

ASPECTO

Analysis report 2026-07-15

MAPPING OF VULNERABLE NATURE TYPES AND SPECIES AT SEIONGULTAREN, NORDLAND, 2026

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Summary

Aspecto AS conducted a mapping survey of vulnerable nature types and red-listed species in the vicinity of the planned aquaculture facility at Seiongultaren, Nordland. The survey was carried out in accordance with recommendations by the Norwegian Institute of Marine Research ("Havforskningsinstituttet"), the joint guidance issued by Fiskeridirektoratet og Miljødirektoratet (2022), and in line with the reference frameworks from OSPAR, MAREANO, and Artsdatabanken.

The mapping was conducted in June 2026 using a CORAX underwater drone (Coastal ROV/AUV Explorer). A total of 17,2 km of video transects were recorded, covering 0,072 km² of seabed. Of this, 0,054 km² was located within the influence area of the proposed facility, corresponding to 4,3 % of the influence area.

The mapped seabed comprised a shallow sandy plateau in the west and a moderately sloping seabed descending towards deeper areas in the east. The substrate was dominated by sand or gravel, while stones, boulders, and smaller rocks occurred primarily along slopes and transition zones.

One nature type was observed within the influence area: svampskog (*Noe beskyttet dyp svampskog på fastbunn i atlantisk vann* (red-list status: LC: Least Concern)). Svampskog covered 5,1 % of the mapped area within the influence area and were primarily located in its central and southern parts. Neither the identified nature type nor any sponges identified to species level were classified as threatened, and the recorded svampskog were considered locally and regionally representative of exposed coastal hard-bottom habitats.

No confirmed red-listed species were recorded within the influence area. However, 59 observations were assigned to the taxa *Sebastes* spp. and *Molva* spp., comprising 45 observations of *Sebastes* spp. and 14 observations of *Molva* spp. As these observations could not be reliably identified to species level, it could not be ruled out that some individuals belonged to red-listed species.

Sammendrag

Aspecto AS har gjennomført en kartlegging av sårbare naturtyper og rødlistede arter i nærheten av det planlagte akvakulturanlegget ved Seiongultaren, Nordland. Kartleggingen ble gjennomført i samsvar med anbefalinger fra Havforskningsinstituttet, den felles veilederen fra Fiskeridirektoratet og Miljødirektoratet (2022), og i tråd med referanserammeverk fra OSPAR, MAREANO og Artsdatabanken.

Kartleggingen ble gjennomført i juni 2026 ved opptak av videotransekter med en CORAX undervannsdrone (Coastal ROV/AUV Explorer). Det ble tatt opp totalt 17,2 km med videotransekter, som dekket 0,072 km² sjøbunn. Av dette lå 0,054 km² innenfor det planlagte anleggets influensområde, tilsvarende 4,3 % av influensområdet.

Det kartlagte området besto av et grunt sandplatå i vest og en moderat hellende sjøbunn ned mot dypere områder i øst. Substratet var dominert av sand eller grus, mens stein, blokker og mindre steiner hovedsakelig forekom langs skråninger og overgangssoner.

Én naturtype ble observert innenfor influensområdet: svampskog, tilsvarende *Noe beskyttet dyp svampskog på fastbunn i atlantisk vann* (rødlistestatus: LC, uten risiko). Svampskog dekket 5,1 % av det kartlagte arealet innenfor influensområdet og forekom hovedsakelig i de sentrale og sørlige delene. Verken den identifiserte naturtypen eller noen av svampene som ble identifisert til artsnivå, var klassifisert som truet. De registrerte svampskogene ble vurdert som lokalt og regionalt representative for eksponerte kystnære hardbunnshabitater.

Ingen bekreftede rødlistede arter ble registrert innenfor influensområdet. Det ble imidlertid gjort 59 observasjoner av taksaene *Sebastes* spp. og *Molva* spp., fordelt på 45 observasjoner av *Sebastes* spp. og 14

observasjoner av *Molva* spp. Ettersom observasjonene ikke kunne identifiseres til artsnivå, kunne det ikke utelukkes at enkelte individer tilhørte rødlistede arter.

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Glossary

Annotation: A note added to a dataset or material. In this report, it refers to a marked location along a transect where a biologically relevant observation has been made, typically the presence of an organism or nature type.

Anthropogenic: Refers to something of human origin. In this report often used in the term of “anthropogenic impact”, meaning environmental effects caused by humans (e.g. trash, abandoned fishing equipment, pipelines).

Influence area: The estimated area that will most likely be influenced by the planned aquaculture. This area is based on models, derived from the local currents surrounding the fish-farm, in accordance with the Norwegian recommendation (Kutti T & Husa V. 2021 & 2022, Fiskeridirektoratet og Miljødirektoratet. 2022).

AUV: Autonomous Underwater Vehicle. Refers to a self-propelled, unmanned underwater drone that can operate without real-time human control, using onboard sensors and computers to navigate.

Farm grid: The area of the fish-farm where the farm’s net cages will or already are placed.

Mapped area: The total area that has been recorded by the AUV and analysed.

Nature type: A classification unit that describes an area of nature (land or sea) having relatively uniform environmental conditions (abiotic + biotic) and typical communities of vegetation and/or animals.

Red-listed: Describes species formally assessed and classified according to their conservation status, indicating their level of risk of extinction. For this report, all species or nature types within red-list categories: Extinct (EX), Critically Endangered (CR), Regionally Extinct (RE), Endangered (EN), and Vulnerable (VU), are considered red-listed. Near Threatened (NT) is considered vulnerable and will also be included.

Taxon (plural: **Taxa**): A monophyletic (or currently accepted as such) group of organisms classified together in taxonomy (e.g., species, genus, family). In this report we will be using the current classification and accepted names presented in the World Register of Marine Species (WoRMS).

Transects: A predetermined survey line along which data is recorded, e.g. video recordings.

1. Introduction

1.1 Background

Aspecto AS has, on behalf of Lovundlaks AS, conducted a mapping of vulnerable nature types and red-listed species in the vicinity of the planned aquaculture facility in Seiongultaren, Nordland. The planned aquaculture facility is located approximately 75 km west of Mo i Rana (Figure 1). The purpose of the mapping was to investigate and describe the presence of vulnerable nature types, as well as any red-listed species within the influence area, prior to applying for marine aquaculture in the area.

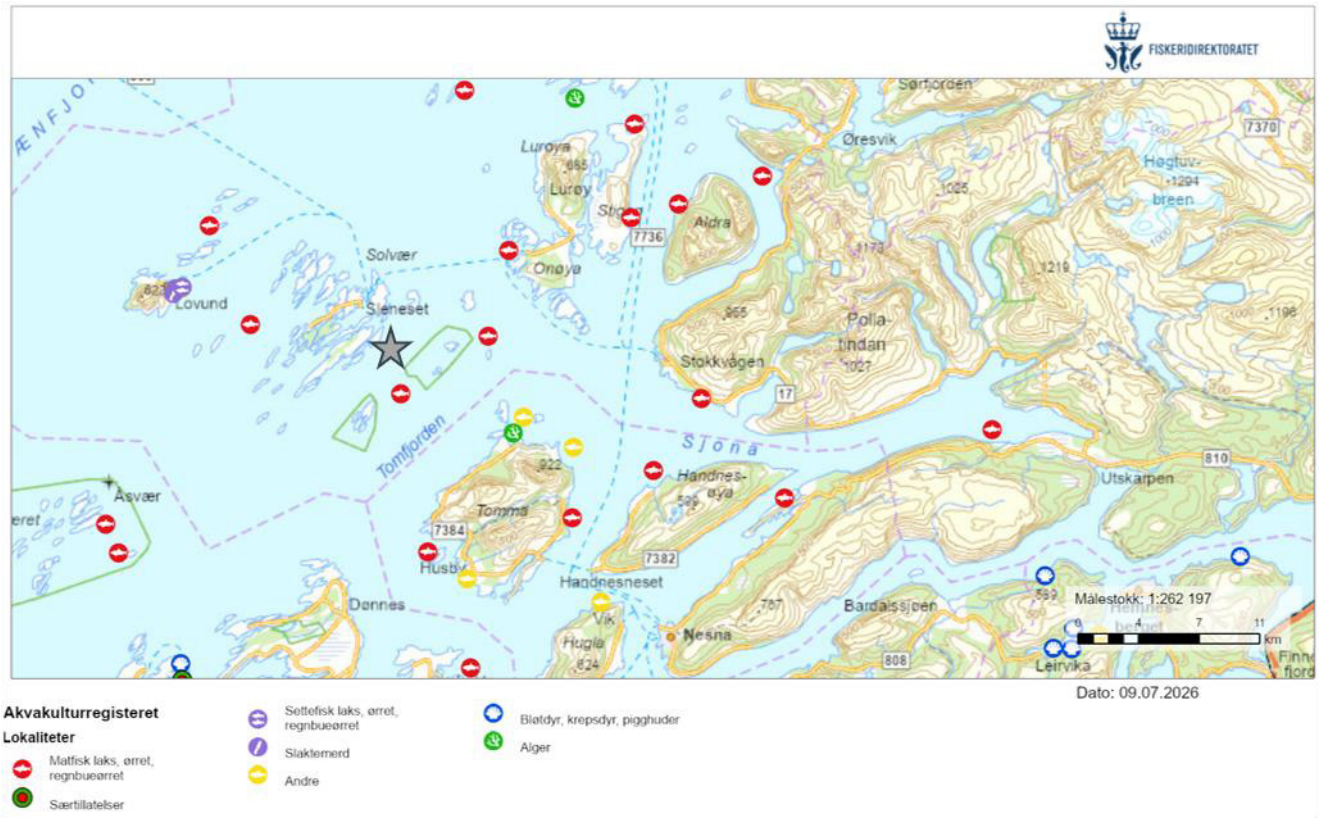

Figure 1. Map from the Norwegian Directorate of Fisheries' online portal, showing the position of the planned aquaculture facility (marked with a grey star), and nearby aquacultures according to the legend.

1.2 Vulnerable nature types within Norwegian waters

The identification of vulnerable nature types and red-listed or sensitive species is based on Artsdatabanken's list of threatened species and nature types (Artsdatabanken, 2025), as well as the OSPAR and MAREANO lists of vulnerable habitats/biotopes (OSPAR, 2023; MAREANO, 2023). OSPAR (the Oslo-Paris Convention) is a regional convention aimed at protecting the marine environment of the Northeast Atlantic, regulating international cooperation for the conservation of marine ecosystems in the area. Within OSPAR, ecosystems of high ecological value in the Northeast Atlantic – including Norwegian waters – have been defined, with particular focus on marine benthic communities (OSPAR, 2023). In the national MAREANO program ("Marine AREA database for Norwegian waters"), which maps the marine environment of Norway, eight vulnerable biotopes in Norwegian waters have been identified based on the OSPAR list (MAREANO, 2023).

Following the recommended methodology for this type of mapping, and drawing on data from the national MAREANO programme, all relevant nature types were identified. In total, 18 nature types were selected from

the list published by the Norwegian Fiskeridirektoratet and Miljødirektoratet (2022), and paired with corresponding nature types from the Norwegian Red List of Nature Types (Artsdatabanken, 2025) (Appendix 1. Table 1).

1.3 Red-listed and potentially red-listed species

Artsdatabanken is responsible for maintaining the Norwegian Red List for threatened species, in which both species and nature types are assessed according to established criteria and assigned a threat category accordingly. Species are classified into the following six Red List categories: Regionally Extinct (RE/CO), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), and Data Deficient (DD) (Figure 2). Species assessed as not threatened or considered stable are classified as Least Concern (LC), and if the available data are insufficient, the assessment is set to Not Evaluated (NE). The latter two categories are not included on the Red List.

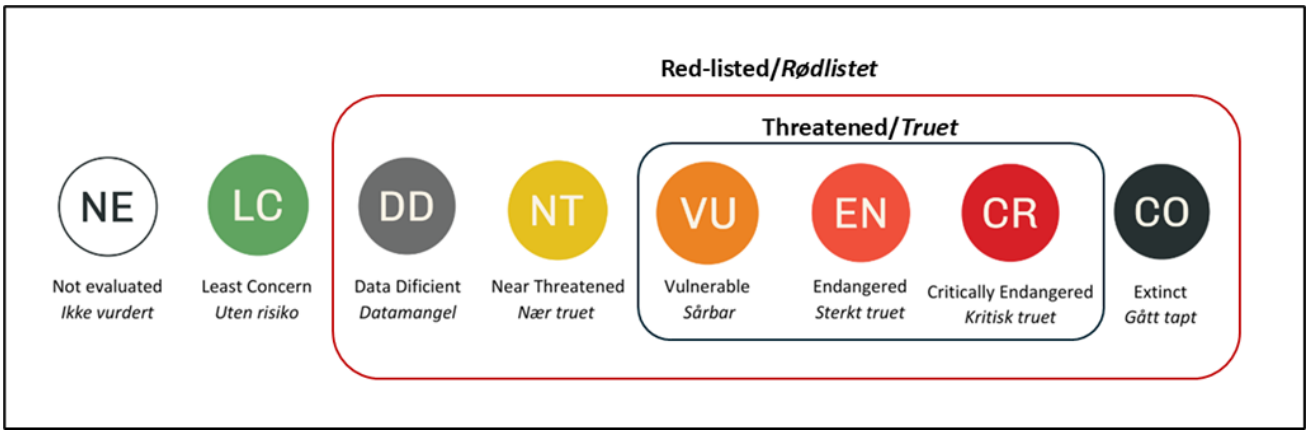

Figure 2. Visuallization of the different levels of Red List categories.

Red-listed species that may occur in the influence area, based on Artsdatabanken (2021), and which form the focus of this mapping, are presented in Appendix 1, Table 2**Error! Reference source not found.**. Species categorized as DD (Data Deficient) are excluded from the list, as the lack of knowledge makes it impossible to determine whether they should be red-listed. Species that are not possible to detect or identify with appropriate degree of confidence based on macro-morphology and regional knowledge are also omitted. This includes, for example, small benthic arthropods with distinguishing features that can only be observed in a laboratory setting.

1.4 Previously known locally occurring red-listed species

When searching for previously recorded relevant, red-listed species (excluding terrestrial and avian species) in the vicinity of the facility (approximately 10 km radius), within the time-frame of the last 10 years (2015-2026), one record of relevant red-listed species was found (Artskart, 2026). This record consisted of the red-listed species håbrann (*Lamna nasus*, VU: sårbar) that was observed on the west side of the island Lovund, approximately 8 km southwest of the farm grid.

2. Material and method

2.1 Currents and influence area

To define the expected influence area from the planned aquaculture facility, measurements of the local currents as well as topographic mapping were used to estimate the spread of discharge from the planned facility. Current measurements were conducted at Seiongultaren by Aqua Kompetanse during two periods; 27/9 - 31/10 2024 and 31/10 2024 – 06/01 2025. The currents were measured at several depths (6, 15, 37, 51, 58 and 68 meters), but here only four depths are included: 6 m, 15 m, discharge depth (37 m), and bottom depth (68 m). Based on the results, current roses were generated, showing the proportion of measurements recorded within each 10° sector, expressed as water transport in m^3/m^2/day (Figure 3). The current roses provide an indication of the current's dominating direction.

The current conditions at Seiongultaren show a predominant direction toward NE at 6 m depth, NE at 15 m depth, NE–SW at the discharge depth (37 m), and toward SW at the bottom depth (68 m) (Figure 3). The current roses indicate the prevailing current directions.

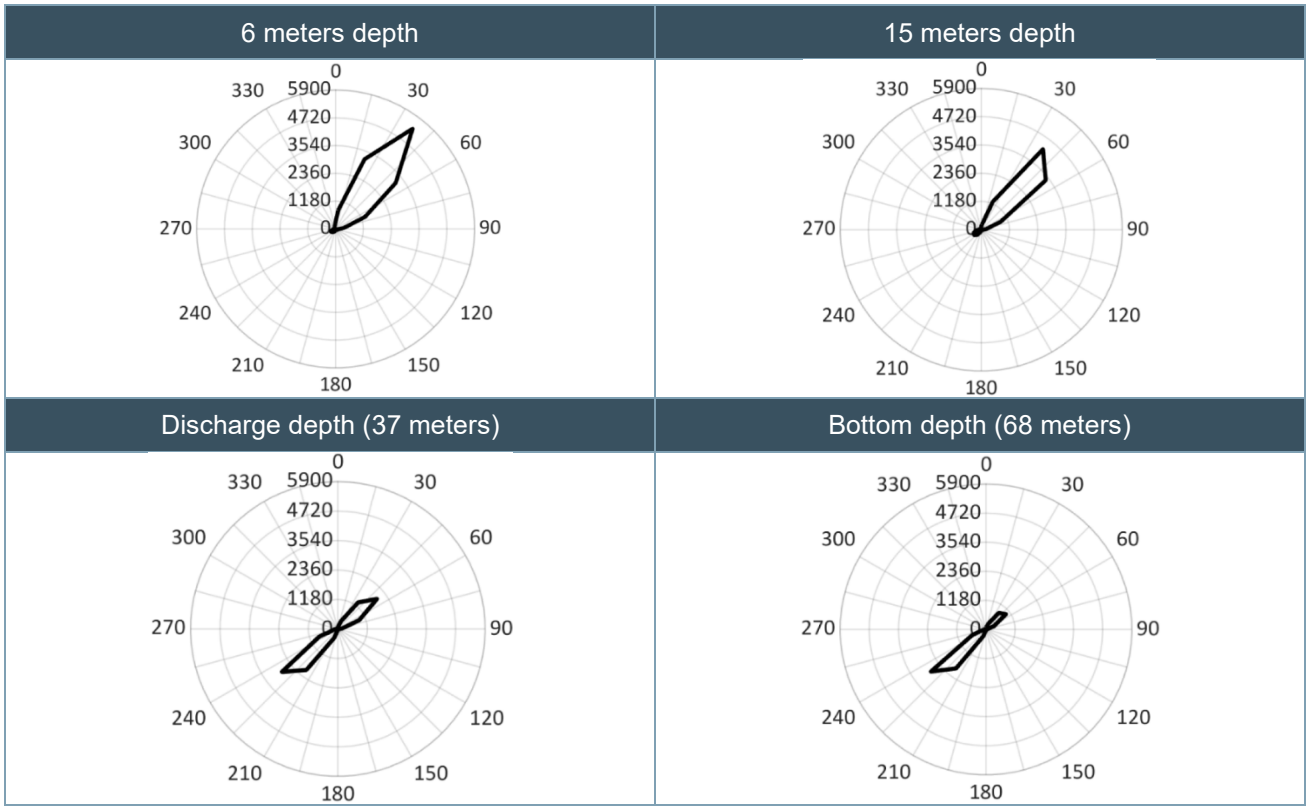

Figure 3. Current roses for depths of 6 and 15 meters (top left and right), the discharge depth (bottom left), and the bottom depth (bottom right) during the measurement period. The current roses show water transportation (m^3/m^2/day and direction over the measurement period September 2024–January 2025 (Aqua Kompetanse, 2025)

Based on current direction and water exchange, the sedimentation in Seiongultaren is expected to occur mainly towards the northeast and southwest. No major holes or depressions that could lead to sediment accumulation have been identified within the influence area (Aqua Kompetanse, 2025). Current velocities exceeding 10 cm/s were measured at both the discharge depth (37 m) and the bottom depth (68 m), which is considered favourable with respect to the dispersal of organic material from the facility. Based on this, dispersion of discharges is expected to follow the current directions at the discharge depth (Aqua Kompetanse, 2025).

The influence area for the planned aquaculture facility was delineated based on the hydrological parameters described above. The delineation follows the recommendations of the Norwegian Institute of Marine Research (Kutti & Husa, 2021, 2022), defining an area extending 1 km upstream and downstream of the farm grid and at least 250 m perpendicular to the main current direction. The resulting influence area is shown in Figure 4 (dashed lines).

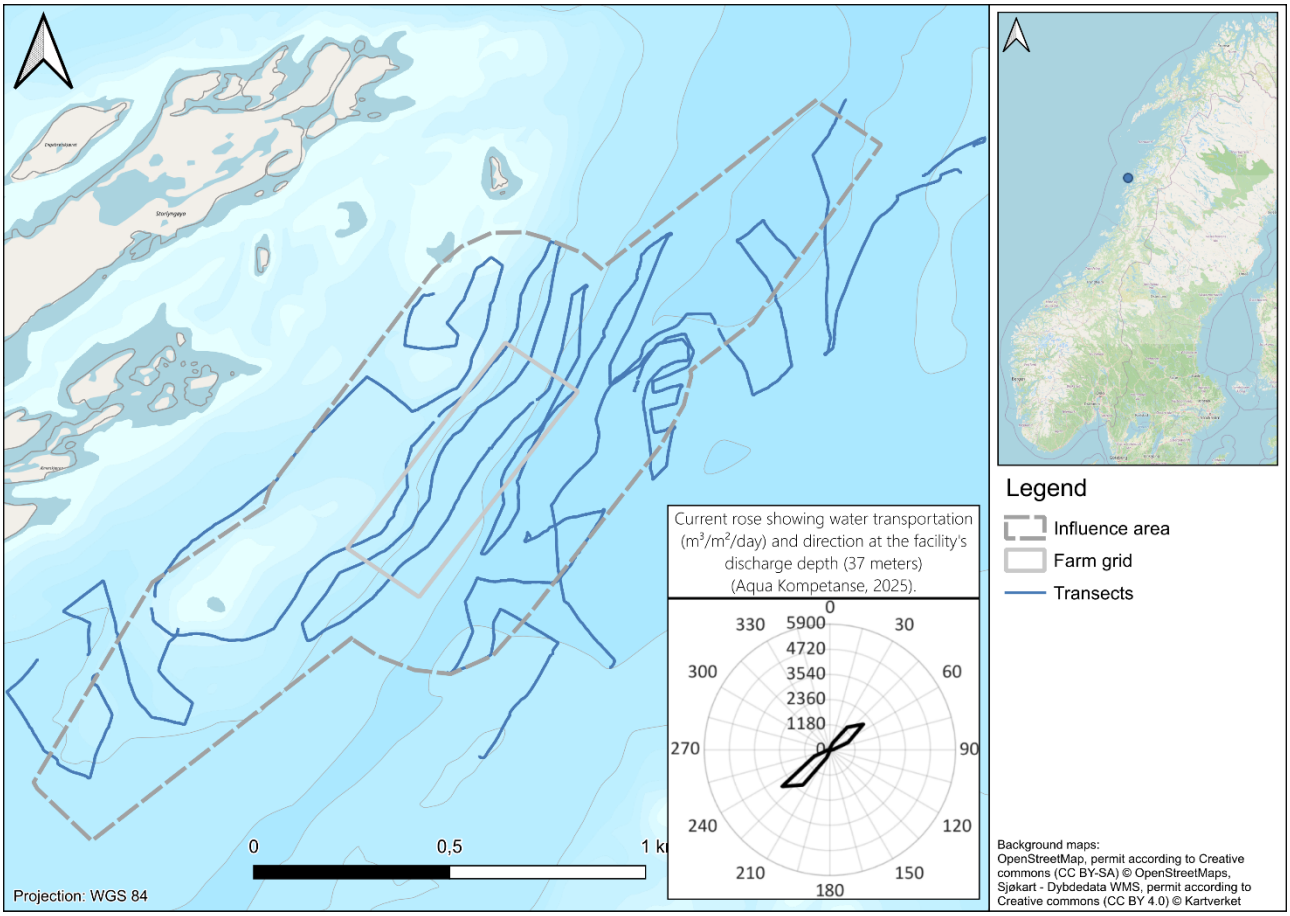

Figure 4. Map showing the extent of the estimated influence area (within the dashed grey line) in relation to the planned facility area (within the solid grey line). A current rose is included on the map to display the main direction of the local currents at the discharge depth (Aqua Kompetanse, 2025). The survey transects are marked with blue lines.

2.1.1 Topography

Seiongultaren is located in the archipelago outside of Mo i Rana, between two large clusters of islands (mainly Storlungøya and Svenningen). The farm grid Is located 900 meters southeast of Storlyngøya, where the seabed underneath is gently sloping down from the island at 50-100 meters depth, ending in a relatively flat seabed southeast of the farm grid at 100-150 meters depth. Just 500 meters southwest of the farm grid there's a larger underwater mound (diameter 200 meters).

2.2 Mapped area

Video transects were recorded with the CORAX, aiming to cover at least 4 % of the influence area, in accordance with the recommended methodology (Fiskeridirektoratet og Miljødirektoratet, 2022, and Kutti & Husa, 2021 & 2022) (Figure 4). The transects were placed to represent the widest possible range of nature types, based on local topography, current conditions and site-specific knowledge. Moreover, several transects were located partially or entirely outside the designated influence area; these were included to provide broader contextual information on the surrounding environment and to obtain a more comprehensive understanding of the influence area and the area in its vicinity.

The transects were designed by Kristin Galtung, MSc in Marine Ecology, at Aspecto AS, with experience in AUV transect planning for habitat mapping. Fieldwork was carried out over two days in June 2026 (10/6 and 15/6), by Kristoffer Christiansen and Andrè Hanssen at Aspecto AS, both experienced in marine fieldwork and AUV operations.

2.3 Equipment

In this project, an AUV video system was used to map the seafloor using high-resolution video imagery. At the core of the system is a specially designed underwater drone called CORAX (Coastal ROV AUV Explorer), which autonomously surveys the seabed through video recording while georeferencing all files to produce integrated seafloor maps for further analysis. The system was developed by Skarv Technologies AS in collaboration with Aspecto AS.

The system records video using a downward-facing 4K camera (4024 × 3036 pixels at 8 FPS) with integrated lighting. The video data are synchronized with sonar sensors. This integrated dataset combines seafloor imagery with bathymetric and geolocation data, enabling the production of a continuous seafloor map (image mosaic). The resulting map supports the identification and analysis of vulnerable nature types, biotopes, and red-listed species.

The precise geolocation and calculated topography also enable accurate size measurements directly from the image mosaic without the need for an external laser. This allows, for example, the size of observed species to be determined, supporting species identification and density calculations. Figure 5 presents a schematic overview of the system components.

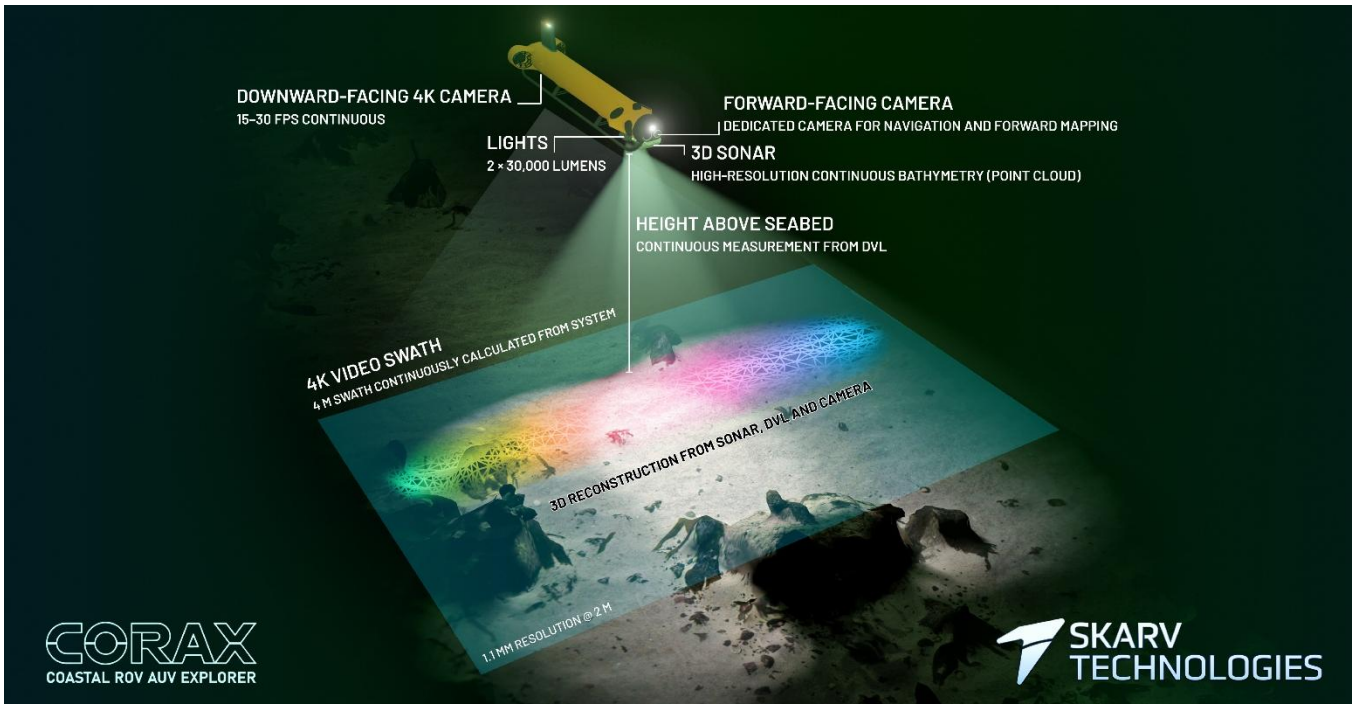

Figure 5. Schematic illustration of the CORAX system and its components as used in the current survey.

CORAX is programmed to follow the planned transects at an altitude of approximately 2 meters above the seabed. This allows the video system to survey roughly 4 m² per meter of transect filmed.

2.4 Video- and image analysis

Video and image analysis was conducted using the Skarv Technologies Toolboox, and online system for analysis where substrate, nature types and relevant species were annotated in a continues video-analysis. The video analysis followed the suggested method in Kutti & Husa (2021 & 2022). Video analysis, data analysis and report writing was done by the marine biologist Thalia Eccleston (MSc in Marine Biology), Johanna Nadmyr (MSc in Marine biology), Johnny Berglund (PhD in Marine Ecology) and Raquel Pereira (PhD in Systematic Biology), at Pelagia Nature & Environment AB, all of whom have extensive experience with similar analyses in marine environments. A short resumé can be found in Appendix 4 of all participants in this project.

Each video was analysed, and the following observations were annotated:

- Occurrence of vulnerable nature types
- Estimated density of relevant species within the observed nature types
- Observations of red-listed and potentially red-listed species
- Other observations of interest, such as anthropogenic structures or trash

The seafloor substrate was also noted in all annotations, following the European standard for visual seabed mapping (EN 16260:2012), and supplemented with the categories “coral gravel” and “dead coral skeletons” according to Kutti & Husa (2021 & 2022):

- Bedrock and large boulders (>63 cm) (FF)
- Stones (6,3-63 cm) (St)
- Sand and gravel (0,63-6,3 cm) (G)
- Silt and clay (<0,63 cm) (S)
- Coral- or shell-gravel (KG)
- Dead coral skeletons (DK)

Throughout the analysis process, an internal quality control, through cross validation, was performed to ensure accurate species identification. After completing annotations, each annotator randomly selected two previously annotated videos (<30 minutes long). These videos were independently re-annotated by a second annotator. The differences between the sets of annotations were subsequently compared and discussed to ensure consistency.

Since not all of the nature types have established thresholds for individual densities linked to the nature types, a literature review was conducted, resulting in a set of threshold values presented in Table 1, along with the thresholds specified by Artsdatabanken (2025). During the video analysis, possible occurrences of the target nature types were annotated and subsequently supplemented with density calculations in QGIS. The presented threshold values in Table 1 were then used as a guideline to determine whether observed densities were sufficiently high for the nature type in question.

To further ensure the correct identification of nature types, a minimum area requirement of 25 m² was applied for an occurrence to be classified as a nature type, as well as a minimum density of 20 observations per 100 m^2 (0,2 observations/m^2), in accordance with Artsdatabanken (2025) and OSPAR (2008). An exception is made regarding the minimum density requirement for the nature type *Dyp sjøfjærskog på mudderbunn i intermediært vann* since the species in question (*Umbellula encrinus*) is very solitary and rare, and thus only two specimens are needed within the vicinity of each other (100 m^2) to be considered a nature type.

Finally, following the methodology proposed by Kutti & Husa (2021 & 2022), certain nature types were also supplemented with a set of nature-type-specific observations, which are detailed in the final column in Table 1.

For some nature types (for example ruglbunn and tareskog) it is difficult to delineate and count individual organisms. Therefore, individual density was not applied for these nature types; instead, percentage cover was used and a qualitative assessment was made (Table 1). Likewise, individual density was not used for nature types consisting of sparse occurrences of single species, where the main focus of the nature type is the presence of the species rather than its functional contribution (e.g., deep sea pen communities composed of *Umbellula encrinus*, or scallop beds).

Table 1. List of threshold values for individual density or percent cover of related species, grouped by nature types according to both the Norwegian Fiskeridirektoratet og Miljødirektoratet (2022), as well as the Norwegian Red List of Nature types (Artsdatabanken, 2025). References for the identified thresholds are provided. For certain nature types, the Norwegian Institute of Marine Research guidance recommends the inclusion of additional parameters, which are listed in column five.

	Nature types (2022)	Red-listed nature types (2025)	Thresholds	Additional details regarding nature types
Algae	Stortareskog	*Moderat eksponert stortareskog i Nordsjøen*	≥ 5 observations/m^2 (Frigstad et al. 2021)	For all types of kelp forest, the density of sea urchins (Echinoidea) should be estimated across the entire nature type. In cases where sea urchins are observed in such high numbers that individual counts are not feasible, only the percent cover may be recorded.
		Moderat eksponert stortareskog i Norskehavet og Barentshavet sør		
	Sukkertareskog	*Moderat eksponert sukkertareskog i Skagerrak*	≥ 7 observations/m^2 (Frigstad et al. 2021)	
		Moderat eksponert sukkertareskog i Norskehavet og Barentshavet sør		
	Fingertarebunn	*Moderat eksponert fingertareskog i Nordsjøen*	≥ 5 observations/m^2 (Frigstad et al. 2021)	
		Moderat eksponert fingertareskog i Norskehavet og Barentshavet sør		
	Ruglbunn	*Grunn ruglbunn*	> 30 % coverage (Artsdatabanken. 2025)	
	Kransalgebunn	-	Qualitative estimation	
Vascular plants	Ålegrasseng/ålegras	-	> 25 % coverage (Artsdatabanken. 2025)	For eelgrass- and dwarf eelgrass meadows, the number of individuals per square meter should be estimated at five points (e.g., five 1 × 1 m quadrats) every 50 meters throughout the entire nature type.
	Dvergålegrasbunn	-		
	Brakkvanns-/undervannseng	*Undervannseng i ekstrembrakt vann i Skagerrak*		
Mixed	Bløtbunnsområder i strandsonen	-	Qualitative estimation	
Bivalves	Eksponert blåskjellbunn	-	> 30 % coverage (OSPAR. 2008)	For all mussel beds, the number of individuals per square meter should similarly be estimated at five points (e.g., five 1 × 1 m quadrats) every 50 meters throughout the nature type. For oyster beds, the invasive Pacific oyster (*Magallana gigas*) should be counted separately from the native European oyster (*Ostrea edulis*), if possible.
	O-skjellbunn	-	≥ 5 observations/m^2 (JNCC. 2014)	
	Europeisk flatøstersbunn	-	≥ 5 observations/m^2 (JNCC. 2014)	
	Kamskjellforekomster	-	Qualitative estimation	
Cnidarians	Hardbunnskorallskog	*Eksponert dyp hornkorallskog på fastbunn i kystvann*	>20 observations/100 m^2 (Artsdatabanken. 2025)	For observations of *Paragorgia arborea* or *Desmophyllum pertusum*, the size of the first ten observations within each transect should be recorded.
		Noe beskyttet dyp hornkorallskog på fastbunn i atlantisk vann		
	Bløtbunns-korallskogbunn	*Dyp hornkorallskog på mudderbunn i atlantisk vann*		
		Dyp hornkorallskog på mudderbunn i intermediært vann		
	Korallrev	*Kysttilknyttet korallrev-bunn*	>75% coverage (Norwegian Government. 2025)	
	Sjøfjærbunn	*Dyp sjøfjærskog på mudderbunn i intermediært vann*	>1 observations/100 m^2 (Artsdatabanken. 2025)	
		-	>20 observations/100 m^2 (Artsdatabanken. 2025) and gravende megafauna	
Sponges	Svampskog	*Dyp svampskog på mudderbunn i atlantisk vann*	>20 observations/100 m^2 (Artsdatabanken. 2025)	
		Dyp svampskog på sedimentbunn i atlantisk vann		
		Noe beskyttet dyp svampskog på fastbunn i dyphavsvann		

*Sjøfjærbunn may be defined as present even when sjøfjær density is below 20 observations per 100 m², provided that burrowing megafauna is also observed, as this is part of the habitat type “Sjøfjærbunn og annen gravende megafauna”.

All observations of red-listed species were recorded in accordance with the 2021 Norwegian Red List (Appendix 1. Table 2; Artsdatabanken, 2021). Observations of organisms that could not be confidently identified to species, but which might represent a red-listed species, were also documented. For example, fish from the genus *Molva*

were recorded when it could not be determined whether the individuals were lange (*Molva molva*) or the red-listed blålange (*Molva dypterygia*). Furthermore, species with the status Data Deficient (DD) are excluded from the analysis, as the lack of information prevents determining whether this species are threatened or not.

3. Results

Following the project plan, a total distance of 17,2 km was recorded using video transects. These video transects covered a mapped area of 0,054 km^2 within the influence area (total 1,26 km^2), corresponding to 4,3 % of the area. A description of the video transects can be found in Appendix 2.

The substrate within the mapped area consisted primarily of sand or gravel, followed by stones and boulders. Overall, the substrate was relatively uniform, with stones and boulders mainly occurring on the more prominent slopes in the transition between the sheltered western area and the deeper, more exposed eastern area. Although soft bottoms dominated, some differences were observed between shallow and deeper areas. In the shallow areas, the sand or gravel contained dead maerl, numerous dead bivalve shells and decomposing algae, whereas the deeper areas were characterised by more homogeneous sand or gravel.

Topographically, the mapped area consisted of a shallow sandy plateau (west side) and a moderate sloping seabed (east side) with boulders, rock walls, and smaller stones, ending up in the deepest area on homogeneous sand or gravel. The average depth of the transects was 85,7 meters, with a maximum depth of 176,5 meters. The shallowest observation was recorded at 3,4 meters. No deep-sea beds (deeper than 200 meters) were noted within the mapped area.

The following results on nature types and red-listed species are based only on observations made within the influence area, unless otherwise specified.

3.1 Nature types within the influence area

One nature type was observed within the influence area: svampskog. Other observations of taxa associated with vulnerable nature types did not meet the criteria for classification as such within the influence area. For example, several areas with kelp were observed within the mapped area northwest of the farm grid, but these did not meet the criteria for coverage or area (Table 1). Furthermore, two areas of sjøfjærbunn, covering a total area of 240 m², were observed outside the influence area and have therefore not been included in the results. These areas consisted mainly of the sea pen species liten piperenser (*Virgularia mirabilis*).

A detailed overview of the observed nature type within the influence area is provided below.

3.1.1 Nature types based on sponges

Based on all sponge observations, one nature type could be defined within the influence area, namely *svampskog; Noe beskyttet dyp svampskog på fastbunn i atlantisk vann* (red-list status: LC: uten risiko) (Table 2, Figure 6). A total of 34 individual areas of svampskog were observed within the influence area. Another 31 areas with svampskog were noted outside the influence area (Figure 6).

Table 2. Overview of all nature types based on sponges, grouped by nature types according to the Norwegian Fiskeridirektoratet og Miljødirektoratet (2022), and including the red-listed nature types according to 2025's list (Artsdatabanken, 2025). The table includes species density (expressed as individuals per square meter), the total area of each nature type in square meters, and its percentage coverage of the mapped area. For each confirmed nature type, the shortest distance between the nature type and the farm grid is also presented (in meters).

Nature types (2022)	Norwegian Red List for Nature Types (2025)	Red-listing	Observed nature type?	Highest density	Area	Distance
Svampskog	Noe beskyttet dyp svampskog på fastbunn i atlantisk vann	LC	Yes, 34 areas	1,37 obs./m^2	2 766 m^2	0 m

Many of the areas with svampskog were located close to one another, thus likely representing larger continuous areas rather than multiple small, isolated patches (Figure 6). In total, the sponge grounds covered an area of 2 766 m², corresponding to 5,1 % of the mapped area, with the largest individual occurrence measuring 256 m².

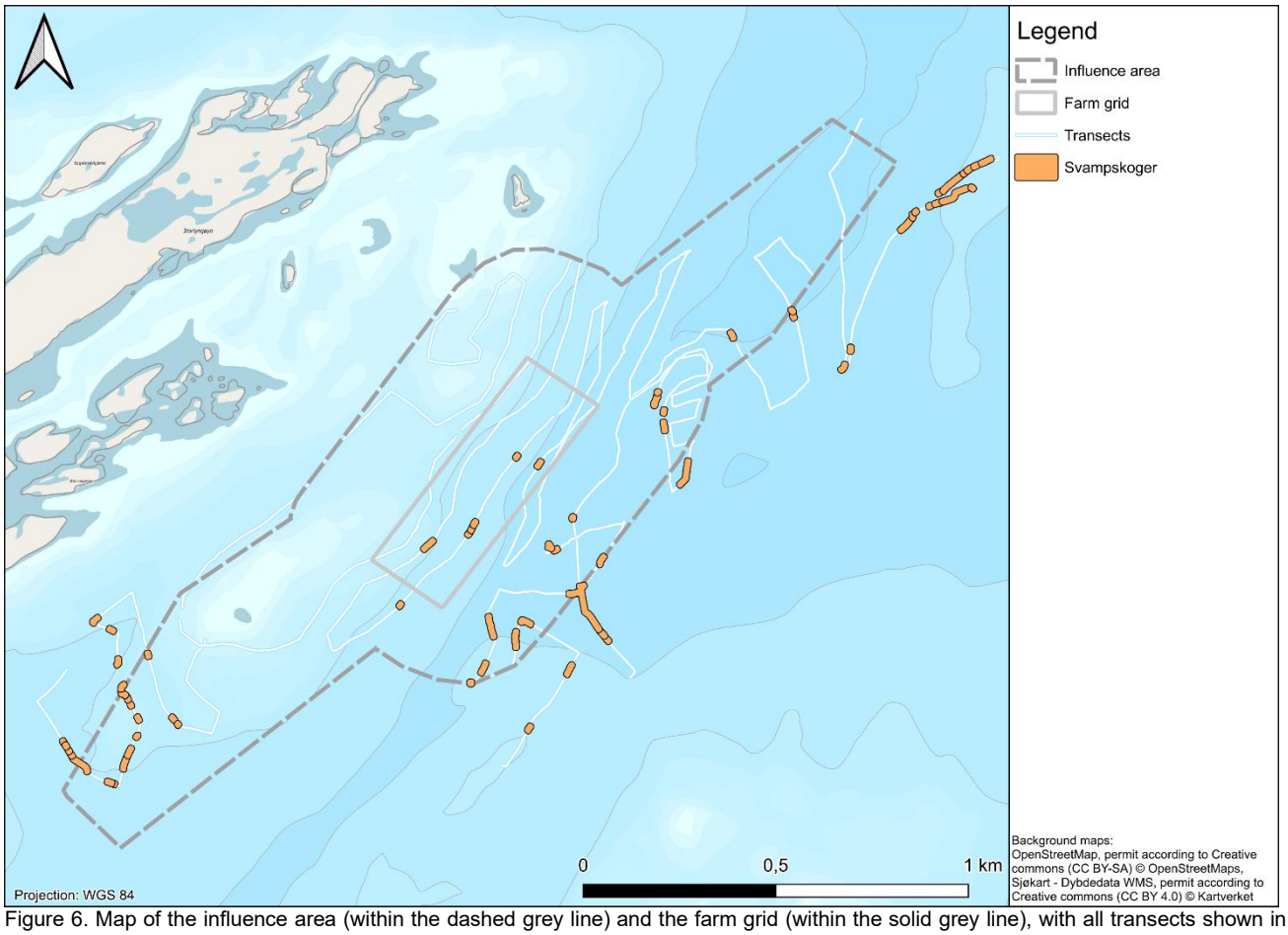

Figure 6. Map of the influence area (within the dashed grey line) and the farm grid (within the solid grey line), with all transects shown in white. Nature types are marked according to the legend.

The sponge grounds consisted primarily of various species of demosponges, including taxa within the genera *Phakellia* spp. and *Geodia* spp. (Figure 7). On average, the density of sponges within the nature type was 0,76 observations/m², with a maximum recorded density of 1,37 observations/m². Six svampskoger were located beneath the farm grid.

All sponge taxa identified to species level were classified as either LC (*Least Concern*) or NE (*Not Evaluated*), with only one species falling into the latter category. Accordingly, no red-listed sponge species were recorded. Neither the identified nature type nor the sponge species comprising it are therefore considered threatened under the Norwegian red-list framework.



Figure 7. Example images of some of the sponges observed within the mapped area. The image on the left shows an aggregation of *Phakellia* spp., while the image on the right shows several *Geodia* spp..

3.2 Observations of red-listed species

No red-listed species were observed within the influence area. Eight observations of the red-listed coral sjøtre (*Paragorgia arborea*, red-list status: NT, nær truet) were recorded outside of the influence area. The nearest occurrences was located approximately 270m east of the farm grid (Figure 9).

Two potentially red-listed species were observed within the influence area (Table 3, Figure 8). These observations consisted of 45 observations of the fish uer (*Sebastes spp.*) and 14 observations of lange (*Molva* spp.) (Table 3, Figure 8, Figure 9). Both taxa were observed beneath the area of the farm grid.

A certain degree of caution should be applied when interpreting seabed mapping data that include mobile fauna, (e.g. fish species) which are less sensitive to local impacts due to their ability to move away from any threat. The positions of these species' observations should therefore be regarded primarily as indicators of their presence within the area.

Table 3. List of the observed potentially red-listed species, according to the Norwegian Red List (Artsdatabanken, 2021). The table includes level of red-listing, total number of observations within the influence area and the shortest distance between an observation and the farm grid (in meters).

Group	Common name	Scientific name	Red-list status	No. of observations	Closest distance to farm grid
Boney fish	Lange*	*Molva spp.*	-	14	0 m
	Uer*	*Sebastes spp.*	-	45	0 m

* Observations where species identification could not be determined at species level, and it could therefore not be ruled out whether the observations were of red-listed species or not.

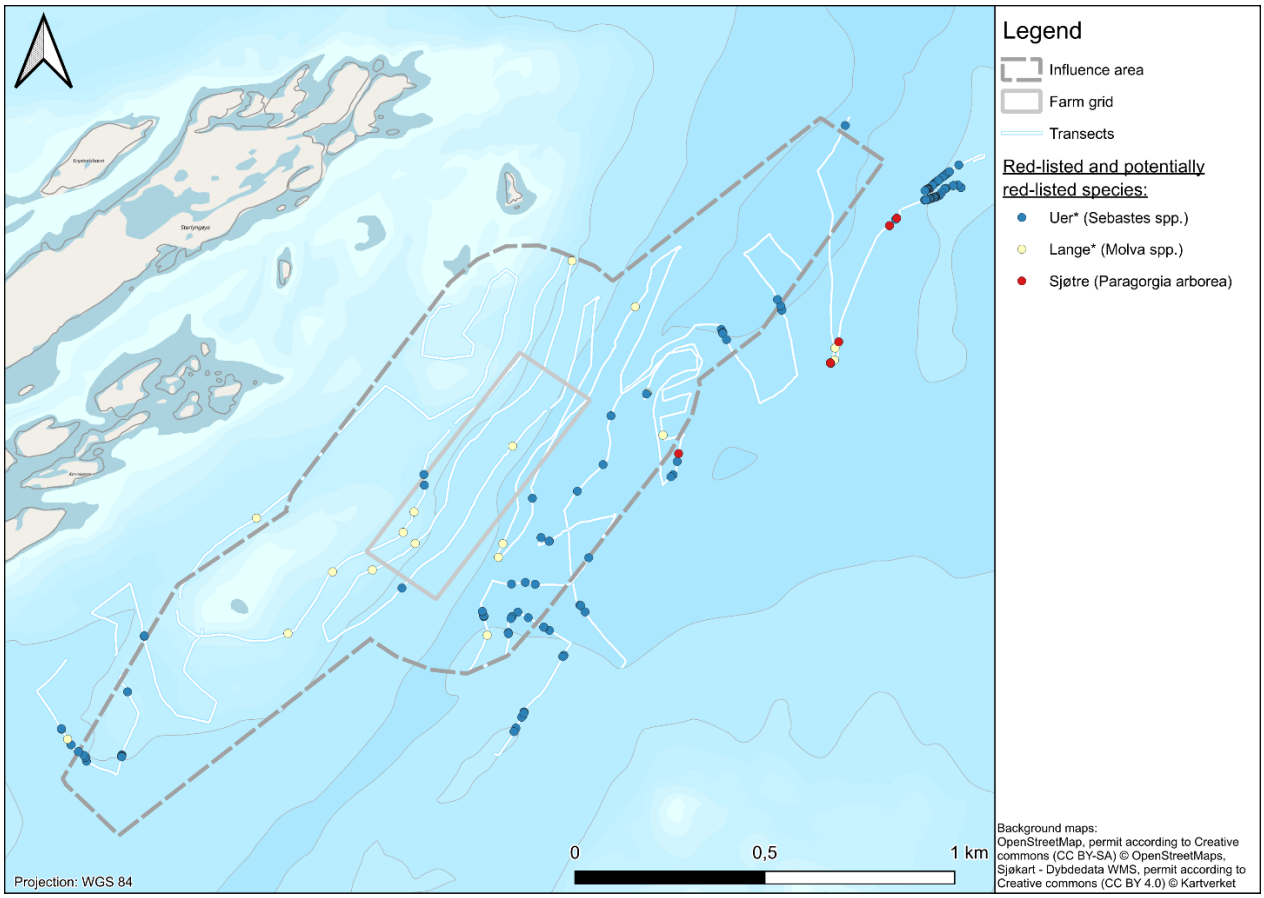

Figure 8. Map of the influence area (dashed grey polygon) and the farm grid (within the solid grey line), with all transects marked in white/light blue. Red-listed and potentially red-listed species are presented as points according to the legend.



Figure 9. Images of the red-listed and potentially red-listed species observed, where the image on the left shows sjøtre (*Paragorgia arborea*), the middle image shows uer (*Sebastes* spp.), and the image on the right shows lange (*Molva* spp.).

3.3 Other observations

The influence area of Seiongultaren was diverse in substrate type, topography, and species diversity. A mix of hard and soft bottoms were described, along a seabed which followed a mix of sloped terrain with some interruptions from small seamounts, rock walls, and a ridgeline. The variation in seabed types and topographic features can explain the level of biodiversity across the area.

The most common faunal group observed on hard bottoms were demosponges, including *Geodia* spp., *Phakellia* spp., and *Axinella* spp. (e.g., *Geodia barretti* (LC), *Phakellia ventilabrum* (LC) and *Axinella infundibuliformis* (LC)). Across soft bottoms, sjøpiggsvin (*Echinoidea* spp.) dominated the shallower seabed, followed by liten piperenser (*Virgularia mirabilis* (LC)) in deeper waters.

Within these groups there were occasions of less frequent species including other sponges like *Polymastia boletiformis* (LC), *Craniella zetlandica* (LC), *Mycale lingua* and *Stryphnus fortis* (LC) covered in *Hexadella dedritifera* (LC). Some aggregations of species were identified, ranging from larger mobile fauna such as the potentially red-listed uer (*Sebastes norvegicus*) seen over sponge grounds (Figure 10), to small sessile species like the hydroid nodding sea fir (*Corymorpha nutans*) seen in coarse sediment. Many other teleost species were observed across the influence area, ranging from the common torsk (Gadus morhua (LC)), and flyndrefisk species like rødspette (*Pleuronectes platessa* (LC)), to the rarer occasions of large kveite (*Hippoglossus hippoglossus* (LC)) (Figure 10), breiflabb (*Lophius piscatorius* (LC)) and gråsteinbit (*Anarhichas lupus* (LC)). Havmus (*Chimaera monstrosa* (LC)) were common in deeper soft bottom areas.

A range of burrowing crustaceans was frequently observed on soft bottoms, including trollhummer (*Galatheoidea* spp.) and sjøkreps (*Nephrops norvegicus* (LC)), together with occasional burrowing anemones such as fyrverkerianemone (*Pachycerianthus multiplicatus*) (Figure 10). Other crustaceans were observed on hard substrates, including taskekrabbe (*Cancer pagurus*) (LC) and an unidentified crab (family Lithodidae), possibly trollkrabbe (*Lithodes maja*) (LC). Some bivalves were also identified, including kamskjell species (Pectinidae); however, these did not occur at sufficiently high densities to be considered a scallop bed. In areas outside the influence area where gorgonian corals were observed, associated fauna were also recorded, including medusahoder (*Gorgonocephalus caputmedusae*) (LC) on large sjøbusk (*Paramuricea placomus*) (LC).

Floral species diversity was relatively low, with many shallow sections containing large amounts of dead maerl (*Lithothamniaceae* spp.) and accumulations of dead kelp (*Laminaria* and *Saccharina*). However, some areas with live sukkertare (*Saccharina latissima*) (LC) were observed on bedrock in shallow areas. These did not meet the threshold requirements to be considered kelp forest and were often found in areas with many sjøpiggsvin (*Echinoidea*).

A few anthropogenic objects were identified, including ropes, pipelines or cables, an unidentified metal object (likely a piece of machinery) and some glass bottles.



Figure 10. Figure 10. Examples of fauna observations not associated with mapped nature types. Left: uer (*Sebastes* spp.); middle: kveite (*Hippoglossus hippoglossus*); right: fyrverkerianemone (*Pachycerianthus multiplicatus*).

4. Conclusion and Assessment

In total, 17,2 km of video transects were recorded and analysed, mapping 0,054 km² of seabed within the influence area, equivalent to 4,3 % of the area.

The mapped area consisted of a shallow sandy plateau in the west and a moderately sloping seabed towards deeper areas in the east. Substrates were generally dominated by sand or gravel, while stones, boulders and smaller rocks occurred mainly along slopes and transition zones between the shallower western area and the deeper, more exposed eastern area.

A total of 10 693 observations were annotated during the video analysis, of which the vast majority were of various algae (5 222 observations) and sponges (4 723 observations).

One nature type was identified within the influence area: *svampskog*, corresponding to *Noe beskyttet dyp svampskog på fastbunn i atlantisk vann* (red-list status: LC, Least Concern). The identified nature type is not red-listed as threatened, and no sponge assemblages of exceptional rarity, composition or regional significance were recorded. All sponge taxa identified to species level were classified as either LC or NE, with only one species classified as NE. Consequently, no red-listed sponge species were recorded, meaning that neither the nature type itself nor the sponge species comprising it are considered threatened under the Norwegian red-list framework.In total, 34 areas with svampskog were observed, covering 2 766 m², corresponding to 5,1 % of the mapped area within the influence area. Six of these areas were located beneath the farm grid. On average, sponge density within the areas with svampskog was 0,76 observations/m², with a maximum recorded density of 1,37 observations/m².

Svampskog observations were primarily comprised of demosponges within genera such as *Phakellia* and *Geodia*. The recorded densities and species composition do not indicate an unusual or particularly distinctive sponge community. Similar sponge-dominated habitats are regularly associated with hard-bottom substrates in exposed coastal environments, and the occurrences documented here are considered locally and regionally representative.

No red-listed species were observed within the mapped area. However, two taxa (*Molva* spp. and *Sebastes* spp.) were observed, for which species-level identification could not be confirmed, and it could therefore not be ruled out whether these observations belonged to red-listed species.

Aside from the observations mentioned above, no additional occurrences of vulnerable nature types or red-listed species were recorded within the influence area of Seiongultaren.

5. References

Artsdatabanken. 2025. *Sammendrag av ekspertkomiteenes vurderinger - Norsk rødliste for naturtyper 2025*.

Artsdatabanken (2025. Norsk rødliste for naturtyper 2025. Hentet 16.07.2026 fra https://lister.artsdatabanken.no/naturtyper/2025

Artsdatabanken. 2021. *Norsk rødliste for arter 2021.* https://artsdatabanken.no/lister/rodlisteforarter/2021/ [2026-06-22]

Artskart. 2026. *Species map search: Red-listed observations between the years 2015-2026.* https://artskart.artsdatabanken.no/#map/471131,7450781/10/background/greyMap/filter/%7B%22IncludeSubTaxonIds%22%3Atrue%2C%22Categories%22%3A%5B14%2C13%2C12%2C11%5D%2C%22Found%22%3A%5B2%5D%2C%22CenterPoints%22%3Atrue%2C%22BoundingBox%22%3A%22POLYGON%20((454174.65585683193%207442392.799399871%2C488088.12460683193%207442392.799399871%2C488088.12460683193%207459169.705649871%2C454174.65585683193%207459169.705649871%2C454174.65585683193%207442392.799399871))%22%2C%22Style%22%3A1%2C%22YearFrom%22%3A2015%7D [2026-07-09]

Aqua Kompetance 2025. *Vannstrømmåling ved Seiongultaren, Lurøy, kommune, september 2024 – januar 2025*. AQUA KOMPETANSE AS, Rapportnr: 3569-1-25S SEIONGULTAREN

Fiskeridirektoratet og Miljødirektoratet. 2022. *Kartleggingsmetodikk for sårbar natur ved søknad om akvakultur i sjø.*

Frigstad, H., Gundersen, H., Andersen, G. S., Borgersen, G., Kvile, K. Ø., Krause-Jensen, D., Boström, C., Bekkby, T., Anglès d'Auriac, M., Ruus, A., Thormar, J., Asdal, K. & Hancke, K. 2021. *Blue Carbon–climate adaptation, CO2 uptake and sequestration of carbon in Nordic blue forests: Results from the Nordic Blue Carbon Project*. Nordic Council of Ministers.

JNCC. 2014. *Defining Annex I biogenic Modiolus modiolus reef habitat under the Habitats Directive: Report of an inter-agency workshop.* JNCC Report No. 531.

Kutti, T. & Husa, V. 2021. *Forslag til metode for kartlegging av sårbare arter og naturtyper på dypt vann til søknader om akvakultur i sjø.* Rapport fra Havforskningen 2021-39 22.10.2021, ISSN:1893-4536, s. 55.

Kutti, T. & Husa, V. 2022. *Forslag til metode for kartlegging av sårbare arter og naturtyper på grunt vann (0-50 meters dyp) til søknad om akvakultur i sjø.* Rapport fra Havforskningen 2022-9 31.03.2022, ISSN: 1893-4536, s. 34.

MAREANO. 2023. *Sårbare biotoper*. https://www.MAREANO.no/tema/bunnhabitater/sarbare-biotoper [2025-01-15]

Norderhaug, K., Gonzalez-Mirelis, G., Gulliksen, B., Haugland, B.T., Ross, R.E., Tandberg, A.H. og Trannum, H. (26.11.2025). Marint: Vurdering av Litt beskyttet til litt eksponert afotisk fastbunn i atlantisk vann, dominert av svamper. Norsk rødliste for naturtyper 2025. Artsdatabanken. https://lister.artsdatabanken.no/naturtyper/2025/1059

Norwegian Government. 2025*. Forskrift om endring i forskrift 13. mai 2011 nr. 512 om utvalgte naturtyper etter naturmangfoldloven.*

NS-EN 16260:2012. 2012. *Water quality — Visual seabed surveys using remotely operated and/or towed observation gear for collection of environmental data*. https://online.standard.no/nb/ns-en-16260-2012

OSPAR. 2023. *List of Threatened and/or Declining Species & Habitats*. https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats [2025-01-05]

Appendix 1. Tables of red-listed nature types and species

Table 1. Overview of the relevant, red-listed nature types listed by both the Norwegian Fiskeridirektoratet og Miljødirektoratet (2022), as well as the Norwegian Red List of Nature types (Artsdatabanken, 2025), grouped by type of biota. When relevant, the NiN code ("Nature i Norge") and red-listing levels is presented to each nature type.

	Nature types (According to Fiskeridirektoratet og Miljødirektoratet 2022)	Red-listed nature types (According to Norsk rødliste for naturtyper 2025)	"Natur i Norge"-code	Red-list status
Algae	Stortareskog	*Moderat eksponert stortareskog i Nordsjøen*	MA02-M020-02	**NT**
		Moderat eksponert stortareskog i Norskehavet og Barentshavet sør	MA02-M020-02	**NT**
	Sukkertareskog	*Moderat eksponert sukkertareskog i Skagerrak*	MA02-M020-02	**EN**
		Moderat eksponert sukkertareskog i Norskehavet og Barentshavet sør	MA02-M020-02	**EN**
	Fingertarebunn	*Moderat eksponert fingertareskog i Nordsjøen*	MA02-M020-02	**NT**
		Moderat eksponert fingertareskog i Norskehavet og Barentshavet sør	MA02-M020-02	**VU**
	Ruglbunn	*Grunn ruglbunn*	MA05-M020-01	**NT**
	Kransalgebunn	-	-	-
Vascular plants	Ålegrasseng/ålegras	-	-	-
	Dvergålegrasbunn	-	-	-
	Brakkvanns-/undervannseng	*Undervannseng i ekstrembrakt vann i Skagerrak*	MF01-M020-02	**VU**
Mixed	Bløtbunnsområder i strandsonen	-	-	-
Bivalves	Eksponert blåskjellbunn	-	-	-
	O-skjellbunn	-	-	-
	Europeisk flatøstersbunn	-	-	-
	Kamskjellforekomster	-	-	-
Cnidarians	Hardbunnskorallskog	*Eksponert dyp hornkorallskog på fastbunn i kystvann*	MA03-M020-02	**NT**
		Noe beskyttet dyp hornkorallskog på fastbunn i atlantisk vann	MA03-M020-02	**NT**
	Bløtbunns-korallskogbunn	*Dyp hornkorallskog på mudderbunn i atlantisk vann*	MA06-M020-04	**EN**
		Dyp hornkorallskog på mudderbunn i intermediært vann	MA06-M020-06	**EN**
	Korallrev	*Kysttilknyttet korallrev-bunn*	MB03-M020-01	**NT**
	Sjøfjærbunn	*Dyp sjøfjærskog på mudderbunn i intermediært vann*	MA06-M020-06	**NT**
Sponges	Svampskog	*Dyp svampskog på mudderbunn i atlantisk vann*	MA06-M020-04	**NT**
		Dyp svampskog på sedimentbunn i atlantisk vann	MA06-M020-03	**NT**
		Noe beskyttet dyp svampskog på fastbunn i dyphavsvann	MA03-M020-08	**EN**

Table 2. List of red-listed species according to the Norwegian Red List (2021) which are searched for during the survey, grouped taxonomically. Species marked with • are considered likely to be identifiable in underwater video footage collected with CORAX.

Common name		Scientific name	Red-list status	AphiaID
Cnidarians		*Anthelia fallax*	NT	125346
	• Large-polyped deep-sea soft coral (Eng)	*Anthomastus grandiflorus*	NT	125335
	Greater flowerbud coral (Eng)	*Anthothela grandiflora*	NT	125414
	• Augekorall	*Desmophyllum pertusum*	NT	1245747
	• Bambuskorall	*Isidella lofotensis*	NT	125374
	• Sjøtre	*Paragorgia arborea*	NT	125418
	• Grisehalekorall	*Radicipes gracilis*	VU	125357
	• Northern sea fan coral (Eng)	*Callistephanus pallida*	VU	1608729
Hydrozoans		*Pliobothrus symmetricus*	NT	117962
		Stylaster gemmascens	NT	117965
	Pink branching hydrocoral (Eng)	*Stylaster norvegicus*	NT	117968
Boney fish	• Europeisk ål	*Anguilla anguilla*	EN	126281
	Polartorsk	*Boreogadus saida*	EN	126433
	Stillehavssild	*Clupea pallasii*	EN	151159
	Alaskatorsk	*Gadus chalcogrammus*	NT	300735
	Blålange	*Molva dypterygia*	EN	126459
	Laks	*Salmo salar*	NT	127186
	Vanlig uer	*Sebastes norvegicus*	EN	151324
Sharks and skates	• Brugde	*Cetorhinus maximus*	EN	105837
	Storskate	*Dipturus intermedius*	CR	711846
	Svartskate	*Dipturus nidarosiensis*	VU	105871
	• Håbrann	*Lamna nasus*	VU	105841
	• Nebbskate	*Leucoraja fullonica*	CR	105874
	• Håkjerring	*Somniosus microcephalus*	NT	105919
	• Pigghå	*Squalus acanthias*	VU	105923
Lampreys	• Arktisk niøye	*Lethenteron camtschaticum*	VU	101173
	• Havsniøye	*Petromyzon marinus*	NT	101174
Arthropods	• Europeisk hummer	*Homarus gammarus*	VU	107253

Appendix 2. Description of the analysed transects

Below follows a description of different areas of transects, grouped according to their geology and placement within the influence area (Figure 11).

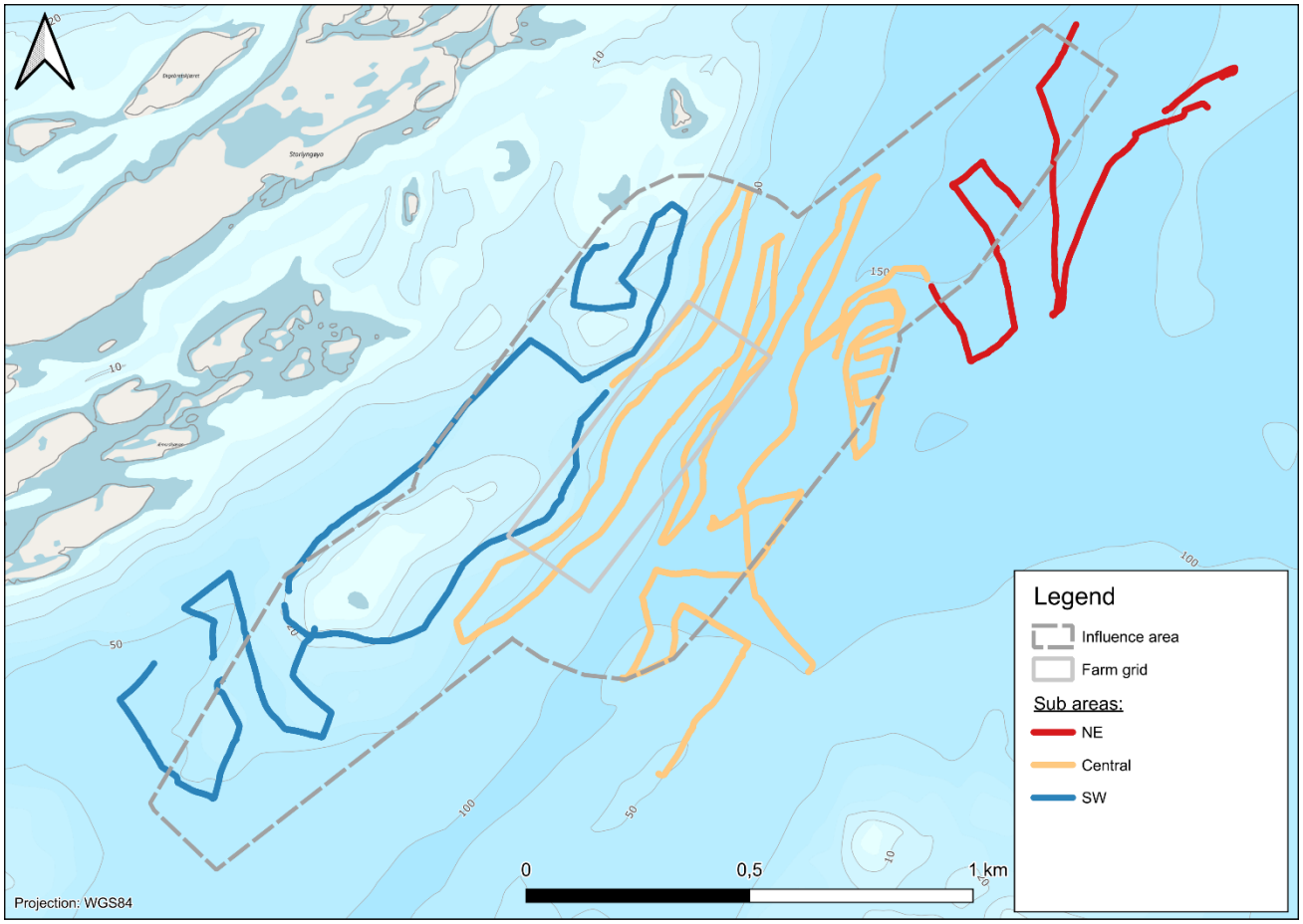

Figure 11. Map showing the location of video transects and their geological sub areas within the influence area (dashed grey line) and the farm grid (solid grey box).

Area descriptions

North-east (NE)

The north-eastern subarea is the deepest and most exposed subarea within the mapped area, with an average depth of 101,2 meters. The seabed was dominated by stones, boulders and smaller rocks, although small sections of sand or gravel were also observed. The majority of this subarea was located outside of the influence area.

This subarea was dominated primarily by demosponges, including *Geodia* spp. and *Phakellia* spp., which formed aggregations with densities ranging from 0,56 to 1,73 individuals/m^2. Schools of uer (*Sebastes* spp.) were present in proximity to the sponge grounds, together with some sjøtre (*P. arborea*) which were all located outside of the influence area. In addition, monospecific sea-pen bottoms formed by liten piperenser (*V. mirabilis*)

dominated the small sandy section of the north-eastern subarea. These sjøfjærbunn, which were located outside the influence area, had densities of 0,26 and 0,31 individuals/m^2.

Central

The transects comprising the central subarea covered the largest depth range, from 24,4 to 159,3 meters. The seabed was dominated by stones and boulders, although small sections of sand or gravel were also observed.

The central subarea was also dominated by demosponges, with sponge grounds showing densities ranging from 0,50 to 1,13 individuals/m^2. Fan-shaped sponges appeared to dominate, with *Axinella* spp. (some likely *Axinella infundibuliformis*) being more common in the shallower areas, while *Phakellia* spp. dominated in deeper areas, where *Geodia* spp. and some sjøbusk (*P. placomus*) were also present (sjøbusk was found outside of the influence area). In the sandy sections, some liten piperenser (*V. mirabilis*) and *Pachycerianthus multiplicatus* were observed.

South-west (SW)

The south-western subarea is a shallow inner subarea, with an average depth of 32,02 meters. The seabed was composed mainly of sand or gravel, although small sections of stones, boulders and smaller rocks were also present. In addition, some areas had a rough-textured bottom, possibly consisting of dead maerl, as well as numerous dead bivalve shells.

This area was dominated by sea urchins, particularly Svabergsjøpiggsvin (*Echinus esculentus*), which were especially common among sukkertare (*Saccharina latissima*) shoots in the shallowest sections. In deeper sections, fan-shaped demosponges, including *Axinella* spp. (some likely *Axinella infundibuliformis*) and *Phakellia* spp., together with liten piperenser (*V. mirabilis*), were the dominant taxa.

Appendix 3. Coral observations

Common name	Scientific name	Red-list status	Observations within influence area	Total observations
Sjøtre	*Paragorgia arborea*	**NT**	0	8
Sjøbusk	*Paramuricea placomus*	**LC**	0	3
Total:	2 taxa		0 observations	11 observations

Appendix 4. Personal resumé

Johnny Berglund
Pelagia Nature & Environment AB
Quality control, Project manager



Johnny Berglund holds a PhD in marine ecology from Umeå University. In addition to his research work, he has worked for almost 20 years on marine issues from an authority perspective, primarily linked to the protection and management of aquatic environments as well as environmental monitoring and marine planning. During his years at the County Administrative Board of Västerbotten, he has been a central figure in marine nature management and for several years has been engaged by the Swedish Marine and Water Management Agency and the SLU Swedish Species Information Centre for his expert knowledge.

Johanna Nadmyr
Pelagia Nature & Environment AB
Video annotations, Data analysis, Report writing, Quality control



Johanna holds a Master's degree in Marine Biology from Stockholm University and has an academic background in marine ecology, with focus on ecosystem dynamics and environmental effects. She has since built a career as an environmental consultant, working within a wide range of coastal- and offshore projects in both Sweden and Norway. Her work has included seafloor mapping, benthic fauna taxonomy, ecological assessments, and extensive data and GIS analysis. Johanna has been involved in numerous projects related to the environmental impacts of fish farms and is experienced in writing reports for both regulatory and project-based needs. In addition, she brings valuable field expertise, both from her diving and her years working in the field, conducting various marine surveys.

Thalia Eccleston
Pelagia Nature & Environment AB
Video annotations, Report writing



Thalia has a Master's degree in Marine Vertebrate Ecology and Conservation from the University of Exeter, gaining important skills in marine ecology, fisheries science, data analysis, and academic writing. Her previous role as a Research Assistant at the Marine Centre Wales (Bangor University) involved collecting data on bycatch in net fisheries as a part of a wider fisheries management programme with Welsh government and working on image analysis of benthic habitats to assess the status of Modiolus reefs around Wales.

Raquel Pereira
Pelagia Nature & Environment AB
Video annotations, Data analysis



Raquel Pereira holds a PhD in Systematic Biology from Uppsala University and is a specialist in sponge taxonomy. Her scientific background includes deep-sea habitat characterization, species identification, and the integration of morphological and genetic datasets to solve systematic and taxonomic issues. She has more than a decade of experience identifying benthic fauna from the Northeast Atlantic, which includes the use of ROV imagery. Since January 2025, she has been conducting benthic species and Nature-types identification based on underwater videos from the Norwegian marine areas, supported by additional skills in GIS. She also brings practical field competence as an experienced diver and seaman.

Jessica Bouron
Pelagia Nature & Environment AB
Video annotations



Jessica studied for her bachelor's degree in Marine Biology at the University of Exeter. She has worked at Pelagia since 2023, gaining experience with picking marine benthic fauna samples in the aquatic lab, working in the field, and more recently analysing underwater videos from Norway. Alongside work, she has been studying for a Masters in GIS from Lund University, through which she is developing valuable skills in using GIS software, spatial data analysis and academic writing.

Kelsey Archer Barnhill
Aspecto AS
Quality Control



Kelsey holds a PhD in deep-sea ecology from the University of Edinburgh and has an academic background in cold-water coral ecosystems and other benthic habitats. She has extensive experience from offshore research, including more than 100 days at sea, working with ROV/AUV data collection, seafloor mapping, habitat classification, and visualization of marine environments. Kelsey specializes in benthic ecosystems, particularly cold-water corals, and has contributed to international conservation efforts such as the global IUCN Red List assessment of cold-water corals. She has also been involved in several major deep-sea research expeditions, coordinating scientific activities and data collection. In recent years, Kelsey has increasingly worked at the interface between science and management, translating marine research into policy and regulatory recommendations.

Kristin Galtung
Aspecto AS
Transect planning and Quality Control



Kristin Galtung holds a Master's degree in Marine Ecology from The Arctic University of Norway, with a specialization in pollution and ecotoxicology. She has two years of experience working at the Norwegian Institute for Water Research (NIVA) as a research assistant, contributing to national and international projects on plastic pollution. Her work included developing monitoring programs and surveys, as well as conducting fieldwork and laboratory analyses, including participation in EU-funded projects. She also has one years' experience in planning survey transects and conducting seabed mapping using AUVs.