

# Platform location N05a

Demarcation of the habitat type "Reef " (H1170)  
following BfN (2018)



**Client:**  
Deutsche Umwelthilfe  
Berlin

**02.11.2022**

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## Content

<b>1. Purpose</b> .....	<b>5</b>
<b>2. Methodology for mapping</b> .....	<b>6</b>
<b>3. Data basis</b> .....	<b>10</b>
<b>4. Results</b> .....	<b>13</b>
<b>5. Comparison with literature and other sources</b> .....	<b>15</b>
5.1 Video transects.....	15
5.1.1 Platform Area (MarineSpace 2022a) .....	15
5.1.2 Platform Area (MarineSpace 2022b) .....	15
5.2 SSS-sediment classification.....	16
5.3 Literature .....	16
<b>6. Conclusion</b> .....	<b>18</b>
<b>Literature</b> .....	<b>19</b>

## Figures and Tables

<b>Fig. 1:</b>	The orange "aggregation of stones" form the geogenic reef type "boulder field (North Sea)", the yellow "aggregation of stones" and the individual stones with a surrounding buffer zone do not (criterion 3).....	8
<b>Fig. 2:</b>	Areas within in a "boulder field" but without the occurrence of stones / boulders (*) are also assigned to the reef (see explanations for criterion 4).....	9
<b>Fig. 3:</b>	Environmental seabed features chart platform area N05a (from: MarineSpace 2022a).....	11
<b>Fig. 4:</b>	Environmental seabed features chart cable route (from: MarineSpace 2022b). ....	12
<b>Fig. 5:</b>	Reef areas following BfN (2018).....	14
<b>Fig. 6:</b>	Video transect ENV_29: Infralittoral mixed sediment (A5.43) (MarineSpace (2022b, Appendix C) .....	16
<b>Fig. 7:</b>	Potential reefs "Borkumse Stenen" (from BOS et al. 2014) and platform location N05a. ....	17
<b>Tab. 1:</b>	Parameters for reef classification and results of the classification. ....	13

## 1. Purpose

ONE-Dyas BV plans to develop a drilled well in block N05a of the North Sea Dutch Continental Shelf. Further, it is planned to develop a well in Block N04a by installing a minimum facilities and gas export platform and connecting it with a pipeline to the processing platform N05a (hereinafter referred to as "the Project"). A power cable from the platform to the Riffgat OWF is part of the project. The Project runs along the Dutch German border within Dutch blocks N04a and N05a, with a portion crossing over into German waters.

A habitat assessment (HAB) for the N05a platform area and the N05a-Riffgat OWF cable route area was carried out by MarineSpace (2022a, b). According to these documents, no stony reefs (H1170) following the Annex I habitats of the EU Habitats Directive (1992) were detected in the survey area around the planned platform location N05a and the cable route to the Offshore Wind Farm (OWF) Riffgrund.

BioConsult GmbH & Co. KG was commissioned by Deutsche Umwelthilfe e.V. to verify the above statement using the data available in the HAB. The standard used for the verification is the mapping guidelines for reefs of the Federal Agency for Nature Conservation (BfN) from 2018. The use of the guidelines is mandatory for all projects in the German Exclusive Economic Zone (EEZ) of the North Sea and the Baltic Sea. The mapping guidelines are also used for approval procedures in Germany that concern areas within the territorial sea that are further away from the coast.

The future N05a processing platform is located in the Dutch territorial sea and in the immediate vicinity of the border with the German territorial sea. Since the power cable to the platform runs through the German territorial sea, an application of the mapping guidelines for the route of the power cable is appropriate and, in order to create a uniform assessment basis, also for the platform location.

## 2. Methodology for mapping

The definition and a general description of the characteristic features of the habitat type "Reefs" (H1170) in the European seas including regionally differentiated examples of characteristic settlements are taken from the "Interpretation Manual of European Union Habitats" (EUR28) in its current version:

*"Reefs can be either biogenic concretions or of geogenic origin. They are hard compact substrata on solid and soft bottoms, which arise from the sea floor in the sublittoral and littoral zone. Reefs may support a zonation of benthic communities of algae and animal species as well as concretions and corallogenic concretions.*

*Clarifications:*

- *"Hard compact substrata" are: rocks (including soft rock, e.g. chalk), boulders and cobbles (generally >64 mm in diameter).*
- *"Biogenic concretions" are defined as: concretions, encrustations, corallogenic concretions and bivalve mussel beds originating from dead or living animals, i.e. biogenic hard bottoms which supply habitats for epibiotic species.*
- *"Geogenic origin" means: reefs formed by non biogenic substrata.*
- *"Arise from the sea floor" means: the reef is topographically distinct from the surrounding seafloor.*
- *"Sublittoral and littoral zone" means: the reefs may extend from the sublittoral uninterrupted into the intertidal (littoral) zone or may only occur in the sublittoral zone, including deep water areas such as the bathyal.*
- *Such hard substrata that are covered by a thin and mobile veneer of sediment are classed as reefs if the associated biota are dependent on the hard substratum rather than the overlying sediment."*

However, the interpretation manual does not contain any information on minimum sizes of reef areas or information on their demarcation from the surrounding environment. This gap is filled by the mapping guidelines of the BfN. For the North Sea, the mapping guidelines of the BfN differentiate between three types of reefs:

- „boulder field (North Sea)“
- „boulder > 2 m“
- „residual sediment with occasional stones and/or boulders“

Based on the available data (see chapter 3), the occurrence of the reef type „boulder field (North Sea)“ in the vicinity of the platform location N05a cannot be excluded. According to the mapping guidelines this reef type is defined as follows:

*"Recording and spatial delimitation is based on hydroacoustic geoscientific methods (side scan sonar mosaics) and includes the following criteria and parameters:*

Criterion 1:

*The minimum size of individual stones to be digitized is based on the currently smallest detection size for individual objects when evaluating side scan sonar data in the frequency range  $\geq 300$  kHz (resulting stone size approx. 30 - 50 cm). Such single stones or blocks are given buffer zones with a radius of 75 m and presented that way.*

Criterion 2:

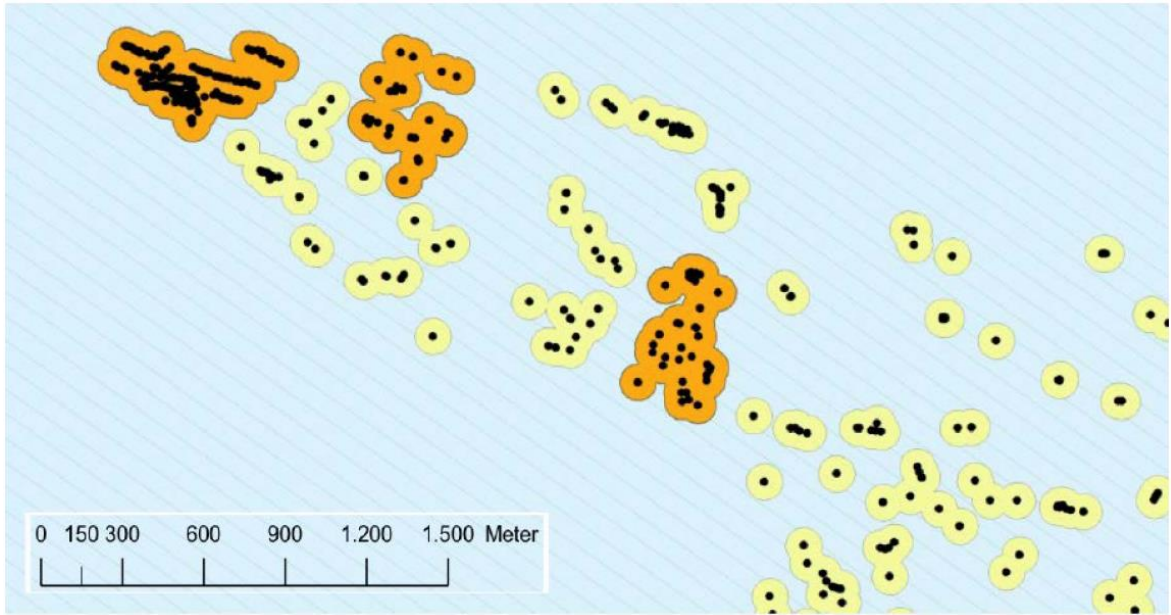
*If the distance between adjacent individual stones ( $\geq$  approx. 30 - 50 cm) or blocks is  $\leq 150$  m, i.e. if their buffer zones either touch or overlap, they are combined into a "stone or block collection" (Fig. 1).*

Criterion 3:

*If such a "stone or block collection" has at least 21 individual stones ( $\geq$  approx. 30 - 50 cm) or if the blocks have an average distance to their nearest neighbor of  $\leq 50$  m, it forms a geogenic reef of the "boulder field" type (**Fig. 1**).*

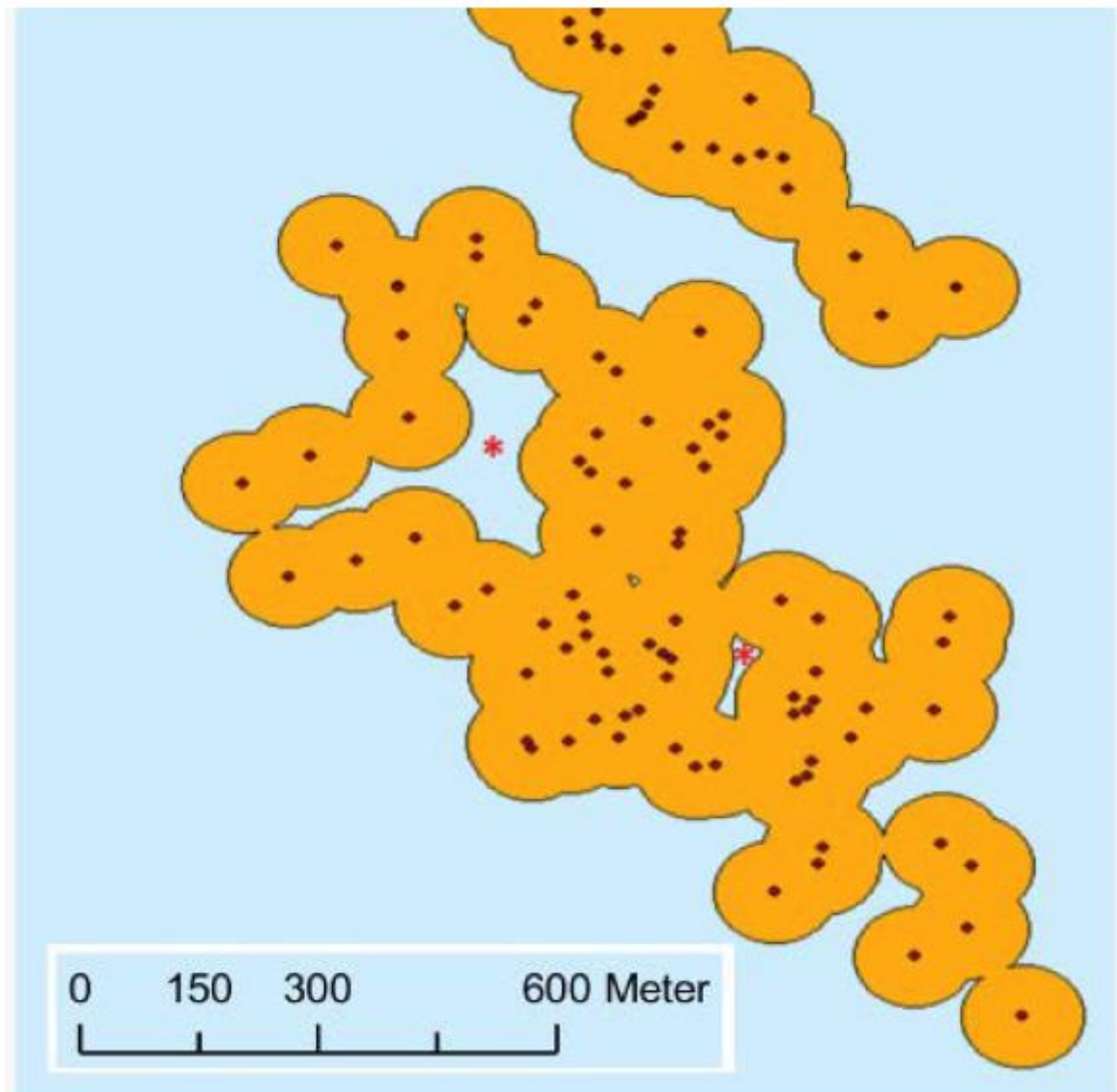
Criterion 4:

*If there are areas without stones or blocks that are within an area that meets all of the preceding criteria (1-3) for a geogenic reef than these areas are also assigned to the total area of the reef (Fig. 2)."*



**Fig. 1:** The orange "aggregation of stones" form the geogenic reef type "boulder field (North Sea)", the yellow "aggregation of stones" and the individual stones with a surrounding buffer zone do not (criterion 3)





**Fig. 2:** Areas within in a "boulder field" but without the occurrence of stones / boulders (\*) are also assigned to the reef (see explanations for criterion 4).

### 3. Data basis

The basis for the demarcation of the reef are the data collected by GEOxyz (see MarineSpace (2022a und 2022b), each in Appendix C) for sediments and seabed features >0.3 m (see Fig. 3 and Fig. 4). In this regard, the text about the platform location (MarineSpace 2022a) and cable route (MarineSpace 2022b) states:

*"Interpretation of seabed features, sediment and seabed contacts from the current and 2019 SSS data is presented in Appendix C.*

*Seabed sediments were interpreted within the northern half of the 1 km x 1 km survey area as to comprise sand and clay. In the south of the survey area sediments were expected to comprise fine sand with shell fragments.*

*Outcrops of clay were interpreted within the survey area. These had a positive relief of up to 0.5 m above background seabed levels with measured gradients of up 6° on their flanks.*

*Numerous SSS contacts were identified within the charted area, with the majority interpreted as boulders within the charted area. Most of these contacts were identified within the areas where seabed sediments were interpreted as coarse sand and clay although occasional contacts were seen outside these areas. The closest contact to N05a platform location occurred 52 m north-north-east and was interpreted as boulder with height of less than 0.5 m." (MarineSpace (2022a), p. 4-3)*

*„Numerous SSS contacts were identified within the charted area, with the majority interpreted as boulders within the charted area. Most of these contacts were identified within the areas where seabed sediments were interpreted as coarse sand and clay although occasional contacts were seen outside these areas." (MarineSpace (2022b), p. 4-3)*

*"Eight-Hundred-Thirty (830) side scan sonar contacts were observed within the route survey. Most of the contacts are boulders located around the N05-A platform and stretching to the east side to Riffgat, besides the boulders the following contacts are found, twenty-six (26) debris items, two (2) wrecks." (Appendix Basic Design Report)*

The 830 side scan sonar contacts are >0.5 m and were found in 2019. They are listed in the Appendix Basic Design Report together with the coordinates. These coordinates can be used to evaluate them in GIS according to the mapping guidelines. Of the total of 830 side scan sonar contacts, 800 are classified as "object". Of these, 397 are located in the map section in Fig. 3 and thus in the vicinity of platform location N05a. In the 1 x 1 km survey area around platform location N05a there are 85 objects. In the area surrounding the cable route to OWF Riffgrund there are 398 side scan sonar contacts >0.5 m (see Fig. 4).

In addition to the side scan sonar contacts >0.5 m, Fig. 3 and Fig. 4 also include contacts >0.3-0.5 m. Since no coordinates are available for these contacts, they are digitized from the georefer-

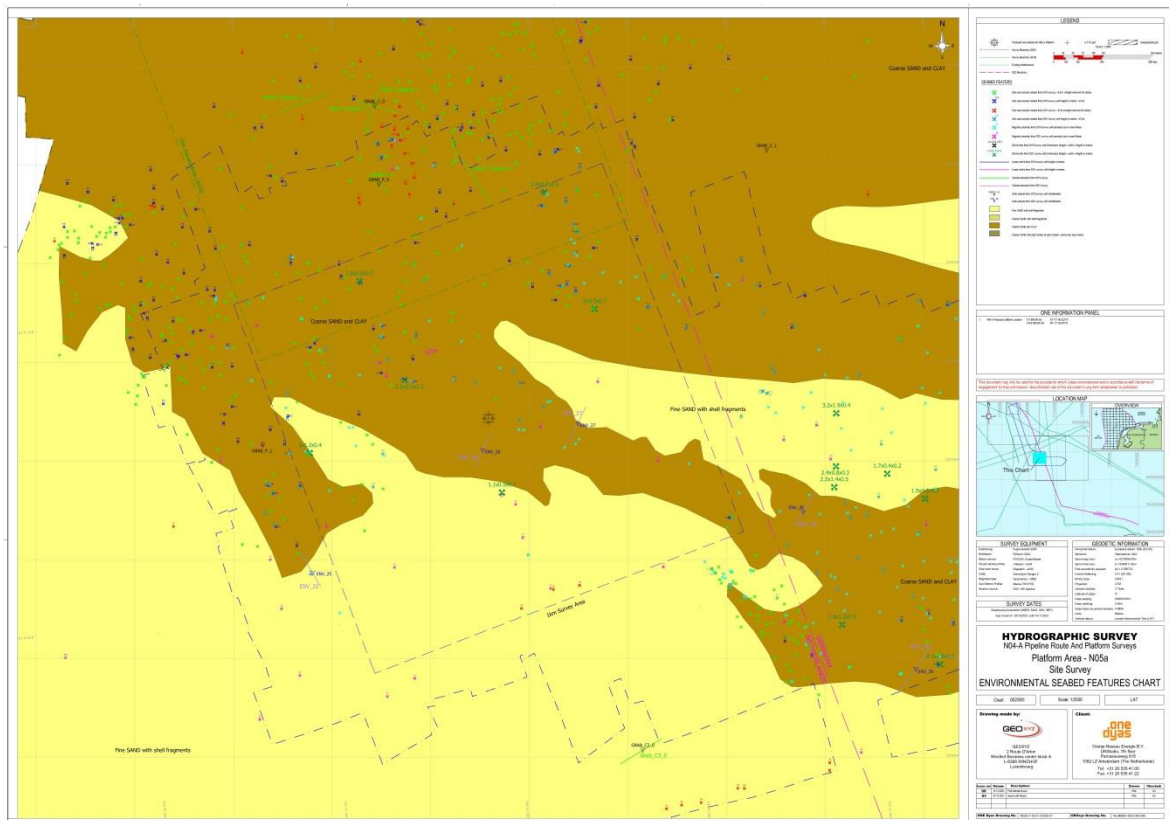
enced map at a scale of 1 : 5,000. 64 of the 372 "objects" >0.3-0.5 m from Fig. 3 are located within the survey area. Another 314 "objects" >0.3-0.5 m are located in the area of the cable route to OWF Riffgrund (Fig. 4).

Both figures also show more recent data from 2021, which are not discussed in detail in the text. In total, only 314 "objects" were recorded in 2021, considerably fewer than in 2019.

The two survey years are therefore evaluated separately.

When interpreting the results, it should be noted that the side scan sonar contacts classified as "objects" in the Appendix are not all boulders (see citations above). Since further differentiation is not possible based on the available data, all side scan sonar contacts are classified as "boulder" by precaution. This represents a "worst case" approach.

Due to inaccuracies in the digitization of the individual stones, there may also be slight differences in the reef demarcation compared to the original data.



**Fig. 3:** Environmental seabed features chart platform area N05a (from: MarineSpace 2022a).

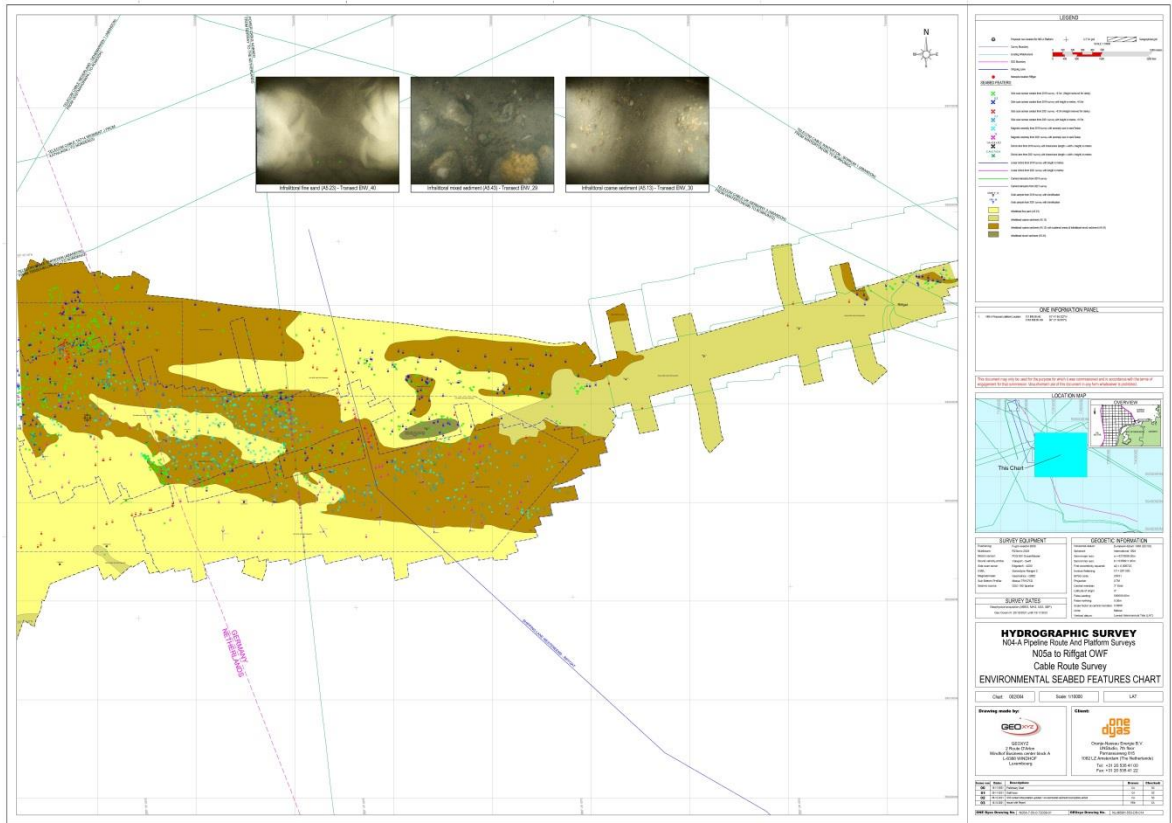


Fig. 4: Environmental seabed features chart cable route (from: MarineSpace 2022b).

## 4. Results

According to the methodology of the mapping guidelines described in chapter 2, a buffer zone with a radius of 75 m was placed around each "object" (classified as boulders by precaution) using the program ArcGis 10.8.1 Desktop. All overlapping buffer zones with >20 objects were assigned with an ID. The results are summarized in Tab. 1.

Since in all aggregations of boulders the mean distance to the nearest neighbor was  $\leq 50$  m (criterion 3), the nine aggregation from the year 2019 and the four aggregations from the year 2021 are to be classified as geogenic reefs of the type „boulder field (North Sea)“ according to the mapping guidelines of the BfN.

**Tab. 1:** Parameters for reef classification and results of the classification.

<b>Year</b>	<b>buffer-ID</b>	<b>Minimum Distance (m)</b>	<b>Average Distance (m)</b>	<b>Maximum Distance (m)</b>	<b>Number of objects</b>	<b>geogenic reef of the "boulder field" type</b>
2019	7	0.14	27.47	97.66	38	yes
	11	9.40	20.66	114.39	50	yes
	13	0.40	48.54	106.83	47	yes
	15	0	14.32	78.60	93	yes
	16	0	14.57	77.39	23	yes
	24	0	14.51	111.82	197	yes
	25	0	16.20	113.30	93	yes
	40	0	12.28	107.31	814	yes
	43	0	15.19	75.09	48	yes
2021	42	0	2.42	59.98	25	yes
	33	0	43.45	131.21	75	yes
	32	2.0	44.76	148.37	27	yes
	22	5.65	39.35	142.15	37	yes

To illustrate the differences between the years 2019 and 2021, the reef areas resulting from the buffer zones are shown in different colors in Fig. 5. Accordingly, only small areas are classified as the reef type "boulder field" in both years. Since the distribution of boulders is similar in both years despite the lower number of boulders in the year 2021, it is likely that they are still present in the area but covered by sediment. Another reason for the differences between the years could be due to the methodology in collecting and evaluating the SSS. Based on the available documents it cannot be said if methodological differences play a role.

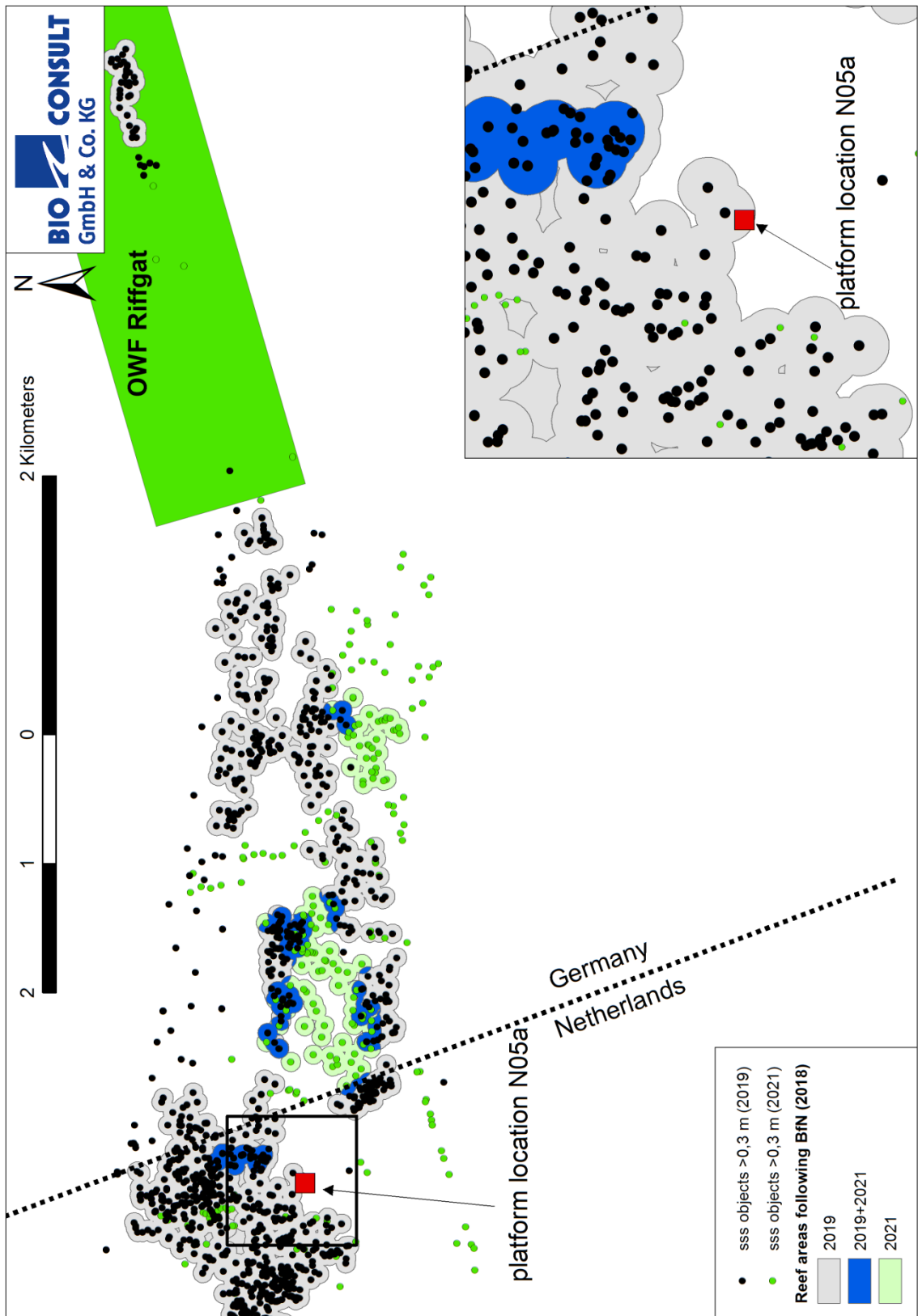


Fig. 5: Reef areas following BfN (2018).

## 5. Comparison with literature and other sources

### 5.1 Video transects

In general, video transects present a suitable method for the detection of reefs but especially for the assessment of their condition. Video transects can only cover a very small area; for each video transect it is only a few 100 m<sup>2</sup>. Based on these recordings, the occurrence of reefs in the entire survey area cannot be excluded with certainty. Incidental findings may provide indications of the presence of reefs. However, it is not possible to demarcate areas of occurrences of reefs based on incidental findings. The results of the video transects conducted as part of the project are therefore not used to demarcate reefs. However, they can provide indications of reef structures such as small stones not detected using SSS.

#### 5.1.1 Platform Area (MarineSpace 2022a)

Drop-down video (DDV) was conducted along 2 x 100 m long transects.

*"Substrate larger than 64 mm (cobbles and boulders) was not observed from seabed imagery. Similarly, no typical species associated with Reefs (H1170) were seen within seabed imagery or seabed sampling observations.*

*As there were no hard substrate areas or typical species identified from the 2021 DDV data, the areas observed within the N05a platform were not be defined as Reefs (H1170) under the Dutch MANFQ criteria (MANFQ, 2014a)."* (MarineSpace 2022a, p. 4-8)

#### 5.1.2 Platform Area (MarineSpace 2022b)

Drop-down video (DDV) was conducted along 18 transects.

*"Substrate larger than 64 mm (cobbles and boulders) were identified from seabed imagery at 12 stations and therefore a stony reef assessment was conducted. Cobbles and boulder observed in the DDV were plotted on geographical information system (GIS) software, this revealed an area less than 100 m<sup>2</sup> for each transect. Furthermore, cobble and boulder areas were separated on average by more than 20 m. From the epifauna observed only a few were associated with Reefs (H1170). Therefore, based on the Dutch Ministry of Agriculture, Nature and Food Quality (MANFQ, 2014a), these areas of cobbles and/or boulders could not be defined as EC Habitats Directive Annex I Reefs (H1170).*

*Substrate larger than 64 mm (cobbles and boulders) was observed from seabed imagery at 12 stations (ENV20, ENV28-30, ENV33-35, ENV37, ENV39, ENV41, ENV43-44). Based on Dutch MANFQ habitat profile (MANFQ, 2014a), the stony areas observed and identified from the 2021*

*DDV data were not functionally related and therefore did not form a habitat type greater than 100 m<sup>2</sup>. In addition very few typical species were found in association with the observed hard substrate (see Section 4.2.1). These areas, therefore, could not be defined as Reefs (H1170).*" (MarineSpace 2022b, p. vi)

## 5.2 SSS-sediment classification

Area-wide sediment maps were produced based on the side scan sonar surveys done by GEOxyz (see Fig. 3 and Fig. 4).

In the area of the video transect ENV\_29 lies an area that is described as "Coarse SAND with a high density of sand mason, worms and razor clams" by GeoXYZ (see Fig. 4) and according to EUNIS classified as "Infralittoral mixed sediment (A5.43)". The still image from this transect (see Fig. 6) that is included in MarineSpace (2022b, Appendix C) shows that not only gravel but also smaller stones with reef-typical fauna occur. This area lies almost entirely in the aggregation of boulders with the ID 24 from the year 2019.



**Fig. 6:** Video transect ENV\_29: Infralittoral mixed sediment (A5.43) (MarineSpace (2022b, Appendix C)

## 5.3 Literature

The most important summary study on the benthic habitats of the area "Borkumse Stenen", in which the platform location N05a is situated, is from BOS et al. (2014). As can be seen in Fig. 7, the platform location N05a is situated at the southern edge of an area classified potentially as a reef (H1170) by BOS et al. (2014). These results correspond to the reef demarcation according to the mapping guidelines of the BfN (see Fig. 5).



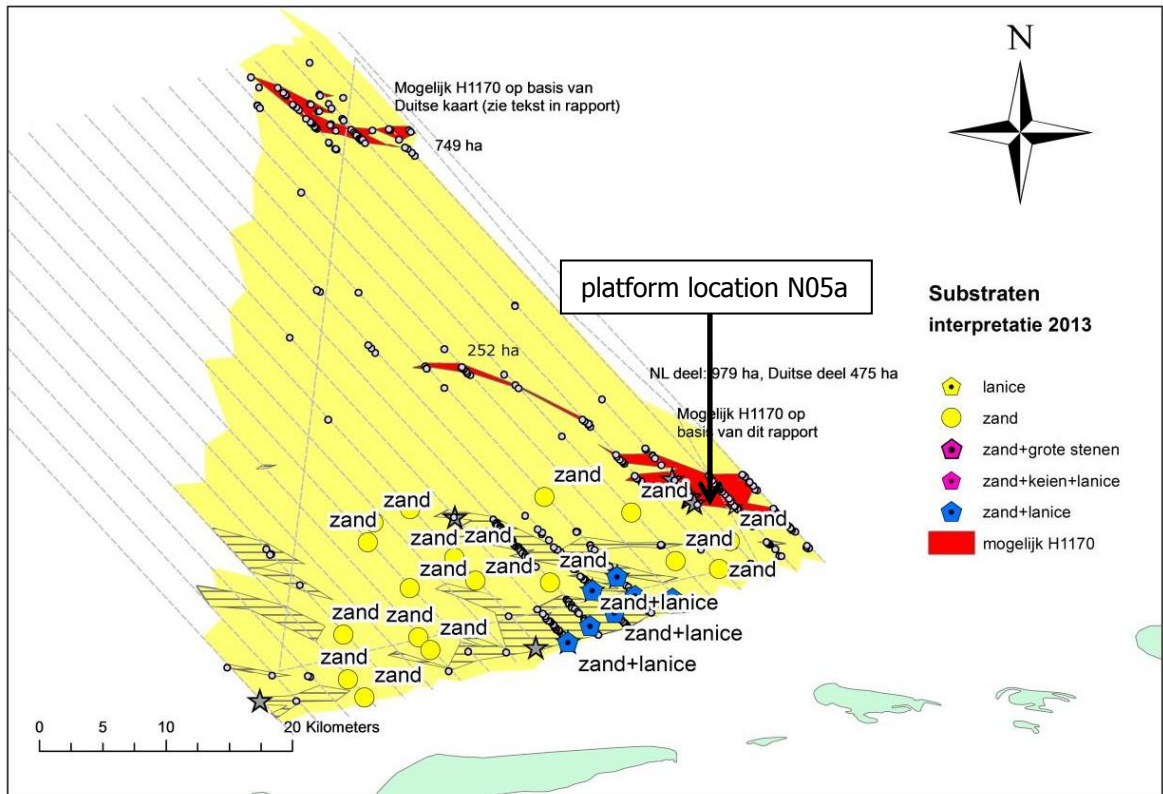


Fig. 7: Potential reefs "Borkumse Stenen" (from BOS et al. 2014) and platform location N05a.

## 6. Conclusion

According to the analysis of the available data following the mapping guidelines of the BfN (2018), geogenic reefs of the type "boulder field" are present in the vicinity of the platform location N05a and also in the area of the planned power cable. They are classified as stony reefs (H1170) following the Annex I habitats of the EU Habitats Directive (1992). The available data from 2019 and 2021 result in a different reef demarcation. Since the distribution of boulders is similar in both years despite the lower number of boulders in the year 2021, it is likely that they are still present in the area but covered by sediment.

When interpreting the results, it should be noted that the side scan sonar contacts classified as "objects" in the Appendix are not all boulders (see citations above). Since further differentiation is not possible based on the available data, all side scan sonar contacts are classified as "boulder" by precaution. This represents a "worst case" approach.

The presence of reefs is also suggested by the video transects conducted as part of the project and by the research of BOS et al. (2014).

## Literature

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