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ENERGINET - MARINE ENVIRONMENTAL STUDIES

Kattegat Benthic Ecology, Technical Report

Energinet Eltransmission A/S

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Customer:	Energinet Eltransmission A/S, Tonne Kjærsvej 65 7000 Fredericia Denmark	Tuborg Parkvej DK 2900 Denmark Tel: +45 39 45 48 00
Customer contact:	Amalie Rasmussen	DK89832314
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Objective:

This document summarizes marine benthic environmental baseline data from Kattegat planned offshore wind farm area, including export cable corridor to shore in Kattegat, Danish sector.

Prepared by:	Verified by:	Approved by:
Øyvind Fjukmoen Principal Consultant	Kjersti Myhre Senior Principal Consultant	Digitalt signeret af Lyager, Kristian Placering: Esbjerg, Denmark Dato: 2024.11.27 15:49:05+01'00' Kristian Lyager KAM Energinet
Lars Ulvestad Senior Consultant		
Annecken Nøland Consultant		
Emma Åslein Høgh Consultant		

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ABBREVATIONS

Abbreviation	Explanation
AMBI index	AZTI Marine Biotic Index (AMBI), was designed to establish the ecological quality of European coasts. The index examines the response of soft-bottom benthic communities to natural and man-induced disturbances in coastal and estuarine environments.
ANOSIM	Analysis of Similarity, statistical analysis
CTD	Conductivity-Temperature-Density
DCE	Danish Centre for Environment and Energy
DKI	The Danish Quality Index for benthic infauna used for assessment of infauna condition
DW	Dry weight
ECC	Export Cable Corridors.
EEA	European Environment Agency
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency (Miljøstyrelsen, MST)
EQS	Environmental Quality Standards
GEUS	De Nationale Geologiske Undersøgelser for Danmark og Grønland
GIS	Geographic Information System
GW	Giga Watt
HAPS	Sediment core sampler. Samples a cylinder of sediment in soft to loose seabed sediments
Landfall	Is where the cable transfers from sea to land
MDS	Multidimensional Scaling
NEQS	National Environmental Quality Standards
NOVANA	Nationale Overvågningsprogram for Vandmiljø og Natur
OWF	Offshore Wind Farm
PAH	Polycyclic aromatic hydrocarbon
PSU	Practical salinity unit
ROV	Remotely Operated Vehicle
SCAFOR	Abundance scale used for both littoral and sublittoral taxa
Shannon-Wiener index	The Shannon-Wiener Index gives a measure of the diversity of species in a community
SIMPER analysis	Similarity Percentage Analysis, calculates the contribution of each variable to the dissimilarity observed between two groups
TOC	Total Organic carbon given as % of DW

1 SUMMARY

DNV on behalf of Energinet Eltransmission A/S (Energient) has carried out benthic baseline surveys in the planned offshore wind farm area Kattegat in Danish waters, including export cable corridor to shore.

The technical report provides a comprehensive overview of the marine benthic environmental baseline data collected in 2024 for the planned Kattegat Offshore Wind Farm (OWF) area and its export cable corridor (ECC). This includes details on hydrography, sediment composition, sediment chemistry, infauna, megafauna, and macroalgae. Also, results from previous studies in the area are shortly summarized.

The survey area includes the southern parts of Kattegat at depths of 20-40 meters and an export cable corridor to Djursland on the east coast of central Jutland. Fieldwork was conducted in April 2024 and involved sediment sampling, visual mapping with ROVs, and hydrography measurements. An additional nearshore sampling was performed in June 2024.

Analyses of the sediment samples from the planned Kattegat OWF area showed that the sediments are primarily composed of sand and silt, with some stations containing shell fragments and clay in deeper layers. CTD profiles showed salinity stratification typical for Kattegat, with higher salinity at the bottom layers and good oxygen levels throughout the water column. Results from chemical analysis show that most chemical parameters were within threshold values, except for arsenic, which exceeded NEQS thresholds at all stations.

A total of 22 stations were sampled for infauna analyses, revealing 22418 individuals distributed among 214 taxa, with mollusks being the most abundant group. Visual mapping has also been performed with ROV surveys covering 13.7 km of seabed, documenting 79 species of benthic megafauna and macroalgae, along with 21 fish species. The invasive round goby (*Neogobius melanostomus*) was detected in both the OWF and ECC areas, indicating its establishment in the Kattegat.

WSP has modelled substrate types in the planned Kattegat OWF and ECC areas according to the Danish classification system. Identified infauna communities registered are mud/silt, sand, mixed substrate with 1-10% rocky bottom and mixed substrate 10-25% rocks.

The biomass measurements from samples retrieved at the planned Kattegat OWF and ECC areas. Mollusca contributed most to the biomass in most stations, but echinoderms also ranked high in total biomass in several stations. Phoronids that were also commonly dominating the fauna occurrences numerically were also among the top five species contributing to the overall biomass.

2 INTRODUCTION

2.1 Background

In order to accelerate the expansion of Danish offshore wind production, it was decided with the agreement on the Finance Act for 2022 to offer an additional 2 GW of offshore wind for establishment before the end of 2030. In addition, the parties behind the Climate Agreement on Green Power and Heat 2022 of 25 June 2022 (hereinafter Climate Agreement 2022) decided), that areas that can accommodate an additional 4 GW of offshore wind must be offered for establishment before the end of 2030. Most recently, a political agreement was concluded on 30 May 2023, which establishes the framework for the Climate Agreement 2022 with the development of 9 GW of offshore wind, which potentially can be increased to 14 GW or more if the concession winners – i.e. the tenderers who will set up the offshore wind turbines – use the freedom included in the agreement to establish capacity in addition to the tendered minimum capacity of 1 GW per tendered area.

Figure 2-1 Planned *Kattegat OWF area and cable route to shore (ECC).*

To enable the realization of the political agreements on significantly more energy production from offshore wind before the end of 2030, the Danish Energy Agency has drawn up a plan for the establishment of offshore wind farms in three areas in the North Sea, the Kattegat and the Baltic Sea respectively. The Kattegat OWF is stipulated to generate ~1.200 MW of electricity.

The offshore areas for the planned Kattegat OWF area (Figure 2-1) consist of a wind farm area and an export cable corridor to Djursland on the east coast of central Jutland. The wind farm area is located approximately 15 km Jutland. The area for the planned Kattegat OWF area is approximately 112 km^2. The planned Kattegat OWF area will be connected to land via subsea cables making landfall close to Grenå on the east coast of Jutland.

2.2 Objective

The objective of this benthic ecology baseline report is to present an overview of existing knowledge and baseline data collected in 2024 regarding hydrography, sediment composition, sediment chemistry, infauna and megafauna and macroalgae in the areas for the planned Kattegat offshore wind farm (OWF) area and export cable corridor to shore (ECC).

2.3 Report structure

The report is initiated with a description of the methodology used in the offshore benthic survey performed in April 2024 and the survey close to shore (shallow water) performed in June 2024. The chapter elaborates on the parameters analysed, the methodology for sampling of the seabed and finally the methodology for the visual transect survey.

To give a background for placements of stations and parameters chosen, the next chapter gives a sum up of the existing information from previous studies in the area. Further details of existing data can be found in Benthic Ecology – Scope Report (DNV,2023).

Finally, Chapter 5 gives a detailed description of the survey results for the offshore and shallow water surveys performed in 2024. The chapter includes a section with sediment characteristics and a description of the benthic communities.

3 METHODOLOGY

The following section describes survey area, sampling program, cruise information, equipment and methodology as well as data analyses performed in the planned Kattegat OW F area and ECC to shore in 2024. Details regarding the cruise is given in a separate cruise report (DNV, 2024b).

3.1 Survey area

The area for the planned Kattegat OWF area and its export cable corridor (ECC) (Figure 3-1) is the survey area relevant for this study. The Kattegat OWF area is situated in the southern parts of Kattegat at depths of 20-40 meters and close to the Briseis flak and Schultz and Hanstens grund. The export cable corridor is 15 km long, with water depths of 0-22 meters and makes landfall near Grenå.

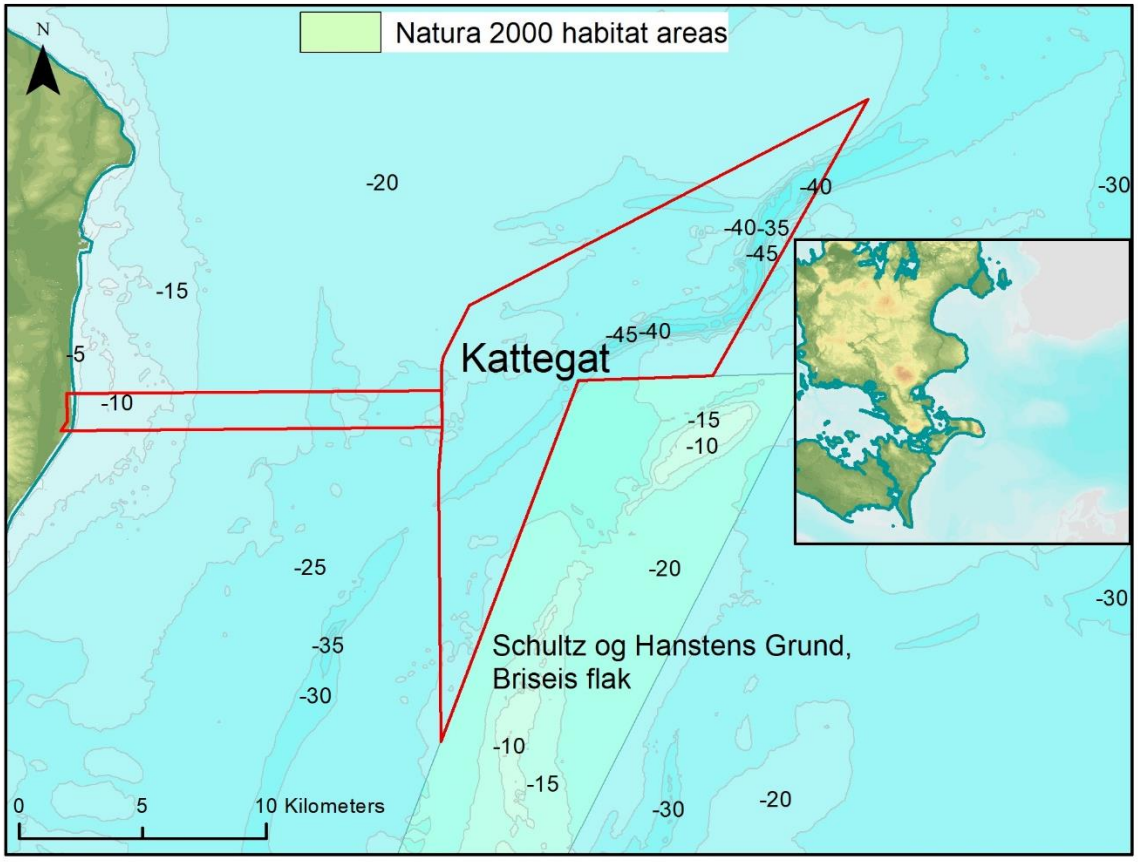


Figure 3-1 *The planned Kattegat OWF area and export cable route.*

3.2 Sampling program

Work was performed according to program developed by DNV in agreement with Energinet (DNV, 2024a).

The environmental survey scope included sampling of:

- Sediment data: benthic macrofauna (infauna) and sediment grain composition and chemistry.
- Visual mapping data of seabed habitats, fauna and flora (ROV)
- Hydrography (salinity, temperature, oxygen content in the water masses)

Overview of sampling program is given in Table 3-1 and Table 3-2. A map with the sampling locations and the locations of the visual survey transects is given in Figure 3-2 and Figure 3-3.

Sediment samples were collected from environmental stations within the two main areas, planned Kattegat OWF area and Kattegat ECC. In total 22 stations were sampled, and 12 visual survey transects were filmed. Environmental stations were evenly distributed within the areas and were placed so that main substrate types were sampled and so that the range of variability was sampled. Details regarding sediment stations are given in Appendix 1.

Visual survey transects were placed in such a manner that both dominant seabed substrate types were covered in addition to areas of particular interest e.g. such as stony reefs. Transects were evenly distributed over the areas, covering the depth gradient and different substrate types.

Two or three hydrographical stations were sampled for each area to obtain baseline data regarding salinity, temperature and oxygen content in the water masses and will serve as supporting parameters for the infauna analyses.

Table 3-1. *Table showing number of sediment stations, hydrography stations and visual survey transects. Numbers in parentheses indicate number of shallow water stations in each area (separate cruise with smaller vessel).*

Area	No. environmental stations sediment sampling	No. of hydrography stations	No. transects for visual mapping
Kattegat OWF	14	3	6
Kattegat ECC	8 (2)	2	6 (3)
Total	**22**	**5**	**12**

Table 3-2 *Table showing performed sampling in the two main areas; Kattegat OWF and Kattegat ECC.*

Area	Stations	Hydrography	Bio	Grain	TOC	Metals	PAH	Phthalates	Phenols
Kattegat OWF	14	3	56	14	14	7	7	7	7
Kattegat ECC	8	2	20	7	8	5	5	4	4
SUM	**22**	**5**	**78**	**21**	**22**	**12**	**12**	**11**	**11**

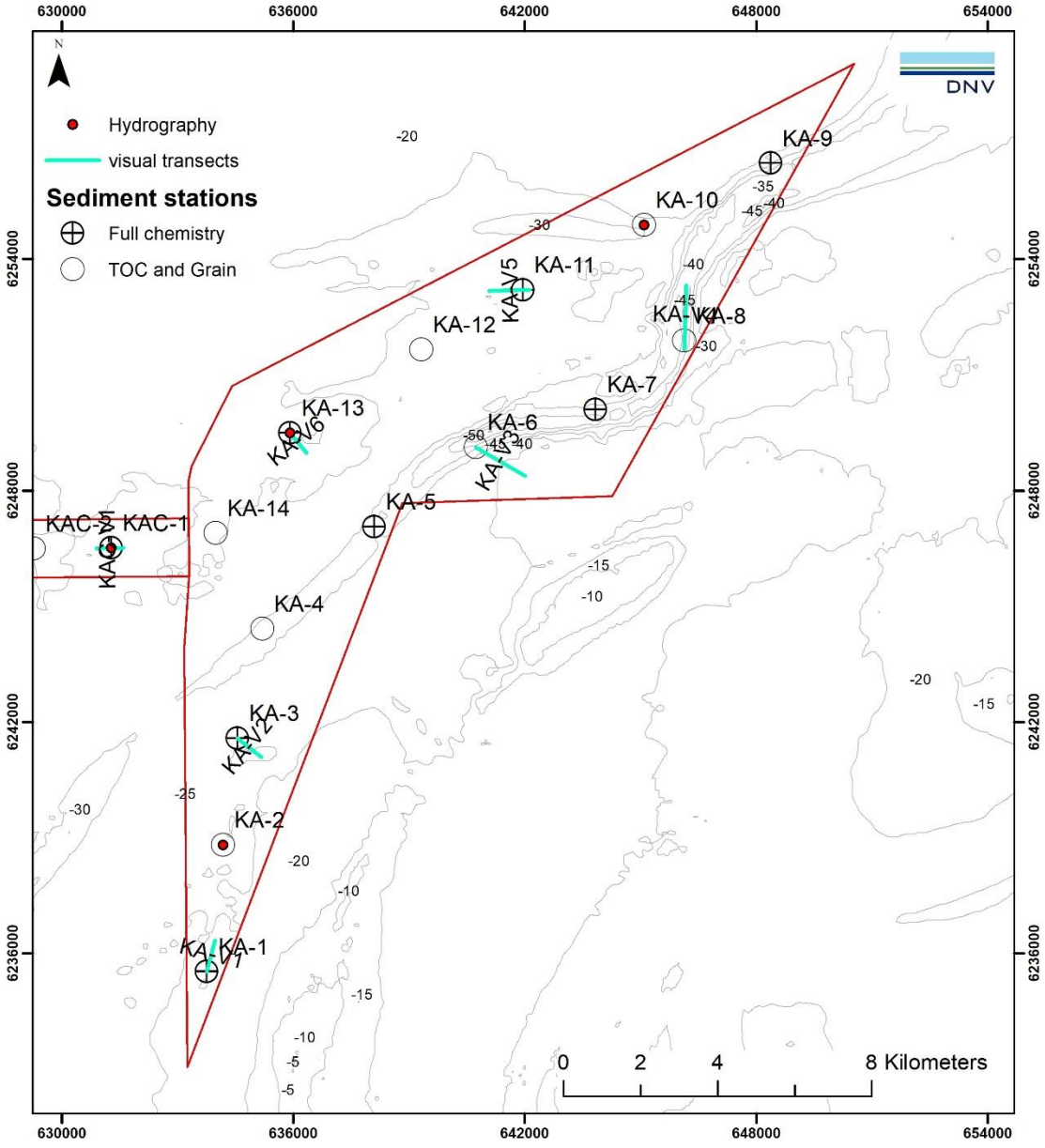


Figure 3-2 *Map showing sediment sampling stations, hydrography stations and visual survey transects in the area for the planned Kattegat OWF area.*

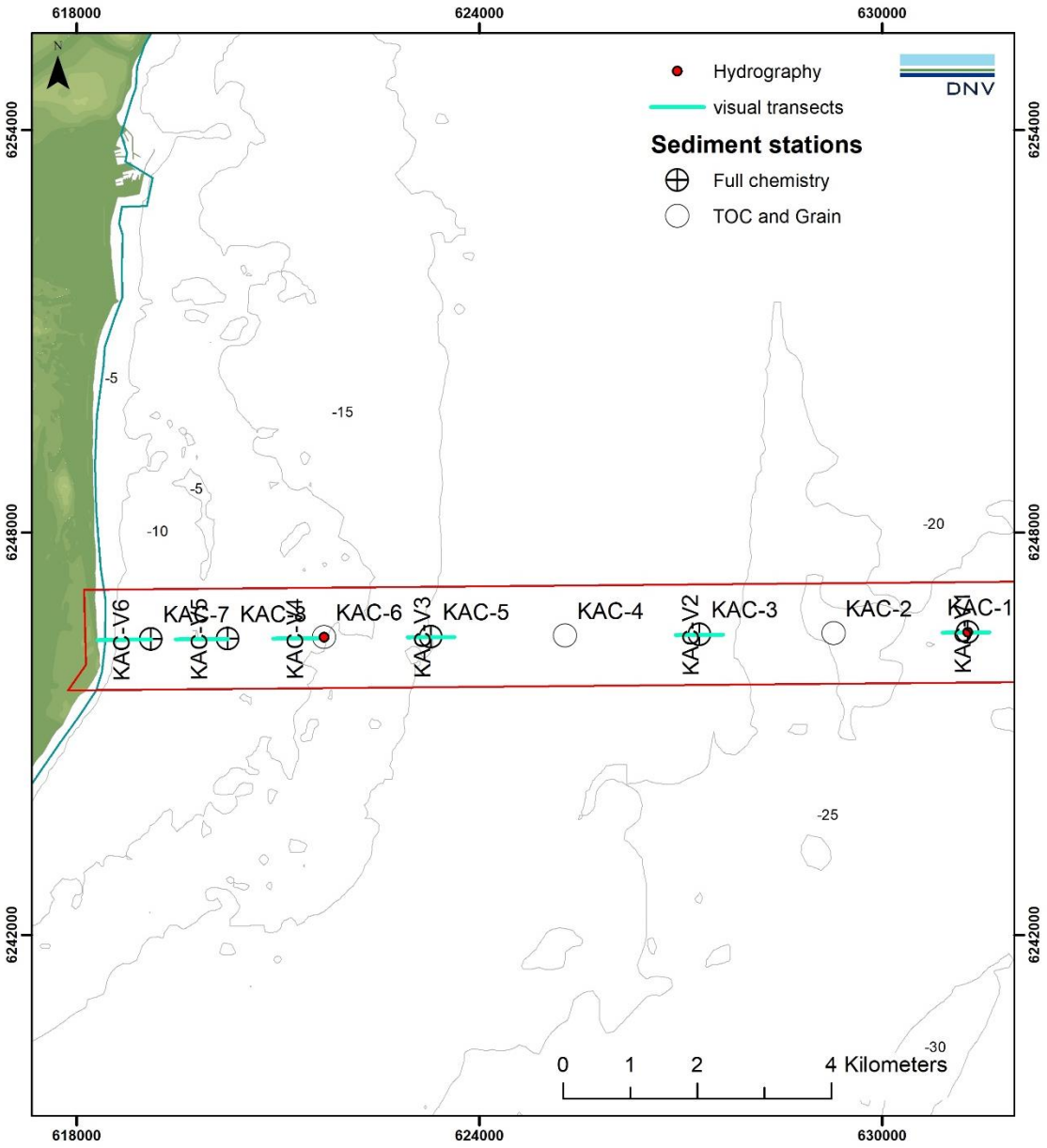


Figure 3-3. *Map showing sediment sampling stations, hydrography stations and visual survey transects in the export cable corridor for the planned Kattegat OWF area.*

3.3 Methods and equipment

3.3.1 Cruise information

Offshore fieldwork was carried out 10-12 April 2024 from the vessel Esvagt Server (Figure 3-4). The fieldwork was done in conjunction with a larger environmental baseline cruise where the areas for the planned Kattegat and Kriegers Flak II OWF areas and export cable corridors were also surveyed. Nearshore/ shallow water stations were inspected and sampled 11-14 June 2024 in collaboration with WSP, by use of WSP's vessel "Sephia".

In total 13.7 km of visual survey transects were visually mapped (12 visual survey transects) and 78 grab samples from 28 stations were obtained for analyses of infauna and chemistry in the planned Kattegat OWF area and ECC.

Figure 3-4 *Esvagt Server (L) and WSP's SEPHIA (R).*

3.3.2 Sediment sampling and analysis

A summary of sediment sampling and analyses performed is given in Table 3-3 .

Macrobenthic fauna living in the sediments (infauna) are traditionally included in offshore environmental monitoring. The reason for this is that the study of benthic communities can give an indication of the effects of pollution from activities, while chemical monitoring of sediments is aimed at assessing the dispersion and concentration levels of pollutants in the seabed sediments. It is important to obtain baseline data on both benthic infauna communities as well as chemical and physical characteristics of the sediments before activities take place in the planned Kattegat OWF area and Kattegat ECC. The baseline will be used in the Environmental Impact Assessment (EIA) for the planned Kattegat project.

The benthic fauna is a suitable biological parameter for monitoring the general environmental status and effects of pollution or disturbances since most of the species have limited mobility and changes in species composition and densities of individuals can therefore easily be identified. The distribution of the fauna can be related to natural variations in environmental parameters such as depth and type of sediment, but also anthropogenic factors such as pollution and organic enrichment.

The sediment sampling carried out is standard for this type of investigation. The following equipment was used (see Figure 3-5):

- Combi grab – modified van Veen (0.15 m^2 surface area, takes chemistry and biology samples in the same cut)
- Reception table in stainless steel
- Measuring cylinder
- Washing table
- Sieves (5 mm and 1.0 mm round holes)
- Winch with Spectron rope

Each environmental station was spatially limited to an area with a radius of 25 meters where sediment sampling took place.

Each station was sampled with 4 replicates for fauna analyses. Pooled samples for chemistry and sediment composition were prepared for each station. An overview of sampled stations and grabs is given in Appendix 1.

During sampling, the sediment samples for infauna analyses were sieved on 1 mm sieves and fixated and stored for analysis in the accredited taxonomical laboratory. Procedures are described in DNV's Biolaboratory's quality system: "Sampling of marine sediment and soft bottom analyses". A flow chart showing the different steps in the preparation of macrofauna is shown in Figure 3-6.

Sampling was carried out in accordance with accredited procedures described in *Handbook for the Biology laboratory quality system; sampling of marine sediment and soft bottom analyses*. The sediment was sampled so that the surface in the samples was undisturbed, and the washing/sieving of the fauna samples was carried out gently. Animals were fixed in formalin (4 % neutralized with hexamine), added pink Bengal and stored in plastic buckets. Sediment samples for chemical analyses and sediment characteristics were stored in rilsan bags or plastic cups. Freezers were utilized for storage of chemical samples. All samples were double-labeled and packed in solid boxes to avoid damage to the sample packing. Sampling was performed in accordance with the standards NS-EN ISO 16665, NS-EN ISO 5667-19, NS-EN ISO 16665.

Measurements of infauna biomass was made on wet weight basis for each station. Biomass for different species / taxa at each station was calculated as wet weight per 1 m^2. Each taxa / species was weighed with an accuracy of 0.1 mg after conservation liquid was drain off on filter paper. Species or taxa with less weight than this was set to 0.1 mg.

Analysis of grain size composition and content of organic matter were performed as supporting parameters for the infauna analyses. Chemical analyses were performed to fulfil parameters requested by The Water Framework Directive (from coast to 12 nautical mile) and The Marine Strategy Framework Directive (outside 12 nautical mile). The national and EU's environmental quality requirements (EQS, Environmental Quality Standards) are used to assess the substance analysis results. Lab analyses of sediment samples were carried out by Eurofins and Danish Center for Environment and Energy (DCE) (Phthalates and phenols).

Table 3-3 *Overview of sediment sampling in the areas for the planned Kattegat OWF area and its ECC. Sediment layer sampled is specified for the different analyses of chemistry and grain sizes. Bio refers to number of grabs.*

Kattegat OWF	Station depth (m)		Grain	TOC	Metals	PAH	Phthalates	Phenols
		Bio	0-5 cm	0-1 cm				
KA-1	21	4	1	1	1	1	1	1
KA-2	22	4	1	1				
KA-3	24	4	1	1	1	1	1	1
KA-4	27	4	1	1				
KA-5	28	4	1	1	1	1	1	1
KA-6	30	4	1	1				
KA-7	36	4	1	1	1	1	1	1
KA-8	38	4	1	1				
KA-9	33	4	1	1	1	1	1	1
KA-10	27	4	1	1				
KA-11	22	4	1	1	1	1	1	1
KA-12	22	4	1	1				
KA-13	21	4	1	1	1	1	1	1
KA-14	21	4	1	1				
SUM		**56**	**14**	**14**	**7**	**7**	**7**	**7**
Kattegat ECC								
KAC-1	22	4	1	1	1	1	1	1
KAC-2	22	4	1	1				
KAC-3	21	4	1	1	1	1	1	1
KAC-4	20	4	1	1				
KAC-5	16	4	1	1	1	1	1	1
KAC-6	12	2	1	1				
KAC-7*	11		1	1	1	1	1	1
KAC-8*	10		-	1	1	1	-	-
SUM		**21**	**7**	**8**	**5**	**5**	**4**	**4**
Overall SUM		**78**	**21**	**22**	**12**	**12**	**11**	**11**
*: Shallow water station sampled from smaller vessel								

Figure 3-5. *Grab sampling. Grab type used, a Van Veen type grab (collects sediments for 0.1 m^2 samples of macrofauna and 0.05 m^2 for sediment chemistry and grain size analyses.*

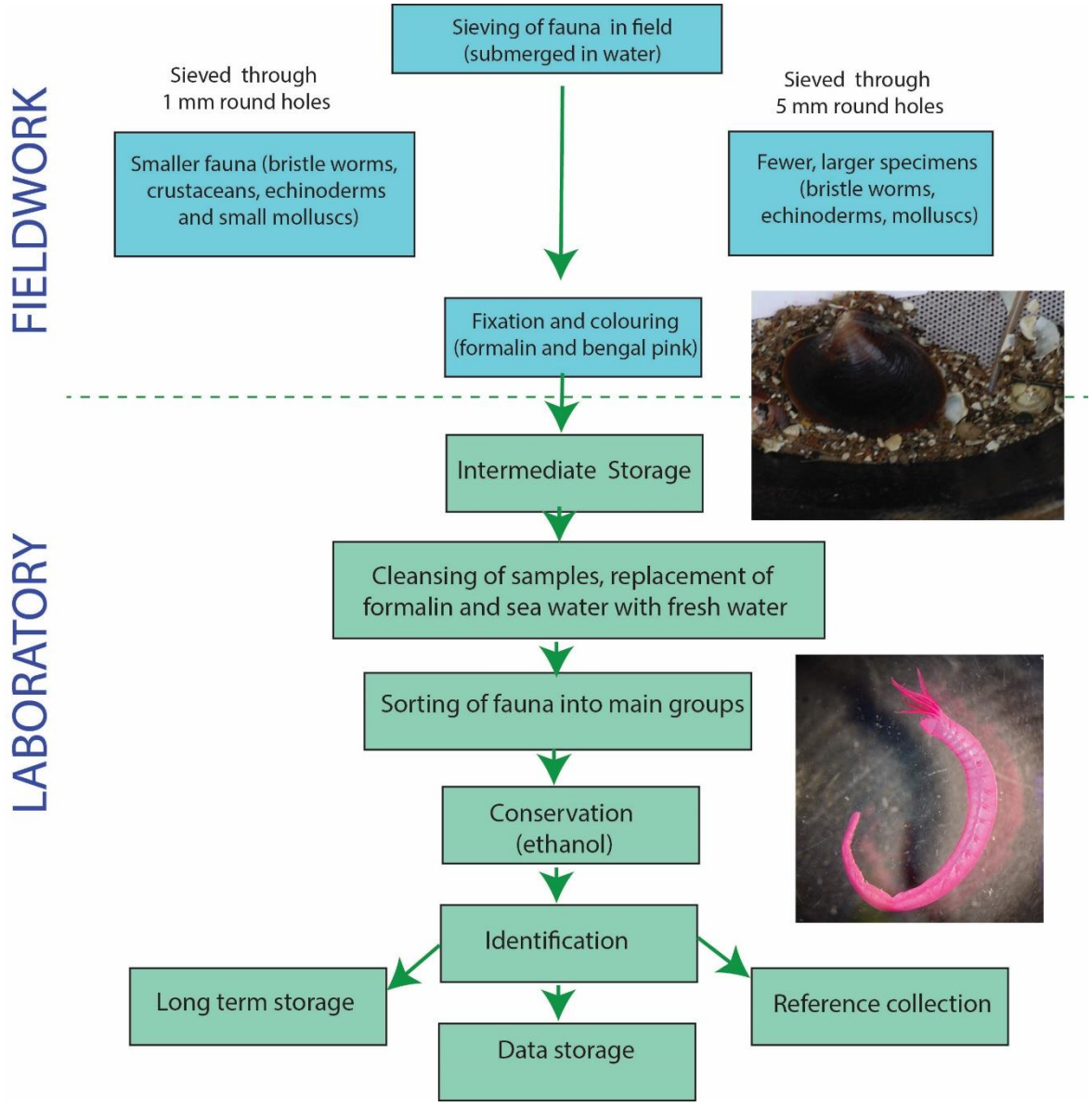


Figure 3-6. *Flow chart showing preparation and analyses of sediment macrofauna samples.*

3.3.2.1 Data analysis

Results that are reported from infauna analyses includes species present, number of species, abundance, biomass, biodiversity (Shannon-Wiener), Evenness (pileou), AMBI (AZTI's Marine Biotic Index) and the Danish DKI index (Danish Quality Index). Results are presented aided by multivariate statistics such as cluster analyses (dendrograms and multidimensional scaling plots), principal components analyses and SIMPER analyses, also including results from analyses of sediment chemistry and physical parameters.

3.3.3 Visual mapping

Summary of ROV lines performed are given in Table 3-4 and Figure 3-7. A total of 13.7 km spread over 12 visual transects were filmed, and 1757 still images were captured.

Visual mapping was conducted with an observation class ROV (Remotely Operated Vehicle). DNV's ROV "Chimaera", of the type "SPERRE 15K" (Figure 3-8). The ROV was fitted with HD camera, still camera, laser for size calculations and sonar for scanning of the seafloor. Underwater navigation was obtained by transponder (Kongsberg cNode beacon) communicating with the vessels USBL system (Kongsberg Hipap 500). The navigational system onboard worked well with the cNode beacon and navigational data was clean and accurate. See Figure 3-7 . The visual mapping was carried out according to requirements in the standard DK-EN 16260:2012. The ROV generally flew 1- 1,5 meters above the seabed along the transects and field of view was generally 1-2 meter. High resolution still photos were captured every 20-30 meters along the survey transects.

Shallow water (<10 meters depth) visual transects were performed by WSP and by use of their BlueROV.

Table 3-4 *Overview of visual survey transects. Positions in ETRS89 UTM32N*.

Area	Name	Length (m)	Depth interval (m)	Transect centerpoint	
				Easting	Northing
Kattegat OWF	KA-V1	1396	17-19	633868	6235930
	KA-V2	2724	17-22	634869	6241340
	KA-V3	1115	17-23	641374	6248760
	KA-V4	1129	34-40	646166	6252490
	KA-V5	1578	18-21	641602	6253190
	KA-V6	1306	16-19	636132	6249240
Kattegat ECC	KAC-V1	695	18-21	631248	6246510
	KAC-V2	700	18-20	627281	6246480
	KAC-V3	700	12-16	623281	6246440
	KAC-V4*	730	8-11	621296	6246430
	KAC-V5*	781	6-8	619865	6246410
	KAC-V6*	803	1.5-7	618711	6246400

*: Shallow water transects performed with small ROV.

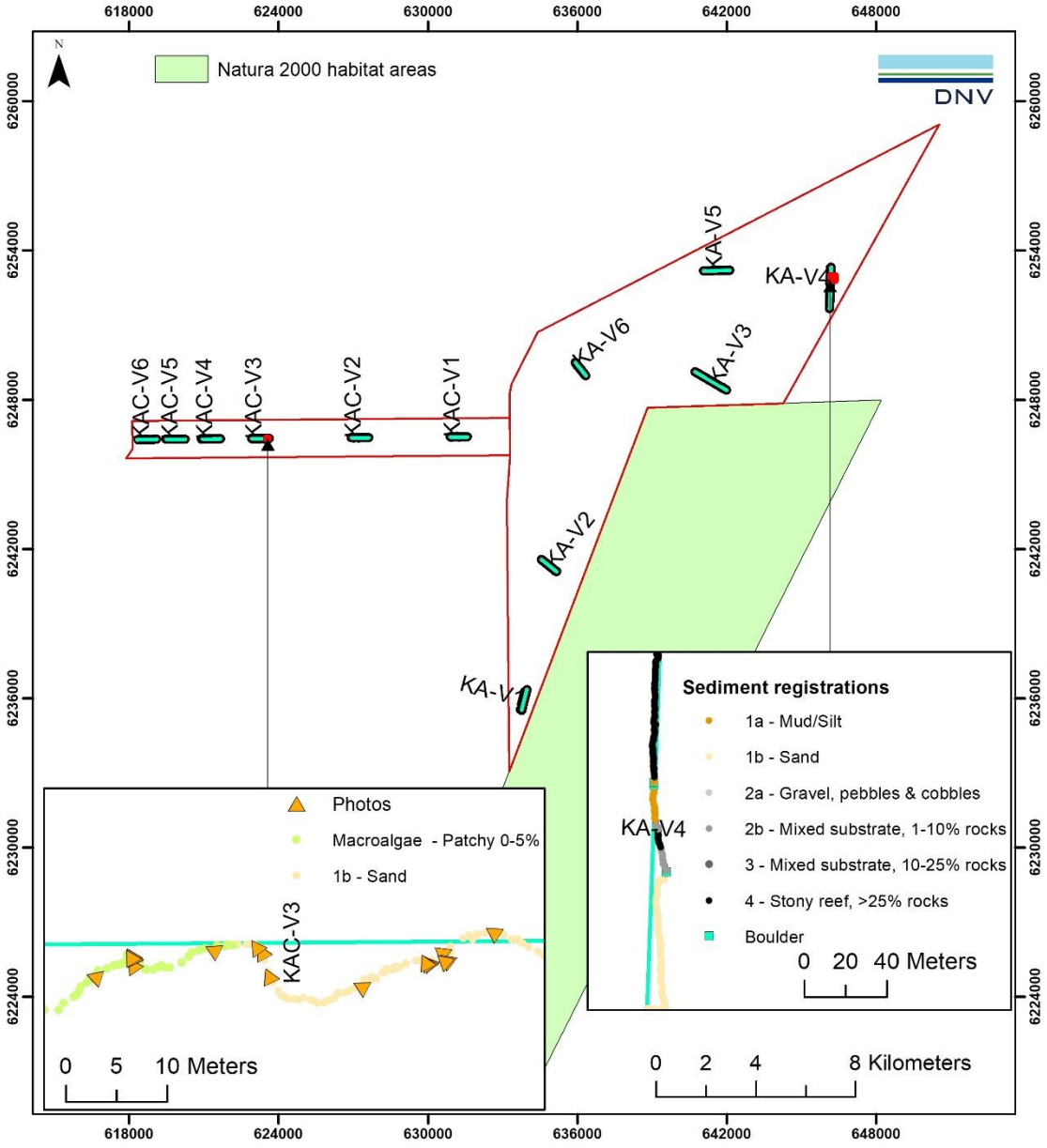


Figure 3-7 *Map showing overview of visual survey transects visually inspected by DNV in the areas for the planned Kattegat OWF area and its ECC in April 2024. Example of ROV navigational data and georeferenced registrations of sediment (according to the Danish sediment classification system) and fauna coverage are shown for two transects (zoomed in for sections of KA-V4 sediment, and KAC-V3 - fauna registrations).*

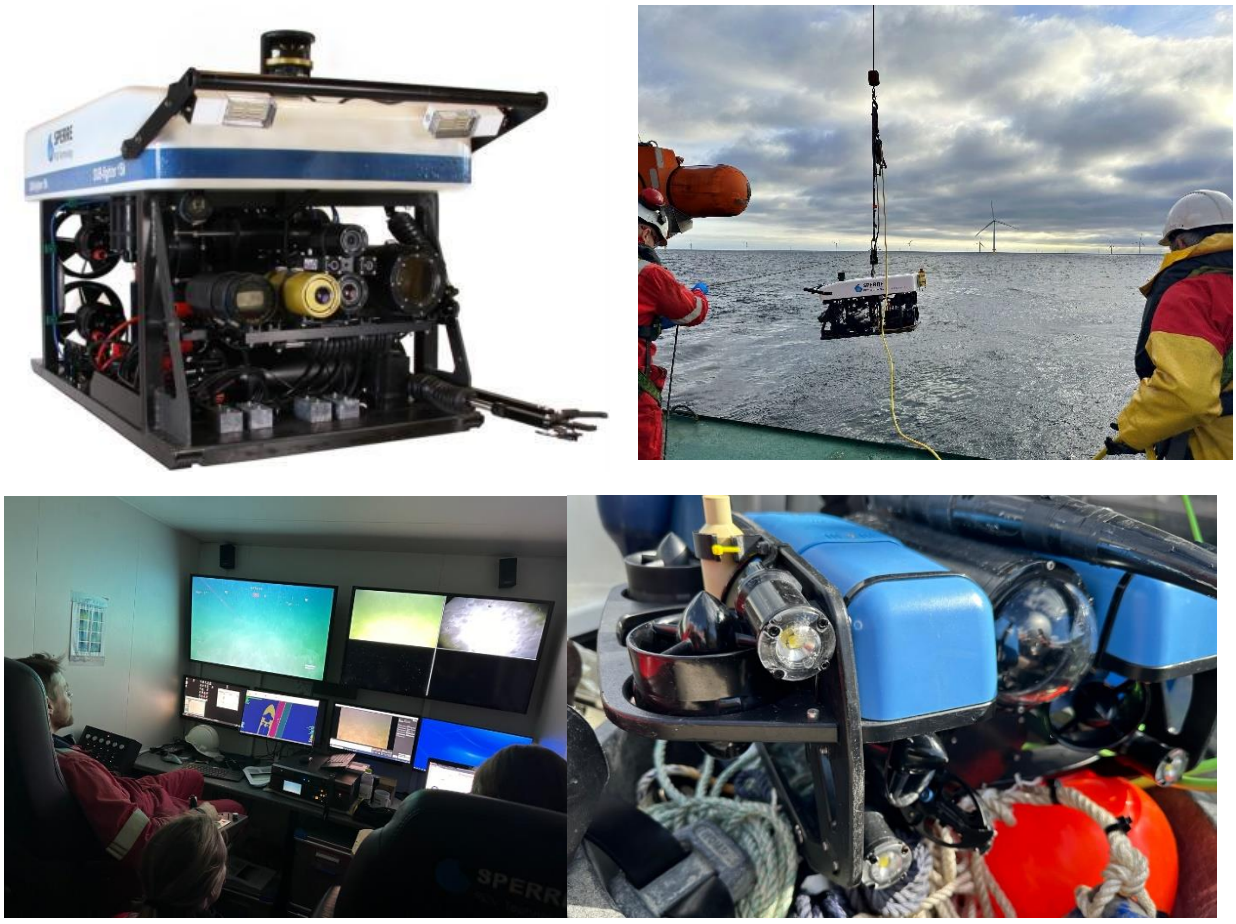


Figure 3-8 *DNV's ROV "Chimaera". A SPERRE Subfighter 15K. and WSPs BlueROV (bottom right) used for shallow water surveys.*

3.3.3.1 Data logging system

Logging of findings was made by use of DNV's video logger software ensuring that findings are georeferenced. The log included date, time, type of seabed substratum, megafauna, and any special observations (e.g., debris or fish). ROV position was recorded every second in a navigation log. By merging these two logs all registrations from the video material were given a coordinate to be used in preparation of maps. Still images were also georeferenced for presentations in GIS system. Species encountered, substrate types and distribution of fauna in general was registered along the ROV transect, and findings were georeferenced for presentations in maps, together with species lists. Seabed classifications followed the Danish substrate classification method (next section).

3.3.3.2 Substrate and fauna registrations

Registrations of substrate and fauna were made according to DS-EN-16260.

Substrate classifications were made according to the Danish classification system as described in Raw material statutory order no.1680 of 17-12-2018. Summarized in Table 3-5 (with reference to WSP, 2022). Note that WSP is preparing modelled distribution of substrate types according to the same classification system for the planned Kattegat OWF area and ECC in 2024.

All megafauna species and habitat types encountered during the surveys were registered. In addition to species registration by review of the video material, the species lists are based on identification from still photos. The abundance of each species was logged using the SACFOR scale, which is a relative six-graded abundance scale, changing with animal size (Table 3-6)

In instances where fauna could not be identified to species, identifications were made to higher taxonomical levels, or "video species" were introduced in instances where the same type of unidentified fauna was encountered over several transects.

The video registrations of sponges were categorised into two groups; "soft bottom sponges" and "hard bottom sponges"

Survey transects to be covered during visual mapping often constitute several km of seabed. Counting individual sponges in images or calculating percent coverage can be quite time-consuming and generally cannot be applied to the whole length of the survey transect. Semi-quantitative density estimates provide an efficient way of assessing spatial patterns on the seabed. The method requires trained experts in order to keep results reliable and methods replicable. DNV uses the following semi-quantitative scale when logging sponges: "No sponges", "single individual", "scattered", "common" and" high". Sponge individuals were logged as single when there was about 10 m or more between individuals (i.e., a couple of viewing frames in video between individuals). For illustrative purposes, single individuals and no sponges are shown as a combined group in this report, so that seabed sponge cover classification in maps and figures are represented by four semi-quantitative groups.

Sea pens, sea feathers and soft corals/carnation corals were classified as following (ind./ 25m^2): "Rare": <5, "Scattered": 6-10, "Common": 11-15, "High": >15.

Table 3-5: *Sediment characterization according to the Danish classification system (WSP, 2022).*

Main type	Description	Sub type
Type 1 – Sand and soft sediments	Areas that consist of soft sediments as gyttja, silt or mud, to hard sediments of sand (0.06 – 2.0 mm) and gravel fraction grain size, with a variation of bed forms (often dynamical). sediments), Coverage of boulders (>100 mm) is less than 1%.	1a (gyttja or silty soft bottom, loose
		1b (firm bed type of sandy loose sediment)
		1c (clayish firm sediments).
Type 2 – Sand, gravel and small rocks with a few larger rocks (area coverage 1-10%)	Composed chiefly of sand or fine-grained matrix but with varying amounts of gravel (2-20mm) and pebbles/small cobbles (20-100 mm). The substrate may contain some (1-10%) scattered boulders (>100mm). This is further divided into the sub-divisions of type 2a and 2b.	2a is a bed type consisting of a variety of gravel, pebbles and cobbles with less than 1% area coverage of larger rocks (>100 mm).
		2b is a bed type with a varying sediment content of gravel, pebbles and cobbles and a spread of larger

		rocks of cobble to boulder grain sizes with an area coverage of 1-10% (>100 mm).
Type 3 – Sand, gravel, small rocks and several larger rocks (area coverage 10-25%)	Areas consisting of mixed marine sediment types dominated by sand, gravel and smaller rocks. This sediment type consists of a spread of larger rocks (>100 mm) with an area coverage of 10-25% and can be associated with rocky reefs when spatial connection to substrate type 4	
Type 4 – Rocky areas (reefs), consisting of many larger rocks (area coverage >25%)	Dense spreading of larger rocks or rock reefs (stone reefs) with forming of cavities / rock shelters and can have a bathymetric anomaly due to the high ground of large rocks compared to the adjacent sediment.	

Table 3-6 *The SACFOR scale used for logging species abundances (From http://jncc.defra.gov.uk).*

% cover scale	Growth form		Size of individuals/colonies				Density scale	
	Crust/meadow	Massive/Turf	<1cm	1-3 cm	3-15 cm	>15 cm		
>80%	S		S				**>1/0.001 m^2 (1x1 cm)**	**>10,000 / m^2**
40-79%	A	S	A	S			**1-9/0.001 m^2**	**1000-9999 / m^2**
20-39%	C	A	C	A	S		**1-9 / 0.01 m^2 (10 x 10 cm)**	**100-999 / m^2**
10-19%	F	C	F	C	A	S	**1-9 / 0.1 m^2**	**10-99 / m^2**
5-9%	O	F	O	F	C	A	**1-9 / m^2**	
1-5% or density	R	O	R	O	F	C	**1-9 / 10m^2 (3.16 x 3.16 m)**	
<1% or density		R		R	O	F	**1-9 / 100 m^2 (10 x 10 m)**	
					R	O	**1-9 / 1000 m^2 (31.6 x 31.6 m)**	
						R	**<1/1000 m^2**	

S	A	C	F	O	R	P
super-abundant	abundant	common	frequent	occasional	rare	present

4 EXISTING DATA

In this chapter the existing data and knowledge is presented. The purpose of this is to provide an overview of previous work done in the area which also will support the baseline information of the benthic ecology in the planned Kattegat OWF and the ECC areas.

4.1 NOVANA Sampling stations

An overview of NOVANA benthic monitoring stations in the Kattegat project area monitored in the period 1st of January 2020 to 1st of August 2023 are given in Figure 4-1. There are not registered any monitoring stations inside the Kattegat array area or export cable corridor, however, three monitoring stations are inside or in a short distance to the planned landfall area: stations Tr.04, Tr.03 and Tr.01 (macroalgae) (Table 4-1).

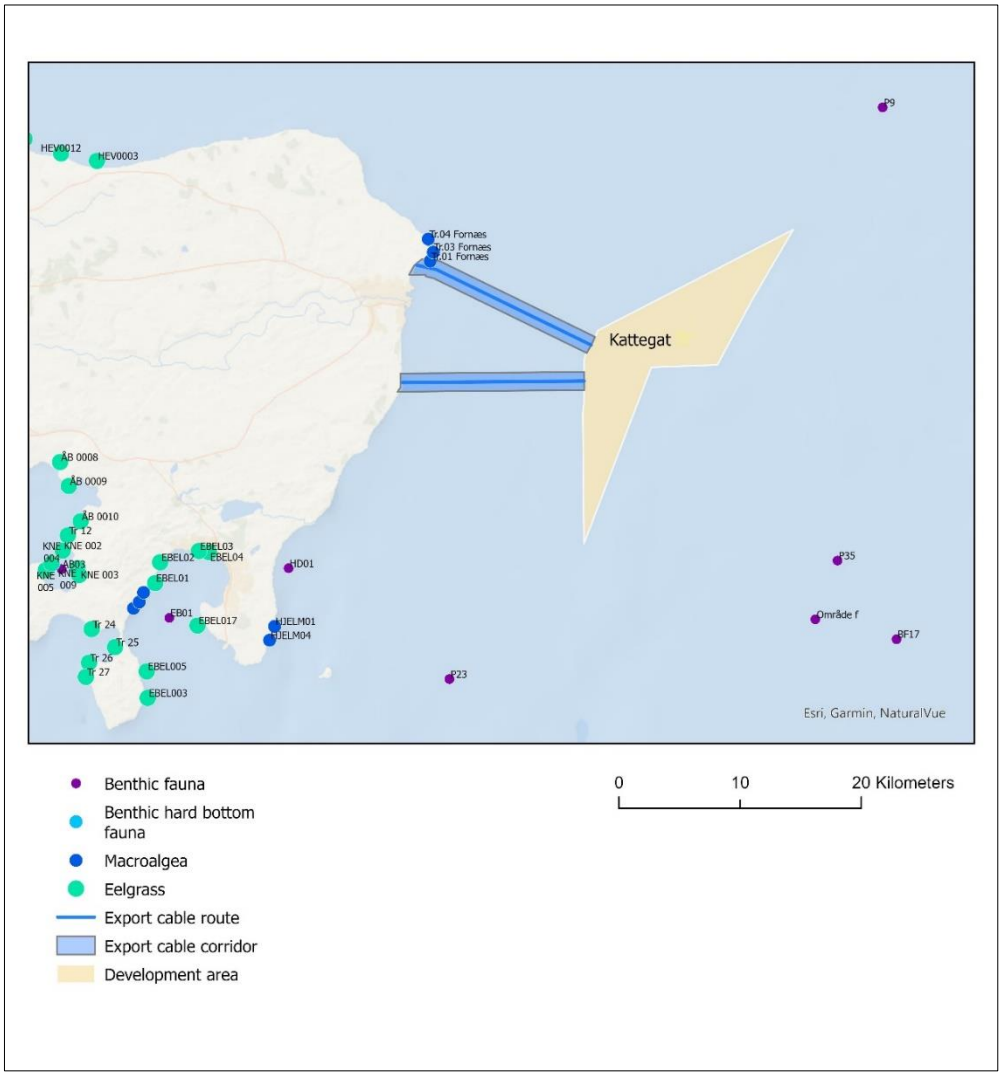


Figure 4-1 *NOVANA benthic monitoring stations in the Kattegat project area sampled in the period 1st of January 2020 to 1st of August 2023. Stations that overlap or are in close distance to the northern export cable corridor are stations Tr.04 Fornæs, Tr.03 Fornæs and Tr.01 Fornæs. Source: Miljøgis, 2023.*

Table 4-1. *An overview of NOVANA benthic monitoring stations inside, or close to the Kattegat export cable route, sampled in the period 1st of January 2020 to 1st of August 2023. Source: Miljøgis, 2023.*

Station name	Parameter	No. of surveillance	First surveillance	Last surveillance
Tr.04, Fornæs	Macroalgae	15	03-08-1983	02-09-2021
Tr.03, Fornæs	Macroalgae	17	02-08-1983	02-09-2021
Tr.01, Fornæs	Macroalgae	17	26-07-1983	02-09-2021

An overview of all registered NOVANA benthic monitoring stations in the planned Kattegat OWF area, export cable corridor and landfall, is given in Figure 4-2.

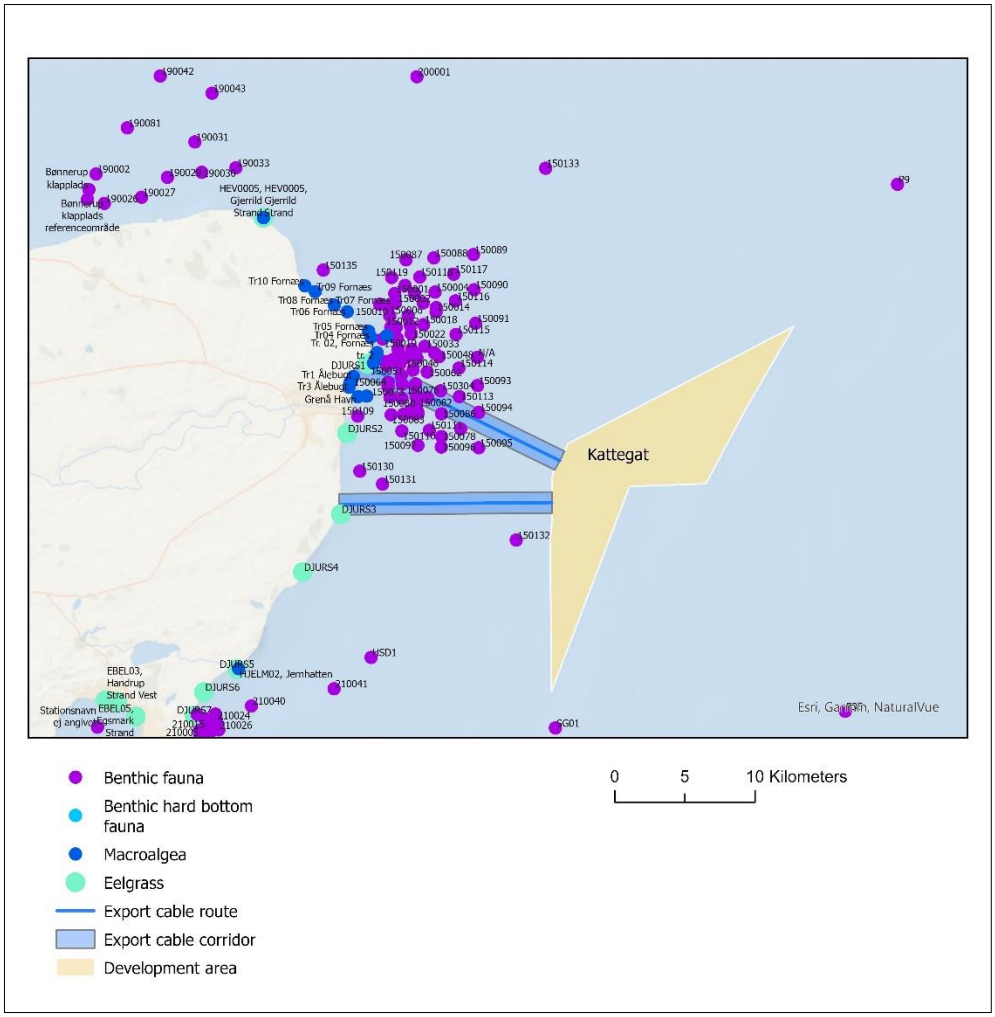


Figure 4-2 *Registered NOVANA benthic monitoring stations in the Kattegat project area. Please see Appendix 1 for more information about the monitoring stations. Source: Miljøgis, 2023.*

4.2 Natura 2000 sites

A large Natura 2000 site borders the Kattegat area, *Schultz og Hastens Grund samt Briseis Flak,* where sand banks and reefs are the basis of designation (EEA, 2023) (Figure 4-3). There are two monitoring stations for hard bottom fauna within this Natura 2000 site (Miljøstyrelsen, 2022).

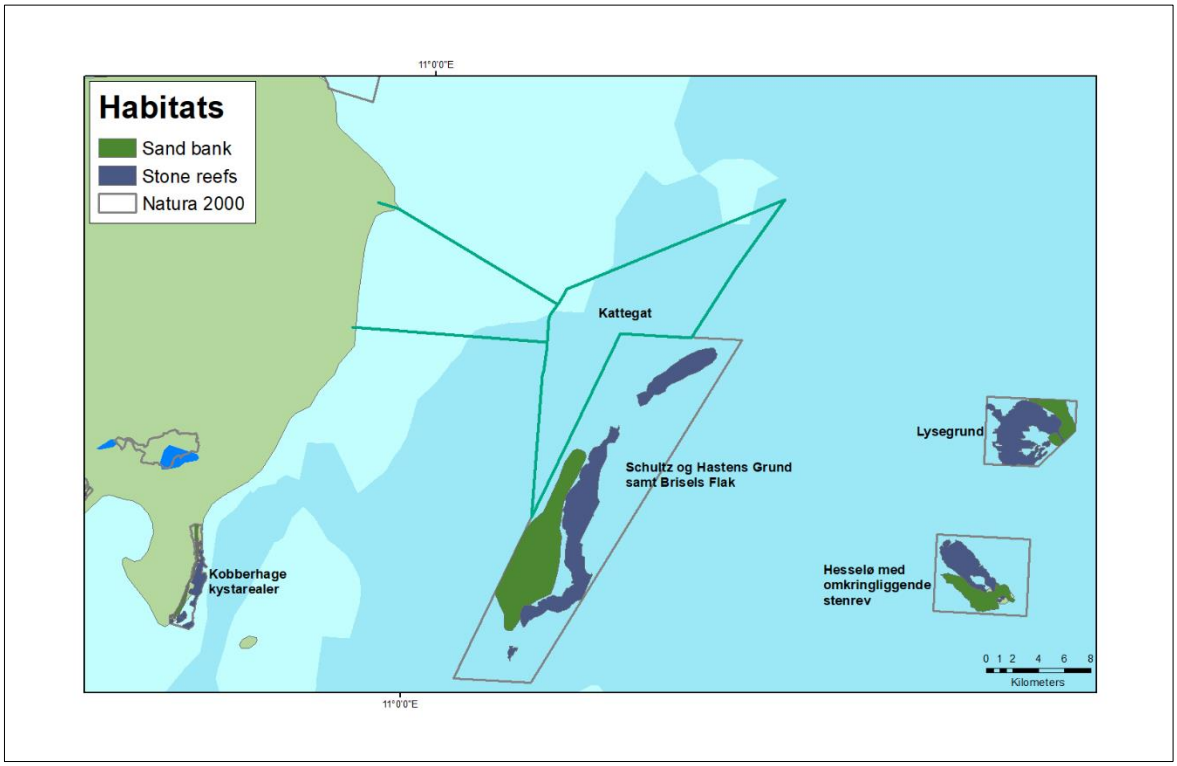


Figure 4-3 *Natura 2000 sites in the Kattegat project area. Source: Miljøgis, 2023*.

4.3 Anholt

The Anholt OWF is located approximately 25 km from the planned Kattegat OWF in Kattegat between the headland Djursland of Jutland and the island Anholt (Figure 4-4). The area is characterised by fairly uniform seabed conditions and water depths between 15 and 20 meters. A quantitative survey of the benthic fauna and sediment was conducted in April 2009 at 80 stations evenly distributed in the 88 km^2 large project area (Rambøll, 2009). Point dives, transect dives, and ROV (Remotely Operated Vehicle) dives were performed to verify the geological classifications and to relate the substrate types to fauna and flora communities (Figure 4-4). The Kattegat northern landfall area overlap with the Anholt landfall area (Figure 4-5).

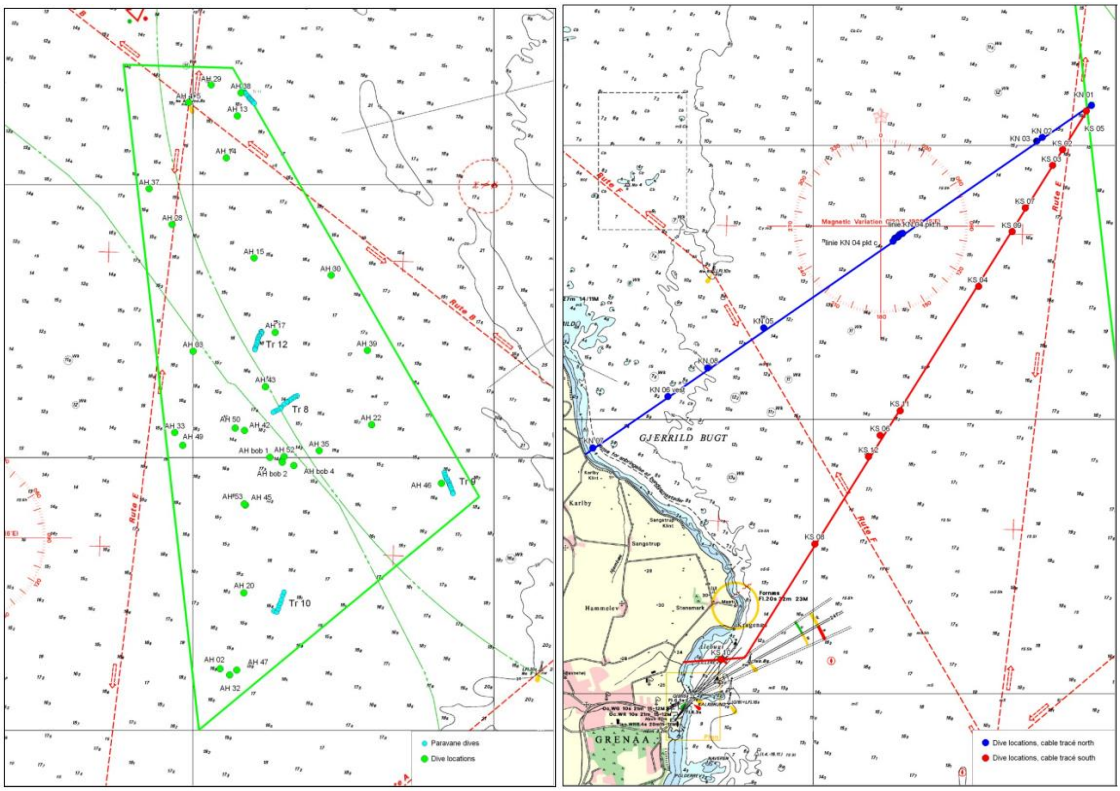


Figure 4-4 *Anholt project area (green frame) and the visual verification points (green dots) (left) and Anholts two potential cable corridors (right). Visual verification points along the northern cable corridor are blue spots and visual verification points along the southern cable corridor are red spots. Source: Rambøll, 2009.*

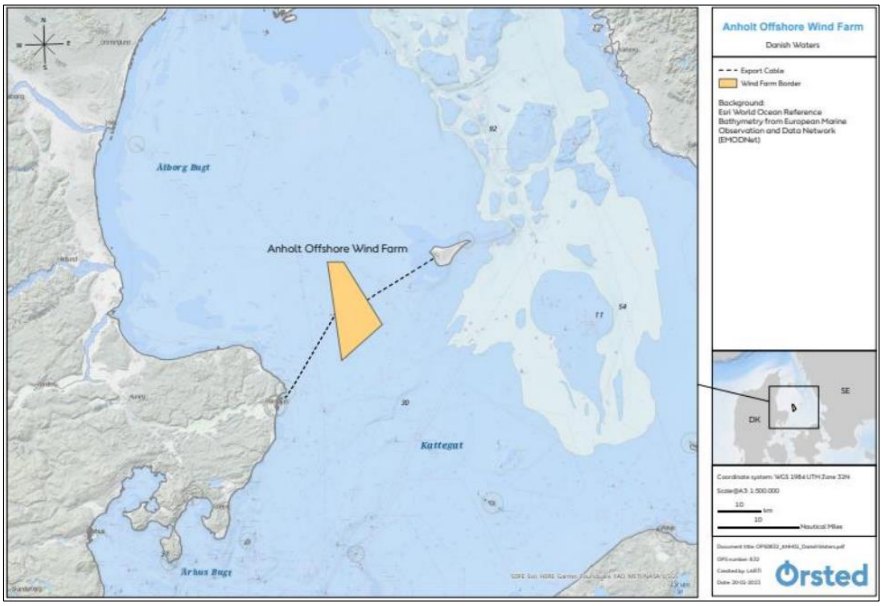


Figure 4-5. *Location of Anholt OWF and the export cable corridor. Source: Ørsted, 2023.*

A quantitative survey of the benthic fauna and sediment was conducted in April 2009 at 80 stations evenly distributed in the 88 km^2 large project area (Rambøll, 2009).

The two cable corridors, as well as the project area, are relatively homogenous regarding substrate types. The dominating bottom substrate of the two cable corridors, is sand with scattered larger stones with areas where gravel and pebbles dominate. In the innermost part of the corridors (a few hundred meters from the shore) the bottom is dominated by stones in the northern corridor and by limestone in the southern corridor. The depth in the two cable corridors varies between app. 6-20 meters (Rambøll, 2009). Four different substrate types were identified (Figure 4-6); substrate type 1 with sand as dominating substrate; substrate type 2, with sand, gravel and pebbles; substrate type 3 with sand, gravel, pebbles and scattered larger stones, and substrate type 4, which is dominated by larger stones forming stone reefs. In areas with substrate type 1, the fauna and especially different species of mussels were dominating. In areas with substrate type 2, more species was recorded than in areas with substrate type 1. Mussels were dominating but starfish and common whelks were also plentiful. In areas with substrate type 3, macroalgae were present due to the higher number of larger stones. Mussels, starfish, dead man´s finger and sea urchins were plentiful. In areas with substrate type 4, macroalgae and larger mussels were dominating.

The dominating substrate type in the area was type 1 and type 2. Benthic type 3 was also regularly registered while type 4 was only observed in a few limited areas in the wind farm construction site, but at several locations along the cable corridors (Figure 4-6 and Figure 4-7 Figure 4-7). Solid limestone formations were recorded close to the shore of the cable corridors and were assigned in the category substrate type 4. Stone reefs with cave forming properties was not registered in the project area.

The content of organic matter was below 1% of the dry weight of the sediment. The benthic fauna was very rich and 166 species and higher taxa were identified. The abundance of the benthic was moderate and around 1000 individuals per m^2 in most of the area. The biomass of the benthic fauna was highly variable in the area and strongly dependent on the distribution of large specimens of Icelandic cyprine (*Arctica cyprina*), which was present at 2/3 of the stations. Bristle worms (polychaetes) and crustaceans were the most diverse taxa with 61 species and 41 species, respectively. Bivalves (29 species) contributed to most of the benthic biomass.

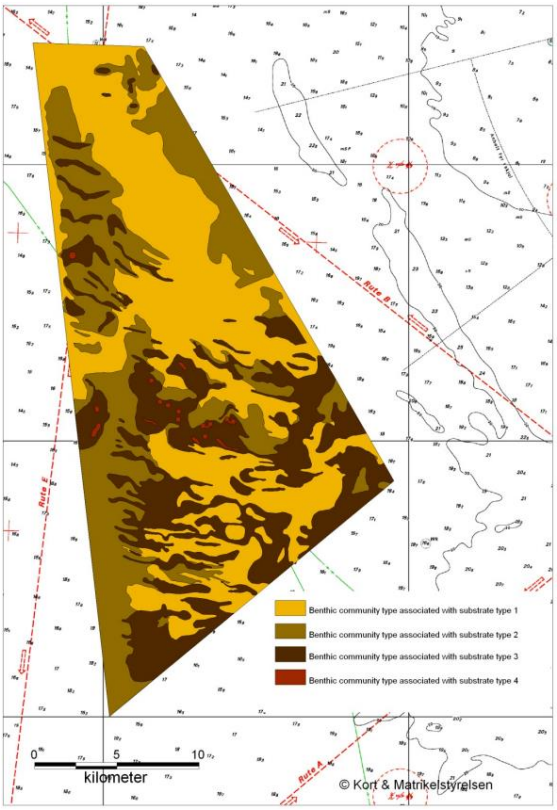


Figure 4-6. *Benthic community map showing the four different benthic community types in the Anholt array area. Source: Rambøll, 2009.*

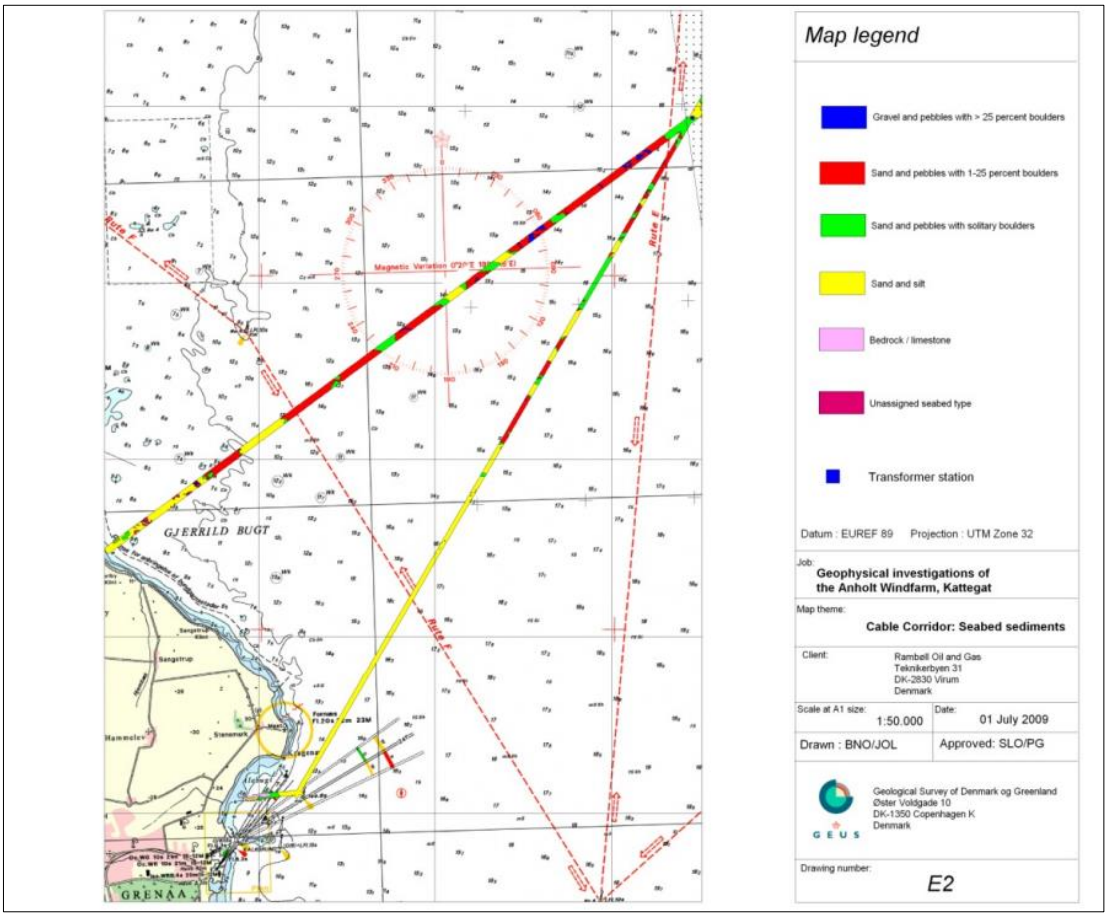


Figure 4-7. *Final benthic substrate map showing the area and distribution patterns of the four final substrate types defined in the two cable corridors. Source: Rambøll, 2009.*

4.3.1 Summary

An overview of previous sampling stations within or in close distance to the OWF area, export cable corridor and landfall area in the planned Kattegat OWF area is given in Table 4-2

Table 4-2. *An overview of sampling stations in or close to the Kattegat project area; NOVANA stations examined in the period 1st of January 2020 to 1st of August 2023, monitoring stations in connection to the Anholt offshore wind farm project area, and monitoring stations in the Natura 2000 site Schultz og Hastens Grund samt Briseis Flak.*

Kattegat	**No. of NOVANA monitoring stations with results < 3 years**	**No. of Anholt site stations sampled in 2009**	**No. of Natura 2000 monitoring stations *Schultz og Hastens Grund samt Briseis Flak***
Array area	0	0	2
Corridor & landfall	3 (macroalgae)	1 dive location	-

4.4 Abiotic data

Physical parameters such as depth, salinity, and oxygen concentration are determining factors for the living conditions and habitat types available for benthic fauna and flora. Salinity, temperature, and oxygen profiles are measured in the water column using a CTDO. The planned Kattegat OWF area is located in the southern parts of Kattegat, a semi-enclosed sea between Denmark and Sweden, with water depths of 20-40 m.

Kattegat is influenced by water input from the Baltic and the North Sea and is characterised by a strong vertical salinity stratification called a halocline. This stratification creates a two-layer system, made up of highly saline water (34 PSU) from Skagerrak that sinks to the deeper water layers, whilst the surface waters are less saline and a mix of deep water and brackish water from the Baltic (15-30 PSU) (Andersson, 1996; Wesselander et al., 2017). The halocline, which is present in Kattegat throughout the year, is strongest during summer and weakest during winter (Andersson, 1996).

Dissolved oxygen is necessary for healthy marine ecosystems, making oxygen deficiency of particular concern. Well-oxygenated bottom water is important for the survival of especially benthic fauna Oxygen deficiency can be caused by eutrophication; excessive enrichment of marine water with nutrients, which may lead to extreme algal blooms. Eutrophication is a significant threat in Kattegat, as bacterial decomposition of the organic material from algal blooms can cause oxygen depletion and disturb the overall water quality (Devlin et al., 2022). The European Environment Agency measure the dissolved oxygen (DO) concentration in European marine water based on a four-class system: Good: >6 mg/l, Moderate: 4-6 mg/l, Poor: 2-4 mg/l, Very Poor: <2 mg/l (EEA, 2023). Oxygen concentrations above 6 mg/l are considered to support marine life with minimal problems, whilst concentrations below 2 mg/l can cause severe problems (hypoxia) (Levin et al., 2009). The deep-water oxygen concentrations in Kattegat typically decline with increasing distance from Skagerrak, its deep-water source, and has mean near-bed dissolved oxygen concentrations of 3.98 mg/l (‘Poor’ conditions) based on data from 2006-2014 (OSPAR, 2017). Oxygen deficits have been previously reported in the coastal and deep-water areas of Kattegat, especially in the southern parts where the halocline lies very close to the bottom (Wesselander et al., 2017; Andersson, 1996; Rosenberg et al., 1990).

5 2024 SURVEY RESULTS

5.1.1 Benthic habitat description

In the Kattegat area, muddy sand is found in the central and southern part of the area (Figure 5-1). A smaller part of the western area consists of sand, and in the northern part there is gravel and coarse sand with till/diamicton (contains particles ranging in size from clay to boulders) and stones (COWI, 2022b). The deposits of moraine and stones in the area may indicate that there are stone reefs in these areas. These marine habitats are very important for maintaining the biodiversity in the area. It is assumed that the benthic fauna composition in the Kattegat area is similar to that found in the area for the planned Hesselø OWF area, as they are located relatively close to each other (COWI, 2022b).

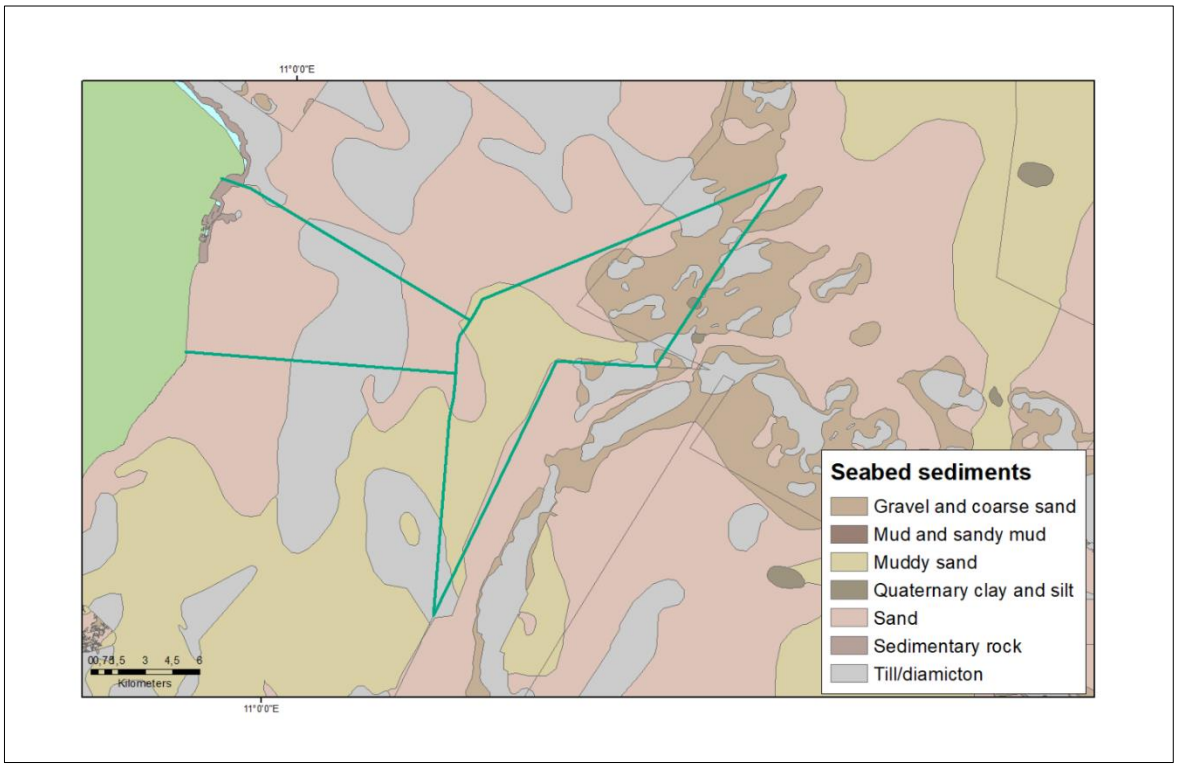


Figure 5-1 *Seabed sediments in the Kattegat project area. Source: GEUS, 2023.*

5.2 Abiotic data (Hydrography)

Abiotic data refers to the environment's non-living chemical and physical parts that affect living organisms and ecosystem functioning. This includes factors such as temperature, oxygen, salinity, and other non-biological influences that contribute to the conditions and habitat types available for organisms. In the context of environmental studies, abiotic data is crucial for understanding the habitat and living conditions of species like benthic fauna and flora.

CTD profiles of salinity, temperature and oxygen concentrations were sampled at five stations (KA-2, KA-10, KA-13, KAC-1 and KAC-6) in the Kattegat area (Figure 5-2). CTD profiles show the variation in salinity, temperature and oxygen vertically in the water column from the sea surface to approximately 1 meter above the sea bottom. The maximum depths for the five stations in the area for the planned Kattegat area varied between 7 and 24 meters, with KAC-6 being the shallowest station (Figure 5-2).

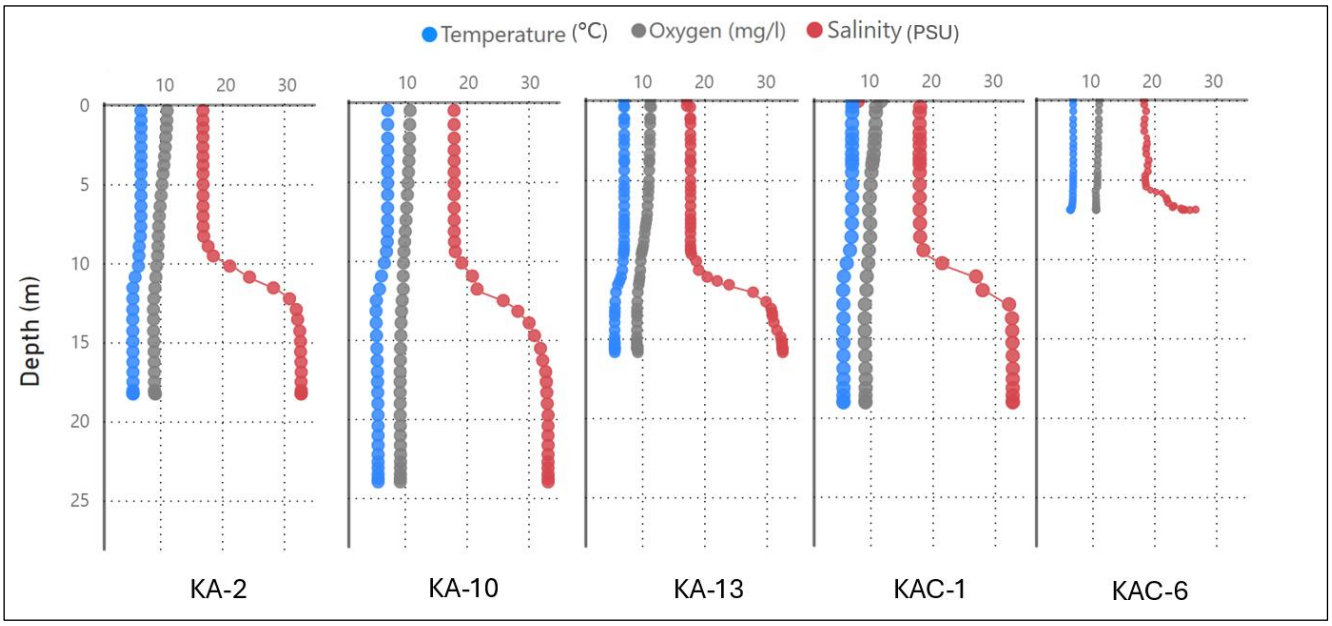


Figure 5-2 *CTD profiles of salinity, temperature and oxygen in the area for the planned Kattegat OWF area and ECC area***.**

Most of the stations have a similar salinity pattern, ranging from 17-19 PSU in the upper water layers and with the highest concentrations at the sea bottom (32-33 PSU). It rapidly increases at around 10 meters depth for all stations (except for KAC-6), representing a layer in the water column termed the halocline, which is typical for Kattegat. The halocline works as a density barrier between the less saline upper water layers and the more saline water layers below, which can prevent mixing between the two. The halocline is found at 8-11 meters depth for all stations except for KAC-6, where the halocline is less prominent due to the shallow depth of the station. KAC-6 has an increase in salinity of 6-7 meters depth, with a maximum salinity of 26.7 PSU at 7 meters depth.

Generally, the temperature and oxygen concentrations remain relatively constant downwards in the water column with slightly higher values at the sea surface. No distinct thermocline (sharp change in temperature with depth) was observed at any of the stations, which can be explained by the fact that the CTDO measurements were taken in April 2024. A thermocline typically forms during summer when there is sufficient heating of the surface waters, whilst salinity stratification (halocline) is independent of temperature and can be caused by water input from Skagerrak and the Baltic, wind-driven mixing near the surface, and/or coastal circulation patterns. The presence of a halocline without a thermocline in April suggests salinity-driven stratification but minimal temperature stratification due to the cooler, well-mixed water column typical of early spring.

The oxygen concentrations in the surface layers had an average concentration of 11-12 mg/l for all stations and decreased gradually to 8-9 mg/l in the bottom water, except for KAC-6 with slightly higher bottom water concentrations of 10.5 mg/l. The oxygen concentrations are classified as ‘Good’ (>6 mg/l) for all stations (EEA, 2023). The data did not show any signs of oxygen depletion in the deeper waters as previously reported in Kattegat (Andersson, 1996; Wesselander et al., 2017), or it could be the hydrography of the localized area.

5.3 Seabed sediment characteristics

5.3.1 Sediment samples

The colour and characteristics (clay, silt, sand, gravel etc.) of the sediments collected in the grab samples were described during sampling. At Kattegat, the sediment was characterized by an olive to grey-brown colour, typically with a thin layer of brown sediment on the surface and a more grey-brown colour throughout the rest of the sample (Figure 5-3). The sediment composition at these stations was predominantly a mixture of sand and silt, with clay present in the deeper layers. Several stations also contained shell fragments (KA-3, KA-4 and KA-11).

Figure 5-3 *Sediment colour and characteristics in a selection from the planned Kattegat OWF area.*

In Kattegat ECC, the sediment had an olive to grey-brown colour (Figure 5-4). The sediment at these stations varied less, mostly consisting of sand and some areas with gravel, stones, and shells. The presence of coarser sediment and stones often resulted in more unsuccessful grab attempts, as it was challenging to target a soft-bottom area. This was especially evident at stations KAC-6, KAC-7 and KAC-8, which resulted in 12, 15 and 20 misses, respectively.

Figure 5-4 *Sediment colour and characteristics in a selection from Kattegat ECC.*

5.3.1.1 Physical parameters

Physical and chemical sediment samples were collected from the sediment as supporting parameters for the statistical analysis. The physical parameters total organic content (TOC) and grain size in the sediments determine the oxygen conditions. From the grain size distribution, the fraction of silt and clay fraction (particles < 0.063 mm) was determined, as well as the median particle size in the sediment (D50). D50 is the particle size where 50 % of the particles are bigger and 50 % of the particles are smaller than this size.

The results from the planned Kattegat OWF area (Table 5-1) varied with depth, but comparing the two deepest stations (KA-8 and KA-7, at 38 and 36 m) with the shallowest stations (KA-1, KA-13, KA-14, all at 21 m) revealed a pattern. In general, the organic content (TOC) and the silt and clay fractions increased with greater water depth, while the average grain size (D50) decreased. Consequently, the deeper areas exhibited high organic content and fine-grained sediments. In contrast, the shallow stations typically displayed larger grain sizes and lower organic content. The results from Kattegat ECC (Table 5-2) were less clear, as most had an inaccurate value for TOC content (<2 %). Still, KAC-1, the deepest station shows a pattern similar to the one in the planned Kattegat OWF area, and the D50 was somewhat higher in the shallower areas, indicating coarser sediments. KAC-7 had particularly coarse sediments, with a D50 of 2.629 mm and the lowest silt and clay fraction (0.6 %). The mean fraction at Kattegat ECC was approx. 7 %, while it in the planned Kattegat OWF area was approx. 8 %.

Table 5-1 *Physical conditions in the sediment surface in the planned Kattegat OWF area. TOC = total organic carbon, D50 = median particle size. Silt and clay are all particles <0.063 mm*

Station	Depth [m]	TOC [% of DW]	D50 [mm]	Silt and Clay fraction (%)
KA-1	21	<0.2	0.274	2.7
KA-2	22	<0.2	0.348	3.4
KA-3	24	0.52	0.162	16.1
KA-4	27	0.24	0.111	11.5
KA-5	28	<0.2	0.300	3.9
KA-6	30	0.34	0.193	10.7
KA-7	36	0.83	0.107	27.4
KA-8	38	0.34	0.139	12.4
KA-9	33	<0.2	0.185	4.1
KA-10	27	0.31	0.203	11.3
KA-11	22	<0.2	0.160	3.1
KA-12	22	0.2	0.132	4
KA-13	21	<0.2	0.215	1.7
KA-14	21	<0.2	0.309	1.6

Table 5-2 *Physical conditions in the sediment surface at Kattegat ECC. TOC = total organic carbon, D50 = median particle size. Silt and clay are all particles <0,063 mm*

Station	Depth [m]	TOC [% of DW]	D50 [mm]	Silt and Clay fraction (%)
KAC-1	22	0.24	0.110	26.8
KAC-2	22	<0.2	0.329	1.6
KAC-3	21	<0.2	0.227	8.8
KAC-4	20	<0.2	0.212	11.2
KAC-5	16	<0.2	0.115	2
KAC-6	12	<0.2	0.185	2
KAC-7	11	<0.2	2.629	0.6
KAC-8	10	<0.2	0.496	2.9

5.3.1.2 Chemical parameters

Classification of environmental quality status in the sampled sediments is made according to the threshold criteria in Table 5-3, listed in the order of importance.

Table 5-3 *Threshold values for the parameters analysed. NEQS = National Environmental Quality Standards (Miljøstyrelsen, n.d.), Danish EPA. EQS = Environmental Quality Standards (HELCOM, 2017), EU. ERL = Effect Range Low (OSPAR Commission, 2021), US EPA. LAL = Lower Action Level (Miljøstyrelsen, 2008), Danish Dredging Manual/Klapvejledningen.*

Parameter		Thresholds			
		NEQS	EQS	ERL	LAL
Heavy metals	Arsenic (As)	0.4		8.2*	20
	Barium (Ba)				
	Lead (Pb)	163	120	47*	40
	Cadmium (Cd)	3.8	2.3	1.2*	
	Chromium (Cr)	9.2		81*	
	Copper (Cu)			34*	20
	Mercury (Hg)			0.15*	
	Nickel (Ni)	6.8		21*	30
	Silver (Ag)	13			
	Zinc (Zn)			150*	
PAH	Naphthalene	0.138		0.160**	
	Acenaphthylene				
	Acenaphthene	0.048***			
	Fluorene				
	Anthracene	0.024***	0.024***	0.085**	0.085
	Fluoranthene	3.5***		0.600**	
	Pyrene	0.42***		0.665**	
	Chrysene/ Triphenylene	0.0231***		0.384**	
	Benzo(b+j+k)fluoranthene				
	Benzo(e)pyrene				
	Indeno(1,2,3-cd)pyrene			0.240**	
	Benzo(g,h,i)perylene			0.085**	
	1-Methylnaphthalene	0.478 x fOC			
	2-Methylnaphthalene	0.478 x fOC		0.070**	
	Dimethylnaphthalenes, sum	0.478 * fOC			
	Trimethylnaphthalenes, sum	0.478 * fOC			
Phthtalates	Dibutyl phthalate (DBP)				
	Benzylbutylphthalate (BBP)	0.4***			
	Di(2-ethylhexyl)adipat (DEHA)				
	Di(2-ethylhexyl)phthalate (DEHP)	0.53***			
	Di-n-octylphthalate (DNOP)				
	Diisononylphthalate (DNP)				
	Diisodecylphthalat (DIDP)				
Phenols	4-t-octylphenol	0.2***			
	4-n-octylphenol				
	4-n-nonylphenol				
	Nonylphenols, sum				
	Nonylphenol-monoethoxylater (NP1EO)				
	Nonylphenol-diethoxylater (NP2EO)				
	Dibenzothiophene			0.190**	

* 5% Al
** 2.5 % TOC
*** 5% OC

The analysis of the samples collected from the planned Kattegat OWF area and ECC shows that most of the chemical parameters are within their threshold values. Still, the NEQS threshold values for arsenic were exceeded at all stations at both locations (Table 5-4 and Table 5-5). No other thresholds (EQS, ERL, or LAL) were exceeded.

Table 5-4 *Chemical conditions in the sediment surface in the planned Kattegat OWF area. Unit = mg/kg. Chemical parameters (heavy metals, PAH-compounds, phthalates, phenols, and dibenzothiophene). Red numbers represent exceeded threshold values (see Table 5-3). Heavy metals, PAH and dibenzothiophene are analysed by Eurofins, and those marked with an asterisk (*). Phthalates and phenols are analysed by DCE.*

Parameter		Station and depth (m)						
		KA-1	KA-3	KA-5	KA-7	KA-9	KA-11	KA-13
		21	24	28	36	33	22	21
Heavy metals	Arsenic (As)	2	3.1	2.8	4.1	3.6	5.6	2.6
	Barium (Ba)	2.7	4.8	3.6	11	3.4	61	3.1
	Lead (Pb)	2.9	5.1	3.8	8.3	4.1	5.6	3.4
	Cadmium (Cd)	<0.03	0.071	<0.03	0.075	0.035	0.058	<0.03
	Chromium (Cr)	2.2	4.5	2.8	8.3	4.1	5.1	4.2
	Copper (Cu)	0.7	1.3	0.65	2.8	0.86	1.1	0.58
	Mercury (Hg)	0.0064	0.0073	0.0075	0.0064	<0.005	0.0082	<0.005
	Nickel (Ni)	1.4	2.3	1.4	4.4	1.6	2.6	1.4
	Silver (Ag)	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
	Zinc (Zn)	5.3	12	7.2	21	11	14	7.7
PAH	Naphthalene	<0.0008	0.0034	<0.0008	0.0051	<0.0008	<0.0008	<0.0008
	Acenaphthylene	<0.0005	0.0007	<0.0005	0.0012	<0.0005	<0.0005	<0.0005
	Acenaphthene	<0.0005	<0.0005	<0.0005	<0.0008	<0.0005	<0.0005	<0.0005
	Fluorene	<0.0005	0.0009	<0.0005	0.0017	<0.0005	<0.0005	<0.0005
	Anthracene	<0.0005	0.0016	<0.0005	0.0029	<0.0005	<0.0005	<0.0005
	Fluoranthene	<0.003	0.0081	<0.003	0.018	<0.003	<0.003	<0.003
	Pyrene	<0.003	0.0061	<0.003	0.014	<0.003	<0.003	<0.003
	Chrysene/ Triphenylene	<0.001	0.0047	0.0014	0.01	<0.0015	<0.001	<0.001
	Benzo(b+j+k)fluoranthene	0.002	0.018	0.0035	0.035	0.0042	0.0025	0.002
	Benzo(e)pyrene	<0.001	0.0052	0.0012	0.011	0.0015	<0.001	<0.001
	Indeno(1,2,3-cd)pyrene	<0.002	0.0072	<0.002	0.013	0.0022	<0.002	<0.002
	Benzo(g,h,i)perylene	0.001	0.0083	0.0015	0.016	0.0026	0.0016	0.0011
	1-Methylnaphthalene	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.0005	<0.0005
	2-Methylnaphthalene	<0.001	0.0018	<0.001	0.0038	<0.001	<0.001	<0.001
	Dimethylnaphthalenes, sum	<0.003	0.0049	<0.003	0.01	<0.003	<0.003	<0.003
	Trimethylnaphthalenes sum	<0.001	0.0022	<0.001	0.0046	<0.001	<0.001	<0.001
Phthalates	Dibutylphthalate (DBP)	<0.001	0.001	0.016	0.009	0.003	0.007	<0.001
	Benzylbutylphthalate (BBP)	<0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.001
	Di(2-ethylhexyl)adipat (DEHA)	0.003	0.002	0.019	0.004	0.004	0.005	0.002
	Di(2-ethylhexyl)phthalate (DEHP)	0.003	0.01	0.043	0.038	0.019	0.009	0.008
	Di-n-octylphthalate (DNOP)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Diisononylphthalate (DNP)	<0.005	0.007	<0.005	0.018	0.011	<0.005	0.006
	Diisodecylphthalat (DIDP)	0.001	0.014	0.002	0.031	0.007	0.003	0.003
Phenols	4-t-octylphenol	<0.001	0.0019	<0.001	0.0023	<0.001	0.0037	0.0045
	4-n-octylphenol	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	4-n-nonylphenol	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0013
	Nonylphenols, sum	0.0028	0.0034	<0.001	0.0026	<0.001	0.0012	0.0016
	Nonylphenol-monoethoxylater (NP1EO)	0.0028	<0.001	0.0024	<0.001	0.0039	0.0017	0.0034
	Nonylphenol-diethoxylater (NP2EO)	0.0019	<0.001	0.0021	0.0020	0.0028	<0.001	0.0013
	Dibenzothiophene	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table 5-5 *Chemical conditions in the sediment surface at Kattegat ECC. Unit = mg/kg. Chemical parameters (heavy metals, PAH-compounds, phthalates, phenols, and dibenzothiophene). Red numbers represent exceeded threshold values (see Table 5-3). Heavy metals, PAH and dibenzothiophene are analysed by Eurofins, and phthalates and phenols are analysed by DCE.*

Parameter		Station and depth (m)				
		KAC-1	KAC-3	KAC-5	KAC-7	KAC-8
		22	21	16	11	10
Heavy metals	Arsenic (As)	3.1	2.3	2	2.5	2.7
	Barium (Ba)	4.7	2.9	2.4	0.76	1.1
	Lead (Pb)	4.4	3.2	2.9	<0.03	<0.03
	Cadmium (Cd)	0.082	0.064	<0.03	0.76	0.64
	Chromium (Cr)	4.9	3.7	2.3	0.44	1.5
	Copper (Cu)	0.95	0.67	0.45	<0.005	0.007
	Mercury (Hg)	<0.005	<0.005	<0.005	0.76	1
	Nickel (Ni)	2.1	1.4	0.98	<0.15	<0.15
	Silver (Ag)	<0.15	<0.15	<0.15	2.7	3.1
	Zinc (Zn)	12	9.4	4.5	<0.0015	<0.0008
PAH	Naphthalene	0.0009	<0.0008	<0.0008	<0.0005	<0.0005
	Acenaphthylene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Acenaphthene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Fluorene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Anthracene	0.0006	<0.0005	<0.0005	<0.003	<0.003
	Fluoranthene	0.0037	<0.003	<0.003	<0.003	<0.003
	Pyrene	<0.003	<0.003	<0.003	<0.001	<0.001
	Chrysene/ Triphenylene	0.0021	<0.0015	<0.001	<0.0015	<0.0015
	Benzo(b+j+k)fluoranthene	0.0063	0.0034	<0.0015	<0.001	<0.001
	Benzo(e)pyrene	0.0022	0.0011	<0.001	<0.002	<0.002
	Indeno(1,2,3-cd)pyrene	0.0032	<0.002	<0.002	<0.001	<0.001
	Benzo(g,h,i)perylene	0.0037	0.0018	<0.001	<0.0005	<0.0005
	1-Methylnaphthalene	<0.0005	<0.0005	<0.0005	<0.001	<0.001
	2-Methylnaphthalene	0.0011	<0.001	<0.001	<0.003	<0.003
	Dimethylnaphthalenes. sum	0.0041	<0.003	<0.003	<0.001	<0.001
	Trimethylnaphthalenes. sum	0.0025	<0.001	<0.001	<0.01	<0.01
Phthalates	Dibutylphthalate (DBP)	0.010	0.001	0.008	<0.01*	<0.01*
	Benzylbutylphthalate (BBP)	<0.001	0.005	0.001	-	-
	Di(2-ethylhexyl)adipat (DEHA)	0.004	0.004	0.01	<0.01*	<0.01*
	Di(2-ethylhexyl)phthalate (DEHP)	0.014	0.002	0.014	<0.01*	<0.01*
	Di-n-octylphthalate (DNOP)	<0.001	<0.001	<0.001	<0.02*	<0.02*
	Diisononylphthalate (DNP)	0.006	<0.005	<0.005	<0.01*	<0.01*
	Diisodecylphthalat (DIDP)	0.01	0.011	0.005	-	-
Phenols	4-t-octylphenol	<0.001	<0.001	<0.001	<0.0005*	<0.0005*
	4-n-octylphenol	<0.0005	<0.0005	<0.0005	<0.0005*	<0.0005*
	4-n-nonylphenol	0.0007	<0.0005	<0.0005	<0.1*	<0.1*
	Nonylphenols, sum	0.0019	0.0012	0.0012	<0.001*	<0.001*
	Nonylphenol-monoethoxylater (NP1EO)	0.0038	<0.001	0.0014	-	-
	Nonylphenol-diethoxylater (NP2EO)	0.0020	0.0012	0.0016	-	-
	Dibenzothiophene	<0.001	<0.001	<0.001	-	-

5.3.2 Visual registrations of sediment type (ROV)

A total of 13,7 km of seabed in the planned Kattegat OWF area and ECC was surveyed by use of ROV in April 2024, and registrations of substrate type according to the Danish classification system were made along the survey transects. A map summarising substrate registration in each survey transect is shown in Figure 5-5. An example map of sediment registrations along the visual transects is given in Figure 5-6. Detailed maps of substrate registrations for each visual survey transect are given in Appendix 2.

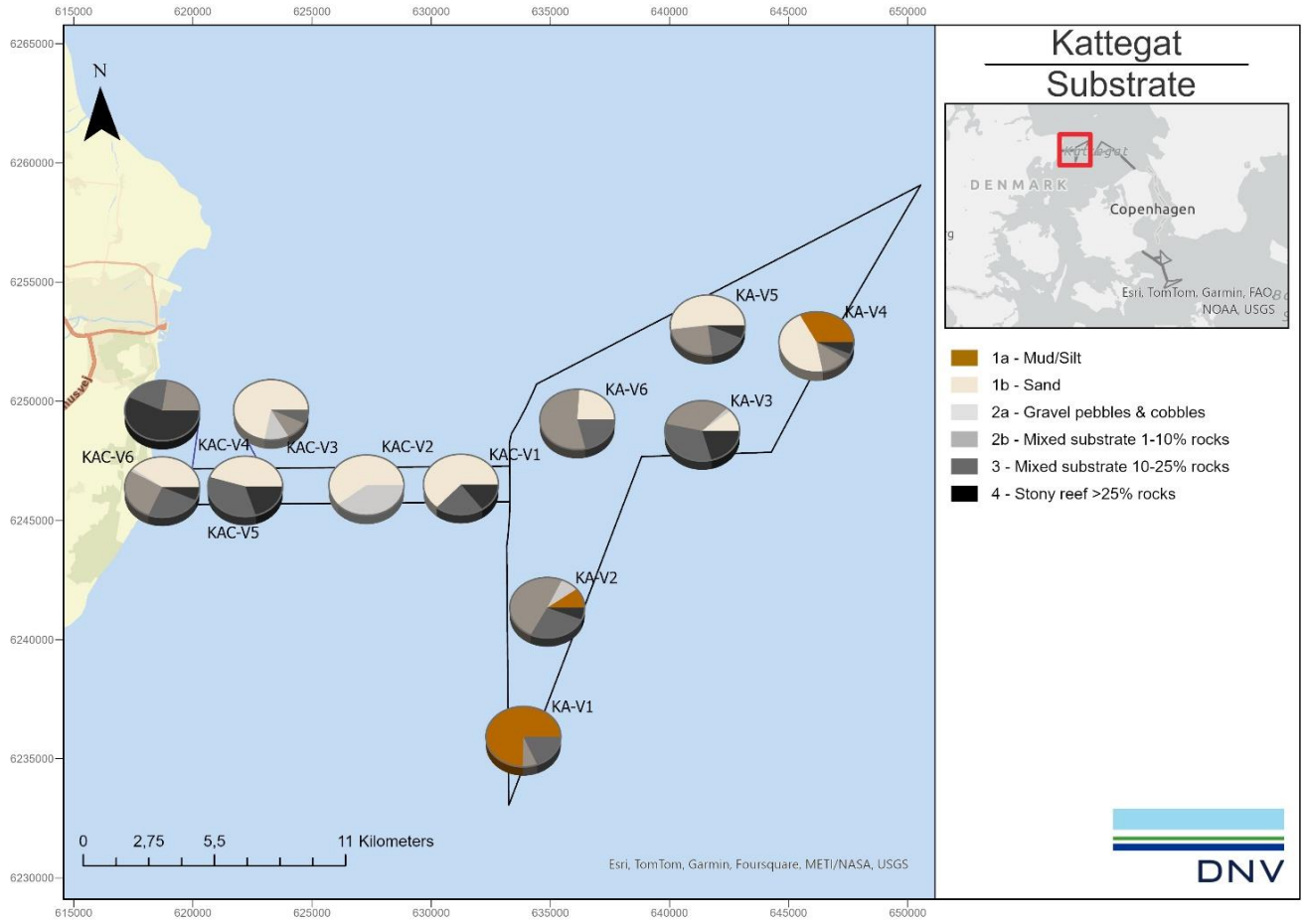


Figure 5-5 *Map summarising registrations of substrate types according to the Danish classification scheme in visual survey transects.*

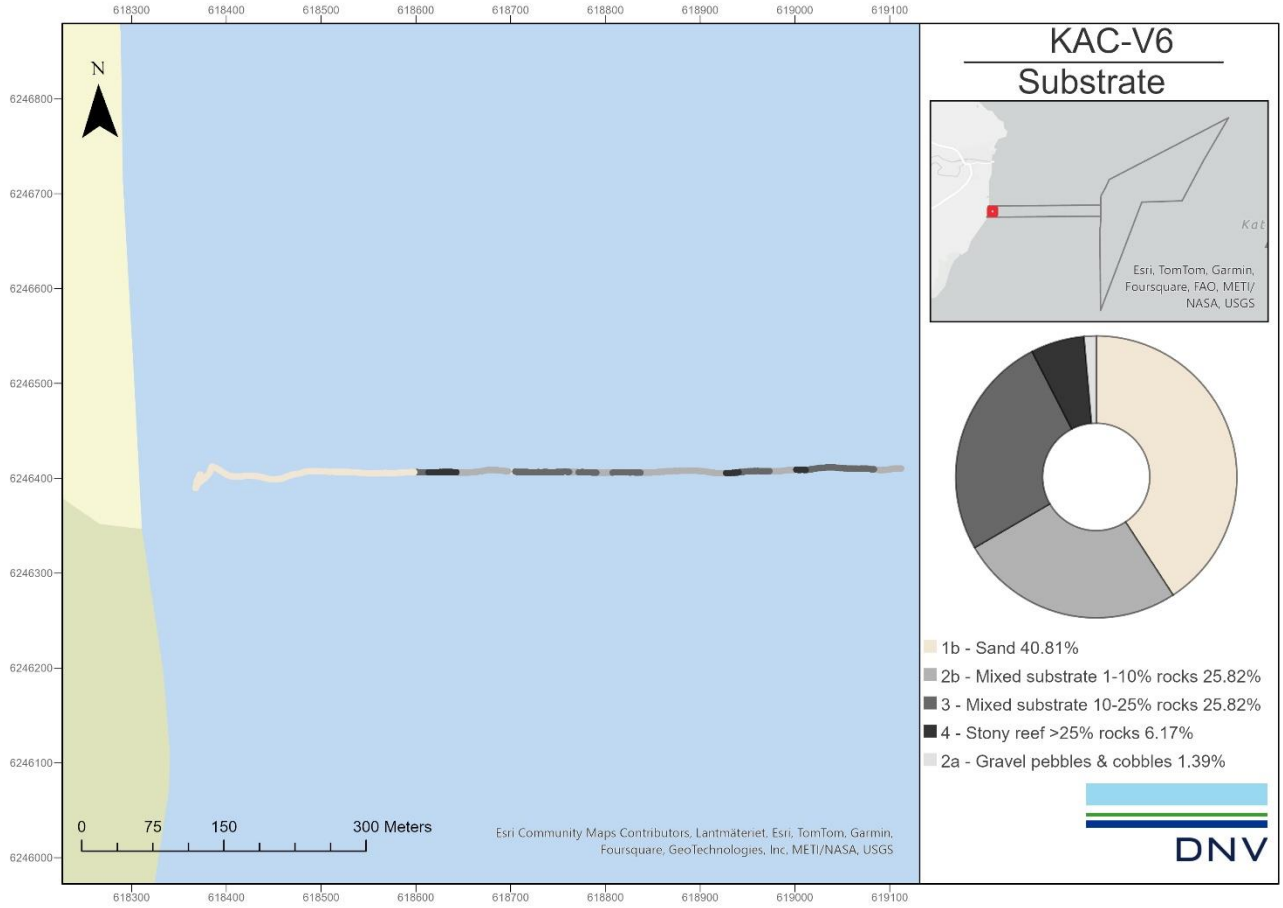


Figure 5-6 *Example map of substrate registrations along the ROV survey track, visual transect KAC-V6*.

5.4 Benthic communities (nature types)

5.4.1 Benthic megafauna and macroalgae (ROV)

5.4.1.1 General overview

A total of 13.7 km with visual survey transects were surveyed in detail, and registrations were made of dominating fauna and flora types along the survey tracks. A species list was produced for each survey transect. A map summarising main registrations flora types in each visual transect is given in Figure 5-8. A detailed map of fauna and flora registrations along the seabed for each visual survey transect is given in Appendix 3. An example map of detailed registrations of flora and fauna along a visual survey transect is given in Figure 5-9. The species list for the visual survey is given in Appendix 4. Example images of seabed fauna and flora is given in Figure 5-10. Example images from landfall/ shoreline at Grenå is given in Figure 5-11.

A total of 79 species of benthic megafauna and macroalgae were registered in the planned Kattegat OWF area and ECC, in addition, 21 fish species were encountered during the survey. Table 5-6 gives a summary of the distribution of species within taxonomical groups, shown as histograms in Figure 5-7.

Table 5-6 *Table summarising number of species of megafauna and macro algae in each taxonomical group in the visual survey transects in the planned Kattegat OWF area and Kattegat ECC.*

AREA	STATION	GROUP								
		Porifera	Polychaeta	Varia	Crustacea	Mollusca	Echinodermata	Cnidaria	Pisces	Plantae
KATTEGAT OWF	KA-V1	1	4		2	2	3	1	5	3
	KA-V2	1	1		2	3	3		5	1
	KA-V3				2	2	3	3	5	4
	KA-V4		2		2	2	1	3	6	2
	KA-V5		2		1	4	5		7	2
	KA-V6				3	1	7	1	4	3
	No. Species	1	4		4	5	12	4	12	8
KATTEGAT ECC	KAC-V1	1	2		5	5	6	1	4	4
	KAC-V2		1		3	3	7	2	9	3
	KAC-V3	1	1	1	4	6	3	3	12	9
	KAC-V4	1	1		1	1	2			14
	KAC-V5	1	2	2	4	2	3			18
	KAC-V6	1	1	2	3	1	2			22
	No. Species	3	4	2	7	9	9	5	19	31
TOTAL		3	6	2	7	10	13	7	21	31

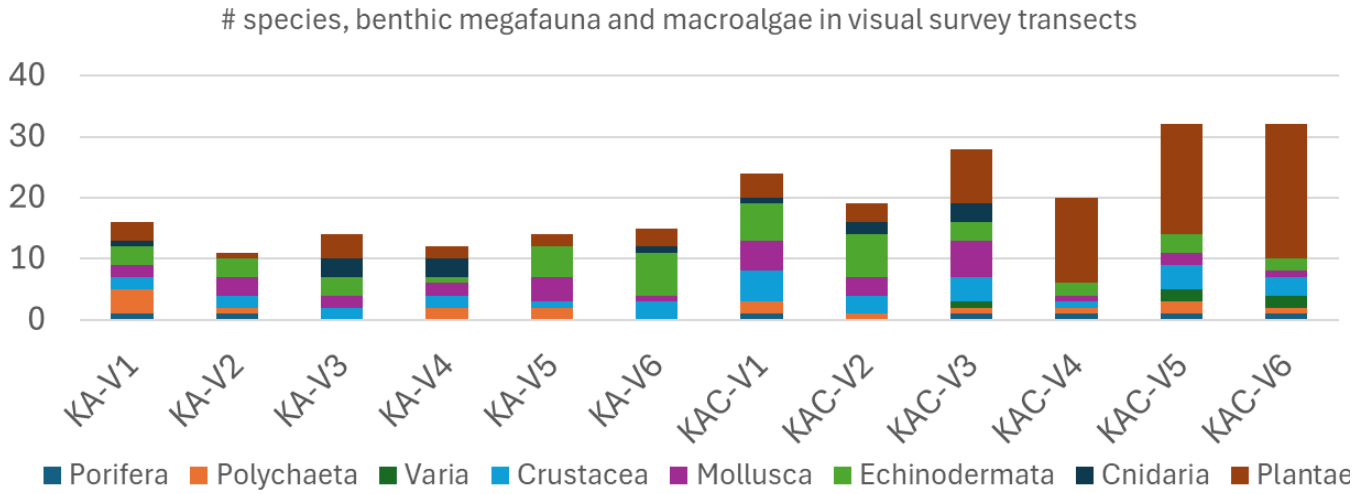


Figure 5-7 *Histogram showing number of species within different taxonomical groups of benthic megafauna and macroalgae registered in visual survey transects in the planned Kattegat OWF area and Kattegat ECC.*

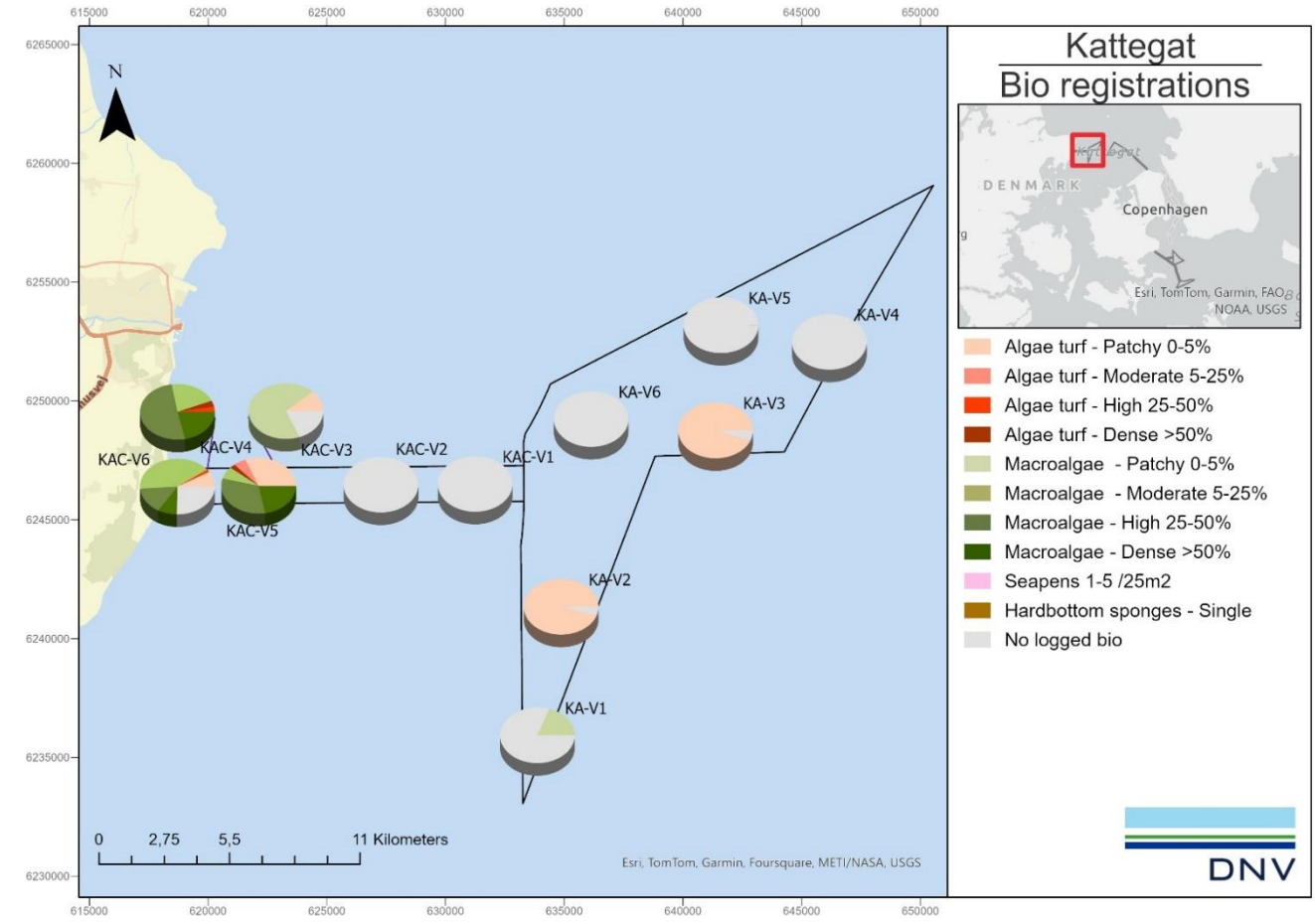


Figure 5-8 *Map summarising relative amounts of main findings of fauna and flora coverage types in visual survey transects at the planned Kattegat OWF area and ECC.*

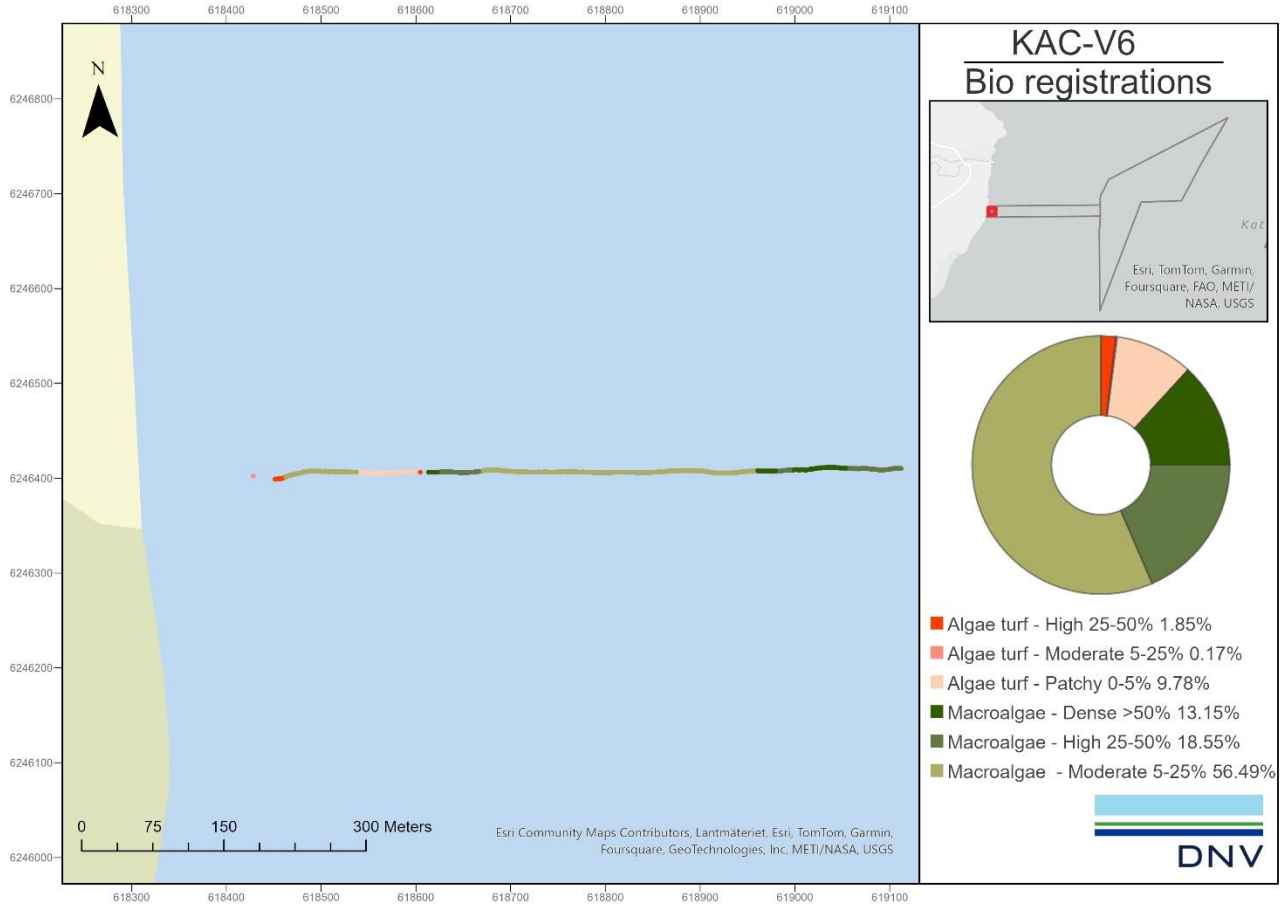
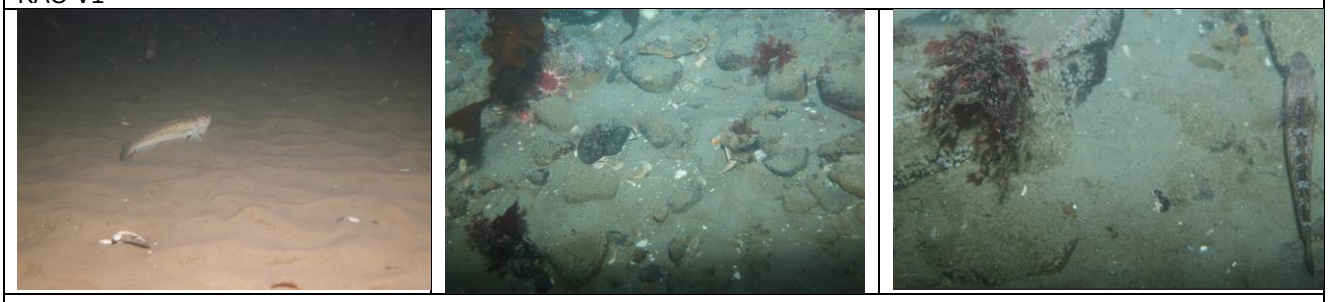


Figure 5-9 *Example map showing registrations of megafauna and macroalgae along the ROV track for visual survey transect KAC-V6.*

KA-V1

KA-V3

KAC-V1



KAC-V3

Figure 5-10 *Example images from selected visual survey transects: KA-V1, KA-V3, KAC-V1, KAC-V3.*

Figure 5-11 *Example images from landfall at Kattegat ECC, bottom images show seabed at 1- and 2-meters depth*.

5.4.1.2 Red-listed or vulnerable species and nature types

No red listed species were encountered in the visual survey transects. Ocean Quahog (*Arctica islandica)* was registered at low densities in several transects. The species is listed in OSPARs list of declining species and/or habitats and considered to be under threat/ or in decline in OSPAR Region II (The greater North Sea), see OSPAR (2009).

Stony reefs supporting increased levels of biodiversity of hard bottom fauna and flora were registered in smaller portions of transects KA-V3, KAC-V4 and KAC-V5 (see Figure 5-5).

5.4.1.3 Introduced species

The invasive Round goby (*Neogobius melanostomus*) was registered in both the planned Kattegat OWF area and Kattegat ECC. The species main area of habitation is reported to be in the waters south of Zealand (see Jensen et al., 2023), but clearly has been established in Kattegat.

Apart from the Round goby no macrofauna or macroalgae species considered as invasive species to Danish waters were registered in the visual surveys.

5.4.1.4 Multivariate analyses, visual data

Similarity analyses based on relative abundances of species in visual survey transects were performed. The resulting cluster diagram (dendrogram) is shown in Figure 5-12. The analyses show that the visual transects can be separated in two main groups at 25% similarity. The group to the left in the dendrogram (KAC-V4, KACV5 and KAC-V) consists of the shallowest transects that are dominated by the algae *Ceramium spp., Furcellaria lumbricalis, Vertebrata spp.* and *Chorda filum.* The remaining transects are situated in deeper water and are dominated, by varying densities mainly of hermit crab *Pagurus bernhardus,* ocean quahog *Arctica islandica,* the snail *Turitella sp.* and the echinoderms *Asterias rubens, Ophiothrix fragilis,* and *Ophiocomina nigra.*

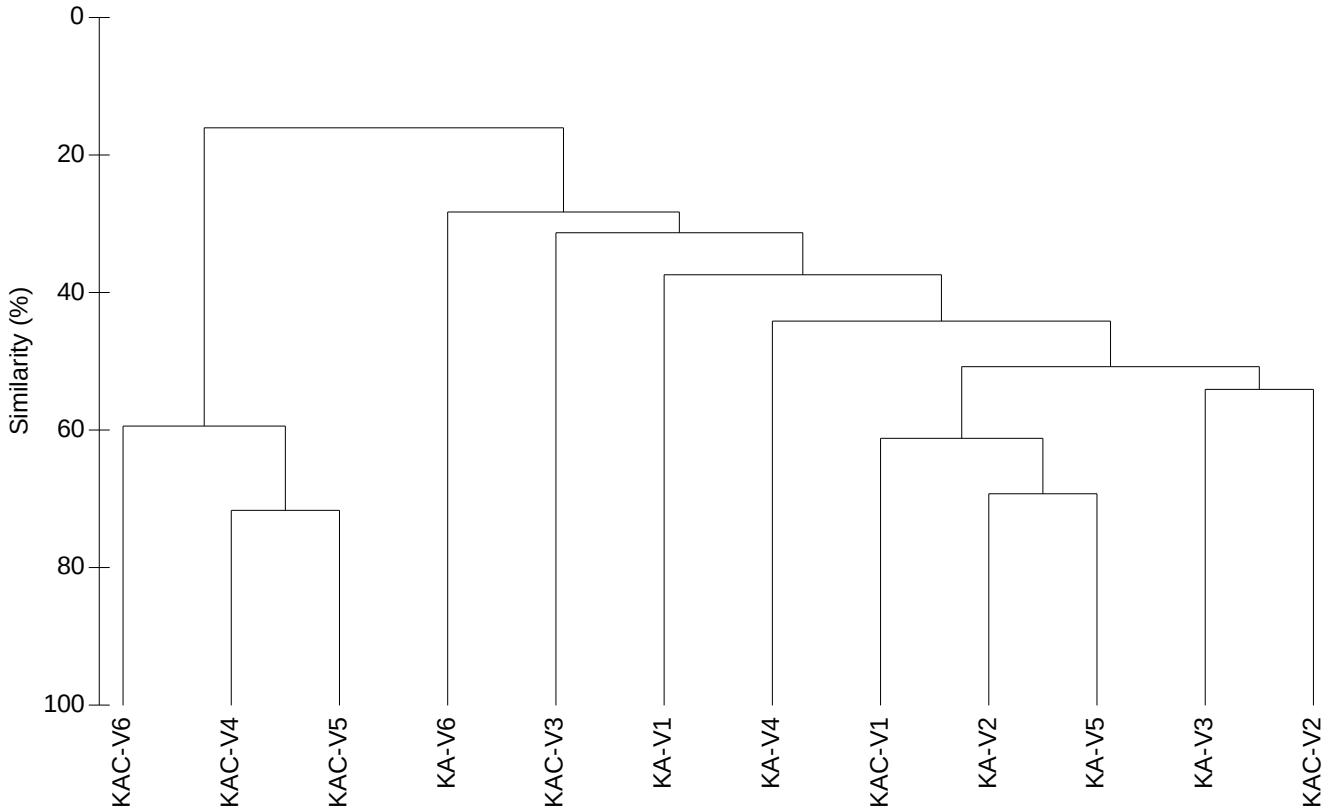


Figure 5-12 *Dendrogram resulting from similarity analyses of relative abundances of species of megafauna and macroalgae in visual survey transects.*

5.4.2 Benthic infauna (sediment samples)

A total of 78 sediment samples were analyzed from 22 different stations at Kattegat OWF and ECC. Four grab samples (0.1 m^2 surface area) were analyzed for each environmental station. The samples were analyzed for benthic infauna species occurrences and abundances. Biomass of each infauna species at each sediment station was calculated for 1 m^2.

5.4.2.1 Diversity and dominant species

Table 5-7 shows the distribution of individuals and taxa for infauna sampled at Kattegat OWF and ECC. Species list from the survey is given in Appendix 5. A total of 22418 individuals distributed among 214 different taxa were recorded (juveniles excluded). Mollusca dominated the benthic infauna, constituting 39 % of individuals and 21 % of the species overall. Mollusca were particularly dominating in the planned Kattegat OWF area, in Kattegat ECC the polychaeta were dominating in number of specimens as is generally the case in benthic samples. The most species rich group was polychaeta, constituting 45% of the species overall. Echinoderms, even though low in species numbers had high densities of individuals, mainly attributed to occurrences of brittle stars.

Number of species, individuals, and the diversity indexes H, J and ES100, AMBI and DKI for the different environmental stations sampled is given in Table 5-8. Relative distribution of species in relation to ecological AMBI group is given in Figure 5-13. Highest number of individuals were recorded at station KA-3. Lowest number of individuals were registered at station HES-1. Highest number of species was registered at station KAC-6 and KAC-5, - the shallowest stations located closest to shore in the survey. Note that only 2 grabs were obtained from station GAC-6 (due to high amounts of rocks at the station).

Shannon-Wiener diversity (H') varied between 3.3 – 4.8 (KA-5 and KA-8, respectively). The diversity indexes are generally high and indicate high to good ecological status. AMBI scores are generally low and indicate good status (slightly disturbed class). The distribution of fauna within ecological AMBI groups (Figure 5-13) reflect a mix of infauna groups with various feeding preferences and sensitivity, and very few pollution indicators.

Table 5-7 *Distribution of individuals and taxa of infauna within the main taxonomic groups Kattegat OWF and Kattegat ECC (juveniles excluded).*

	Kattegat total				OWF				ECC			
Faunal groups	**Ind.**		**Taxa**		**Ind.**		**Taxa**		**Ind.**		**Taxa**	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Polychaeta	6722	30,0	99	45,2	4996	27,5	90	45,2	1726	40,5	58	45,7
Crustacea	1131	5,0	49	22,4	856	4,7	44	22,1	275	6,5	29	22,8
Mollusca	8736	39,0	46	21,0	7506	41,3	45	22,6	1230	28,9	27	21,3
Echinodermata	2762	12,3	8	3,7	2393	13,2	8	4,0	369	8,7	4	3,1
Varia	3067	13,7	12	5,5	2404	13,2	12	6,0	663	15,6	9	7,1
Total	**22418**	**100,0**	**214**	**97,7**	**18155**	**100,0**	**199**	**100,0**	**4263**	**100,0**	**127**	**100,0**

The ten most common species at each station is shown in Table 5-8. The fauna composition reflects healthy communities in most stations characterized with high biodiversity and with infauna communities being comprised of a mix of filter feeders, suspension feeders and carnivores. Kattregat OWF have high abundances of the mussel *Kurtiella bidentata* and the horseshoe worm *Phoronis.* Kattegat ECC have higher abundances of the polychaeta *Scoloplos armiger* and is generally more heterogenous with regards to what species is dominating at each station. The brittle star *Amphiura filiformis* is commonly found on most stations.

Table 5-8 *Univariate indexes calculated based on infauna samples The number of species (S) and individuals (N) per 0.4 m^2, Shannon Wiener's diversity index (H'), ES100 and evenness (J') AMBI and DKI. Results are presented station wise. Juveniles excluded.*

Station	S	N	J'	ES(100)	H'(log2)	AMBI	DKI
KA-1	65	979	0,69	26,95	4,14	1,97	0,76
KA-2	98	1209	0,73	31,85	4,80	2,23	0,80
KA-3	79	2063	0,65	24,42	4,13	2,02	0,76
KA-4	69	1858	0,60	21,41	3,66	2,26	0,68
KA-5	94	1489	0,51	23,65	3,34	2,27	0,67
KA-6	85	1604	0,59	23,81	3,76	2,21	0,71
KA-7	83	1782	0,64	26,32	4,08	2,22	0,74
KA-8	95	2022	0,61	26,30	3,98	2,27	0,72
KA-9	81	1043	0,69	28,88	4,39	1,79	0,78
KA-10	90	1825	0,67	27,42	4,33	2,10	0,77
KA-11	54	642	0,70	24,84	4,03	2,05	0,73
KA-12	54	1002	0,62	19,66	3,57	2,00	0,70
KA-13	49	374	0,73	27,22	4,08	1,63	0,75
KA-14	53	263	0,81	33,80	4,66	1,67	0,79
KAC-1	72	1638	0,64	21,61	3,95	2,35	0,71
KAC-2	52	296	0,83	33,84	4,74	1,79	0,79
KAC-3	78	907	0,75	30,41	4,71	2,11	0,79
KAC-4	59	902	0,76	27,88	4,47	2,24	0,84
KAC-5	48	420	0,81	28,87	4,51	1,72	0,86
KAC-6*	33	100	0,82	33,00	4,13	1,73	0,79
Min.	33	100	0,51	19,66	3,34	1,63	0,67
Max.	98	2063	0,83	33,84	4,80	2,35	0,86
* Only 2 grabs							

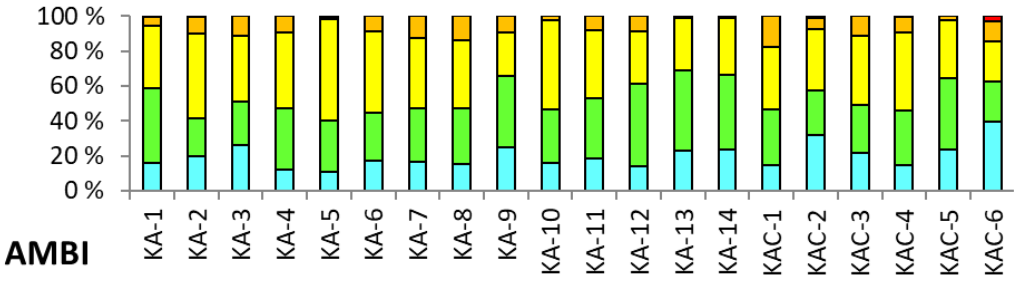


Figure 5-13 *Relative amounts of individuals of macrofauna in various ecological AMBI groups at the different stations. Explanation: ● Gr. I - sensitive species; ● Gr. II – neutral species; ● Gr.III – tolerant species; ● Gr.IV – opportunistic species; ● Gr.V – pollution indicators.*

Table 5-1. Ten most dominant taxa at each station (juveniles included),in the planned Kattegat OWF area and Kattegat ECC 2024.

KA-1	No.ind	%	Cum%
Phoronis	277	27	27
Scoloplos armiger	115	11	38
Kurtiella bidentata	115	11	49
Thyasira flexuosa	54	5	54
Chaetozone setosa kompleks	38	3	58
Pholoe baltica	38	3	62
Amphiura filiformis	37	3	65
Ampharete lindstroemi kompleks	25	2	68
Ophiuroidea juv.	23	2	70
Echinocyamus pusillus	23	2	72
Number of taxa 65			

KA-2	No.ind	%	Cum%
Kurtiella bidentata	178	14	14
Thyasira flexuosa	152	12	26
Scoloplos armiger	110	8	35
Amphiura filiformis	72	5	41
Phoronis	65	5	46
Pholoe baltica	64	5	51
Nucula nucleus	52	4	55
Ampharete lindstroemi kompleks	49	3	59
Mediomastus fragilis	45	3	63
Prionospio fallax	42	3	66
Number of taxa 98			

KA-3	No.ind	%	Cum%
Kurtiella bidentata	435	20	20
Nucula nucleus	265	12	32
Phoronis	212	9	42
Prionospio fallax	187	8	51
Thyasira flexuosa	185	8	59
Amphiura filiformis	180	8	68
Ophiuroidea juv.	60	2	71
Diplocirrus glaucus	58	2	73
Notomastus latericeus	52	2	76
Pholoe baltica	48	2	78
Number of taxa 79			

KA-4	No.ind	%	Cum%
Kurtiella bidentata	614	31	31
Amphiura filiformis	261	13	45
Phoronis	225	11	57
Prionospio fallax	147	7	64
Thyasira flexuosa	90	4	69
Cirripedia	81	4	73
Pholoe baltica	60	3	76
Ophiuroidea juv.	54	2	79
Nucula nucleus	46	2	82
Gammaropsis melanops	36	1	84
Number of taxa 69			

KA-5	No.ind	%	Cum%
Kurtiella bidentata	692	44	44
Amphiura filiformis	290	18	63
Phoronis	67	4	68
Pholoe baltica	53	3	71
Ophiuroidea juv.	40	2	74
Notomastus latericeus	30	1	76
Spiophanes kroyeri	20	1	77
Urothoe elegans	20	1	78
Praxillella affinis	19	1	80
Nemertea	17	1	81
Number of taxa 94			

KA-6	No.ind	%	Cum%
Kurtiella bidentata	569	33	33
Amphiura filiformis	260	15	49
Nucula nucleus	112	6	56
Prionospio fallax	108	6	62
Thyasira flexuosa	75	4	67
Phoronis	71	4	71
Ophiuroidea juv.	70	4	75
Pholoe baltica	53	3	78
Notomastus latericeus	30	1	80
Diplocirrus glaucus	24	1	81
Number of taxa 85			

KA-7	No.ind	%	Cum%
Kurtiella bidentata	463	24	24
Amphiura filiformis	342	18	43
Prionospio fallax	181	9	52
Nucula nucleus	104	5	58
Ophiuroidea juv.	68	3	62
Pholoe baltica	60	3	65
Scalibregma inflatum	50	2	67
Thyasira flexuosa	49	2	70
Abra nitida	37	1	72
Ennucula tenuis	35	1	74
Number of taxa 83			

KA-8	No.ind	%	Cum%
Kurtiella bidentata	631	30	30
Amphiura filiformis	334	16	46
Prionospio fallax	238	11	58
Nucula nucleus	80	3	62
Retusa umbilicata	79	3	65
Phoronis	71	3	69
Pholoe baltica	59	2	72
Amphictene auricoma	46	2	74
Ophiuroidea juv.	37	1	76
Varicorbula gibba	35	1	77
Number of taxa 95			

KA-9	No.ind	%	Cum%
Phoronis	273	24	24
Nucula nucleus	96	8	33
Scoloplos armiger	84	7	40
Thyasira flexuosa	74	6	47
Prionospio fallax	68	6	53
Ophiuroidea juv.	56	5	58
Cirripedia	44	3	62
Kurtiella bidentata	43	3	66
Diplocirrus glaucus	41	3	70
Tellimya ferruginosa	33	2	73
Number of taxa 81			

KA-10	No.ind	%	Cum%
Ophiuroidea juv.	403	17	17
Kurtiella bidentata	399	17	35
Amphiura filiformis	259	11	47
Scalibregma inflatum	199	8	55
Phoronis	117	5	61
Scoloplos armiger	102	4	65
Thyasira flexuosa	95	4	69
Pholoe baltica	93	4	73
Magelona minuta	58	2	76
Notomastus latericeus	36	1	78
Number of taxa 90			

KA-11	No.ind	%	Cum%
Kurtiella bidentata	152	22	22
Phoronis	111	16	38
Amphiura filiformis	55	8	46
Scoloplos armiger	46	6	53
Prionospio fallax	42	6	59
Pholoe baltica	33	4	64
Nucula nucleus	29	4	69
Ophiuroidea juv.	24	3	72
Thyasira flexuosa	24	3	76
Edwardsia	16	2	78
Number of taxa 54			

KA-12	No.ind	%	Cum%
Phoronis	308	30	30
Kurtiella bidentata	169	16	46
Amphiura filiformis	96	9	56
Thyasira flexuosa	79	7	64
Prionospio fallax	70	6	70
Nucula nucleus	65	6	77
Scoloplos armiger	33	3	80
Edwardsia	29	2	83
Pholoe baltica	18	1	85
Magelona minuta	14	1	86
Number of taxa 54			

KA-13	No.ind	%	Cum%
Phoronis	95	24	24
Kurtiella bidentata	63	16	40
Edwardsia	26	6	47
Echinocyamus pusillus	26	6	53
Scoloplos armiger	22	5	59
Cochlodesma praetenue	22	5	64
Ophiuroidea juv.	14	3	68
Amphiura filiformis	11	2	71
Nucula nucleus	11	2	74
Cirripedia	8	2	76
Number of taxa 49			

KA-14	No.ind	%	Cum%
Phoronis	45	16	16
Kurtiella bidentata	33	11	27
Scoloplos armiger	22	7	35
Echinocyamus pusillus	15	5	41
Amphiura filiformis	14	5	46
Edwardsia	12	4	50
Ophiuroidea juv.	12	4	54
Tellimya ferruginosa	9	3	58
Arctica islandica	8	2	60
Nephtys longosetosa	7	2	63
Number of taxa 53			

KAC-1	No.ind	%	Cum%
Kurtiella bidentata	268	15	15
Phoronis	249	14	30
Prionospio fallax	242	14	44
Thyasira flexuosa	178	10	54
Amphiura filiformis	169	9	64
Nucula nucleus	103	5	70
Ophiuroidea juv.	76	4	74
Scoloplos armiger	69	4	78
Pholoe baltica	58	3	82
Chaetozone setosa kompleks	33	1	84
Number of taxa 72			

KAC-2	No.ind	%	Cum%
Scoloplos armiger	48	15	15
Cochlodesma praetenue	31	9	24
Echinocyamus pusillus	22	6	31
Kurtiella bidentata	19	5	37
Prionospio	16	5	42
Argissa hamatipes	15	4	47
Ophiuroidea juv.	13	4	51
Amphiura filiformis	11	3	54
Phoronis	10	3	57
Pholoe baltica	9	2	60
Number of taxa 52			

KAC-3	No.ind	%	Cum%
Scoloplos armiger	114	11	11
Kurtiella bidentata	103	10	22
Phoronis	78	8	30
Amphiura filiformis	71	7	37
Prionospio fallax	65	6	44
Thyasira flexuosa	59	6	50
Pholoe baltica	48	4	55
Magelona minuta	41	4	60
Ophiuroidea juv.	36	3	63
Notomastus latericeus	33	3	67
Number of taxa 78			

KAC-4	No.ind	%	Cum%
Scoloplos armiger	142	15	15
Phoronis	114	12	27
Kurtiella bidentata	93	9	36
Thyasira flexuosa	64	6	43
Ampharete lindstroemi kompleks	54	5	49
Amphiura filiformis	54	5	55
Pholoe baltica	37	3	58
Notomastus latericeus	33	3	62
Prionospio fallax	33	3	65
Nucula nucleus	28	2	68
Number of taxa 59			

KAC-5	No.ind	%	Cum%
Scoloplos armiger	60	14	14
Phoronis	58	13	27
Fabulina fabula	36	8	36
Cirripedia	28	6	42
Cochlodesma praetenue	27	6	49
Lanice conchilega	20	4	54
Edwardsia	19	4	58
Spio	18	4	62
Arctica islandica	13	3	65
Nemertea	12	2	68
Number of taxa 48			

KAC-6	No.ind	%	Cum%
Ischyrocerus megacheir	25	24	24
Scoloplos armiger	10	9	33
Chaetozone setosa kompleks	9	8	42
Caprellidae	9	8	50
Pholoe baltica	6	5	56
Edwardsia	4	3	60
Nephtys juv.	4	3	64
Oligochaeta	3	2	67
Kurtiella bidentata	3	2	70
Nemertea	2	1	72
Number of taxa 33			

5.4.2.2 Multivariate analyses

Cluster diagram and MDS plot resulting from similarity analyses of species composition at the different stations are shown in Figure 5-14. The analyses show that stations can be grouped into three main groups at 50 % similarity (group A, B and station KAC-6 in a separate group). A general description and main reason for groupings are given in Table 5-9.

The groupings are mainly according to grain sizes and depths, with most species and individuals registered in Group A comprising most of the deeper stations with higher amount of silt and clay in the sediments. As can be seen in the MDS plot the grouping of stations between groups, but also within groups is according to depth interval samples are located.

BIOENV analysis show best correlation (0.64) between the observed similarities and a combination of the environmental variables depth, % silt and clay and median grain size (D50). The relatively low correlation coefficient reflects that the link between fauna composition and the environmental variables are not very clear.

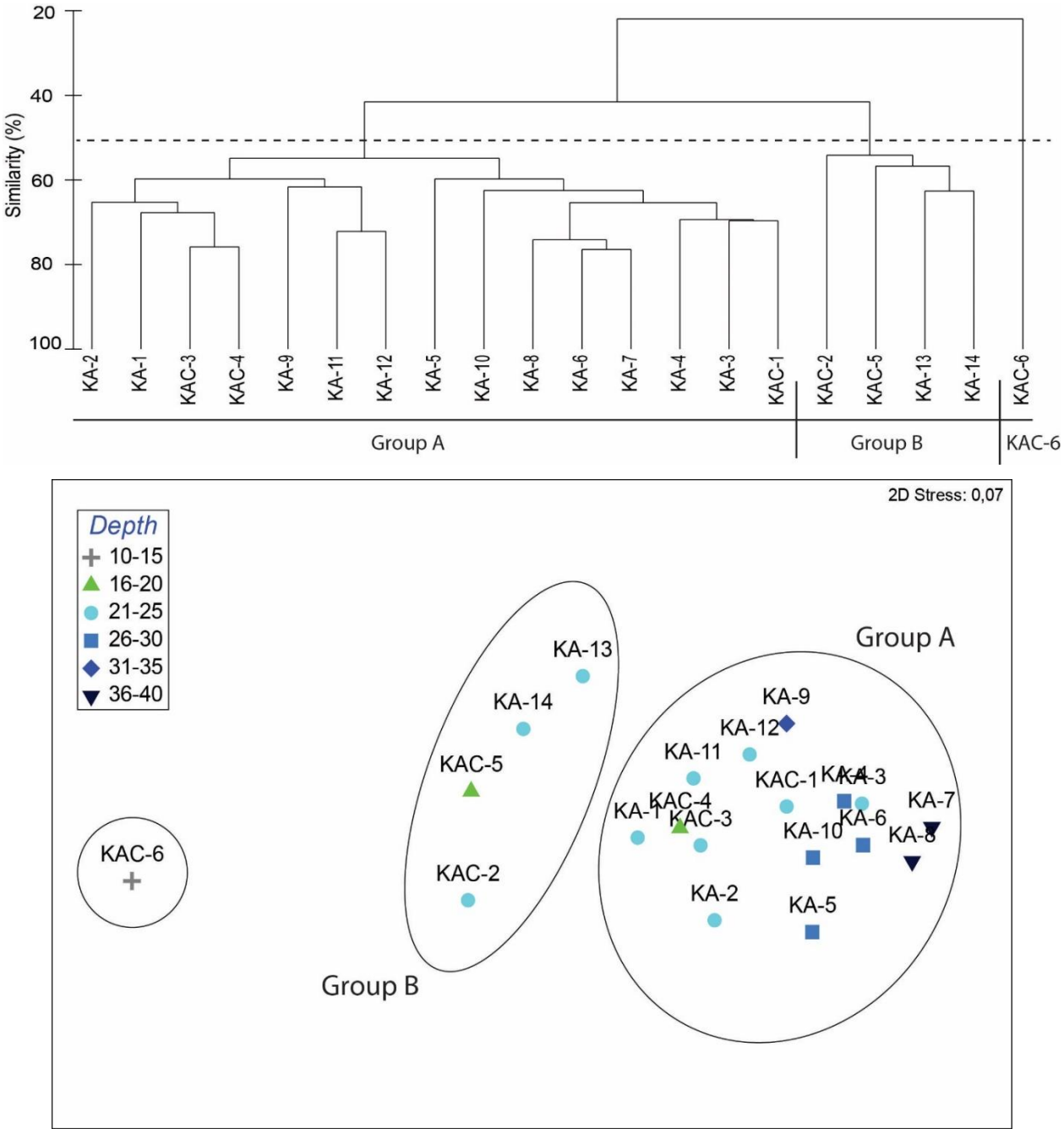


Figure 5-14 *Cluster diagram (top) and MDS plot (bottom) resulting from similarity analyses of species composition of infauna in sediment samples from the planned Kattegat OWF area and Kattegat ECC. Depth interval for environmental stations is shown in the MDS as colour coded symbols.*

Table 5-9 *Table showing main reason for grouping of stations according to infauna species similarities.*

Group	Stations	General description	Main reason for grouping
A	Most Kattegat OWF stations and ECC stations KAC-1, KAC-3 and KAC-4	Generally somewhat higher content of silt and clay in sediments and situated at intermediate to deepest depths	Species rich and individual rich group. High abundance of the mussel *Kurtiella bidentata* and *Thyasira flexuosa, Phoronids* and brittle star *Amhiura filiformis.*
B	KA-13, KA-14, KAC-2, KAC-5	Low content of silt and clay in sediments, shallow and intermediate depths	Fewer of the species dominating in group A. More of the mussels *Cochlodesma praetenue* and *Fabulina fabula* and the irregular sea urchin *Echinocyamus pusillus* than the other groups.
KAC-6	KAC-6 (only 2 grabs analysed)	Shallowest station close to shore. Sediments characterized by coarse sediments and stones.	Few species and individuals. More of the polychaeta *Scoloplos armiger* than in group A. More of the crustaceans *Ischyrocerus megacheir* and *caprellidae* than the other groups.

Sampling effort in the current study is relatively high compared to earlier studies in the area, mainly because of equipment used (Van Veen grab instead of HAPS corer), but also because of replicate samples at each environmental station. A species accumulation plot is given in Figure 5-15. The figure indicates that the species richness in the area is relatively well-captured with the chosen sampling regime (the saturation curve flattens out with increased sampling effort).

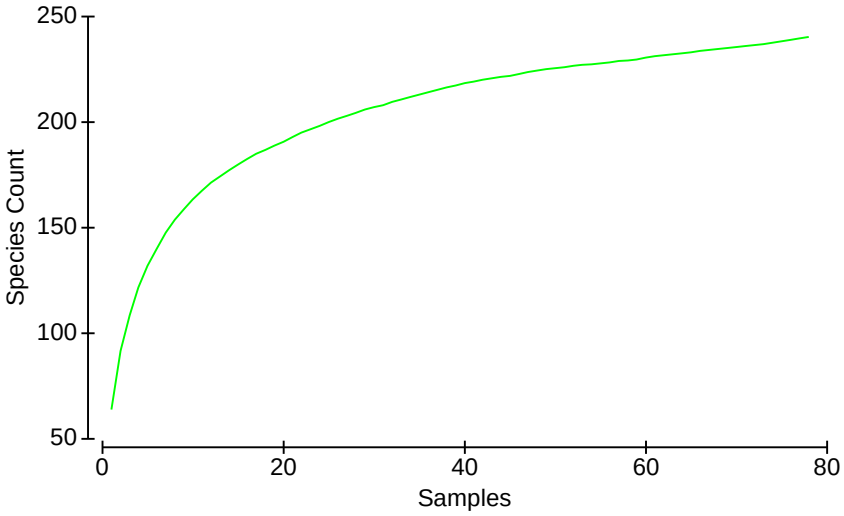


Figure 5-15 *Species accumulation plot showing number of species in relation to sampling effort, - grab samples (each grab sampling 0.1 m^2 surface area) in the planned Kattegat OWF area and ECC combined.*

5.4.2.3 Infauna and modelled substrate type

WSP has modelled substrate types on Kattegat according to the Danish classification system (Figure 5-16). Infauna communities identified in grab samples are shown in Table 5-10. Grouping of stations according to species similarities (previous section) does not fall into groups according to substrate types.

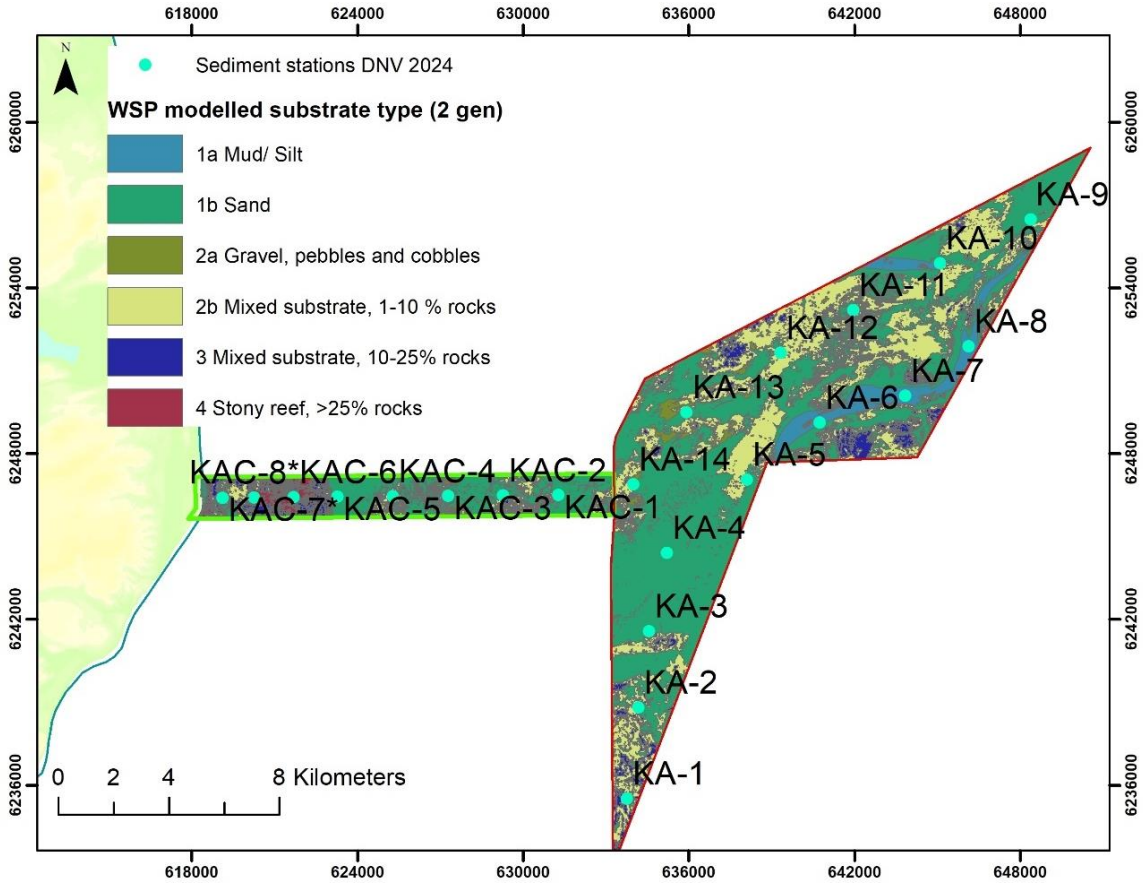


Figure 5-16 *Modelled substrate types in the planned Kattegat OWF area and ECC (WSP, 2024) and sediment stations sampled for infauna in 2024.*

Table 5-10 ***I****nfauna communities dominating in modelled substrate types****.***

Substrate type	Fauna
1a Mud/silt	*Highly dominated by mollusc Kurtiella bidentata, brittle star Amphiura filiformis and polychaete Prionospio fallax*
1b Sand	*More phoronis than 1a, 3 and more A. filiformis and P. fallax than 2b. Less phoronis compared to most stations in 2b*
2b Mixed substrate, 1-10% rocks	*Dominated by Phoronis, Thyasira flexuosa, Scoloplos armiger*
3 Mixed substrate, 10-25% rocks	*More Kurtiella bidentata and Pholoe baltica than all other groups.*

5.4.2.4 Biomass registrations

Summary of biomass measurements at the planned Kattegat OWF and ECC is given in Table 5-11 and Table 5-12. A map showing biomass registrations in relation to taxonomical group is shown in Figure 5-17. Mollusca contributed most to the biomass in most stations, particularly due to sporadic occurrences of ocean quahog – *Arctica islandica*, but echinoderms also ranked high in total biomass in several stations, particularly due to the irregular sea urchin *Echinocardium cordatum.* The brittle star *Amphiura filiformis* contributed to much of the biomass in deeper parts of Kattegat OWF. Phoronids that were also commonly dominating the fauna occurrences numerically were also among the top five species contributing to the overall biomass. See Figure 5-18 for overview of contribution to biomass at different stations from six species contributing most to the biomass.

Table 5-11 *Table summarising biomass measurements at each station at Kattegat OWF (wet weight (g) per m2) for different taxonomical groups*

Station	Varia	Polychaeta	Mollusca	Echinodermata	Crustacea	Total biomass
KA-1	11.98	4.68	246.70	38.85	3.45	305.66
KA-2	4.19	12.71	133.76	15.31	0.15	166.13
KA-3	14.21	15.19	38.98	186.25	0.01	254.64
KA-4	5.55	5.78	371.47	80.54	0.03	463.38
KA-5	3.83	20.98	13.34	65.35	0.39	103.90
KA-6	4.18	11.67	29.54	65.41	0.04	110.85
KA-7	2.74	41.78	21.19	149.22	0.01	214.94
KA-8	4.93	28.80	10.33	131.98	0.04	176.09
KA-9	9.43	3.03	16.12	75.34	0.02	103.95
KA-10	19.55	7.35	354.96	71.61	0.11	453.59
KA-11	5.11	2.17	4.98	98.01	0.03	110.31
KA-12	11.78	3.40	15.62	73.25	0.00	104.05
KA-13	5.11	2.97	234.15	35.30	0.00	277.54
KA-14	3.47	2.51	1613.16	52.75	4.87	1676.76

Table 5-12 *Table summarising biomass measurements at each station at Kattegat ECC (wet weight g per m2) for different taxonomical groups*

Station	Varia	Polychaeta	Mollusca	Echinodermata	Crustacea	Total biomass
KAC-1	11.84	3.54	180.26	60.94	0.03	256.62
KAC-2	0.93	1.30	206.87	60.37	0.11	269.59
KAC-3	3.62	10.99	104.19	20.31	14.44	153.55
KAC-4	10.51	9.86	115.50	31.80	0.03	167.70
KAC-5	3.55	11.45	1838.53	5.66	0.18	1859.37
KAC-6	0.15	5.01	0.09	0.00	0.07	5.32

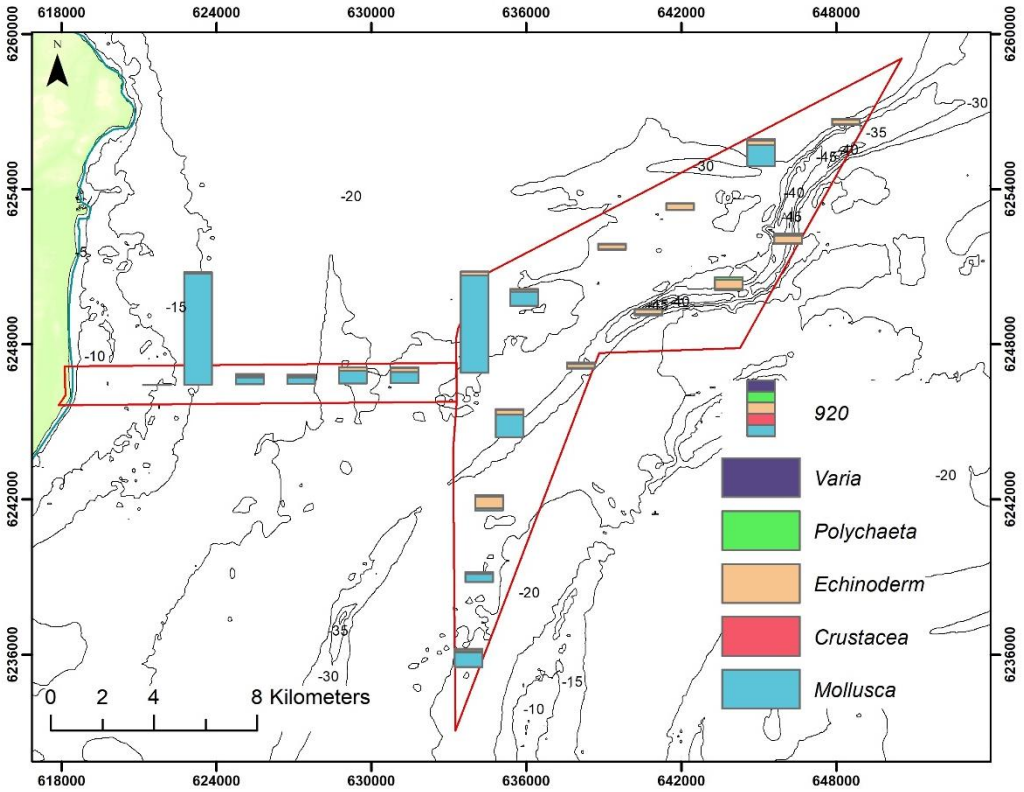


Figure 5-17 *Map showing biomass registrations at Kattegat OWF and ECC. Histogram shows relative contribution to the total biomass from different taxonomical groups.*

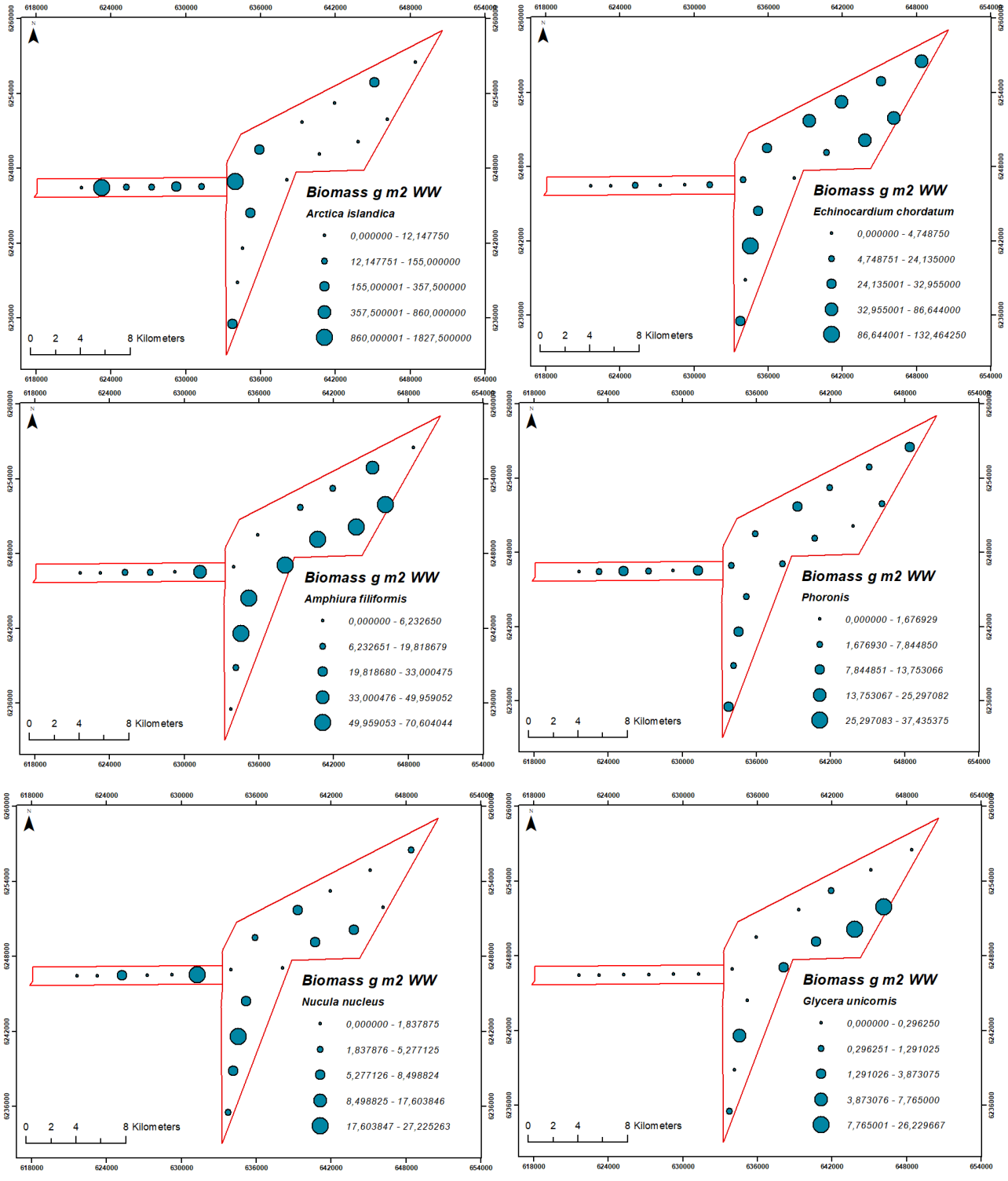


Figure 5-18 *Map showing biomass measurements of four species contributing most to the biomass at Kattegat OWF and ECC.*

6 CONCLUSION

The survey area includes the southern parts of Kattegat at depths of 20-40 meters and an export cable corridor to Djursland on the east coast of central Jutland. Fieldwork was conducted in April 2024 and involved sediment sampling, visual mapping with ROVs, and hydrography measurements. An additional nearshore sampling was performed in June 2024.

Analyses of the sediment samples from the planned Kattegat OWF area showed that the sediments are primarily composed of sand and silt, with some stations containing shell fragments and clay in deeper layers. CTD profiles showed salinity stratification typical for Kattegat, with higher salinity at the bottom layers and good oxygen levels throughout the water column. Results from chemical analysis show that most chemical parameters were within threshold values, except for arsenic, which exceeded NEQS thresholds at all stations.

A total of 22 stations were sampled for infauna analyses, revealing 22418 individuals distributed among 214 taxa, with mollusks being the most abundant group. Visual mapping has also been performed with ROV surveys covering 13.7 km of seabed, documenting 79 species of benthic megafauna and macroalgae, along with 21 fish species. The invasive round goby (*Neogobius melanostomus*) was detected in both the OWF and ECC areas, indicating its establishment in the Kattegat.

WSP has modelled substrate types in the planned Kattegat OWF and ECC areas according to the Danish classification system. Identified infauna communities registered are mud/silt, sand, mixed substrate with 1-10% rocky bottom and mixed substrate 10-25% rocks.

The biomass measurements from samples retrieved at the planned Kattegat OWF and ECC areas. Mollusca contributed most to the biomass in most stations, but echinoderms also ranked high in total biomass in several stations. Phoronids that were also commonly dominating the fauna occurrences numerically were also among the top five species contributing to the overall biomass.

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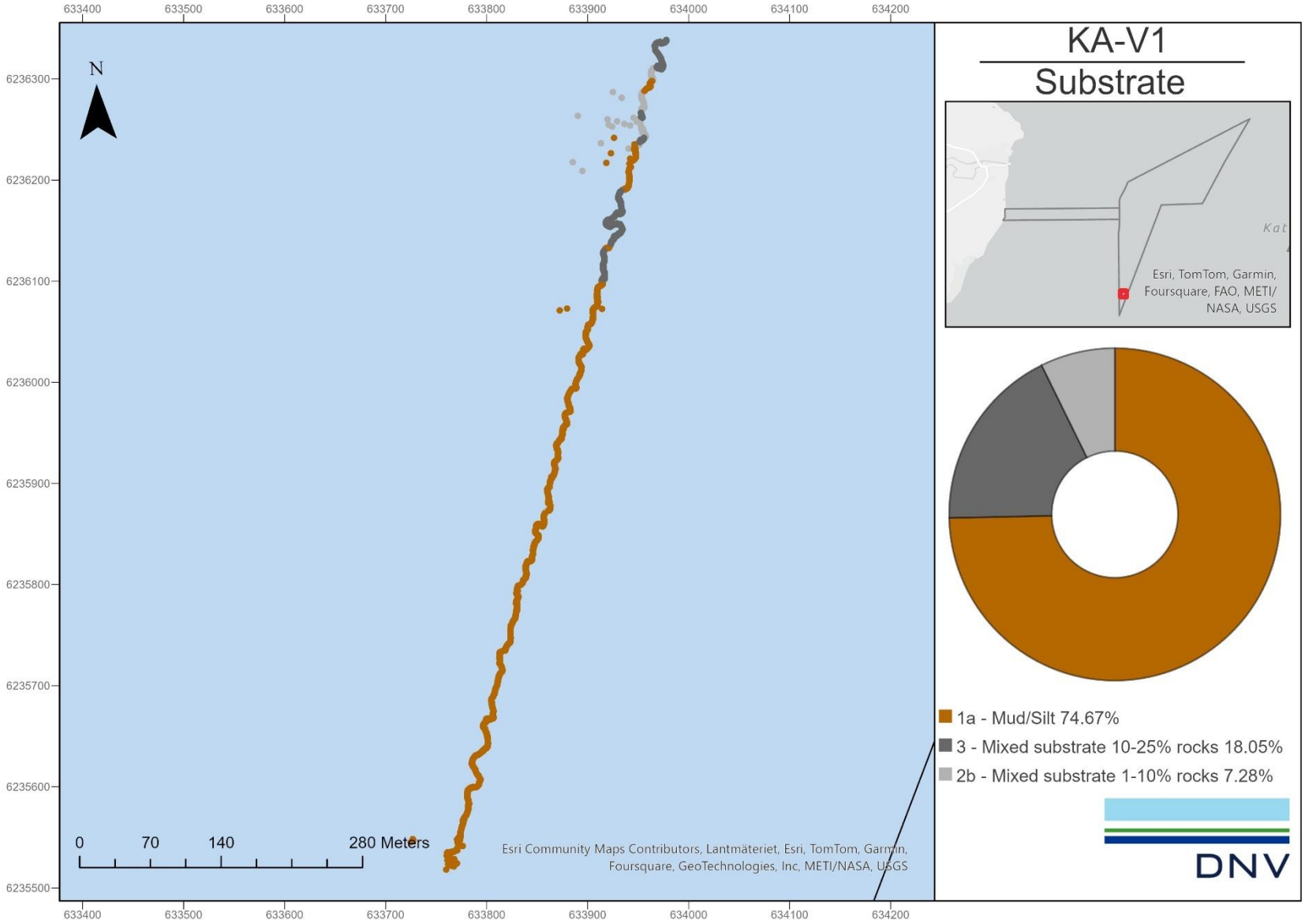
APPENDIX 1 STATION LOG, SEDIMENT SAMPLING

ETRS 89 UTM 32N				Deviation from program: samples not taken due to rocks																					
*Shallow water stations			#														Chemistry		Bio						
	East	North	st.	CTD	Bio	Grain	TOC	Metal	PAH	Phthalates	Phenols	Depth	Date	Start	Stop	Time	Blend sample	#1	#2	#3	#4	GrabbID	Misses	Description	Comments
Kattegat																									
KA-1	633764	6235525	1		4	1	1	1	1	1	1	21	10.apr	20:26	20:44	00:18	x	5	6	6	6	B25	1	Grey brown fine sand	
KA-2	634180	6238813	1	1	4	1	1					22	10.apr	19:39	20:02	00:23	x	8	9	7	7	B25	0	Greybrown sandy clay	
KA-3	634560	6241581	1		4	1	1	1	1	1	1	24	10.apr	18:47	19:11	00:24	x	11	12	11	12	B25	0	Grey brown silty clay	Shells
KA-4	635207	6244417	1		4	1	1					27	10.apr	17:47	18:17	00:30	x	7	8	12	8	B25	0	Olivebrown sand w silt	Shells
KA-5	638104	6247065	1		4	1	1	1	1	1	1	28	10.apr	15:04	15:43	00:39	x	5	8	7	10	B25	1	Brown coarse sand	
KA-6	640740	6249124	1		4	1	1					30	10.apr	14:23	14:54	00:31	x	13	12	6	11	B25	0	Brown top , grey silty clay	
KA-7	643841	6250104	1		4	1	1	1	1	1	1	36	10.apr	11:04	12:42	01:38	x	11	11	13	12	B25	0	Brown top grey sand silt clay	
KA-8	646137	6251885	1		4	1	1					38	10.apr	11:15	11:35	00:20	x	10	12	12	10	B25	0	Grey brown silty clay	
KA-9	648383	6256489	1		4	1	1	1	1	1	1	33	10.apr	09:33	09:58	00:25	x	6	7	7	7	B25	1	Grey brown silt	
KA-10	645102	6254888	1	1	4	1	1					27	10.apr	10:22	10:45	00:23	x	8	10	8	10	B25	0	Grey brown sandy clay	
KA-11	641954	6253203	1		4	1	1	1	1	1	1	22	10.apr	13:03	13:29	00:26	x	4	5	6	5	B25	0	Brown top sand	Shells
KA-12	639318	6251660	1		4	1	1					22	10.apr	13:45	14:05	00:20	x	6	6	6	6	B25	0	Brown sand	
KA-13	635920	6249498	1	1	4	1	1	1	1	1	1	21	10.apr	15:58	16:33	00:35	x	6	6	6	7	B25	0	Olivebrown soft sand	
KA-14	633991	6246898	1		4	1	1					21	10.apr	16:48	17:20	00:32	x	7	6	5	7	B25	2	Olivebrown soft sand	
			14	**3**	**56**	**14**	**14**	**7**	**7**	**7**	**7**														
Kattegat ECC																									
KAC-1	631280	6246513	1	1	4	1	1	1	1	1	1	22	10.apr	21:38	22:04	00:26	x	6	6	7	7	B25	0	Grey brown silty clay	Shells
KAC-2	629281	6246496	1		4	1	1					22	10.apr	22:20	22:36	00:16	x	5	5	7	5	B25	0	Grey brown sandy	
KAC-3	627281	6246479	1		4	1	1	1	1	1	1	21	10.apr	22:56	23:18	00:22	x	5	5	6	6	B25	1	Olive brown sand	
KAC-4	625281	6246461	1		4	1	1					20	10.apr	23:41	23:56	00:15	x	6	6	6	5	B25	0	Olive brown sand	
KAC-5	623281	6246444	1	1	4	1	1	1	1	1	1	16	11.apr	00:20	00:46	00:26	x	6	6	7	7	B25	0	Olive brown sand	Shells
KAC-6	621687	6246437	1			1	1					12	11.apr	00:52	01:30	00:38	x	7	6			B25	12	Olive brown sand w stones	
KAC-7*	619112	6246408	1			1	1	1	1	1	1	11	11.jun	12:50	13:25	00:35	x	5	7	5		Mini	15	Sand and gravel	
KAC-8*	620256	6246418	1				1	1	1			10	11.jun	11:50	12:35	00:45	x	7	6			Mini	20	Olive brown sand w stones	
			8	**2**	**20**	**7**	**8**	**5**	**5**	**4**	**4**														
Sum analyses																									
			22	**5**	**76**	**21**	**22**	**12**	**12**	**11**	**11**														

APPENDIX 2 MAPS OF SUBSTRATE REGISTRATIONS IN VISUAL TRANSECTS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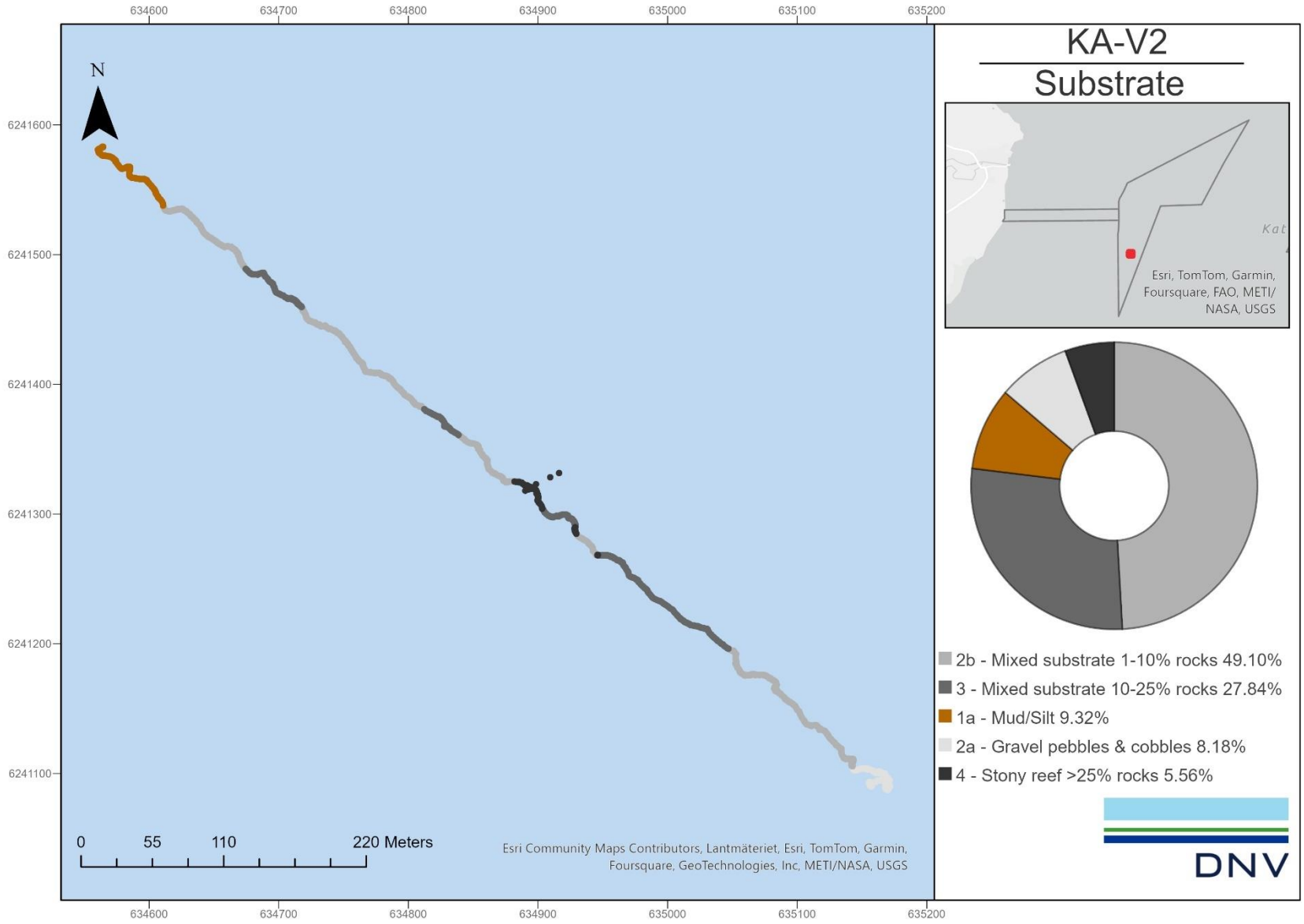
6236200
6236100
6236000
6235900
6235800
6235700
6235600
6235500
N
0
70
140
280 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KA-V1
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
1a - Mud/Silt 74.67%
3 - Mixed substrate 10-25% rocks 18.05%
2b - Mixed substrate 1-10% rocks 7.28%
DNV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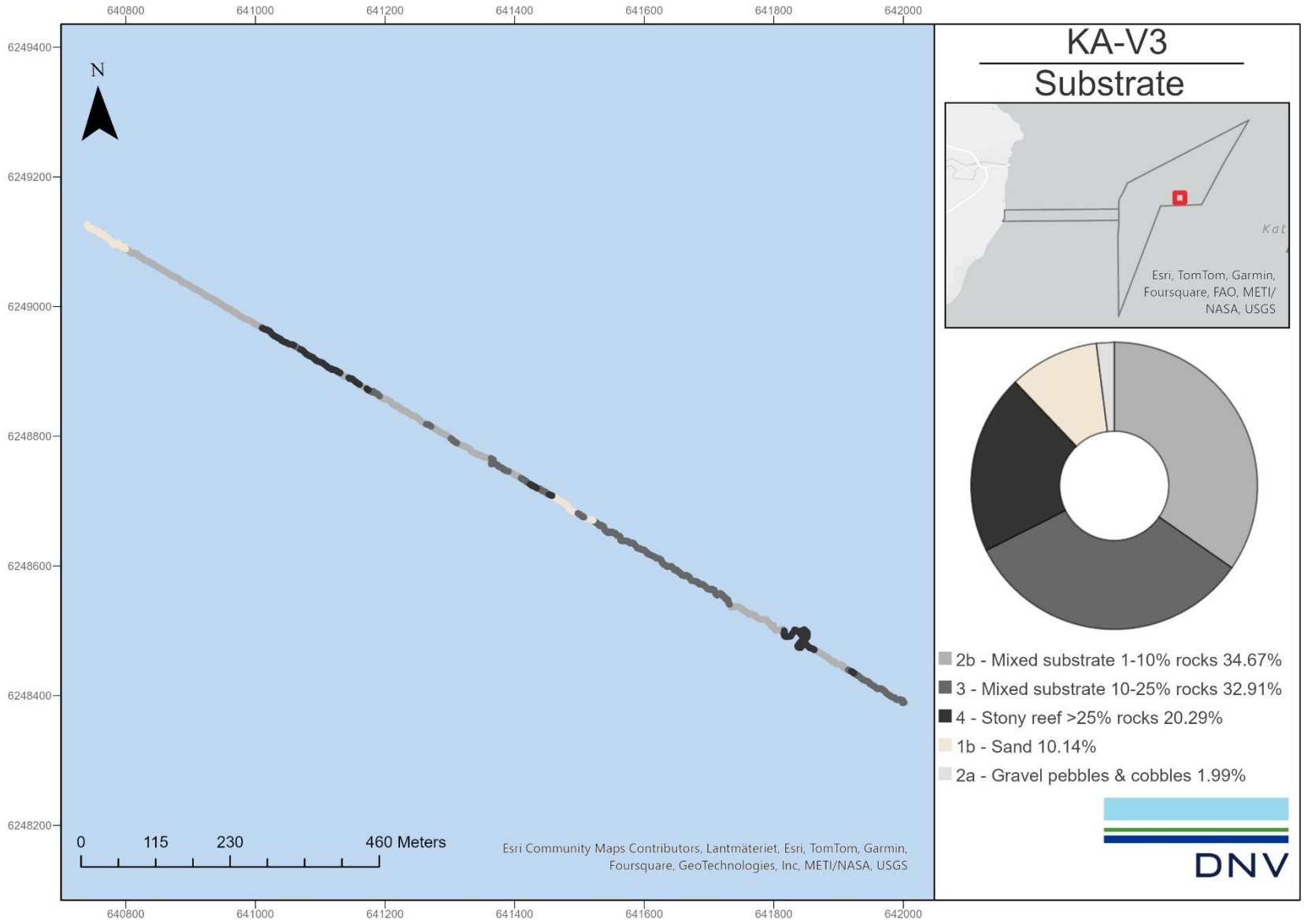
634700
634800
634900
635000
635100
635200
N
6241600
6241500
6241400
6241300
6241200
6241100
0
55
110
220 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KA-V2
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
2b - Mixed substrate 1-10% rocks 49.10%
3 - Mixed substrate 10-25% rocks 27.84%
1a - Mud/Silt 9.32%
2a - Gravel pebbles & cobbles 8.18%
4 - Stony reef >25% rocks 5.56%
DNV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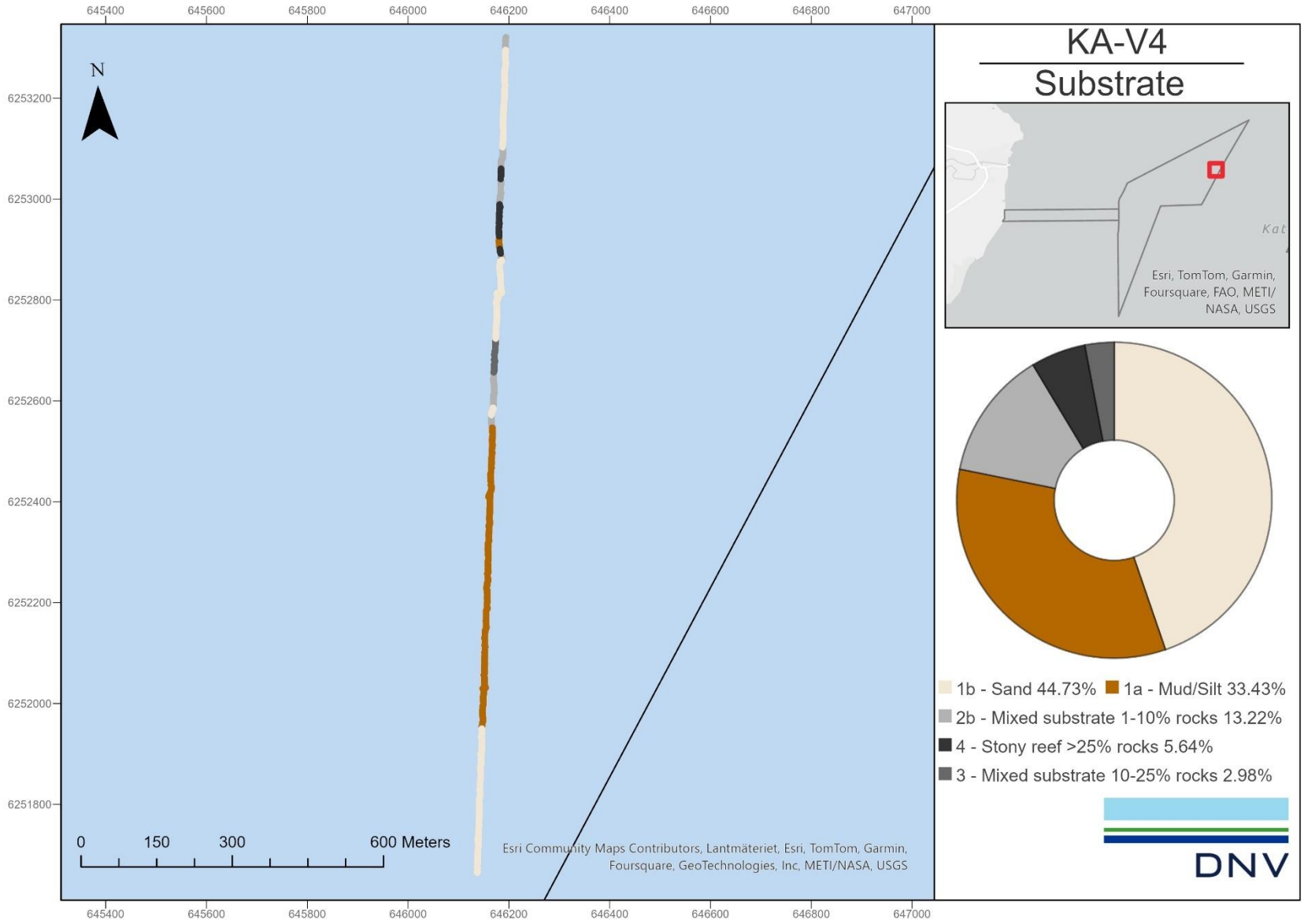
641200
641400
641600
641800
642000
6249400
6249200
6249000
6248800
6248600
6248400
6248200
N
0
115
230
460 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KA-V3
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
2b - Mixed substrate 1-10% rocks 34.67%
3 - Mixed substrate 10-25% rocks 32.91%
4 - Stony reef >25% rocks 20.29%
1b - Sand 10.14%
2a - Gravel pebbles & cobbles 1.99%
DNV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646600
646800
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6253000
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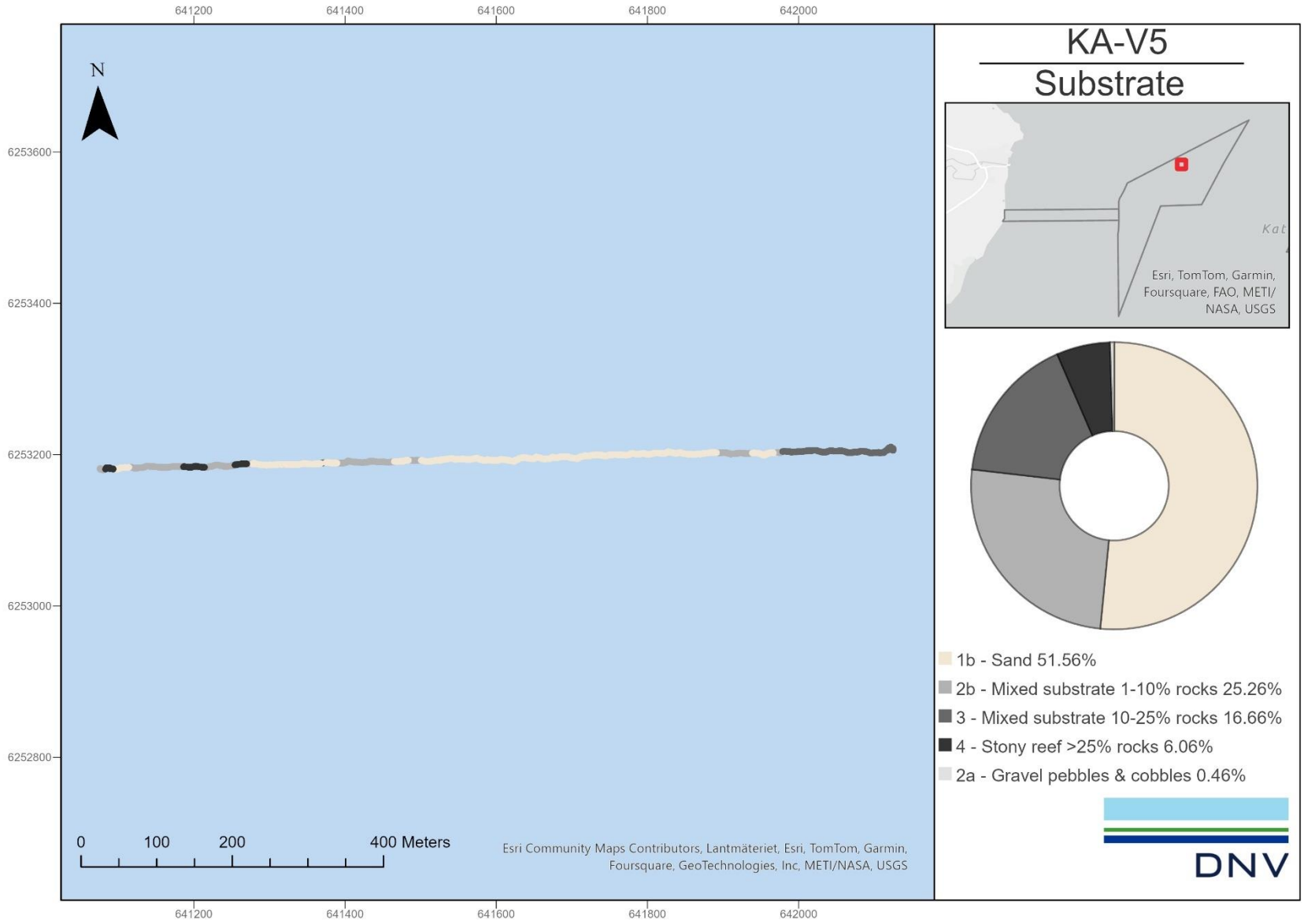
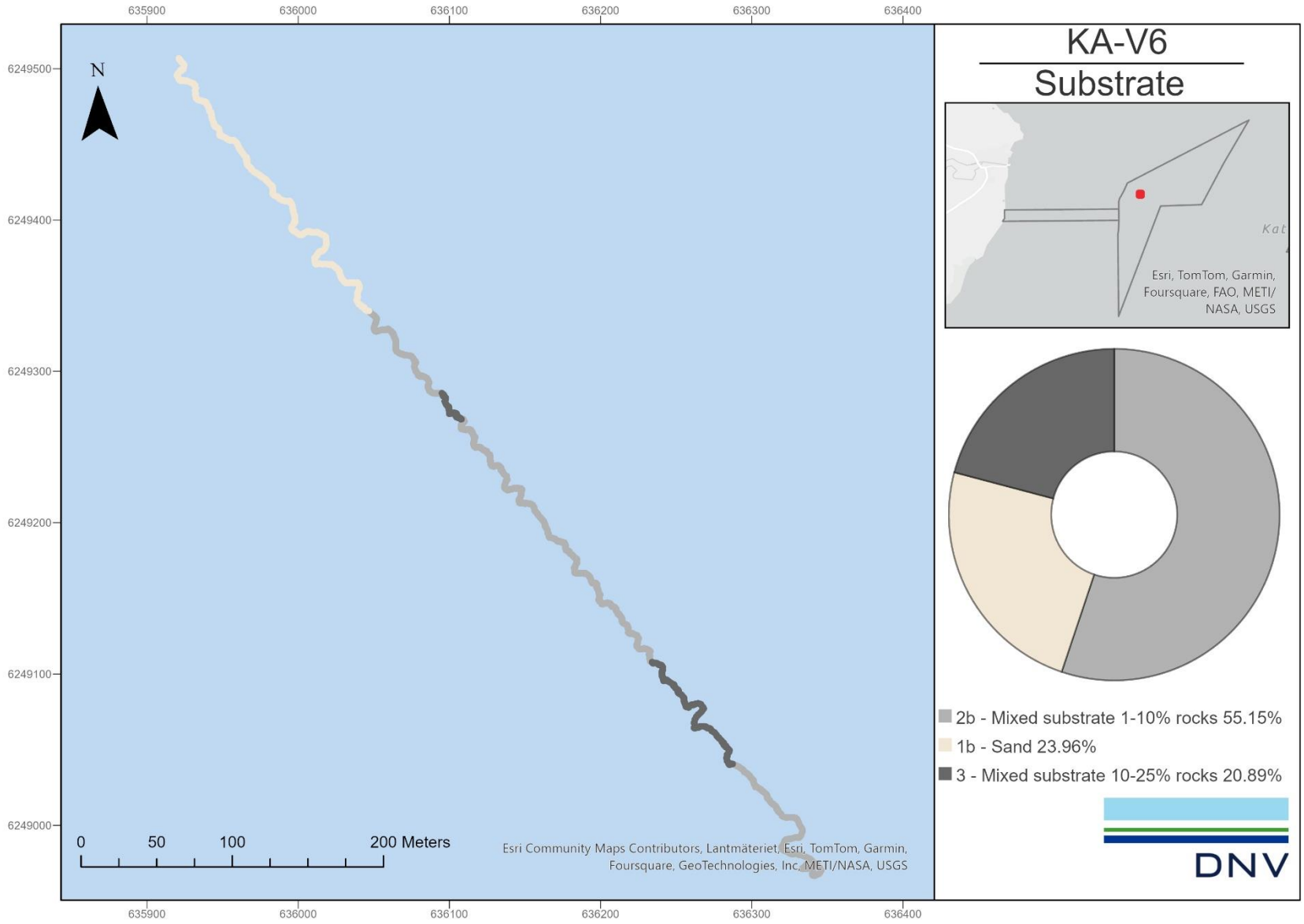
6252200
6252000
6251800
N
0
150
300
600 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KA-V4
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
1b - Sand 44.73%
1a - Mud/Silt 33.43%
2b - Mixed substrate 1-10% rocks 13.22%
4 - Stony reef >25% rocks 5.64%
3 - Mixed substrate 10-25% rocks 2.98%
DNV


641200
641400
641600
641800
642000
N
6253600
6253400
6253200
6253000
6252800
0
100
200
400 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KA-V5
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
1b - Sand 51.56%
2b - Mixed substrate 1-10% rocks 25.26%
3 - Mixed substrate 10-25% rocks 16.66%
4 - Stony reef >25% rocks 6.06%
2a - Gravel pebbles & cobbles 0.46%
DNV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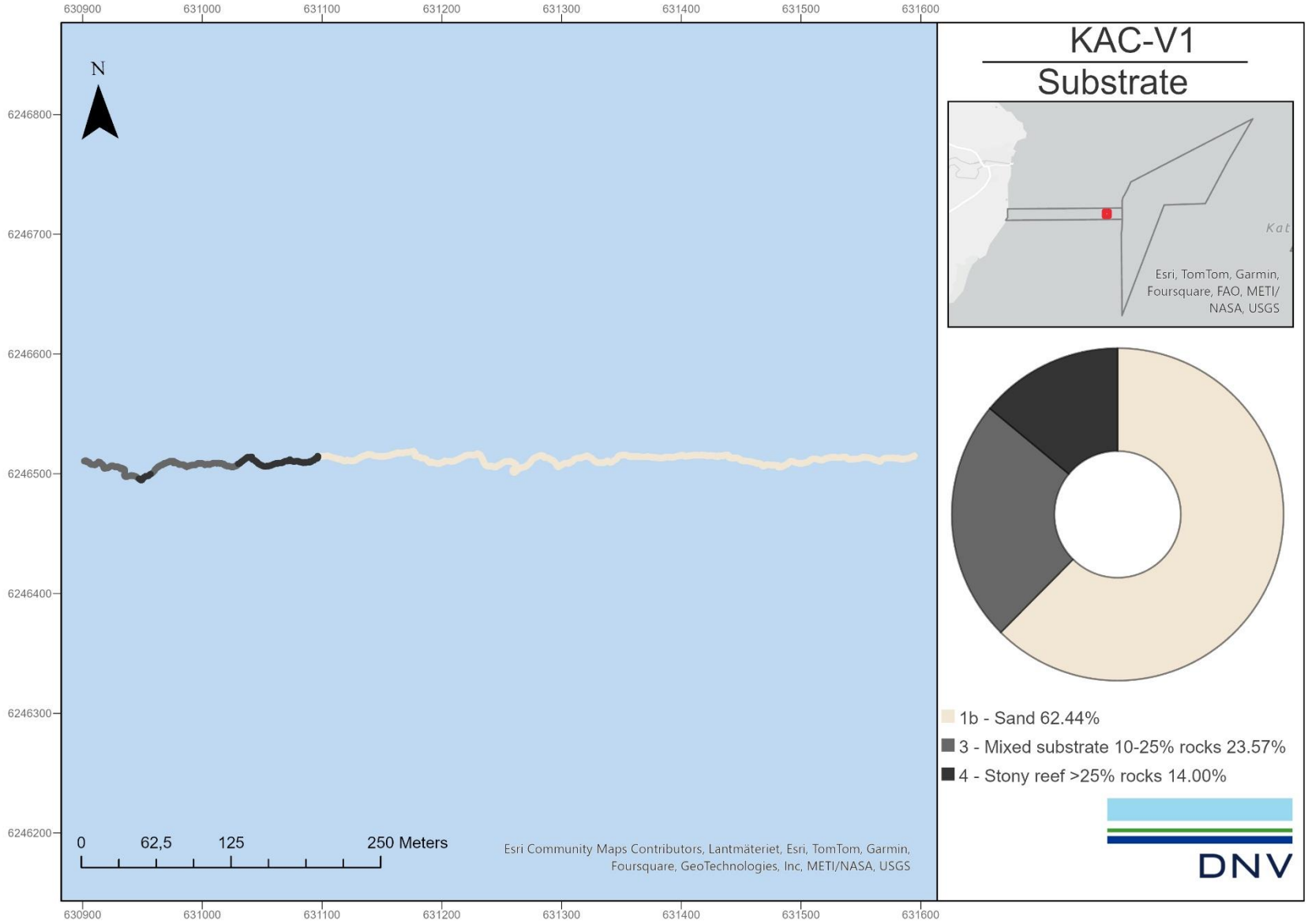
636100
636200
636300
636400
6249500
6249400
6249300
6249200
6249100
6249000
N
0
50
100
200 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KA-V6
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
2b - Mixed substrate 1-10% rocks 55.15%
1b - Sand 23.96%
3 - Mixed substrate 10-25% rocks 20.89%
DNV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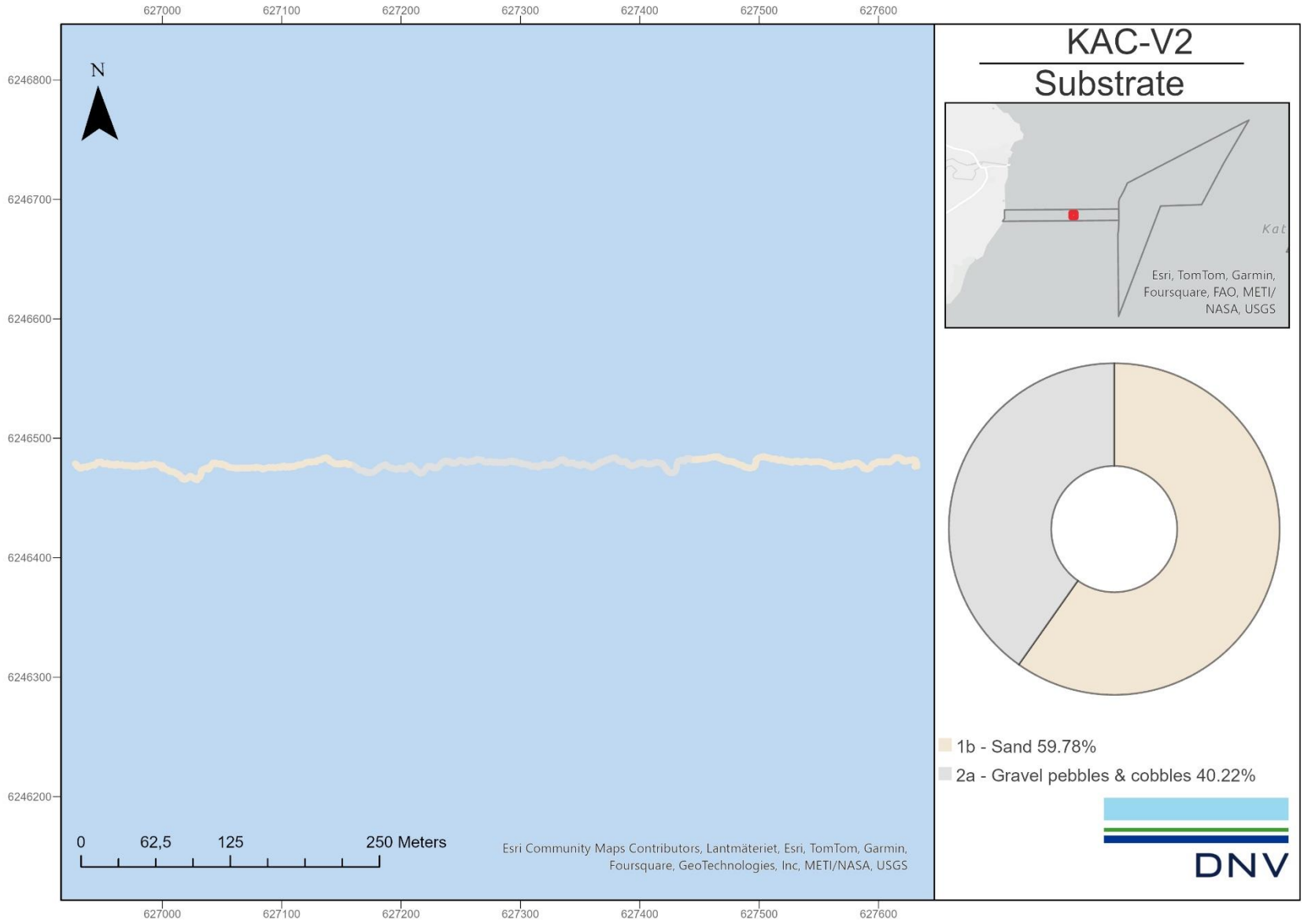
631300
631400
631500
631600
N
6246800
6246700
6246600
6246500
6246400
6246300
6246200
0
62,5
125
250 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KAC-V1
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
1b - Sand 62.44%
3 - Mixed substrate 10-25% rocks 23.57%
4 - Stony reef >25% rocks 14.00%
DNV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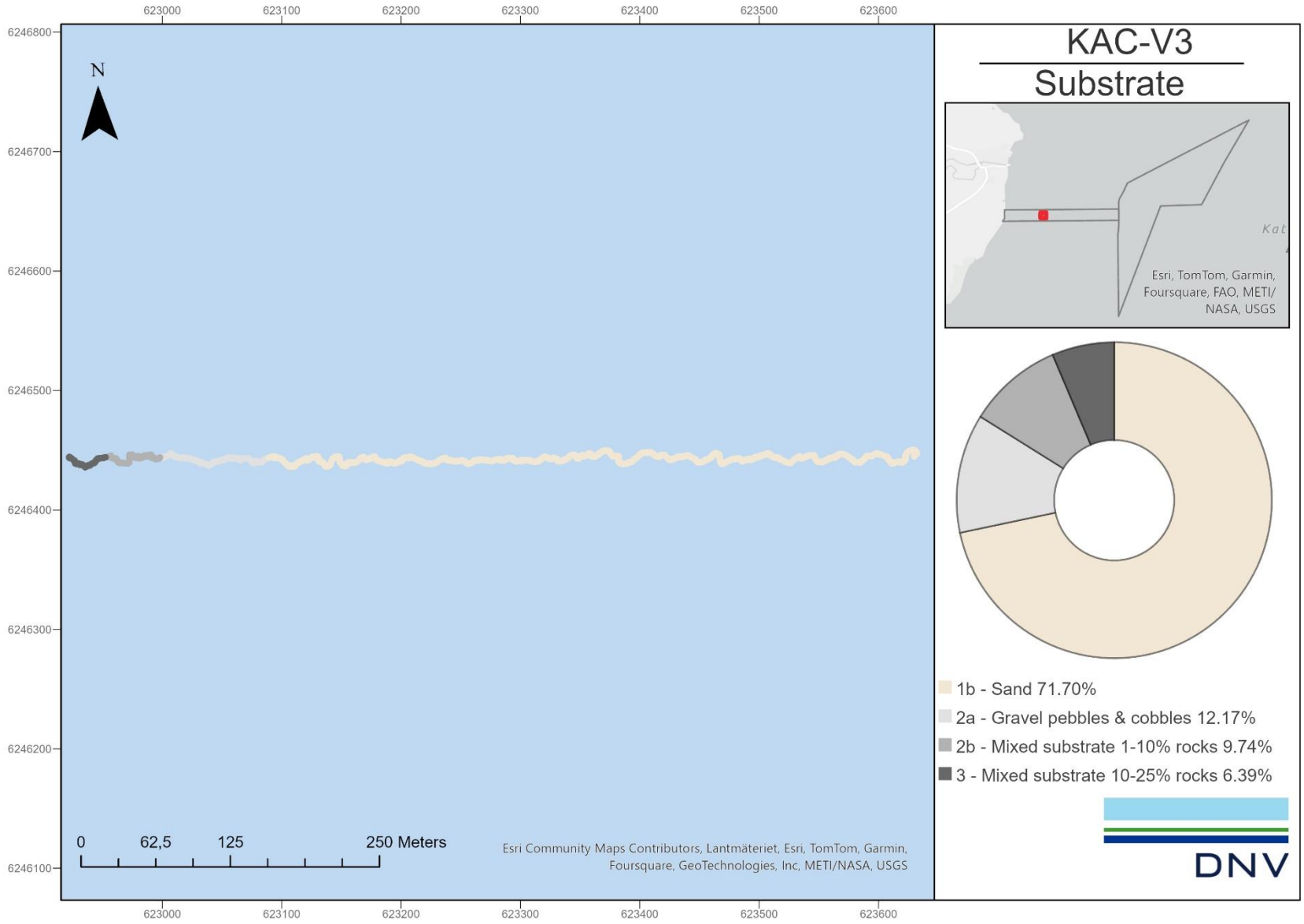
627400
627500
627600
6246800
6246700
6246600
6246500
6246400
6246300
6246200
N
0
62,5
125
250 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KAC-V2
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
1b - Sand 59.78%
2a - Gravel pebbles & cobbles 40.22%
DNV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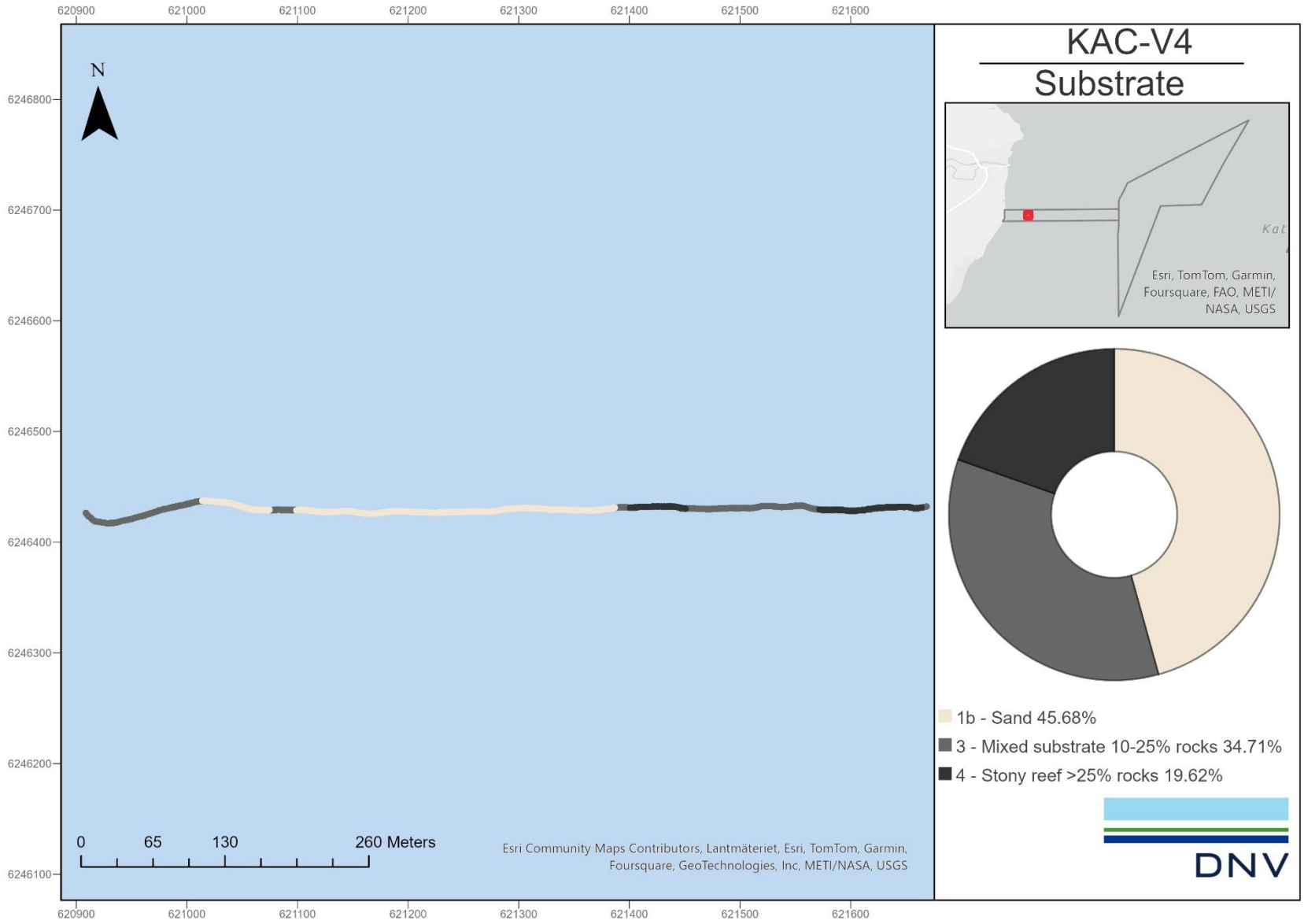
6246600
6246500
6246400
6246300
6246200
6246100
N
0
62,5
125
250 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KAC-V3
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
1b - Sand 71.70%
2a - Gravel pebbles & cobbles 12.17%
2b - Mixed substrate 1-10% rocks 9.74%
3 - Mixed substrate 10-25% rocks 6.39%
DNV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621400
621500
621600
6246800
6246700
6246600
6246500
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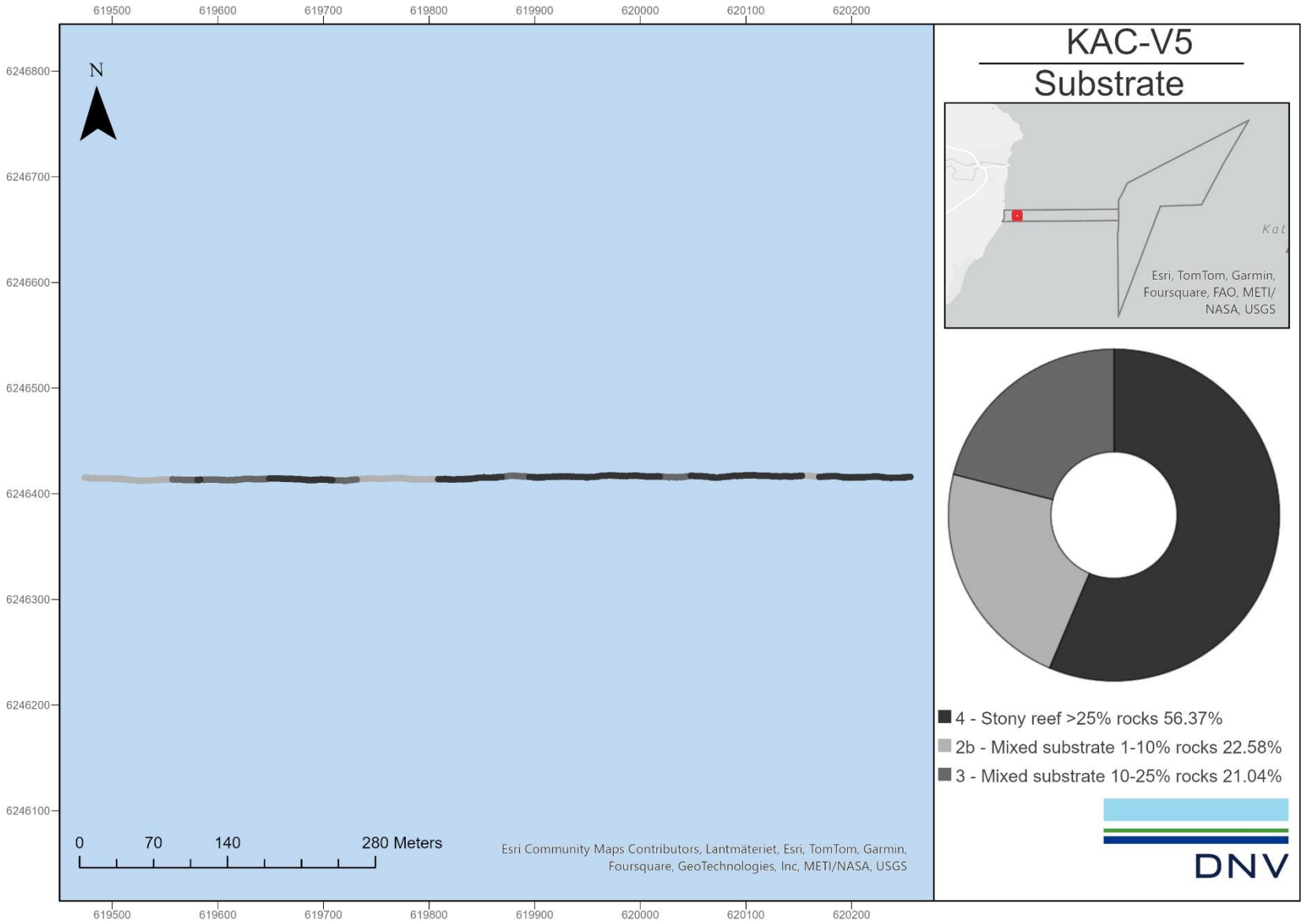
6246300
6246200
6246100
N
0
65
130
260 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KAC-V4
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
1b - Sand 45.68%
3 - Mixed substrate 10-25% rocks 34.71%
4 - Stony reef >25% rocks 19.62%
DNV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6246600
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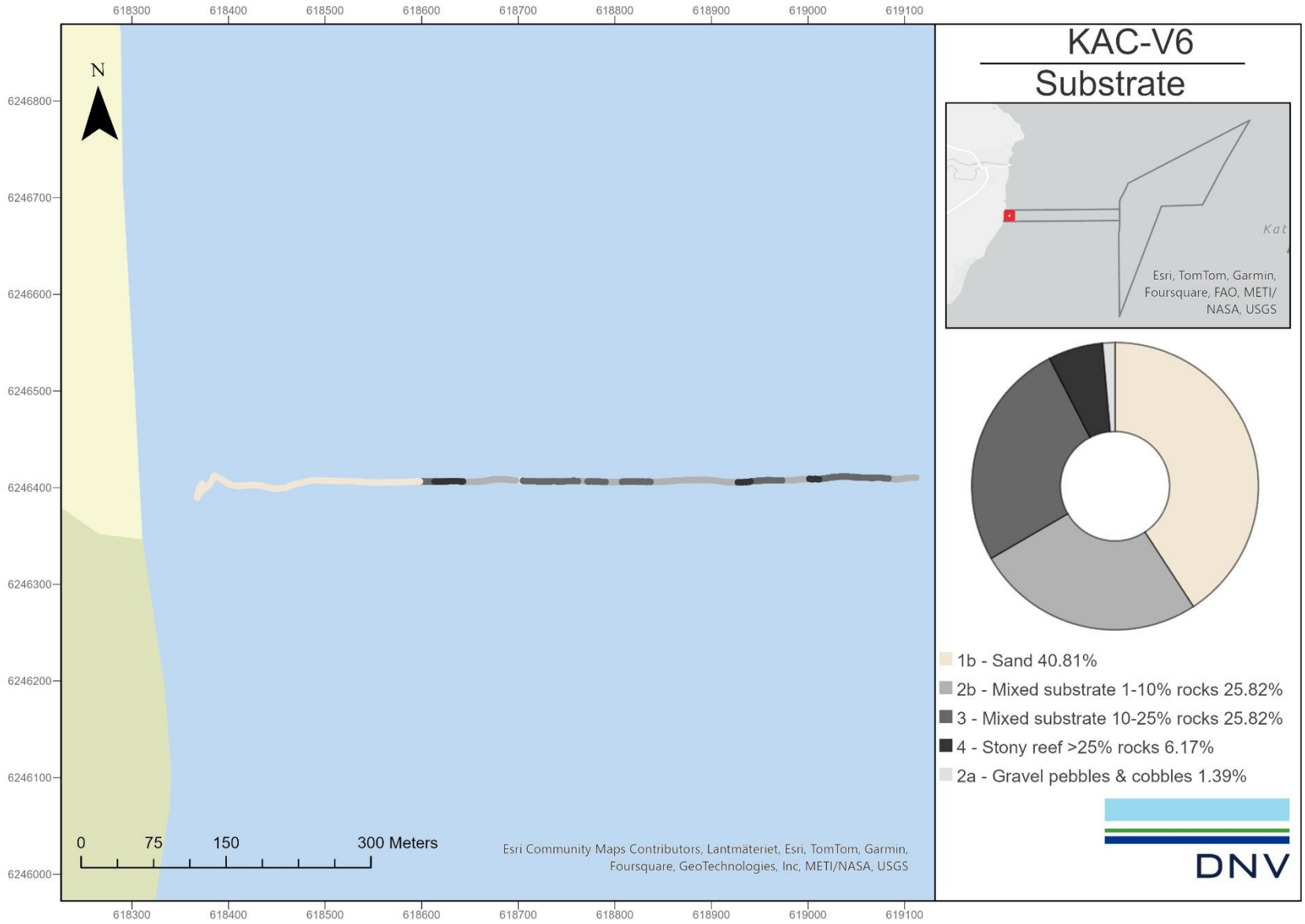
6246300
6246200
6246100
N
0
70
140
280 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KAC-V5
Substrate
Kat
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
4 - Stony reef >25% rocks 56.37%
2b - Mixed substrate 1-10% rocks 22.58%
3 - Mixed substrate 10-25% rocks 21.04%
DNV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6246700
6246600
6246500
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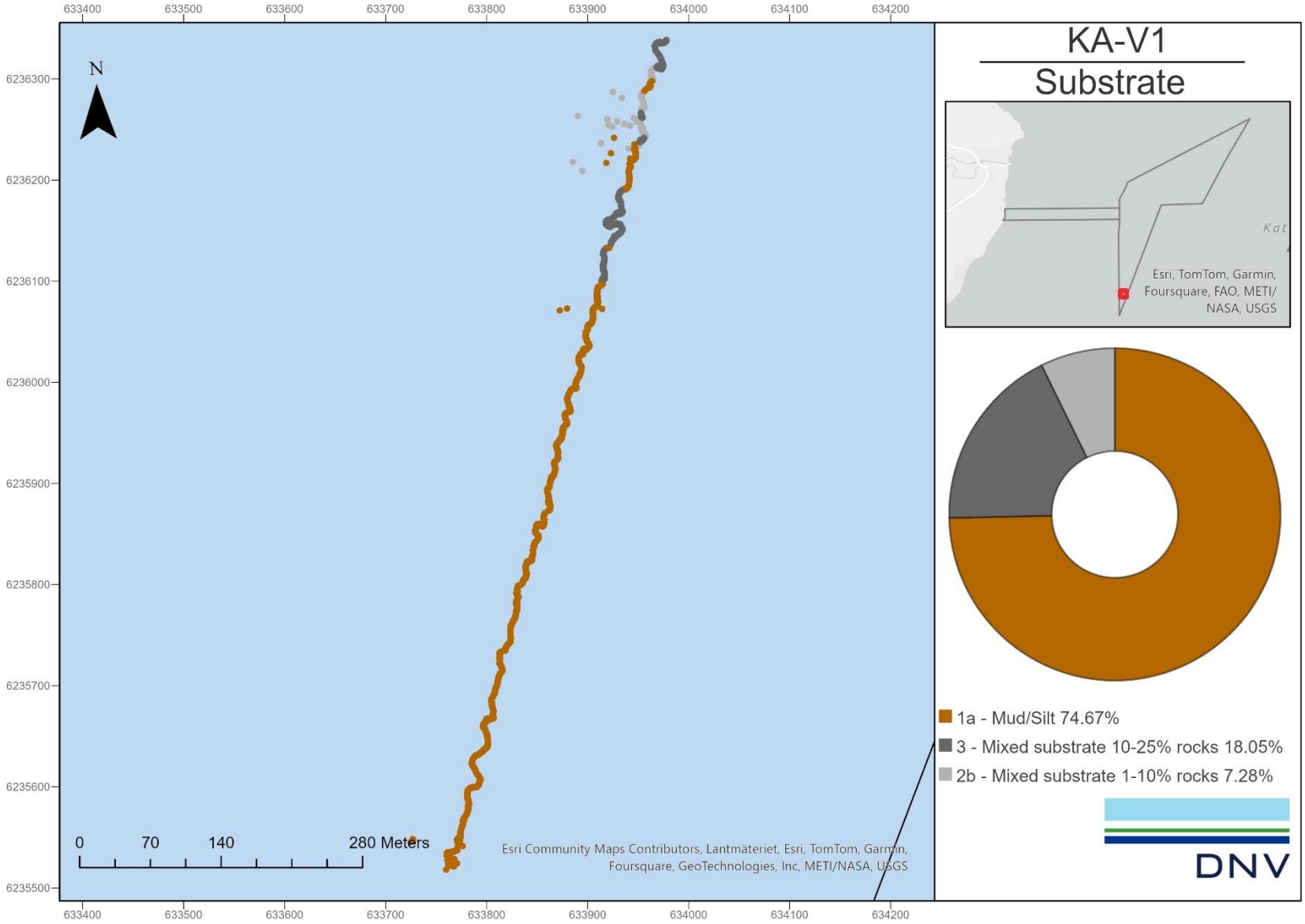
6246300
6246200
6246100
6246000
N
0
75
150
300 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KAC-V6
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
1b - Sand 40.81%
2b - Mixed substrate 1-10% rocks 25.82%
3 - Mixed substrate 10-25% rocks 25.82%
4 - Stony reef >25% rocks 6.17%
2a - Gravel pebbles & cobbles 1.39%
DNV

APPENDIX 3 MAPS OF FAUNA AND FLORA REGISTRATIONS IN VISUAL SURVEY TRANSECTS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6236100
6236000
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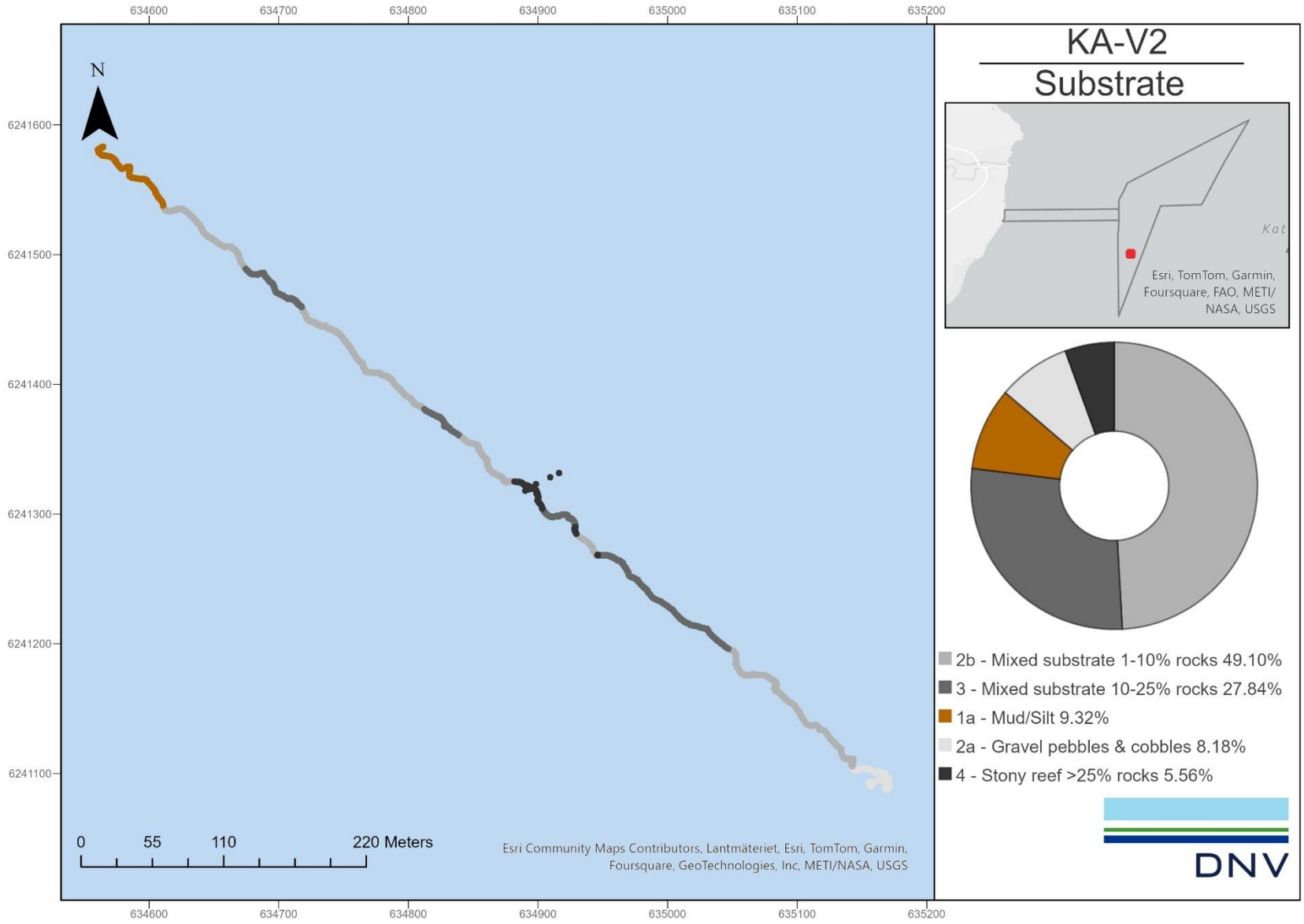
6235800
6235700
6235600
6235500
N
0
70
140
280 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KA-V1
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
1a - Mud/Silt 74.67%
3 - Mixed substrate 10-25% rocks 18.05%
2b - Mixed substrate 1-10% rocks 7.28%
DNV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634800
634900
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635100
635200
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6241600
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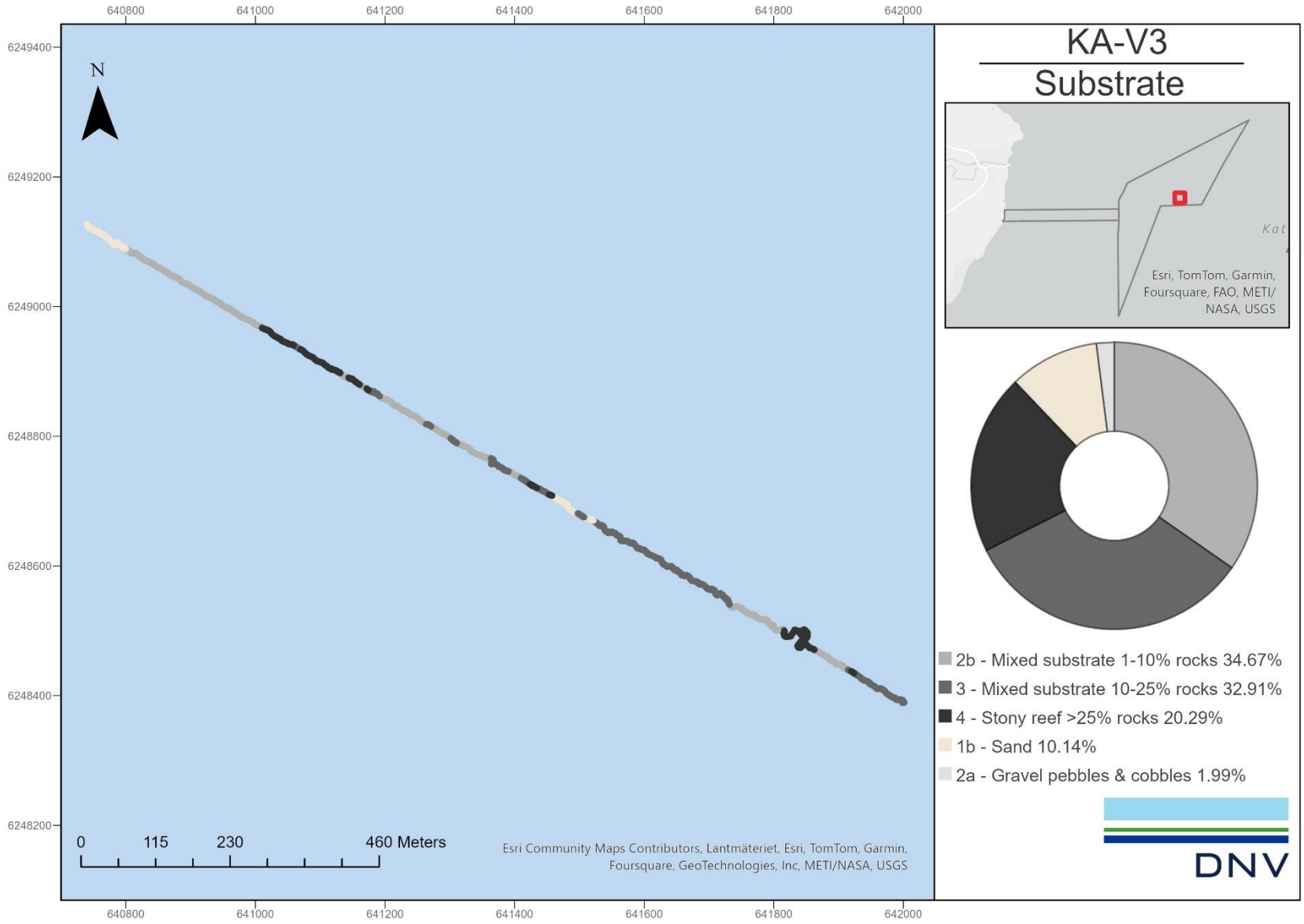
6241300
6241200
6241100
0
55
110
220 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KA-V2
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
2b - Mixed substrate 1-10% rocks 49.10%
3 - Mixed substrate 10-25% rocks 27.84%
1a - Mud/Silt 9.32%
2a - Gravel pebbles & cobbles 8.18%
4 - Stony reef >25% rocks 5.56%
DNV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6249200
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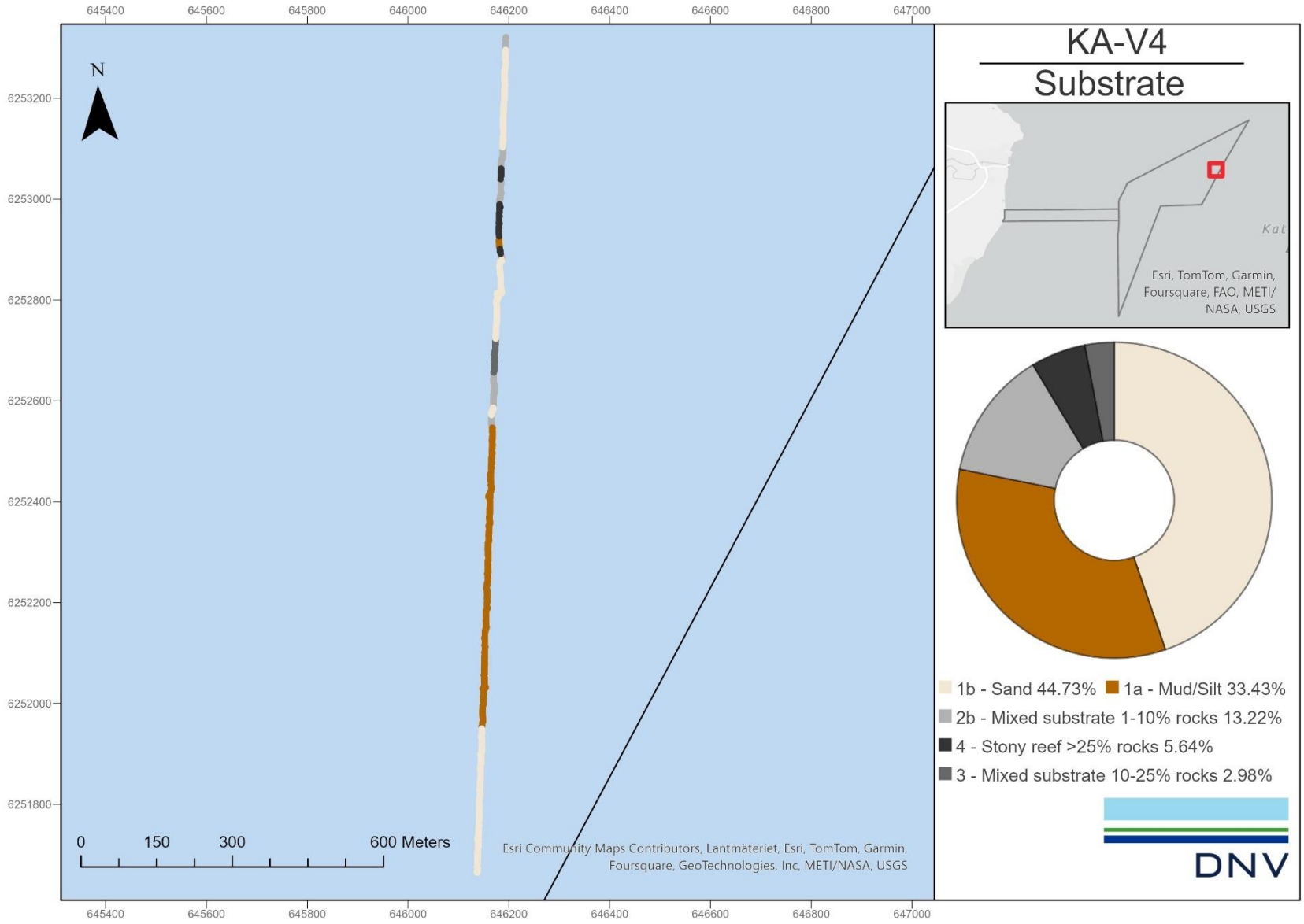
6248800
6248600
6248400
6248200
N
0
115
230
460 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KA-V3
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
2b - Mixed substrate 1-10% rocks 34.67%
3 - Mixed substrate 10-25% rocks 32.91%
4 - Stony reef >25% rocks 20.29%
1b - Sand 10.14%
2a - Gravel pebbles & cobbles 1.99%
DNV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646800
647000
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6253000
6252800
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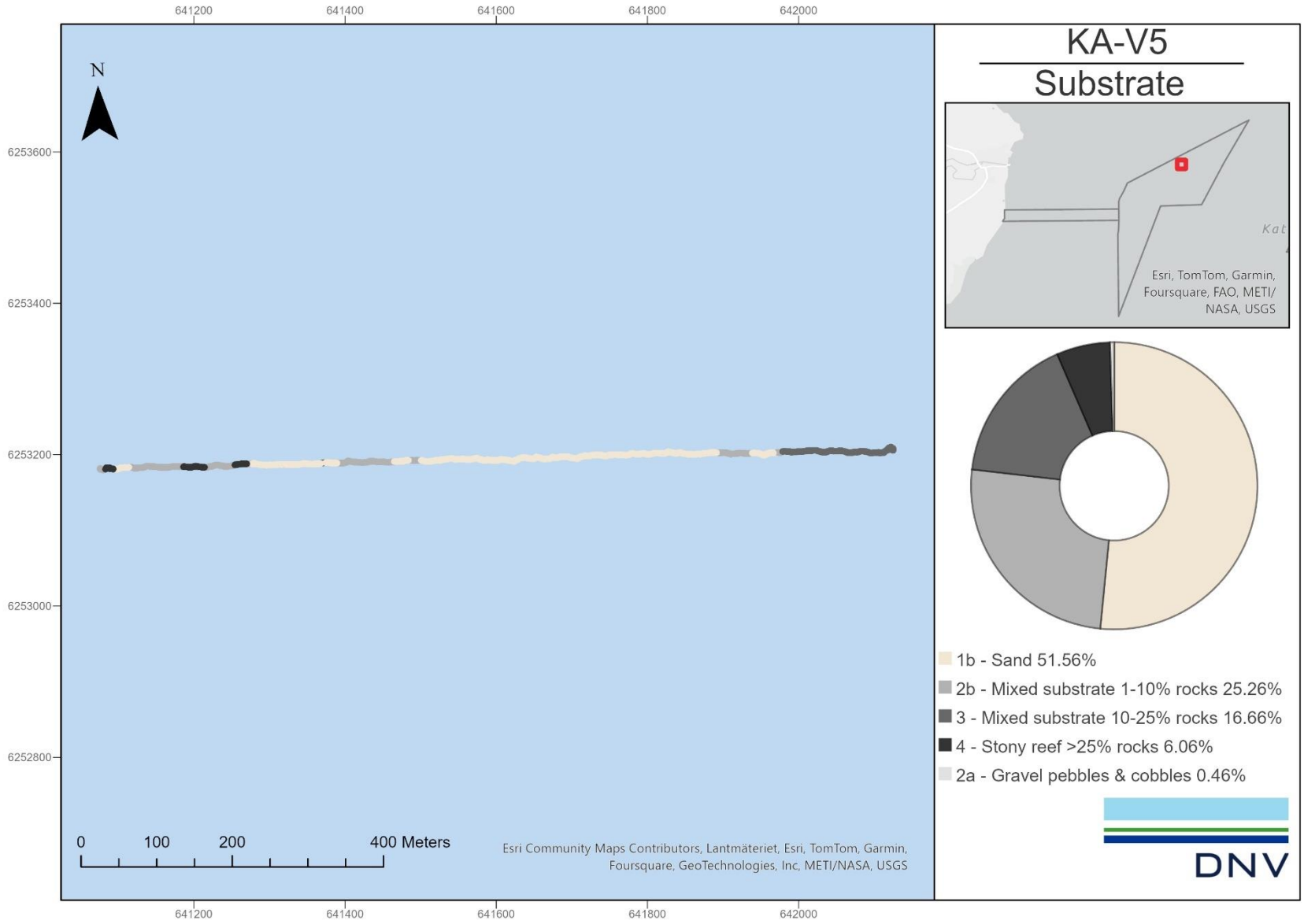
6252400
6252200
6252000
6251800
N
0
150
300
600 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KA-V4
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
1b - Sand 44.73%
1a - Mud/Silt 33.43%
2b - Mixed substrate 1-10% rocks 13.22%
4 - Stony reef >25% rocks 5.64%
3 - Mixed substrate 10-25% rocks 2.98%
DNV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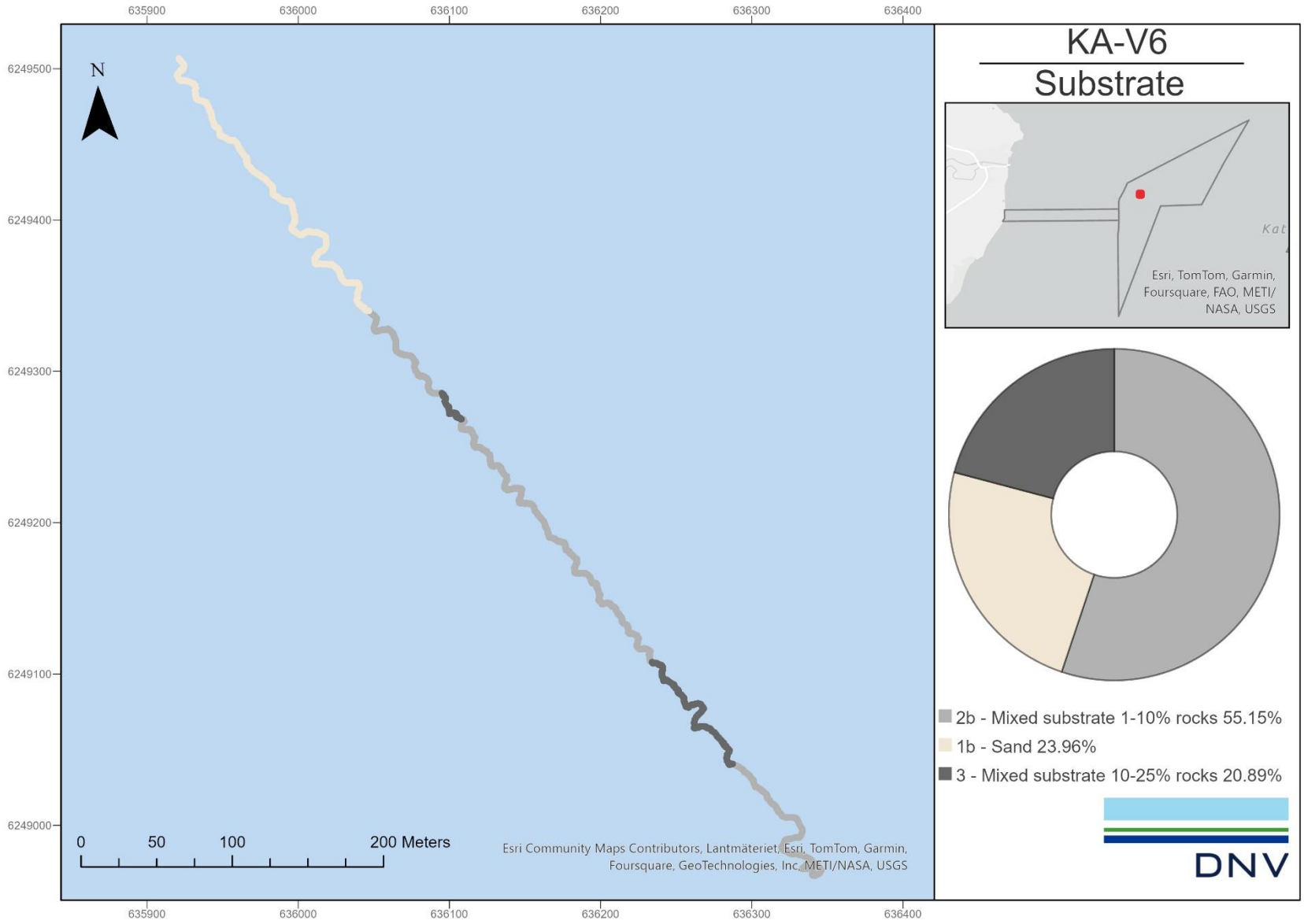
641600
641800
642000
N
6253600
6253400
6253200
6253000
6252800
0
100
200
400 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KA-V5
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
1b - Sand 51.56%
2b - Mixed substrate 1-10% rocks 25.26%
3 - Mixed substrate 10-25% rocks 16.66%
4 - Stony reef >25% rocks 6.06%
2a - Gravel pebbles & cobbles 0.46%
DNV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636200
636300
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6249400
6249300
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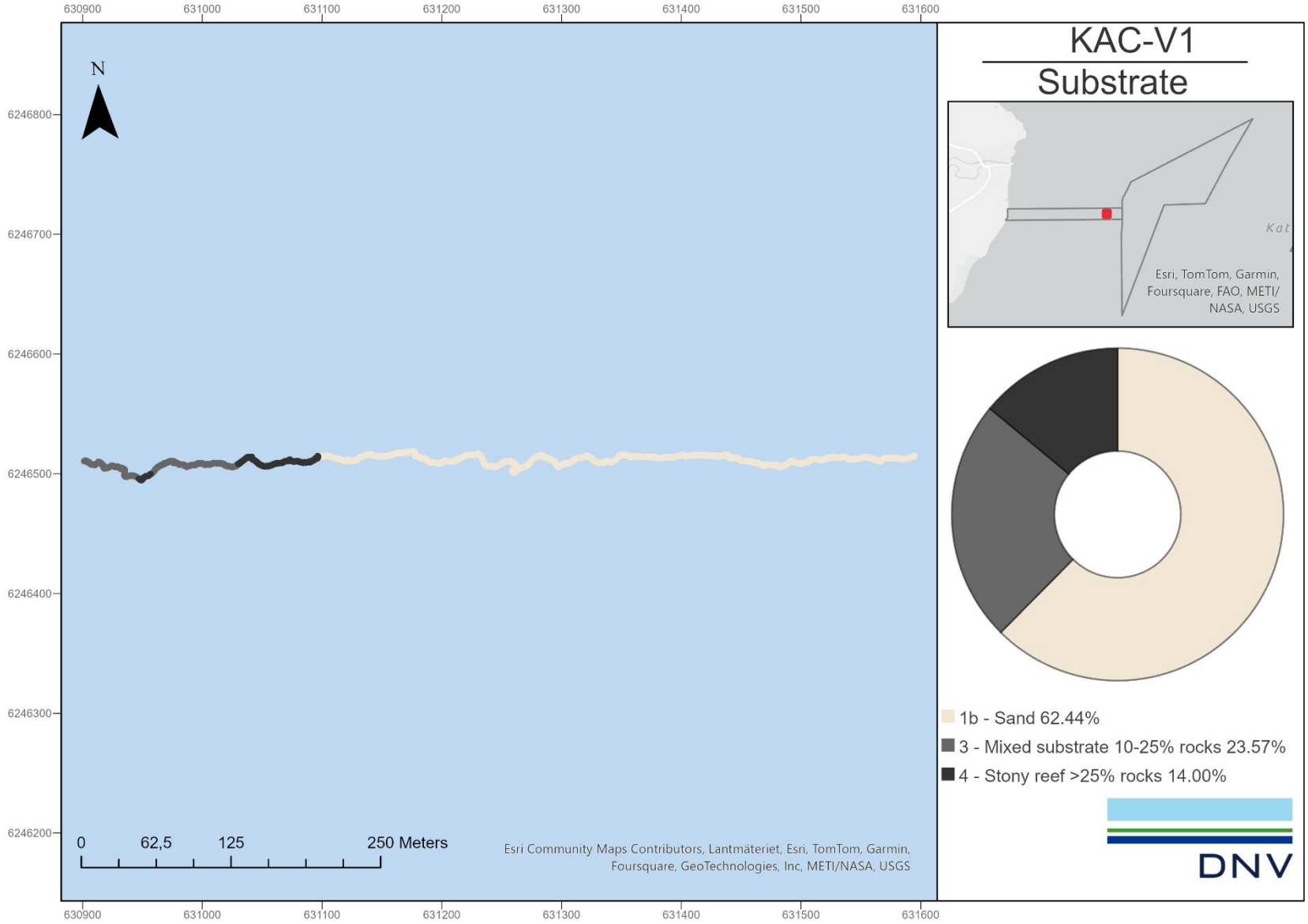
6249100
6249000
N
0
50
100
200 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KA-V6
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
2b - Mixed substrate 1-10% rocks 55.15%
1b - Sand 23.96%
3 - Mixed substrate 10-25% rocks 20.89%
DNV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631500
631600
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6246800
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6246500
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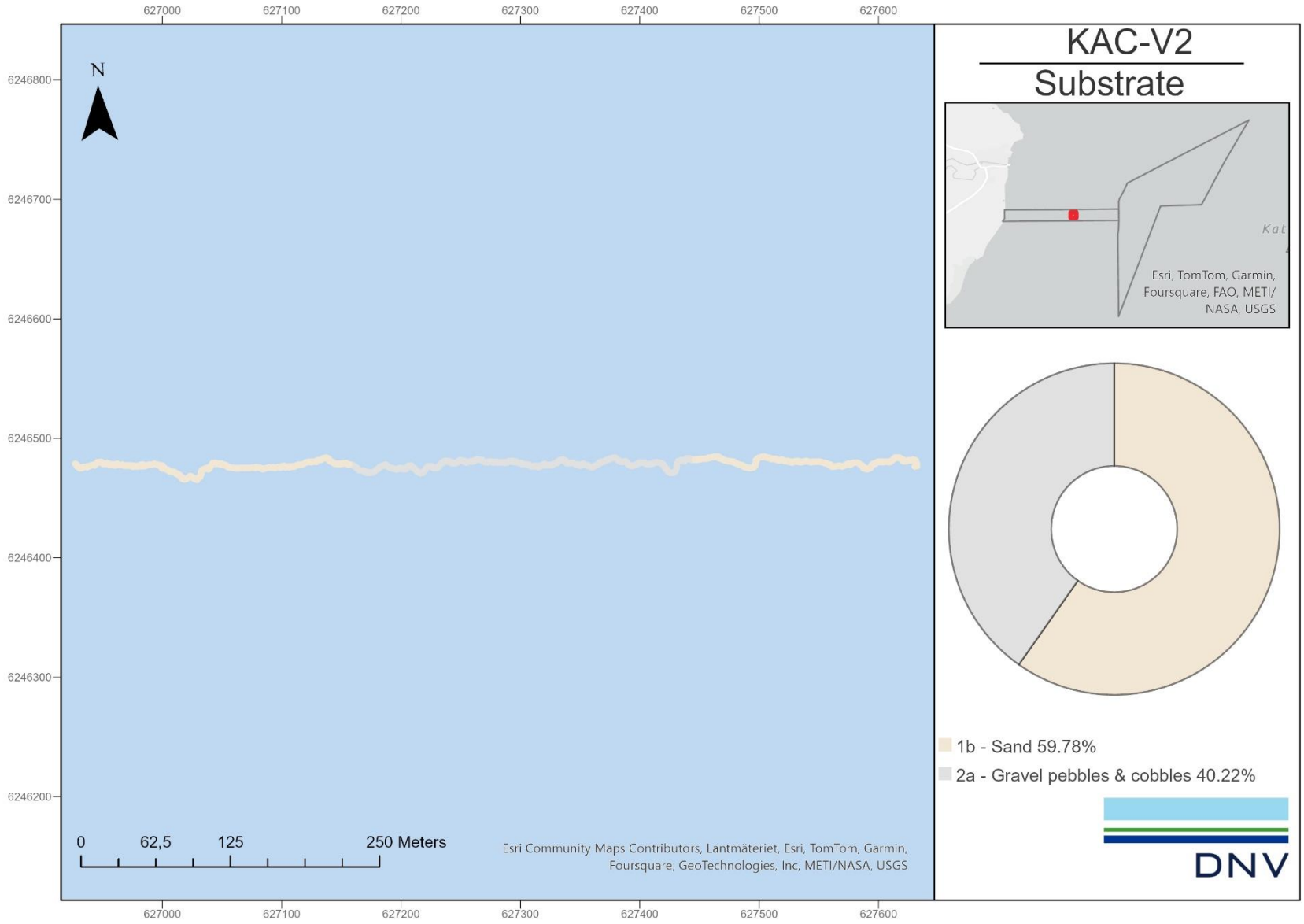
6246300
6246200
0
62,5
125
250 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KAC-V1
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
1b - Sand 62.44%
3 - Mixed substrate 10-25% rocks 23.57%
4 - Stony reef >25% rocks 14.00%
DNV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627400
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6246700
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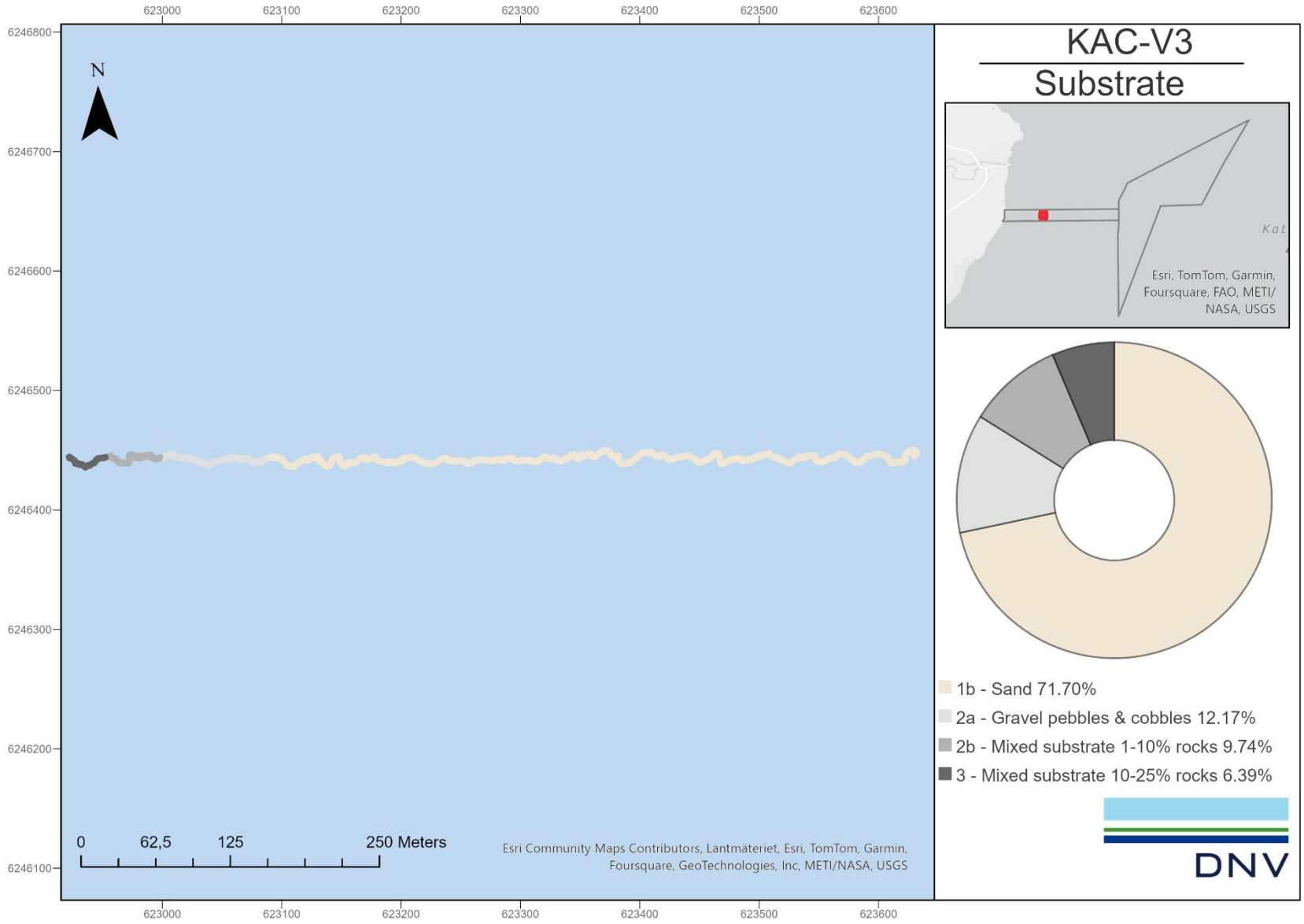
6246200
N
0
62,5
125
250 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KAC-V2
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
1b - Sand 59.78%
2a - Gravel pebbles & cobbles 40.22%
DNV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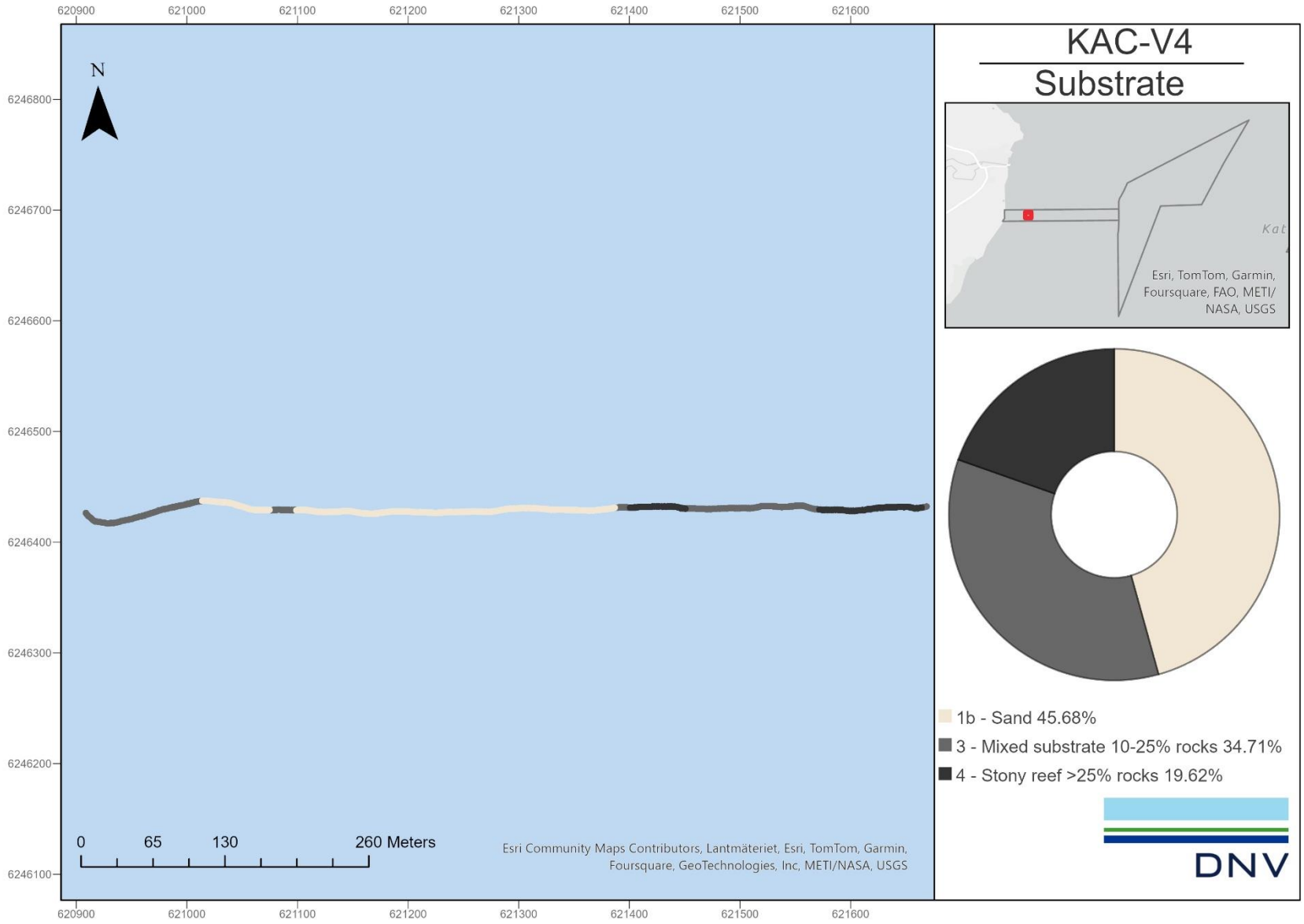
623600
6246800
6246700
6246600
6246500
6246400
6246300
6246200
6246100
N
0
62,5
125
250 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KAC-V3
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
1b - Sand 71.70%
2a - Gravel pebbles & cobbles 12.17%
2b - Mixed substrate 1-10% rocks 9.74%
3 - Mixed substrate 10-25% rocks 6.39%
DNV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621000
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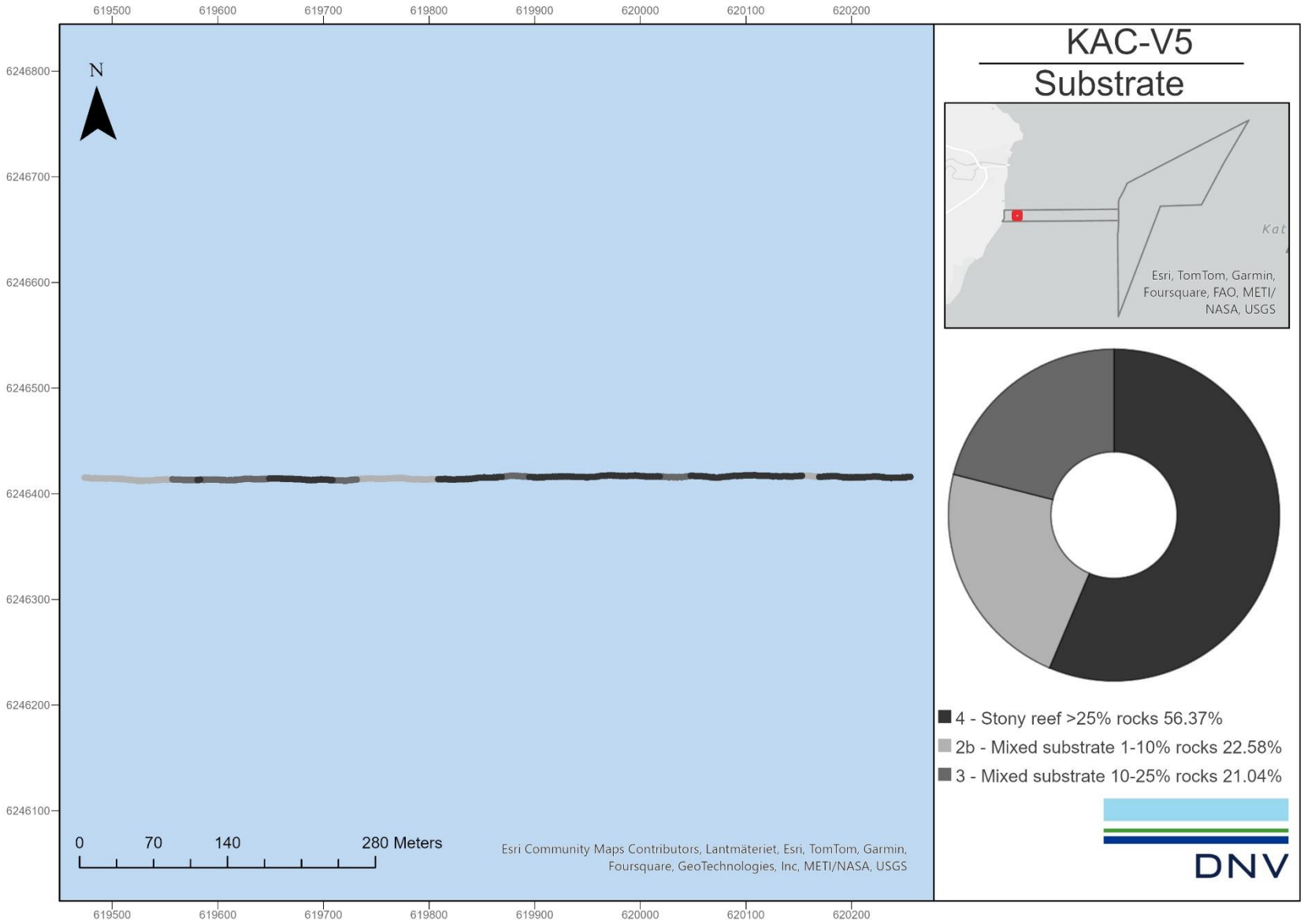
621200
621300
621400
621500
621600
6246800
6246700
6246600
6246500
6246400
6246300
6246200
6246100
N
0
65
130
260 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KAC-V4
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
1b - Sand 45.68%
3 - Mixed substrate 10-25% rocks 34.71%
4 - Stony reef >25% rocks 19.62%
DNV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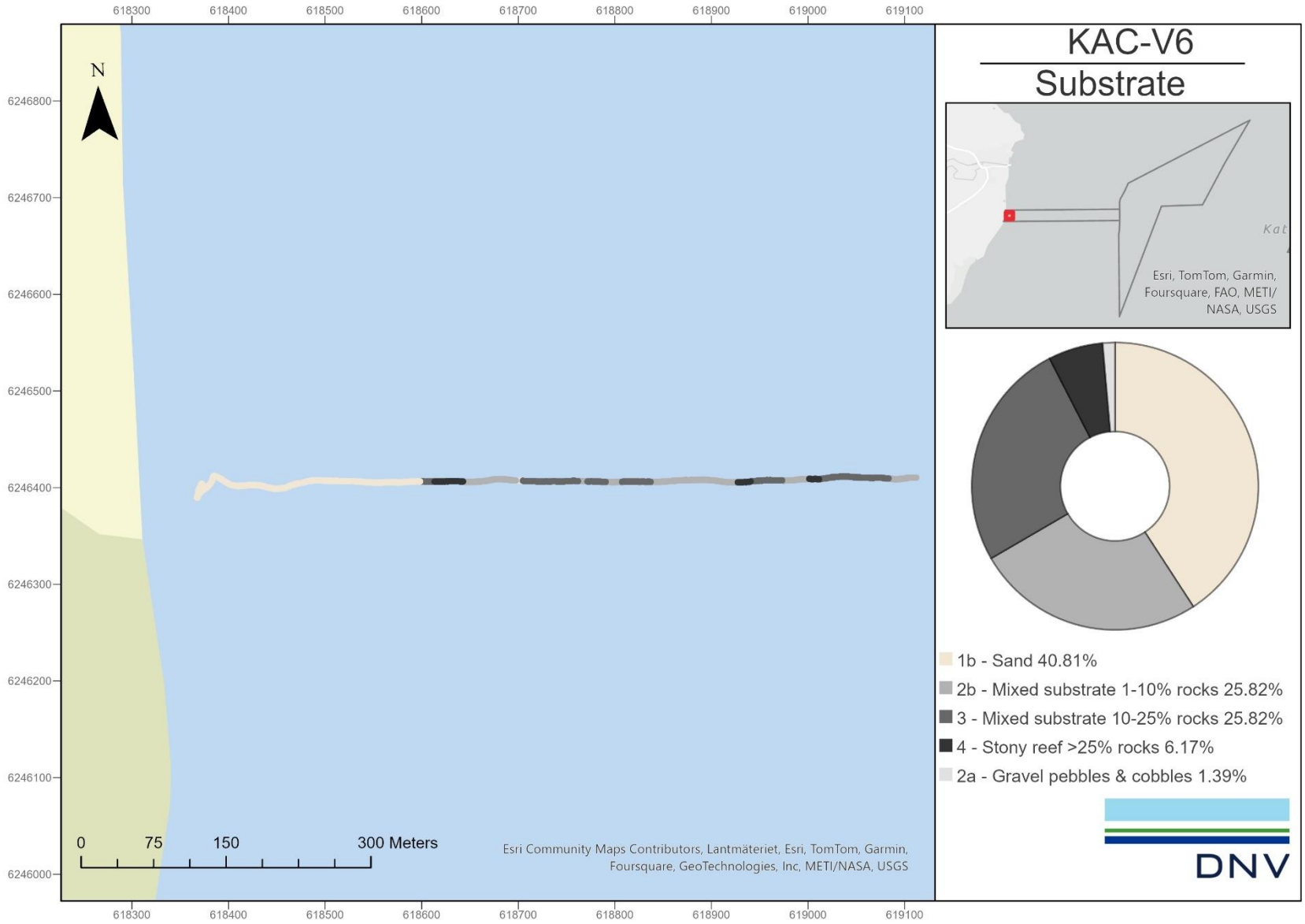
619600
619700
619800
619900
620000
620100
620200
6246800
6246700
6246600
6246500
6246400
6246300
6246200
6246100
N
0
70
140
280 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KAC-V5
Substrate
Kat
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
4 - Stony reef >25% rocks 56.37%
2b - Mixed substrate 1-10% rocks 22.58%
3 - Mixed substrate 10-25% rocks 21.04%
DNV


618300
618400
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618600
618700
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618900
619000
619100
6246800
6246700
6246600
6246500
6246400
6246300
6246200
6246100
6246000
N
0
75
150
300 Meters
Esri Community Maps Contributors, Lantmäteriet, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS
KAC-V6
Substrate
Esri, TomTom, Garmin, Foursquare, FAO, METI/ NASA, USGS
1b - Sand 40.81%
2b - Mixed substrate 1-10% rocks 25.82%
3 - Mixed substrate 10-25% rocks 25.82%
4 - Stony reef >25% rocks 6.17%
2a - Gravel pebbles & cobbles 1.39%
DNV

APPENDIX 4 SPECIES LIST VISUAL TRANSECTS

Species	KA-V1	KA-V2	KA-V3	KA-V4	KA-V5	KA-V6	KAC-V1	KAC-V2	KAC-V3	KAC-V4	KAC-V5	KAC-V6
PORIFERA												
cf. Halichondria panicea										1	1	1
Cf. pachymatisma johnstonia							1					
Porifera indet	1	1							1			
Ahrodita aculeata	1											
Arenicola marina	1			1	1		1				1	1
Polychaeta indet 1	1	1		1	1		1	1				
Serpulidae indet									1			
cf. Spirobranchus triqueter	1											
Spirorbis sp.										1	1	
VARIA												
Electra pilosa											2	2
Membranipora membranacea									1		1	2
CRUSTACEA												
Cancer pagurus			1	1		1	1	1				
Carcinus maenas							1		1		1	1
Hyas spp.						1	1		1		1	
Littorina littorea												2
Pagurus bernhardus	1	1	1	1	1	1	1	1	1			
Polyplacophora indet											1	
Semibalanus balanoides	1	1					1	1	1	1	1	2
MOLLUSCA												
Aporrhais pespelecani									1			
Arctica islandica	1	1	1		1	1	1	1	1	1	1	
Buccinum undatum							1		1			
Buccinum undatum (eggs)					1		1		1			
Cardiidae indet		1		1	1		1					
Modiolus modiolus									1			
Mytilus edulis											1	2

Neptunea antiqua	1											
Pectinidae indet								1				
Turitella spp.		1	1	1	1		1	1	1			
ECHINODERMATA												
Asterias rubens	1	1	1		1		1	1	1	1	1	1
Crossaster paposus						1	1		1			
Echinus esculentus			1		1		1	1				
Henricia spp.	1										1	
Marthasterias glacialis					1			1	1	1	1	1
Mesothuria intestinalis						1						
Ophiocomina nigra		1	1		2	4	2	2				
Ophiotrix fragilis		1		1	1	3	2	1				
Ophiura albida						1						
cf. Ophiura robusta						1						
Ophiura sarsii								1				
Ophiura sp.						1						
Psolus phantapus	1						1	2				
Actiniaria indet			1	1				1	1			
Alcyonium digitatum	1		1	3		1		1				
Halecium cf. halecinum									1			
Hydroidea indet			1									
Pennatula phosphorea				1								
cf. Sagartiogeton undatus									1			
Urticina eques							1					
PISCES												
Actinopterygii indet		1										
Agonus cataphractus								1				
Agonus cataphractus									1			
Clupea harengus									1			
Eutrigla gurnardus									1			
Gadus morhua	1			1	1				1			
Gobiidae sp.		1	1			1	1					
Labridae indet	1											

Limanda limanda	1		1	1	1		2	1	1			
Lumpenus lampretaeformis									1			
Melanogrammus aeglefinus	1	1			1			1				
Merlangius merlangus								1				
Myoxocephalus scorpius									1			
Neogobius melanostomus	1					1		1				
Platichthys flesus				1				1	1			
Pleuronectes platessa		1	1	1	1		1	1				
Pleuronectidae indet		1			1				1			
Pomatoschistus sp.			1	1	1	1	1	1				
Syngnathus sp								1	1			
Trachinus draco									1			
Trisopterus minutus			1	1	1	1			1			
PLANTAE												
Ceramium shuttleworthianium												1
Ceramium sp.										1	1	1
Ceramium tenuicorne										1	2	2
Ceramium virgatum						1				2	2	2
Chorda filum										1	2	2
Chordaria flagelliformis												2
Cladophora sericea												2
cf. Coccotylus truncatus										1	1	
Delesseria sanguinea									1			
cf. Desmarestia aculeata	1								1			
cf. Desmarestia viridis									1			
Dilsea carnosa									1			
Ectocarpus spp.										1	1	2
Eudesme virescens											2	2
Fucus vesiculosus												2
Furcellaria lumbricalis						1			1	2	2	2
Halidrys siliquisa										1	2	2
Hildenbrandia rubra											2	3
Laminaria digitata			1				1		1	2	2	2

Palmaria palmata	1	1	1		1		1					
Phycodrys rubens									1	1	1	
Phymatolithon lenormandii			3	1	1		1		1	1	2	3
Polyides rotunda							1	1				
Pylaiella littoralis											1	2
Rhodophyta indet			1	1				1				
Rhodomela cf. confervoides								1			1	1
Saccharina latissima	1					1			1	1	1	2
Spongonema tomentosum												2
Ulva intestinalis												2
Vertebrata fucoides										1	1	2
Vertebrata spp.										2	2	3

APPENDIX 5 SPECIES LIST INFAUNA

Kattegat	KA-1	KA-2	KA-3	KA-4	KA-5	KA-6	KA-7	KA-8	KA-9	KA-10	KA-11	KA-12	KA-13	KA-14
Oligochaeta	2	3			3									
Priapulus caudatus						1	1							
Cephalochordata	9	6			3					1	1		2	2
Edwardsia	10	13	1	3	11	12	1	2	5	29	16	29	26	12
Nemertea	7	17	21	11	17	16	25	13	8	35	2	4	5	3
Phoronis	277	65	212	225	67	71	34	71	273	117	111	308	95	45
Platyhelminthes						1	1							
Golfingiidae					1		1							
Phascolion (Phascolion) strombus strombus					3		1				2	1		
Thysanocardia procera		2	1	1		1		2	1	4	1			
Ampharete lindstroemi kompleks	25	49	22	6	6	2	2	9	3	23	6	10	5	4
Anobothrus gracilis						2	2	2						
Paramphinome jeffreysii				1	4	1	2	3	1	4				
Laetmonice						1								
Apistobranchus tullbergi		1	1			2	1			1				
Heteromastus filiformis			3	1	2	8	2							
Mediomastus fragilis	19	45	8		15	4	7	9	1	13	6			1
Notomastus latericeus	7	29	52	31	30	30	29	19	7	36	4	2		1
Chaetopterus norvegicus							2	1						
Chaetozone setosa kompleks	38	30	12	14		6	11	2	9	9	4	4		1
Tharyx killariensis	3	30	17	7	2	2		1	3	6	1	1		1
Dorvilleidae									1					
Bradabyssa villosa			1			1	2							
Diplocirrus glaucus	2	1	58	4		24	26	6	41	17		4	1	
Pherusa plumosa		1												

Glyceridae juv.	11	9	10	6	2		9	3	3	9	7	3	1	1
Glycera alba		1		1				2	9			3		
Glycera lapidum						2								
Glycera unicornis	1	1	7	7	5	4	14	10			1			
Goniada maculata	4	8	3	7	7	3	5	6	4	10	5	3	3	5
Nereimyra punctata		2							1					
Oxydromus vittatus			2			3	9	5	2	6				
Podarkeopsis helgolandicus			1			1	2	4						
Magelona alleni	4	6	2			1		2	4	6				
Magelona minuta	3	23	36	7	5	13	15	10	16	58	11	14	2	1
Clymenella cincta					2									
Clymenura					3									
Lumbriclymene					1									
Maldanidae juv.	1	1												
Praxillella affinis			2	12	19	1	2	10		1				
Praxillella praetermissa			1	1		2	3	2		1				
Praxillura longissima							1	2						
Rhodine gracilior	1	4	23		1	5	1							
Rhodine loveni							1							
Nephtys juv.				1	2									
Nephtys caeca	9	4								1				1
Nephtys ciliata		4	1											
Nephtys hombergii			2	1	2	1		2		1		4	2	2
Nephtys incisa						1								
Nephtys longosetosa	4				2									7
Nereididae		3							1	1			4	
Ophelina acuminata		4	1		2									
Orbinia sertulata					1					1				
Scoloplos armiger	115	110	31	14	16	9	3	5	84	102	46	33	22	22
Galathowenia oculata	3	1		3	10	12	10	5	1		1	2		
Myriochele danielsseni					4									
Owenia			1	3	4	2	3	4	1	1		1		
Aricidea (Acmira) catherinae					1									

Aricidea (Aricidea) minuta	2	8				1			1					1
Aricidea (Strelzovia) suecica									3	4				
Levinsenia gracilis		7	12		1								1	
Paradoneis lyra	6	12			1					3				
Amphictene auricoma		8	13	3	5	5	27	46	11	8	9	4	2	1
Cistenides hyperborea						2	2							
Lagis koreni					1			1					1	
Pectinaria belgica								3						
Pholoe baltica	38	64	48	60	53	53	60	59	15	93	33	18	4	7
Pholoe pallida						1	2	3						
Eteone	3	5	2									1		
Eulalia						1	1							
Eumida	2	5	4		3	2	3	2	4	2		1		
Hypereteone foliosa	1	4						1	1	1		1		
Phyllodoce groenlandica		2	1			2						1		
Phyllodoce rosea								2						
Glyphohesione klatti							4			1				
Poecilochaetus serpens	1	1			3	1		1	1	1			2	
Bylgides		2											1	
Gattyana cirrhosa	7	3						1		2				
Harmothoe		1												
Polynoidae juv.	8	3	7		5	2	6	3	5	17	4	3	2	3
Chone	1				1				1			1	1	
Polyphysia crassa							1							
Scalibregma inflatum		1	2		5	4	50	8	26	199	1			1
Hydroides norvegica				1										
Sthenelais limicola				1	2		1	2	1		3	1		
Sphaerodorum						3		1		1				
Dipolydora		1			2	2		1						
Prionospio	3	3			5		1		2	18	3			1
Prionospio fallax	8	42	187	147	6	108	181	238	68	10	42	70	2	
Prionospio multibranchiata			1	2	1	3	13	17						
Pseudopolydora nordica			2			2		2	1					

Pseudopolydora pulchra	1							1		1				
Spio	16	6	2	1	2	1			3	9	4	10	4	3
Spiophanes bombyx		1	2	12	2	1			6	3	1			
Spiophanes kroyeri				7	20	8	22	22	1	13	6	2	1	1
Exogone naidina	2	5		2						1				
Parexogone hebes		1												1
Sphaerosyllis hystrix	1	5								2				1
Amphitrite cirrata		3												
Lanice conchilega	9	1												
Polycirrus		2			2					1				
Terebellidae juv.	1													
Terebellides			1		1			1						
Trichobranchus roseus			6	1		4	2	7	1	1				
Trochochaeta multisetosa							2							
Cirripedia	9	3	17	81	5	3	6	1	44	8	2		8	
Pycnogonida										1	1	1		
Acidostoma obesum										1				
Ampelisca brevicornis	2	3		1	2				1	1	1			3
Ampelisca tenuicornis	3	8	7	10	13	3	1	2	2	13	4	5	2	6
Paramphilochoides odontonyx					4					1	1			
Autonoe longipes		2	4	1		1			2				1	
Astacilla dilatata		1			2	1		4	2	13				
Argissa hamatipes	2	2	19	4	3	4	1	19	4		4	2		3
Bathyporeia elegans	6										1		1	3
Apherusa bispinosa								1						
Caprellidae		2	1		1				1	1				
Crassicorophium crassicorne			1		4			7						1
Diastylis rathkei			1		1		1	2		2		1		
Diastyloides biplicatus									2					
Diastyloides serratus		1	1	1	1		8	8	2			1		
Dulichia					1	1	1		1					
Eriopisa elongata			1											
Ericthonius punctatus				5				1	2					

Ischyrocerus megacheir			3											
Parajassa pelagica	2	1			2	3	10	11	3	4	4		1	4
Eudorella truncatula		2	8	4		19	3	12	2	3				
Leucothoe lilljeborgi				1	1				3	1				3
Tryphosella nanoides		2	1		1		1	2	1					
Nebalia bipes						2			1					
Bathymedon longimanus								1						
Monoculodes	1	2	3	3	1	2	6	10	10		3		2	
Synchelidium tenuimanum									7	1				
Westwoodilla caecula					1	1	1	3						
Paguridae	1	1		2										1
Gammaropsis melanops			1	36					1	1	1	1		
Gammaropsis nitida				23			1	2	1					
Megamphopus cornutus		1												
Harpinia antennaria			12	5	4	3	1	5		3	2	6	3	
Harpinia laevis							4			1				
Podoceridae		1												
Liocarcinus pusillus					1									
Pseudocuma			1	3	1		1	7	2	2		1		
Pycnogonidae		1			1									
Metopa	1	2		4										
Upogebia		1												
Urothoe elegans					20								1	1
Centraloecetes kroyeranus	4	6							1		3	1	1	2
Cheirocratus sundevallii		1	3		2				1		2	1	1	
Nototropis vedlomensis				1	4			1	1	1				
Asteroidea juv.				1										
Echinoidea juv.			2				2							
Ophiuroidea juv.	23	24	60	54	40	70	68	37	56	403	24	9	14	12
Amphiura chiajei						1								
Amphiura filiformis	37	72	180	261	290	260	342	334	13	259	55	96	11	14
Brissopsis lyrifera								1						
Leptopentacta elongata												1		

Echinocyamus pusillus	23	10			5					6	2		26	15
Echinocardium cordatum	1		9	5	1	2	10	10	13	5	8	7	4	2
Ophiura albida					1									
Psolus														1
Caudofoveata		1	6	1		1	2	1	3	3				
Acteon tornatilis								1	1					
Arctica islandica	2			3									1	8
Arctica islandica juv.										2				
Astarte montagui	1	9			4									
Astarte sulcata		1			1									
Buccinum undatum		2											1	
Parvicardium pinnulatum		2						1		1				
Bittium reticulatum								1						
Cylichna cylindracea	2	1	5	5	5	12	13	16	13	10	2	5	1	2
Diaphana					1					1				1
Eulimidae									1					
Hiatella arctica		1												
Hyala vitrea		1	6	1	1	3	15	3						
Leptochiton asellus		1		1							1			
Lucinoma borealis			1											
Lyonsia norwegica										1				
Spisula subtruncata	1		1			1	1	1					1	1
Oenopota		1						1						
Kurtiella bidentata	115	178	435	614	692	569	463	631	43	399	152	169	63	33
Tellimya ferruginosa	3	1	20	10		10	10	14	33	13	6	7	4	9
Tellimya tenella							2	9						
Mya arenaria						2	1			1				
Crenella decussata		3												
Mytilus edulis		2												
Euspira nitida			1		2		1	1				1	1	
Ennucula tenuis			6	11	1	10	35	22	8	11				
Nucula nucleus	22	52	265	46	12	112	104	80	96	26	29	65	11	2
Cochlodesma praetenue	1	1		1					5	12	2		22	7

Phaxas pellucidus	4	1	1	1	1	1	1			3	1	1		3
Philinidae		2	2	1							1			
Gari fervensis					1							2		1
Retusa umbilicata	1	4	17	7	1	17	27	79	4	29			1	
Abra alba	2	1												
Abra nitida		2	19	10	3	15	37	8		3		2		1
Fabulina fabula	22		1						2	1	1	1	4	2
Macoma calcarea						1								
Thracia convexa			1			5	2	7		1				
Thracia phaseolina	9	1	1					1	2	5	2	3	5	1
Thyasira flexuosa	54	152	185	90	14	75	49	27	74	95	24	79	5	7
Chamelea striatula	3			1	1	3	1	3	5	1		1	4	
Dosinia lupinus				1	2	2		4		1		2	2	
Mysia undata					1		1	1	1	6				
Timoclea ovata										5				
Papillicardium minimum								2						
Pyrgiscus jeffreysii								1			1			
Varicorbula gibba	1	8	12	6	8	10	28	35	7	11	6	7		1

Kattegat ECC	**KAC-1**	**KAC-2**	**KAC-3**	**KAC-4**	**KAC-5**	**KAC-6**
Oligochaeta	1	2		2		3
Cephalochordata		5		1	2	1
Edwardsia	26	2	10	14	19	4
Nemertea	10	8	12	13	12	2
Phoronis	249	10	78	114	58	
Platyhelminthes	1					
Golfingiidae		2				
Phascolion (Phascolion) strombus strombus		1				
Ampharete lindstroemi kompleks	22	8	17	54	4	
Anobothrus gracilis			1		1	

Apistobranchus tullbergi			1			
Heteromastus filiformis	1					
Mediomastus fragilis		4	3	10	4	2
Notomastus latericeus	20		33	33	1	1
Chaetozone setosa kompleks	33	5	22	24	7	9
Tharyx killariensis	2	7	4	2		
Diplocirrus glaucus	11		1			
Glycera alba		1	1			
Glycera unicornis	7	2	3	5	1	
Glyceridae juv.	5	2	12	4		
Goniada maculata	8	7	7	7	6	1
Magelona alleni		3	2	3	2	
Magelona minuta	17		41	9	1	1
Maldane sarsi	1					
Praxillella affinis	2					
Praxillella praetermissa			2			
Nephtys juv.					4	4
Nephtys caeca					1	2
Nephtys hombergii	1		2			2
Nephtys longosetosa		5				
Nereididae			2	3		1
Ophelia borealis		3				
Ophelina acuminata			1		1	
Scoloplos armiger	69	48	114	142	60	10
Galathowenia oculata	2	1				
Owenia			2	1		
Aricidea (Aricidea) minuta			2			
Paraonidae		1	1			
Amphictene auricoma	4	2	4	3		
Pholoe baltica	58	9	48	37	8	6
Eteone	4	2	4	14		1
Eulalia				1		
Eumida	4		6	2		

Phyllodoce groenlandica			1	2		
Glyphohesione klatti	1					
Poecilochaetus serpens		2	2	1		1
Polynoidae	5				2	1
Polynoidae juv.		8	9	15		
Jasmineira caudata		1				
Sabellidae			2			
Scalibregma inflatum	2			2		
Sigalion mathildae					1	
Sthenelais limicola	4		2			
Dipolydora		1	2	1		2
Prionospio		16	4			
Prionospio fallax	242		65	33		
Prionospio multibranchiata	3					
Pseudopolydora nordica	1					
Pseudopolydora pulchra	1					
Pygospio elegans						1
Spio	6	2	17	20	18	1
Spiophanes bombyx	4			2	3	
Spiophanes kroyeri	4		2			
Exogone naidina	1				1	
Parexogone hebes		2	3	4		
Sphaerosyllis hystrix		1				
Syllidae			1			
Lanice conchilega	2		7	10	20	2
Polycirrus	1	1	1	5		
Cirripedia	4		19	1	28	
Ampelisca brevicornis	1	4		1	3	
Ampelisca tenuicornis	12	5	1	4		
Paramphilochoides odontonyx			1	1		
Autonoe longipes			1		2	
Astacilla dilatata	2		1			
Argissa hamatipes	1	15	14	14	7	1

Bathyporeia elegans					12	1
Apherusa bispinosa						1
Caprellidae			3			9
Crassicorophium crassicorne	2		2		1	1
Ischyrocerus megacheir						25
Parajassa pelagica		5	1		3	1
Eudorella truncatula	1					
Leucothoe lilljeborgi			1			
Tryphosites longipes			3			
Bathymedon					7	
Perioculodes longimanus	5	2	2	2	1	1
Synchelidium tenuimanum	1			1		
Paguridae			1			
Gammaropsis	3					
Harpinia antennaria	4					
Harpinia crenulata						1
Liocarcinus pusillus			1		1	
Pseudocuma	1		3			
Pycnogonidae	2					
Metopa			1			
Centraloecetes kroyeranus	1	2	7	5		
Cheirocratus sundevallii	1	2			2	
Ophiuroidea juv.	76	13	36	20		
Amphiura filiformis	169	11	71	54	8	
Echinocyamus pusillus		22	2	2	8	
Echinocardium cordatum	11	3	4	2	1	
Psolus		1				
Caudofoveata	1					
Arctica islandica	1	1	1	2	13	
Arctica islandica juv.				5		
Parvicardium pinnulatum		1				
Cylichna cylindracea	4		1	4		
Hiatella arctica				1		

Lucinoma borealis	1					
Spisula subtruncata					1	
Kurtiella bidentata	268	19	103	93	10	3
Tellimya ferruginosa	4		4	6		
Euspira nitida			2			
Ennucula tenuis			1			
Nucula nucleus	103		31	28	3	
Cochlodesma praetenue	4	31		9	27	
Phaxas pellucidus	1		2	3		
Philinidae		1	3		1	
Gari fervensis	1	1	2	1	1	
Pyrgiscus rufescens	1					
Retusa umbilicata	3	1		1		
Abra nitida	4		1	1		
Fabulina fabula	1		7	9	36	
Thracia convexa						1
Thracia phaseolina		2	5			
Thyasira flexuosa	178	1	59	64	6	
Chamelea striatula	2		4	4	3	
Dosinia lupinus				1		
Mysia undata	1		5			
Timoclea ovata						1
Varicorbula gibba	9	2	4	14	2	

APPENDIX 6 BIOMASS RESULTS

Kattegat OWF area

Group	Species	KA-1	KA-2	KA-3	KA-4	KA-5	KA-6	KA-7	KA-8	KA-9	KA-10	KA-11	KA-12	KA-13	KA-14
Varia	Oligochaeta	0,0006667	0,001			0,001									
Varia	Priapulus caudatus						0,011375	0,011375							
Varia	Cephalochordata	0,037125	0,0195			0,02325					0,001	0,00125		0,00695	0,00695
Varia	Edwardsia	0,1125	0,15015	0,00775	0,0303693	0,0570625	0,429	0,0035	0,0202462	0,0506155	0,3393	0,064	0,1425833	0,2444	0,0762
Varia	Nemertea	0,0105	0,2344583	0,441	0,0460625	0,493	0,042	0,808125	0,5485413	0,014	11,310833	0,084391	0,05925	0,2725	0,00825
Varia	Phoronis	11,822954	3,7655682	13,753066	5,44875	3,0187222	3,5100625	1,6769286	4,3612794	9,3631087	7,84485	4,8031985	11,564903	4,5879911	3,3825
Varia	Platyhelminthes						0,17775	0,17775							
Varia	Golfingiidae					0,00975		0,00275							
Varia	Phascolion (Phascolion) strombus strombus					0,231		0,0558333				0,1465	0,01725		
Varia	Thysanocardia procera		0,0236071	0,011	0,028		0,0075		0,00275	0,0055	0,059	0,0145			
Polychaeta	Ampharete lindstroemi complex	0,2051136	0,4489625	0,10175	0,0145	0,035	0,0113446	0,0113446	0,012375	0,0170168	0,0685577	0,0135	0,04625	0,0283614	0,061
Polychaeta	Anobothrus gracilis						0,0785	0,04875	0,019						
Polychaeta	Paramphinome jeffreysii				0,0046563	0,0125	0,00775	0,0045	0,0139688	0,0055	0,018625				
Polychaeta	Laetmonice						0,00475								
Polychaeta	Apistobranchus tullbergi		0,00225	0,00275			0,0005	0,0025			0,0025				
Polychaeta	Heteromastus filiformis			0,0285	0,0049722	0,003	0,0313333	0,0099444							
Polychaeta	Mediomastus fragilis	0,035625	0,0476471	0,042		0,035625	0,0078706	0,0154	0,009	0,00125	0,0221	0,006			0,0019676
Polychaeta	Notomastus latericeus	0,044625	0,5850192	1,1740625	0,3125833	0,5271429	3,3616667	8,580375	1,80025	0,0375	0,393	0,2021	0,0185		0,0547003
Polychaeta	Chaetopterus norvegicus							0,757	0,3785						
Polychaeta	Chaetozone setosa complex	0,0475													
Polychaeta	Tharyx killariensis	0,0029484	0,01	0,0136	0,007	0,00175	0,0019656		0,00025	0,00125	0,001125	0,0009828	0,0015		0,00275
Polychaeta	Dorvilleidae									0,001					
Polychaeta	Bradabyssa villosa			0,04575			0,04575	0,0915							
Polychaeta	Diplocirrus glaucus	0,0318957	0,0159479	0,8280263	0,038		0,4628571	0,5113333	0,051	0,6218333	0,1030625		0,1405	0,0159479	
Polychaeta	Pherusa plumosa		0,4035												
Polychaeta	Glyceridae juv.	0,01375	0,0135	0,021875	0,01275	0,018		0,0106875	0,003375	0,0090375	0,0271125	0,01575	0,0090375	0,0065	0,003
Polychaeta	Glycera alba		0,0068333		0,0068333				0,0255	0,0315			0,01275		
Polychaeta	Glycera lapidum						0,011375								
Polychaeta	Glycera unicornis	0,752975	0,0045	5,270825	0,01925	3,764875	1,862	22,785	16,64625			0,752975			
Polychaeta	Goniada maculata	0,021	2,704	0,1496875	0,3492708	0,4725	0,03375	0,1695833	0,008	0,0113333	0,5016667	0,066875	0,11325	0,045375	0,11125
Polychaeta	Nereimyra punctata		0,01425							0,007125					
Polychaeta	Oxydromus vittatus			0,006			0,00825	0,03825	0,01375	0,0025	0,024				
Polychaeta	Podarkeopsis helgolandicus			0,0125			0,013125	0,02625	0,055						
Polychaeta	Magelona alleni	0,0045	0,0015	0,0975			0,0132188		0,0045	0,052875	0,0045				
Polychaeta	Magelona minuta	0,0047562	0,00575	0,031	0,006125	0,01	0,0108333	0,01625	0,005	0,003	0,0373947	0,01925	0,0105	0,00325	0,00925
Polychaeta	Clymenella cincta					6,258									
Polychaeta	Clymenura					0,00825									
Polychaeta	Lumbriclymene					0,0035									
Polychaeta	Maldanidae juv.	0,007125	0,007125												
Polychaeta	Praxillella affinis			0,0455	0,1398	0,1262143	0,0514586	0,1995	0,5145857		0,1165				
Polychaeta	Praxillella praetermissa			0,118625	0,00075		0,0725	0,76575	0,3645		0,118625				
Polychaeta	Praxillura longissima							0,027	0,054						
Polychaeta	Rhodine gracilior	0,00625	0,1253333	1,5400417		0,0293229	0,06375	0,0293229							

Group	Species	KA-1	KA-2	KA-3	KA-4	KA-5	KA-6	KA-7	KA-8	KA-9	KA-10	KA-11	KA-12	KA-13	KA-14
Polychaeta	Rhodine loveni							0,1645							
Polychaeta	Nephtys juv.				0,00175	0,0035									
Polychaeta	Nephtys caeca	0,21825	5,429								0,69075				0,69075
Polychaeta	Nephtys ciliata		0,3575	0,089375											
Polychaeta	Nephtys hombergii			1,267	0,42475	1,10725	1,03325		1,10725		0,553625		0,492	1,10725	1,10725
Polychaeta	Nephtys incisa						0,1809167								
Polychaeta	Nephtys longosetosa	0,055				0,031									0,12075
Polychaeta	Nereididae		0,018							0,006	0,006			0,024	
Polychaeta	Ophelina acuminata		0,107	0,0305		0,1775									
Polychaeta	Orbinia sertulata					2,218125					2,218125				
Polychaeta	Scoloplos armiger	1,07	0,6970192	0,18755	0,08225	0,208	0,054	0,0246137	0,0175	0,7007368	0,6423571	0,4715	0,3102	0,27775	0,2129286
Polychaeta	Galathowenia oculata	0,0224125	0,0074708		0,0224125	0,09	0,162	0,102	0,033125	0,0074708		0,00325	0,0045		
Polychaeta	Myriochele danielsseni					0,0176667									
Polychaeta	Owenia			1,07575	3,22725	4,303	2,1515	3,22725	4,303	1,07575	1,07575		1,07575		
Polychaeta	Aricidea (Acmira) catherinae					0,001375									
Polychaeta	Aricidea (Aricidea) minuta	0,0023333	0,0093333				0,00175			0,00075					0,001
Polychaeta	Aricidea (Strelzovia) suecica									0,0015	0,006				
Polychaeta	Levinsenia gracilis		0,0048125	0,01275		0,000875								0,000875	
Polychaeta	Paradoneis lyra	0,009	0,003			0,0015					0,0045				
Polychaeta	Amphictene auricoma		0,368	1,95325	0,045	0,08875	0,4025	1,549125	1,14425	0,0715	0,2093333	0,3195	0,319	0,0981212	0,0490606
Polychaeta	Cistenides hyperborea						0,057	0,057							
Polychaeta	Lagis koreni					0,463			0,463					0,463	
Polychaeta	Pectinaria belgica								0,62325						
Polychaeta	Pholoe baltica	0,1198462	0,1288421	0,114	0,1022727	0,091425	0,0868611	0,1263158	0,0901389	0,045	0,151125	0,12375	0,02925	0,0195	0,041125
Polychaeta	Pholoe pallida						0,0035	0,007	0,0105						
Polychaeta	Eteone	0,0084375	0,02375	0,00175									0,0028125		
Polychaeta	Eulalia						0,00075	0,0015							
Polychaeta	Eumida	0,0355	0,03625	0,0776667		0,05825	0,0388333	0,0375	0,0388333	0,031	0,011		0,06575		
Polychaeta	Hypereteone foliosa	0,0015	0,006						0,0015	0,00225	0,0015		0,00075		
Polychaeta	Phyllodoce groenlandica		0,576	0,288			0,576						0,288		
Polychaeta	Phyllodoce rosea								0,0095						
Polychaeta	Glyphohesione klatti							0,021			0,00525				
Polychaeta	Poecilochaetus serpens	0,006125	0,00675			0,0165	0,006125		0,006125	0,006125	0,006125			0,01225	
Polychaeta	Bylgides		0,0035											0,00175	
Polychaeta	Gattyana cirrhosa	0,0105	0,003						0,00125		0,0005				
Polychaeta	Harmothoe		0,0825												
Polychaeta	Polynoidae juv.	0,007	0,003	0,007875		0,0040625	0,001	0,0195	0,002625	0,00125	0,0072857	0,0039964	0,00075	0,00175	0,0029973
Polychaeta	Chone	0,3185833				0,137				0,00075			0,3185833	0,818	
Polychaeta	Polyphysia crassa							0,649							
Polychaeta	Scalibregma inflatum		0,0068344	0,0136687		0,16625	0,001	0,0434211	0,004	0,0046429	0,1081522	0,01225			0,0068344
Polychaeta	Hydroides norvegica				0,649										
Polychaeta	Sthenelais limicola				0,01475	0,0975		0,022	0,0255	0,0365		0,0405	0,00575		
Polychaeta	Sphaerodorum						0,00075		0,001		0,001				

Group	Species	KA-1	KA-2	KA-3	KA-4	KA-5	KA-6	KA-7	KA-8	KA-9	KA-10	KA-11	KA-12	KA-13	KA-14
Polychaeta	Dipolydora		0,0005			0,004	0,007		0,002						
Polychaeta	Prionospio	0,00225	0,00075			0,0025		0,0005417		0,0010833	0,009	0,00125			0,0005417
Polychaeta	Prionospio fallax	0,004	0,0399	0,193375	0,1119205	0,0085	0,1050811	0,1703529	0,1990172	0,0588462	0,0116118	0,06825	0,0721875	0,006	
Polychaeta	Prionospio multibranchiata			0,0016188	0,0005	0,0016188	0,005625	0,0325	0,03145						
Polychaeta	Pseudopolydora nordica			0,0045			0,014		0,0073333	0,00175					
Polychaeta	Pseudopolydora pulchra	0,01025							0,01025		0,01025				
Polychaeta	Spio	0,079	0,03	0,00625	0,0049229	0,011	0,00275			0,0147688	0,054	0,009	0,035	0,0316667	0,02475
Polychaeta	Spiophanes bombyx		0,00125	0,0065	0,107	0,0109667	0,0054833			0,078	0,003	0,0054833			
Polychaeta	Spiophanes kroyeri				0,0530833	0,1525	0,243	1,010625	0,138875	0,0130556	0,052	0,0385	0,0261111	0,00625	0,003
Polychaeta	Exogone naidina	0,003	0,00125		0,003						0,0015				
Polychaeta	Parexogone hebes		0,0004545												0,0004545
Polychaeta	Sphaerosyllis hystrix	0,00025	0,00125								0,001				0,0005
Polychaeta	Amphitrite cirrata		0,197625												
Polychaeta	Lanice conchilega	1,51875	0,09625												
Polychaeta	Polycirrus		0,072			0,03925					0,00325				
Polychaeta	Terebellidae juv.	0,001													
Polychaeta	Terebellides			0,16125		0,16125			0,16125						
Polychaeta	Trichobranchus roseus			0,1665	0,01525		0,377	0,1116	0,3906	0,07325	0,0685				
Polychaeta	Trochochaeta multisetosa							0,305							
Mollusca	Abra alba	1,2615	0,7755												
Mollusca	Abra nitida		0,479	1,8176667	2,174	0,0285	0,565	4,2238864	0,525		0,261		0,8515		0,007
Mollusca	Acteon tornatilis								0,00525	0,00575					
Mollusca	Arctica islandica	232,5			357,5						343,21429			205	1607,5
Mollusca	Astarte montagui	0,02375	7,203			2,4865									
Mollusca	Astarte sulcata		0,047			0,04925									
Mollusca	Bittium reticulatum								0,0025						
Mollusca	Buccinum undatum		6,62525											7,5	
Mollusca	Caudofoveata		0,018225	0,171	0,018225		0,018225	0,0425	0,0255	0,037875	0,00975				
Mollusca	Chamelea striatula	1,07025			0,498	3,00125	8,089125	5,2415	1,666125	6,5525	1,36275		0,0015	7,549	
Mollusca	Cochlodesma praetenue	0,0245	0,01375		0,0035					0,0108333	0,93	0,0605		2,38975	0,224
Mollusca	Crenella decussata		0,01725												
Mollusca	Cylichna cylindracea	0,0415	0,0165	0,16375	0,0275	0,0125	0,075	0,416	0,364	1,15375	0,0966667	0,039	0,076875	0,00425	0,0925
Mollusca	Diaphana					0,00125					0,0075				0,00775
Mollusca	Dosinia lupinus				0,001	1,7765	0,006		0,285		0,0535		0,005	7,501	
Mollusca	Ennucula tenuis			0,036	0,0971667	0,0375	0,0925	0,79275	0,13475	0,103	0,07865				
Mollusca	Eulimidae									0,0025					
Mollusca	Euspira nitida			0,02625		0,1278		0,0385	0,0405				0,061	0,15325	
Mollusca	Fabulina fabula	0,4499		0,00075						0,0015	0,03275	0,0105	0,0095	0,09	1,102
Mollusca	Gari fervensis					0,00325							0,0055		2,1855
Mollusca	Hiatella arctica		0,04												
Mollusca	Hyala vitrea		0,00125	0,013875	0,0005	0,15575	0,00225	0,0593182	0,00225						
Mollusca	Kurtiella bidentata	0,4779687	0,5259091	1,3241912	1,5416739	1,9510556	2,047163	2,485869	1,10425	0,0555417	0,1471313	0,5073	0,5724875	0,1845	0,11825
Mollusca	Leptochiton asellus		0,05125		0,00175							0,0245			

Group	Species	KA-1	KA-2	KA-3	KA-4	KA-5	KA-6	KA-7	KA-8	KA-9	KA-10	KA-11	KA-12	KA-13	KA-14
Mollusca	Lucinoma borealis			2,54275											
Mollusca	Lyonsia norwegica										0,01625				
Mollusca	Macoma calcarea						7,5								
Mollusca	Mya arenaria						0,0045	0,00325			0,0095				
Mollusca	Mysia undata					1,44625		0,2545	1,24325	0,8078125	1,7235				
Mollusca	Mytilus edulis		100												
Mollusca	Nucula nucleus	3,0745	8,435	27,225263	6,18125	0,693	8,0322667	5,8565	1,7545455	4,4376	0,338	1,837875	7,4295	2,990625	0,076
Mollusca	Oenopota		0,1025						0,021						
Mollusca	Papillicardium minimum								0,094						
Mollusca	Parvicardium pinnulatum		0,10925						0,01475		0,05475				
Mollusca	Phaxas pellucidus	1,099	0,17025	0,03825	0,24375	0,25825	0,0005	0,1575			0,411375	0,08675	0,18925		0,39525
Mollusca	Philinidae		0,003	0,001	0,00375							0,18875			
Mollusca	Pyrgiscus jeffreysii								0,0015			0,0015			
Mollusca	Retusa umbilicata	0,00475	0,016	0,0325833	0,0035	0,00525	0,03995	0,1215	0,09085	0,001	0,15805			0,001	
Mollusca	Spisula subtruncata	0,017		0,02575			0,00625	0,25525	2,0035					0,40725	0,61525
Mollusca	Tellimya ferruginosa	0,0435	0,024	1,16	0,34		0,1183333	0,4925	0,112	0,050875	0,1885	0,0225	0,0385	0,243	0,2334375
Mollusca	Tellimya tenella							0,02625	0,0196875						
Mollusca	Thracia convexa			0,00609			0,015	0,0045	0,035		0,0065				
Mollusca	Thracia phaseolina	0,23175	0,00975	0,001					0,00025	0,00375	0,015	0,055	0,238125	0,095	0,1075
Mollusca	Thyasira flexuosa	6,3758571	8,8832308	3,1852174	2,8305	0,3059	2,84625	0,4398864	0,320625	2,8852292	5,2524038	2,1093333	3,667575	0,04625	0,408625
Mollusca	Timoclea ovata										0,2675				
Mollusca	Varicorbula gibba	0,0075	0,198	1,2045	0,0075	1,004	0,085	0,2744	0,4655	0,011375	0,325875	0,033	2,46925		0,091
Echinodermata	Asteroidea juv.				0,07575										
Echinodermata	Echinoidea juv.			0,269				0,269							
Echinodermata	Ophiuroidea juv.	0,1232143	0,072	0,0255	0,0135	0,01	0,0175	0,017	0,00925	0,014	0,3389518	0,006	0,00225	0,0035	0,003
Echinodermata	Amphiura chiajei						0,00875								
Echinodermata	Amphiura filiformis	6,23265	15,236571	53,486413	53,882033	59,868926	53,675589	70,604044	68,952487	2,6837794	38,477688	11,354451	19,818679	2,2708903	2,890224
Echinodermata	Brissopsis lyrifera								13,17925						
Echinodermata	Leptopentacta elongata												3,1585		
Echinodermata	Echinocyamus pusillus	0,1243438	0,0025			0,0141406					0,0169688	0,0056563		0,0735313	0,0424219
Echinodermata	Echinocardium cordatum	32,365		132,46425	26,5675	4,74875	11,7105	78,331875	49,8375	72,644	32,774625	86,644	50,270391	32,955	15,501
Echinodermata	Ophiura albida					0,70925									
Echinodermata	Psolus														34,31775
Crustacea	Ampelisca brevicornis	0,06	0,0855		0,0165	0,0435				0,0085	0,04975	0,029			0,0795
Crustacea	Ampelisca tenuicornis	0,00075	0,001	0,00175	0,0008333	0,089375	0,00025	0,00025	0,0005	0,0005	0,00325	0,001	0,000625	0,0005	0,0015
Crustacea	Paramphilochoides odontonyx					0,00025					0,00025	0,00025			
Crustacea	Autonoe longipes		0,0005	0,001	0,00025		0,00025			0,0005				0,00025	
Crustacea	Argissa hamatipes	0,0005	0,0005	0,00475	0,001	0,00075	0,0005	0,00025	0,0007917	0,0003333		0,0005	0,0005		0,000375
Crustacea	Astacilla dilatata		0,00025			0,0005	0,00025		0,0005	0,00025	0,0003611				
Crustacea	Nototropis vedlomensis				0,00025	0,0215			0,00025	0,00025	0,00025				
Crustacea	Cheirocratus sundevalli		0,00025	0,00075		0,0005				0,00025		0,0005	0,00025	0,00025	
Crustacea	Caprellidae		0,0005	0,00025		0,00025				0,00025	0,00025				
Crustacea	Crassicorophium crassicorne			0,00025		0,0005			0,00175						0,00025

Group	Species	KA-1	KA-2	KA-3	KA-4	KA-5	KA-6	KA-7	KA-8	KA-9	KA-10	KA-11	KA-12	KA-13	KA-14
Crustacea	Centraloecetes kroyeranus	0,001	0,0005							0,00025		0,000375	0,00025	0,00025	0,0005
Crustacea	Diastylis rathkei			0,00025		0,01025		0,00775	0,027		0,051		0,00025		
Crustacea	Diastyloides biplicatus									0,0005					
Crustacea	Diastyloides serratus		0,00025	0,00025	0,00025	0,00025		0,0006667	0,001	0,00025			0,00025		
Crustacea	Apherusa bispinosa								0,00025						
Crustacea	Gammaropsis melanops			0,00025	0,003					0,00025	0,00025	0,00025	0,00025		
Crustacea	Megamphopus cornutus		0,00025												
Crustacea	Ischyrocerus megacheir			0,00075											
Crustacea	Parajassa pelagica	0,0005	0,00025			0,0005	0,00075	0,000625	0,00275	0,00075	0,001	0,001		0,00025	0,001
Crustacea	Ericthonius punctatus				0,00125				0,00025	0,0005					
Crustacea	Gammaropsis nitida				0,00575			0,00025	0,0005	0,00025					
Crustacea	Eudorella truncatula		0,0005	0,0005	0,001		0,0371364	0,00075	0,00075	0,0005	0,00075				
Crustacea	Leucothoe lilljeborgi				0,00025	0,00025				0,00075	0,00025				0,00075
Crustacea	Acidostoma obesum										0,00025				
Crustacea	Tryphosella nanoides		0,0005	0,00025		0,00025		0,00025	0,0005	0,00025					
Crustacea	Eriopisa elongata			0,00025											
Crustacea	Nebalia bipes						0,0005			0,00025					
Crustacea	Bathymedon longimanus								0,00025						
Crustacea	Monoculodes	0,00025	0,0005	0,000375	0,00075	0,00025	0,0005	0,0015	0,00125	0,00125		0,00075		0,00025	
Crustacea	Synchelidium tenuimanum									0,0005833	0,00025				
Crustacea	Westwoodilla caecula					0,00025	0,00025	0,00025	0,00075						
Crustacea	Paguridae	3,38625													4,78125
Crustacea	Harpinia antennaria			0,0006	0,00125	0,001	0,00075	0,00025	0,000625		0,00075	0,0005	0,0015	0,00075	
Crustacea	Harpinia laevis							0,0005			0,00025				
Crustacea	Pycnogonidae		0,00025			0,00025									
Crustacea	Dulichia					0,00025	0,00025	0,00025		0,00025					
Crustacea	Podoceridae		0,00025												
Crustacea	Bathyporeia elegans	0,0015										0,00025		0,00025	0,000375
Crustacea	Pseudocuma			0,00025	0,00075	0,00025		0,00025	0,000875	0,0005	0,0005		0,00025		
Crustacea	Liocarcinus pusillus					0,21525									
Crustacea	Metopa	0,00025	0,0005		0,001										
Crustacea	Upogebia		0,05725												
Crustacea	Urothoe elegans					0,0008333								0,00025	0,00025

Kattegat ECC area

Group	Species	KAC-1	KAC-2	KAC-3	KAC-4	KAC-5	KAC-6
Varia	Oligochaeta	0,0015625	0,001		0,0005		0,007875
Varia	Cephalochordata		0,30625		0,06125	0,1225	0,06125
Varia	Edwardsia	0,1586	0,009	0,0375	0,1988	0,0696667	0,0725
Varia	Nemertea	0,1525	0,007	0,1494167	0,17875	0,1596	0,005
Varia	Phoronis	11,352434	0,5475	3,4311875	10,07475	3,1983654	
Varia	Platyhelminthes	0,17775					
Varia	Golfingiidae		0,00725				
Varia	Phascolion (Phascolion) strombus strombus		0,0558333				
Polychaeta	Ampharete lindstroemi complex	0,1331	0,0173333	0,051	0,3285	0,0173	
Polychaeta	Anobothrus gracilis			0,00475		0,00475	
Polychaeta	Apistobranchus tullbergi			0,0025			
Polychaeta	Heteromastus filiformis	0,0049722					
Polychaeta	Mediomastus fragilis		0,0055	0,004125	0,02	0,0055	0,0015
Polychaeta	Notomastus latericeus	0,2325		1,3087105	0,39525	0,01525	0,028
Polychaeta	Chaetozone setosa complex	0,060225	0,01375	0,0825	0,0315	0,01575	0,0533571
Polychaeta	Tharyx killariensis	0,002875	0,00175	0,0085	0,0015		
Polychaeta	Diplocirrus glaucus	0,47905		0,04355			
Polychaeta	Glycera alba		0,0068333	0,0068333			
Polychaeta	Glycera unicornis	0,11025	0,0315	0,02775	0,11125	0,01575	
Polychaeta	Glyceridae juv.	0,0159028	0,0125	0,0285	0,0036667		
Polychaeta	Goniada maculata	0,142	0,0245	0,020125	0,03675	0,42225	0,01995
Polychaeta	Magelona alleni		0,00775	0,0045	0,00525	0,0075	
Polychaeta	Magelona minuta	0,0074375		0,0243438	0,00225	0,00075	0,0005938
Polychaeta	Maldane sarsi	0,005					
Polychaeta	Praxillella affinis	0,1029171					
Polychaeta	Praxillella praetermissa			0,019			
Polychaeta	Nephtys juv.					0,261	0,0463333
Polychaeta	Nephtys caeca					2,0245	4,0945
Polychaeta	Nephtys hombergii	0,52025		0,561625			0,08275
Polychaeta	Nephtys longosetosa		0,134375				
Polychaeta	Nereididae			0,36325	1,06425		0,0085
Polychaeta	Ophelia borealis		0,219				

Group	Species	KAC-1	KAC-2	KAC-3	KAC-4	KAC-5	KAC-6
Polychaeta	Ophelina acuminata			0,0486667		0,0486667	
Polychaeta	Scoloplos armiger	0,438	0,4243636	1,14	1,6353152	1,2723913	0,45625
Polychaeta	Galathowenia oculata	0,003	0,0015				
Polychaeta	Owenia			0,003	0,0015		
Polychaeta	Aricidea (Aricidea) minuta			0,0005			
Polychaeta	Paraonidae		0,0015	0,0015			
Polychaeta	Amphictene auricoma	0,19275	0,13575	0,19275	0,0855		
Polychaeta	Pholoe baltica	0,0908667	0,030375	0,1189091	0,0709167	0,0448	0,02525
Polychaeta	Eteone	0,0095	0,00475	0,001	0,0175		0,0035
Polychaeta	Eulalia				0,0029375		
Polychaeta	Eumida	0,018		0,23775	0,1195		
Polychaeta	Phyllodoce groenlandica			0,2485	0,497		
Polychaeta	Glyphohesione klatti	0,00225					
Polychaeta	Poecilochaetus serpens		0,0210833	0,03475	0,006		0,00825
Polychaeta	Polynoidae	0,003125				0,0035	0,003
Polychaeta	Polynoidae juv.		0,0053333	0,01575	0,0125		
Polychaeta	Jasmineira caudata		0,136				
Polychaeta	Sabellidae			0,272			
Polychaeta	Scalibregma inflatum	0,0005			0,000875		
Polychaeta	Sigalion mathildae					0,39875	
Polychaeta	Sthenelais limicola	0,5395		0,26975			
Polychaeta	Dipolydora		0,0018125	0,003625	0,00125		0,00475
Polychaeta	Prionospio		0,004	0,001			
Polychaeta	Prionospio fallax	0,2054341		0,0429464	0,0240625		
Polychaeta	Prionospio multibranchiata	0,015					
Polychaeta	Pseudopolydora nordica	0,00125					
Polychaeta	Pseudopolydora pulchra	0,01025					
Polychaeta	Pygospio elegans						0,0018806
Polychaeta	Spio	0,024	0,0105	0,0626875	0,045	0,1242	0,00725
Polychaeta	Spiophanes bombyx	0,04			0,005	0,02775	
Polychaeta	Spiophanes kroyeri	0,0205		0,01025			
Polychaeta	Exogone naidina	0,00025				0,001125	

Group	Species	KAC-1	KAC-2	KAC-3	KAC-4	KAC-5	KAC-6
Polychaeta	Parexogone hebes		0,0016667	0,00425	0,001		
Polychaeta	Sphaerosyllis hystrix		0,00025				
Polychaeta	Syllidae			0,3471208			
Polychaeta	Lanice conchilega	0,0565		5,2885	5,31	6,7420833	0,1675
Polychaeta	Polycirrus	0,0535	0,0460833	0,0805	0,02125		
Mollusca	Abra nitida	0,733		0,05925	0,05975		
Mollusca	Arctica islandica	145	202,5	90	92,5	1827,5	
Mollusca	Caudofoveata	0,2202292					
Mollusca	Chamelea striatula	0,3645		7,86925	2,932	0,70575	
Mollusca	Cochlodesma praetenue	0,072	3,32785		0,072	3,04695	
Mollusca	Cylichna cylindracea	0,0675		0,0275	0,1085		
Mollusca	Dosinia lupinus				10		
Mollusca	Ennucula tenuis			0,003			
Mollusca	Euspira nitida			0,083			
Mollusca	Fabulina fabula	0,0025		0,028	0,38025	4,1371875	
Mollusca	Gari fervensis	0,008	0,7375	0,0125	0,0065	1,71775	
Mollusca	Hiatella arctica				0,0065		
Mollusca	Kurtiella bidentata	0,93465	0,02375	0,5439688	0,2155909	0,2	0,03075
Mollusca	Lucinoma borealis	0,07125					
Mollusca	Mysia undata	0,58425		0,0125			
Mollusca	Nucula nucleus	26,998875		1,1831667	7,2006667	0,0975	
Mollusca	Parvicardium pinnulatum		0,0245				
Mollusca	Phaxas pellucidus	0,02375		0,5075	0,0885		
Mollusca	Philinidae		0,00075	0,011625		0,00225	
Mollusca	Pyrgiscus rufescens	0,01775					
Mollusca	Retusa umbilicata	0,0135	0,00375		0,002		
Mollusca	Spisula subtruncata					0,47425	
Mollusca	Tellimya ferruginosa	0,0215		0,3095	0,003		
Mollusca	Thracia convexa						0,034
Mollusca	Thracia phaseolina		0,0155	0,10875			
Mollusca	Thyasira flexuosa	5,1090238	0,2325	3,3992045	1,8666667	0,5965	
Mollusca	Timoclea ovata						0,028

Group	Species	KAC-1	KAC-2	KAC-3	KAC-4	KAC-5	KAC-6
Mollusca	Varicorbula gibba	0,0225	0,0055	0,0285	0,05425	0,053	
Echinodermata	Ophiuroidea juv.	0,0160769	0,00975	0,1362857	0,014		
Echinodermata	Amphiura filiformis	40,757949	1,79025	16,993981	7,63725	1,5694074	
Echinodermata	Echinocyamus pusillus		0,0916667	0,0096667	0,011	0,0386667	
Echinodermata	Echinocardium cordatum	20,1685	4,52175	3,17	24,135	4,0501875	
Echinodermata	Psolus		53,96				
Crustacea	Ampelisca brevicornis	0,02575	0,103		0,02875	0,09225	
Crustacea	Ampelisca tenuicornis	0,0005	0,00125	0,00025	0,0005		
Crustacea	Paramphilochoides odontonyx			0,00025	0,00025		
Crustacea	Autonoe longipes			0,00025		0,0005	
Crustacea	Argissa hamatipes	0,00025	0,00075	0,00175	0,000875	0,000875	0,00025
Crustacea	Astacilla dilatata	0,0005		0,00025			
Crustacea	Cheirocratus sundevalli	0,00025	0,0005			0,0195	
Crustacea	Caprellidae			0,00025			0,06435
Crustacea	Crassicorophium crassicorne	0,0005		0,00025		0,00025	0,00025
Crustacea	Centraloecetes kroyeranus	0,00025	0,0005	0,00175	0,00125		
Crustacea	Apherusa bispinosa						0,00025
Crustacea	Gammaropsis	0,00075					
Crustacea	Ischyrocerus megacheir						0,0003676
Crustacea	Parajassa pelagica		0,00125	0,00025		0,00075	0,00025
Crustacea	Eudorella truncatula	0,00025					
Crustacea	Leucothoe lilljeborgi			0,00025			
Crustacea	Tryphosites longipes			0,00025			
Crustacea	Bathymedon					0,00175	
Crustacea	Perioculodes longimanus	0,00125	0,0005	0,0005	0,0005	0,00025	0,00025
Crustacea	Synchelidium tenuimanum	0,00025			0,00025		
Crustacea	Paguridae			14,39			
Crustacea	Harpinia antennaria	0,001					
Crustacea	Harpinia crenulata						0,00025
Crustacea	Pycnogonidae	0,0005					
Crustacea	Bathyporeia elegans					0,0617143	0,00025
Crustacea	Pseudocuma	0,00025		0,00075			

Crustacea	Liocarcinus pusillus			0,04675		0,00025	
Crustacea	Metopa			0,00025			

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