic direction, i.e. the one within the 12 nm zone, runs from West to East. This shipping route is connected to the estuaries of the Ems, Weser, Elbe and the Jade Bay through branching switchs. All of these routes are priority areas for shipping according to the LROP (2008).

Apart from these shipping routes the „Waterways and Shipping Office“ (Wasser- und Schifffahrtsamt, WSA) defined anchoring areas (see ROB 2005 and Figure 14), „unrestricted maneuvering areas“ (see ROKK 2005) and areas where cables are prohibited („Kabelverbotszonen“). The latter are mentioned in ROKK (2005), but not shown in the map.

These areas aim to ensure that the necessary space to maneuver, especially when approaching an estuary, is not limited due to windfarms or other structures (ROKK 2005). This includes the dropping of the anchor in an emergency as well as a possible drifting with dropped anchor (which is likely to damage cables and includes the possibility of a collision with existing structures).

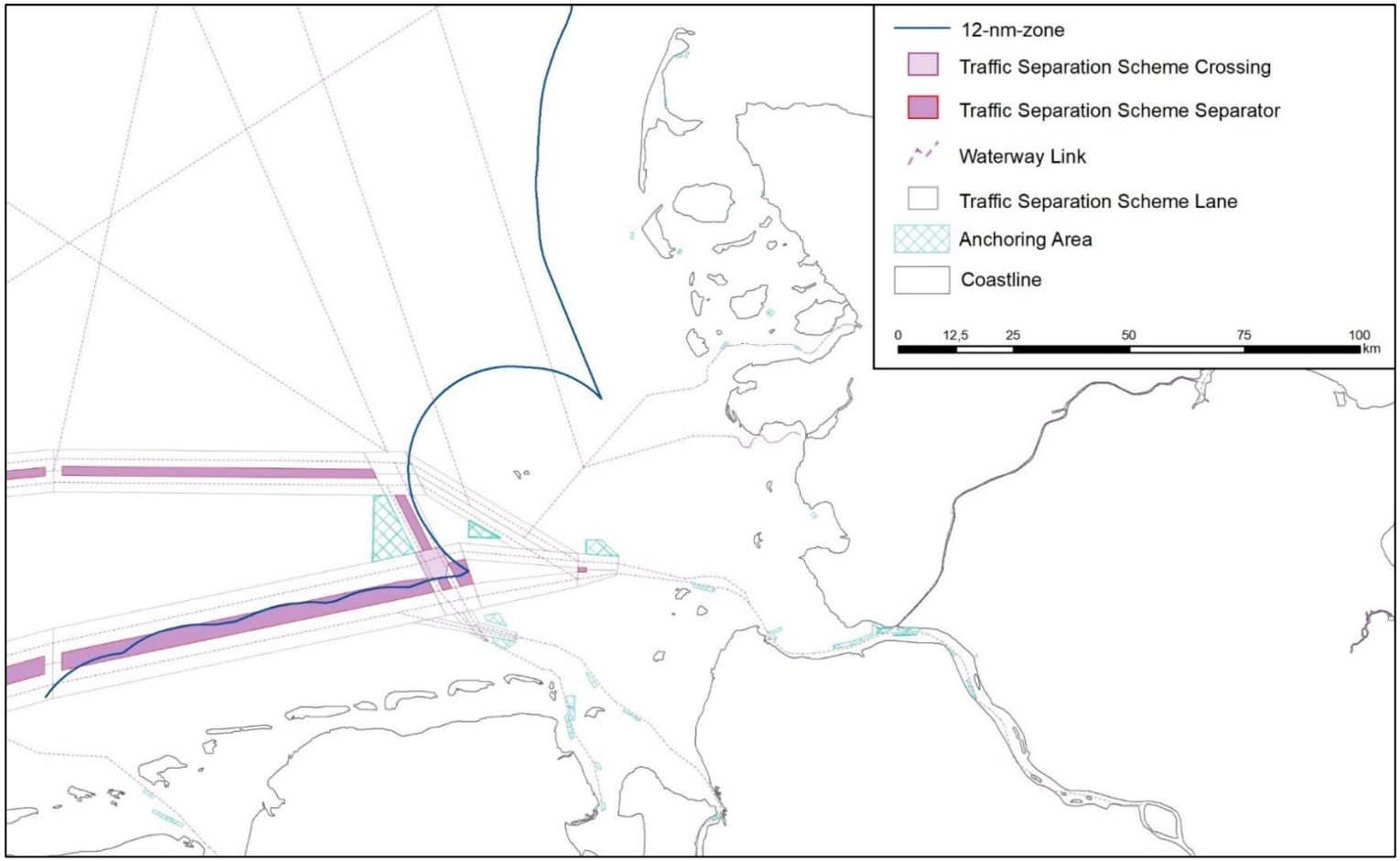


Figure 14: Designated areas for shipping within the 12 nm zone (source: BSH 2016[26], 2011[27])

[26] BSH, Bundesamt für Seeschifffahrt und Hydrographie, Federal Office of Marine Shipping and Hydrography (2016): WMS-Server, data from 2016. Online: https://www.geoseaportal.de/mapapps/resources/apps/inspire_watertransportnetwork/index.html?lang=de

[27] BSH, Bundesamt für Seeschifffahrt und Hydrographie, Federal Office of Marine Shipping and Hydrography (2011): data considering anchoring areas made available in 2011. The current data available at the GeoSeaPortal (WMS-Server) is from the year 2007 and does not seem to be up-to-dateor complete, as they depict only two of the anchoring areas (equally to ROKK (2005) and ROB (2005))

4.6.2 FUTURE CHANGES

As mentioned above, the MSP for the German EEZ in the North Sea is currently being revised. So far, no preliminary draft has been published by the BSH. It can be assumed that the level of current shipping traffic (see Figure 13 above) will not only continue but steadily increase in the near and long-term future within the EEZ as well as the 12 nm zone.

4.6.3 RELEVANCE FOR THE PROJECT

EEZ

In the designated priority areas for shipping (see Figure 12), shipping is granted priority over the other spatially significant uses. Any spatially relevant plans, measures and projects in these areas that are not compatible with the function of the priority area for shipping are prohibited.

In the designated priority and reserve areas for shipping, special consideration is given to shipping. This needs to be taken into account when considering other spatially relevant plans, measures and projects.

Shipping provides risks for different operations. During the operation, the project vessel may be hampered in its maneuverability. In the priority and reserve areas for shipping, the vessel (for example cable ship, survey vessel) constitutes an obstacle for shipping, which basically presents the risk of collision.

12 nm zone

Generally speaking, shipping is entitled to be unobstructed by other activities, which is why emerging conflicts usually are resolved in favour of shipping (ROB 2005). The LROP (2008) states that a negative impact on shipping within the priority areas due to the operation or building of windfarms is to be prevented. This not only includes the wind turbines themselves, but also the necessary cables: Even though it is not impossible to run a cable through restricted areas (in each case an overall assessment of all aspects is performed to see if and under which circumstances cables and corridors are feasible), crossings of shipping lanes are to be limited categorically to an inevitable minimum (ROKK 2005).

Especially the anchoring areas are restricted in terms of running a cable and can be considered as „no go“ areas.

4.7 WRECKS

4.7.1 PRESENT SITUATION

To ensure the safety of shipping in German Waters, the BSH regularly investigates and collects data of all known underwater obstacles (e.g. ship wrecks) in the EEZ and the 12-nm-zone of the North Sea. Wrecks and other underwater obstructions are investigated by using modern sonar systems such as Side Scan Sonar (SSS) and mulitbeam echo sounder.

Known positions (see Figure 15 below) are then mapped and presented in nautical charts (paper & electronic versions). Of particular interest in the investigations are the location/position and the shallowest depth of the object. The current condition and environmental settings (e.g. kolk-formed depressions) are also important for a precise assessment of the hazardous situation and this information serves as a basis for further investigations of the underwater obstacle in the future.

An overview of currently known wreck positions in the German EEZ and 12 nm zone of the North Sea is shown in Figure 15 below. While the majority of wrecks are situated in the 12 nm

zone, known wreck positions within the German EEZ of the North Sea are more widely dispersed.

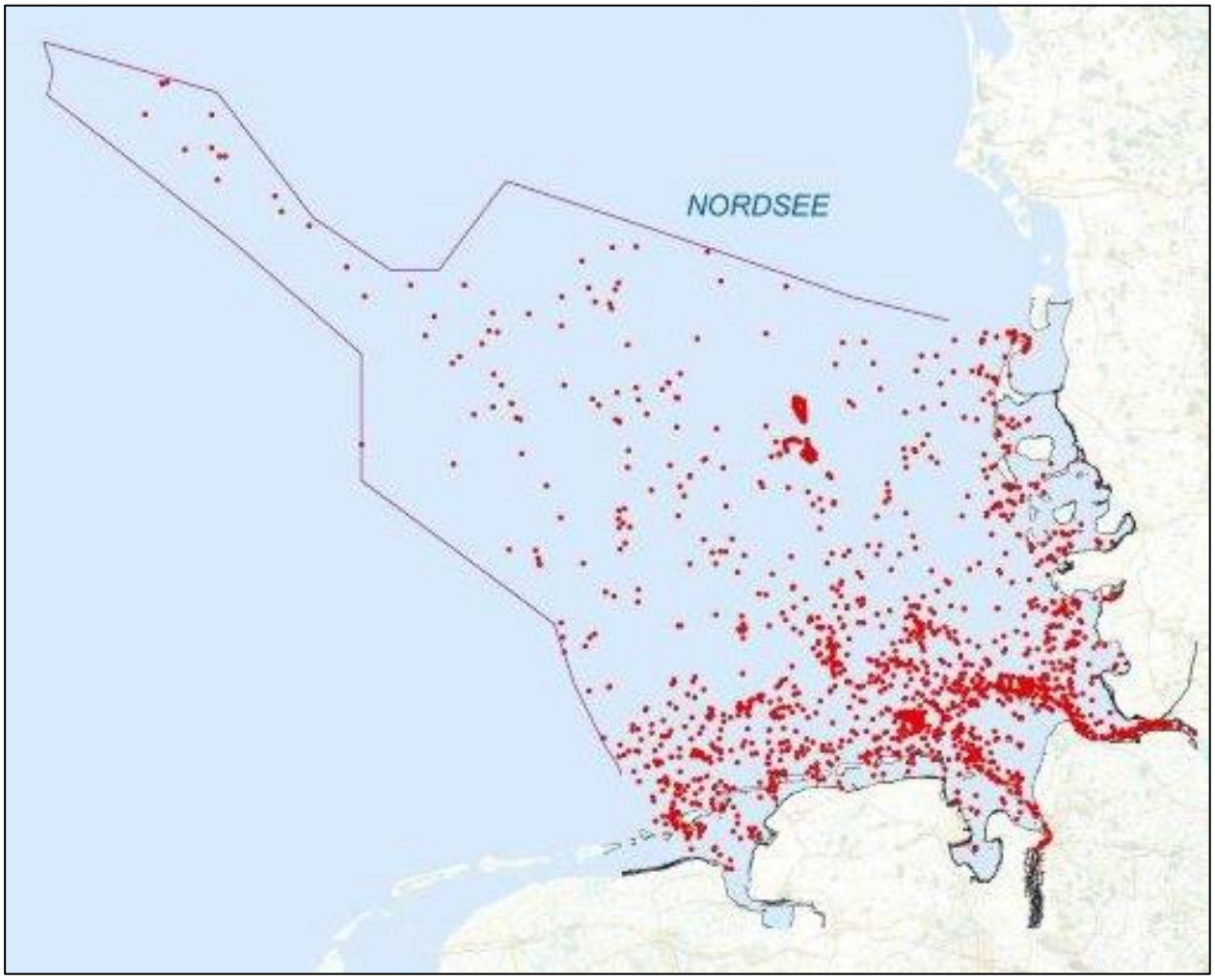


Figure 15: Overview of wreck positions in the German EEZ and 12 nm zone of the North Sea (source: BSH 2019)

4.7.2 FUTURE CHANGES

Since the BSH investigates and collects data on underwater obstacles on a regular basis, it is to be expected that prospective new information on wrecks will be incorporated into their data base. Furthermore, since underwater obstacles are subject to constant change (e. g. due to the tidal current in the North Sea), the BSH checks underwater obstacles at regular intervals to monitor changes of e.g. wrecks regarding their depth and location.

4.7.3 RELEVANCE FOR THE PROJECT

When planning the routing of cables and pipelines, information on existing wrecks is crucial. Wrecks, and other seabed obstacles, are to be avoided during the laying of the cable/pipeline since they pose a risk for the burial equipment including the cable/pipeline being damaged.

4.8 FISHING

4.8.1 PRESENT SITUATION

EEZ

Due to the regulatory competence of the EU, a designation of restrictive areas for fishing within the German EEZ of the North Sea (with the exception of marine conservation areas, see below) is neither possible nor useful given the common fishing policy of the EU.

Fishing can be subdivided into commercial fishing and recreational fishing. The actual commercial fishing comprises of bottom-contacting fishing (e.g. with bottom trawls, dreges and seines), pelagic fishing (e.g. trawl nets), gillnet fishing and trap fishing (e.g. weirs and baskets). Recreational fishing is mainly undertaken from boats with fishing rods. Within the German EEZ of the North Sea, national as well as international fishing (here in particular commercial fishing) takes place.

The ICES Secretariat has collected relevant VMS (vessel monitoring systems) and logbook data to produce, as a technical service to OSPAR, updated spatial data layers on fishing intensity/pressure within regions II and III of the OSPAR maritime area. Surface abrasion due to bottom fishing intensity in the OSPAR area in 2017 is presented in Figure 16 below.

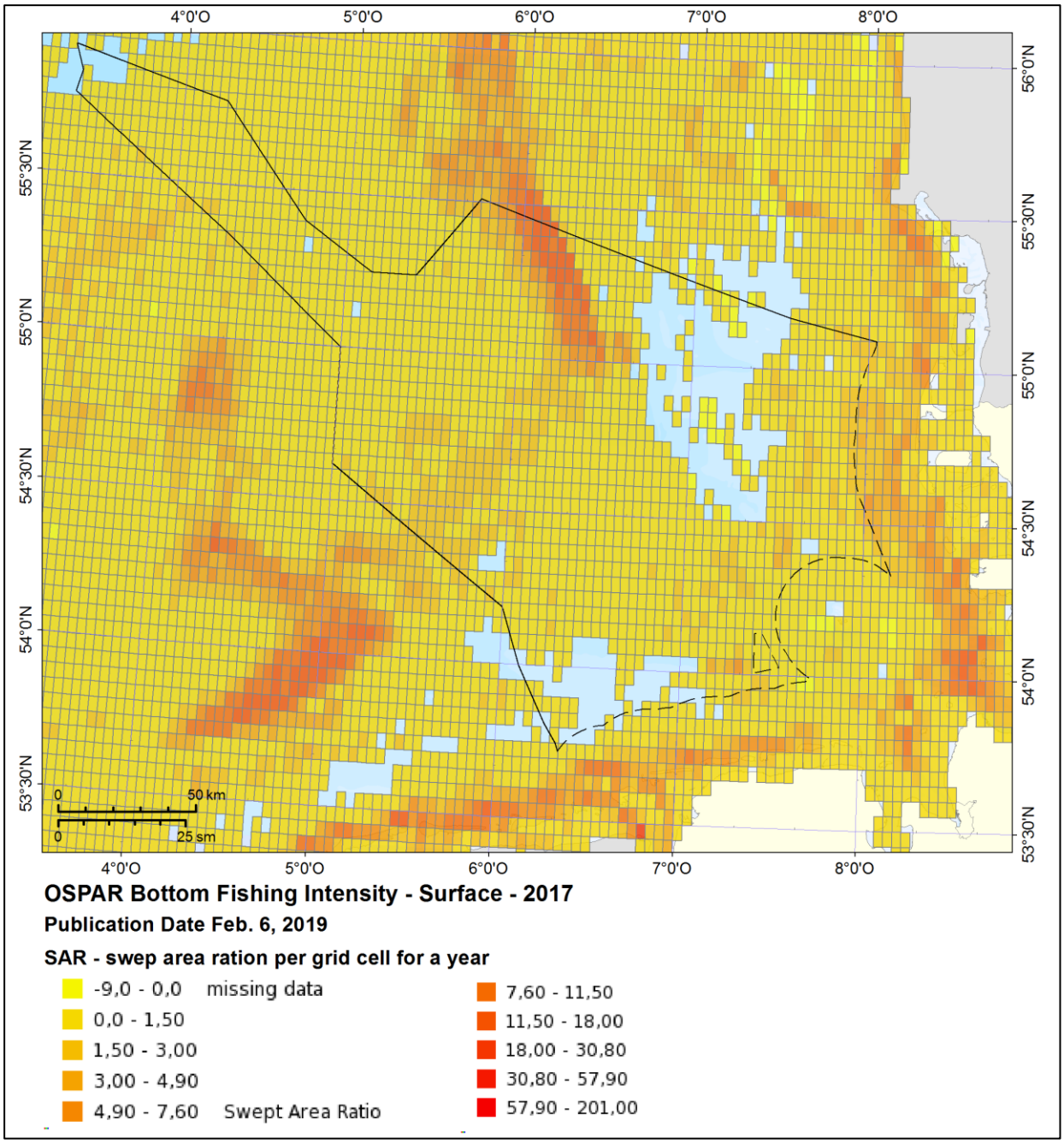


Figure 16: OSPAR Bottom Fishing Intensity - Surface - 2017 (source: https://odims.ospar.org, Publication Date Feb. 6, 2019)

Bottom-contacting fishing within the German EEZ occurs particularly in the central area of the German bight. Fishing with smaller beam trawls occurs mainly in coastal areas. Currently, the EU-commission is preparing regulations concerning the closure of larger areas of protected marine conservation areas for fishing (notably bottom-contacting fishing).

According to ICES-data, pelagic fishing occurs particularly in larger areas of the German bight (outside of marine conservation areas) and is carried out primarily by Denmark.

Gillnet fishing (pelagic and ground-based) occurs mainly in the marine conservation areas “Doggerbank” and “Sylter-Außenriff – Östliche Deutsche Bucht” as well as in the areas between them.

Trap fishing with weirs and fish baskets occurs almost exclusively in the western part of the marine conservation area “Sylter Außenriff – Östliche Deutsche Bucht“; to a lesser extend also within the marine conservation area “Borkum Riffgrund”.

Recreational fishing as well as commercial deep-sea fishing usually occurs between May and October each year and takes mainly place in coastal waters.

12 nm zone

According to ROKK (2005), fishermen are not restricted to using certain areas exclusively, as there are no designated or priority areas for fishing. Instead, fishing is generally allowed within coastal waters, but is at the same time restricted due to various regulations (environment, fishing, shipping) and dependant on the occurences of the fishes themselves, which is why certain areas are de facto substantially more in use than others (ROB 2005, also see Figure 16). For example, the ROKK shows an area in which ships which are at least 8 m long are not allowed to fish with trawls to preserve the stocks of plaice (“Schollenbox“). Overall, approximately 64 % of Lower Saxony’s coastal waters are used for fishing (ROKK 2005). Particularly imporant is the shrimp fishing zone, which is shown in the map of ROKK (2005). Nevertheless, this area also has no special spatial or legal status.

The only exception is the harvesting of mussels. There are designated areas with a right of use for mussel fisheries (mussel cultures, “Muschelkulturbezirke“) which are within Lower Saxony’s coastal waters mainly in the area of the Osterems, Juist and in the Jade Bay (ROKK 2005). These mussel cultures are not shown in the map of ROKK, but there is data available of the State Fisheries Department of Lower Saxony (see Figure 17). The mussel cultures of Schleswig-Holstein are shown in ROB (2005).

Aquaculture in the German North Sea is of little importance compared to the world market. According to the ROB (2005), this is due to the low annual avarage water temperatures and the exposure to freezing. By now there are only a few breeding establishments (algae, fishes), which do not produce their breeds in costal waters but in indoor halls at the shore.

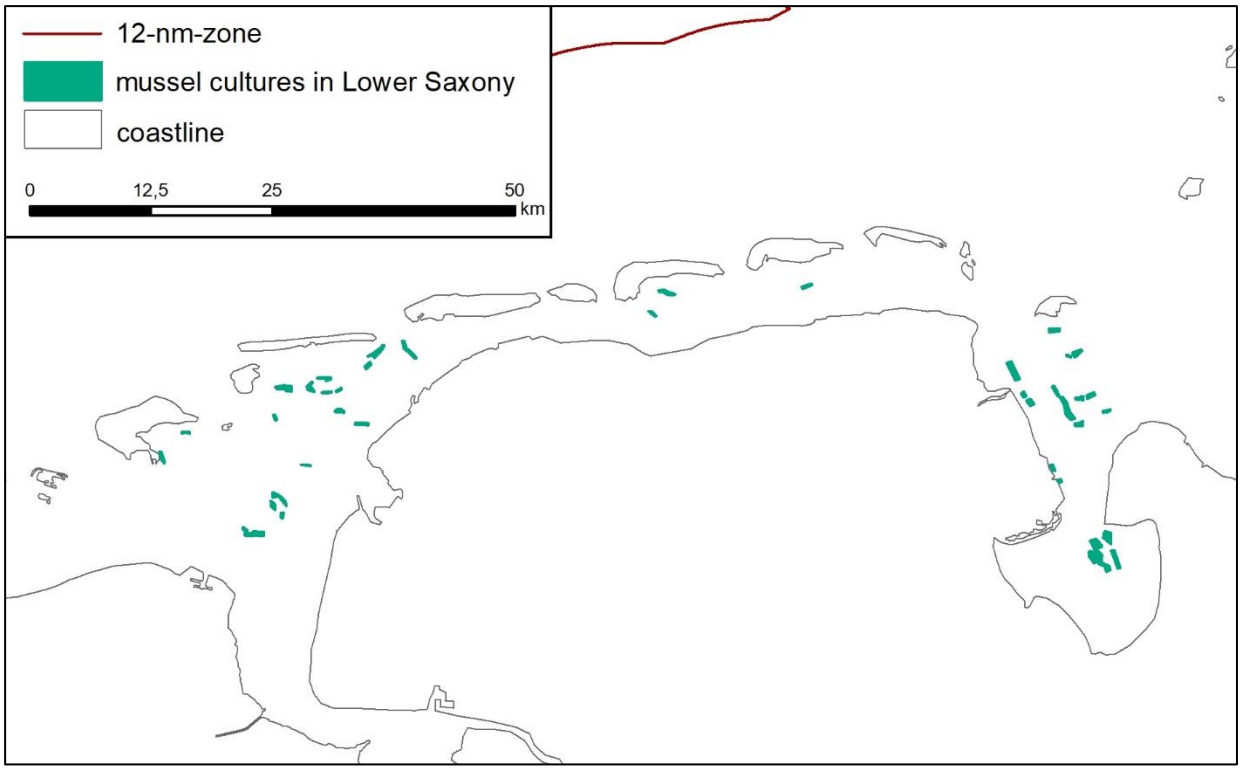


Figure 17: Designated areas for mussel cultures in Lower Saxony (source: State Fisheries Department of Lower Saxony 2015 [28])

4.8.2 FUTURE CHANGES

Since fishing plays a major economic role, it can be assumed that current fishing intensity within the German EEZ and the 12-nm-zone of the North Sea will continue and potentially even increase in the near and long-term future. However, due to the current plans of the EU-comission to close of larger areas of marine conservation areas for fishing (notably bottom-contacting fishing) in the near future, there might be a potential shift in the specified areas used for fishing.

4.8.3 RELEVANCE FOR THE PROJECT

Obstruction of fishery operations during the operation can be a factor. The ROKK (2005) only states generally that negative impacts on fisheries due to other usages are to be avoided. No detailled restrictions or potential conflicts are mentioned.

Certain fishing gear penetrates the sea floor and, in principle, may cause damage to the cable/pipeline in the case of little sediment cover, which also poses a risk to fishing vessels. This is why according to the ROB (2005), fishing is prohibited in the surroundings of cable routes. However, this regulation is rarely enforced due to a lack of incidents. Since cables/pipelines are usually placed into the sea floor, therefore being covered by a sediment layer of at least 1 – 1,5 m, , this aspect does currently not represent a major issue.

However, mussel cultures have to be taken into consideration, because cables are not permitted to cross those areas.

[28] Staatliches Fischereiamt Niedersachsen, State Fisheries Department (2015): Delivered data considering the mussel cultures in Lower Saxony. According to a verbal note (23.04.2019) the data is still up-to-date and can be used further.

Aquaculture has no relevance in the framework of this project.

4.9 NATURE CONSERVATION AREAS

4.9.1 PRESENT SITUATION

EEZ

For the relevant habitat types and species (annex I and II) under the FFH directive (92/43/EWG), the following areas, which are protected as sites of community areas (SCI), are of great significance:

- Borkum-Riffgrund (DE 2104-301)
- Doggerbank (DE 1003-301)
- Sylter Außenriff (DE 1209-301)

Consequently, these areas have been secured as priority areas for the marine environment and marine species in the MSP of the BSH.

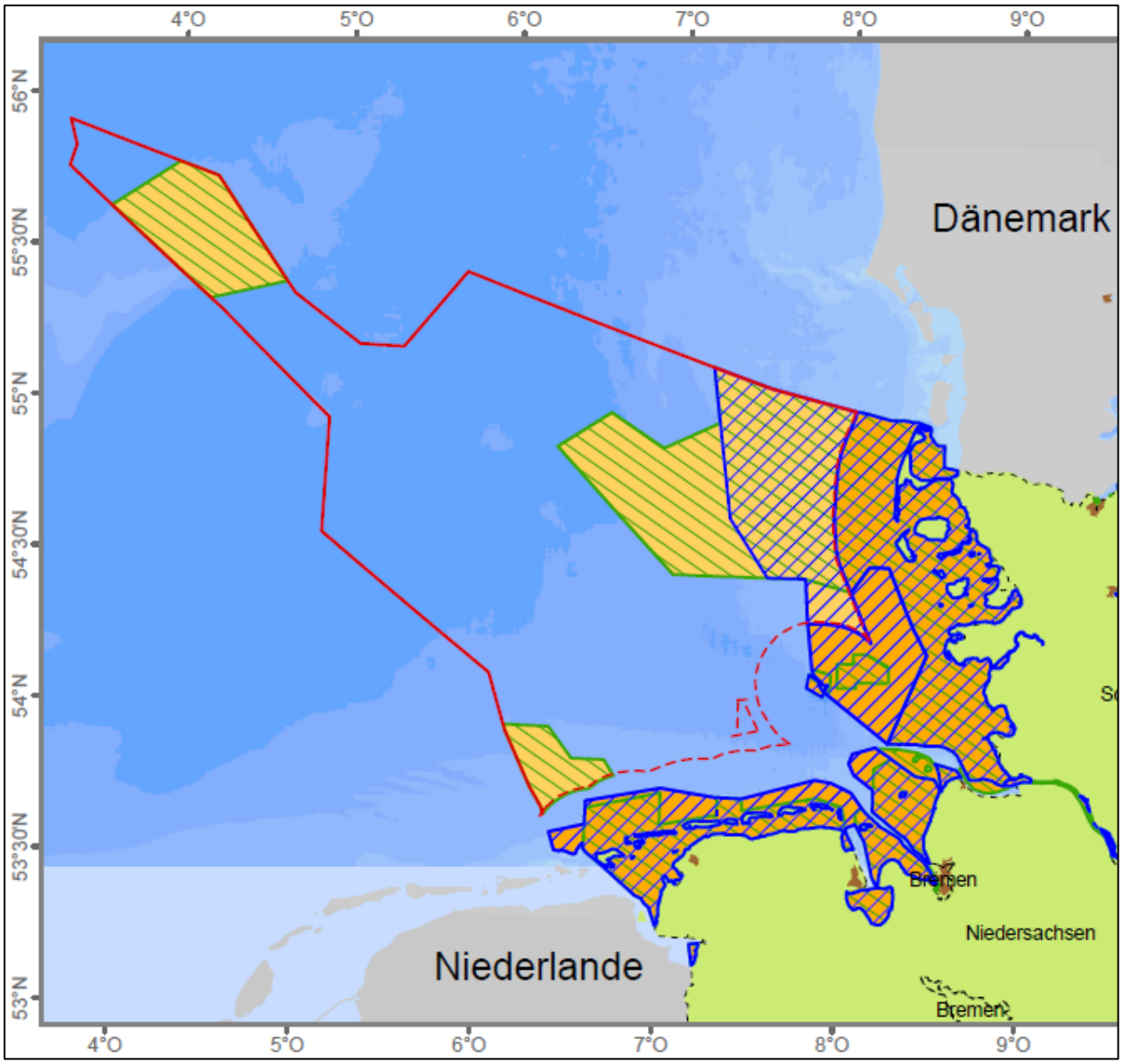
For the relevant bird species under the Wild Birds directive (79/409/EWG), the following area, which is protected as an area of special protection (SPA), is of great significance:

- Östliche Deutsche Bucht (DE 1011-401)

Consequently, this area has been secured as a priority area for the marine environment and marine bird species in the MSP of the BSH.

Since September 2017, the areas “Borkum Riffgrund” and “Doggerbank” are protected as national marines reserves as well. The two areas “Sylter Außenriff” and “Östliche Deutsche Bucht” have been declared as one national marine reserve: “Sylter Außenriff – Östliche Deutsche Bucht”.

Nature conservation areas currently existing in the German EEZ of the North Sea are shown in Figure 18 below.



Fauna-Flora Habitat sites (FFH-sites) 12 nm zone

Fauna-Flora Habitat sites (FFH-sites) German EEZ

EU Bird Protected Areas (SPA) 12 nm zone

EU Bird Protected Areas (SPA). German EEZ

Figure 18: Nature conservation areas in the German EEZ and 12 nm zone of the North Sea (source: www.meeresschutz.info).

12 nm zone

Due to the high ecological importance, there are many protected areas within the wadden and coastal sea (according to BNatSchG, FFH-Directive and Birds Directive [29] [30] [31] [32] [33] [34] [35] [36]):

- national park: Schleswig-Holsteinisches Wattenmeer
- national park: Niedersächsisches Wattenmeer
- national park: Hamburgisches Wattenmeer
- nature reserve: Borkum Riff
- UNESCO biosphere reserve: Niedersächsisches Wattenmeer
- UNESCO biosphere reserve: Die Halligen
- SPA: Seevogelschutzgebiet Helgoland
- SPA: Ramsar-Gebiet S-H Wattenmeer und angrenzende Küstengebiete
- SPA: Niedersächsisches Wattenmeer und angrenzendes Küstenmeer
- SPA: Hamburgisches Wattenmeer
- FFH-site: Nationalpark Schleswig-Holsteinisches Wattenmeer und angrenzende Küstengebiete
- FFH-site: Steingrund
- FFH-site: Helgoland mit Helgoländer Felssockel
- FFH-site: Nationalpark Niedersächsisches Wattenmeer
- FFH-site: Hamburgisches Wattenmeer

The Wadden Sea National Parks of Schleswig-Holstein and Lower Saxony cover large parts of the coastal waters of the respective federal state (Figure 19). The Wadden Sea National Park of

[29] UNESCO (2019): Man and the Biosphere Programme. http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/man-and-biosphere-programme/about-mab/

[30] Verordnung über das Naturschutzgebiet "Borkum Riff" in der niedersächsischen 12-Seemeilen-Zone der Nordsee: https://www.nlwkn.niedersachsen.de/naturschutz/schutzgebiete/einzelnen_naturschutzgebiete/verordnungstext-zum-naturschutzgebiet-borkum-riff-45319.html

[31] MU, Niedersächsisches Ministerium für Umwelt, Energie, Bauen und Klimaschutz, Lower Saxony's Office for Environment, Energy, Building and Climate Protection (2019): Download of Lower Saxony's SPA and FFH-sites: http://www.umwelt.niedersachsen.de/service/umweltkarten/natur_landschaft/natura_2000/natura-2000-europaeische-vogelschutzgebiete-und-gemeldete-ffh-gebiete-in-niedersachsen-9124.html; Download of Lower-Saxony's other nature protection areas: https://www.umwelt.niedersachsen.de/service/umweltkarten/natur_landschaft/besonders_geschuetzte_teile_von_natur_und_landschaft/naturschutzrechtlich-besonders-geschuetzte-teile-von-natur-und-landschaft-9065.html

[32] Standard Data Forms of Lower Saxony's Natura-2000-sites: https://www.nlwkn.niedersachsen.de/naturschutz/natura_2000/downloads_zu_natura_2000/downloads-zu-natura-2000-46104.html#volstDat-VS

[33] Standard Data Forms and Conservation Objectives of Schleswig-Holstein's SPA. https://www.schleswig-holstein.de/DE/Fachinhalte/S/schutzgebiete/vogelschutz/Vogelschutzgebiete.html

[34] Gesetz über den Nationalpark Hamburgisches Wattenmeer: https://www.nationalpark-wattenmeer.de/hh/nationalpark/erlaubt-verboten/rechtsgrundlagen

[35] Biosphäre die Halligen (2019): https://halligen.de/biosphaere/unesco-biosphaere

[36] Standard Data Forms and Conservation Objectives of Schleswig-Holstein's FFH-sites: https://www.schleswig-holstein.de/DE/Fachinhalte/S/schutzgebiete/ffh/FFHSchutzgebiete.html

Hamburg is situated in front of the estuary of the river Elbe in-between the transion area of coastal waters belonging to Lower Saxony and Schleswig-Holstein.The Special Protection Area (SPA) for birds of the “Lower Saxony Wadden Sea and adjacent coastal waters” covers the whole area of the Lower Saxony national park and additionally includes the nature reserve “Borkum Riff” situated directly westward of the national park. However, the bounderies of the SPA are not completely identical with those of the national park due to the fact that the bounderies of the national park are dependant on the mean hight tide water level, which changes over time (vgl. § 3 NwattNPG[37]), whereas the SPA bounderies remain constant. The FFH site “Lower Saxony National Park” does not cover the the whole national park; three large parts North of the East Frisian Islands are not included. According to the national park management (2019[38]), the core and recreational zones of the biosphere reserve “Niedersächsisches Wattenmeer” correspond to zones I and II of the national park.

The entire area of the Wadden Sea National Park of Hamburg has been coextensively declared as FFH-side and SPA as well.

The Wadden Sea National Park of Schleswig Holstein is equivalent to the FFH site and SPA „Wadden Sea National Park of Schleswig-Holstein and adjacent coastal waters”. The SPA “Sanctuary for Seabirds Helgoland” encompasses nearly the whole remaining coastal waters of Schleswig Holstein.

Furthermore, the Federal Ministry of Environment (Bundesumweltministerium, BMU) established a main concentration area of loons (*Gavia stellata* and *Gavia arctica*; “Hauptkonzentrationsgebiet Seetaucher“, see Figure 20) which is especially important for the population as it includes 66% of the loon population of the North Sea, i.e. 83 % of the population of the EEZ (BMU 2009[39]).

[37] NWattNPG, Gesetz über den Nationalpark „Niedersächsisches Wattenmeer“: http://www.nds-voris.de/jportal/portal/t/asi/page/bsvorisprod.psml?pid=Dokumentanzeige&showdoccase=1&js_peid=Trefferliste&documentnumber=1&numberofresults=1&fromdoctodoc=yes&doc.id=jlr-WattenmeerNatPGNDrahmen&doc.part=X&doc.price=0.0#focuspoint

[38] Nationalparkverwaltung Niedersachsen, National Park Administration of Lower Saxony (2019): Handlungsprogramm Biosphärenreservat. https://www.nationalpark-wattenmeer.de/nds/biosphaerenreservat/handlungsprogramm

[39] BMU, Bundesumweltministerium, Federal Ministry of Environment (2009): “Positionspapier des Geschäftsbereichs des Bumdesumweltministeriums zur kumulativen Bewertung des Seetaucherhabitatverlusts durch Offshore-Windparks in der deutschen AWZ der Nord- und Ostsee als Grundlage für eine Übereinkunft des BfN mit dem BSH”. https://www.bfn.de/fileadmin/BfN/awz/Dokumente/seetaucher_positionspapier_bf.pdf

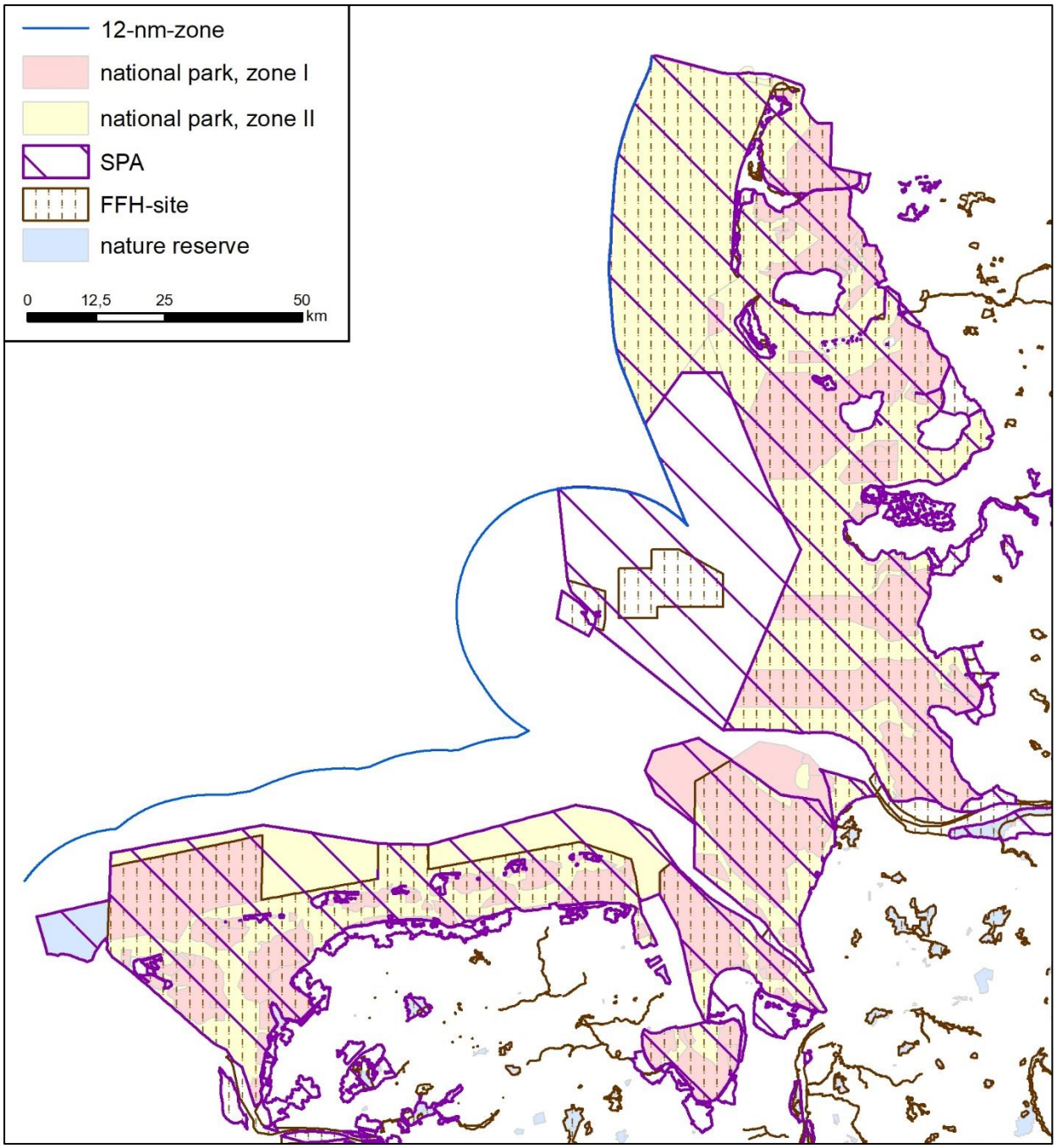


Figure 19: **Nature conservation areas within the 12 nm zone; not displayed: UNESCO biosphere reserves, FFH-site and SPA „Hamburgisches Wattenmeer“ (sources: LLUR 2013[40], MU 2019, national park administration SH 2015[41])**

[40] LLUR, Landesamt für Landwirtschaft, Umwelt und ländliche Räume Schleswig-Holstein, State Office of Agriculture, Environment and Rural Areas Schleswig-Holstein (2013): Data considering Schleswig-Holstein’s SPA and FFH-sites were delivered on request (and are still up-to-date).
[41] Nationalparkverwaltung Schleswig-Holstein, National Park Administration Schleswig-Holstein (2015): Data considering Schleswig-Holstein’s and Hamburg’s national parks were delivered on request.

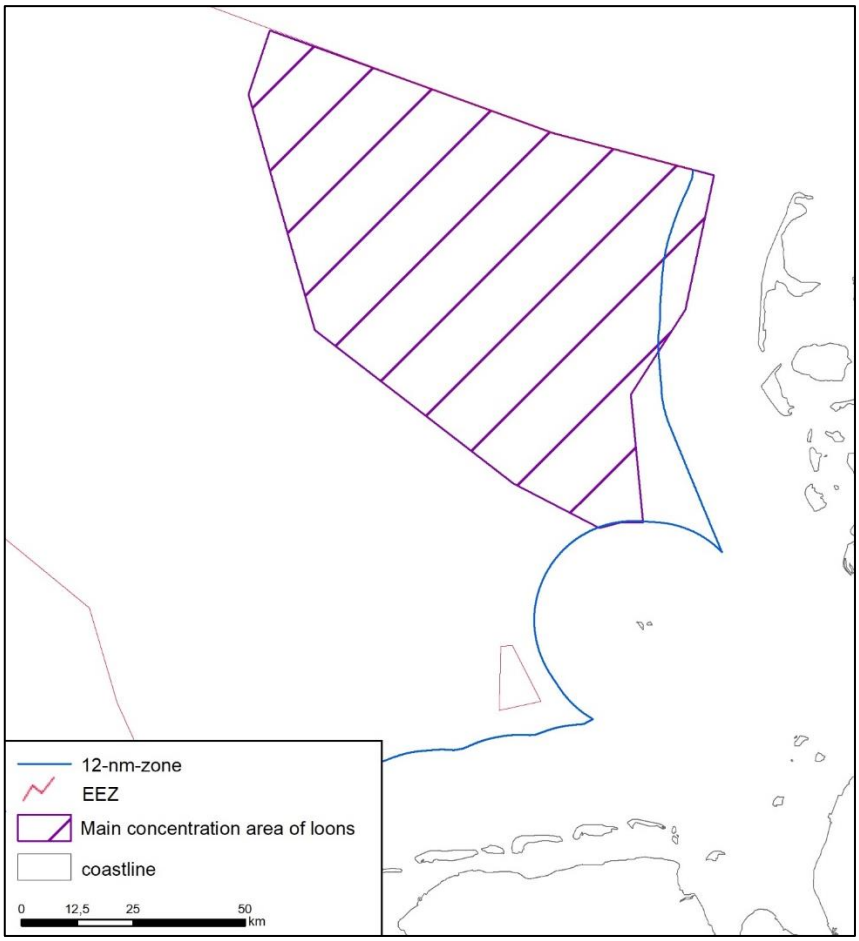


Figure 20: Main concentration area of loons (*Gavia stellata* and *Gavia arctica;* source: BMU 2009[42])

4.9.2 FUTURE CHANGES

At this point in time, no information on any other nature conservation areas in prospective planning within the German EEZ or 12 nm zone of the North Sea exists. The development area of the biosphere reserve “Niedersächsisches Wattenmeer”, which is currently in preparation, will likely be restricted to the mainland and coastline.

4.9.3 RELEVANCE FOR THE PROJECT

EEZ

Utilisation or crossing of nature conservation areas requires an FFH impact study and to be submitted as part of the application documents (FFH impact assessment; appropriate assessment acc. to § 34 of the Federal Nature Conservation Act [Bundesnaturschutzgesetz]).

Utilisation or crossing of nature conservation areas may increase the disturbances caused by construction and operation, because certain habitats and species display greater sensitivity and are subject to greater protection. This may make approval considerably more difficult.

[42] BMU, Bundesumweltministerium, Federal Ministry of Environment (2009): “Positionspapier des Geschäftsbereichs des Bumdesumweltministeriums zur kumulativen Bewertung des Seetaucherhabitatverlusts durch Offshore-Windparks in der deutschen AWZ der Nord- und Ostsee als Grundlage für eine Übereinkunft des BfN mit dem BSH”. https://www.bfn.de/fileadmin/BfN/awz/Dokumente/seetaucher_positionspapier_bf.pdf

The greater the impacts caused by the intervention, the higher the effort and cost of processing the conditions of the Federal Nature Conservation Act are likely to be.

Avoidance of nature conservation areas therefore has a number of advantages. Utilizing or crossing nature conservation areas complicates the planning process, but it is possible in principle.

12 nm zone

According to the regulations of the protected areas, there are various restrictions within the different areas. These result from the respective protective purposes and conservation objectives. Within the national parks, there are additional regulations within the two (or three) zones. The most important regulations are summarised below.

The most important legal basis of the national parks are the National Park Laws. They define the protective purposes in § 2 thusly:

- Preservation of the area's special character, beauty and nativeness
- Preservation of natural processes and developments
- Preservation of biological diversity (animal and plant species as well as their habitats)

Forbidden are – generelly speaking – all actions which destroy, damage, change oder disturb the national parks or elements of the parks.

According to § 6 NWattNPG, within Lower Saxony's national park it is, inter alia, especially forbidden to

- disturb the silence / peace of nature due to noise or by other means,
- disturb wildlife.

According to § 5 NPG[43], within Schleswig-Holstein's national park it is, inter alia, especially forbidden to

- make an intervention according to § 7 Abs. 1 Landesnaturschutzgesetz (State's Law of Nature Conservation), blast or drill,
- destroy or change the habitats of animals and locations of plants as well as remove plants or parts of them,
- disturb, hurt or kill animals or their forms of development,
- build or run wind turbines,
- enter zone 1,
- use any kind of recources within the "no-use" zone ("nutzungsfreie Zone"),
- affect whales substantially within the whale protection area.

According to Hamburg's Law about the national park (§ 5), it is, inter alia, especially forbidden

- to remove or destroy plants or parts of them
- disturb, catch, hurt or kill wildlife animals or their forms of development,
- build or change structures, pipelines, paths, stairs or bridges

[43] NPG, Gesetz zum Schutze des schleswig-holsteinischen Wattenmeers (Nationalparkgesetz): http://www.gesetze-rechtsprechung.sh.juris.de/jportal/portal/t/1g80/page/bsshoprod.psml?pid=Dokumentanzeige&showdoccase=1&js_peid=Trefferliste&documentnumber=1&numberofresults=1&fromdoctodoc=yes&doc.id=jlr-NParkGSH1999rahmen&doc.part=X&doc.price=0.0#focuspoint

- change the form of soil or water (e.g. due to fillings)
- mine recources, blast or drill
- disturb the silence / peace of nature due to noise or by other means,

The national park administrations are authorized to make exceptions for individual cases considering these prohibitions.

Legal basis for the natura-2000-sites (SPA and FFH) is the BNatSchG (Federal Law of Environmental Protection):

§ 33 (1) Any changes and disturbances that could cause a significant deterioration of a Natura 2000 site in its conservation objectives or its protection purposes are prohibited.

§ 34 states, that projects which could significantly affect an area must be subject to an impact assessment and that an approval of the project, despite significant adverse effects, is only possible, if compelling reasons of public interest exist and if reasonable alternatives are not available.

The specific conservation objectives and protection purposes of the particular Natura 2000 sites add up:

- for all Natura 2000 sites from the species and habitat types of the standard data sheets,
- in the case of the FFH and SPA areas of "The Wadden Sea of Lower Saxony" additionally from the NWattNPG (§ 2 and 3 as well as annex 5),
- in the case of the Schleswig-Holstein Natura 2000 sites additionally from the protection purposes.

For the Natura 2000 sites, which are not covered by the boundaries of the national parks, the reasons for the designation are briefly listed below.

Area	**Reason of Protection**
FFH Steingrund	Reef near Helgoland as a rare and species-rich habitat
FFH Helgoland and its shelf	Unique rock, cliff and reef situation with appropriate flora and fauna
SPA Seabird sanctuary of Helgoland	(Very) significant wintering area for red-throated and artic loons, moulting and resting area for black scoter and foraging ground for seabirds of Helgoland

A regulation was issued for the nature reserve "Borkum reef", which specified the protection purpose in § 2 as "an important resting, passage and wintering area for i.a. loons" due to the high biological productivity and fish density in the area.

According to § 3 the following utilisation is prohibited i. a:

- all acts for the purpose of exploring and exploiting, maintenance and managing of the living and non-living natural resources of the waters above the seabed as well as of the seabed and its subsoil, and other economic exploration and exploitation activities,
- the construction of artificial islands, facilities and structures
- the dumping of dredged material

The UNESCO Biosphere Reserves act in accordance with UNESCO's "Man and the Biosphere Program". This program aims at an integrative, sustainable human use and development of the

reserves, which respects both ecological and economic, social and cultural aspects. On the website of the national park administration further information is provided.

4.10 NATURE PROTECTION AREAS: § 30 HABITATS ACCORDING TO BNATSCHG (FEDERAL ACT FOR THE PROTECTION OF NATURE)

4.10.1 PRESENT SITUATION

EEZ

Four marine biotope types are protected according to § 30 BNatSchG in the German EEZ of the North Sea:

- Sublittoral sandbanks
- Reefs
- Muddy grounds with probing megafauna
- Species-rich gravel, coarse sand, and shell layers

Since the first two biotope types – sandbanks and reefs – correspond to habitat types (annex I) under the FFH directive (92/43/EWG), they usually occur within nature conservation areas (see chapter 4.9). However, all four § 30 marine biotope types are protected wherever they exist in the German EEZ; inside and outside of nature conservation areas.

Other marine biotope types protected according to § 30 BNatSchG – only occur within the German 12 nm zone (see Figure 21).

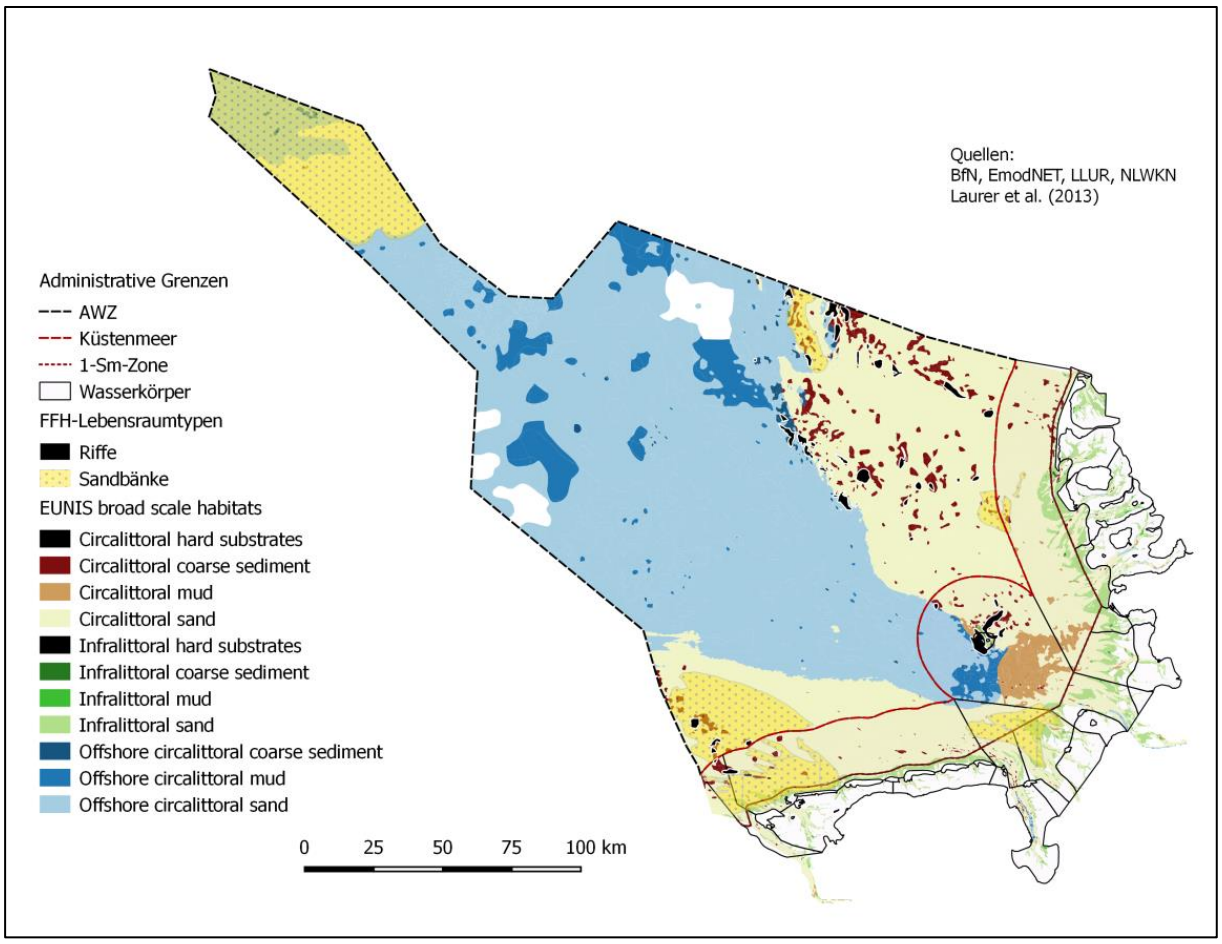


Figure 21: Draft map of FFH habitat types (Riffe = Reefs, Sandbänke = Sandbanks) and EUNIS Habitats in the German EEZ and 12 nm zone of the North Sea (source: BfN, EmodNET, LLUR, NLWKN, Laurer et al. (2013))

The biotope type “sublittoral sandbanks” occurs within the German EEZ of the North Sea in all three sites of community areas (SCI): “Borkum-Riffgrund”, “Doggerbank” and “Sylter Außenriff” and in an area just North of the western part of “Sylter Außenriff” (see Figure 21). As of May 2017, no further occurrence has been identified in the German EEZ.

Reefs occur within the German EEZ of the North Sea especially within the two national marine reserves “Sylter Außenriff – Östliche Deutsche Bucht” and „Borkum Riffgrund” and to a lesser extend just North of the western part of the SCI “Sylter Außenriff”.

The biotope type “muddy grounds with probing megafauna” – in its legally protected form with sea pens – has not yet been identified in the German EEZ of the North Sea. However, this biotope type is listed in the regulation for the marine conservation area „Sylter Außenriff – Östliche Deutsche Bucht“ as a “to be developed” biotope type, i.e. a target state has been defined for it.

The biotope type “species richt gravel-, coarse sand- and shell layers” occurs especially in the marine conservation areas “Borkum Riffgrund” and „Sylter Außenriff – Östliche Deutsche Bucht“ in close proximity to reefs. Depending on sediment composition, possible occurrences in further areas of the German EEZ is to be expected, albeit to a lesser extent.

12 nm zone

Within the 12 nm zone, more biotope types which are protected according to § 30 BNatSchG occur, apart from the ones mentioned for the EEZ. These are: seeweads, sandbanks, reefs, mussel banks, tidal flats (wadden sea), tideways, muddy grounds with probing megafauna and species-rich gravel, coarse sand, and shell layers.

The location and delineation of seaweed and mussel banks can be seen in data of the national park administrations (see Figure 22). Data of the BSH gives informations about tidal flats and tideways. Regarding sandbanks, reefs, muddy grounds and species-rich gravel, coarse sand, and shell layers there is no free data available for the 12-nm-zone. However, at least the muddy ground biotope type occurs only very sporadically.

A few informations, though not complete / up-to-date regarding the 12-nm-zone, can be seen in Figure 21 above.

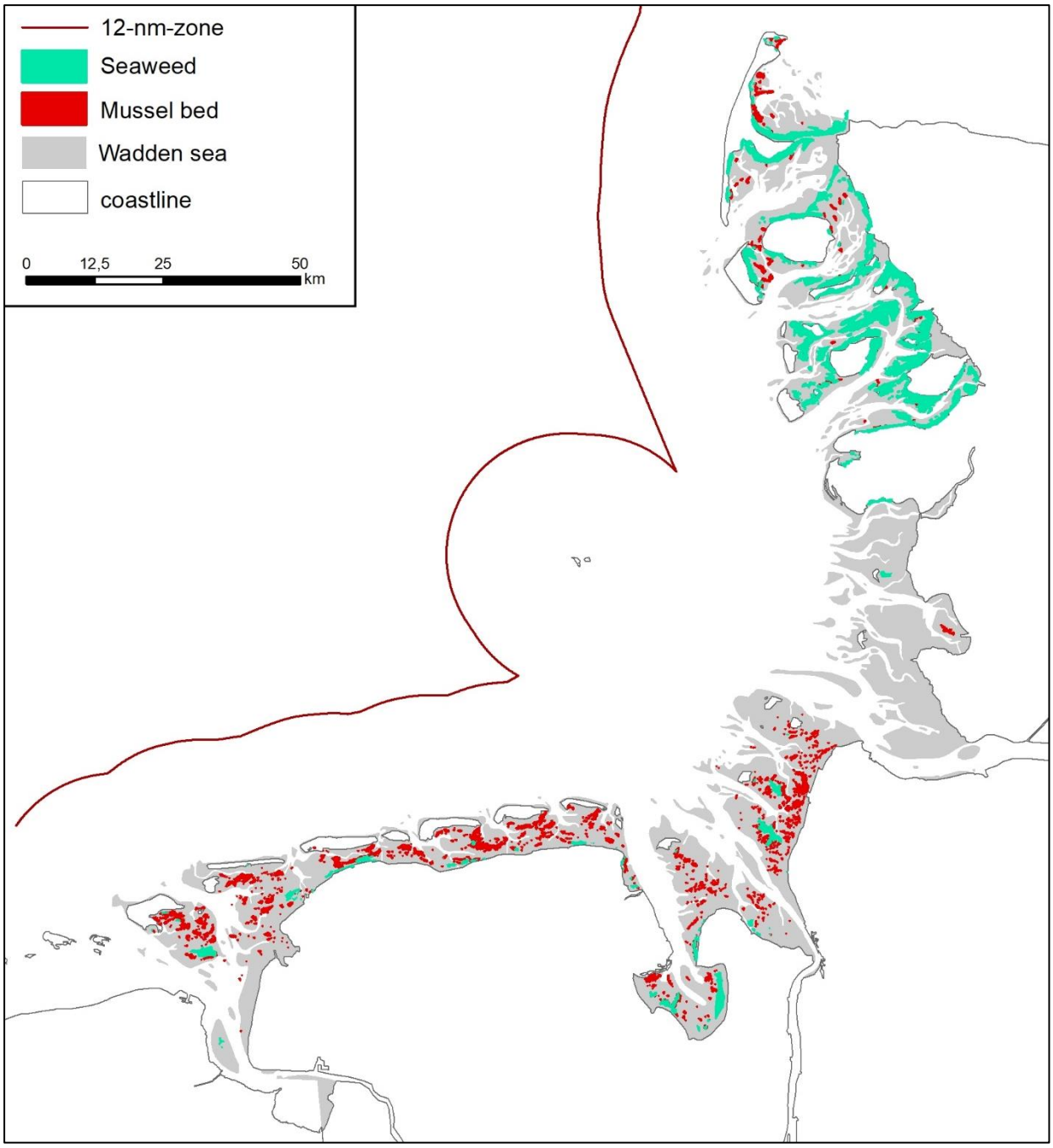


Figure 22: Protected biotopes within the 12 nm zone (sources: national park administrations 2013[44], 2016 & 2017[45], BSH 2011[46])

[44] Nationalparkverwaltung Niedersächisches Wattenmeer (2013, 2016): data considering seegrass and mussel banks, download: http://mdi.niedersachsen.de/HeronKaDI/JAVA_SCRIPT/37_Portal/
[45] Nationalparkverwaltung Schleswig-Holsteinisches Wattenmeer (2017): data considering seegrass and mussel banks delivered on request
[46] BSH (2011): data considerung tidal flats delivered on request

4.10.2 FUTURE CHANGES

EEZ

Since the biotope mapping of the German EEZ by the BfN is not yet completed, further information on the occurrence of these § 30 biotope types – particularly “species rich gravel, coarse sand and shell layers” may arise in the near and mid-term future.

12 nm zone

An area-wide survey and mapping of biotope types within the 12-nm-zone is not yet available. Therefore, unknown protected biotope types are to be expected. Furthermore, it has to be considered that existing occurrences of protected biotypes could shift their position due to various factors.Therefore it is to be expected that there will be changes and shifts in the distribution of biotope types, which will continue in the future.

4.10.3 RELEVANCE FOR THE PROJECT

Utilisation or crossing of § 30 biotopes is relevant for the project for the following reasons:

According to § 30 BNatSchG it is prohibited to destroy or substantially affect, inter alia, the biotopes mentioned above. If the impact of an act or project can be compensated for, it is possible to obtain an exception to this prohibition. This is why utilisation or crossing requires exceptional approval. In this case special justification of the need has to be explained and submitted as part of the application documents.

Utilisation or crossing may increase the disruptions caused by construction and operation because certain § 30 biotopes display more pronounced sensitivity. This may make approval eligibility more difficult.

The higher theimpacts, the higher the effort and cost of complying with the conditions of the Federal Nature Conservation Act are likely to be.

Avoiding § 30 biotopes therefore has a number of advantages. Utilizing or crossing of § 30 biotopes complicates the planning process, but it is possible in principle.

Usually an important step during the planning process is the mapping of the area of the planned project (e.g. cable routes). The mapping results are decisive for determining the exact routing/position of the planned object, because only the variation with the least impact on protected biotopes is likely to be approved (in the case that equivalent alternatives exist).

4.11 MILITARY EXCERCISE AREAS

4.11.1 PRESENT SITUATION

EEZ

Since the military use of the German EEZ in the North Sea is not explicitly regulated in the United Nations Convention on the Law of the Sea (UNCLOS), no rules have been determined in the MSP of the BSH. However, securing the functionality of the Federal Armed Sources is of great national significance, which means that military excercise areas have been included in the MSP for informational purposes. According to § 2 Section 1 SeeAnlV, the permit requirement for facilities/projects planned within the German EEZ serves, amongst other things, the purpose of protecting “other predominatly public interests” which are e.g. military matters.

Various forms of military excercises are taking place on, in and above the water within the German EEZ of the North Sea, e .g. Shooting excercises, Air Force, Torpedo Exercise, Mine Hunting, Submarine and unclassified military excercises. During these manoeuvres, the

German Navy employs military vessels such as destroyers, frigates, corvettes, cruisers, submarines, minesweepers or speedboats as well as aircraft and helicopters. The excercise areas are usually publicly accessible areas unless they are explicity designated as restricted zones. Details regarding the extent of military uses are confidential and not accessible for further evaluation. The display of military excercise areas is based on the “Notices for Mariners” published by the BSH (see Figure 23). According to warning alerts in these notices, about 3-4 military excercises per year happened between 2011 and 2016, lasting from a few months up to half a year.

Military excercise areas currently existing in the German EEZ of the North Sea as of 06.12.2018 are shown in Figure 23 below:

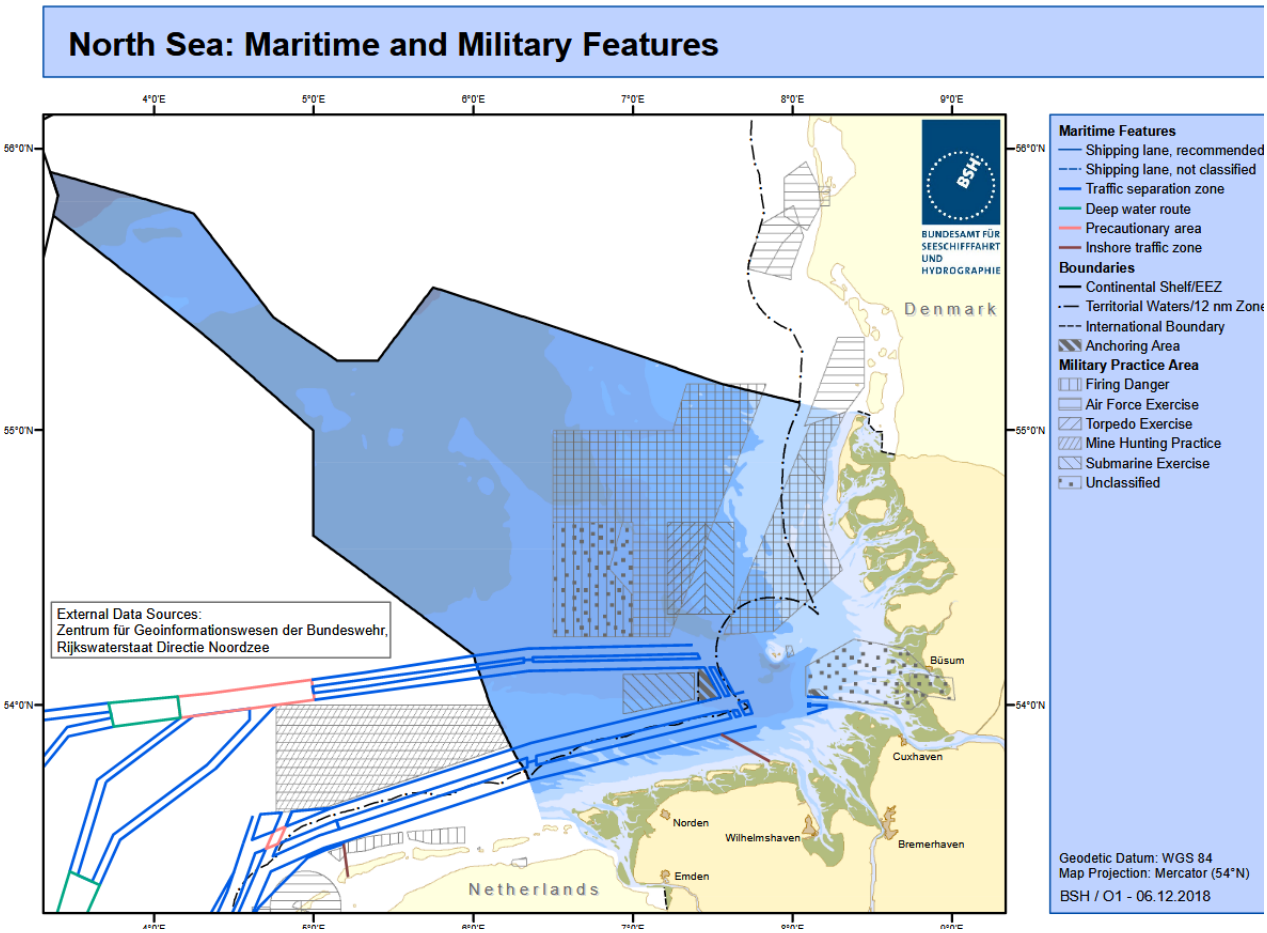


Figure 23: Maritime and military features in the German EEZ and 12 nm zone of the North Sea as of 06.12.2018 (source: BSH 2019,[47]).

12 nm zone

According to the ROB (2005) military activity on the sea mainly comprise exercises of the Navy, low-altitude flights of the Air Force and target practices.

According to the ROKK (2005), there is only one torpedo launch area in the costal waters of Lower Saxony, located south of Helgoland. The ROB (2005) specifies beside different military excercise areas also serveral dumping grounds for explosives as well as the caution area

[47] https://www.bsh.de/EN/TOPICS/Offshore/Maps/_Anlagen/Downloads/NorthSea_Maritime_MilitaryFeatures.pdf?__blob=publicationFile&v=2

Meldorfer Bucht (a proving ground for navy missiles and other weapons). Most of the areas mentioned are shown in Figure 23.

4.11.2 FUTURE CHANGES

Since details regarding the extent of military uses are confidential and not publicly accessible for further evaluation, an assessment of future changes is difficult. It is reasonable to assume that the above mentioned military excercises will continue in the defined military excercise areas.

The ROB (2005) states, although the deployment strategy of the German Federal Armed Forces intended to close down military areas on the mainland this do not seem to lead to a reduction of military areas in the coastal zone. However a further extension of the existing military areas is also not to be expected.

4.11.3 RELEVANCE FOR THE PROJECT

Military exercises pose a problem for a project either by making an area inaccessible for a certain period or by interference with navy vessels of any kind.

The general right of peaceful transit may be suspended in restricted and warning areas (§ 60 (2) SeeSchStrO). According to the ROB (2005) there are no national prescriptions to restrict fishery, raw materials exploitation, installation of offshore windfarms or other ventures at military claimed areas in the coastal zone. However corresponding to provisions of federal state law such restrictions may be possibly implemented.

In general, there are various national defense privileges in the relevant laws which is why during assessment procedures usually the national defense is given priority over other interests.

In any case, areas contaminated by ammunition are to be considered thoroughly. Within these areas the implementation of a project is only possible with greatly increased effort. The ROB (2005) listed some former explosives dumping grounds, but the deposits of ammunition at the 12 nm zone are not limited to these sites.

4.12 MARINE SCIENTIFIC RESEARCH

4.12.1 PRESENT SITUATION

In the marine environment of the German EEZ different research work such as basic research, monitoring activities or user-orientated research is carried out. Research work can involve vessels, aircrafts or fixed installed stations and covers different methods, e.g. side-scan-sonar and other seismic measures, sediment sampling via grabbers or multicorers, species sampling via beam trawl, line transect counts via vessel or aircraft or recordings of marine mammals sounds via acoustic detectors. Furthermore, sensors for continuous measurements (e.g. salinity, water temperature, pH-level) can be attached to buoys or unmanned light vessels.

The measuring platforms (e.g. FINO 1, FINO 3, measuring mast “Nordsee Ost”) currently existing in the German EEZ of the North Sea as of 05.04.2019 are displayed in Figure 7 (see chapter 4.2.1)[48].

Furthermore, four BSH measuring stations exist in the German Bight: the unmanned light vessel “German Bight”, the unmanned light vessel “TW Ems”, the North Sea buoy II and the North Sea buoy III. The scientific research areas of the Institute for Sea Fishing have been defined as

[48]https://www.bsh.de/DE/THEMEN/Offshore/Offshore-Vorhaben/Messstellen/messstellen_node.html

priority and reserve areas for marine research in the MSP[49] of the BSH (see Figure 5 in chapter 4.1).

4.12.2 FUTURE CHANGES

The currently planned (application submitted) measuring platforms are included in the BSH map (see Figure 7) as well. At this point in time, no information on any other planned measuring platforms or stations in the German EEZ of the North Sea exists.

4.12.3 RELEVANCE FOR THE PROJECT

Marin scientific research mainly pose a problem for a operation, either by making an area inaccessible for a certain period or by interference with survey vessels of all kind.

[49] https://www.bsh.de/DE/THEMEN/Offshore/Offshore-Vorhaben/Forschungshandlungen/forschungshandlungen_node.html

5 INTERNATIONAL AND EUROPEAN COMMUNITY LEGAL FRAMEWORK

At the european and international level, different marine conventions exist, in which the transnational protection of marine ecosystems are coordinatend and bundled. The most important international legal base is the United Nations Convention on the Law of the Sea ("Seerechtsübereinkommen = SRÜ") from 1982 which became effective in 1994. The SRÜ obliges the Contracting States i.a. to protect the marine environment. It therefore constitutes the international basis for actions regarding the protection of marine environments and the sustainable development of ocean and coastal environments and their ressources. By cooperating at a national, sub-regional, regional and global level, the Contracting States should realise an effective protection of the marine environment. The cooperative concepts must be integrative in its content and preventive and precautionary regarding their impact. The SRÜ applies to the marine territories of the Contracting States (coastal waters and EEZs) as well as to the high sea.

The regulations of the Convention on Biodiversity (CBD) from 1992 are valid for ecosystems and habitats in the national marine territories of each Contracting party, including the EEZ and the continental shelf. On the high sea and the deep sea-bed, the CBD regulations solely apply to actions of national citizens of a Constracting State. Article 5 of the CBD addresses regulations for ecosystem protection outside of areas under national jurisdiction and implements a broadly formulated obligation to cooperate for the conservation and the sustainable use of biodiversity, even in ungoverned spaces. The conservation of natural habitats in situ is one goal of the CBD which should be achieved through a system of marine conservation areas. The Contracting States have dealt repeatedly at 2-yearly conferences with questions regarding the protection of marine biodiversity in the ocean. At the 9th conference in the year 2008 in Bonn (Germany), scientific and environmental criteria for the establishment of marine conservation areas have been agreed upon. In Europe, the conservation of biological diversity in accordance to the CBD is supported by a variety of different instruments. Besides the implementation of the EU-FFH-directive, the measures for implementing the EU marine strategy directive (see below) to ensure the conservation of marine ecosystems are currently paramount.

To offset the impacts of climate change, the United Nations have signed the framework agreement about climate change dated 09th of May 1992 (signed at the Rio-conference) as well as the additional protocal of Kyoto dated 11th of December 1997. The agreement demands from the Contracting parties not only the reduction of climate relevant greenhouse gas emissions but also the preparation of measures to adjust to the negative impacts of climate change, such as the development of integrative management plans for coastal areas and for strengthening coastal protection. Due to the precautionary principle in the framework about climate change, all activites in the coastal and marine regions are to be contemplated from a prevention point of view.

To prevent marine contamination through waste and other materials, the London-Agreement dated 29th of December 1972 became effective, which was supplemented by the London-Protocoll in 1996. The London-Protocoll replaced the Agreement when it became effective in 2007, anchoring a generell prohibition of introducing waste and other materials into the marine environment. Exceptions are only allowed for certain types of wastes, e.g. dreged material.

The MARPOL-Convention (International Convention for the Prevention of Marine Pollution from Ships) dated 2nd of November 1973 is an international, world-wide convention for the conservation of marine environments. The convention obligates the Signing Contracting States to prevent the discharge of pulluting substances from ships and standardizes the requirements for the various forms of contaminants in connection with ships during their operation in Annex I – VI (contamination of oil, harmfull liquid substances, contaminants which are transported

packaged, ship sewage, ship waste, air contaminants). With the revision of Annex V of the Convention, it was regulated that no ship waste is allowed to be discharged into the ocean (with exceptions).

The OSPAR-Convention (Convention for the Protection of the Marine Environment of the North-East Atlantic) from 1992 became effective under international law on 25th of March 1998. The Contracting States (Belgium, Denmark, Germany, Finnland, France, Iceland, Ireland, Luxemburg, Netherlands, Norway, Poland, Sweden, Switzerland, Spain, UK, Northern Ireland, EU) have to take all possible measures, to prevent and eliminate pollution. They will further undertake all necessary steps to protect the marine areas from negative impacts by human activities, to protect human heatlh, to conserve marine ecoystems and, as far as practicable, to restore impaired marine zones. Whilst doing so, they have to consider the precautionary- and perpetrator-principle and apply the “best-available-technique” and “best environmental practice”.

The protection of the North Sea is subject of the Bonn-Agreement from 1983 about cooperation when fighting to protect the North Sea from oil and other materials (Bonn-Agreement). Member States are the EU, Belgium, Denmark, France, Germany, Netherlands, Norway, Sweden, UK and North Ireland. The agreement applies when a pollution or a potential pollution of the sea with oil and other materials in the North Sea poses a serious and imminent threat to the coast (and connected interests) of one or more Member States. It also applies to the monitoring of potential or imminent threats in the North Sea, to ensure a fast determination and consequent fight against pollution as well as to address violations against the regulations.

The European Marine Strategy Framework Directive (MSFD) of 2008, together with the EU strategy for the protection and conservation of the marine environment of 2005, forms the environmental pillar of european marine politics. It is the overall goal of the MSFD to achieve or to conserve a good environmental ocean status in all european oceans by the year 2020. This status is defined as the state of maritime waters that are ecologically diverse and dynamic oceans, that are clean, healthy and productive and where the marine environment is used in a sustainable matter so that the using and activity possibilities of the current generation are protected for the next generation. The european countries bordering sea basins are obligated to develop regional strategies and national actionplans to avoid a deterioration and also to achieve the overall goal of a good environmental ocean status with suitable measures. The regional cooperation OSPAR serves as a regional cooperation platform for the implementation of the MSFD in the North Sea. The european and international legal requirements are becoming the “national marine protection” through the legal and technical implementation, only then unfolding their effect. Here, the following national regulations must be mentioned: the water framework directive (“MSRL”), the law about the implementation of the OSPAR-Convention and the implementation of the different resolutions and recommendations stated in the agreements and conventions.

Besides the above mentioned agreements and conventions, marine conservation is supported by the EU-FFH directive and the EU wild birds directive. The protection of marine ecoystems from negative impacts through human activities such as fishing, shipping, energy production etc. is also regulated by the extension of the law of regional planning (“ROG”) to the EEZ and the approval procedures by the BSH for wind farms projects in the German EEZ. The high sea contribution law (“Hohe-See-Einbringungsgesetz”) prohibits also at a national level the waste disposal in the ocean (exceptions: dredging material and material from urn burials).

The UNECE (United Nations Economic Commission for Europe) Convention (ESPOO Convention), a Convention on Environmental Impact Assessment (EIA) for Transboundary Projects, has been in force since 1997. This Convention regulates the participation of affected states and their public in EIA procedures in other states where there could be significant

transboundary impacts between ECE states. The contracting parties are obliged to notify the parties concerned of projects listed in Annex I of the Convention (including large-diameter oil and gas pipelines, construction of high-voltage overhead lines with a current of 220 kV or more and a length of 15 km or more, larger wind turbines for generating electricity [wind farms]). The notification is to include information on the project and information on possible transboundary environmental impacts. In addition, the Party of Origin is required to provide comprehensive EIA documentation (Annex II). The Parties recommend the use of the „Leitfaden für die Praktische Anwendung der Espoo-Konvention“ (UN ECE 2003).

6 LICENSING PROCEDURE IN THE GERMAN EXCLUSIVE ECONOMIC ZONE (EEZ)

6.1 CABLES

Laying and operation of interconnectors and of offshore connection lines (bringing electricity from OWF to shore) is subject to different approval procedures resulting from different legal basis.

Interconnector

Construction and operation of submarine interconnectos cables in the German EEZ of the North Sea requires prior approval in accordance with the German Federal Mining Act (BBergG). Installation and operation require approval

- with regard to mining aspects (§ 133 (1) No. 1 of the Federal Mining Act),
- with regard to the regulations on use of waters above the continental shelf and the air space above these waters (§ 133 (1) No. 2 of the Federal Mining Act).

No plan approval procedure is required.

Offshore grid connection

Since 2017 planning and construction of the offshore connection cables is regulated by the Wind energy-at-sea law (Windenergie-auf-See-Gesetz, WindSeeG). Since then, the Federal Maritime and Hydrographic Agency (BSH) has been responsible for the development and preliminary investigation of areas for the construction and operation of offshore wind energy on the basis of the Wind Energy at Sea Act (WindSeeG) in an overall planning process.

The so-called central model describes a successive planning and tendering process. In the first step, the areas for offshore wind energy are defined spatially and temporally in the Site Development Plan (FEP). The FEP is the controlling planning instrument for the use of offshore wind energy and offshore grid connections. The FEP plans the areas for offshore wind energy and offshore grid connections in the North Sea spatially in the period from 2026 to at least 2030. In order to ensure synchronisation with the required grid connections for the offshore wind turbines, the location of the offshore platforms and the route for the grid connections within the German Exclusive Economic Zone will be determined.

According to WindSeeG grid connections require a plan approval procedure.

6.1.1 COMPETENT AUTHORITIES

Interconnector

According to § 133 para 1 No 1 BBergG, the Landesamt für Bergbau, Energie und Geologie, Clausthal Zellerfeld (LBEG) grants a license that covers the specific mining issues. This includes the installation process, maintenance and monitoring of the cable. A license according

to § 133 BBergG may only be denied, if there is hazard to life or health of persons or to property or if an impairment of predominant public interests must be expected and if such hazard and/or impairment cannot be avoided or compensated for by a time limitation, condition or imposition.

According to § 133 para 1 No 2 and para 4 BBergG, a second license, which is granted by the Bundesamt für Seeschifffahrt und Hydrographie, Hamburg (BSH), covers the use of the waters superjacent to the continental shelf. In particular, the BSH examines effects on the environment and shipping, fishing, other off-shore activities, pipelines and other sea cables. The BSH involves specialized agencies such as the Bundesamt für Naturschutz.

The State Office for Mining, Energy and Geology (LBEG) in Clausthal-Zellerfeld (1.) and the Federal Maritime and Hydrographic Agency (BSH) in Hamburg (2.) are thus responsible for granting approval. The BSH can only grant approval if approval of the mining aspects (1.) has been obtained. The addresses are as follows:

- Landesamt für Bergbau, Energie und Geologie, An der Marktkirche 9, 38678 Clausthal-Zellerfeld
- Bundesamt für Seeschifffahrt und Hydrografie (BSH), Bernhard-Nocht-Str. 78, 20359, Hamburg

Offshore grid connection

The year 2017 marked a system change in the field of offshore wind energy. Since then, the Federal Maritime and Hydrographic Agency (BSH) has been responsible for the development and preliminary investigation of areas for the construction and operation of offshore wind energy on the basis of the Wind Energy at Sea Act (WindSeeG) in an overall planning process.

The address is as follows:

Bundesamt für Seeschifffahrt und Hydrografie (BSH), Bernhard-Nocht-Str. 78, 20359, Hamburg

6.1.2 LICENSING REQUIREMENTS

The BSH as one of the permitting authority for cables in the German EEZ has drafted guidelines for spatial development in the EEZ. The priorities are as follows:

- Securing and strengthening maritime traffic,
- Securing natural resources by avoiding disruptions to and pollution of the marine environment,
- Strengthening economic capacity through orderly spatial development and optimisation of spatial use,
- Promotion of offshore wind energy use in accordance with the Federal Government's sustainability strategy,
- Long-term sustainable use of the properties and potential of the EEZ through reversible uses, economic use of space, and priority of marine uses.

The first two are the dominating priorities which have a major effect on the permitting of cable routes.

Regional Planning

Spatial planning law also applies within the EEZ but with consideration of the requirements of the UN-Convention on the Law of the Sea (§ 1 para 4 Federal Regional Planning Act, ROG). Compliance with Spatial Planning Aims (Spatial Plan for the German EEZ of North Sea since 2009) is a necessary prerequisite for plan approval.

The Ordinance on regional planning in the German EEZ (Verordnung über die Raumordnung in der deutschen ausschließlichen Wirtschaftszone in der Nordsee, AWZ Nordsee-ROV) of 21st of

September 2009 (BGBl I No 61 of 25.09.2009 S. 3107) contains spatial law requirements for pipelines and submarine cables (3.3.1 (4) – (9)). In particular, the Ordinance stipulates that in order to minimise negative impacts on the marine environment sensitive habitats submarine cables should not be installed during periods when certain species are particularly vulnerable (3.3.1 (8)). The Ordinance does not determine specific cable routes for transnational HVDC. The planned grid connection of OWF is outlined in the in the Site Development Plan (FEP).

Natura 2000

Four areas in the German EEZ (North Sea) have been nominated as Natura 2000 sites according to the EU Habitats Directive (Borkum-Riffgrund, Doggerbank and Sylter Aussriff) and the Birds Directive (Östliche-Deutsche-Bucht). If the cable route crosses such an FFH site or its proximity an appropriate assessment will have to be carried out. The assessment is part of the licensing procedure.. As Art. 79 para 1 of the UN-Convention on the Law of the Sea entitles the States to lay submarine cables and pipelines on the continental shelf (EEZ).. According to Art. 57 para 3 point 4 of the Federal Act for the Protection of Nature (BNatSchG), restrictions in connection with laying of undersea cables and pipelines in Natura 2000-sites are only permissable if conservation objectives of a Natura 2000-site according to § 34 BNatSchG as well as the implementation of the EU-directive 2008/56/EG (Marine Strategy Framework Directive) are not significantly affected.

6.1.3 REQUIRED PERMITS

Interconnector

The required permits are the following:

- permit from State Office for Mining, Energy and Geology (LBEG) in Clausthal-Zellerfeld according to § 133 (1) No. 1 of the Federal Mining Act
- permit from Federal Maritime and Hydrographic Agency (BSH) in Hamburg according to § 133 (1) No. 2 of the Federal Mining Act
- permit from shipping police authorities (Wasserstraßen- und Schifffahrtsamt) in accordance with § 31 of the Federal Waterways Act (WaStrG)
- permit from Federal Agency on Nature Consvervation (Bundesamt für Naturschutz), if habitats according to § 30 of nature conservation law (BNatSchG) are crossed

Offshore grid connection

According to the Offshore Wind Energy Act (Windenergie-auf-See-Gesetz; WindSeeG 2017) installation and operation of offshore grid connection require planning approval (Planfeststellung) as a result of a planning approval procedure. The plan resulting from the procedure encompasses all other relevant statutory regulations, so no other public law licenses are necessary (all licenses are concentrated within one permit). These necessary licenses, which are encompassed, may contain e.g. the permit from shipping police authorities (Wasserstraßen- und Schifffahrtsamt) in accordance with the Federal Waterways Act (WaStrG) and a permit from Federal Agency on Nature Conservation (Bundesamt für Naturschutz), if habitats according to § 30 of nature conservation law (BNatSchG) are crossed.

During the planning approval procedure the BSH is to consider opinions and statements of other public authorities, bodies and NGO in its decision making process.

6.1.4 APPLICATION DOCUMENTS

Interconnector

The necessary documents for the application are the following:

- Application itself, including detailed information on the project (with routing, data on subsoil, technical description and specification, different route alternatives, expert report on warming aspects and, if required, expert report on magnetic field)
- Although not formerly required, a description of environmental impacts based on content/structure of an environmental impact assessment is necessary
- Natura 2000 impact study (appropriate assessment), if a Natura 2000 area may be affected
- Species protection impact study (according to § 62 of the Federal Nature Conservation Act [BNatSchG])
- Separate study on § 30 habitats (if applicable, application for exemption or exception in accordance with Federal Nature Conservation Act)
- Intervention / Compensation plan (intervention regulation)
- Study on relevance for the marine strategy
- Risk analysis concerning possible interference with shiping
- Geotechnical survey report
- Biological survey report

Offshore grid connection

The necessary documents for the application are the following:

- Application itself, including detailed information on the project (with routing, data on subsoil, technical description and specification, different route alternatives, expert report on warming aspects and, if required, expert report on magnetic field)
- Environmental Impact Assessment
- Natura 2000 impact study (appropriate assessment), if a Natura 2000 area may be affected
- Species protection impact study (according to § 62 of the Federal Nature Conservation Act [BNatSchG])
- Separate study on § 30 habitats (if applicable, application for exemption or exception in accordance with Federal Nature Conservation Act)
- Intervention / Compensation plan (intervention regulation)
- Study on relevance for the marine strategy
- Risk analysis concerning possible interference with shiping
- Geotechnical survey report
- Biological survey report

6.1.5 RISKS FOR LICENSING

Interconnector

Although the EEZ is not part of the German territory, the Federal Republic of Germany holds the authority to restrict the installation of seacables if public interests, such as shipping, fishery and environmental concerns are affected (Art. 79 para 3 of the UN-Convention on the Law of the Sea). However, several cables, interconnectors as well as OWF shore connections have been planned, approved and laid. The approval processes show, that especially routing is a challenge due to interference with other activities, installations and nature protection. Therfore spatial planning has been implemented in the EEZ giving guidance on possibilities and restrictions concerning cable laying.

Therfore it is still a time consuming process (see below) but the overall risk for licensing can be classified as low.

Offshore grid connection

According to the procedure as outlined in the Offshore Wind Energy Act (Windenergie-auf-See-Gesetz; WindSeeG 2017) (see above) offshore grid connection will have a low risk for licensing, if the technical planning is state of the art.

6.1.6 REQUIRED SURVEYS AND OTHER ACTIVITIES FOR THE PERMITTING PROCESS OF EEZ

The following work packages and surveys are to be expected as a result of the permitting requirements:

- Route selection and comparison (only Interconnector)
- Cable specification and burial methods
- Cable Study 2K and EM
- Burial Assessment Study
- Ship risk Analysis
- Geological Route Survey according to StUK Baugrund
- Biological Survey (mainly benthos) according to Stuk4

StUK4: Standard Investigation of the Impacts of Offshore Wind Turbines on the Marine Environment (StUK), 4th edition of Oktober 2013 contains requirements for the Environmental Impact Study and monitoring during construction and operation also for cables.

6.1.7 APPLICATION AND PERMITTING PROCESSES (TIMELINE)

Interconnector

The following work packages are required, including information on the possible overall timespan required for the work packages:

- Predefining the route: should be based on a desk top study integrating technical, environmental and economic issues. Several informal meetings with BSH and others. Required timespan: about 5 months
- Scoping: preparation of a report to be sent out by BSH to several parties describing the planned project, the methodology for the EIA and the planned survey programme. During the scoping meeting, this will be discussed and some weeks later BSH will inform the project. Required timespan: about 4 months
- Geotechnical route survey (preparation): Required timespan: about 1 month
- Geotechnical route survey: Required timespan: about 4 month
- Biological route survey (preparation): formal survey design definition will be a result of the scoping-meeting. It is best to develop the design based on the results of the Side Scan Sonar Survey. Required timespan: 1 months
- Biological route survey: this is necessary input for the preparation of the application documents. Field work will require about two weeks; laboratory and office work about 4 month. Required timespan: 5 months
- Technical specification: Required timespan: 3 months
- Application documents: the required application documentations must include: survey reports, technical reports and environmental reports. It should be possible to use more or less the same reports for the different permit applications for Mining State Office, Hydrographic Agency, Conservation Agency and Water and Shipping Authority. Required time span: 6 month

- Permitting processes: the permitting processes (based on the above mentioned documents) from sending out the application up to permits needs some consultancy and some time. Most time consuming is the BSH permit due to public participation. Estimated required timespan: 8 month.

This overview results in a time span of about 1.5 to 2 years for the application and permitting process, taking parallel working into account.

Offshore grid connection

Facilitating the planning of an OWF in the EEZ is one aim of the Offshore Wind Energy Act (Windenergie-auf-See-Gesetz; WindSeeG 2017). Due to the site development plan, the time necessary to get approval will be reduced. However, not much experience exist so far.

The following work packages are required, including information on the possible overall timespan required for the work packages:

- Detailed Geotechnical survey according to StUK Baugrund (preparation): Required timespan: about 1 month
- Geotechnical survey: Required timespan: about 4 month
- Technical specification: Required timespan: 6 months
- Biological route survey (preparation): it is best to develop the design based on the results of the Side Scan Sonar Survey. Required timespan: 1 months
- Biological route survey: this is necessary input for the preparation of the application documents. Field work will require about two weeks; laboratory and office work about 4 month. Required timespan: 5 months
- Application documents: the required application documentations must include: survey reports, technical reports and environmental reports. Required time span: 6 month
- Permitting processes: the permitting processes (based on the above mentioned documents) from sending out the application up to approval is estimated to require about 6-8 month.
    - 1st round of participation: small circle of authorities
    - 2nd round (scoping): broader circle including several NGOs and authorities
    - 3rd round: as 2nd round with participation of neighbouring states hearing

This overview results in a time span of about 1.5 years for the application and permitting process taking parallel working into account.

6.2 PIPELINES

In the Exclusive Economic Zone (EEZ) or on the continental shelf, all countries are fundamentally granted the freedom to lay pipelines. However, they must give consideration to the rights and obligations of the coastal state and comply with the laws and regulations enacted by the UN Convention on the Law of the Sea (UNCLOS), see Art. 58 of UNCLOS. Art. 79 of UNCLOS contains detailed regulations for the laying of pipelines that grant the coastal state various powers vis-à-vis the laying state.

In Germany, transposition into national law shall primarily take place through the German Federal Mining Act (Bundesberggesetz, or BBergG), and the Marine Facilities Ordinance (Seeanlagenverordnung, or SeeAnlV).

Construction and operation of a submarine pipeline in the German EEZ of the North Sea requires prior approval in accordance with the German Federal Mining Act (BBergG). Installation and operation require approval

- with regard to mining aspects (§ 133 (1) No. 1 of the Federal Mining Act),
- with regard to the regulations on use of waters above the continental shelf and the air space above these waters (§ 133 (1) No. 2 of the Federal Mining Act).

A plan approval procedure is not required. For pipelines longer than 40 km an environmental impact assessment (EIA) in the EEZ is obligatory.

6.2.1 COMPETENT AUTHORITIES

According to § 133 para 1 No 1 BBergG, the Landesamt für Bergbau, Energie und Geologie, Clausthal Zellerfeld (LBEG) grants a license that covers the specific mining issues. This includes the installation process, the maintenance and the monitoring of the pipeline. A license according to § 133 BBergG may only be denied, if there is hazard to life or health of persons or to property or if an impairment of predominant public interests must be expected and if such hazard and/or impairment cannot be avoided or compensated by a time limitation, condition or imposition.

According to § 133 para 1 No 2 and para 4 BBergG, a second license, which is granted by the Bundesamt für Seeschifffahrt und Hydrographie, Hamburg (BSH), covers the use of the waters superjacent to the continental shelf. In particular, the BSH examines effects on the environment and shipping, fishing, other off-shore activities, pipelines and other sea cables. The BSH involves specialized agencies such as the Bundesamt für Naturschutz.

The State Office for Mining, Energy and Geology (LBEG) in Clausthal-Zellerfeld (1.) and the Federal Maritime and Hydrographic Agency (BSH) in Hamburg (2.) are responsible for granting approval. The BSH can only grant approval if approval for the mining aspects (1.) has been obtained. The addresses are as follows:

- Landesamt für Bergbau, Energie und Geologie, An der Marktkirche 9, 38678 Clausthal-Zellerfeld

Bundesamt für Seeschifffahrt und Hydrografie (BSH), Bernhard-Nocht-Str. 78, 20359, Hamburg

6.2.2 LICENSING REQUIREMENTS

The BSH, as one permitting authority for cables and pipelines in the German EEZ, has drafted guidelines for spatial development in the EEZ. The priorities are as follows:

- Securing and strengthening maritime traffic,
- Securing natural resources by avoiding disruptions to and pollution of the marine environment,
- Strengthening economic capacity through orderly spatial development and optimisation of spatial use,
- Promotion of offshore wind energy use in accordance with the Federal Government's sustainability strategy,
- Long-term sustainable use of the properties and potential of the EEZ through reversible uses, economic use of space, and priority of marine uses.

The first two are the dominating priorities which have a major effect on the permitting of pipeline routes.

Regional Planning

Spatial planning law also applies within the EEZ but with consideration of the requirements of the UN-Convention on the Law of the Sea (§ 1 para 4 Federal Regional Planning Act, ROG). Compliance with Spatial Planning Aims (Spatial Plan for the German EEZ of North Sea since 2009) is a necessary prerequisite for approval.

The Ordinance on regional planning in the German EEZ (Verordnung über die Raumordnung in der deutschen ausschließlichen Wirtschaftszone in der Nordsee, AWZ Nordsee-ROV) of 21st of September 2009 (BGBl I No 61 of 25.09.2009 S. 3107) contains spatial law requirements for pipelines and submarine cables (3.3.1 (4) – (9)). In particular, the Ordinance stipulates that in order to minimise negative impacts on the marine environment sensitive habitats submarine pipelines should not be installed during periods when certain species are particularly vulnerable (3.3.1 (8)). The Ordinance does not determine specific pipeline routes for transnational pipelines.

Natura 2000

Four areas in the German EEZ (North Sea) have been nominated as Natura 2000 sites according to the EU Habitats Directive (Borkum-Riffgrund, Doggerbank and Sylter Aussriff) and the Birds Directive (Östliche-Deutsche-Bucht). If the pipeline route crosses such an FFH site or its proximity, an appropriate assessment will have to be carried out. The assessment is part of the licensing procedure, i.e. it will be carried out by the BSH. As Art. 79 para 1 of the UN-Convention on the Law of the Sea entitles the States to lay submarine cables and pipelines on the continental shelf (EEZ), the laying of a pipeline cannot, in general, be excluded by Natura 2000 requirements. The regime of protection is therefore less strict than within FFH sites in the Coastal waters and onshore.

6.2.3 REQUIRED PERMITS

The required permits are the following:

- permit from State Office for Mining, Energy and Geology (LBEG) in Clausthal-Zellerfeld according to § 133 (1) No. 1 of the Federal Mining Act
- permit from Federal Maritime and Hydrographic Agency (BSH) in Hamburg according to § 133 (1) No. 2 of the Federal Mining Act
- permit from shipping police authorities (Wasserstraßen- und Schifffahrtsamt) in accordance with § 31 of the Federal Waterways Act (WaStrG)

permit from Federal Agency on Nature Consvervation (Bundesamt für Naturschutz), if habitats according to § 30 of nature conservation law (BNatSchG) are crossed.

6.2.4 APPLICATION DOCUMENTS

The necessary documents for the application are the following:

- Application itself, including detailed information on the project (with routing, data on subsoil, technical description and specification, different route alternatives, expert report on temperature anomalies)
- Environmental Impact Assessment
- Natura 2000 impact study (appropriate assessment), if a Natura 2000 area may be affected
- Species protection impact study (according to § 62 of the Federal Nature Conservation Act [BNatSchG])
- Separate study on § 30 habitats (if applicable, application for exemption or exception in accordance with Federal Nature Conservation Act)
- Intervention / Compensation plan (intervention regulation)
- Study on relevance for the marine strategy
- Risk analysis concerning possible interference with shiping
- Geotechnical survey report
- Biological survey report

6.2.5 RISKS FOR LICENSING

Although the EEZ is not part of German territory, the Federal Republic of Germany holds the authority to restrict the installation of pipelines if public interests, such as shipping, fishery and environmental concerns are affected (Art. 79 para 3 of the UN-Convention on the Law of the Sea). However, some pipelines and several cables, interconnectors as well as OWF shore connections have been planned, approved and laid. The approval processes show, that especially routing is a challenge due to interference with other activities, installations and nature protection. Therfore spatial planning has been implemented in the EEZ giving guidance on possibilities and restrictions concerning pipeline laying.

Therfore, it is still a time consuming process (see below), but the overall risk for licensing can be classified as low.

6.2.6 REQUIRED SURVEYS AND OTHER ACTIVITIES FOR THE PERMITTING PROCESS OF EEZ

The following work packages and surveys are to be expected as a result of the permitting requirements:

- Route selection and comparison
- Pipeline specification and burial methods
- Burial Assessment Study
- Ship risk Analysis
- Geological Route Survey according to StUK Baugrund
- Biological Survey (mainly benthos) according to Stuk4

StUK4: Standard Investigation of the Impacts of Offshore Wind Turbines on the Marine Environment (StUK), 4th edition of Oktober 2013 contains requirements for the Environmental Impact Study and monitoring during construction and operation also for cables and pipelines.

6.2.7 APPLICATION AND PERMITTING PROCESSES (TIMELINE)

The following work packages are to be expected, including information on the possible overall timespan required for the work packages:

- Predefining the route: should be based on a desk top study integrating technical, environmental and economic issues. Several informal meetings with BSH and others. Required timespan: about 5 months
- Scoping: preparation of a report to be sent out by BSH to several parties describing the planned project, the methodology for the EIA and the planned survey programme. During the scoping meeting this will be discussed and some weeks later BSH will inform the project. Required timespan: about 4 months
- Geotechnical route survey (preparation): Required timespan: about 1 month
- Geotechnical route survey: Required timespan: about 4 month
- Biological route survey (preparation): formal survey design definition will be a result of the scoping-meeting. It is best to develop the design based on the results of the Side Scan Sonar Survey. Required timespan: 1 months
- Biological route survey: this is necessary input for the preparation of the application documents. Field work will require about two weeks; laboratory and office work about 4 month. Required timespan: 5 months
- Technical specification: Required timespan: 3 months
- Application documents: the required application documentations must include: survey reports, technical reports and environmental reports. It should be possible to use more

or less the same reports for the different permit applications for Mining State Office, Hydrographic Agency, Conservation Agency and Water and Shipping Authority. Required time span: 6 month

- Permitting processes: the permitting processes (based on the above mentioned documents) from sending out the application up to permits needs some consultancy and some time. Most time consuming is the BSH permit due to public participation. Estimated required timespan: 8 month.

This overview results in a time span of about 1.5 to 2 years for the application and permitting process taking parallel working into account.

6.3 SAND- AND GRAVELMINING

The search for economically relevant mineral resources in the Federal Republic of Germany is subject to the regulations of the Federal Mining Act (Bundesberggesetz - BBergG).

Whoever aims to extract concessionable mineral resource requires a production licence compliant with § 8 Mining Act or the mineral rights compliant with § 9 Mining Act. These are issued by the responsible agency. According to § 6ff and to § 50 BBerG there is a two-step procedure for licensing.

6.3.1 COMPETENT AUTHORITIES

Based on § 6ff and § 50 BBerG the Landesamt für Bergbau, Energie und Geologie, Clausthal Zellerfeld (LBEG) grants a license that covers the specific mining issues. LBEG involves specialized agencies such as the Bundesamt für Naturschutz.

The address is as follows:

Landesamt für Bergbau, Energie und Geologie, An der Marktkirche 9, 38678 Clausthal-Zellerfeld

6.3.2 LICENSING REQUIREMENTS

Licensing requirements differ depending on the size of the area for mining that is applied for. If the area is >25 ha or is located in an area of nature conservation an Environmental Impact Assessment is required. In the following, we assume that an area larger than 25 ha will be applied for.

A general operating plan (Rahmenbetriebsplan) is applied for in the second step of licensing; the formal procedure is a plan approval procedure (Planfeststellungsverfahren, according to § 52 Abs. 2a BBergG).

No content-related licensing requiremens have been issued from LBEG, however, the guidelines for spatial development in the EEZ drafted bei BSH may give some orientiation. The priorities are as follows:

- Securing and strengthening maritime traffic,
- Securing natural resources by avoiding disruptions to and pollution of the marine environment,
- Strengthening economic capacity through orderly spatial development and optimisation of spatial use,
- Promotion of offshore wind energy use in accordance with the Federal Government's sustainability strategy,
- Long-term sustainable use of the properties and potential of the EEZ through reversible uses, economic use of space, and priority of marine uses.

The first two are the dominating priorities which have a major effect on the permitting of mining areas.

Regional Planning

Spatial planning law also applies within the EEZ, but with consideration of the requirements of the UN-Convention on the Law of the Sea (§ 1 para 4 Federal Regional Planning Act, ROG). Compliance with Spatial Planning Aims (Spatial Plan for the German EEZ of North Sea since 2009) is a necessary prerequisite for approval.

The Ordinance on regional planning in the German EEZ (Verordnung über die Raumordnung in der deutschen ausschließlichen Wirtschaftszone in der Nordsee, AWZ Nordsee-ROV) of 21st of September 2009 (BGBl I No 61 of 25.09.2009 S. 3107) contains spatial law requirements for pipelines and submarine cables (3.3.1 (4) – (9)). In particular, the Ordinance stipulates that in order to minimise negative impacts on the marine environment sensitive habitats, submarine pipelines should not be installed during periods when certain species are particularly vulnerable (3.3.1 (8)). The Ordinance does not determine specific pipeline routes for transnational pipelines.

Natura 2000

Four areas in the German EEZ (North Sea) have been nominated as Natura 2000 sites according to the EU Habitats Directive (Borkum-Riffgrund, Doggerbank and Sylter Aussriff) and the Birds Directive (Östliche-Deutsche-Bucht). If mining is applied for in an FFH site or its proximity, an appropriate assessment will have to be carried out. The assessment is part of the licensing procedure. However, getting a license for mining in a Natura 2000 area will be quite difficult.

6.3.3 REQUIRED PERMITS

According to Federal Mining Act (Bundesberggesetz - BBergG), sand mining (> 25 ha) requires planning approval (Planfeststellung) as a result of a planning approval procedure. The plan resulting from the procedure encompasses all other relevant statutory regulations, so no other public law licenses are necessary (all licenses are concentrated within one approval). These necessary licenses, which are encompassed may contain e.g. the permit from shipping police authorities (Wasserstraßen- und Schifffahrtsamt) in accordance with the Federal Waterways Act (WaStrG) and a permit from Federal Agency on Nature Conservation (Bundesamt für Naturschutz), if habitats according to § 30 of nature conservation law (BNatSchG) are disturbed.

During the planning approval procedure the LBEG will consider opinions and statements of other public authorities, bodies and NGO in its decision making process.

6.3.4 APPLICATION DOCUMENTS

The necessary documents for the application are the following:

- Application itself, including detailed information on the project (with coordinates, data on subsoil, technical description and specification)
- Environmental Impact Assessment
- Natura 2000 impact study (appropriate assessment), if a Natura 2000 area may be affected directly or indirectly
- Species protection impact study (according to § 62 of the Federal Nature Conservation Act [BNatSchG])
- Separate study on § 30 habitats (if applicable, application for exemption or exception in accordance with Federal Nature Conservation Act)

- Intervention / Compensation plan (intervention regulation)
- Study on relevance for the marine strategy
- Risk analysis concerning possible interference with shiping
- Geotechnical survey report
- Biological survey report

6.3.5 RISKS FOR LICENSING

Although sand and gravel mining is somewhat privileged in the EEZ and by German law, restrictions due to nature conservation have increased the risk to getting approval over the last years. However, this is also due to the location of the proposed mining areas: they were situated entirely within Natura 2000 areas. Outside of the Natura 2000 areas, the percentage of fine material in the sediments is higher, thus suitability is reduced. This means, that risk to a successful licensing is high, if sand and gravel with very low fine material percentage is necessary and probably much lower, if a higher percentage of fine material is tolerable.

6.3.6 REQUIRED SURVEYS AND OTHER ACTIVITIES FOR THE PERMITTING PROCESS OF EEZ

The following work packages and surveys are to be expected as a result of the permitting requirements:

- Area selection and comparison
- Dredging plan und methods
- Ship risk Analysis
- Geological Route Survey
- Biological Survey (mainly benthos) according to Stuk4

StUK4: Standard Investigation of the Impacts of Offshore Wind Turbines on the Marine Environment (StUK), 4th edition of Oktober 2013 contains requirements for the Environmental Impact Study and monitoring during construction and operation also for sand- and gravelmining.

6.3.7 APPLICATION AND PERMITTING PROCESSES (TIMELINE)

The following work packages are required, including information on the possible overall timespan required for the work packages:

- Predefining the area: should be based on a desk top study integrating technical, environmental and economic issues. Several informal meetings with LBEG, BSH and others. Required timespan: about 5 months
- Scoping: preparation of a report to be send out by LBEG to several parties describing the planned project, the methodology for the EIA and the planned survey programme. During the scoping meeting this will be discussed and some weeks later LBEG will inform the project. Required timespan: about 4 months
- Geotechnical survey (preparation): Required timespan: about 1 month
- Geotechnical survey: Required timespan: about 4 month
- Biological survey (preparation): formal survey design definition will be a result of the scoping-meeting. It is best to develop the design based on the results of a Side Scan Sonar Survey. Required timespan: 1 months
- Biological survey: this is necessary input for the preparation of the application documents. Field work will need about two weeks; laboratory and office work about 4 month. Required timespan: 5 months
- Technical specification: Required timespan: 3 months

- Application documents: the required application documentations must include: survey reports, technical reports and environmental reports. Required time span: 6 month
- Permitting processes: the permitting processes (based on the above mentioned documents) from sending out the application up to permits needs some consultancy and some time, also due to public participation. Estimated required timespan: 16 month.

This overview results in a time span of about 3 years for the application and permitting process taking parallel working into account.

6.4 OFFSHORE WIND FARMS

Construction and operation of an Offshore-Windfarm (OWF) in the German EEZ is regulated by several laws. Most relevant are the Renewable Energy Law (Erneuerbare-Energien-Gesetz, EEG), the Energy Industry Act (Energiewirtschaftsgesetz, EnWG), the Marine Facilities Ordinance (Seeanlagenverordnung, SeeAnlV), the Wind energy-at-sea law (Windenergie-auf-See-Gesetz, WindSeeG) and the Federal Natur Conservation Law (Bundesnaturschutzgesetz, BNatSchG).

The year 2017 marked a system change in the field of offshore wind energy. Since then, the Federal Maritime and Hydrographic Agency (BSH) has been responsible for the development and preliminary investigation of areas for the construction and operation of offshore wind energy on the basis of the Wind Energy at Sea Act (WindSeeG) in an overall planning process.

The so-called central model describes a successive planning and tendering process. In the first step, the areas for offshore wind energy are defined spatially and temporally in the Site Development Plan (FEP). The next step is the preliminary investigation of the areas defined in the FEP. After the preliminary investigation has been carried out, the areas are auctioned off in a competitive procedure by the Federal Network Agency by making the results of the preliminary investigation available to the bidders. The bidder who has been awarded a contract can erect wind turbines on the site after passing the approval procedure, is entitled to the market premium and may use the connection capacity of the offshore grid connection.

In its central model, the FEP is the controlling planning instrument for the use of offshore wind energy and offshore grid connections. The FEP plans to utilize the areas spatially designated for offshore wind energy and offshore grid connections in the North Sea in the period from 2026 to at least 2030. In order to ensure synchronisation with the required grid connections for the offshore wind turbines, the location of the offshore platforms and the route for the grid connections within the German Exclusive Economic Zone will be determined.

6.4.1 COMPETENT AUTHORITIES

The approval process in the German EEZ is based on the Offshore Wind Energy Act (Windenergie-auf-See-Gesetz; WindSeeG 2017), which specifically regulates the necessary steps and requirements to be considered by the BSH as the competent authority.

The address is as follows:

- Bundesamt für Seeschifffahrt und Hydrografie (BSH), Bernhard-Nocht-Str. 78, 20359, Hamburg

6.4.2 LICENSING REQUIREMENTS

According to Offshore Wind Energy Act (Windenergie-auf-See-Gesetz; WindSeeG 2017) installation and operation of OWF require planning approval (Planfeststellung) as a result of a planning approval procedure. A plan may only be approved if there is:

- no threat to the marine environment
- no threat to safety or efficiency of shipping traffic
- no threat to national or allied defence
- no threat to other public law requirements

During the planning approval procedure, the plan will be balanced with other interests such as fishery, sand and gravel mining and others. The plan encompasses all other relevant statutory regulations, so no other public law licenses are necessary (all licenses are concentrated within one license).

Compliance with Spatial Planning Aims (Spatial Plan for the German EEZ of North Sea since 2009) is a necessary prerequisite for plan approval. However, as a result of the procedure defined in the Offshore Wind Energy Act (Windenergie-auf-See-Gesetz; WindSeeG 2017) this will be given for all sites which came to auction (part 3 of WindSeeG).

According to the Offshore Wind Energy Act (Windenergie-auf-See-Gesetz; WidSeeG 2017) OWF have to be built in areas which are already identified as appropriate in the site development plan for the German EEZ (part 2 of WindSeeG) and which have already been preliminary surveyed by BSH. This means, that the OWF-developer must no longer make ecological surveys as part of the application documents, because this will be done by the BSH.

The preliminary investigation of the sites stipulated in the site development plan will take place with the aim of

1. providing the bidders with the information which makes possible a competition-based offer, and
2. determining the suitability of the sites and examining individual subjects of the investigation in advance in order to accelerate the subsequent planning approval procedure.

6.4.3 REQUIRED PERMITS

According to Offshore Wind Energy Act (Windenergie-auf-See-Gesetz; WindSeeG 2017) installation and operation of OWF require planning approval (Planfeststellung) as a result of a planning approval procedure. The plan resulting from the procedure encompasses all other relevant statutory regulations, so no other public law licenses are necessary (all licenses are concentrated within one permit). These necessary licenses, which are encompassed may contain e.g. the permit from shipping police authorities (Wasserstraßen- und Schifffahrtsamt) in accordance with the Federal Waterways Act (WaStrG) and a permit from Federal Agency on Nature Conservation (Bundesamt für Naturschutz), if habitats according to § 30 of nature conservation law (BNatSchG) are affected.

During the planning approval procedure, the BSH will consider opinions and statements of other public authorities, bodies and NGO in its decision making process.

6.4.4 APPLICATION DOCUMENTS

The necessary documents for the application are the following:

- Application itself including detailed information on the project (technical description and specification)
- Technical Risk Analysis on the probability of a ship/wind turbine-collision
- Design Basis (according to Standard „Design of OWF“)
- Prognosis on the hull-retaining configuration of the substructure of the foundations
- Preliminary Draft of Installation Structure (according to Standard „Design of OWF“)
- Environmental Impact Study according to UVPG

- Natura 2000 impact study (appropriate assessment), if a Natura 2000 area may be affected
- Species protection impact study (according to § 62 of the Federal Nature Conservation Act [BNatSchG])
- Study on § 30 habitats (if applicable, application for exemption or exception in accordance with Federal Nature Conservation Act)
- Study on relevance for the marine strategy
- Geotechnical survey report according to StUK Baugrund

6.4.5 RISKS FOR LICENSING

According to the procedure as outlined in the Offshore Wind Energy Act (Windenergie-auf-See-Gesetz; WindSeeG 2017) (see above), OWF will have a low risk for licensing, if the technical planning is state of the art.

6.4.6 REQUIRED SURVEYS AND OTHER ACTIVITIES FOR THE PERMITTING PROCESS OF EEZ

Surveys and other activities required for the permitting process according to the procedure as outlined in the Offshore Wind Energy Act coming in operation as of 2026, will be reduced compared to today, due to the preliminary surveys, which will be performed by BSH. According to StUK Baugrund, a detailed survey of subsoil conditions are to be performed and some technical studies as outlined in the chapter above.

6.4.7 APPLICATION AND PERMITTING PROCESSES (TIMELINE)

Facilitating the planning of an OWF in the EEZ is one aim of the Offshore Wind Energy Act (Windenergie-auf-See-Gesetz; WindSeeG 2017). Due to the site development plan and the preliminary investigations performed by BSH prior to the auction process will probably reduce the time necessary to get approval. However, not much experience exists so far.

The following work packages are required, including information on the possible overall timespan required for the work packages:

- Detailed Geotechnical survey according to StUK Baugrund (preparation): Required timespan: about 1 month
- Geotechnical survey: Required timespan: about 4 month
- Technical specification: Required timespan: 6 months
- Application documents: the required application documentations must include: survey reports, technical reports and environmental reports. Required time span: 6 month
- Permitting processes: the permitting processes (based on the above mentioned documents) from sending out the application up to approval needs some time: 8-12 month.
    - 1st round of participation: small circle of authorities
    - 2nd round (scoping): broader circle including several NGOs and authorities
    - 3rd round: as 2nd round with participation of neighbouring states hearing

This overview results in a time span of about 1.5-2 years for the application and permitting process taking parallel working into account.

7 LICENSING PROCEDURE IN THE GERMAN 12 NM ZONE

7.1 CABLES

Construction and operation of submarine cables in the German 12 nm zone of the North Sea requires plan approval of the Lower Saxony Federal State Authority for Road Constuction and Traffic (Niedersächsische Landesbehörde für Straßenbau und Verkehr, NLStBV). As a preliminary step of the approval procedure for the laying of a high-voltage cable in the German territorial waters, it is to be verified whether a regional planning procedure (ROV) with a state planning approval is to be initiated. This is to be agreed with the Amt für regionale Landesentwicklung (ArL) Weser-Ems. In case of a ROV, potential locations (e.g. corridors) for the project will be evaluated on the basis of a draft technical planning and existing environmental data. Typically there is no need for an environmental field study, although there might be project-specific requirements of the authorities to be aligned prior to the project. The potential sites identified in the regional planning procedure then form the basis for the subsequent plan approval procedure. In the next step, the resulting plans for the implementation of the project will be submitted to the planning approval authority to open a plan approval procedure (PFV) followed by a planning permission permit (PFB). The plan approval encompasses all other relevant statutory regulations (§ 75 Paragraph 1 Sentence 1 VwVfG). In addition to the planning approval, other official decisions, in particular decisions under public law, are also required.

For the construction, operation and modification of high-voltage cables of 110 kV or higher within the German territorial seas (12 nm zone), planning permission by the competent authority is required under national law (EnWG § 43). Technical measures required to operate power cables, such as substations and grid connection points, can be integrated into the planning permission procedure at the request of the applicant. In the course of planning permission, public and private interests affected by the project are to be taken into consideration. Plan approval procedures are regulated by the Administrative Procedure Act (VwVfG § 72 ff).

7.1.1 COMPETENT AUTHORITIES

Lower Saxony

For regional planning procedure and plan approval in the context of the construction, operation and modification of high voltage power lines, the competent authorities for the state of Lower Saxony are:

- Regional planning procedure authority:
  Amt für regionale Landesentwicklung Weser-Ems, Theodor-Tantzen-Platz 8, 26122 Oldenburg
- Approving authority:

  Nds. Landesbehörde für Straßenbau und Verkehr (NLStBV), Stabsstelle Planfeststellung, Göttinger Chaussee 76 A, 30453 Hannover
- Lower nature conservation authority:
  Nds. Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN), Betriebsstelle Brake-Oldenburg, Geschäftsbereich Regionaler Naturschutz, Ratsherr-Schulze-Straße 10, D-26122 Oldenburg
- Lower nature conservation authority:
  Nationalparkverwaltung Niedersächsisches Wattenmee (NLPV), Virchowstraße 1, 26382 Wilhelmshaven

- Authorized for shipping lane:
  Wasserstraßen- und Schifffahrtsamt Emden, Am Eisenbahndock 3, 26725 Emden

Schleswig Holstein

For planning permission in the context of the construction, operation and modification of high voltage power lines, the competent authority for the state of Schleswig-Holstein is:

- Ministerium für Energiewende, Landwirtschaft, Umwelt, Natur und Digitalisierung des Landes Schleswig-Holstein, Amt für Planfeststellung Energie, Mercatorstraße 5,

  24106 Kiel
- Lower nature conservation authority:
  Landesbetrieb für Küstenschutz, Nationalpark und Meeresschutz Schleswig-Holstein (LKN.SH), Herzog-Adolf-Straße 1, 25813 Husum

Hamburg

- Bundesamt für Seeschifffahrt und Hydrografie (BSH), Bernhard-Nocht-Str. 78, 20359 Hamburg
- Wasser-und Schiffahrtsamt Hamburg, Moorweidenstraße 14, 20148 Hamburg

7.1.2 LICENSING REQUIREMENTS

As the permitting authority for cables in the German 12nm zone, the NLStBV has drafted guidelines for spatial development in the 12 nm zone. The priorities are as follows:

- Securing and strengthening maritime traffic
- Securing natural resources by avoiding disruptions to and pollution of the marine environment
- Strengthening economic capacity through orderly spatial development and optimisation of spatial use
- Long-term sustainable use of the properties and potential of the 12 nm zone through reversible uses, economic use of space, and priority of marine uses.

The first two points contain the main priorities which have a major effect on the permitting of cable routes.

The approval process is a purely legal-administrative process which will take place on the basis of an application. The applicant submits the plan of the project to the competent authority for consideration in a plan approval procedure. The application material will comprise the EIA (environmental impact assessment) investigations and other environmental assessments, landscape plans, alignment investigations, technical project descriptions with accompanying drawings and proposals for compensatory measures. The submitted documents are then checked for completeness. Within one month of receipt of the complete document set, the hearing authority will invite the relevant local authorities and stakeholders to comment and arrange for the plan to be put on display in the municipalities which the project is likely to affect.

For cable installations in the 12 nm zone, an environmental impact assessment (EIA) is not yet required by law but is always carried out as a precautionary measure. The approval authority expressly welcomes this procedure.

ESPOO-Convention

The UNECE (United Nations Economic Commission for Europe) Convention (ESPOO Convention), a Convention on Environmental Impact Assessment (EIA) for Transboundary Projects, has been in force since 1997. This Convention regulates the participation of affected states and their public in EIA procedures in other states where there could be significant

transboundary impacts between ECE states. The contracting parties are obliged to notify the parties concerned of projects listed in Annex I of the Convention (including large-diameter oil and gas pipelines, construction of high-voltage overhead lines with a current of 220 kV or more and a length of 15 km or more, larger wind turbines for generating electricity [wind farms]). The notification is to include information on the project and information on possible transboundary environmental impacts. In addition, the Party of Origin is required to provide comprehensive EIA documentation (Annex II). The Parties recommend the use of the „Leitfaden für die Praktische Anwendung der Espoo-Konvention“ (UN ECE 2003).

Subsea power cables are not listed as compulsory projects. The project is to be notified to the national contact point in the Netherlands, Germany and Denmark. Initial contact is made to the Danish contact point indicating that no further hearings are required.

Protected Areas

Along the German coast of the North Sea there are numerous Natura2000- and bird protection areas (Figure 18). In addition, the Wadden Sea is strictly protected by the national parks of Lower Saxony, Hamburg and Schleswig Holsten (Figure 19). If the cable route crosses such a Natura2000 or bird protection area or its proximity, a Natura2000 assessment will have to be carried out (see below). The Natura2000 assessment is part of the licensing procedure, i.e. it will be carried out by the NLStBV.

7.1.3 REQUIRED PERMITS

In the planning permission permit (PFB) are integrated:

- Water law permit
- Shipping Police Approval (SSG)
- Nature conservation exceptions and exemptions
- Exemption according to § 67 para. 1 BNatSchG from the prohibitions of § 30 para. 2 BNatSchG
- Exemption according to § 67 (1) BNatSchG in conjunction with § 17 NWattNPG from the prohibitions according to §§ 6, 12 and 15 NWattNPG
- Exemption according to § 34 (3) and (4) BNatSchG

The required permits are the following:

- permit from Federal Maritime and Hydrographic Agency (BSH) in Hamburg
- permit from shipping police authorities (Wasser- und Schifffahrtsamt)
- Permit from Federal Agency on Nature Conservation (Bundesamt für Naturschutz), if habitats according to § 30 of nature conservation law (BNatSchG) are crossed
- Further approvals depending on the scope and location of the project:
    - Conservation permits

The local water and shipping authorities of the Federal Waterways and Shipping Administration (WSV) are responsible for issuing a river and maritime police permit.

- Wasserstraßen- und Schifffahrtsamt Weser-Jade-Nordsee, Am Alten Vorhafen 1, 27568 Bremerhaven
- Wasserstraßen- und Schifffahrtsamt Kiel-Holtenau, Schleuseninsel 2, 24159 Kiel
- Wasserstraßen- und Schifffahrtsamt Emden, Am Eisenbahndock 3, 26725 Emden

7.1.4 APPLICATION DOCUMENTS

The necessary documents for the application are the following:

- Application itself, including detailed information on the project (with routing, data on subsoil, technical description and specification, different route alternatives, expert report on warming aspects and, if required, expert report on magnetic field)
- Although not formerly required, a description of environmental impacts based on content/structure of an environmental impact study is necessary
- Landscape Conservation Accompanying Plan (LBP)
- EIA report
- Natura 2000 impact study (appropriate assessment), if a Natura 2000 area may be affected
- Species protection impact study (according to § 62 of the Federal Nature Conservation Act [BNatSchG])
- Separate study on § 30 habitats (if applicable, application for exemption or exception in accordance with Federal Nature Conservation Act)
- Report on Water Framework Directive
- Report on Marine Strategy Framework Directive
- Compensation plan
- Risk analysis concerning possible interference with shipping
- Geotechnical survey report (2K Criterium)
- Study on immission and similar effects
- Emissions report: sound mitigation
- Biological survey report
- Field study reports

LANDSCAPE MANAGEMENT PLAN

Within the framework of the planning approval procedure, a landscape conservation accompanying plan is required to take into account the intervention regulation according to § 14 to 17 of the Federal Nature Conservation Act (BNatSchG) as well as the examination of species protection concerns according to § 44ff of the Federal Nature Conservation Act (BNatSchG).

FFH IMPACT ASSESSMENT

This can be integrated into the documents or prepared separately [50].

ENVIRONMENTAL IMPACT ASSESSMENT

In the Act on Environmental Impact Assessment (UVPG) Annex 1 List of "projects subject to EIA" Annex 1, high-voltage cables are not explicitly mentioned, but the planning approval authority generally proceeds in the same way as planning approval procedures within the framework of the construction of high-voltage overhead lines (UVPG, Annex 1, No. 19.1) [51]. High voltage overhead lines with a length of more than 15 km and a rated voltage of 220 kV or more are subject to EIA. For all other projects, the EIA obligation is determined within the framework of a general (§ 7 Paragraph 1 Sentence 1) or site-specific (§ 7 Paragraph 2) preliminary assessment of the individual case.

[50] http://www.strassenbau.niedersachsen.de/projekte/verfahrensablauf/entwurfsplanung/entwurfsplanung-75467.html

[51] http://www.gesetze-im-internet.de/uvpg/index.html#BJNR102050990BJNE002432116

Depending on the planned area of the project, the environmental impact assessment may, among other things, require technical contributions under species protection law, for example within the framework of the Habitat Directive (Natura2000), the Water Framework Directive (WFD) or habitat types (LRT).

7.1.5 RISKS FOR LICENSING

OBJECTIONS AND CLAIMS WITHIN PLAN APPROVAL PROCEDURE:

During the consultation process, objections may be raised by the relevant local authorities and stakeholders to comment and arrange for the plan to be put on display in the municipalities which the project is likely to affect. Objections and suggestions regarding the planned project are forwarded to the applicant by the competent authority. The applicant is then required to comment on objections and suggestions and, as far as possible, take these into account in form of a plan change. If the applicant cannot meet objections, they are required to justify this and try to reach an agreement in the context of a public hearing. In order to reach a compromise, further reports or changes to the plan may be required.

If no agreement is reached within the course of the public hearing, the competent authority will make a ruling regarding objections.. Upon notification, legal action may be filed within one month.

PROJECT INTERFERENCE

If several independent projects, for which planning approval procedures are prescribed, come together in such a way that only a uniform decision is possible for these projects or for parts of them, and if at least one of the planning approval procedures is regulated by federal law, then only one planning approval procedure takes place for these projects or for their parts.

EXISTING INFRASTRUCTURE

Where appropriate, existing installations such as wind farms, cable routes or cable crossings are to be be taken into account.

7.1.6 REQUIRED SURVEYS AND OTHER ACTIVITIES FOR THE PERMITTING PROCESS IN THE 12 NM ZONE

The following work packages and surveys are foreseen as a result of the permitting requirements:

- Route selection and comparison
- Cable specification and burial methods
- Cable Study 2K and EM
- Burial Assessment Study
- Ship risk Analysis
- Geological Route Survey according to StUK Baugrund
- Biological Survey (mainly benthos) according to StUK4[52]

The permission process for cable-laying generally requires subsurface surveys and unexploded ordnance (UXO) surveys at the landfall site, construction sites and along the cable corridor prior

[52] StUK4, BSH 2013: Standard Investigation of the Impacts of Offshore Wind Turbines on the Marine Environment (StUK), 4th edition of October 2013 contains requirements for the Environmental Impact Study and monitoring during construction and operation also for cables

to the start of the project. Any sites flagged up as potentially hazardous during the unexploded ordnance surveys are to be cleared in advance.

7.1.7 APPLICATION AND PERMITTING PROCESSES (TIMELINE)

All times given are estimated and may vary according to project characteristics.

SPATIAL PLANNING

- Usually no acquisition
- Preparation of scoping documents: 2 months
- Hearing date: 0.5 months
- Preparation of application documents: 12 months
    - explanatory report
    - General plans and use of roads
    - construction
    - Site and land acquisition plan / building plan
    - intersections
    - building directory
    - Landscape Conservation Accompanying Plan (LBP)
    - Acquisition of land / security in rem
    - EIA report (is made, does not have to be milled according to UVPG)
    - Natura2000
    - Species protection technical contribution
    - Technical contribution on biotope protection according to §30 BNatSchG
    - Report on Water Framework Directive
    - Report on Marine Strategy Framework Directive
- completeness check: 2.5 months
- Adjustment documents: 1 month
- Dispatch by approval authority: 1 month
- Organization of display for municipalities: 0,75 months
- Publication: 1 month
- Opinion procedure (if necessary, extension of deadline): 3 months
- Replies:1 month
- Hearing: 2 months
- Authorisation: 6 months

PLAN APPROVAL PROCEDURE

- Preparation of scoping documents: 2 months
- hearing date: 0.5 months
- Determination of the scope of the investigation: 1 month
- Implementation Observations: 12 months
- Preparation of application documents: 11 months
    - explanatory report
    - General plans and use of roads
    - construction
    - Site and land acquisition plan / building plan
    - intersections
    - building directory
    - Landscape Conservation Accompanying Plan (LBP)

  - Acquisition of land / security in rem
  - EIA report (is made, does not have to be milled according to UVPG)
  - Natura2000
  - Species protection technical contribution
  - Technical contribution on biotope protection according to §30 BNatSchG
  - Report on Water Framework Directive
  - Report on Marine Strategy Framework Directive
- completeness check: 2.5 months
- Adjustment documents: 1month
- Dispatch by approval authority: 1 month
- Organization of display for municipalities: 0,75 months
- Publication: 1 month
- Opinion procedure (if necessary, extension of deadline): 1.5 months
- Replies: 1 month
- Hearing: 2 months
- Authorisation: 6 months
- Plan changes, if necessary

7.2 PIPELINES

In German territorial waters the German Energy Industry Law (Energiewirtschaftsgesetz – EnWG) regulates the proceedings. The Mining Authorities are responsible for the technical examination and approval of the project.

The Lower Saxony federal state authority for Mining, Energy and Geology (Landesamt für Bergbau, Energie und Geologie, LBEG) is responsible for approving pipelines in the federal states of Lower Saxony and Bremen, and in some cases in Schleswig-Holstein and Hamburg [53]. Furthermore, transit pipelines and underwater cables on the German continental shelf of the North Sea and the Schleswig-Holstein area of the Baltic Sea belong to this field of reponsibility.

The procedures carried out by the LBEG include non-objection procedures in accordance with the High-Pressure Gas Pipeline Ordinance (GasHDrLtgV), planning approvals (PG) in accordance with environmental and energy regulations as well as planning approval procedures (PFV) in accordance with mining, environmental and energy regulations with public participation and environmental impact assessments (UVP).

Furthermore, the LBEG issues permits for transit pipelines and underwater cables in the German territorial sea and on the continental shelf of the North Sea and Baltic Sea and supervises these projects in accordance with §133 of the Federal Mining Act (BBergG). LBEG approves and supervises operational pipelines of companies in the oil/natural gas and storage mining, potash/salt mining, lignite mining and the coal/natural gas industry via the operational plan procedure in accordance with BBergG.

For the construction including the laying and operation of pipelines in, above or below a federal waterway or on its banks as well as for the use (§3 Water Resources Act) of a federal waterway, a shipping police permit (Strom- und Schifffahrtspolizeiliche Genehmigung - SSG) is required according to § 31 Federal Waterways Act. According to § 31 (1) No. 2 WaStrG, if the intended measure is expected to impair the condition of the federal waterway required for shipping or the safety or ease of traffic.

[53] http://www.lbeg.niedersachsen.de/energie_rohstoffe/leitungskataster/das-lbeg-leitungskataster-932.html, https://www.lbeg.niedersachsen.de/bergbau/genehmigungsverfahren/uebersicht/97237.html

7.2.1 COMPETENT AUTHORITIES

The superordinate authority is:

- Approval agency:
  Landesamt für Bergbau, Energie und Geologie (LBEG), An der Marktkirche 9,
  38678 Clausthal-Zellerfeld

Lower Saxony

- Lower nature conservation authority:
  Nds. Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN),
  Betriebsstelle Brake-Oldenburg, Geschäftsbereich Regionaler Naturschutz,
  Ratsherr-Schulze-Straße 10, D-26122 Oldenburg
- Lower nature conservation authority:
  Nationalparkverwaltung Niedersächsisches Wattenmeer (NLPV), Virchowstraße 1,
  26382 Wilhelmshaven
- Authorized for shipping lanes:
  Wasserstraßen- und Schifffahrtsamt Emden, Am Eisenbahndock 3, 26725 Emden

Schleswig Holstein

- Lower nature conservation authority:
  Landesbetrieb für Küstenschutz, Nationalpark und Meeresschutz Schleswig-Holstein
  (LKN.SH), Herzog-Adolf-Straße 1, 25813 Husum

Hamburg

- Bundesamt für Seeschifffahrt und Hydrografie (BSH), Bernhard-Nocht-Str. 78,
  20359 Hamburg
- Wasser-und Schiffahrtsamt Hamburg, Moorweidenstraße 14, 20148 Hamburg

7.2.2 LICENSING REQUIREMENTS

The LBEG, as the permitting authority for pipelines in the German 12 nm zone, has drafted guidelines for spatial development in the 12 nm zone. The priorities are as follows:

- Securing and strengthening maritime traffic,
- Securing natural resources by avoiding disruptions to and pollution of the marine environment,
- Strengthening economic capacity through orderly spatial development and optimisation of spatial use,
- Long-term sustainable use of the properties and potential of the 12 nm zone through reversible uses, economic use of space, and priority of marine uses.

The first two bullet points are the main priorities which have a major effect on the permitting of pipeline routes.

The approval process is a purely legal-administrative process which will take place based on an application. The applicant submits the plan of the project to the competent authority for consideration in a plan approval procedure. The application material will comprise the EIA (environmental impact assessments) investigations and other environmental assessments, landscape plans, alignment investigations, technical project descriptions with accompanying drawings and proposals for compensatory measure. The submitted documents are then checked for completeness. Within one month of receipt of the complete plan, the hearing authority will invite the relevant local authorities and stakeholders to comment and arrange for the plan to be put on display in the municipalities which the project is likely to affect.

Furthermore, the LBEG issues planning approval decisions and planning approvals in accordance with environmental law and energy industry procedures, depending on whether they require public participation and/or EIA or not. The obligation to carry out preliminary EIA assessments or EIAs for mining projects arises from the Ordinance on the Environmental Impact Assessment of Mining Projects (EIA-V Mining) and the Act on the Environmental Impact Assessment (EIA Act). Energy planning approval procedures according to § 43 No. 2 EnWG Environmental planning approval procedures according to § 20 and Annex 1 EIA Act No. 19.3 to 19.6 for pipeline systems for water-polluting substances, gases, chemicals, etc. Gas supply pipelines with a diameter of more than 300 mm require planning approval.

ESPOO-CONVENTION

The UNECE (United Nations Economic Commission for Europe) Convention (ESPOO Convention), a Convention on Environmental Impact Assessment (EIA) for Transboundary Projects, has been in force since 1997. This Convention regulates the participation of affected states and their public in EIA procedures in other states where there could be significant transboundary impacts between ECE states. The contracting parties are obliged to notify the parties concerned of projects listed in Annex I of the Convention (including large-diameter oil and gas pipelines, construction of high-voltage overhead lines with a current of 220 kV or more and a length of 15 km or more, larger wind turbines for generating electricity [wind farms]). The notification shall include information on the project and information on possible transboundary environmental impacts. In addition, the Party of Origin is required to provide comprehensive EIA documentation (Annex II). The Parties recommend the use of the “Leitfaden für die Praktische Anwendung der Espoo-Konvention“ (UN ECE 2003).

PROTECTED AREAS

Along the German coast of the North Sea there are numerous Natura2000- and bird protection areas (Figure 18). In addition, the Wadden Sea is strictly protected by the National Parks of Lower Saxony, Hamburg and Schleswig Holsten (Figure 19). If the cable route crosses such a Natura2000 or bird protection area or its proximity, a Natura2000 assessment will have to be carried out (see below). The Natura2000 assessment is part of the licensing procedure, i.e. it will be carried out by the LBEG.

7.2.3 REQUIRED PERMITS

In the planning permission permit (PFB) are integrated:

- Water law permit
- Shipping Police Approval (SSG)
- Nature conservation exceptions and exemptions
- Exemption according to § 67 para. 1 BNatSchG from the prohibitions of § 30 para. 2 BNatSchG
- Exemption according to § 67 (1) BNatSchG in conjunction with § 17 NWattNPG from the prohibitions according to §§ 6, 12 and 15 NWattNPG
- Exemption according to § 34 (3) and (4) BNatSchG

The required permits are the following:

- permit from Federal Maritime and Hydrographic Agency (BSH) in Hamburg
- permit from shipping police authorities (Wasser- und Schifffahrtsamt)
- permit from Federal Agency on Nature Conservation (Bundesamt für Naturschutz), if habitats according to § 30 of nature conservation law (BNatSchG) are crossed
- Further approvals depending on the scope and location of the project:

- Conservation permits

The local water and shipping authorities of the Federal Waterways and Shipping Administration (WSV) are responsible for issuing a river and maritime police permit.

- Wasserstraßen- und Schifffahrtsamt Weser-Jade-Nordsee, Am Alten Vorhafen 1, 27568 Bremerhaven
- Wasserstraßen- und Schifffahrtsamt Kiel-Holtenau, Schleuseninsel 2, 24159 Kiel
- Wasserstraßen- und Schifffahrtsamt Emden, Am Eisenbahndock 3, 26725 Emden

7.2.4 APPLICATION DOCUMENTS

The necessary documents for the application are the following:

- Application itself, including detailed information on the project (with routing, data on subsoil, technical description and specification, different route alternatives, expert report on warming aspects and, if required, expert report on magnetic field)
- Although not formerly required, a description of environmental impacts based on content/structure of an environmental impact study is necessary
- Landscape Conservation Accompanying Plan (LBP)
- EIA report
- Natura 2000 impact study (appropriate assessment), if a Natura 2000 area may be affected
- Species protection impact study (according to § 62 of the Federal Nature Conservation Act [BNatSchG])
- Separate study on § 30 habitats (if applicable, application for exemption or exception in accordance with Federal Nature Conservation Act)
    - Report on Water Framework Directive
- Report on Marine Strategy Framework Directive
- Compensation plan
- Risk analysis concerning possible interference with shipping
- Geotechnical survey report (2K Criterium)
- Study on immission and similar effects
- Emissions report: sound mitigation
- Biological survey report
- Field study reports

7.2.5 RISKS FOR LICENSING

OBJECTIONS AND CLAIMS WITHIN PLAN APPROVAL PROCEDURE:

During the consultation process, objections may be raised by the relevant local authorities and stakeholders to comment and arrange for the plan to be put on display in the municipalities which the project is likely to affect. Objections and suggestions regarding the planned project are forwarded to the applicant by the competent authority. The applicant is then required to comment on objections and suggestions and, as far as possible, take these into account in form of a plan change. If the applicant cannot meet objections, they are required to justify this and try to reach an agreement in the context of a public hearing. In order to reach a compromise, further reports or changes to the plan may be required.

If no agreement is reached within the course of the public hearing, the competent authority will make a ruling regarding objections. Upon notification, legal action may be filed within one month.

PROJECT INTERFERENCE

If several independent projects, for which planning approval procedures are prescribed, come together in such a way that only a uniform decision is possible for these projects or for parts of them, and if at least one of the planning approval procedures is regulated by federal law, then only one planning approval procedure takes place for these projects or for their parts.

EXISTING PLANTS

Where appropriate, existing installations such as wind farms, cable routes or cable crossings are to be be taken into account.

7.2.6 REQUIRED SURVEYS AND OTHER ACTIVITIES FOR THE PERMITTING PROCESS IN THE 12 NM ZONE

The following work packages and surveys are foreseen because of the permitting requirements:

- Route selection and comparison
- Cable specification and burial methods
- Cable Study 2K and EM
- Burial Assessment Study
- Ship risk Analysis
- Geological Route Survey according to StUK Baugrund
- Biological Survey (mainly benthos) according to StUK4

StUK4 (BSH 2013): Standard Investigation of the Impacts of Offshore Wind Turbines on the Marine Environment (StUK), 4th edition of October 2013 contains requirements for the Environmental Impact Study and monitoring during construction and operation also for cables

The permission process for cable-laying generally requires subsurface surveys and unexploded ordnance (UXO) surveys at the landfall site, construction sites and along the cable corridor prior to the start of the project. Any sites flagged up as potentially hazardous during the unexploded ordnance surveys are to be cleared in advance.

7.2.7 APPLICATION AND PERMITTING PROCESSES (TIMELINE)

All times given refer to the maximum duration.

SPATIAL PLANNING

- Usually no acquisition
- Preparation of scoping documents: 2 months
- Hearing date: 0.5 months
- Preparation of application documents: 12 months
    - explanatory report
    - General plans and use of roads
    - construction
    - Site and land acquisition plan / building plan
    - intersections
    - building directory
    - Landscape Conservation Accompanying Plan (LBP)
    - Acquisition of land / security in rem
    - EIA report (is made, does not have to be milled according to UVPG)
    - Natura2000 preliminary assessment
    - Species protection technical contribution

    - Technical contribution on biotope protection according to §30 BNatSchG
    - Report on Water Framework Directive
    - Report on Marine Strategy Framework Directive
- completeness check: 2.5 months
- Adjustment documents: 1 month
- Dispatch by approval authority: 1 month
- Organization of display for municipalities: 0,75 months
- Outlay: 1 month
- Opinion procedure (if necessary, extension of deadline): 3 months
- Replies:1 month
- Hearing: 2 months
- Authorisation: 6 months

PLAN APPROVAL PROCEDURE

- Preparation of scoping documents: 2 months
- hearing date: 0.5 months
- Determination of the scope of the investigation: 1 month
- Implementation Observations: 12 months
- Preparation of application documents: 12 months
    - explanatory report
    - General plans and use of roads
    - construction
    - Site and land acquisition plan / building plan
    - intersections
    - building directory
    - Landscape Conservation Accompanying Plan (LBP)
    - Acquisition of land / security in rem
    - EIA report (is made, does not have to be milled according to UVPG)
    - Natura2000
    - Species protection technical contribution
    - Technical contribution on biotope protection according to §30 BNatSchG
    - WRRL technical contribution
    - MSRL technical contribution
- completeness check: 2.5 months
- Adjustment documents: 1month
- Dispatch by approval authority: 1 month
- Organization of display for municipalities: 0,75 months
- Outlay: 1 month
- Opinion procedure (if necessary, extension of deadline): 1.5 months
- Replies: 1 month
- Hearing: 2 months
- Authorisation: 6 months
- Plan changes, if necessary

7.3 SAND- AND GRAVELMINING

The search for economically relevant mineral resources in the Federal Republic of Germany is subject to the regulations of the Federal Mining Act (Bundesberggesetz - BBergG).

Whoever aims to produce (extract) concessionable mineral resource within the EEZ or 12 nm zone requires a production licence compliant with § 8 Mining Act or the mineral rights compliant with § 9 Mining Act. These are issued by the responsible agency. In the states of Lower Saxony, Schleswig-Holstein, Hamburg, Bremen and on the continental shelf of the North Sea, this agency is the State Authority of Mining, Energy and Geology (Landesamt für Bergbau, Energie und Geologie, LBEG, [54]). According to § 6ff and § 50 BBergG there is a two-step procedure for licensing.

The application for sand extraction must be made via a plant permit in accordance with § 36 WHG and §§ 83, 57 NWG.

When extracting mineral resources within the 12 nm zone of Lower Saxony, the Lower Nature Conservation Authorities (Untere Naturschutzbehörde) must also be involved. Within the national park "Niedersächsisches Wattenmeer" this is the corresponding national park administration. Outside the "Wadden Sea of Lower Saxony" National Park, the State Agency for Water Management, Coastal and Nature Conservation (NLWKN) performs the tasks of the Lower Nature Conservation Authority and is the contact for all nature conservation and landscape conservation issues (ZuStVO-Naturschutz, 18 July 2011,[55]).

Within the Schleswig-Holstein 12 nm zone, sand and gravel extraction are only permitted for coastal protection purposes ([56]). This is also laid down in the currently valid Schleswig-Holstein State Development Plan (LEP SH 2010 [57]), and in the update of the State Development Plan (draft January 2018, page 169,[58]).

7.3.1 COMPETENT AUTHORITIES

Based on § 6ff and § 50 BBergG the Landesamt für Bergbau, Energie und Geologie, Clausthal Zellerfeld (LBEG) grants a license that covers the specific mining issues. LBEG involves specialized agencies such as the respective Lower Nature Conservation Authority or the national park administration for projects within the 12 nm zone.

The superordinate authority is:

- Landesamt für Bergbau, Energie und Geologie, An der Marktkirche 9, 38678 Clausthal-Zellerfeld.
- Lower nature conservation authority:
- Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN), Direktion, Am Sportplatz 23, 26506 Norden, or
  Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN), Betriebsstelle Brake-Oldenburg, Geschäftsbereich Regionaler Naturschutz, Ratsherr-Schulze-Straße 10, 26122 Oldenburg or
- Nationalparkverwaltung Niedersächsisches Wattenmeer, Virchowstr. 1, 26382 Wilhelmshaven.

[54] https://www.lbeg.niedersachsen.de/bergbau/taetigkeiten_zustaendigkeiten/bodenschaetze_und_untergrundspeicherung/bodenschaetze-und-untergrundspeicher-96017.html).
[55] https://www.nlwkn.niedersachsen.de/naturschutz/nlwkn_als_untere_naturschutzbehoerde/der-nlwkn-als-untere-naturschutzbehoerde-im-kuestenmeer-111753.html
[56] https://www.schleswig-holstein.de/DE/Fachinhalte/G/geologie/Downloads/FachbeitragRohstoffeBericht.pdf?__blob=publicationFile&v=3
[57] Landesentwicklungsplan SH 2010 - Textteil (PDF 2MB, Datei ist nicht barrierefrei)
[58] https://bolapla-sh.de/file/10428009-fe12-11e8-b6a2-0050569710bc)

7.3.2 LICENSING REQUIREMENTS

The LBEG will conduct a preliminary review, which decides whether an environmental impact assessment (EIA) according to § 3a UVPG is required. Should they decide that it is, the plan approval procedure (according to § 52 Abs. 2a BbergG[59], and under public involvement) will be conducted. A general operating plan (Rahmenbetriebsplan according to § 57a BBergG[60]) is then applied for in the second step of licensing. Should they decide that no EIA is necessary, a regular approval procedure without public involvement will be conducted [61].

For the mining of sand within the coastal waters of the federal state of Lower Saxony, a plant approval procedure in accordance with § 36 of the Water Resources Act (WHG) and §§ 83, 57 of the Lower Saxony Water Act (NWG) is to be carried out.

Within the 12 nm-zone of Schleswig-Holstein, permits are only valid in the context of coastal protection measures and are therefore not relevant here.

7.3.3 REQUIRED PERMITS

According to the Federal Mining Act (Bundesberggesetz - BBergG) sand mining (> 25 ha) requires planning approval (Planfeststellung) as a result of a planning approval procedure. The plan resulting from the procedure encompasses all other relevant statutory regulations, so no other public law licenses are necessary (all licenses are concentrated within one approval). These necessary licenses which will be encompassed may contain e.g. the permit from shipping police authorities (Wasserstraßen- und Schifffahrtsamt) in accordance with the Lower Saxony Water Act (NWG) and a permit from the competent Lower nature conservation authority (NLWKN or NLPV), if habitats according to § 30 of the nature conservation act (BNatSchG) are disturbed.

During the planning approval procedure the LBEG will consider opinions and statements of other public authorities, bodies and NGOs in its decision making process. It is also possible that the water authority will take the place of the authority responsible for planning approval (here: LBEG).

The planning permission permit (PFB) encompasses:

- Water law permit
- Shipping Police Approval (SSG)
- Nature conservation exceptions and exemptions
- Exemption according to § 67 para. 1 BNatSchG from the prohibitions of § 30 para. 2 BNatSchG
- Exemption according to § 67 (1) BNatSchG in conjunction with § 17 NWattNPG from the prohibitions according to §§ 6, 12 and 15 NWattNPG
- Exemption according to § 34 (3) and (4) BNatSchG

[59] https://www.gesetze-im-internet.de/bbergg/__52.html
[60] https://www.gesetze-im-internet.de/bbergg/__57a.html
[61] http://www.lbeg.niedersachsen.de/bergbau/genehmigungsverfahren/uebersicht/97237.html

7.3.4 APPLICATION DOCUMENTS

According to our experience the necessary documents for the application are the following. The actually required approval document set may vary according to the actual project:

- Preliminary application form including project description, reference to the legal situation (§ 8 in conjunction with § 9 Para. 1 No. 4 and § 10 of the Water Resources Act (WHG)) and list of application components
- Preliminary data sheet with the most important data on the project and overall information on applicant, project location, affected corporated bodies, affected protected areas
- Explanatory report (including presentation of the results of the expert opinions)
  - Presentation of the actual situation (spatial, structural, legal, water management and ecological boundary conditions) for dredging and dumping areas, maintenance and ownership conditions, impacts, capacity of dumping sites
- Initiation, objective, scope and implementation period of the planned dredging measure Information according to GÜBAK (Joint Agreement on the Handling of Dredgings in Coastal Waters, August 2009)
  - Sedimentological investigations
  - Chemical tests
  - Biological studies and evaluations, if any
  - If applicable, alternatives to the deposit requested
  - Impact prognosis, if applicable
  - Monitoring programme
- Maps, plans and drawings in suitable scales
  - Overview maps of the project
  - Site plan with designation of the water body, boundaries of affected protected areas, jurisdiction boundaries, uses, etc.
  - Actual and target heights in the extraction area before and after excavation work has been carried out
  - Technical contribution on the compatibility of the project with the achievement objectives for water bodies according to $27 WHG (WRRL) ind § 45 WHG (MSRL)
- Natura2000 and bird directive assessment according to § 34 BNatschG and $ 26 BNatschG
- Technical contribution on species protection law according to § 44 ff. BNatschG
- For interventions in nature and landscape in accordance with § 14 BNatschG:
  - Description of the intervention and the intended damage-preventing or mitigating facilities as well as the replacement and / or compensation measures - if necessary, submission of the landscape conservation accompanying plan (LBP) in accordance with § 15 BNatschG
- Opinion of the competent nature conservation authority
- Opinion of the ESC (WSA) responsible

7.3.5 RISKS FOR LICENSING

Mainly restrictions due to nature conservation have increased the risk of getting an approval during the last years. Large parts of the 12 nm-zone in Germany are national parks (Figure 18). Sandmining within the 12 nm-zone of Schleswig-Holstein is only permitted for coastal protection measures. In Lower Saxony there are no designated sand mining areas, permits are also mostly given for measures related to coastal protection. An application for sand and gravel

mining within the very dynamic habitat of the national park “Niedersächsisches Wattenmeer” is unlikely to be successful.

7.3.6 REQUIRED SURVEYS AND OTHER ACTIVITIES FOR THE PERMITTING PROCESS IN THE 12 NM ZONE

The following work packages and surveys are foreseen as a result of the permitting requirements:

- Area selection and comparison
- Dredging plan und methods
- Ship risk Analysis
- Geological Route Survey
- Biological Survey (mainly benthos) according to NLWKN & NLPV 2012[62] or Standard Investigation concept (StUK4, BSH 2013)[63].

7.3.7 APPLICATION AND PERMITTING PROCESSES (TIMELINE)

The following work packages are foreseen including information on the possible overall timespan required for the work packages:

- Predefining the area: should base on a desktop study integrating technical, environmental and economic issues. Several informal meetings with LBEG, NLWKN or NLPV and others. Required timespan: about 5 months
- Scoping: preparation of a report to be send out by LBEG to several parties describing the planned project, the methodology for the EIA and the planned survey programme. During the scoping meeting this will be discussed and some weeks later LBEG will inform the project. Required timespan: about 4 months
- Geotechnical survey (preparation): Required timespan: about 1 month
- Geotechnical survey: Required timespan: about 4 month
- Biological survey (preparation): formal survey design definition will be a result of the scoping-meeting. Best is developing the design based on the results of a Side Scan Sonar Survey. Required timespan: 1 months
- Biological survey: this is necessary input for the preparation of the application documents. Field work will need about two weeks; laboratory and office work about 4 month. Required timespan: 5 months
- Technical specification: Required timespan: 3 months
- Application documents: the required application documentations must include: Survey reports, technical reports and environmental reports. Required time span: 6 month
- Permitting processes: the permitting processes (based on the above mentioned documents) from sending out the application up to permits needs some consultancy and some time, also due to public participation. Estimated required timespan: 16 month.

This overview results in a time span of up to 3 years for the application and permitting process taking parallel working into account.

[62] NLWKN & NLPV 2012: http://www.energiewende-naturvertraeglich.de/index.php%3Fid=961&tx_fedownloads_pi2%5Bdownload%5D=5741

[63] StUK4, BSH 2013: Standard Investigation of the Impacts of Offshore Wind Turbines on the Marine Environment; contains requirements for the Environmental Impact Study and monitoring during construction and operation also for cables and pipelines. Download: https://www.bsh.de/DE/PUBLIKATIONEN/_Anlagen/Downloads/Offshore/Standards-EN/Standard-Investigation-impacts-offshore-wind-turbines-marine-environment.pdf?__blob=publicationFile&v=4

7.4 OFFSHORE WIND FARMS

In **Lower Saxony,** a Federal State Development Plan (Landesraumordnungsplan (LROP), last amended on 26th of September 2017), regulates the terms of windfarm utilisation at sea within the coastal waters of Lower Saxony as well as the grid connection of the facilities for wind energy use from wind farms of the Exclusive Economic Zone (EEZ). Responsible here is the Lower Saxony Ministry of Food, Agriculture and Consumer Protection (Niedersächsisches Ministerium für Ernährung, Landwirtschaft und Verbraucherschutz).

According to the LROP (New Publication of the Ordinance on the Lower Saxony Spatial Planning Programme, chapter 4.2 Energy), only wind energy plants for the purpose of testing of wind energy use at sea and for their development are allowed to be constructed within the 12 nm zone. Two areas have been designated to be suitable for the testing of wind energy use at sea: “Nordergründe” and “Riffgat”[64].

The wind farms “Nordergründe“ and “Riffgat“ have been build within these suitable areas (see chapter 4.3). The designation for these priority areas end at the end of December 31, 2020. Afterwards the exclusion of wind farms in the 12 nm zone encompass these areas as well.

Within the 12 nm zone of Lower Saxony, no further plants for testing the use of wind energy at sea are requested or planned, and accordingly no further approvals are to be expected until the end of 2020.

In **Schleswig-Holstein** the Federal State Development Plan (Landesentwicklungsplan (LEP SH) released 2010) provides the basis for the spatial development of the state up until 2025. The LEP SH defines principles and objectives for wind energy use, including submarine cable systems in the coastal waters for connecting offshore wind farms of the EEZ. Responsible here is the Ministry for Home Affairs, Rural Areas and Integration (Ministerium für Inneres, ländliche Räume und Integration). In the currently valid LEP SH[65], the use of wind energy in Schleswig-Holstein's coastal waters is limited to the construction of an offshore wind farm as a test and demonstration facility in the Baltic Sea. There are no designated areas in the North Sea. At present a partial update of the LEP SH for the period after 2025 is being compiled, which is going to specifiy the principles and objectives of regional planning with regard to wind energy use more precisely. The update is available as a draft version (2018 [66]). The plan states that within the coastal waters of Schleswig-Holstein numerous interests form an obstacle against the use of wind energy. In the area of the North Sea, these are primarily conservation reasons, but also aspects of tourism as well as ship safety issues. The density of highly competitive opposing spatial utilisations does not leave much room for the use of wind energy (part B, 4 Wirtschaftliche Entwicklung, Seite 137,[67]). Within the territorial waters of Schleswig-Holstein in North and Baltic Sea as well as the river Elbe there are as yet no priority or reserve areas for wind energy and no current plans exist (Seite 162).

In summary nearshore wind farms within the 12 nm zone will not get a legal approval either in Lower Saxony or in Schlesweig-Holstein in the future.

[64] https://www.ml.niedersachsen.de/landesraumordnungsprogramm/neubekanntmachung-der-lrop-verordnung-2017-158596.html; Anhang 5 - Begrenzungslinien
[65] https://www.schleswig-holstein.de/DE/Fachinhalte/L/landesplanung_raumordnung/Downloads/landesentwicklungsplan/landesentwicklungsplan_sh_2010.pdf?__blob=publicationFile&v=5)
[66] https://bolapla-sh.de/file/10428009-fe12-11e8-b6a2-0050569710bc
[67] https://bolapla-sh.de/file/10428009-fe12-11e8-b6a2-0050569710bc

7.4.1 COMPETENT AUTHORITIES

Not applicable, because no further approvals of nearshore wind farms are going to be expected at the 12 nm zone of Lower Saxony or Schleswig-Hostein.

7.4.2 LICENSING REQUIREMENTS

Not applicable, because no further approvals of nearshore wind farms are going to be expected at the 12 nm zone of Lower Saxony or Schleswig-Hostein.

7.4.3 REQUIRED PERMITS

Not applicable, because no further approvals of nearshore wind farms are going to be expected at the 12 nm zone of Lower Saxony or Schleswig-Hostein.

7.4.4 APPLICATION DOCUMENTS

Not applicable, because no further approvals of nearshore wind farms are going to be expected at the 12 nm zone of Lower Saxony or Schleswig-Hostein.

7.4.5 RISKS FOR LICENSING

Not applicable, because no further approvals of nearshore wind farms are going to be expected at the 12 nm zone of Lower Saxony or Schleswig-Hostein.

7.4.6 REQUIRED SURVEYS AND OTHER ACTIVITIES FOR THE PERMITTING PROCESS IN THE 12 NM ZONE

Not applicable, because no further approvals of nearshore wind farms are going to be expected at the 12 nm zone of Lower Saxony or Schleswig-Hostein.

7.4.7 APPLICATION AND PERMITTING PROCESSES (TIMELINE)

Not applicable, because no further approvals of nearshore wind farms are going to be expected at the 12 nm zone of Lower Saxony or Schleswig-Hostein.

8 FINAL CONCLUSION

8.1 MAIN RISKS

TIME SCHEDULE

The required time budget for environmental studies, compilation of approval documents and authority decision making is a major topic to be considered prior to approval.

Table 5 aims to compile the estimated periods per approval type and project step at a glance, according to our project experience. The table given is made in good conscience, however, juridical completeness cannot be guaranteed. Actual time requirements may vary depending on the project type, complexity and regulatory environment. The table does not imply a consecutive working sequence. Each approval type stands on its own. In case a plan approval procedure is applicable, this approval type encompasses all other relevant statutory regulations.

According to our experience, proper authority engineering and intensive working-level communication from the very beginning of the project until finalisation of the approval process is highly recommendable.

FIELD STUDY PERIODS

Field studies need to be conducted in the biologically relevant activity period of the monitored species. In our experience, postponing such activities to the next suitable season (e.g. in the following calendar year) relative to the actual project step is mandatory in terms of legal certainty since the technical correctness of the underlying studies is a major concern in possible court cases.

PLANNING AMENDMENTS

Among all time budget related topics, the formal process of planning amendments after submission of the approval documents needs to be emphasized. In our experience, the preliminary planning stage of spatial planning should already be used by the technical project part to specify as many project feature characteristics as possible. This avoids “loops” in the plan approval stage, where environmental approval documents have to be adapted to the latest technical planning, after having already been submitted to the authorities.

COLLECTIVE ACTION

Projects licensed by a plan approval procedure can be subject to collective action according to §64 BNatSchG (“Rechtsbehelfe”). Each nature conservation organisation has the right to take legal action against a project without having to prove the infringement of individual rights.

A possible court case forms a major time risk and an obstacle with unpredictable consequences for the applicant’s project success.

Table 5: Estimated project time budgets according to the formal project steps

Approval type/ Planning stage	Project step	Required time [weeks]	
		min	max
Spatial Planning	Typically no environmental field studies [1]		
	Scoping document	**2**	**8**
	Public hearing	**1**	**2**
	Approval document compilation	**12**	**52**
	Report alignment	**2**	**4**
	Distribution by authority	**4**	**4**
	Organisation of publication within the local authorities	**3**	**3**
	Publication period	**4**	**4**
	Receipt of stakeholder statements (Time extension if applicable)	**4**	**12**
	Replies	**2**	**4**
	Public hearing	**2**	**8**
	Consenting, Approval	**12**	**26**
Plan approval procedure	Scoping document	**2**	**8**
	Public hearing	**1**	**2**
	Determination of monitoring scope	**1**	**4**
	Environmental field studies [2]	**12**	**52**
	Compilation of approval documents	**26**	**52**
	Authority check for completeness	**8**	**10**
	Report alignment	**2**	**4**
	Distribution by authority	**4**	**4**
	Organisation of publication within the local authorities	**3**	**3**
	Publication period	**4**	**4**
	Receipt of stakeholder statements (Time extension if applicable)	**4**	**6**
	Replies	**2**	**4**
	Public hearing	**2**	**8**
	Consenting, Approval	**12**	**26**
	optionally: Formal process of planning amendments	not predictable	
Shipping Police Approval (ssG)	Application	**6**	**8**
Water law permit	Compilation of application documents	**12**	**52**
	Authority check for completeness	**8**	**10**
	Report alignment	**2**	**4**
	Distribution by authority	**4**	**4**
	Organisation of publication within the local authorities	**3**	**3**
	Publication period	**4**	**4**

Approval type/ Planning stage	Project step	Required time [weeks]	
		min	max
	Receipt of stakeholder statements (Time extension if applicable)	**4**	**6**
	Replies	**2**	**4**
	Public hearing	**2**	**8**
	Consenting, Approval	**12**	**26**
	optionally: Formal process of planning amendments	not predictable	

Explanations: *[1] Special monitoring issues may occur dependent on project type and licencensing authority. Typically no environmental field studies will be required due to the fact that the applicant is not able to detail necessary feature characteristics of the project during this planning stage to such an extent that a acceptable monitoring design can be made.*
[2] Field studies need to be conducted in the biologically relevant activity period of the monitored species.

8.2 RECOMMENDATION CONCERNING ROUTING (CABLE/PIPELINE)

In our experience of linear marine and terrestrian infrastructure planning, a decisive question when bringing infrastructure to the mainland, is the location of landfall in Germany.

From a national German perspective, the most direct, southbound connection between two of the possible hub locations and the main infrastructural recipients in Central Europe would lead to of landfall in Lower Saxony. This scenario would involve diagonally crossing German wind farm infrastructure, two East-Western shipping lanes (VTG's), one of the East Frisian Islands and several protected areas. While crossings of infrastructure within the EEZ raise mainly technical alignment questions, crossing the barrier islands in Lower Saxony as well as inserting cables in German estuaries will be accompagnied by a vast number of political stakeholders. Environmental issues regarding the crossing of the strictest German and European protection areas are to be solved. All further linear activities will take place under the impression of current German grid improvement which narrows more and more possible technical and environmental "gaps" on the barrier islands as well as in the estuaries in the close future.

Dependent on the north-easternmost hub location, Schleswig-Holstein might be the shorter "marine option", but yields a longer terrestrial connection to the relevant consumers in Central Europe. This option is accompanied by questions such as crossing protected coastal areas as well as crossing the river Elbe to realize a further southbound grid connection.